



FACTORY AUTOMATION

STANDARD

PHOTOELECTRIC SENSORS



With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the "Elektrotechnik und Elektroindustrie (ZVEI) e.V. including the supplementary clause: „Erweiterter Eigentumsvorbehalt“.

We at Pepperl+Fuchs recognise a duty to make a contribution to the future,
For this reason, this printed matter is produced on paper bleached without the use of chlorine.

2000 Purchase of Visolux

2000 Purchase of Elcon Italy

1998 Intelligent opto-sensors

1998 IS Remote Process Interface Zone 1

1995 Rotary encoders

1996 Remote Process Interface Zone 2

1994 AS-Interface

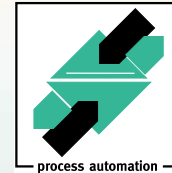
1995 HART Multiplexer

1993 Microwave ID system

1993 Level control



1991 Division into business areas
Factory Automation and
Process Automation



1990 K-system

1990 Inductive ID system

1986 Opto-sensors

1984 Ultrasonic sensors

1968 Ex isolating switch amplifier

1958 First inductive proximity switch worldwide

1945 Founding year

EXISTENCE

Signals in the world of automation

During the more than 50 successful years of company history, it has always been possible to blaze new trails with innovative products.

Our central challenge is to intensify the necessary growth through future innovations as well and, whenever it makes sense, to support them through acquisitions.

ONE COMPANY, TWO DIVISIONS

FACTORY AUTOMATION

Factory Automation Division

Product areas

- Binary and analogue sensors
- in various technologies
 - Inductive and capacitive sensors
 - Magnetic sensors
 - Ultrasonic sensors
 - Photoelectric sensors
- Incremental and absolute value rotary encoders
- Counters and secondary switching devices
- Identification systems
- AS-Interface

Branches and partners

- Mechanical engineering
- Printing and paper
- Conveyor and transport systems
- Packaging and beverage machines
- Automobile industry



PROCESS AUTOMATION



Process Automation Division

Product areas

- Signal conditioners
- Intrinsically safe interface components
- Remote process interface
- Intrinsically safe field bus solutions
- Level control sensors
- Process measuring and control systems engineering at the interface level
- Ex-protection training

Branches and partners

- Chemistry
- Industrial and community wastewater systems
- Oil, gas and petro-chemicals
- PLC and process control systems
- Engineering companies for process systems

A worldwide presence

A worldwide sales and service organisation that provides consultation through competent and reliable employees, making it possible for you to reach us whenever and wherever you need us. There are more than 30 Pepperl+Fuchs companies throughout the world. You can find the current worldwide address information on our Web pages or in the Pepperl+Fuchs brochure, which you can request by e-mail.

PRESENT



IN HARMONY - THE PEPPERL+FUCHS TRIANGLE



Central office for America

- Founding year 1983
- More than 220 employees
- R&D, production, sales



Main headquarters of the company group

- Founding year 1945
- More than 1000 employees
- R&D, production, sales



Central office for Asia and Australia

- Founding year 1979
- More than 600 employees
- R&D, production, sales

Concentration and distribution - distributed unity

Know-how, professional expertise and highly motivated employees can be found everywhere in the world. It would be inefficient not to use this potential. As an integral part of making economical use of all available resources, we have concentrated precisely defined

assignment areas in Centers of Expertise. These are responsible not only for worldwide control and ongoing development, but also for ensuring that all relevant information is equally available at all locations.

Germany/Tuttlingen



Germany/Berlin



Italy



Hungary



You too can take advantage of the experience and innovation of Pepperl+Fuchs GmbH. We hope to help you do just that with this "Standard Photoelectric Sensors" catalogue.

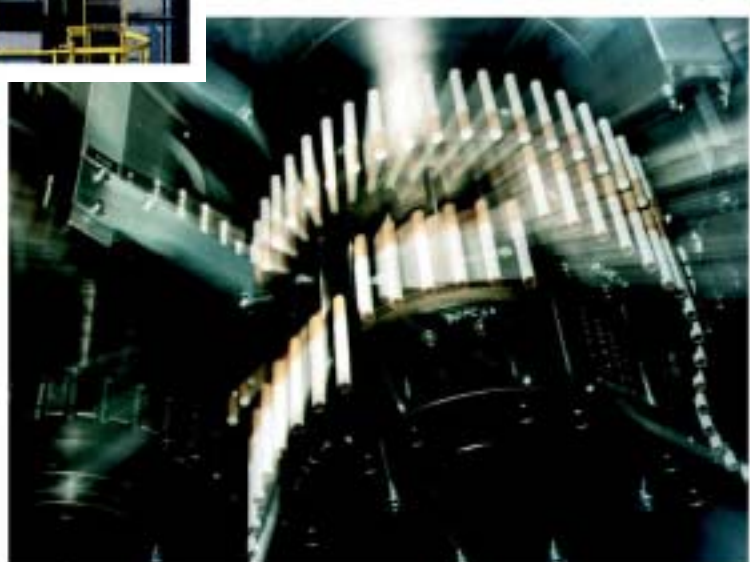
Additional catalogues from Pepperl+Fuchs' factory automation division describe:

- Photoelectric safety sensors
- Special photoelectric sensors
- Inductive, capacitive and magnetic sensors
- Rotary encoders, speedometers and switching devices
- Ultrasonic sensors
- Sensor systems
 - AS-Interface
 - Identification systems
- Coupling devices.

Standard photoelectric sensors

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Series 24	302
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Series 27	438
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Worldwide presence of a strong product brand

Visolux – a synonym for photoelectric competence

Modern automation technology affects our lives more and more every day. The effects range from industrial manufacturing and processing to our daily life, for example when doors in stores, supermarkets and in public transportation open as if by themselves.

A prerequisite for almost all automation solutions - in addition to the achievements of micro-electronics - is a sensor system with a sufficient level of performance, although the sensors work in the background, theirs is effectively the key role. It is the sensors that continuously supply the control system with current information about process states and events. Without these important components, most automation solutions would be inconceivable.



While automation in the private sector generally serves purpose of comfort and convenience, use of automation in the industrial setting to operate machines and systems brings simple financial rewards. The cost of routine process and monitoring tasks can be reduced to a bare minimum, making it possible to save money on operating costs - which is indispensable today.

Market leader expands range of products

The Visolux brand name stands for all photoelectric sensors within the Pepperl+Fuchs factory automation division, including door, gate and elevator sensors, as well as sensors used in numerous safety applications. During the 50-year history of our company, we have developed into one of the most respected manufacturers of sensors with a worldwide presence. During this time, the company has often played a pioneering role in technology.

Responsible for products, solutions and questions throughout the photoelectric sector, the Visolux division now fits seamlessly into the Pepperl+Fuchs tradition and the company philosophy: To develop innovative and high-quality, economical automation solutions that will allow our customers to create decisive advantages in global competition. At the same time, the photoelectric competence center is able to take advantage of the worldwide sales network and the worldwide production sites of the globally optimised parent company with branch offices in all the important industrial regions of Europe.



Foreword

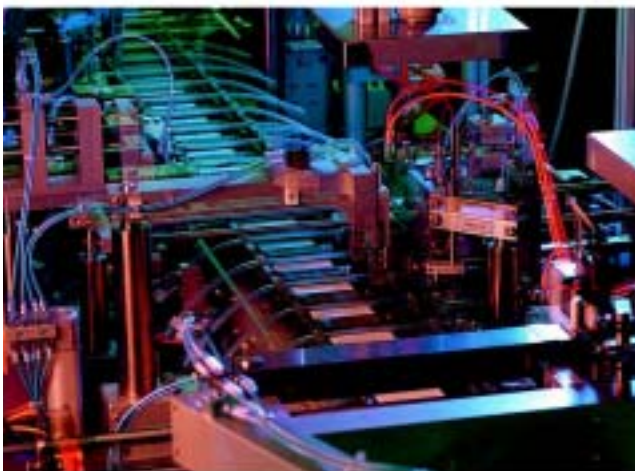
Photoelectric components with central significance

Photoelectric sensors take on central significance today in the context of recording or monitoring objects without contact. They are used everywhere when there is a need to position, classify or count. The applications range from the automobile industry, mechanical engineering and assembly automation through storage and conveyor systems and packaging machines to the printing and paper industry, not to mention monitoring and safety systems.



A comprehensive range of products

A wide range of products allows Pepperl+Fuchs/Visolux to play a role as a complete provider and market leader with an accordingly highly developed range of end products. This makes it possible to fine-tune the solutions of the photoelectric specialist optimally to individual situations.



The range of solutions includes standard light beam switches available in a wide variety of models, light

scanners, colour sensors, systems that work with laser light and data transfer photoelectric sensors, 1-image processing systems, distance measuring devices and safety optical barriers. These last solutions above make it possible to create contact-free protective equipment.



For applications in which single-beam optical recording is not sufficient, a wide range of light grids is available. They are used for profile monitoring of pallets, monitoring of elevator doors or to check for paper tears on printing machines and much more.



Finally, data transmission light beam switches use wireless data transmissions based on light beamed at linearly moving vehicles to ensure that machine down time because of broken towing cables or communication errors caused by impact forces during loop contact is a thing of the past.



The special device catalog offers comprehensive information in quick overview format for the business area of doors, gates and elevators, etc., in addition to sensors for safety applications.



Do you need customer-specific solutions?

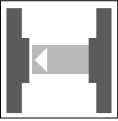
If there is no suitable sensor in the Visolux product selection, or if there are special problems that cannot be solved with standard products off the shelf, the Pepperl+Fuchs/Visolux development team would be happy to take on the task. The photoelectric specialist has already proven its flexibility and eagerness to provide solutions in numerous customer-specific solutions.

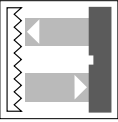


Possibilities range from modifying the model and shape of devices to adding additional functions, or even working in close cooperation with the customer to develop innovative ideas for solutions.

Overview

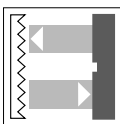
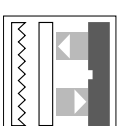
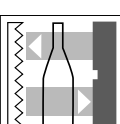
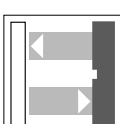
Selection tables based on detection range

Functional principle	Type	Maximum detection range	Start on page
Single path light beam switches 	KS9/KSE9	375 mm	656
	KS11/KSE11	375 mm	656
	KS10/KSE10	1500 mm	656
	M4.1/MV4.1	5000 mm	30
	M15/MV15	10 m	132
	M40/MV40	10 m	150
	G12/GV12	5700 mm	708
	OBE5000-18GM70	6400 mm	708
	L21/LV21/LK21	16 m	226
	E18/EV18	18 m	708
	M11/MV11	22 m	52
	M13/MV13	22 m	94
	VS/VSE18	30 m	708
	L39/LK39/LV39	30 m	544
	L24/LV24/LK24	45 m	302
	L25/LV25/LK25	45 m	384
L32/LV32	45 m	526	
L27/LV27	50 m	438	

Functional principle	Type	Maximum detection range	Start on page
Reflex light beam switches with or without polarisation filter 	ML4.1-54-F	1000 mm	30
	MLV40-54	2000 mm	150
	GLV12-54	1500 mm	708
	MLV15-54	3000 mm	132
	OBS1500-18GM70	2000 mm	708
	MLV15-6	4000 mm	132
	MLV40-6	4000 mm	150
	GLV12-6	2500 mm	708
	VL18-54	4000 mm	708
	OJ3000-M1K-E01	6000 mm	576
	OCS3000-M1A-B3	6000 mm	576
	OBS3000-18GM70	4500 mm	708
	RL(F/K)21-54	8000 mm	226
	RLF22-54	8000 mm	226
	RL30-54	7000 mm	526
	RL32-54	15 m	526
	RL(K)91-54	7000 mm	558
	VL18-6	6000 mm	708
	RL(K)39-55	9000 mm	544
	MLV11-54	9000 mm	52
	MLV13-54	7000 mm	94
	RL(K)21-6	8000 mm	226
	RL(K)24-54	16 m	302
	RL(K)91-6	7000 mm	558
	OBS6000-L2-E0-V1	9000 mm	576

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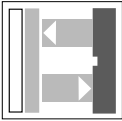
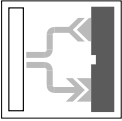
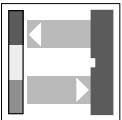
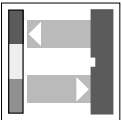
Selection tables based on detection range, continued

Functional principle	Type	Maximum detection range	Start on page
Continuation Reflex light beam switches with or without polarisation filter 	RL(K)25	14 m	384
	RL(K)24-55	16 m	302
	RL32-55	15 m	526
	OJ10000+U1+E123	15 m	576
	OCS10M+U1A+B3	15 m	576
	RL(K)27-55	18 m	438
	RL(K)28-55	16 m	464
Reflex light beam switches with foreground suppression 	RL28-55-V	12 m	464
	RL32-55-V	14 m	526
Reflex light beam switches for clear glass detection 	MLV40-54-G	1400 mm	150
	MLV11-54-G	4000 mm	52
	RLF22-54-G	5000 mm	226
	RL27-54-G	9000 mm	438
Reflection light scanners 	KT9	60 mm	656
	KT11	70 mm	656
	KT10	80 mm	656
	GLV12-8	200 mm	708
	OBT200-18GM70	200 mm	708
	MLV15-8	300 mm	132
	ML4.1-8	400 mm	30
	MLV13-8	400 mm	94
	OBT400-L2-E0-V1	400 mm	576
	VT18	400 mm	708
	MLV11-8	500 mm	52
	MLV40-8	500 mm	150
	OJ500-M1K-E01	500 mm	576
	OCT500-M1A-B3	500 mm	576
	RL(F/K)21-8	800 mm	226
	RL32-8	800 mm	526
	RL(K)39-8	800 mm	544
	RL27-8	1500 mm	438
	RL(K)24-8	2000 mm	302
	RL(K)25-8	2000 mm	384
OJ2000+U1+E123	2000 mm	576	
OCT2000+U1A+B3	2000 mm	576	
GLV30-8	2500 mm	708	


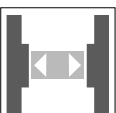
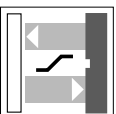

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Overview

Selection tables based on detection range, continued

Functional principle	Type	Maximum detection range	Start on page
Reflection light scanners with background suppression 	KT10-H	8 mm	656
	ML4.1-8-H	80 mm	30
	RL(K)21-8-H	80 mm	226
	OCH100-18GM70	100 mm	708
	VT18-H	120 mm	708
	MLV11-8-H	150 mm	52
	MLV40-8-H	150 mm	150
	RL(K)24-8-H	150 mm	302
	OCH150-M1K-E01	150 mm	576
	GLV30-8-H	150 mm	708
	OBH200-L2-E4-V1	200 mm	576
	RL25-8-H	300 mm	384
	RL27-8-H	500 mm	438
	RL39-8-H	500 mm	544
	RL30-8-H	800 mm	526
	RL32-8-H	800 mm	526
RL(K)23-8-H	3000 mm	264	
RL28-8-H	2000 mm	464	
Fibre optics photoelectric sensors 	SU15	600 mm	614
	OBT200L-18GM70	600 mm	708
	MLV11-LL	600 mm	52
	GLV30-LL	420 mm	708
	MLV40-LL	200 mm	150
	SU14	250 mm	614
	RL5-LL	1,5 mm	886
Print mark scanners 	DK10	9,5 mm	886
	DK21	25 mm	886
	DK20	25 mm	886
	RL-UV4	28 mm	886
	RL-UV3	130 mm	886
	RL5-LL	1,5 mm	886
Colour sensors 	DF20	25 mm	922
	VCS110	80 mm	922

Selection tables based on detection range, continued

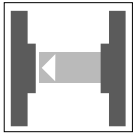
Functional principle	Type	Maximum detection range	Start on page
Light grids 	PRS	60 mm	934
	ELG-E(S)	125 mm	934
	LG	1500 mm	934
	PR	1500 mm	934
	PLVscan	6000 mm	934
Data transmission 	DAD10-8P	5000 mm	974
	DAD30	150 m	974
	LS230	450 m	974
	LS600	270 m	974
Distance measuring devices 	EDM3,5	3500 mm	1012
	EDM5	5000 mm	1012
	EDM20	20 m	1012
Model lines	Type	Maximum detection range	Start on page
Ex devices/NAMUR 	OJ200-M1K-E23-Ex	200 mm (with fibre optics for direct detection)	848
	OCT300-M1K-N2	300 mm	848
	MLV11-8-Ex	500 mm	848
	RL36-8-Ex	2000 mm	848
	OCS2000-M1K-N2	4000 mm	848
	MLV11-54-Ex	4500 mm	848
	RL36-55-Ex	11.5 m	848
	M11-Ex/MV11-Ex	15 m	848
	L36-Ex/LV36-Ex	45 m	848

Overview

An overview of basic functional principles

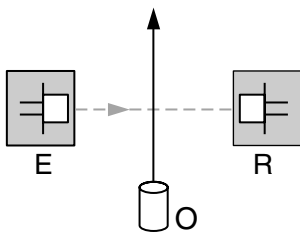
The type, size, shape and surface characteristics of the objects to be recorded, the distance between the sensor and the object, and the environmental conditions determine the design of the system and the selection of suitable sensor types.

1. Single path light beam switches



The emitter and receiver of the single path light beam switch are housed in different cases that are separated from each other. The emitter (E) transmits directly to the receiver (R). If an object

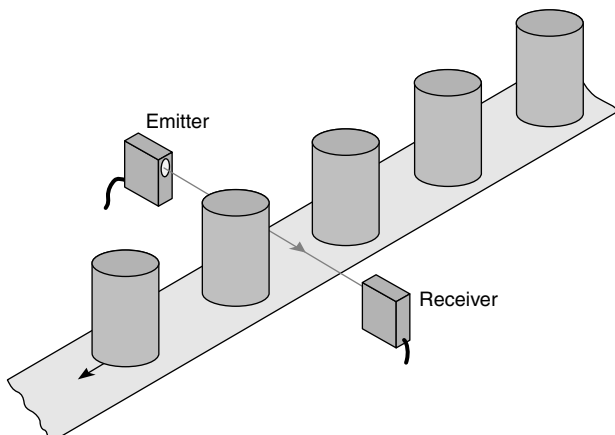
(O) interrupts the light beam, the receiver voltage drops and the switching function is initiated.



Characteristics:

- Detects opaque and reflecting objects.
- Large operating range and high stability control, since the light beam only covers the signal path once.
- Not significantly affected by interference, and therefore suitable for application in difficult conditions, for example applications outside of buildings or in dirty environments.
- Additional installation expense, since both units need to be mounted and wired.

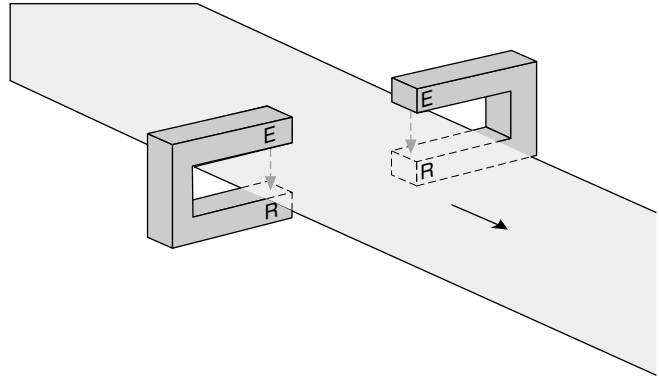
Typically, single path light beam switches are used to monitor production and packaging lines (see fig.) to measure full state in transparent containers or as a safety measure for doors and hazardous areas. The last-named area of application is a domain of single path systems.



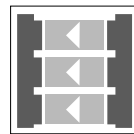
Special versions of single path light beam switches

Fork type light beam switches

If there is only a small distance in space to cover - a few millimeters or centimeters - the two can be arranged in a u-shaped housing one next to the other. Fork type light beam switches (see figure) have the advantage in comparison to normal single path light beam switches of a simpler electrical installation, since cabling is only required for one device. In addition, there is no need to adjust the optical axis.

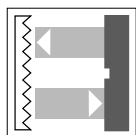


Light grids

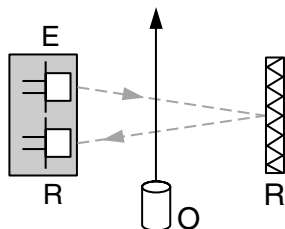


Especially in safety applications, the task at hand often involves monitoring a large surface. The easiest way to achieve this is by arranging a number of through-beam sensors parallel to each other. In a light grid of this type, all emitters are combined together in a single housing. This also applies to all receivers whose switch outputs are logically connected. This reduces the time and expense required for installation in comparison to a corresponding number of single path light beam switches. The distances between the individual beams of the grid can be selected specifically for the application.

2. Reflex light beam switches

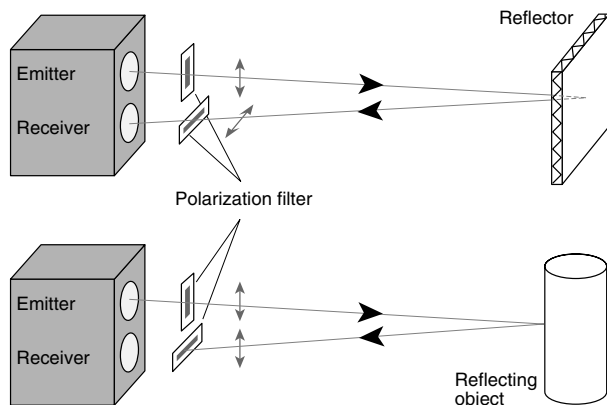


The reflex light beam switch contains the emitter and receiver in a single housing. The light from the transmitter is beamed back from a reflector to the receiver. If the beam of light is interrupted, the switching function is initiated.



Reflex light beam switches with polarisation filter

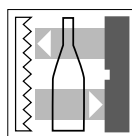
The problem that typically arises for reflection systems, that glossy and reflective objects cannot be reliably detected, can be eliminated by using a polarisation filter. To do this, a linear polarising filter is placed in front of the emitter and receiver of the light barrier. The polarisation planes of the filter are perpendicular to each other (see fig.). These filters determine two polarisation planes offset to each other by 90°. In this manner, only light beams from the triple reflector reach the receiver, since the reflector modifies the polarisation plane of the light in such a manner that it can pass through the filter in front of the receiver unhindered.



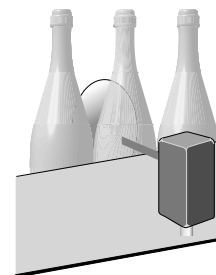
Characteristics:

- Detects opaque objects even with glossy and reflective surfaces.
- It is also possible to detect clear glass with special sensors (G-version).
- Minimal time and expense for installation since the electrical connection is only necessary on the light beam switches side.

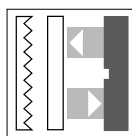
Reflex light beam switches for clear glass detection



Reflex light beam switches with reduced stability control are used for the special application of clear glass detection. This results in increased switching sensitivity with only minor absorption through the glass.

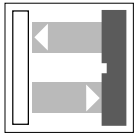


Reflex light beam switches with foreground suppression

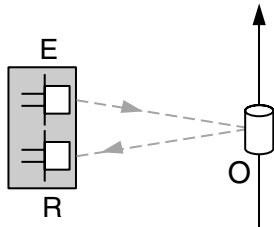


These light beam switches ignore all signals from reflectors and high-gloss reflective objects that are closer to the sensor than the adjusted minimum detection range.

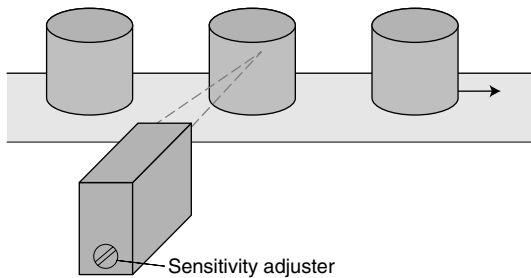
3. Reflection light scanners



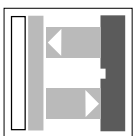
The structure of the reflection light scanner is based on the same principle as a reflex light beam switch. It does not have a reflector, however. Instead, the light reflected from the recorded object is evaluated by the receiver.



Due to the diffuse reflection (re-emission) through the object, the detection range of the light sensor is reduced in comparison to the reflex light beam switch. This is referred to as the detection range. The detection range means the maximum distance from the emitter at which an object can still be reliably detected.



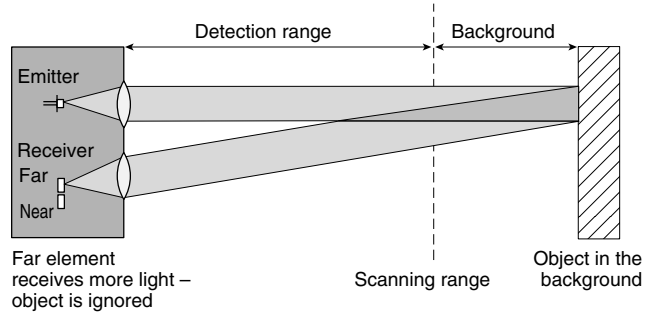
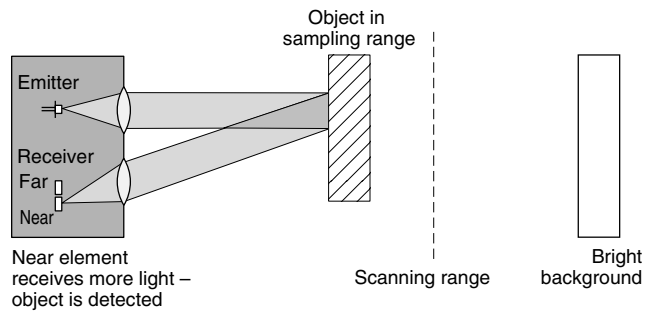
Reflection light scanners with background suppression



Reflection light scanners with background suppression were developed to achieve a defined detection range with any objects - independent of its brightness, colour or other properties such as

the brightness of the background. The figure below illustrates the functional principle of a reflection light scanner with background suppression. The light emitted by the emitter falls on the object, focused by the optics. If the object is located within the detection range, a portion of the reflected light, focused by the receiver lens, is directed on the near element (N) of the receiver and the sensor emits the signal "turned on".

As the distance from the object increases, this light spot moves in the direction of the far element (F). At the detection range limit, half of the light spot is on the near element and half is on the far element, and the sensor signals "off". As the object recedes further in the distance, the light falls only on the far element and the sensor continues to signal "off".



Characteristics:

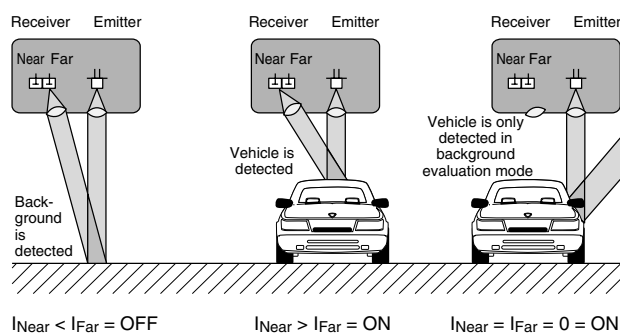
- A nearly constant detection range on diffusely reflecting materials with sharply differing re-emission levels.
- Dark objects in front of a bright background are reliably recorded.
- Not sensitive to interfering reflections of objects outside the adjusted detection range.
- High stability control
- Inexpensive installation since the sensor consists of only one unit and no reflector is required.

The principle of foreground suppression is similar to background suppression. Light scanners of this type ignore all objects that are located closer to the sensor than a previously adjusted minimum detection range.

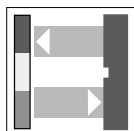
Reflection light scanner with background analysis

In addition to background suppression, a principle that is to a certain extent the opposite one is used for specific applications, namely foreground evaluation. While the first procedure ignores the background and is concerned only with objects within the detection range, the other evaluates only the light reflected from the background; not the object, but rather the background is the reference (see fig.). If an object interrupts the light path to the background, the sensor switches regardless of whether the reflected light has reached the receiver again, thus signalling or not signalling an object detected in front of the background - for example with reflecting objects.

Sensors that evaluate the background have no blind area and are more especially suitable for recording difficult objects, especially those that are highly reflective. In addition, in contrast to systems with background suppression, they can be tested and can be designed to be self-monitoring.



Special versions of the direct detection light scanners



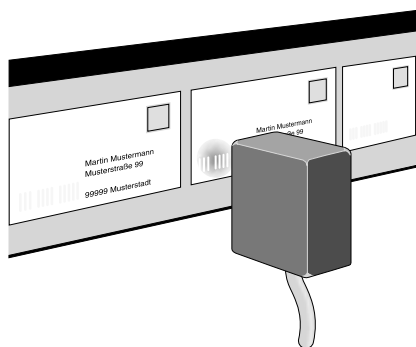
The typical feature of the standard direct detection light scanner, responding sensitively to the surface characteristics of the sensor material, is put to use with print mark sensors and colour sensors.

Print mark scanners or contrast sensors

This sensor type evaluates differences in brightness between a material and the markings made on it. The colour of the transmitted light or the colour of the print marks must be selected in such a manner as to result in the greatest possible contrast. The sensor is designed based on the auto-collimation principle, i.e., the emitter and receiver are located on a common optical axis (a one-eyed system).

Luminescence sensors

A variant of the print mark sensor, the luminescence sensor works with modulated ultra-violet light. Suitable materials (luminophores) that are excited to photoluminescence by the radiated light are placed on the sensor material. These marking materials include optical brighteners in white paper, but they are also components in certain kinds of chalk, paint, oils, greases and text marks.



The light radiated from the luminophores to the receiver has a longer wave length than that which is radiated from the emitter; it falls within the visible spectral range. Because of the modulation and the precisely defined frequency offset between the transmitted and received light, luminescence sensors are barely affected at all by sources of interference light and thus function especially reliably.

Colour sensors

While a standard print mark sensor evaluates only differences in brightness within a specific range of the spectrum determined by the light colour of the sensor, the colour sensor breaks up the light re-emitted from the object into several portions of the spectrum and returns an intensity value for each of these sub-spectra. The distribution of this value reflects the spectral properties - and thus the colour - of the sensor material.

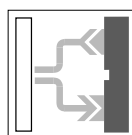
Visolux colour sensors work according to the three-range procedure. A distinction is made here between the active and passive three-range procedure.

- Active three-range procedure:

The sensor material is beamed sequentially with three transmitter colours (red, green and blue). The quantity of light reflected is measured individually for each colour. The three colours that are obtained in this manner are used to unambiguously determine the colour of the sensor object.
- Passive three-range procedure

The sensor material is beamed with white transmitted light. The light source may be a white LED, for example. After this the red, green and blue portions of the reflected light are filtered out and the light quantity is determined for each one. Three receivers are used for this process. In this manner, the colour of the sensor object is determined.

4. Fibre optics systems



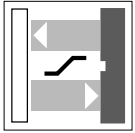
The optical properties of an optical barrier correspond, depending on the design, to those of a single path light beam switch or to those of a direct detection light scanner.

Single path systems have one fibre optic each for emitter and receiver. For reflection systems, the light is guided in a single fibre optics through separate emitter and receiver fibres.

The emitter and receiver are arranged together in a single housing. The optically active area is guided via flexible fibre optics made of glass or plastic optical fibre from the device to the sampling station. Due to their small optically active surfaces, fibre optics systems are also suitable for detecting small details in near applications. Special fibre optics with coaxial or mixed fibre arrangement and small fibre diameters (plastic optical fibre: several 100 µm, glass fibres: typically, 50 µm).

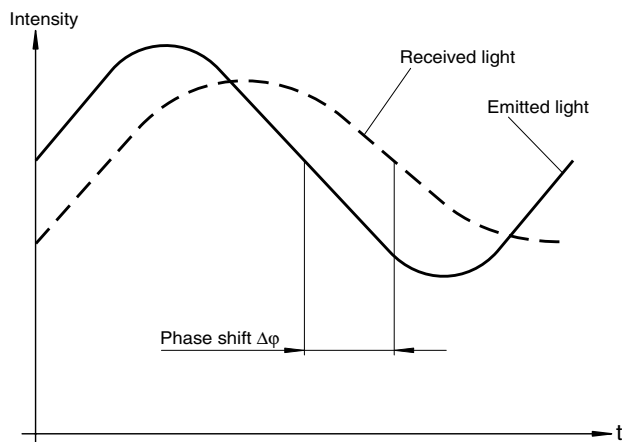
Because of the large angle of divergence at the light exit of the fibre optics (about 70°), the detection and sensor ranges for fibre optics are generally shorter than with standard light beam switches or light scanners. This can be increased if necessary with suitable optical attachments.

5. Distance measuring devices



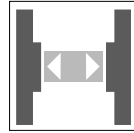
The time required for a beam of light to cover the route emitter - object - receiver - is a measure of the distance to the object. A method of indirectly determining distance is the procedure referred to as "phase correlation". The distance is determined by means of the phase shift $\Delta\phi$ between the emitted and reflected intensity modulated light.

The emitter generates sinusoidal intensity modulated steady light with a modulation of the order of magnitude of several MHz. The light reflected on the reflector or on the object reaches the receiver with the phase shift $\Delta\phi$ (see fig.). The phase comparator connected downstream in the circuit returns an output signal proportional to the distance.



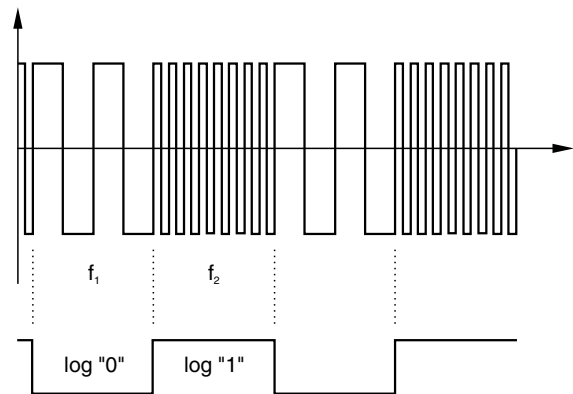
Different measurement ranges can be implemented depending on the reflector that is used. Thus we cover a measurement range up to 5 m for diffusely reflecting objects and up to 20 m for retro-reflectors with our devices in the EDM series.

6. Data transmission light beam switches



Data transmission light beam switches are used to transmit information from a point A to another point B without the use of cables. Typically, one of the two optical data couplers can be moved in the axial direction. The FSK procedure (frequency shift keying) is used for transmission over the optical route. In other words, the bit information is coded in the carrier frequency.

The receiver now filters frequencies f_1 and f_2 from the received signal by means of switches designed with very narrow bands and converts them into a bit sequence. This prevents interference from superimposed signals (for example light flashes from fluorescent lamps) that would cause the transmitted information to be incorrect. In addition, this procedure has very low sensitivity to a fluctuating signal level (amplitude).



Our product selection includes data transmission light beam switches for parallel devices and for serial data transmission.

- Parallel data transfer:

A data transmission light beam switch can transfer 8 bits bidirectionally. To do this, the signals in the device are converted into a serial bit sequence. The data is then applied to the parallel outputs in the receiver. FSK modulation, which is noise-resistant, is used to transfer the binary signals.

- Serial data transfer:

Our serial data transmission light beam switches also use the FSK procedure. The data that is available at the interface is transferred without the use of a protocol and is then exported again at the serial interface.

Many devices with a serial interface are also available in a version with a red transmitter light. These devices are always used when the structure must consist of parallel transfer routes and the possibility of mutual influence with the adjacent infrared route must be excluded.

7. Light grids for clear glass detection

The devices of the PR and LG series are high-resolution light curtains used to detect very small non-position guided objects.

Using special low-noise receiver stages and an ingenious evaluation algorithm, it is possible to reliably detect even highly transparent objects with a high level of stability control.

Crossed beam evaluation:

Each transmitter has a line of sight to each receiver. This results in very high resolution for the sensor.

Automatic calibration:

After the power supply is turned on (model number - W), or alternatively after calibration input has been externally activated (model number -F), the sensor calibrates itself automatically. Each individual emitter-receiver route is calibrated separately in this process.

Example PR16:

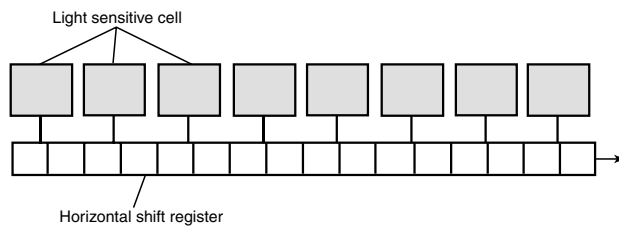
16 transmitters, 16 receivers with crossed beam evaluation, 256 light beams are internally calibrated and evaluated separately. In addition, the switching limit of the individual transmitter-receiver routes is subject to continuous control during operation within a certain bandwidth. This means that at certain time intervals, the sensor compares the value that has been saved with the level of reception that is actually being measured at that moment.

If these two values should differ over the course of time (because of slight smudges or minor misadjustment) the emitter threshold of each individual light path is redetermined. This makes it possible to ensure that highly transparent objects will always be detected, even in harsh industrial conditions.

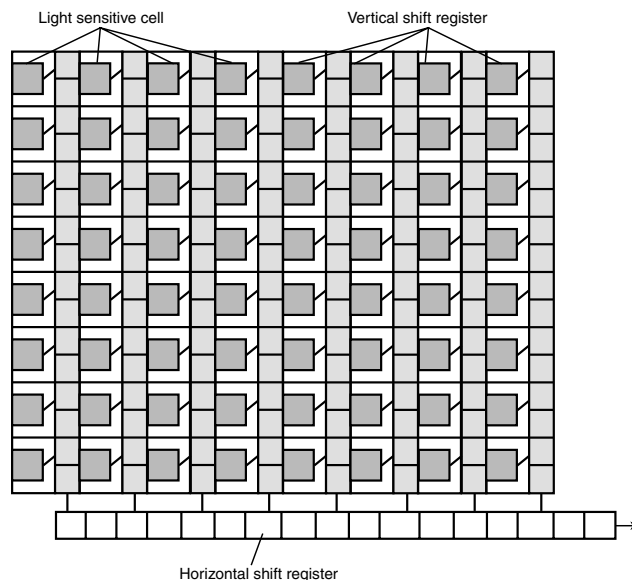
8. Image processing

All VISOLUX image processing devices use a CCD element as the light receiver. These consist of a grid of precisely arranged light-sensitive cells. When light hits a cell, a charge is built up in this cell. The more light hits the cell, or the longer it hits the cell, the greater the charge that is collected in this cell. The information is represented by the number of charges in the cell. A shift register is used to read the information.

CCD elements may be roughly distinguished as line and matrix elements. For line sensors, the light-sensitive elements are all arranged in a line. Sensors of this type are capable of making one-dimensional evaluations without additional measures.



Matrix elements contain a flat arrangement of light-sensitive cells.



Sensors of this type allow for two-dimensional evaluation.









Depending on whether a black-and-white or colour camera is being used, these sensors can be used for various applications.

A significant component of each image processing system is the necessary signal evaluation. Of particular interest here are systems containing the complete evaluation that require no additional computer. Because of the completely integrated intelligence, such systems can be used as binary sensors.

The purpose of our solutions is always to offer you a system that is custom-designed to meet a specific task. Time-consuming tasks of setting parameters or programming are reduced to a minimum.

Overview









Selection table based on model line

Photo	Model line	Device design	Functional principle											Threshold detection range		
			Through-beam sensor	Reflex light beam switch	Reflex light beam switch with polarisation filter	Reflex light beam switch with foreground suppression	Reflex light beam switch for clear glass detection	Direct detection light scanner	Direct detection light scanner with background suppression	Fibre optics light beam switch	Colour sensors	Contrast button	Luminescence button		Light grid	
	Series ML4.1	M4.1/MV4.1	●													5000 mm
		ML4.1-54-F			●											1000 mm
		ML4.1-8						●								400 mm
		ML4.1-8-H							●							80 mm
	Series MLV15	M15/MV15	●													10 m
		MLV15-6		●												4000 mm
		MLV15-54			●											3000 mm
		MLV15-8						●								300 mm
	Series MLV13	M13/MV13	●													22 m
		MLV13-54			●											7000 mm
		MLV13-8						●								400 mm
	Series MLV11	M11/MV11	●													22 m
		MLV11-54			●		●									9000 mm
		MLV11-8						●								500 mm
		MLV11-8-H							●							150 mm
		MLV11-LL								●						600 mm
	Series MLV40	M40/MV40	●													10 m
		MLV40-6		●												4000 mm
		MLV40-54			●											2000 mm
		MLV40-54-G					●									1400 mm
		MLV40-8						●								500 mm
		MLV40-8-H							●							150 mm
		MLV40-LL								●						200 mm
	Series 39	L39/LV39/LK39	●													30 m
		RL(K)39-55			●											9000 mm
		RL(K)39-8						●								800 mm
		RL39-8-H							●							500 mm
	Series 25	L25/LV25/LK25	●													45 m
		RL(K)25			●											14 m
		RL(K)25-8						●								2000 mm
		RL25-8-H							●							300 mm
	Series 32	L32/LV32	●													45 m
		RL32-54			●											7000 mm
		RL32-55			●	●										15 m
		RL32-8						●								800 mm
		RL32-8-H							●							800 mm

Light type						Operating voltage		Signal output						Maximum switching frequency	Connection			Housing		Additional functions					Start on page					
Red light	Infrared	Laser	Red, Blue, Green	Green	Ultraviolet	White light/halogen	DC	AC/DC	via AS-Interface	PNP	NPN	Common mode	Push-pull		Relay	2-wire/NAMUR	AS-Interface	Insulation penetration method	Connector	Terminal compartment	Cable	Plastic	Metal	Output of the pre-fault indication		Test input	Sensitivity adjustment	Detection width adjustment	Timer functions	TEACH-IN
●							●						●				500 Hz	●			●		●						30	
●							●						●				500 Hz	●			●		●							
●							●						●				500 Hz	●			●									
●							●						●				500 Hz	●			●		●							
	●						●			●			●				500 Hz	●			●		●					●		132
	●						●			●			●				1 kHz	●			●		●					●		
	●						●			●			●				1 kHz	●			●		●					●		
	●						●			●			●				1 kHz	●			●		●					●		
●							●			●	●						500 Hz	●		●	●				●					94
●							●			●	●						500 Hz	●		●	●				●					
●							●			●	●						500 Hz	●		●	●				●					
●							●						●				1 kHz	●			●		●	●	●	●	●	●	●	52
●							●		●				●		●		1 kHz	●			●		●	●	●	●	●	●	●	
●							●						●		●		1 kHz	●			●		●	●	●	●	●	●	●	
●							●						●		●		1 kHz	●			●		●	●	●	●	●	●	●	
	●						●					●	●				100 Hz	●		●	●									150
	●						●					●	●				500 Hz	●		●	●									
●							●					●	●				500 Hz	●		●	●		●							
●							●					●	●				500 Hz	●		●	●									
	●						●					●	●				500 Hz	●		●	●									
	●						●					●	●				70 Hz	●		●	●						●			
	●						●					●	●				100 Hz	●		●	●					●				
	●						●	●		●	●			●			300 Hz	●	●		●		●							544
●							●	●	●	●	●			●			300 Hz	●	●		●		●				●			
	●						●	●	●	●	●			●			100/300 Hz	●	●		●		●				●			
	●						●		●	●							200 Hz	●	●		●		●				●			
●							●	●	●			●	●	●	●		25/100/250 Hz	●	●		●		●	●	●					384
●							●	●	●			●	●	●	●		25/100/250 Hz	●	●		●		●	●	●					
	●						●	●	●			●	●	●	●		25/100/250 Hz	●	●		●		●	●	●					
	●						●					●	●				50 Hz	●	●		●		●	●		●				
●							●						●				150 Hz	●			●		●							526
●							●						●				250 Hz	●			●									
●							●						●				250 Hz	●			●									
	●						●						●				250 Hz	●			●									
	●						●						●				250 Hz	●			●									

Overview

Selection table based on model line, continued

Photo	Model line	Device design	Functional principle											Threshold detection range		
			Through-beam sensor	Reflex light beam switch	Reflex light beam switch with polarisation filter	Reflex light beam switch with foreground suppression	Reflex light beam switch for clear glass detection	Direct detection light scanner	Direct detection light scanner with background suppression	Fibre optics light beam switch	Colour sensors	Contrast button	Luminescence button		Light grid	
	Series 27	L27/LV27	●													50 m
		RL(K)27-54-G					●									9000 mm
		RL(K)27-55			●											18 m
		RL27-8						●								1500 mm
		RL27-8-H							●							500 mm
	Series 91	RL(K)91-6		●												9000 mm
		RL(K)91-54			●											7000 mm
	Series 21	L21/LV21/LK21	●													16 m
		RL(K)21-6		●												10 m
		RL(F/K)21-54			●											8000 mm
		RL(F/K)21-8						●								800 mm
		RL(K)21-8-H							●							80 mm
	Series 22	RLF22-54			●											8000 mm
		RLF22-54-G					●									8000 mm
	Series 28	RL(K)28-55			●											16 m
		RL28-55-V				●										12 m
		RL28-8-H							●							2000 mm
	Series 23	RL(K)23								●						3000 mm
		RL(F/K)23-8-H								●						3000 mm
	Series 24	L24/LV24/LK24	●													45 m
		RL(K)24-54			●											10 m
		RL(K)24-55			●											16 m
		RL(K)24-8						●								2000 mm
		RL(K)24-8-H								●						150 mm
	Series VariKont L®	OBS6000-L2-E0-V1			●											9000 mm
		OBT400-L2-E0-V1						●								400 mm
		OBH200-L2-E4-V1							●							200 mm
	Series VariKont M®	OJ3000-M1K-E01		●												6000 mm
		OCS3000-M1A-B3			●											6000 mm
		OCH150-M1K-E01							●							150 mm
		OJ500-M1K-E01							●							500 mm
		OCT500-M1A-B3							●							500 mm









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Light type						Operating voltage		Signal output						Maximum switching frequency	Connection			Housing		Additional functions					Start on page					
Red light	Infrared	Laser	Red, Blue, Green	Green	Ultraviolet	White light/halogen	DC	AC/DC	via AS-Interface	PNP	NPN	Common mode	Push-pull		Relay	2-wire/NAMUR	AS-Interface	Insulation penetration method	Connector	Terminal compartment	Cable	Plastic	Metal	Output of the pre-fault indication		Test input	Sensitivity adjustment	Detection width adjustment	Timer functions	TEACH-IN
●							●						●				1 kHz	●			●		●	●	●		●	●		438
●							●						●				1 kHz	●			●		●	●	●		●	●		
●							●			●	●						1 kHz	●			●		●	●	●		●	●		
●							●						●				1 kHz	●			●		●	●	●		●	●		
●							●			●							1 kHz	●			●		●	●	●		●	●		
	●						●	●				●		●			25 Hz	●		●	●									558
●							●	●				●		●			25 Hz	●		●	●									
	●						●	●				●		●			25/35 Hz		●		●			●						226
	●						●	●				●		●			25/50 Hz		●		●		●							
●							●	●				●	●	●			25/35 Hz	●	●		●		●							
	●						●	●				●	●	●			25/35 Hz	●	●		●			●						
	●						●	●				●	●	●			25/35 Hz	●	●		●			●						
●							●						●				35 Hz	●			●									226
●							●						●				35 Hz	●			●									
●							●	●				●	●	●			35 Hz/1 kHz	●	●	●	●		●	●	●		●			464
●							●			●	●	●	●				1 kHz	●		●	●		●	●	●					
●	●						●			●	●	●	●				250 Hz	●		●	●					●				
	●						●		●			●	●		●		70 Hz	●			●			●			●			264
●	●						●	●		●		●	●	●	●		70 Hz	●	●		●					●	●			
●							●	●				●	●	●			25/700 Hz	●	●		●		●	●						302
●							●	●				●	●	●			12/25/1000 Hz	●	●		●		●	●						
●							●	●				●	●	●			12/25/1000 Hz	●	●		●		●	●						
●							●	●				●	●	●			25/250 Hz	●	●		●		●	●						
●							●	●				●	●	●			25/250 Hz	●	●		●		●	●						
●							●			●	●						200 Hz	●			●									576
●							●			●	●						200 Hz	●			●									
●							●			●	●						100 Hz	●			●									
●							●			●	●						0.2/1.5 kHz		●		●		●							576
●							●		●						●		0.2/1.5 kHz	●	●		●		●							
	●						●			●	●						0.2/1.5 kHz		●		●		●							
	●						●			●	●						0.2/1.5 kHz	●	●		●		●							
	●						●		●						●		0.2/1.5 kHz	●	●		●		●							

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Overview

Selection table based on model line, continued








Photo	Model line	Device design	Functional principle											Threshold detection range		
			Through-beam sensor	Reflex light beam switch	Reflex light beam switch with polarisation filter	Reflex light beam switch with foreground suppression	Reflex light beam switch for clear glass detection	Direct detection light scanner	Direct detection light scanner with background suppression	Fibre optics light beam switch	Colour sensor	Contrast button	Luminescence button		Light grid	
	Fibre optics light beam switches	SU14			●						●					250 mm
		SU15		●							●					600 mm
	Series KT10 and Signal converters	KS10/KSE10	●													1500 mm
		KT10						●								80 mm
		KT10-H								●						8 mm
		SU10														
		SU11														
	Series KT9	KS9/KSE9	●													375 mm
		KT9							●							60 mm
	Series KT11	KS11/KSE11	●													375 mm
		KT11							●							70 mm
	Series GLV12	G12/GV12	●													5700 mm
		GLV12-6		●												2500 mm
		GLV12-54			●											1500 mm
		GLV12-8							●							200 mm
	Series 18GM	OBE5000-18GM70	●													6400 mm
		OBS1500-18GM70			●											2000 mm
		OBS3000-18GM70		●												4500 mm
		OBT200-18GK70							●							200 mm
		OCH100-18GM70								●						100 mm
		OBT200L-18GM70									●					600 mm
	Series VL18	VS/VSE18	●													30 m
		VL18-6		●												6000 mm
		VL18-54			●											4000 mm
		VT18							●							400 mm
		VT18-H								●						120 mm
		E18/EV18	●													18 m
	Series GLV30	GLV30-8							●							2500 mm
		GLV30-8-H								●						150 mm
		GLV30-LL									●					420 mm

Light type							Operating voltage		Signal output						Maximum switching frequency	Connection			Housing		Additional functions					Start on page				
Red light	Infrared	Laser	Red, Blue, Green	Green	Ultraviolet	White light/halogen	DC	AC/DC via AS-Interface	PNP	NPN	Common mode	Push-pull	Relay	2-wire/NAMUR		AS-Interface	Insulation penetration method	Connector	Terminal compartment	Cable	Plastic	Metal	Output of the pre-fault indication	Test input	Sensitivity adjustment		Detection width adjustment	Timer functions	TEACH-IN	
●	●						●		●	●						1 kHz	●			●		●		●		●				614
●							●					●				1.5 kHz	●		●	●		●					●			
	●																		●		●								656	
	●																		●		●									
							●				●					70 Hz		●		●										
							●		●	●	●					70 Hz	●		●		●	●								
	●						●		●	●						250 Hz	●		●		●			●						656
	●						●		●	●						250 Hz	●		●		●									
	●						●		●	●						250 Hz	●		●		●			●						656
	●						●		●	●						250 Hz	●		●		●									
●							●		●	●						500 Hz	●		●		●				●					708
●							●		●	●						700 Hz	●		●		●				●					
●							●		●	●						700 Hz	●		●		●				●					
●							●		●	●						700 Hz	●		●		●				●					
	●						●		●	●						300 Hz	●		●		●									708
●							●		●	●						300 Hz	●		●		●									
	●						●		●	●						300 Hz	●		●		●									
	●						●		●	●						300 Hz	●		●		●									
	●						●					●				1 kHz	●				●									
	●						●		●	●						300 Hz	●		●		●									
●	●						●		●							500 Hz	●		●	●	●			●						708
	●						●		●							500 Hz	●		●	●										
●							●		●							500 Hz	●				●									
	●						●		●							500 Hz	●		●		●									
	●						●		●							500 Hz	●				●									
	●						●		●							1 kHz	●				●		●	●						
	●						●					●				35 Hz	●			●										708
	●						●					●				35 Hz	●			●										
	●						●		●							80 Hz	●			●										

Fibre optics devices
Series KT
Sensors in threaded housing

Overview

Selection table based on model line, continued

Photo	Model line	Device design	Functional principle											Threshold detection range			
			Through-beam sensor	Reflex light beam switch	Reflex light beam switch with polarisation filter	Reflex light beam switch with foreground suppression	Reflex light beam switch for clear glass detection	Direct detection light scanner	Direct detection light scanner with background suppression	Fibre optics light beam switch	Colour sensor	Contrast button	Luminescence button		Light grid		
	Ex-Devices/NAMUR	M11-Ex/MV11-Ex	●													15 m	
		MLV11-54-Ex			●												4500 mm
		MLV11-8-Ex						●									500 mm
		L36-Ex/LV36-Ex	●														45 m
		RL36-55-Ex			●												11.5 m
		RL36-8-Ex						●									2000 mm
		OCS2000-M1K-N2			●												4000 mm
		OCT300-M1K-N2							●								300 mm
		OJ200-M1K-E23-Ex									●						200 mm
	Series DK	DK10/DK10-LAS										●				9.5/300 mm	
		DK20										●				25 mm	
		DK21											●			25 mm	
		RL-UV												●		130 mm	
		RL5-LL								●		●				1.5 mm	
	Colour sensors	VCS110										●				80 mm	
		DF20										●				25 mm	
	Light grids	ELG												●		125 mm	
		LG												●		1500 mm	
		PR												●		1500 mm	
		PRS												●		60 mm	
		PLVscan												●		11000 mm	
	Data transmission light beam switches	DAD10-8P	●													5000 mm	
		DAD30	●													150 m	
		LS230	●													450 m	
		LS600	●													270 m	
	Distance measuring devices	EDM		●					●							20 m	
	Power packs	PS1															
		VS-GA															

Light type							Operating voltage		Signal output						Maximum switching frequency	Connection				Housing		Additional functions						Start on page			
Red light	Infrared	Laser	Red, Blue, Green	Green	Ultraviolet	White light/halogen	DC	AC/DC	via AS-Interface	PNP	NPN	Common mode	Push-pull	Relay		2-wire/NAMUR	AS-Interface	Insulation penetration method	Connector	Terminal compartment	Cable	Plastic	Metal	Output of the pre-fault indication	Test input	Sensitivity adjustment	Detection width adjustment		Timer functions	TEACH-IN	
●							●								●		100 Hz	●				●			●					848	
●							●								●		100 Hz	●				●			●						
	●						●								●		100 Hz	●				●			●						
●							●								●		100 Hz	●				●			●						
●							●								●		100 Hz	●				●			●						
	●						●								●		100 Hz	●				●			●						
	●						●								●		100 Hz	●				●			●						
	●						●								●		100 Hz	●				●			●						
							●								●		0.2/1.5 kHz	●				●			●			●			
							●								●		16.5 kHz	●				●			●			●			886
							●								●		16.5 kHz	●				●			●			●			
							●								●		16.5 kHz	●				●			●			●			
							●								●		90 Hz	●				●			●			●			
							●								●		5 kHz	●				●			●			●			
							●								●		40 Hz	●				●			●			●			922
							●								●		1.65 kHz	●				●			●			●			
							●								●		350 Hz	●				●			●			●			934
							●								●		12/ 25 Hz	●				●			●			●			
							●								●		6/25/100 Hz	●				●			●			●			
							●								●		5/10 Hz	●				●			●			●			
							●								●		40 Hz	●				●			●			●			
							●								●		232 kHz	●				●			●			●			974
							●								●		83/118 kHz	●				●			●			●			
							●								●		83/118 kHz	●				●			●			●			
							●								●		8.5/13.5 MHz	●				●			●			●			
							●								●		50 Hz	●				●			●			●			1012
							●								●		20 Hz	●				●			●			●			1026
							●								●		25 Hz	●				●			●			●			

Ex-Devices/ NAMUR
Print Mark Scanners
Colour Sensors
Light Grids
Data Transmission
Distance Sensors
Power Supply



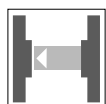
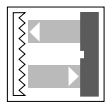
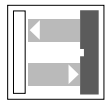
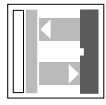
Series ML4.1 – small and precise

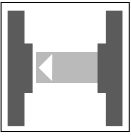


The attributes of the ML4.1 series are impressive: shorter than a match, but with all the power and precision of light beam switches series with significantly larger dimensions. The ML4.1 is the most suitable solution for applications with conditions of limited space for which a high degree of precision is required in switching accuracy. There are four different types of optical functions available for selection. Through beam sensors with 2.5 m detection range, reflex light beam switches, reflection light scanners with 400 mm detection range and reflection light scanners with background suppression and 20 mm, 40 mm, 60 mm, 80 mm detection range. One feature all sensors share in common is a sturdy plastic housing with scratch-resistant glass lenses.

The devices are connected by means of an M8 connector. A push-pull output stage is available as a signal output. The switching type and bright or dark switching can be programmed with an additional electrical connection. Clearly visible LEDs make it easy to adjust and signal functional readiness.

Areas of application include paper processing machines, printing machines and packaging machines.

Principle	Type code	Sensing range/detection range	Page
	ML4.1/MV4.1	0 mm ... 2500 mm	32
	ML4.1-54-F	0 mm ... 400 mm	36
	ML4.1-8	0 mm ... 400 mm	40
	ML4.1-8-H-RT	7 mm ... 60 mm	44
	ML4.1-8-H-IR	7 mm ... 80 mm	48



Single path light beam switch

M4.1/MV4.1/40b/95/110

with M8, 4-pin metal connector



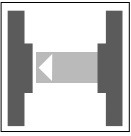
- ◆ Detection range up to 5 m
- ◆ Miniature design
- ◆ Push-pull output
- ◆ Test input
- ◆ sensitivity adjuster

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/2/01

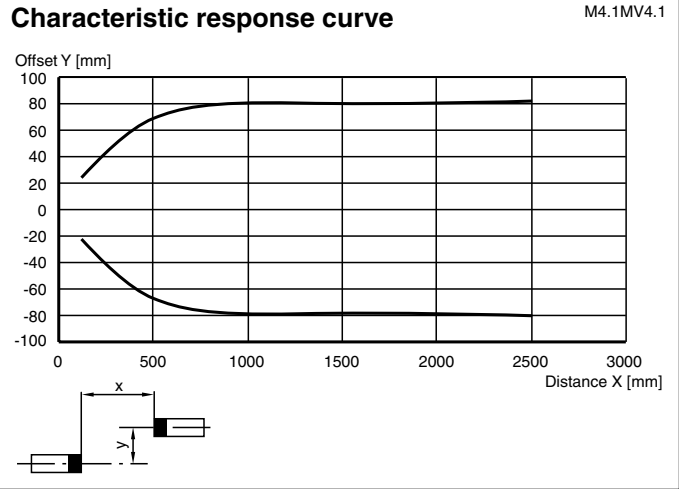
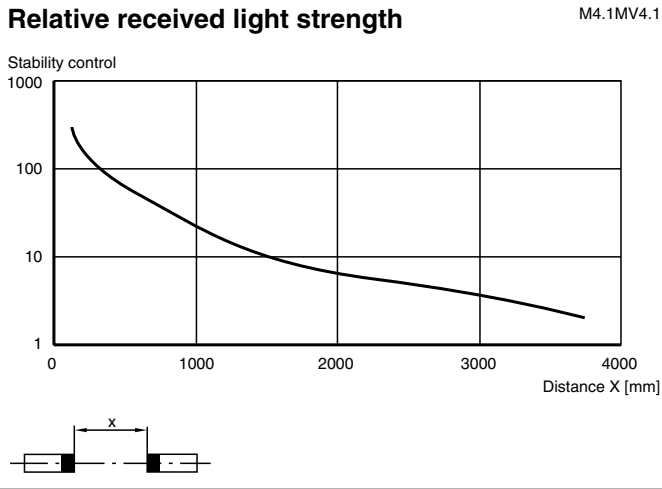
Ordering code		M4.1/MV4.1/40b/95/110
Effective detection range	0 ... 2500 mm	◆
Threshold detection range	5 m	◆
Obstacle size	9 mm	◆
Light source	LED	◆
Light type	Red, alternating light	◆
Angle of divergence	Emitter 5° Receiver 15°	◆
Diameter of the light spot	260 mm at 2500 mm detection range	◆
Ambient light limit	100000 Lux	◆
Approvals	CE	◆
Standard conformity	EN 60947-5-2	◆
Operating display	LED, green	◆
Function display	LED yellow, lights up when light beam is free. Flashes when falling short of the stability control	◆
Controls	sensitivity adjuster	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	< 10 %	◆
No-load supply current	< 25 mA (device)	◆
Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆
Switching type	Light/dark on selectable electrically switchable	◆
Switching voltage	max. 30 V DC	◆
Switching current	max. 200 mA	◆
Switching frequency	500 Hz	◆
Response time	1 ms	◆
Test input	Input emitter deactivation at $U_E=10 \dots 30 \text{ V}$	◆
Ambient temperature	-20 ... 60 °C	◆
Storage temperature	-20 ... 75 °C	◆
Protection degree	IP65	◆
Connection type	4-pin, M8 connector	◆
Housing	ABS	◆
Light exit	Glass	◆
Mass	15 g (device)	◆

Date of issue: 10/2/01

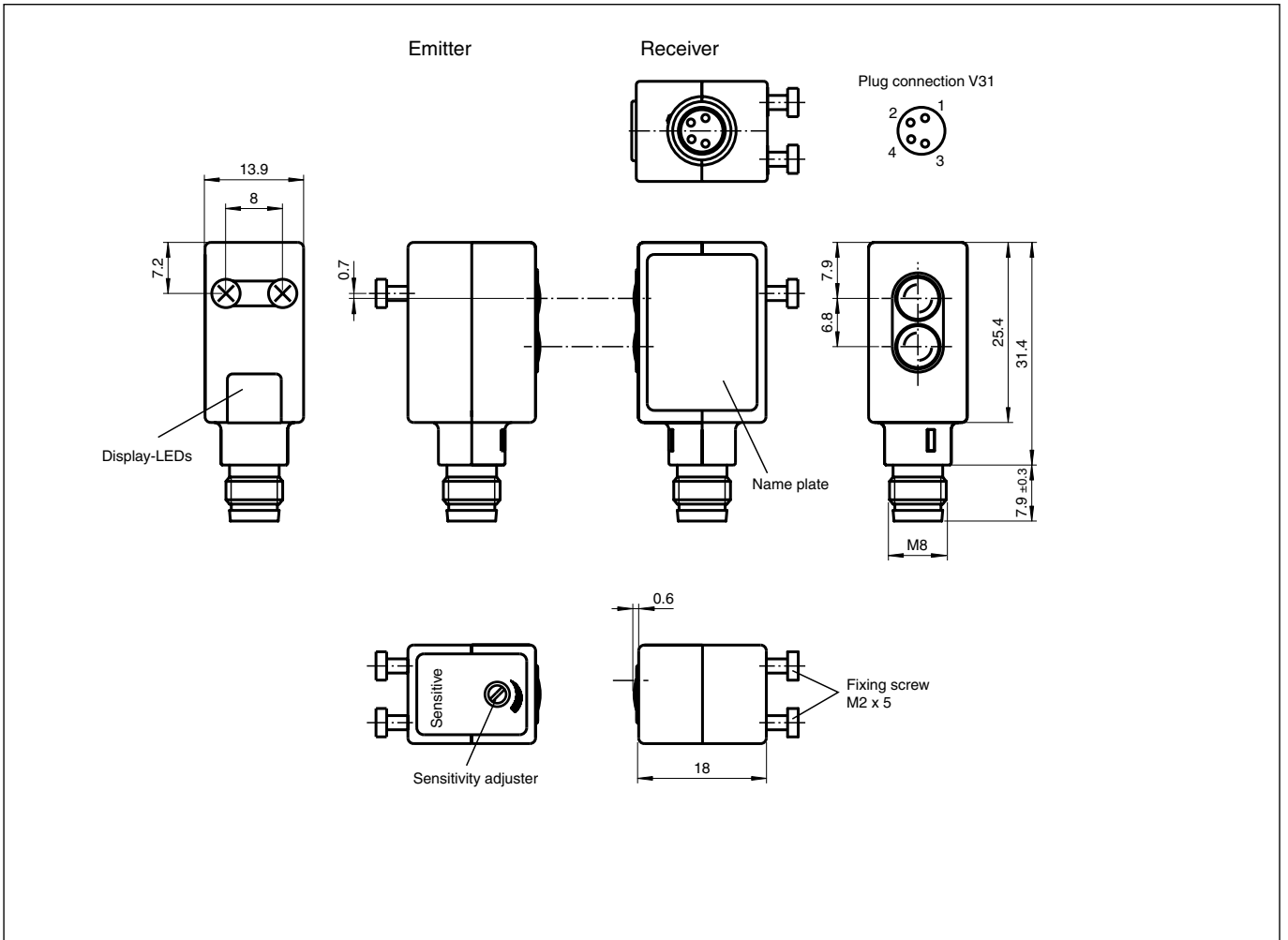


M4.1/MV4.1/40b/95/110

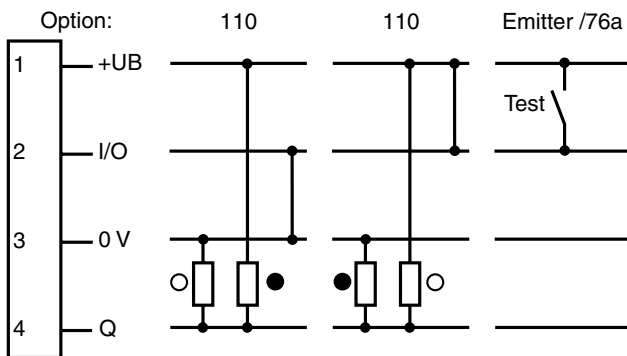
Diagrams



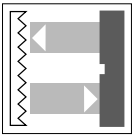
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



Reflection light beam switch with polarisation filter

ML4.1-54-F/.../95/110

with M8, 4-pin metal connector



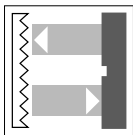
- ◆ Detection range up to 1000 mm
- ◆ Miniature design
- ◆ Push-pull output
- ◆ Polarisation filters
- ◆ Coaxial optical system

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

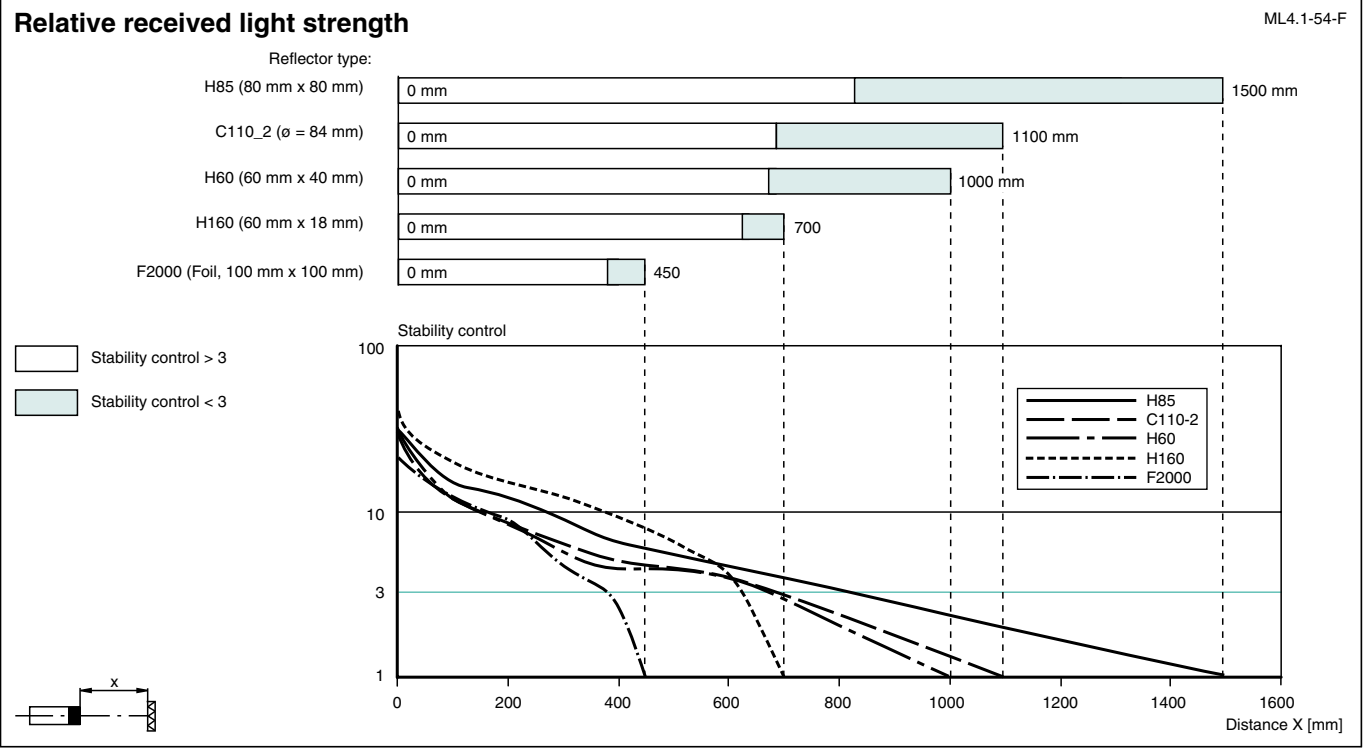
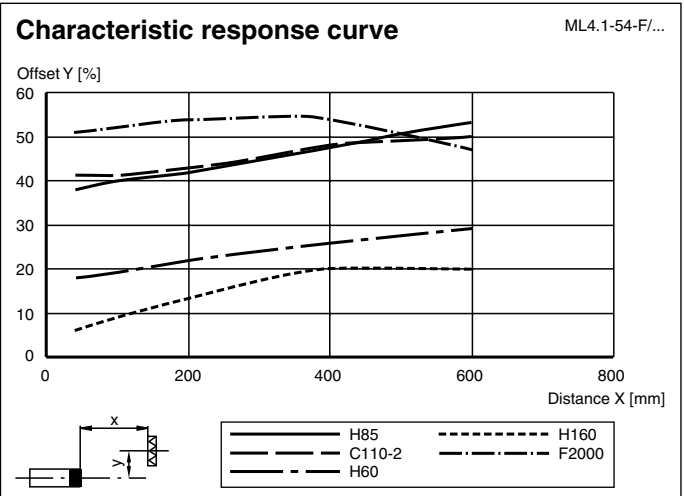
Date of issue: 10/2/01

Ordering code		ML4.1-54-F/40b/95/110	ML4.1-54-F/82b/95/110
Effective detection range	0 ... 400 mm	◆	◆
Threshold detection range	1000 mm (with H60 reflector)	◆	◆
Reflector distance	0 ... 400 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Angle of divergence	approx. 3 °	◆	◆
Diameter of the light spot	20 mm	◆	◆
Ambient light limit	100000 Lux	◆	◆
Approvals	CE	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Operating display	LED, green Power on	◆	◆
Function display	LED yellow, lights up when light beam is free. Flashes when falling short of the stability control	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	25 mA	◆	◆
Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	dark ON		◆
	light/dark switching	◆	
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Output of the pre-fault indication	1 pnp		◆
Test input			
Ambient temperature	-20 ... 60 °C	◆	◆
Storage temperature	-20 ... 75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	4-pin, M8 connector	◆	◆
Housing	ABS GV5	◆	◆
Light exit	Glass	◆	◆
Mass	15 g	◆	◆

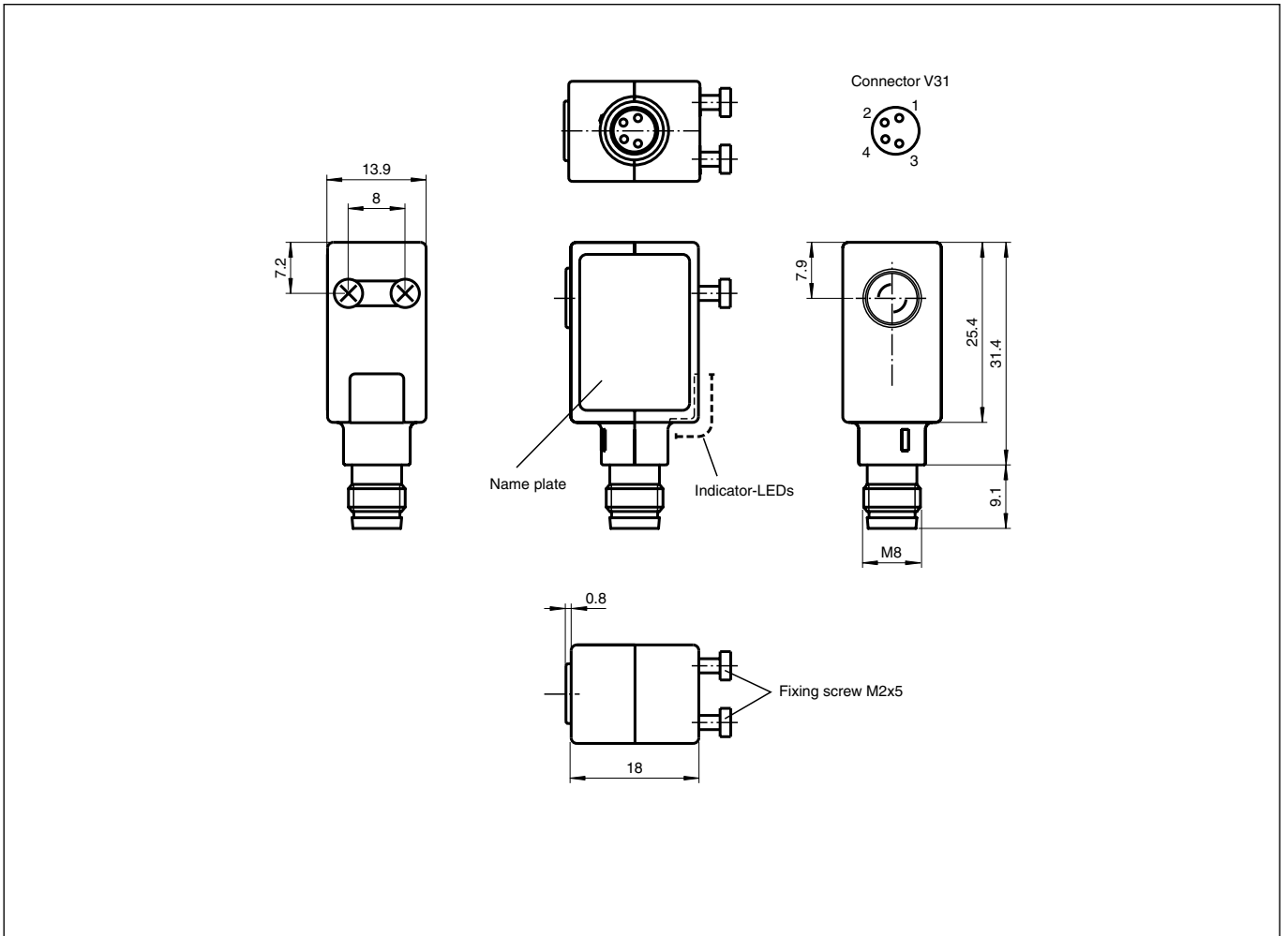
Date of issue: 10/2/01



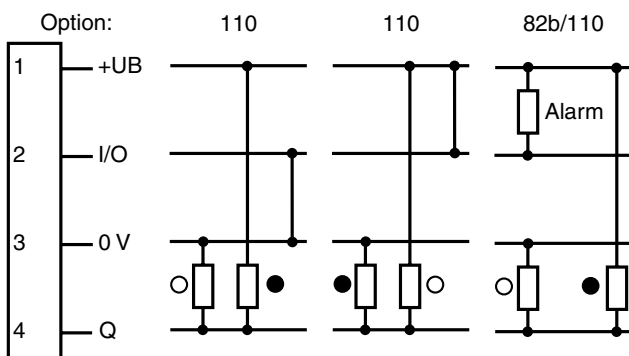
Diagrams

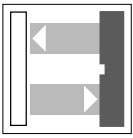


Dimensions



Electrical Connection





Reflection light scanner

ML4.1-8-400/40b/95/110

with M8, 4-pin metal connector



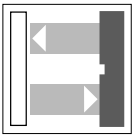
- ◆ Detection range 0 mm ... 400 mm
- ◆ Miniature design
- ◆ Push-pull output
- ◆ sensitivity adjuster

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

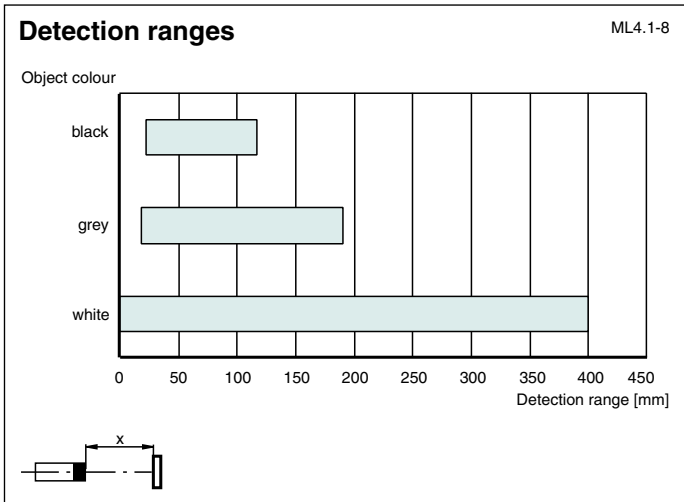
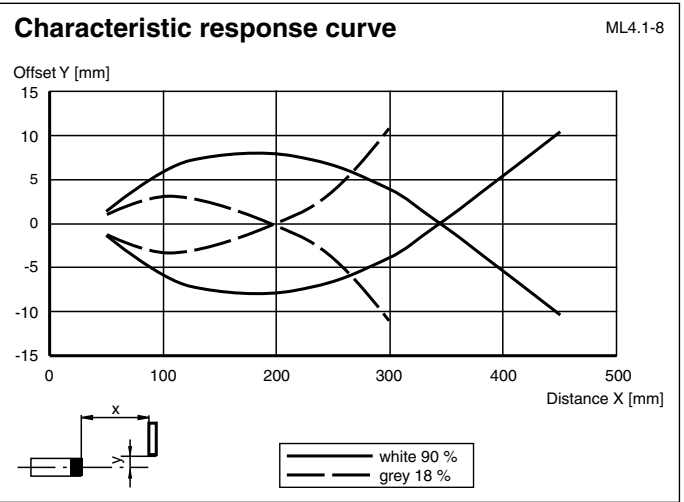
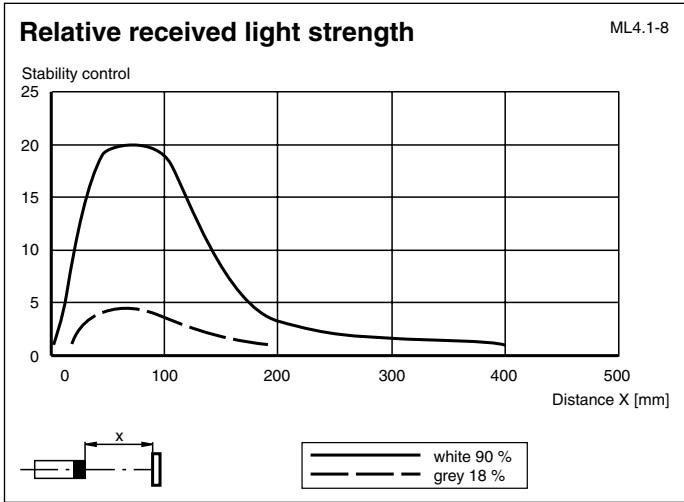
Date of issue: 10/2/01

Ordering code		ML4.1-8-400/40b/95/110
Detection range	0 ... 400 mm	◆
Adjustment range	150 ... 400 mm	◆
Light source	LED	◆
Light type	Red, alternating light	◆
Angle of divergence	approx. 10 °	◆
Diameter of the light spot	80 mm at 400 mm detection range	◆
Ambient light limit	80000 Lux	◆
Approvals	CE	◆
Standard conformity	EN 60947-5-2	◆
Operating display	LED, green Power on	◆
Function display	LED yellow, flashes when falling short of the stability control	◆
Controls	sensitivity adjuster	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	25 mA	◆
Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆
Switching type	light/dark switching	◆
Switching voltage	max. 30 V DC	◆
Switching current	max. 200 mA	◆
Switching frequency	500 Hz	◆
Response time	1 ms	◆
Ambient temperature	-20 ... 60 °C	◆
Storage temperature	-20 ... 75 °C	◆
Protection degree	IP65	◆
Connection type	4-pin, M8 connector	◆
Housing	ABS GV5	◆
Light exit	Glass	◆
Mass	15 g	◆

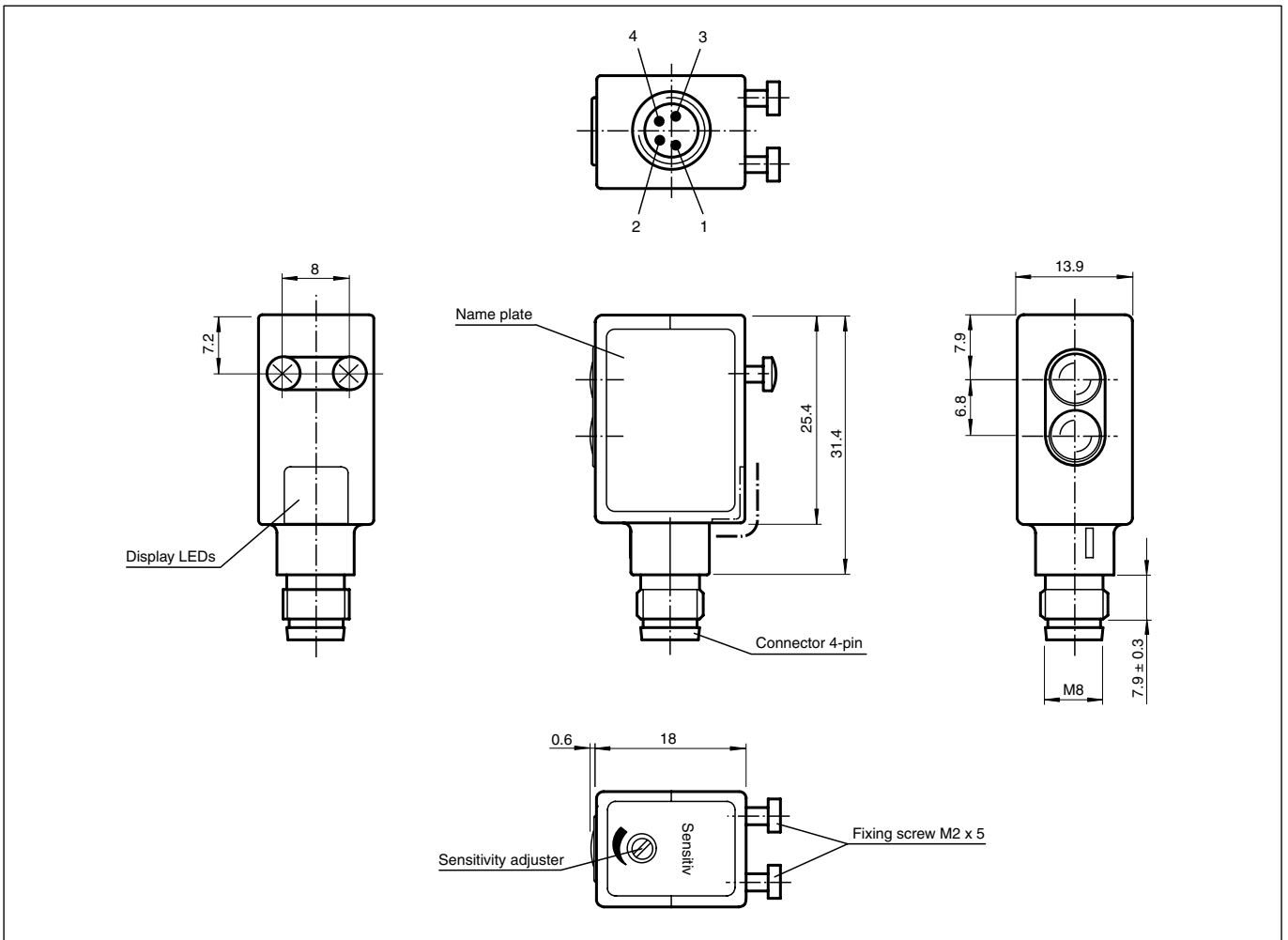
Date of issue: 10/2/01



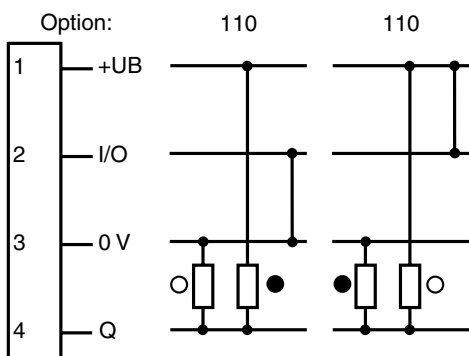
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



Reflection light scanner with background suppression

ML4.1-8-H-..-RT/95/110

with M8, 4-pin metal connector

CE



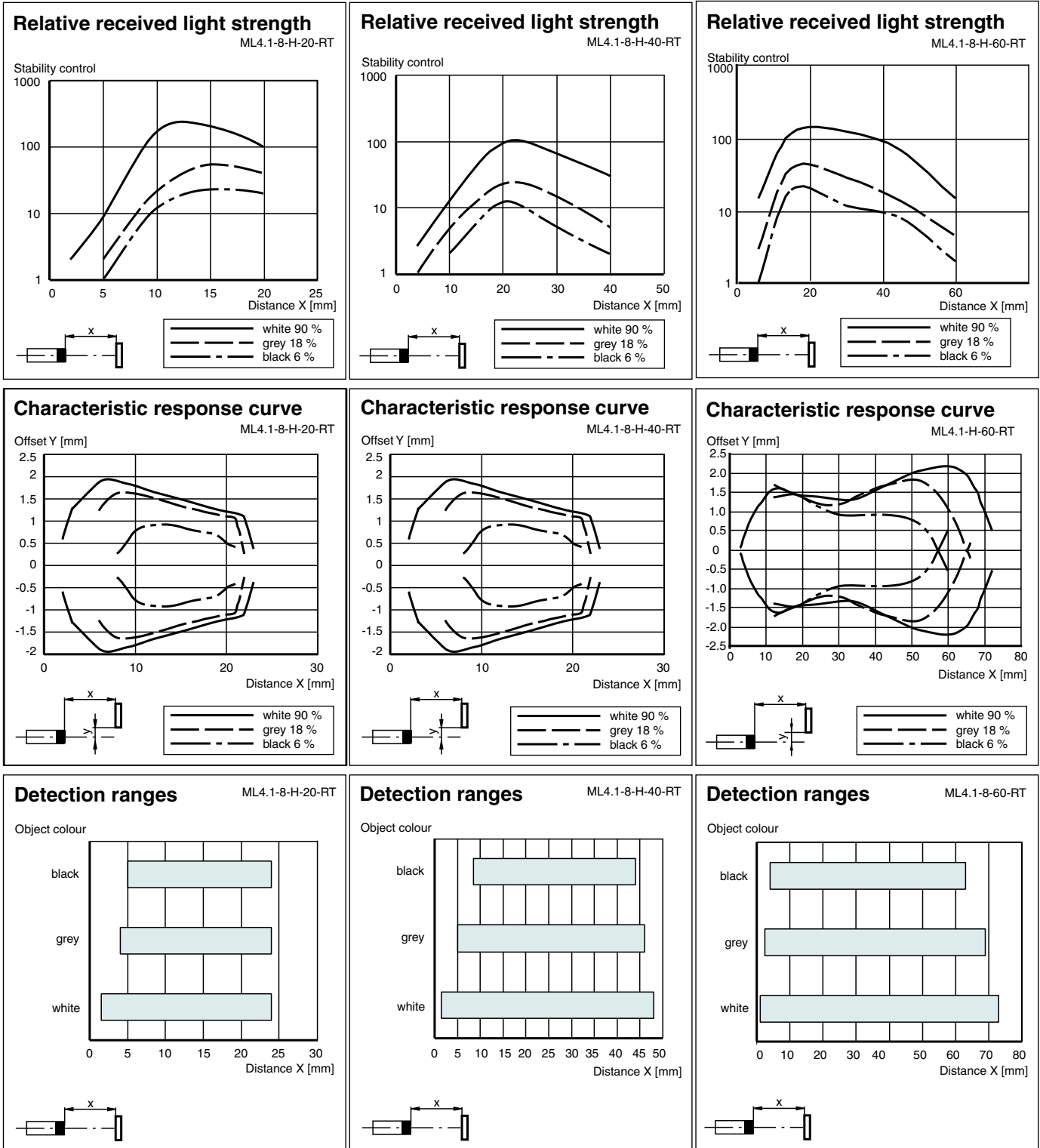
- ◆ Detection range 20 mm, 40 mm or 60 mm
- ◆ Miniature design
- ◆ Push-pull output
- ◆ Visible red light
- ◆ Precise background suppression
- ◆ Very small black-white difference

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

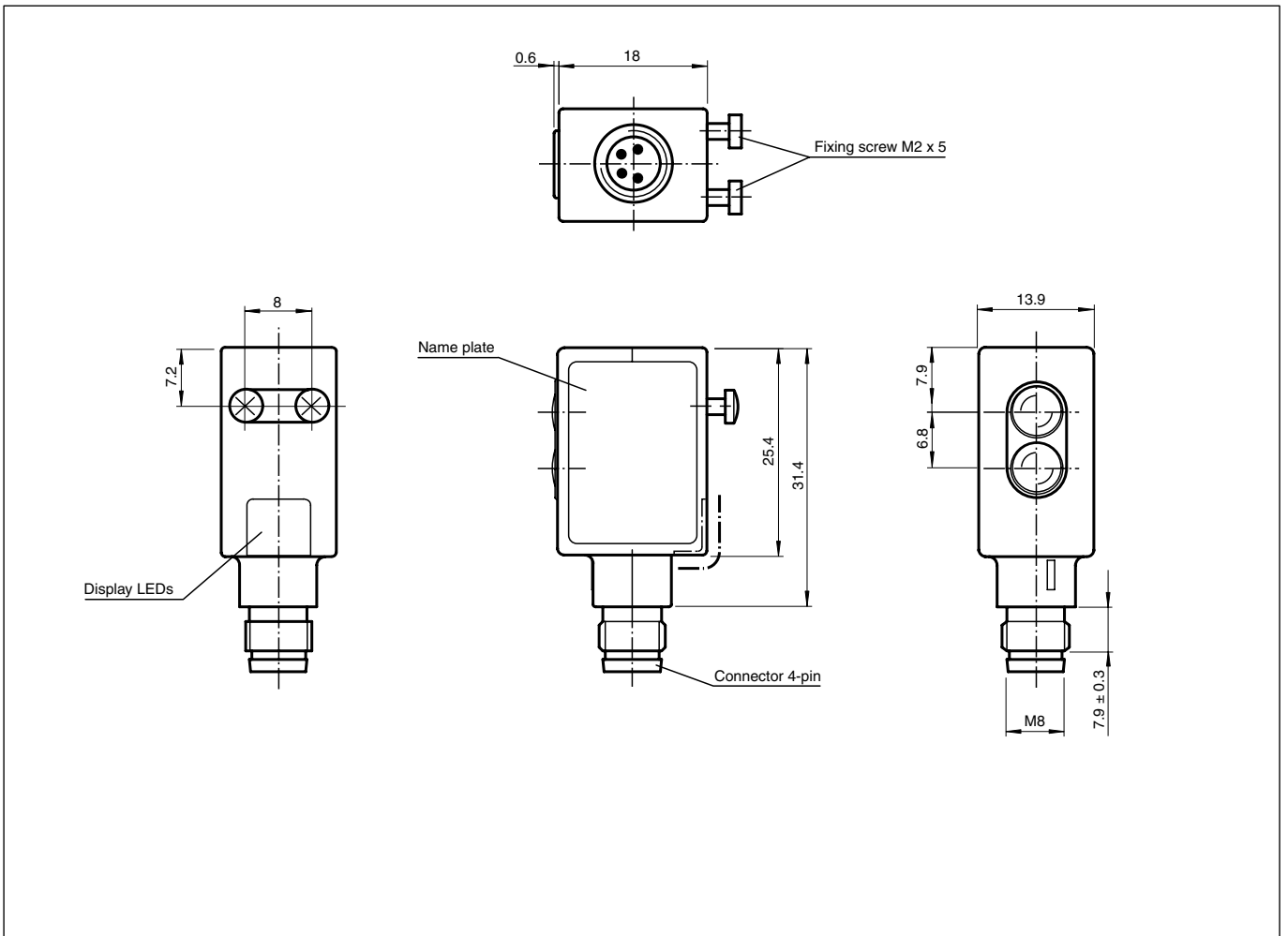
Ordering code		ML4.1-8-H-20-RT/95/110	ML4.1-8-H-40-RT/95/110	ML4.1-8-H-60-RT/95/110
Detection range	7 ... 20 mm	◆		
	10 ... 40 mm		◆	
	10 ... 60 mm			◆
Sensor range max.	7 ... 25 mm	◆		
	10 ... 50 mm		◆	
	10 ... 80 mm			◆
Background suppression	starts from 25 mm	◆		
	starts from 50 mm		◆	
	starts from 80 mm			◆
Black/white difference (6%/90%)	approx. 1 mm	◆		
	approx. 3 mm		◆	
	approx. 20 mm			◆
Light source	LED	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆
Angle of divergence	approx. 6°		◆	◆
	approx. 8°	◆		
Diameter of the light spot	3 mm	◆		
	4 mm		◆	
	6 mm			◆
Ambient light limit	100000 Lux	◆	◆	◆
Approvals	CE	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Operating display	LED, green Power on	◆	◆	◆
Function display	LED yellow, lights up when light beam is free. Flashes when falling short of the stability control	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	25 mA	◆	◆	◆
Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆	◆	◆
Switching type	Light/dark on selectable electrically switchable	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	500 Hz	◆	◆	◆
Response time	1 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C			◆
	-20 ... 60 °C	◆	◆	
Storage temperature	-20 ... 75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	4-pin, M8 connector	◆	◆	◆
Housing	ABS GV5	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	15 g	◆	◆	◆



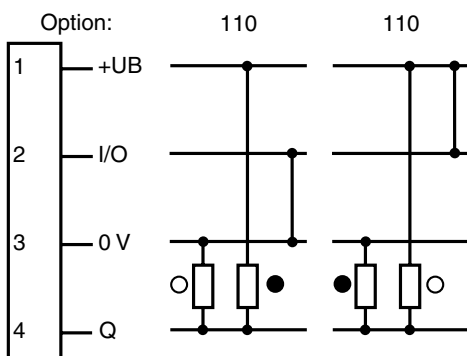
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



Reflection light scanner with background suppression

ML4.1-8-H-..-IR/95/110

with M8, 4-pin metal connector

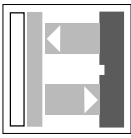
CE



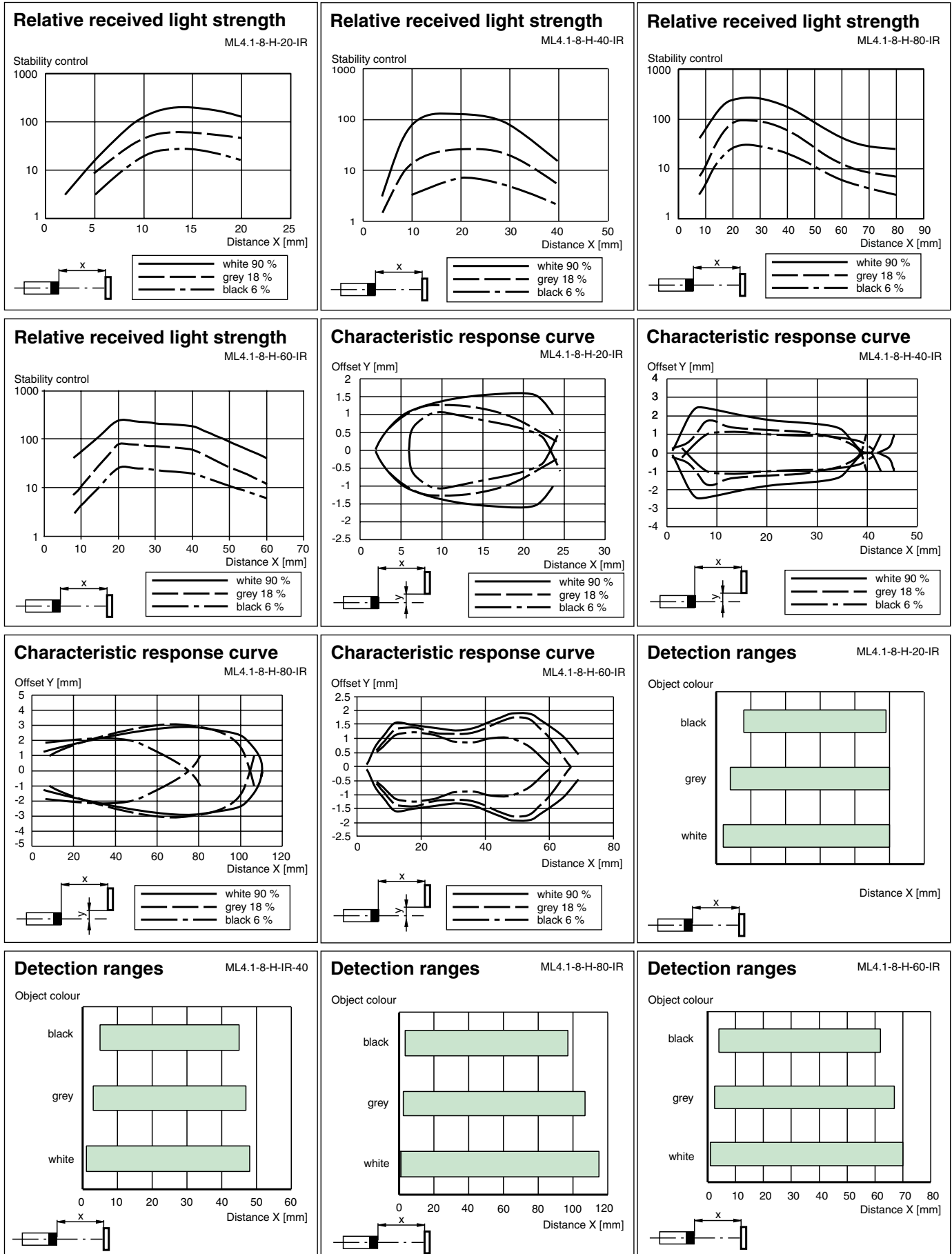
- ◆ Detection range 20 mm, 40 mm, 60 mm or 80 mm
- ◆ Miniature design
- ◆ Push-pull output
- ◆ Precise background suppression
- ◆ Infrared light
- ◆ Very small black-white difference

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

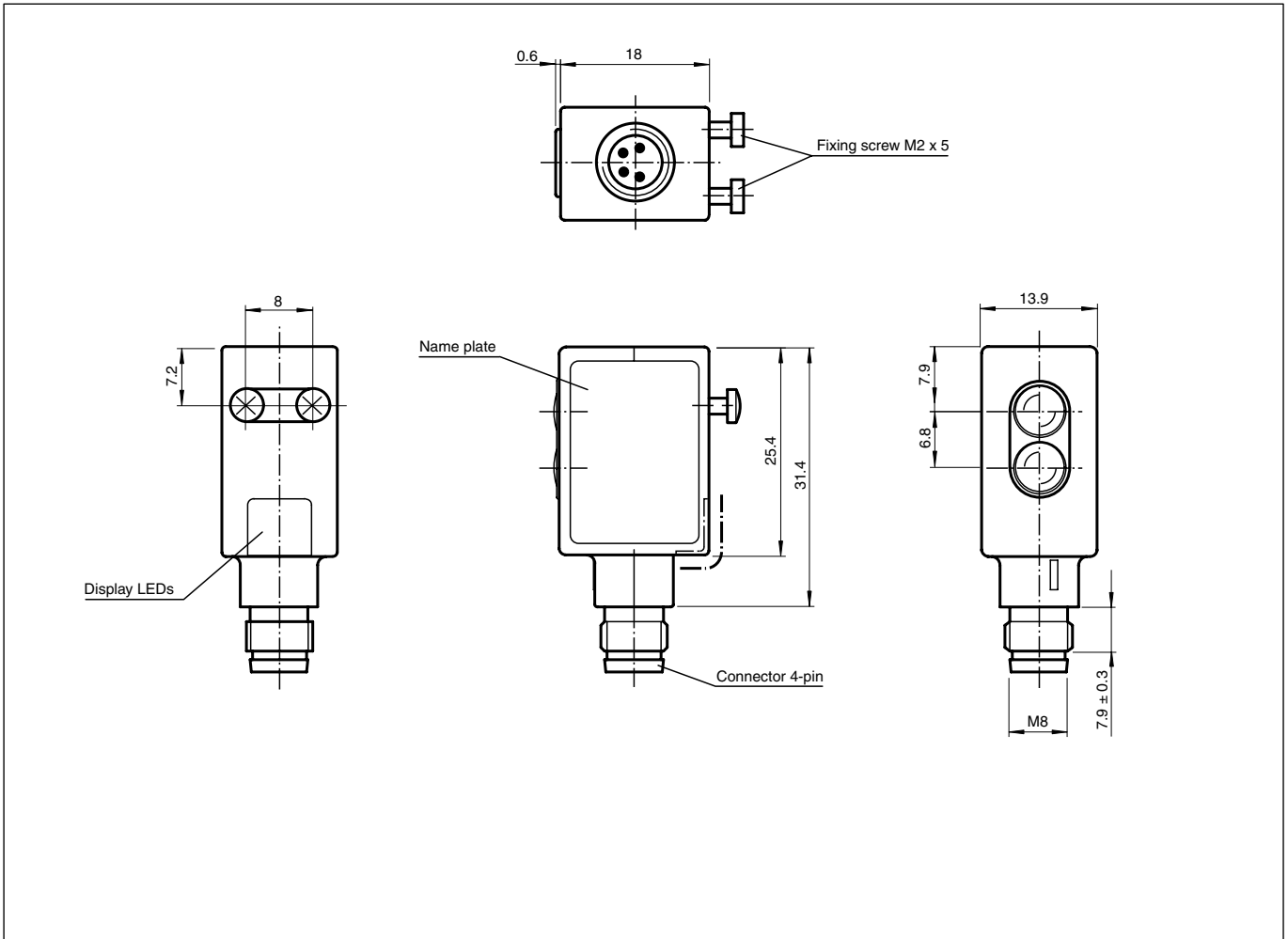
Ordering code		ML4.1-8-H-20-IR/95/110	ML4.1-8-H-40-IR/95/110	ML4.1-8-H-60-IR/95/110	ML4.1-8-H-80-IR/95/110
Detection range	7 ... 20 mm	◆			
	10 ... 40 mm		◆		
	10 ... 60 mm			◆	
	10 ... 80 mm				◆
Sensor range max.	7 ... 25 mm	◆			
	10 ... 50 mm		◆		
	10 ... 75 mm			◆	
	10 ... 100 mm				◆
Background suppression	starts from 25 mm	◆			
	starts from 50 mm		◆		
	starts from 80 mm			◆	
	starts from 100 mm				◆
Black/white difference (6%/90%)	approx. 1 mm	◆			
	approx. 3 mm		◆		
	approx. 10 mm			◆	
	approx. 20 mm				◆
Light source	IREd	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆
Angle of divergence	approx. 6 °	◆	◆	◆	◆
	approx. 8 °	◆			
Diameter of the light spot	3 mm	◆			
	4 mm		◆		
	5 mm			◆	
	6 mm				◆
Ambient light limit	100000 Lux	◆	◆		◆
	500000 Lux			◆	
Approvals	CE	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Operating display	LED, green Power on	◆	◆	◆	◆
Function display	LED yellow, lights up when light beam is free. Flashes when falling short of the stability control	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	25 mA	◆	◆	◆	◆
Signal output	Push-pull output, short-circuit proof, protected against reverse polarity	◆	◆	◆	◆
Switching type	Light/dark on selectable electrically switchable	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	500 Hz	◆	◆	◆	◆
Response time	1 ms	◆	◆	◆	◆
Ambient temperature	-20 ... 60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C			◆	
	-20 ... 75 °C	◆	◆		◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	4-pin, M8 connector	◆	◆	◆	◆
Housing	ABS GV5	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	15 g	◆	◆	◆	◆



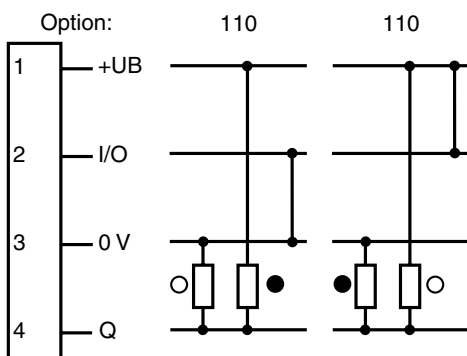
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON





Series MLV11 – The Multitalent with extended application range

The integrated microcontroller makes it possible: Commissioning by keystroke, parameterisation via an optical interface and astonishing versatility at an affordable price.

The connector, which can be offset by 90°, also allows for extensive yet simple installation options. The wide range of devices offers diverse solutions to choose from for your automation tasks, such as detecting transparent objects, recording objects from 0.1 mm with LASER designs, adjustable background suppression, NAMUR designs and AS-Interface.

The simple operation via membrane keys makes adjustments easy and saves money.

Principle	Type code	Detection range	Page
	M11/MV11/112	0 m ... 15 m	58
	M11/MV11-E/112	0 m ... 15 m	58
	MLV11-54/112	0 mm ... 6000 mm	62
	MLV11-54-E/112	0 mm ... 6000 mm	62
	MLV11-54-LAS/112	0 m ... 15 m	62
	MLV11-54-G/112	0 mm ... 3000 mm	66
	MLV11-54-G-E/112	0 mm ... 3000 mm	66
	MLV11-8-LAS-150/112	0 mm ... 150 mm	78
	MLV11-8-LAS/300/112	0 mm ... 300 mm	78
	MLV11-8-500/112	0 mm ... 500 mm	70
	MLV11-8-E-500/112	0 mm ... 500 mm	70
	MLV11-8-H-150/112	0 mm ... 150 mm	74
	MLV11-8-H-E-150/112	0 mm ... 150 mm	74
	MLV11-LL-G/112	0 mm ... 600 mm (LME18)	82
	MLV11-LL-K/112	0 mm ... 150 mm (KLE00)	88

Adjusting to a target object

Adjustment options:

- **Manual (with membrane keys)**
- **Automatic (TEACH-IN)**

Note:

The sensitivity adjustment is maintained even after the electrical power is turned off.

M11/MV11 single path light beam switch

Manual Adjustment



Receiver

Emitter

Automatic Adjustment



Receiver

Emitter

Sensitivity/Adjusting with the membrane keyboard

At the delivery the optical barrier is set to maximum over the whole operating distance from 0 m up to 15 m. It is possible via the membrane key to achieve the detection of material with partial optical absorption (detection of partly transparent or small objects) or the effective operating distance reducing (improvement of the interference light suppression).

A useful adjustment is achievable in a range of 2 m up to 15 m. In this range, the automatic adjustment (TEACH-IN) ensures a function with optimal signal reserve.

Manual adjustment of reception sensitivity

1. Align the emitter and receiver correctly. The light path must be unobstructed.
2. If necessary, press the "+"- and "-"- keys at the same time for 5 seconds (until the green LED flashes briefly **once**). The sensor is now "unlocked". The light path must be unobstructed!
3. You can adjust the sensitivity of the sensor with the two "+" and "-" keys (the red LED flashes with each keystroke, the yellow indicates the switch status). The push buttons feature a repeat function (simply hold down the key for repeated actuation). The sensitivity adjustment is maintained even after the electrical power is turned off.

Note:

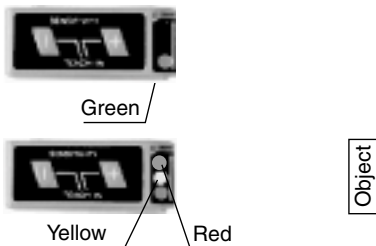
If the red LED does not flash when the button is pushed, the sensor is at the end of the adjustable range or the sensor is no longer locked.

Automatic adjustment (TEACH-IN) of sensitivity

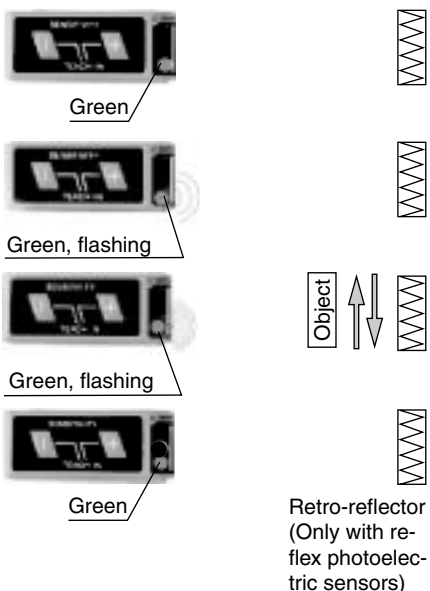
1. Align the emitter and receiver correctly. The light path must be unobstructed.
2. If necessary, press the "+"- and "-"- keys at the same time for 5 seconds (until the green LED flashes briefly **once**). Release the keys briefly. The sensor is now "unlocked". The light path must be unobstructed!
3. Press the "+"- and "-"- keys simultaneously (approx. 2 s) until the green LED flashes, then release both keys. The sensor is now in "teaching" or programming mode. This is indicated by the green LED flashing (2 Hz).
4. The teaching process has finished when the green LED remains on.

All types of sensors except for M11/MV11 (single path light beam switch)

Manual Adjustment

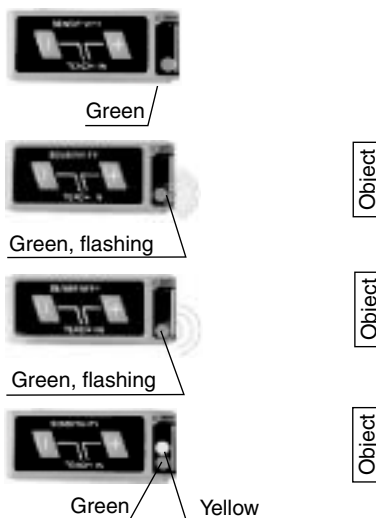


Dynamic TEACH-IN



The MLV11-8 direct detection light scanners and optical guide sensors in direct detection

Static TEACH-IN



Manual adjustment

1. If necessary, press the "+"- and "-"- keys at the same time for at least 5 seconds (until the green LED flashes once briefly). The sensor is now "unlocked".
2. Place the object to be recorded in the sensing range at the desired distance. You can now adjust the sensitivity of the sensor with the two "+" and "-"- keys (the red LED flashes with each keystroke; the yellow indicates the switch status). The buttons are equipped with a repeat function (simply hold down the key for repeated actuation).

Note:

If the red LED does not flash when the button is pushed, the sensor is at the end of the adjustable range or the sensor is no longer locked.

TEACH-IN for moved objects (dynamic TEACH-IN).

1. If necessary, press the "+"- and "-"- keys at the same time for 5 seconds (until the green LED flashes briefly once). The sensor is now "unlocked".
2. Simultaneously push the "+" and "-"- buttons (for about 1 second) until the red LED that is lit goes out. The sensor is now in "teaching" or programming mode. This is indicated by the green LED flashing (2 Hz).

Note:

If the red LED does not flash when the key is pressed, the sensor is not locked.

3. Traverse the recording range at the desired distance with the objects to be recorded (one object is sufficient). The green LED flashes briefly at a higher frequency (4 Hz). As soon as the LED flashes again with the output frequency, the teaching process is completed if there is an object in the recording range.

Note:

The very brief change in flashing frequency is undetectable under certain circumstances.

4. To complete TEACH-IN, you must now press either the "+" key or the "-"- key. After that, the sensor will work in normal operating mode.

TEACH-IN for objects at a fixed distance (static TEACH-IN)

1. If necessary, press the "+"- and "-"- keys at the same time for 5 seconds (until the green LED flashes briefly once). The sensor is now "unlocked".
2. Place the object to be recorded in the sensing range at the desired distance. Simultaneously push the "+" and "-"- buttons (for about 1 second) until the red LED that is lit goes out. The sensor is now in "teaching" or programming mode. This is indicated by the green LED flashing.

Note:

If the red LED does not flash when the key is pressed, the sensor is not locked.

3. The green LED flashes briefly at a higher frequency (4 Hz). As soon as the LED flashes again at the output frequency of 2 Hz, the teaching process is complete.
4. To complete TEACH-IN, you must now press either the "+" key or the "-"- key. After that, the sensor will work in normal operating mode.

Date of issue 10/02/2001

Series MLV11

Parameter settings

Single path (M11/MV11), reflex photo-electric sensors (MLV11-54), direct detection sensors (MLV11-8), light barriers for fibre optics (MLV11-LL) and sensors with laser light (MLV11-...-LAS)

Parameters:

- Outputs:

An optical interface (PC or hand-held) is used to set parameters.

Factory setting underlined

- N.O. and pre-fault
- N.C. and pre-fault
- antivalent

-Pre-fault signal

- dynamic
- static
- off

- Switching frequency → Switch delay:

- 1 kHz ⇒ 0.5 ms
- 500 Hz → 1 ms
- 250 Hz → 2 ms
- 100 Hz → 5 ms
- 50 Hz → 10 ms
- 20 Hz → 25 ms

for application-optimised interference suppression

-Hysteresis:

- small
- standard
- large

- Time function 1:

- no
- on delay (0.1 s to 25.5 s in 0.1 s steps)

- Time function 2:

- no
- off delay (0.1 s to 25.5 s in 0.1 s steps)
- pulse extension (1 ms to 255 ms in 1 ms steps)
- one shot output function (1 ms to 255 ms in 1 ms steps)

-Pulse frequency:

- pulse frequency 1
- pulse frequency 2
- pulse frequency 3

-Keyboard disabling

- off
- automatic
- always

-Input function:

- no
- test (transmitter deactivation)
- AND logic operation
- OR logic operation
- XOR logic operation
- NC/NO switching
- function reserve test (normal operation with half transmission power) only sensortypes MLV11-54/MLV11-8 and MLV11-LL
- TEACH-IN (level controlled) only sensortypes MLV11-54/MLV11-8 and MLV11-LL
- LATCH only sensortypes MLV11-54/MLV11-8 and MLV11-LL
- D-Flipflop only sensortypes MLV11-54/MLV11-8 and MLV11-LL

-Input inverted

- all control input functions can be inverted

-Parameterisation disable:

- off
- on

-Mode of operation:
(only for sensors with light guide connection MLV11-LL...)

- direct detection
- through-beam mode

For through-beam sensors, parts of these settings are not available and are only possible on the receiver:

hysteresis
pulse frequency
emitter deactivation
the emitter is equipped with a test input (switches emitter off).

Description

Adjustment options:

- **manual** (with membrane keys)
- **automatic (TEACH IN)**

Note:

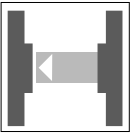
The sensitivity adjustment (manual or by TEACH-IN) is maintained even after the electrical power is turned off.

Through beam sensor M11/MV11...

Sensitivity/Adjusting with the membrane keyboard

At the delivery, the sensitivity of the photoelectric sensor is set to maximum over the whole operating distance of 0 m ... 15 m. It is possible via the membrane key to achieve the detection of material with partial optical absorption (detection of partly transparent or small objects) or the effective operating distance reducing (improvement of the interference light suppression).

A useful adjustment can be achieved in the 2 m ... 15 m range. In this range, the automatic adjustment (TEACH-IN) ensures a function with optimal signal reserve.



M11/MV11-.../76a/112

Series
MLV11

Single path light beam switch

M11/MV11-.../76a/112

with 5-pin M12 connector, 90° adjustable position

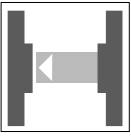
CE



- ◆ Detection range up to 15 m
- ◆ Visible red light
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Automatic adjustment of the sensitivity per TEACH-IN
- ◆ Detection of partially transparent objects
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP68
- ◆ All materials approved for food industry applications
- ◆ Multifunction input
- ◆ Metal parts made of high-grade steel

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		M11/MV11-47/76a/112	M11/MV11-48/76a/112	M11/MV11-E/47/76a/112	M11/MV11-E/48/76a/112
Effective detection range	0 ... 15 m	◆	◆	◆	◆
Adjustment range	2 ... 15 m	◆	◆	◆	◆
Reference target	Receiver	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Diameter of the light spot	500 mm at a distance of 15 m	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing (only receiver)	◆	◆	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	≤ 25 mA (device)	◆	◆	◆	◆
Time delay before availability	≤ 400 ms	◆	◆	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆		◆	
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆		◆
Switching type	light/dark switching	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Voltage drop	≤ 2.5 V	◆	◆	◆	◆
Switching frequency	≤ 1000 Hz	◆	◆	◆	◆
Response time	≤ 0.6 ms	◆	◆	◆	◆
Timer function	parameterisable	◆	◆	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable nnp, dynamic/static configurable	◆		◆	
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V (emitter)	◆	◆	◆	◆
Control input	inactive: ≤ 3 V or unwired; active: ≥ 7 V (receiver)	◆		◆	
	inactive: ≥ 7 V or unwired; active: ≤ 3 V (receiver)		◆		◆
Ambient temperature	-25 ... +70 °C	◆	◆	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆	◆	◆
Protection degree	IP68	◆	◆	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆	◆	◆
Housing	PBT	◆	◆	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆	◆	◆
Connector	AISi	◆	◆		
	high grade steel			◆	◆
Dove tail	AISi	◆	◆		
	high grade steel			◆	◆
Mass	60 g (device)	◆	◆	◆	◆



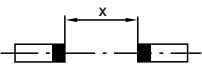
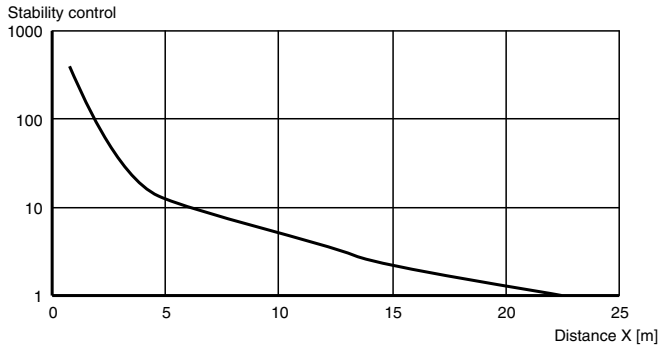
M11/MV11-.../76a/112

Series
MLV11

Diagrams

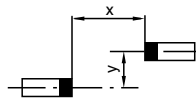
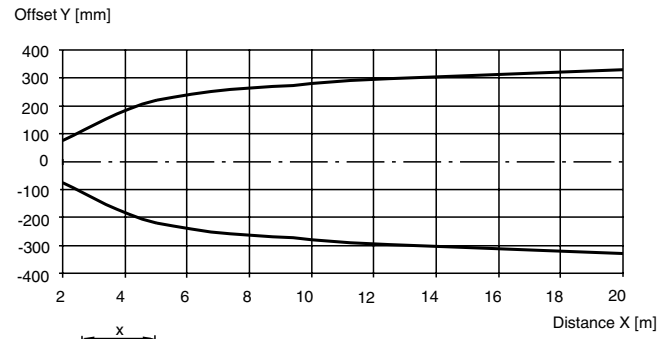
Relative received light strength

M11/MV11

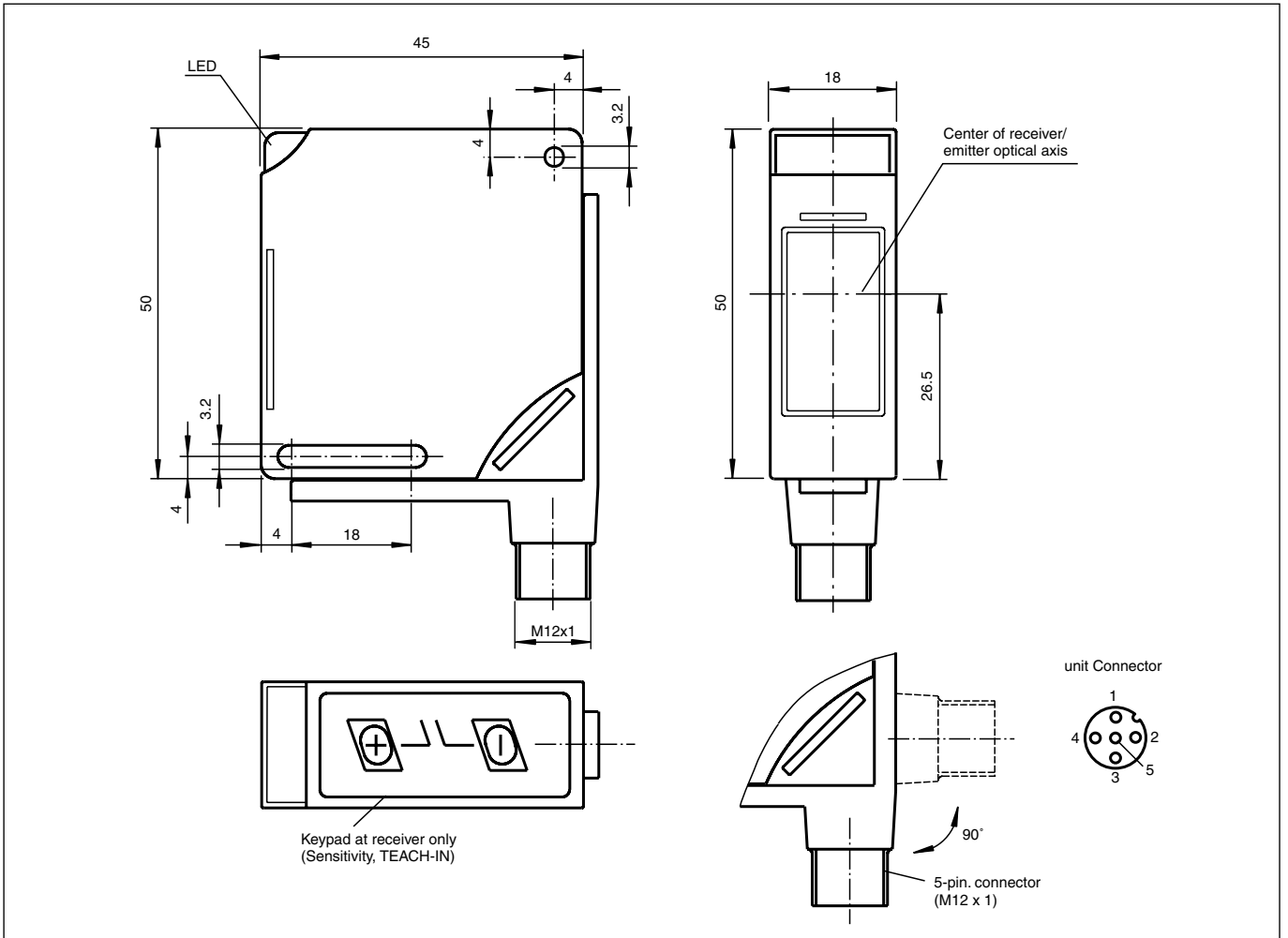


Characteristic response curve

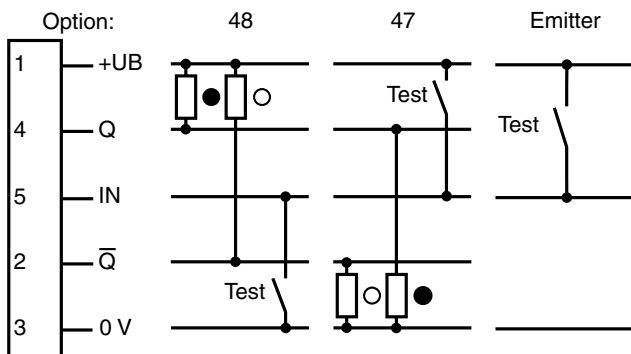
M11/MV11

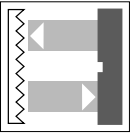


Dimensions



Electrical Connection





MLV11-54-.../112

Series
MLV11

Reflection light beam switch

MLV11-54-.../112

with 4-pin or 5-pin M12 connector, 90° adjustable position

CE

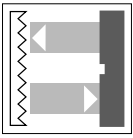


- ◆ Detection range up to 15 m
- ◆ Glare protected with polarisation filter
- ◆ Visible red light
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Automatic adjustment of the sensitivity per TEACH-IN
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP68
- ◆ Multifunction input
- ◆ Detection of partially transparent objects
- ◆ All materials approved for food industry applications
- ◆ Boost mode - approx. 4 x the brightness of the transmitted light as adjustment aid

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		MLV11-54-47/112	MLV11-54-48/112	MLV11-54-E/47/112	MLV11-54-E/48/112	MLV11-54-LAS/47/112	MLV11-54-LAS/48/112	MLV11-54-E-LAS/47/112	MLV11-54-AS-1/112
Effective detection range	0 ... 15 m					◆	◆	◆	
	0 ... 6 m	◆	◆	◆	◆				◆
Reflector distance	300 ... 15000 mm					◆	◆	◆	
	600 ... 6000 mm	◆	◆	◆	◆				◆
Reference target	H60 reflector					◆	◆	◆	
	H85 reflector	◆	◆	◆	◆				◆
Light source	LED	◆	◆	◆	◆				◆
	Laser diode					◆	◆	◆	
Light type	Red, alternating light	◆	◆	◆	◆				◆
	Red light 670 nm pulsed LASER-light (12 µs), 2 mW peak power, laser class 2, eye-safe					◆	◆	◆	
Diameter of the light spot	200 mm at a distance of 6000 mm	◆	◆	◆	◆				◆
	50 mm at a distance of 15 m					◆	◆	◆	
Ambient light limit	10000 Lux	◆	◆	◆	◆				◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆				◆
Approvals	CE	◆	◆	◆	◆				◆
Operating display	LED green	◆	◆	◆	◆				◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆	◆	◆				◆
Controls	Membrane keys for setting sensitivity and TEACH-IN via AS-i network	◆	◆	◆	◆				◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆				◆
Ripple	10 %	◆	◆	◆	◆				◆
No-load supply current	≤ 25 mA	◆	◆	◆	◆				◆
Time delay before availability	≤ 50 ms					◆	◆	◆	
	≤ 80 ms	◆	◆	◆	◆				◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆		◆		◆		◆	
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆		◆		◆		
	AS-Interface								◆
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Switching current	≤ 35 mA								◆
	max. 200 mA	◆	◆	◆	◆	◆	◆	◆	
Voltage drop	≤ 2.5 V	◆	◆	◆	◆	◆	◆	◆	
Switching frequency	≤ 1000 Hz	◆	◆	◆	◆	◆	◆	◆	◆
Response time	≤ 0.5 ms	◆	◆	◆	◆	◆	◆	◆	◆
Timer function	parameterisable	◆	◆	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable	◆		◆		◆		◆	
	nnp, dynamic/static configurable		◆		◆		◆		
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V	◆		◆		◆		◆	
	inactive: ≥ 7 V or unwired; active: ≤ 3 V		◆		◆		◆		◆
Ambient temperature	-25 ... +70 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP68	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	Connector M12 x 1, 4-pin								◆
	5-pin M12 x 1 connector, 90° adjustable position	◆	◆	◆	◆	◆	◆	◆	◆
Housing	PBT	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆	◆	◆	◆	◆	◆	◆
Connector	AlSi	◆	◆			◆	◆		◆
	high grade steel			◆	◆			◆	
Dove tail	AlSi	◆	◆			◆	◆	◆	◆
	high grade steel			◆	◆				◆
Mass	60 g	◆	◆	◆	◆	◆	◆	◆	◆

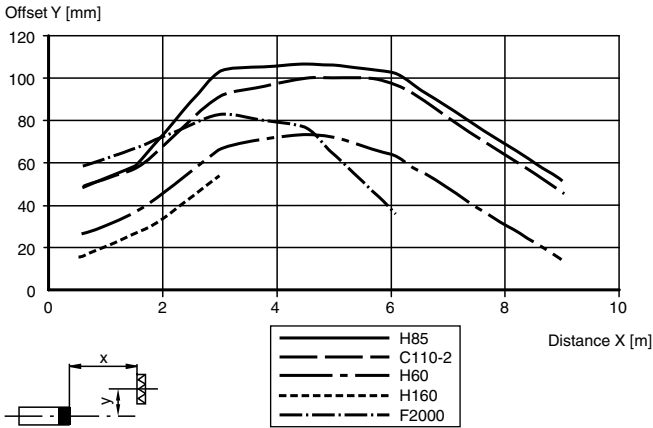
Date of issue 10/15/01



Diagrams

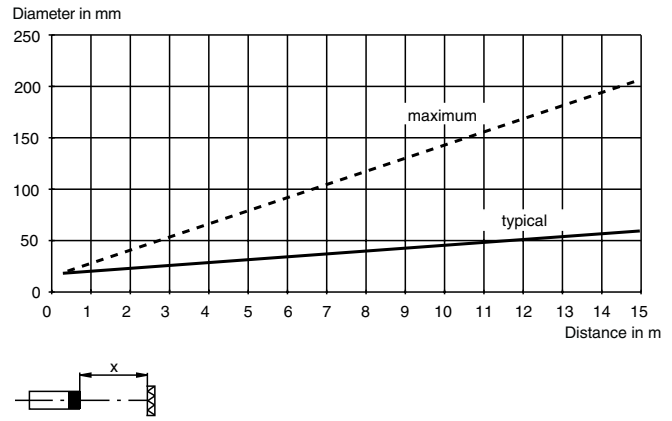
Characteristic response curve

MLV11-54



Light spot diameter = f (Distance)

MLV11-54-LAS



Relative received light strength

MLV11-54

Reflector type:

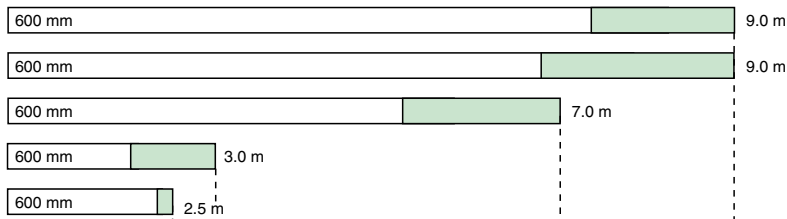
H85 (80 mm x 80 mm)

C110_2 (ø = 84 mm)

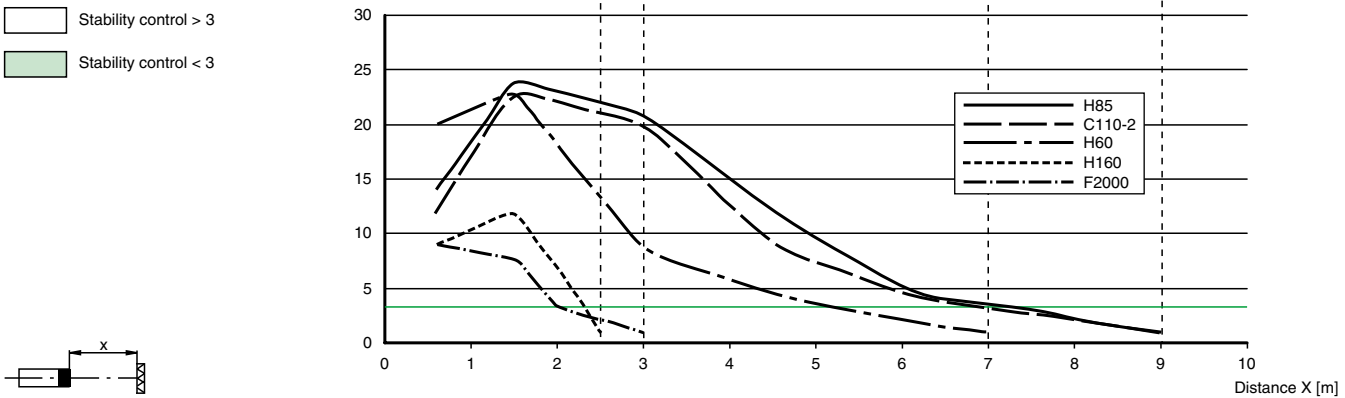
H60 (60 mm x 40 mm)

F2000 (Foil, 100 mm x 100 mm)

H160 (60 mm x 18 mm)



Stability control



Programming

Address preset to 00, can be changed via Busmaster or programming devices

IO-Code 1

ID-Code F

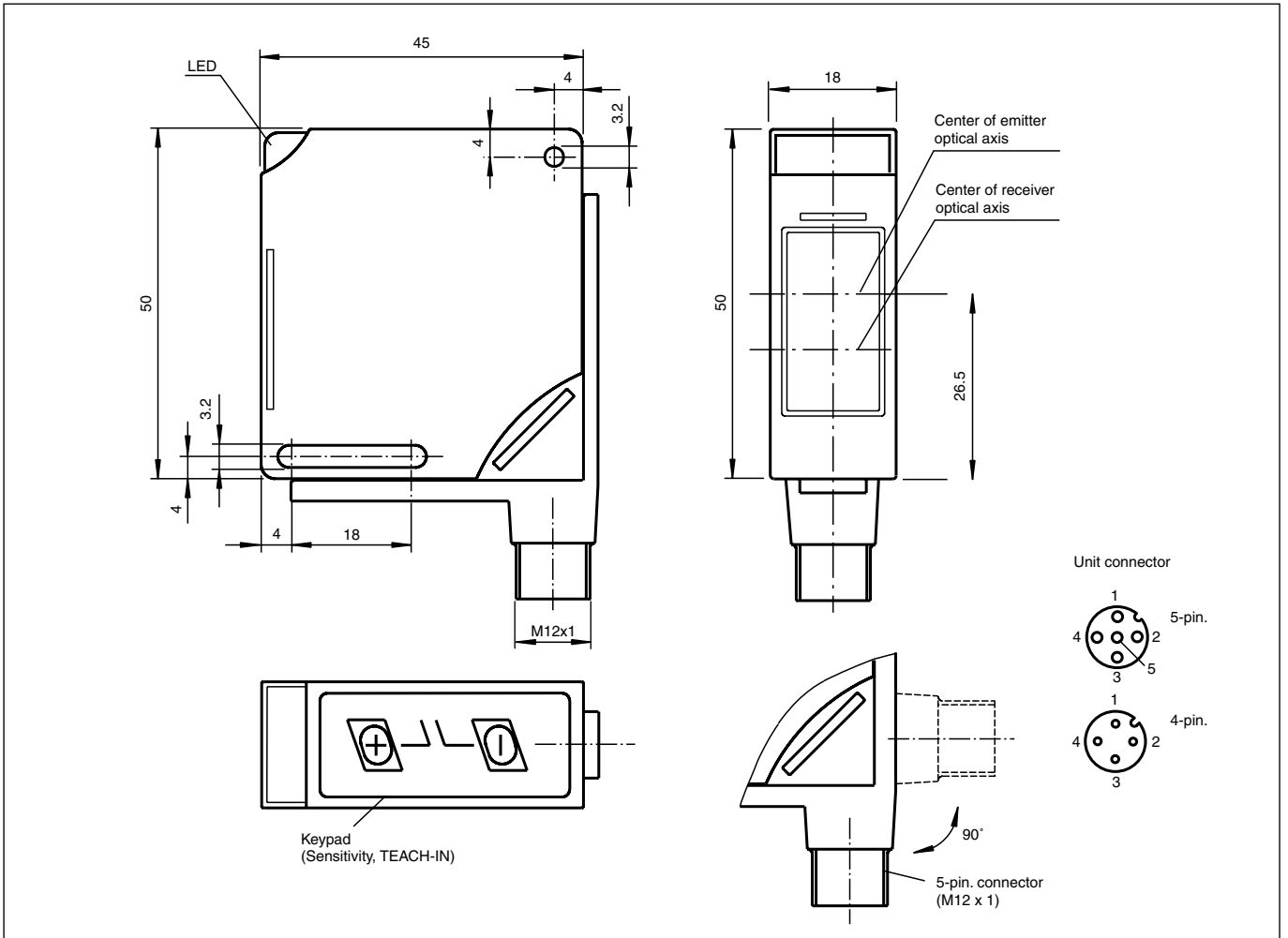
• Data bit

Bit	Function
D0	Switch output
D1	Pre-fault indication (0=ON, 1=OFF)
D2	antivalent switch output
D3	Function input

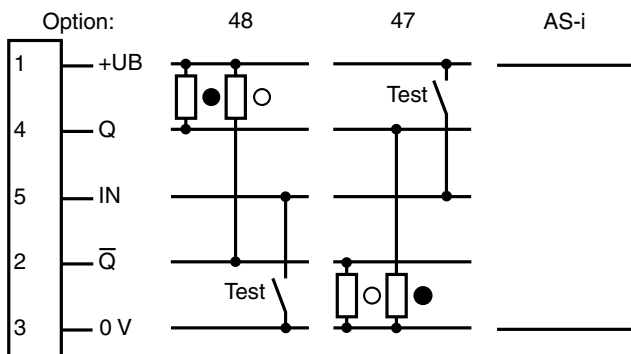
• Parameter bit

Bit	Function
P0	not used
P1	not used
P2	not used
P3	not used

Dimensions



Electrical Connection





MLV11-54-G-.../112

Reflection light beam switch

MLV11-54-G-.../112

with 4-pin or 5-pin M12 connector, 90° adjustable position

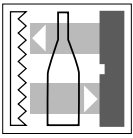
CE



- ◆ Detection range up to 3 m
- ◆ Detection of transparent objects, i.e. clear glass, PET and transparent foils
- ◆ Glare protected with polarisation filter
- ◆ Visible red light
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Automatic adjustment of the sensitivity per TEACH-IN
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP68
- ◆ All materials approved for food industry applications
- ◆ Multifunction input

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		MLV11-54-G/47/112	MLV11-54-G/48/112	MLV11-54-G-E/47/112	MLV11-54-G-E/48/112	MLV11-54-G-AS-I/112
Effective detection range	0.1 ... 3 m	◆	◆	◆	◆	◆
Reflector distance	600 ... 3000 mm	◆	◆	◆	◆	◆
Reference target	H60 reflector	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆	◆
Diameter of the light spot	100 mm at a distance of 3000 mm	◆	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆	◆	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆	◆	◆	◆
Operating voltage	via AS-i network					◆
	10 ... 30 V DC	◆	◆	◆	◆	
Ripple	10 %	◆	◆	◆	◆	
No-load supply current	≤ 25 mA	◆	◆	◆	◆	
Time delay before availability	≤ 80 ms	◆	◆	◆	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆		◆		
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆		◆	
	AS-Interface					◆
Switching type	light/dark switching	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	
Switching current	≤ 35 mA					◆
	max. 200 mA	◆	◆	◆	◆	
Voltage drop	≤ 2.5 V	◆	◆	◆	◆	
Switching frequency	≤ 1000 Hz	◆	◆	◆	◆	◆
Response time	≤ 0.5 ms	◆	◆	◆	◆	◆
Timer function	parameterisable	◆	◆	◆	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable	◆		◆		
	nnp, dynamic/static configurable		◆		◆	
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V	◆		◆		
	inactive: ≥ 7 V or unwired; active: ≤ 3 V		◆		◆	
Ambient temperature	-25 ... +70 °C	◆	◆	◆	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆	◆	◆	◆
Protection degree	IP68	◆	◆	◆	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆	◆	◆	
	4-pin M12 x 1 connector, 90° adjustable position					◆
Housing	PBT	◆	◆	◆	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆	◆	◆	◆
Connector	AISI	◆	◆			◆
	high grade steel			◆	◆	
Dove tail	AISI	◆	◆			◆
	high grade steel			◆	◆	
Mass	60 g	◆	◆	◆	◆	◆

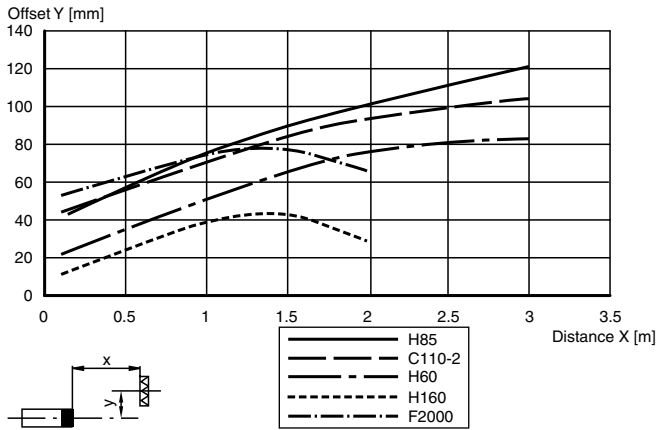


MLV11-54-G-.../112

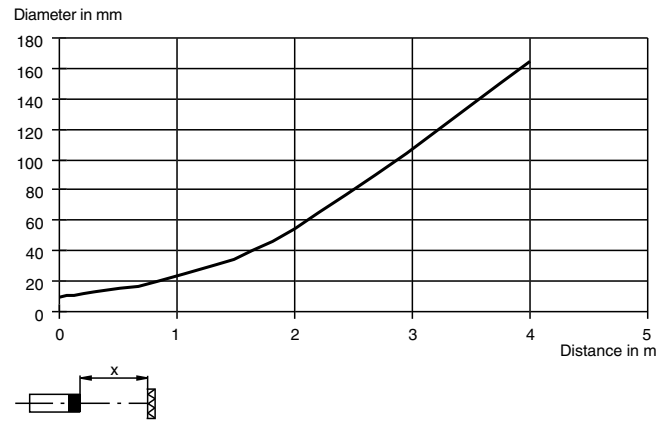
Series
MLV11

Diagrams

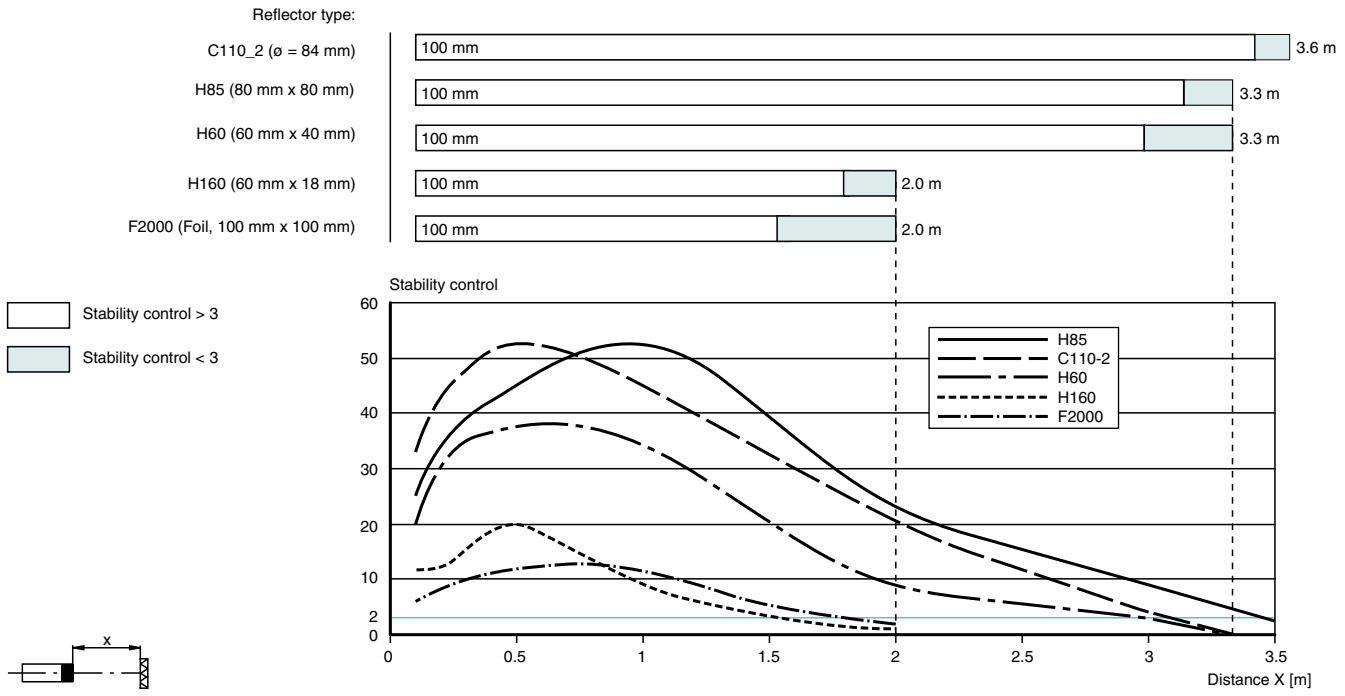
Characteristic response curve MLV11-54-G



Light spot diameter = f (Distance) MLV11-54-G



Relative received light strength MLV11-54-G



Programming

Address preset to 00, can be changed via Busmaster or programming devices

IO-Code 1

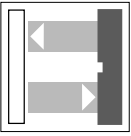
ID-Code F

• Data bit

Bit	Function
D0	Switch output
D1	Pre-fault indication (0=ON, 1=OFF)
D2	antivalent switch output
D3	Function input

• Parameter bit

Bit	Function
P0	not used
P1	not used
P2	not used
P3	not used



MLV11-8-.-500/./112

Series
MLV11

Reflection light scanner

MLV11-8-.-500/./112

with 5-pin M12 connector, 90° adjustable position

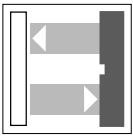
CE



- ◆ Sensing range up to 500 mm
- ◆ Diffuse reflective sensor for standard applications
- ◆ Visible red light
- ◆ Automatic setting of the switching points (sensitivity) per TEACH-IN
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Multifunction input
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP68
- ◆ All materials approved for food industry applications

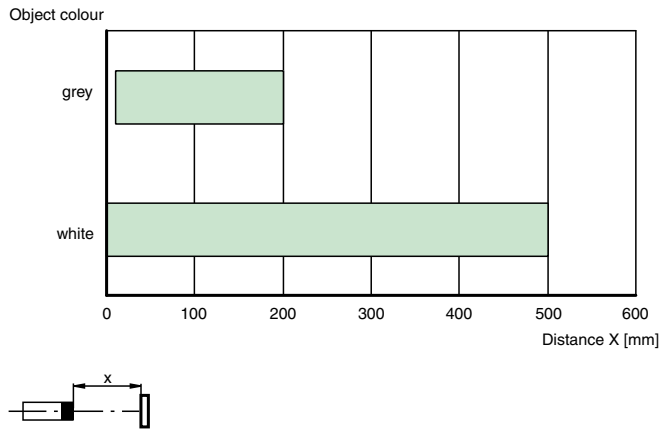
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		MLV11-8-500/47/112	MLV11-8-500/48/112	MLV11-8-E-500/47/112	MLV11-8-E-500/48/112	MLV11-8-500-AS-I/112
Detection range	0 ... 500 mm	◆	◆	◆	◆	◆
Adjustment range	50 ... 500 mm	◆	◆	◆	◆	◆
Reference target	Standard white 100 mm x 100 mm	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆	◆
Diameter of the light spot	25 mm at a distance of 500 mm	◆	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆	◆	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆	◆	◆	◆
Operating voltage	via AS-i network					◆
	10 ... 30 V DC	◆	◆	◆	◆	
Ripple	10 %	◆	◆	◆	◆	
No-load supply current	≤ 25 mA	◆	◆	◆	◆	
Time delay before availability	≤ 80 ms	◆	◆	◆	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆		◆		
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆		◆	
	AS-Interface					◆
Switching type	light/dark switching	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	
Switching current	≤ 35 mA					◆
	max. 200 mA	◆	◆	◆	◆	
Voltage drop	≤ 2.5 V	◆	◆	◆	◆	
Switching frequency	≤ 1000 Hz	◆	◆	◆	◆	◆
Response time	≤ 0.5 ms	◆	◆	◆	◆	◆
Timer function	parameterisable	◆	◆	◆	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable nnp, dynamic/static configurable	◆	◆	◆	◆	
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V inactive: ≥ 7 V or unwired; active: ≤ 3 V	◆	◆	◆	◆	
Ambient temperature	-25 ... +70 °C	◆	◆	◆	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆	◆	◆	◆
Protection degree	IP68	◆	◆	◆	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆	◆	◆	◆
Housing	PBT	◆	◆	◆	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆	◆	◆	◆
Connector	AISI	◆	◆			◆
	high grade steel			◆	◆	
Dove tail	AISI	◆	◆			◆
	high grade steel			◆	◆	
Mass	60 g	◆	◆	◆	◆	◆

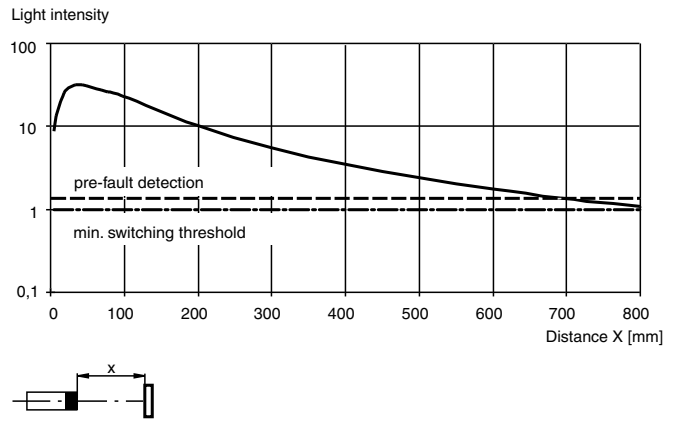


Diagrams

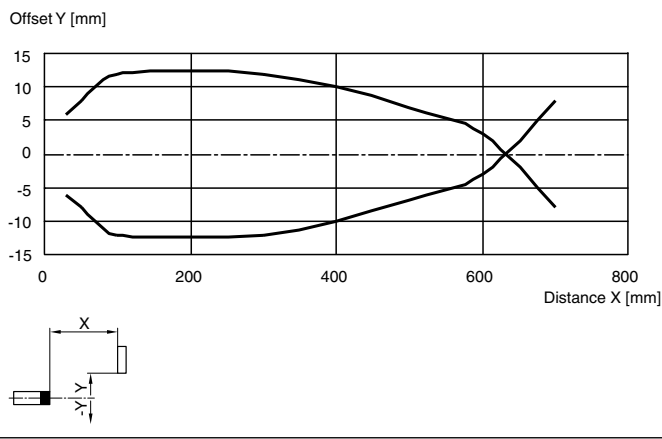
Detection ranges MLV11-8-500



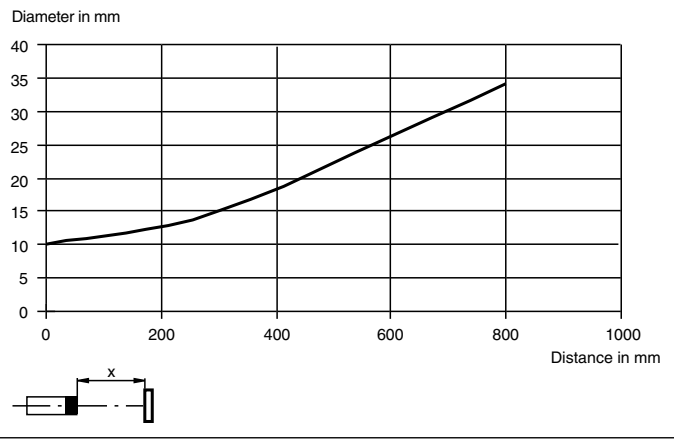
Relative Light Intensity MLV11-8-500



Characteristic response curve MLV11-8-500



Light spot diameter = f (Distance) MLV11-8-500



Programming

Address preset to 00, can be changed via Busmaster or programming devices
 IO-Code 1
 ID-Code F

• Data bit

Bit	Function
D0	Switch output
D1	Pre-fault indication (0=ON, 1=OFF)
D2	antivalent switch output
D3	Function input

• Parameter bit

Bit	Function
P0	not used
P1	not used
P2	not used
P3	not used



MLV11-8-H-.-150/./65a/112

Series
MLV11

Reflection light scanner with background suppression

MLV11-8-H-.-150/./65a/112

with 5-pin M12 connector, 90° adjustable position

CE



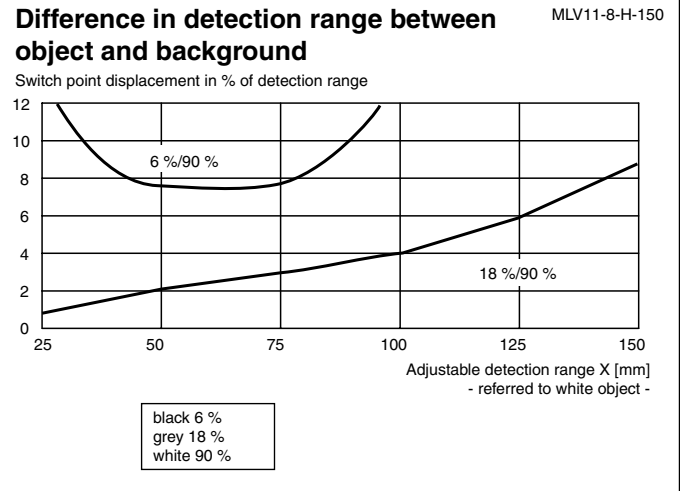
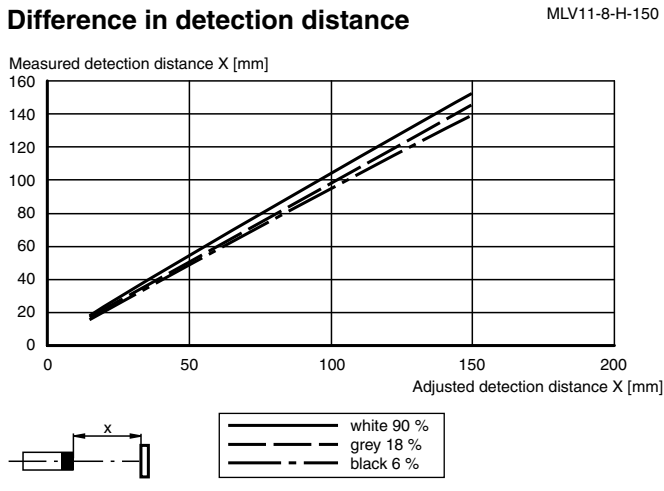
- ◆ Sensing range up to 150 mm
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Test input
- ◆ Protection degree IP67
- ◆ All materials approved for food industry applications

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

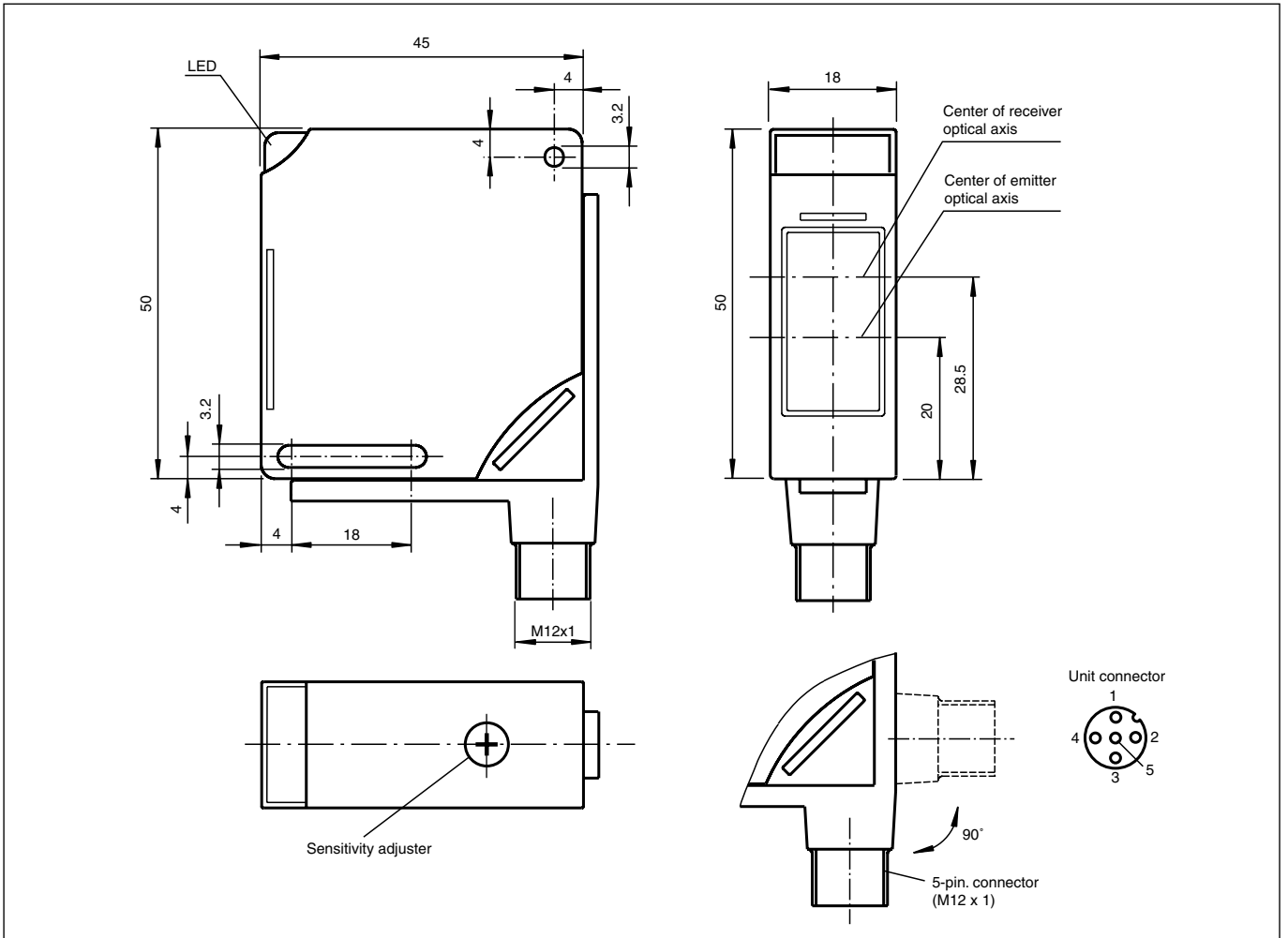
Ordering code		MLV11-8-H-150/47/65a/112	MLV11-8-H-150/48/65a/112	MLV11-8-H-E-150/47/65a/112	MLV11-8-H-E-150/48/65a/112
Detection range	0 ... 150 mm	◆	◆	◆	◆
Adjustment range	20 ... 150 mm	◆	◆	◆	◆
Reference target	Standard white 100 mm x 100 mm	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Diameter of the light spot	4 mm at a distance of 80 mm	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆
Function display	LED yellow: switching state LED red flashing pre-fault indicator	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	≤ 25 mA	◆	◆	◆	◆
Time delay before availability	≤ 80 ms	◆	◆	◆	◆
Signal output	2 switch outputs npn, normally open/closed (complementary)		◆		◆
	2 switch outputs pnp, normally open/closed (complementary)	◆		◆	
Switching type	light/dark switching	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 100 mA	◆	◆	◆	◆
Voltage drop	≤ 2.5 V	◆	◆	◆	◆
Switching frequency	≤ 1000 Hz	◆	◆	◆	◆
Response time	≤ 0.5 ms	◆	◆	◆	◆
Output of the pre-fault indication	On request	◆	◆	◆	◆
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V	◆		◆	
	inactive: ≥ 7 V or unwired; active: ≤ 3 V		◆		◆
Ambient temperature	-25 ... +70 °C	◆	◆	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆	◆	◆
Housing	ABS	◆	◆	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆	◆	◆
Connector	AISI	◆	◆		
	high grade steel			◆	◆
Dove tail	AISI	◆	◆		
	high grade steel			◆	◆
Mass	40 g	◆	◆	◆	◆



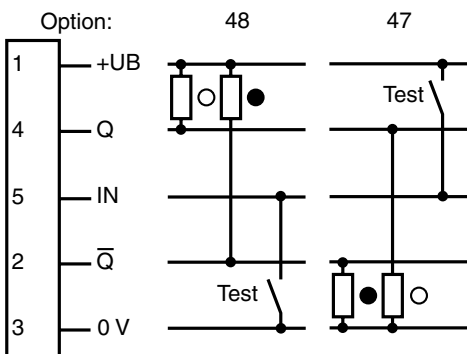
Diagrams

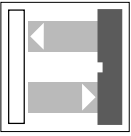


Dimensions



Electrical Connection





MLV11-8-LAS-.../112

Series
MLV11

Reflection light scanner

MLV11-8-LAS-.../112

with 5-pin M12 connector, 90° adjustable position

CE



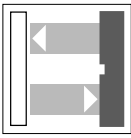
- ◆ Sensing range up to 300 mm
- ◆ Energetic diffuse type sensor for the detection of small objects (\varnothing 0.1 mm)
- ◆ Focal point at approx. 60 mm
- ◆ Automatic adjustment of the switching points (sensitivity) via TEACH-IN
- ◆ Visible red light, pulsed LASER light
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Multifunction input
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP68
- ◆ All materials approved for food industry applications
- ◆ Boost-Mode - approx. 4 times the brightness of the transmitted light as an aid in adjustment

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

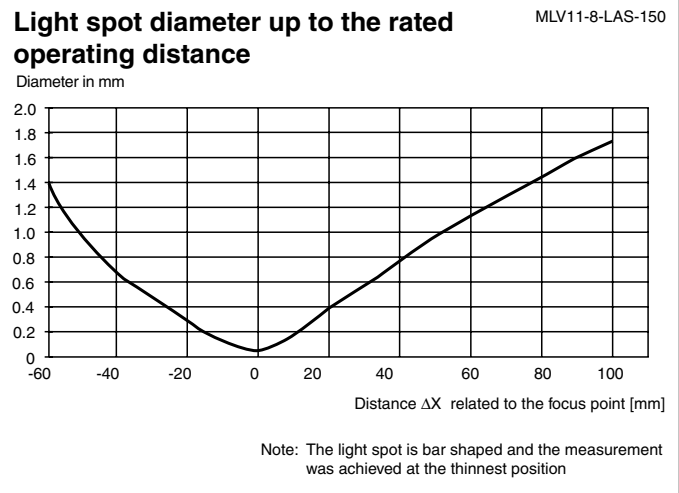
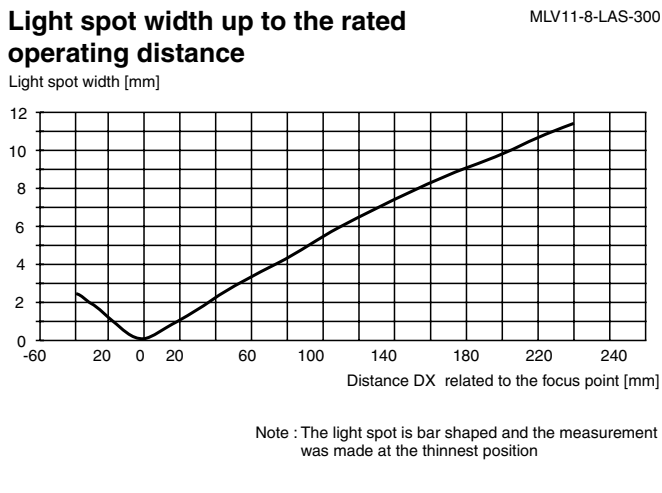
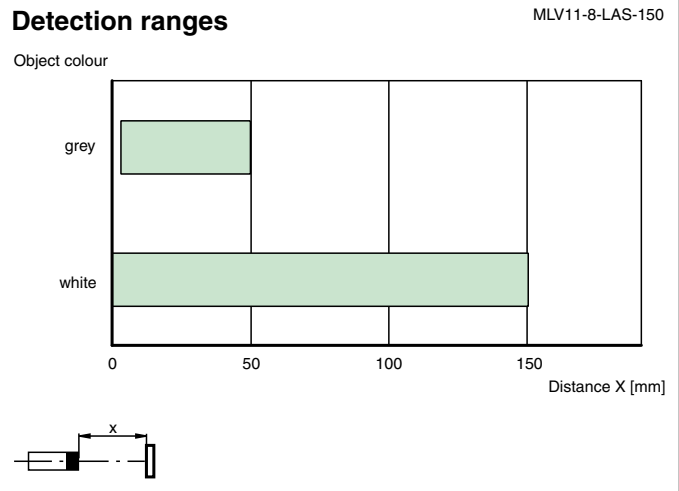
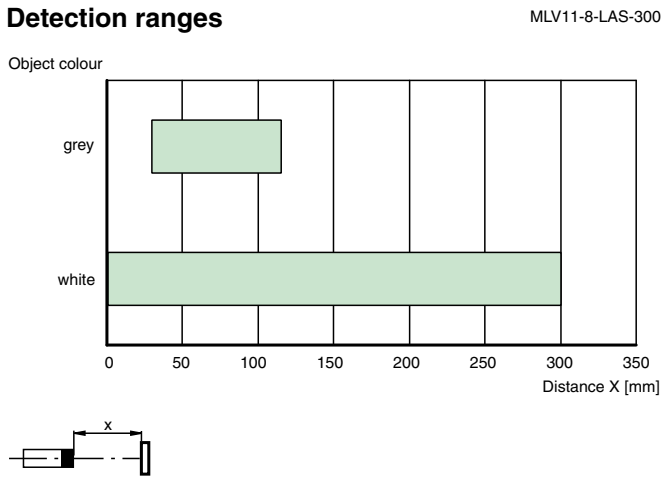
Ordering code		MLV11-8-LAS-150/47/112	MLV11-8-LAS-150/48/112	MLV11-8-LAS-300/47/112	MLV11-8-LAS-300/48/112	MLV11-8-LAS-150-AS-I/112	MLV11-8-LAS-300-AS-I/112
Detection range	0 ... 150 mm	◆	◆			◆	
	0 ... 300 mm			◆	◆		◆
Adjustment range	50 ... 150 mm	◆	◆			◆	
	50 ... 300 mm			◆	◆		◆
Reference target	Standard white 10 mm x 10 mm	◆	◆			◆	
	Standard white 100 mm x 100 mm			◆	◆		◆
Light source	Laser diode	◆	◆	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆	◆	◆
	Laser class 2, eyesafe	◆	◆	◆	◆	◆	◆
Diameter of the light spot	0.1 mm at a distance of 60 mm ± 2	◆	◆	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆	◆	◆
Function display	TEACH-IN: LED green flashing						
	switching state: LED yellow	◆	◆	◆	◆	◆	◆
	pre-fault indicator: LED red flashing						
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆	◆	◆	◆	◆
Operating voltage	via AS-i network					◆	◆
	10 ... 30 V DC	◆	◆	◆	◆		
Ripple	10 %	◆	◆	◆	◆		
No-load supply current	≤ 25 mA	◆	◆	◆	◆		
Time delay before availability	≤ 50 ms	◆	◆	◆	◆		
	≤ 80 ms					◆	◆
Signal output	2 switch outputs pnp, parameterisable as			◆			
	- NO/NC (antivalent)	◆					
	- NO and pre-fault indication						
	- NC and pre-fault indication						
	2 switch outputs npn, parameterisable as		◆		◆		
	- NO/NC (antivalent)						
	- NO and pre-fault indication						
	- NC and pre-fault indication						
	AS-Interface					◆	◆
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆		
Switching current	≤ 35 mA					◆	◆
	max. 200 mA	◆	◆	◆	◆		
Voltage drop	≤ 2.5 V	◆	◆	◆	◆		
Switching frequency	≤ 1000 Hz	◆	◆	◆	◆	◆	◆
Response time	≤ 0.5 ms	◆	◆	◆	◆	◆	◆
Timer function	parameterisable	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable	◆		◆			
	nnp, dynamic/static configurable		◆		◆		
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V	◆		◆			
	inactive: ≥ 7 V or unwired; active: ≤ 3 V		◆		◆		
Ambient temperature	-10 ... +40 °C	◆	◆	◆	◆		
	-25 ... +70 °C					◆	◆
Storage temperature	-40 ... +70 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP68	◆	◆	◆	◆	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆	◆	◆	◆	◆
Housing	PBT	◆	◆	◆	◆	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆	◆	◆	◆	◆
Connector	AlSi	◆	◆	◆	◆	◆	◆
Dove tail	AlSi	◆	◆	◆	◆	◆	◆
Mass	60 g	◆	◆	◆	◆	◆	◆

10/15/01

Date of issue



Diagrams



Programming

Address preset to 00, can be changed via Busmaster or programming devices
 IO-Code 1
 ID-Code F

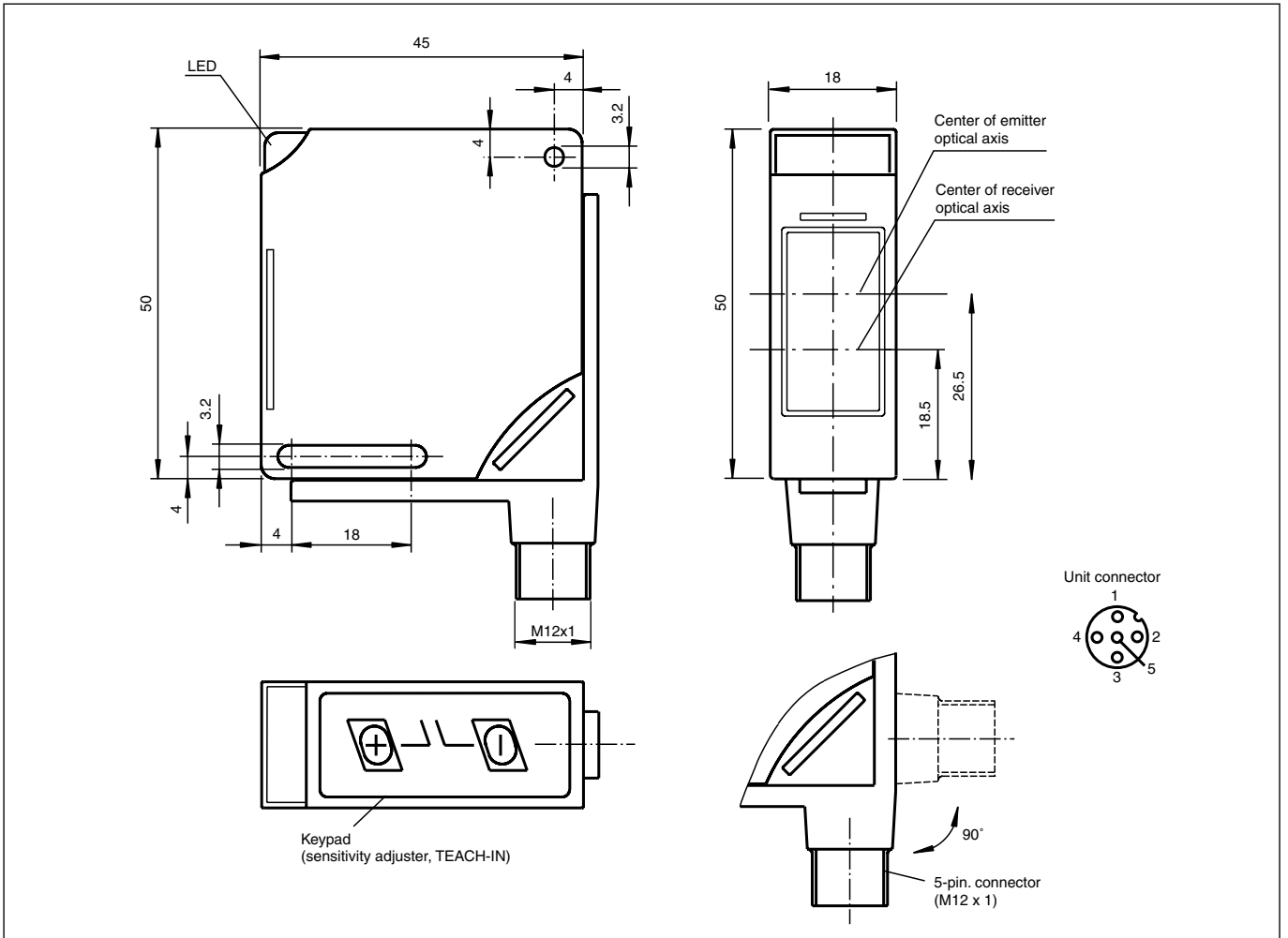
• Data bit

Bit	Function
D0	Switch output
D1	Pre-fault indication (0=ON, 1=OFF)
D2	antivalent switch output
D3	Function input

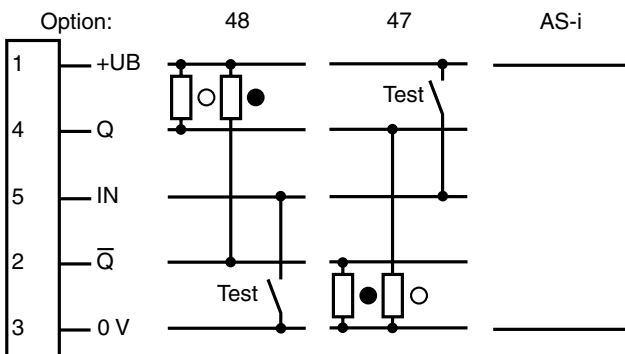
• Parameter bit

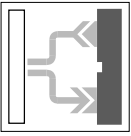
Bit	Function
P0	not used
P1	not used
P2	not used
P3	not used

Dimensions



Electrical Connection





MLV11-LL-G/.. /112

Series
MLV11

Fibre optics sensor

MLV11-LL-G/.. /112

with 5-pin M12 connector, 90° adjustable position

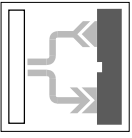
CE



- ◆ Detection range depends on the fibre optics being used
- ◆ For glass fibre optics
- ◆ Visible red light
- ◆ Automatic adjustment of the switching points (sensitivity) via TEACH-IN
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Multifunction input
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP68
- ◆ All materials approved for food industry applications

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		MLV11-LL-G/47/112	MLV11-LL-G/48/112
Effective detection range	0 ... 600 mm (with fibre LME 18-2.3-0.5-K2)	◆	◆
Reference target	Standard white 50 mm x 50 mm in direct detection	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 26 mA	◆	◆
Time delay before availability	≤ 80 ms	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆	
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 1000 Hz	◆	◆
Response time	≤ 0.5 ms	◆	◆
Repeat accuracy	≤ 0.5 % of the sensing range	◆	◆
Timer function	parameterisable	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable	◆	
	npn, dynamic/static configurable		◆
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V	◆	
	inactive: ≥ 7 V or unwired; active: ≤ 3 V		◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆
Housing	PBT	◆	◆
Connector	AISi	◆	◆
Dove tail	AISi	◆	◆
Mass	60 g	◆	◆

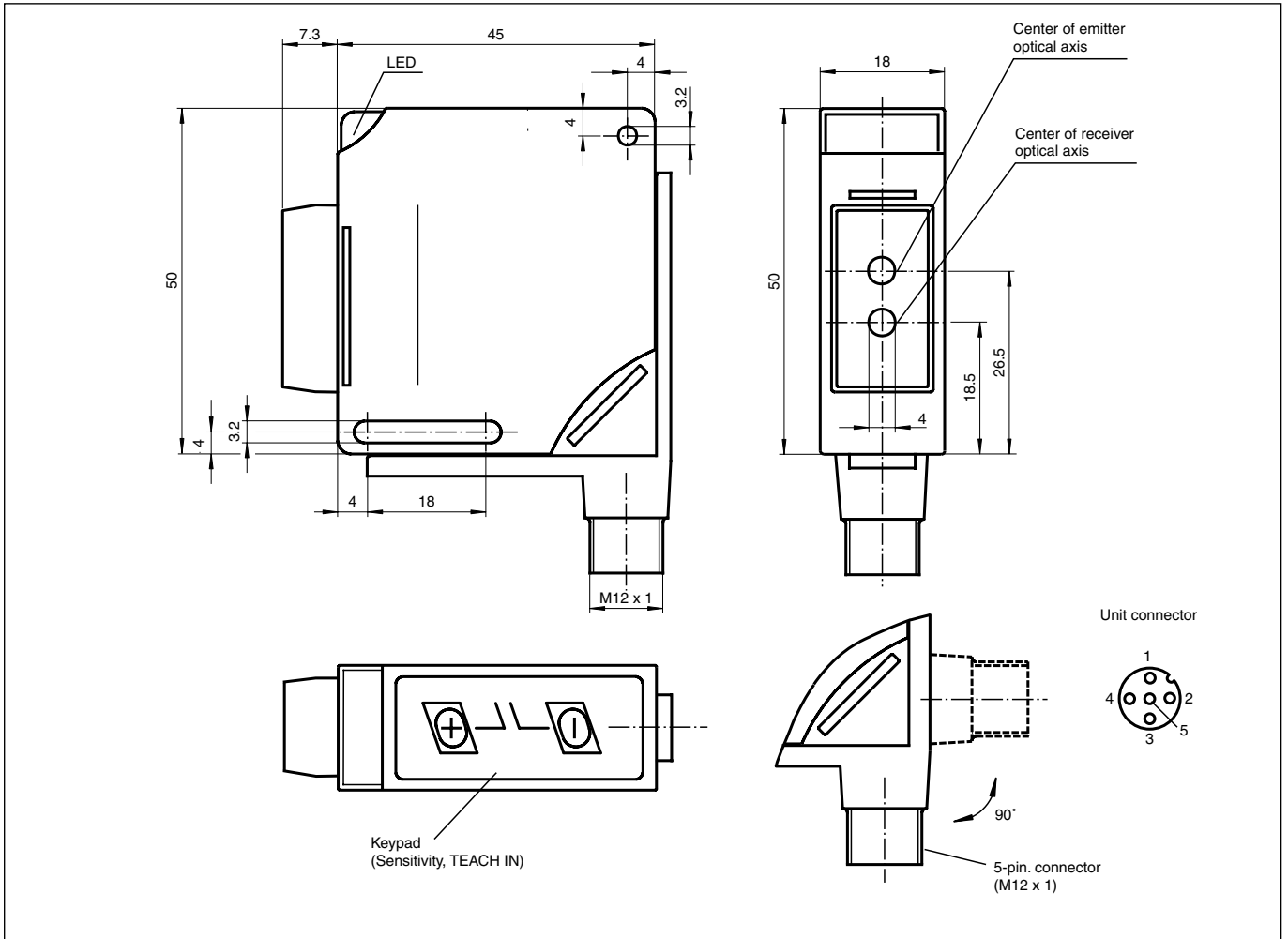


MLV11-LL-G/./112

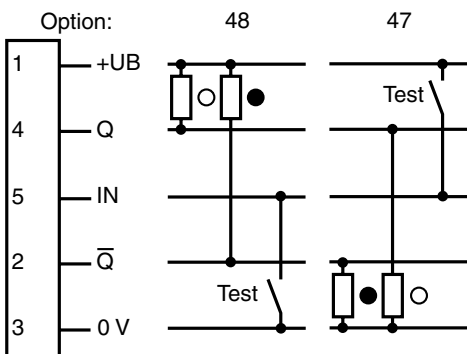
**Series
MLV11**

Date of issue 10/15/01

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Selection table for fibre

	Model number	Range in mm	Detection range in mm	Fig.
fibre optics, single path with PVC coating	LCE 06-1,9-0,5-K9	500		4
	LCE 06-2,3-0,5-K2	600		1
fibre optics, single path with metal coating	LME 06-1,9-0,5-K9	500		4
	LME 06-2,3-0,5-K10	600		5
	LME 06-2,3-0,5-K2	600		1
	LME 06-2,3-0,5-K3	600		2
	LME 06-2,3-0,5-K4	600		3
	LME 06-2,3-1,0-K2	600		1
	LME 06-2,3-2,0-K2	600		1
glass fibre optics, single path with silicone coating	LSE 06-1,1-0,5-K9	100		4
fibre optics, reflex with PVC coating	LCR 06-2,7-0,5-K9		75	12
	LCR 06-3,2-0,5-K1		100	6
	LCR 06-3,2-0,5-K2		100	7
	LCR 06-3,2-0,5-K5		100	10
	LCR 06-3,2-1,0-K5		100	10
	LCR 06-3,2-2,0-K2		100	7
glass fibre optics, reflex with metal coating	LMR 06-1,1-0,5-K3		10	8
	LMR 06-2,3-0,25-K3		45	8
	LMR 06-2,3-0,5-K3		45	8
	LMR 06-2,3-0,5-K7		45	11
	LMR 06-2,7-0,5-K9		75	12
	LMR 06-3,2-0,5-K1		100	6
	LMR 06-3,2-1,0-K1		100	6
	LMR 06-3,2-2,0-K1		100	6
	LMR 06-3,2-2,0-K4		100	9
LMR 06-3,2-3,0-K1		100	6	
fibre optics, reflex with silicone coating	LSR 06-2,3-0,5-K12		45	13
	LSR 06-3,2-0,5-K1		100	6

Other lengths and end pieces available on request

Fig.1

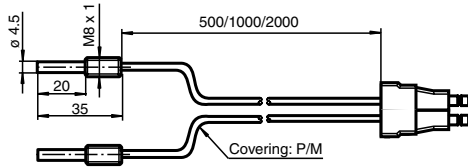


Fig.2

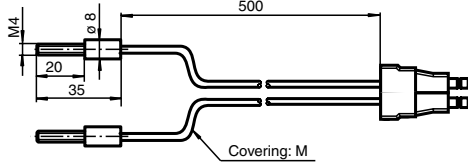


Fig.3

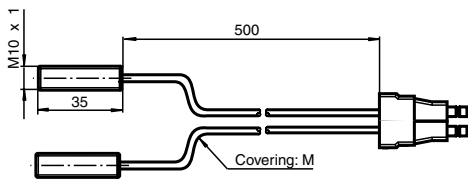


Fig.4

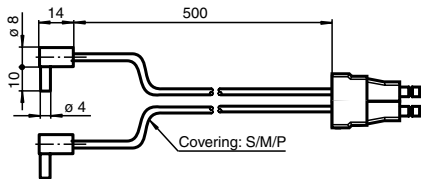


Fig.5

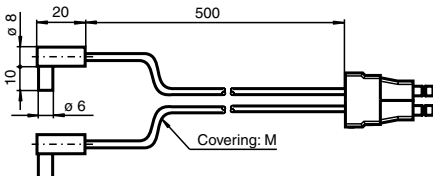


Fig.6

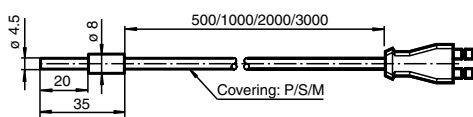


Fig.7

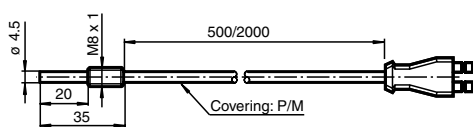


Fig.8

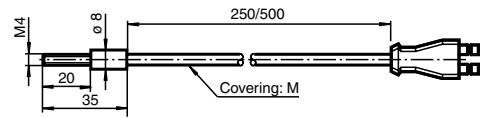


Fig.9

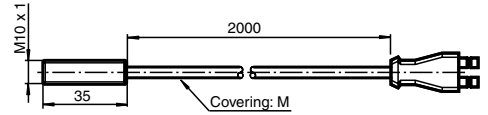


Fig.10

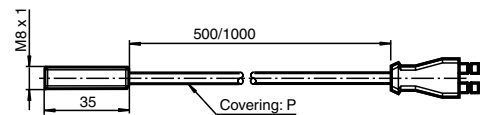


Fig.11

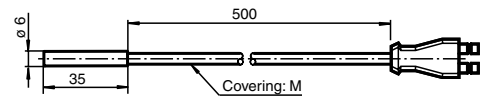


Fig.12

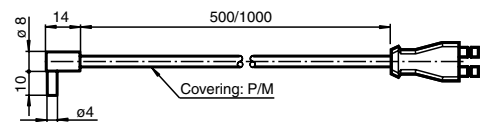
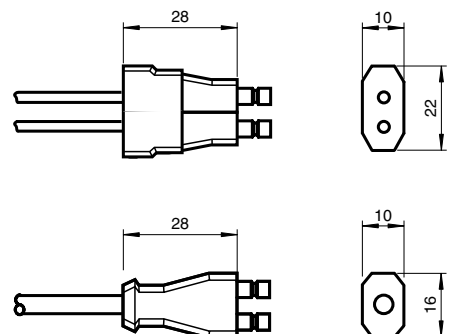
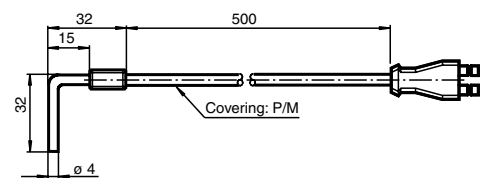
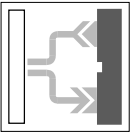


Fig.13



Covering material:
M = metal, P = PVC, S = silicone



MLV11-LL-K/./112

Series
MLV11

Fibre optics sensor

MLV11-LL-K/./112

with 5-pin M12 connector, 90° adjustable position

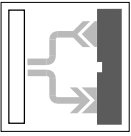
CE



- ◆ Detection range depends on the fibre optics being used
- ◆ For plastic fibre optics
- ◆ Visible red light
- ◆ Automatic adjustment of the switching points (sensitivity) via TEACH-IN
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Multifunction input
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP68
- ◆ All materials approved for food industry applications

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

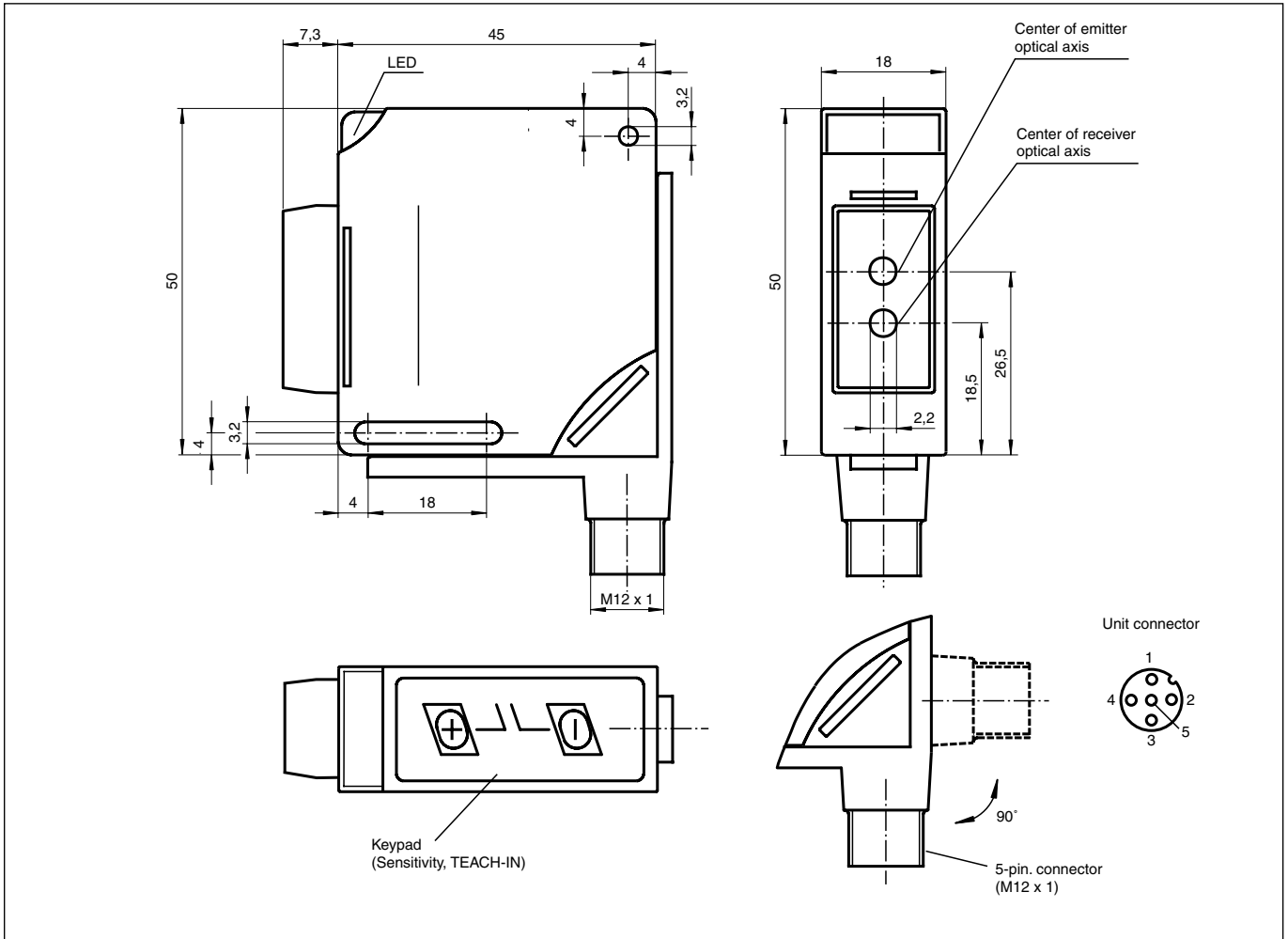
Ordering code		MLV11-LL-K/47/112	MLV11-LL-K/48/112
Effective detection range	0 ... 150 mm (with fibre KLE 00-2.2-2.0-K52)	◆	◆
Reference target	Standard white 50 mm x 50 mm in direct detection	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 26 mA	◆	◆
Time delay before availability	≤ 80 ms	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆	
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 1000 Hz	◆	◆
Response time	≤ 0.5 ms	◆	◆
Repeat accuracy	≤ 0.5 % of the sensing range	◆	◆
Timer function	parameterisable	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable		◆
	npn, dynamic/static configurable	◆	
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V	◆	
	inactive: ≥ 7 V or unwired; active: ≤ 3 V		◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆
Housing	PBT	◆	◆
Connector	AlSi	◆	◆
Dove tail	AlSi	◆	◆
Mass	60 g	◆	◆



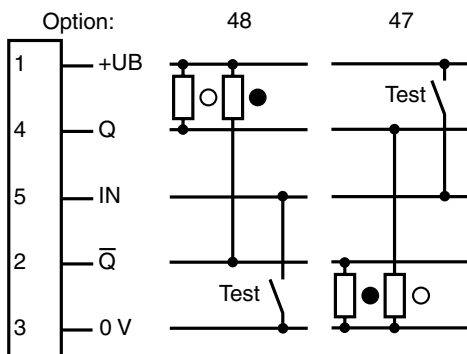
MLV11-LL-K/./112

**Series
MLV11**

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Selection table for fibre

	Model number	Range in mm	Detection range in mm	Fig.
plastic fibre optics, single path	KLE 00-2,2-2,0-K53	150		1
	KLE 00-2,2-2,0-K55	150		2
	KLE 00-1,0-2,0-K56	50		3
	KLE 00-2,2-2,0-K52	150		4
	KLE 00-1,0-2,0-K54	50		5
	KLE 00-2,2-2,0-K51	50		6
plastic fibre optics, reflex	KLR 00-2,2-2,0-K57		60	7
	KLR 00-2,2-2,0-K59		70	8
	KLR 00-1,0-2,0-K58		25	9
	KLR 00-2,2-2,0-K60		60	10
	KLR 00-1,0-2,0-K61		20	11
	KLR 00-2,2-2,0-K40		70	12

Other lengths and end pieces available on request

Fig.1

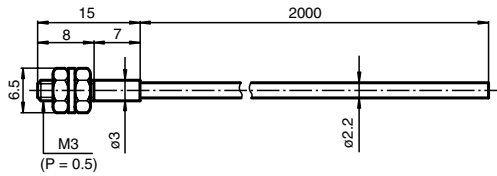


Fig.2

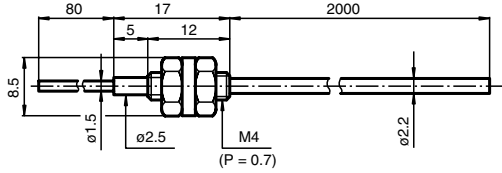


Fig.3

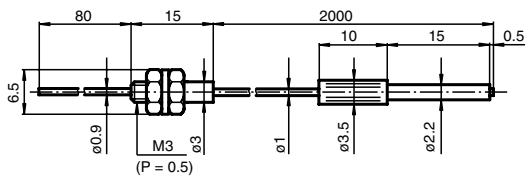


Fig.4

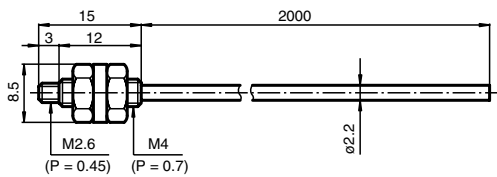


Fig.5

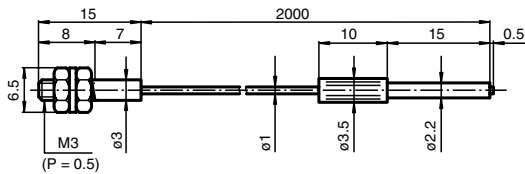


Fig.6

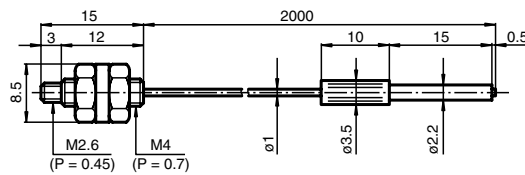


Fig.7

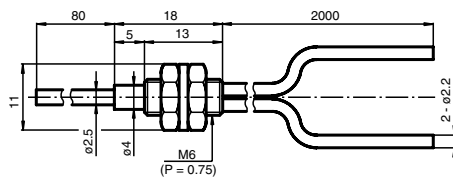


Fig.8

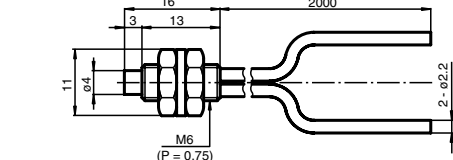


Fig.9

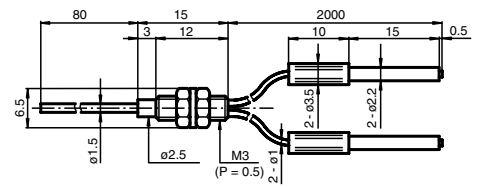


Fig.10

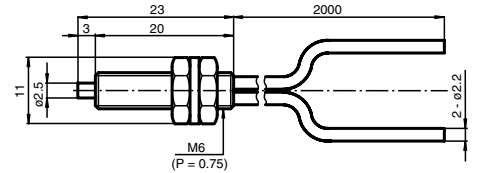


Fig.11

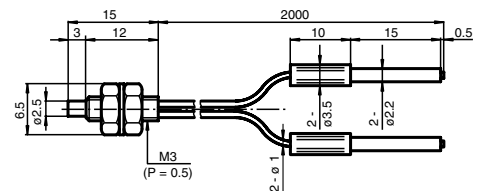
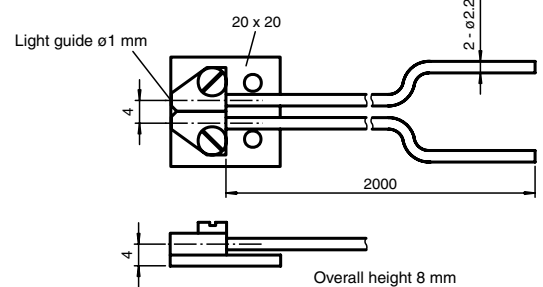
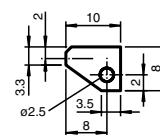


Fig.12



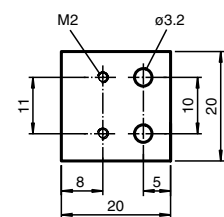
- Direct detection**
If both light guide heads are fixed **parallel** to the base plate, then the direct detection or reflex operation is possible.
- Retro-reflective operation**
A blind zone exists in front of the heads. This is larger in reflex operation than in direct detection (diffuse reflection). The actual size of the zone depends on the application.
- Through-beam operation**
Through-beam operation is achieved by removing the base plate and mounting the heads so that they are mutually opposed on a **common** reference axis.
- Triangulation**
By loosening and changing the positions of the heads on the base plate, the heads can be inclined at an arbitrary angle to each other. The reference axes of the light guides then form a **triangle**. Objects are detected which are located at the point of intersection of the axes.

Head



4 mm thick

Base plate



Aluminium 2 mm thick





Series MLV13 – sturdy and economical

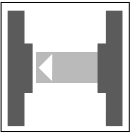
The MLV13 series represents a cost-effective alternative to other light beam switch series. Three different function types with different optical features allow for numerous solutions to automation tasks.

One feature shared in common by all sensors is a rugged plastic housing. It is ultrasound welded and completely waterproof. The light outlet surface is protected by a scratch-resistant plastic disk. Available optical function types include the single path light beam switch with a detection range of 15 m, the reflex light beam switch with polarisation filter and a detection range of 6 m, and the energetic direct detection light scanner with a detection.

An M12 4-pin connector, an M8 4-pin connector or a fixed cable are used for the electrical connection. Short circuit-proof PNP or NPN transistor outputs are available as a signal output. All sensors of Series 13 are light/dark on and programmable. The series design also includes indication of the switching state and pre-fault indication.

Areas of application include paper processing machines, printing machines packaging machines and storage and conveyor systems.

Principle	Type code	Detection range	Page
	M13/MV13/115	0 m ... 15 m	96
	M13/MV13/73c	0 m ... 15 m	100
	M13/MV13/95	0 m ... 15 m	104
	MLV13-54/115	0 mm ... 6000 mm	108
	MLV13-54/73c	0 mm ... 6000 mm	112
	MLV13-54/95	0 mm ... 6000 mm	116
	MLV13-8-400/115	5 mm ... 400 mm	120
	MLV13-8-400/73c	5 mm ... 400 mm	124
	MLV13-8-400/95	5 mm ... 400 mm	128



M13/MV13/./40b/115

Single path light beam switch

M13/MV13/./40b/115

with 2 m fixed cable

CE



- ◆ Detection range up to 15 m
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Light/dark ON, programmable
- ◆ Protection degree IP67

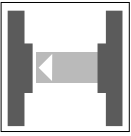
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		M13/MV13/30/40b/115	M13/MV13/32/40b/115
Effective detection range	0 ... 15 m	◆	◆
Adjustment range	2 ... 15 m	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Approvals	CE	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Operating display	LED green (emitter)	◆	◆
Function display	Switching state: LED yellow (receiver) Pre-fault indicator: LED red flashing (receiver)	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 30 ms	◆	◆
Signal output	1 switch output, pnp, NO/NC		◆
	1 switch output, npn, NO/NC	◆	
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 150 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m cable, 4 x 0.14 mm ² , PVC	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	40 g (device)	◆	◆

Series
MLV13

10/2/01

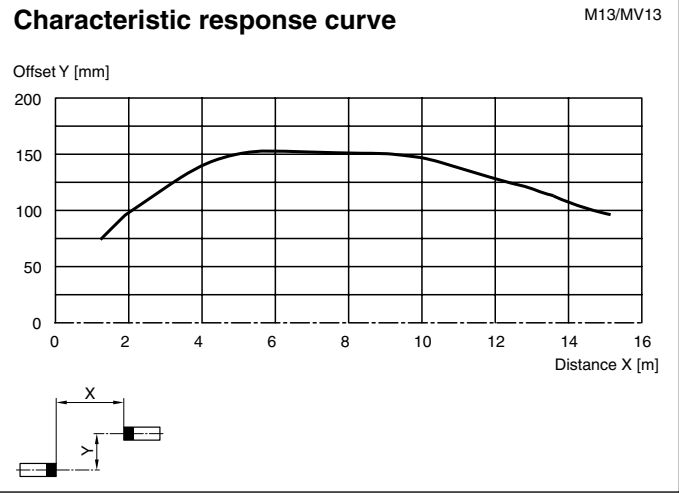
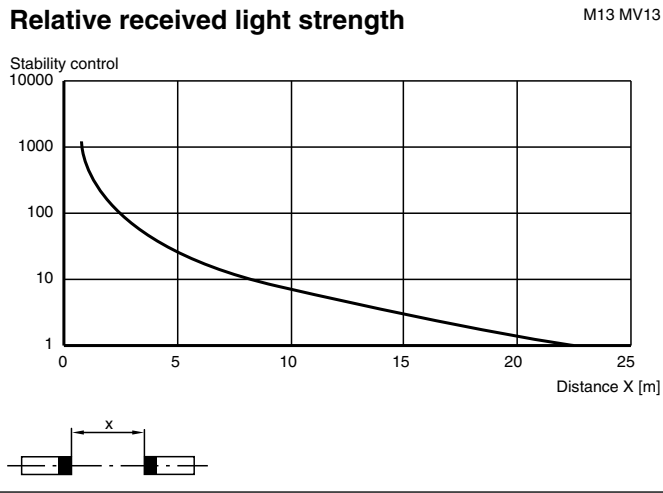
Date of issue



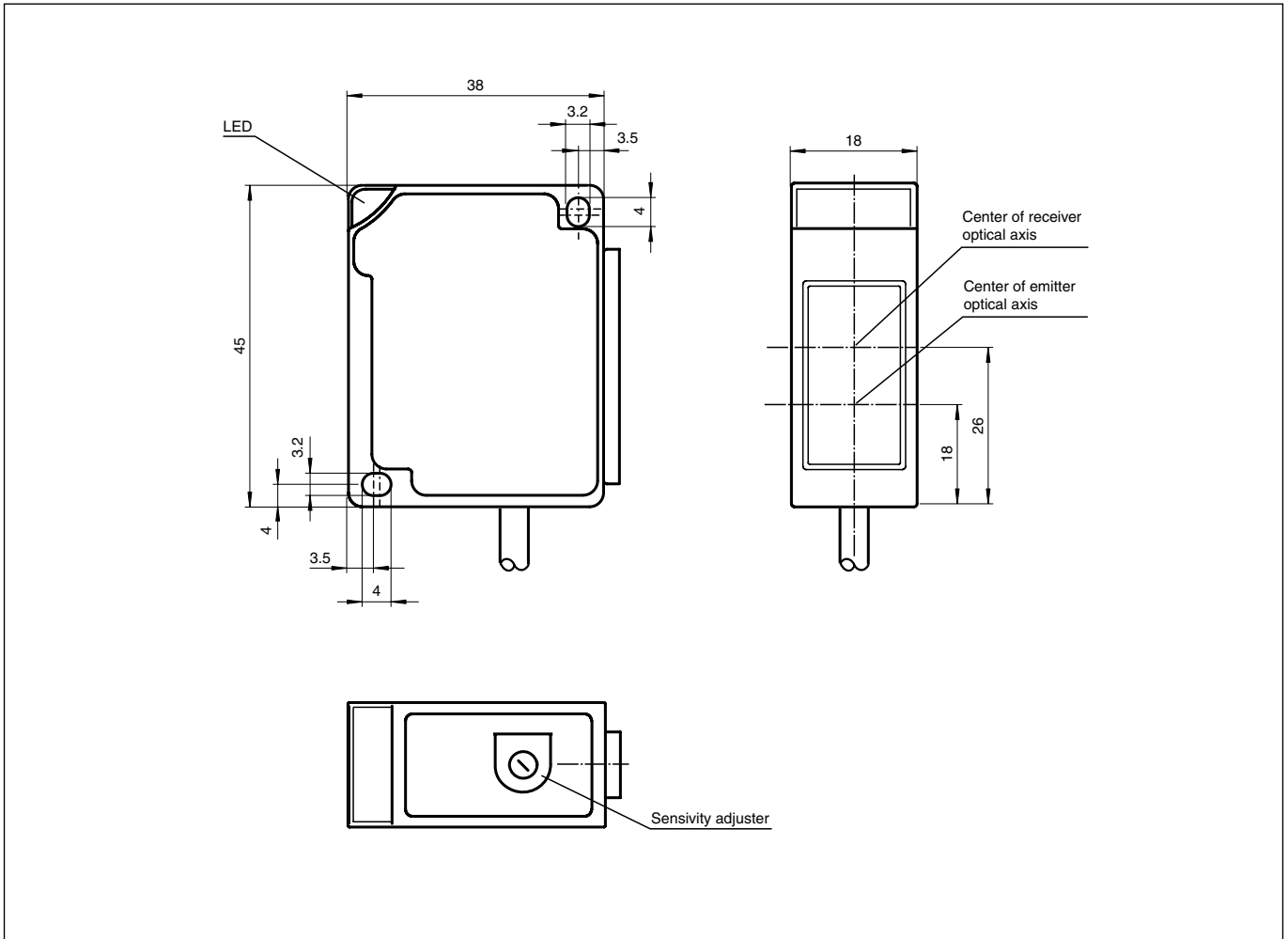
M13/MV13/./40b/115

Diagrams

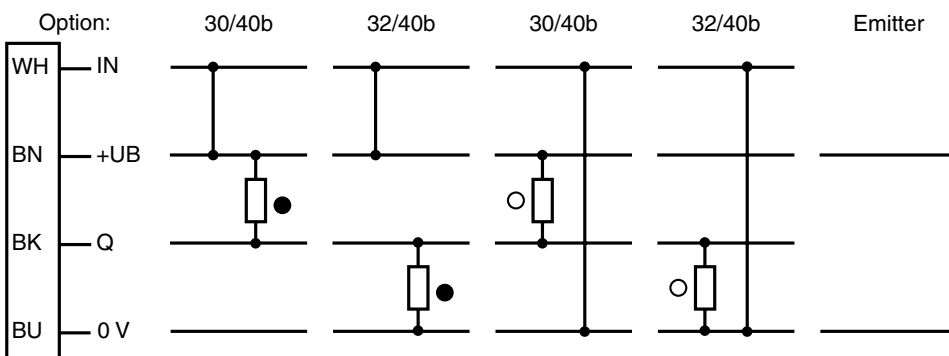
Series
MLV13

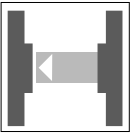


Dimensions



Electrical Connection





M13/MV13/./40b/73c

Single path light beam switch

M13/MV13/./40b/73c

with 4-pin, M12 x 1 connector

Series
MLV13

CE

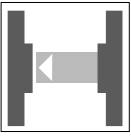


- ◆ Detection range up to 15 m
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Light/dark ON, programmable
- ◆ Protection degree IP67
- ◆ Connector M12 x 1 for fast mounting

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

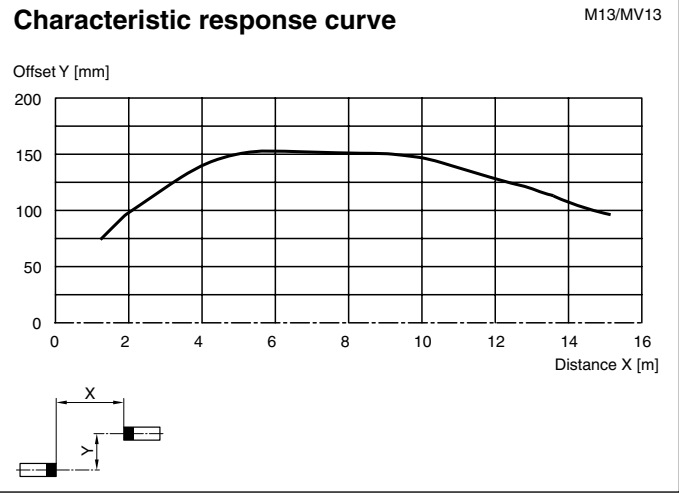
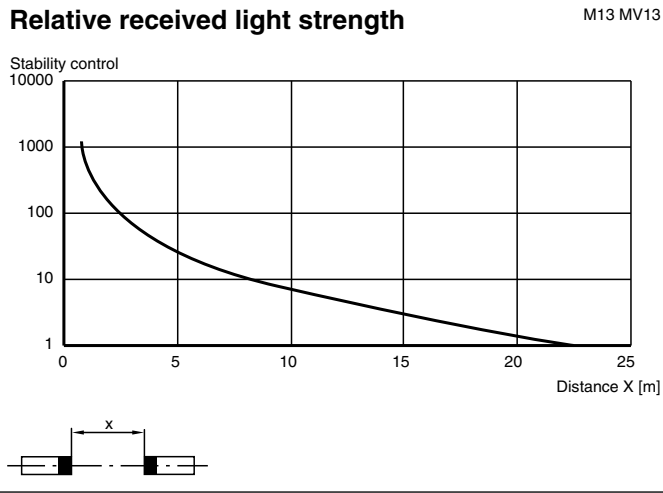
Date of issue 10/2/01

Ordering code		M13/MV13/30/40b/73c	M13/MV13/32/40b/73c
Effective detection range	0 ... 15 m	◆	◆
Adjustment range	2 ... 15 m	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Approvals	CE	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Operating display	LED green (emitter)	◆	◆
Function display	Switching state: LED yellow (receiver) Pre-fault indicator: LED red flashing (receiver)	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 30 ms	◆	◆
Signal output	1 switch output, pnp, NO/NC		◆
	1 switch output, npn, NO/NC	◆	
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 150 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	40 g (device)	◆	◆



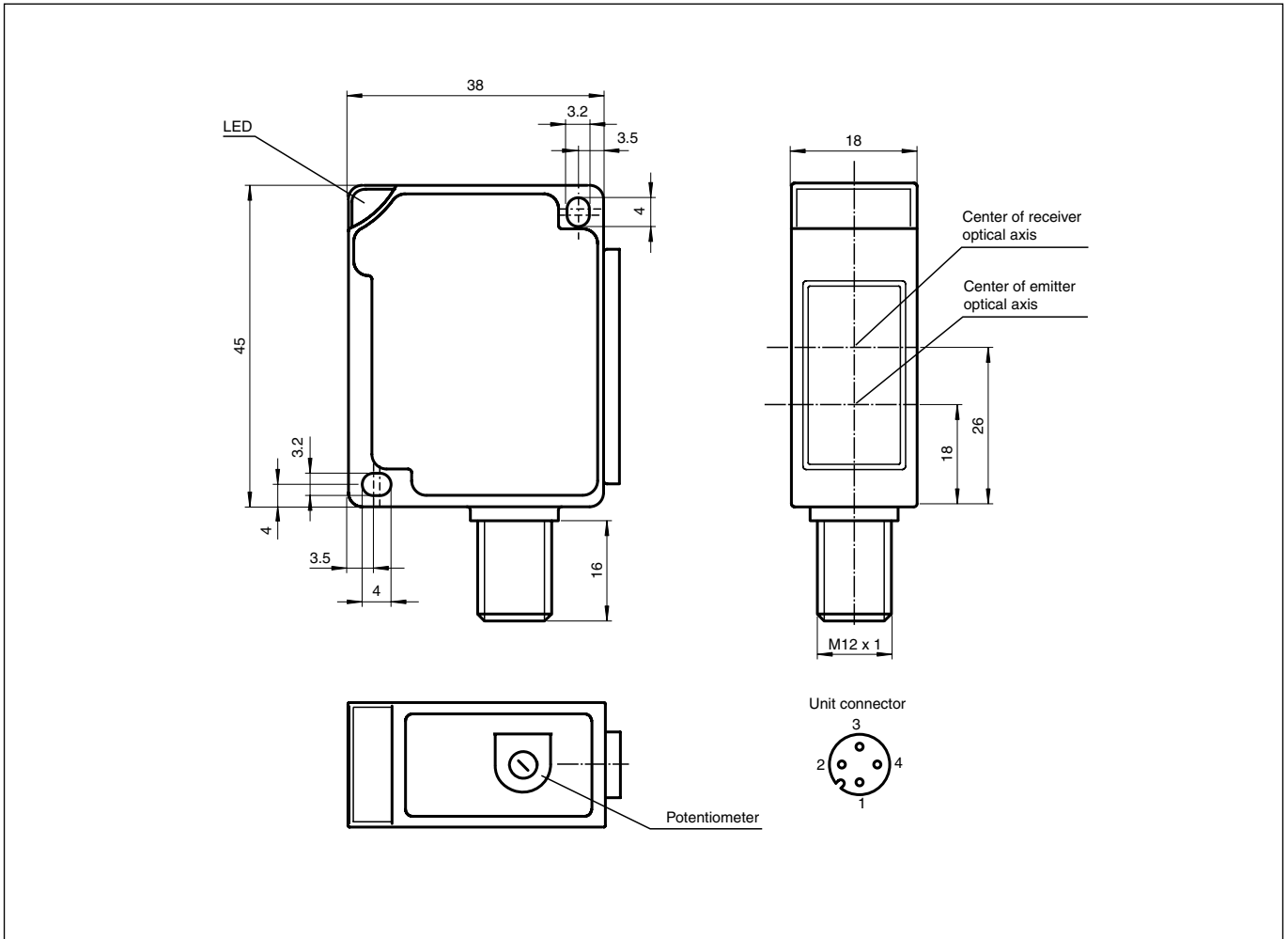
M13/MV13/./40b/73c

Diagrams

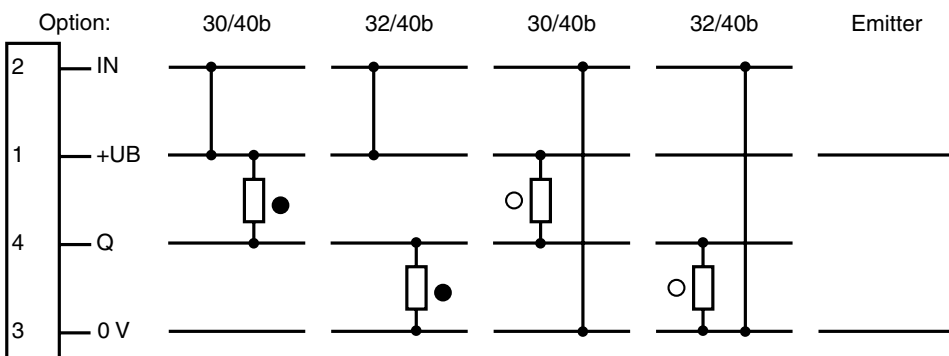


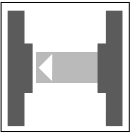
Series MLV13

Dimensions



Electrical Connection





M13/MV13/./40b/95

Single path light beam switch

M13/MV13/./40b/95

with 4-pin, M8 connector

Series
MLV13

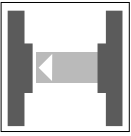


- ◆ Detection range up to 15 m
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Light/dark ON, programmable
- ◆ Protection degree IP67
- ◆ M8 x 1 connector for rapid mounting

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

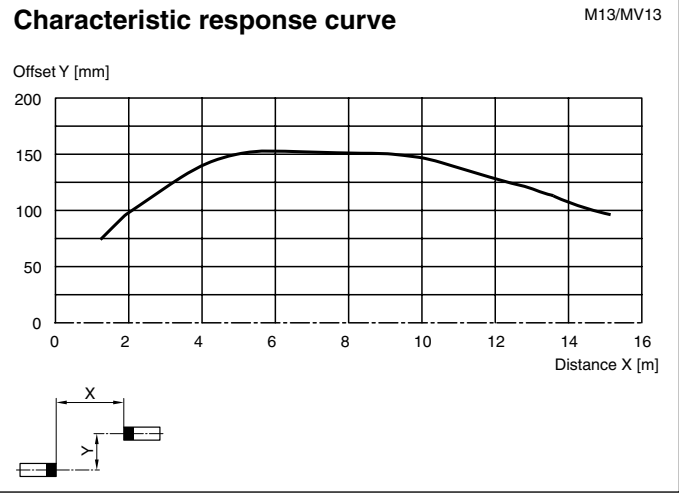
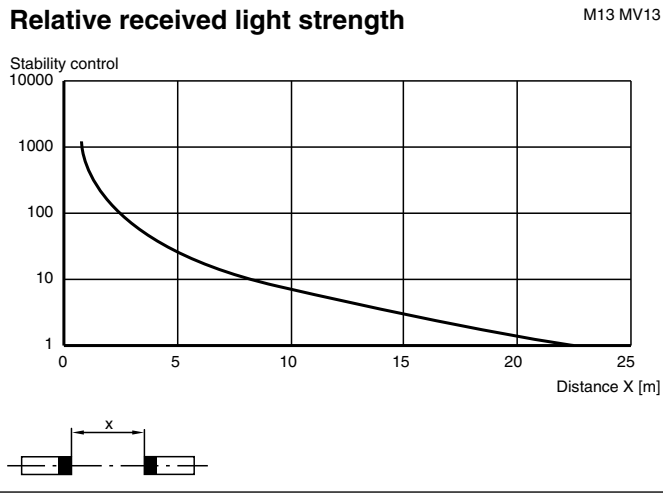
Date of issue 10/2/01

Ordering code		M13/MV13/30/40b/95	M13/MV13/32/40b/95
Effective detection range	0 ... 15 m	◆	◆
Adjustment range	2 ... 15 m	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Approvals	CE	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Operating display	LED green (emitter)	◆	◆
Function display	Switching state: LED yellow (receiver) Pre-fault indicator: LED red flashing (receiver)	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 30 ms	◆	◆
Signal output	1 switch output, pnp, NO/NC		◆
	1 switch output, npn, NO/NC	◆	
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 150 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M8 x 1 connector	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	40 g (device)	◆	◆



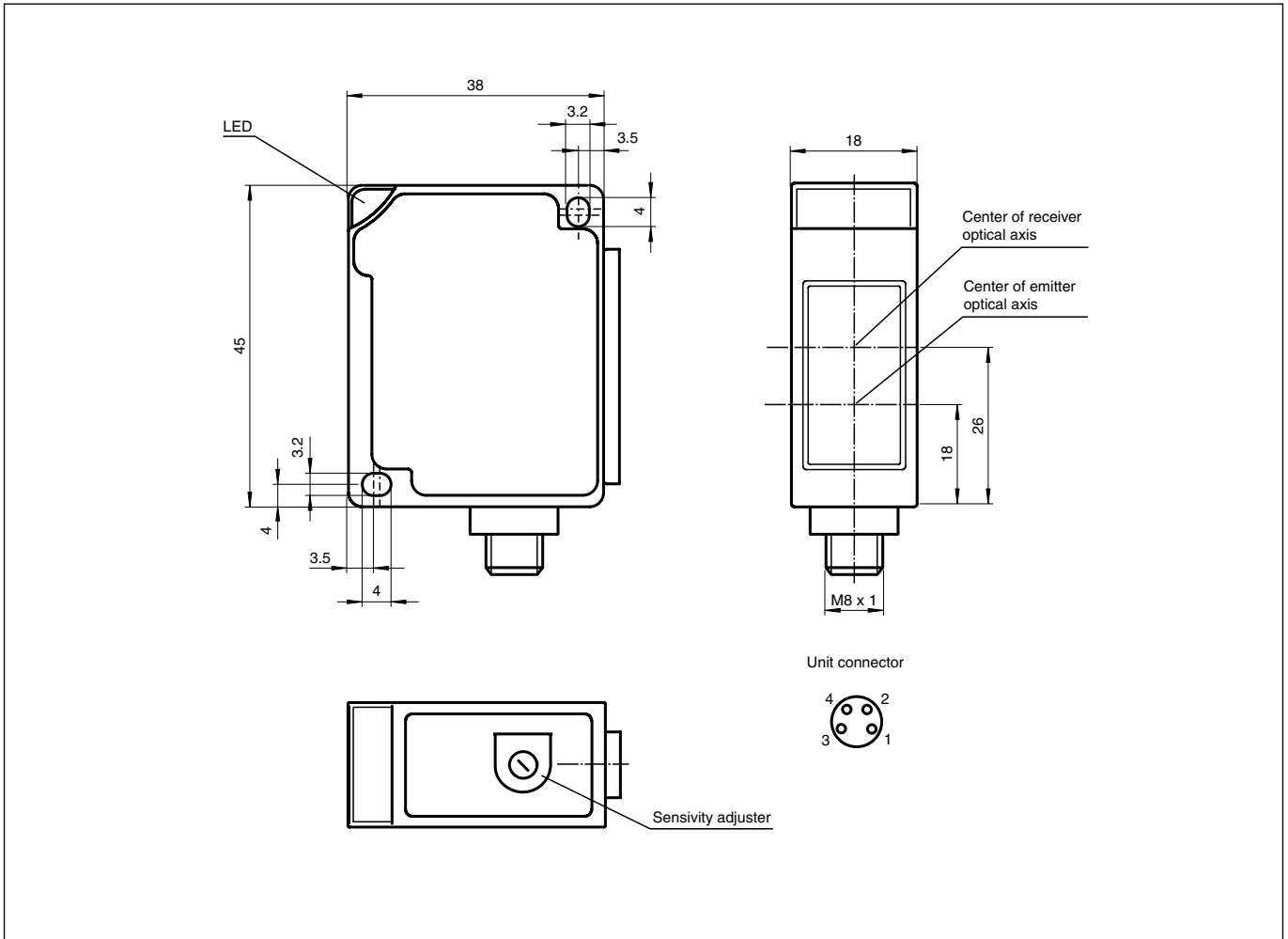
M13/MV13/./40b/95

Diagrams

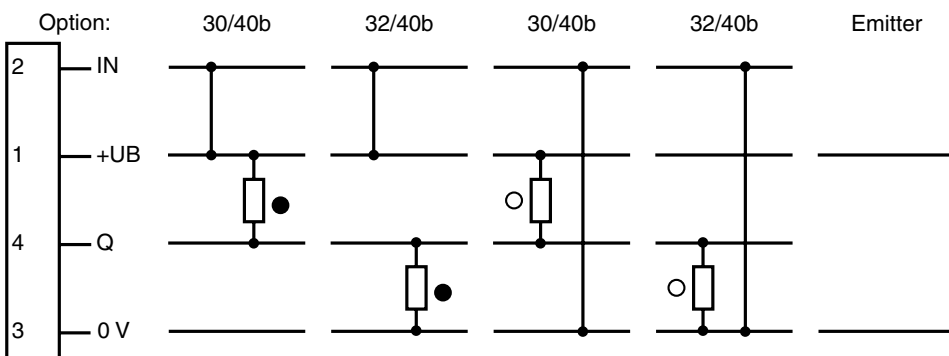


Series MLV13

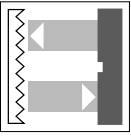
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV13-54/./40b/115

Reflection light beam switch with polarisation filter

MLV13-54/./40b/115

with 2 m fixed cable

CE



- ◆ Detection range up to 6000 mm
- ◆ Glare protected with polarisation filter
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Control input for light-/dark switching
- ◆ Protection degree IP67
- ◆ All materials approved for food industry applications

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

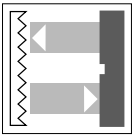
Date of issue 10/2/01

Ordering code		MLV13-54/30/40b/115	MLV13-54/32/40b/115
Effective detection range	0 ... 6 m	◆	◆
Reference target	Reflector C110_2	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Diameter of the light spot	200 mm at a distance of 6000 mm	◆	◆
Ambient light limit	10000 Lux	◆	◆
Approvals	CE	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Function display	Switching state: LED yellow pre-fault indicator: LED red	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 80 ms	◆	◆
Signal output	1 switch output, pnp, NO/NC	◆	◆
	1 switch output, npn, NO/NC	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 500 Hz	◆	◆
Response time	≤ 1 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m cable, 4 x 0.14 mm ²	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	40 g	◆	◆

Series
MLV13

10/2/01

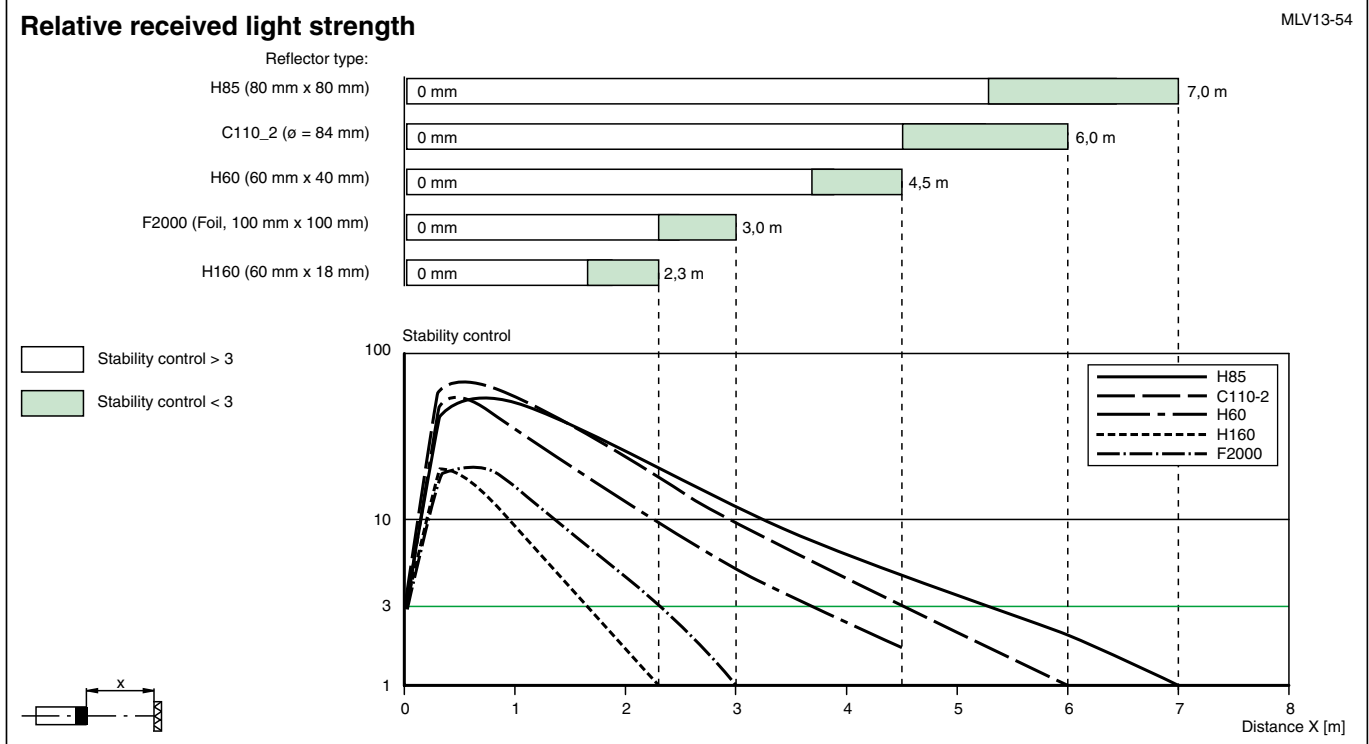
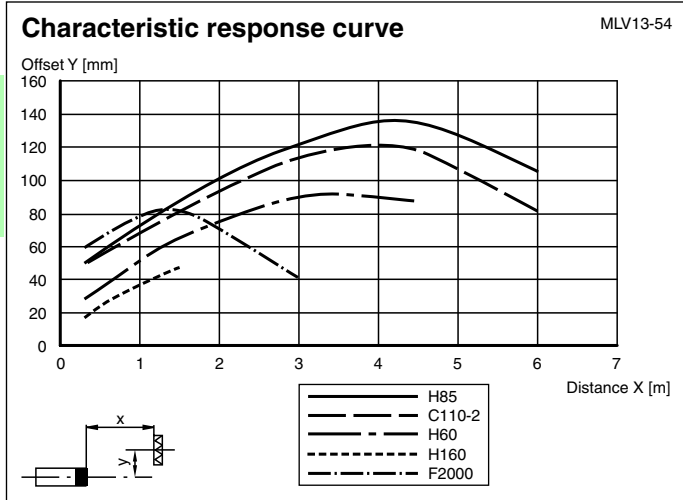
Date of issue



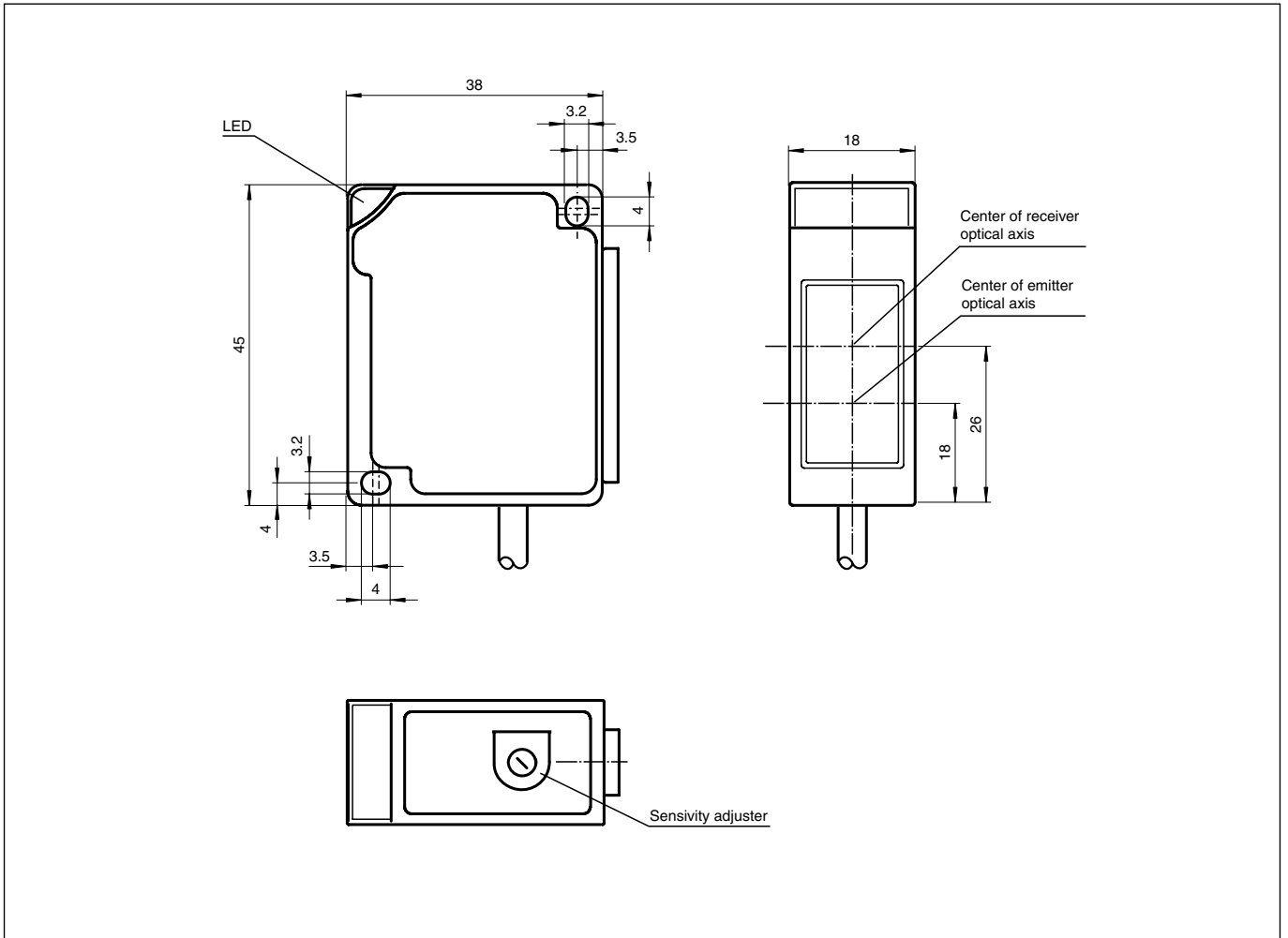
MLV13-54/./40b/115

Diagrams

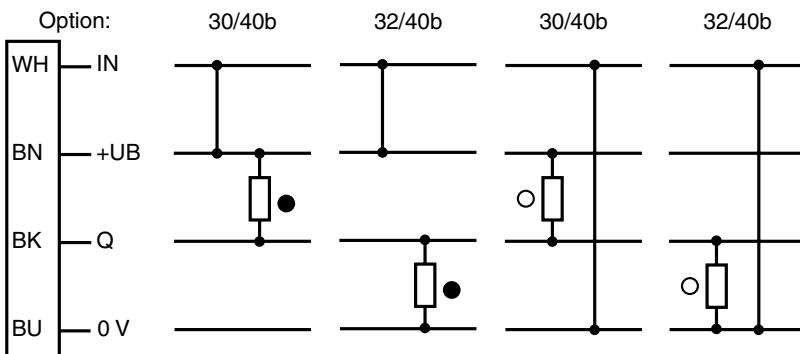
Series
MLV13

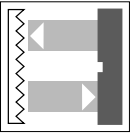


Dimensions



Electrical Connection





MLV13-54/.. /40b/73c

Reflection light beam switch with polarisation filter

MLV13-54/.. /40b/73c

with 4-pin, M12 connector

Series
MLV13

CE



- ◆ Detection range up to 6000 mm
- ◆ Glare protected with polarisation filter
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Control input for light-/dark switching
- ◆ Protection degree IP67
- ◆ All materials approved for food industry applications

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

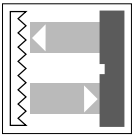
Date of issue 10/2/01

Ordering code		MLV13-54/30/40b/73c	MLV13-54/32/40b/73c
Effective detection range	0 ... 6 m	◆	◆
Reference target	Reflector C110_2	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Diameter of the light spot	200 mm at a distance of 6000 mm	◆	◆
Ambient light limit	10000 Lux	◆	◆
Approvals	CE	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Function display	Switching state: LED yellow pre-fault indicator: LED red	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 80 ms	◆	◆
Signal output	1 switch output, pnp, NO/NC	◆	◆
	1 switch output, npn, NO/NC	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 500 Hz	◆	◆
Response time	≤ 1 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	40 g	◆	◆

Series
MLV13

10/2/01

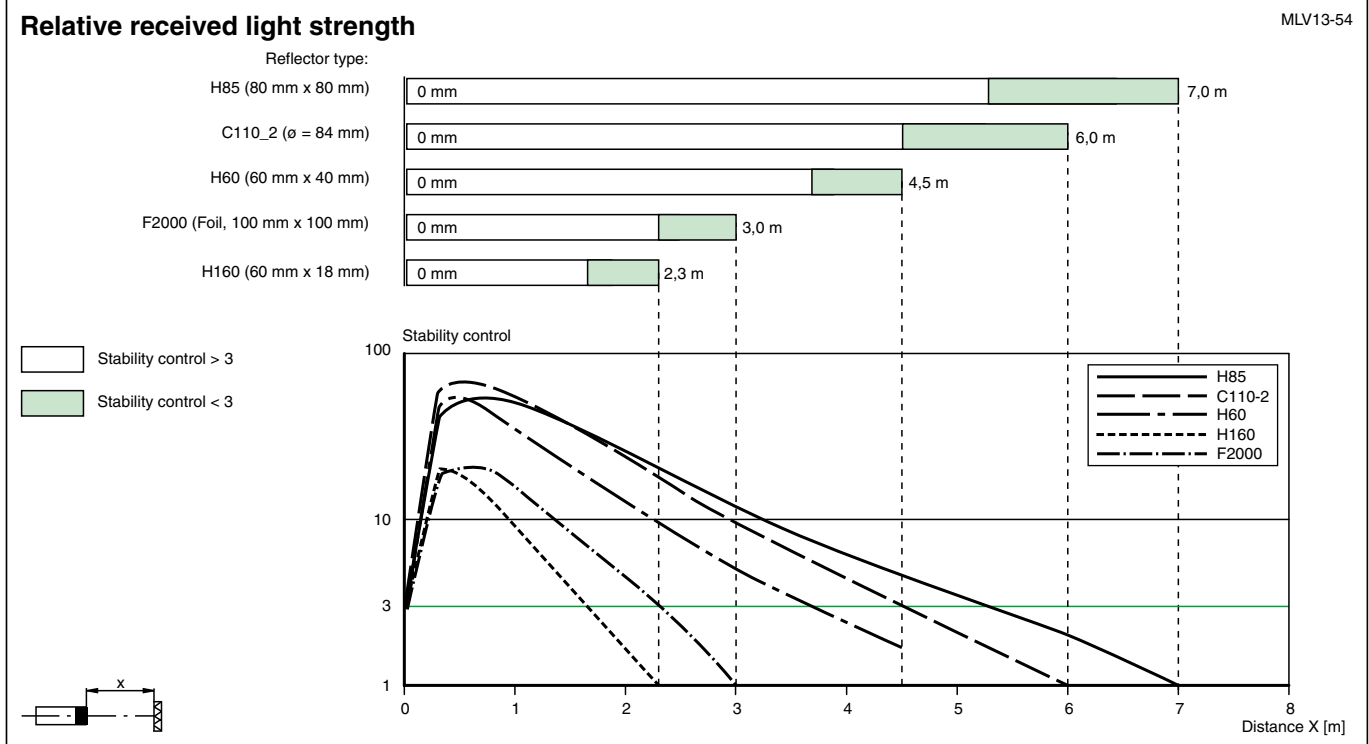
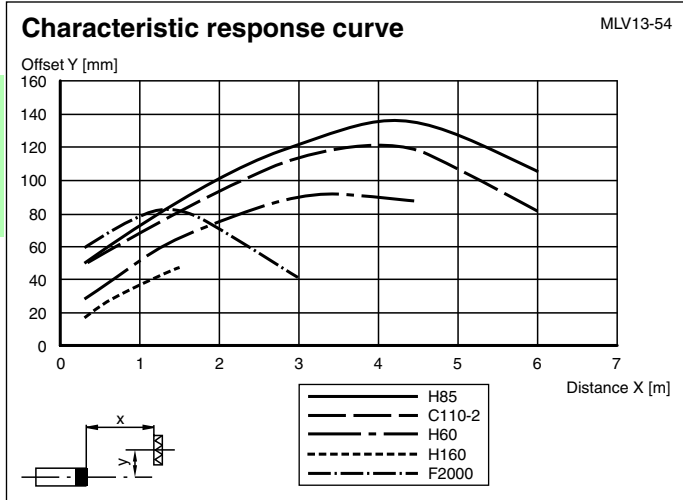
Date of issue



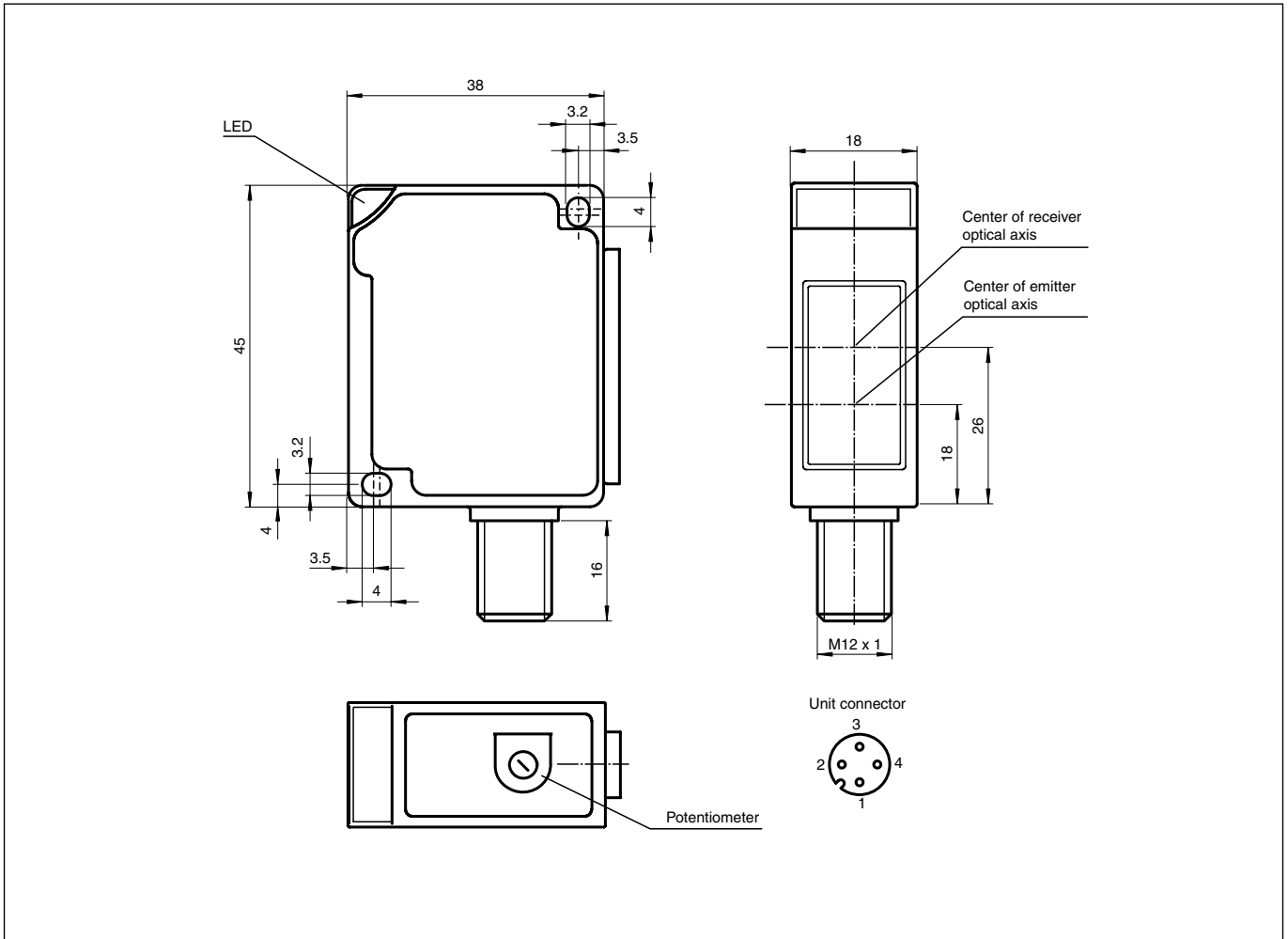
MLV13-54/.. /40b/73c

Diagrams

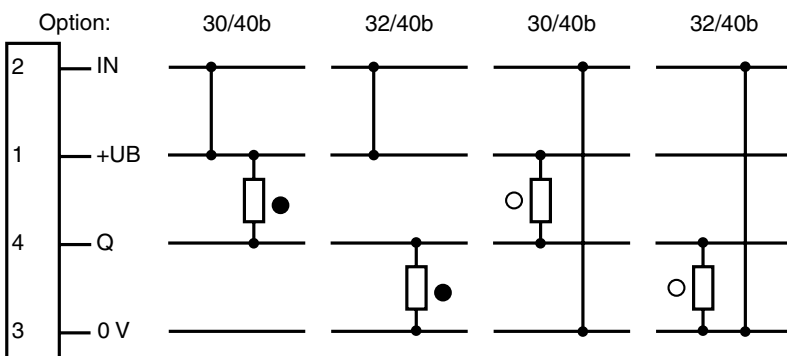
Series
MLV13

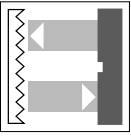


Dimensions



Electrical Connection





MLV13-54/.. /40b/95

Reflection light beam switch with polarisation filter

MLV13-54/.. /40b/95

with 4-pin, M8 connector

Series
MLV13

CE

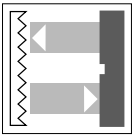


- ◆ Detection range up to 6000 mm
- ◆ Glare protected with polarisation filter
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Control input for light-/dark switching
- ◆ Protection degree IP67
- ◆ All materials approved for food industry applications

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue 10/2/01

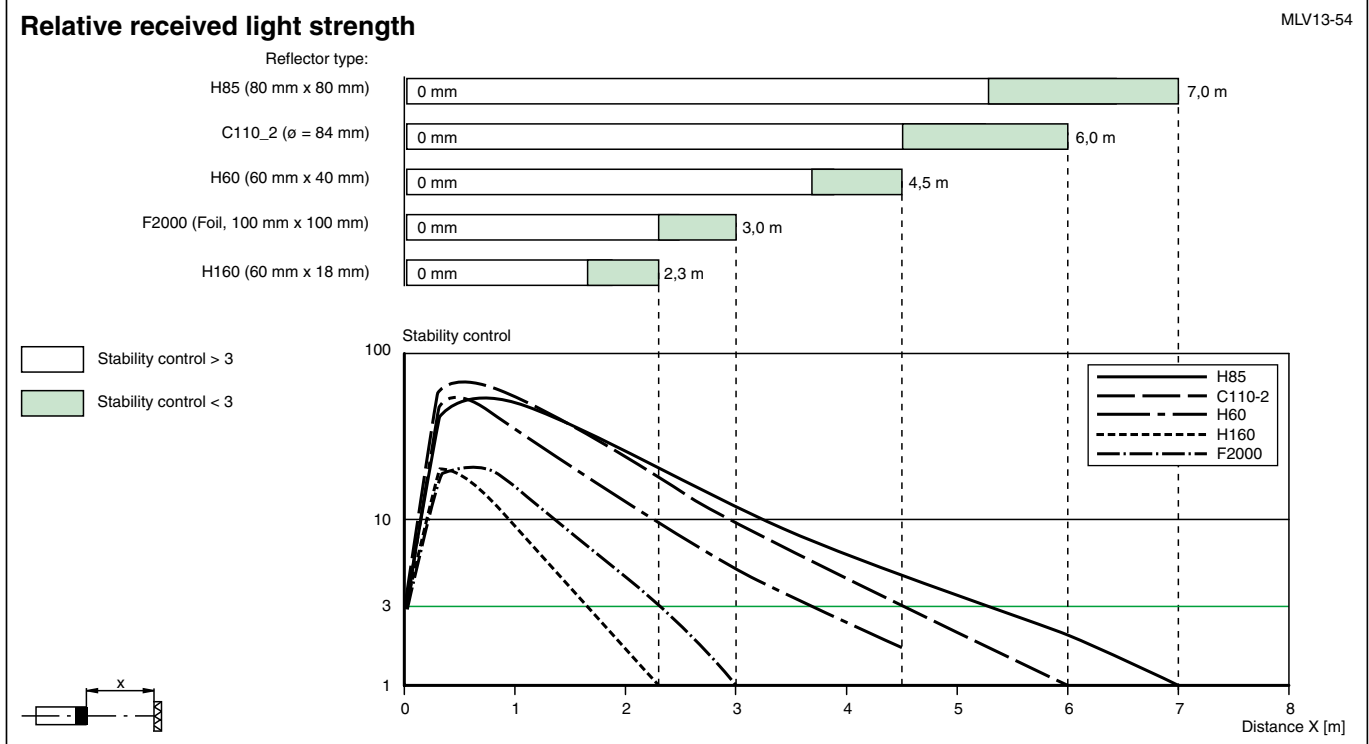
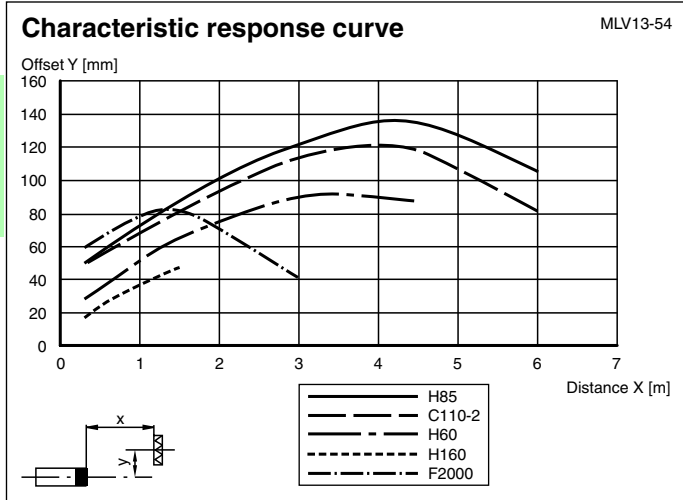
Ordering code		MLV13-54/30/40b/95	MLV13-54/32/40b/95
Effective detection range	0 ... 6 m	◆	◆
Reference target	Reflector C110_2	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Diameter of the light spot	200 mm at a distance of 6000 mm	◆	◆
Ambient light limit	10000 Lux	◆	◆
Approvals	CE	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Function display	Switching state: LED yellow pre-fault indicator: LED red	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 80 ms	◆	◆
Signal output	1 switch output, pnp, NO/NC	◆	◆
	1 switch output, npn, NO/NC	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 500 Hz	◆	◆
Response time	≤ 1 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M8 x 1 connector	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	40 g	◆	◆



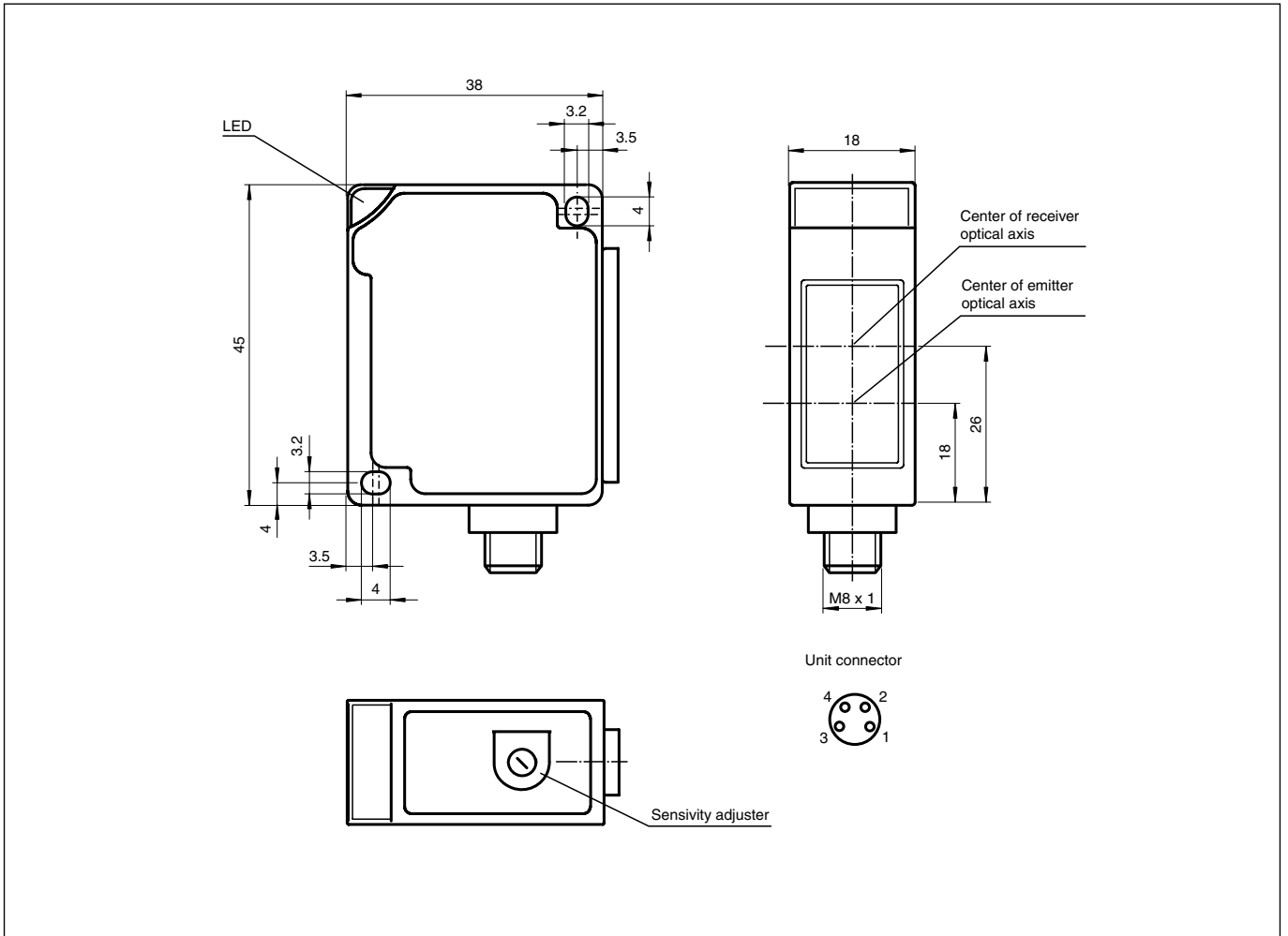
MLV13-54/./40b/95

Diagrams

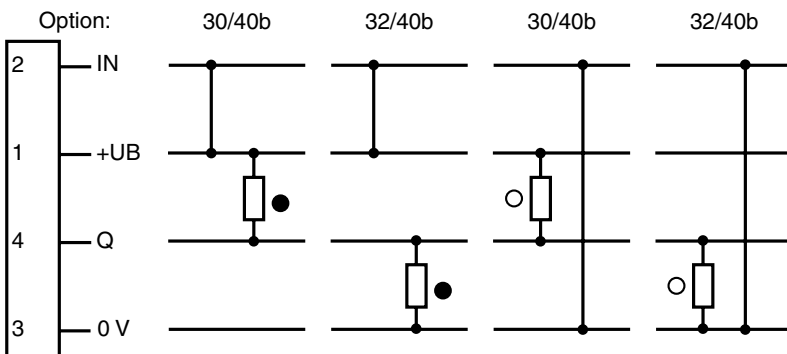
Series
MLV13



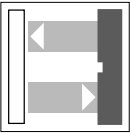
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV13-8-400/./40b/115

Reflection light scanner

MLV13-8-400/./40b/115

with 2 m fixed cable

Series
MLV13

CE

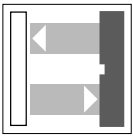


- ◆ Detection range up to 400 mm
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Control input for light-/dark switching
- ◆ Protection degree IP67

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue 10/2/01

Ordering code		MLV13-8-400/30/40b/115	MLV13-8-400/32/40b/115
Detection range	5 ... 400 mm	◆	◆
Adjustment range	50 ... 400 mm	◆	◆
Reference target	Standard white, 100 mm x 100 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Approvals	CE	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Function display	Switching state: LED yellow pre-fault indicator: LED red	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 30 ms	◆	◆
Signal output	1 switch output, npn, NO/NC	◆	◆
	1 switch output, npn, NO/NC	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 500 Hz	◆	◆
Response time	≤ 1 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m cable, 4 x 0.14 mm ²	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	40 g	◆	◆



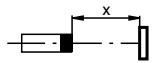
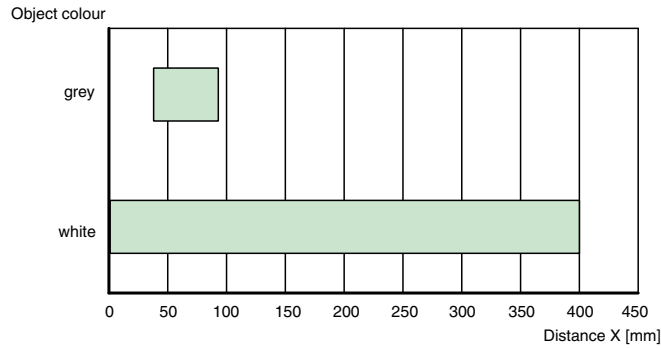
MLV13-8-400/./40b/115

Diagrams

Series
MLV13

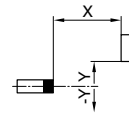
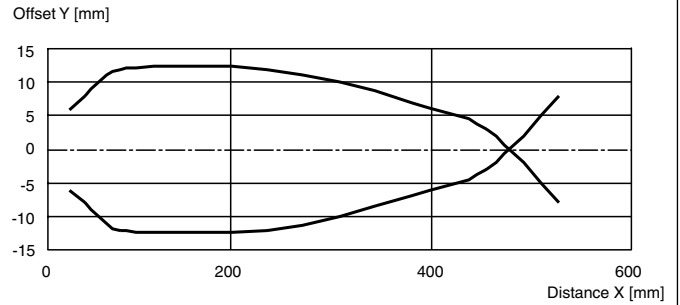
Detection ranges

MLV13-8-400

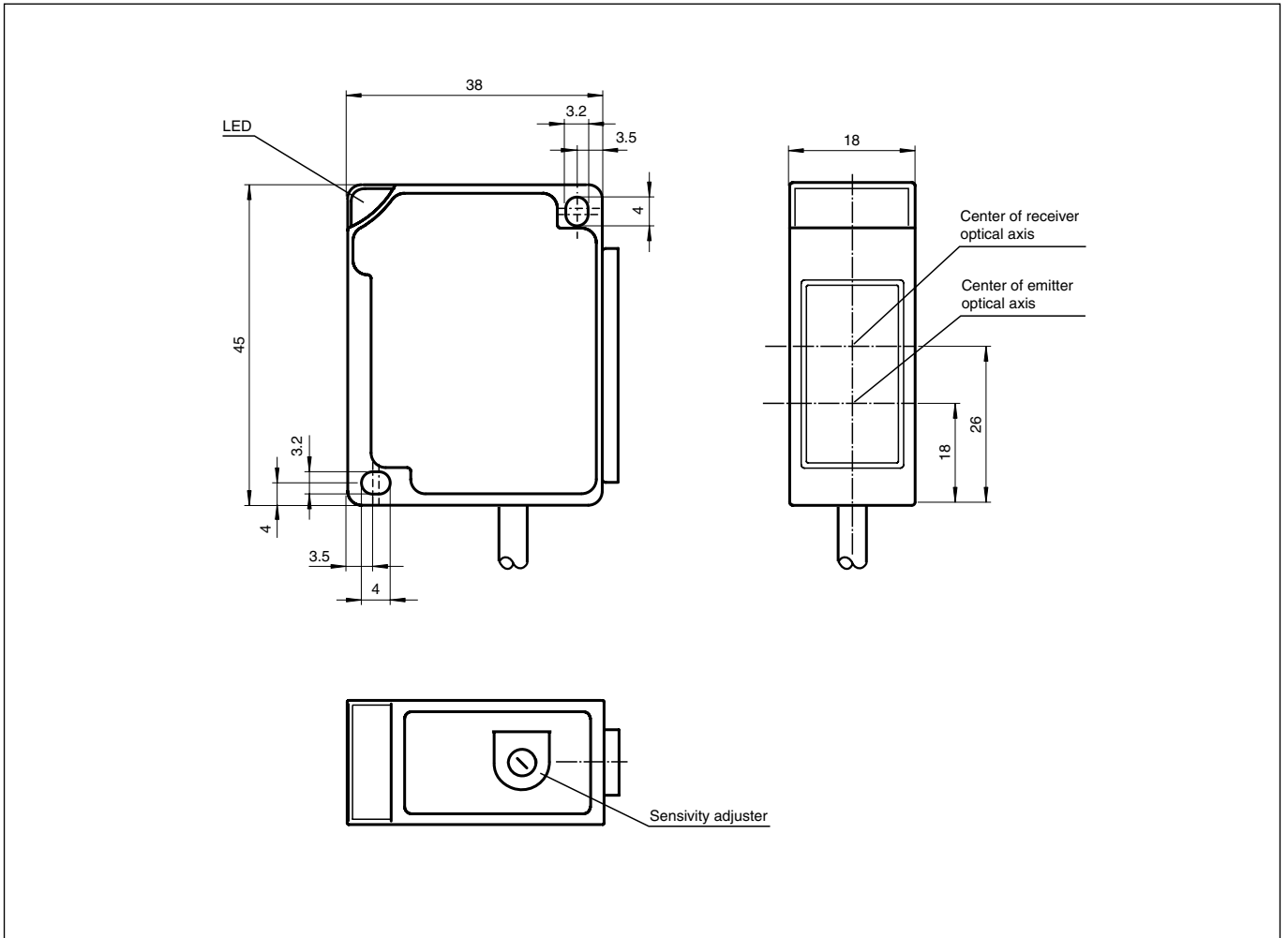


Characteristic response curve

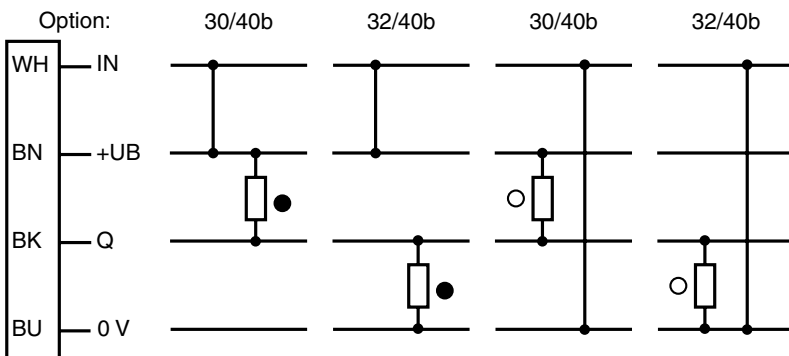
MLV13-8-400

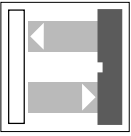


Dimensions



Electrical Connection





MLV13-8-400/./40b/73c

Reflection light scanner

MLV13-8-400/./40b/73c

with 4-pin, M12 connector

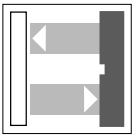
CE



- ◆ Sensing range up to 400 mm
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Control input for light-/dark switching
- ◆ Protection degree IP67
- ◆ Connector M12 x 1 for fast mounting

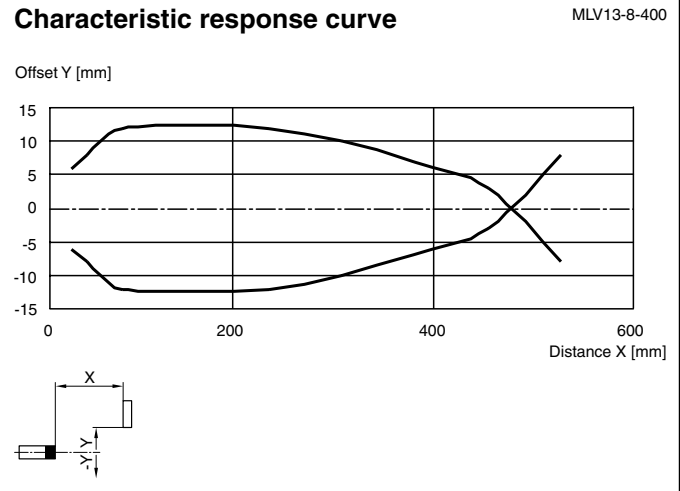
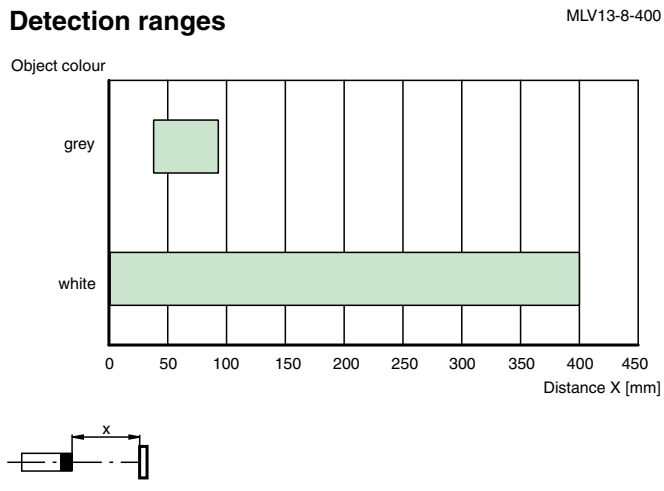
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		MLV13-8-400/30/40b/73c	MLV13-8-400/32/40b/73c
Detection range	5 ... 400 mm	◆	◆
Adjustment range	50 ... 400 mm	◆	◆
Reference target	Standard white, 100 mm x 100 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Approvals	CE	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Function display	Switching state: LED yellow pre-fault indicator: LED red	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 30 ms	◆	◆
Signal output	1 switch output, npn, NO/NC	◆	◆
	1 switch output, npn, NO/NC	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 500 Hz	◆	◆
Response time	≤ 1 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	40 g	◆	◆



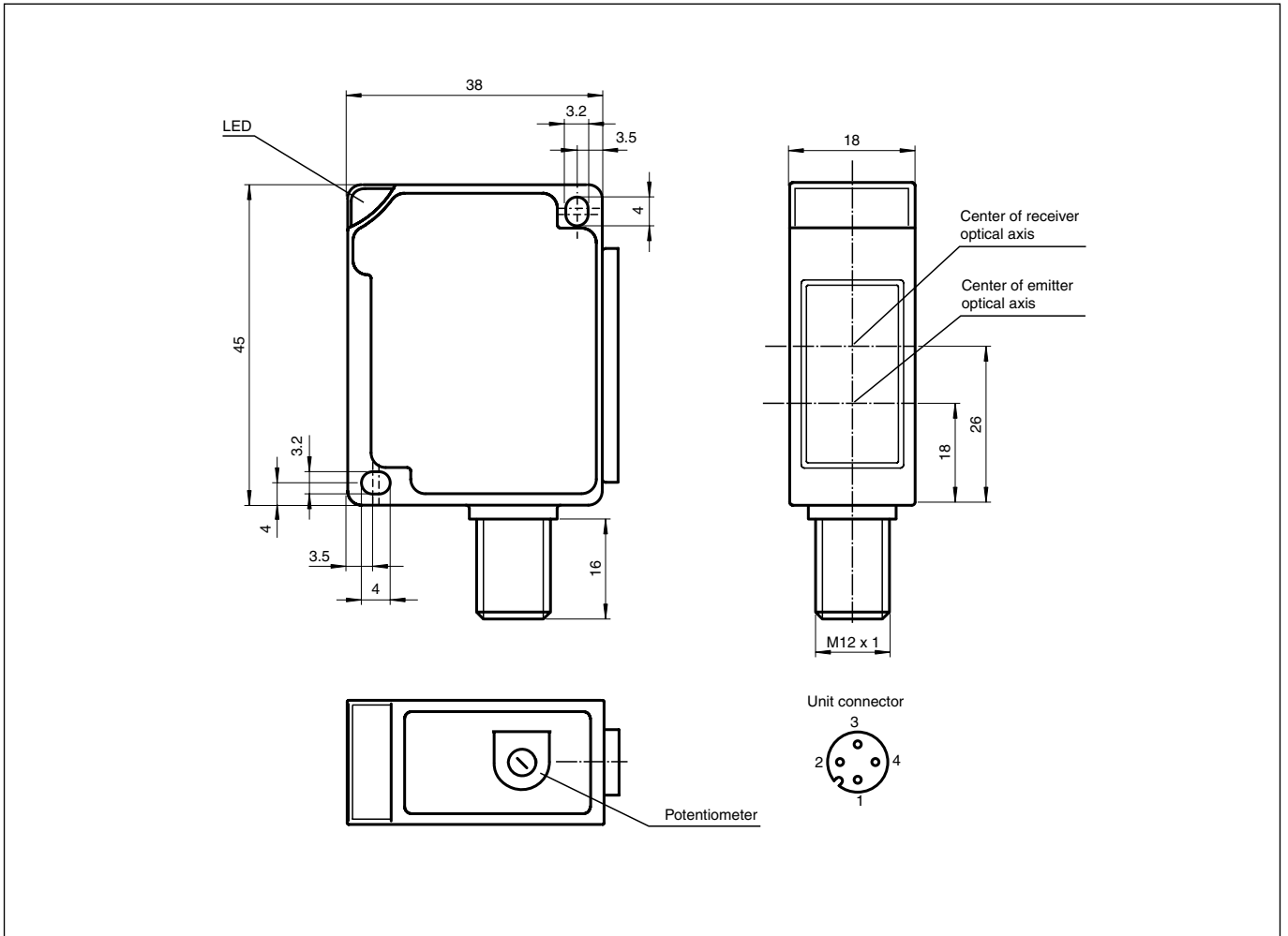
MLV13-8-400/./40b/73c

Diagrams

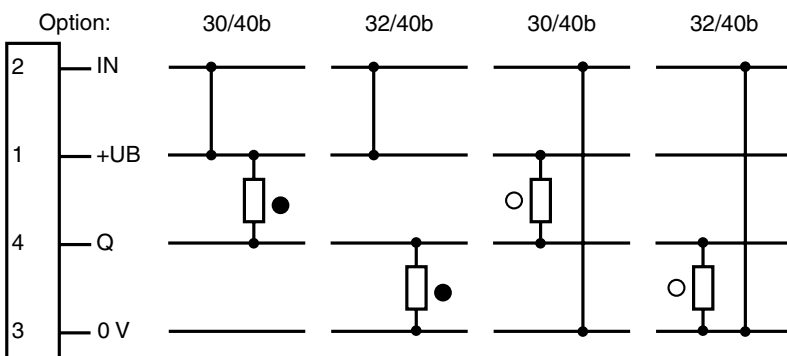


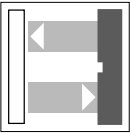
Series
MLV13

Dimensions



Electrical Connection





MLV13-8-400/./40b/95

Reflection light scanner

MLV13-8-400/./40b/95

with 4-pin, M8 connector

Series
MLV13



- ◆ Detection range up to 400 mm
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Control input for light-/dark switching
- ◆ Protection degree IP67
- ◆ M8 x 1 connector for rapid mounting

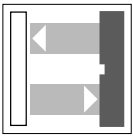
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue 10/2/01

Ordering code		MLV13-8-400/30/40b/95	MLV13-8-400/32/40b/95
Detection range	5 ... 400 mm	◆	◆
Adjustment range	50 ... 400 mm	◆	◆
Reference target	Standard white, 100 mm x 100 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Approvals	CE	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Function display	Switching state: LED yellow pre-fault indicator: LED red	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 30 ms	◆	◆
Signal output	1 switch output, pnp, NO/NC	◆	◆
	1 switch output, npn, NO/NC	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 500 Hz	◆	◆
Response time	≤ 1 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M8 x 1 connector	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	40 g	◆	◆

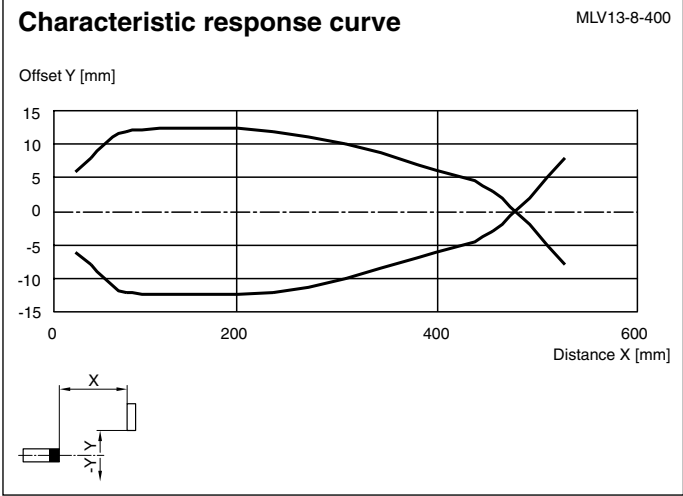
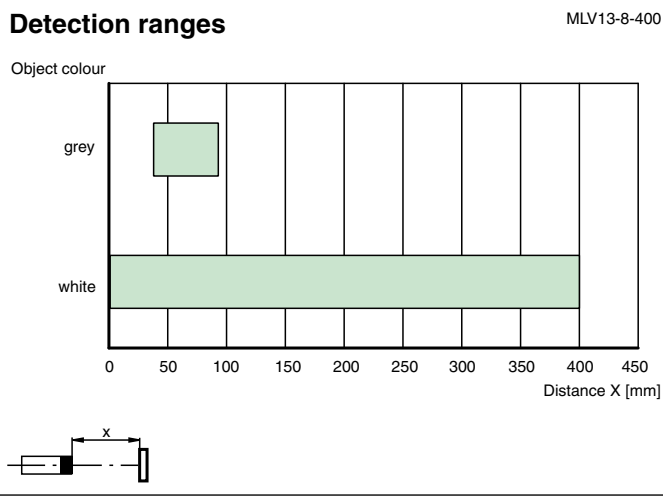
Series
MLV13

Date of issue
10/2/01

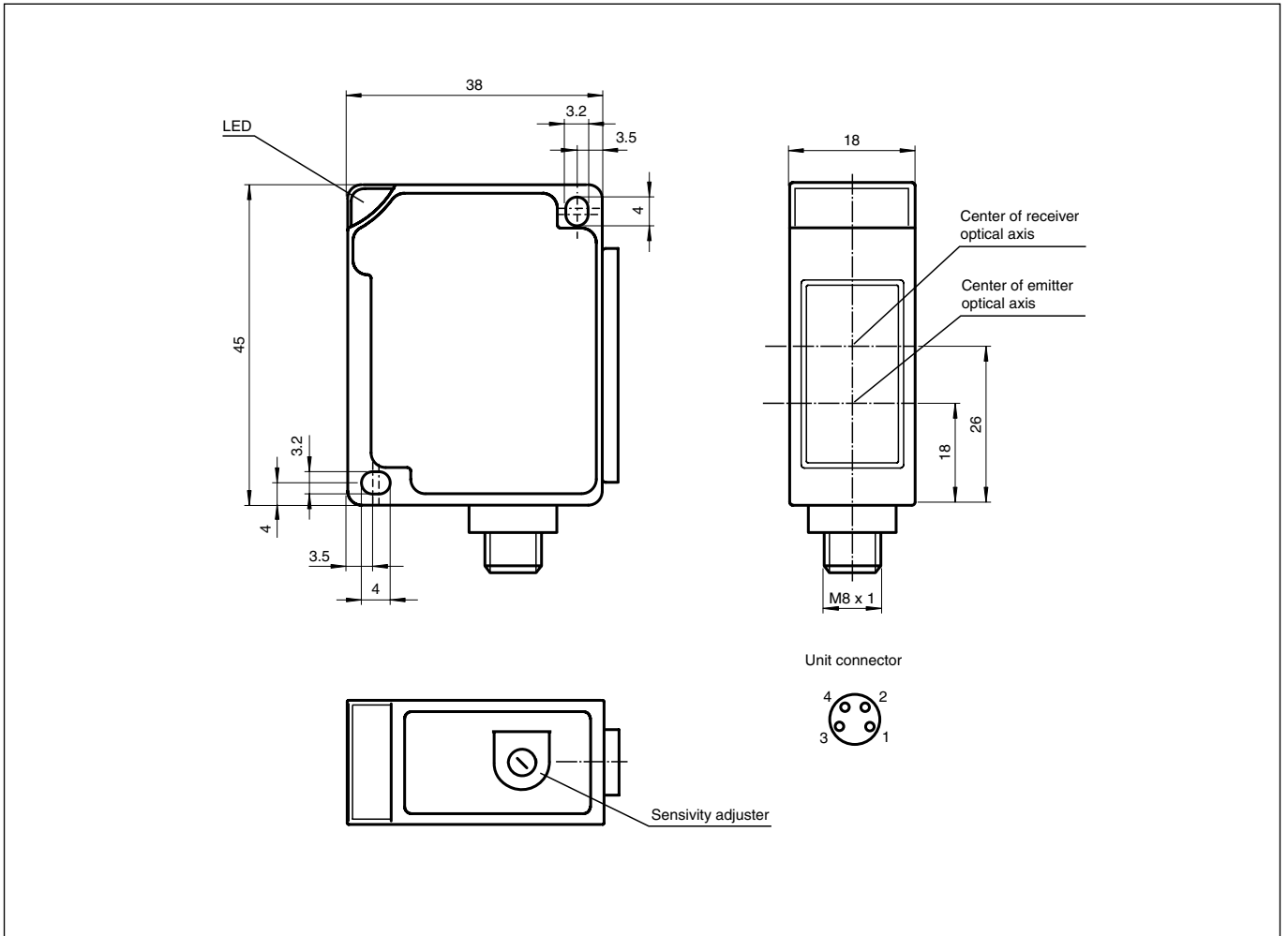


Diagrams

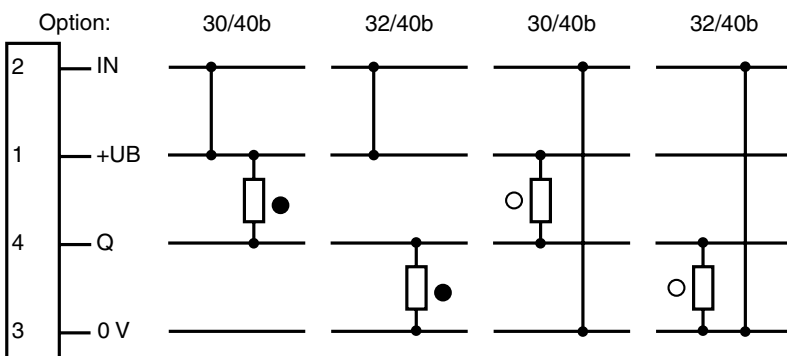
Series MLV13



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



Series MLV15 – small, sturdy and versatile



The amount of space required by sensors is a critical factor for a large number of applications. In spite of their reduced dimensions, light beam switches of the MLV15 series offer a relatively extensive range of services available to the user. Four different function types with different optical features allow for numerous solutions to automation tasks.

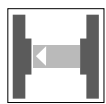
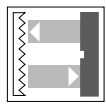
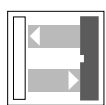
One feature shared in common by all sensors is a rugged plastic housing. The housing is cast and waterproof. The light outlet surface is protected by a scratch-resistant plastic disk. A 4-pin M8 connector is used for the electrical connection.

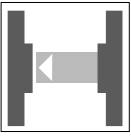
Either two antivalent PNP transistors or two antivalent NPN transistors are available as signal outputs. The sensors of this series include switching status and pre-fault indication as standard features. Devices with pre-fault indication output are also included in this product selection.

The following photoelectric types are available: Single path light beam switch with 5 m effective operating distance, reflection light beam switch without polarisation filter with 2 m detection range, reflection light beam switch with polarisation filter with 1.5 m detection range and a reflection light scanner with 300 mm detection range.

The main areas of application for these sensors include printed circuit board manufacturing, the packaging industry, assembly and handling systems and special mechanical engineering.

Series MLV15

Principle	Type code	Sensing range/detection range	Page
	M15/MV15/95	0 mm ... 5000 mm	134
	MLV15-6/95	0 mm ... 2000 mm	138
	MLV15-54/95	0 mm ... 1500 mm	142
	MLV15-8-300/95	3 mm ... 300 mm	146



M15/MV15/.../95/...

Single path light beam switch

M15/MV15/.../95/...

with M8, 4-pin metal connector



Series
MLV15

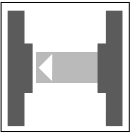


- ◆ Detection range up to 10 m
- ◆ Small dimensions
- ◆ Integrated signal converter
- ◆ Protection degree IP67
- ◆ Light adjuster

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue 10/2/01

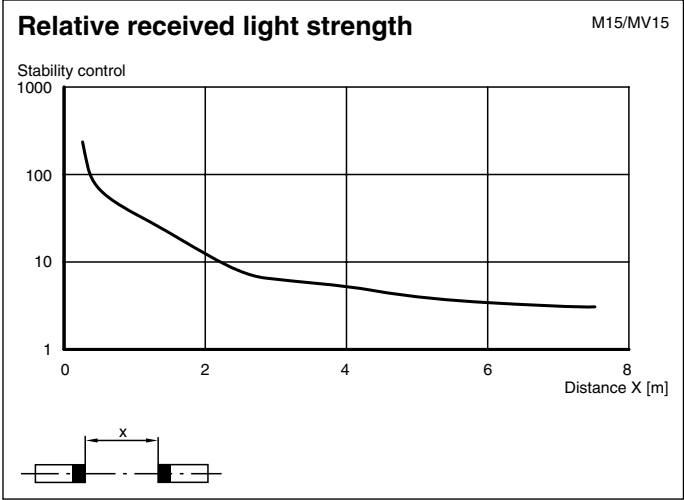
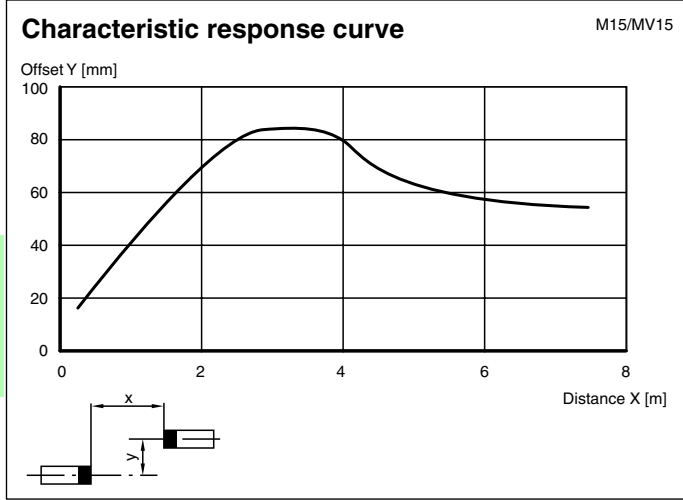
Ordering code		M15/MV15/47/95	M15/MV15/48/95	M15/MV15/82b/95/103
Effective detection range	0 ... 5000 mm	◆	◆	◆
Threshold detection range	10 m	◆	◆	◆
Obstacle size	11 mm	◆	◆	◆
Light source	IREDD	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	emitter: approx. 3.5 ° receiver: approx. 5.5 °	◆	◆	◆
Diameter of the light spot	300 mm at 5000 mm detection range	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, lights up when light beam is free, flashes when falling short of the stability control	◆	◆	◆
Controls	Light adjuster, bright-dark switch	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	< 30 mA (device)	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp, short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 100 mA			◆
	max. 200 mA	◆	◆	
Switching frequency	500 Hz	◆	◆	◆
Response time	1 ms	◆	◆	◆
Output of the pre-fault indication	pnp, inactive 2 s after falling short of the stability control			◆
Test input	Emitter deactivation for $U_E = 10 \dots 30 \text{ V}$	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	◆
Connection type	4-pin, M8 connector	◆	◆	◆
Housing	ABS	◆	◆	◆
Light exit	Plastic	◆	◆	◆
Mass	15 g (device)	◆	◆	◆



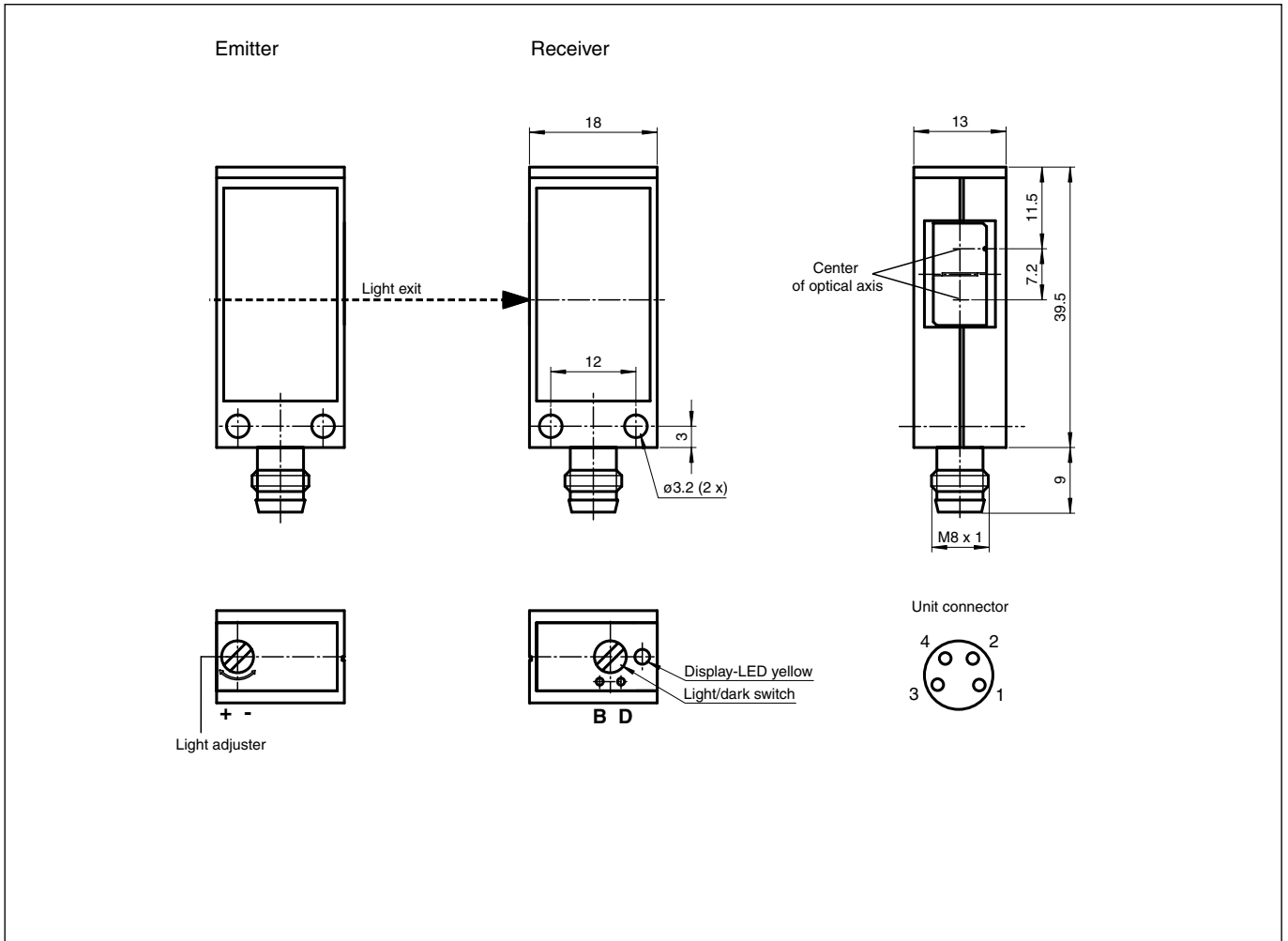
M15/MV15/.../95/...

Diagrams

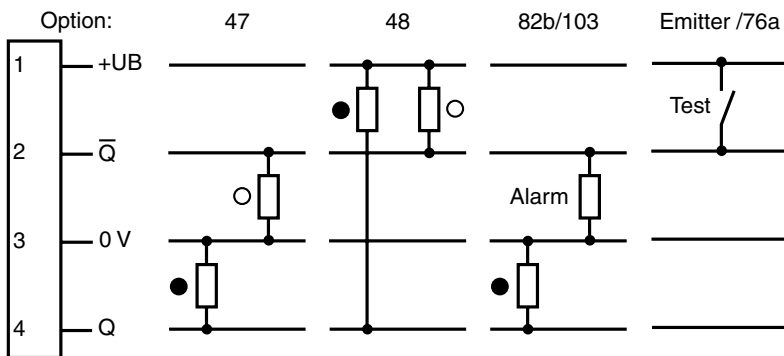
Series
MLV15



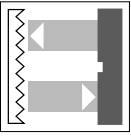
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV15-6/.../95/...

Reflection light beam switch

MLV15-6/.../95/...

with M8, 4-pin metal connector

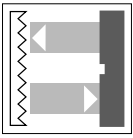


- ◆ Detection range up to 4 m
- ◆ Small dimensions
- ◆ Integrated signal converter
- ◆ Protection degree IP67
- ◆ Adjustable timer functions
- ◆ Light adjuster

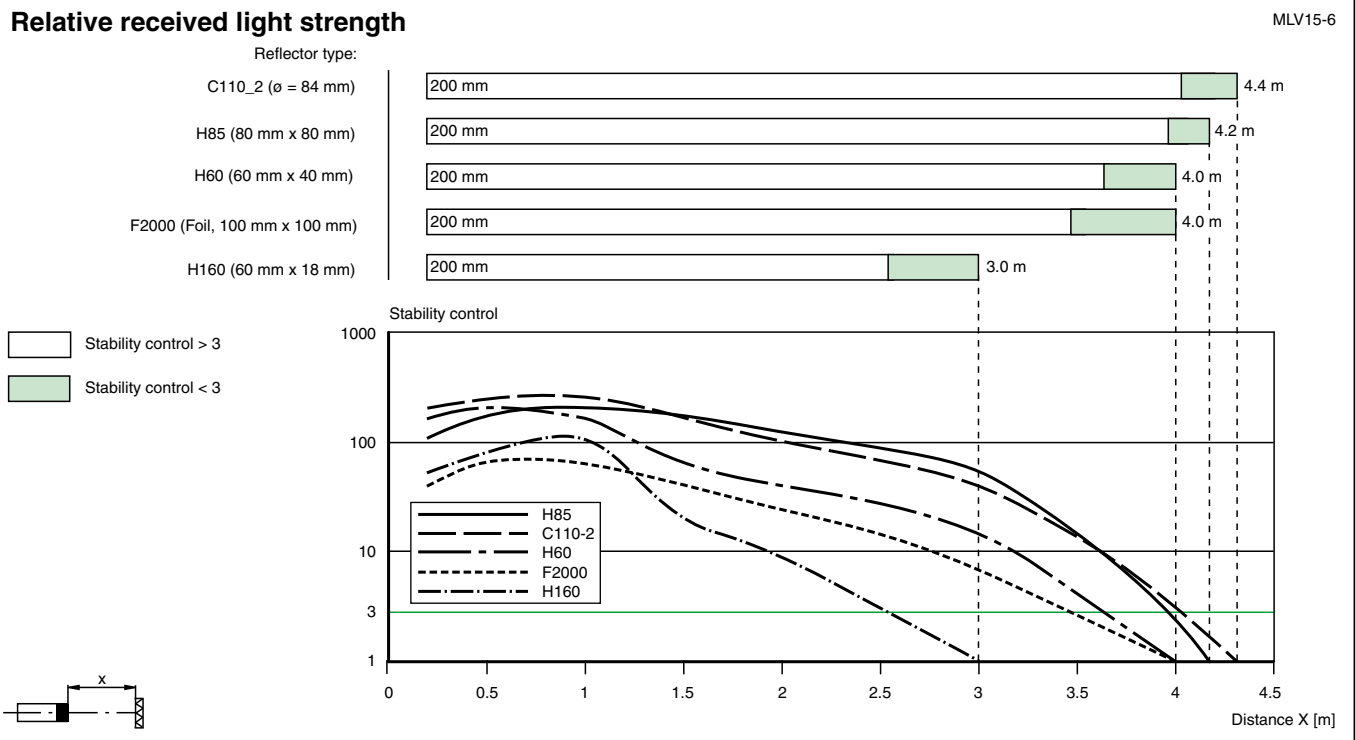
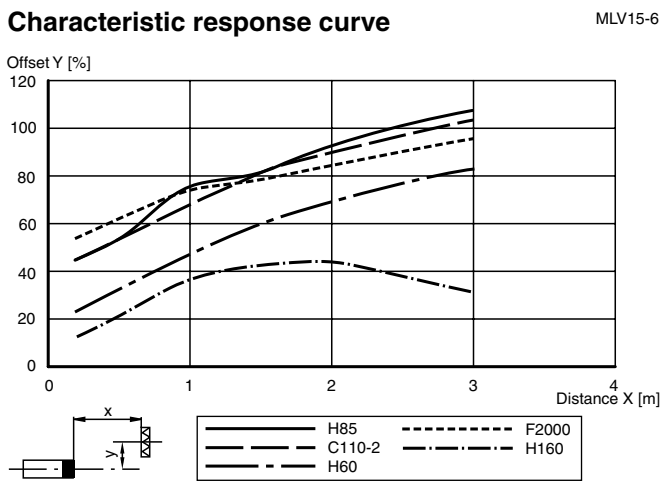
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		MLV15-6/47/95	MLV15-6/48/95	MLV15-6/40a/82b/95/103
Effective detection range	200 ... 2000 mm (with H60 reflector)	◆	◆	◆
Threshold detection range	4000 mm (with H60 reflector)	◆	◆	◆
Reflector distance	100 ... 2000 mm	◆	◆	◆
Light source	IREDD	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 4 °	◆	◆	◆
Diameter of the light spot	120 mm at 2000 mm detection range	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, lights up when light beam is free, flashes when falling short of the stability control	◆	◆	◆
Controls	Light adjuster	◆	◆	◆
Controls	Time adjuster	◆	◆	
Controls	Light/dark switch			◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	25 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp antivalent, short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 100 mA			◆
	max. 200 mA	◆	◆	
Switching frequency	1000 Hz	◆	◆	◆
Response time	0.5 ms	◆	◆	◆
Output of the pre-fault indication	1 pnp, inactive when falling short of the stability control	◆	◆	◆
Timer function	Output 1: off-delay; output 2: energising delay; adjustment range 0 ... 10 s	◆	◆	
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	◆
Connection type	4-pin, M8 connector	◆	◆	◆
Housing	ABS	◆	◆	◆
Light exit	Plastic	◆	◆	◆
Mass	15 g	◆	◆	◆

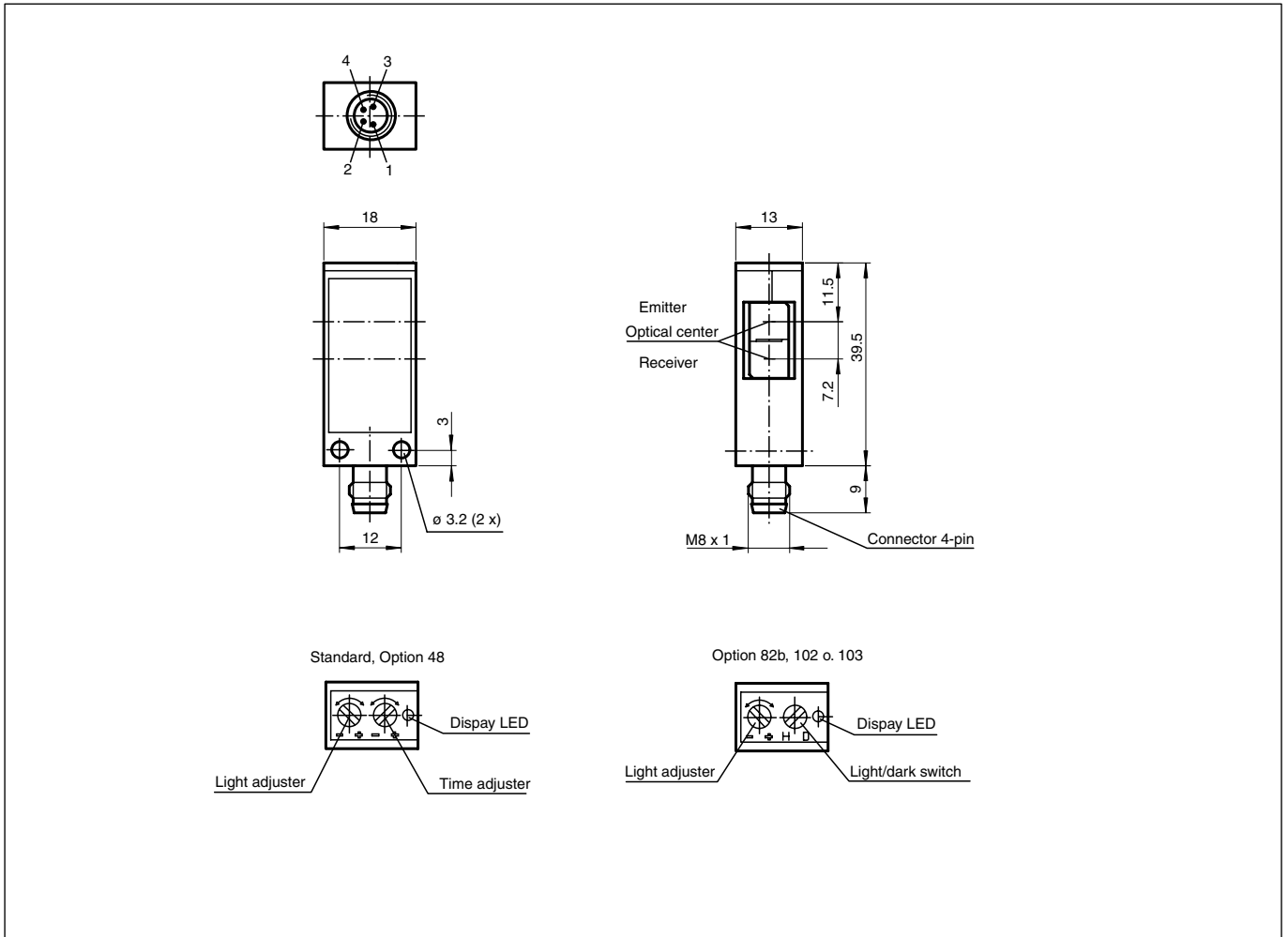
Series
MLV15



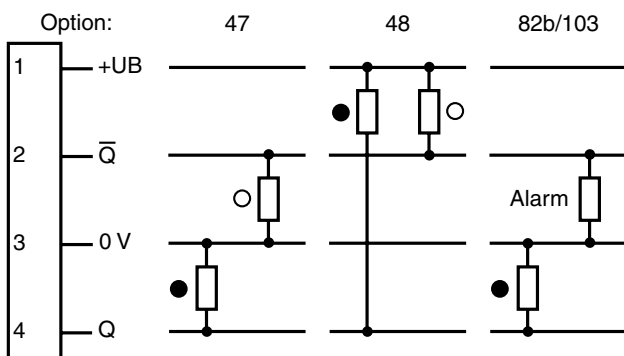
Diagrams



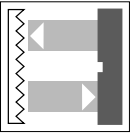
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV15-54/.../95/...

Reflection light beam switch with polarisation filter

MLV15-54/.../95/...

with M8, 4-pin metal connector

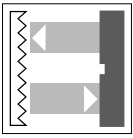
Series
MLV15



- ◆ Detection range up to 3 m
- ◆ Small dimensions
- ◆ Integrated signal converter
- ◆ Protection degree IP67
- ◆ Adjustable timer functions
- ◆ Light adjuster

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

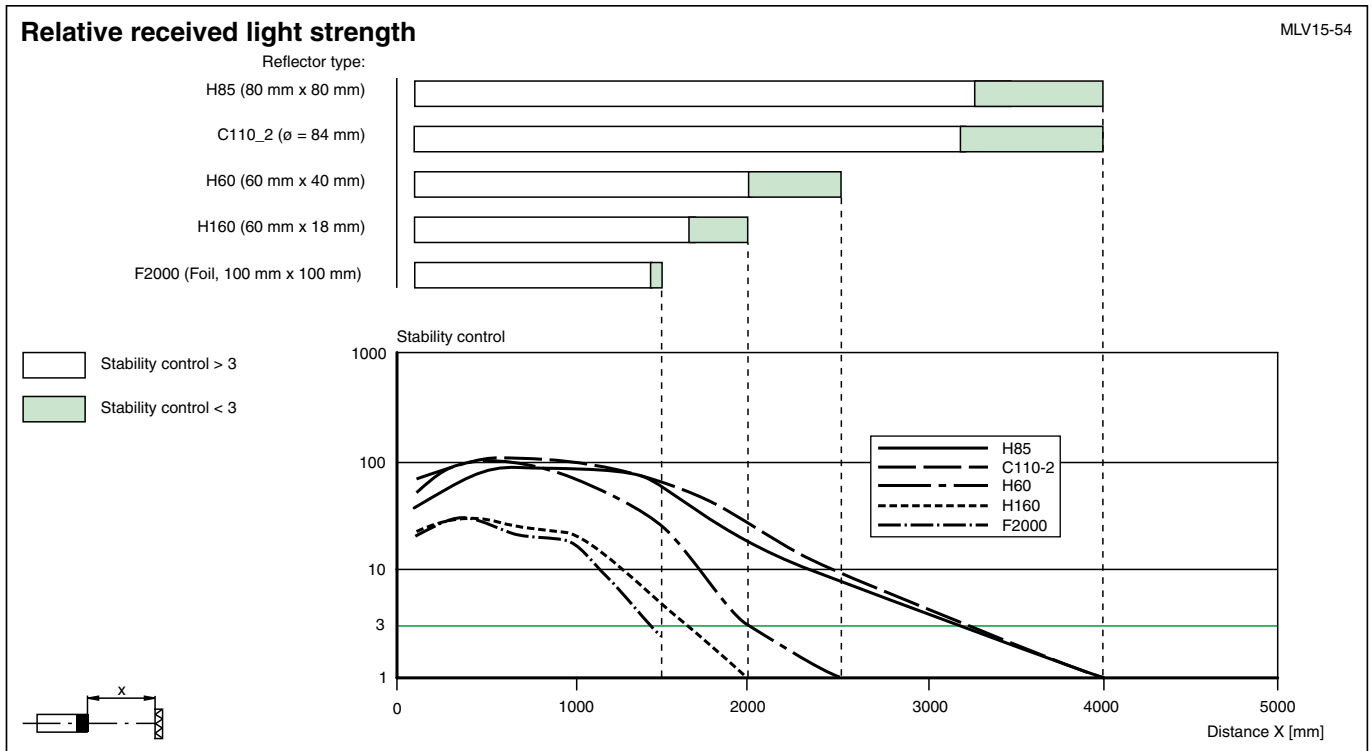
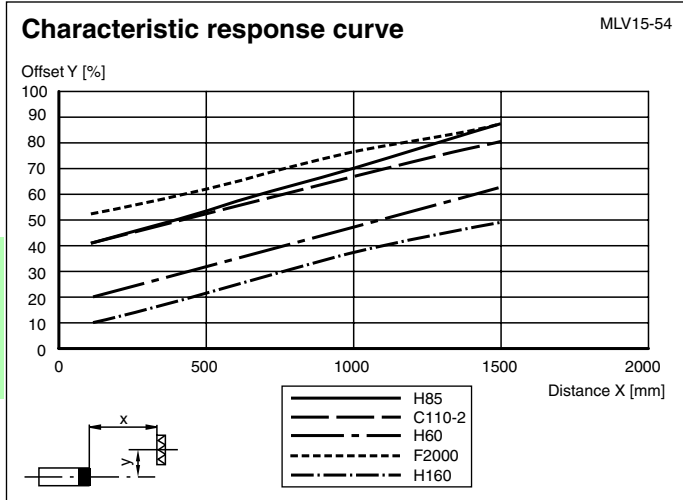
Ordering code		MLV15-54/47/95	MLV15-54/48/95	MLV15-54/40a/82b/95/103
Effective detection range	100 ... 1500 mm (with H60 reflector)	◆	◆	◆
Threshold detection range	3000 mm (with H60 reflector)	◆	◆	◆
Reflector distance	100 ... 1500 mm	◆	◆	◆
Light source	LED	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆
Angle of divergence	approx. 4 °	◆	◆	◆
Diameter of the light spot	120 mm at 2000 mm detection range	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, lights up when light beam is free, flashes when falling short of the stability control	◆	◆	◆
Controls	Light adjuster	◆	◆	◆
Controls	Time adjuster	◆	◆	◆
Controls	Light/dark switch			◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	25 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp antivalent, short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 100 mA			◆
	max. 200 mA	◆	◆	
Switching frequency	1000 Hz	◆	◆	◆
Response time	0.5 ms	◆	◆	◆
Output of the pre-fault indication	1 pnp, inactive when falling short of the stability control			◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	◆
Connection type	4-pin, M8 connector	◆	◆	◆
Housing	ABS	◆	◆	◆
Light exit	Plastic	◆	◆	◆
Mass	15 g	◆	◆	◆



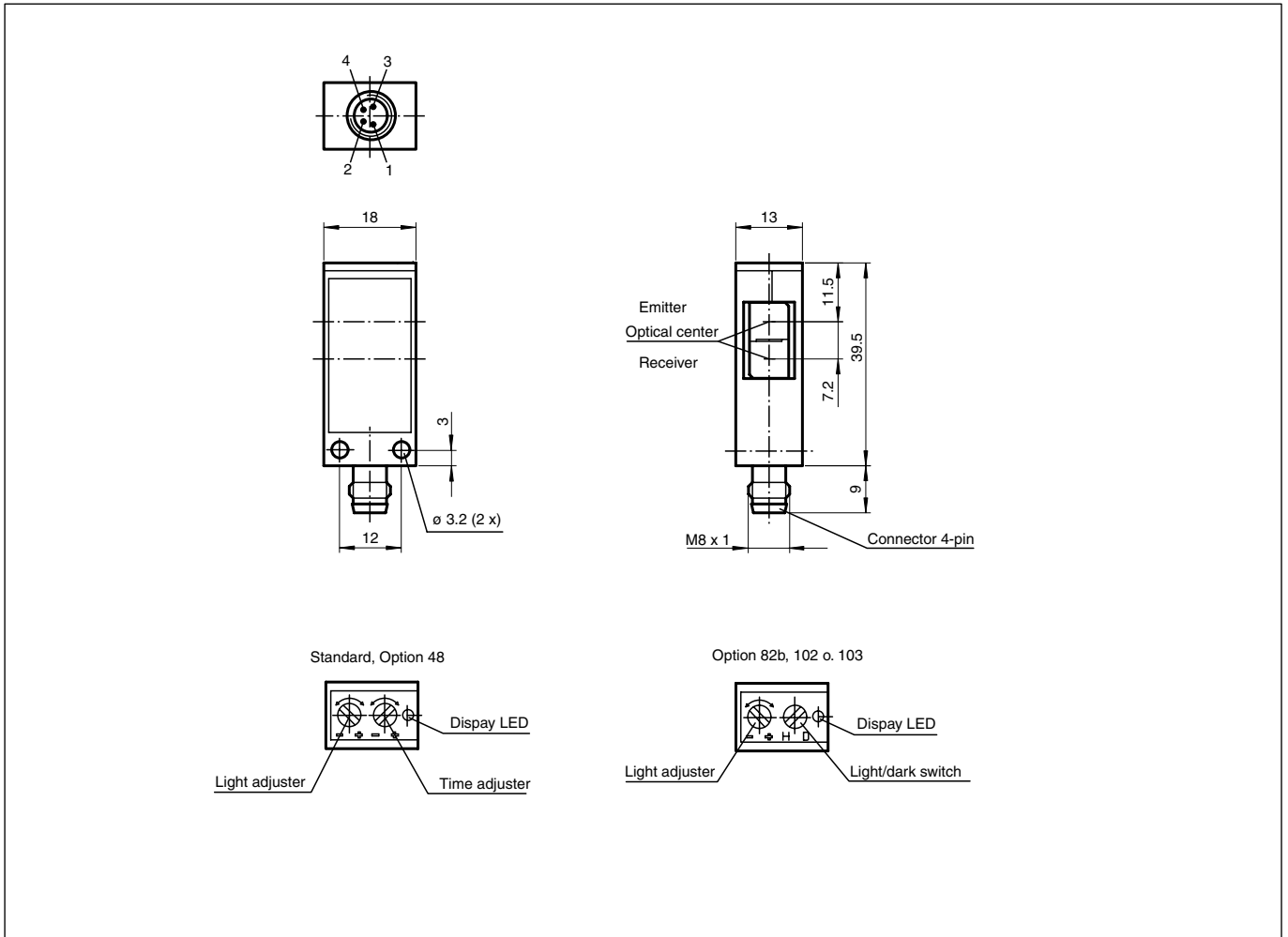
MLV15-54/.../95/...

Diagrams

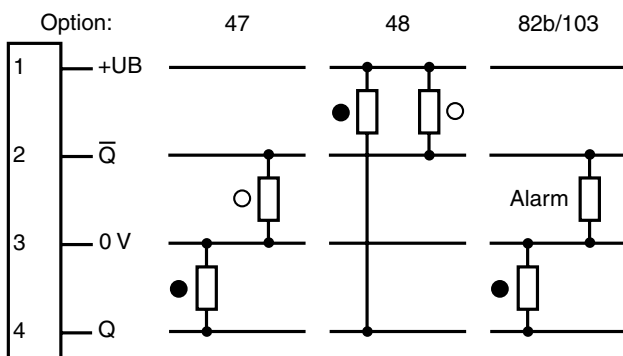
Series MLV15



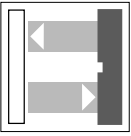
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV15-8-300/.../95/...

Reflection light scanner

MLV15-8-300/.../95/...

with M8, 4-pin metal connector

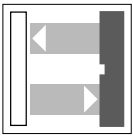
Series
MLV15



- ◆ Detection range 3 mm ... 300 mm, adjustable
- ◆ Small dimensions
- ◆ Integrated signal converter
- ◆ Protection degree IP67
- ◆ Adjustable timer functions
- ◆ Light adjuster

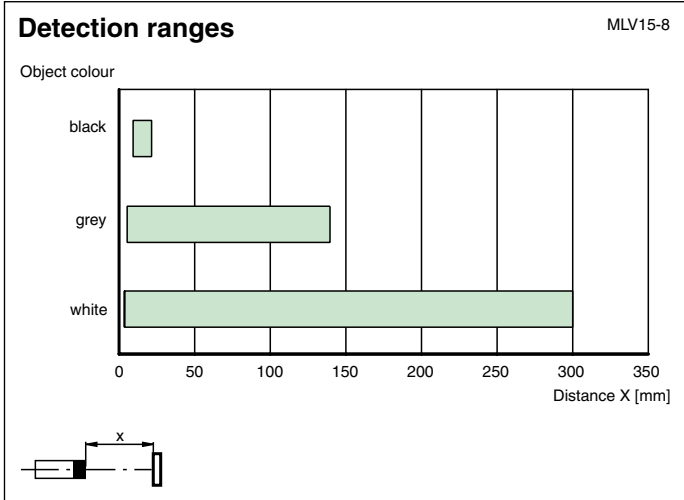
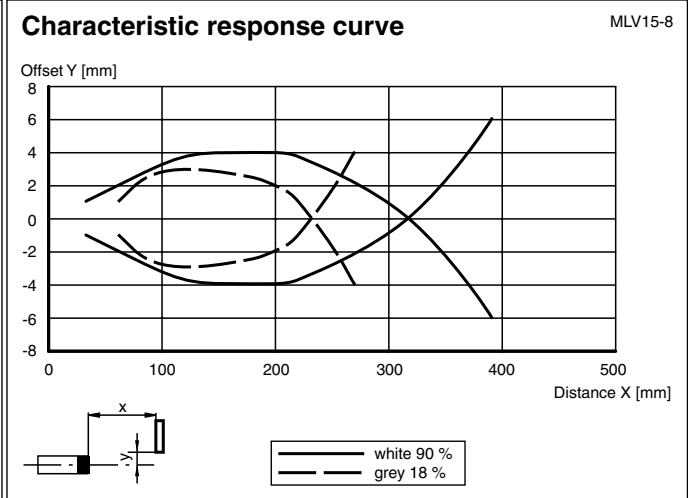
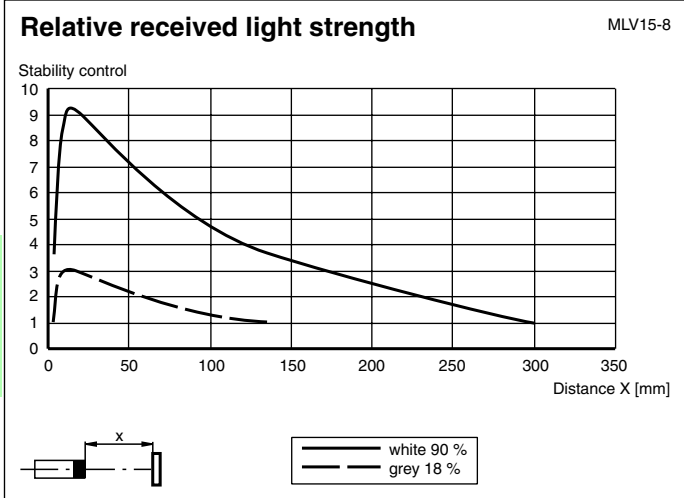
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		MLV15-8-300/47/95	MLV15-8-300/48/95	MLV15-8-300/40a/82b/95/103
Detection range	3 ... 300 mm	◆	◆	◆
Adjustment range	75 ... 300 mm	◆	◆	◆
Light source	IRED	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 16 °	◆	◆	◆
Diameter of the light spot	90 mm at 300 m detection range	◆	◆	◆
Ambient light limit	70000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, flashes when falling short of the stability control	◆	◆	◆
Controls	Light adjuster	◆	◆	◆
Controls	Time adjuster	◆	◆	◆
Controls	Light/dark switch			◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	25 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp antivalent, short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 100 mA			◆
	max. 200 mA	◆	◆	
Switching frequency	1000 Hz	◆	◆	◆
Response time	0.5 ms	◆	◆	◆
Output of the pre-fault indication	1 pnp, inactive when falling short of the stability control			◆
Timer function	Output 1: off-delay; output 2: energising delay; adjustment range 0 ... 10 s	◆	◆	
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	◆
Connection type	4-pin, M8 connector	◆	◆	◆
Housing	ABS	◆	◆	◆
Light exit	Plastic	◆	◆	◆
Mass	15 g	◆	◆	◆

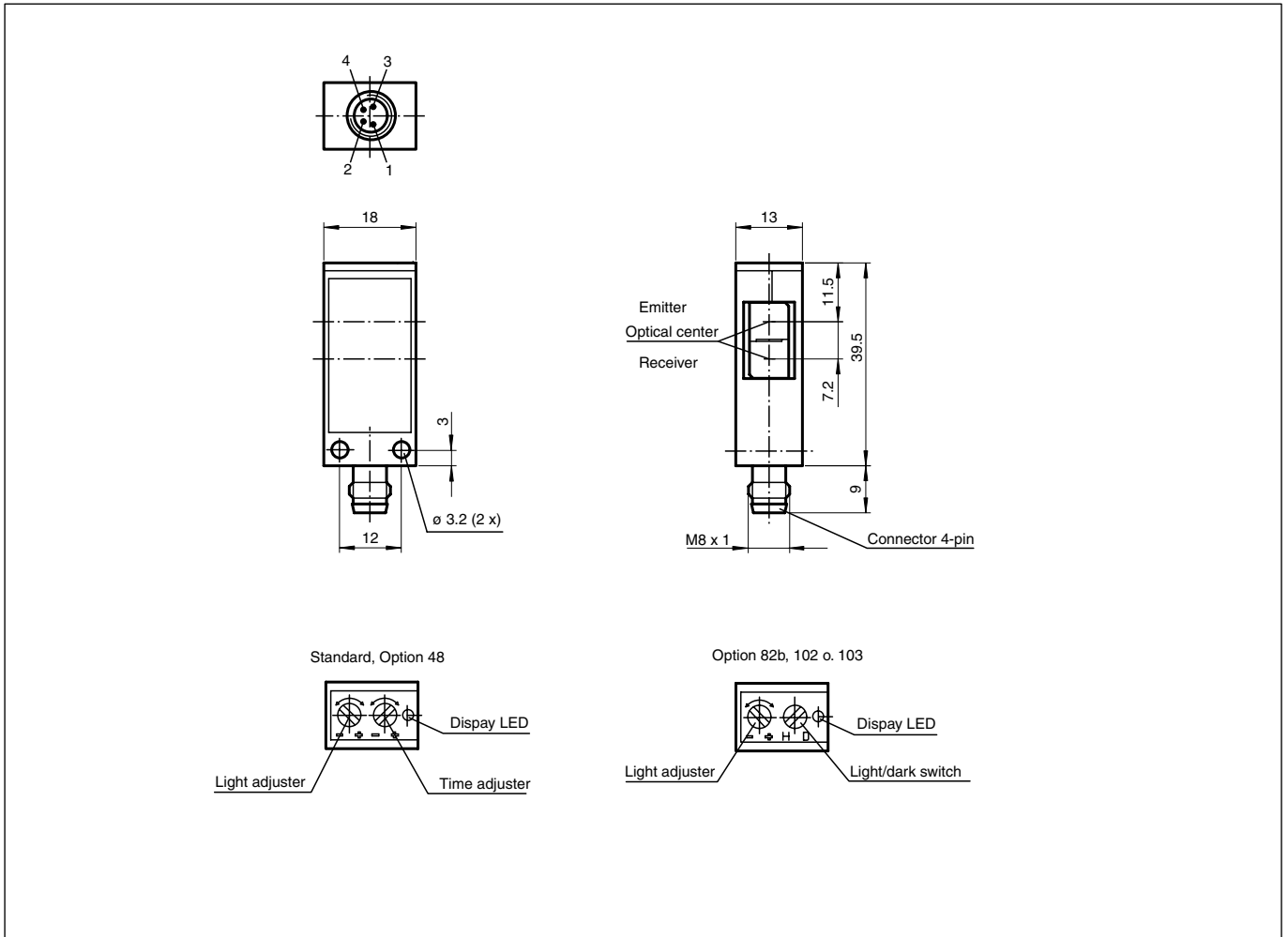


Diagrams

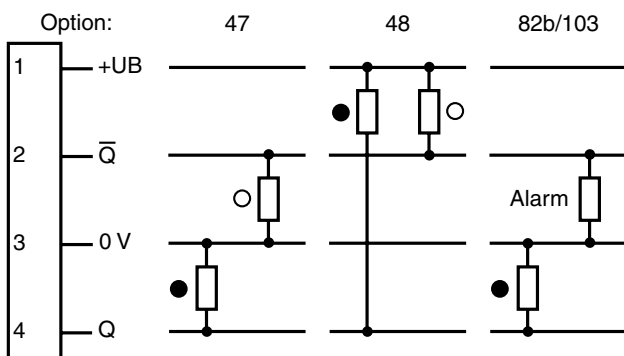
Series
MLV15



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Series MLV40



Date of issue 10/04/2001

Series MLV40 – small, sturdy and versatile



Often the space requirement and type of device protection of a sensor determine whether it is suitable for use in a specific place. If the place has narrow or cramped conditions, light beam switches of the MLV40 series are the right sensors. Its design is miniaturised, which means that it offers the user enough free space to ensure an installation that will meet functional needs, even in very cramped conditions. Its sturdy housing is made of metal, which ensures proper functionality of the sensor, even in harsh environmental conditions. In spite of their small design size, light beam switches of the MLV40 series provide a significant level of sensor performance. The series is composed of seven function types with different optical sensor functions, providing solutions for a wide range of automation tasks.

The product selection includes single path light beam switches, reflex light beam switches with or without polarisation filters, reflex light beam switches for recording transparent materials, reflection light scanner and reflection light scanner with background suppression and fibre optic light beam switches. All devices are available with a variety of signal outputs, antivalent or synchronised-switching. A yellow LED indicates the switching status and serves at the same time as a pre-fault indicator. The connection can be made either with an M12 connector or a fixed cable.

This series of light beam switches is suitable for a wide range of applications. The main areas of application include packaging machines, paper processing machines, textile machines and many other automated systems.

Principle	Type code	Sensing range/detection range	Page
	M40/MV40-1365/115	0 mm ... 5000 mm	154
	M40/MV40-1365/92	0 mm ... 5000 mm	158
	MLV40-6/92	0 mm ... 2000 mm	166
	MLV40-6/115	0 mm ... 2000 mm	162
	MLV40-54/115	0 mm ... 1000 mm	170
	MLV40-54/92	0 mm ... 1000 mm	174
	MLV40-54-G/92	0 mm ... 400 m	182
	MLV40-54-G/115	0 mm ... 400 m	178
	MLV40-8-500/115	10 mm ... 500 mm	186
	MLV40-8-500/92	10 mm ... 500 mm	190
	MLV40-8-H/115	10 mm ... 80 mm	194
	MLV40-8-H/92	10 mm ... 80 mm	198
	MLV40-8-H-150-65/40a/92	10 mm ... 150 mm	206
	MLV40-8-H-150-65/40a/115	10 mm ... 150 mm	202
	MLV40-LL-IR/115	depends on the fibre optics being used	210
	MLV40-LL-IR/92	depends on the fibre optics being used	218
	MLV40-LL-RT/115	depends on the fibre optics being used	210
	MLV40-LL-RT/92	depends on the fibre optics being used	218

Special mating connectors for series MLV40

	Model number	Design	Number of pins	Cable length/m	Fig.
Version M12	V1-W-10M-PVC-VIS	Socket, angled	4-pins	10	1
	V1-G-2M-PVC-VIS	Socket, straight	4-pins	2	2
	V1-W-2M-PVC-VIS	Socket, angled	4-pins	2	1
	V1-G-5M-PVC-VIS	Socket, straight	4-pins	5	2
	V1-W-5M-PVC-VIS	Socket, angled	4-pins	5	1

Figure 1:

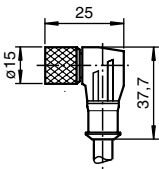
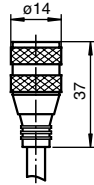
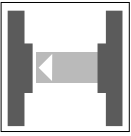


Figure 2:





M40/MV40-1365/.. /115

Single path light beam switch

M40/MV40-1365/.. /115

with 2 m fixed cable



Series
MLV40



- ◆ Detection range up to 10 m
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Pre-fault indication

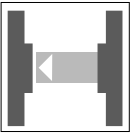
For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		M40/MV40-1365/47/115	M40/MV40-1365/48/115	M40/MV40-1365/49/115
Effective detection range	0 ... 5 m	◆	◆	◆
Threshold detection range	10 m	◆	◆	◆
Obstacle size	18 mm	◆	◆	◆
Light source	IREC	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 2 °	◆	◆	◆
Diameter of the light spot	150 mm at 5000 mm detection range	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, lights up when light beam is free, flashes when falling short of the stability control	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	< 35 mA (emitter); < 25 mA (receiver)	◆	◆	◆
Signal output	< 35 mA (emitter); < 25 mA (receiver)	◆		
	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
Switching type	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
	dark ON			◆
	light/dark switching	◆	◆	
Switching voltage	30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	100 Hz	◆	◆	◆
Response time	5 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	Fixed cable 2 m	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g (device)	◆	◆	◆

Series
MLV40

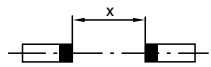
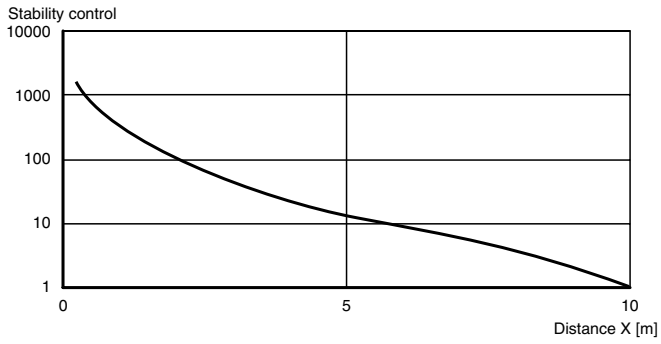


M40/MV40-1365/./115

Diagrams

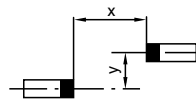
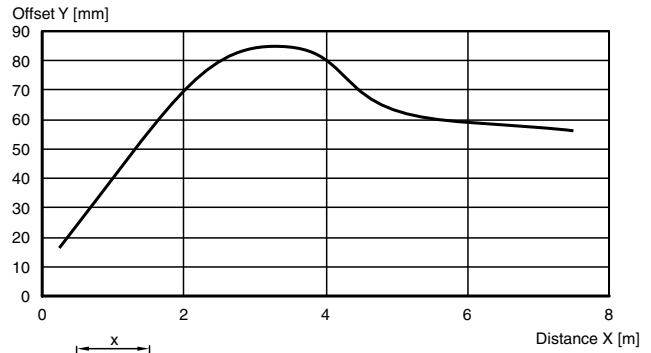
Relative received light strength

M40/ MV40-1365



Characteristic response curve

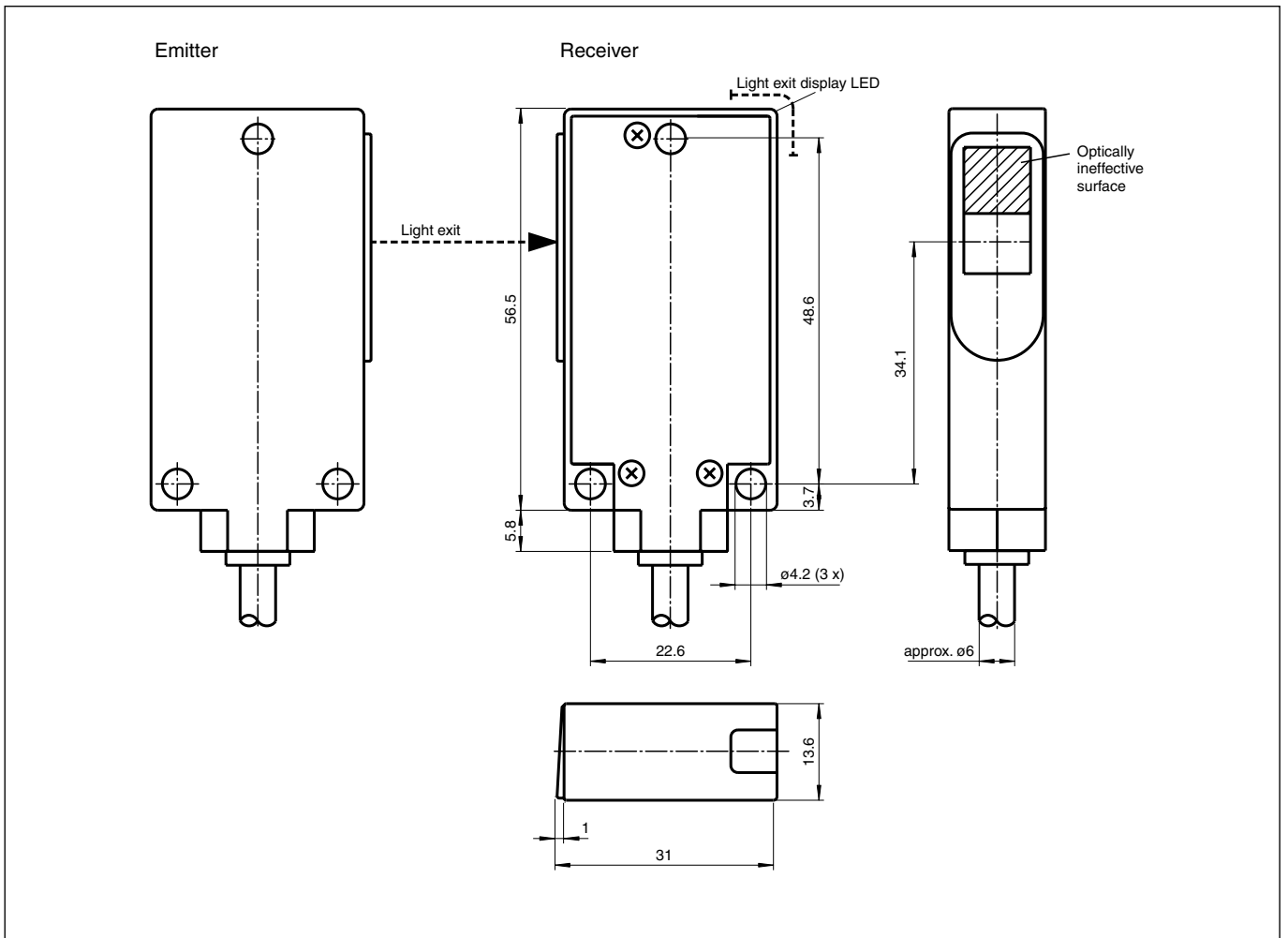
M40/ MV40-1365



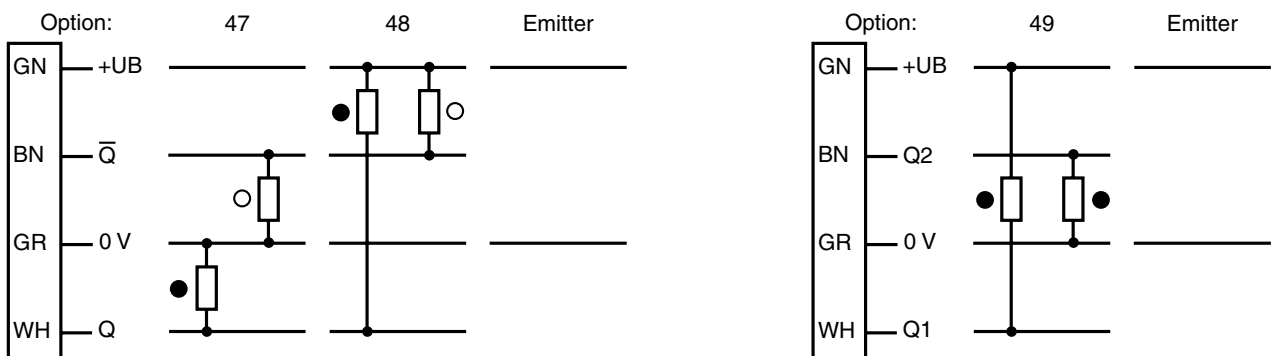
Series
MLV40

Date of issue: 10/4/01

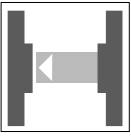
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



M40/MV40-1365/.. /92

Single path light beam switch

M40/MV40-1365/.. /92

with M12, 4-pin metal connector



Series
MLV40



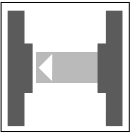
- ◆ Detection range up to 10 m
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Pre-fault indication

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

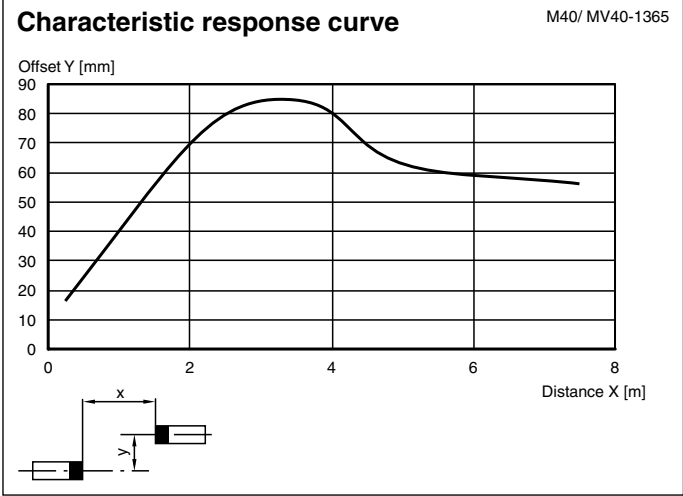
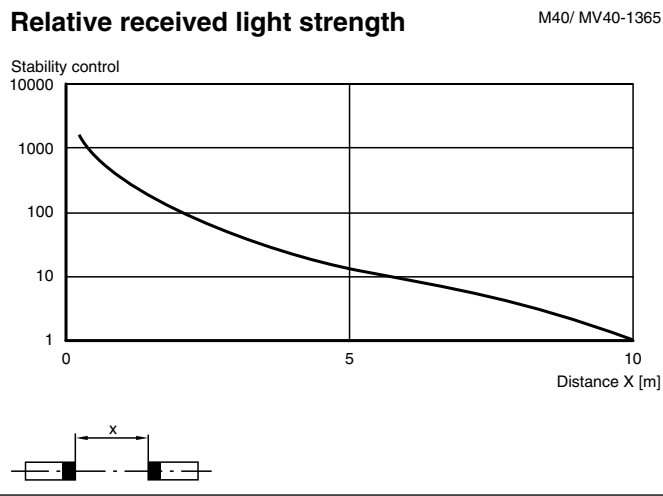
Date of issue: 10/4/01

Ordering code		M40/MV40-1365/47/92	M40/MV40-1365/48/92	M40/MV40-1365/49/92
Effective detection range	0 ... 5 m	◆	◆	◆
Threshold detection range	10 m	◆	◆	◆
Obstacle size	18 mm	◆	◆	◆
Light source	IREDD	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 2 °	◆	◆	◆
Diameter of the light spot	150 mm at 5000 mm detection range	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, lights up when light beam is free, flashes when falling short of the stability control	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	< 35 mA (emitter); < 25 mA (receiver)	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	dark ON			◆
	light/dark switching	◆	◆	
Switching voltage	30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	100 Hz	◆	◆	◆
Response time	5 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g (device)	◆	◆	◆



M40/MV40-1365/./92

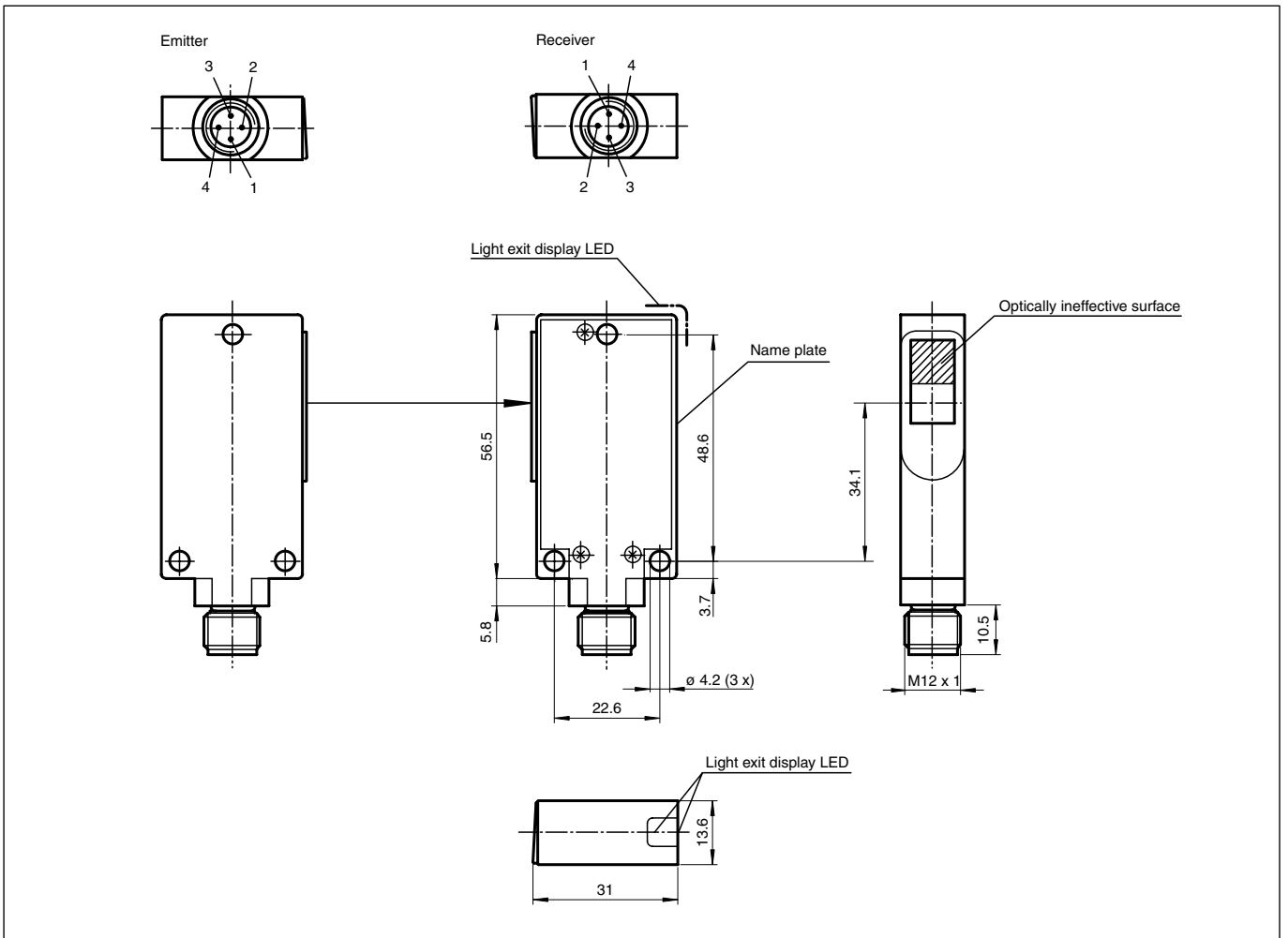
Diagrams



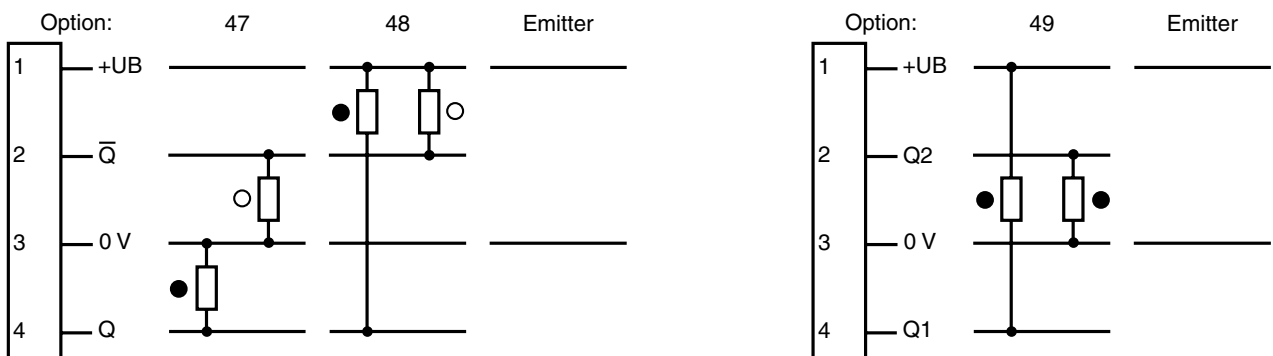
Series MLV40

Date of issue: 10/4/01

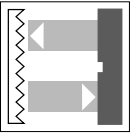
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV40-6/.../115

Reflection light beam switch

MLV40-6/.../115

with 2 m fixed cable



Series
MLV40



- ◆ Detection range up to 4 m
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Pre-fault indication

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

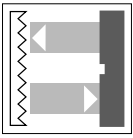
For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		MLV40-6/4/7/115	MLV40-6/4/8/115	MLV40-6/4/0b/49/115
Effective detection range	0.1 ... 2 m	◆	◆	◆
Threshold detection range	4 m (with H60 reflector)	◆	◆	◆
Reflector distance	100 ... 2000 mm	◆	◆	◆
Light source	IREd	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 4 °	◆	◆	◆
Diameter of the light spot	100 mm at 2000 mm detection range	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, lights up when light beam is free, flashes when falling short of the stability control	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 npn antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	500 Hz	◆	◆	◆
Response time	1 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	Fixed cable 2 m	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g	◆	◆	◆

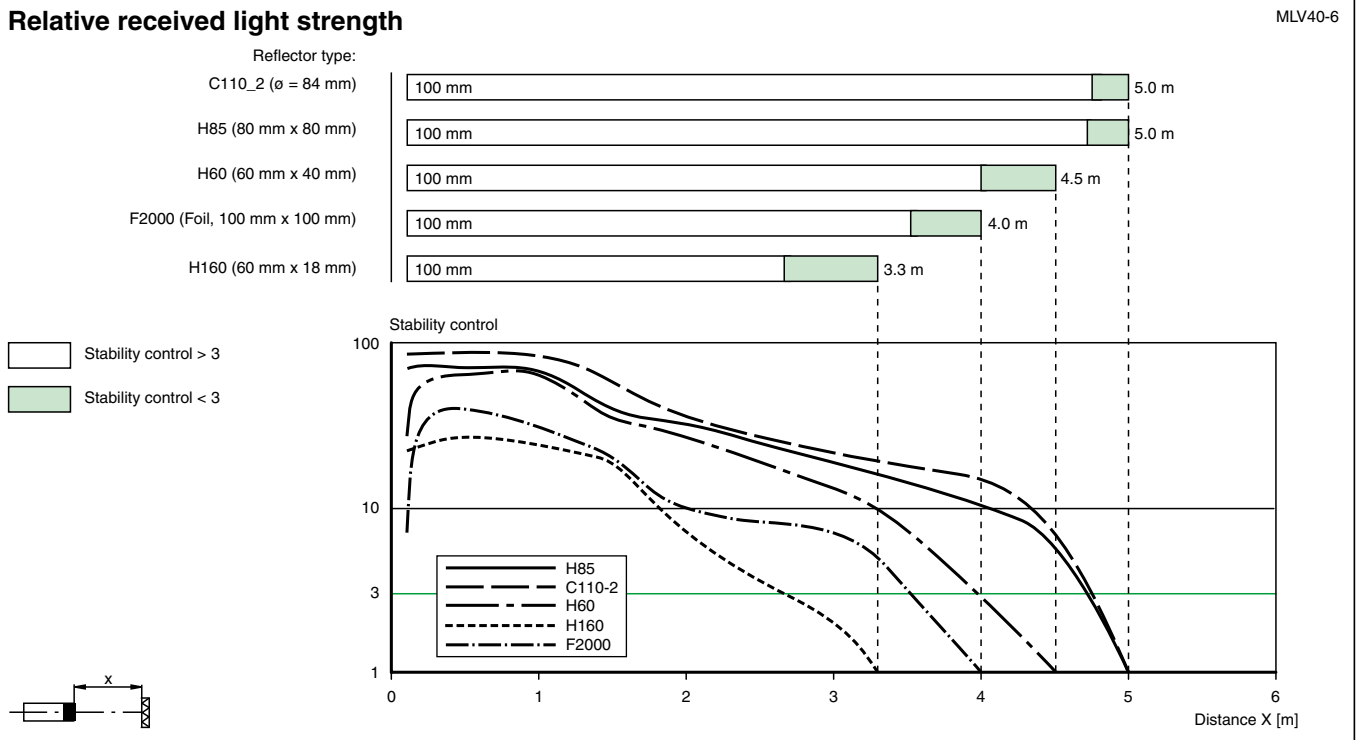
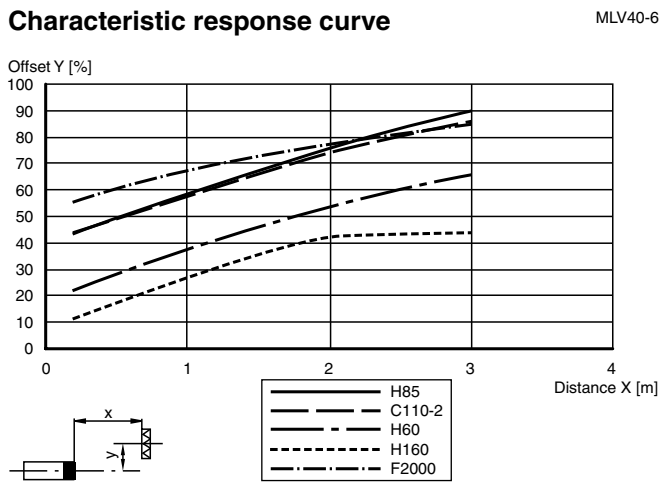
Series
MLV40

Date of issue: 10/4/01



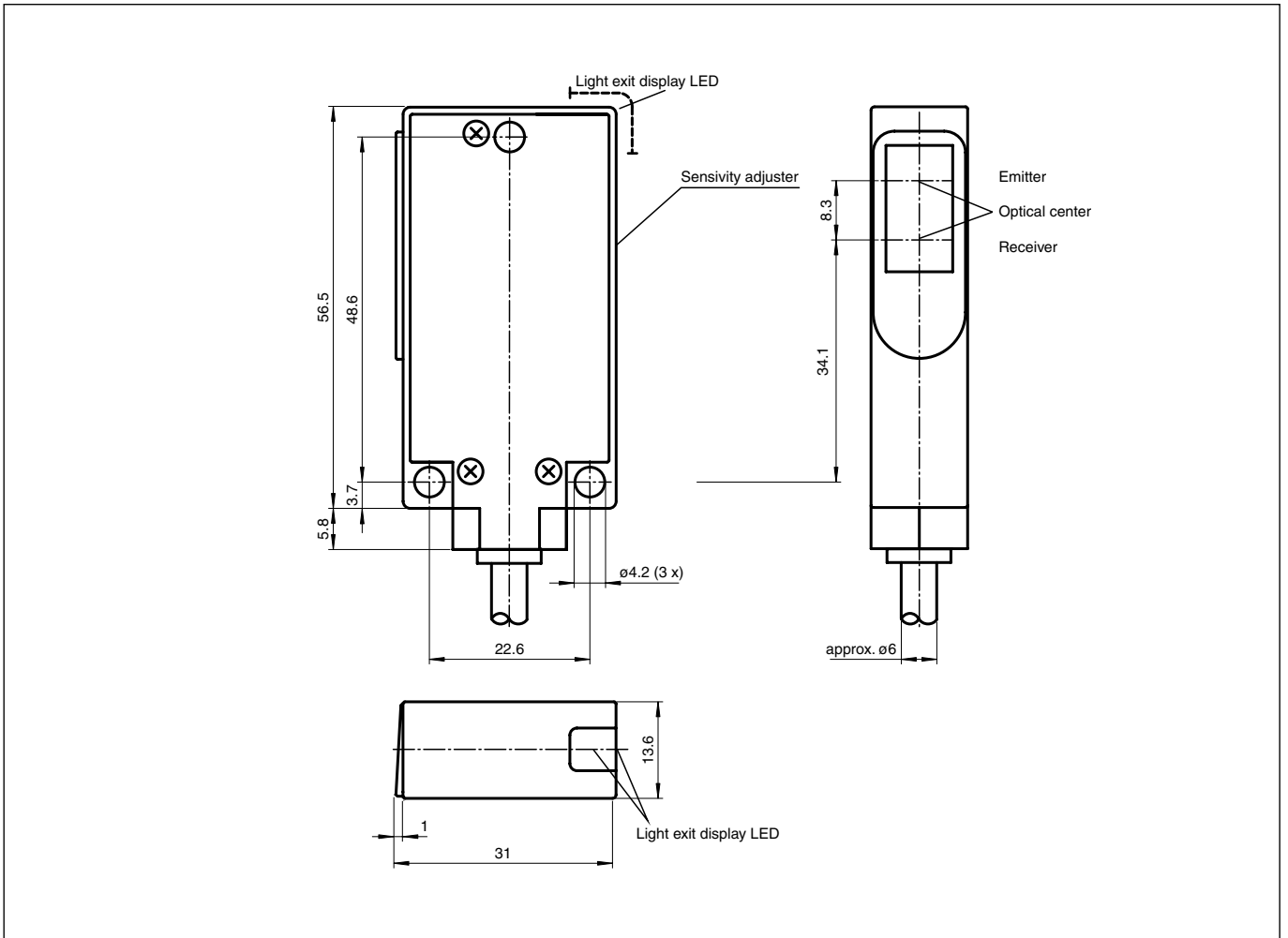
MLV40-6/.../115

Diagrams

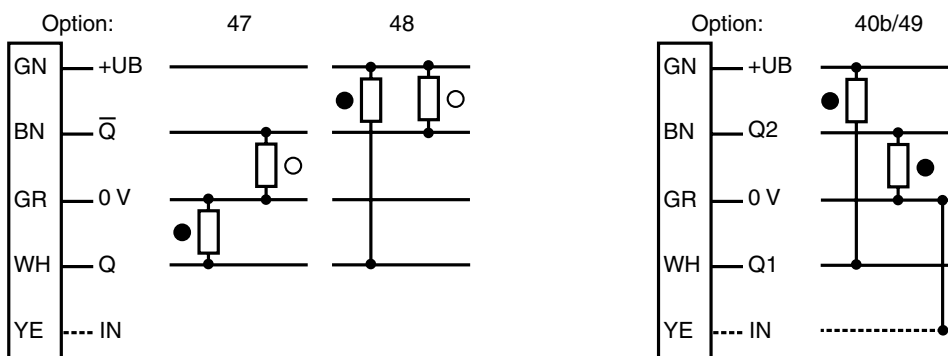


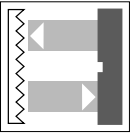
Series
MLV40

Dimensions



Electrical Connection





MLV40-6/.. /92

Reflection light beam switch

MLV40-6/.. /92

with M12, 4-pin metal connector



Series
MLV40



- ◆ Detection range up to 4 m
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Pre-fault indication

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

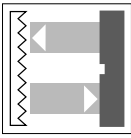
For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		MLV40-6/47/92	MLV40-6/48/92	MLV40-6/49/92
Effective detection range	0.1 ... 2 m	◆	◆	◆
Threshold detection range	4 m (with H60 reflector)	◆	◆	◆
Reflector distance	100 ... 2000 mm	◆	◆	◆
Light source	IRED	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 4 °	◆	◆	◆
Diameter of the light spot	100 mm at 2000 mm detection range	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, lights up when light beam is free, flashes when falling short of the stability control	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	dark ON			◆
	light/dark switching	◆	◆	
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	500 Hz	◆	◆	◆
Response time	1 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g	◆	◆	◆

Series
MLV40

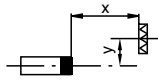
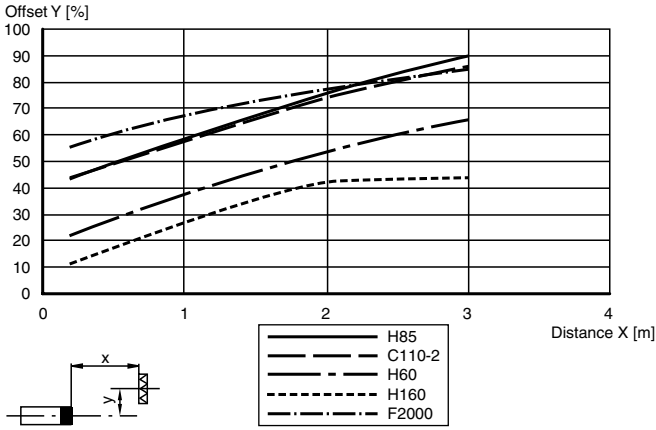
Date of issue: 10/4/01



Diagrams

Characteristic response curve

MLV40-6

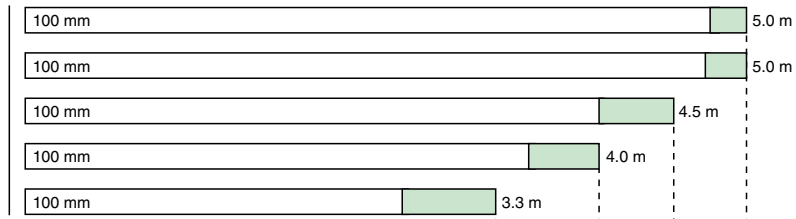


Relative received light strength

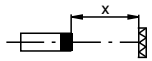
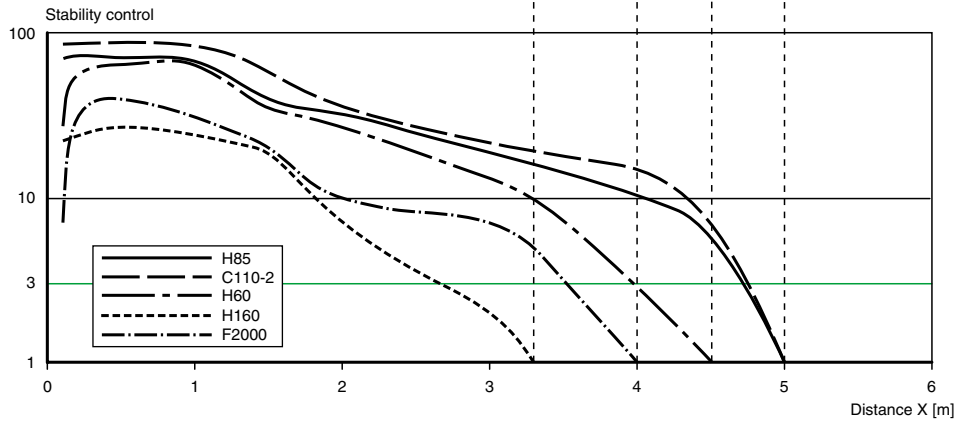
MLV40-6

Reflector type:

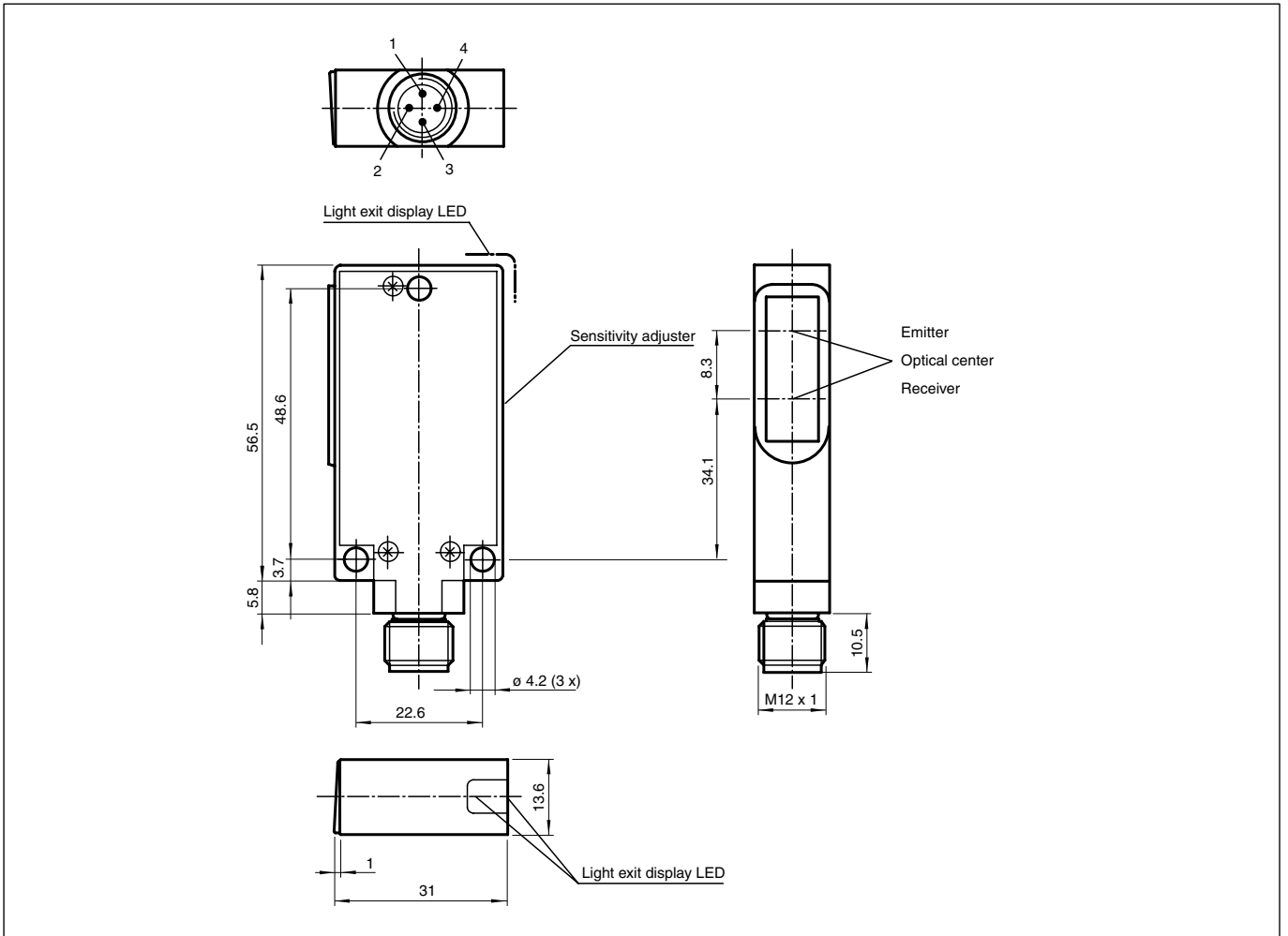
- C110_2 ($\phi = 84$ mm)
- H85 (80 mm x 80 mm)
- H60 (60 mm x 40 mm)
- F2000 (Foil, 100 mm x 100 mm)
- H160 (60 mm x 18 mm)



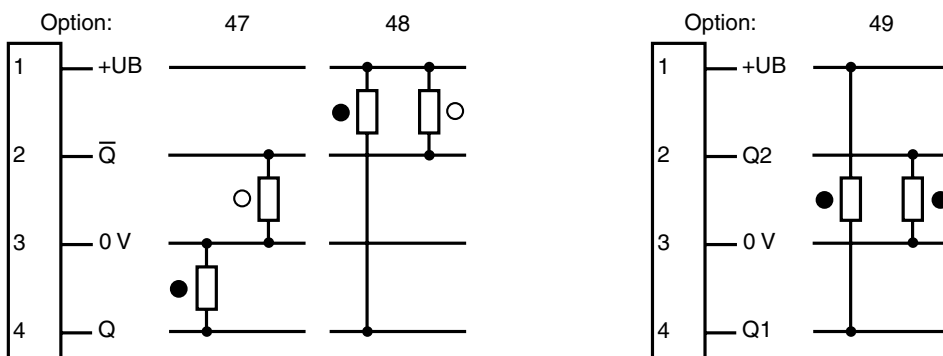
- Stability control > 3
- Stability control < 3



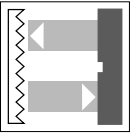
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV40-54/.../115

Reflection light beam switch with polarisation filter

MLV40-54/.../115

with 2 m fixed cable



Series
MLV40



- ◆ Detection range up to 2000 mm
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Pre-fault indication
- ◆ Polarisation filters

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

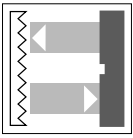
For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		MLV40-54/4/7/115	MLV40-54/4/8/115	MLV40-54/40b/49/115
Effective detection range	0.1 ... 1000 mm	◆	◆	◆
Threshold detection range	2000 mm (with H60 reflector)	◆	◆	◆
Reflector distance	100 ... 1000 mm	◆	◆	◆
Light source	LED	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆
Angle of divergence	approx. 4 °	◆	◆	◆
Diameter of the light spot	approx. 40 mm at 1000 mm detection range	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, lights up when light beam is free, flashes when falling short of the stability control	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	500 Hz	◆	◆	◆
Response time	1 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	Fixed cable 2 m	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g	◆	◆	◆

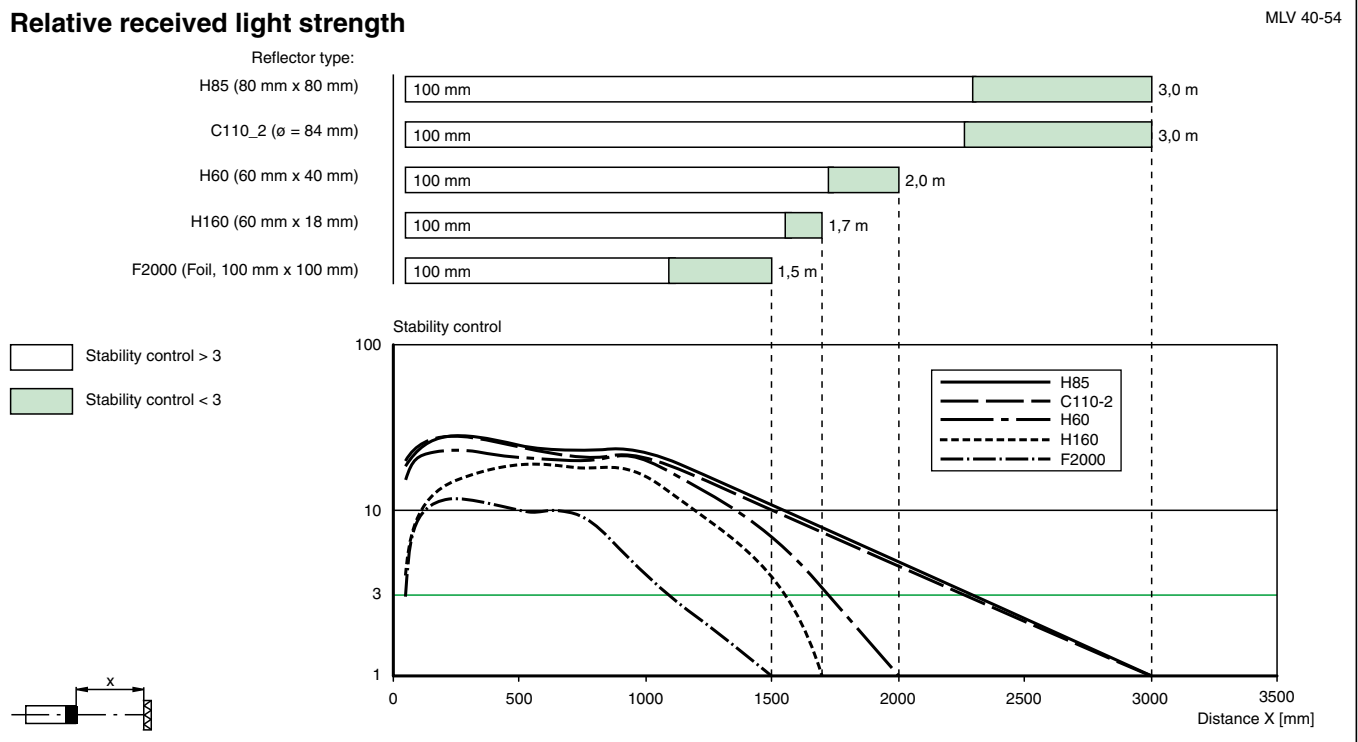
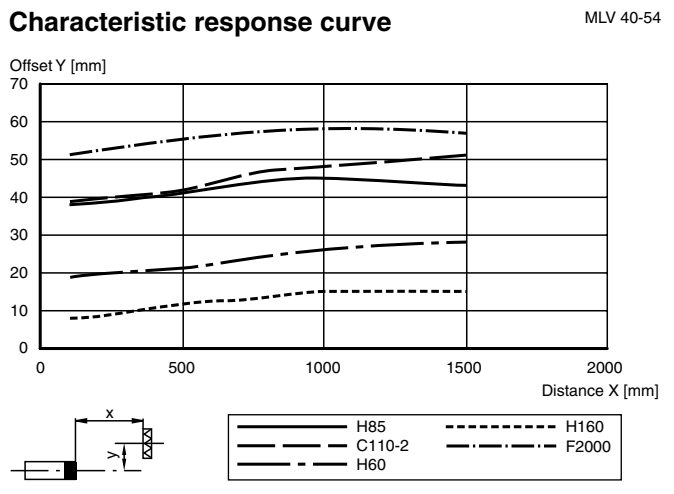
Series
MLV40

Date of issue: 10/4/01

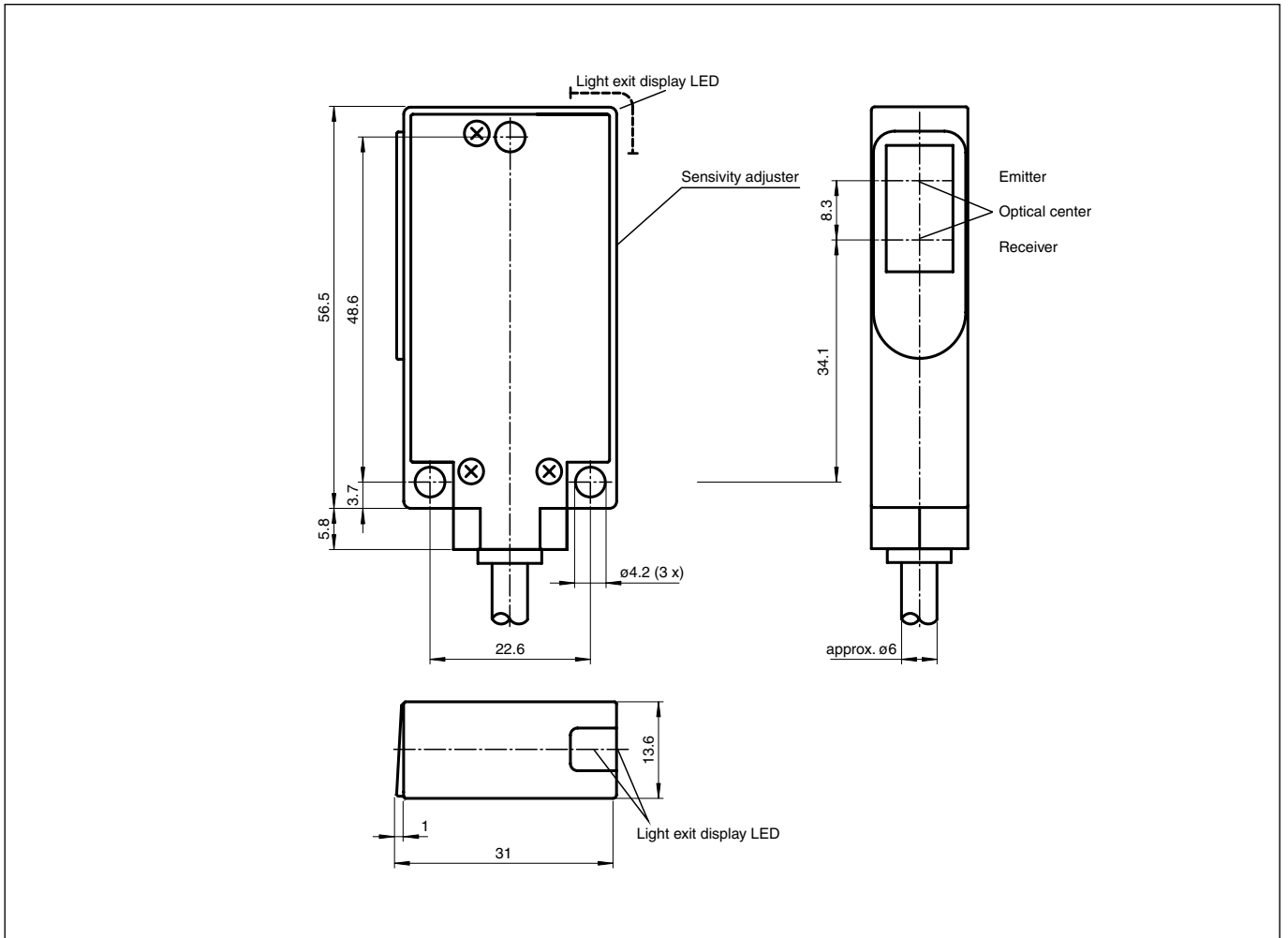


MLV40-54/.../115

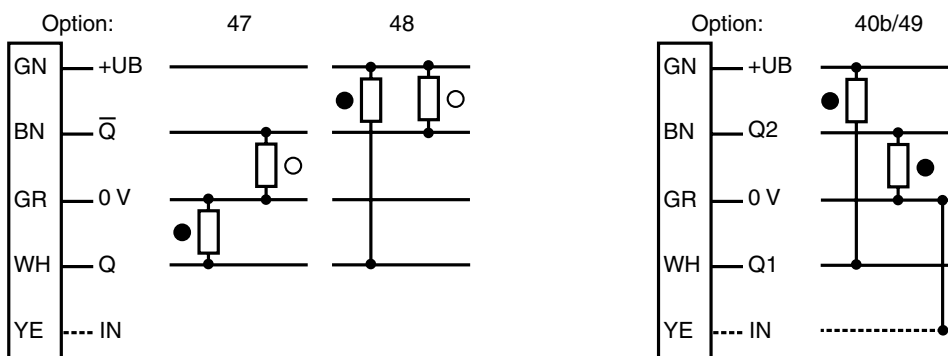
Diagrams

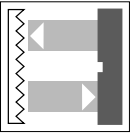


Dimensions



Electrical Connection





MLV40-54/...

Reflection light beam switch with polarisation filter

MLV40-54/...

with M12, 4-pin metal connector



Series
MLV40



- ◆ Detection range up to 2000 mm
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Pre-fault indication
- ◆ Polarisation filters

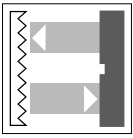
For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

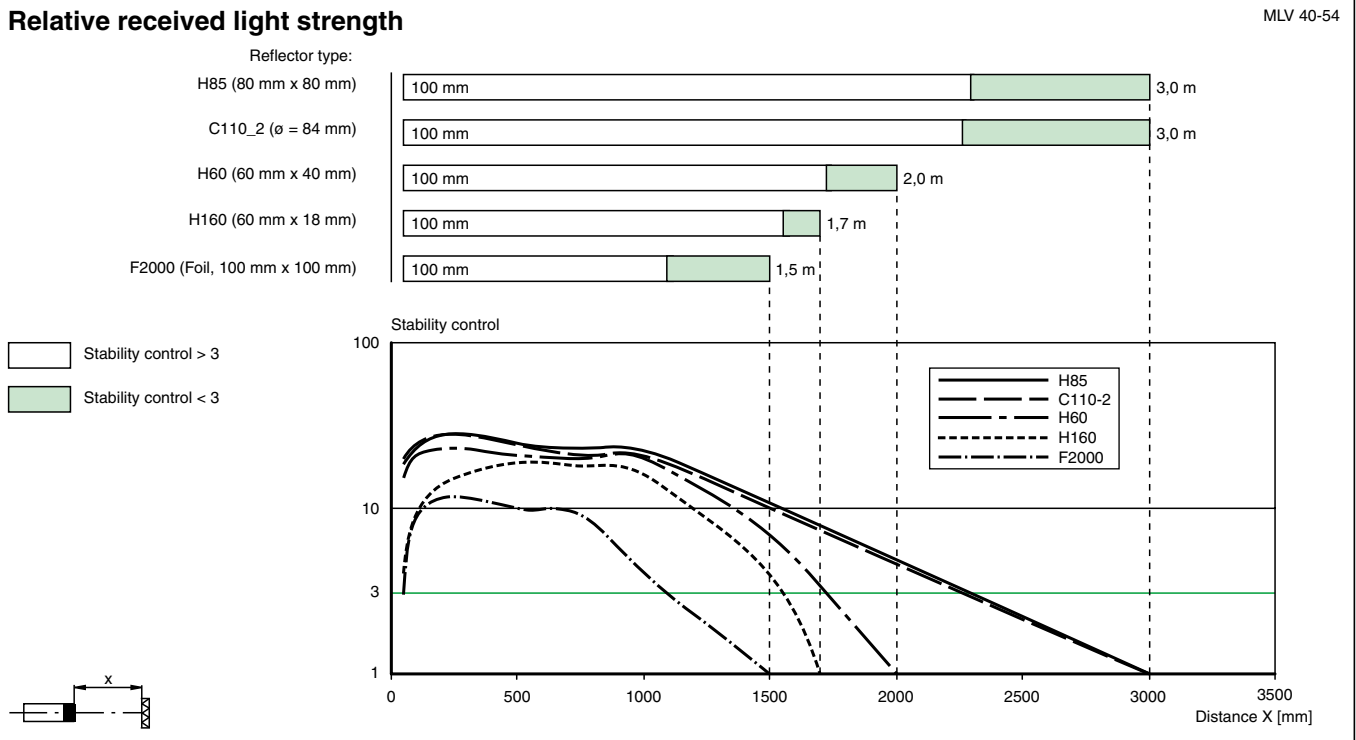
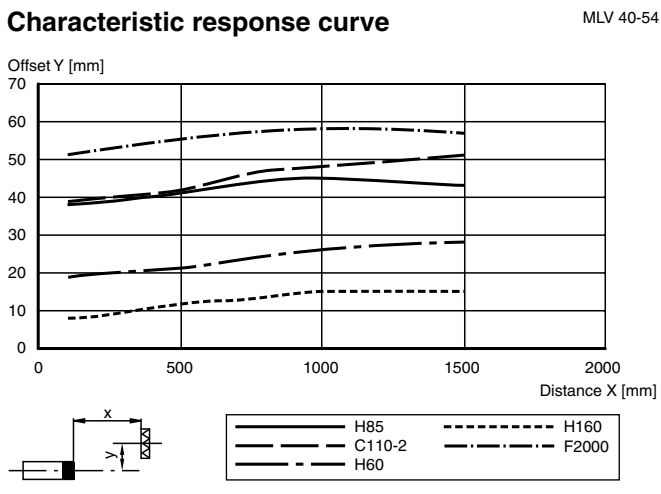
Ordering code		MLV40-54/47/92	MLV40-54/48/92	MLV40-54/49/92	MLV40-54-1424
Effective detection range	0.1 ... 1000 mm	◆	◆	◆	◆
Threshold detection range	2000 mm (with H60 reflector)	◆	◆	◆	◆
Reflector distance	100 ... 1000 mm	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Angle of divergence	approx. 3 °	◆	◆	◆	◆
Diameter of the light spot	approx. 40 mm at 1000 mm detection range	◆	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Function display	LED yellow, lights up when light beam is free, flashes when falling short of the stability control	◆	◆	◆	◆
Controls	Light/dark switch				◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆			
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆		
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆	
	1 pnp, short-circuit proof, protected against reverse polarity				◆
Switching type	dark ON			◆	
	light/dark switching	◆	◆		◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	500 Hz	◆	◆	◆	◆
Response time	1 ms	◆	◆	◆	◆
Output of the pre-fault indication	1 pnp, 0.1 A; 30 V DC, active after 10 s when falling short of the stability control				◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆

Series
MLV40



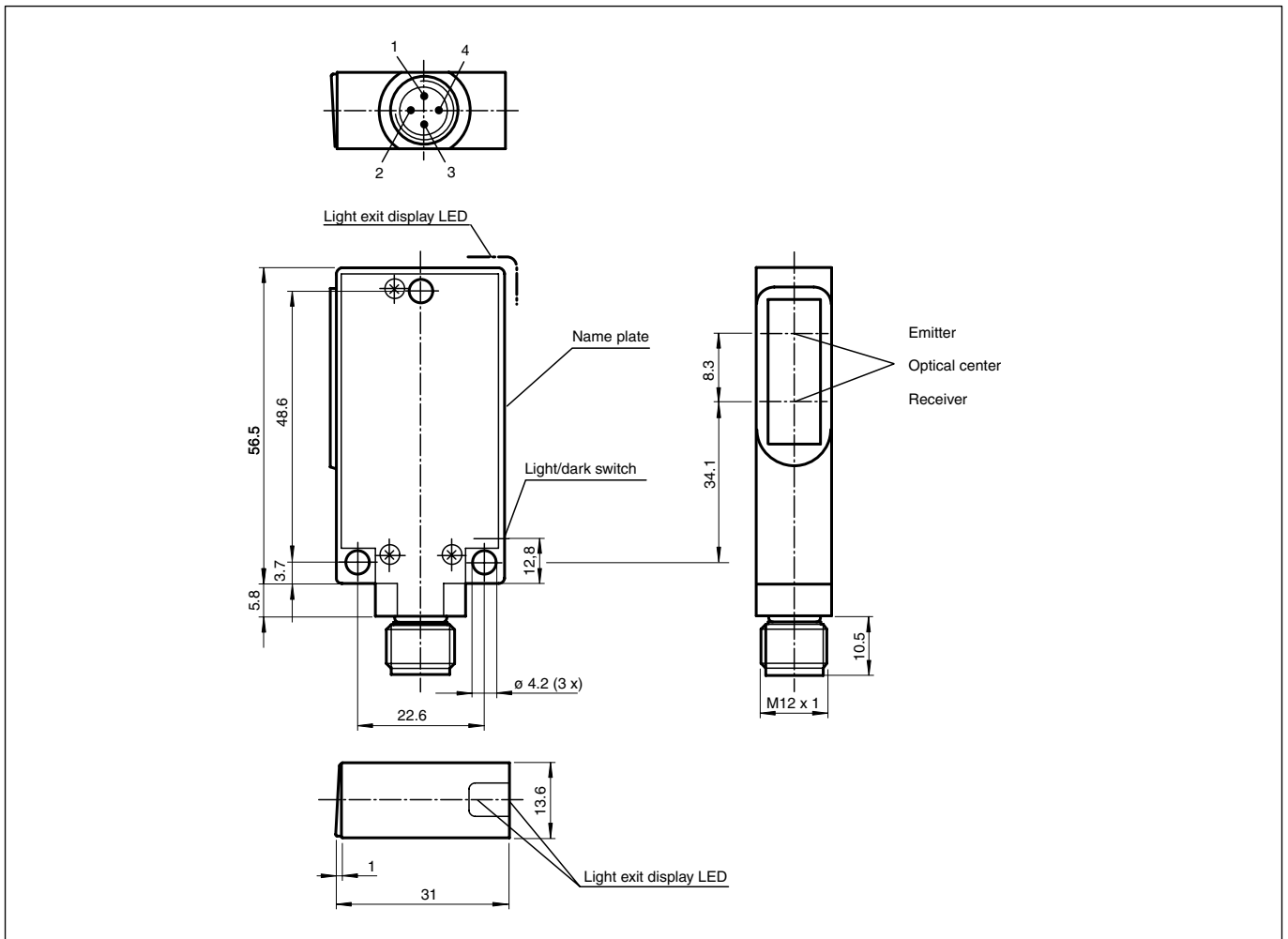
MLV40-54/...

Diagrams

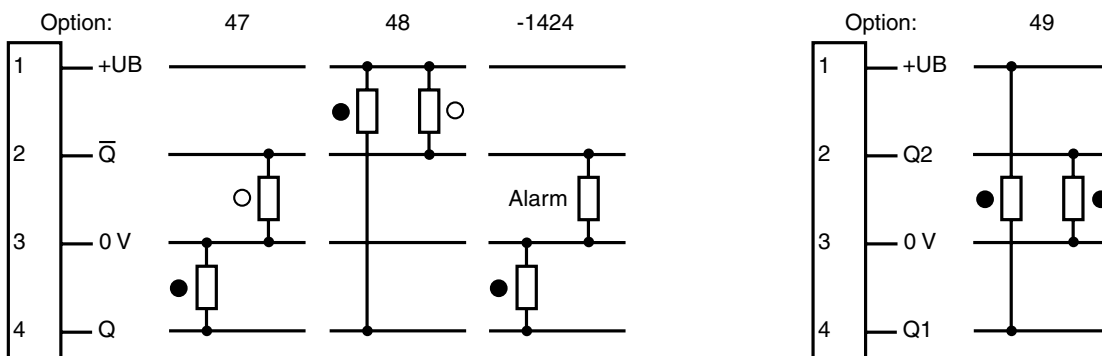


Series MLV40

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV40-54-G/40a/./115

Reflection light beam switch with polarisation filter for glass detection

MLV40-54-G/40a/./115

with 2 m fixed cable



Series
MLV40



- ◆ Detection range up to 400 mm
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Pre-fault indication
- ◆ Detection of transparent materials

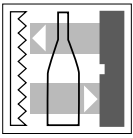
For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		MLV40-54-G/40a/47/115	MLV40-54-G/40a/48/115	MLV40-54-G/40a/49/115
Effective detection range	0 ... 400 mm	◆	◆	◆
Threshold detection range	1000 mm (with H60 reflector)	◆	◆	◆
Reflector distance	0 ... 400 mm	◆	◆	◆
Light source	LED	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆
Angle of divergence	approx. 3 °	◆	◆	◆
Diameter of the light spot	approx. 20 mm at 400 mm detection range	◆	◆	◆
Ambient light limit	75000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED green, lights up when light beam is free red LED when falling short of the stability control	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	500 Hz	◆	◆	◆
Response time	1 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	Fixed cable 2 m	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g	◆	◆	◆

Series
MLV40

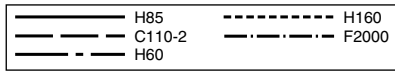
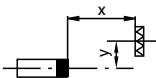
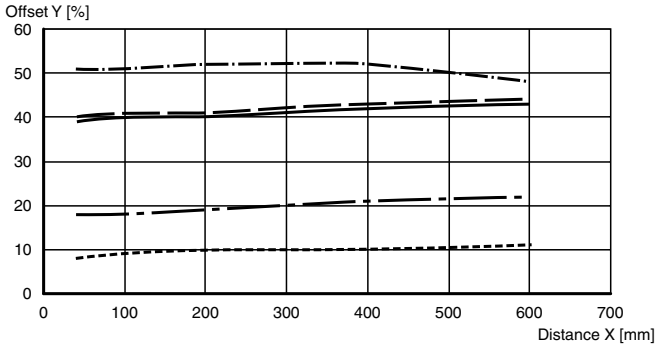


MLV40-54-G/40a../115

Diagrams

Characteristic response curve

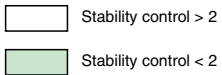
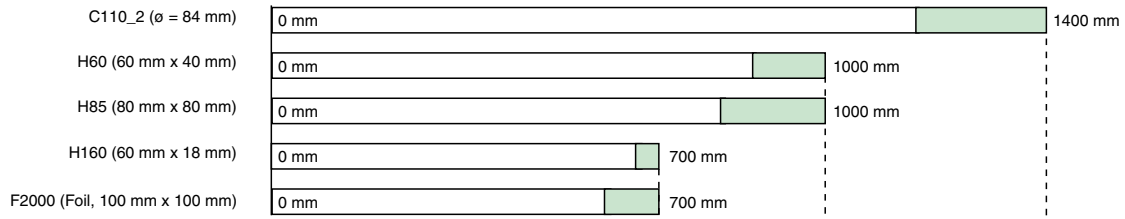
MLV 40-54-G



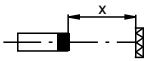
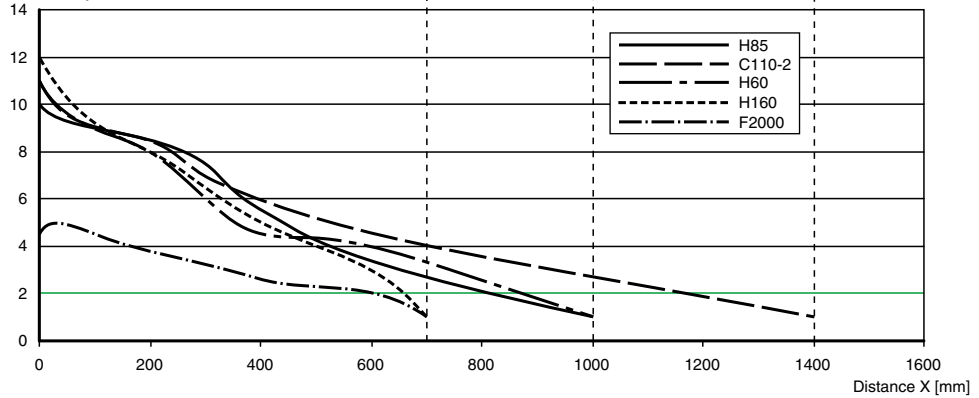
Relative received light strength

MLV 40-54-G

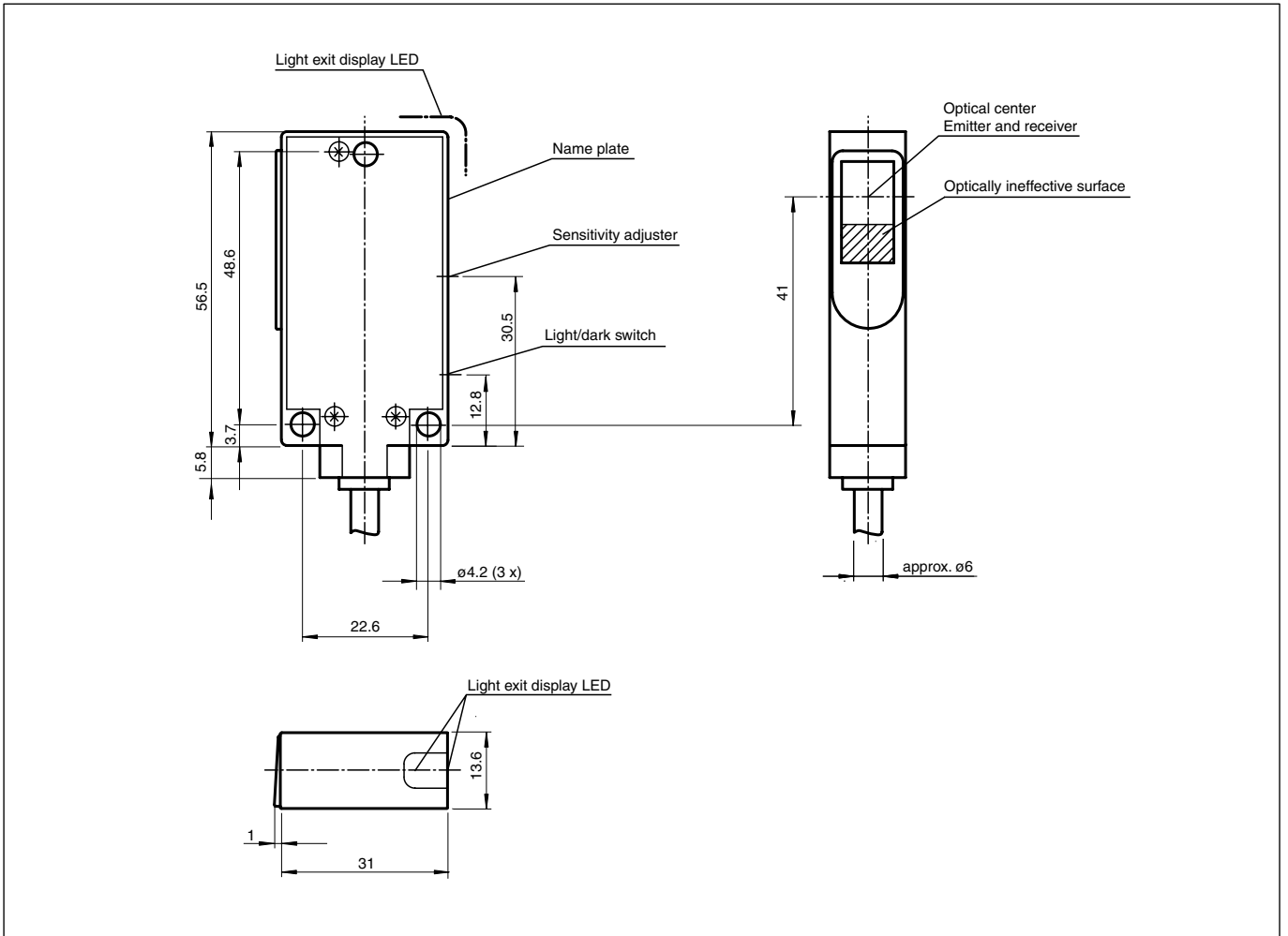
Reflector type:



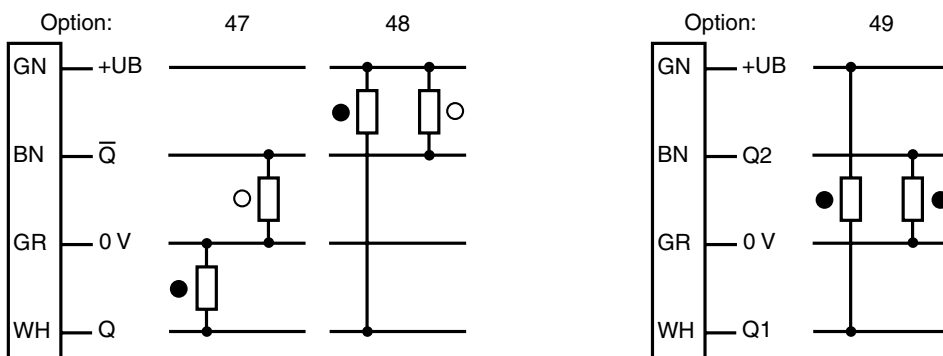
Stability control



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV40-54-G/...

Reflection light beam switch with polarisation filter for glass detection

MLV40-54-G/...

with M12, 4-pin metal connector



Series
MLV40



- ◆ Detection range up to 400 mm
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Pre-fault indication
- ◆ Detection of transparent materials

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		MLV40-54-G/40a/47/92	MLV40-54-G/40a/49/92	MLV40-54-G/40a/49/92	MLV40-54-G-1700
Effective detection range	0 ... 400 mm	◆	◆	◆	
	0 ... 200 mm				◆
Threshold detection range	1000 mm (with H60 reflector)	◆	◆	◆	
	400 mm (with H60 reflector)				◆
Reflector distance	0 ... 400 mm	◆	◆	◆	
	0 ... 200 mm				◆
Light source	LED	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Angle of divergence	approx. 2 °				◆
	approx. 3 °	◆	◆	◆	
Diameter of the light spot	approx. 20 mm at 400 mm detection range	◆	◆	◆	
	approx. 8 mm at 200 mm detection range				◆
Ambient light limit	75000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Function display	LED green, lights up when light beam is free red LED when falling short of the stability control	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆	
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆	◆
Signal output	2 npn antivalent, short-circuit proof, protected against reverse polarity	◆			
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆		
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆	
	2 pnp, antivalent, short-circuit proof, protected against reverse polarity, with internal 10 kOhm pull-down				◆
Switching type	light/dark switching	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	500 Hz	◆	◆	◆	◆
Response time	1 ms	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆

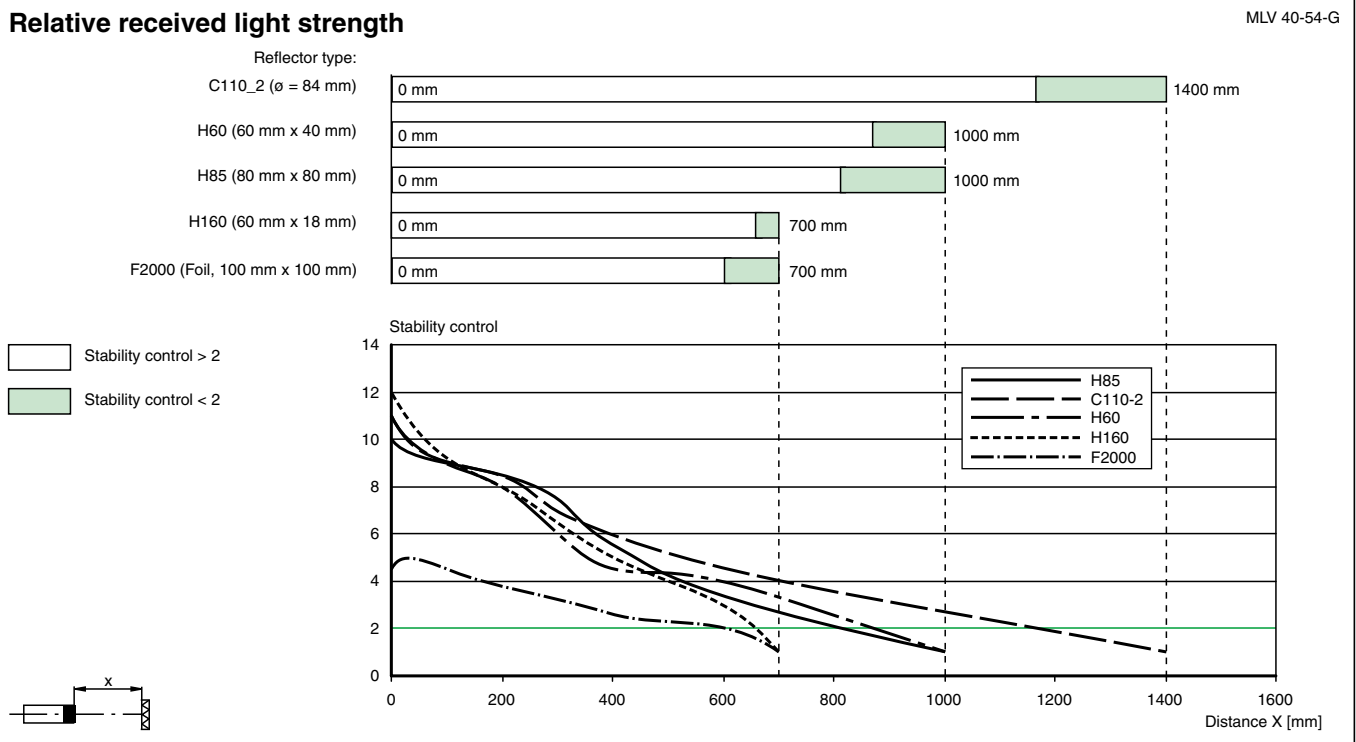
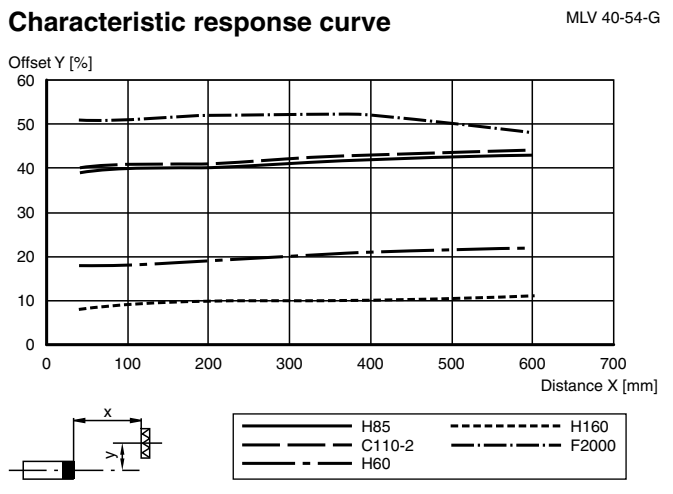
Series
MLV40

Date of issue: 10/4/01

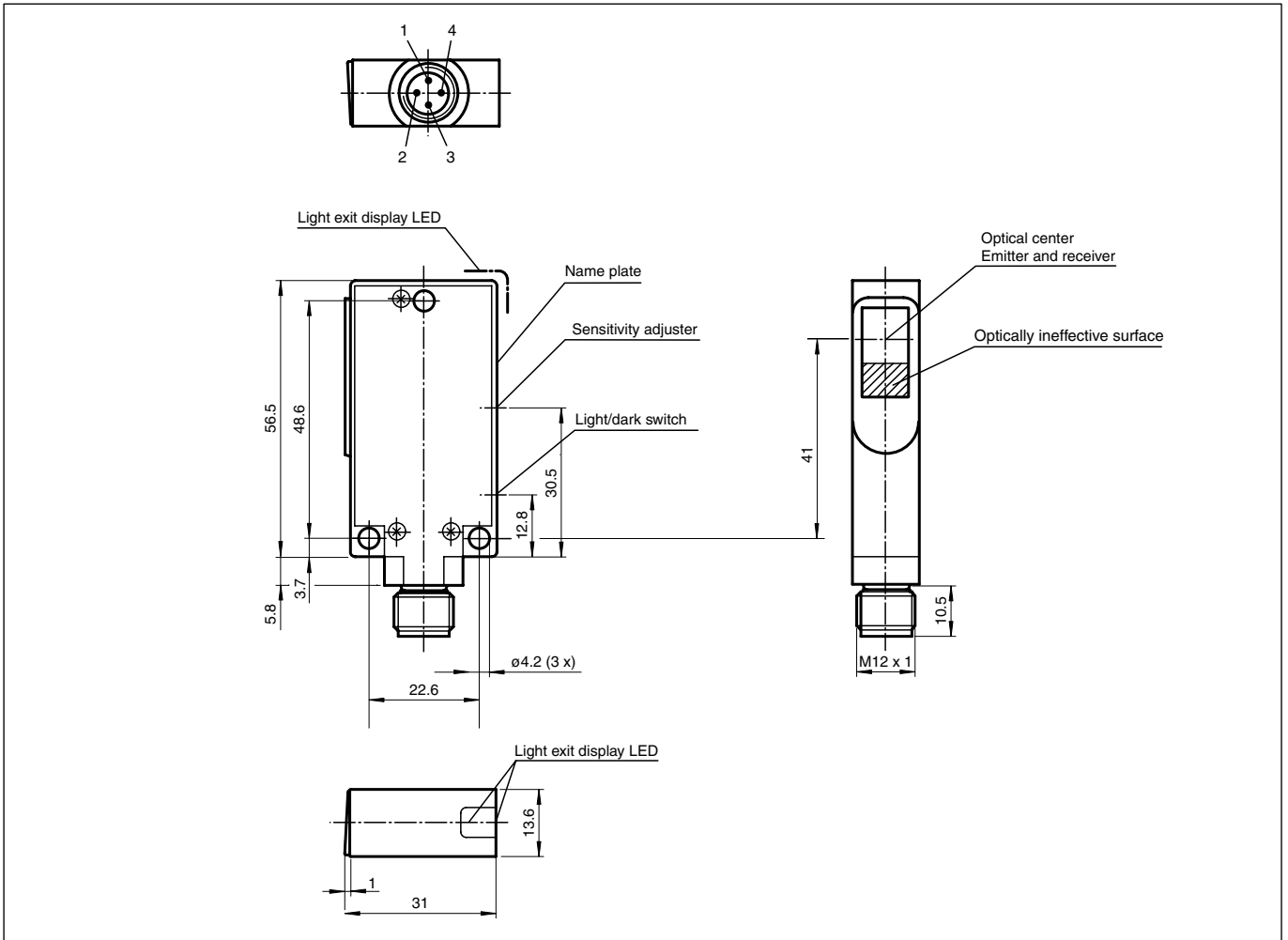


MLV40-54-G/...

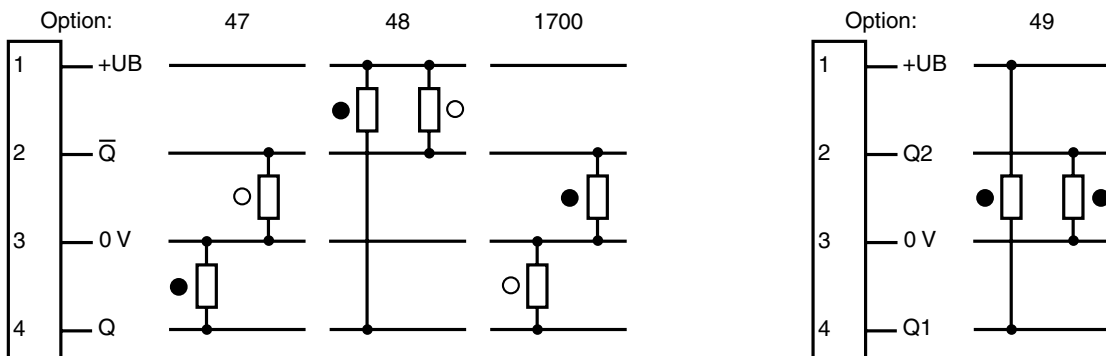
Diagrams



Dimensions

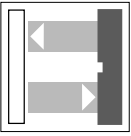


Electrical Connection



Date of issue: 10/4/01

○ = Light ON, ● = Dark ON



MLV40-8-500/.. /115

Reflection light scanner

MLV40-8-500/.. /115

with 2 m fixed cable



Series
MLV40



- ◆ Detection range 10 mm ... 500 mm, adjustable
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Pre-fault indication

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

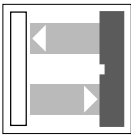
For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		MLV40-8-500/47/115	MLV40-8-500/48/115	MLV40-8-500/49/115
Detection range	10 ... 500 mm	◆	◆	◆
Adjustment range	100 ... 500 mm	◆	◆	◆
Light source	IREd	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 4 °	◆	◆	◆
Diameter of the light spot	approx. 30 mm at 500 mm detection range	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, flashes when falling short of the stability control	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	dark ON			◆
	light/dark switching	◆	◆	
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	500 Hz	◆	◆	◆
Response time	1 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	Fixed cable 2 m	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g	◆	◆	◆

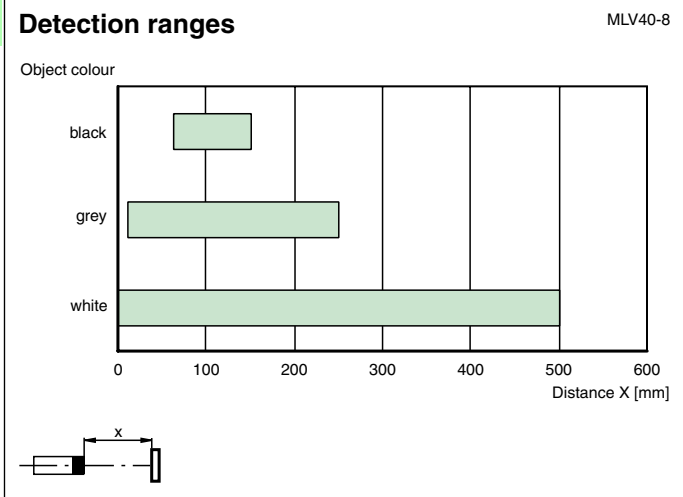
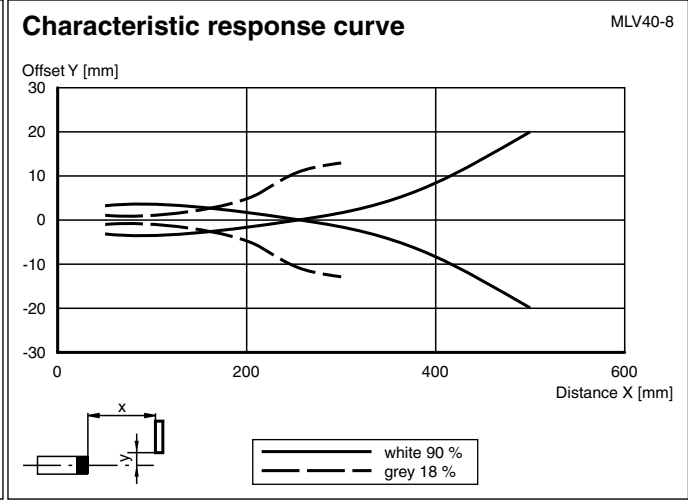
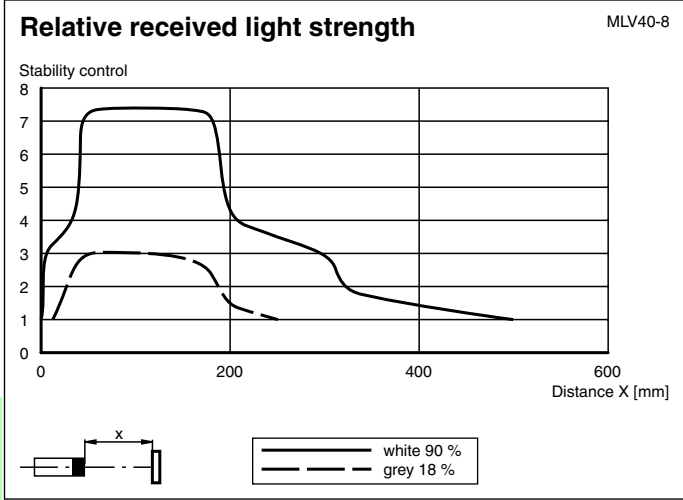
Series
MLV40

Date of issue: 10/4/01

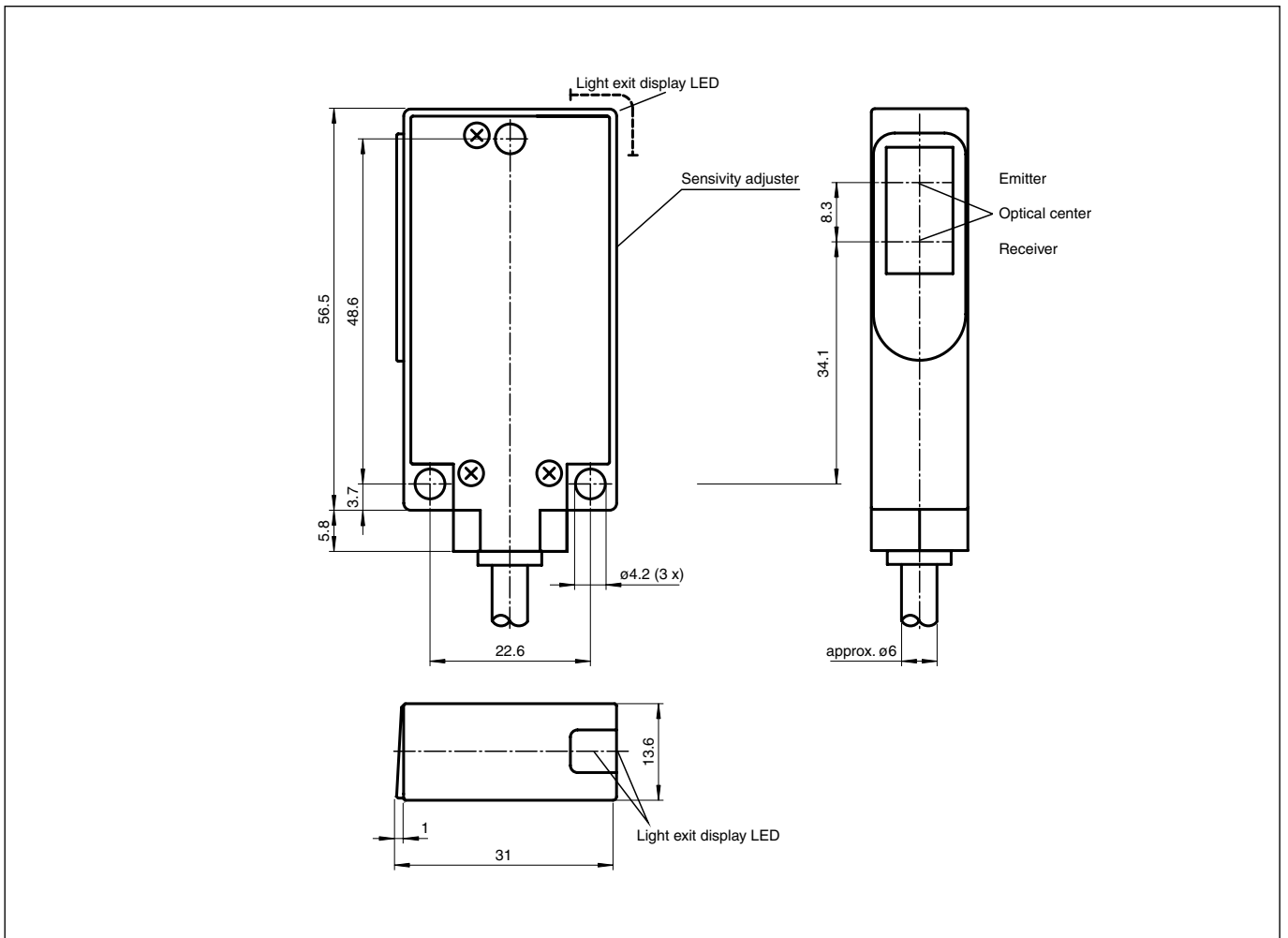


Diagrams

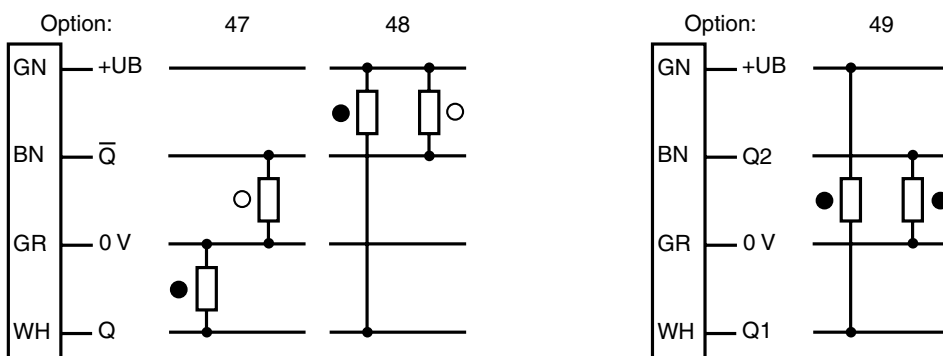
Series
MLV40



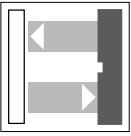
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV40-8-500/.. /92

Reflection light scanner

MLV40-8-500/.. /92

with M12, 4-pin metal connector



Series
MLV40



- ◆ Detection range 10 mm ... 500 mm, adjustable
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Pre-fault indication

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

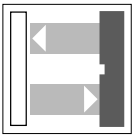
For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		MLV40-8-500/47/92	MLV40-8-500/48/92	MLV40-8-500/49/92
Detection range	10 ... 500 mm	◆	◆	◆
Adjustment range	100 ... 500 mm	◆	◆	◆
Light source	IREC	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 4 °	◆	◆	◆
Diameter of the light spot	approx. 30 mm at 500 mm detection range	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, flashes when falling short of the stability control	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 npn antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	dark ON			◆
	light/dark switching	◆	◆	
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	500 Hz	◆	◆	◆
Response time	1 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g	◆	◆	◆

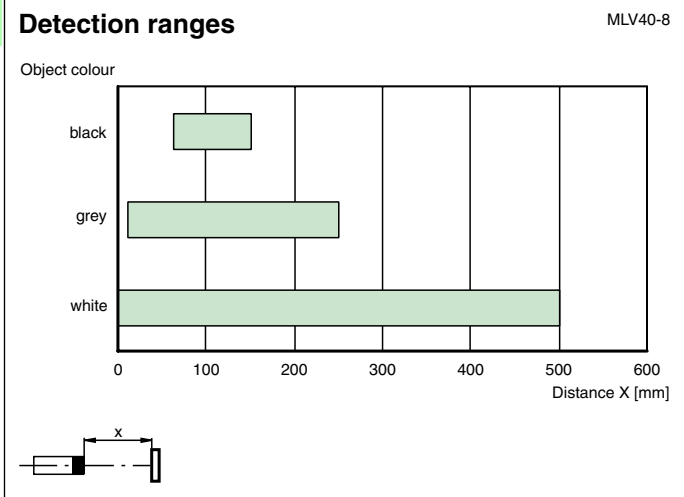
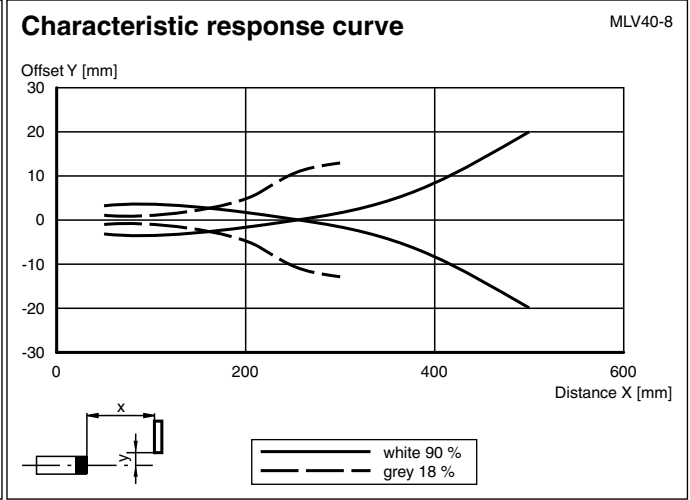
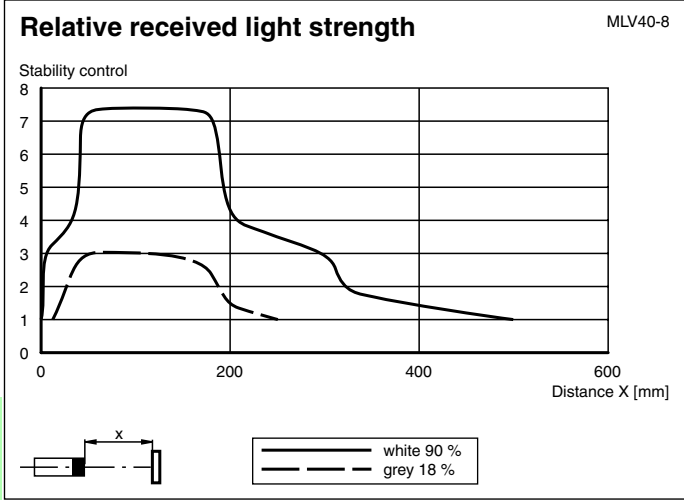
Series
MLV40

Date of issue: 10/4/01

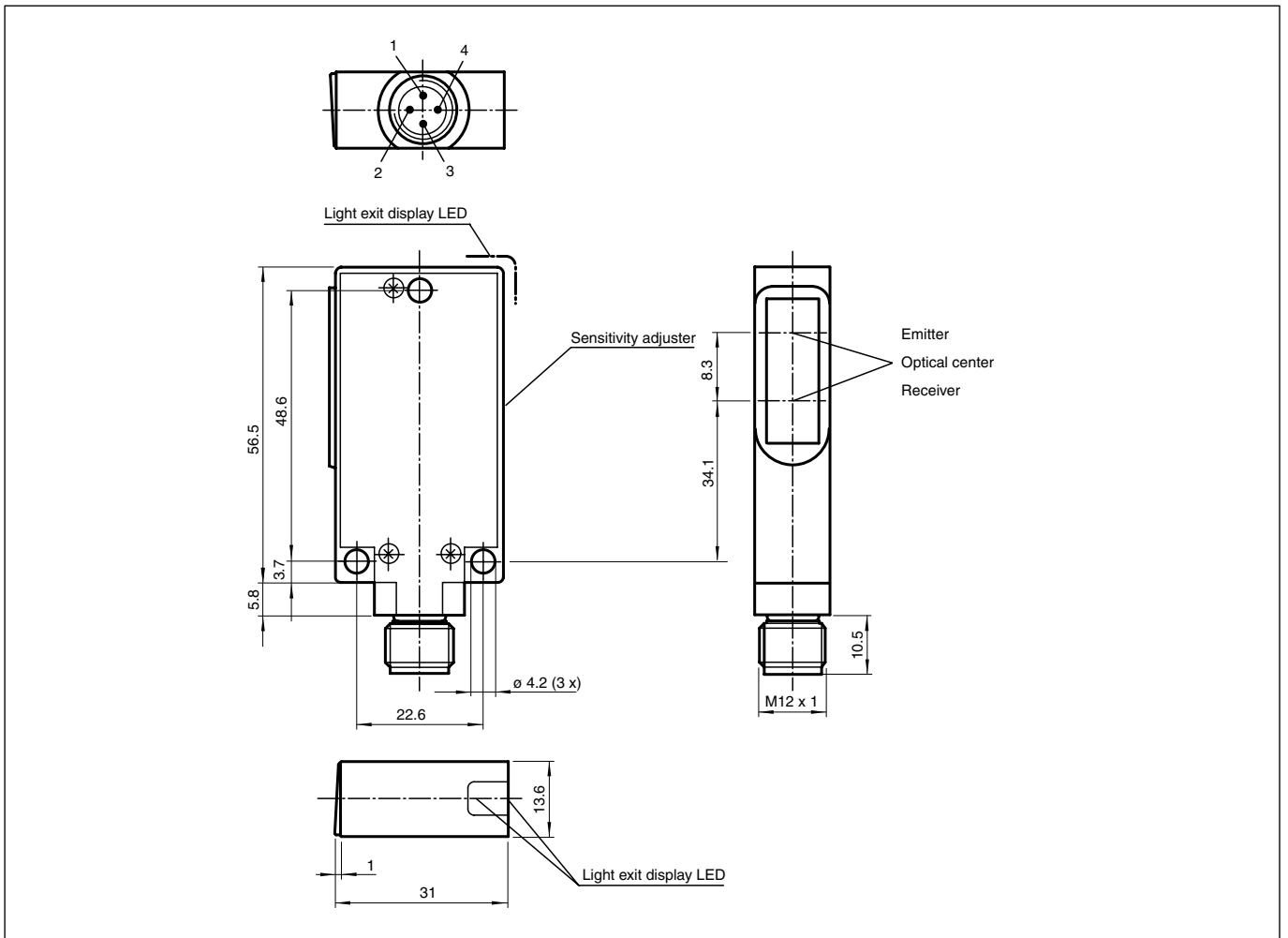


Diagrams

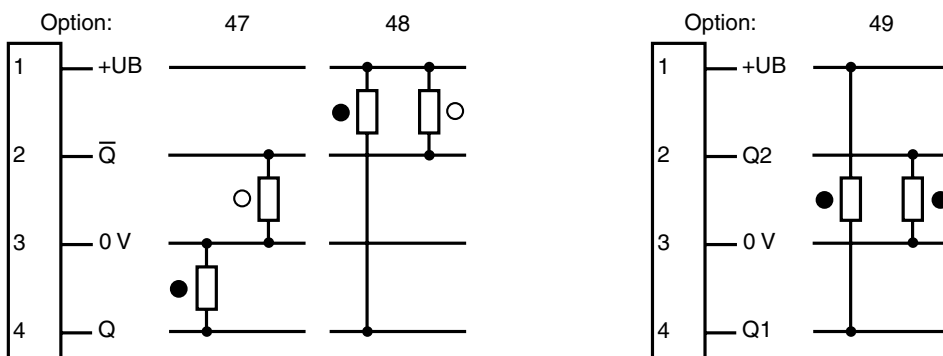
Series
MLV40



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV40-8-H-80/./115

Reflection light scanner with background suppression

MLV40-8-H-80/./115

with 2 m fixed cable



Series
MLV40



- ◆ Detection range 10 mm ... 80 mm
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Minimal black-/white difference

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

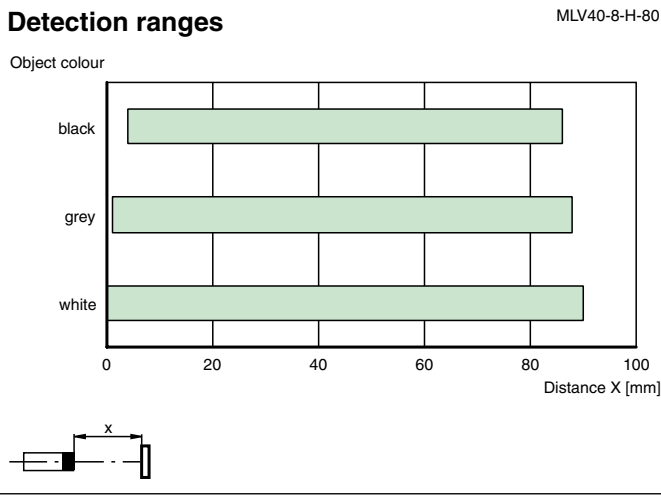
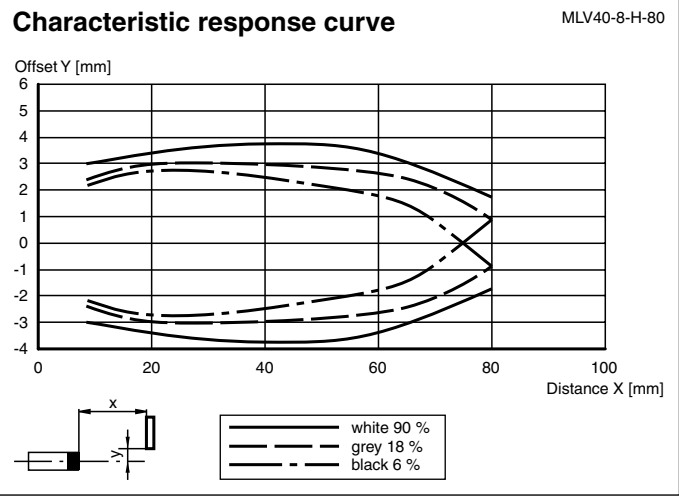
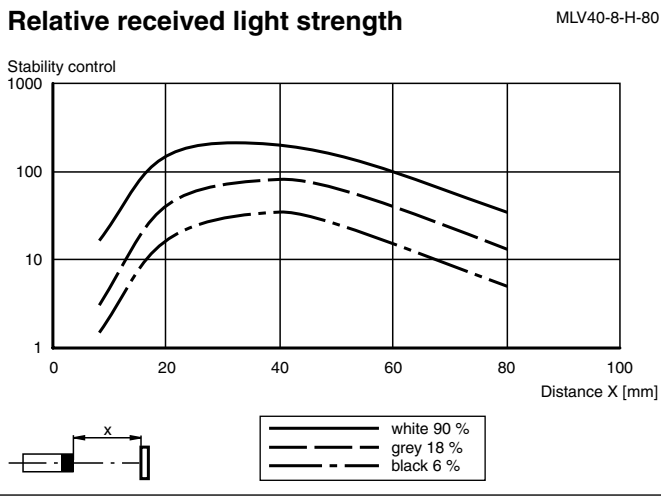
Ordering code		MLV40-8-H-80/47/115	MLV40-8-H-80/48/115	MLV40-8-H-80/49/115
Detection range	10 ... 80 mm	◆	◆	◆
Detection range min.	10 ... 80 mm	◆	◆	◆
Sensor range max.	10 ... 90 mm	◆	◆	◆
Background suppression	starts from 90 mm	◆	◆	◆
Black/white difference (6%/90%)	< 8 mm	◆	◆	◆
Light source	IRED	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 7 °	◆	◆	◆
Diameter of the light spot	approx. 10 mm at 80 mm detection range	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, flashes when falling short of the stability control	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	dark ON			◆
	light/dark switching	◆	◆	
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	70 Hz	◆	◆	◆
Response time	5 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	Fixed cable 2 m	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g	◆	◆	◆

Series
MLV40



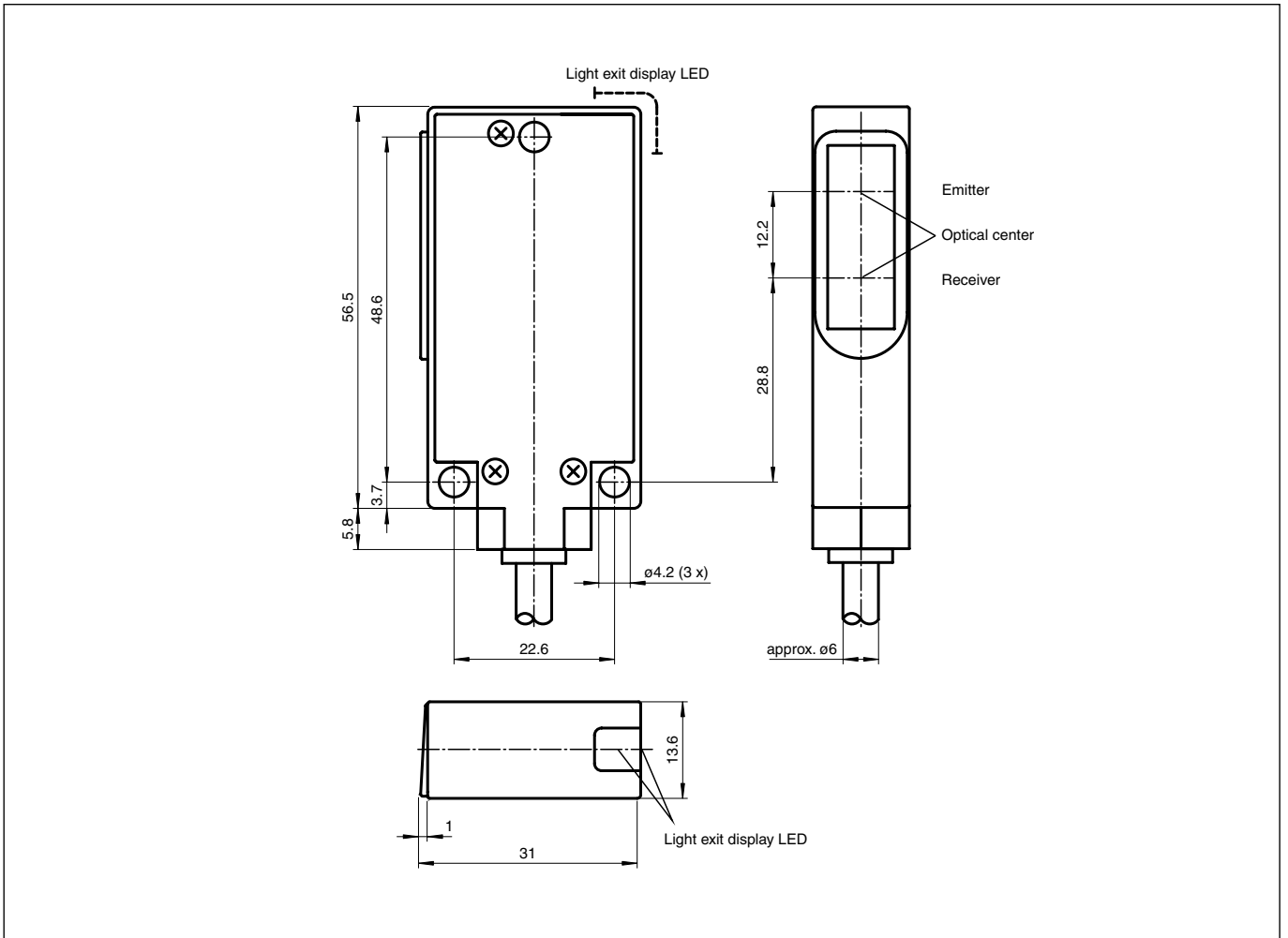
MLV40-8-H-80/./115

Diagrams

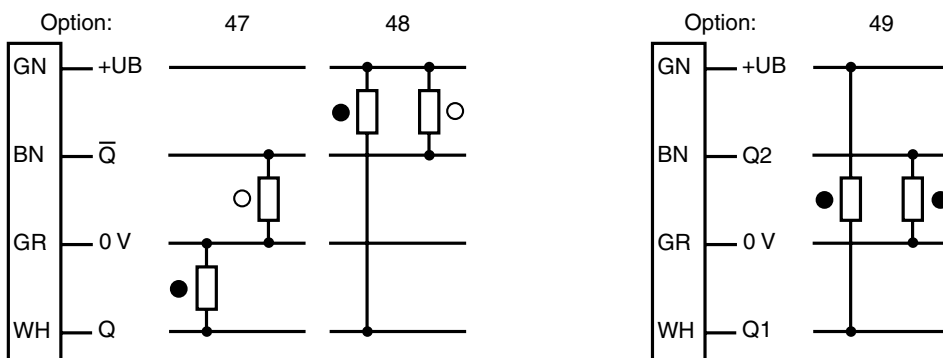


Series MLV40

Dimensions



Electrical Connection



Date of issue: 10/4/01

○ = Light ON, ● = Dark ON



MLV40-8-H-80/./92

Reflection light scanner with background suppression

MLV40-8-H-80/./92

with M12, 4-pin metal connector



Series
MLV40



- ◆ Detection range 10 mm ... 80 mm
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Minimal black-/white difference

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

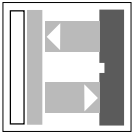
For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		MLV40-8-H-80/47/92	MLV40-8-H-80/48/92	MLV40-8-H-80/49/92
Detection range	10 ... 80 mm	◆	◆	◆
Detection range min.	10 ... 80 mm	◆	◆	◆
Sensor range max.	10 ... 90 mm	◆	◆	◆
Background suppression	starts from 90 mm	◆	◆	◆
Black/white difference (6%/90%)	< 8 mm	◆	◆	◆
Light source	IREL	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 7 °	◆	◆	◆
Diameter of the light spot	approx. 10 mm at 80 mm detection range	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, flashes when falling short of the stability control	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 npn antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 npn and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	dark ON			◆
	light/dark switching	◆	◆	
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	70 Hz	◆	◆	◆
Response time	5 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g	◆	◆	◆

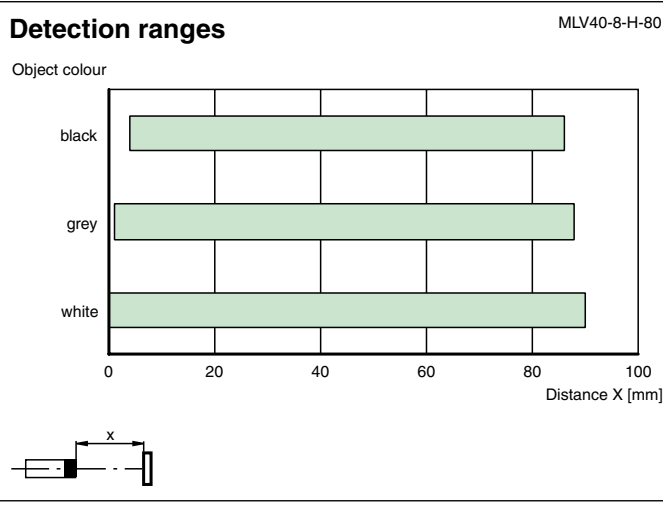
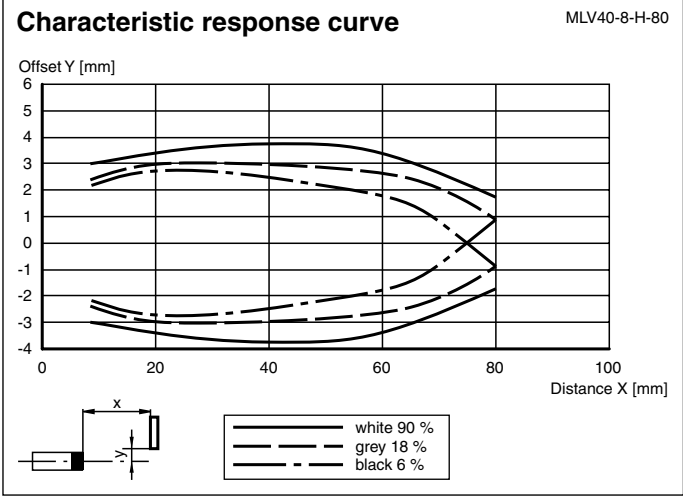
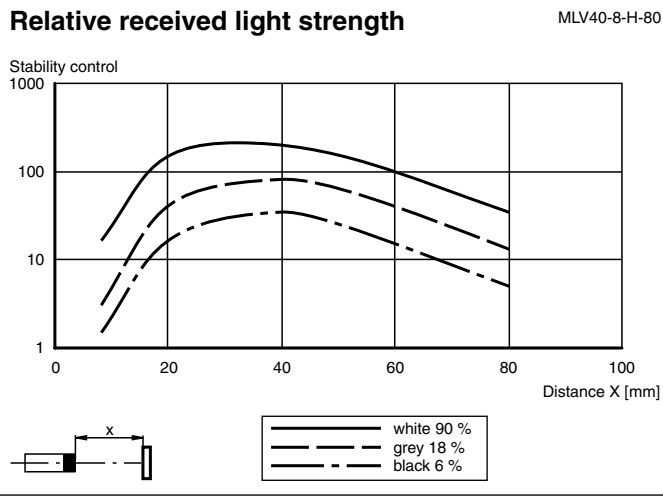
Series
MLV40

Date of issue: 10/4/01



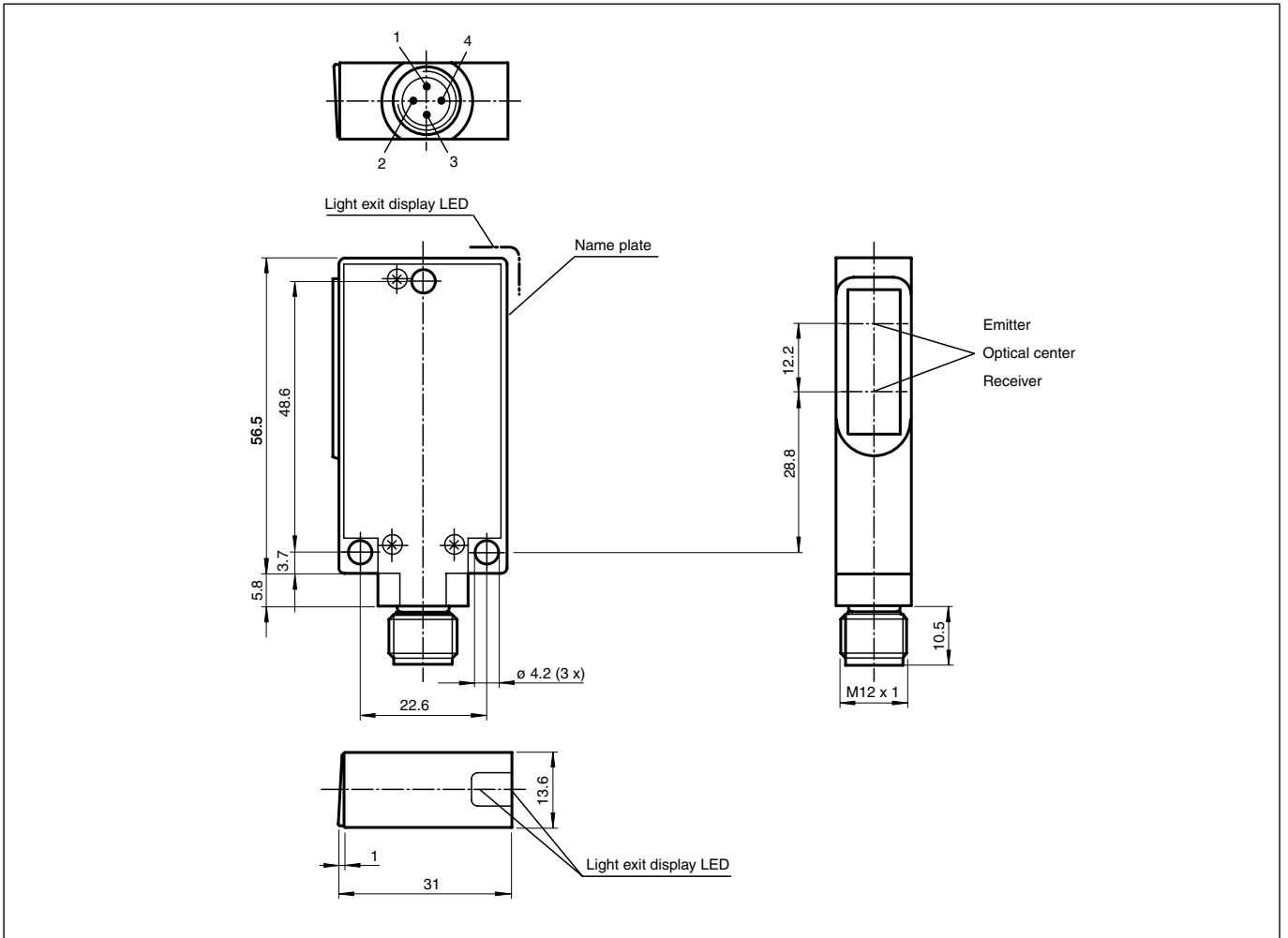
MLV40-8-H-80/./92

Diagrams

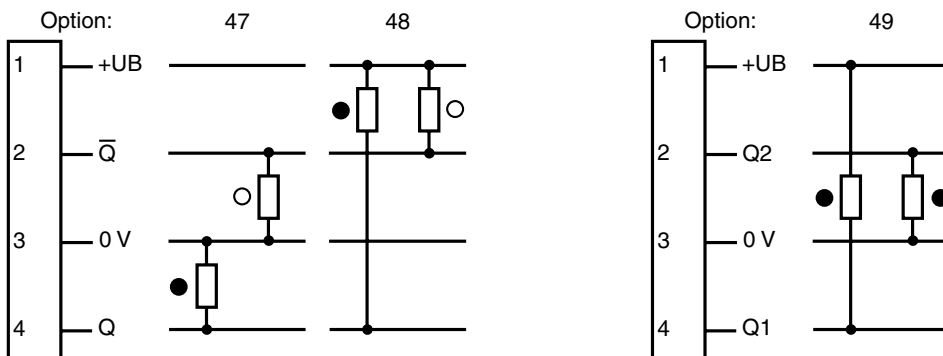


Series MLV40

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



MLV40-8-H-150-65/40a/./115

Reflection light scanner with background suppression

MLV40-8-H-150-65/40a/./115

with 2 m fixed cable



Series
MLV40



- ◆ Detection range 10 mm ... 150 mm, adjustable
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Minimal black-/white difference

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		MLV40-8-H-150-65/40a/47/115	MLV40-8-H-150-65/40a/48/115	MLV40-8-H-150-65/40a/49/115
Detection range	10 ... 150 mm	◆	◆	◆
Detection range min.	10 ... 70 mm	◆	◆	◆
Sensor range max.	10 ... 150 mm	◆	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆	◆
Light source	IREDD	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 7 °	◆	◆	◆
Diameter of the light spot	approx. 10 mm at 80 mm detection range	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED, green	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	70 Hz	◆	◆	◆
Response time	5 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	Fixed cable 2 m	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g	◆	◆	◆

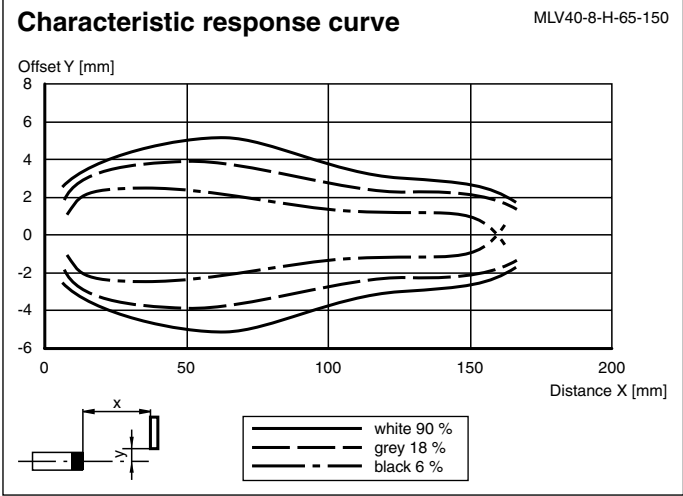
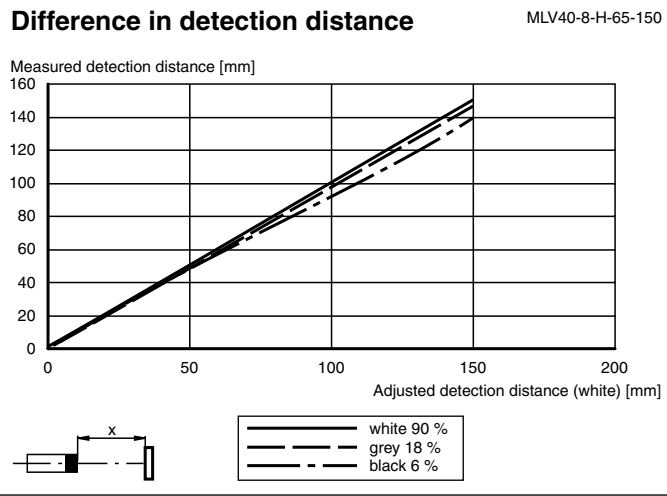
Series
MLV40

Date of issue: 10/4/01



MLV40-8-H-150-65/40a/./115

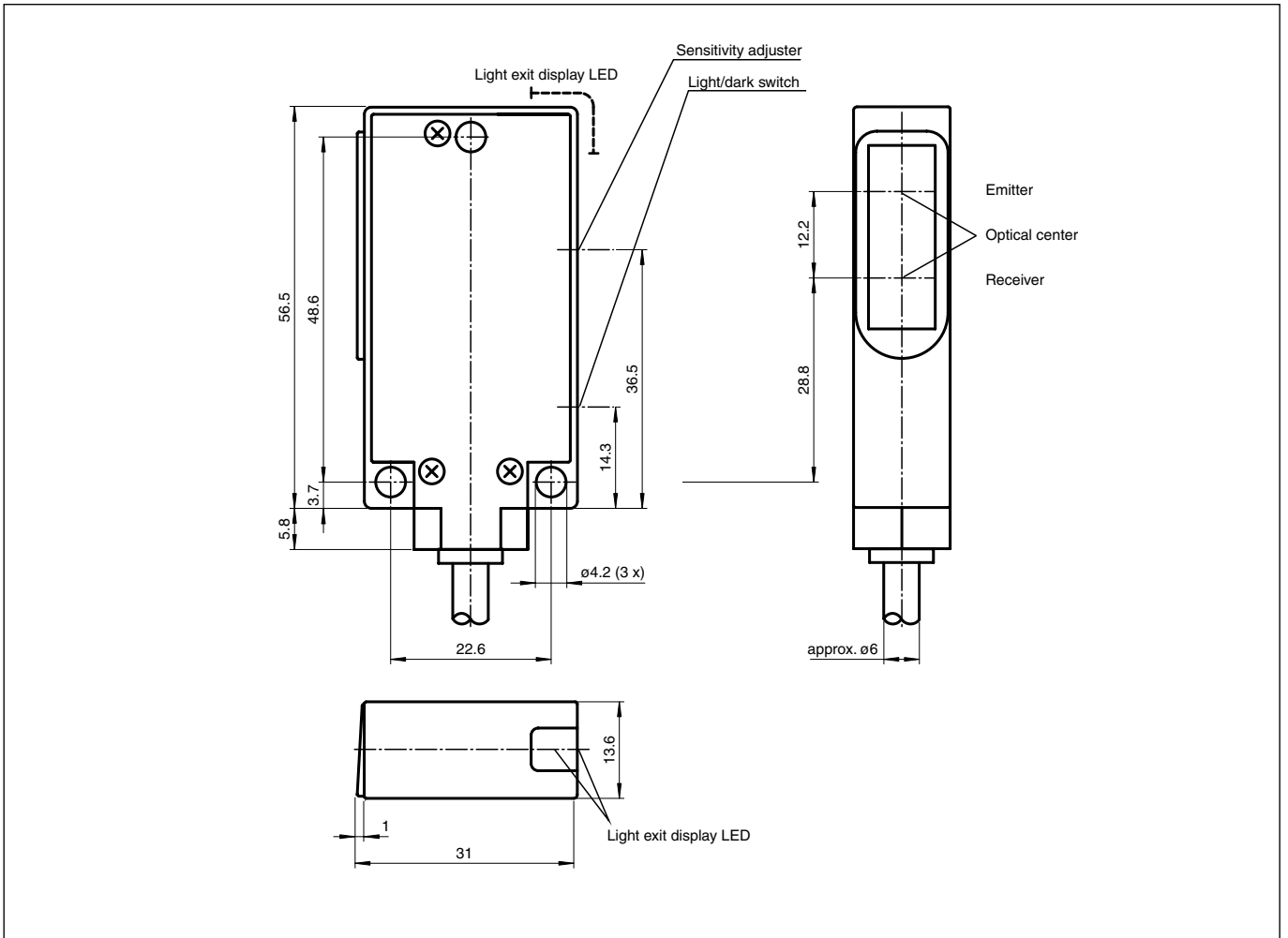
Diagrams



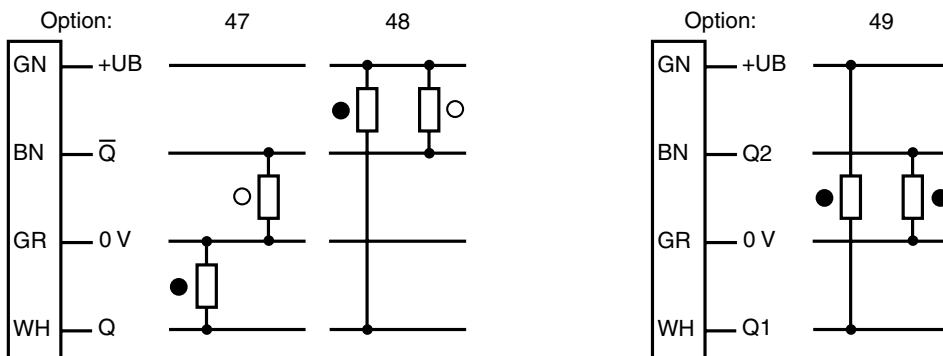
Series MLV40

Date of issue: 10/4/01

Dimensions



Electrical Connection



Date of issue: 10/4/01

○ = Light ON, ● = Dark ON



MLV40-8-H-150-65/40a/./92

Reflection light scanner with background suppression

MLV40-8-H-150-65/40a/./92

with M12, 4-pin metal connector



Series
MLV40



- ◆ Detection range 10 mm ... 150 mm, adjustable
- ◆ Sturdy aluminium housing
- ◆ Scratch-resistant and solvent resistant optical covering made of glass
- ◆ Minimal black-/white difference

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

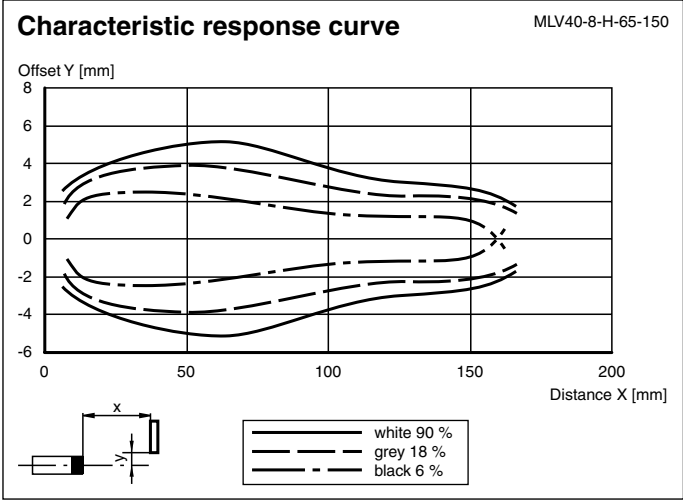
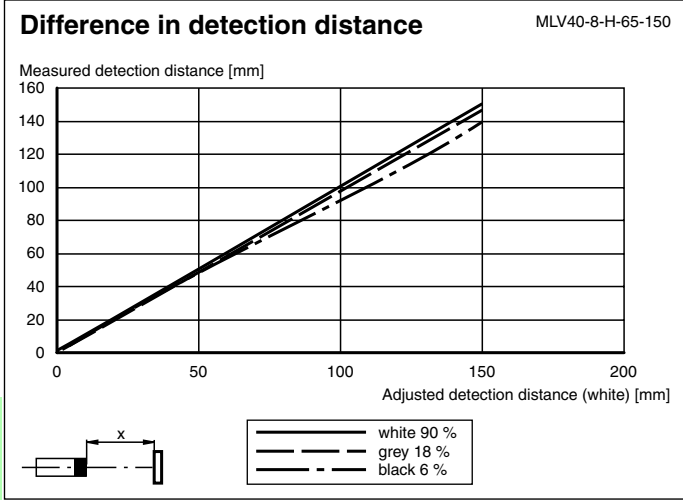
Ordering code		MLV40-8-H-150-65/40a/47/92	MLV40-8-H-150-65/40a/48/92	MLV40-8-H-150-65/40a/49/92
Detection range	10 ... 150 mm	◆	◆	◆
Detection range min.	10 ... 70 mm	◆	◆	◆
Sensor range max.	10 ... 150 mm	◆	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆	◆
Light source	IREd	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 7 °	◆	◆	◆
Diameter of the light spot	approx. 10 mm at 80 mm detection range	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED, green	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 npn antivalent, short-circuit proof, protected against reverse polarity	◆	◆	◆
	2 pnp antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	70 Hz	◆	◆	◆
Response time	5 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	100 g	◆	◆	◆

Series
MLV40



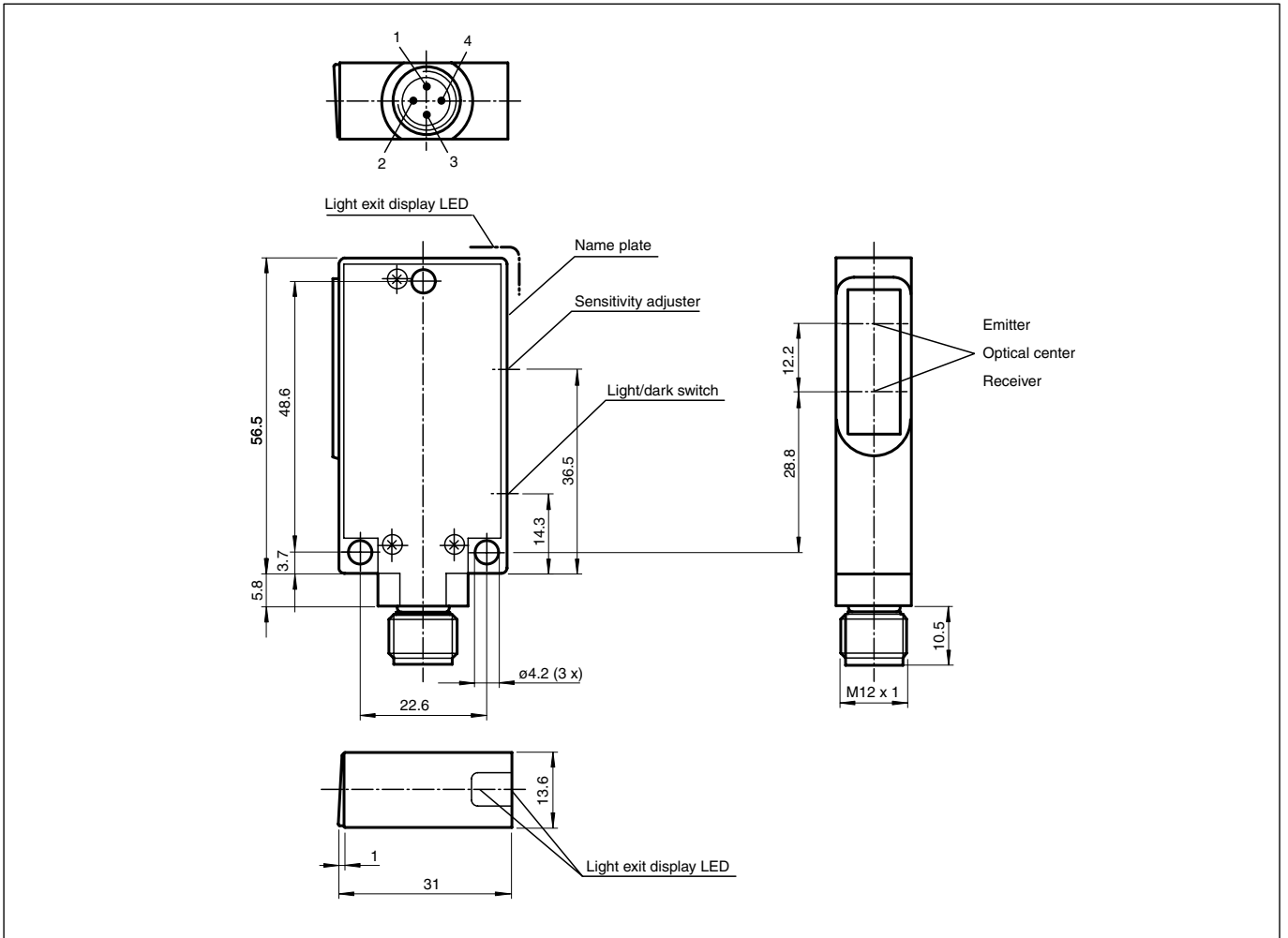
MLV40-8-H-150-65/40a/./92

Diagrams

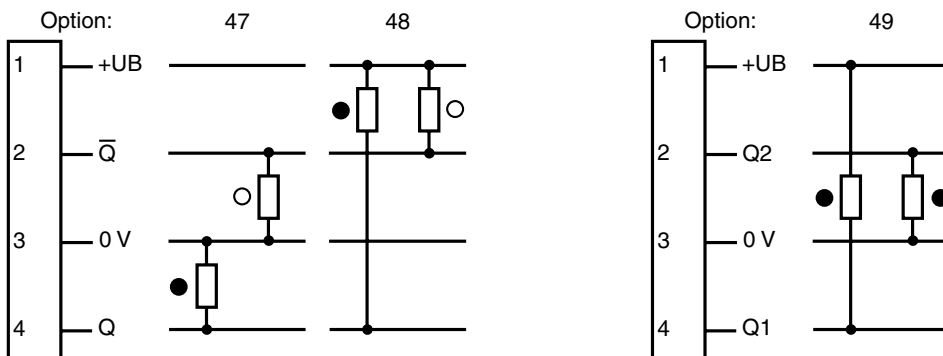


Series MLV40

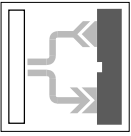
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



MLV40-LL-.../115

Fibre optics sensor

MLV40-LL-.../115

with 2 m fixed cable



- ◆ Sensor range or detection range depends on the fibre optics being used
- ◆ Sturdy aluminium housing
- ◆ Fibre optic adapter with quick tightening shutter
- ◆ Extensive fibre optic product selection as accessories
- ◆ Infrared light (MLV40-LL-IR...)
- ◆ Red light (MLV40-LL-IR...)

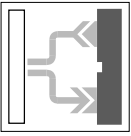
For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

Ordering code		MLV40-LL-RT/47/115	MLV40-LL-RT/48/115	MLV40-LL-RT/49/115	MLV40-LL-IR/47/115	MLV40-LL-IR/48/115	MLV40-LL-IR/49/115
Detection range	Depends on the fibre optics being used	◆	◆	◆	◆	◆	◆
Adjustment range	Depends on the fibre optics being used	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆			
	IRED				◆	◆	◆
Light type	Red, alternating light	◆	◆	◆			
	Infrared, alternating light				◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆
Function display	LED yellow, flashes when falling short of the stability control	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆			◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆			◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆			◆
Switching type	dark ON			◆			◆
	light/dark switching	◆	◆		◆	◆	
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆
Switching frequency	100 Hz	◆	◆	◆	◆	◆	◆
Response time	5 ms	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆
Connection type	Fixed cable 2 m	◆	◆	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆	◆	◆

Series
MLV40

Date of issue: 10/15/01

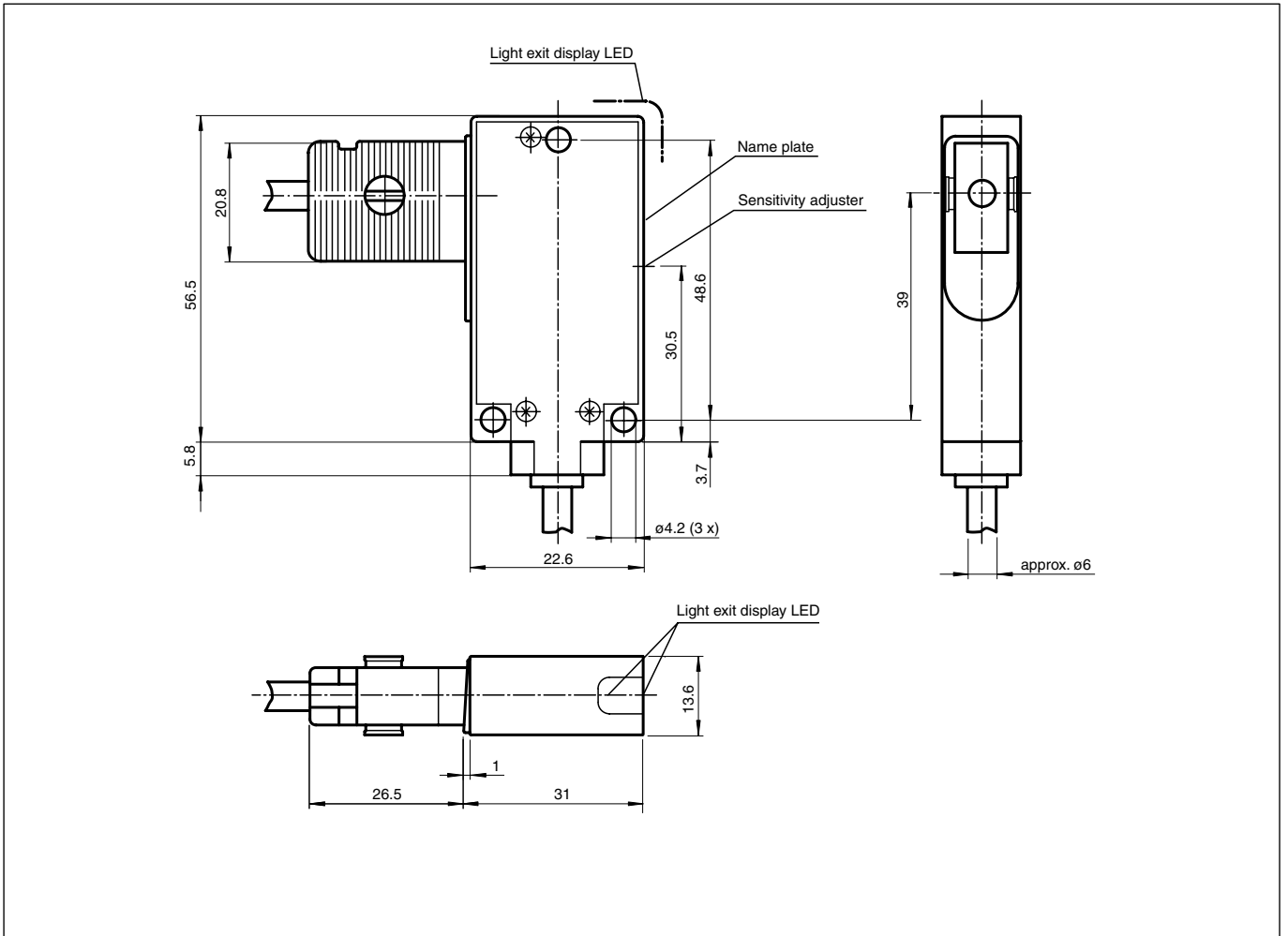


MLV40-LL-.../115

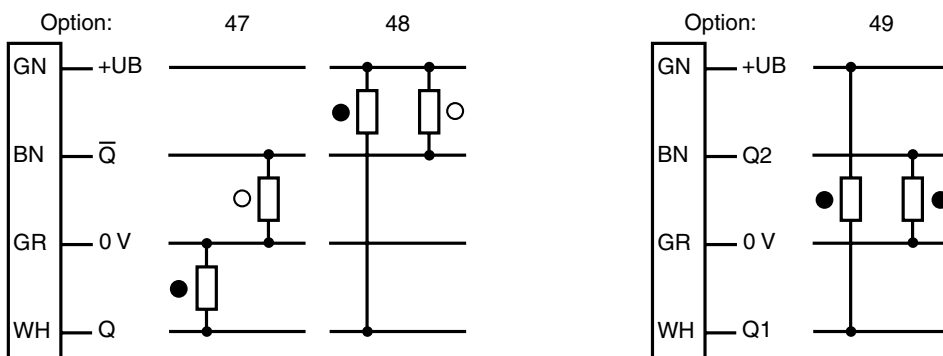
**Series
MLV40**

Date of issue: 10/15/01

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

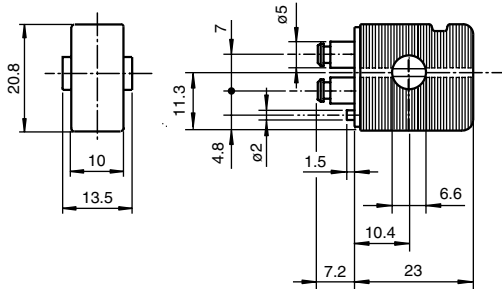
Selection table for fibre

	Model number	Detection range in mm with			Figure
		MLV40-LL-IR	MLV40-LL-RT	SU14-LL	
glass fibre optics single path with PVC coating	LCE04-1,1-0,5-WC3	100	50	100	1
	LCE04-1,1-1,5-WC3	110	60	80	1
	LCE04-1,6-0,5-WC3	280	80	160	2
	LCE04-1,6-1,0-WC3	200	60	120	2
	LCE04-1,6-1,0-Z1	280	80	160	3
	LCE04-1,6-1,0-G	280	80	160	4
glass fibre optics reflex with PVC coating	LCR04-1,1-0,5-WC3	50	25	40	5
	LCR04-1,6-1,0-WC3	100	50	80	6
	LCR04-1,6-0,5-WC2	50	20	40	7
	LCR04-1,6-0,5-Z1	80	40	80	8
	LCR04-1,6-1,0-Z1	100	50	80	8
	LCR04-1,6-1,0-G	100	50	80	9
glass fibre optics single path with metal- silicone coating	LLE04-1,6-1,0-G	280	40	160	10
	LLE04-1,6-1,0-Z1	280	40	160	11
	LLE04-1,6-1,0-WC3	280	35	160	12
	LLE04-1,6-1,0-WC15	250	35	140	13
glass fibre optics reflex with metal-silicone coating	LLR04-1,6-0,5-G	90	40	80	14
	LLR04-1,6-1,0-G	100	50	80	14
	LLR04-1,6-0,5-QW1x4	80	35	60	18
	LLR04-1,6-1,0-QW1x4	60	40	40	18
	LLR04-1,6-0,5-WC3	80	35	60	15
	LLR04-1,6-1,0-WC3	100	50	80	15
	LLR04-1,9-1,0-WC5	100	50	70	16
	LLR04-1,6-1,0-Z1	110	50	80	17
glass fibre optics single path with metal- coating	LME04-0,8-0,5-Z1	80	40	60	19
	LME04-0,8-1,0-Z1	60	30	40	19
	LME04-1,6-0,5-Z1	160	80	120	20
	LME04-1,9-0,5-Z1	200	100	150	20
	LME04-1,6-1,0-WC3	120	60	80	23
	LME04-0,8-0,5-WC4	70	35	45	21
	LME04-1,6-1,5-WC4	120	60	80	22
glass fibre optics reflex with metal coating	LMR04-0,5-0,5-WC4	6	5	5	24
	LMR04-0,5-0,5-Z0	7	6	5	26
	LMR04-0,5-0,5-Z1	7	6	5	25
	LMR04-1,6-0,5-Z1	80	35	60	27
	LMR04-1,9-0,5-Z1	90	40	70	28
	LMR04-0,6-0,5- QW0,25/2	5	3	4	29

Other lengths and end pieces available on request

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Adapter



Single path



Reflex



Fig. 1

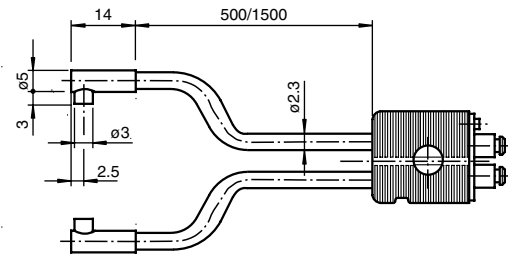


Fig. 2

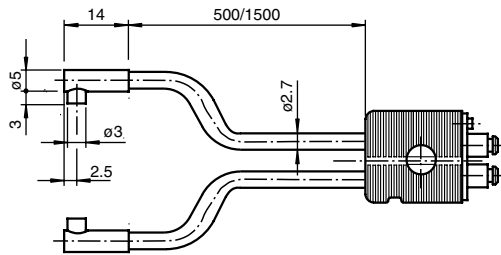


Fig. 3

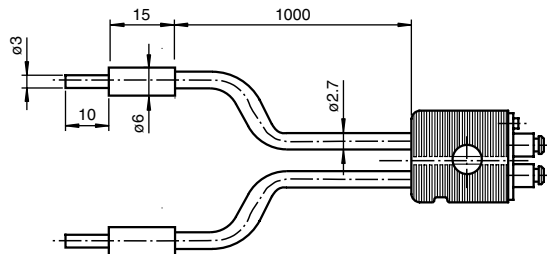


Fig. 4

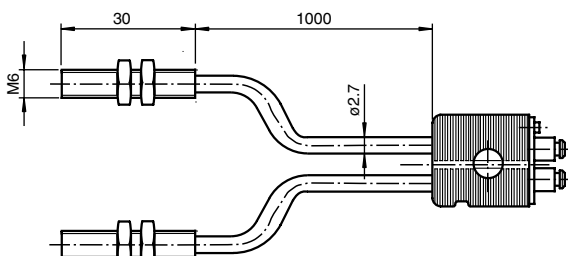


Fig. 5

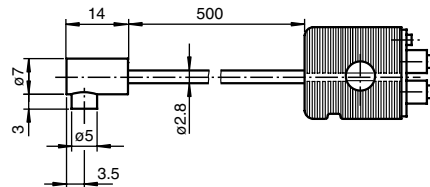


Fig. 6

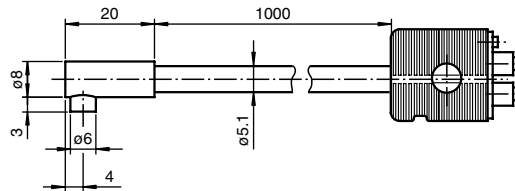


Fig. 7

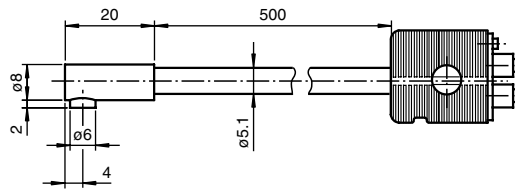


Fig. 8

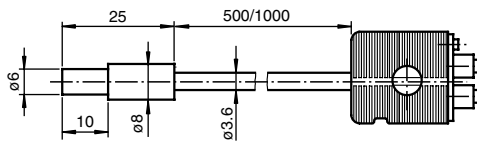
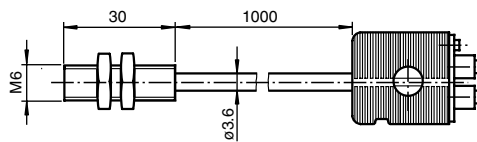


Fig. 9



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Fig. 10

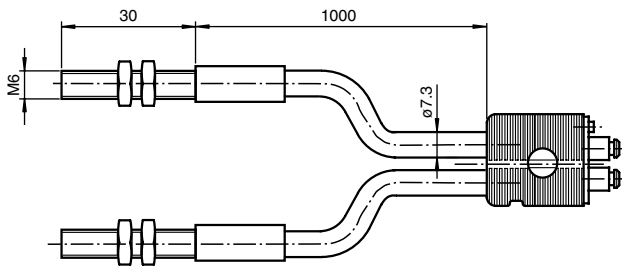


Fig. 15

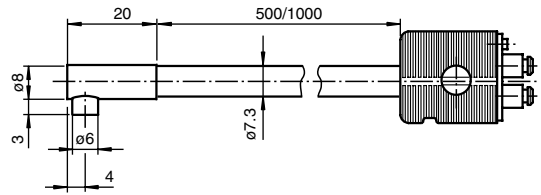


Fig. 11

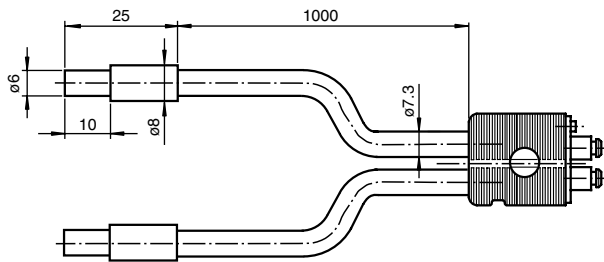


Fig. 16

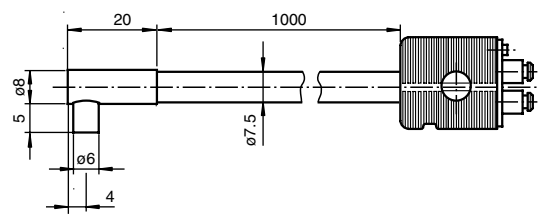


Fig. 12

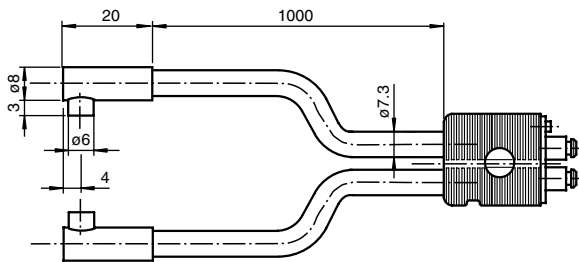


Fig. 17

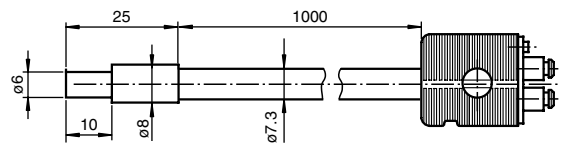


Fig. 13

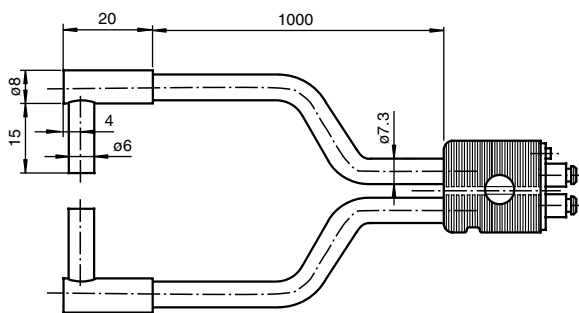


Fig. 18

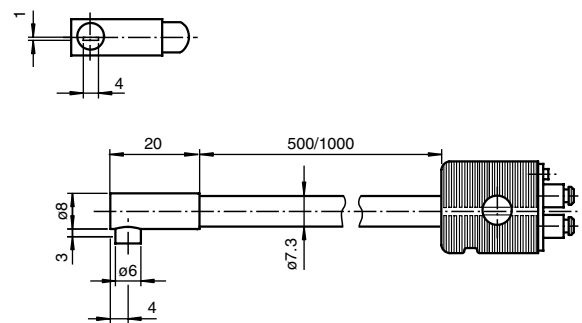


Fig. 14

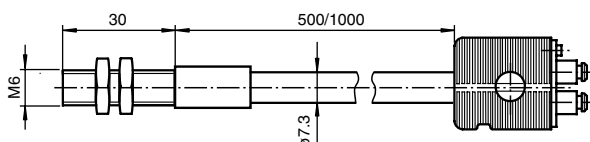
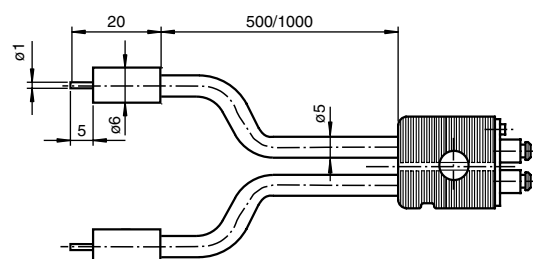


Fig. 19



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Fig. 20

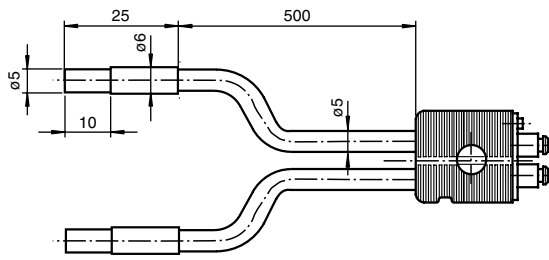


Fig. 25

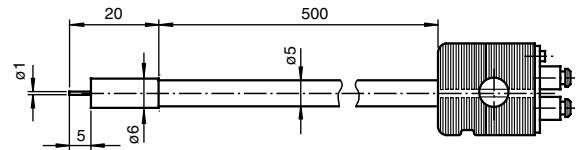


Fig. 21

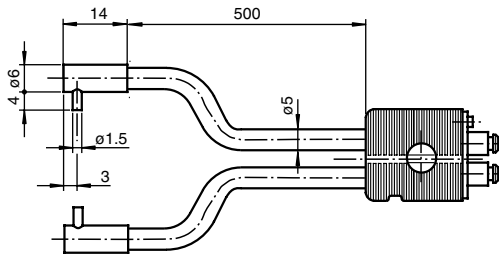


Fig. 26

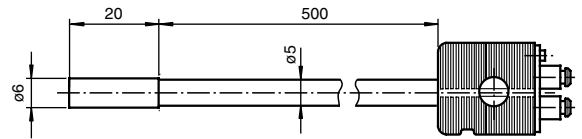


Fig. 22

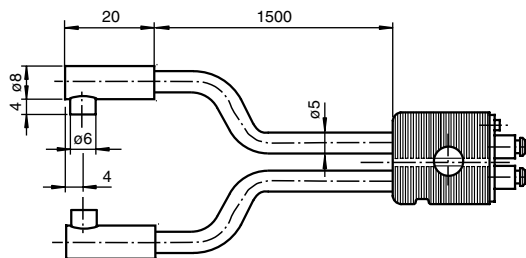


Fig. 27

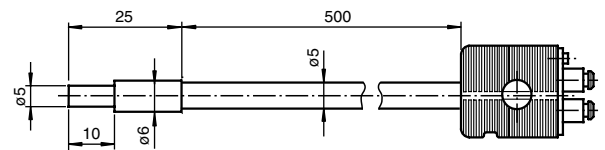


Fig. 23

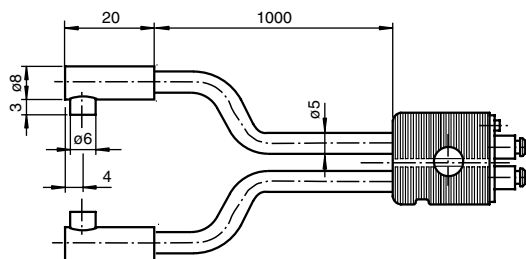


Fig. 28

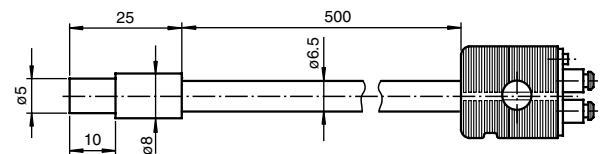


Fig. 24

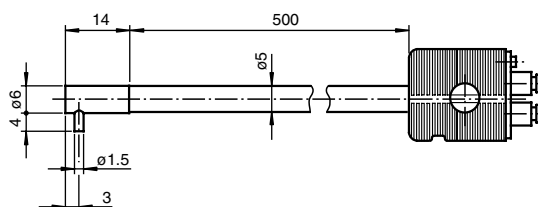
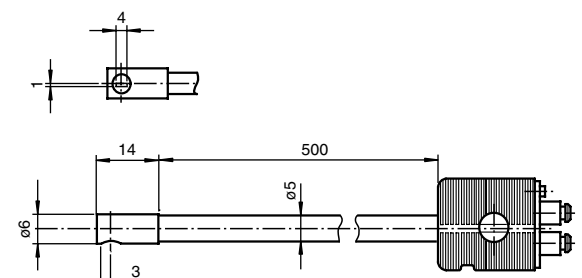
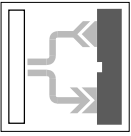


Fig. 29



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MLV40-LL-.../92

Fibre optics sensor

MLV40-LL-.../92

with M12, 4-pin metal connector



Series
MLV40



- ◆ Sensor range or detection range depends on the fibre optics being used
- ◆ Sturdy aluminium housing
- ◆ Fibre optic adapter with quick tightening shutter
- ◆ Extensive fibre optic product selection as accessories
- ◆ Infrared light (MLV40-LL-IR...)
- ◆ Red light (MLV40-LL-IR...)

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

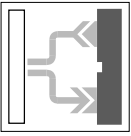
For suitable reflectors and mounting aids refer to chapter "accessories".

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Ordering code		MLV40-LL-RT/47/92	MLV40-LL-RT/48/92	MLV40-LL-RT/49/92	MLV40-LL-IR/47/92	MLV40-LL-IR/48/92	MLV40-LL-IR/49/92
Detection range	Depends on the fibre optics being used	◆	◆	◆	◆	◆	◆
Adjustment range	Depends on the fibre optics being used	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆			
	IREL				◆	◆	◆
Light type	Red, alternating light	◆	◆	◆			
	Infrared, alternating light				◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆
Function display	LED yellow, flashes when falling short of the stability control	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆			◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆			◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆			◆
Switching type	dark ON			◆			◆
	light/dark switching	◆	◆		◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆
Switching frequency	100 Hz	◆	◆	◆	◆	◆	◆
Response time	5 ms	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆	◆	◆

Series
MLV40

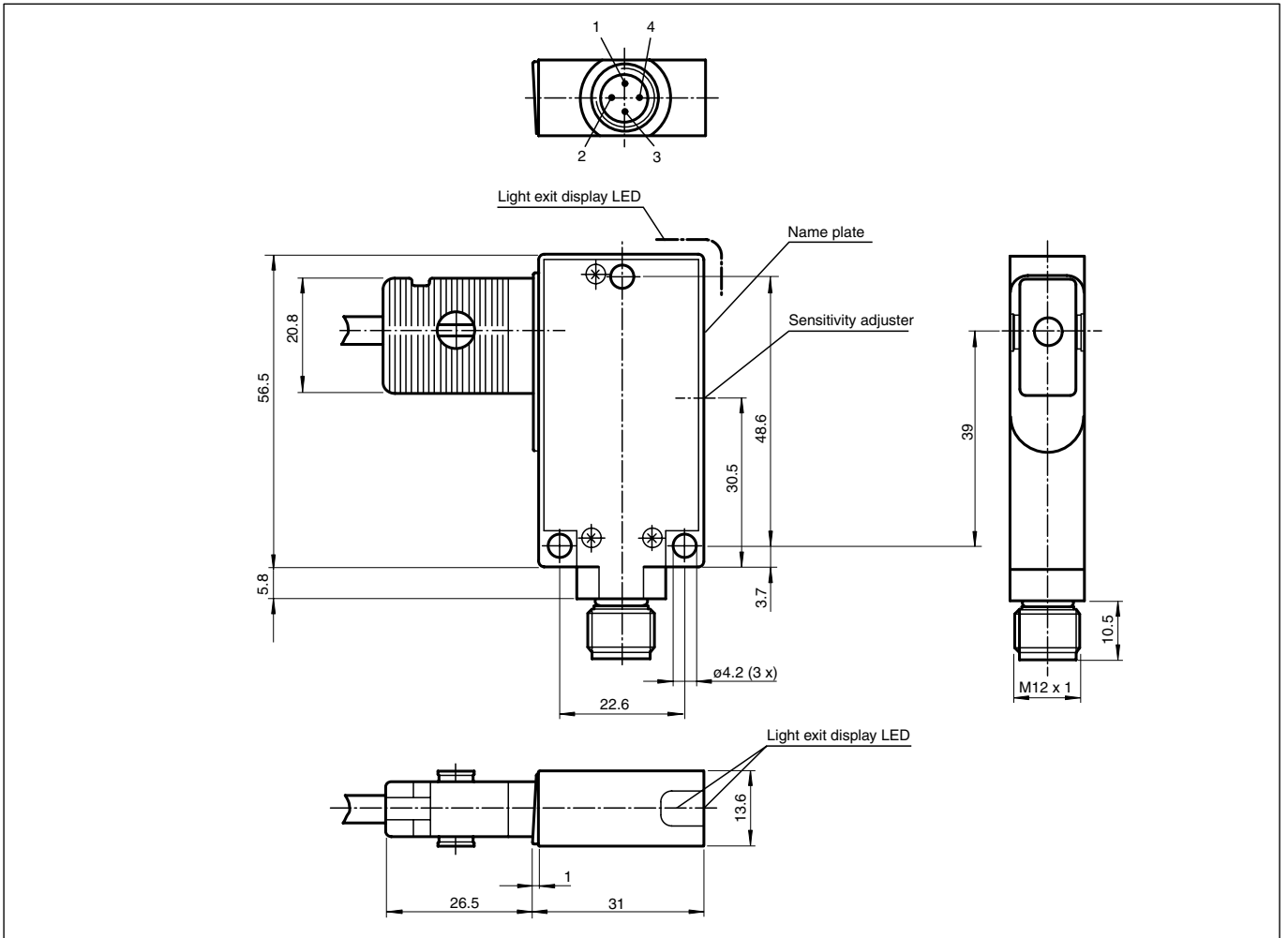
Date of issue: 10/15/01



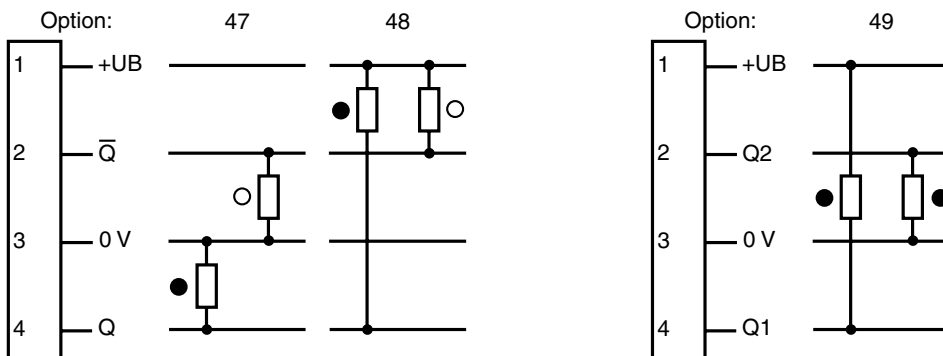
MLV40-LL-.../92

**Series
MLV40**

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

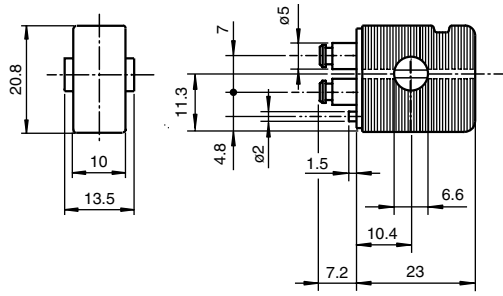
Date of issue: 10/15/01

Selection table for fibre

	Model number	Detection range in mm with			Figure
		MLV40-LL-IR	MLV40-LL-RT	SU14-LL	
glass fibre optics single path with PVC coating	LCE04-1,1-0,5-WC3	100	50	100	1
	LCE04-1,1-1,5-WC3	110	60	80	1
	LCE04-1,6-0,5-WC3	280	80	160	2
	LCE04-1,6-1,0-WC3	200	60	120	2
	LCE04-1,6-1,0-Z1	280	80	160	3
	LCE04-1,6-1,0-G	280	80	160	4
glass fibre optics reflex with PVC coating	LCR04-1,1-0,5-WC3	50	25	40	5
	LCR04-1,6-1,0-WC3	100	50	80	6
	LCR04-1,6-0,5-WC2	50	20	40	7
	LCR04-1,6-0,5-Z1	80	40	80	8
	LCR04-1,6-1,0-Z1	100	50	80	8
	LCR04-1,6-1,0-G	100	50	80	9
glass fibre optics single path with metal- silicone coating	LLE04-1,6-1,0-G	280	40	160	10
	LLE04-1,6-1,0-Z1	280	40	160	11
	LLE04-1,6-1,0-WC3	280	35	160	12
	LLE04-1,6-1,0-WC15	250	35	140	13
glass fibre optics reflex with metal-silicone coating	LLR04-1,6-0,5-G	90	40	80	14
	LLR04-1,6-1,0-G	100	50	80	14
	LLR04-1,6-0,5-QW1x4	80	35	60	18
	LLR04-1,6-1,0-QW1x4	60	40	40	18
	LLR04-1,6-0,5-WC3	80	35	60	15
	LLR04-1,6-1,0-WC3	100	50	80	15
	LLR04-1,9-1,0-WC5	100	50	70	16
	LLR04-1,6-1,0-Z1	110	50	80	17
glass fibre optics single path with metal- coating	LME04-0,8-0,5-Z1	80	40	60	19
	LME04-0,8-1,0-Z1	60	30	40	19
	LME04-1,6-0,5-Z1	160	80	120	20
	LME04-1,9-0,5-Z1	200	100	150	20
	LME04-1,6-1,0-WC3	120	60	80	23
	LME04-0,8-0,5-WC4	70	35	45	21
	LME04-1,6-1,5-WC4	120	60	80	22
glass fibre optics reflex with metal coating	LMR04-0,5-0,5-WC4	6	5	5	24
	LMR04-0,5-0,5-Z0	7	6	5	26
	LMR04-0,5-0,5-Z1	7	6	5	25
	LMR04-1,6-0,5-Z1	80	35	60	27
	LMR04-1,9-0,5-Z1	90	40	70	28
	LMR04-0,6-0,5- QW0,25/2	5	3	4	29

Other lengths and end pieces available on request

Adapter



Single path



Reflex



Fig. 1

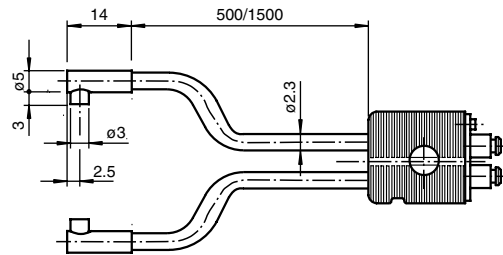


Fig. 2

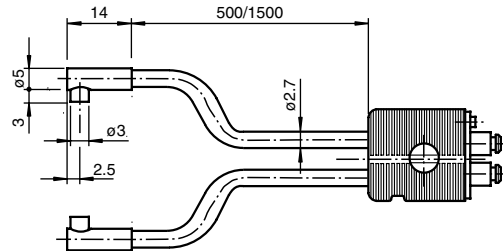


Fig. 3

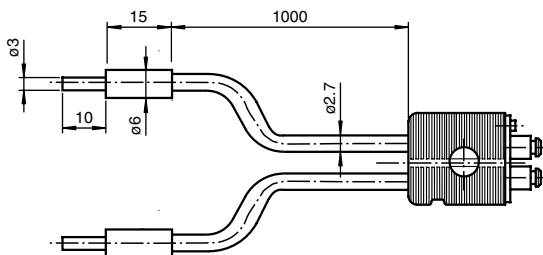


Fig. 4

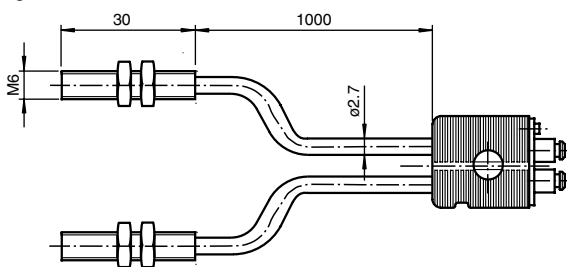


Fig. 5

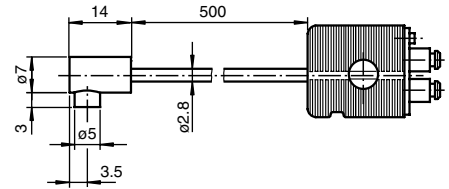


Fig. 6

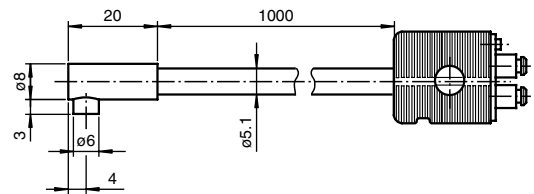


Fig. 7

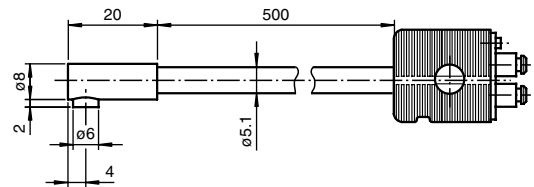


Fig. 8

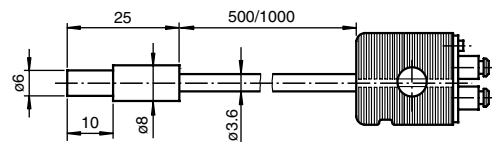
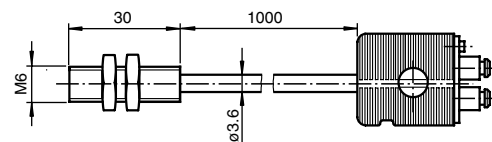


Fig. 9



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Fig. 10

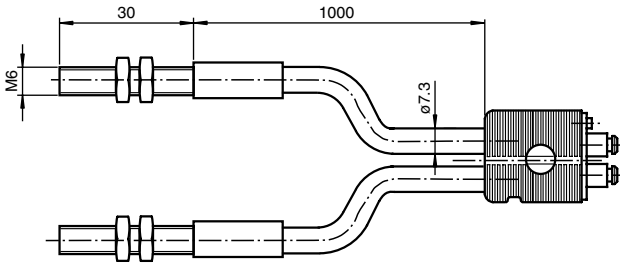


Fig. 11

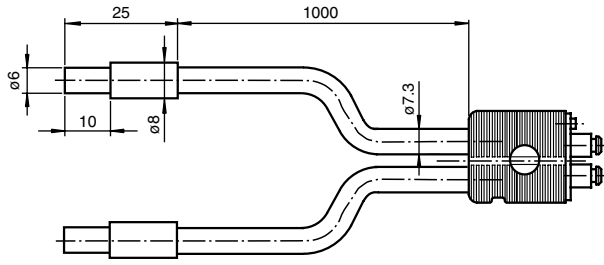


Fig. 12

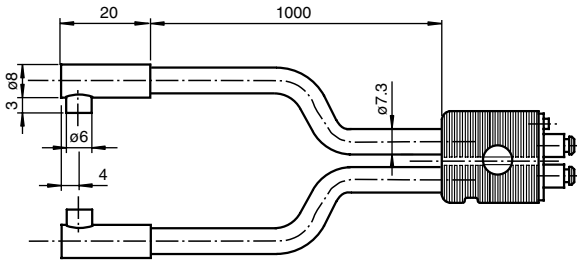


Fig. 13

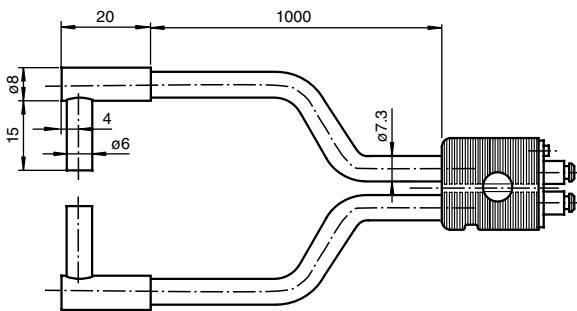


Fig. 14

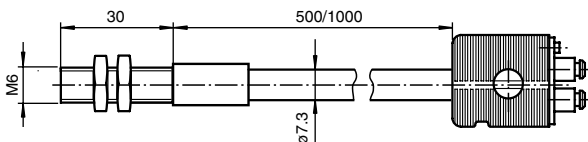


Fig. 15

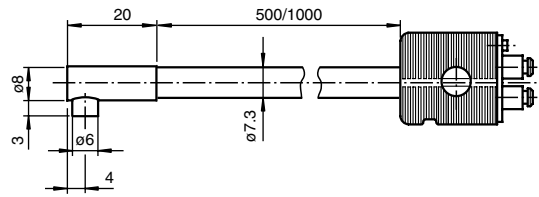


Fig. 16

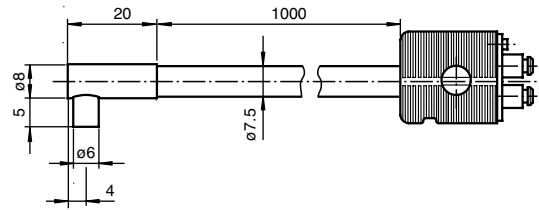


Fig. 17

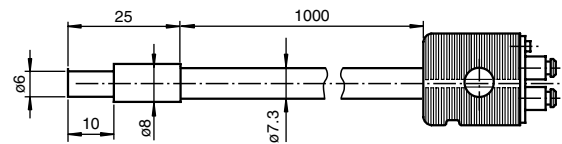


Fig. 18

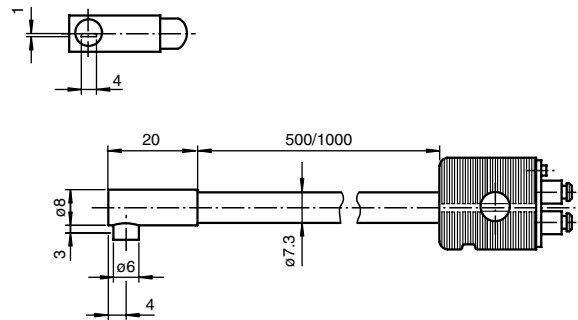
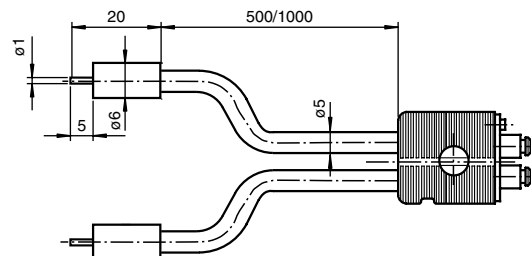


Fig. 19



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Fig. 20

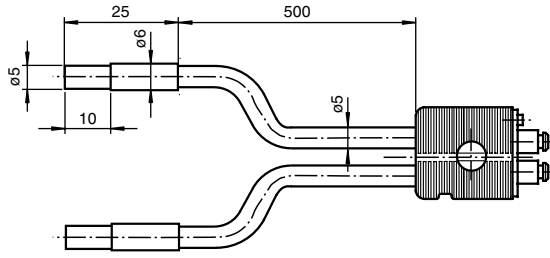


Fig. 25

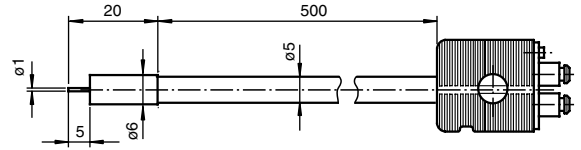


Fig. 21

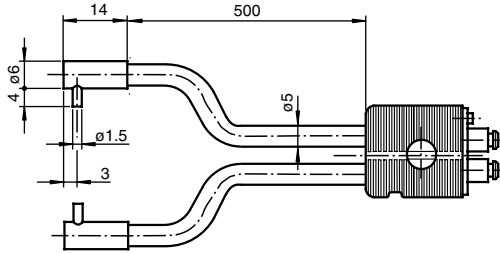


Fig. 26

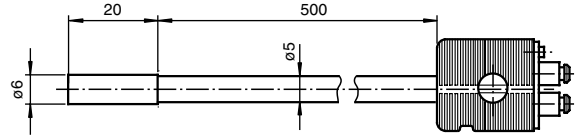


Fig. 22

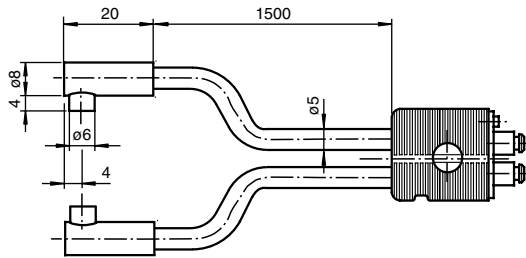


Fig. 27

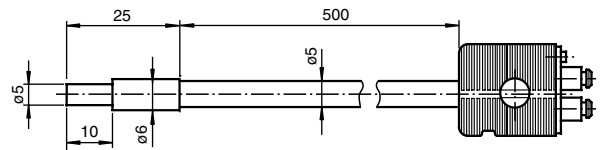


Fig. 23

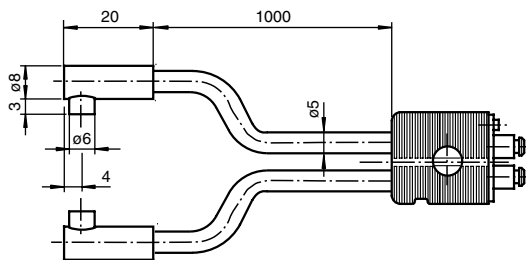


Fig. 28

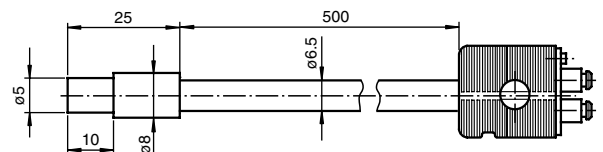


Fig. 24

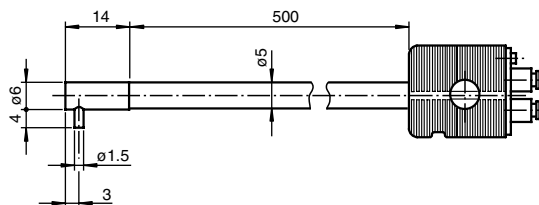
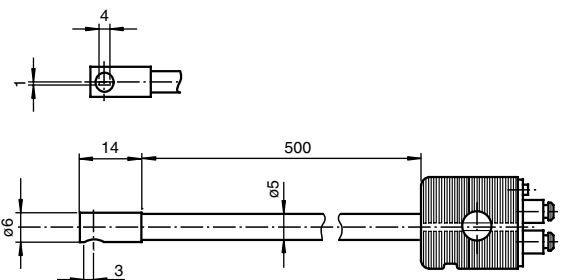


Fig. 29



Date of issue: 10/15/01



Series
21 and 22

Date of issue 10/04/2001

Series 21 and 22 – tried and true

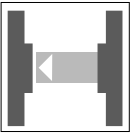


Series 21 and 22 are the tried and true series of light beam switches, which Visolux has included in its product selection for quite some time. Six basic types of different optical devices are available. The single path light beam switch with a detection range of 8 m, the reflex light beam switch without polarisation filter for a detection range of 6 m, the reflex light beam switch with polarisation filter for a detection range of 4 m, the reflex light beam switch for detecting transparent materials with a detection range of 4 m, reflection light scanner with a detection range of 800 mm and the reflection light scanner with background suppression and a fixed detection range of 80 mm.

The feature they all share is the compact, sturdy plastic housing with a scratch-resistant glass disk as an optical covering. The devices can be connected either with sturdy connection terminals or with various connection devices. Various circuit transistors and relay outputs are available for signal output. With the exception of the sensors with background suppression, the DC-operated sensors all have a pre-fault indication feature and a pre-fault output. In addition, light beam switches of series 21 are equipped with a programmable timer.

The preferred areas of application for the devices are storage and conveyor systems, in the door and gate sector, in textile machines, in packaging machines and in many other areas.

Principle	Type code	Sensing range/detection range	Page
	L21/LK21; L21/LV21	0 mm ... 8000 mm	228
	RL(K)21-6	0 mm ... 6000 mm	232
	RL(K)21-54	0.25 mm ... 4000 mm	236
	RLF21-54-1419/74	0.25 mm ... 4000 mm	240
	RLF22-54-1921/74	0.25 mm ... 5000 mm	256
	RLF22-54-G	0.25 mm ... 4000 mm	260
	RL(K)21-8-800	10 mm ... 800 mm	244
	RLF21-8-800-1419	10 mm ... 800 mm	248
	RL(K)21-8-H-80	20 mm ... 80 mm	252



L21/L.21/..

Single path light beam switch

L21/L.21/..

with terminal compartment

CE

Series
21 and 22



- ◆ Detection range up to 16 m
- ◆ Sturdy plastic housing
- ◆ Optical surface made of scratch-resistant glass
- ◆ Pre-fault indication
- ◆ Relay output
- ◆ Transistor output
- ◆ Operating voltage DC
- ◆ Operating voltage AC

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

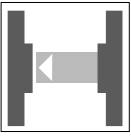
Ordering code		L21/LK21	L21/LV21/49
Effective detection range	0 ... 8000 mm	◆	◆
Threshold detection range	16 m	◆	◆
Obstacle size	20 mm	◆	◆
Light source	IREDD	◆	◆
Light type	Infrared, alternating light	◆	◆
Angle of divergence	1.6 °	◆	◆
Diameter of the light spot	approx. 250 mm at 8000 mm detection range	◆	◆
Ambient light limit	100000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED, red/green, red when falling short of the stability control, green when stability control ≥ 3	◆	◆
Controls	Programming switch for light/dark ON, timer functions, time adjuster	◆	◆
Operating voltage	10 ... 30 V DC		◆
	110 / 220 V AC	◆	
Ripple	10 %		◆
No-load supply current	40 mA		◆
Power consumption	3 VA	◆	
Signal output	1 pnp and 1 npn short-circuit proof, protected against reverse polarity		◆
	1 relay output, 1 alternator	◆	
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	min. 12 V AC/DC, max. 240 V AC	◆	
	30 V DC		◆
Switching current	min. 50 mA AC/DC, max. 5 A AC/DC	◆	
	max. 200 mA		◆
Switching frequency	25 Hz	◆	
	35 Hz		◆
Response time	10 ms		◆
	20 ms	◆	
Timer function	GAN, GAB, IAB, programmable, adjustment range	◆	◆
	0.1 ... 10 s		◆
Test input	Emitter deactivation		◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	terminal compartment	◆	◆
Housing	Terluran GV15	◆	◆
Light exit	Glass	◆	◆
Mass	200 g (device)	◆	◆

Series 21 and 22

Note

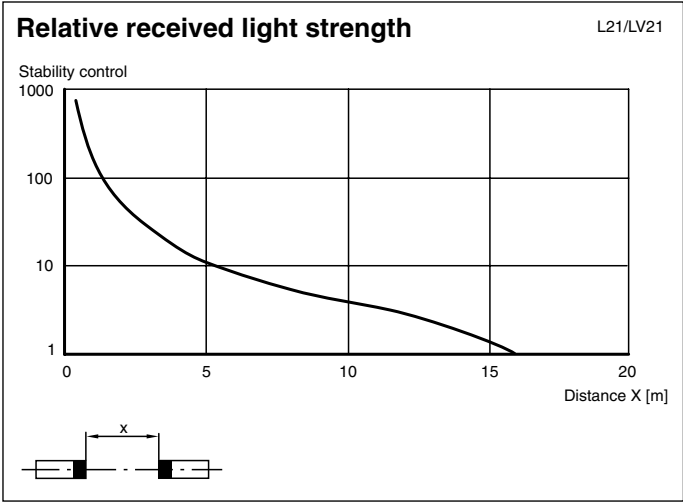
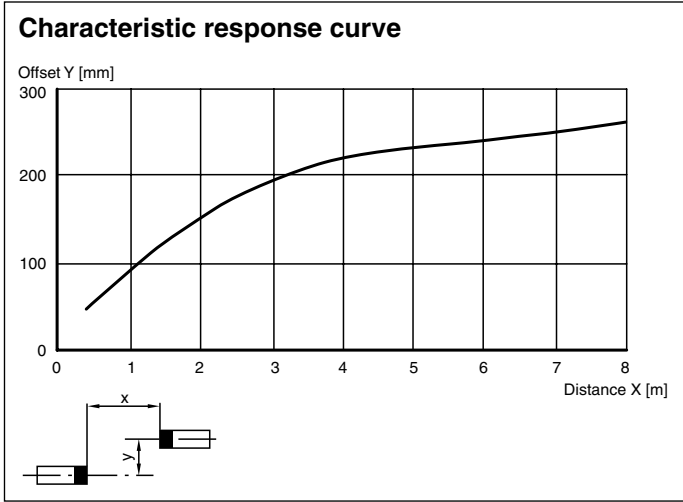
Should not be used for new designs!

Date of issue 10/15/01



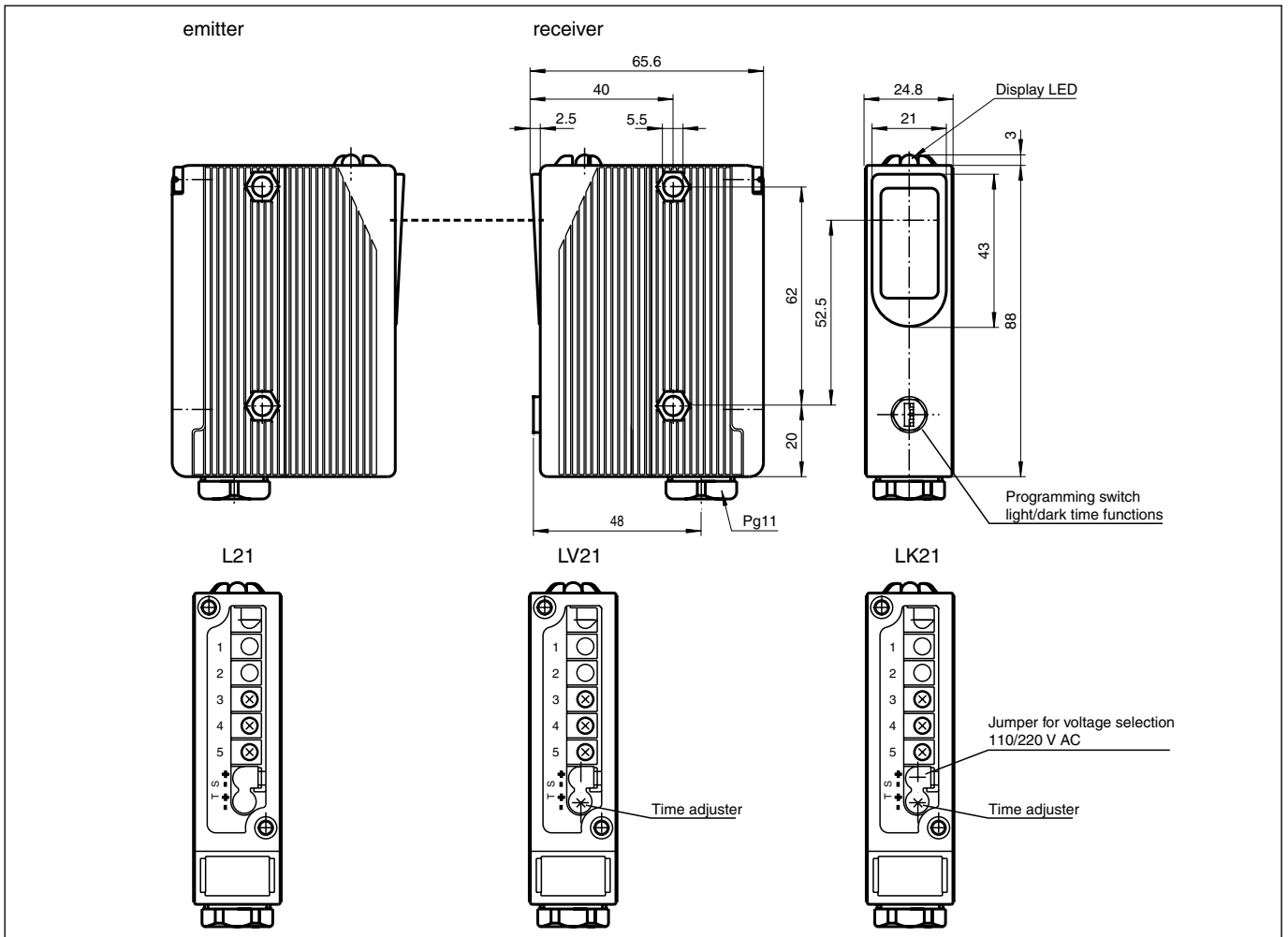
L21/L.21/..

Diagrams



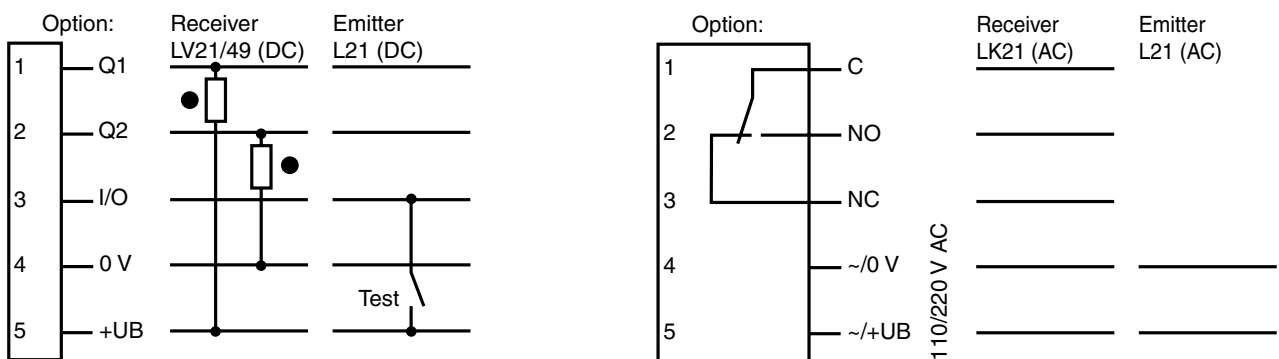
Series 21 and 22

Dimensions



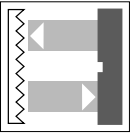
Series 21 and 22

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/15/01



RL.21-6

Reflection light beam switch

RL.21-6

with terminal compartment

CE



- ◆ Detection range up to 10 m
- ◆ Sturdy plastic housing
- ◆ Optical surface made of scratch-resistant glass
- ◆ Pre-fault indication
- ◆ Relay output
- ◆ Transistor output
- ◆ Operating voltage DC
- ◆ Operating voltage AC

Series
21 and 22

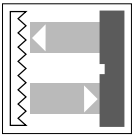
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL21-6/49	RLK21-6
Effective detection range	0 ... 6000 mm	◆	◆
Threshold detection range	10 m with reflector C110-2	◆	◆
Reflector distance	0 ... 6000 mm	◆	◆
Light source	IREL	◆	◆
Light type	Infrared, alternating light	◆	◆
Angle of divergence	approx. 2 °	◆	◆
Diameter of the light spot	approx. 150 mm at 6000 mm detection range	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED, red/green, red when falling short of the stability control, green when stability control ≥ 3	◆	◆
Controls	Programming switch for light/dark ON, timer functions, time adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	
	110 / 220 V AC		◆
Ripple	10 %	◆	
No-load supply current	40 mA	◆	
Power consumption	3 VA		◆
Signal output	1 pnp and 1 npn short-circuit proof, protected against reverse polarity	◆	
	1 relay output, 1 alternator		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	min. 12 V AC/DC, max. 240 V AC		◆
	30 V DC	◆	
Switching current	min. 50 mA AC/DC, max. 5 A AC/DC		◆
	max. 200 mA	◆	
Switching frequency	25 Hz		◆
	50 Hz	◆	
Response time	10 ms	◆	
	20 ms		◆
Timer function	GAN, GAB, IAB, programmable, adjustment range	◆	◆
	0.1 ... 10 s	◆	◆
Output of the pre-fault indication	1 pnp	◆	
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	terminal compartment	◆	◆
Housing	Terluran GV15	◆	◆
Light exit	Glass	◆	◆
Mass	130 g	◆	◆

Series
21 and 22

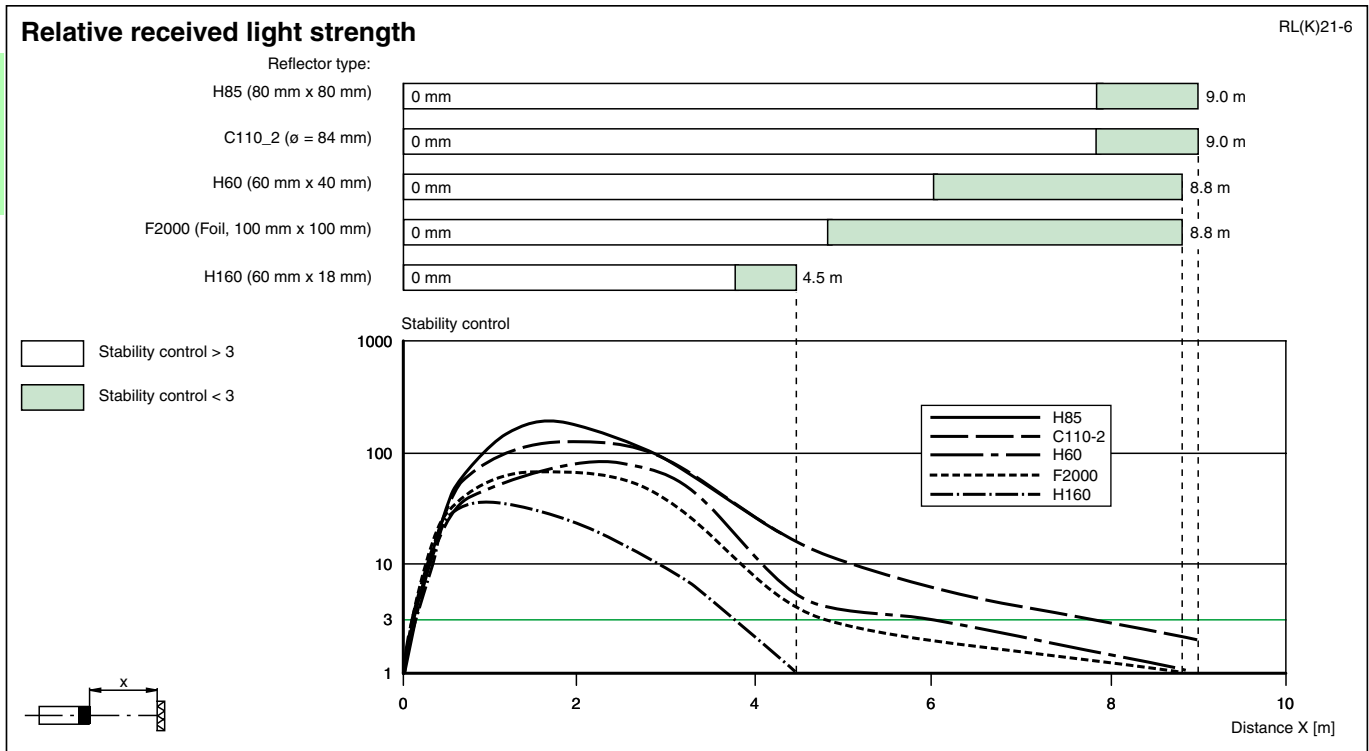
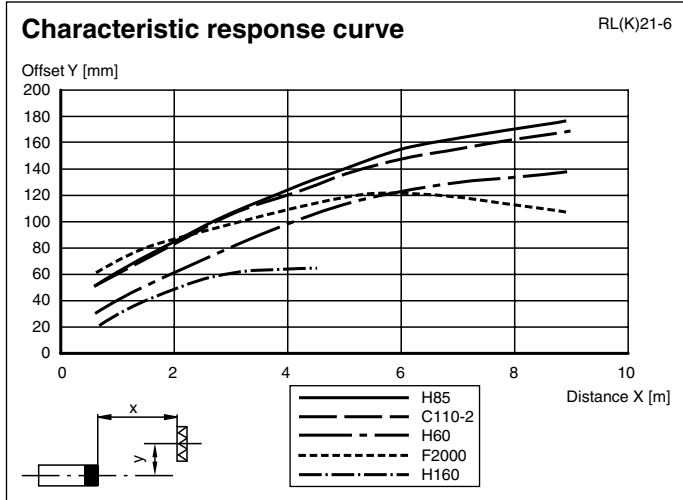
Note

Should not be used for new designs!



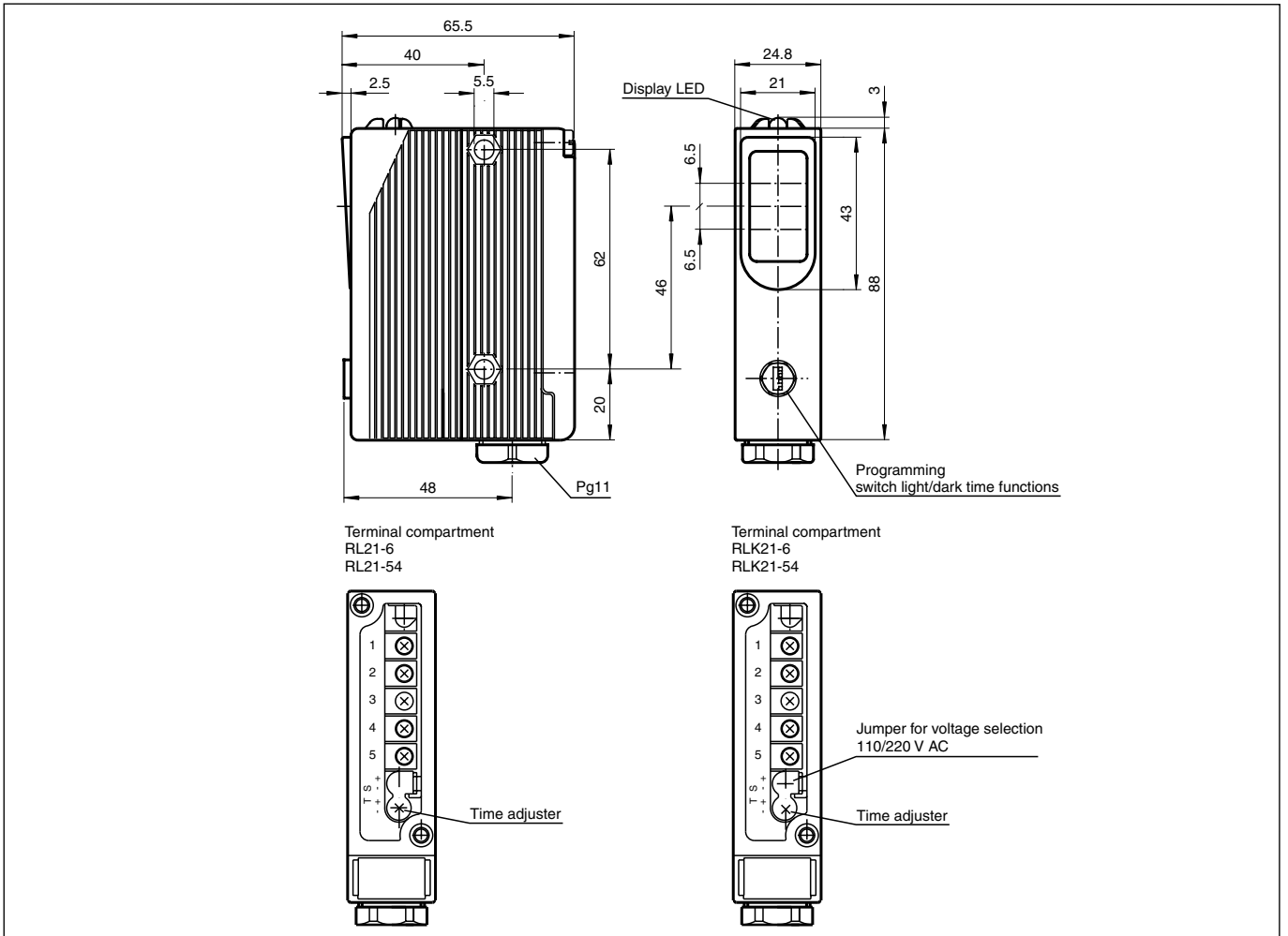
RL.21-6

Diagrams



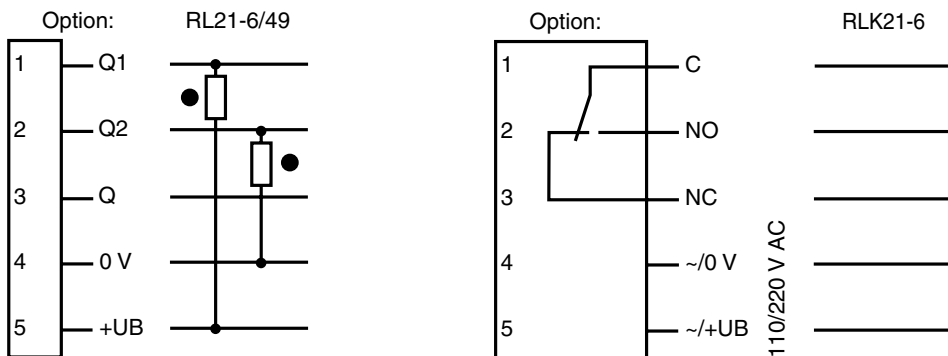
Series 21 and 22

Dimensions



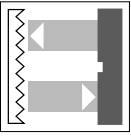
Series 21 and 22

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/15/01



RL.21-54

Reflection light beam switch with polarisation filter

RL.21-54

with terminal compartment

CE



- ◆ Detection range up to 8 m
- ◆ Sturdy plastic housing
- ◆ Optical surface made of scratch-resistant glass
- ◆ Pre-fault indication
- ◆ Relay output
- ◆ Transistor output
- ◆ Operating voltage DC
- ◆ Operating voltage AC

Series
21 and 22

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

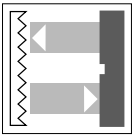
Date of issue 10/15/01

Ordering code		RL21-54/49	RLK21-54
Effective detection range	0.25 ... 4000 mm	◆	◆
Threshold detection range	8000 mm with reflector C110-2	◆	◆
Reflector distance	250 ... 4000 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Angle of divergence	approx. 2 °	◆	◆
Diameter of the light spot	approx. 100 mm at 4000 mm detection range	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED, red/green, red when falling short of the stability control, green when stability control ≥ 3	◆	◆
Controls	Programming switch for light/dark ON, timer functions, time adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	
	110 / 220 V AC		◆
Ripple	10 %	◆	
No-load supply current	40 mA	◆	
Power consumption	3 VA		◆
Signal output	1 pnp and 1 npn short-circuit proof, protected against reverse polarity	◆	
	1 relay output, 1 alternator		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	min. 12 V AC/DC, max. 240 V AC		◆
	30 V DC	◆	
Switching current	min. 50 mA AC/DC, max. 5 A AC/DC		◆
	max. 200 mA	◆	
Switching frequency	25 Hz		◆
	35 Hz	◆	
Response time	10 ms	◆	
	20 ms		◆
Timer function	GAN, GAB, IAB, programmable, adjustment range	◆	◆
	0.1 ...10 s	◆	◆
Output of the pre-fault indication	1 pnp	◆	
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	terminal compartment	◆	◆
Housing	Terluran GV15	◆	◆
Light exit	Glass	◆	◆
Mass	130 g	◆	◆

Series
21 and 22

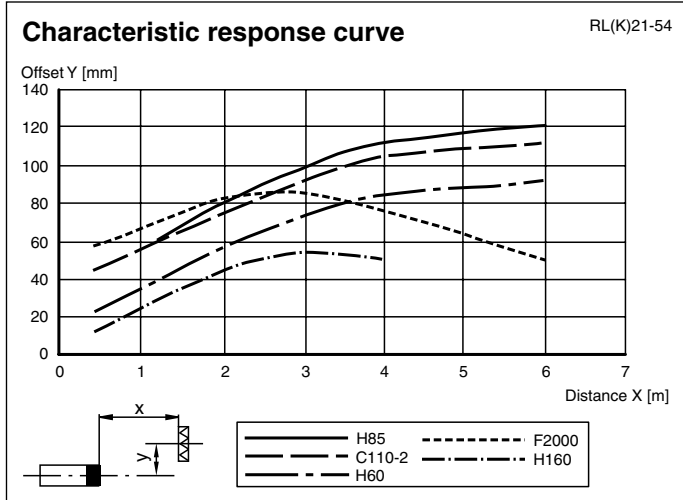
Note

Should not be used for new designs!



RL.21-54

Diagrams



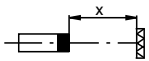
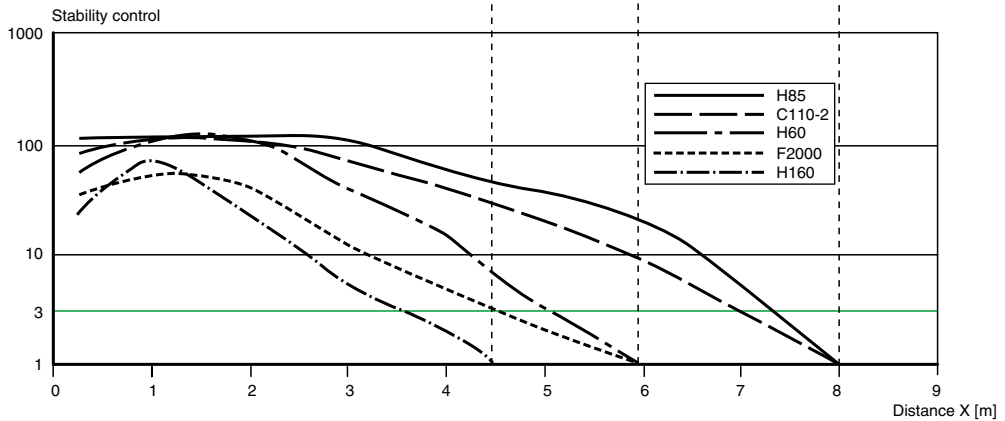
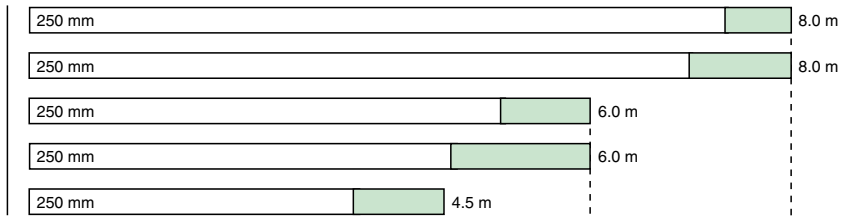
Relative received light strength

RL(K)21-54

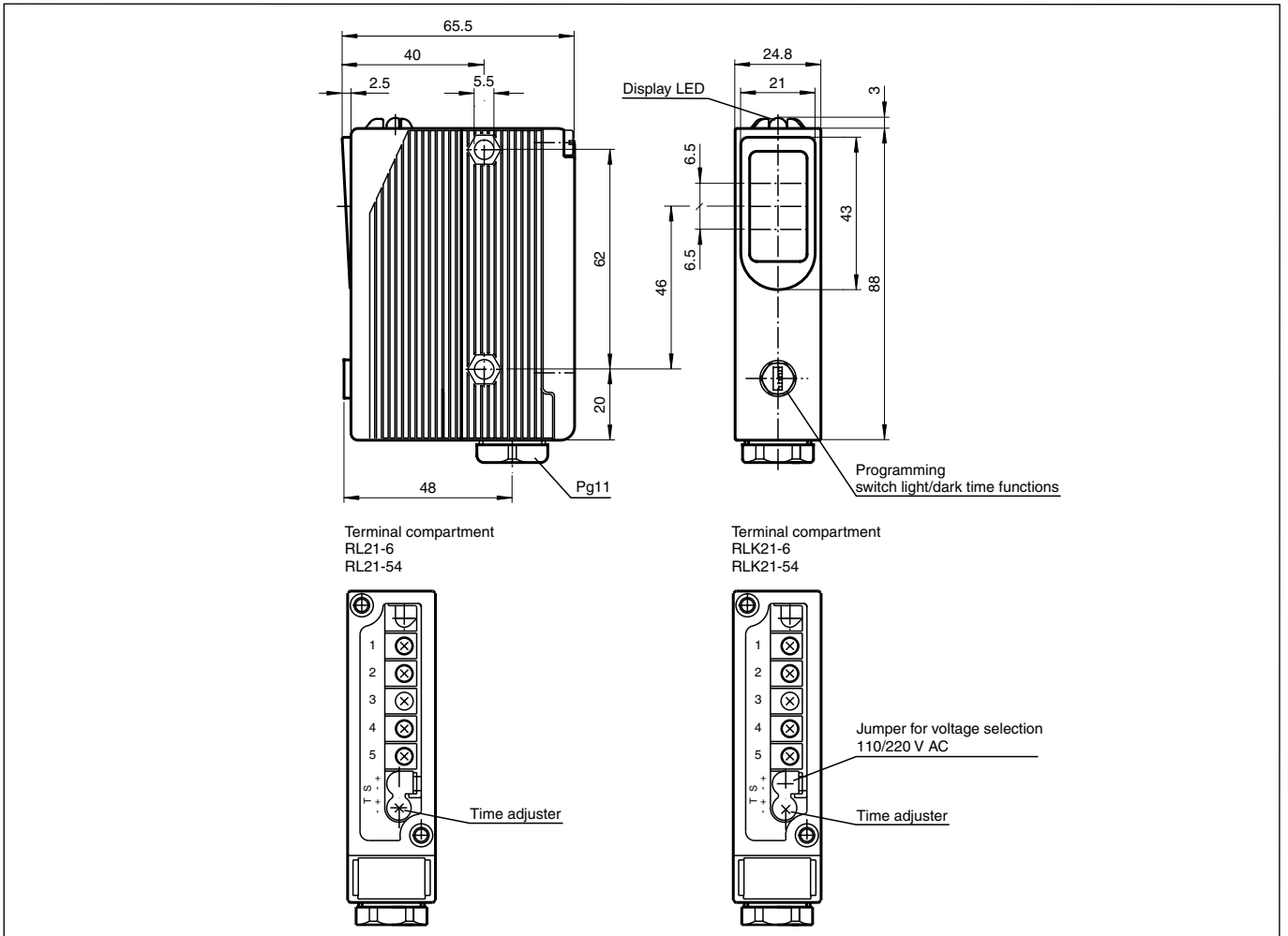
Series 21 and 22

Reflector type:

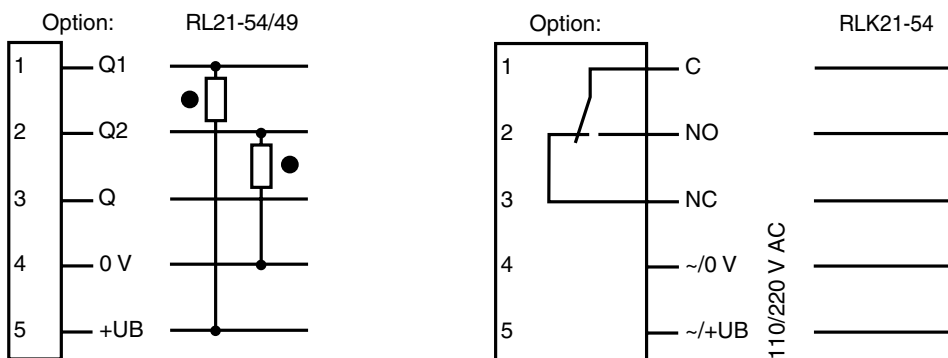
- H85 (80 mm x 80 mm)
- C110_2 (ø = 84 mm)
- H60 (60 mm x 40 mm)
- F2000 (Foil, 100 mm x 100 mm)
- H160 (60 mm x 18 mm)



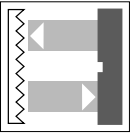
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RLF21-54-1419/44/47/74

Reflection light beam switch with polarisation filter

RLF21-54-1419/44/47/74

with 4-pin, M18 x 1 plastic connector

CE



- ◆ Detection range up to 8 m
- ◆ Sturdy plastic housing
- ◆ Optical surface made of scratch-resistant glass
- ◆ Pre-fault indication
- ◆ Transistor output
- ◆ Operating voltage DC

Series
21 and 22

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue
10/15/01

Ordering code		RLF21-54-1419/44/47/74
Effective detection range	0.25 ... 4000 mm	◆
Threshold detection range	8000 mm with reflector C110-2	◆
Reflector distance	250 ... 4000 mm	◆
Light source	LED	◆
Light type	Red, alternating light	◆
Angle of divergence	approx. 2 °	◆
Diameter of the light spot	approx. 100 mm at 4000 mm detection range	◆
Ambient light limit	80000 Lux	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
Function display	LED, red/green, red when falling short of the stability control, green when stability control ≥ 3	◆
Controls	Programming switch for light/dark ON, timer functions, time adjuster	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	40 mA	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆
Switching type	Light/dark ON, switchable	◆
Switching voltage	30 V DC	◆
Switching current	max. 200 mA	◆
Switching frequency	35 Hz	◆
Response time	10 ms	◆
Timer function	GAN, GAB, IAB, programmable, adjustment range 0.1 ... 10 s	◆
Ambient temperature	-20 ... +60 °C	◆
Storage temperature	-20 ... +75 °C	◆
Protection degree	IP65	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆
Housing	Terluran GV15	◆
Light exit	Glass	◆
Mass	130 g	◆

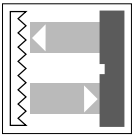
Series
21 and 22

Note

Should not be used for new designs!

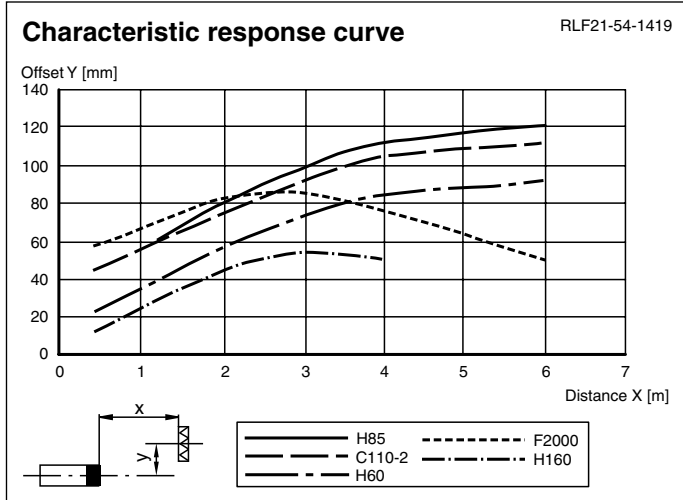
10/15/01

Date of issue



RLF21-54-1419/44/47/74

Diagrams

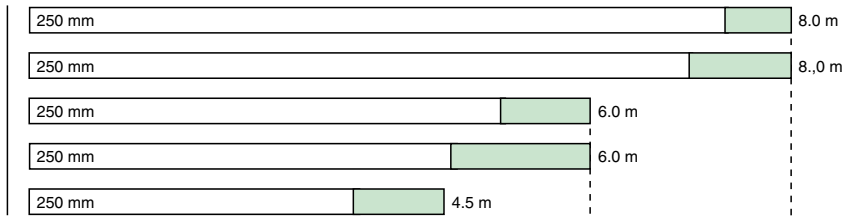


Relative received light strength

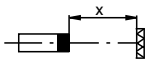
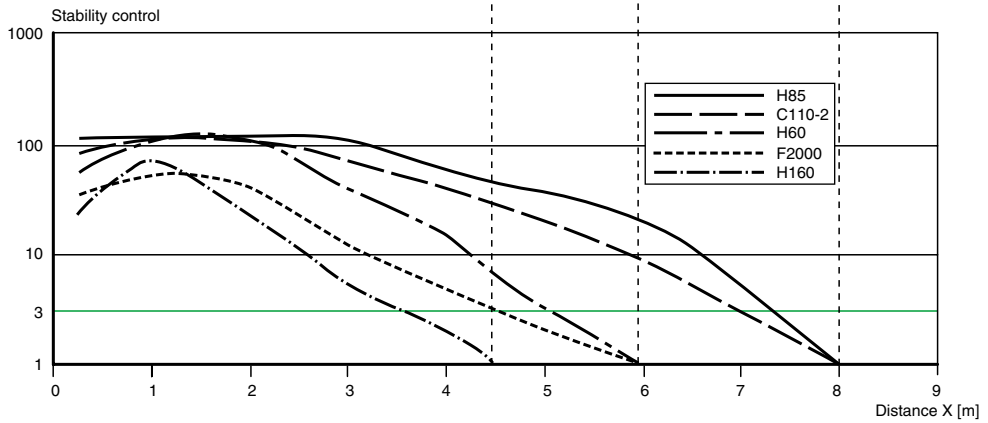
RLF21-54-1419

Reflector type:

- H85 (80 mm x 80 mm)
- C110_2 (ø = 84 mm)
- H60 (60 mm x 40 mm)
- F2000 (Foil, 100 mm x 100 mm)
- H160 (60 mm x 18 mm)

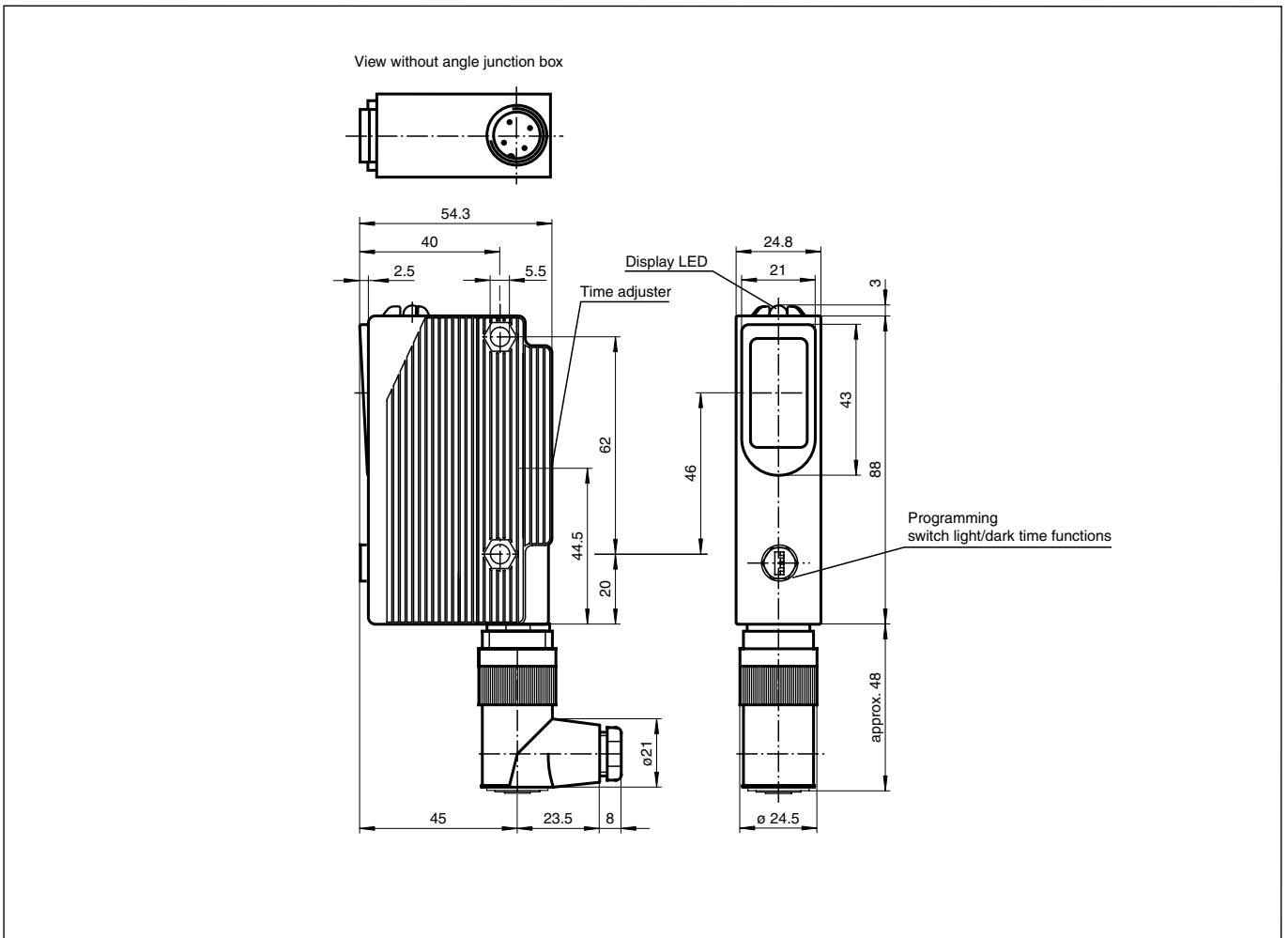


- Stability control > 3
- Stability control < 3



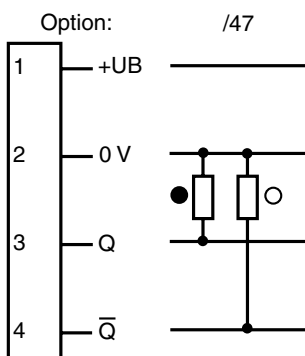
Series 21 and 22

Dimensions



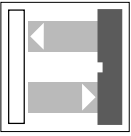
Series 21 and 22

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/15/01



RL.21-8-800

Reflection light scanner

RL.21-8-800

with terminal compartment

CE



- ◆ Detection range 10 mm ... 800 mm, adjustable
- ◆ Sturdy plastic housing
- ◆ Optical surface made of scratch-resistant glass
- ◆ Pre-fault indication
- ◆ Relay output
- ◆ Transistor output
- ◆ Operating voltage DC
- ◆ Operating voltage AC

Series
21 and 22

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue 10/15/01

Ordering code		RL21-8-800/49	RLK21-8-800
Adjustment range	300 ... 800 mm	◆	◆
Detection range	10 ... 800 mm	◆	◆
Light source	IREDD	◆	◆
Light type	Infrared, alternating light	◆	◆
Angle of divergence	approx. 2 °	◆	◆
Diameter of the light spot	approx. 30 mm at 800 mm detection range	◆	◆
Ambient light limit	40000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED, red/green, red when falling short of the stability control, green when stability control ≥3	◆	◆
Controls	Programming switch for light/dark ON, time functions.; time adjuster, sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	
	110 / 220 V AC		◆
Ripple	10 %	◆	
No-load supply current	40 mA	◆	
Power consumption	3 VA		◆
Signal output	1 npn and 1 npn short-circuit proof, protected against reverse polarity	◆	
	1 relay output, 1 alternator		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	min. 12 V AC/DC, max. 240 V AC		◆
	30 V DC	◆	
Switching current	min. 50 mA AC/DC, max. 5 A AC/DC		◆
	max. 200 mA	◆	
Switching frequency	20 Hz		◆
	35 Hz	◆	
Response time	10 ms	◆	
	20 ms		◆
Timer function	GAN, GAB, IAB, programmable, adjustment range		◆
	0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	terminal compartment	◆	◆
Housing	Terluran GV15	◆	◆
Light exit	Glass	◆	◆
Mass	130 g	◆	◆

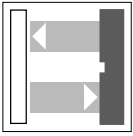
Series
21 and 22

Note

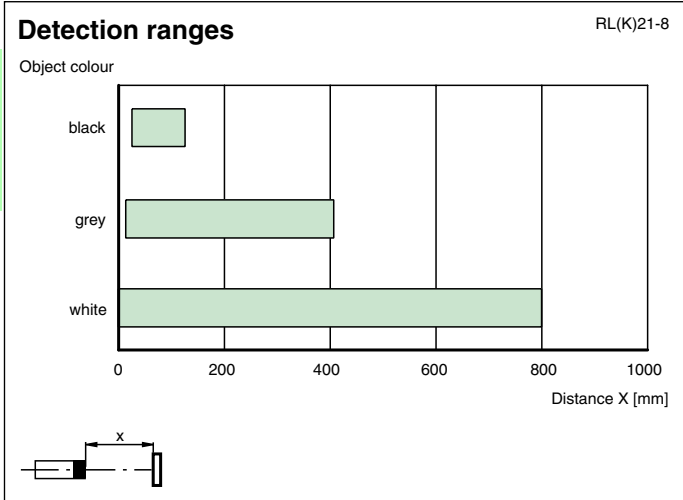
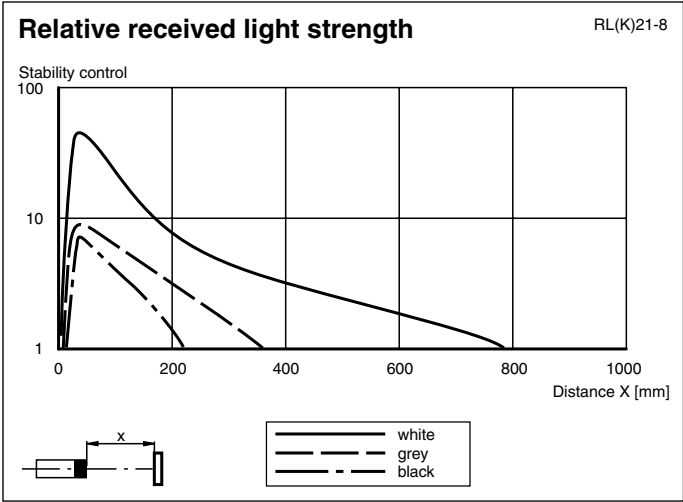
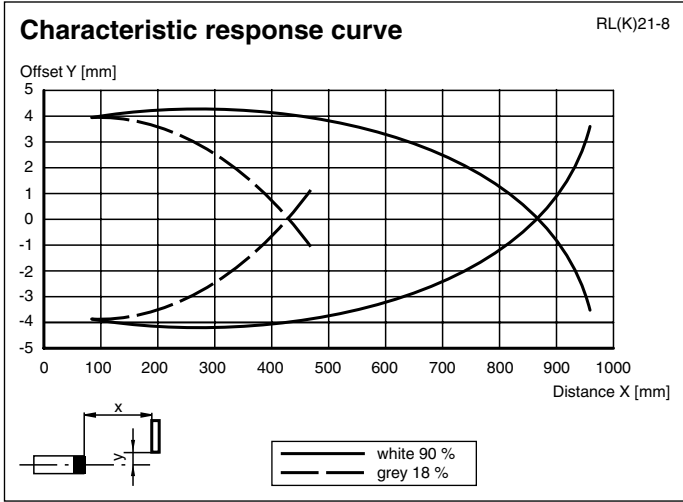
Should not be used for new designs!

10/15/01

Date of issue

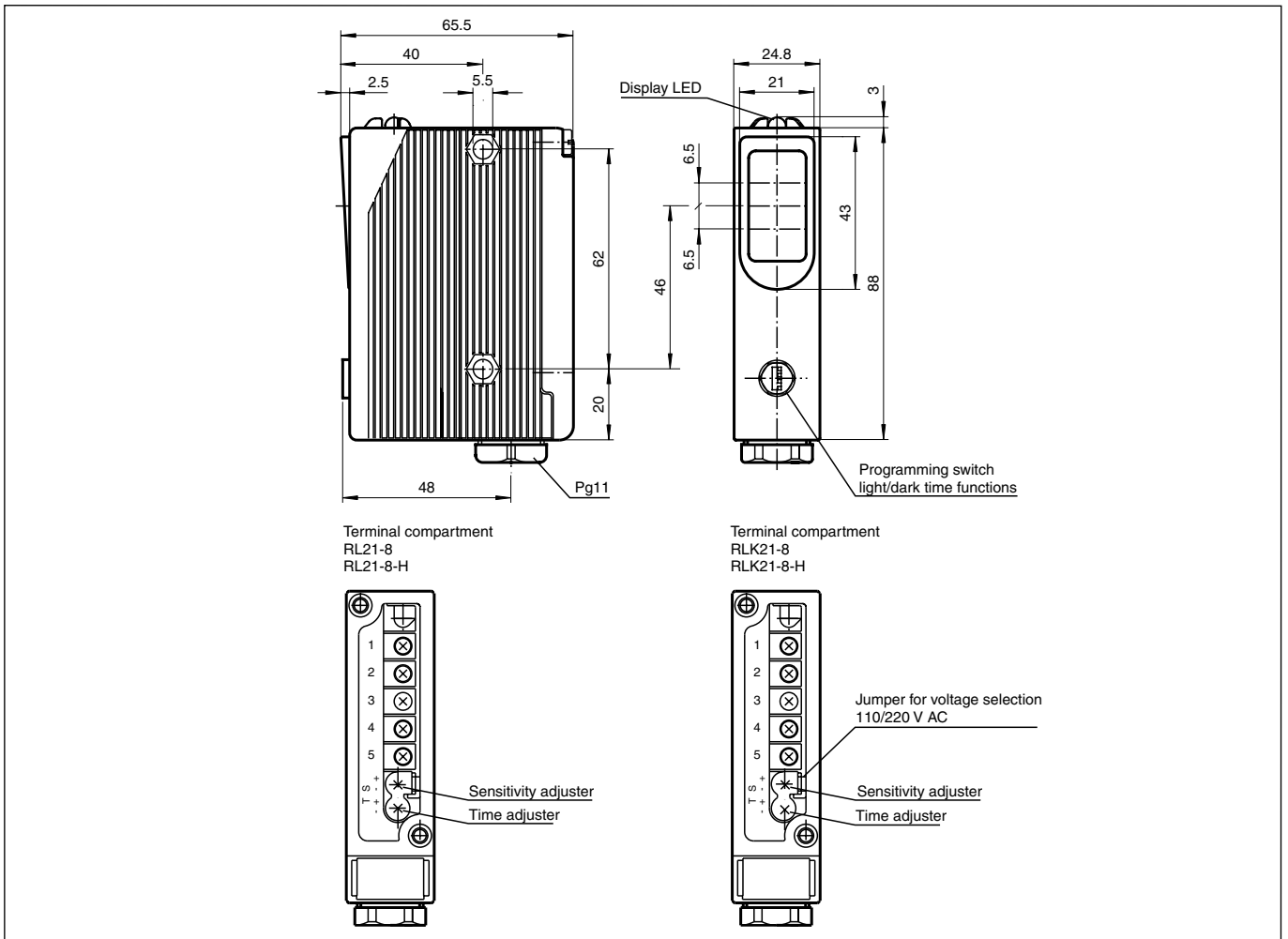


Diagrams



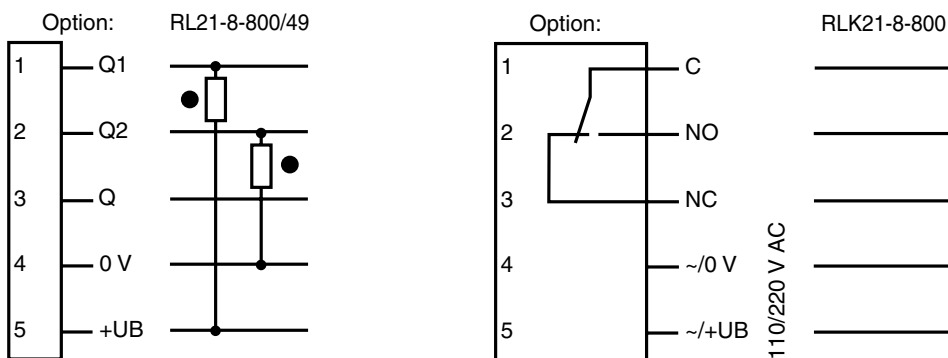
Series 21 and 22

Dimensions



Series 21 and 22

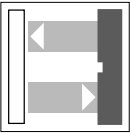
Electrical Connection



10/15/01

Date of issue

○ = Light ON, ● = Dark ON



RLF21-8-800/1419/44/47/74

Reflection light scanner

RLF21-8-800/1419/44/47/74

with 4-pin, M18 x 1 plastic connector

CE



- ◆ Detection range 10 mm ... 800 mm, adjustable
- ◆ Sturdy plastic housing
- ◆ Optical surface made of scratch-resistant glass
- ◆ Pre-fault indication
- ◆ Transistor output
- ◆ Operating voltage DC

Series
21 and 22

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue 10/15/01

Ordering code		RLF21-8-800/1419/44/47/74
Adjustment range	300 ... 800 mm	◆
Detection range	10 ... 800 mm	◆
Light source	IREL	◆
Light type	Infrared, alternating light	◆
Angle of divergence	approx. 2 °	◆
Diameter of the light spot	approx. 30 mm at 800 mm detection range	◆
Ambient light limit	40000 Lux	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
Function display	LED, red/green, red when falling short of the stability control, green when stability control ≥ 3	◆
Controls	Programming switch for light/dark ON, time functions.; time adjuster, sensitivity adjuster	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	40 mA	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆
Switching type	Light/dark ON, switchable	◆
Switching voltage	30 V DC	◆
Switching current	max. 200 mA	◆
Switching frequency	35 Hz	◆
Response time	10 ms	◆
Timer function	GAN, GAB, IAB, programmable, adjustment range 0.1 ...10 s	◆
Ambient temperature	-20 ... +60 °C	◆
Storage temperature	-20 ... +75 °C	◆
Protection degree	IP65	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆
Housing	Terluran GV15	◆
Light exit	Glass	◆
Mass	130 g	◆

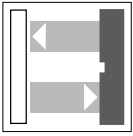
Series 21 and 22

Note

Should not be used for new designs!

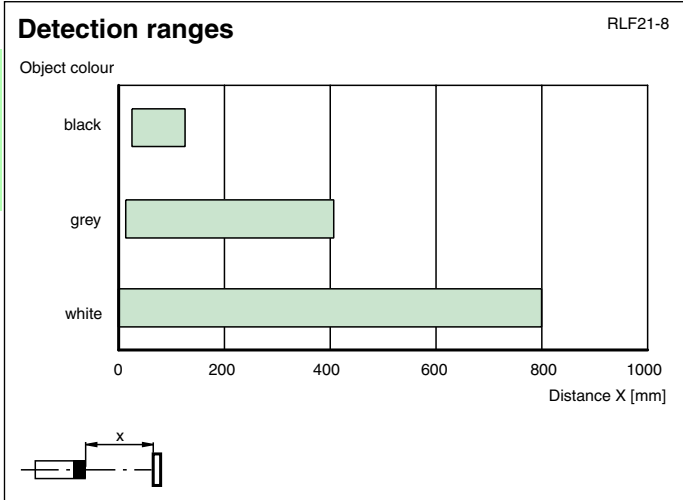
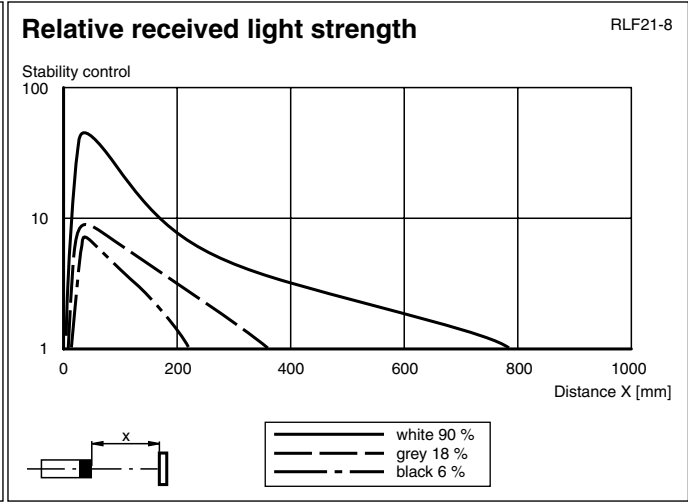
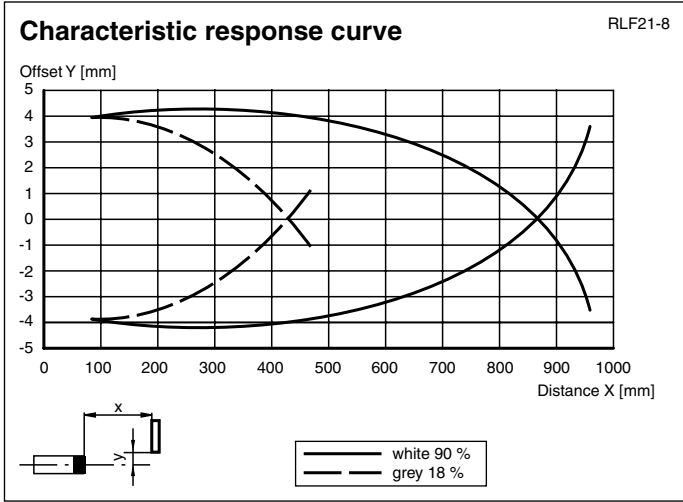
10/15/01

Date of issue



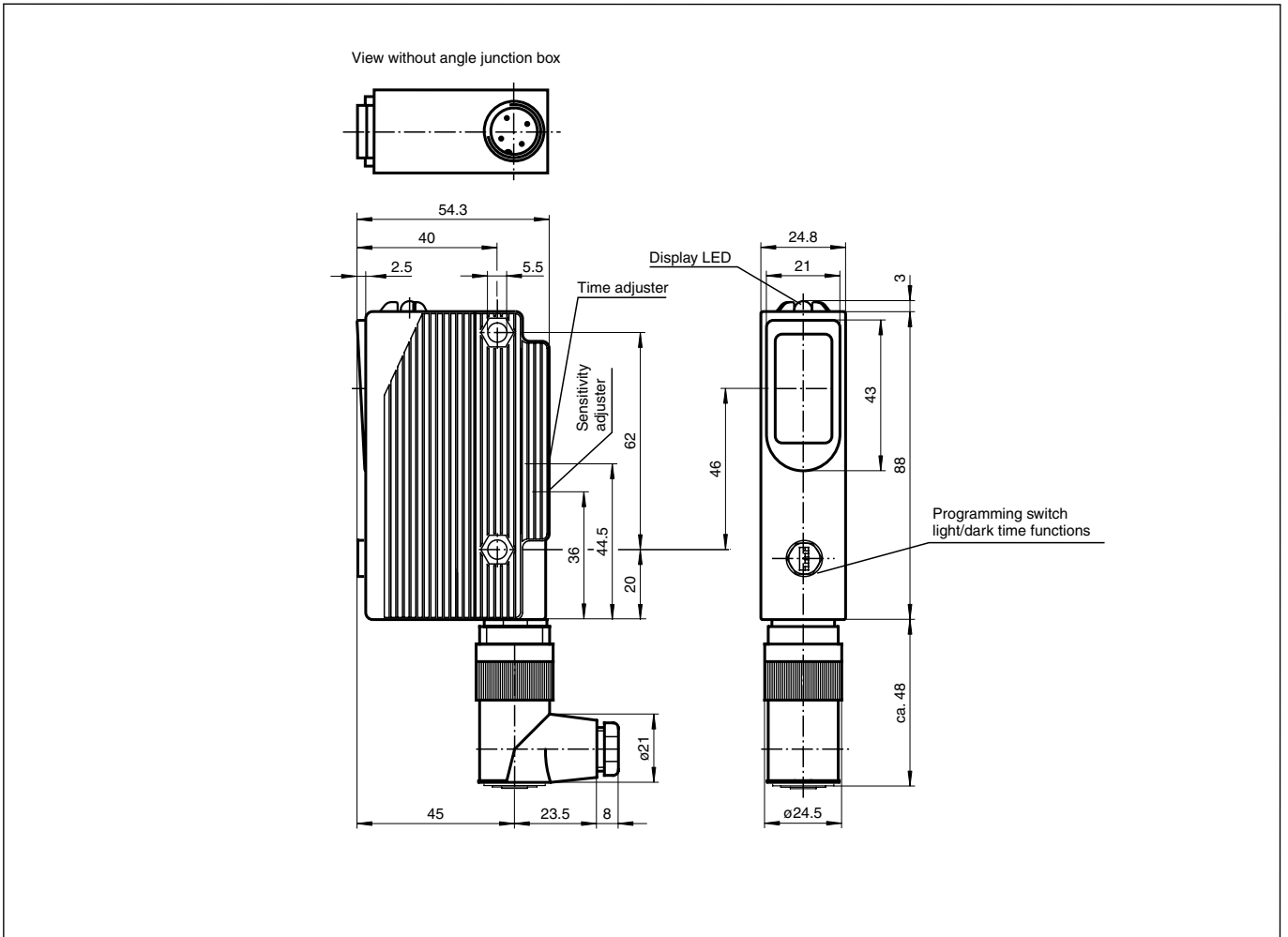
RLF21-8-800/1419/44/47/74

Diagrams



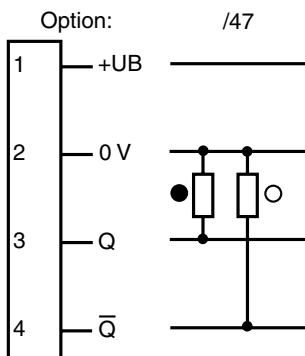
Series 21 and 22

Dimensions



Series 21 and 22

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/15/01



RL.21-8-H-80

Reflection light scanner with background suppression

RL.21-8-H-80

with terminal compartment

CE



- ◆ Detection range 20 mm ... 80 mm
- ◆ Sturdy plastic housing
- ◆ Optical surface made of scratch-resistant glass
- ◆ Pre-fault indication
- ◆ Relay output
- ◆ Transistor output
- ◆ Operating voltage DC
- ◆ Operating voltage AC

Series
21 and 22

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue
10/15/01

Ordering code		RL21-8-H-80/49	RLK21-8-H-80
Detection range	20 ... 80 mm	◆	◆
Detection range min.	20 ... 80 mm	◆	◆
Sensor range max.	20 ... 90 mm	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆
Background suppression	starts from 90 mm	◆	◆
Light source	IRED	◆	◆
Light type	Infrared, alternating light	◆	◆
Angle of divergence	approx. 3 °	◆	◆
Diameter of the light spot	approx. 4 mm at 80 mm detection range	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED, red/green, red when falling short of the stability control, green when stability control ≥ 3	◆	◆
Controls	Programming switch for light/dark ON, timer functions, time adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
	110 / 220 V AC		◆
Ripple	10 %	◆	
No-load supply current	40 mA	◆	
Power consumption	3 VA		◆
Signal output	1 pnp and 1 npn short-circuit proof, protected against reverse polarity	◆	
	1 relay output, 1 alternator		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	min. 12 V AC/DC, max. 240 V AC		◆
	30 V DC	◆	
Switching current	min. 50 mA AC/DC, max. 5 A AC/DC		◆
	max. 200 mA	◆	
Switching frequency	25 Hz		◆
	35 Hz	◆	
Response time	10 ms	◆	
	20 ms		◆
Timer function	GAN, GAB, IAB, programmable, adjustment range 0.1 ... 10 s	◆	◆
Test input	1 pnp	◆	
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	terminal compartment	◆	◆
Housing	Terluran GV15	◆	◆
Light exit	Glass	◆	◆
Mass	130 g	◆	◆

Series 21 and 22

Note

Should not be used for new designs!

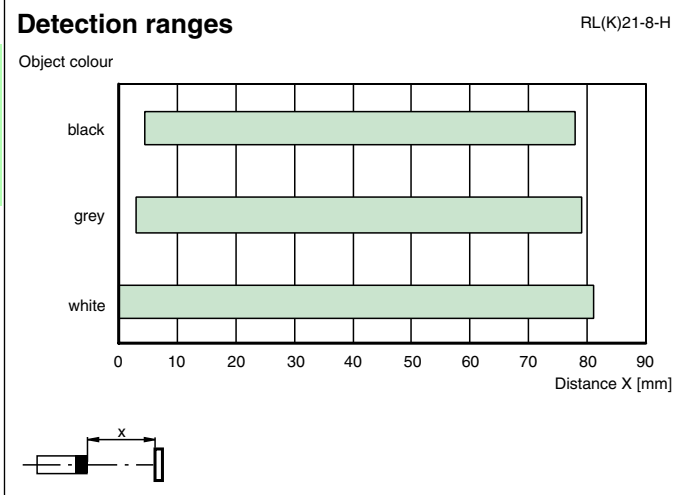
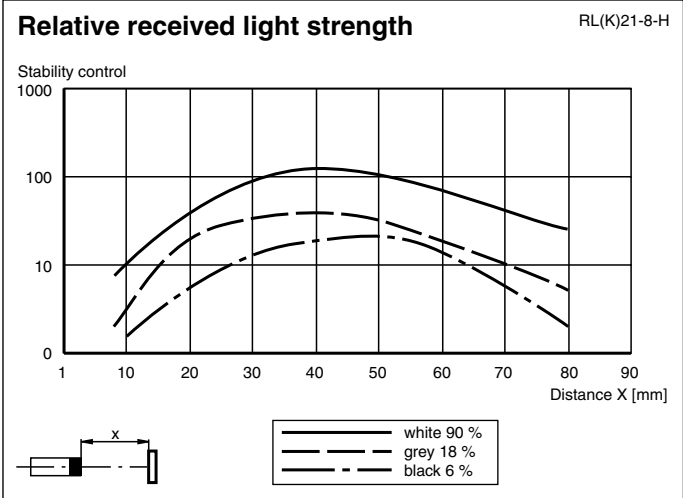
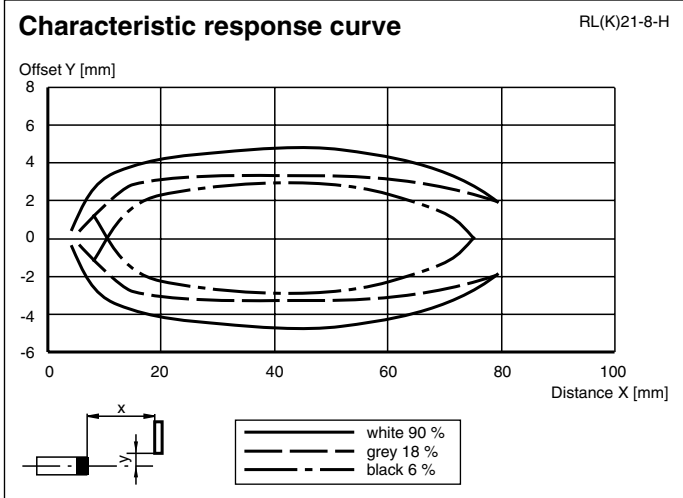
10/15/01

Date of issue



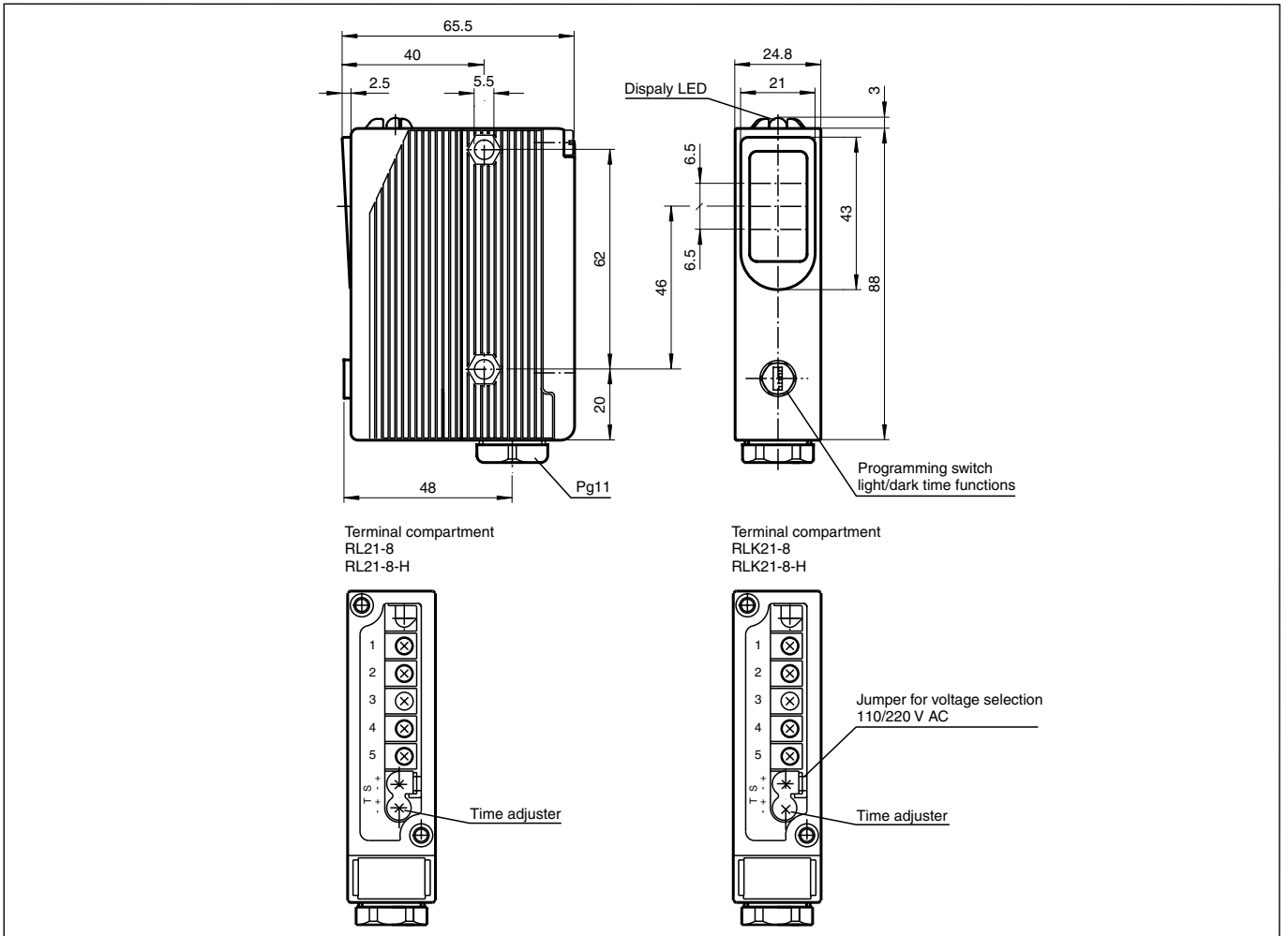
RL.21-8-H-80

Diagrams



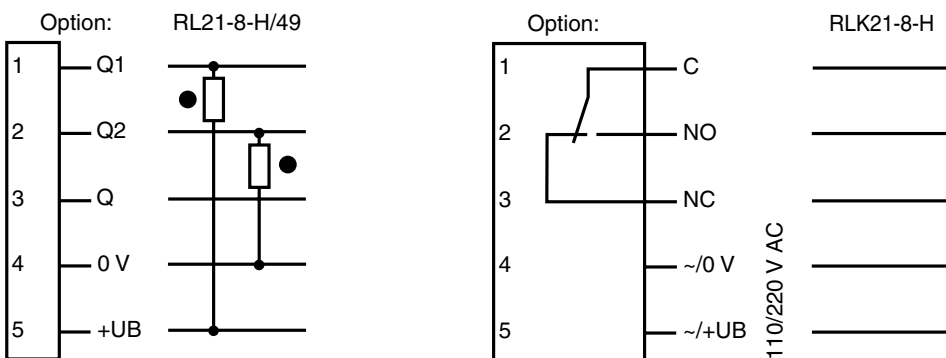
Series 21 and 22

Dimensions



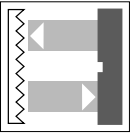
Series 21 and 22

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/15/01



RLF22-54-1921/...

Reflection light beam switch with polarisation filter

RLF22-54-1921/...

with 4-pin, M12 or 4-pin, M18 connector

CE



- ◆ Detection range up to 8 m
- ◆ Sturdy plastic housing
- ◆ Optical surface made of scratch-resistant glass
- ◆ Pre-fault indication

Series
21 and 22

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

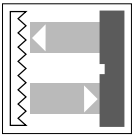
Date of issue 10/4/01

Ordering code		RLF22-54-1921/74b	RLF22-54-1921/92
Effective detection range	0 ... 4000 mm	◆	◆
Threshold detection range	8000 mm (with C110-2 reflector)	◆	◆
Reflector distance	250 ... 4000 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Angle of divergence	approx. 2 °	◆	◆
Diameter of the light spot	approx. 100 mm at 4000 mm detection range	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED, red/green, red when falling short of the stability control, green when stability control ≥ 3	◆	◆
Controls	Time adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	40 mA	◆	◆
Signal output	2 pnp, antivalent, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	35 Hz	◆	◆
Response time	10 ms	◆	◆
Ambient temperature	-20 ... 60 °C	◆	◆
Storage temperature	-20 ... 75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	
	4-pin, M12 metal connector		◆
Housing	Terluran GV15	◆	◆
Light exit	Glass	◆	◆
Connector	metal		◆
Mass	130 g	◆	◆

Series 21 and 22

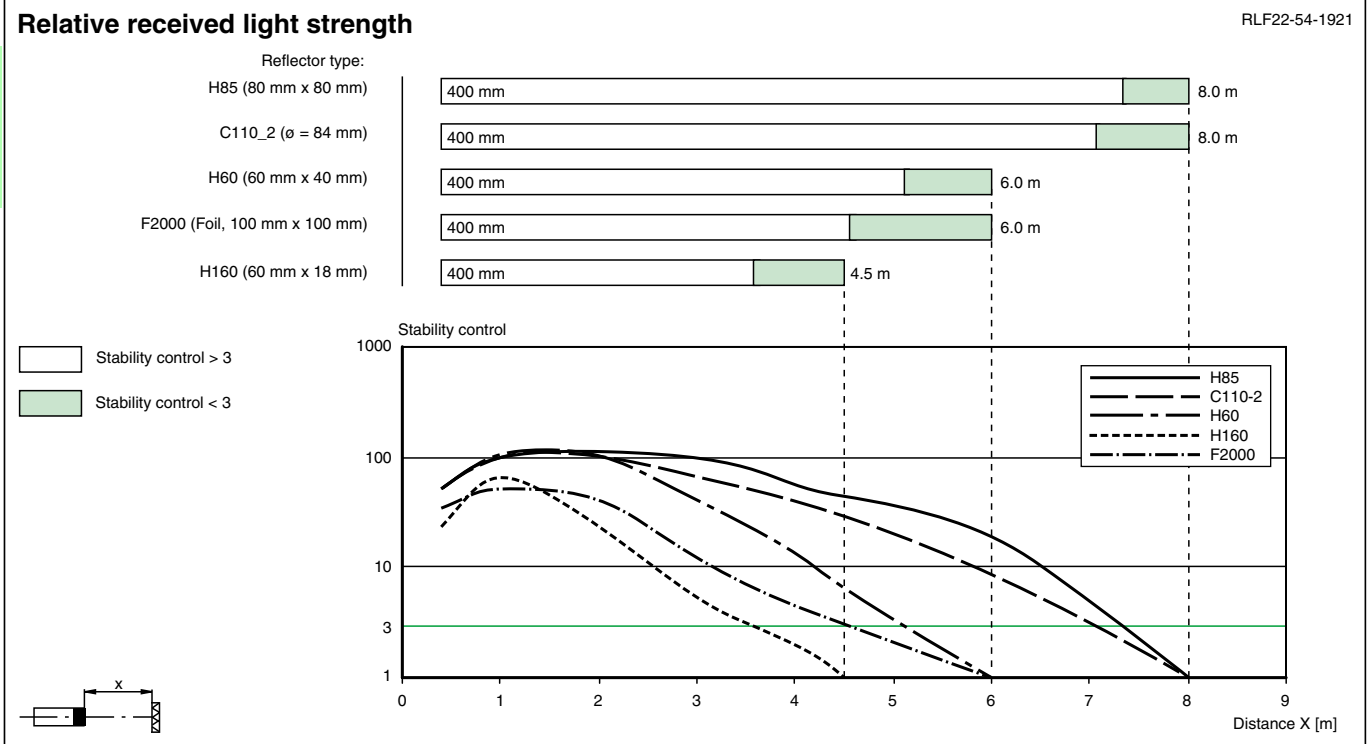
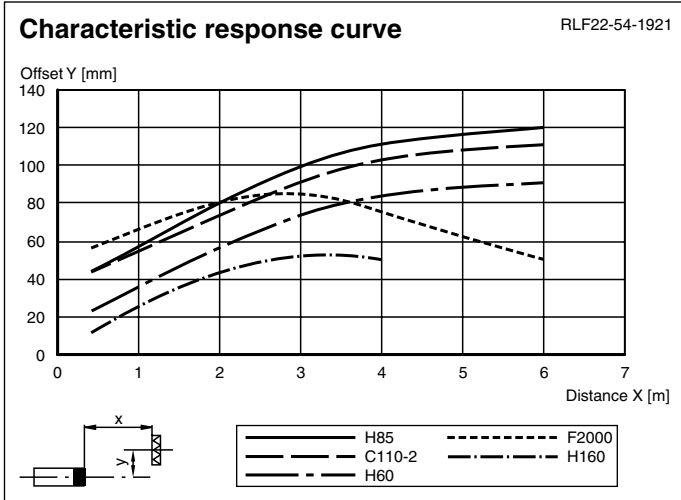
10/4/01

Date of issue



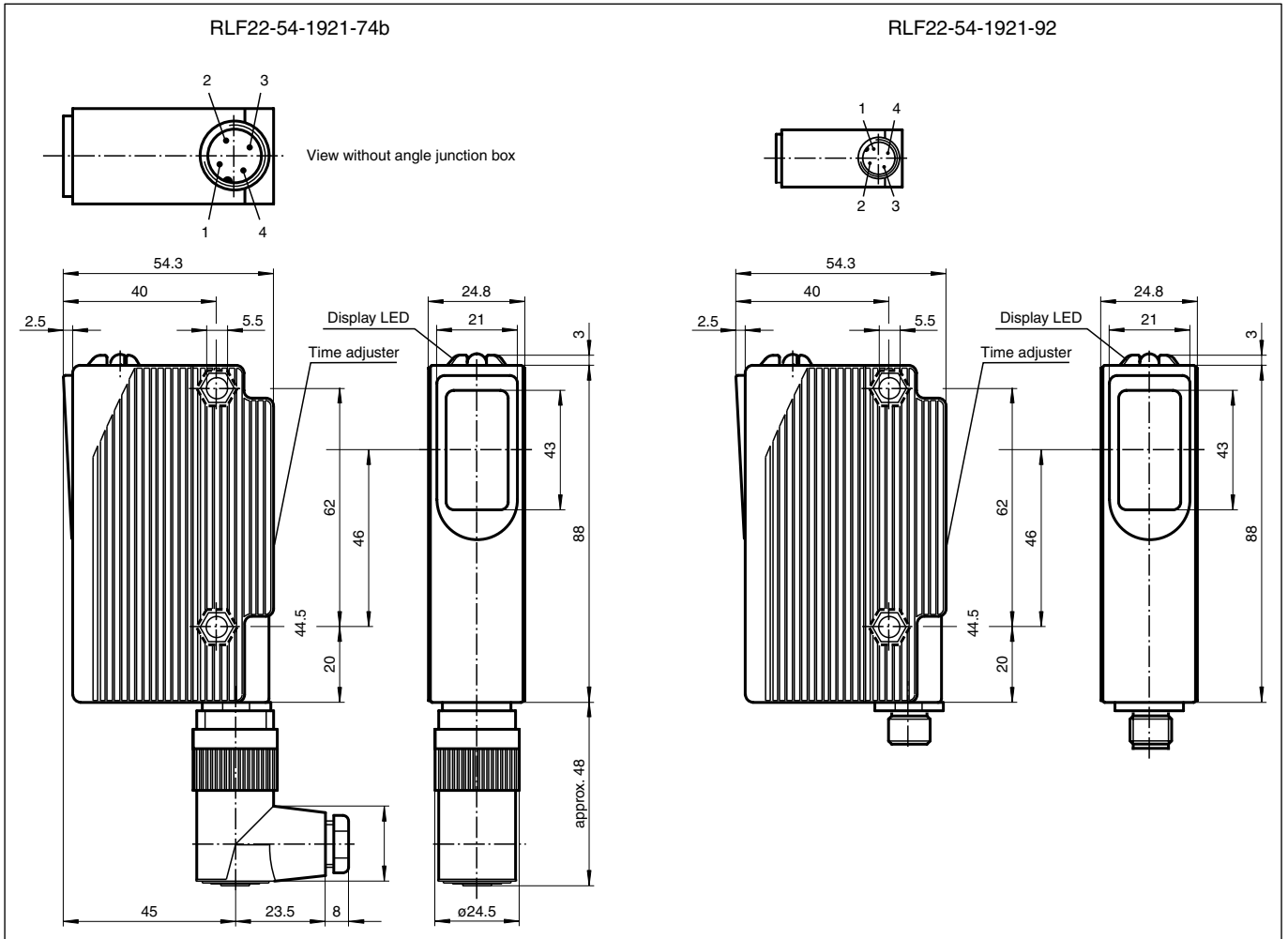
RLF22-54-1921/...

Diagrams



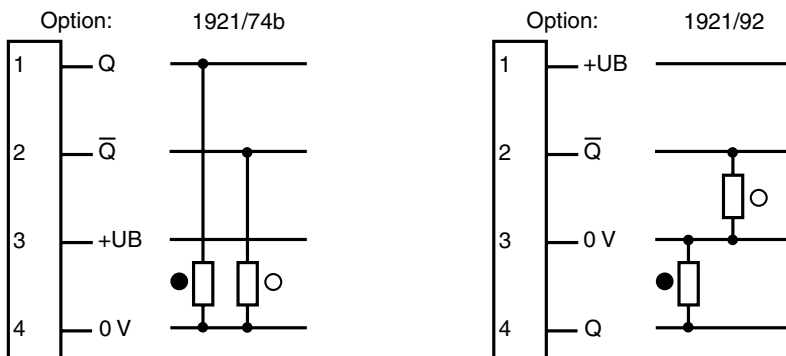
Series 21 and 22

Dimensions



Series 21 and 22

Electrical Connection



○ = Light ON, ● = Dark ON



RLF22-54-G/47/92

Reflection light beam switch with polarisation filter for glass detection

RLF22-54-G/47/92

with M12, 4-pin metal connector

CE



- ◆ Detection range up to 4 m
- ◆ Sturdy plastic housing
- ◆ Optical surface made of scratch-resistant glass
- ◆ Pre-fault indication

Series
21 and 22

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue 10/4/01

Ordering code		RLF22-54-G/47/92
Effective detection range	0 ... 4000 mm	◆
Threshold detection range	5000 mm (with C110-2 reflector)	◆
Reflector distance	300... 4000 mm	◆
Light source	LED	◆
Light type	Red, alternating light	◆
Angle of divergence	approx. 2 °	◆
Diameter of the light spot	approx. 100 mm at 4000 mm detection range	◆
Ambient light limit	60000 Lux	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
Function display	LED, red	◆
Controls	sensitivity adjuster	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	40 mA	◆
Signal output	2 pnp, antivalent, short-circuit proof, protected against reverse polarity	◆
Switching type	light/dark switching	◆
Switching voltage	30 V DC	◆
Switching current	max. 200 mA	◆
Switching frequency	35 Hz	◆
Response time	10 ms	◆
Ambient temperature	-20 ... 60 °C	◆
Storage temperature	-20 ... 75 °C	◆
Protection degree	IP65	◆
Connection type	4-pin, M12 connector	◆
Housing	Terluran GV15	◆
Light exit	Glass	◆
Mass	130 g	◆

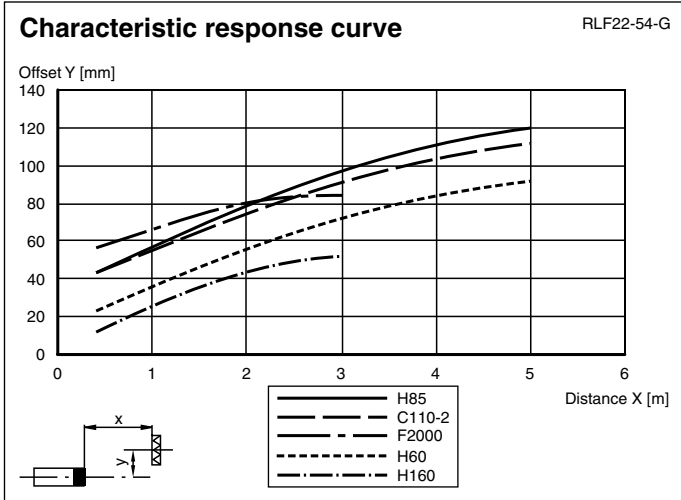
Series
21 and 22

10/4/01

Date of issue



Diagrams



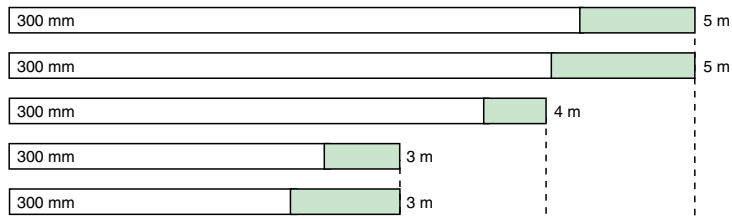
Relative received light strength

RLF22-54-G

Series 21 and 22

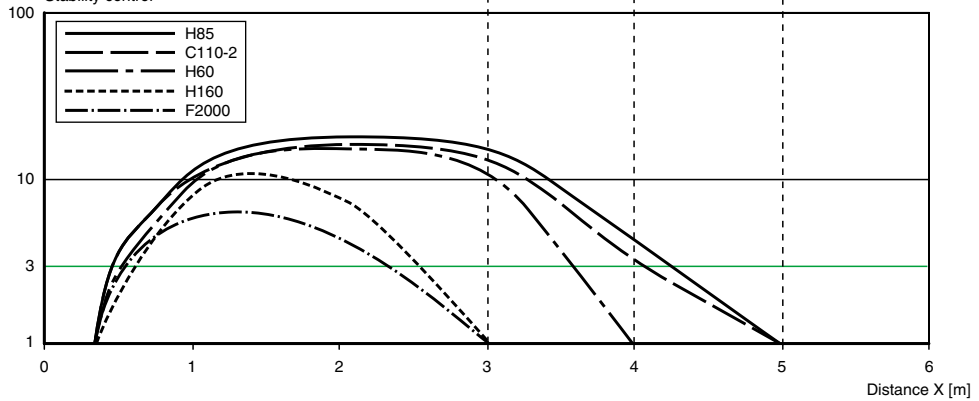
Reflector type:

- H85 (80 mm x 80 mm)
- C110_2 (ø = 84 mm)
- H60 (60 mm x 40 mm)
- H160 (60 mm x 18 mm)
- F2000 (Foil, 100 mm x 100 mm)

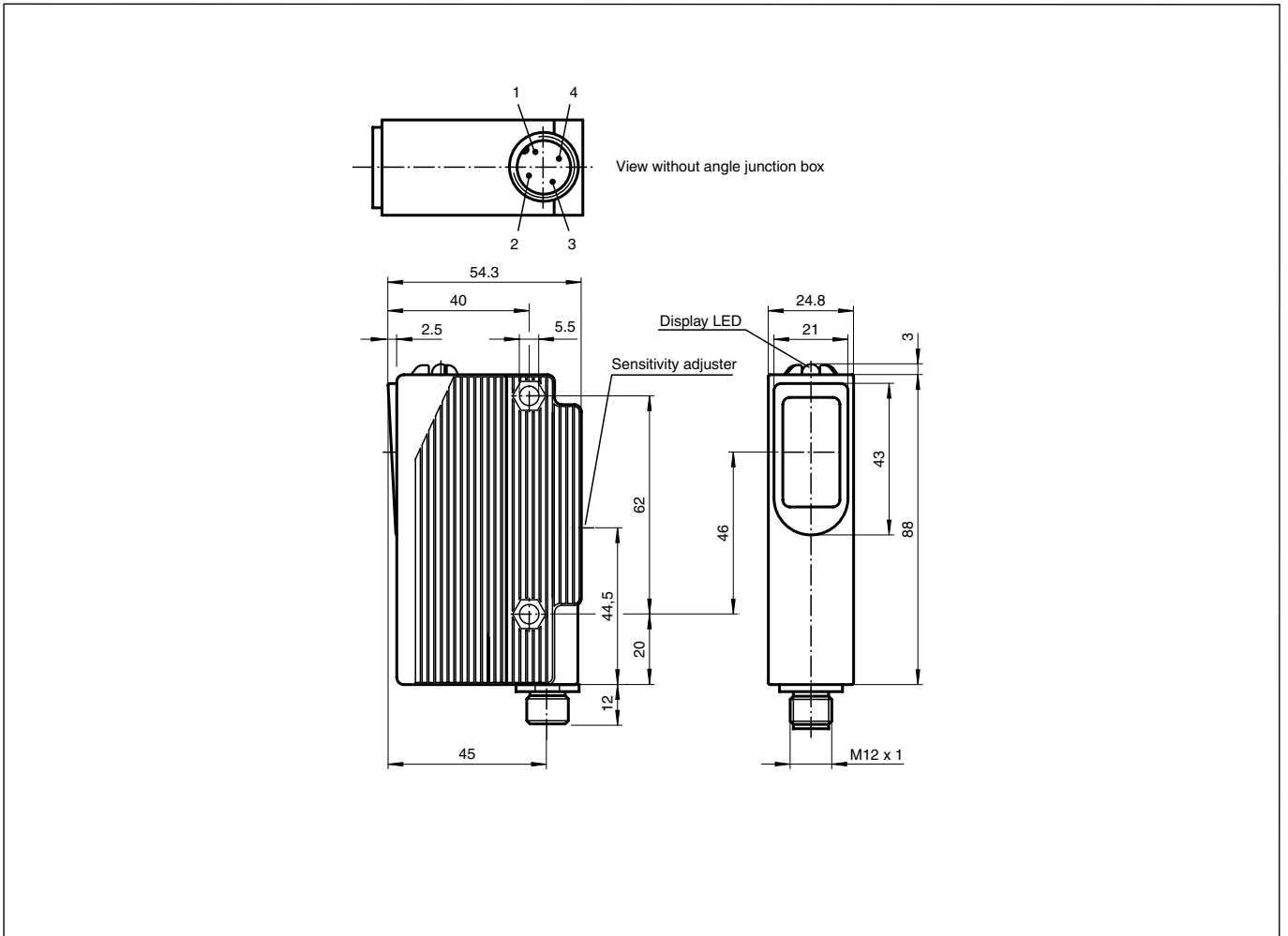


Stability control

- Stability control > 3
- Stability control < 3

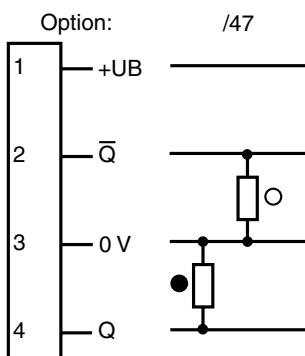


Dimensions



Series 21 and 22

Electrical Connection



○ = Light ON, ● = Dark ON





Series 23 – precise and unsurpassed for very demanding detection

The most significant feature of series 23 is their precise optical behavior at great detection ranges. Recording by means of background suppression accurate to within millimeters, these devices allow for optimal adaptation to extensive functions on machine structures.

Not only are the sensors unaffected by ambient light, but also to members of their own family, so that it is possible to arrange multiple devices of series 23 one next to the other. In addition to all of the operating voltage variants with 10 V to 30 V DC and PNP or NPN output there is an omni-voltage connection with 12 V to 240 V AC/DC and relay output. The sensors with the omni-voltage connection are equipped with an integrated power pack that adjusts itself automatically to the power supply that is applied to the sensor. Due to its fiberglass-reinforced plastic housing and scratch-resistant glass lens, series 23 is most suitable for use where a sturdy device is required.

These features make it available for the most diverse range of applications, for example in material handling and wood processing, in packaging machines and in automatic placement machines.

Principle	Type code	Detection range	Page
	RL23-8-H-1000/74	50 mm ... 1000 mm	266
	RL23-8-H-1000/92	50 mm ... 1000 mm	270
	RLK23-8-H-1000/100	50 mm ... 1000 mm	274
	RL(K)23-8-H-1000/116	50 mm ... 1000 mm	278
	RL23-8-H-2000/74	50 mm ... 2000 mm	266
	RL23-8-H-2000/92	50 mm ... 2000 mm	270
	RLK23-8-H-2000/100	50 mm ... 2000 mm	274
	RL(K)23-8-H-2000/116	50 mm ... 2000 mm	278
	RL23-8-H-500-RT/74a	50 mm ... 500 mm	282
	RL23-8-H-500-RT/92	50 mm ... 500 mm	286
	RL(K)23-8-H-500-RT/100	50 mm ... 500 mm	290
	RL(K)23-8-H-500-RT/116	50 mm ... 500 mm	294
	RL23-8-H-1000-IR-AS-I/116	50 mm ... 1000 mm	298
	RL23-8-H-2000-IR-AS-I/116	50 mm ... 2000 mm	298



RL23-8-H-...-IR/..74a/...

Reflection light scanner with background suppression

RL23-8-H-...-IR/..74a/...

with 4-pin, M18 x 1 plastic connector



- ◆ Sensor range 1000 mm or 2000 mm
- ◆ Sturdy plastic housing
- ◆ Adjustable background suppression
- ◆ Optical surface made of scratch-resistant glass
- ◆ Timer function

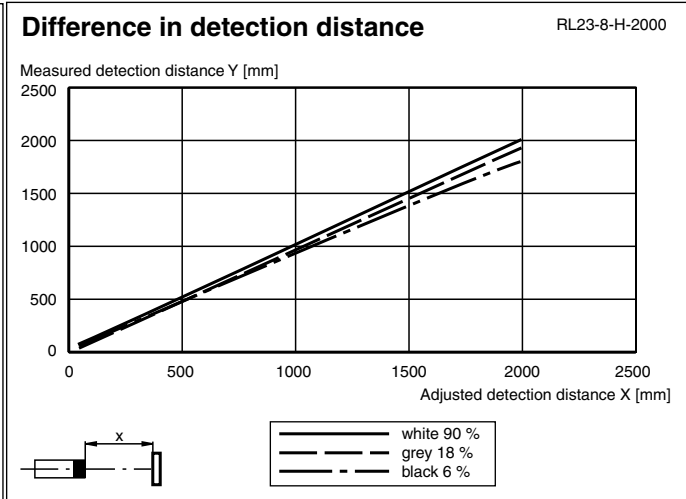
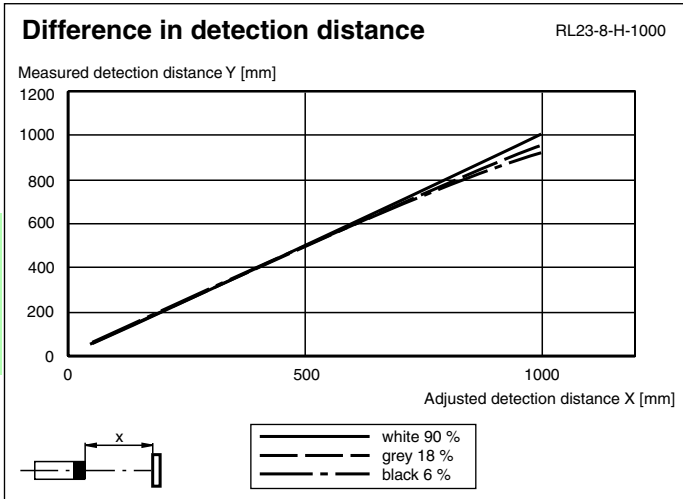
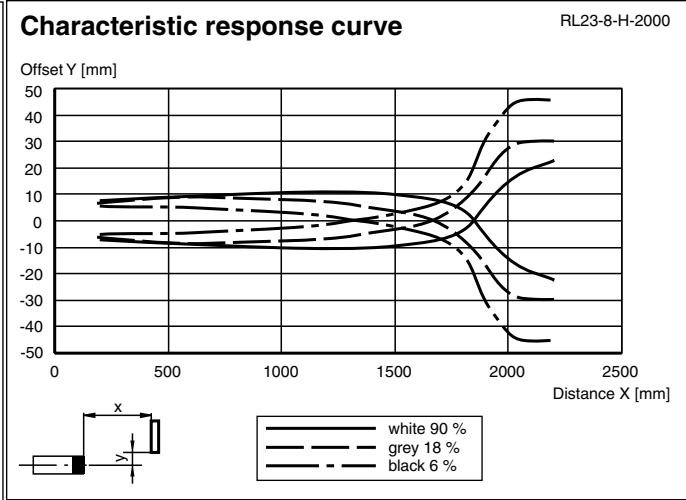
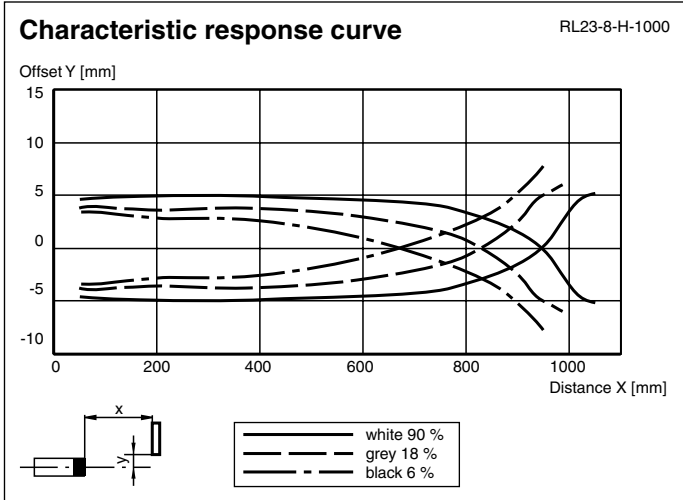
Series
23

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL23-8-H-1000-IR/47/74a	RL23-8-H-1000-IR/47/74a/104	RL23-8-H-1000-IR/49/74a	RL23-8-H-1000-IR/49/74a/104	RL23-8-H-2000-IR/47/74a	RL23-8-H-2000-IR/47/74a/104	RL23-8-H-2000-IR/49/74a	RL23-8-H-2000-IR/49/74a/104
Detection range	50 ... 1000 mm	◆	◆	◆	◆				
	50 ... 2000 mm					◆	◆	◆	◆
Detection range min.	50 ... 150 mm	◆	◆	◆	◆	◆	◆	◆	◆
Sensor range max.	50 ... 1000 mm	◆	◆	◆	◆				
	50 ... 3000 mm					◆	◆	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆	◆	◆				
	< 20 %					◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IREL	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	1.5 °	◆	◆	◆	◆	◆	◆	◆	◆
Diameter of the light spot	25 mm at 1000 mm sensor range	◆	◆	◆	◆				
	50 mm at 2000 mm sensor range					◆	◆	◆	◆
Ambient light limit	12000 Lux	◆	◆	◆	◆				
	5000 Lux					◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED yellow	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Programming switch for light-/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Sensing range adjuster	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Timer functions					◆	◆	◆	◆
Controls	Time adjuster					◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆	◆	◆
No-load supply current	100 mA	◆	◆	◆	◆	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	◆			◆	◆		
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆	◆			◆	◆
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆	◆	◆
Switching frequency	10 Hz		◆		◆		◆		◆
	70 Hz	◆		◆		◆		◆	
Response time	5 ms	◆		◆		◆		◆	
	50 ms		◆		◆		◆		◆
Timer function	GAN, GAB, IAB, programmable, adjustment range					◆	◆	◆	◆
	0.1 ... 10 s					◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆	◆	◆	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆	◆
Mass	180 g	◆	◆	◆	◆	◆	◆	◆	◆

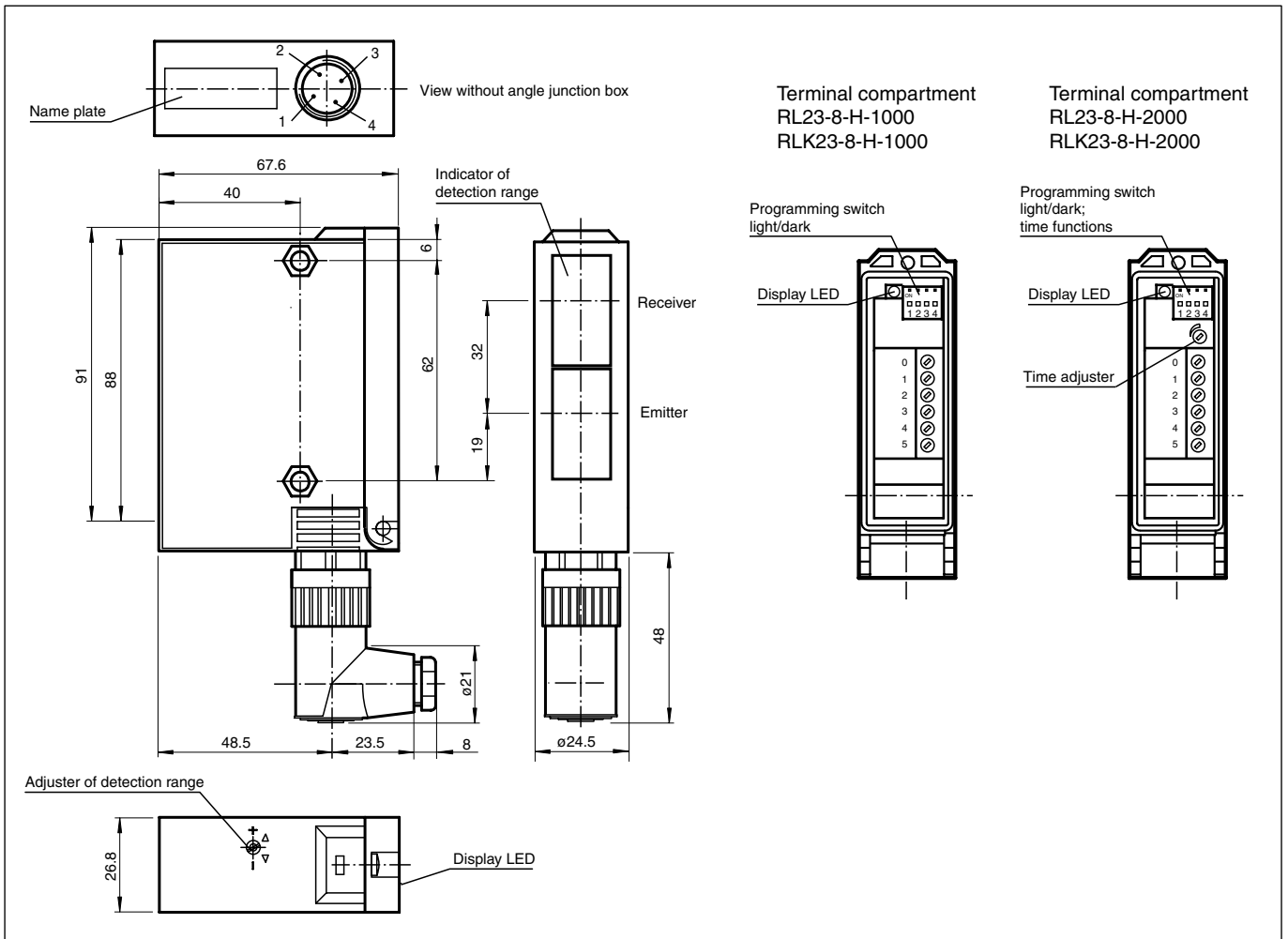


Diagrams

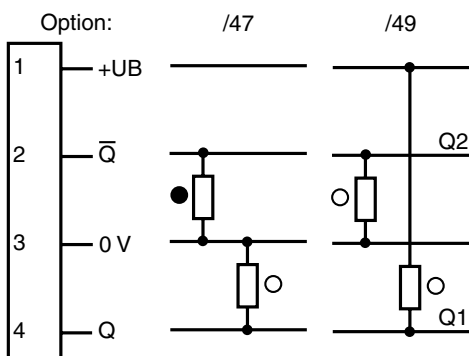


Series 23

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL23-8-H-...-IR/.../92/...

Reflection light scanner with background suppression

RL23-8-H-...-IR/.../92/...

with M12, 4-pin metal connector



- ◆ Sensor range 1000 mm or 2000 mm
- ◆ Sturdy plastic housing
- ◆ Adjustable background suppression
- ◆ Optical surface made of scratch-resistant glass
- ◆ Timer function

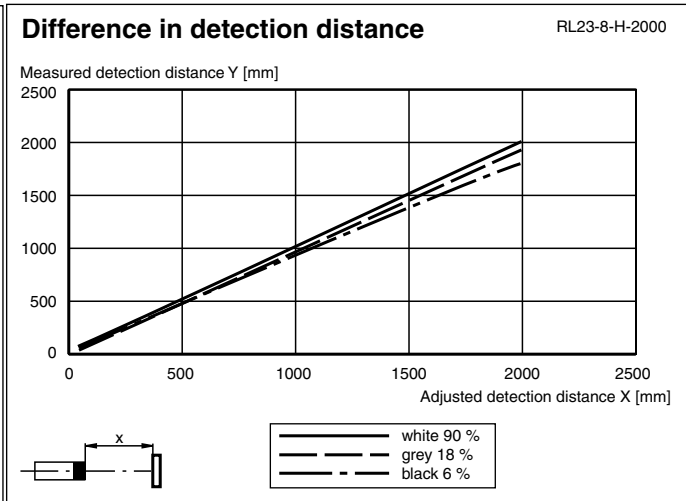
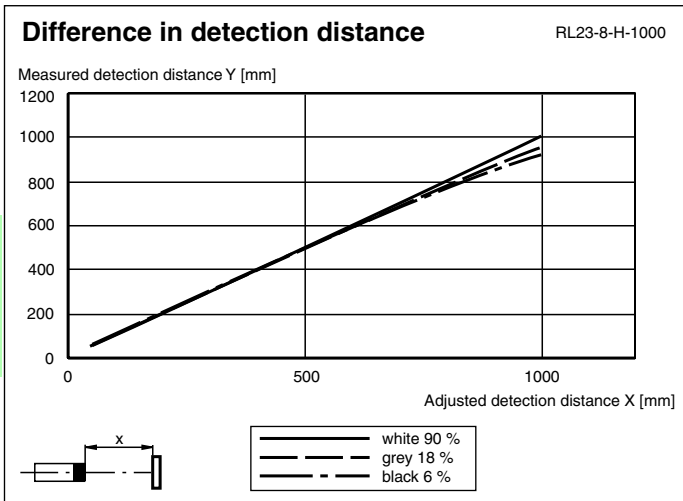
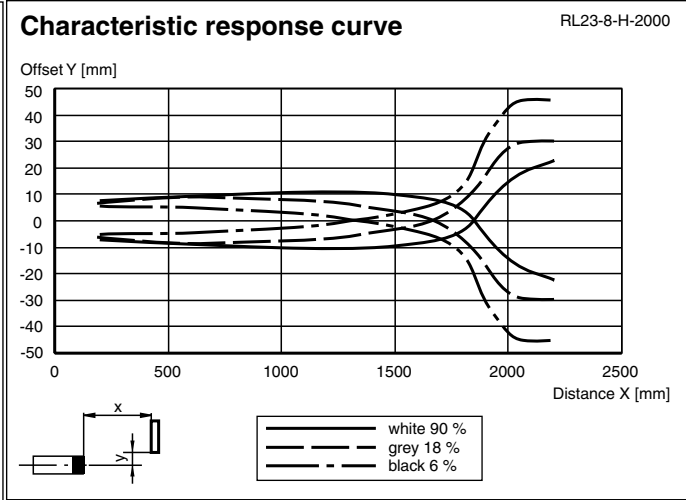
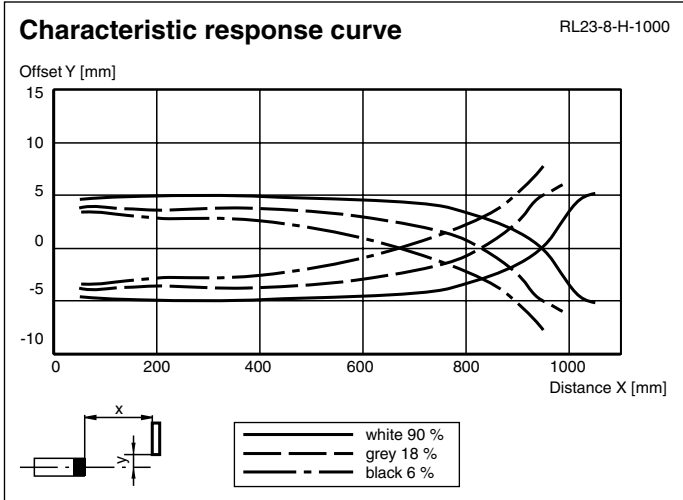
Series
23

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL23-8-H-1000-IR/47/92	RL23-8-H-1000-IR/47/92/104	RL23-8-H-1000-IR/49/92	RL23-8-H-1000-IR/49/92/104	RL23-8-H-2000-IR/47/92	RL23-8-H-2000-IR/47/92/104	RL23-8-H-2000-IR/49/92	RL23-8-H-2000-IR/49/92/104
Detection range	50 ... 1000 mm	◆	◆	◆	◆				
	50 ... 2000 mm					◆	◆	◆	◆
Detection range min.	50 ... 150 mm	◆	◆	◆	◆	◆	◆	◆	◆
Sensor range max.	50 ... 1000 mm	◆	◆	◆	◆				
	50 ... 3000 mm					◆	◆	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆	◆	◆				
	< 20 %					◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IRED	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	1.5 °	◆	◆	◆	◆	◆	◆	◆	◆
Diameter of the light spot	25 mm at 1000 mm sensor range	◆	◆	◆	◆				
	50 mm at 2000 mm sensor range					◆	◆	◆	◆
Ambient light limit	12000 Lux	◆	◆	◆	◆				
	5000 Lux					◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED yellow	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Programming switch for light-/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Sensing range adjuster	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Timer functions					◆	◆	◆	◆
Controls	Time adjuster					◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆	◆	◆
No-load supply current	100 mA	◆	◆	◆	◆	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	◆			◆	◆		
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆	◆			◆	◆
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆	◆	◆
Switching frequency	10 Hz		◆		◆		◆		◆
	70 Hz	◆		◆		◆		◆	
Response time	5 ms	◆		◆		◆		◆	
	50 ms		◆		◆		◆		◆
Timer function	GAN, GAB, IAB, programmable, adjustment range					◆	◆	◆	◆
	0.1 ... 10 s					◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆	◆
Mass	180 g	◆	◆	◆	◆	◆	◆	◆	◆

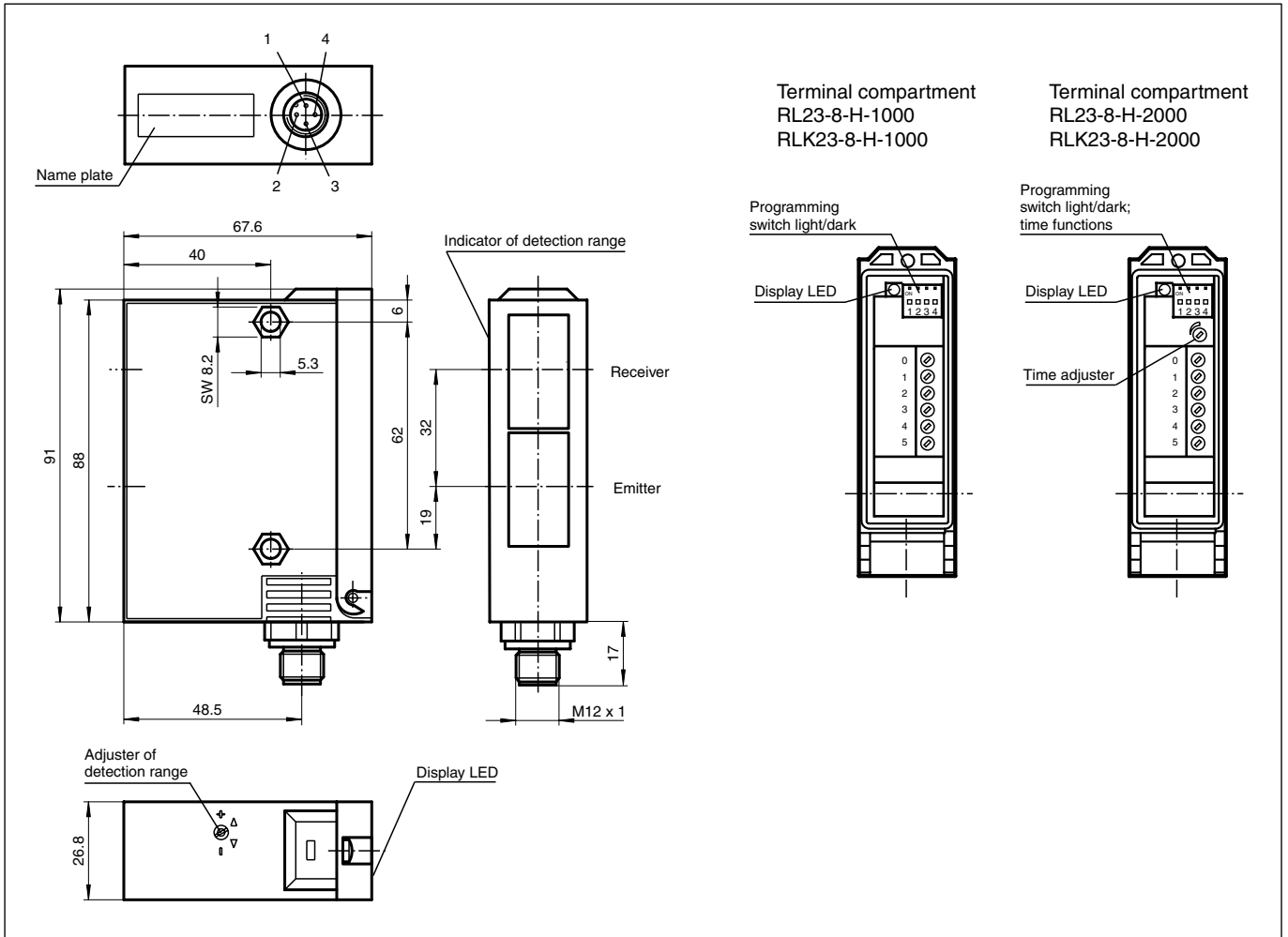


Diagrams

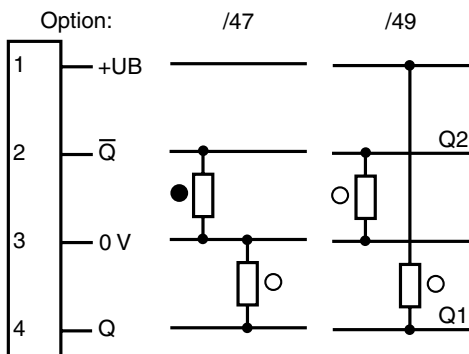


Series 23

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL.23-8-H-...-IR/...

Reflection light scanner with background suppression

RL.23-8-H-...-IR/...

with 7-pin surface-mounted connector up to 250 VAC



- ◆ Sensor range 1000 mm or 2000 mm
- ◆ Sturdy plastic housing
- ◆ Adjustable background suppression
- ◆ Optical surface made of scratch-resistant glass
- ◆ Timer function
- ◆ Operating voltage
12 V ... 240 V AC/DC or
10 V ... 30 V DC

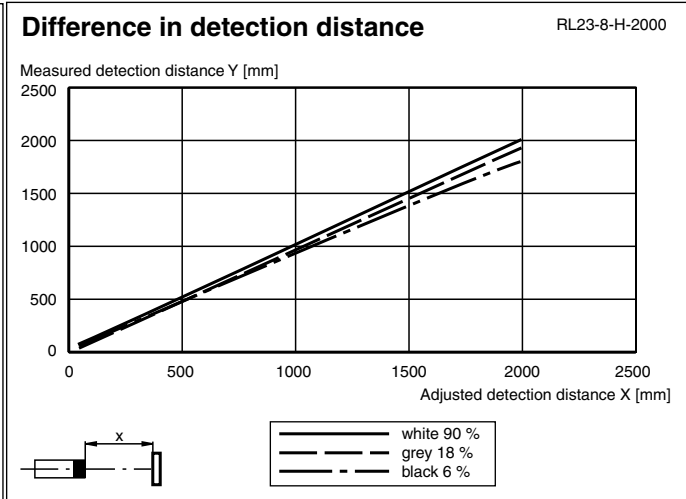
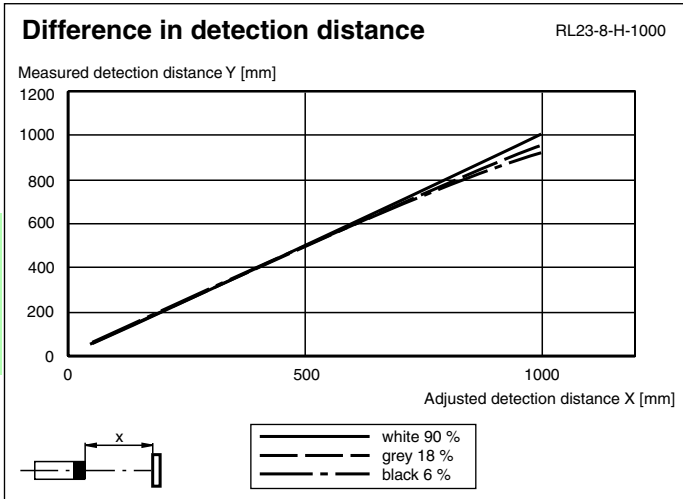
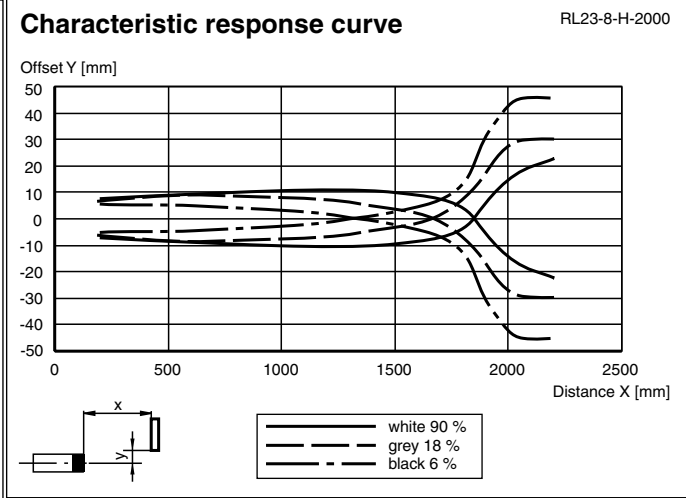
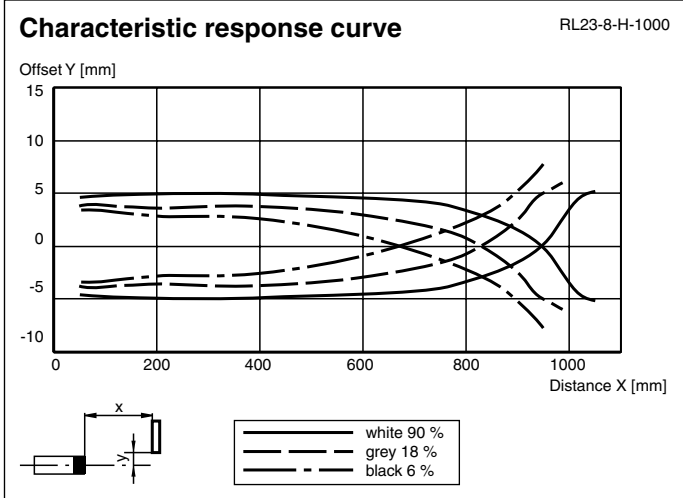
Series
23

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RLK23-8-H-1000-IR/31/100d	RLK23-8-H-1000-IR/31/100d/104	RLK23-8-H-2000-IR/31/100d	RLK23-8-H-2000-IR/31/100d/104	RL23-8-H-1000-IR/100a/125	RL23-8-H-1000-IR/100a/104/125	RL23-8-H-2000-IR/100a/125	RL23-8-H-2000-IR/100a/104/125
Detection range	50 ... 1000 mm	◆	◆			◆	◆		
	50 ... 2000 mm			◆	◆			◆	◆
Detection range min.	50 ... 150 mm	◆	◆	◆	◆	◆	◆	◆	◆
Sensor range max.	50 ... 1000 mm	◆	◆			◆	◆		
	50 ... 3000 mm			◆	◆			◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆			◆	◆		
	< 20 %			◆	◆			◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IRED	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	1.5 °	◆	◆	◆	◆	◆	◆	◆	◆
Diameter of the light spot	25 mm at 1000 mm sensor range	◆	◆			◆	◆	◆	◆
	50 mm at 2000 mm sensor range			◆	◆				
Ambient light limit	12000 Lux	◆	◆			◆	◆		
	5000 Lux			◆	◆			◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED yellow	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Programming switch for light/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Sensing range adjuster	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Timer functions			◆	◆			◆	◆
Controls	Time adjuster			◆	◆			◆	◆
Operating voltage	10 ... 30 V DC					◆	◆	◆	◆
	12 ... 240 V AC/DC, 10 ... 30 V DC	◆	◆	◆	◆				
Ripple	10 %					◆	◆	◆	◆
No-load supply current	100 mA					◆	◆	◆	◆
Power consumption	3 VA	◆	◆	◆	◆				
Signal output	2 pnp antivalent, 1 npn short-circuit proof, protected against reverse polarity					◆	◆	◆	◆
	1 relay, 1 alternator	◆	◆	◆	◆				
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 250 V AC	◆	◆	◆	◆				
	30 V DC					◆	◆	◆	◆
Switching current	max. 2 A	◆	◆	◆	◆				
	max. 200 mA					◆	◆	◆	◆
Switching frequency	10 Hz	◆	◆	◆	◆				
	70 Hz					◆	◆	◆	◆
Response time	5 ms					◆	◆	◆	◆
	50 ms	◆	◆	◆	◆				
Timer function	GAN, GAB, IAB, programmable, adjustment range								
	0.1 ... 10 s			◆	◆			◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	7-pin surface-mounted connector, up to 250 VAC (without cable socket)	◆	◆	◆	◆				
	7-pin surface-mounted connector, up to 50 VAC (with cable socket)					◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆	◆
Mass	180 g	◆	◆	◆	◆	◆	◆	◆	◆

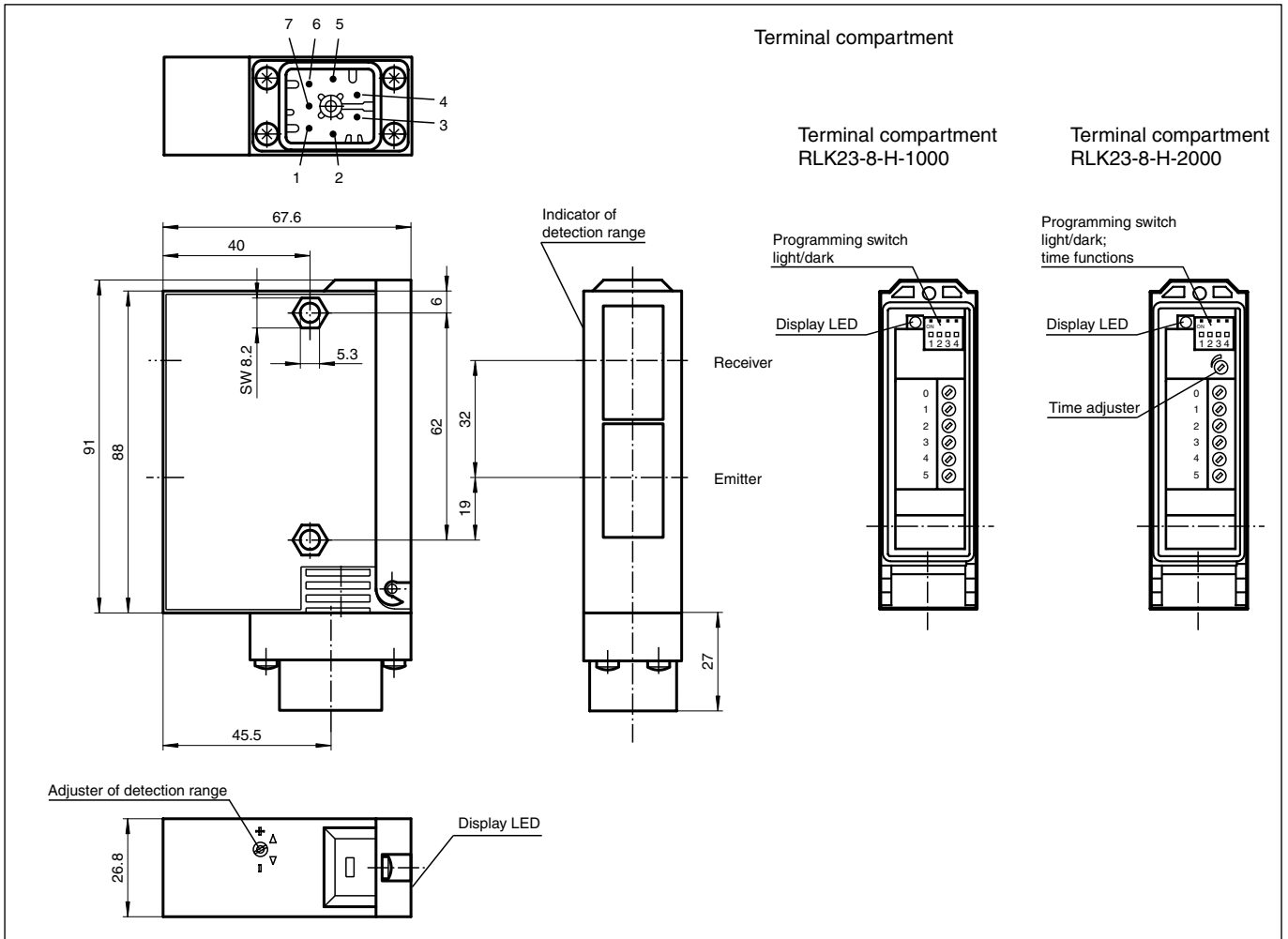


Diagrams

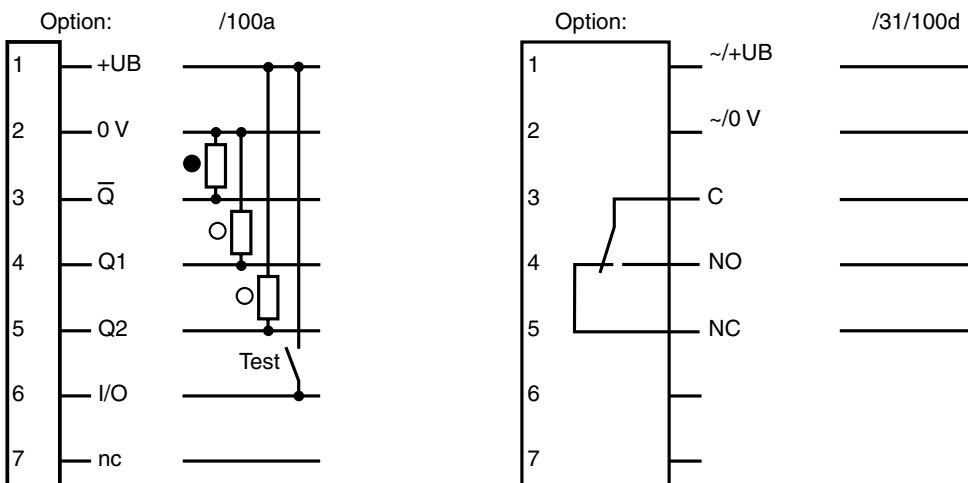


Series 23

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



RL.23-8-H-...-IR/.. /116

Reflection light scanner with background suppression

RL.23-8-H-...-IR/.. /116

terminal compartment



- ◆ Sensor range 1000 mm or 2000 mm
- ◆ Sturdy plastic housing
- ◆ Adjustable background suppression
- ◆ Optical surface made of scratch-resistant glass
- ◆ Timer function
- ◆ Operating voltage
12 V ... 240 V AC/DC or
10 V ... 30 V DC

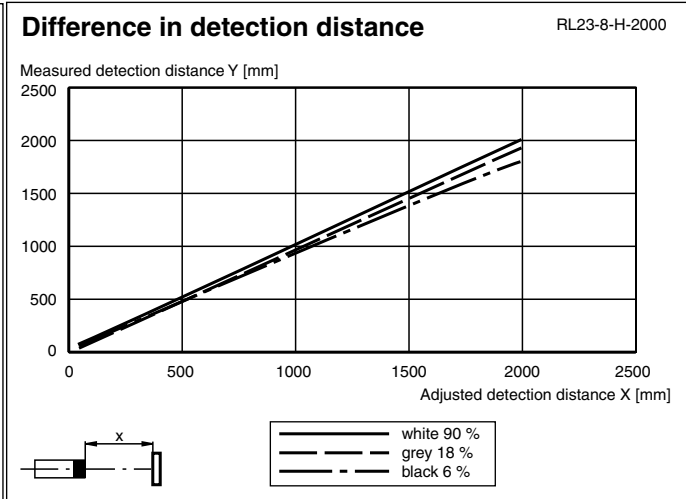
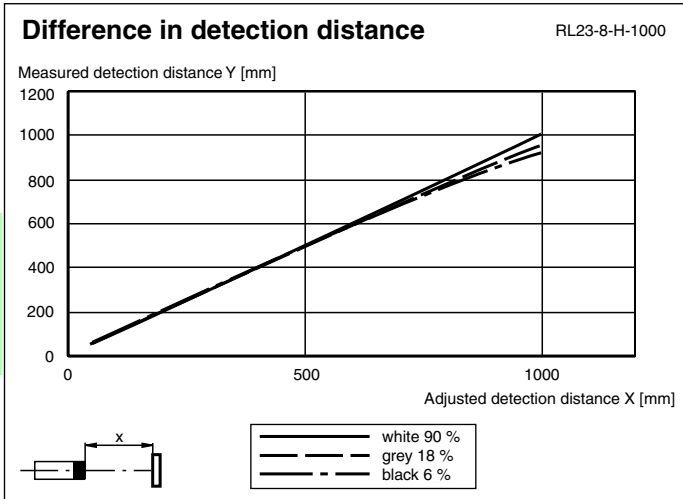
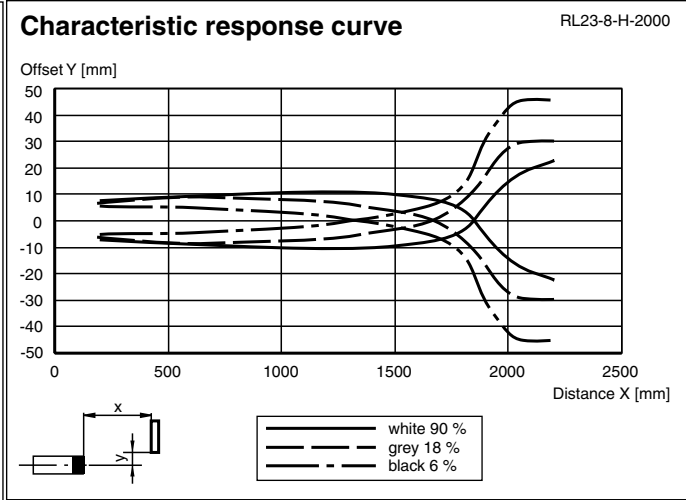
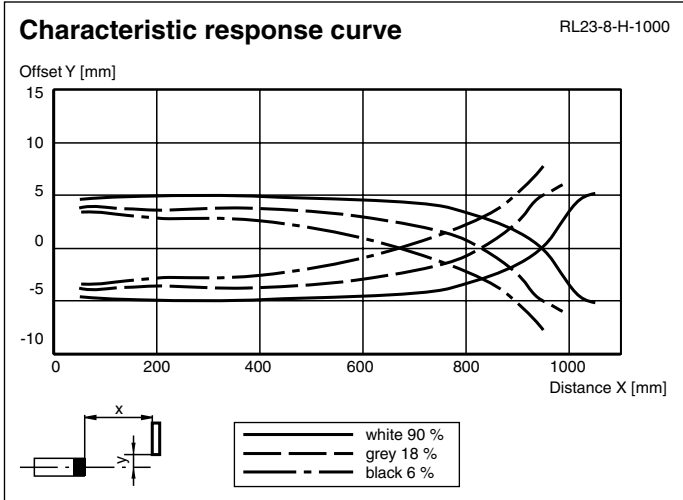
Series
23

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL23-8-H-1000-IR/116/125	RL23-8-H-1000-IR/104/116/125	RL23-8-H-2000-IR/116/125	RL23-8-H-2000-IR/104/116/125	RLK23-8-H-1000-IR/31/116	RLK23-8-H-1000-IR/31/104/116	RLK23-8-H-2000-IR/31/116	RLK23-8-H-2000-IR/31/104/116
Detection range	50 ... 1000 mm	◆	◆			◆	◆		
	50 ... 2000 mm			◆	◆			◆	◆
Detection range min.	50 ... 150 mm	◆	◆	◆	◆	◆	◆	◆	◆
Sensor range max.	50 ... 1000 mm	◆	◆			◆	◆		
	50 ... 3000 mm			◆	◆			◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆			◆	◆		
	< 20 %			◆	◆			◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IRED	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	1.5 °	◆	◆	◆	◆	◆	◆	◆	◆
Diameter of the light spot	25 mm at 1000 mm sensor range	◆	◆			◆	◆		
	50 mm at 2000 mm sensor range			◆	◆			◆	◆
Ambient light limit	12000 Lux	◆	◆			◆	◆		
	5000 Lux			◆	◆			◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED yellow	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Programming switch for light-/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Sensing range adjuster	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Timer functions			◆	◆			◆	◆
Controls	Time adjuster			◆	◆			◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆				
	12 ... 240 V AC, 10 ... 30 V DC					◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆				
No-load supply current	100 mA	◆	◆	◆	◆				
Power consumption	3 VA					◆	◆	◆	◆
Signal output	1 relay output, 1 alternator					◆	◆	◆	◆
	2 npn antivalent, 1 npn short-circuit proof, protected against reverse polarity	◆	◆	◆	◆				
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 250 V AC					◆	◆	◆	◆
	30 V DC	◆	◆	◆	◆				
Switching current	max. 2 A					◆	◆	◆	◆
	max. 200 mA	◆	◆	◆	◆				
Switching frequency	10 Hz					◆	◆	◆	◆
	70 Hz	◆	◆						
Response time	5 ms	◆	◆						
	50 ms			◆	◆	◆	◆	◆	◆
Timer function	GAN, GAB, IAB, programmable, adjustment range								
	0.1 ... 10 s			◆	◆			◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆	◆	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆	◆
Mass	180 g	◆	◆	◆	◆	◆	◆	◆	◆

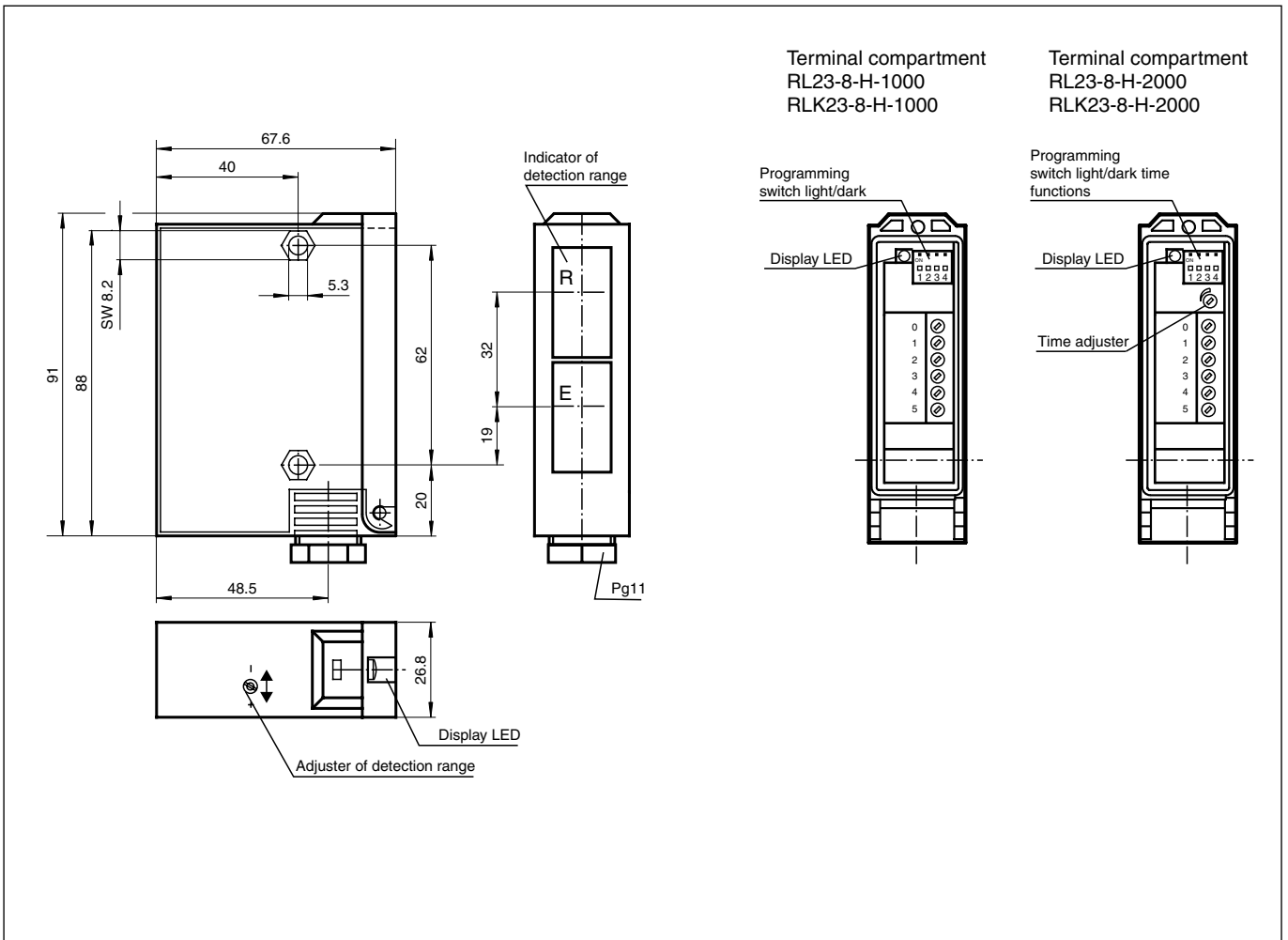


Diagrams

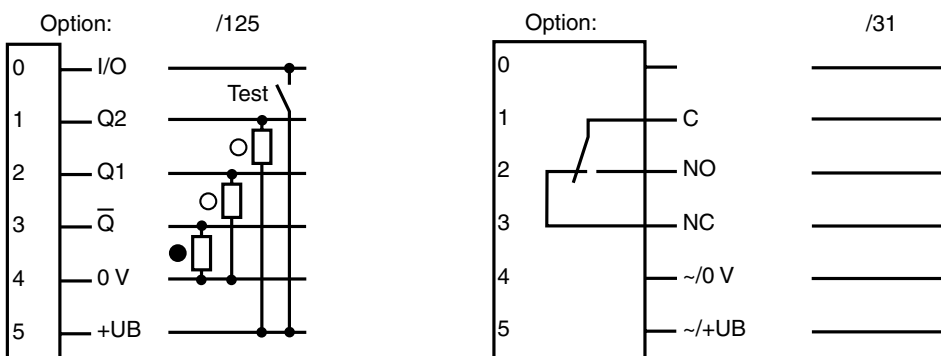


Series 23

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



RL23-8-H-500-RT/..74a/...

Reflection light scanner with background suppression

RL23-8-H-500-RT/..74a/...

with 4-pin, M18 x 1 plastic connector



- ◆ Sensor range 500 mm
- ◆ Sturdy plastic housing
- ◆ Adjustable background suppression
- ◆ Optical surface made of scratch-resistant glass
- ◆ Timer function
- ◆ Visible red light

Series
23

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

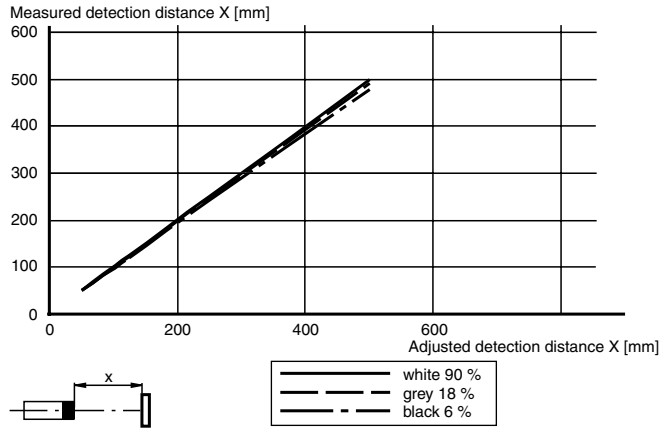
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Ordering code		RL23-8-H-500-RT/47/74a	RL23-8-H-500-RT/47/74a/104	RL23-8-H-500-RT/49/74a	RL23-8-H-500-RT/49/74a/104
Detection range	50 ... 500 mm	◆	◆	◆	◆
Detection range min.	50 ... 150 mm	◆	◆	◆	◆
Sensor range max.	50 ... 500 mm	◆	◆	◆	◆
Black/white difference (6%/90%)	< 5 %	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Angle of divergence	1.5 °	◆	◆	◆	◆
Diameter of the light spot	12 mm at a sensor range of 500 mm	◆	◆	◆	◆
Ambient light limit	12000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Function display	LED yellow	◆	◆	◆	◆
Controls	Programming switch for light-/dark switching	◆	◆	◆	◆
Controls	Sensing range adjuster	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	100 mA	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	◆		
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆	◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	10 Hz		◆		◆
	70 Hz	◆		◆	
Response time	5 ms	◆		◆	
	50 ms		◆		◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	180 g	◆	◆	◆	◆

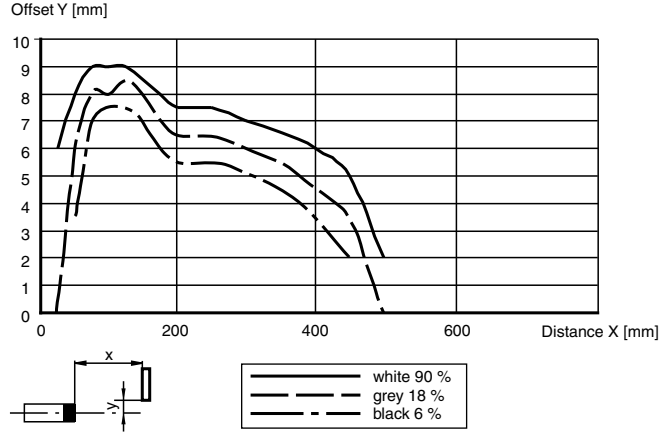


Diagrams

Difference in detection distance

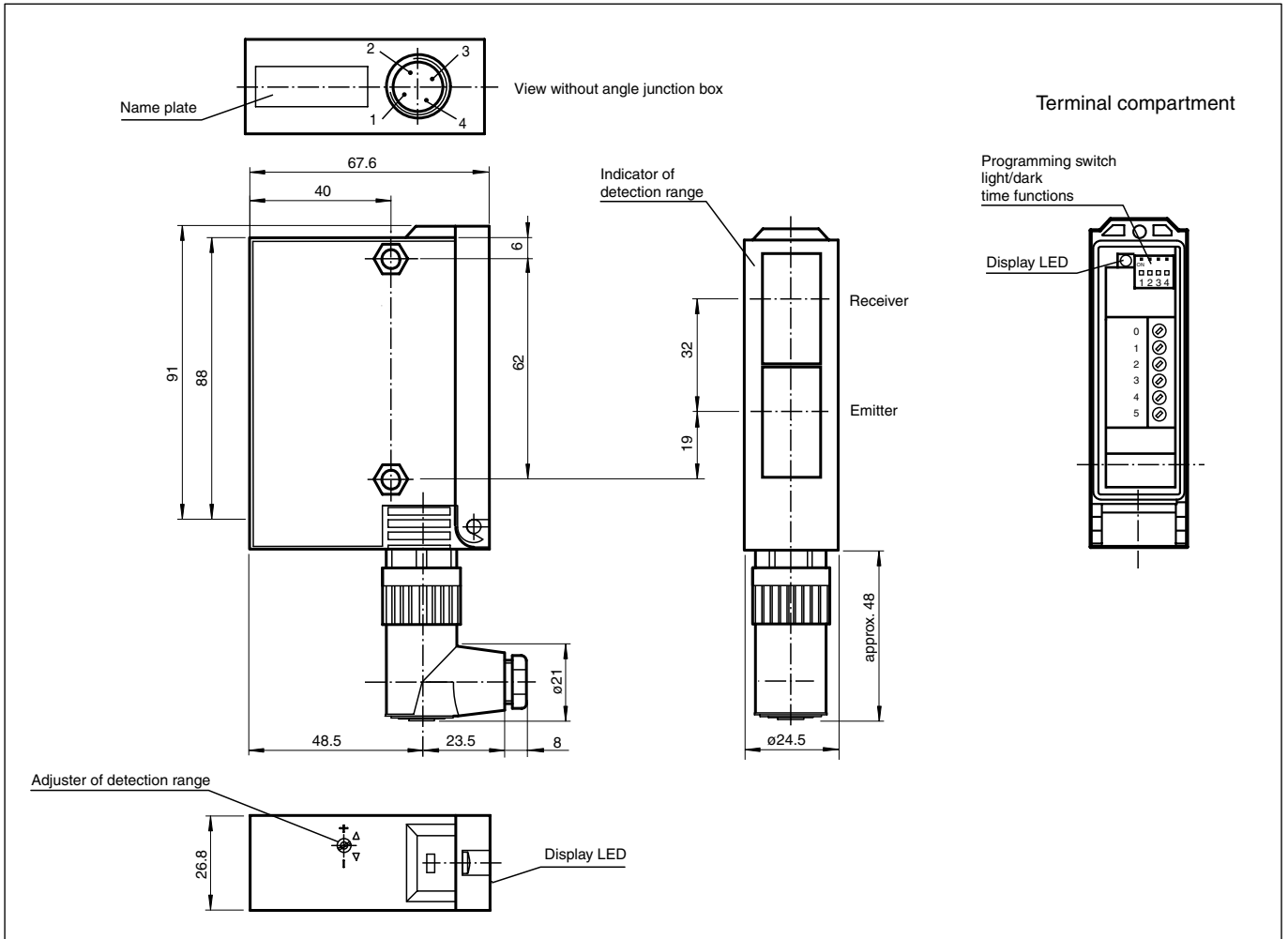


Characteristic response curve

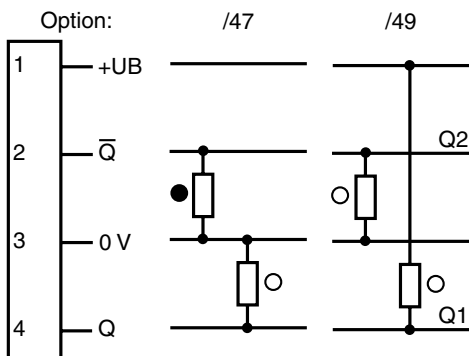


Series 23

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL23-8-H-500-RT/./92/...

Reflection light scanner with background suppression

RL23-8-H-500-RT/./92/...

with M12, 4-pin metal connector



- ◆ Sensor range 500 mm
- ◆ Sturdy plastic housing
- ◆ Adjustable background suppression
- ◆ Optical surface made of scratch-resistant glass
- ◆ Timer function
- ◆ Visible red light

Series
23

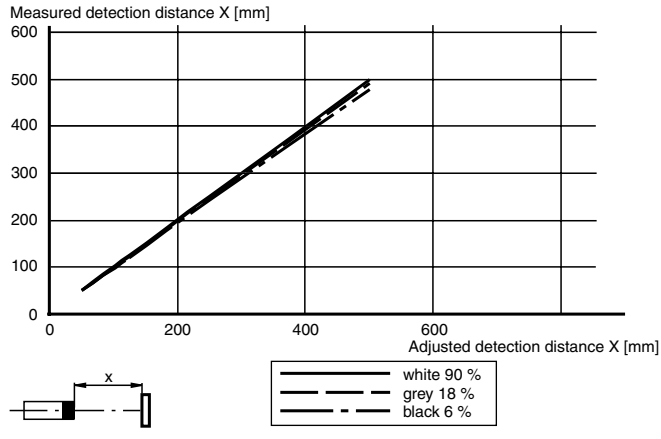
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL23-8-H-500-RT/47/92	RL23-8-H-500-RT/47/92/1 04	RL23-8-H-500-RT/49/92	RL23-8-H-500-RT/49/92/1 04
Detection range	50 ... 500 mm	◆	◆	◆	◆
Detection range min.	50 ... 150 mm	◆	◆	◆	◆
Sensor range max.	50 ... 500 mm	◆	◆	◆	◆
Black/white difference (6 %/90 %)	< 5 %	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Angle of divergence	1.5 °	◆	◆	◆	◆
Diameter of the light spot	12 mm at a sensor range of 500 mm	◆	◆	◆	◆
Ambient light limit	12000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Function display	LED yellow	◆	◆	◆	◆
Controls	Programming switch for light-/dark switching	◆	◆	◆	◆
Controls	Sensing range adjuster	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	100 mA	◆	◆	◆	◆
Signal output	1 pnp and 1 npn short-circuit proof, protected against reverse polarity	◆	◆	◆	◆
	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	◆	◆	◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	10 Hz	◆	◆	◆	◆
	70 Hz	◆	◆	◆	◆
Response time	5 ms	◆	◆	◆	◆
	50 ms	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	180 g	◆	◆	◆	◆

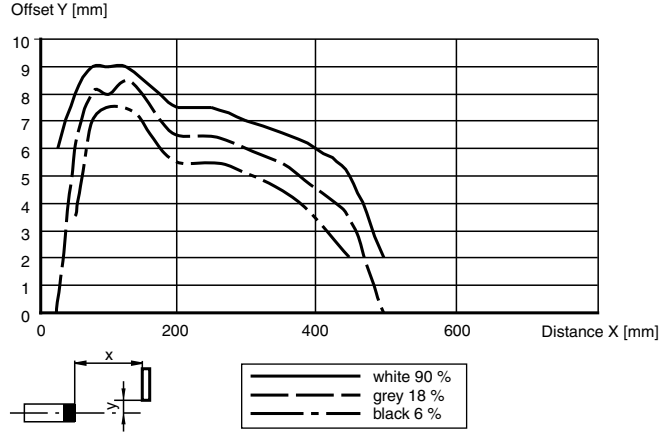


Diagrams

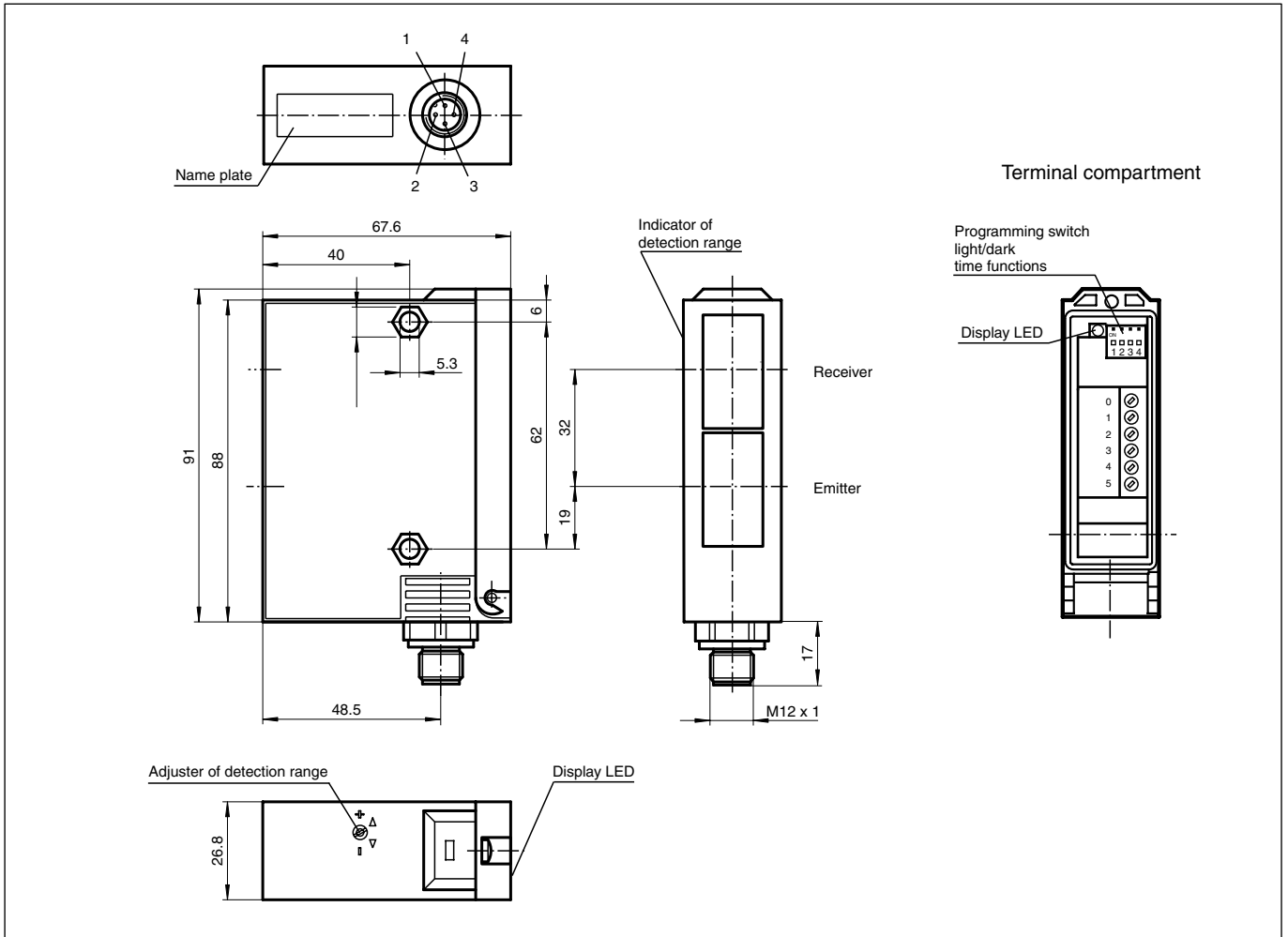
Difference in detection distance



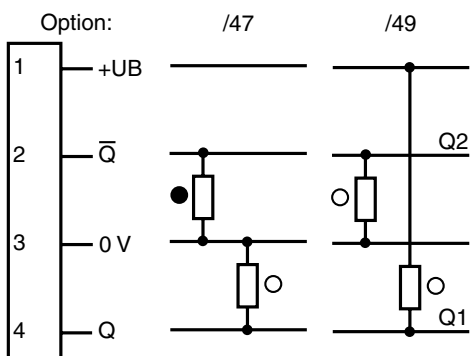
Characteristic response curve



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL.23-8-H-500-RT/...

Reflection light scanner with background suppression

RL.23-8-H-500-RT/...

with 7-pin surface-mounted connector



- ◆ Sensor range 500 mm
- ◆ Sturdy plastic housing
- ◆ Adjustable background suppression
- ◆ Optical surface made of scratch-resistant glass
- ◆ Timer function
- ◆ Operating voltage
12 V ... 240 V AC or 10 V ... 30 V DC
- ◆ Visible red light

Series
23

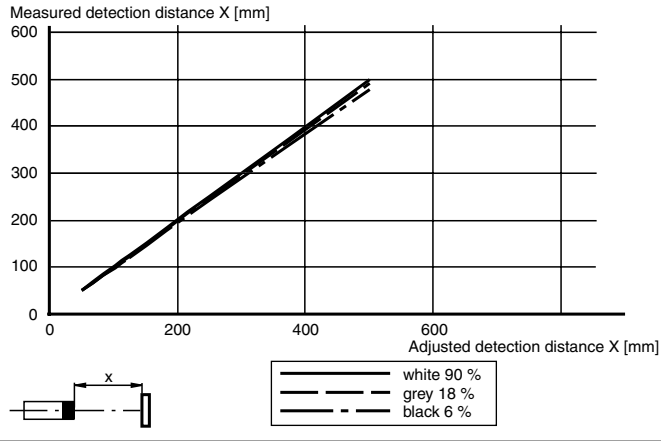
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL23-8-H-500-RT/100a/125	RL23-8-H-500-RT/100a/104/125	RLK23-8-H-500-RT/31/100d
Detection range	50 ... 500 mm	◆	◆	◆
Detection range min.	50 ... 150 mm	◆	◆	◆
Sensor range max.	50 ... 500 mm	◆	◆	◆
Black/white difference (6 %/90 %)	< 5 %	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆
Light source	LED	◆	◆	◆
Angle of divergence	1.5 °	◆	◆	◆
Diameter of the light spot	12 mm at a sensor range of 500 mm	◆	◆	◆
Ambient light limit	12000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow	◆	◆	◆
Controls	Programming switch for light-/dark switching	◆	◆	◆
Controls	Sensing range adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
	12 ... 240 V AC / 10 ... 30 V DC			◆
Ripple	10 %	◆	◆	
No-load supply current	100 mA	◆	◆	
Power consumption	3 VA			◆
Signal output	2 pnp antivalent, 1 npn short-circuit proof, protected against reverse polarity	◆	◆	
	1 relay, 1 alternator			◆
Switching type	Light/dark ON, switchable	◆	◆	◆
Switching voltage	max. 250 V AC			◆
	30 V DC	◆	◆	
Switching current	max. 2 A			◆
	max. 200 mA	◆	◆	
Switching frequency	10 Hz		◆	◆
	70 Hz	◆		
Response time	5 ms	◆		
	50 ms		◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	7-pin surface-mounted connector, up to 250 VAC (without cable socket)			◆
	7-pin surface-mounted connector, up to 50 VAC (with cable socket)	◆	◆	
Housing	Terluran GV15	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	180 g	◆	◆	◆

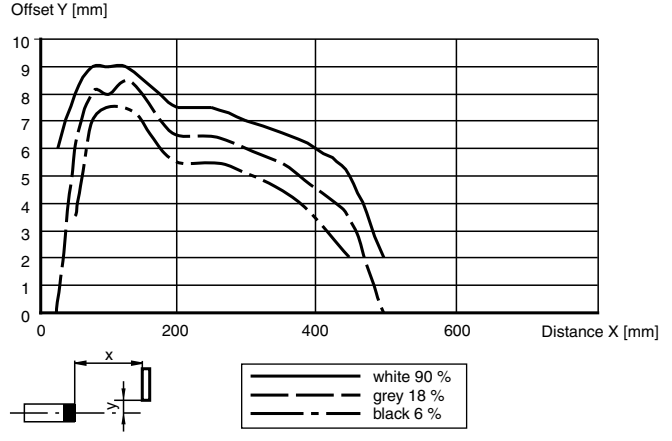


Diagrams

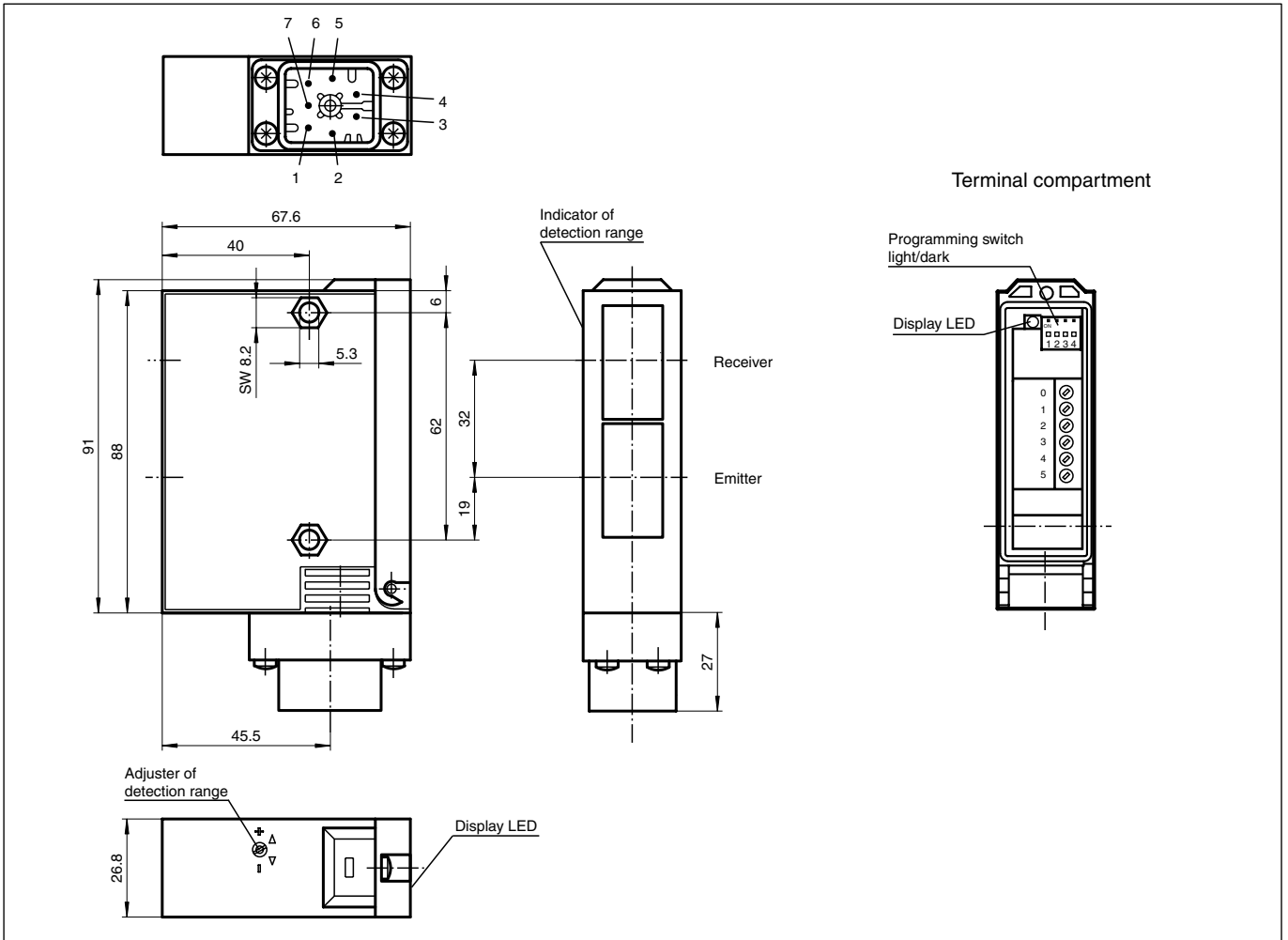
Difference in detection distance



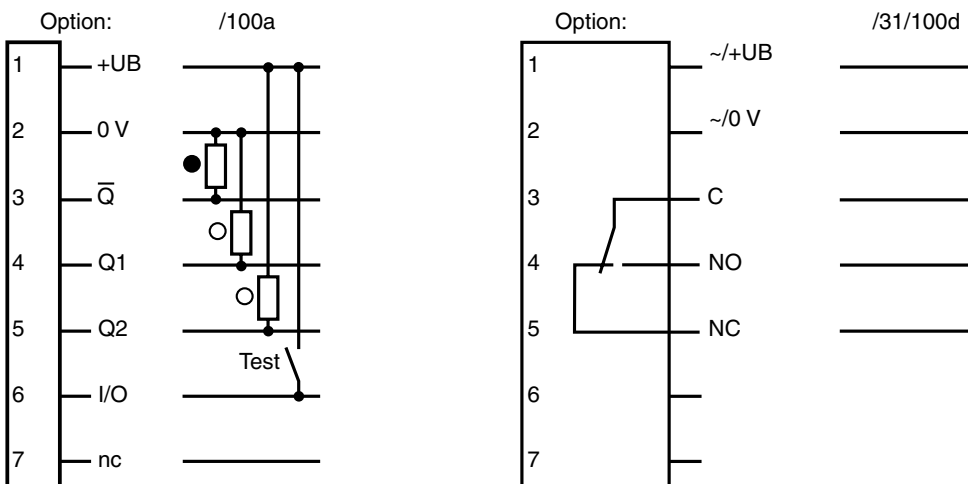
Characteristic response curve



Dimensions



Electrical Connection



Date of issue: 10/4/01

○ = Light ON, ● = Dark ON



RL.23-8-H-500-RT/.. /116

Reflection light scanner with background suppression

RL.23-8-H-500-RT/.. /116

with terminal compartment



- ◆ Sensor range 500 mm
- ◆ Sturdy plastic housing
- ◆ Adjustable background suppression
- ◆ Optical surface made of scratch-resistant glass
- ◆ Timer function
- ◆ Operating voltage
12 V ... 240 V AC or 10 V ... 30 V DC
- ◆ Visible red light

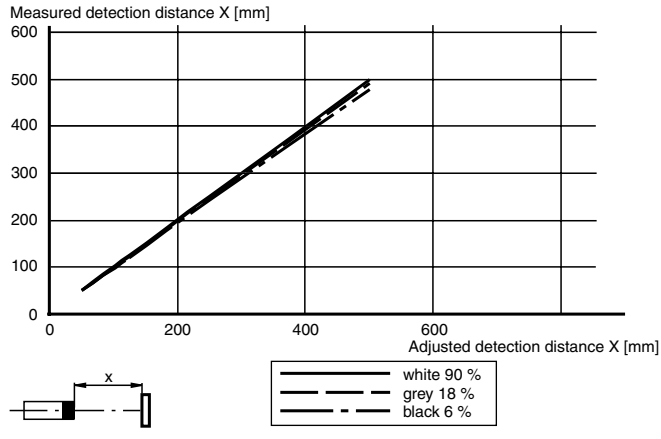
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL23-8-H-500-RT/116/125	RL23-8-H-500-RT/104/116/125	RLK23-8-H-500-RT/31/116
Detection range	50 ... 500 mm	◆	◆	◆
Detection range min.	50 ... 150 mm	◆	◆	◆
Sensor range max.	50 ... 500 mm	◆	◆	◆
Black/white difference (6%/90%)	< 5%	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆
Light source	LED	◆	◆	◆
Angle of divergence	1.5°	◆	◆	◆
Diameter of the light spot	12 mm at a sensor range of 500 mm	◆	◆	◆
Ambient light limit	12000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow	◆	◆	◆
Controls	Programming switch for light-/dark switching	◆	◆	◆
Controls	Sensing range adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
	12 ... 240 V AC, 10 ... 30 V DC			◆
Ripple	10%	◆	◆	
No-load supply current	100 mA	◆	◆	
Power consumption	3 VA			◆
Signal output	2 pnp antivalent, 1 npn short-circuit proof, protected against reverse polarity	◆	◆	
	1 relay, 1 alternator			◆
Switching type	Light/dark ON, switchable	◆	◆	◆
Switching voltage	max. 250 V AC			◆
	30 V DC	◆	◆	
Switching current	max. 2 A			◆
	max. 200 mA	◆	◆	
Switching frequency	10 Hz	◆	◆	◆
	70 Hz	◆		
Response time	5 ms	◆		
	50 ms		◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	180 g	◆	◆	◆

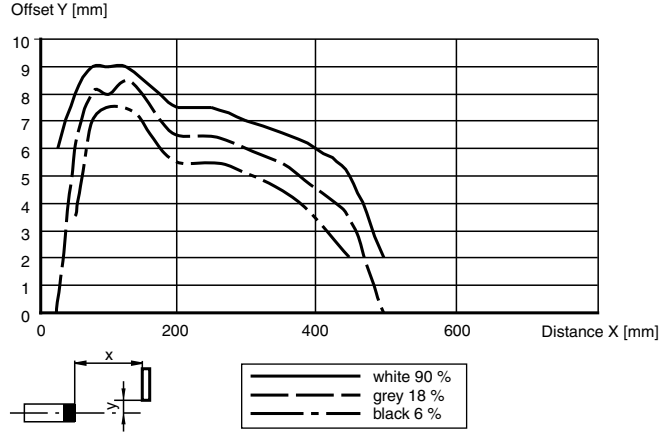


Diagrams

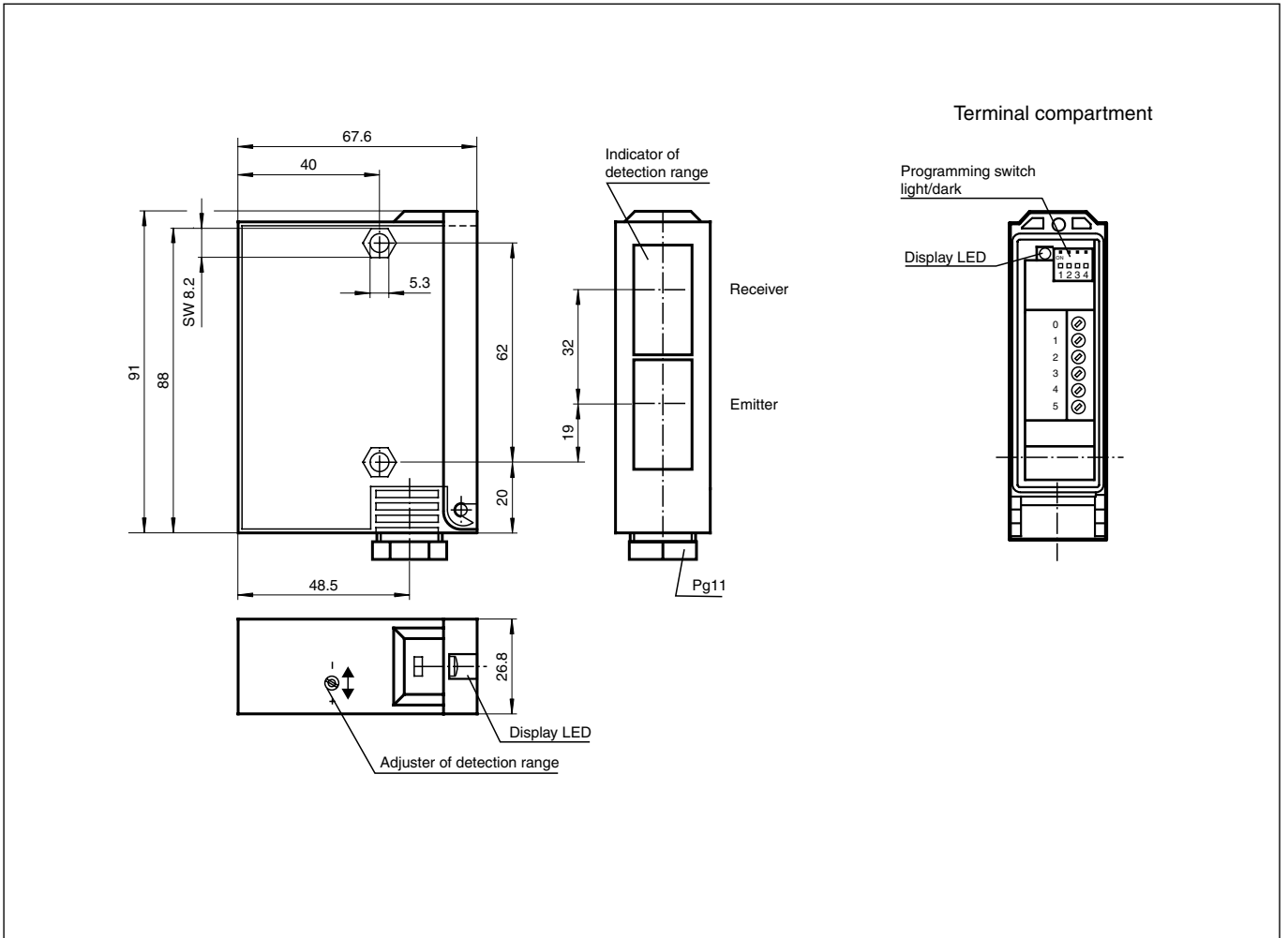
Difference in detection distance



Characteristic response curve

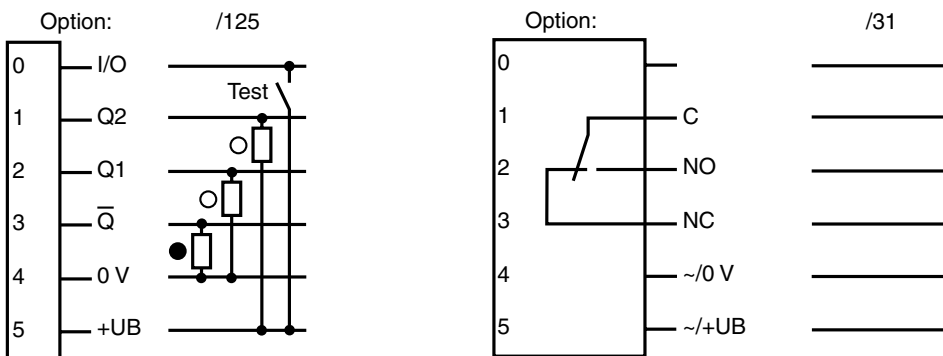


Dimensions



Series 23

Electrical Connection



Date of issue: 10/4/01

○ = Light ON, ● = Dark ON

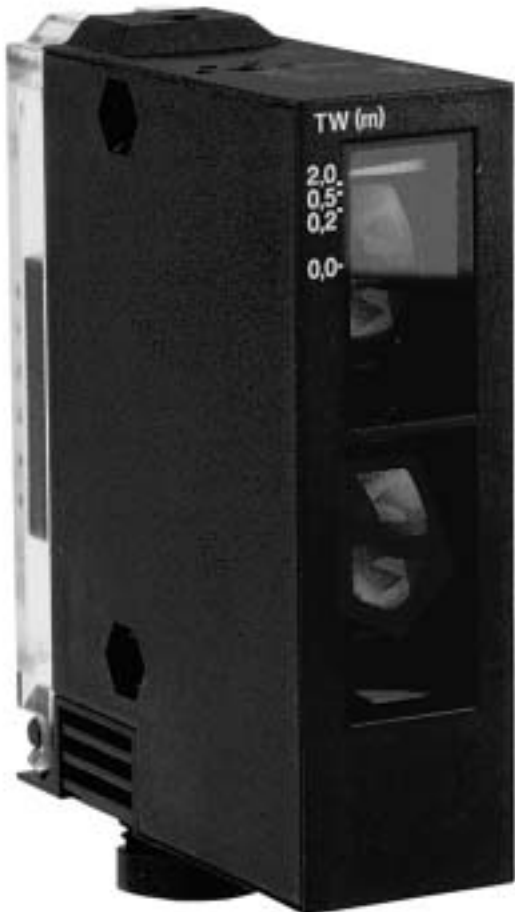


RL23-8-H-...-IR-AS-I/116

Reflection light scanner with AS-Interface

RL23-8-H-...-IR-AS-I/116

with terminal compartment



- ◆ Detection range 50 mm ... 1000 mm or 50 mm ... 2000 mm
- ◆ Sturdy plastic housing
- ◆ Adjustable background suppression
- ◆ Optical surface made of scratch-resistant glass

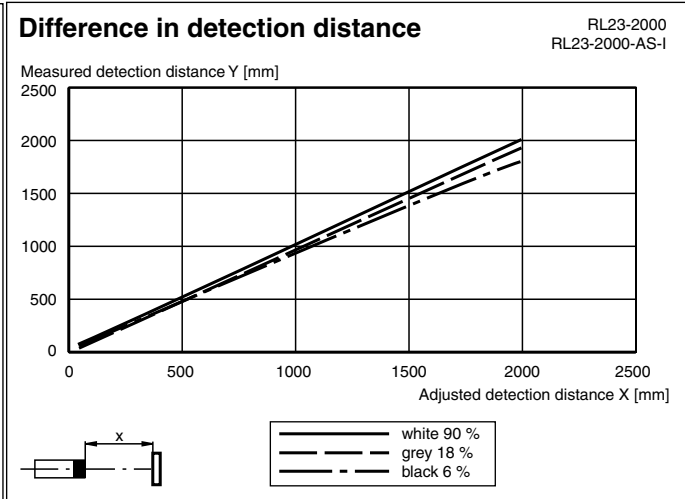
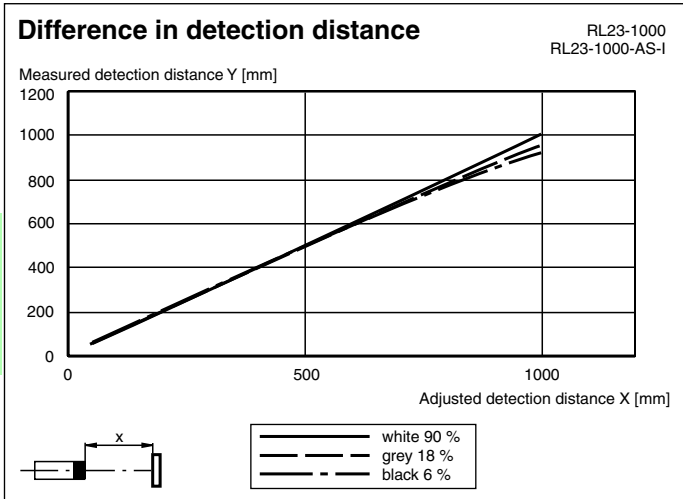
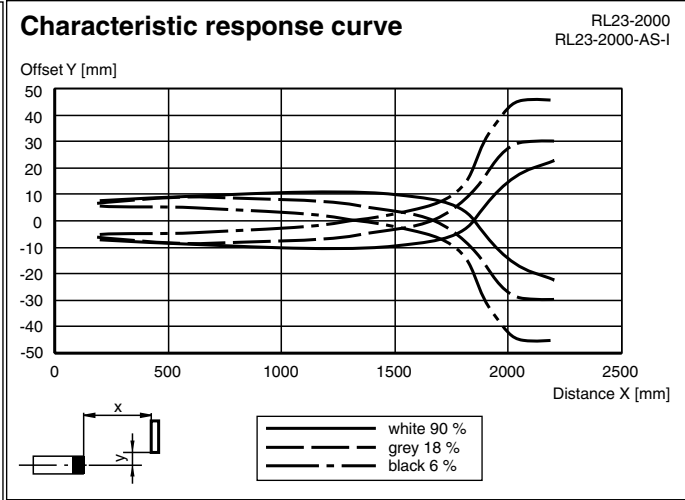
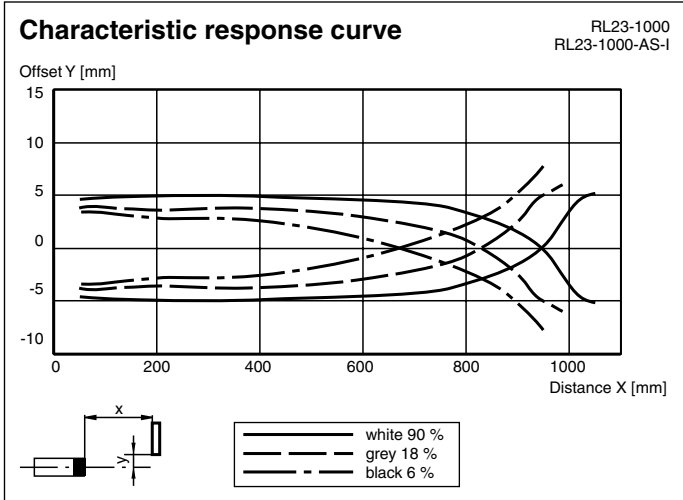
Series
23

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL23-8-H-1000-IR-AS-I/116	RL23-8-H-2000-IR-AS-I/116
Detection range	50 ... 1000 mm	◆	
	50 ... 2000 mm		◆
Detection range min.	50 ... 150 mm	◆	◆
Sensor range max.	50 ... 1000 mm	◆	
	50 ... 3000 mm		◆
Black/white difference (6%/90%)	< 10 %	◆	
	< 20 %		◆
Light type	Infrared, alternating light	◆	◆
Light source	IRED	◆	◆
Angle of divergence	1.5 °	◆	◆
Diameter of the light spot	25 mm at 1000 mm sensor range	◆	
	50 mm at 2000 mm sensor range		◆
Ambient light limit	12000 Lux	◆	
	5000 Lux		◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow	◆	◆
Controls	Parameter bit P1 light-dark switching	◆	◆
Controls	Sensing range adjuster	◆	◆
Operating voltage	by AS-i-Bus	◆	◆
No-load supply current	40 mA	◆	◆
Signal output	Data bit D0 sensor function	◆	◆
Switching type	light/dark switching	◆	◆
Switching frequency	70 Hz	◆	◆
Response time	5 ms	◆	◆
Test input	Transmitter deactivation data bit D3	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	terminal compartment	◆	◆
Housing	Terluran GV15	◆	◆
Light exit	Glass	◆	◆
Mass	180 g	◆	◆



Diagrams



AS-Interface Parameters

Slave profile: IO code = 1, ID code = F

• Parameter bit

Bit	Type	device function
P0	parameter	none
P1	parameter	inversion of D0
P2	parameter	none
P3	parameter	none

Meaning at Host level

none
 1 = light on (D0 = 1 with receiver lit)(light-dark switching)
 0 = dark on (D0 = 0 with receiver lit)
 none
 none

• Data bit

Bit	Type	device function
D0	input	sensor function
D1	input	warning
D2	input	functional readiness
D3	output	test function

Meaning at Host level

1 = receiver lit (at P1 = 1)
 0 = receiver not lit (at P1 = 1)
 1 = receiver lit (at P1 = 0)
 1 = receiver not lit (at P1 = 0)
 1 = sufficient stability control (> 3-fold) or receiver not lit (delay time until setting to 1: < 5 s);
 0 = insufficient stability control (delay time until setting to 0: < 2 s)
 1 = device ready for operation
 0 = device not ready for operation
 none





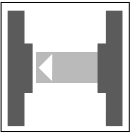
Series 24 – the machine for every task

High demands in terms of versatility, reliability and economy are placed on sensors that are responsible for control tasks in mechanical engineering or in automation systems. The sensors of series 24 meet these demands in every respect. The series includes 5 models that differ optically: The single path light beam switch with a detection range of 30 m, two reflex light beam switches with a detection range of 6 or 10 m, the energetic sensor with a detection range of 2 m and the sensor with background suppression and a detection range of 80 mm.

All the devices have a sturdy plastic housing with a terminal space or various connectors. Standard features of the series include a timer function, pre-fault indicator and pre-fault output, test input, sensitivity controller and light/dark changeover switch. Various different transistor models are available as signal output with a relay output for the omni-current model. If the sensors are used in harsh environmental conditions or in refrigeration houses, certain devices with a heated lens can be used. The series also includes suitable devices for applications in which several sensors affect each other mutually.

These light beam switches are used mainly in general mechanical engineering for a wide variety of control applications, in conveyor systems for pallet recording, on bridge cranes as collision protection and on doors and gates for monitoring closing faces.

Principle	Type code	Sensing range/detection range	Page
	L24/LV24/116; L24/LK24/116	0 m ... 30 m	316
	L24/LV24/74a	0 m ... 30 m	304
	L24/LV24/92	0 m ... 30 m	308
	L24/LK24/100D	0 m ... 30 m	312
	RL(K)24-54/116	0 mm ... 6000 mm	332
	RL(K)24-54/74a	0 mm ... 6000 mm	320
	RL(K)24-54/92	0 mm ... 6000 mm	324
	RLK24-54/100D	0 mm ... 6000 mm	328
	RL(K)24-55/116	0 m ... 10 m	348
	RL(K)24-55/74a	0 m ... 10 m	336
	RL(K)24-55/92	0 m ... 10 m	340
	RLK24-55/100D	0 m ... 10 m	344
	RL(K)24-8-2000/116	10 mm ... 2000 mm	364
	RL(K)24-8-2000/74a	10 mm ... 2000 mm	352
	RL(K)24-8-2000/92	10 mm ... 2000 mm	356
	RLK24-8-2000/100D	10 mm ... 2000 mm	360
	RL(K)24-8-H-80/116	20 ... 80 mm ...	380
	RLK24-8-H-80/74a	20 ... 80 mm ...	368
	RL(K)24-8-H-80/92	20 ... 80 mm ...	372
	RL(K)24-8-H-80/100D	20 ... 80 mm ...	376



L24/LV24/..74a

Single path light beam switch

L24/LV24/..74a

with 4-pin, M18 x 1 plastic connector



- ◆ Detection range up to 45 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions

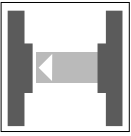
Series
24

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

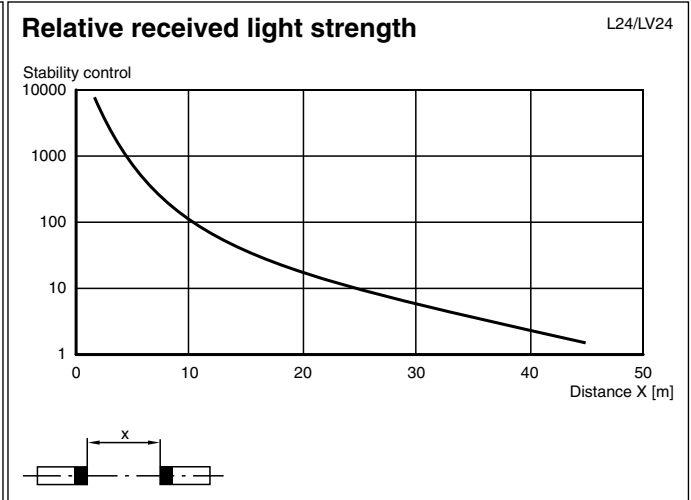
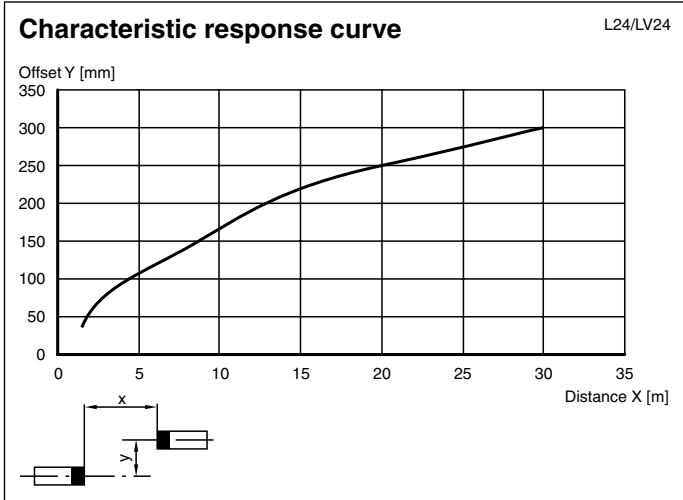
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Ordering code		L24/LV24/47/74a	L24/LV24/49/74a
Effective detection range	0 ... 30 m	◆	◆
Threshold detection range	45 m	◆	◆
Obstacle size	25 mm	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	2 °	◆	◆
Diameter of the light spot	250 mm at 10 m detection range	◆	◆
Ambient light limit	100000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	55 mA (device)	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	light/dark switching	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	700 Hz	◆	◆
Response time	0.7 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Test input	Emitter deactivation	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g (device)	◆	◆



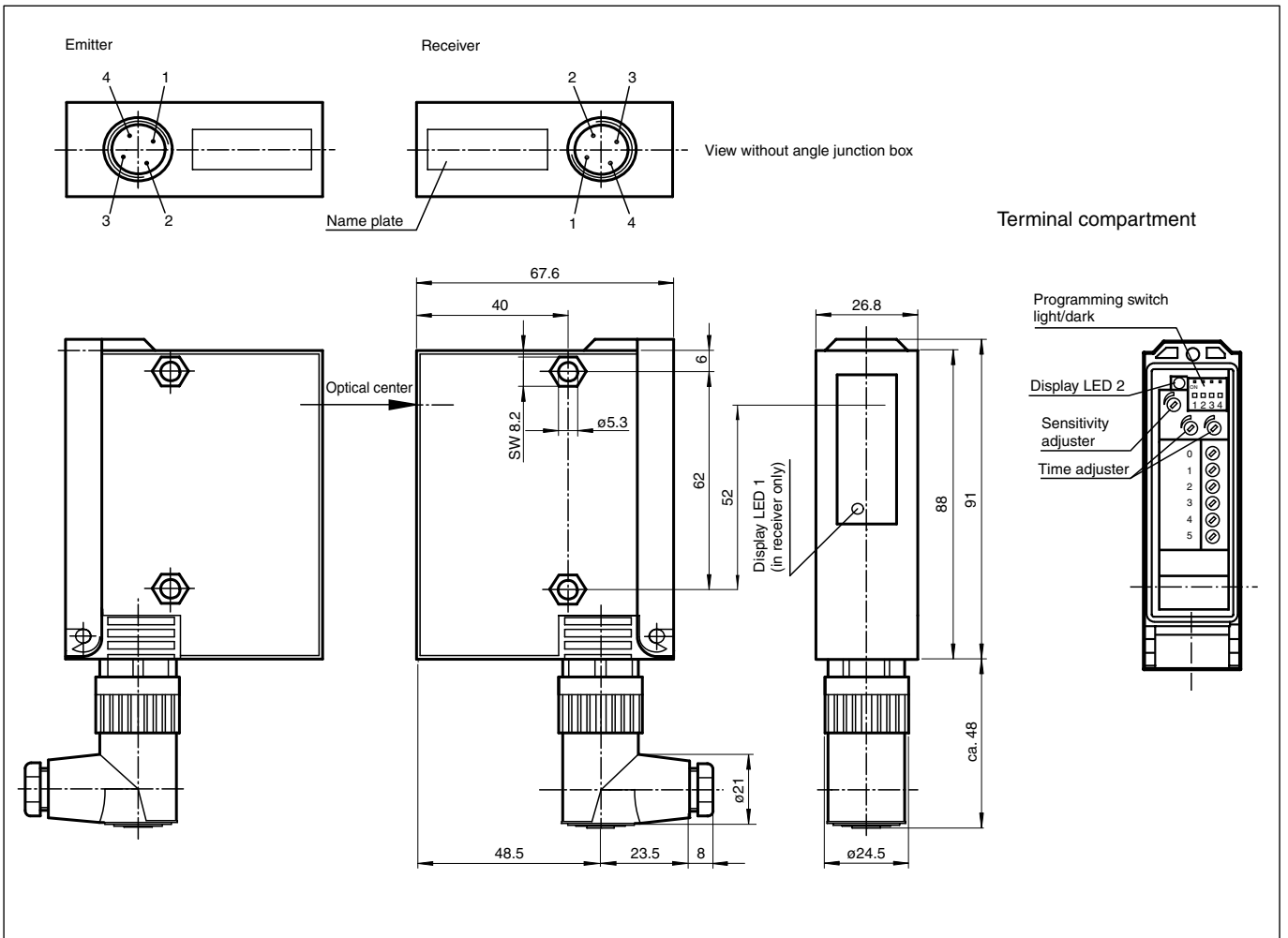
L24/LV24/..74a

Diagrams

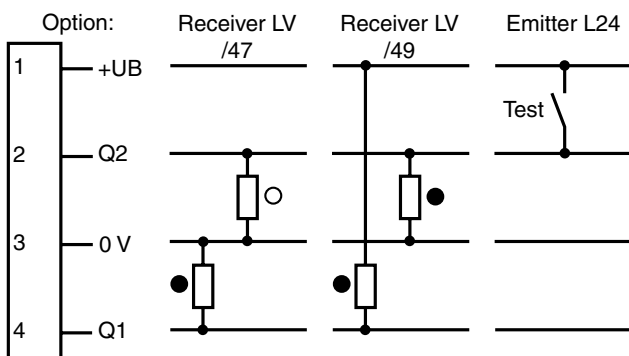


Series
24

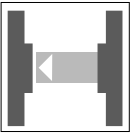
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



L24/LV24/.. /92

Single path light beam switch

L24/LV24/.. /92

with M12, 4-pin metal connector



- ◆ Detection range up to 45 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions

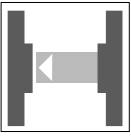
Series
24

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

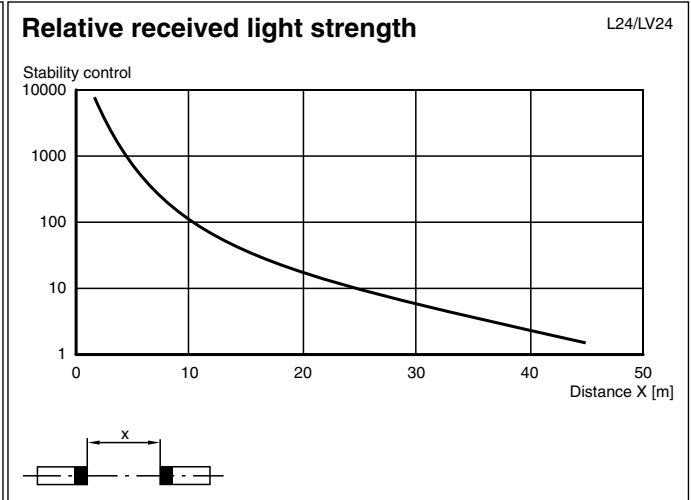
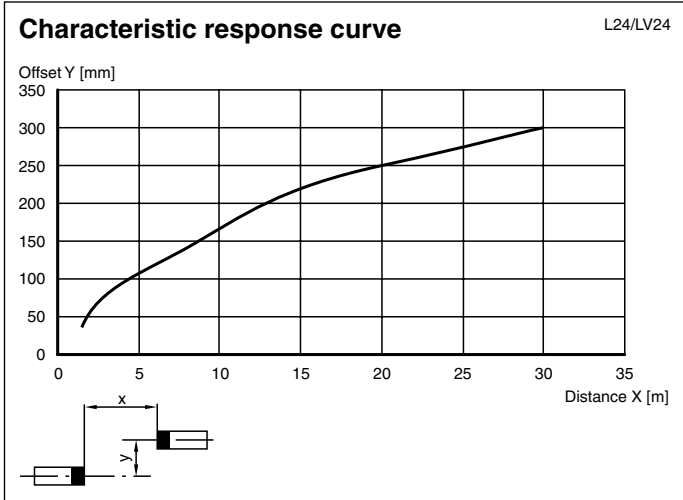
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Ordering code		L24/LV24/47/92	L24/LV24/49/92
Effective detection range	0 ... 30 m	◆	◆
Threshold detection range	45 m	◆	◆
Obstacle size	25 mm	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	2 °	◆	◆
Diameter of the light spot	250 mm at 10 m detection range	◆	◆
Ambient light limit	100000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	55 mA (device)	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	◆
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	light/dark switching	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	700 Hz	◆	◆
Response time	0.7 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Test input	Emitter deactivation	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g (device)	◆	◆



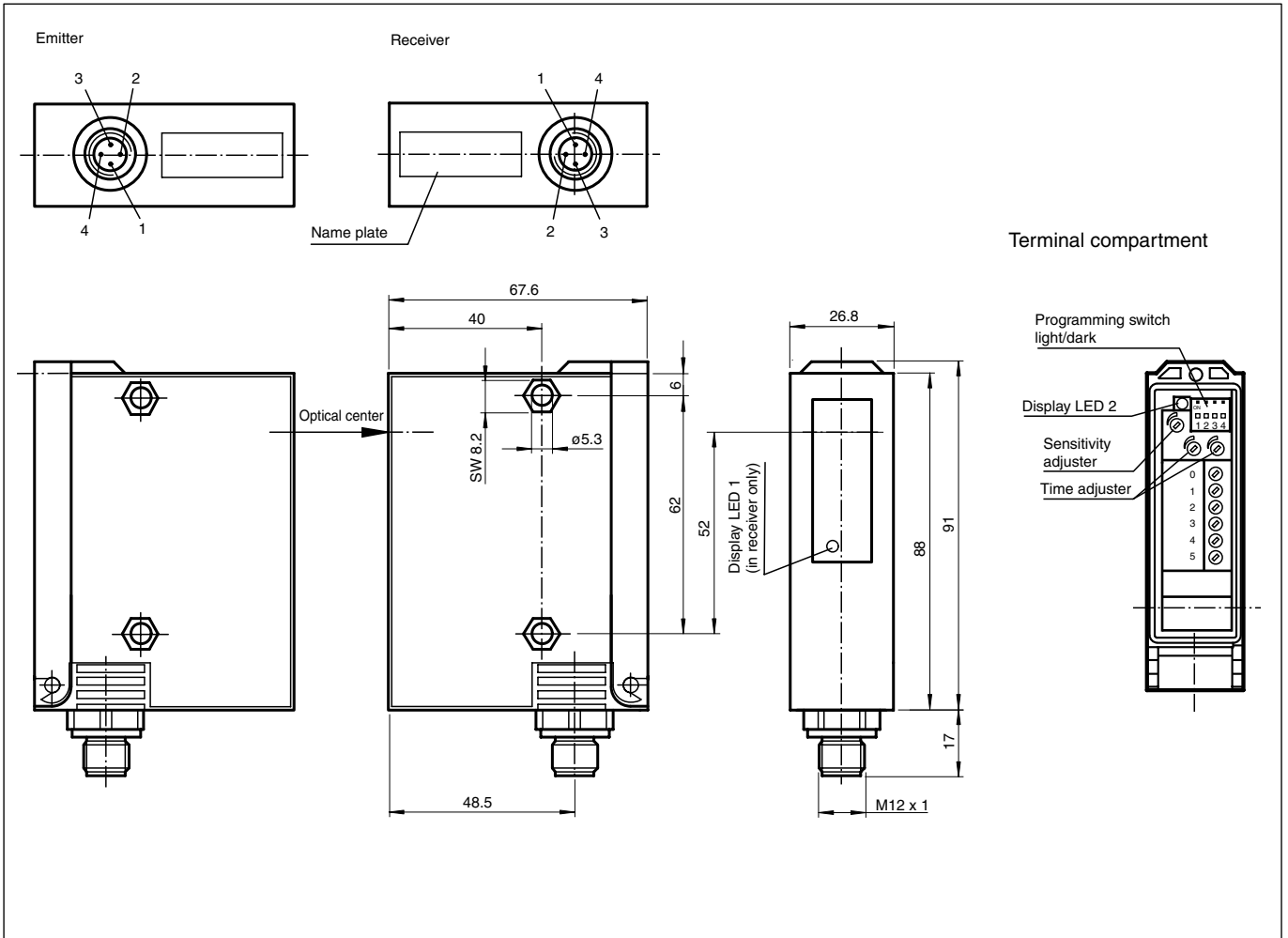
L24/LV24/..92

Diagrams

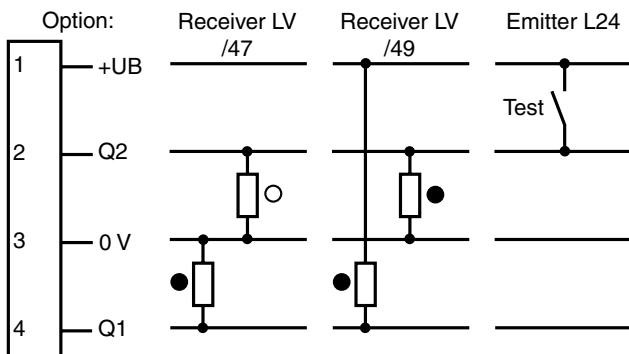


Series
24

Dimensions

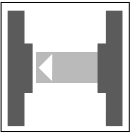


Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



L24/LK24/100D/...

Single path light beam switch

L24/LK24/100D/...

with 7-pin surface-mounted connector up to 250 VAC

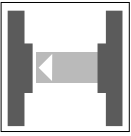


- ◆ Detection range up to 45 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions
- ◆ Operating voltage 24 V AC/DC or 12 V ... 240 V AC/DC

Series
24

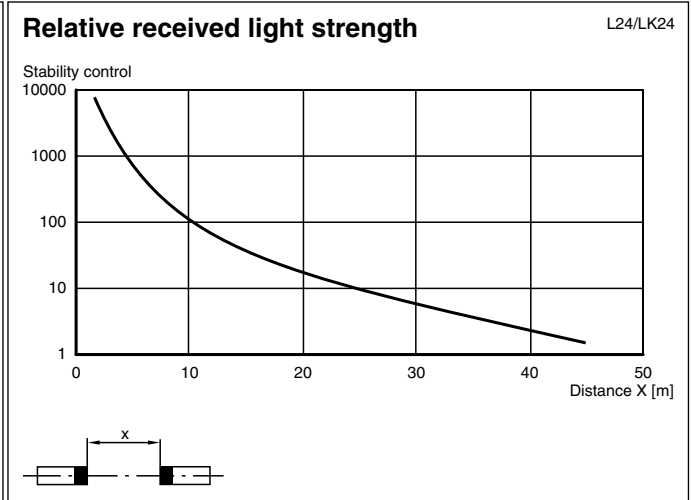
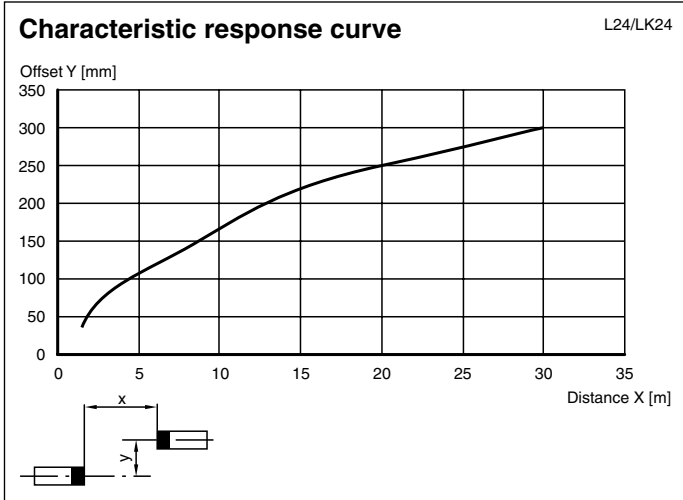
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		L24/LK24/100D	L24/LK24/100D/106
Effective detection range	0 ... 30 m	◆	◆
Threshold detection range	45 m	◆	◆
Obstacle size	25 mm	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	2 °	◆	◆
Diameter of the light spot	250 mm at 10 m detection range	◆	◆
Ambient light limit	100000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	12 ... 240 V AC/DC	◆	◆
	24 V ± 20 % AC/DC		◆
Power consumption	3 VA	◆	◆
Signal output	1 relay output, 1 alternator	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 250 V AC	◆	◆
Switching current	max. 2 A	◆	◆
Switching frequency	25 Hz	◆	◆
Response time	20 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
	-35 ... +55 °C, with heated lens		◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	7-pin surface-mounted connector, up to 250 VAC (without cable socket)	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g (device)	◆	◆



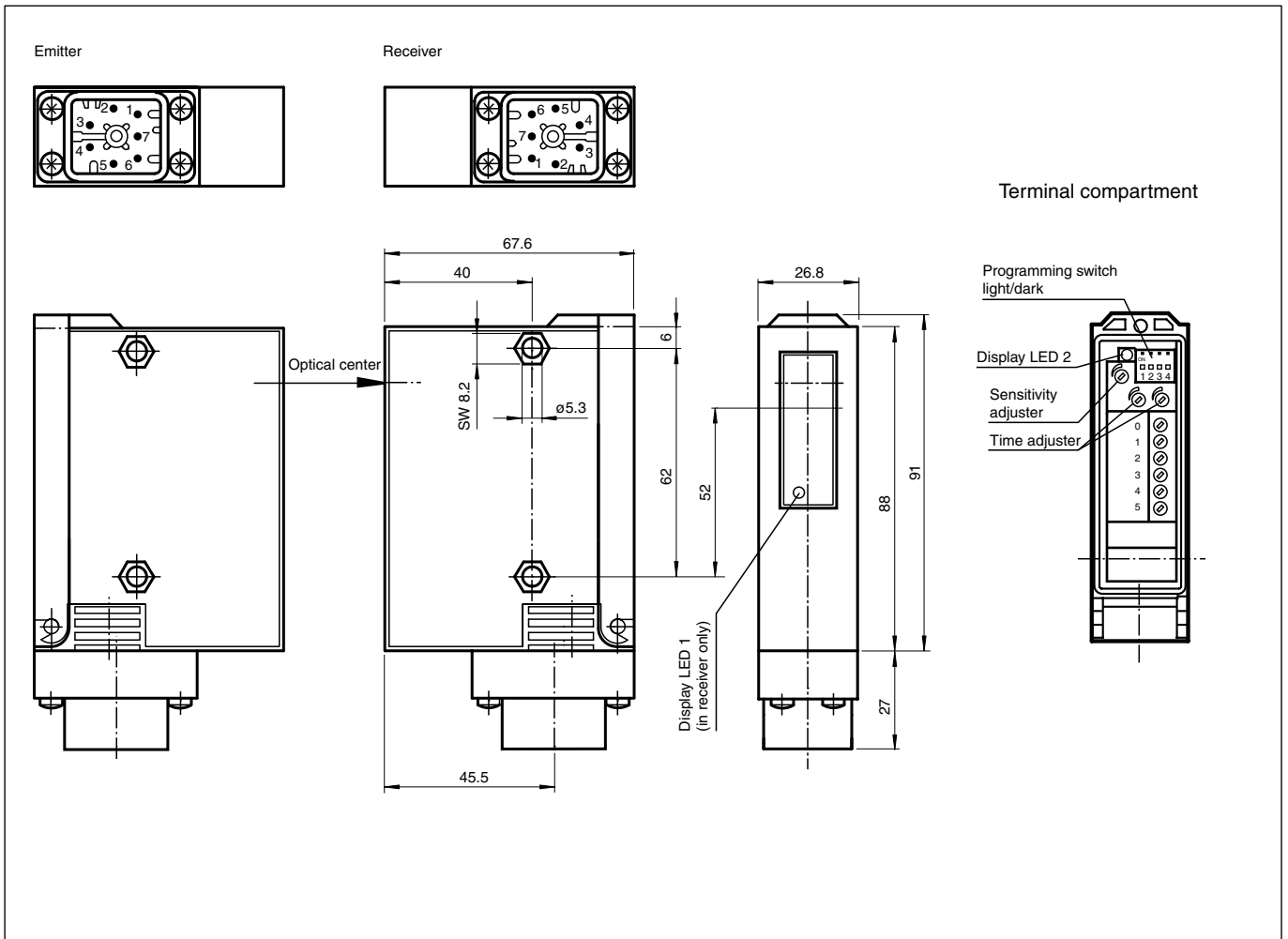
L24/LK24/100D/...

Diagrams

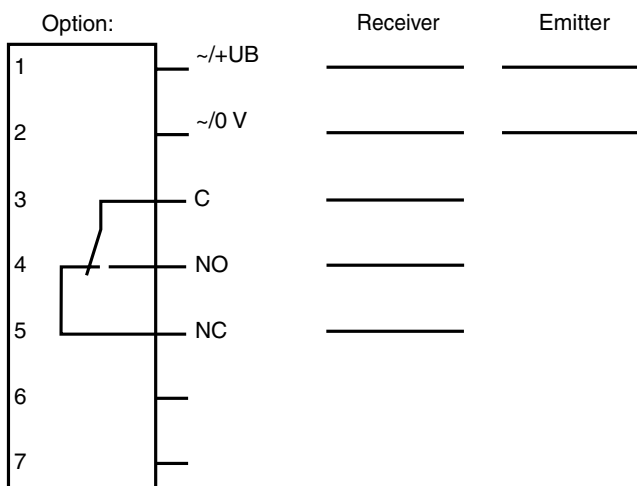


Series
24

Dimensions



Electrical Connection



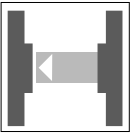
○ = Light ON, ● = Dark ON

Date of issue: 10/4/01

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L24/L.24/.../116

Single path light beam switch

L24/L.24/.../116

with terminal compartment

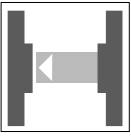


- ◆ Detection range up to 45 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions
- ◆ Operating voltage 10 V ... 30 V DC or 12 V ... 240 V AC/DC

Series
24

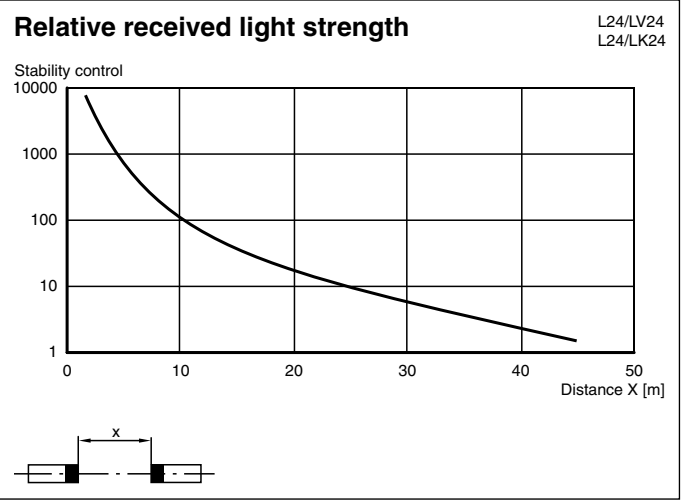
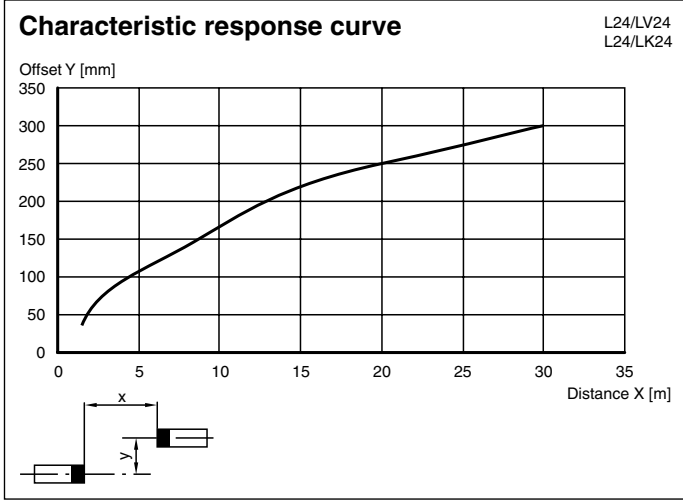
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		L24/L V24/47/76b/116	L24/L V24/49/76b/116	L24/L V24/47/76b/106/116	L24/L V24/49/76b/106/116	L24/L K24/116	L24/L K24/106/116
Effective detection range	0 ... 30 m	◆	◆	◆	◆	◆	◆
Threshold detection range	45 m	◆	◆	◆	◆	◆	◆
Obstacle size	25 mm	◆	◆	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆	◆
Angle of divergence	2 °	◆	◆	◆	◆	◆	◆
Diameter of the light spot	250 mm at 10 m detection range	◆	◆	◆	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆	◆	◆	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆	◆	◆	◆	◆
Controls	2 potentiometers for timer functions	◆	◆	◆	◆	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆				
	12 ... 240 V AC/DC					◆	
	24 V DC ± 20 %			◆	◆		◆
Ripple	10 %	◆	◆	◆	◆		
No-load supply current	100 mA (device)			◆	◆		
	55 mA (device)	◆	◆				
Power consumption	3 VA					◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity 1 relay output, 1 alternator	◆		◆		◆	◆
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆		
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆
Switching voltage	max. 250 V AC					◆	◆
	30 V DC	◆	◆	◆	◆		
Switching current	max. 2 A					◆	◆
	max. 200 mA	◆	◆	◆	◆		
Switching frequency	25 Hz					◆	◆
	700 Hz	◆	◆	◆	◆		
Response time	0.7 ms	◆	◆	◆	◆		
	20 ms					◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	1 pnp	◆	◆	◆	◆		
Test input	Emitter deactivation	◆	◆	◆	◆		
Ambient temperature	-20 ... +60 °C	◆	◆			◆	
	-35 ... +55 °C, with heated lens			◆	◆		◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆	◆	◆	◆
Housing	GF17	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆
Mass	100 g (device)	◆	◆	◆	◆	◆	◆

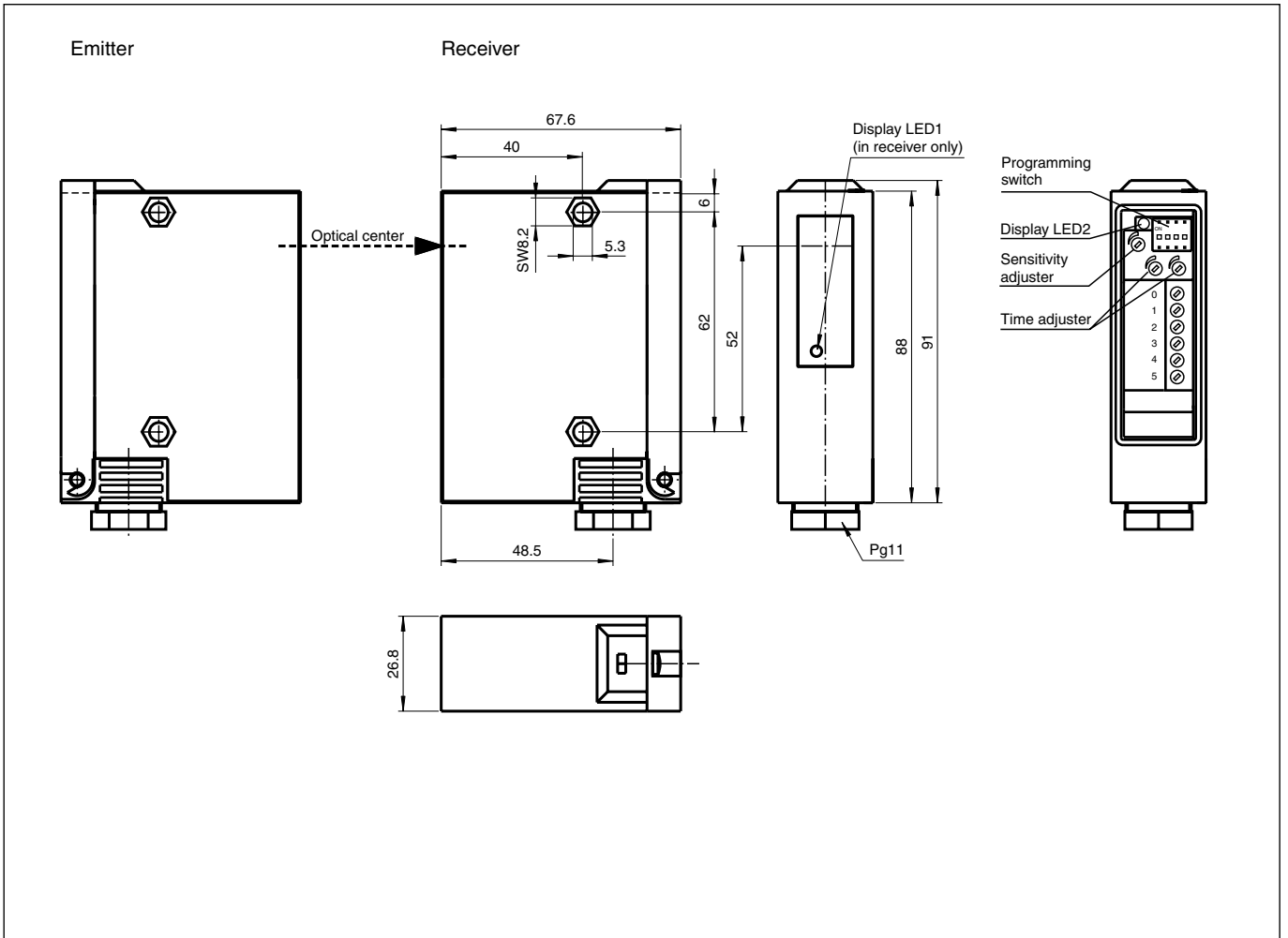


L24/L.24/.../116

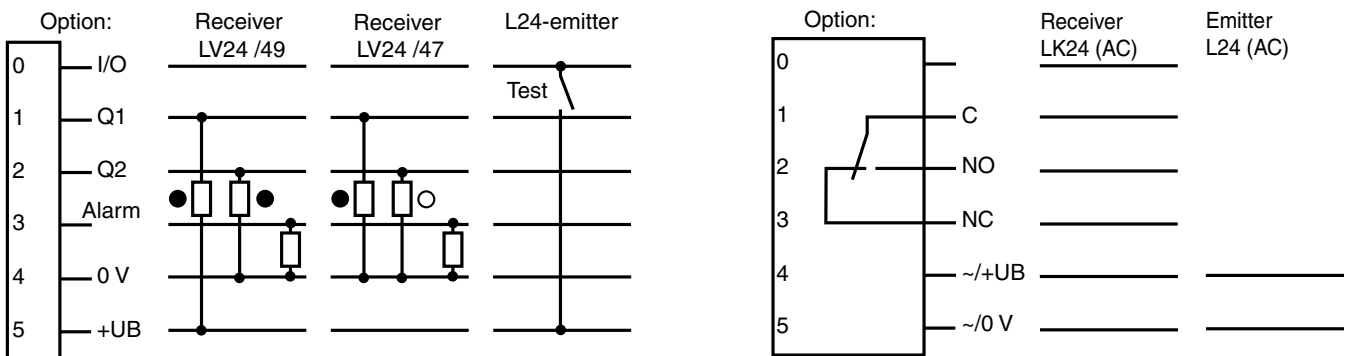
Diagrams



Dimensions

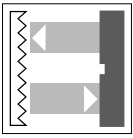


Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



RL24-54/..74a

Reflection light beam switch with polarisation filter

RL24-54/..74a

with 4-pin, M18 x 1 plastic connector

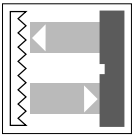


- ◆ Detection range up to 10 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions

Series
24

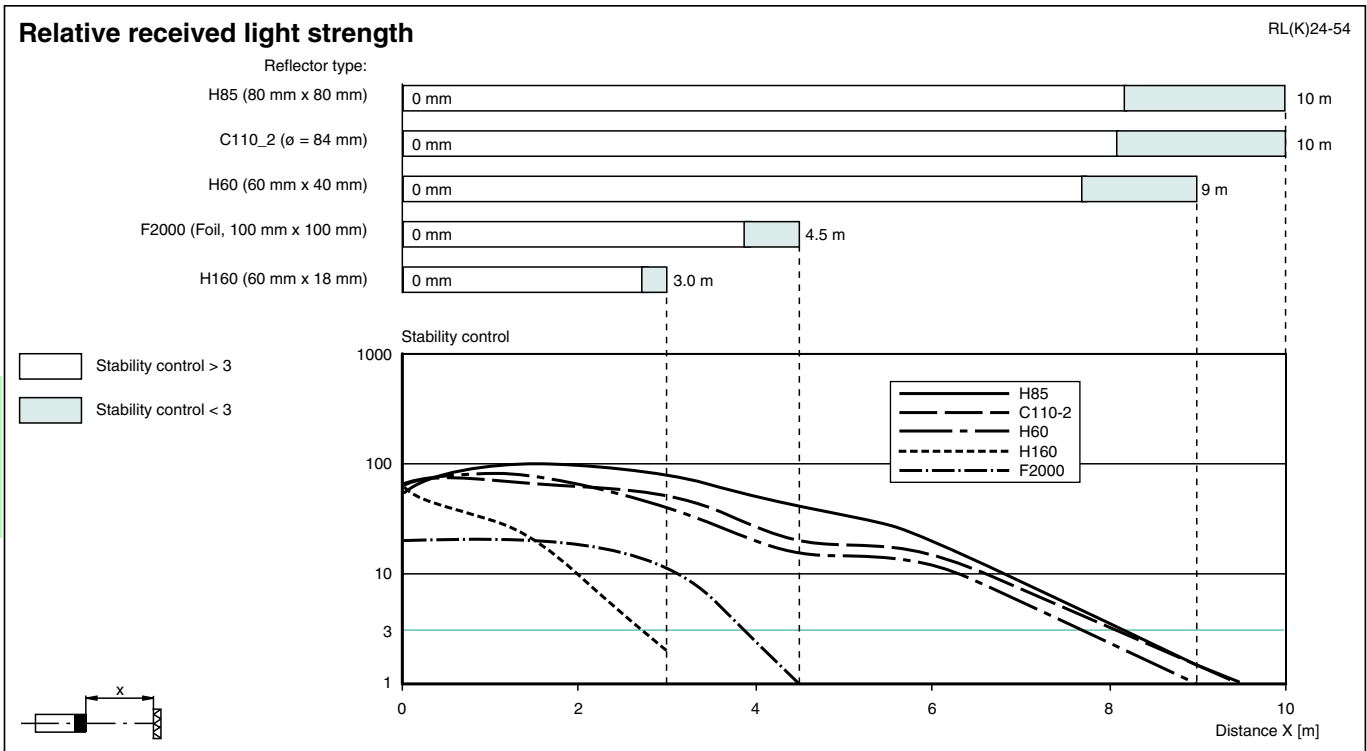
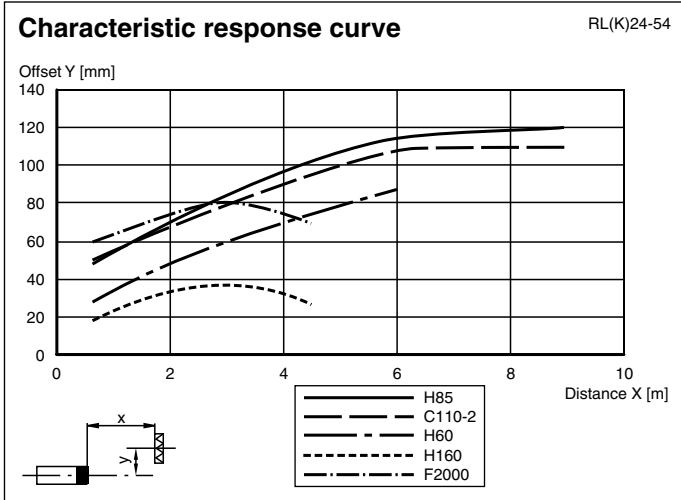
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL24-54/4/774a	RL24-54/49/74a
Effective detection range	0 ... 6000 mm	◆	◆
Threshold detection range	10 m (with C110-2 reflector)	◆	◆
Reflector distance	0 ... 6000 mm	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆
Diameter of the light spot	approx. 150 mm at 6000 mm detection range	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	40 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	light/dark switching	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	1000 Hz	◆	◆
Response time	0.5 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g	◆	◆



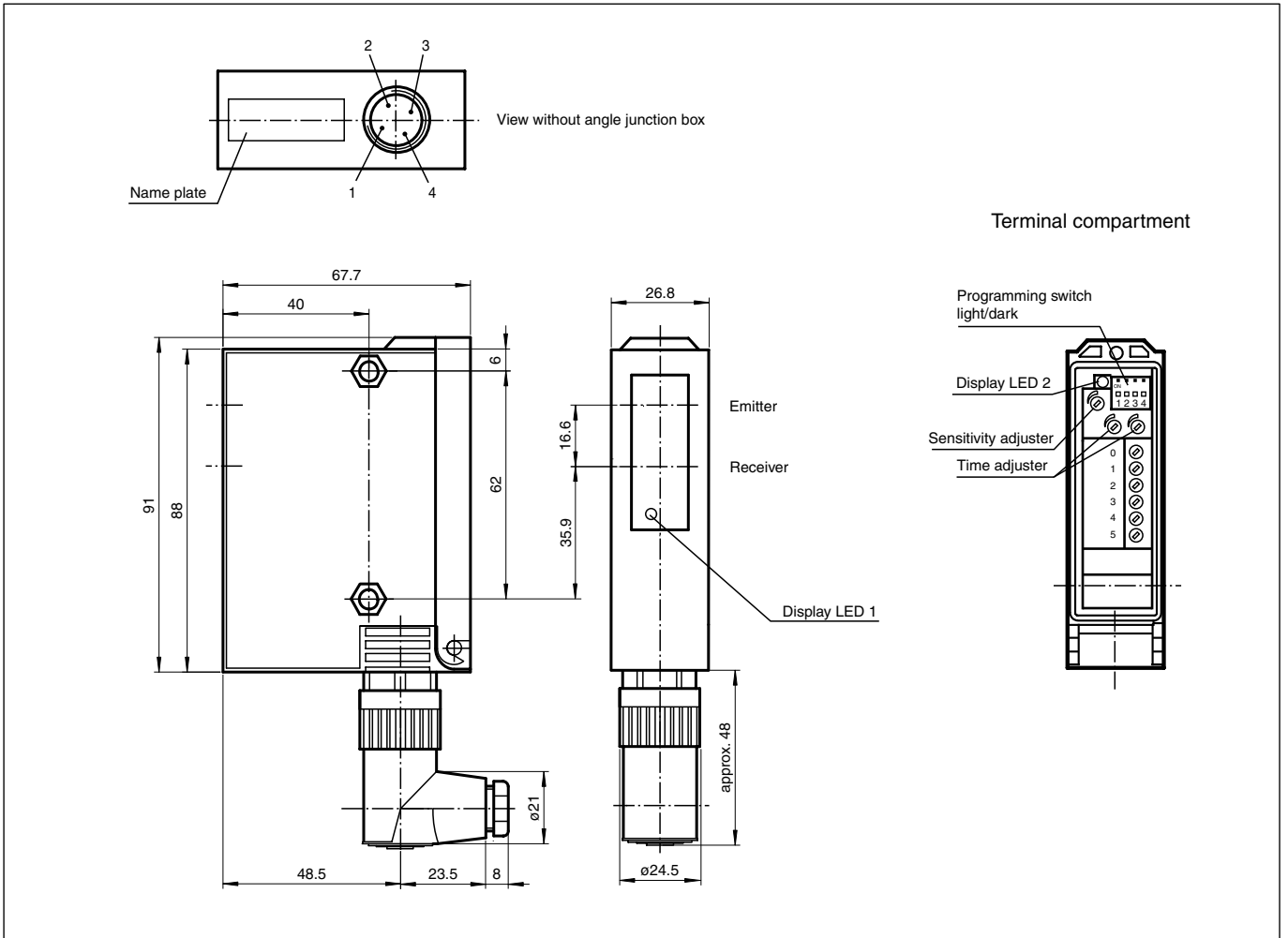
RL24-54/..74a

Diagrams

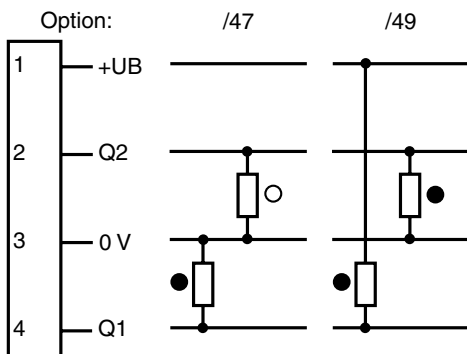


Series 24

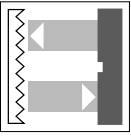
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL24-54/.. /92

Reflection light beam switch with polarisation filter

RL24-54/.. /92

with M12, 4-pin metal connector



- ◆ Detection range up to 10 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions

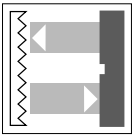
Series
24

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

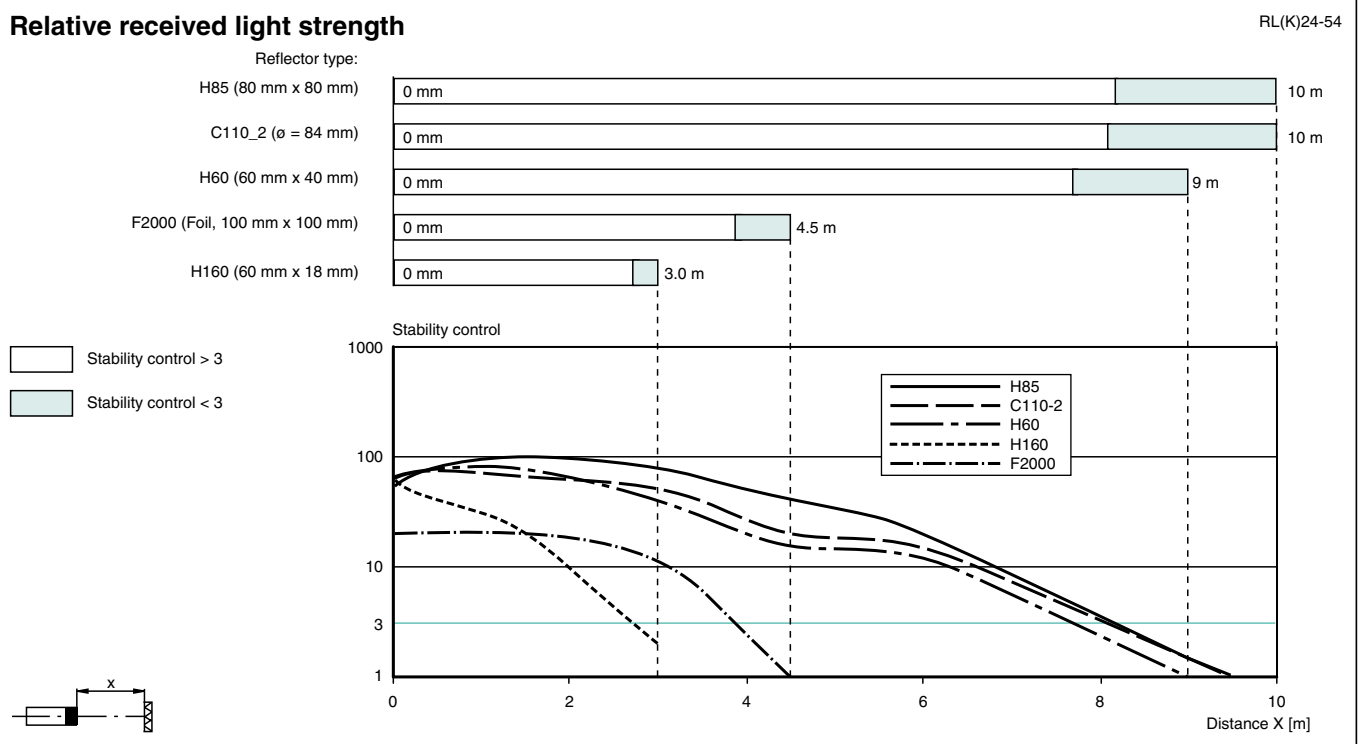
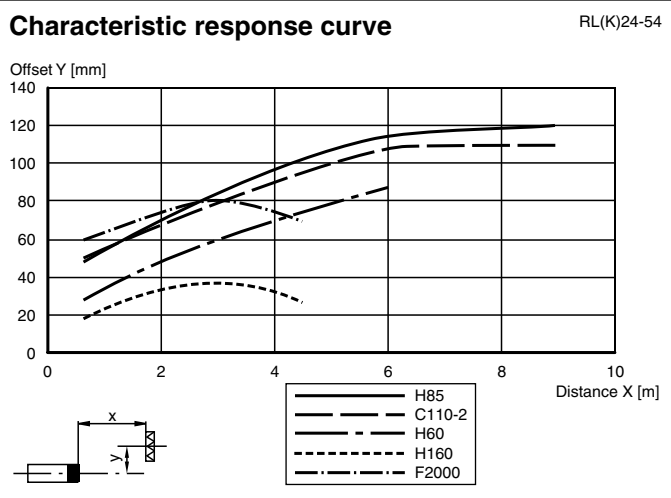
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Ordering code		RL24-54/47/92	RL24-54/49/92
Effective detection range	0 ... 6000 mm	◆	◆
Threshold detection range	10 m (with C110-2 reflector)	◆	◆
Reflector distance	0 ... 6000 mm	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆
Diameter of the light spot	approx. 150 mm at 6000 mm detection range	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	40 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	light/dark switching	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	1000 Hz	◆	◆
Response time	0.5 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g	◆	◆



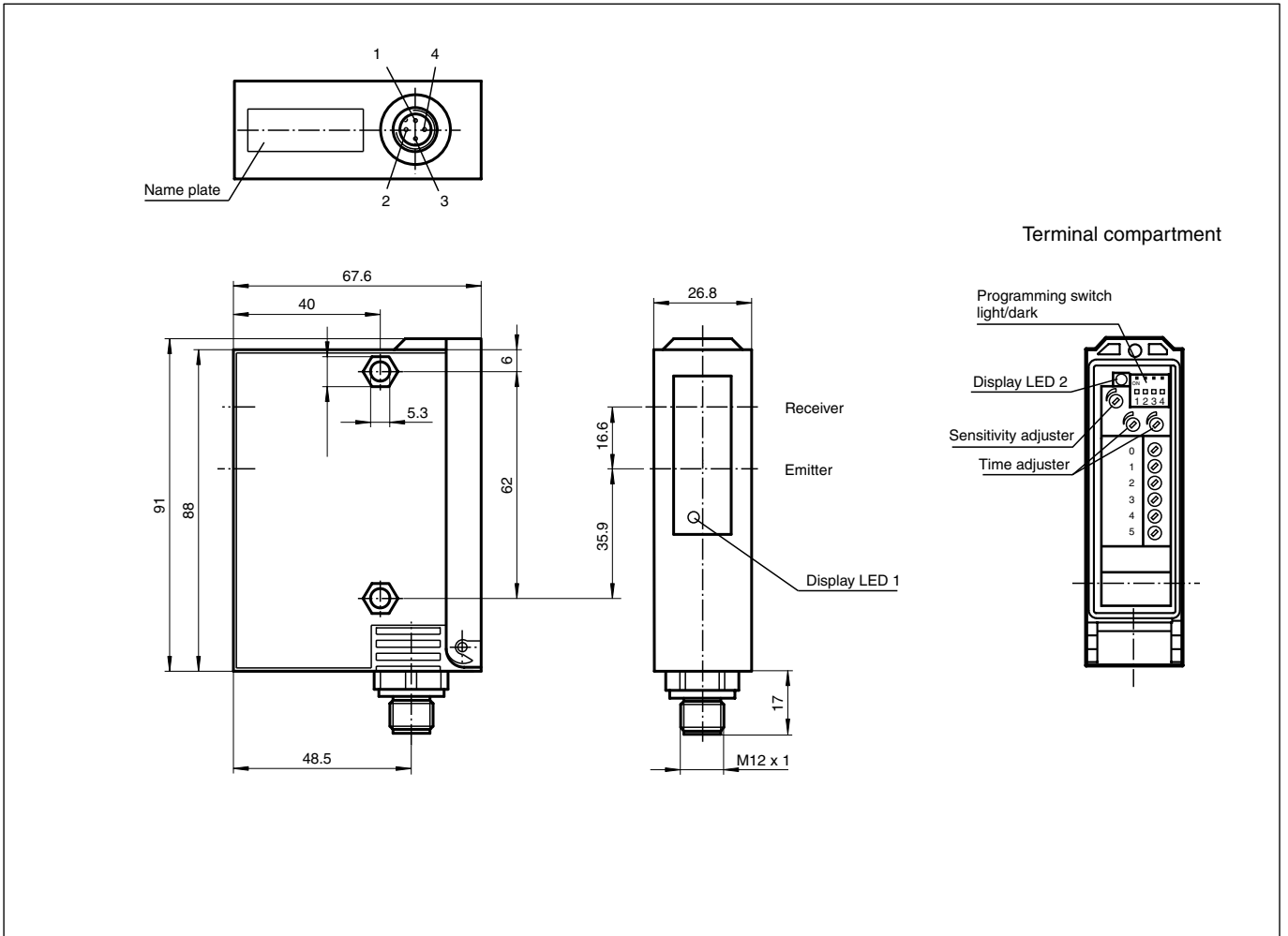
RL24-54/./92

Diagrams

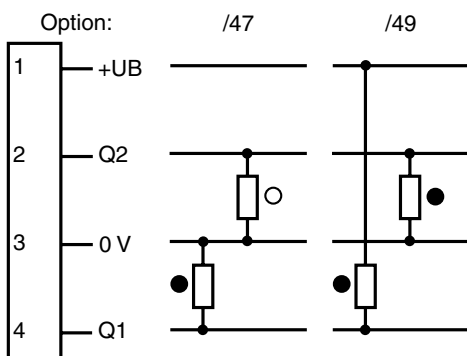


Series 24

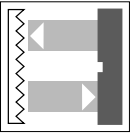
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RLK24-54/100D/...

Reflection light beam switch with polarisation filter

RLK24-54/100D/...

with 7-pin surface-mounted connector up to 250 VAC

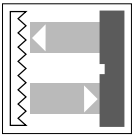


- ◆ Detection range up to 10 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ 4 programmable timer functions
- ◆ Operating voltage
12 V ... 240 V AC/DC

Series
24

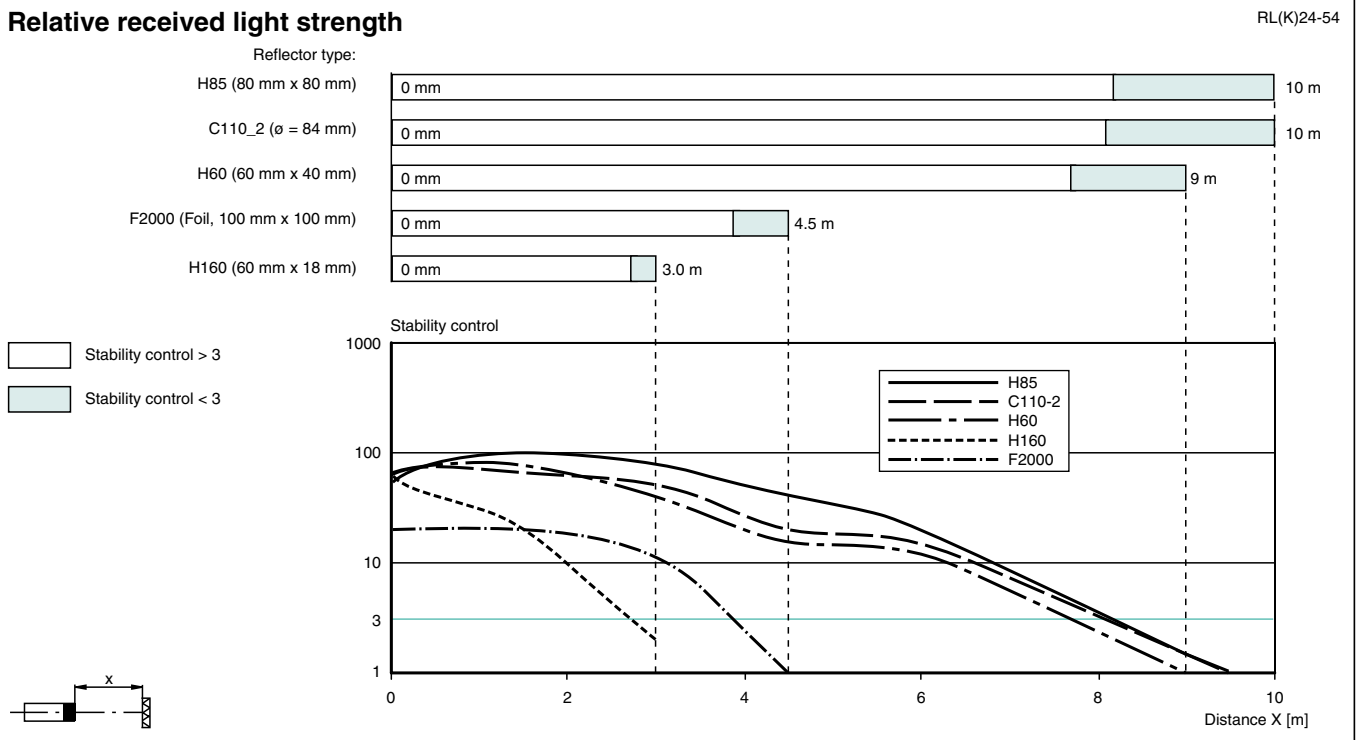
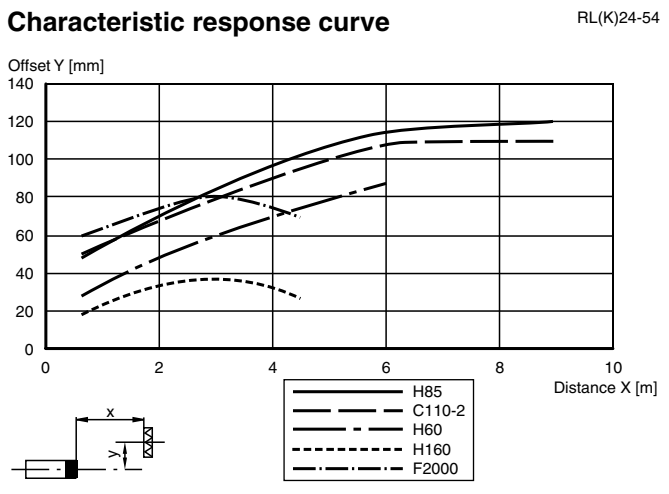
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RLK24-54/100D/104	RLK24-54/100D
Effective detection range	0 ... 6000 mm	◆	◆
Threshold detection range	10 m (with C110-2 reflector)	◆	◆
Reflector distance	0 ... 6000 mm	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆
Diameter of the light spot	approx. 150 mm at 6000 mm detection range	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Multiple arrangement	possible	◆	
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	12 ... 240 V AC/DC	◆	◆
Power consumption	3 VA	◆	◆
Signal output	1 relay output, 1 alternator	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 250 V AC	◆	◆
Switching current	max. 2 A	◆	◆
Switching frequency	12 Hz	◆	
	25 Hz		◆
Response time	20 ms		◆
	40 ms	◆	
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	7-pin surface-mounted connector, up to 250 VAC (without cable socket)	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	115 g	◆	◆



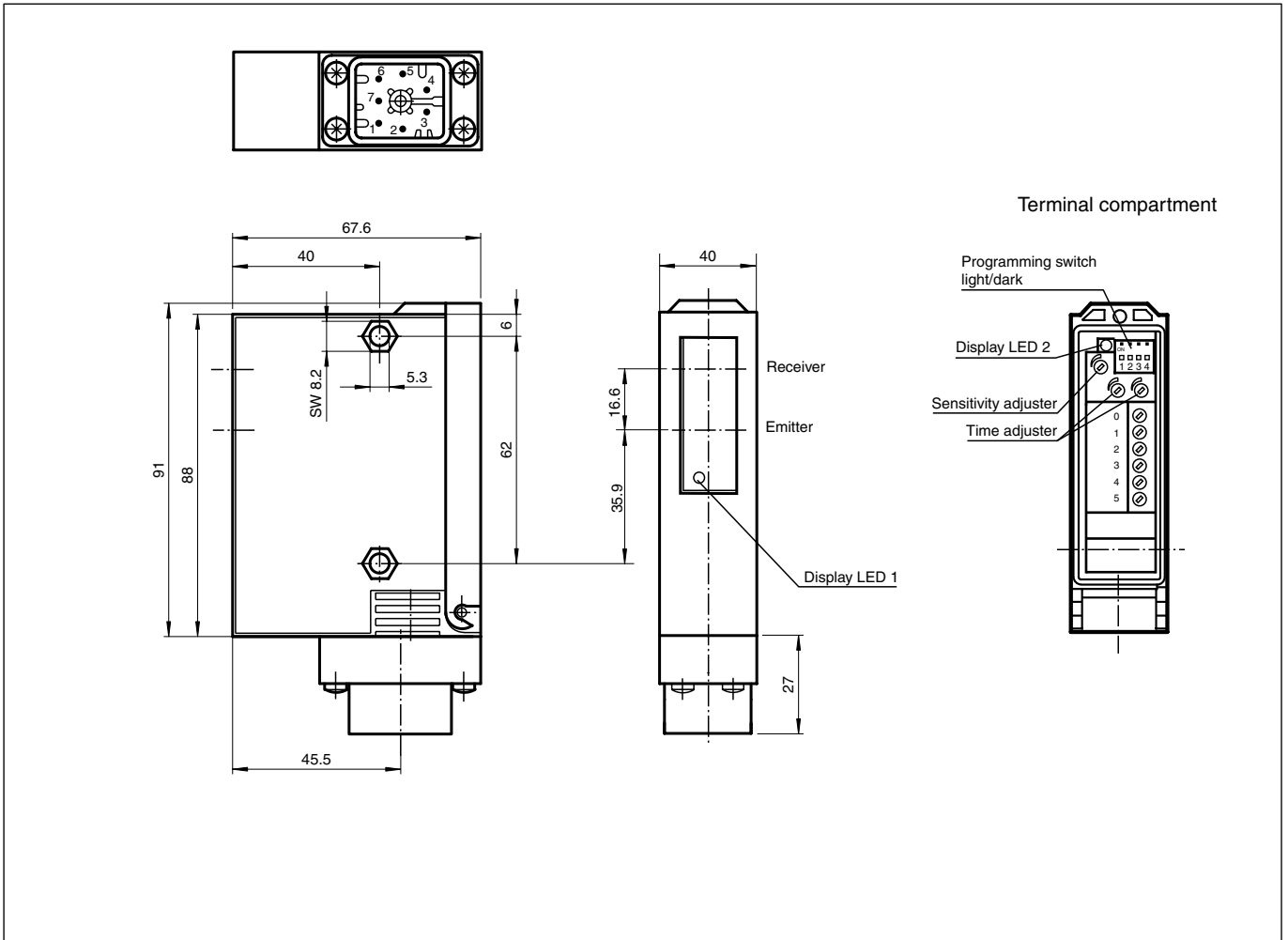
RLK24-54/100D/...

Diagrams

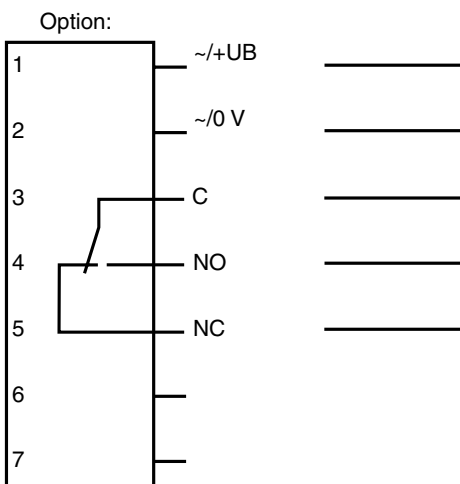


Series 24

Dimensions

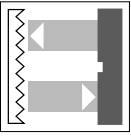


Electrical Connection



○ = Light ON, ● = Dark ON

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RL.24-54/116

Reflection light beam switch with polarisation filter

RL.24-54/116

with terminal compartment

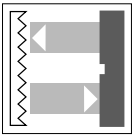


- ◆ Detection range up to 10 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions
- ◆ Operating voltage 10 V ... 30 V DC or 12 V ... 240 V AC/DC

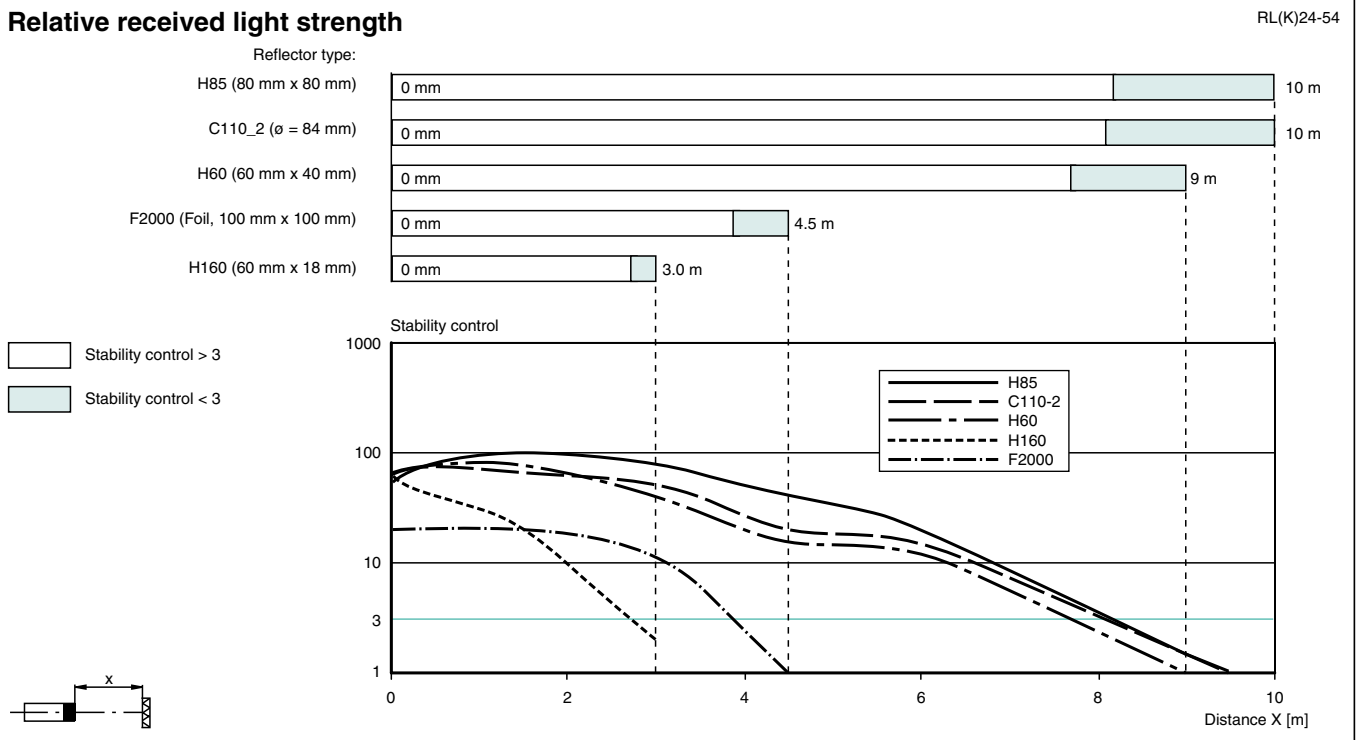
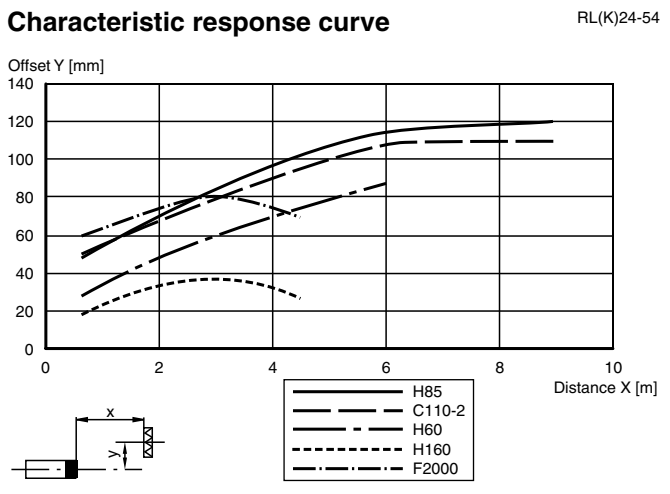
Series
24

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL24-54/47/76b/116	RL24-54/49/76b/116	RL24-54/47/76b/106/116	RL24-54/49/76b/106/116	RLK24-54/116	RLK24-54/104/116	RLK24-54/106/116
Effective detection range	0 ... 6000 mm	◆	◆	◆	◆	◆	◆	◆
Threshold detection range	10 m (with C110-2 reflector)	◆	◆	◆	◆	◆	◆	◆
Reflector distance	0 ... 6000 mm	◆	◆	◆	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆	◆	◆	◆	◆	◆
Diameter of the light spot	approx. 150 mm at 6000 mm detection range	◆	◆	◆	◆	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆	◆
Multiple arrangement	possible						◆	
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆	◆	◆	◆	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆	◆	◆	◆	◆	◆
Controls	2 potentiometers for timer functions	◆	◆	◆	◆	◆	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆					
	12 ... 240 V AC/DC					◆	◆	
	24 V DC ± 20 %			◆	◆			
	24 V AC/DC ±20 %							◆
Ripple	10 %	◆	◆	◆	◆			
No-load supply current	100 mA			◆	◆			
	40 mA	◆	◆					
Power consumption	3 VA					◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆				
	1 relay output, 1 alternator					◆	◆	◆
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆			
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 250 V AC					◆	◆	◆
	30 V DC	◆	◆	◆	◆			
Switching current	max. 2 A					◆	◆	◆
	max. 200 mA	◆	◆	◆	◆			
Switching frequency	1000 Hz	◆	◆	◆	◆			
	12 Hz						◆	
	25 Hz							◆
Response time	0.5 ms	◆	◆	◆	◆			
	20 ms					◆		◆
	40 ms						◆	
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	1 pnp	◆	◆	◆	◆			
Test input	Emitter deactivation	◆	◆	◆	◆			
Ambient temperature	-20 ... +60 °C	◆	◆			◆	◆	
	-35 ... +55 °C, with heated lens			◆	◆			◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆	◆	◆	◆	◆
Housing	GF17	◆	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆			
	115 g					◆	◆	◆

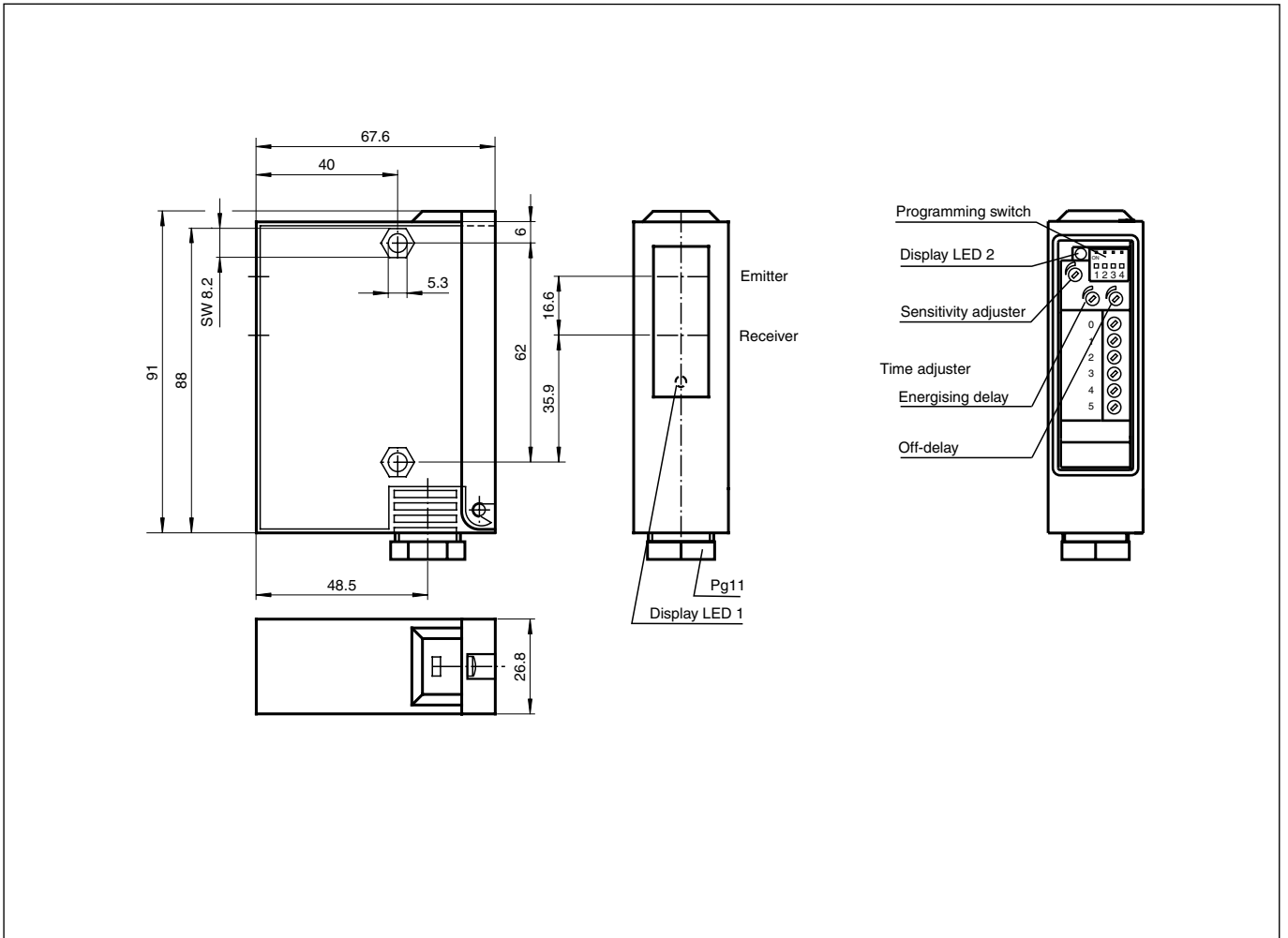


Diagrams

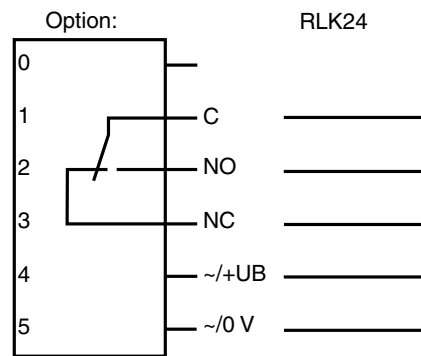
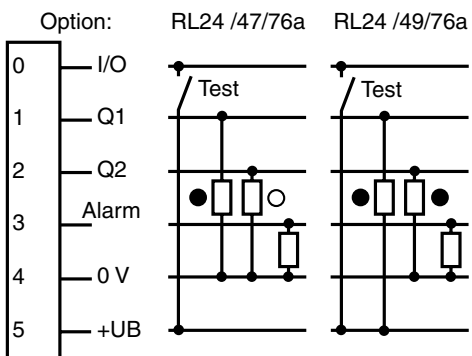


Series 24

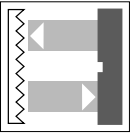
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL24-55/..74a

Reflection light beam switch with polarisation filter

RL24-55/..74a

with 4-pin, M18 x 1 plastic connector

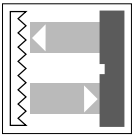


- ◆ Detection range up to 16 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ 4 programmable timer functions

Series
24

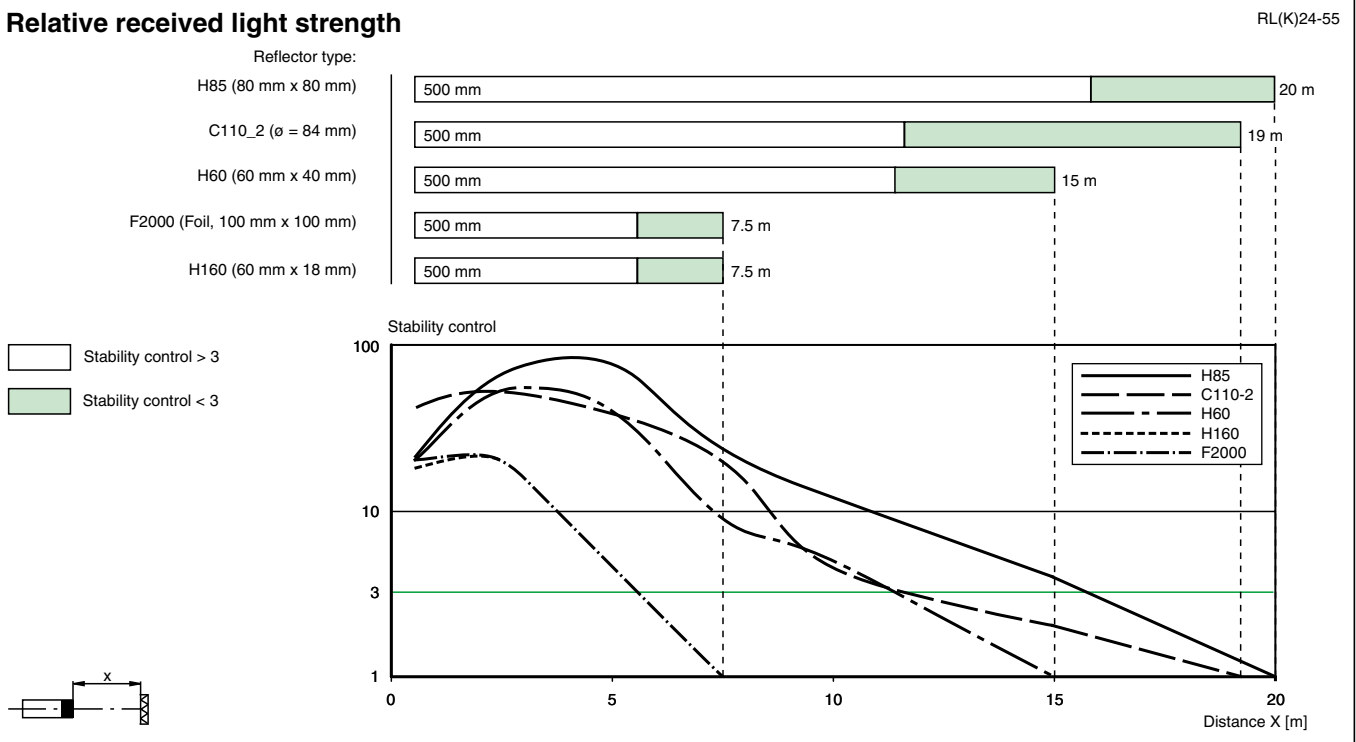
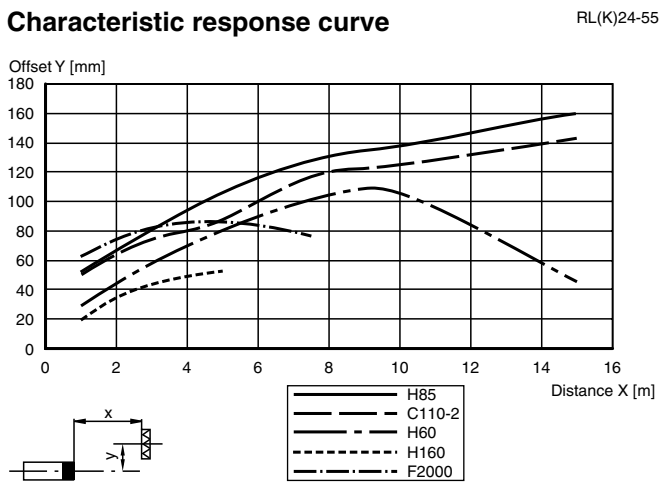
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL24-55/4/774a	RL24-55/49/74a
Effective detection range	0.5 ... 10 m	◆	◆
Threshold detection range	16 m (with C110-2 reflector)	◆	◆
Reflector distance	0.5 ... 10 m	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆
Diameter of the light spot	approx. 250 mm at 10 m detection range	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	40 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	light/dark switching	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	1000 Hz	◆	◆
Response time	0.5 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g	◆	◆



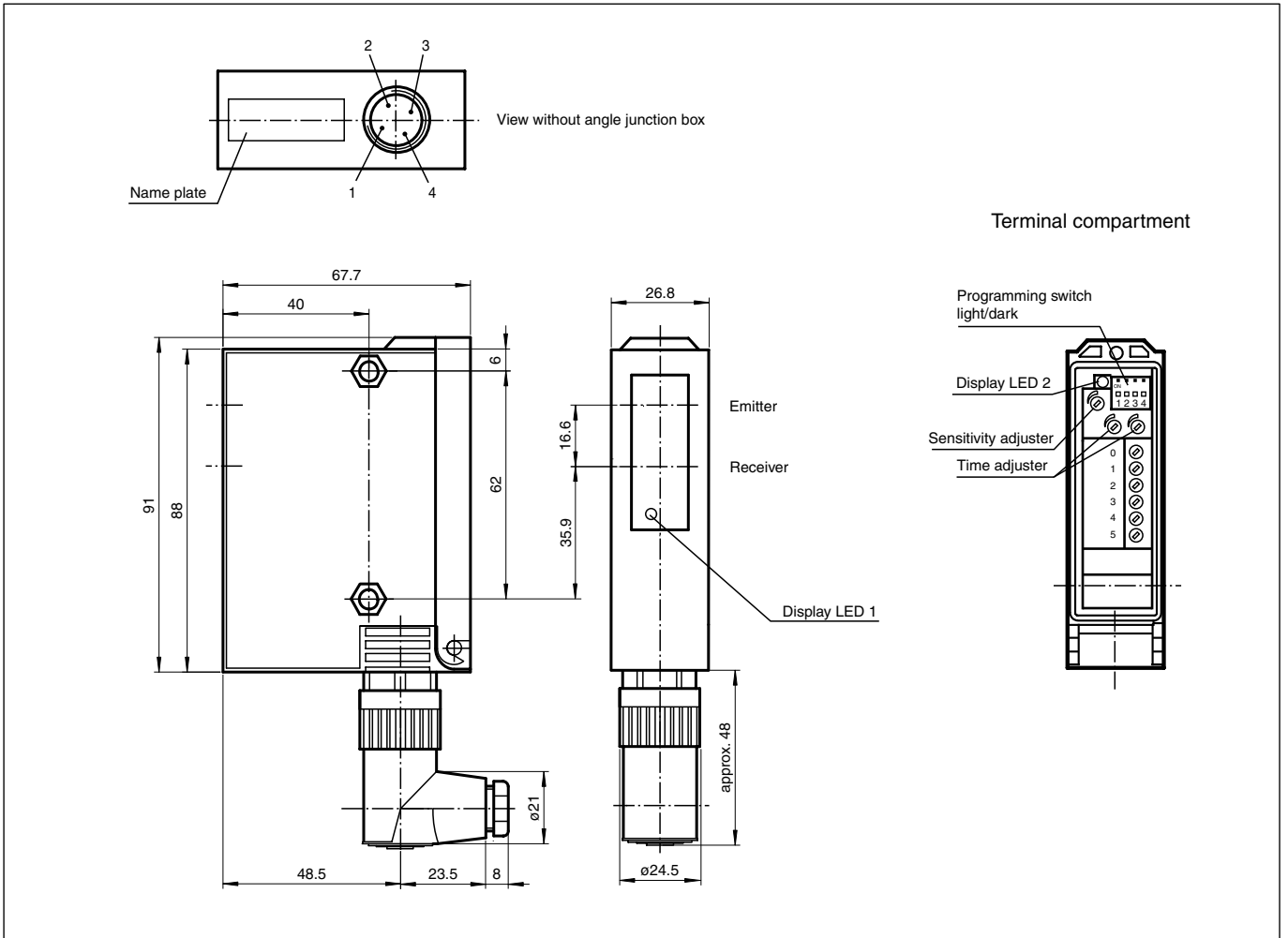
RL24-55/..74a

Diagrams

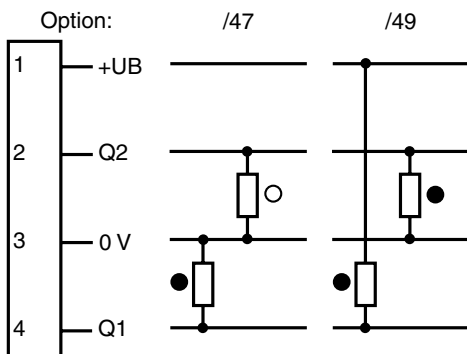


Series 24

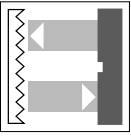
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL24-55/.. /92

Reflection light beam switch with polarisation filter

RL24-55/.. /92

with M12, 4-pin metal connector

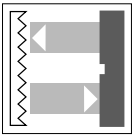


- ◆ Detection range up to 16 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ 4 programmable timer functions

Series
24

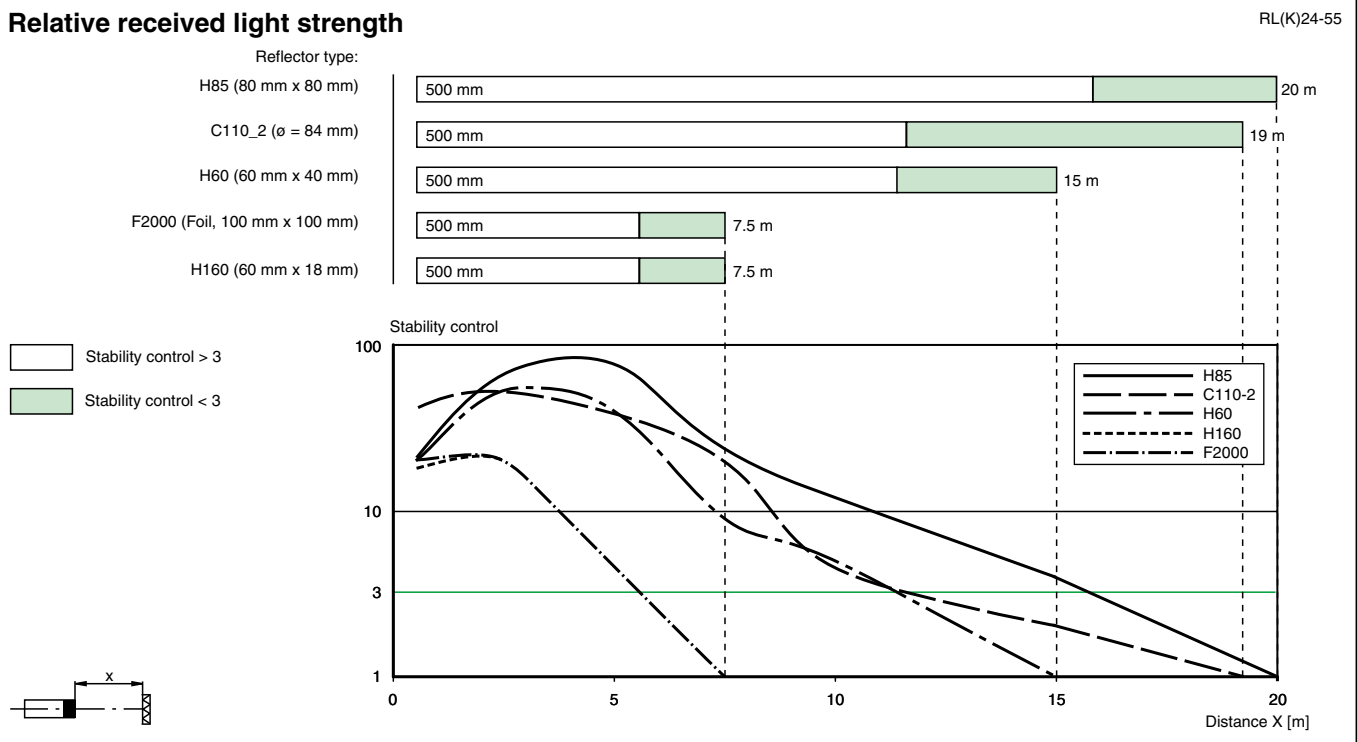
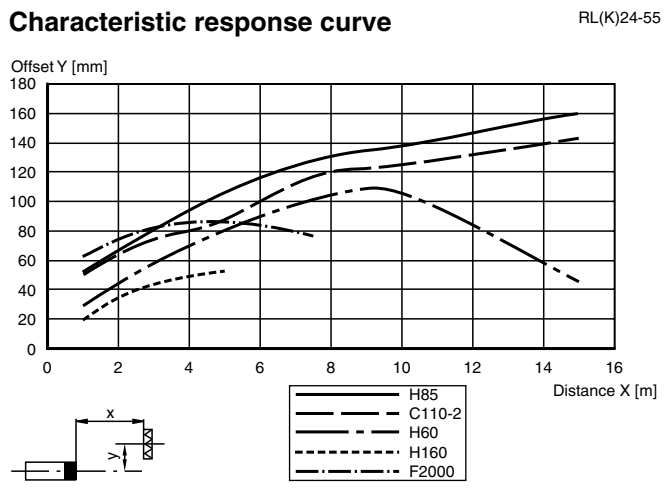
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL24-55/47/92	RL24-55/49/92
Effective detection range	0.5 ... 10 m	◆	◆
Threshold detection range	16 m (with C110-2 reflector)	◆	◆
Reflector distance	0.5 ... 10 m	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆
Diameter of the light spot	approx. 250 mm at 10 m detection range	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	40 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	light/dark switching	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	1000 Hz	◆	◆
Response time	0.5 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g	◆	◆



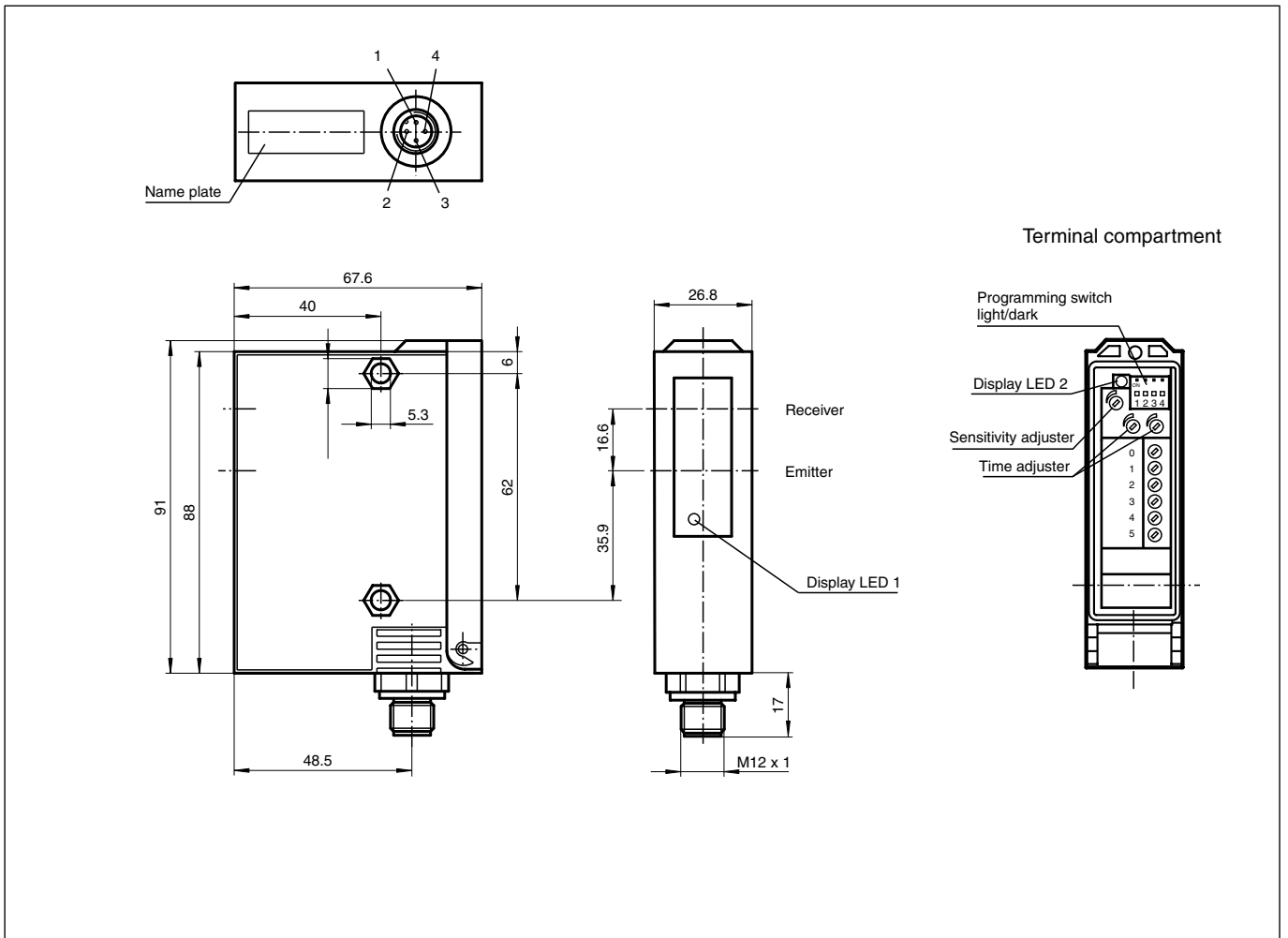
RL24-55/./92

Diagrams

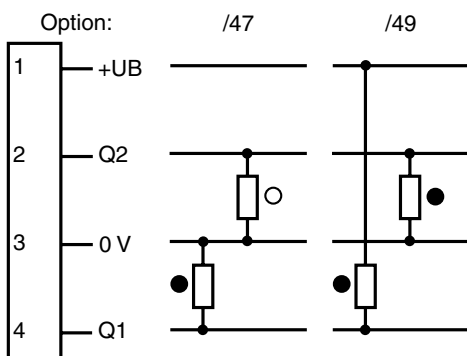


Series 24

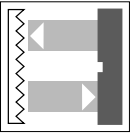
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RLK24-55/100D/...

Reflection light beam switch with polarisation filter

RLK24-55/100D/...

with 7-pin surface-mounted connector up to 250 VAC

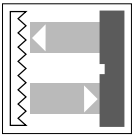


- ◆ Detection range up to 16 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ 4 programmable timer functions
- ◆ Operating voltage
12 V ... 240 V AC/DC

Series
24

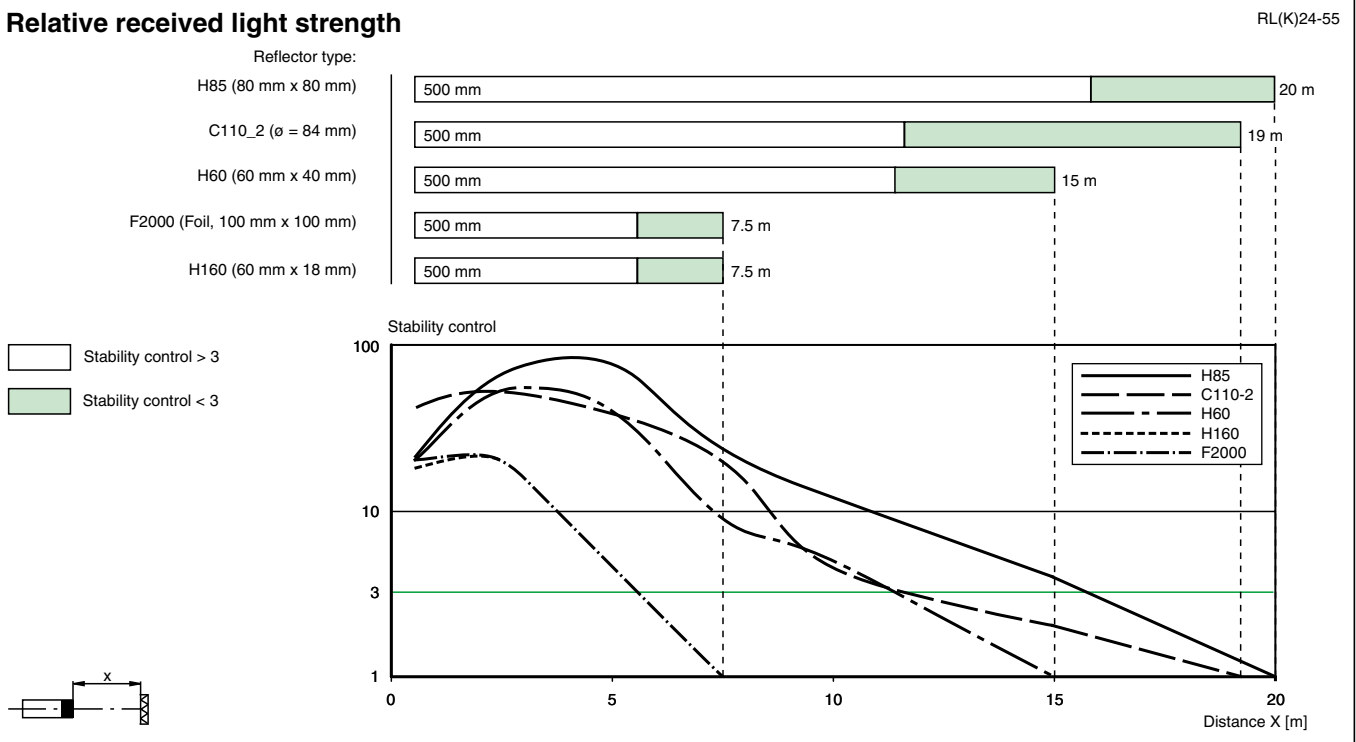
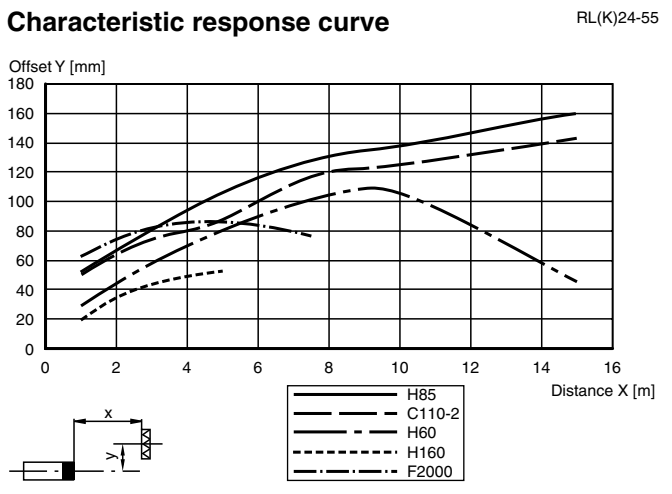
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RLK24-55/100D	RLK24-55/100D/104
Effective detection range	0.5 ... 10 m	◆	◆
Threshold detection range	16 m (with C110-2 reflector)	◆	◆
Reflector distance	0.5 ... 10 m	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆
Diameter of the light spot	approx. 250 mm at 10 m detection range	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Multiple arrangement	possible		◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	12 ... 240 V AC/DC		◆
	24 V DC ± 20 %	◆	
Power consumption	3 VA	◆	◆
Signal output	1 relay output, 1 alternator	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 250 V AC	◆	◆
Switching current	max. 2 A	◆	◆
Switching frequency	12.5 Hz		◆
	25 Hz	◆	
Response time	20 ms	◆	
	40 ms		◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	7-pin surface-mounted connector, up to 250 VAC (without cable socket)	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	115 g	◆	◆



RLK24-55/100D/...

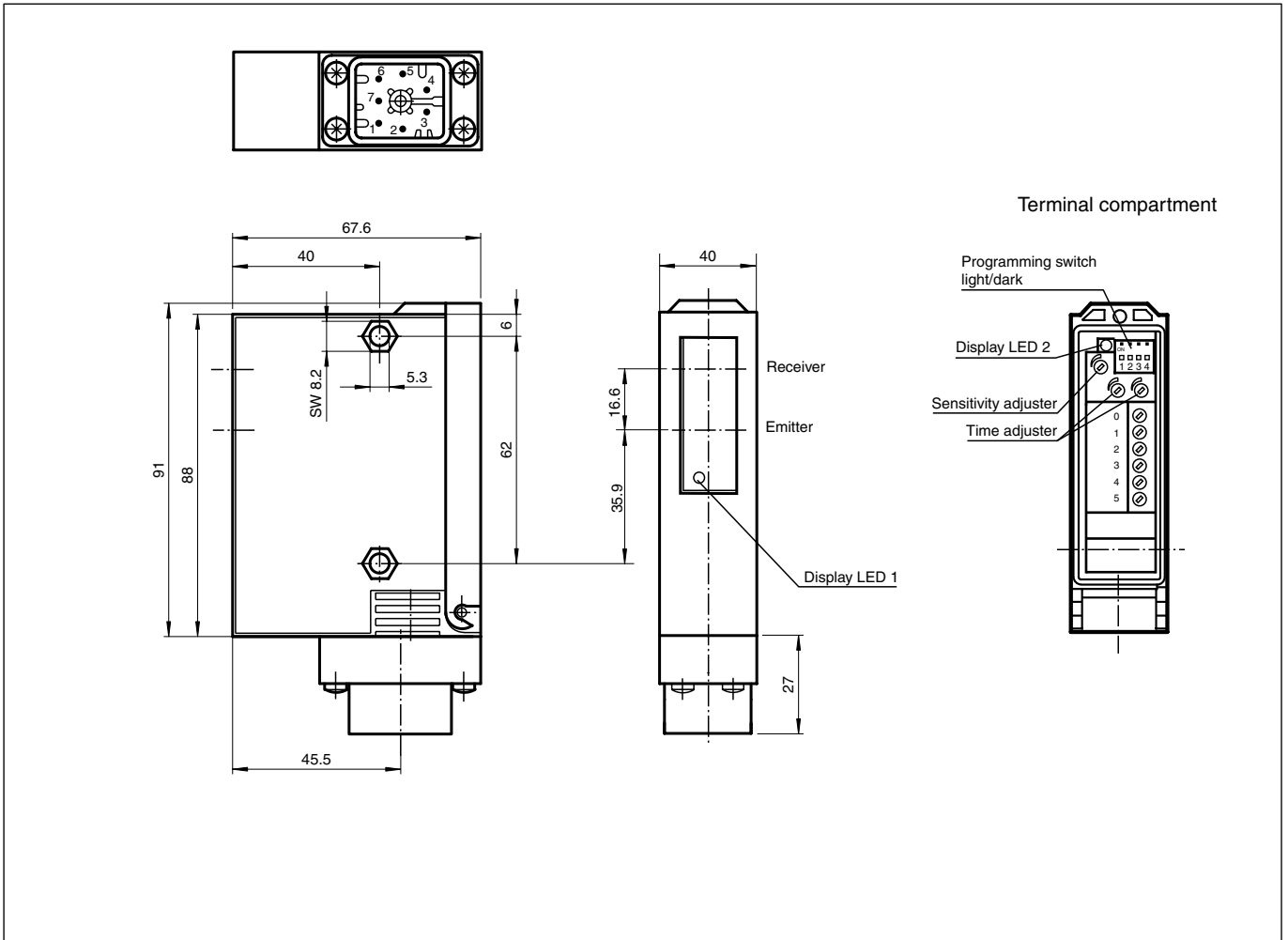
Diagrams



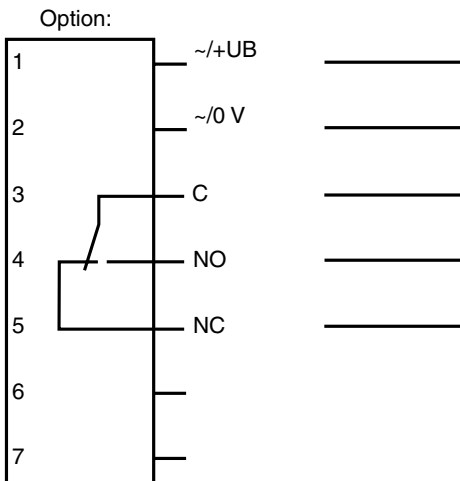
Series 24

Date of issue: 10/4/01

Dimensions

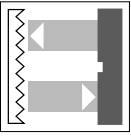


Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



RL.24-55/116

Reflection light beam switch with polarisation filter

RL.24-55/116

with terminal compartment

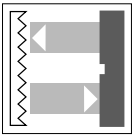


- ◆ Detection range up to 16 m
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions
- ◆ Operating voltage 10 V ... 30 V DC or 12 V ... 240 V AC/DC

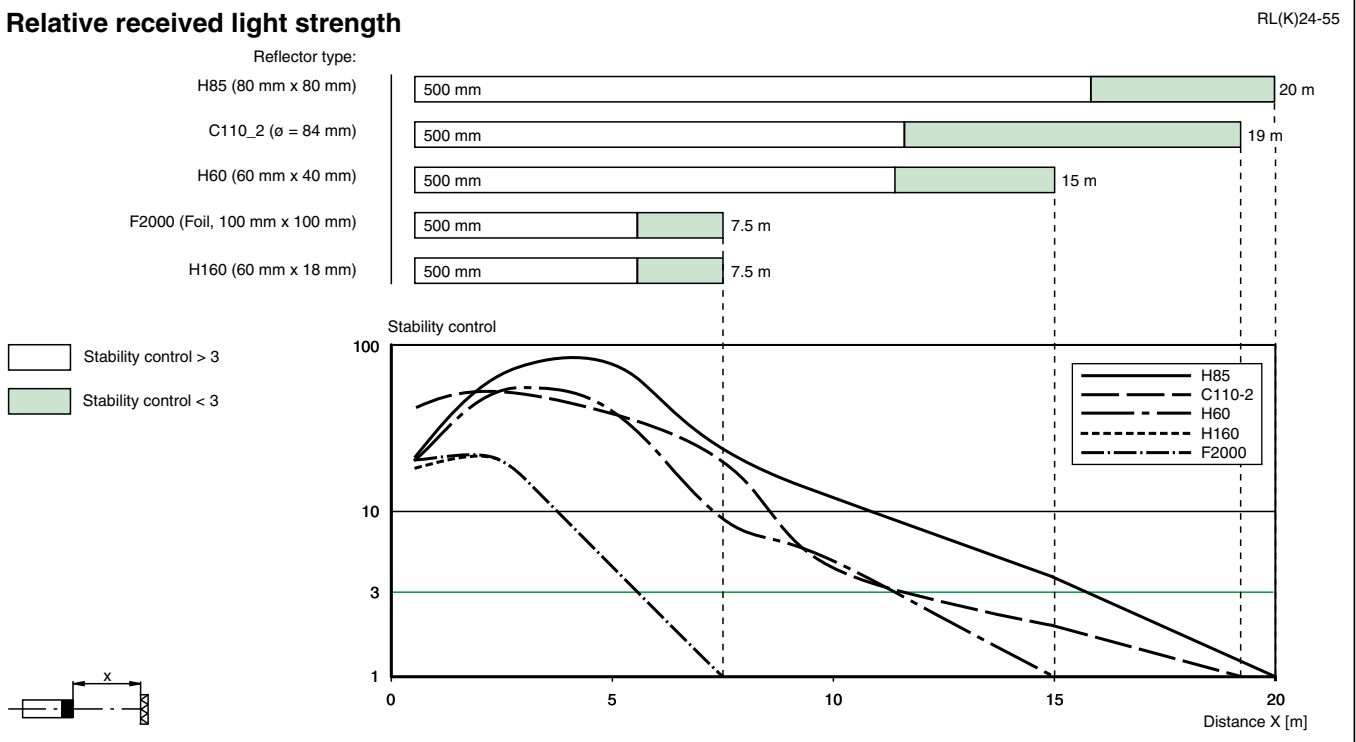
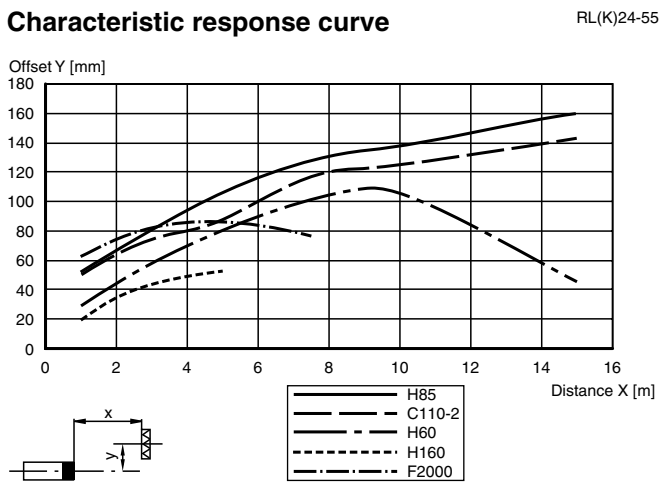
Series
24

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL24-55/47/76b/116	RL24-55/49/76b/116	RL24-55/47/76b/106/116	RL24-55/49/76b/106/116	RLK24-55/116	RLK24-55/104/116	RLK24-55/106/116
Effective detection range	0.5 ... 10 m	◆	◆	◆	◆	◆	◆	◆
Threshold detection range	16 m (with C110-2 reflector)	◆	◆	◆	◆	◆	◆	◆
Reflector distance	0.5 ... 10 m	◆	◆	◆	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆	◆	◆	◆	◆	◆
Diameter of the light spot	approx. 250 mm at 10 m detection range	◆	◆	◆	◆	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆	◆
Multiple arrangement	possible						◆	
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆	◆	◆	◆	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆	◆	◆	◆	◆	◆
Controls	2 potentiometers for timer functions	◆	◆	◆	◆	◆	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆					
	12 ... 240 V AC/DC					◆	◆	
	24 V AC/DC ± 20 %							◆
	24 V DC ± 20 %			◆	◆			
Ripple	10 %	◆	◆	◆	◆			
No-load supply current	100 mA			◆	◆			
	40 mA	◆	◆					
Power consumption	3 VA					◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆				
	1 relay output, 1 alternator					◆	◆	◆
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆			
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 250 V AC					◆	◆	◆
	30 V DC	◆	◆	◆	◆			
Switching current	max. 2 A					◆	◆	◆
	max. 200 mA	◆	◆	◆	◆			
Switching frequency	1000 Hz	◆	◆	◆	◆			
	12.5 Hz						◆	
	25 Hz							◆
Response time	0.5 ms	◆	◆	◆	◆			
	20 ms					◆		◆
	40 ms						◆	
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	1 pnp	◆	◆	◆	◆			
Test input	Emitter deactivation	◆	◆	◆	◆			
Ambient temperature	-20 ... +60 °C	◆	◆			◆	◆	
	-35 ... +55 °C, with heated lens			◆	◆			◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆	◆	◆	◆	◆
Housing	GF17	◆	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆			
	115 g					◆	◆	◆

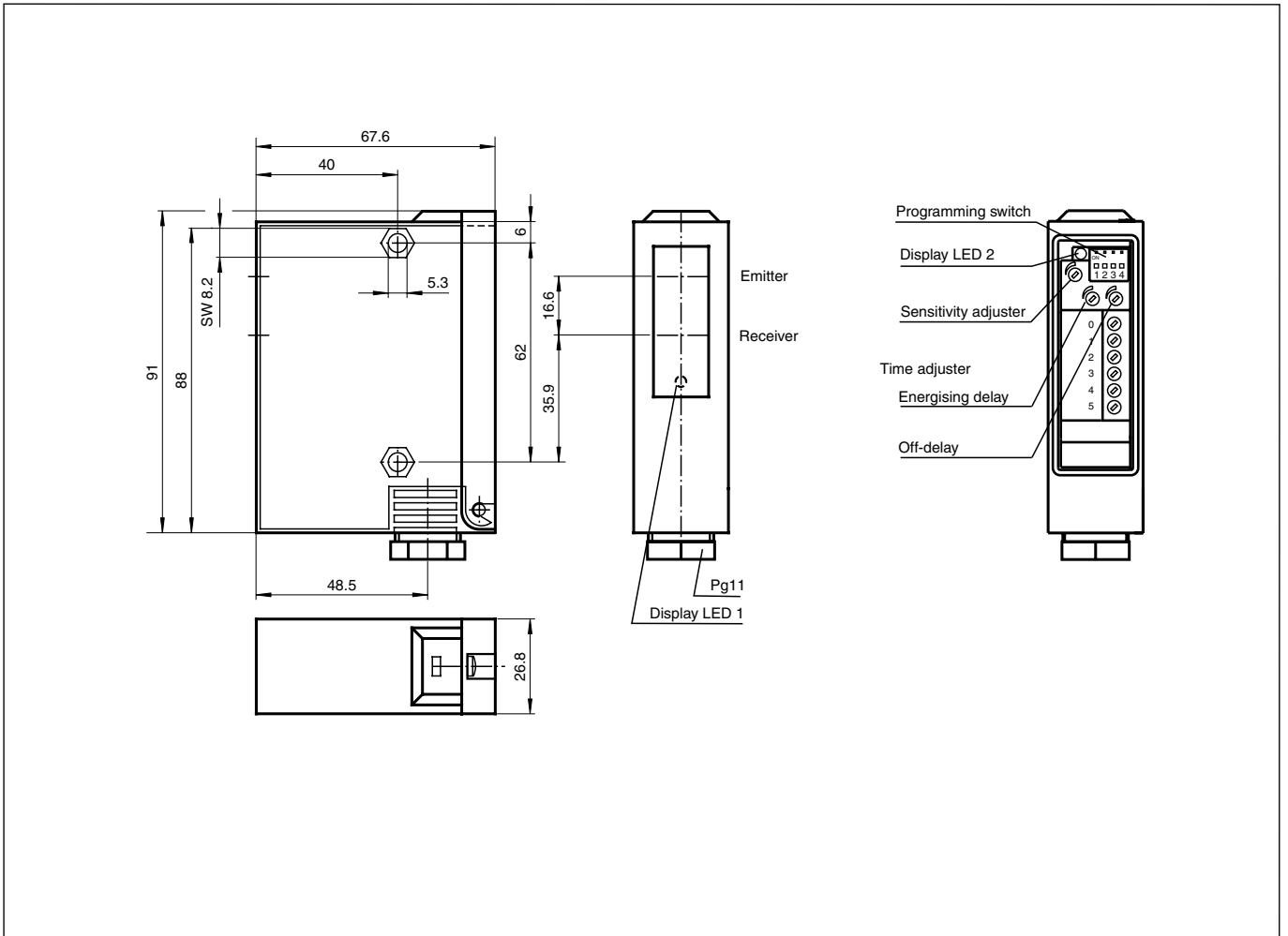


Diagrams

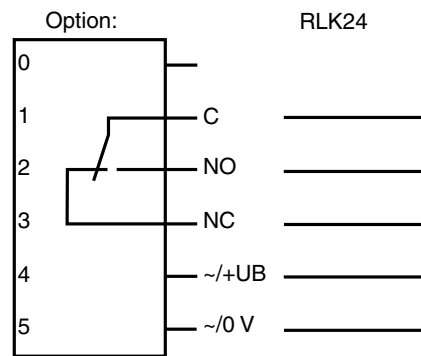
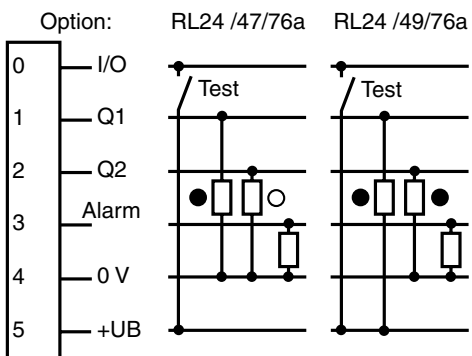


Series 24

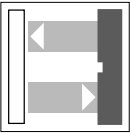
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL24-8-2000/..74a

Reflection light scanner

RL24-8-2000/..74a

with 4-pin, M18 x 1 plastic connector

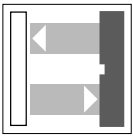


- ◆ Detection range 10 mm ... 2000 mm, adjustable
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ 4 programmable timer functions

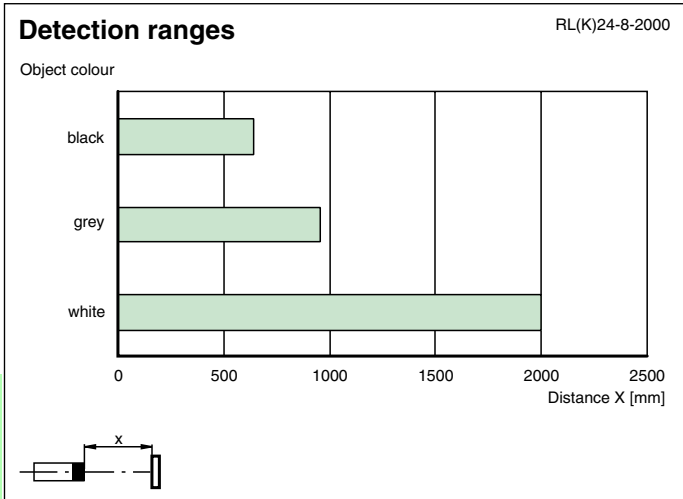
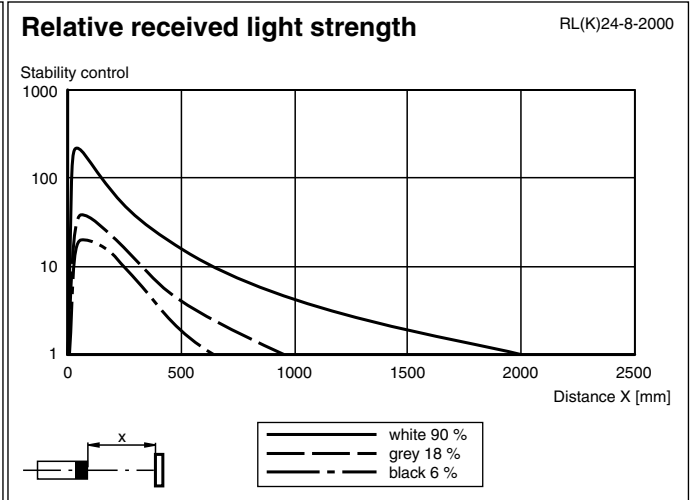
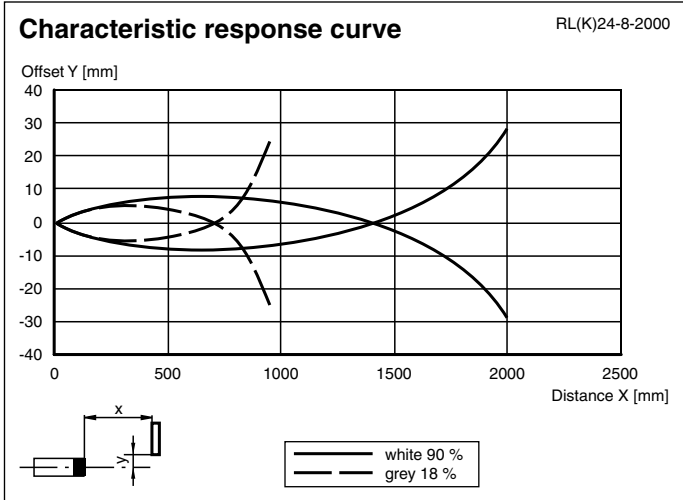
Series
24

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL24-8-2000/4774a	RL24-8-2000/4974a
Adjustment range	600 ... 2000 mm	◆	◆
Detection range	10 ... 2000 mm	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆
Diameter of the light spot	approx. 40 mm at 2000 mm detection range	◆	◆
Ambient light limit	35000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	55 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	light/dark switching	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	250 Hz	◆	◆
Response time	2 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g	◆	◆

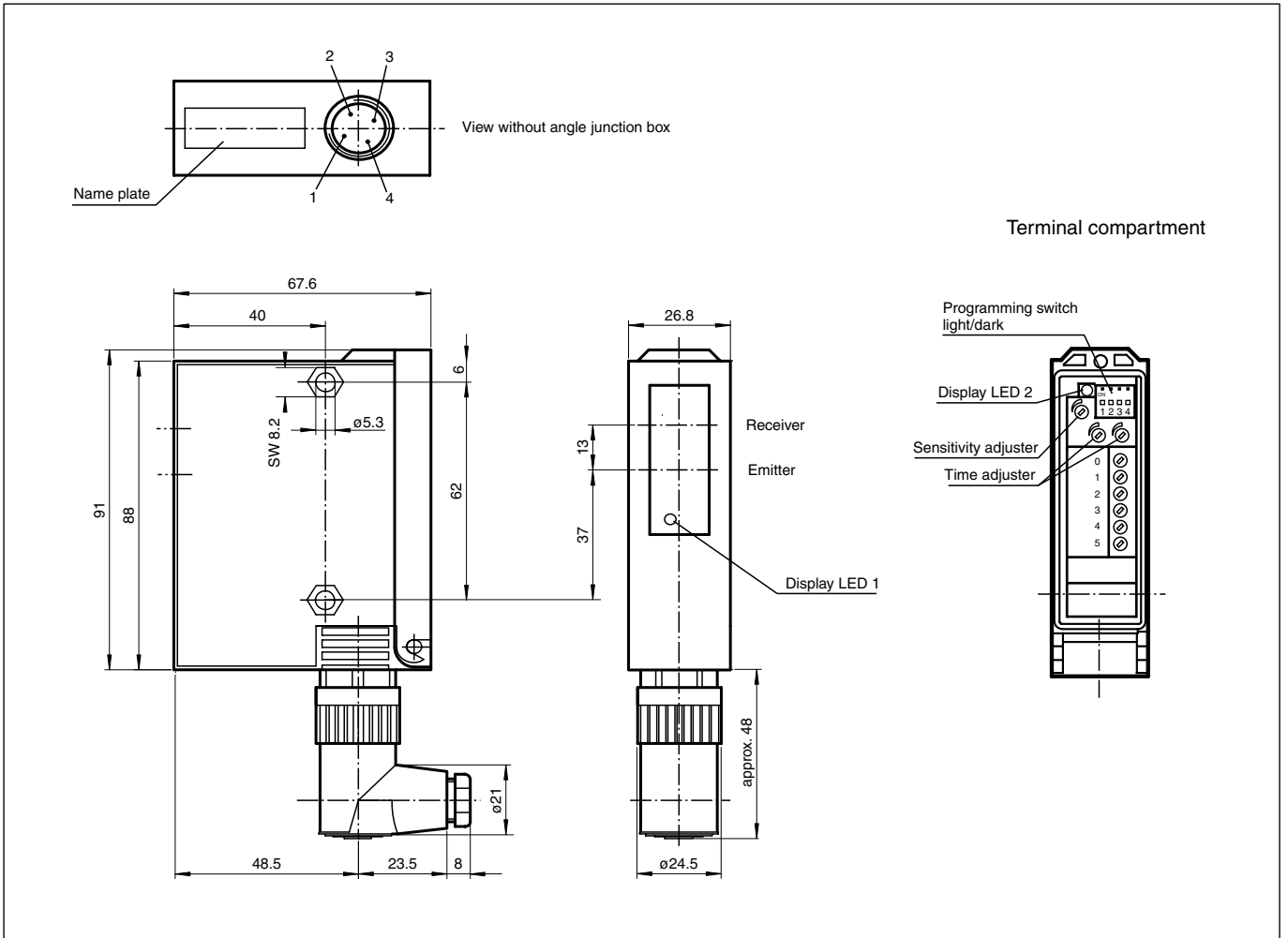


Diagrams

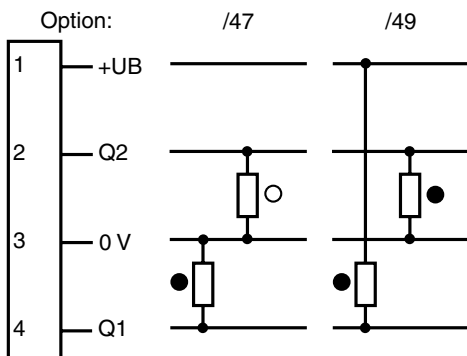


Series 24

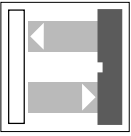
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL24-8-2000/.. /92

Reflection light scanner

RL24-8-2000/.. /92

with M12, 4-pin metal connector

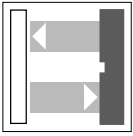


- ◆ Detection range 10 mm ... 2000 mm, adjustable
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ 4 programmable timer functions

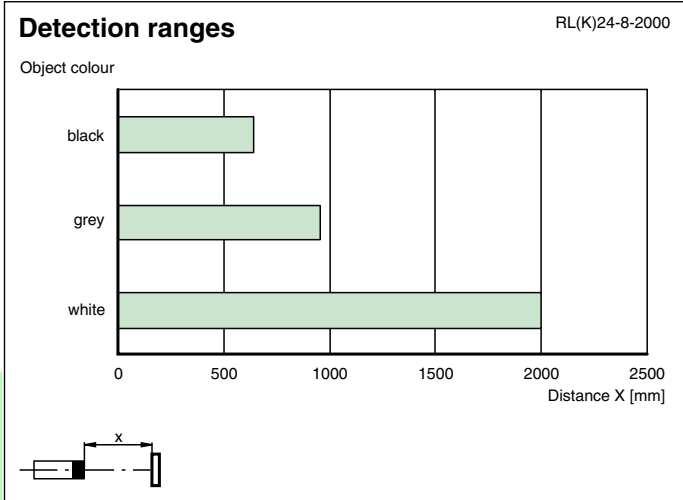
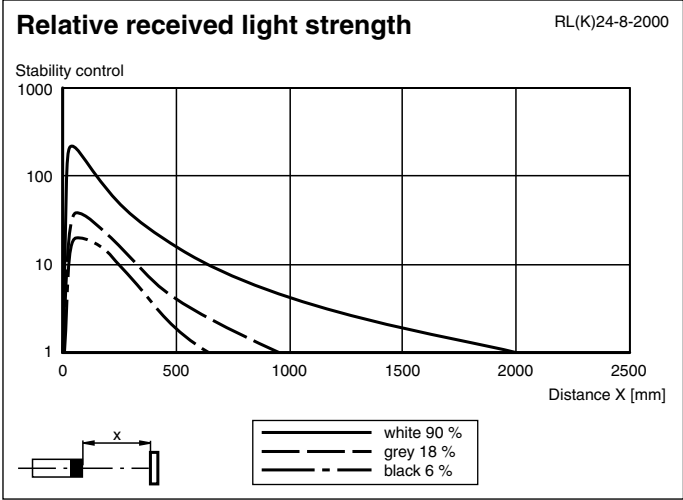
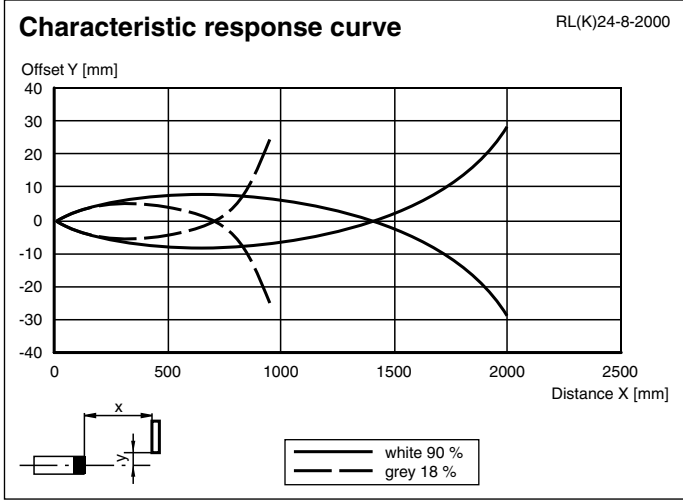
Series
24

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL24-8-2000/47/92	RL24-8-2000/49/92
Adjustment range	600 ... 2000 mm	◆	◆
Detection range	10 ... 2000 mm	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆
Diameter of the light spot	approx. 40 mm at 2000 mm detection range	◆	◆
Ambient light limit	35000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	55 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	light/dark switching	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	250 Hz	◆	◆
Response time	2 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g	◆	◆



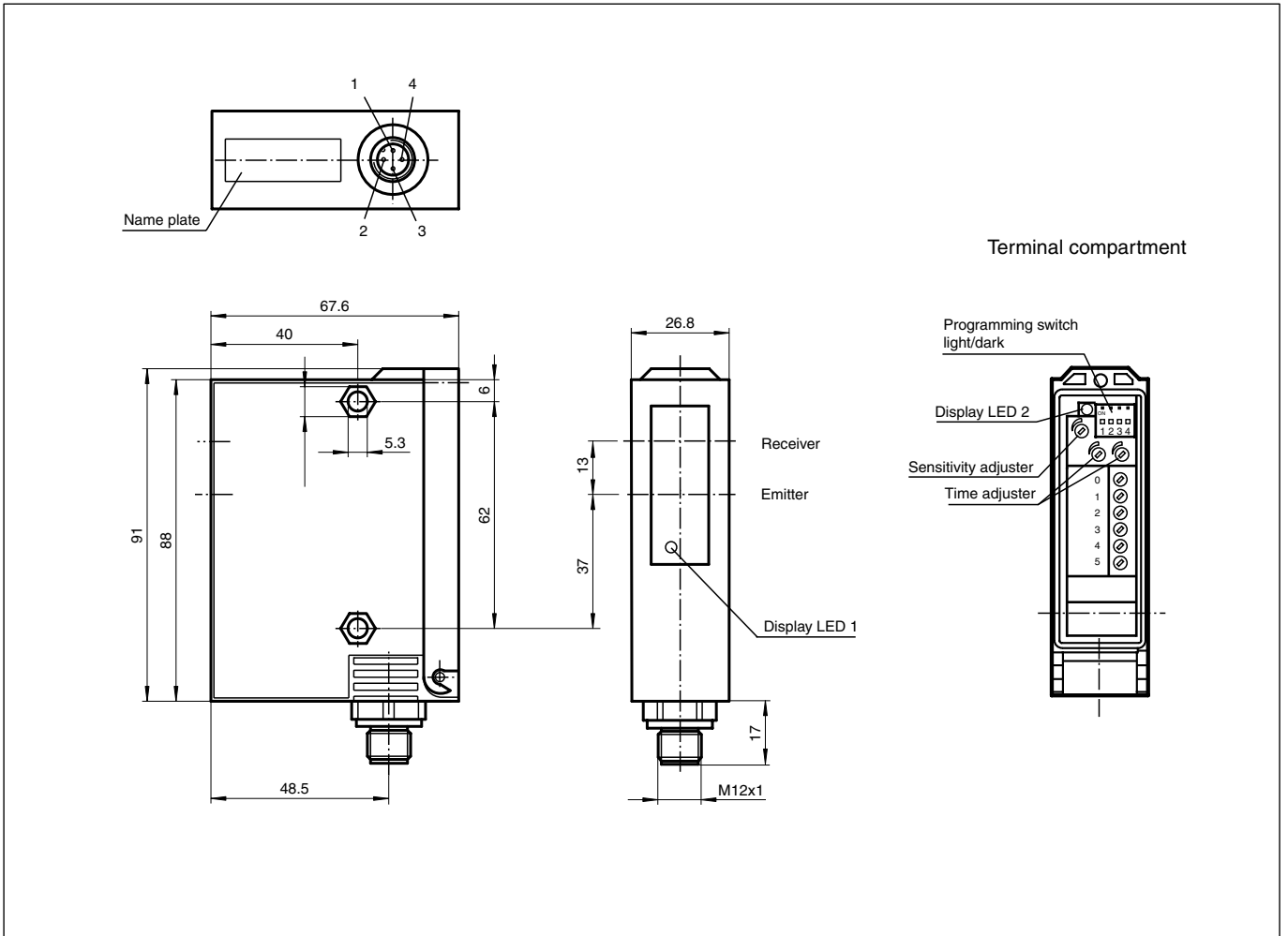
Diagrams



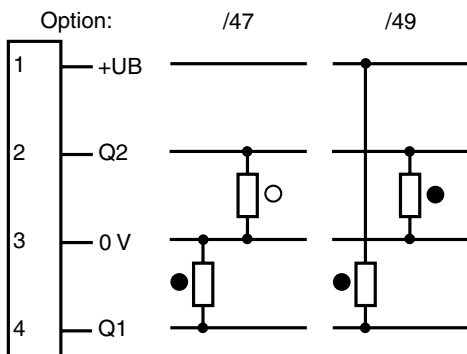
Series 24

Date of issue: 10/4/01

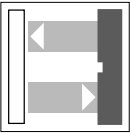
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RLK24-8-2000/100D

Reflection light scanner

RLK24-8-2000/100D

with 7-pin surface-mounted connector up to 250 VAC

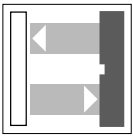


- ◆ Detection range 10 mm ... 2000 mm, adjustable
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ 4 programmable timer functions
- ◆ Operating voltage 12 V ... 240 V AC/DC

Series
24

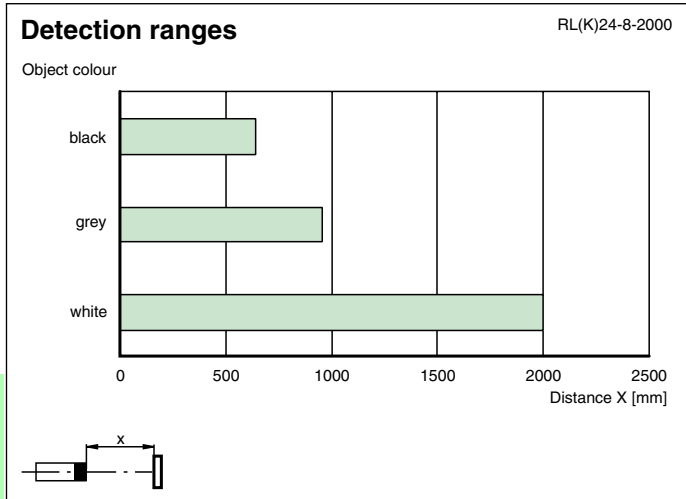
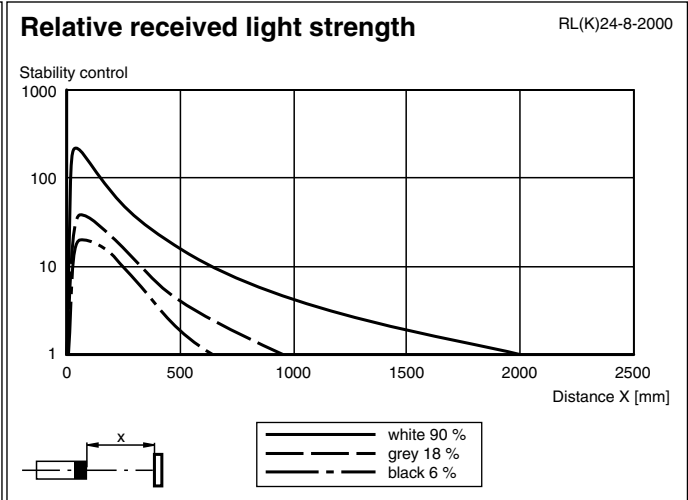
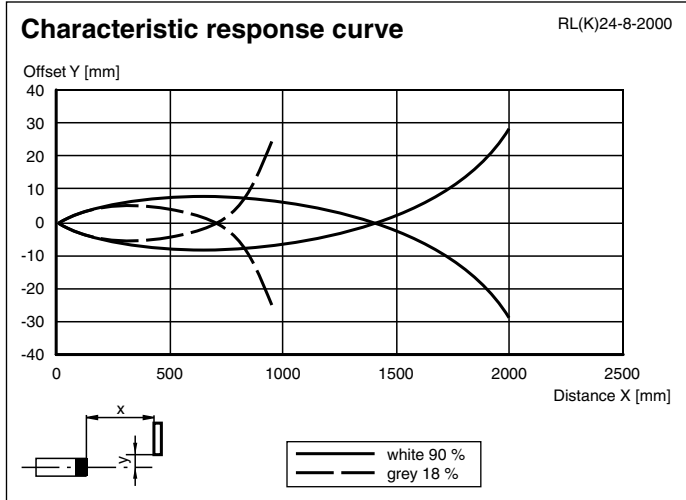
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RLK24-8-2000/100D
Adjustment range	600 ... 2000 mm	◆
Detection range	10 ... 2000 mm	◆
Light type	Red, alternating light	◆
Light source	LED	◆
Angle of divergence	approx. 1.4 °	◆
Diameter of the light spot	approx. 40 mm at 2000 mm detection range	◆
Ambient light limit	35000 Lux	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
USA	UL	◆
Kanada	CSA	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆
Controls	Programming switch for light/dark ON, timer functions	◆
Controls	2 potentiometers for timer functions	◆
Controls	1 Potentiometer as sensitivity adjuster	◆
Operating voltage	12 ... 240 V AC/DC	◆
Power consumption	3 VA	◆
Signal output	1 relay output, 1 alternator	◆
Switching type	light/dark switching	◆
Switching voltage	max. 250 V AC	◆
Switching current	max. 2 A	◆
Switching frequency	25 Hz	◆
Response time	20 ms	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆
Ambient temperature	-20 ... +60 °C	◆
Storage temperature	-20 ... +75 °C	◆
Protection degree	IP65	◆
Connection type	7-pin surface-mounted connector, up to 250 VAC (without cable socket)	◆
Housing	GF17	◆
Light exit	Glass	◆
Mass	115 g	◆



RLK24-8-2000/100D

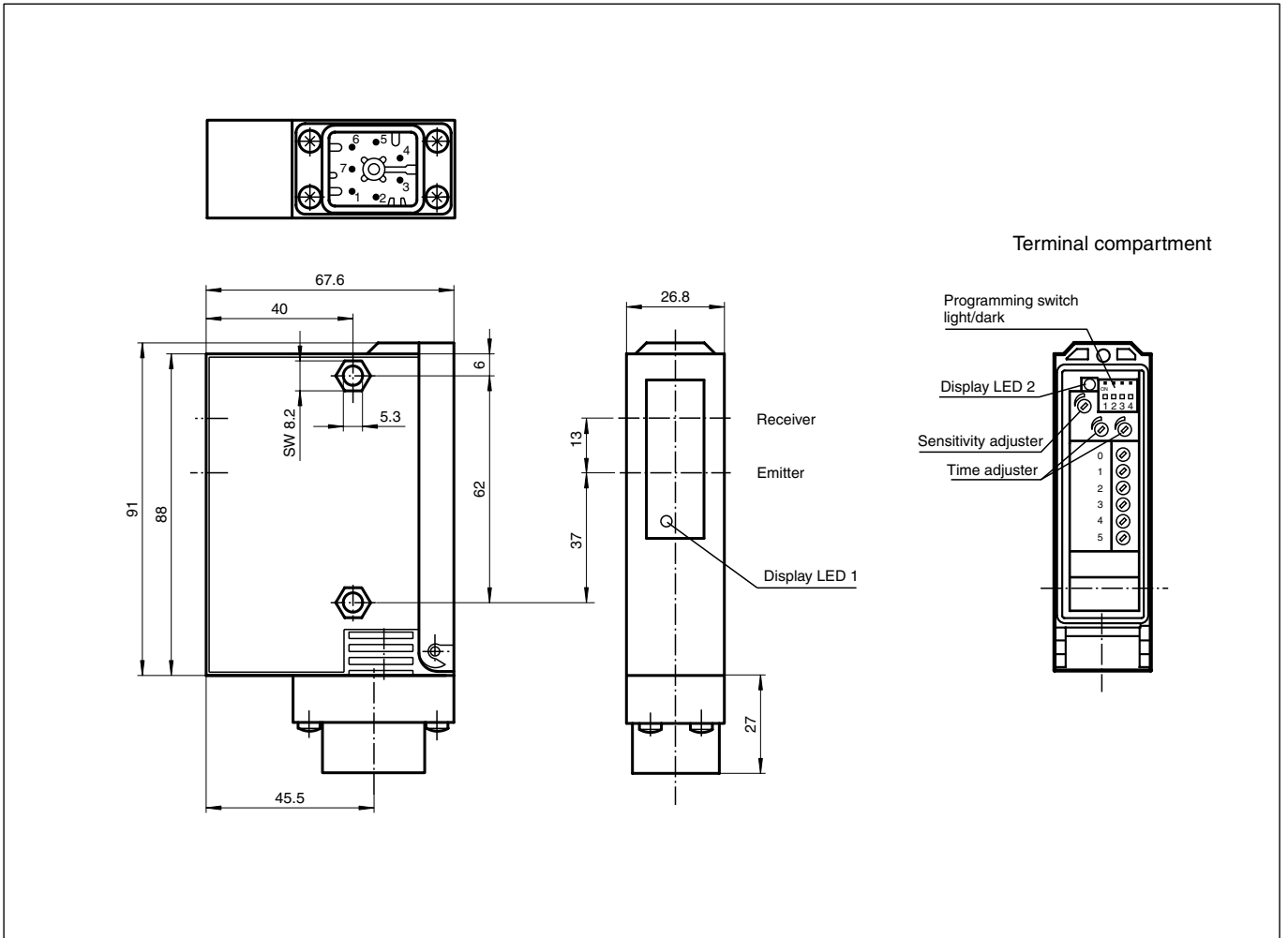
Diagrams



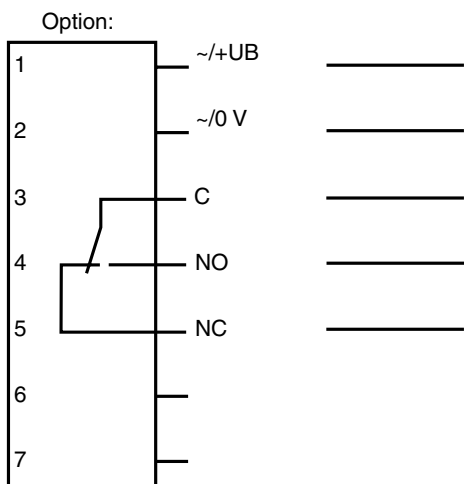
Series 24

Date of issue: 10/4/01

Dimensions

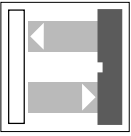


Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



RL.24-8-2000/116

Reflection light scanner

RL.24-8-2000/116

with terminal compartment

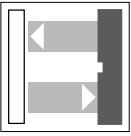


- ◆ Detection range 10 mm ... 2000 mm, adjustable
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions
- ◆ Operating voltage 10 V ... 30 V DC or 12 V ... 240 V AC/DC

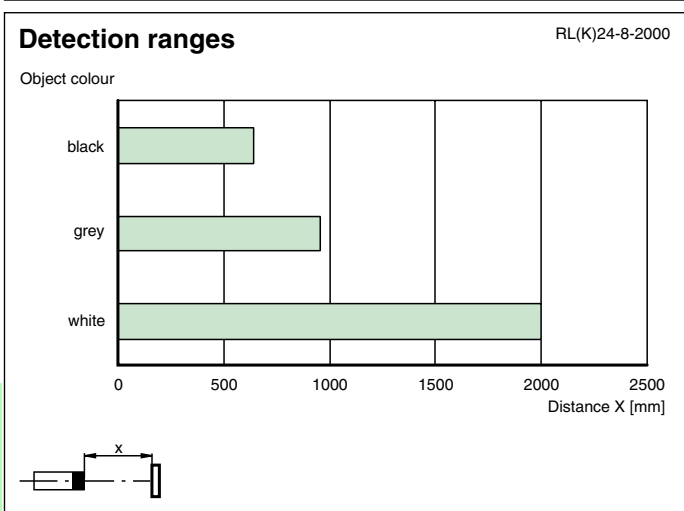
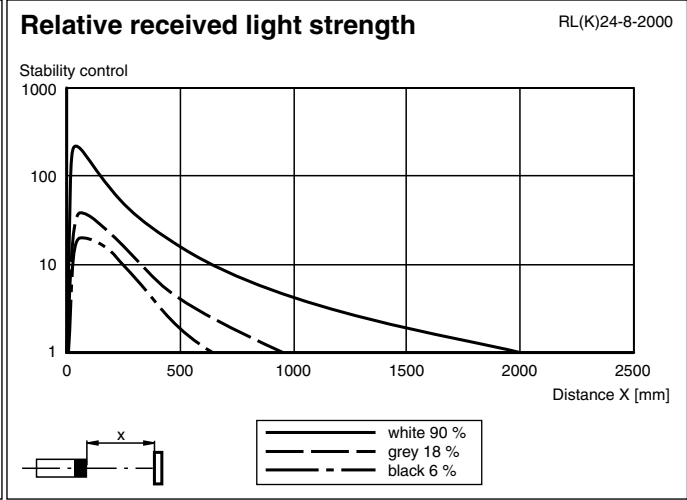
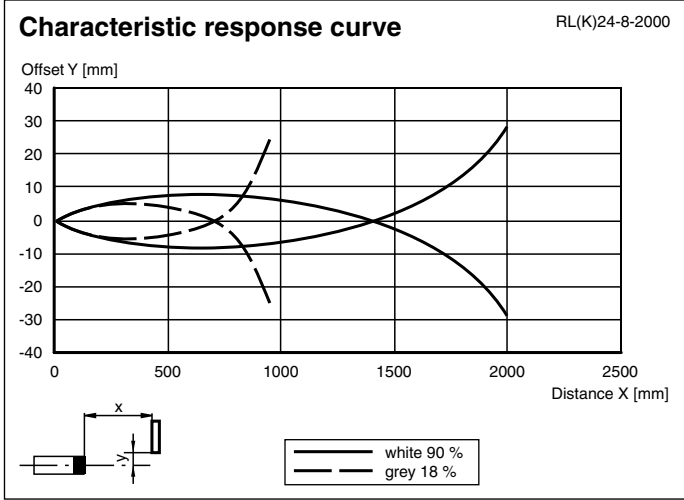
Series
24

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL24-8-2000/4776b/116	RL24-8-2000/4976b/116	RLK24-8-2000/116	RL24-8-2000/4776b/106/116	RL24-8-2000/4976b/106/116
Adjustment range	600 ... 2000 mm	◆	◆	◆	◆	◆
Detection range	10 ... 2000 mm	◆	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆	◆	◆	◆
Diameter of the light spot	approx. 40 mm at 2000 mm detection range	◆	◆	◆	◆	◆
Ambient light limit	35000 Lux	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆	◆	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆	◆	◆	◆
Controls	2 potentiometers for timer functions	◆	◆	◆	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆			
	12 ... 240 V AC/DC			◆		
	24 V DC ± 20 %				◆	◆
Ripple	10 %	◆	◆		◆	◆
No-load supply current	110 mA				◆	◆
	55 mA	◆	◆			
Power consumption	3 VA			◆		
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆			◆	
	1 relay output, 1 alternator			◆		
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆			◆
Switching type	light/dark switching	◆	◆	◆	◆	◆
Switching voltage	max. 250 V AC			◆		
	30 V DC	◆	◆		◆	◆
Switching current	max. 2 A			◆		
	max. 200 mA	◆	◆		◆	◆
Switching frequency	25 Hz			◆		
	250 Hz	◆	◆		◆	◆
Response time	2 ms	◆	◆		◆	◆
	20 ms			◆		
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆	◆	◆	◆
Output of the pre-fault indication	1 pnp	◆	◆		◆	◆
Test input	Emitter deactivation	◆	◆		◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆		
	-35 ... +55 °C, with heated lens				◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆	◆	◆
Housing	GF17	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆
Mass	100 g	◆	◆		◆	◆
	115 g			◆		



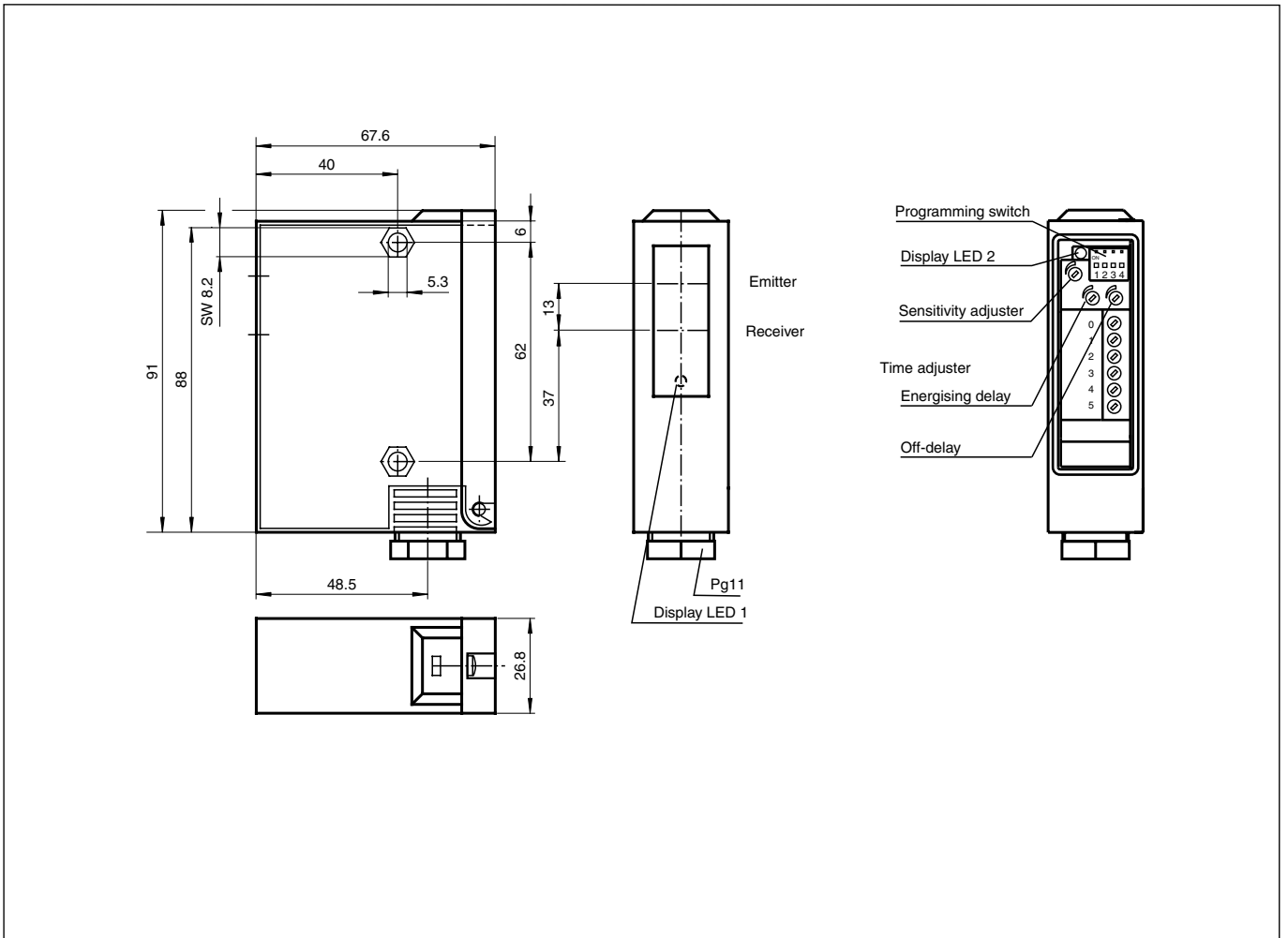
Diagrams



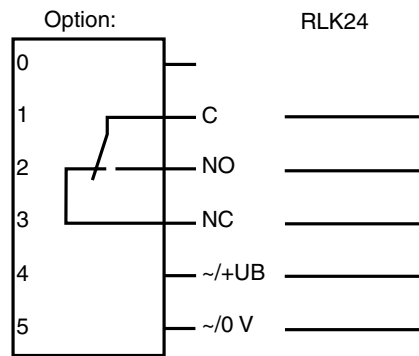
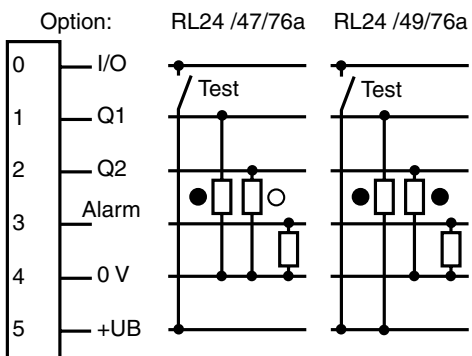
Series 24

Date of issue: 10/4/01

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL24-8-H-80/..74a

Reflection light scanner with background suppression

RL24-8-H-80/..74a

with 4-pin, M18 x 1 plastic connector



- ◆ Sensor range 80 mm
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ 4 programmable timer functions

Series
24

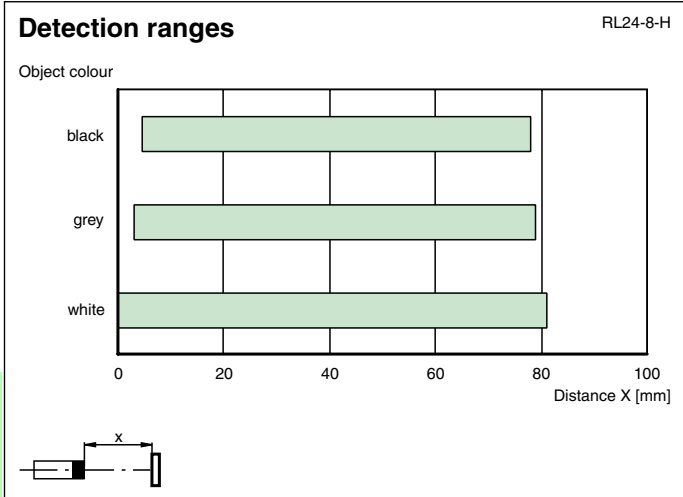
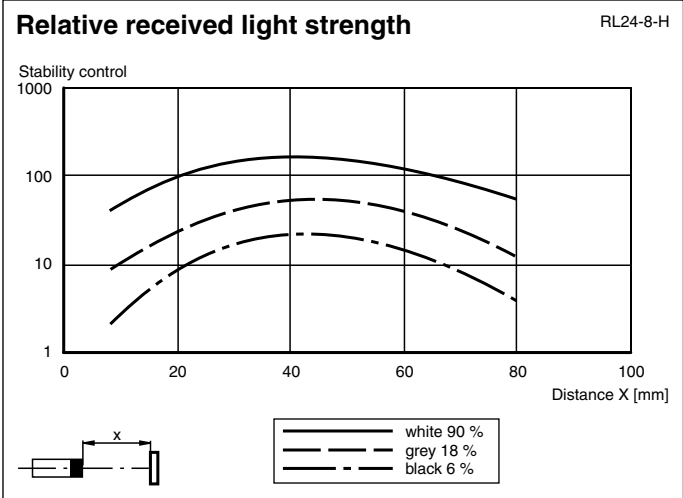
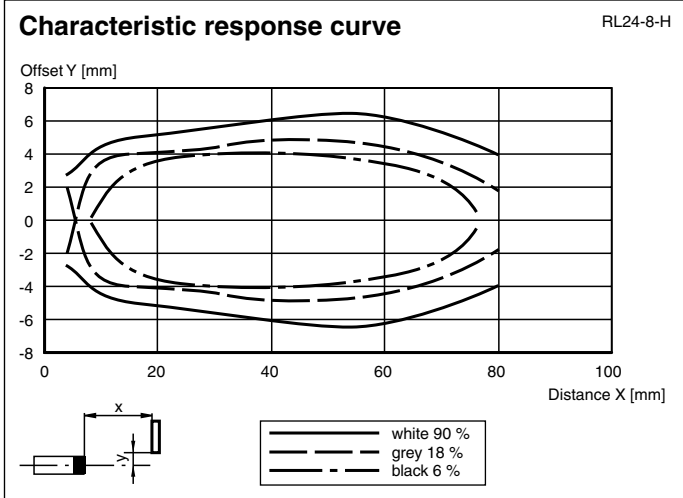
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL24-8-H-80/47/74a	RL24-8-H-80/49/74a
Detection range	20 ... 80 mm	◆	◆
Detection range min.	20 ... 80 mm	◆	◆
Sensor range max.	20 ... 90 mm	◆	◆
Background suppression	starts from 90 mm	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆
Diameter of the light spot	approx. 5 mm at 300 m detection range	◆	◆
Ambient light limit	100000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	55 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	250 Hz	◆	◆
Response time	2 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g	◆	◆



RL24-8-H-80/..74a

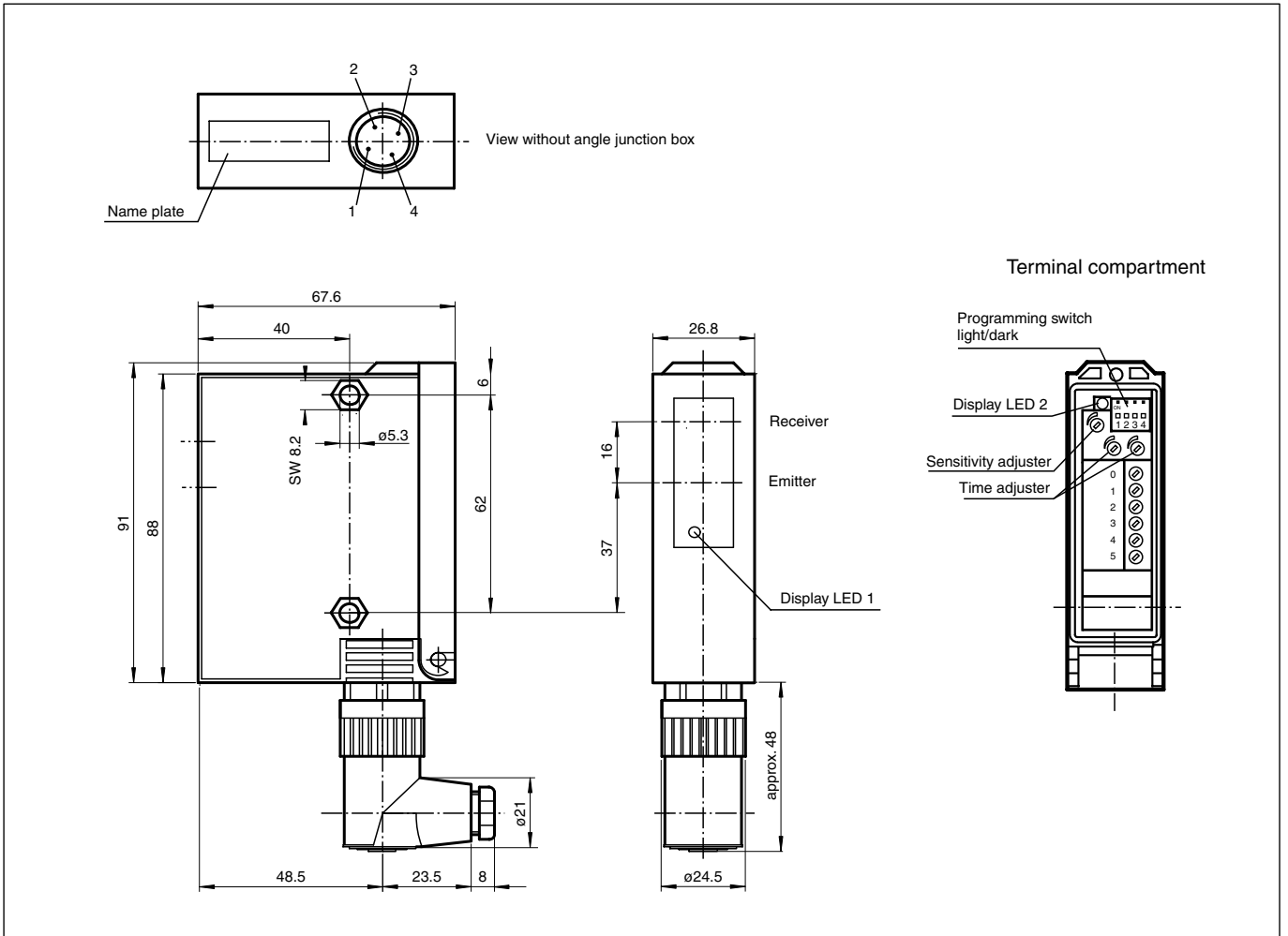
Diagrams



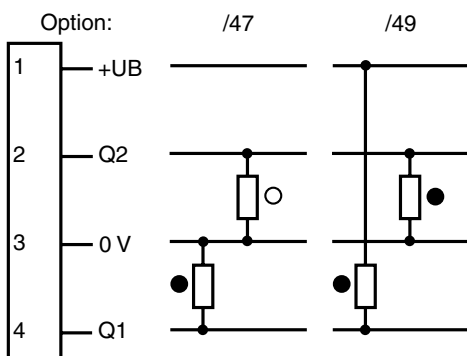
Series 24

Date of issue: 10/4/01

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL24-8-H-80/.. /92

Reflection light scanner with background suppression

RL24-8-H-80/.. /92

with M12, 4-pin metal connector



- ◆ Sensor range 80 mm
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions

Series
24

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

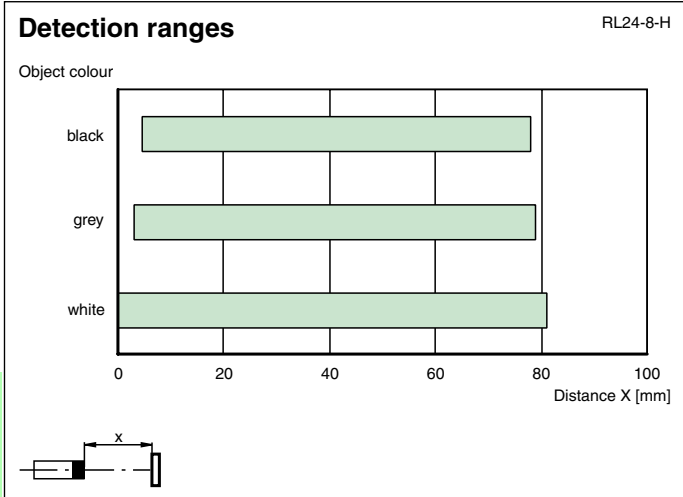
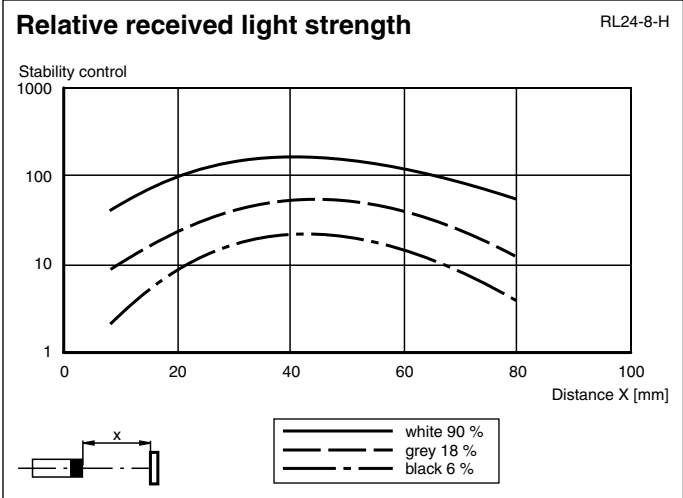
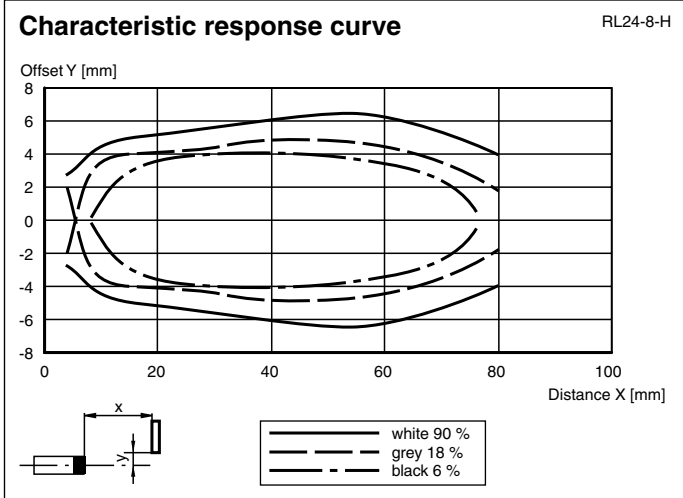
Date of issue: 10/4/01

Ordering code		RL24-8-H-80/47/92	RL24-8-H-80/49/92
Detection range	20 ... 80 mm	◆	◆
Detection range min.	20 ... 80 mm	◆	◆
Sensor range max.	20 ... 90 mm	◆	◆
Background suppression	starts from 90 mm	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆
Diameter of the light spot	approx. 5 mm at 300 m detection range	◆	◆
Ambient light limit	100000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free. flashing when falling short of the stability control	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	55 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	250 Hz	◆	◆
Response time	2 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	100 g	◆	◆



RL24-8-H-80/./92

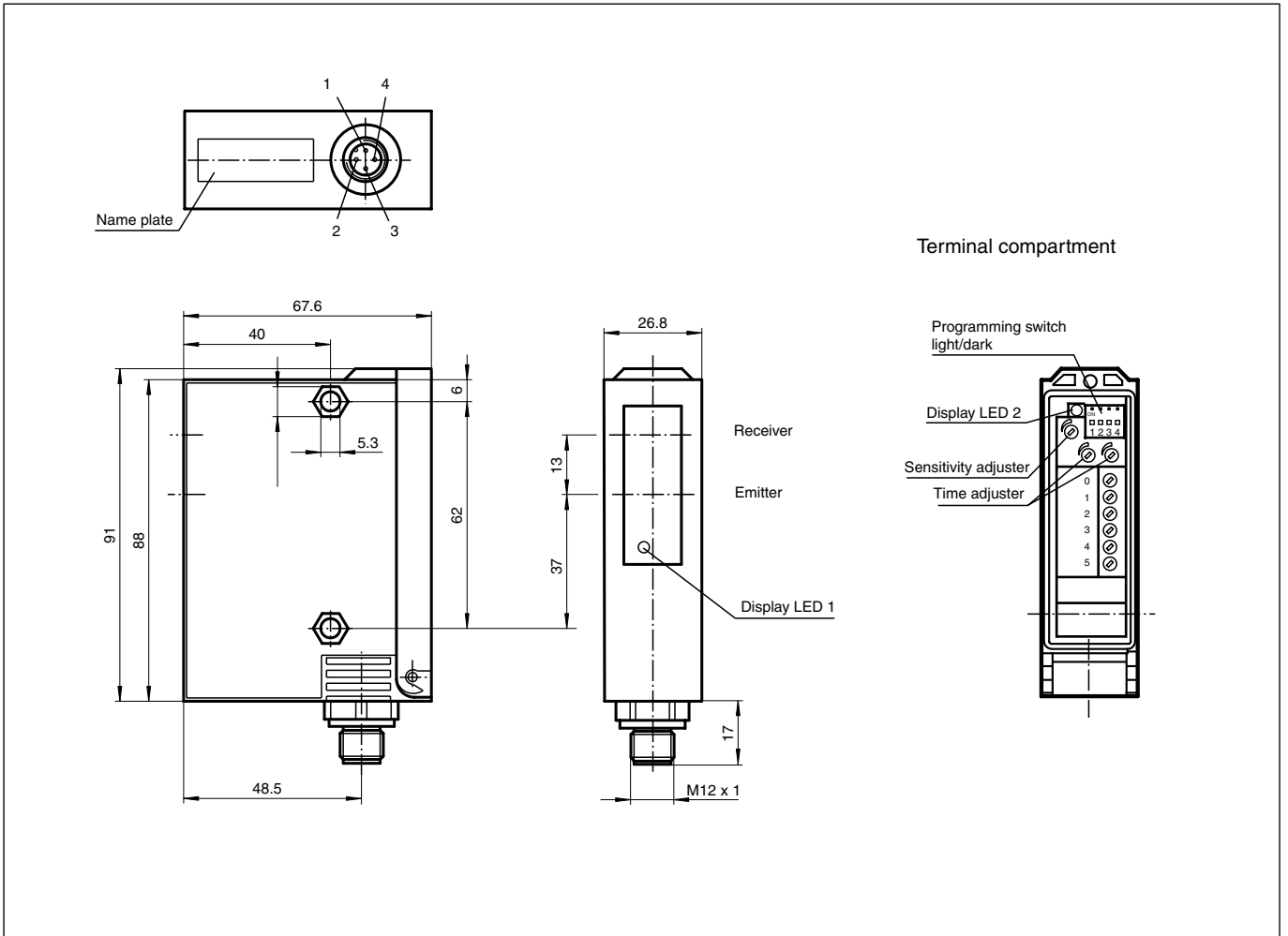
Diagrams



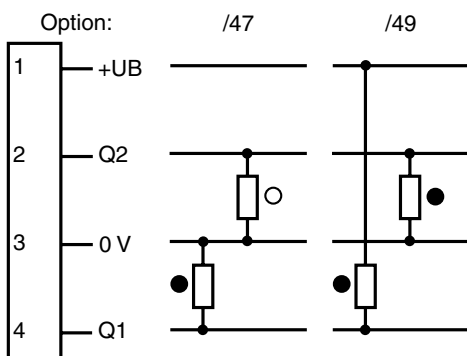
Series 24

Date of issue: 10/4/01

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



RLK24-8-H-.../100D

Reflection light scanner with background suppression

RLK24-8-H-.../100D

with 7-pin surface-mounted connector up to 250 VAC



- ◆ Sensor ranges 80 mm or 150 mm
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ 4 programmable timer functions
- ◆ Operating voltage
12 V ... 240 V AC/DC

Series
24

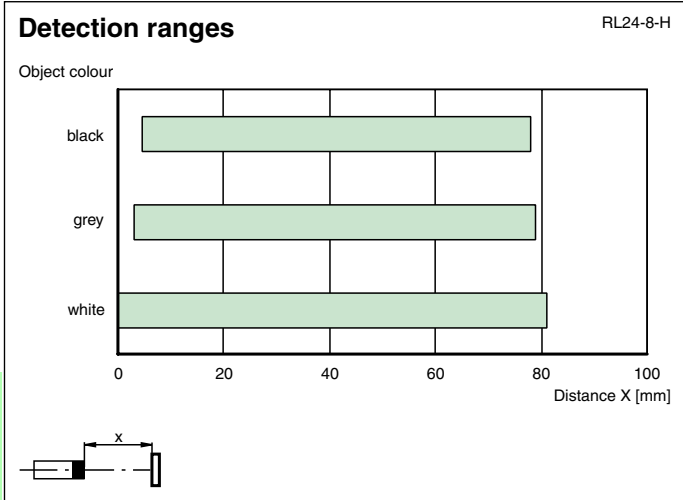
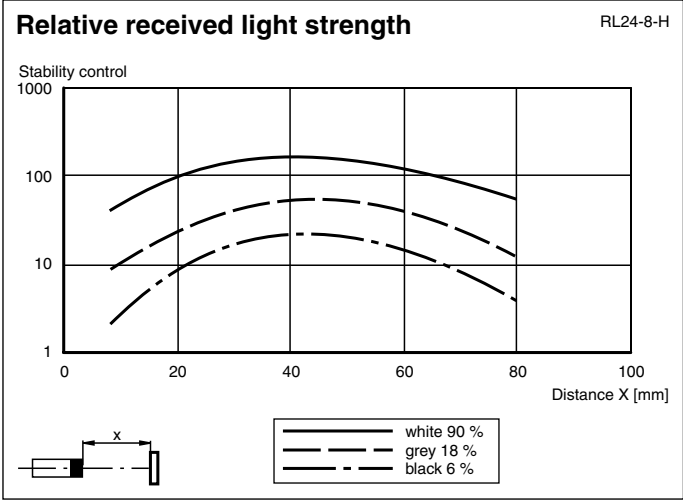
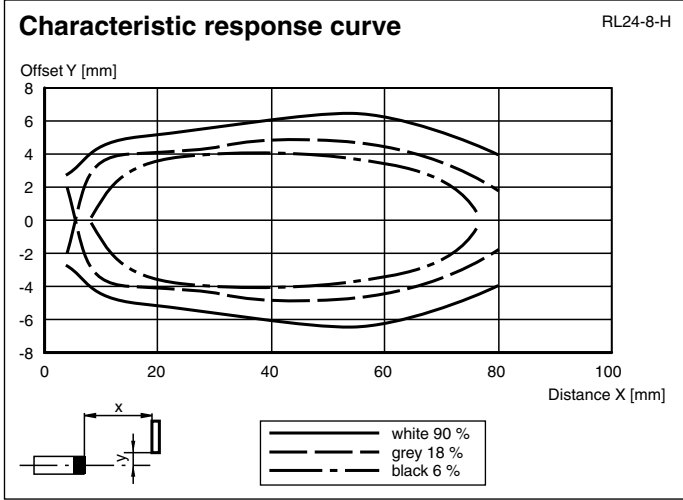
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RLK24-8-H-80/100D	RLK24-8-H-150/100D
Detection range	20 ... 80 mm	◆	
	30 ... 150 mm		◆
Detection range min.	20 ... 80 mm	◆	
	30 ... 150 mm		◆
Sensor range max.	20 ... 90 mm	◆	
	30 ... 160 mm		◆
Background suppression	starts from 160 mm		◆
	starts from 90 mm	◆	
Black/white difference (6%/90%)	< 10%	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	approx. 1.4°	◆	◆
Diameter of the light spot	approx. 5 mm at 300 m detection range	◆	◆
Ambient light limit	100000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free.	◆	◆
	flashing when falling short of the stability control		
Controls	Programming switch for light/dark ON, timer functions	◆	◆
Controls	2 potentiometers for timer functions	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆
Operating voltage	12 ... 240 V AC/DC	◆	◆
Power consumption	3 VA	◆	◆
Signal output	1 relay output, 1 alternator	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 250 V AC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	20 Hz	◆	◆
Response time	25 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	7-pin surface-mounted connector, up to 250 VAC (without cable socket)	◆	◆
Housing	GF17	◆	◆
Light exit	Glass	◆	◆
Mass	115 g	◆	◆



RLK24-8-H-.../100D

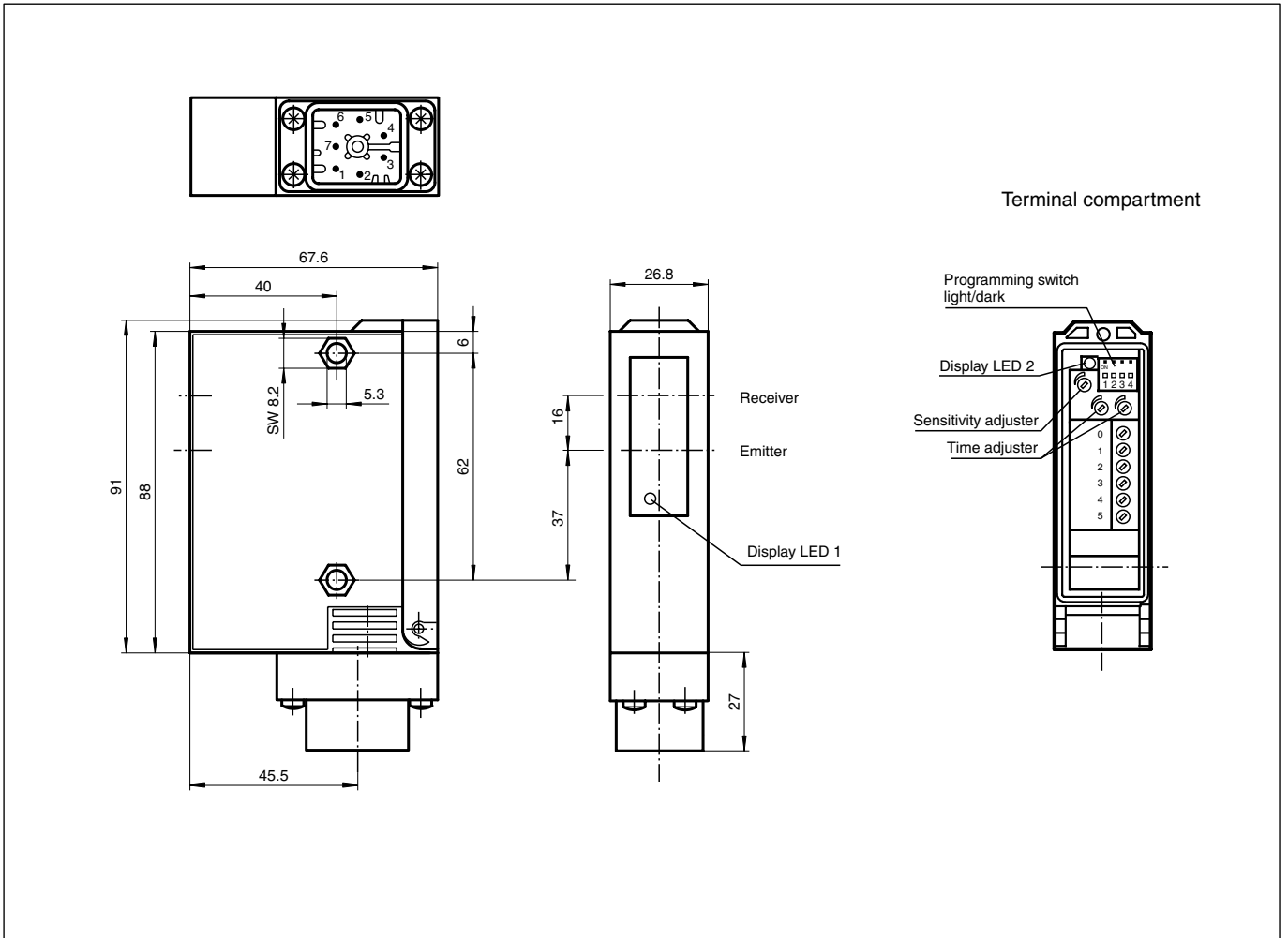
Diagrams



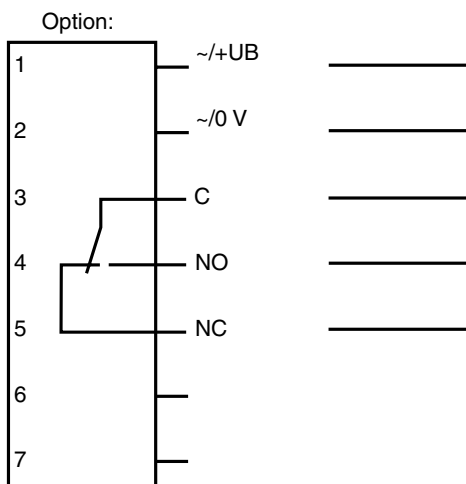
Series 24

Date of issue: 10/4/01

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



RL.24-8-H-../116

Reflection light scanner with background suppression

RL.24-8-H-../116

with terminal compartment



- ◆ Sensor ranges 80 mm or 150 mm
- ◆ Sturdy plastic housing
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ 4 programmable timer functions
- ◆ Operating voltage 10 V ... 30 V DC or 12 V ... 240 V AC/DC

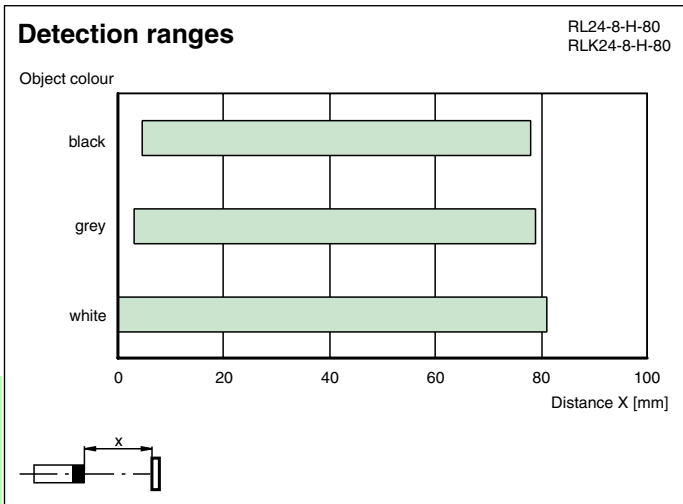
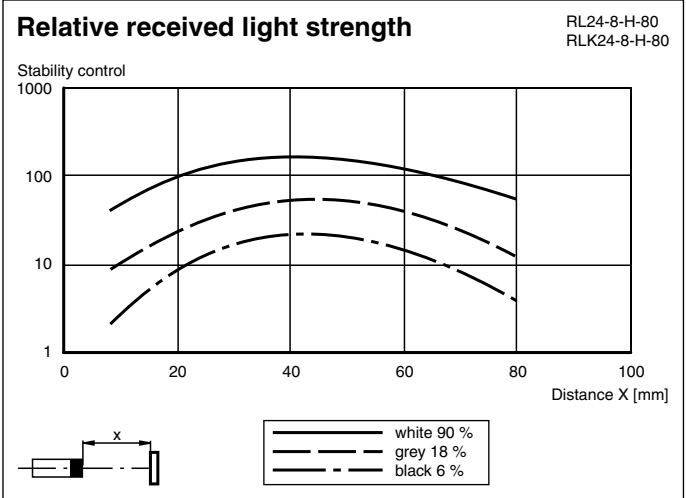
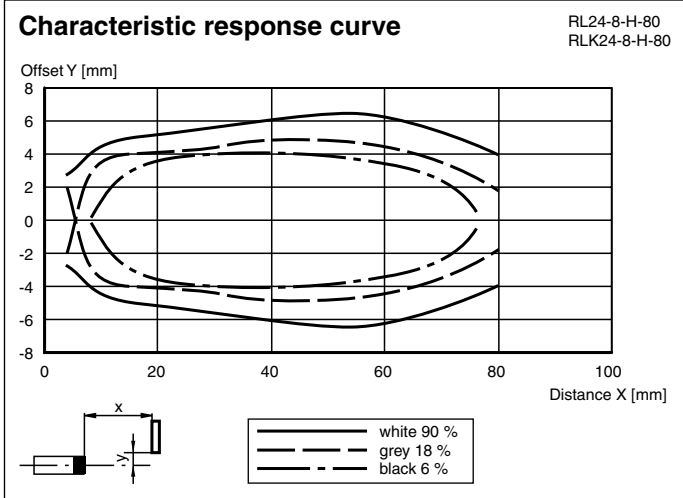
Series
24

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL24-8-H-80/47/76b/116	RL24-8-H-80/49/76b/116	RL24-8-H-80/47/76b/106/116	RL24-8-H-80/49/76b/106/116	RLK24-8-H-80/116	RLK24-8-H-150/116
Detection range	20 ... 80 mm	◆	◆	◆	◆	◆	
	30 ... 150 mm						◆
Detection range min.	20 ... 80 mm	◆	◆	◆	◆	◆	
	30 ... 150 mm						◆
Sensor range max.	20 ... 90 mm	◆	◆	◆	◆	◆	
	30 ... 160 mm						◆
Background suppression	starts from 160 mm						◆
	starts from 90 mm	◆	◆	◆	◆	◆	
Black/white difference (6%/90%)	< 10 %	◆	◆	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆	◆
Angle of divergence	approx. 1.4 °	◆	◆	◆	◆	◆	◆
Diameter of the light spot	approx. 5 mm at 300 m detection range	◆	◆	◆	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆
Function display	LED yellow, frontal and in the terminal compartment, lit up when light beam is free.	◆	◆	◆	◆	◆	◆
	flashing when falling short of the stability control	◆	◆	◆	◆	◆	◆
Controls	Programming switch for light/dark ON, timer functions	◆	◆	◆	◆	◆	◆
Controls	2 potentiometers for timer functions	◆	◆	◆	◆	◆	◆
Controls	1 Potentiometer as sensitivity adjuster	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆				
	12 ... 240 V AC/DC			◆	◆	◆	◆
	24 V DC ± 20 %			◆	◆		
Ripple	10 %	◆	◆	◆	◆		
No-load supply current	105 mA			◆	◆		
	55 mA	◆	◆				
Power consumption	3 VA					◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆			
	1 relay output, 1 alternator					◆	◆
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆		
Switching type	Light/dark ON, switchable	◆	◆	◆	◆	◆	◆
Switching voltage	max. 250 V AC					◆	◆
	30 V DC	◆	◆	◆	◆		
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆
Switching frequency	20 Hz					◆	◆
	250 Hz	◆	◆	◆	◆		
Response time	2 ms	◆	◆	◆	◆	◆	◆
Timer function	GAN, GAB, IAB, GAN-GAB, programmable adjustment range 0.1 ...10 s	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	1 pnp	◆	◆	◆	◆		
Test input	Emitter deactivation	◆	◆	◆	◆		
Ambient temperature	-20 ... +60 °C	◆	◆			◆	◆
	-35 ... +55 °C, with heated lens			◆	◆		
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆	◆	◆	◆
Housing	GF17	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆		
	115 g					◆	◆

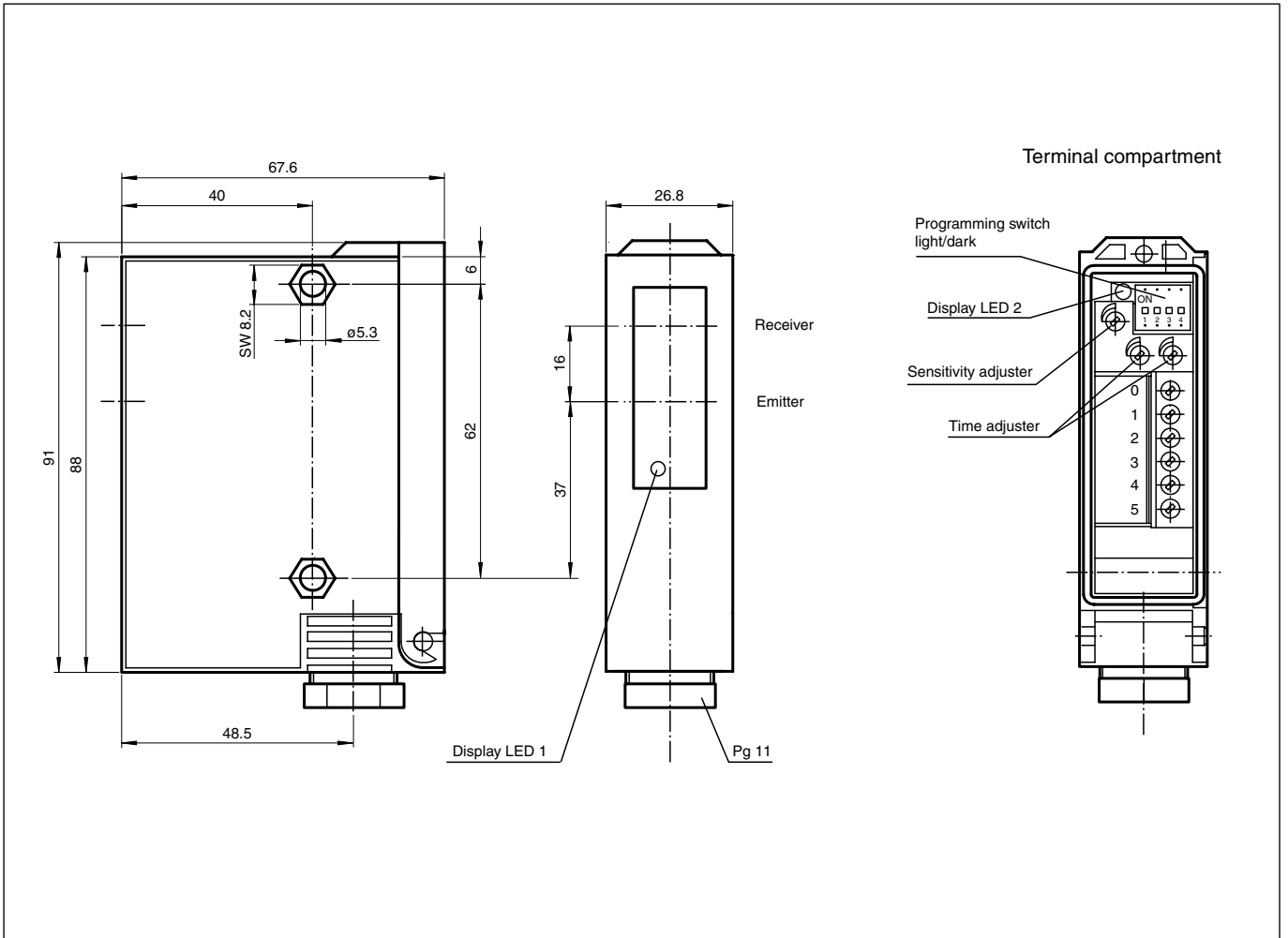


Diagrams

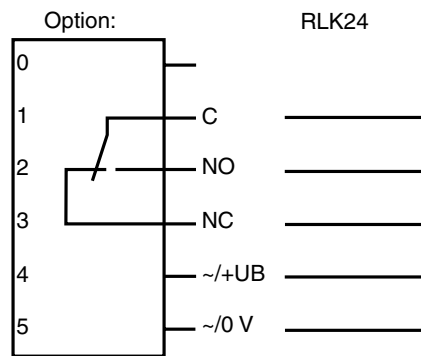
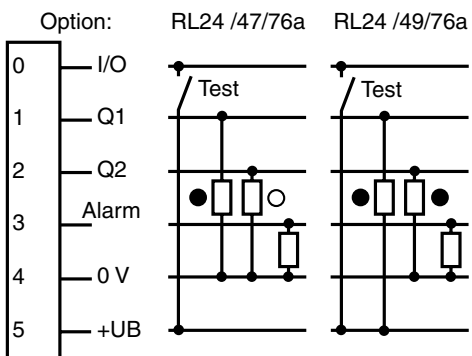


Series 24

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



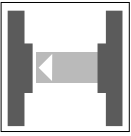


Series 25 – the ultimate in flexibility

The most significant features of the sensors of series 25 are their high output capacity, compact design and their highly variable options for fastening. All function types from single path light beam switches to the sensor with adjustable background suppression belong to series 25. In addition, there are two operating voltage models: 10 V to 30 V DC with PNP or NPN outputs, 12 V to 240 V AC with relay output. The sensors with the omni-voltage connection are equipped with an integrated power pack that adjusts itself automatically to the power supply that is applied to the sensor. Due to its fiberglass-reinforced plastic housing and scratch-resistant glass lens, series 25 is most suitable for use where a sturdy device is required.

These features allow for a highly varied range of possible applications, for example in material handling, in packaging machines, in elevators, with door and gate control systems and in mechanical engineering.

Principle	Type code	Sensing range/detection range	Page
	L25/LV25/116; L25/LK25/116	0 m ... 30 m	394
	L25/LV25/74a; L25/LK25/74a	0 m ... 30 m	386
	L25/LV25/92; L25/LK25/92	0 m ... 30 m	390
	L25/LV25-AS-I	0 m ... 30 m	394
	RL(K)25-55/116	0 mm ... 8000 mm	406
	RL(K)25-55/74a	0 mm ... 8000 mm	398
	RL(K)25-55/92	0 mm ... 8000 mm	402
	RL25-55-AS-I	0 mm ... 8000 mm	406
	RL(K)25-8/116	10 mm ... 2000 mm	420
	RL(K)25-8/74a	10 mm ... 2000 mm	412
	RL(K)25-8/92	10 mm ... 2000 mm	416
	RL25-8-AS-I	10 mm ... 2000 mm	420
	RL25-8-H/116	20 mm ... 300 mm	434
	RL25-8-H/74a	20 mm ... 300 mm	426
	RL25-8-H/92	20 mm ... 300 mm	430



L25/LV25/.../74a

Single path light beam switch

L25/LV25/.../74a

with 4-pin, M18 x 1 plastic connector

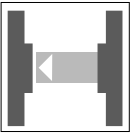


- ◆ Detection range up to 45 m
- ◆ Compact design
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ Test input

Series
25

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		L25/LV25/47/74a	L25/LV25/49/74a	L25/LV25/85/47/74a	L25/LV25/85/49/74a
Effective detection range	0 ... 10 m	◆	◆		
	0 ... 30 m			◆	◆
Threshold detection range	20 m	◆	◆		
	45 m			◆	◆
Obstacle size	18 mm	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆
Light source	IRED	◆	◆	◆	◆
Angle of divergence	emitter: approx. 2 °, receiver: approx. 4 °	◆	◆	◆	◆
Diameter of the light spot	350 mm at a distance of 10 m	◆	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆		
	60000 Lux			◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Function display	LED green, lights up when light beam is free/flashes when falling short of the stability control	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	40 mA (device)	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆	◆
Response time	2 ms	◆	◆	◆	◆
Test input	Emitter deactivation	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	90 g (device)	◆	◆	◆	◆

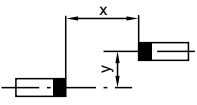
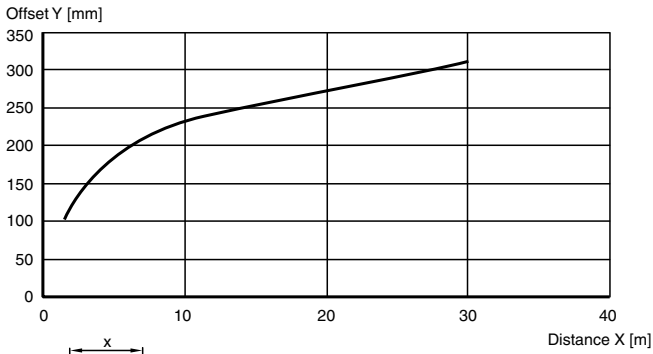


L25/LV25/.../74a

Diagrams

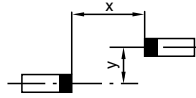
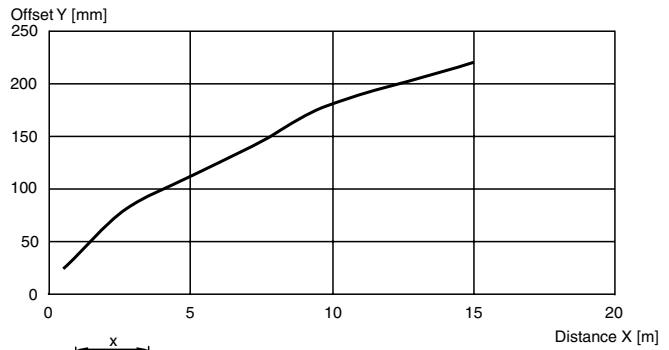
Characteristic response curve

L25/LV25/35



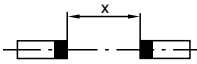
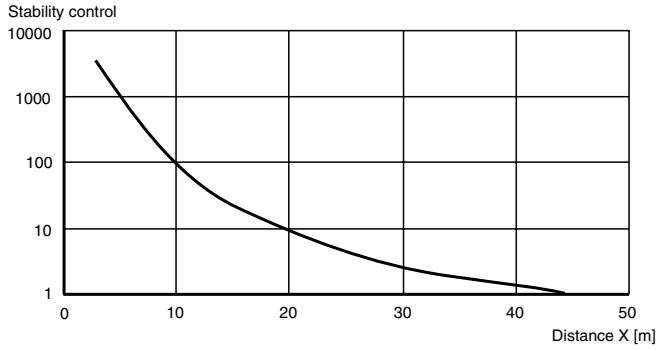
Characteristic response curve

L25/LV25



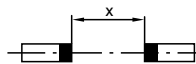
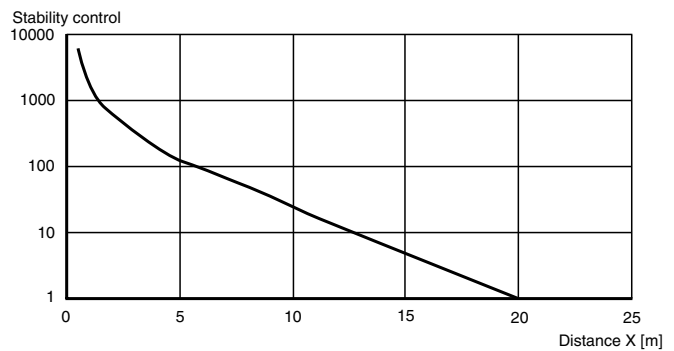
Relative received light strength

L25/LV25/35

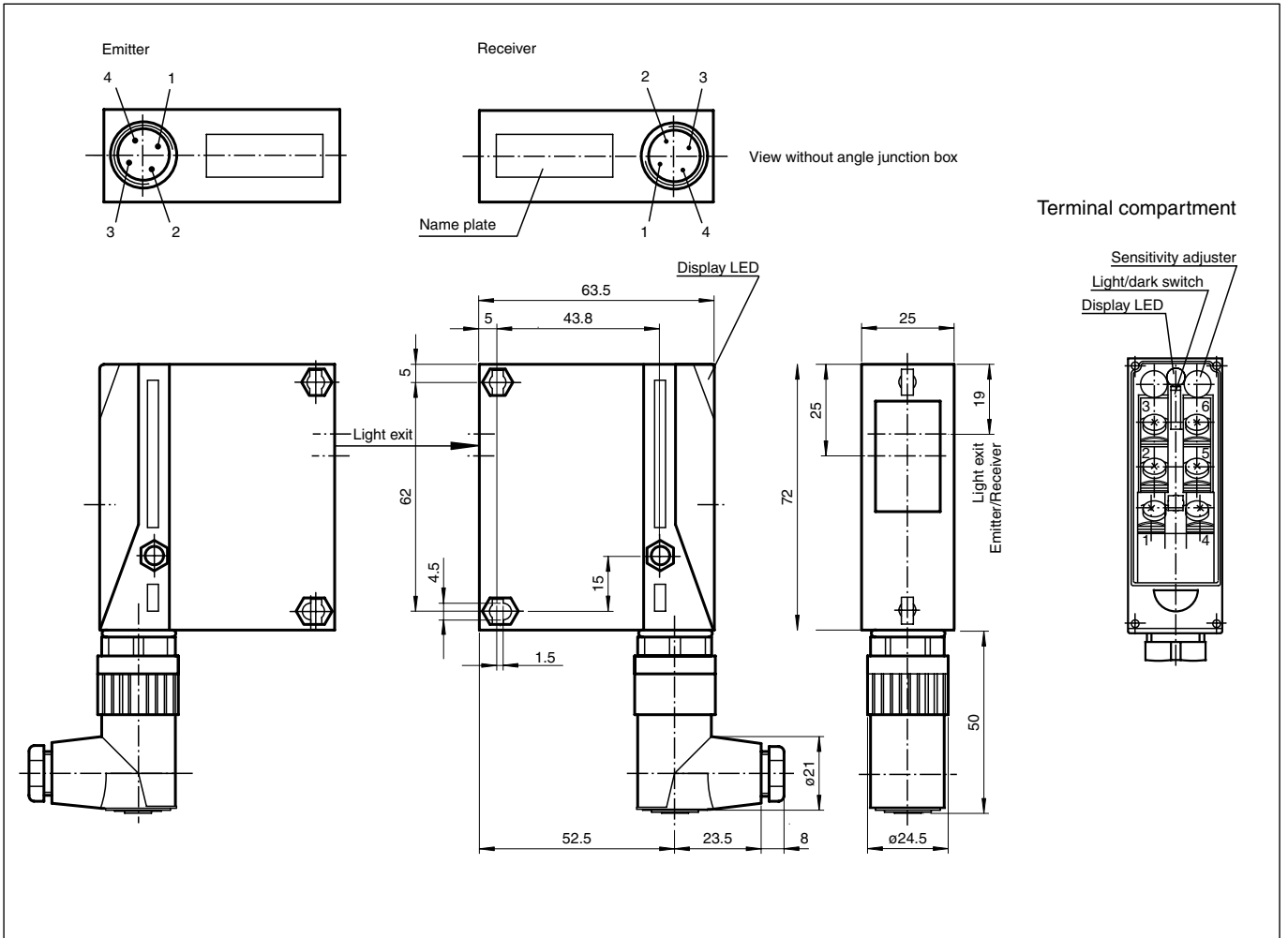


Relative received light strength

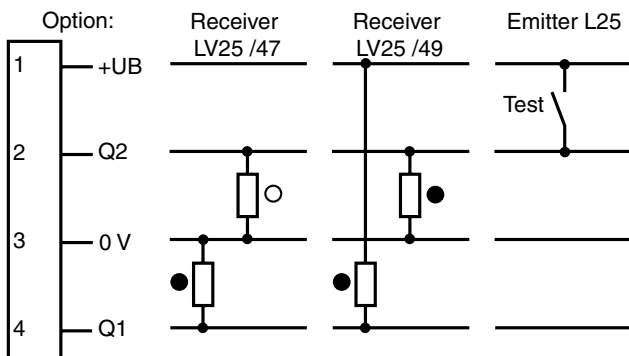
L25/LV25



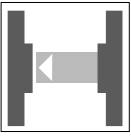
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



L25/LV25/.../92

Single path light beam switch

L25/LV25/.../92

with M12, 4-pin metal connector



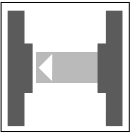
- ◆ Detection range up to 45 m
- ◆ Compact design
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication
- ◆ Test input

Series
25

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		L25/LV25/47/92	L25/LV25/49/92	L25/LV25/35/47/92	L25/LV25/35/49/92
Effective detection range	0 ... 10 m	◆	◆		
	0 ... 30 m			◆	◆
Threshold detection range	20 m	◆	◆		
	45 m			◆	◆
Obstacle size	18 mm	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆
Light source	IRED	◆	◆	◆	◆
Angle of divergence	emitter: approx. 2 °, receiver: approx. 4 °	◆	◆	◆	◆
Diameter of the light spot	350 mm at a distance of 10 m	◆	◆	◆	◆
Ambient light limit	100000 Lux	◆	◆		
	60000 Lux			◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Function display	LED green, lights up when light beam is free/flashes when falling short of the stability control	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	40 mA (device)	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆	◆
Response time	2 ms	◆	◆	◆	◆
Test input	Emitter deactivation	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	90 g (device)	◆	◆	◆	◆

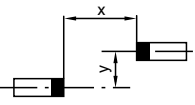
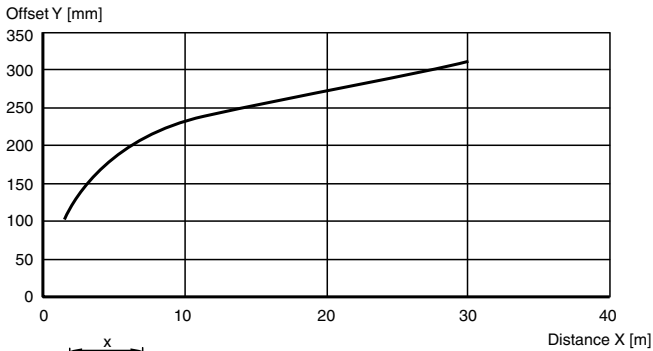


L25/LV25/.../92

Diagrams

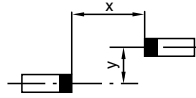
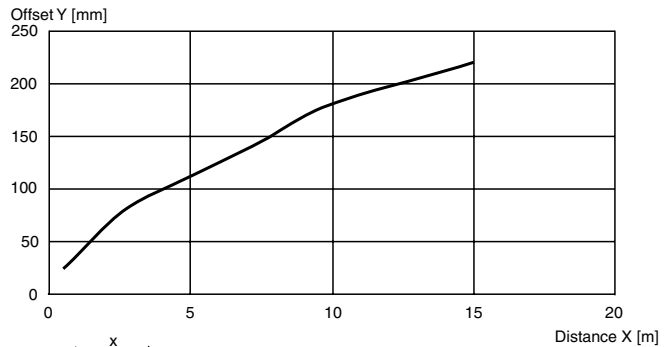
Characteristic response curve

L25/LV25/35



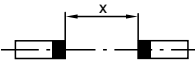
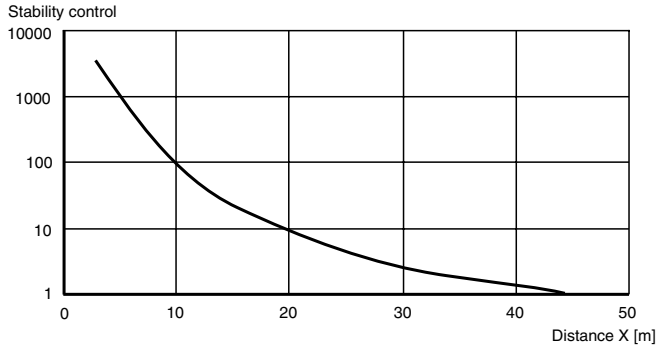
Characteristic response curve

L25/LV25



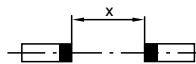
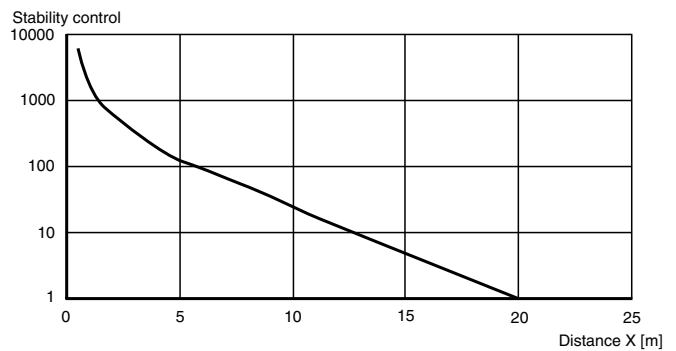
Relative received light strength

L25/LV25/35

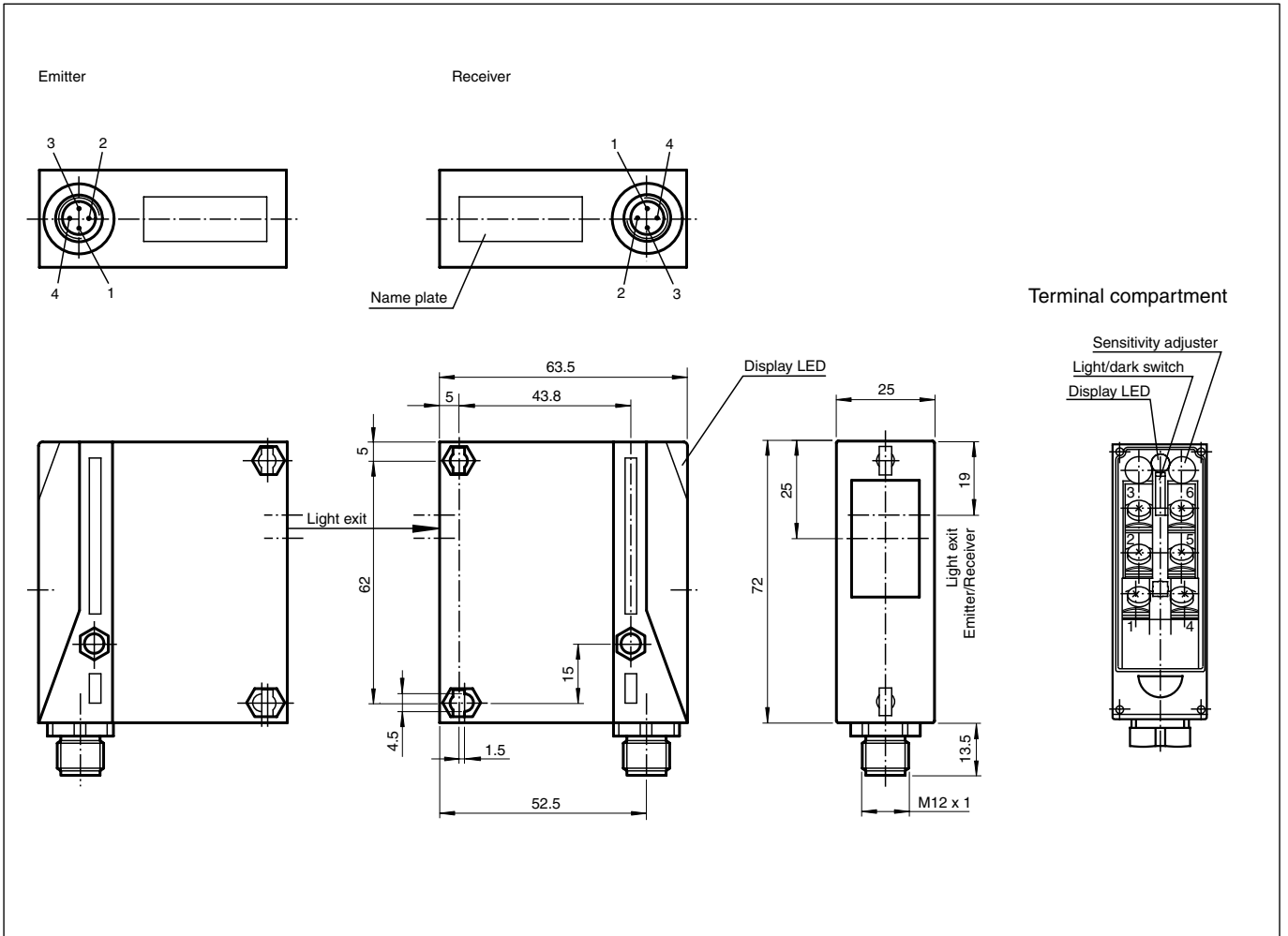


Relative received light strength

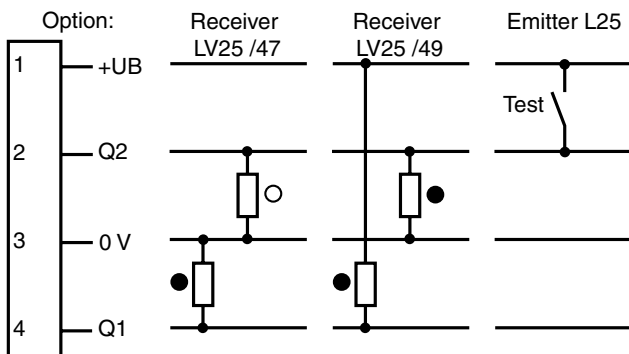
L25/LV25



Dimensions

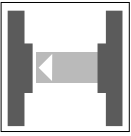


Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



L25/L.25/...

Single path light beam switch

L25/L.25/...

with terminal compartment

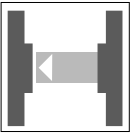


- ◆ Detection range up to 45 m
- ◆ Compact design
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ Test input
- ◆ AS-Interface

Series
25

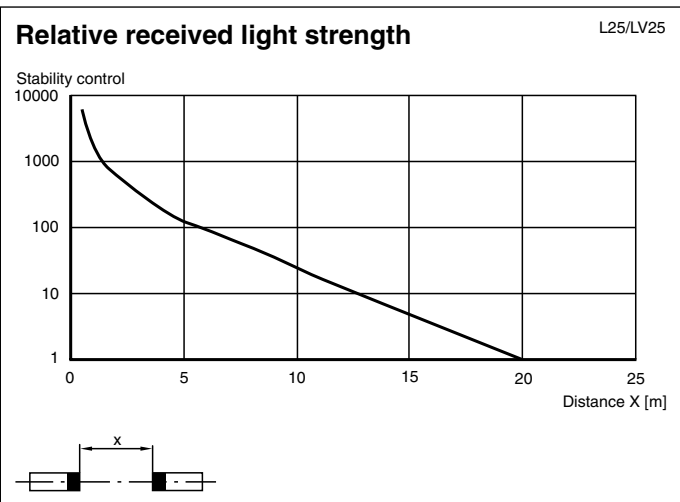
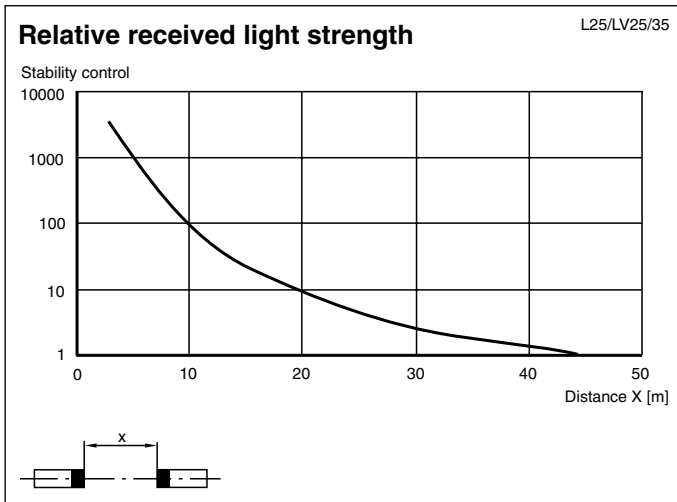
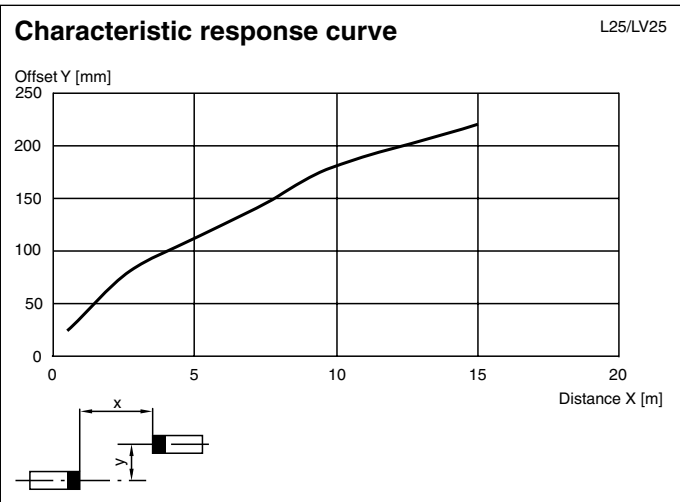
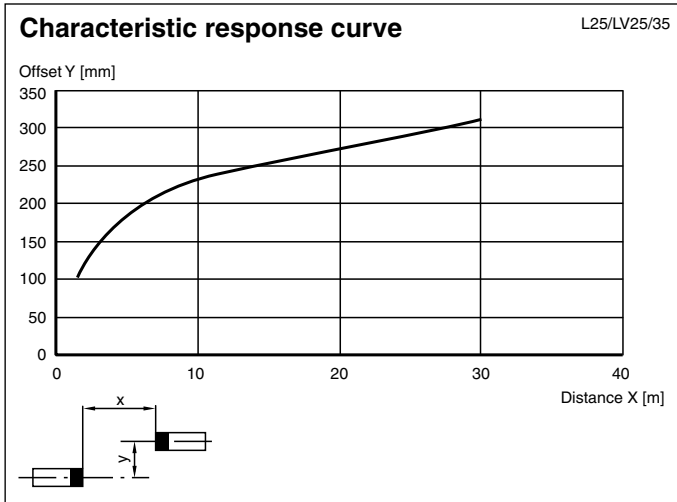
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		L25/LV25/47/116	L25/LV25/49/116	L25/LV25/65/47/116	L25/LV25/65/49/116	L25/LK25/116	L25/LK25/35/116	L25/LV25-AS-I	L25/LV25-AS-I/35
Effective detection range	0 ... 10 m	◆	◆			◆		◆	
	0 ... 30 m			◆	◆		◆		◆
Threshold detection range	20 m	◆	◆			◆		◆	
	45 m			◆	◆		◆		◆
Obstacle size	18 mm	◆	◆	◆	◆	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IRED	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	emitter: approx. 2 °, receiver: approx. 4 °	◆	◆	◆	◆	◆	◆	◆	◆
Diameter of the light spot	approx. 1000 mm at a distance of 30 m						◆		
	350 mm at a distance of 10 m	◆	◆	◆	◆	◆		◆	◆
Ambient light limit	100000 Lux	◆	◆			◆		◆	
	60000 Lux			◆	◆		◆		◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED green, lights up when light beam is free/flashes when falling short of the stability control	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆	◆	◆	◆		
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆		
Operating voltage	via AS-i network							◆	◆
	10 ... 30 V DC	◆	◆	◆	◆				
Ripple	12 ... 240 V AC/DC					◆	◆		
	10 %	◆	◆	◆	◆				
No-load supply current	40 mA (device)	◆	◆	◆	◆			◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆					
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆				
	1 relay, 1 alternator					◆	◆		
	AS-Interface							◆	◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 250 V AC					◆	◆		
Switching current	30 V DC	◆	◆	◆	◆				
	max. 2 A	◆	◆	◆	◆				
Switching frequency	max. 200 mA	◆	◆	◆	◆				
	25 Hz					◆	◆		
	250 Hz	◆	◆	◆	◆				
Response time	250 Hz (max. 100 Hz with 31 slaves)							◆	◆
	2 ms	◆	◆	◆	◆			◆	◆
	20 ms					◆	◆		
Output of the pre-fault indication	1 pnp	◆	◆	◆	◆			◆	◆
	Data bit D1							◆	◆
Test input	Emitter deactivation	◆	◆	◆	◆				
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆	◆	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆	◆
Mass	100 g (device)					◆	◆		
	90 g (device)	◆	◆	◆	◆			◆	◆



L25/L.25/...

Diagrams



AS-Interface Parameters

Slave profile: IO code = 1, ID code = F

• **Parameter bit**

Bit	Type	device function
P0	parameter	none
P1	parameter	inversion of D0
P2	parameter	none
P3	parameter	none

Meaning at Host level

none
 1 = light on (D0 = 1 with receiver lit)(light-dark switching)
 0 = dark on (D0 = 0 with receiver lit)
 none
 none

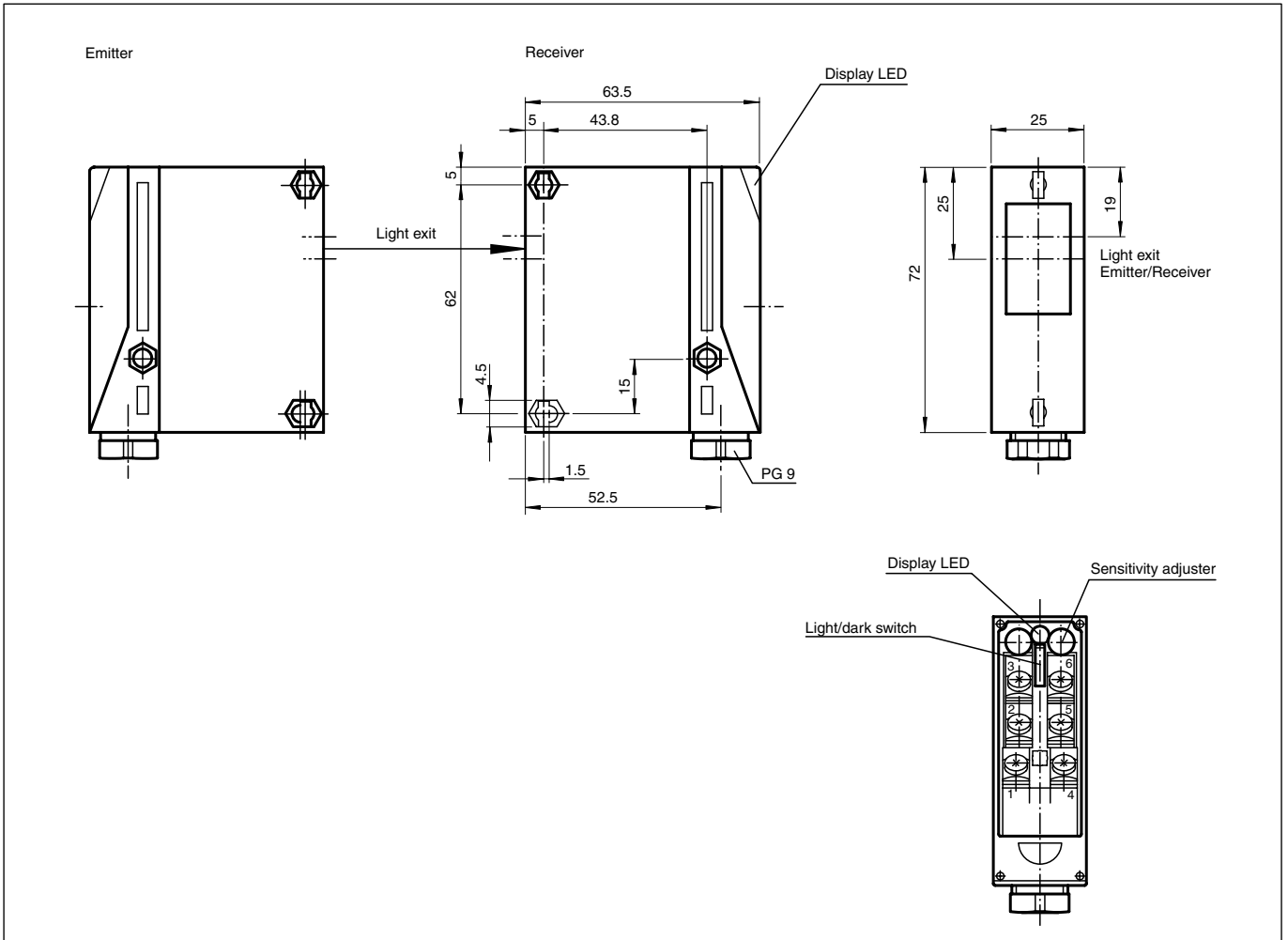
• **Data bit**

Bit	Type	device function
D0	input	sensor function
D1	input	warning
D2	input	functional readiness
D3	output	test function

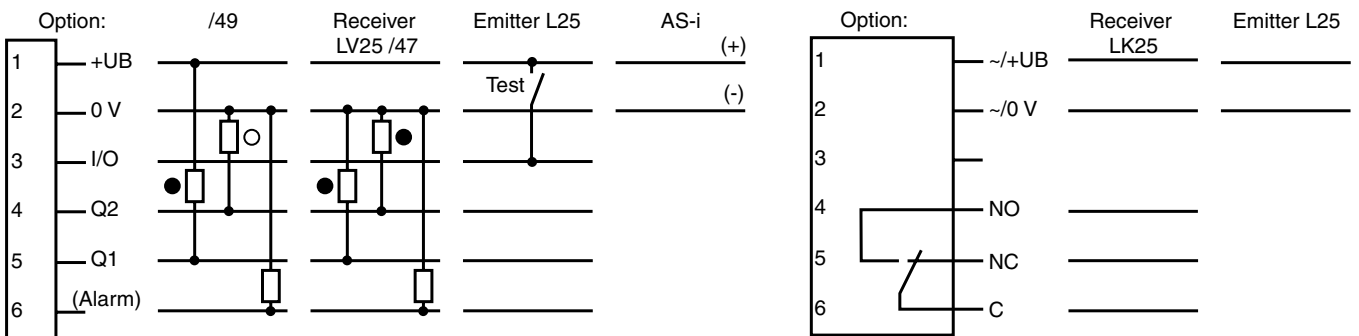
Meaning at Host level

1 = receiver lit (at P1 = 1)
 0 = receiver not lit (at P1 = 1)
 0 = receiver lit (at P1 = 0)
 1 = receiver not lit (at P1 = 0)
 1 = sufficient stability control (> 3-fold) or receiver not lit (delay time until setting to 1: < 5 s);
 0 = insufficient stability control (delay time until setting to 0: < 2 s)
 1 = device ready for operation
 0 = device not ready for operation
 none

Dimensions

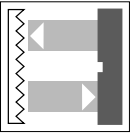


Electrical Connection



○ = Light ON, ● = Dark ON

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RL25-55/.../74a

Reflection light beam switch with polarisation filter

RL25-55/.../74a

with 4-pin, M18 x 1 plastic connector

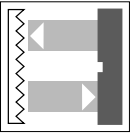


- ◆ Detection range up to 8 m, optional 14 m
- ◆ Compact construction
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication

Series
25

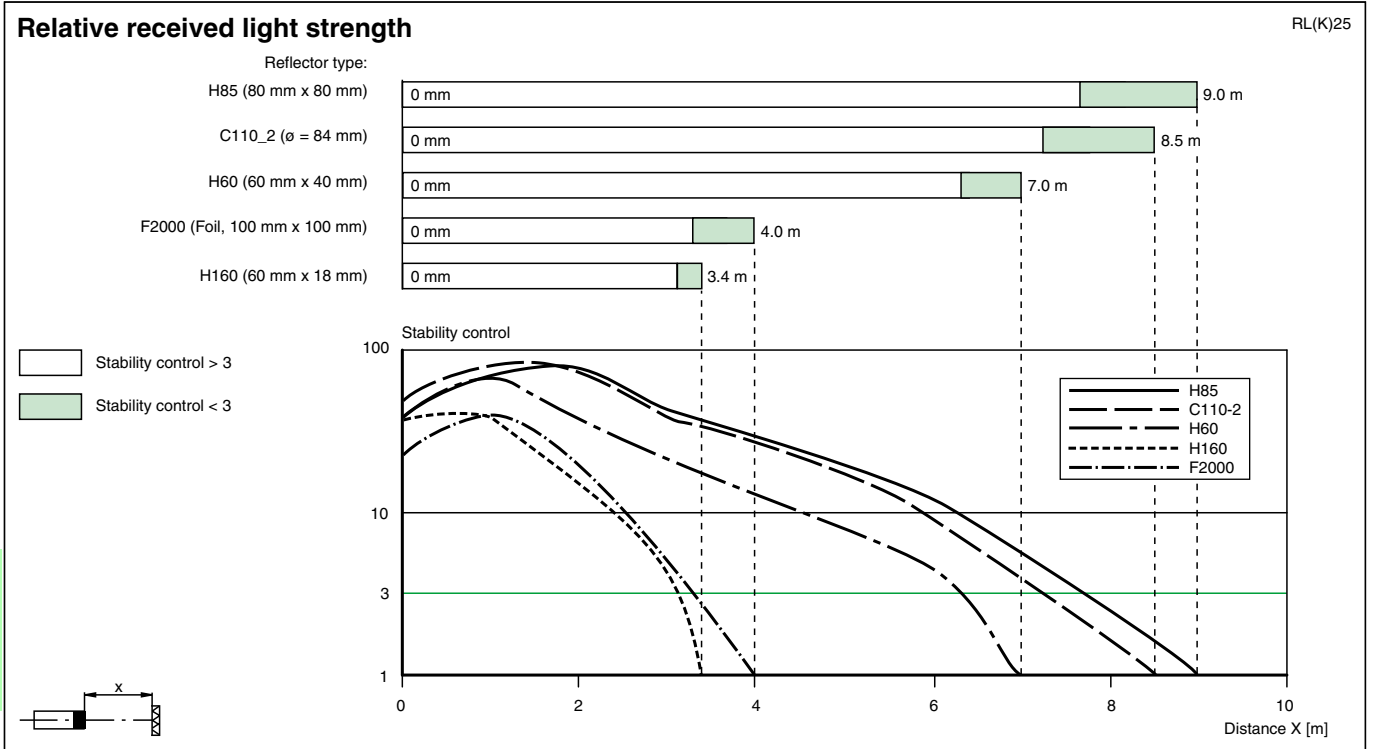
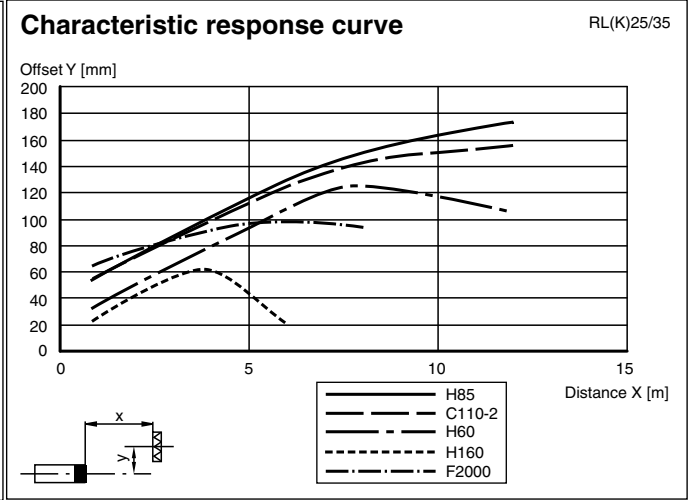
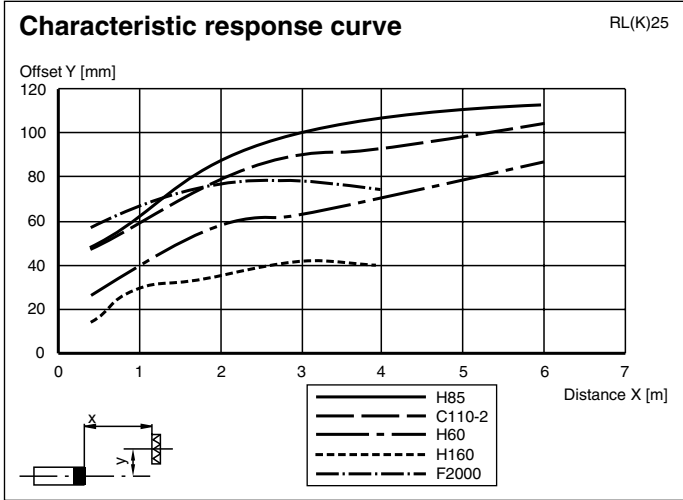
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL25-55/47/74a	RL-25-55/49/74a	RL25-55/05/47/74a	RL25-55/05/49/74a
Effective detection range	0 ... 4000 mm	◆	◆		
	0 ... 8000 mm			◆	◆
Threshold detection range	14 m (with C110-2 reflector)			◆	◆
	8 m (with C110-2 reflector)	◆	◆		
Reflector distance	0 ... 4000 mm	◆	◆		
	400 ... 8000 mm			◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Angle of divergence	approx. 2 °	◆	◆	◆	◆
Diameter of the light spot	approx. 100 mm at a distance of 4000 mm	◆	◆		
	approx. 250 mm at a distance of 10 m			◆	◆
Ambient light limit	80000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Function display	LED green, lights up when light beam is free/flashes when falling short of the stability control	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆	◆
Response time	2 ms	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	90 g	◆	◆	◆	◆



RL25-55/.../74a

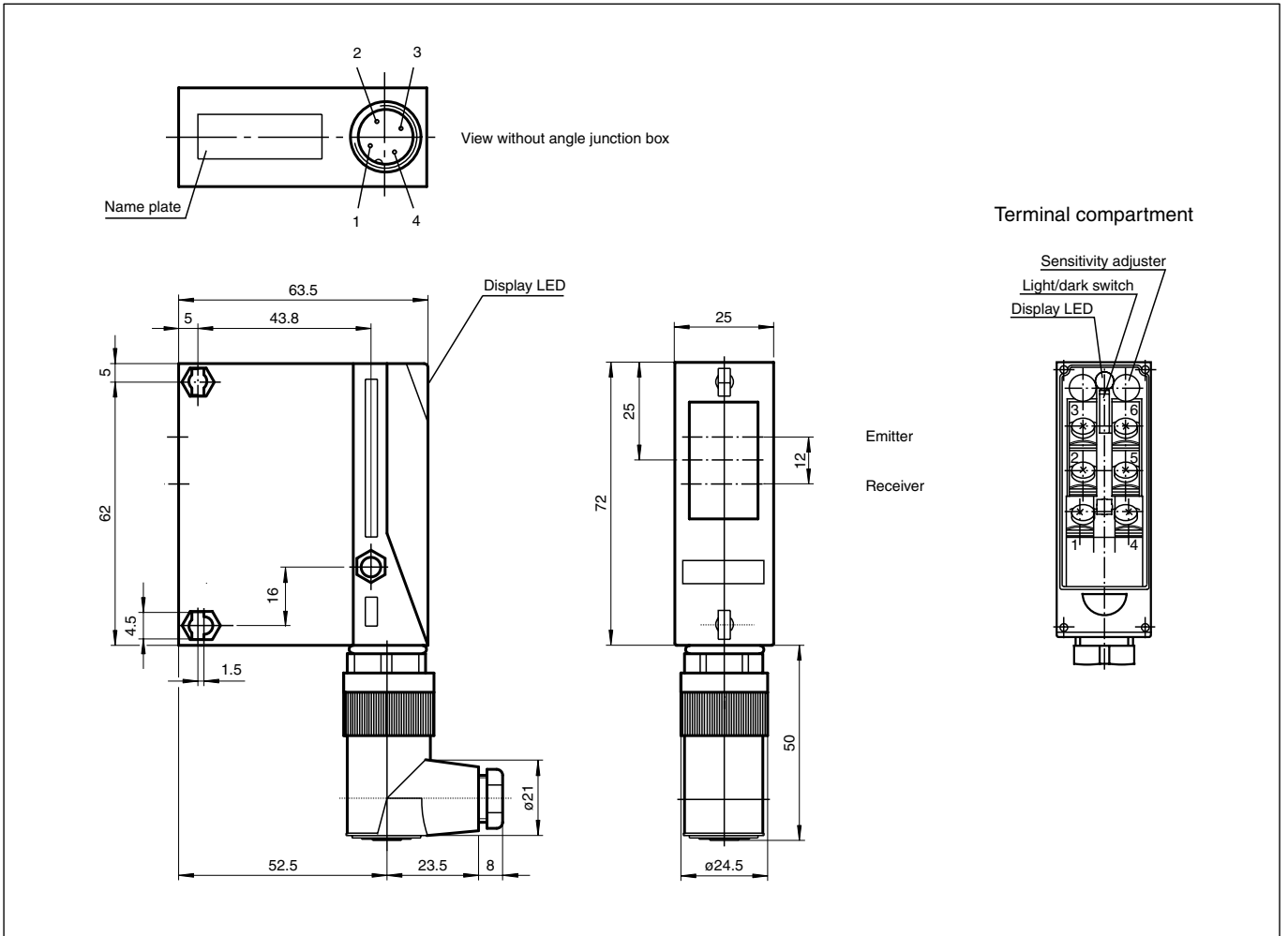
Diagrams



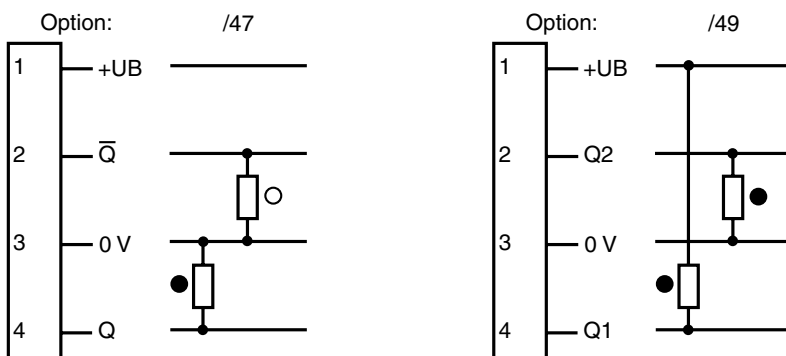
Series 25

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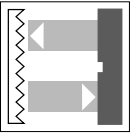
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL25-55/.../92

Reflection light beam switch with polarisation filter

RL25-55/.../92

with M12, 4-pin metal connector



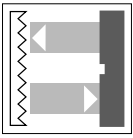
- ◆ Detection range up to 8 m, optional 14 m
- ◆ Compact construction
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication

Series
25

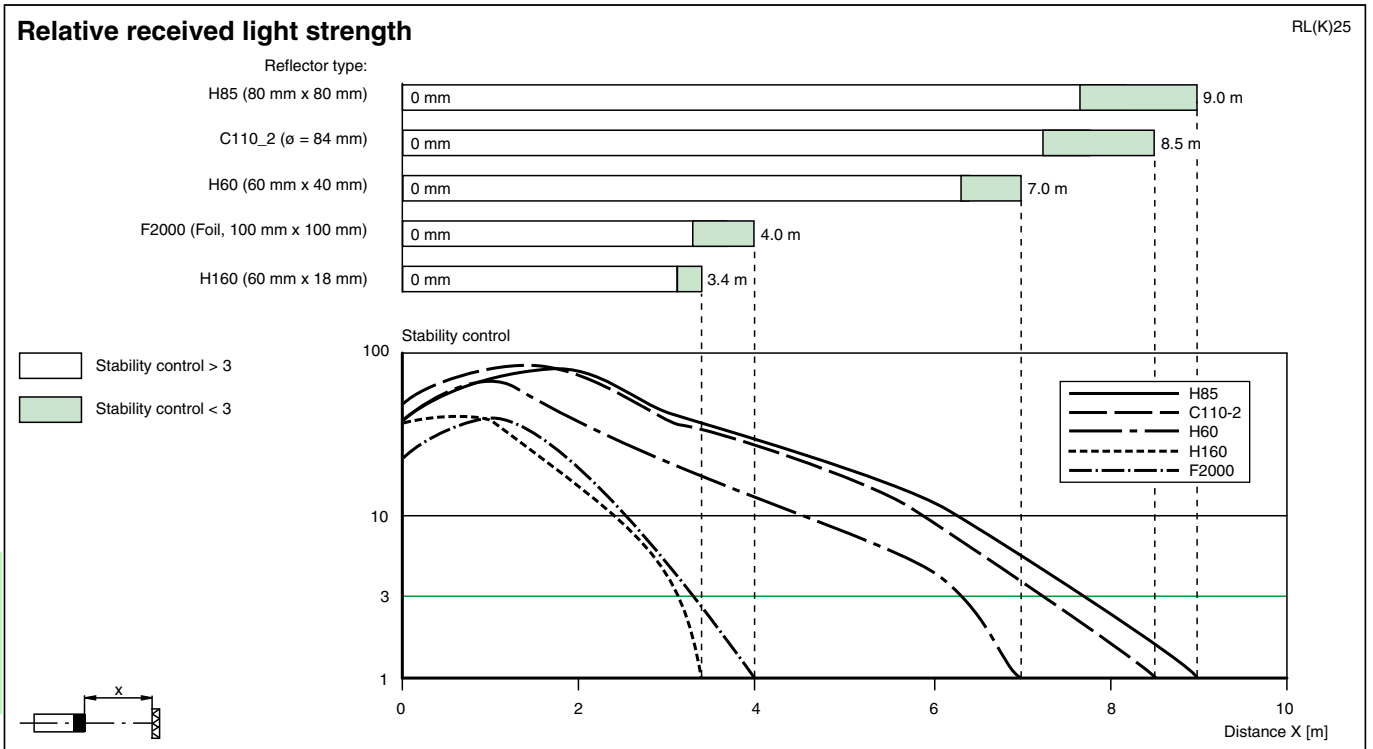
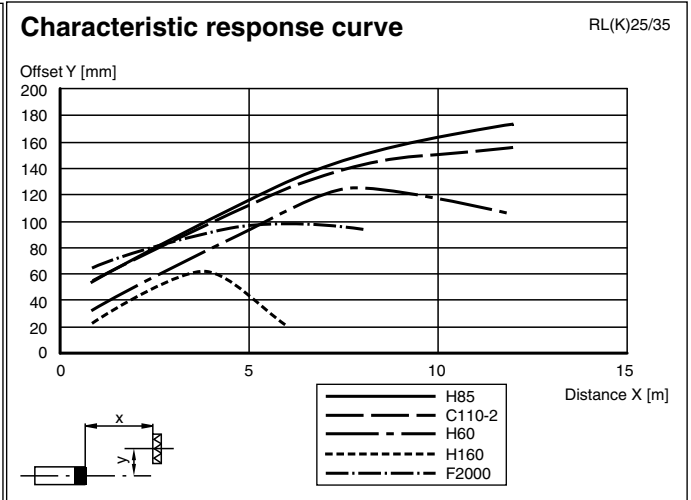
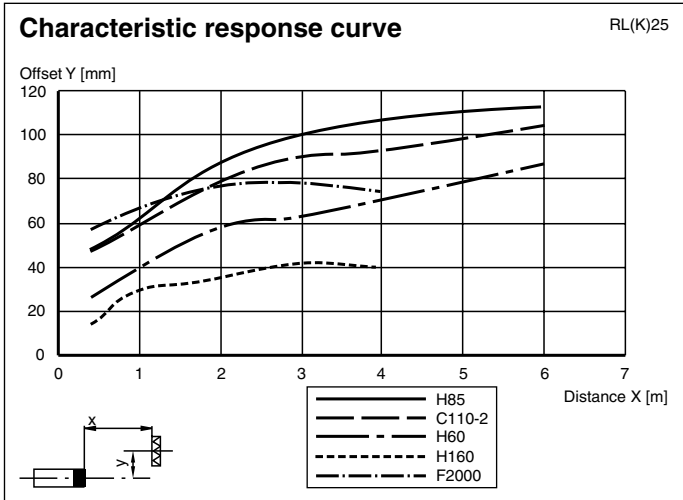
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		RL25-55/47/92	RL25-55/49/92	RL25-55/35/47/92	RL25-55/35/49/92
Effective detection range	0 ... 4000 mm	◆	◆		
	0 ... 8000 mm			◆	◆
Threshold detection range	14 m (with C110-2 reflector)			◆	◆
	8 m (with C110-2 reflector)	◆	◆		
Reflector distance	0 ... 4000 mm	◆	◆		
	400 ... 8000 mm			◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Angle of divergence	approx. 2 °	◆	◆	◆	◆
Diameter of the light spot	approx. 100 mm at a distance of 4000 mm	◆	◆		
	approx. 250 mm at a distance of 10 m			◆	◆
Ambient light limit	80000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Function display	LED green, lights up when light beam is free/flashes when falling short of the stability control	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆	◆
Response time	2 ms	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	90 g	◆	◆	◆	◆



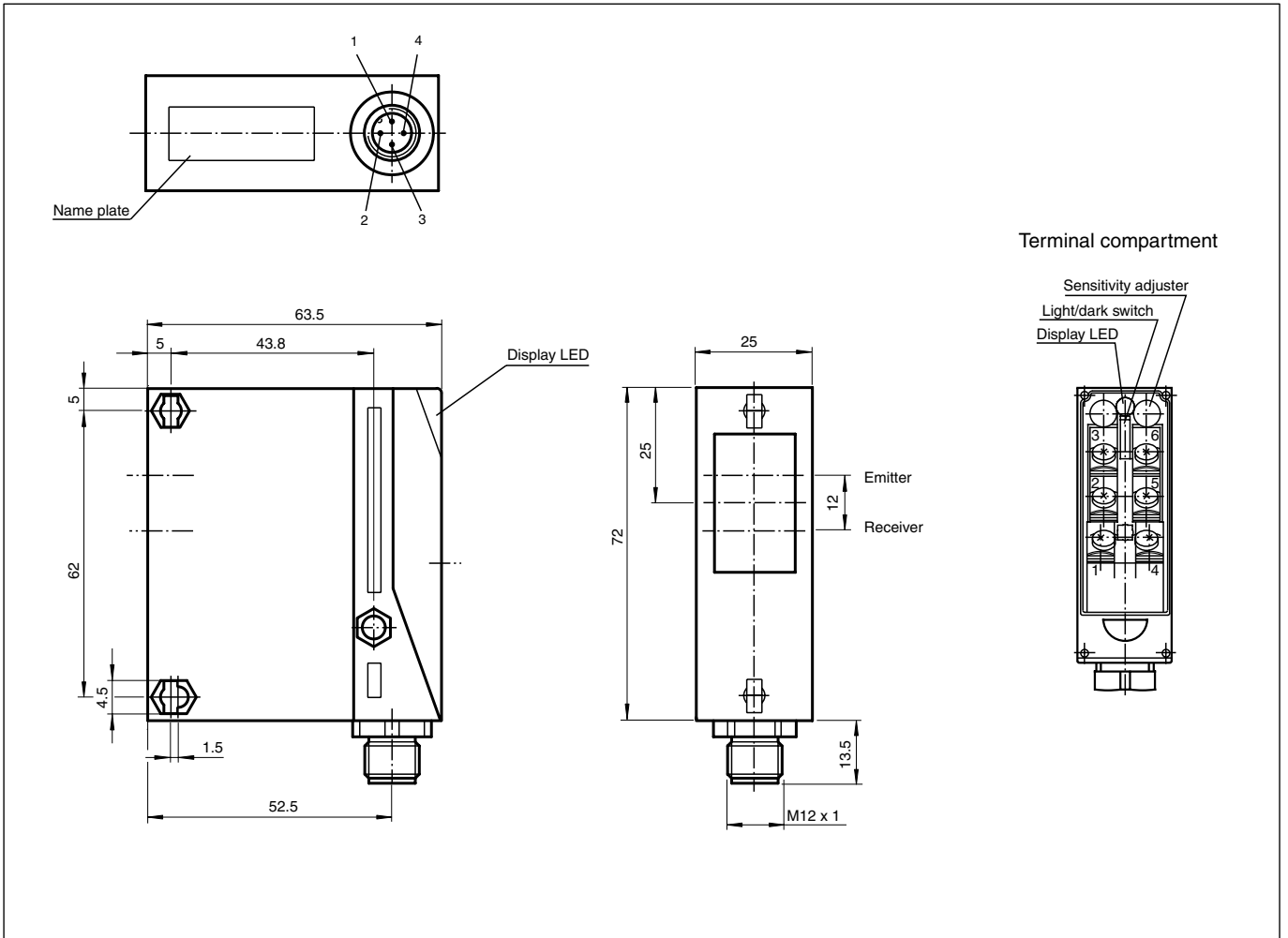
Diagrams



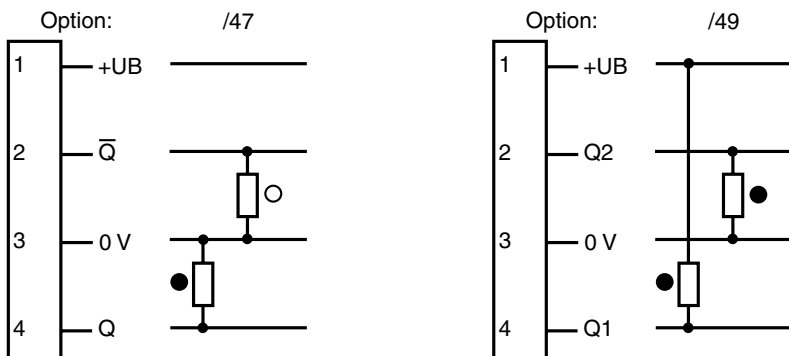
Series 25

Date of issue: 10/4/01

Dimensions

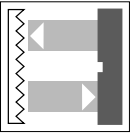


Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



RL.25-55/...

Reflection light beam switch with polarisation filter

RL.25-55/...

with terminal compartment

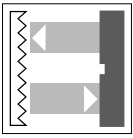


- ◆ Detection range up to 8 m, optional 14 m
- ◆ Compact construction
- ◆ Light/dark switch
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ AS-Interface
- ◆ Test input

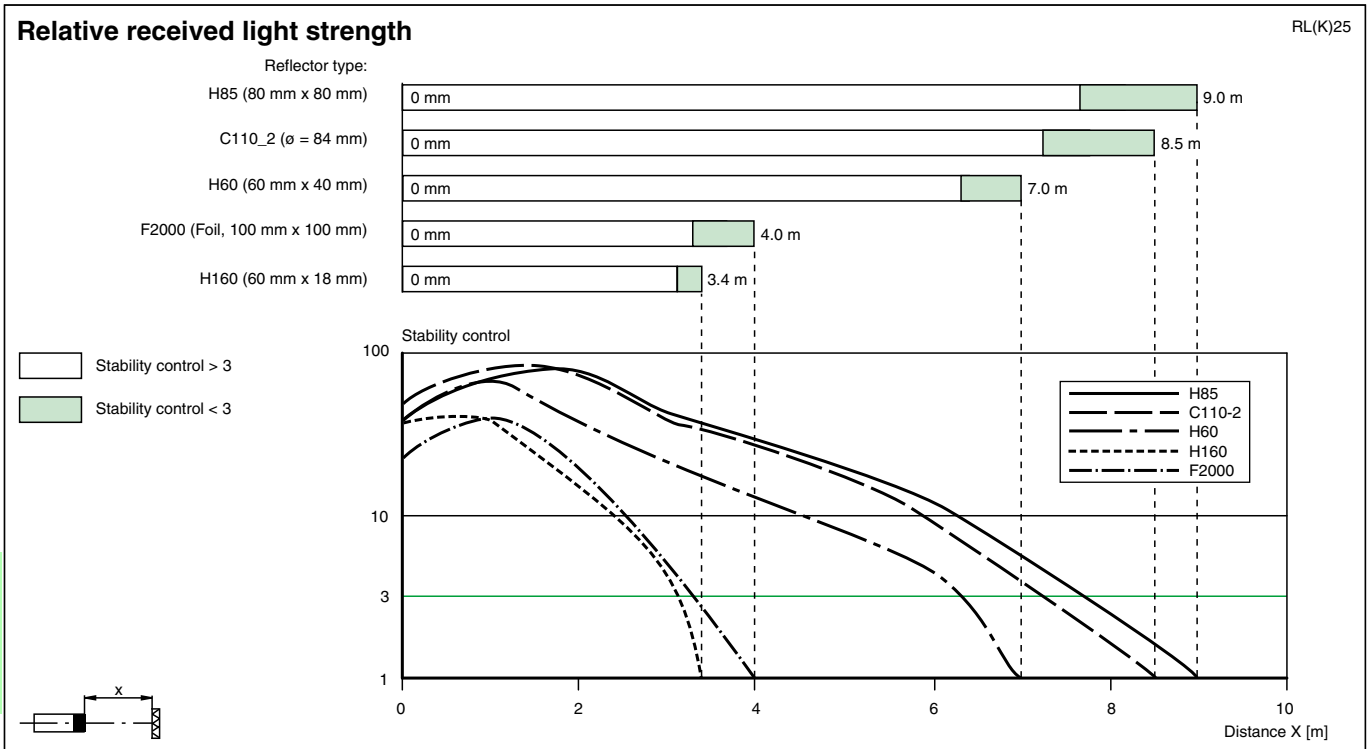
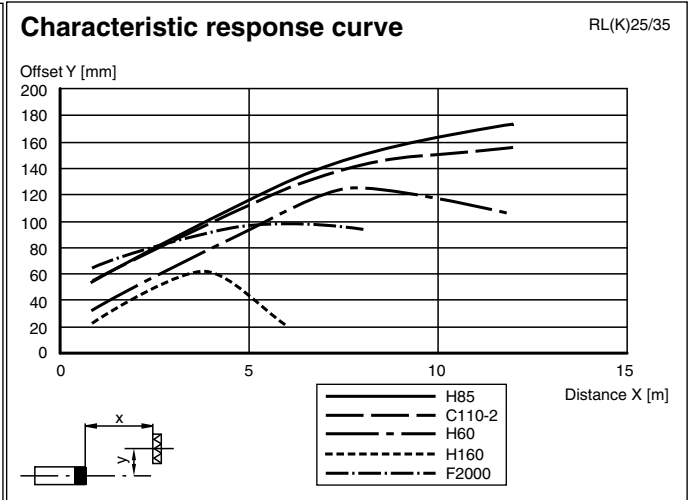
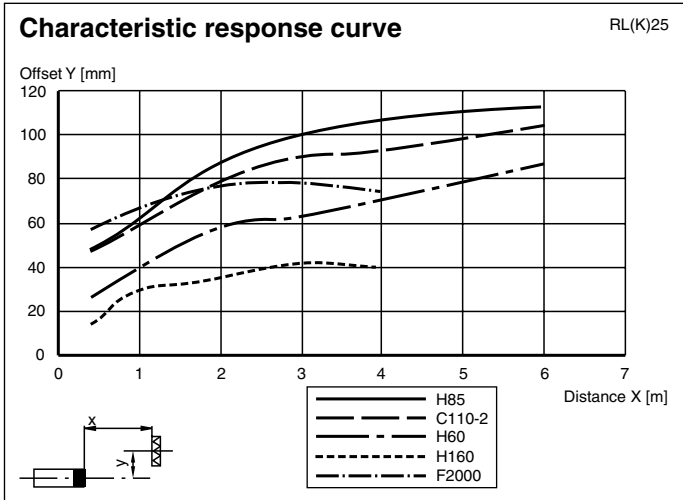
Series
25

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL-25-55/47/116	RL-25-55/49/116	RLK25-55/116	RLK25-55/35/116	RL25-55/35/47/116	RL25-55/35/49/116	RL25-55-AS-I	RL25-55-AS-I/35
Effective detection range	0 ... 4000 mm	◆	◆	◆				◆	
	0 ... 8000 mm				◆	◆	◆		◆
Threshold detection range	14 m (with C110-2 reflector)				◆	◆	◆		◆
	8 m (with C110-2 reflector)	◆	◆	◆				◆	
Reflector distance	0 ... 4000 mm	◆	◆	◆				◆	
	400 ... 8000 mm				◆	◆	◆		◆
Light type	Red, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	approx. 2 °	◆	◆	◆	◆	◆	◆	◆	◆
Diameter of the light spot	approx. 100 mm at a distance of 4000 mm	◆	◆	◆				◆	
	approx. 250 mm at a distance of 10 m				◆	◆	◆		◆
Ambient light limit	80000 Lux	◆	◆	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED green, lights up when light beam is free/flashes when falling short of the stability control	◆	◆	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆		
Controls	Light/dark switch	◆	◆	◆	◆	◆	◆		
Operating voltage	via AS-i network							◆	◆
	10 ... 30 V DC	◆	◆			◆	◆		
	12 ... 240 V AC/DC			◆	◆				
Ripple	10 %	◆	◆			◆	◆		
No-load supply current	40 mA	◆	◆			◆	◆	◆	◆
Power consumption	3 VA			◆	◆				
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆				◆			
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆				◆		
	1 relay, 1 alternator			◆	◆				
	AS-Interface							◆	◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆	◆	◆		
	light/dark switching							◆	◆
Switching voltage	max. 250 V AC			◆	◆				
	30 V DC	◆	◆			◆	◆		
Switching current	max. 2 A			◆	◆				
	max. 200 mA	◆	◆			◆	◆		
Switching frequency	25 Hz	◆	◆	◆	◆	◆	◆		
	250 Hz	◆	◆			◆	◆		
	250 Hz (max. 100 Hz with 31 slaves)							◆	◆
Response time	2 ms	◆	◆	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	1 pnp	◆	◆			◆	◆		
	Data bit D1							◆	◆
Test input	Emitter deactivation	◆	◆			◆	◆		
	Data bit D3							◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆	◆	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆	◆
Mass	100 g			◆	◆			◆	◆
	90 g	◆	◆			◆	◆	◆	◆

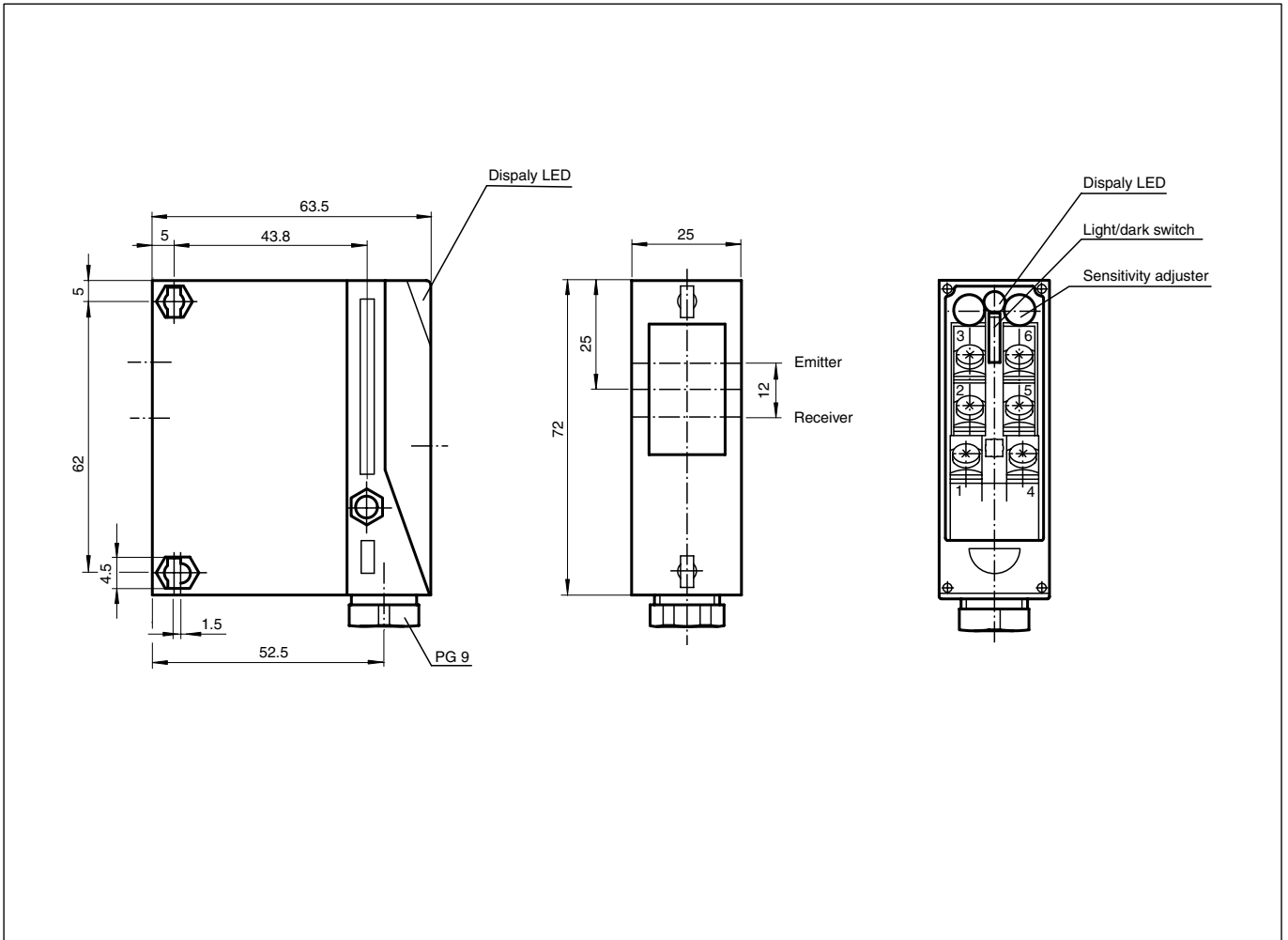


Diagrams

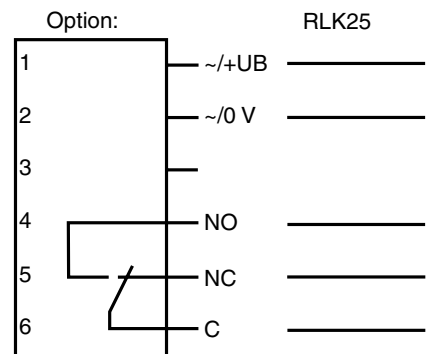
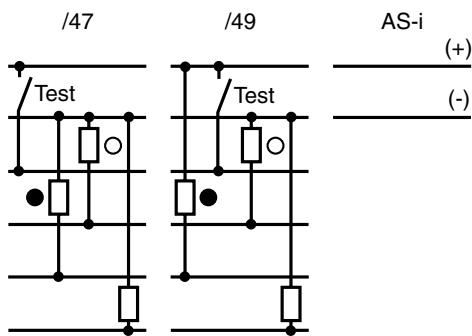


Series 25

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

AS-Interface Parameters

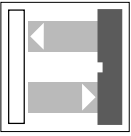
Slave profile: IO code = 1, ID code = F

• Parameter bit

Bit	Type	device function	Meaning at Host level
P0	parameter	none	none
P1	parameter	inversion of D0	1 = light on (D0 = 1 with receiver lit)(light-dark switching) 0 = dark on (D0 = 0 with receiver lit)
P2	parameter	none	none
P3	parameter	none	none

• Data bit

Bit	Type	device function	Meaning at Host level
D0	input	sensor function	1 = receiver lit (at P1 = 1) 0 = receiver not lit (at P1 = 1) 0 = receiver lit (at P1 = 0) 1 = receiver not lit (at P1 = 0)
D1	input	warning	1 = sufficient stability control (> 3-fold) or receiver not lit (delay time until setting to 1: < 5 s); 0 = insufficient stability control (delay time until setting to 0: < 2 s)
D2	input	functional readiness	1 = device ready for operation 0 = device not ready for operation
D3	output	test function	none



RL25-8-.../74a

Reflection light scanner

RL25-8-.../74a

with 4-pin, M18 x 1 plastic connector



- ◆ Sensor ranges 800 mm or 2000 mm
- ◆ Compact construction
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication

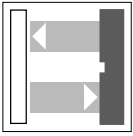
Series
25

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

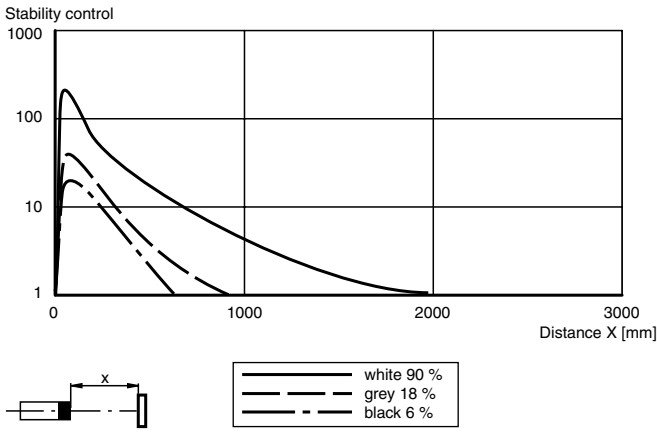
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Ordering code		RL25-8-800/4774a	RL25-8-800/4974a	RL25-8-2000/4774a	RL25-8-2000/4974a
Detection range	10 ... 2000 mm			◆	◆
	10 ... 800 mm	◆	◆		
Adjustment range	300 ... 800 mm	◆	◆		
	600 ... 2000 mm			◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆
Light source	IREd	◆	◆	◆	◆
Angle of divergence	approx. 2 °	◆	◆	◆	◆
Diameter of the light spot	approx. 25 mm at a distance of 800 mm	◆	◆		
	approx. 70 mm at a distance of 2000 mm			◆	◆
Ambient light limit	30000 Lux			◆	◆
	40000 Lux	◆	◆		
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Function display	LED green, lights up when light beam is free/flashes when falling short of the stability control	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆		
	50 Hz			◆	◆
Response time	10 ms			◆	◆
	2 ms	◆	◆		
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	90 g	◆	◆	◆	◆

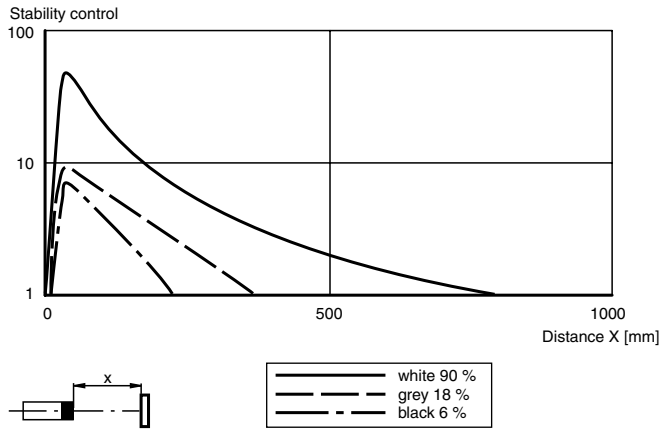


Diagrams

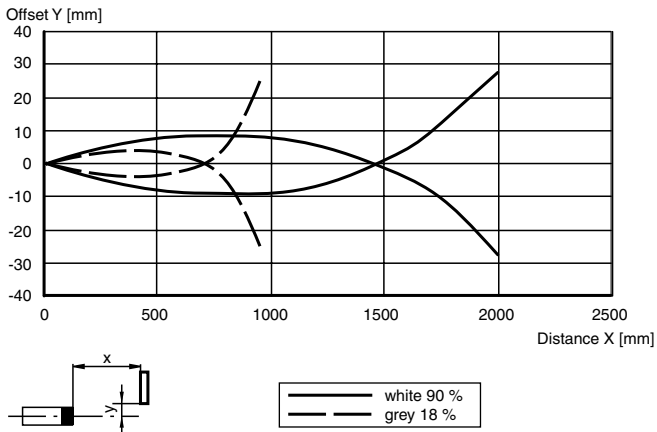
Relative received light strength RL(K)25-8-2000



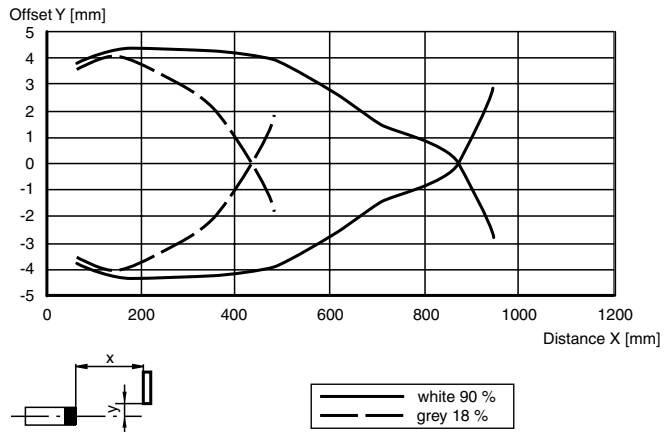
Relative received light strength RL(K)25-8-800



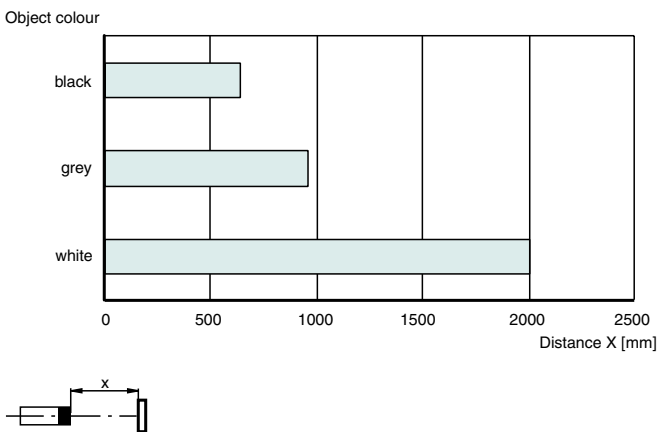
Characteristic response curve RL(K)25-8-2000



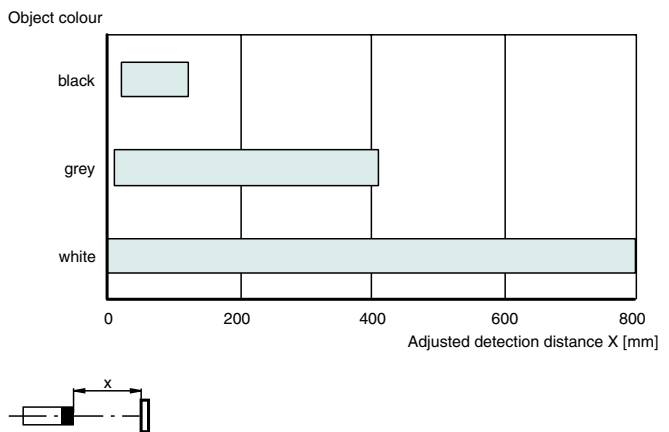
Characteristic response curve RL(K)25-8-800



Detection ranges RL(K)25-8-2000

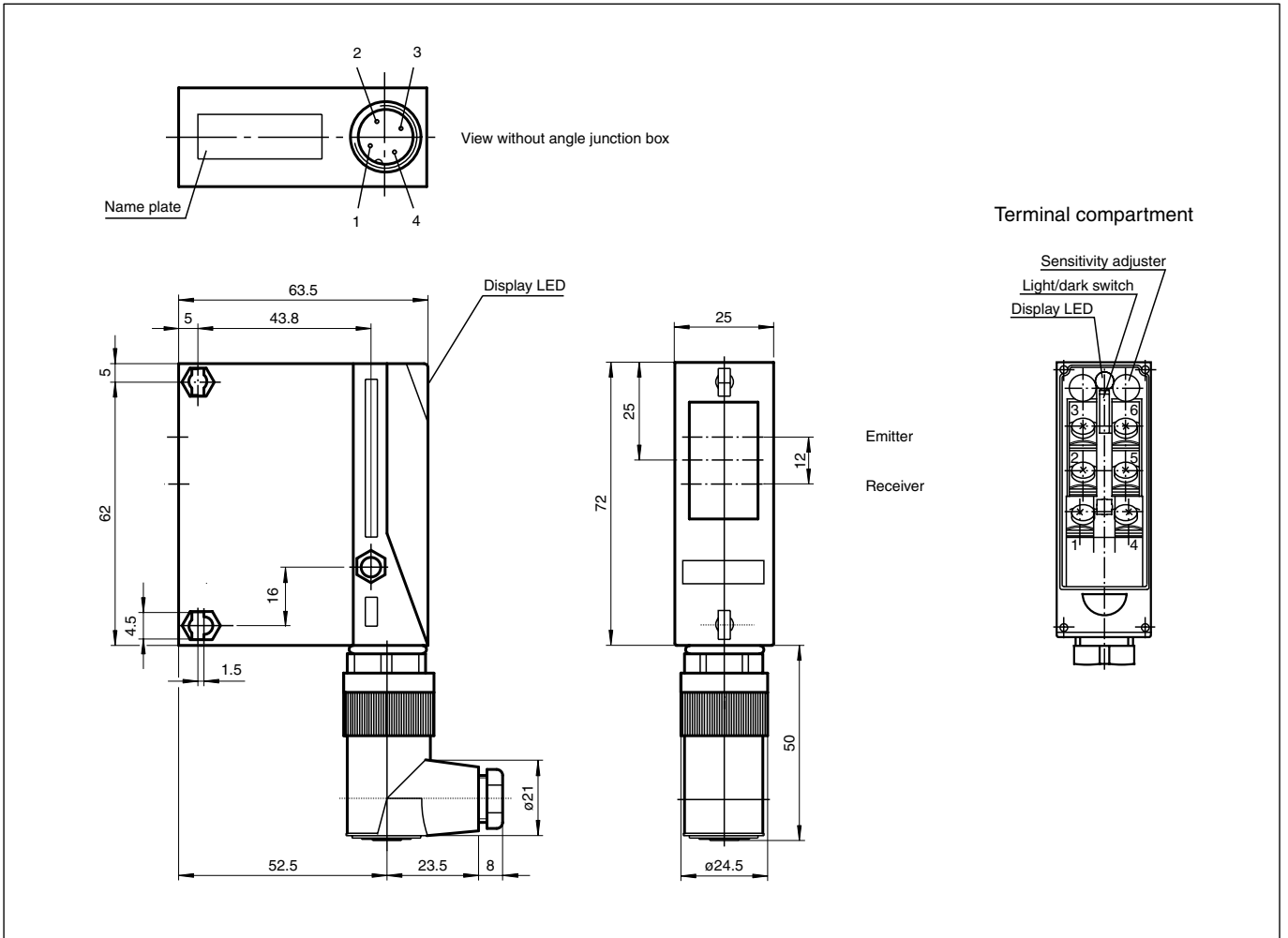


Detection ranges RL(K)25-8-800

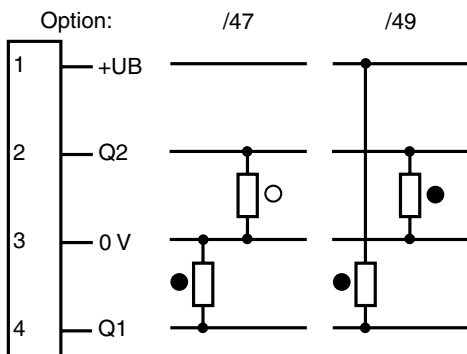


Series 25

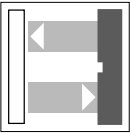
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL25-8-.../92

Reflection light scanner

RL25-8-.../92

with M12, 4-pin metal connector



- ◆ Sensor ranges 800 mm or 2000 mm
- ◆ Compact construction
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication

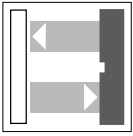
Series
25

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

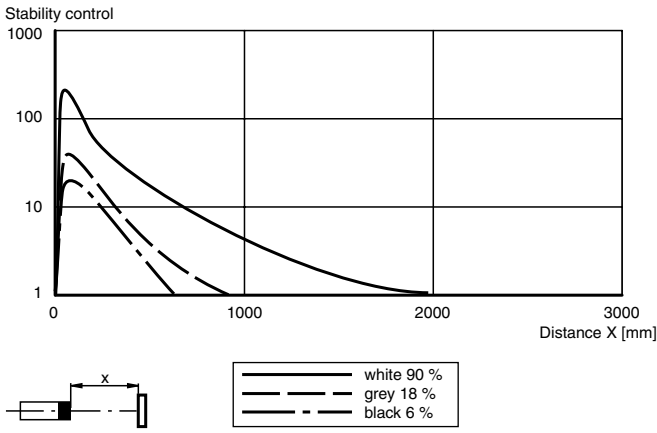
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Ordering code		RL25-8-800/47/92	RL25-8-800/49/92	RL25-8-2000/47/92	RL25-8-2000/49/92
Detection range	10 ... 2000 mm			◆	◆
	10 ... 800 mm	◆	◆		
Adjustment range	300 ... 800 mm	◆	◆		
	600 ... 2000 mm			◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆
Light source	IRED	◆	◆	◆	◆
Angle of divergence	approx. 2 °	◆	◆	◆	◆
Diameter of the light spot	approx. 25 mm at a distance of 800 mm	◆	◆		
	approx. 70 mm at a distance of 2000 mm			◆	◆
Ambient light limit	30000 Lux			◆	◆
	40000 Lux	◆	◆		
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Function display	LED green, lights up when light beam is free/flashes when falling short of the stability control	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆		
	50 Hz			◆	◆
Response time	10 ms			◆	◆
	2 ms	◆	◆		
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	90 g	◆	◆	◆	◆

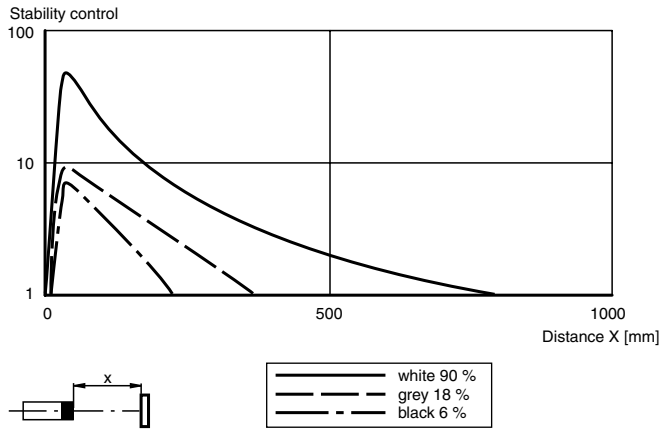


Diagrams

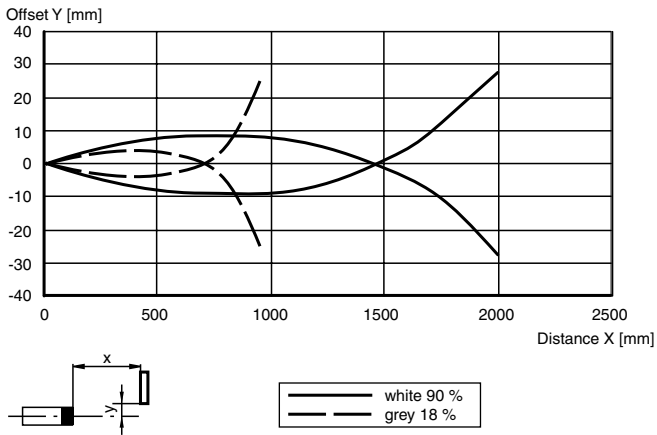
Relative received light strength RL(K)25-8-2000



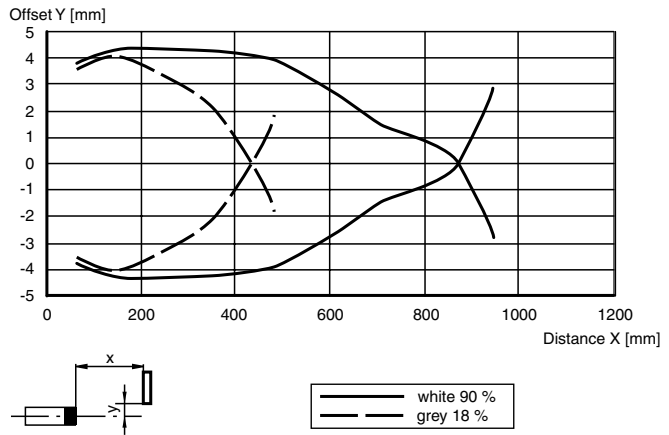
Relative received light strength RL(K)25-8-800



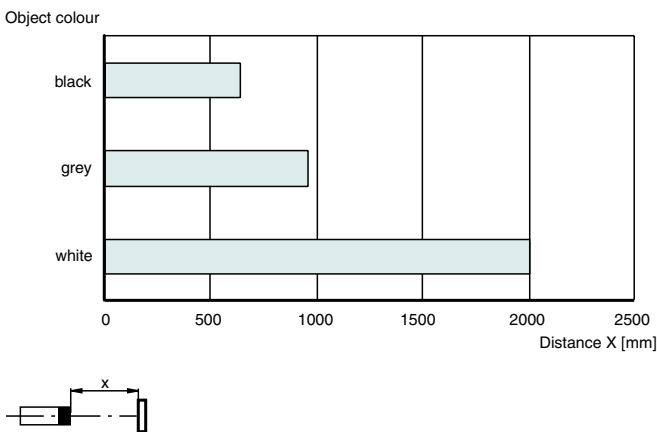
Characteristic response curve RL(K)25-8-2000



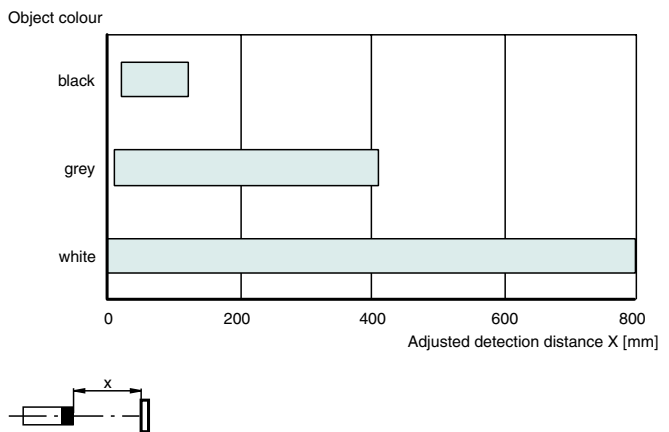
Characteristic response curve RL(K)25-8-800



Detection ranges RL(K)25-8-2000

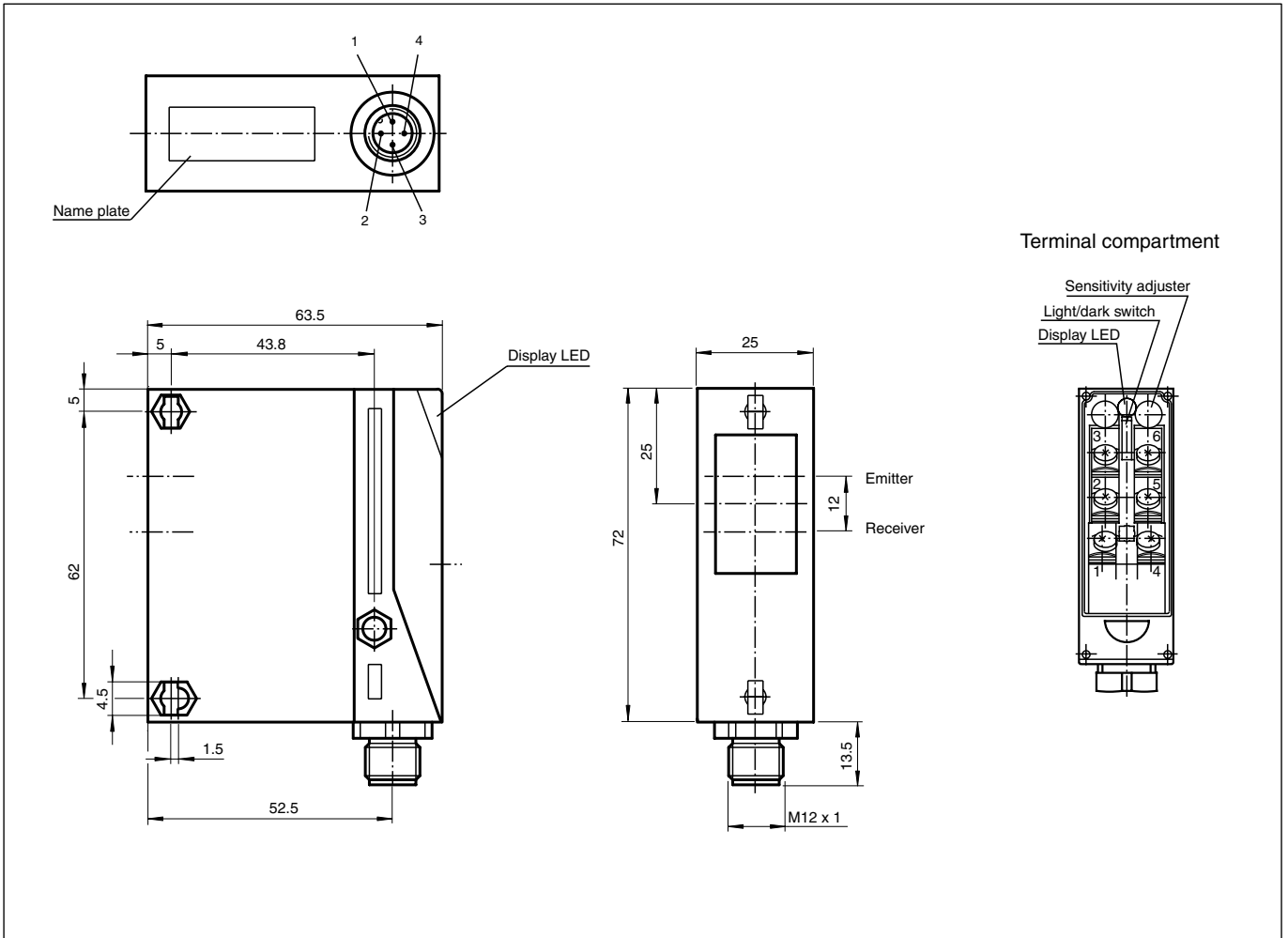


Detection ranges RL(K)25-8-800

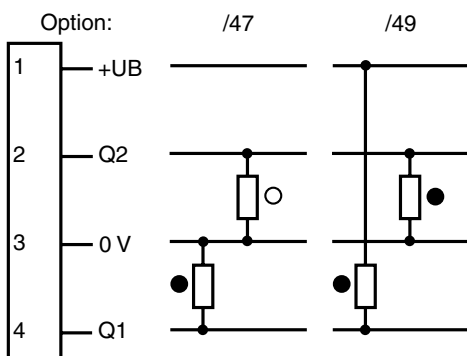


Series 25

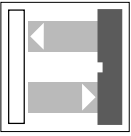
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL.25-8-...

Reflection light scanner

RL.25-8-...

with terminal compartment



- ◆ Sensor ranges 800 mm or 2000 mm
- ◆ Compact construction
- ◆ sensitivity adjuster
- ◆ Light/dark switch
- ◆ Pre-fault indication and output
- ◆ AS-Interface
- ◆ Test input

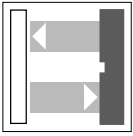
Series
25

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

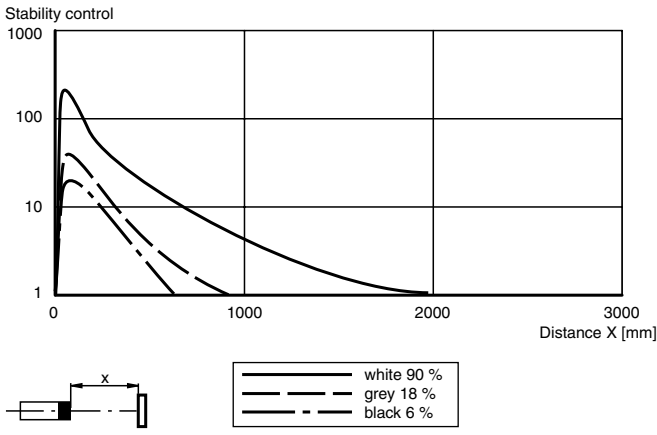
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Ordering code		RL25-8-800/47/116	RL25-8-800/49/116	RLK25-8-800/116	RLK25-8-2000/116	RL25-8-2000/47/116	RL25-8-2000/49/116	RL25-8-800-AS-I	RL25-8-2000-AS-I
Detection range	10 ... 2000 mm				◆	◆	◆		◆
	10 ... 800 mm	◆	◆	◆				◆	
Adjustment range	300 ... 800 mm	◆	◆	◆				◆	
	600 ... 2000 mm				◆	◆	◆		◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IREd	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	approx. 2°	◆	◆	◆	◆	◆	◆	◆	◆
Diameter of the light spot	approx. 25 mm at a distance of 800 mm	◆	◆	◆				◆	
	approx. 70 mm at a distance of 2000 mm				◆	◆	◆		◆
Ambient light limit	30000 Lux				◆	◆	◆		◆
	40000 Lux	◆	◆	◆				◆	
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED green, lights up when light beam is free/flashes when falling short of the stability control	◆	◆	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆		
Controls	Light/dark switch	◆	◆	◆	◆	◆	◆		
Operating voltage	via AS-i network							◆	◆
	10 ... 30 V DC	◆	◆			◆	◆		
	12 ... 240 V AC/DC			◆	◆				
Ripple	10 %	◆	◆			◆	◆		
No-load supply current	40 mA	◆	◆			◆	◆	◆	◆
Power consumption	3 VA			◆	◆				
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆				◆			
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆				◆		
	1 relay, 1 alternator			◆	◆				
	AS-Interface							◆	◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 250 V AC			◆	◆				
	30 V DC	◆	◆			◆	◆		
Switching current	max. 2 A			◆	◆				
	max. 200 mA	◆	◆			◆	◆		
Switching frequency		250 Hz	250 Hz	25 Hz	25 Hz	50 Hz	50 Hz	250 Hz	250 Hz
Response time	10 ms					◆	◆		◆
	2 ms	◆	◆	◆	◆			◆	
Output of the pre-fault indication	1 pnp	◆	◆			◆	◆		
	Data bit D1							◆	◆
Test input	Emitter deactivation	◆	◆			◆	◆		
	Data bit D3							◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆	◆	◆	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆	◆
Mass	100 g			◆	◆				
	90 g	◆	◆			◆	◆	◆	◆

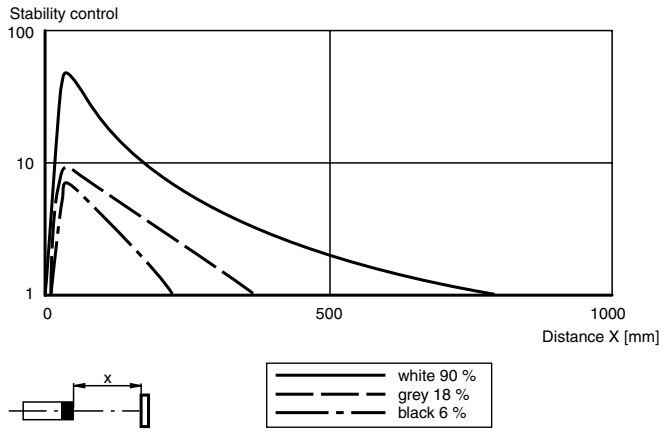


Diagrams

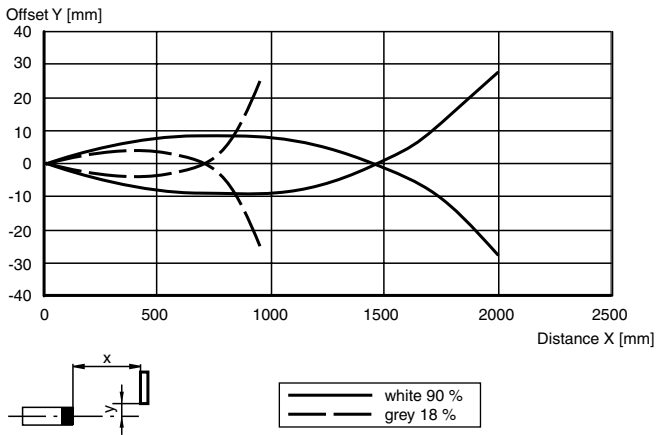
Relative received light strength RL(K)25-8-2000



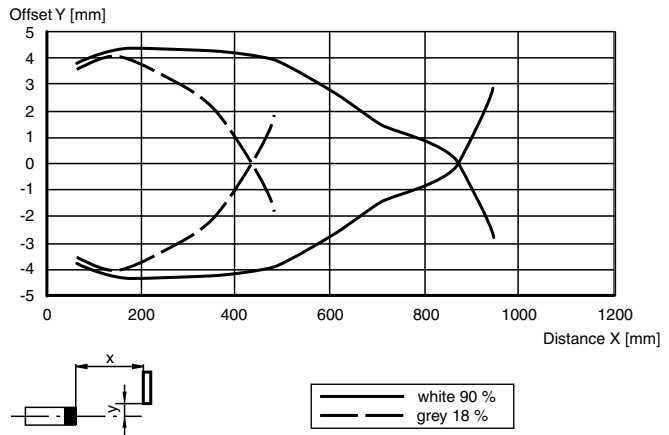
Relative received light strength RL(K)25-8-800



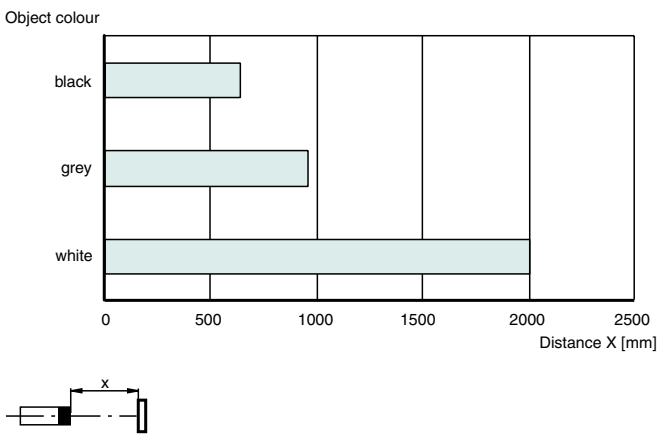
Characteristic response curve RL(K)25-8-2000



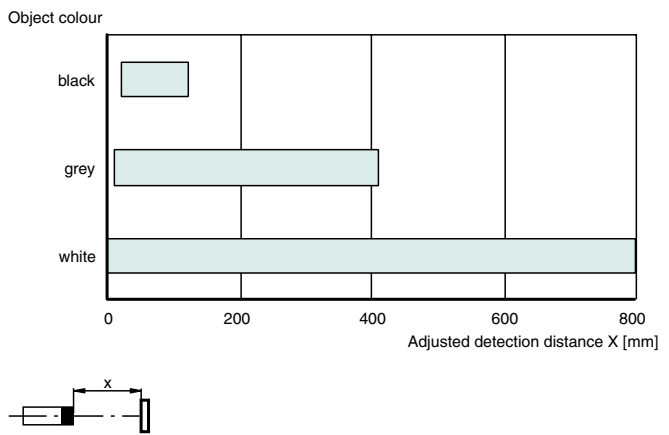
Characteristic response curve RL(K)25-8-800



Detection ranges RL(K)25-8-2000

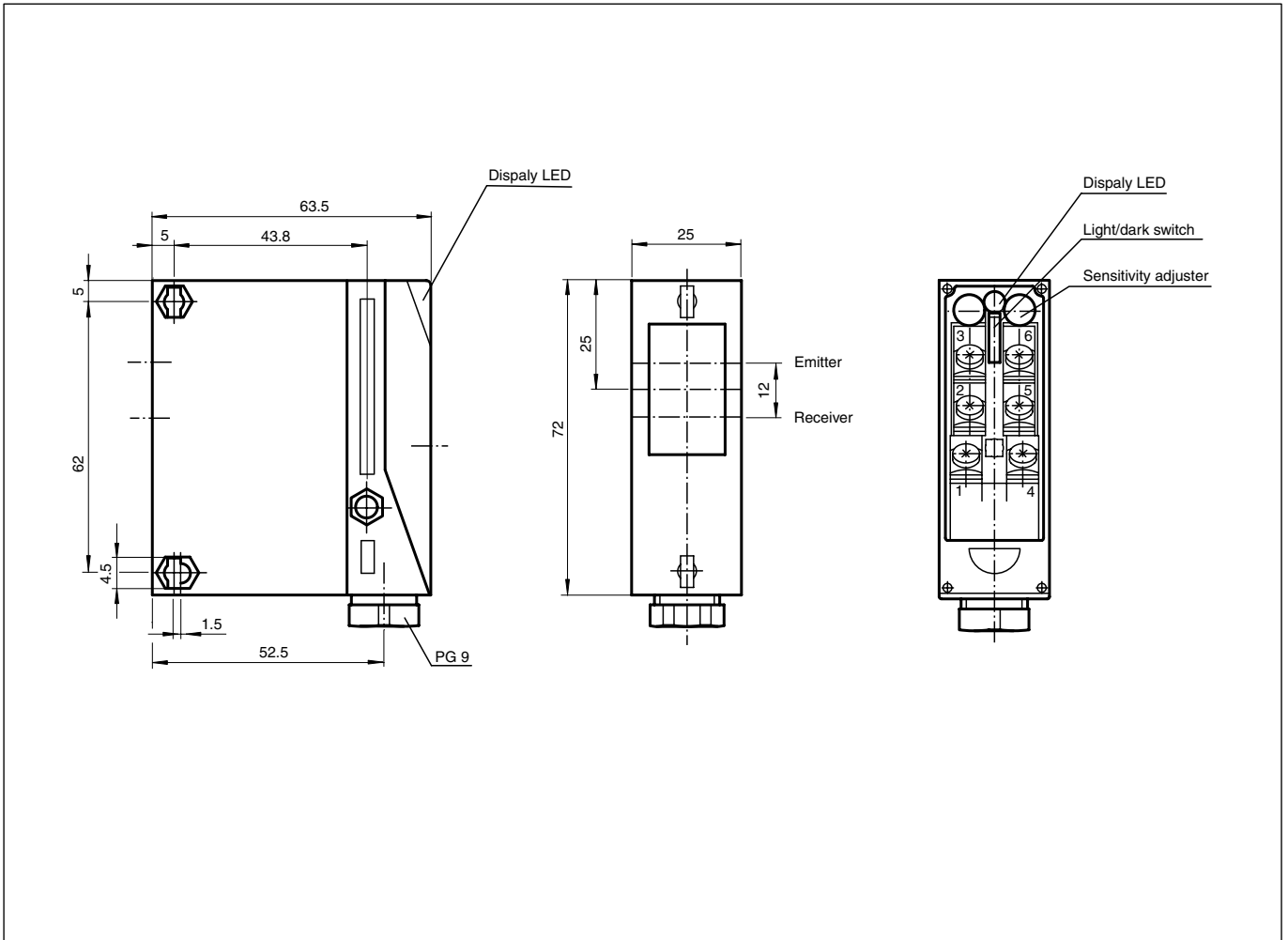


Detection ranges RL(K)25-8-800

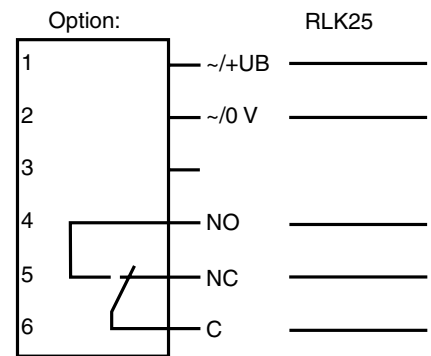
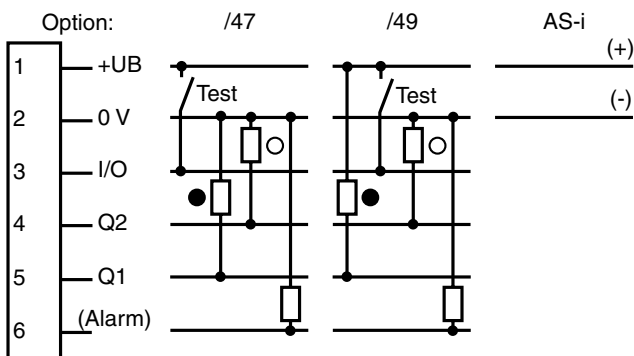


Series 25

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/15/01

AS-Interface Parameters

Slave profile: IO code = 1, ID code = F

• Parameter bit

Bit	Type	device function	Meaning at Host level
P0	parameter	none	none
P1	parameter	inversion of D0	1 = light on (D0 = 1 with receiver lit)(light-dark switching) 0 = dark on (D0 = 0 with receiver lit)
P2	parameter	none	none
P3	parameter	none	none

• Data bit

Bit	Type	device function	Meaning at Host level
D0	input	sensor function	1 = receiver lit (at P1 = 1) 0 = receiver not lit (at P1 = 1) 0 = receiver lit (at P1 = 0) 1 = receiver not lit (at P1 = 0)
D1	input	warning	1 = sufficient stability control (> 3-fold) or receiver not lit (delay time until setting to 1: < 5 s); 0 = insufficient stability control (delay time until setting to 0: < 2 s)
D2	input	functional readiness	1 = device ready for operation 0 = device not ready for operation
D3	output	test function	none



RL25-8-H-300/..74

Reflection light scanner with background suppression

RL25-8-H-300/..74

with 4-pin, M18 x 1 plastic connector



- ◆ Detection range 10 mm ... 300 mm
- ◆ Compact construction
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output
- ◆ Pre-fault indication

Series
25

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

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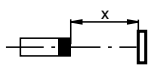
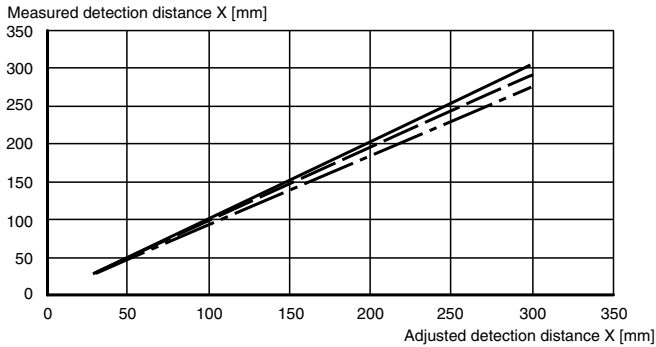
Ordering code		RL25-8-H-300/47/4	RL25-8-H-300/48/4	RL25-8-H-300/49/4
Detection range	20 ... 300 mm	◆	◆	◆
Detection range min.	10 ... 100 mm	◆	◆	◆
Sensor range max.	20 ... 300 mm	◆	◆	◆
Black/white difference (6%/90%)	< 10%	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Light source	IRED	◆	◆	◆
Angle of divergence	approx. 2°	◆	◆	◆
Diameter of the light spot	approx. 10 mm at a distance of 300 mm	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED green, flashes when falling short of the stability control	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10%	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	50 Hz	◆	◆	◆
Response time	10 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	90 g	◆	◆	◆



Diagrams

Difference in detection distance

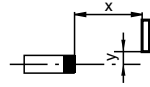
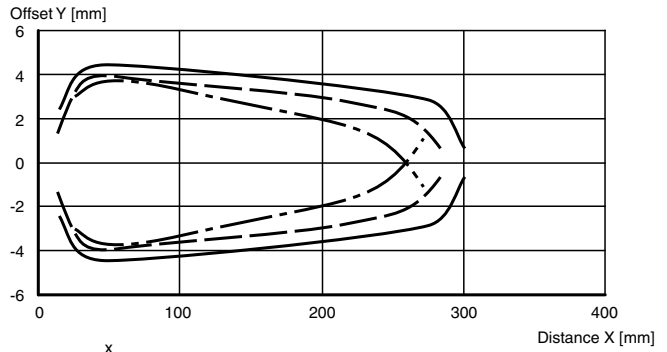
RL25-8-H



- white 90 %
- - - grey 18 %
- · - · black 6 %

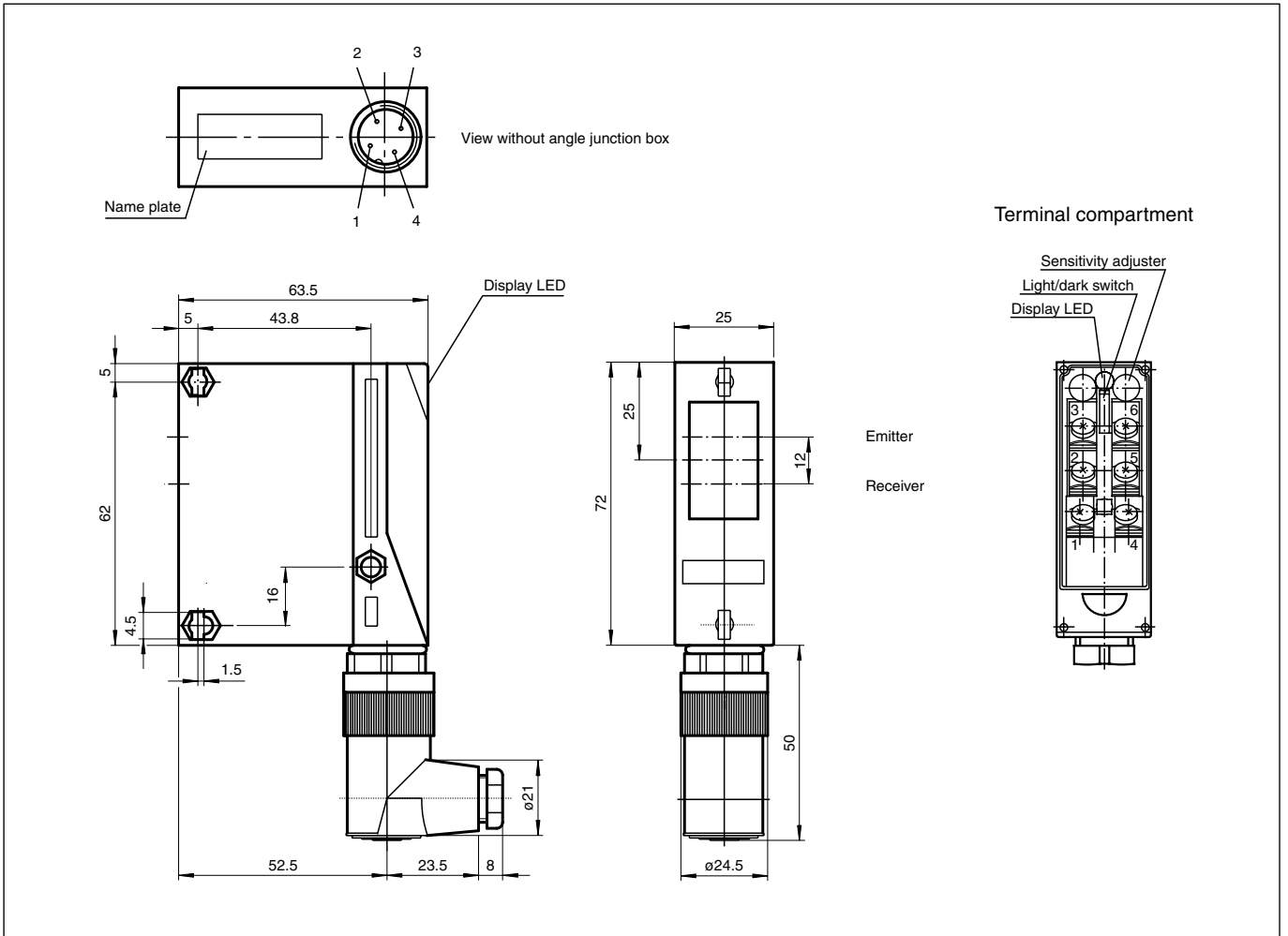
Characteristic response curve

RL25-8-H

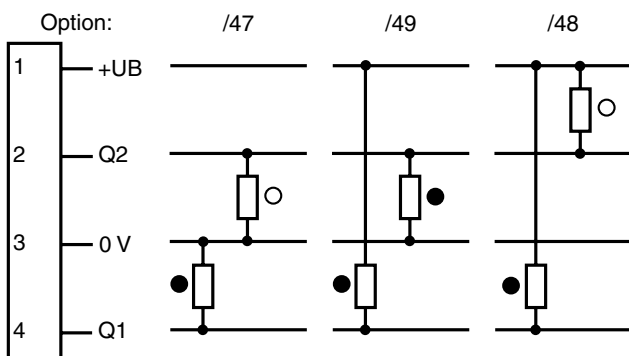


- white 90 %
- - - grey 18 %
- · - · black 6 %

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL25-8-H-300/.. /92

Reflection light scanner with background suppression

RL25-8-H-300/.. /92

with M12, 4-pin metal connector



- ◆ Detection range 10 mm ... 300 mm
- ◆ Compact construction
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication

Series
25

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		RL25-8-H-300/47/92	RL25-8-H-300/48/92	RL25-8-H-300/49/92
Detection range	20 ... 300 mm	◆	◆	◆
Detection range min.	10 ... 100 mm	◆	◆	◆
Sensor range max.	20 ... 300 mm	◆	◆	◆
Black/white difference (6%/90%)	< 10%	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Light source	IREDD	◆	◆	◆
Angle of divergence	approx. 2°	◆	◆	◆
Diameter of the light spot	approx. 10 mm at a distance of 300 mm	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED green, flashes when falling short of the stability control	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10%	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	50 Hz	◆	◆	◆
Response time	10 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	90 g	◆	◆	◆

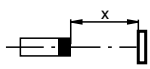
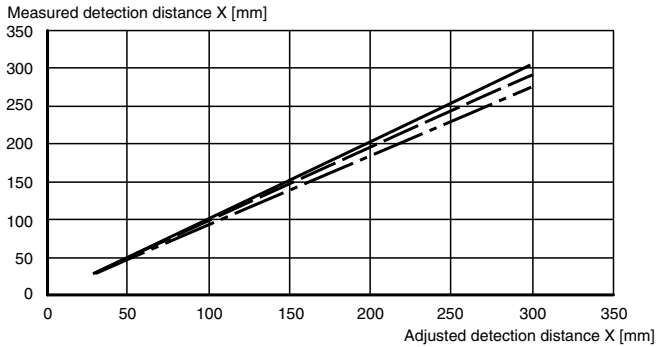
Date of issue: 10/4/01



Diagrams

Difference in detection distance

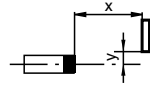
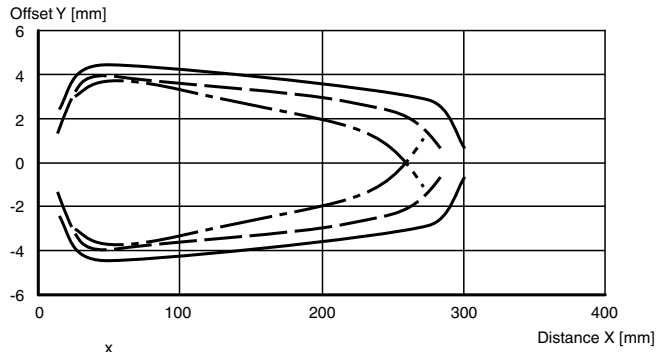
RL25-8-H



- white 90 %
- - - grey 18 %
- · - · black 6 %

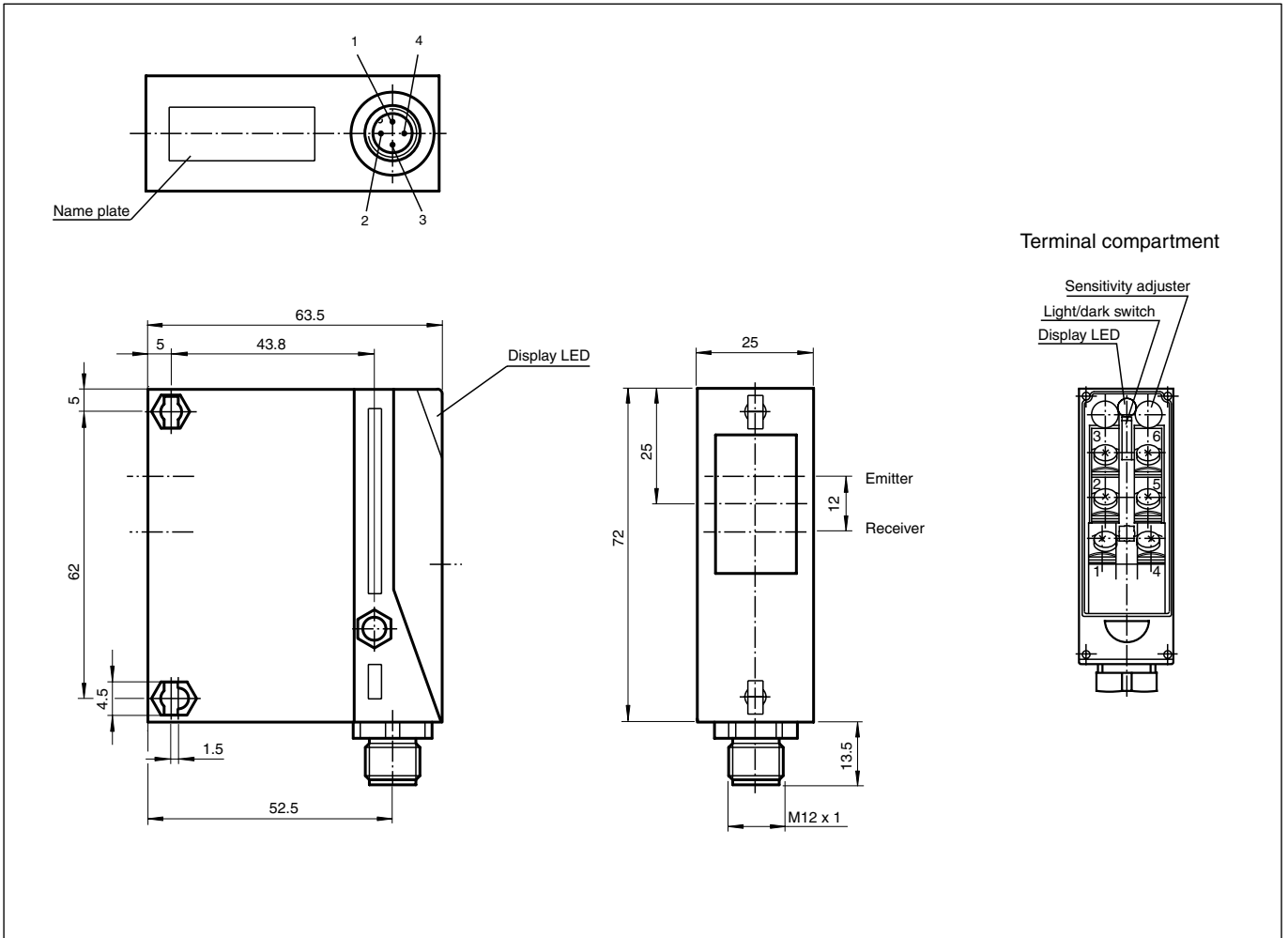
Characteristic response curve

RL25-8-H

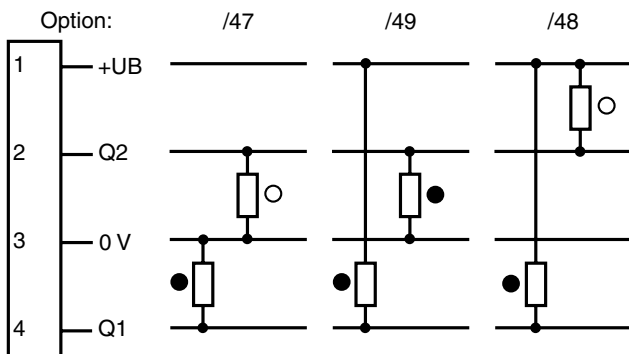


- white 90 %
- - - grey 18 %
- · - · black 6 %

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL25-8-H-300/./116

Reflection light scanner with background suppression

RL25-8-H-300/./116

with terminal compartment



- ◆ Detection range 10 mm ... 300 mm
- ◆ Compact construction
- ◆ Sensitivity adjuster and light-/dark switch
- ◆ Pre-fault indication and output

Series
25

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

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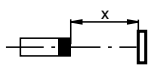
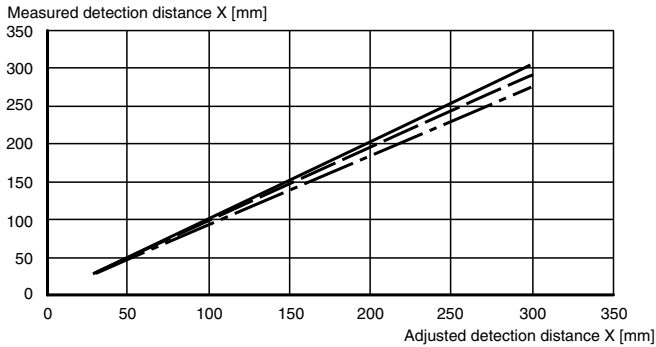
Ordering code		RL25-8-H-300/47/116	RL25-8-H-300/48/116	RL25-8-H-300/49/116
Detection range	20 ... 300 mm	◆	◆	◆
Detection range min.	10 ... 100 mm	◆	◆	◆
Sensor range max.	20 ... 300 mm	◆	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Light source	IRED	◆	◆	◆
Angle of divergence	approx. 2 °	◆	◆	◆
Diameter of the light spot	approx. 10 mm at a distance of 300 mm	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED green, flashes when falling short of the stability control	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆
Controls	sensitivity adjuster		◆	◆
	Sensing range adjuster	◆		
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	2 npn antivalent, short-circuit proof, protected against reverse polarity		◆	
	1 pnp and 1 npn short-circuit proof, protected against reverse polarity			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	50 Hz	◆	◆	◆
Response time	10 ms	◆	◆	◆
Output of the pre-fault indication	1 pnp	◆	◆	◆
Test input	Emitter deactivation	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	terminal compartment	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	90 g	◆	◆	◆



Diagrams

Difference in detection distance

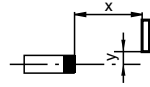
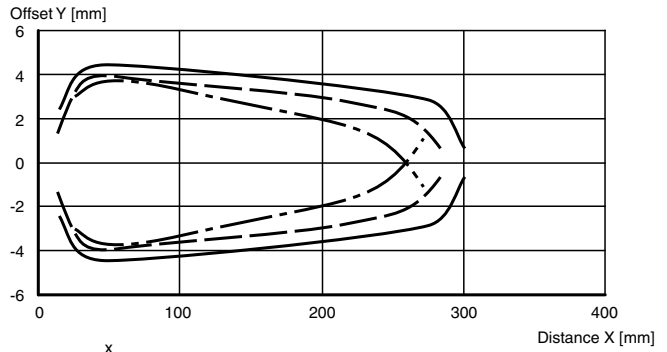
RL25-8-H



- white 90 %
- - - grey 18 %
- · - · black 6 %

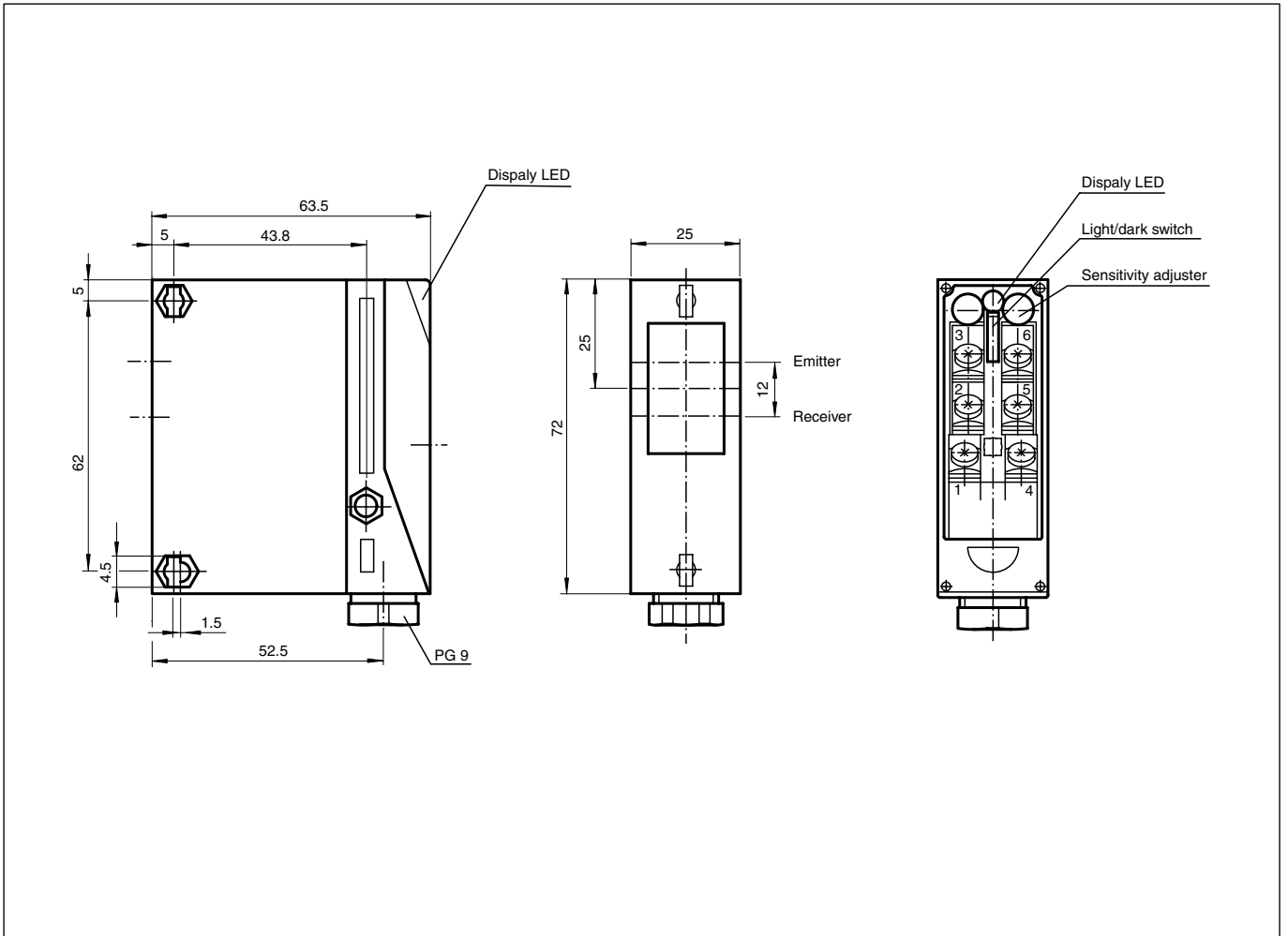
Characteristic response curve

RL25-8-H

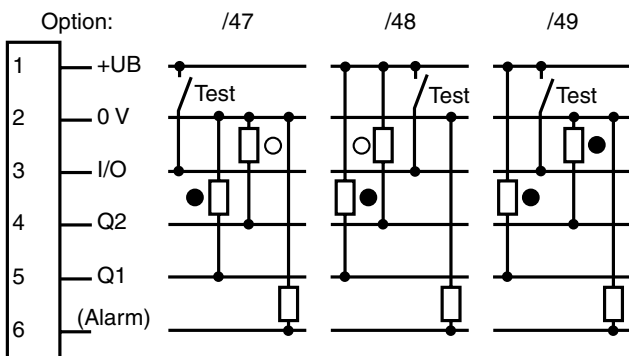


- white 90 %
- - - grey 18 %
- · - · black 6 %

Dimensions

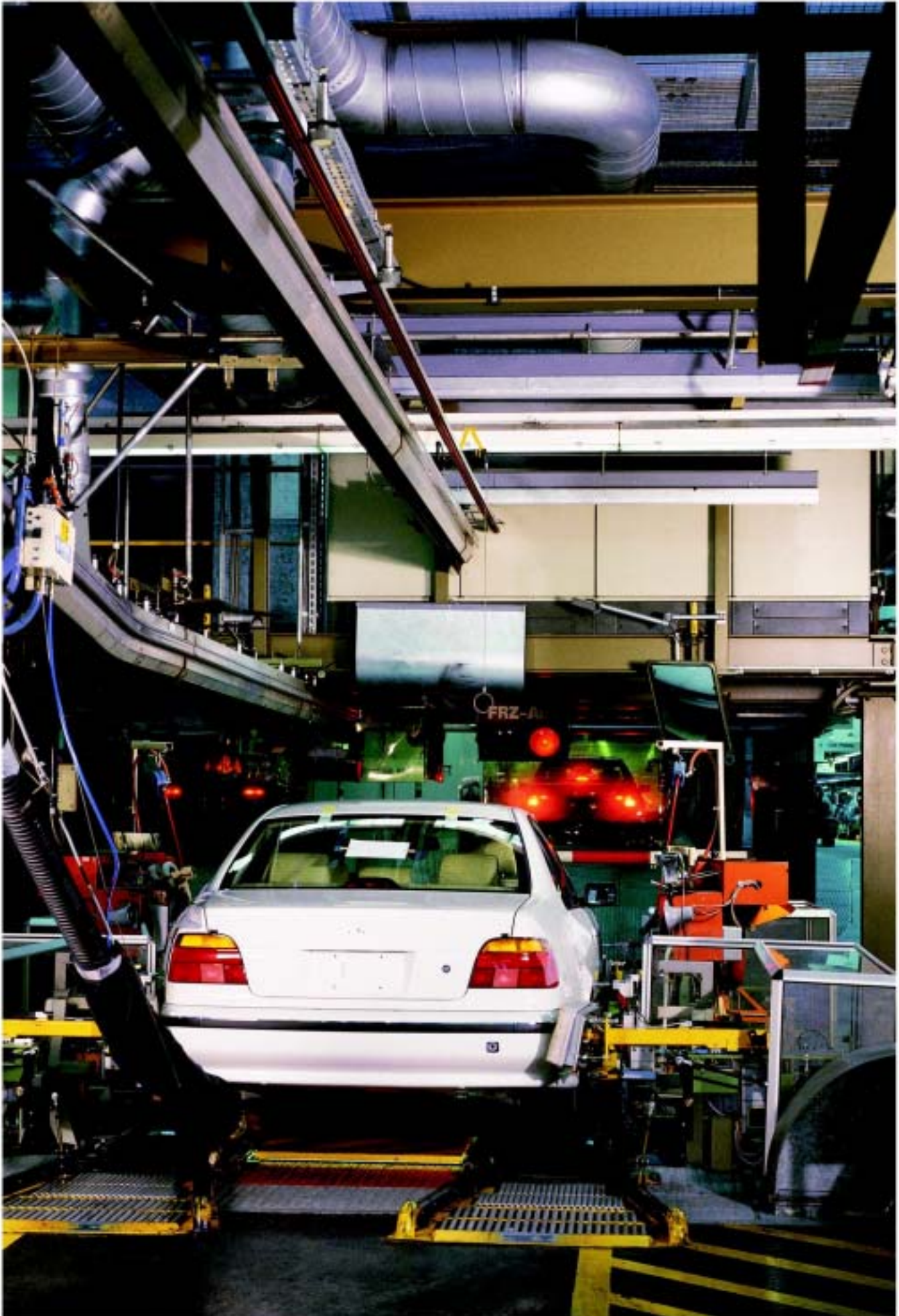


Electrical Connection



Date of issue: 10/4/01

○ = Light ON, ● = Dark ON



Date of issue 10/04/2001



Series 27 – vor even more flexibility and detection range

The integrated microcontroller makes it possible: Commissioning by keystroke, parameterisation via an optical interface and astonishing versatility at an affordable price.

The available high detection ranges make series 27 the ideal light barrier for the area of material handling. A visible red light simplifies adjustment, while DC and AC/DC versions as well as numerous connection possibilities give you the necessary flexibility on-site.

The simple operation via membrane keys makes adjustments easy and saves money.

Principle	Type code	Detection range	Page
	L27/LV27	0 m ... 35 m	444
	RL27-55	0 m ... 12 m	452
	RL27-54-G	0 mm ... 6000 mm	448
	RL27-8	0 mm ... 1500 mm	456
	RL27-8-H	20 mm ... 500 mm	460

Adjusting to a target object

Adjustment options:

- **Manual (with membrane keys)**
- **Automatic (TEACH-IN)**

Note:

The sensitivity adjustment is maintained even after the electrical power is turned off.

L27/LV27 single path light beam switch

Sensitivity/Adjusting with the membrane keyboard

At the delivery the optical barrier is set to maximum over the whole operating distance from 0 m to 35 m. It is possible via the membrane key to achieve the detection of material with partial optical absorption (detection of partly transparent or small objects) or the effective operating distance reducing (improvement of the interference light suppression).

A useful adjustment is achievable in a range of 15 m up to 35 m. In this range, the automatic adjustment (TEACH-IN) ensures a function with optimal signal reserve.

Manual Adjustment



Receiver

Emitter

Manual adjustment of reception sensitivity

1. Align the emitter and receiver correctly. The light path must be unobstructed.
2. If necessary, press the "+"- and "-"- keys at the same time for 5 seconds (until the green LED flashes briefly **once**). The sensor is now "unlocked". The light path must be unobstructed!
3. You can adjust the sensitivity of the sensor with the two "+" and "-"- keys (the red LED flashes with each keystroke, the yellow indicates the switch status). The push buttons feature a repeat function (simply hold down the key for repeated actuation). The sensitivity adjustment is maintained even after the electrical power is turned off.

Note:

If the red LED does not flash when the button is pushed, the sensor is at the end of the adjustable range or the sensor is no longer locked.

Automatic Adjustment



Receiver

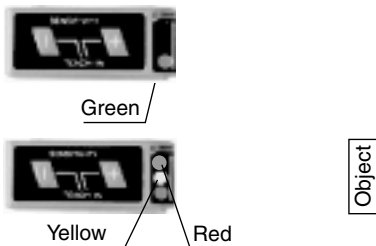
Emitter

Automatic adjustment (TEACH-IN) of sensitivity

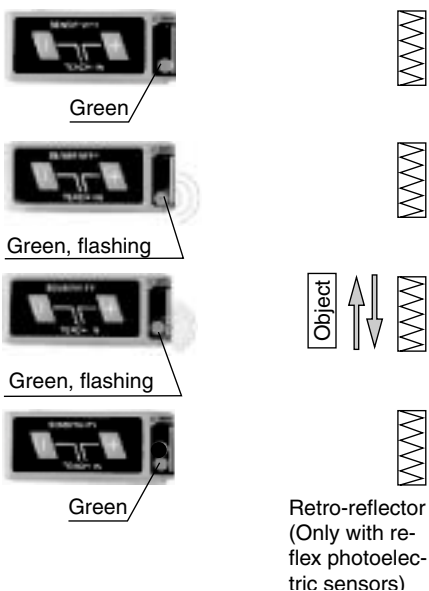
1. Align the emitter and receiver correctly. The light path must be unobstructed.
2. If necessary, press the "+"- and "-"- keys at the same time for 5 seconds (until the green LED flashes briefly **once**). Release the keys briefly. The sensor is now "unlocked". The light path must be unobstructed!
3. Press the "+"- and "-"-keys simultaneously (approx. 2 s) until the green LED flashes, then release both keys. The sensor is now in "teaching" or programming mode. This is indicated by the green LED flashing (2 Hz).
4. The teaching process has finished when the green LED remains on.

All types of sensors except for L27/LV27 (single path light beam switch)

Manual Adjustment

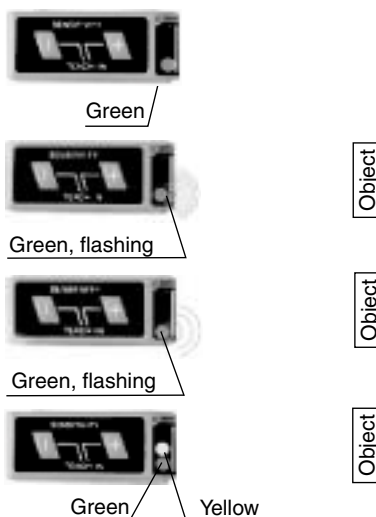


Dynamic TEACH-IN



Direct detection light scanner MLV27-8 in direct detection

Static TEACH-IN



Manual adjustment

1. If necessary, press the "+"- and "-" keys at the same time for at least 5 seconds (until the green LED flashes once briefly). The sensor is now "unlocked".
2. Place the object to be recorded in the recording range at the desired distance. You can now adjust the sensitivity of the sensor with the two "+" and "-" keys (the red LED flashes with each keystroke; the yellow indicates the switch status). The buttons are equipped with a repeat function (simply hold down the key for repeated actuation).

Note:

If the red LED does not flash when the button is pushed, the sensor is at the end of the adjustable range or the sensor is no longer locked.

TEACH-IN for moved objects (dynamic TEACH-IN).

1. If necessary, press the "+"- and "-" keys at the same time for 5 seconds (until the green LED flashes briefly once). The sensor is now "unlocked".
2. Simultaneously push the "+" and "-" buttons (for about 1 second) until the red LED that is lit goes out. The sensor is now in "teaching" or programming mode. This is indicated by the green LED flashing (2 Hz).

Note:

If the red LED does not flash when the key is pressed, the sensor is not locked.

3. Traverse the sensing range at the desired distance with the objects to be recorded (one object is sufficient). The green LED flashes briefly at a higher frequency (4 Hz). As soon as the LED flashes again with the output frequency, the teaching process is completed if there is an object in the sensing range.

Note:

The very brief change in flashing frequency is undetectable under certain circumstances.

4. To complete TEACH-IN, you must now press either the "+" key or the "-" key. After that, the sensor will work in normal operating mode.

TEACH-IN for objects at a fixed distance (static TEACH-IN)

1. If necessary, press the "+"- and "-" keys at the same time for 5 seconds (until the green LED flashes briefly once). The sensor is now "unlocked".
2. Place the object to be recorded in the recording range at the desired distance. Simultaneously push the "+" and "-" buttons (for about 1 second) until the red LED that is lit goes out. The sensor is now in "teaching" or programming mode. This is indicated by the green LED flashing..

Note:

If the red LED does not flash when the key is pressed, the sensor is not locked.

3. The green LED flashes briefly at a higher frequency (4 Hz). As soon as the LED flashes again at the output frequency of 2 Hz, the teaching process is complete.
4. To complete TEACH-IN, you must now press either the "+" key or the "-" key. After that, the sensor will work in normal operating mode. (parameter settings pre-fault: dynamic)

Date of issue 10/04/2001

Series 27

Parameter settings

Single path (L27/LV27), reflex photoelectric sensor (RL27-55) and reflection light scanner (RL27-8)

Parameters:

- Outputs:

An optical interface (PC or hand-held) is used to set parameters.
Factory setting underlined

- N.O. and pre-fault
- N.C. and pre-fault
- antivalent

-Pre-fault signal

- dynamic
- static
- off

- Switching frequency → switch delay:

- 1 kHz → 0.5 ms
- 500 Hz → 1 ms
- 250 Hz → 2 ms
- 100 Hz → 5 ms
- 50 Hz → 10 ms
- 20 Hz → 25 ms

for application-optimised interference suppression

-Hysteresis:

- small
- standard
- large

- time function 1:

- no
- on delay (0.1 s to 25.5 s in 0.1 s steps)

- time function 2:

- no
- off delay (0.1 s to 25.5 s in 0.1 s steps)
- pulse extension (1 ms to 255 ms in 1 ms steps)
- one shot output function (1 ms to 255 ms in 1 ms steps)

-Pulse frequency:

- pulse frequency 1
- pulse frequency 2
- pulse frequency 3

-Keyboard disabling

- off
- automatic
- always

-Input function:

- no
- test (transmitter deactivation)
- NC/NO switching
- AND logic operation
- OR logic operation
- XOR logic operation
- function reserve test (normal operation with half transmission power)
- TEACH-IN (level controlled)
- LATCH
- D flipflop

- Input inverted

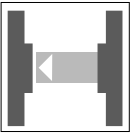
- all control input functions can be inverted

-Parameterisation disable:

- off
- on

Some of these settings are not available on through-beam sensors and are only possible on the receiver:

hysteresis
pulse frequency
emitter deactivation
the emitter is equipped with a test input (switches emitter off)



L27/LV27/..../76a/112

Single path light beam switch

L27/LV27/..../76a/112

with 5-pin M12 connector, 90° adjustable position

CE



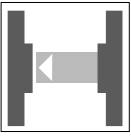
- ◆ Detection range up to 35 m
- ◆ Visible red light
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Automatic adjustment of the sensitivity per TEACH-IN
- ◆ Detection of partially transparent objects
- ◆ Multifunction input
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP67

Series
27

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

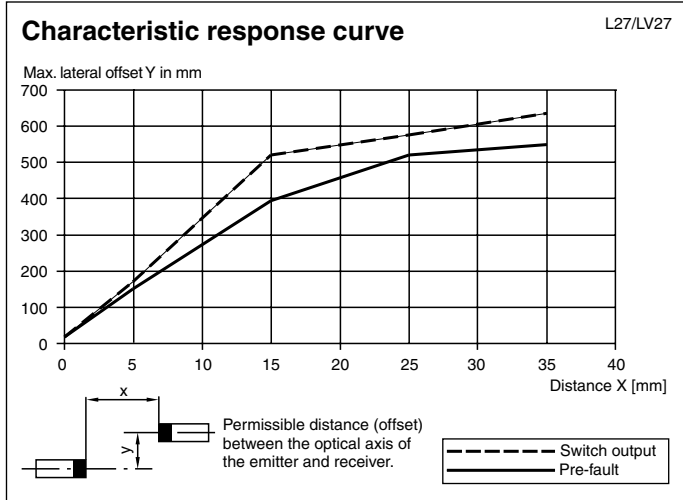
Date of issue: 10/4/01

Ordering code		L27/LV27/4776a/112	L27/LV27/4876a/112
Effective detection range	0 ... 35 m	◆	◆
Adjustment range	15 ... 35 m	◆	◆
Reference target	Receiver	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 28 mA (device)	◆	◆
Time delay before availability	≤ 290 ms	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆	
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 1 kHz	◆	◆
Response time	≤ 0.6 ms	◆	◆
Timer function	parameterisable	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable nnp, dynamic/static configurable	◆	◆
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V (emitter)	◆	◆
Control input	inactive: ≤ 3 V or unwired; active: ≥ 7 V (receiver)	◆	
	inactive: ≥ 7 V or unwired; active: ≤ 3 V (receiver)		◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	emitter: 60 g receiver: 65 g	◆	◆

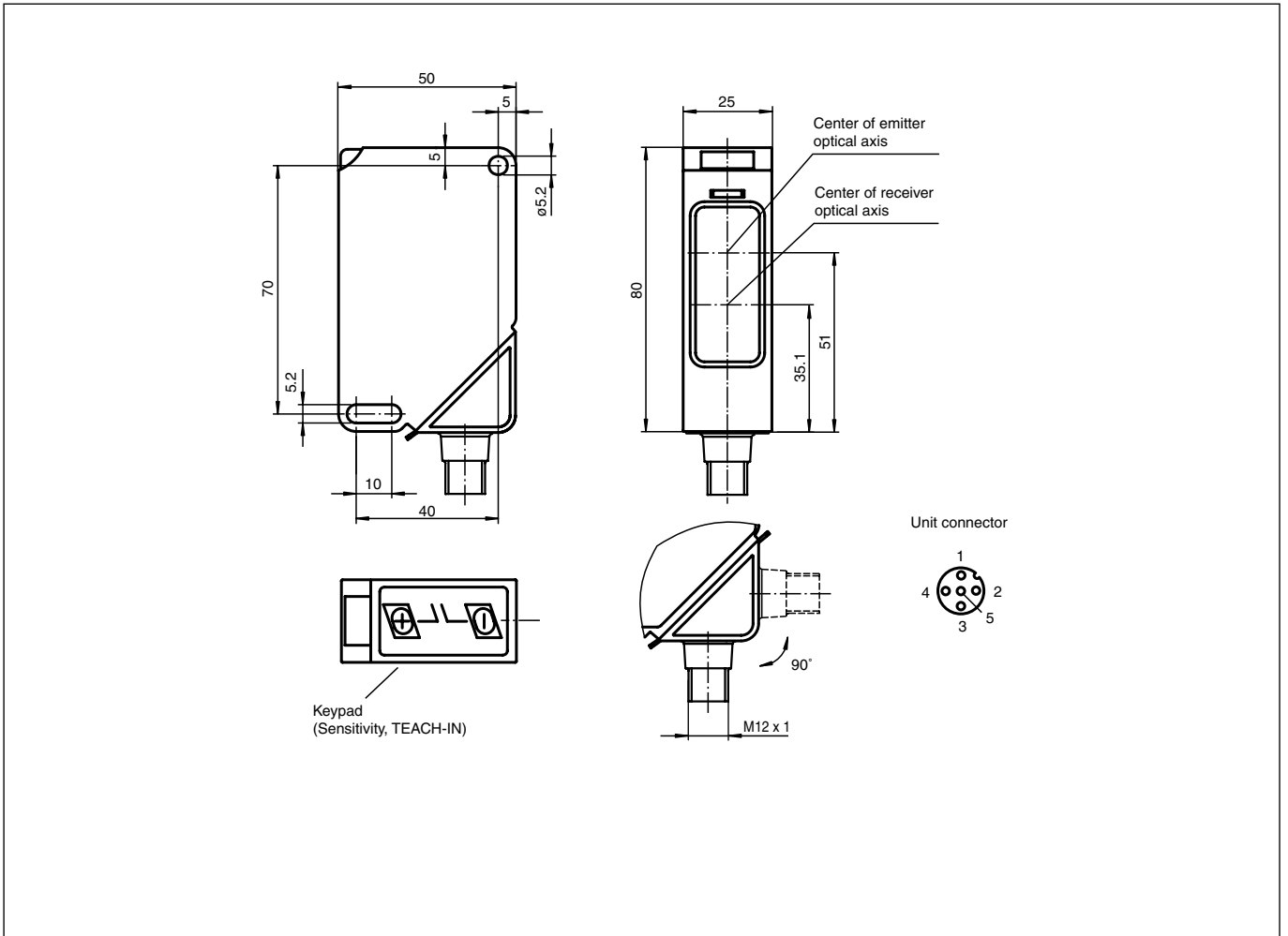


L27/LV27/..76a/112

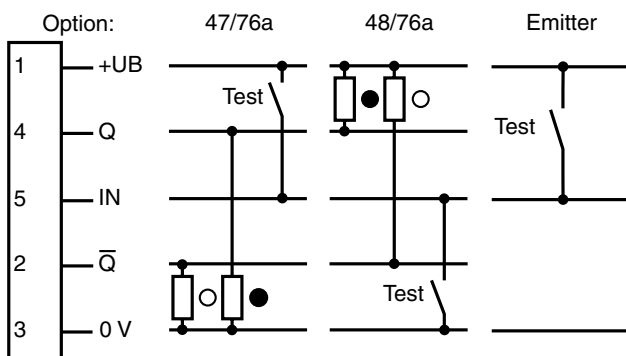
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



RL27-54-G/./112

Reflection light beam switch with polarisation filter

RL27-54-G/./112

with 5-pin M12 connector, 90° adjustable position

CE



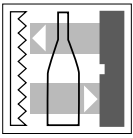
- ◆ Detection range up to 6 m
- ◆ Detection of transparent objects, i.e. clear glass, PET and transparent foils
- ◆ Glare protected with polarisation filter
- ◆ Visible red light
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Automatic adjustment of the sensitivity per TEACH-IN
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP67
- ◆ Multifunction input

Series
27

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

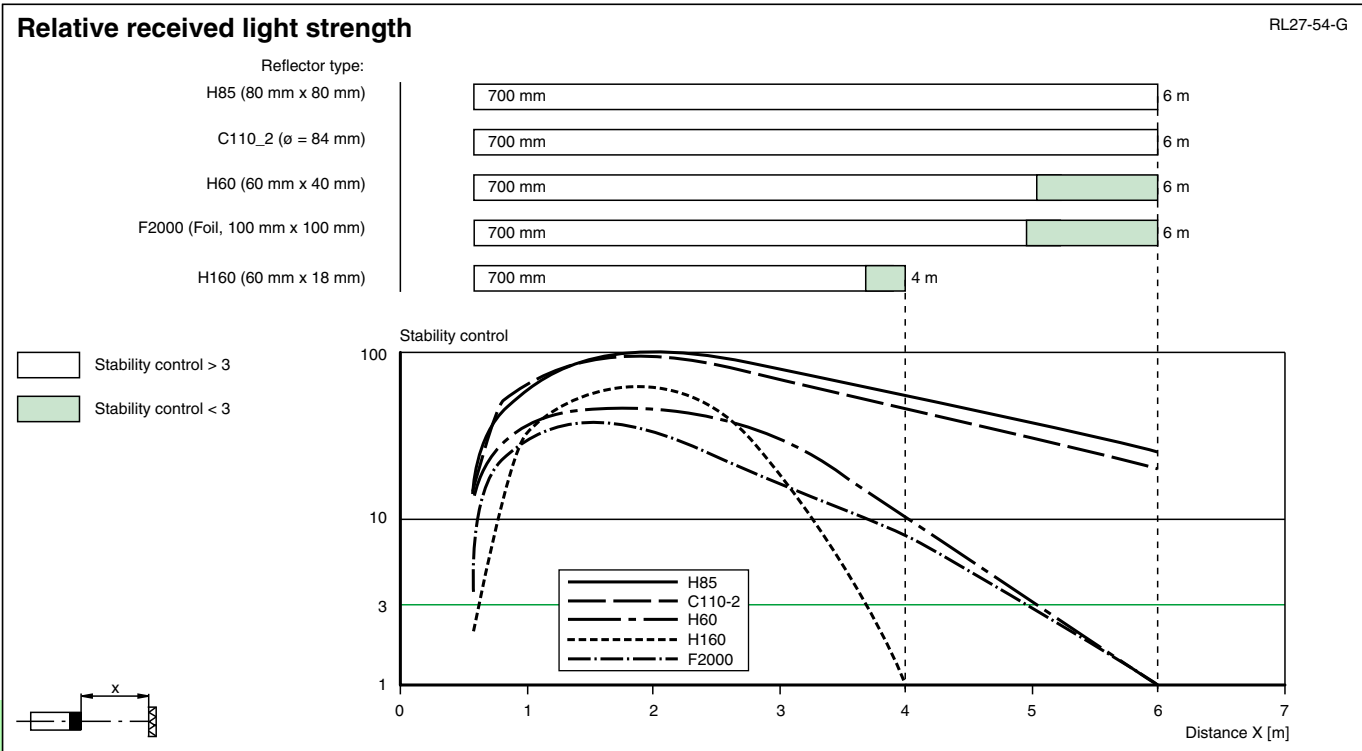
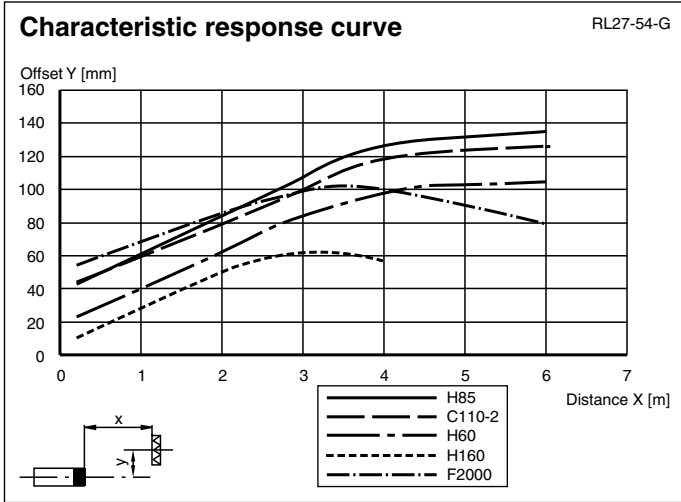
Date of issue: 10/4/01

Ordering code		RL27-54-G/47/112	RL27-54-G/48/112
Effective detection range	0 ... 6 m	◆	◆
Reflector distance	700 ... 6000 mm	◆	◆
Reference target	Reflector C110_2	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆	
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 1 kHz	◆	◆
Response time	≤ 0.5 ms	◆	◆
Timer function	parameterisable	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable	◆	
	npn, dynamic/static configurable		◆
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V	◆	
	inactive: ≥ 7 V or unwired; active: ≤ 3 V		◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	65 g	◆	◆



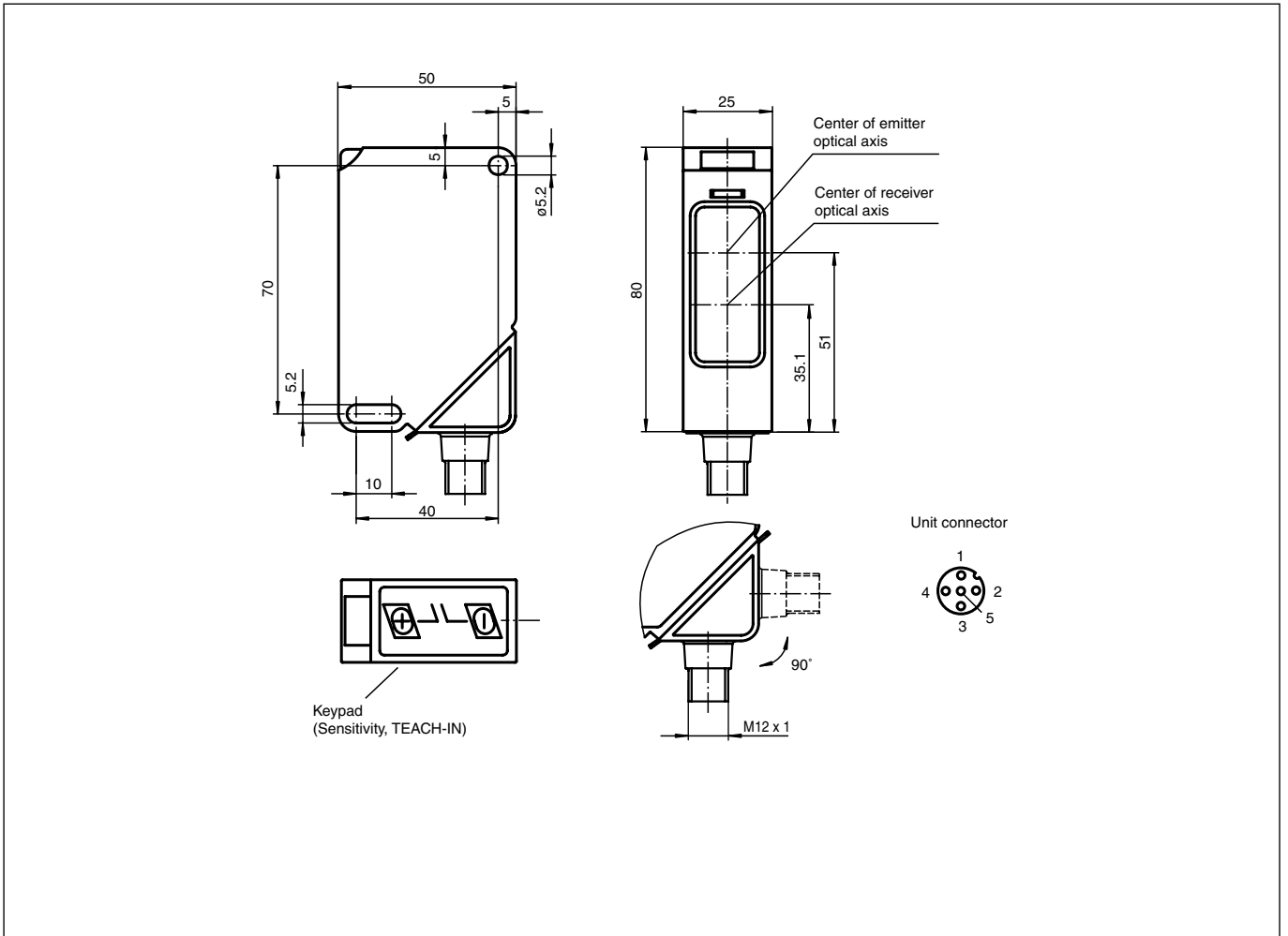
RL27-54-G/./112

Diagrams

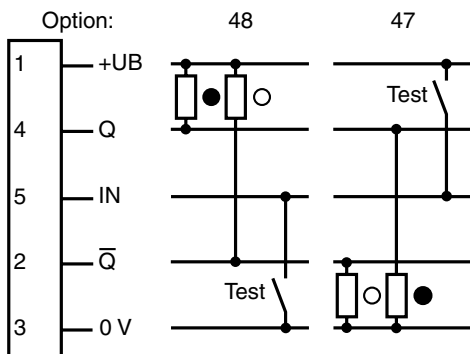


Series 27

Dimensions

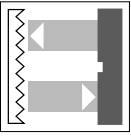


Electrical Connection



Date of issue: 10/4/01

○ = Light ON, ● = Dark ON



RL27-55/.. /112

Reflection light beam switch with polarisation filter

RL27-55/.. /112

with 5-pin M12 connector, 90° adjustable position

CE

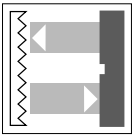


- ◆ Detection range up to 16 m
- ◆ Detection of partially transparent objects
- ◆ Glare protected with polarisation filter
- ◆ Visible red light
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Automatic adjustment of the sensitivity per TEACH-IN
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP67
- ◆ Multifunction input

Series
27

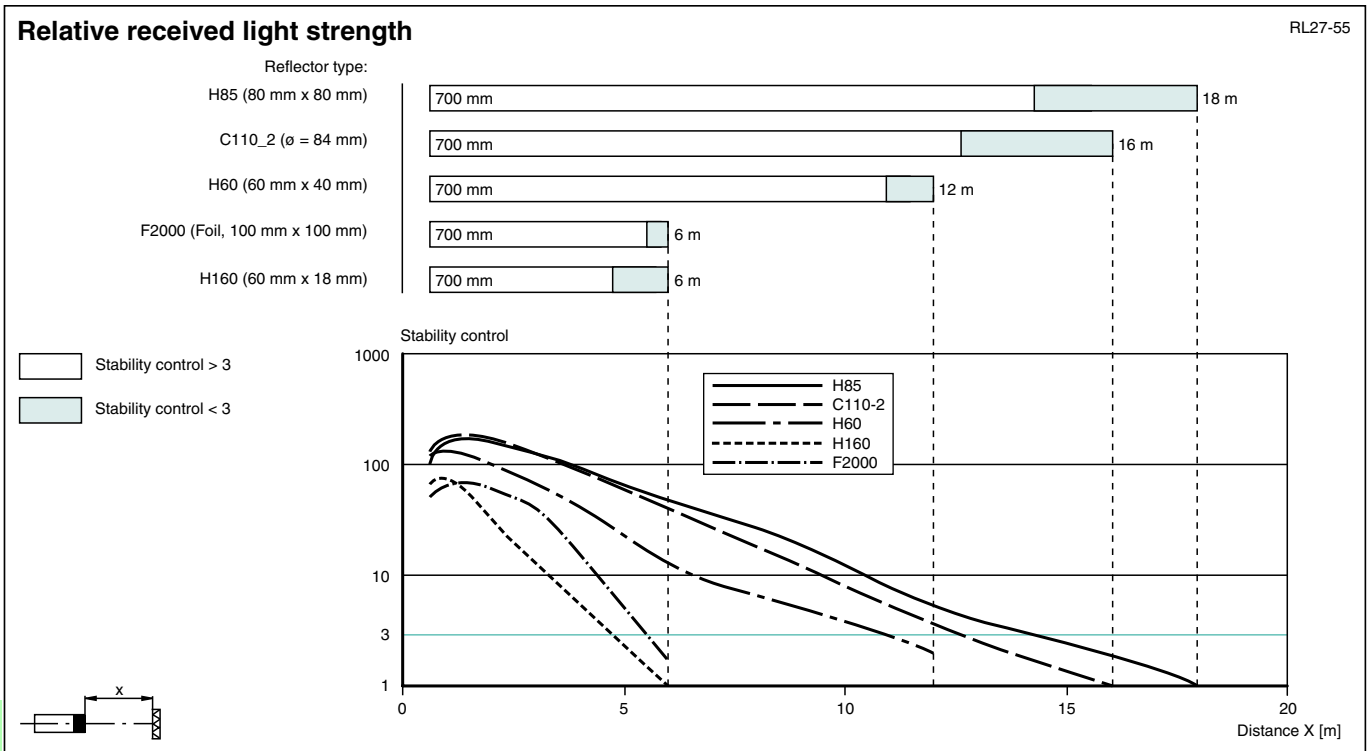
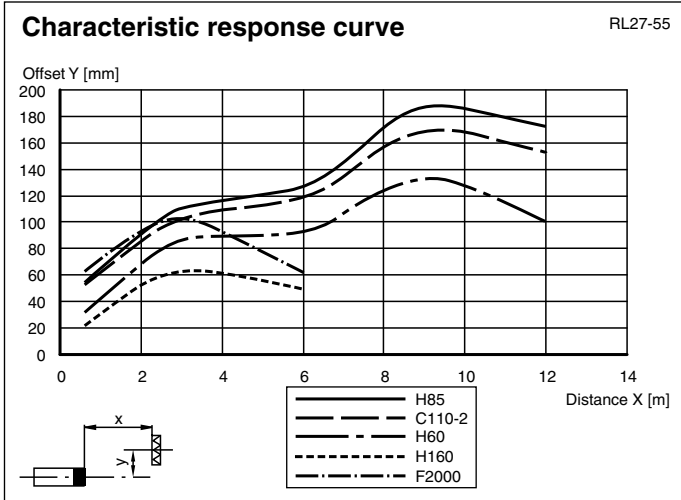
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL27-55/47/112	RL27-55/48/112
Effective detection range	0 ... 16 m	◆	◆
Reflector distance	700 ... 16000 mm	◆	◆
Reference target	Reflector C110_2	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆	
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 1 kHz	◆	◆
Response time	≤ 0.5 ms	◆	◆
Timer function	parameterisable	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable	◆	
	nnp, dynamic/static configurable		◆
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V	◆	
	inactive: ≥ 7 V or unwired; active: ≤ 3 V		◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	65 g	◆	◆

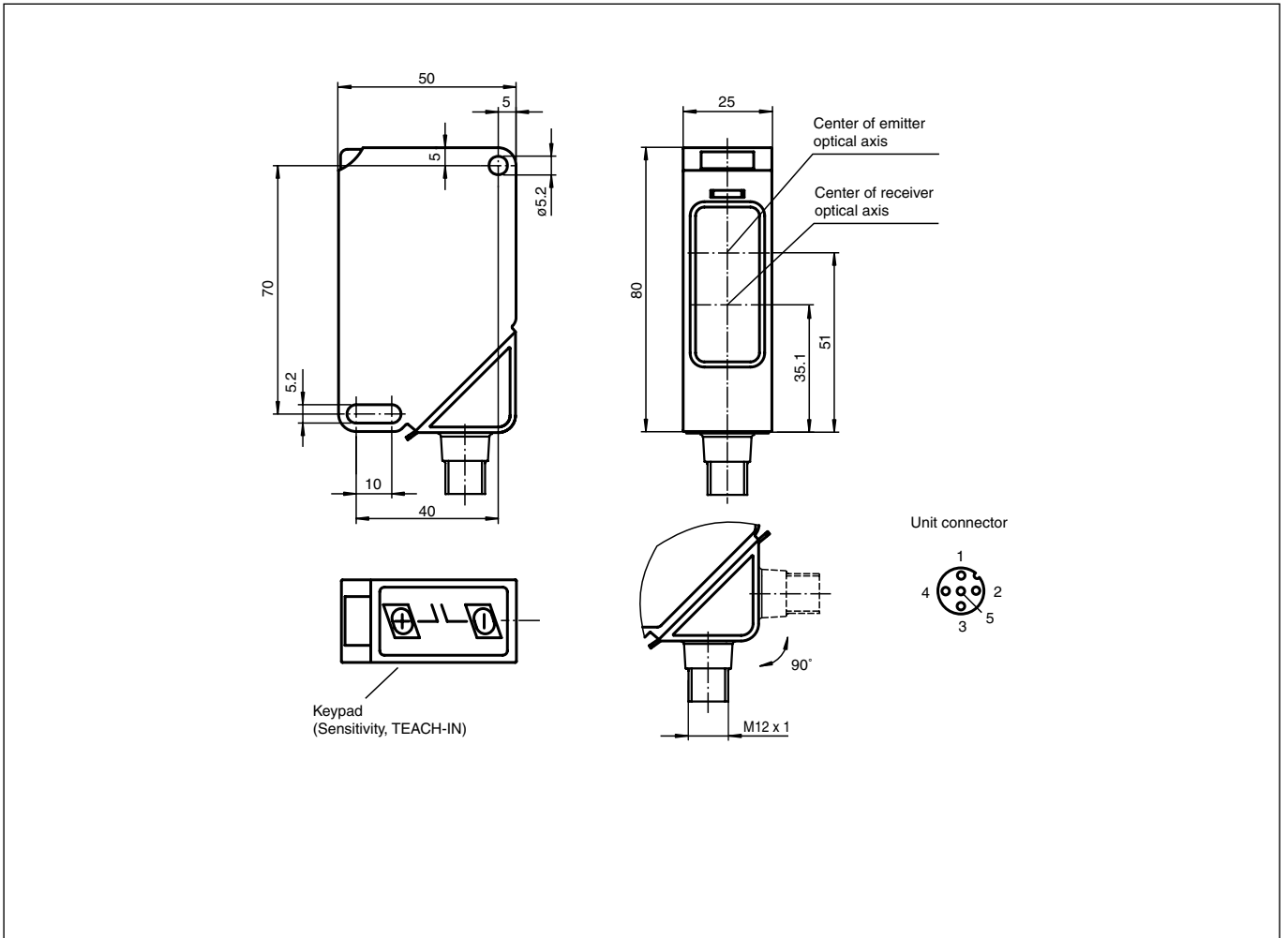


RL27-55/./112

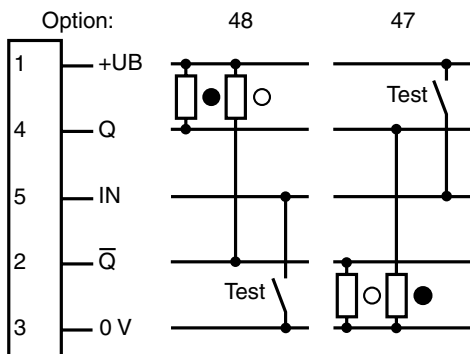
Diagrams



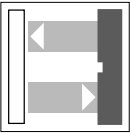
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL27-8-1500/./112

Reflection light scanner

RL27-8-1500/./112

with 5-pin M12 connector, 90° adjustable position

CE



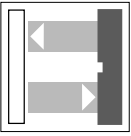
- ◆ Detection range up to 1500 mm
- ◆ Diffuse reflective sensor for standard applications
- ◆ Visible red light
- ◆ Automatic setting of the switching points (sensitivity) per TEACH-IN
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Multifunction input
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Protection degree IP67

Series
27

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

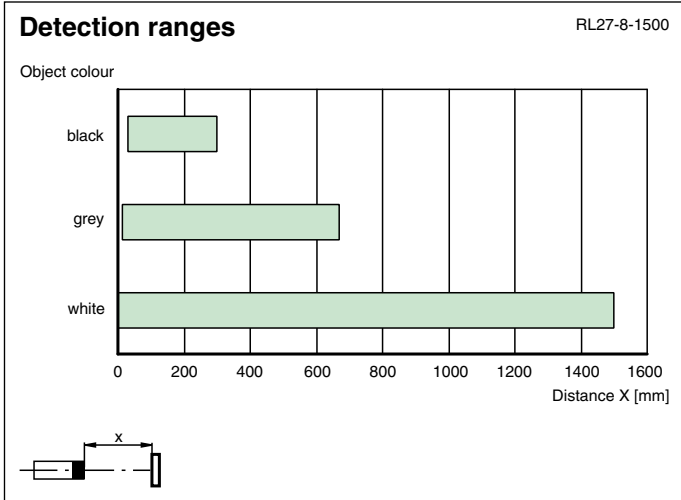
Date of issue: 10/4/01

Ordering code		RL27-8-1500/47/112	RL27-8-1500/48/112
Detection range	0 ... 1500 mm	◆	◆
Adjustment range	110 ... 1500 mm	◆	◆
Reference target	Standard white 100 mm x 100 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 25 mA	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆	
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆
Switching frequency	≤ 1 kHz	◆	◆
Response time	≤ 0.5 ms	◆	◆
Timer function	parameterisable	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable	◆	
	npn, dynamic/static configurable		◆
Test input	inactive: ≤ 3 V or unwired; active: ≥ 7 V	◆	
	inactive: ≥ 7 V or unwired; active: ≤ 3 V		◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆
Housing	ABS	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	65 g	◆	◆

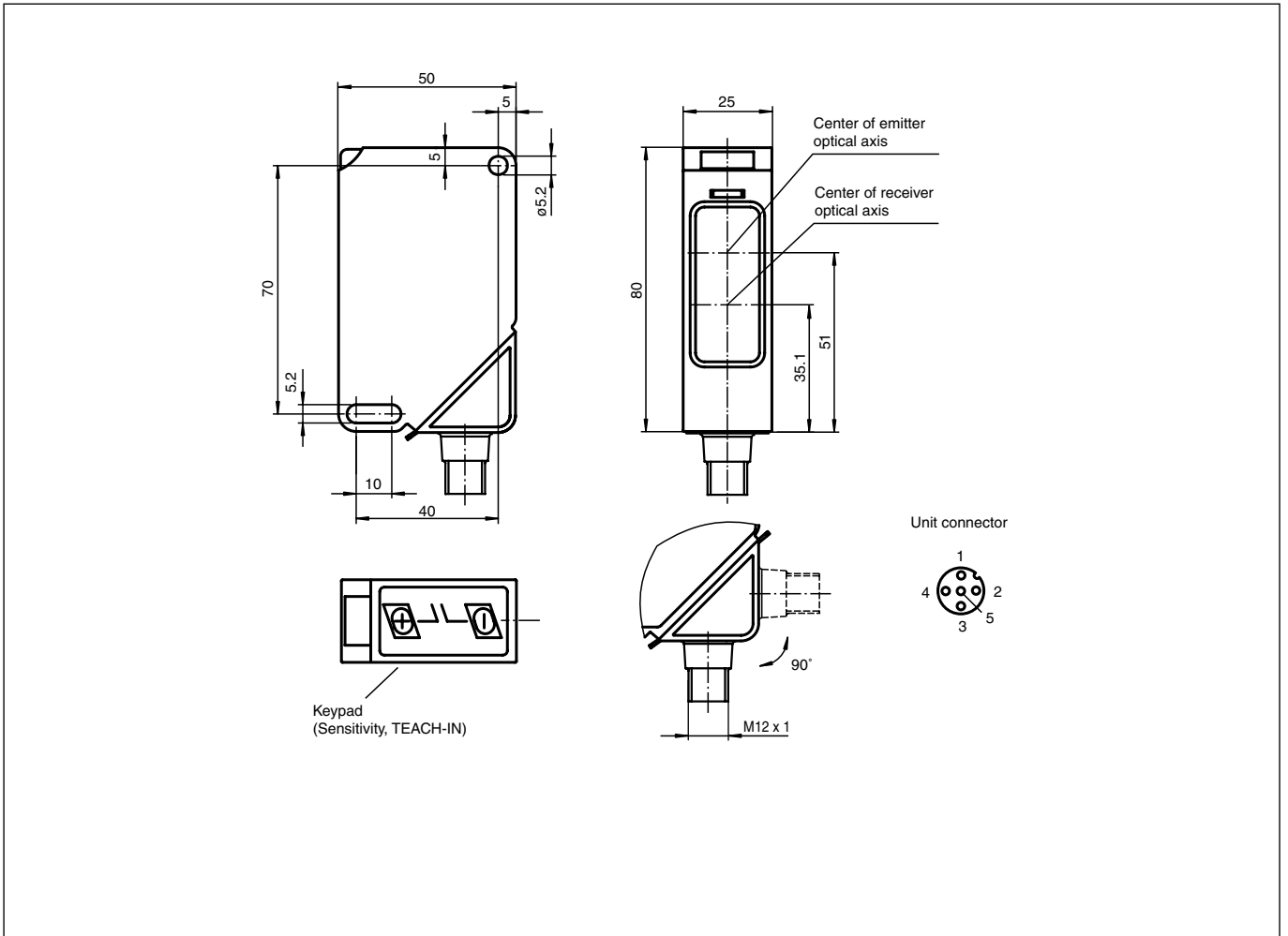


RL27-8-1500/./112

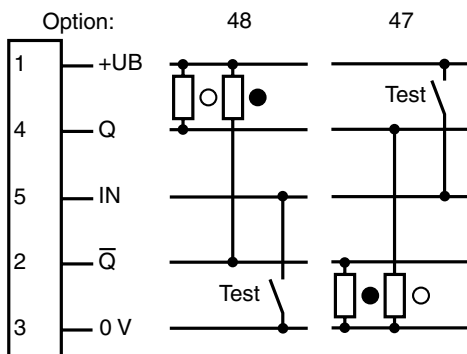
Diagrams



Dimensions



Electrical Connection





RL27-8-H-.../112

Reflection light scanner with background suppression

RL27-8-H-.../112

with 5-pin M12 connector, 90° adjustable position

CE



- ◆ Sensing range up to 1000 mm
- ◆ Visible red light
- ◆ Pre-fault indication
- ◆ Test input
- ◆ Protection degree IP67

Series
27

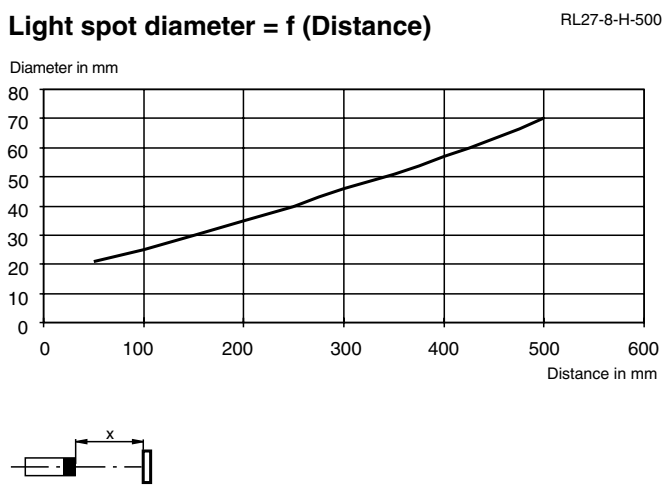
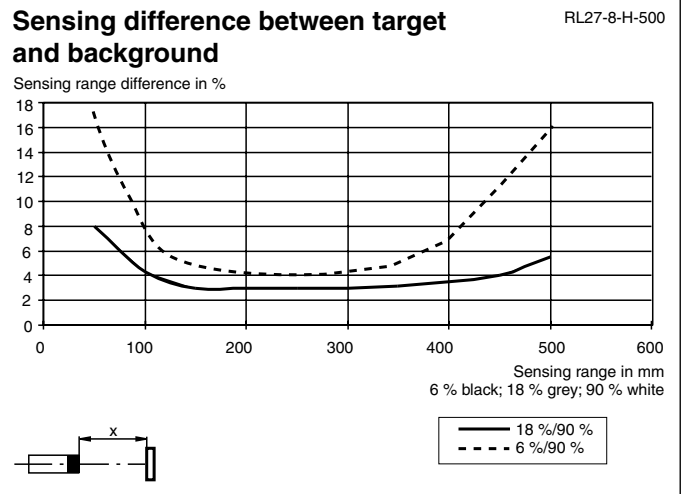
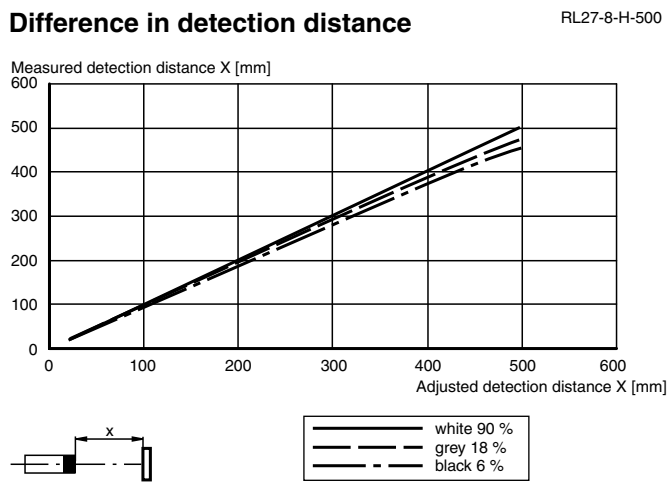
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

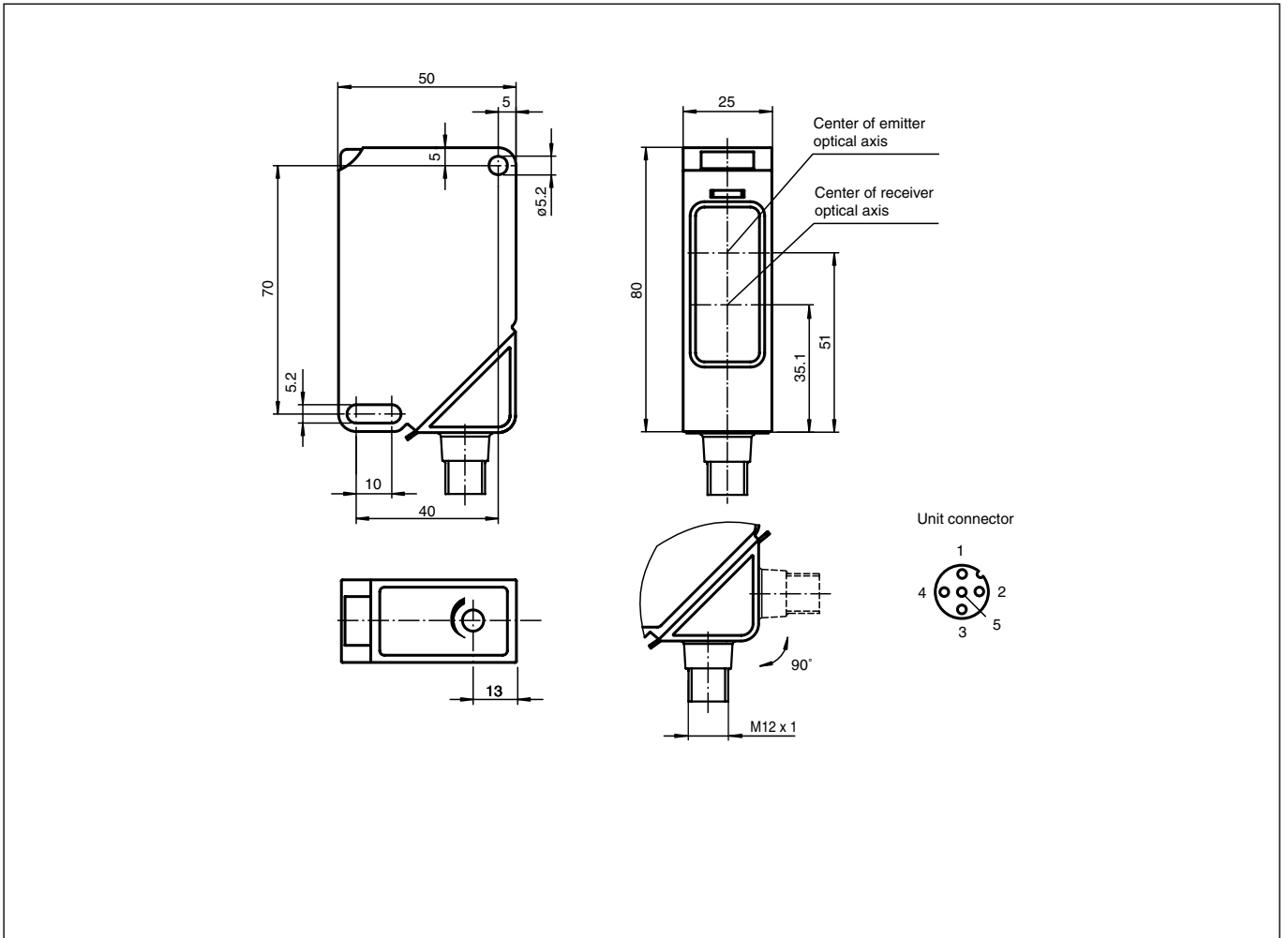
Ordering code		RL27-8-H-500/47/112	RL27-8-H-500/48/112	RL27-8-H-1000/47/112	RL27-8-H-1000/48/112
Detection range	20 ... 500 mm	◆	◆		
	40 ... 1000 mm			◆	◆
Adjustment range	50 ... 1000 mm			◆	◆
	50 ... 500 mm	◆	◆		
Reference target	Standard white 100 mm x 100 mm	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆
Function display	LED yellow: switching state LED red flashing pre-fault indicator	◆	◆	◆	◆
Controls	Adjuster for switch point	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	≤ 35 mA	◆	◆	◆	◆
Time delay before availability	≤ 20 ms	◆	◆	◆	◆
Signal output	2 switch outputs npn, normally open/closed (complementary)		◆		◆
	2 switch outputs pnp, normally open/closed (complementary)	◆		◆	
Switching type	light/dark switching	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Voltage drop	≤ 2.5 V DC	◆	◆	◆	◆
Switching frequency	≤ 1 kHz	◆	◆	◆	◆
Response time	≤ 0.3 ms	◆	◆	◆	◆
Output of the pre-fault indication	On request	◆	◆	◆	◆
Test input	inactive: ≤ 2 V or unwired; active: ≥ 7 V	◆		◆	
	inactive: ≥ 7 V or unwired; active: ≤ 2 V		◆		◆
Ambient temperature	-25 ... +60 °C	◆	◆	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆
Connection type	5-pin M12 x 1 connector, 90° adjustable position	◆	◆	◆	◆
Housing	ABS	◆	◆	◆	◆
Light exit	PMMA	◆	◆	◆	◆
Mass	50 g	◆	◆	◆	◆



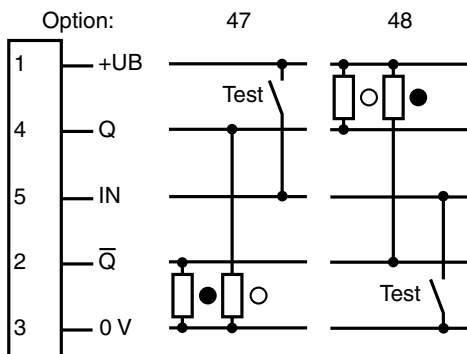
Diagrams



Dimensions



Electrical Connection





Date of issue 10/04/2001



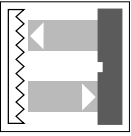
Series 28 – the light beam switches series for the solution to numerous applications

The versatility of this series of light beam switches was the most prominent element in their development. With nearly all optical models, this series is suitable for most applications. One feature all sensors share in common is a waterproof housing with a scratch-resistant optical covering. Clearly visible LEDs make it easy to adjust and signal functional readiness. The modular structure makes it possible to offer a highly diverse connection system. Another feature that should be emphasized is the wide range of signal outputs. Available outputs include antivalent, synchronised switching and push-pull output stages. This product selection also includes models with relay output and timer function. With the exception of the reflection light scanner with background suppression, all devices in this model line come standard equipped with a pre-fault indicator and a pre-fault signal output.

Optical variants in the production selection include reflex light beam switches with polarisation filters, reflex light beam switches with polarisation filters and foreground suppression, reflex light beam switch with polarisation filter for detecting transparent materials, and reflection light scanner with background suppression with three different adjustable detection ranges in red or infrared design.

The possible uses of this series of light beam switches are virtually unlimited. For example, they are used in storage and conveyor systems for compartment-occupied monitoring or for fine compartment positioning in high-shelf warehouses or for presence or height monitoring on pallet conveyors. These light beam switches are also used in the area of doors and gates for securing hazardous closing and shearing edges.

Principle	Type code	Detection range	Page
	RL28-55/105	0 m ... 12 m	474
	RL28-55/74	0 m ... 12 m	470
	RL28-55/115	0 m ... 12 m	466
	RLK28-55/116	0 m ... 12 m	486
	RL28-55-V/105	0 m ... 9 m	482
	RL28-55-V/74	0 m ... 9 m	478
	RL28-8-H-400-RT/105	20 mm ... 400 mm	498
	RL28-8-H-400-RT/74	20 mm ... 400 mm	494
	RL28-8-H-400-RT/115	20 mm ... 400 mm	490
	RL28-8-H-400-IR/105	20 mm ... 400 mm	498
	RL28-8-H-400-IR/74	20 mm ... 400 mm	494
	RL28-8-H-400-IR/115	20 mm ... 400 mm	490
	RL28-8-H-700-RT/105	20 mm ... 700 mm	510
	RL28-8-H-700-RT/74	20 mm ... 700 mm	506
	RL28-8-H-700-RT/115	20 mm ... 700 mm	502
	RL28-8-H-700-IR/105	20 mm ... 700 mm	510
	RL28-8-H-700-IR/74	20 mm ... 700 mm	506
	RL28-8-H-700-IR/115	20 mm ... 700 mm	502
	RL28-8-H-2000-IR/105	20 mm ... 2000 mm	522
	RL28-8-H-2000-IR/74	20 mm ... 2000 mm	518
RL28-8-H-2000-IR/115	20 mm ... 2000 mm	514	



RL28-55/82b/.../115

Reflection light beam switch with polarisation filter

RL28-55/82b/.../115

with 2.5 m fixed cable

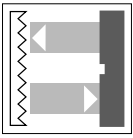


- ◆ Detection range up to 16 m
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Sensitivity adjuster and light/dark switch as standard features of this series
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

Series
28

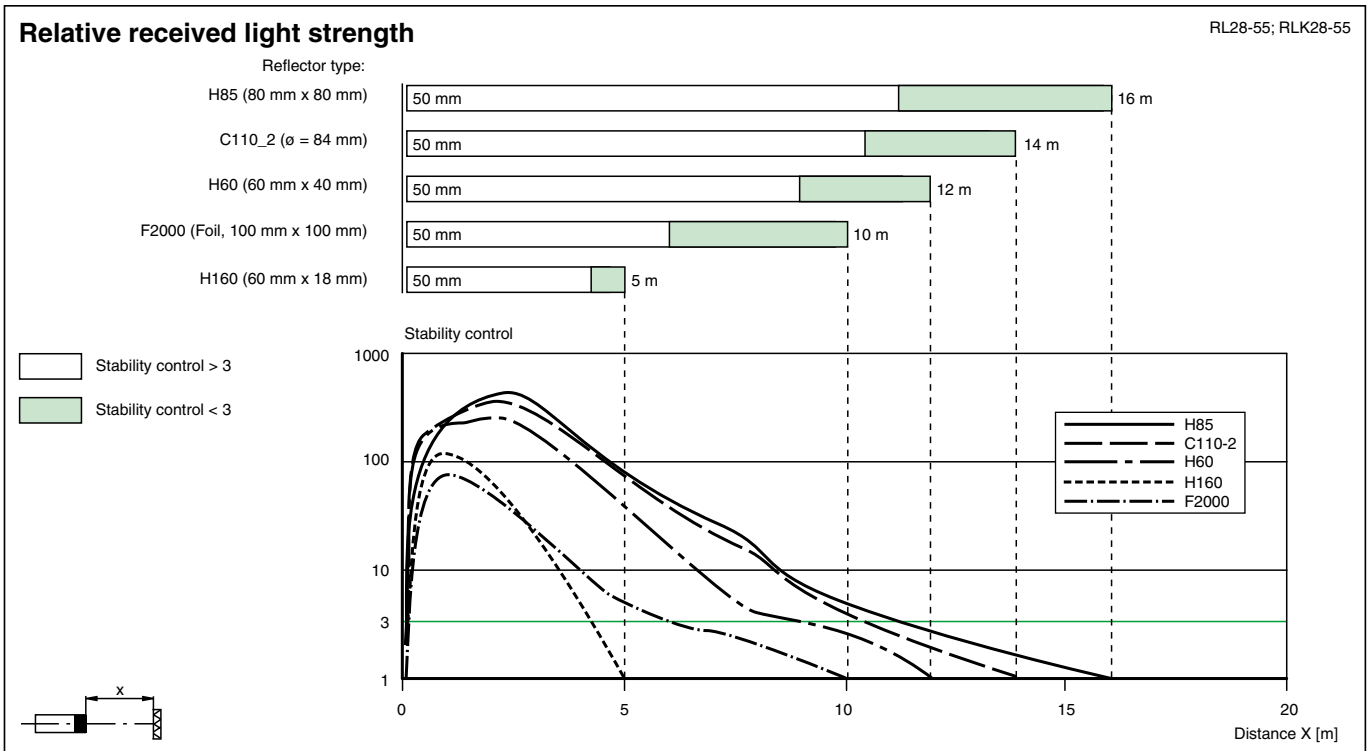
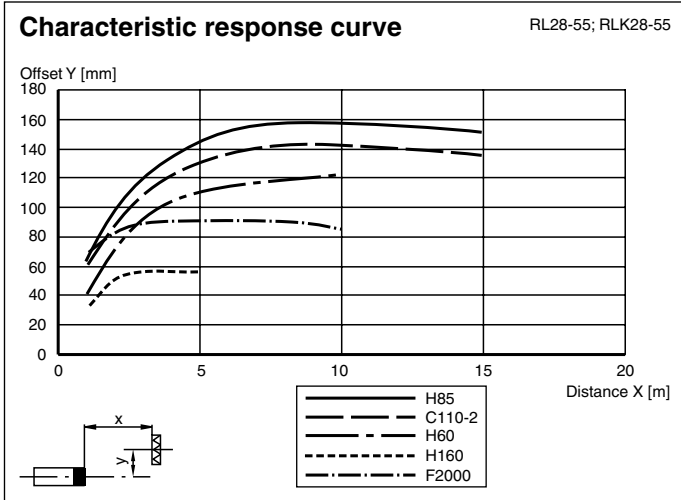
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL28-55/47/82b/115	RL28-55/49/82b/115	RL28-55/82b/110/115
Effective detection range	0 ... 12 m	◆	◆	◆
Threshold detection range	16 m (with H85 reflector)	◆	◆	◆
Reflector distance	0.05 ... 12 m	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆
Light source	LED	◆	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆	◆
Diameter of the light spot	approx. 200 mm at a distance of 12 m	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Operating display	LED green	◆	◆	◆
Function display	2 LEDs yellow, light up when light beam is free, flash when falling short of the stability control, off when light beam is interrupted	◆	◆	◆
Controls	rotary switch for light/dark	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	≤ 40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆	
	1 push-pull output, short-circuit proof, protected against reverse polarity			◆
Switching type	Light/dark ON, switchable	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	1000 Hz	◆	◆	◆
Response time	0.5 ms	◆	◆	◆
Output of the pre-fault indication	1 pnp, inactive when falling short of the stability control for 10 s immediately inactive if 4 light beam interruptions take place	◆	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	◆
Connection type	2.5 m fixed cable, 5 core, Euronorm	◆	◆	◆
Housing	Plastic ABS	◆	◆	◆
Light exit	Plastic	◆	◆	◆
Mass	70 g	◆	◆	◆

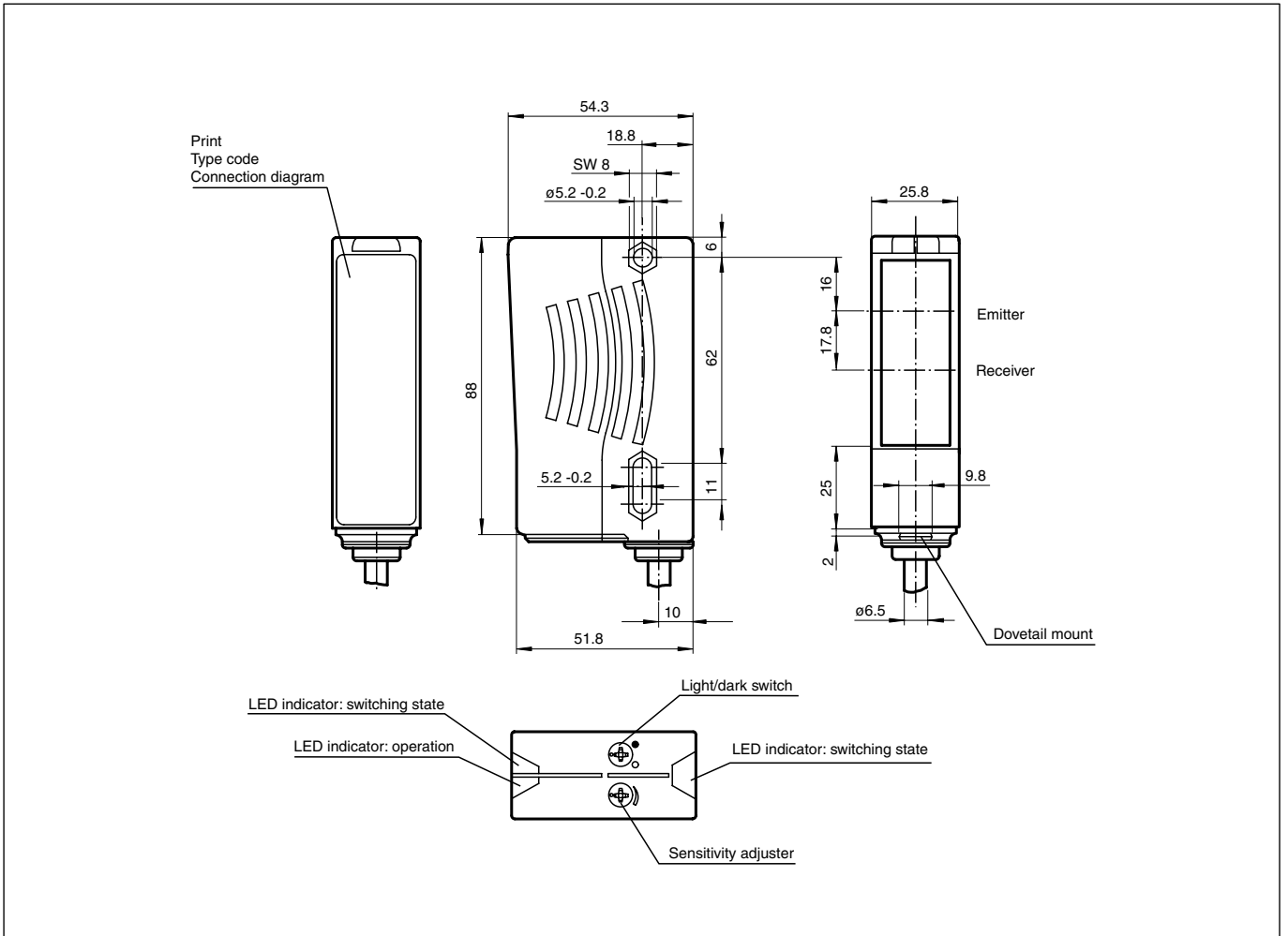


RL28-55/82b/.../115

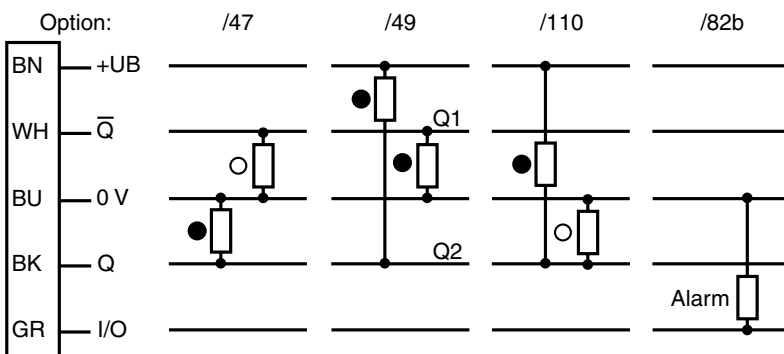
Diagrams



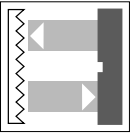
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL28-55/..74

Reflection light beam switch with polarisation filter

RL28-55/..74

with 4-pin, M18 x 1 plastic connector



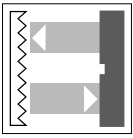
- ◆ Detection range up to 16 m
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Sensitivity adjuster and light/dark switch as standard features of this series
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

Series
28

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

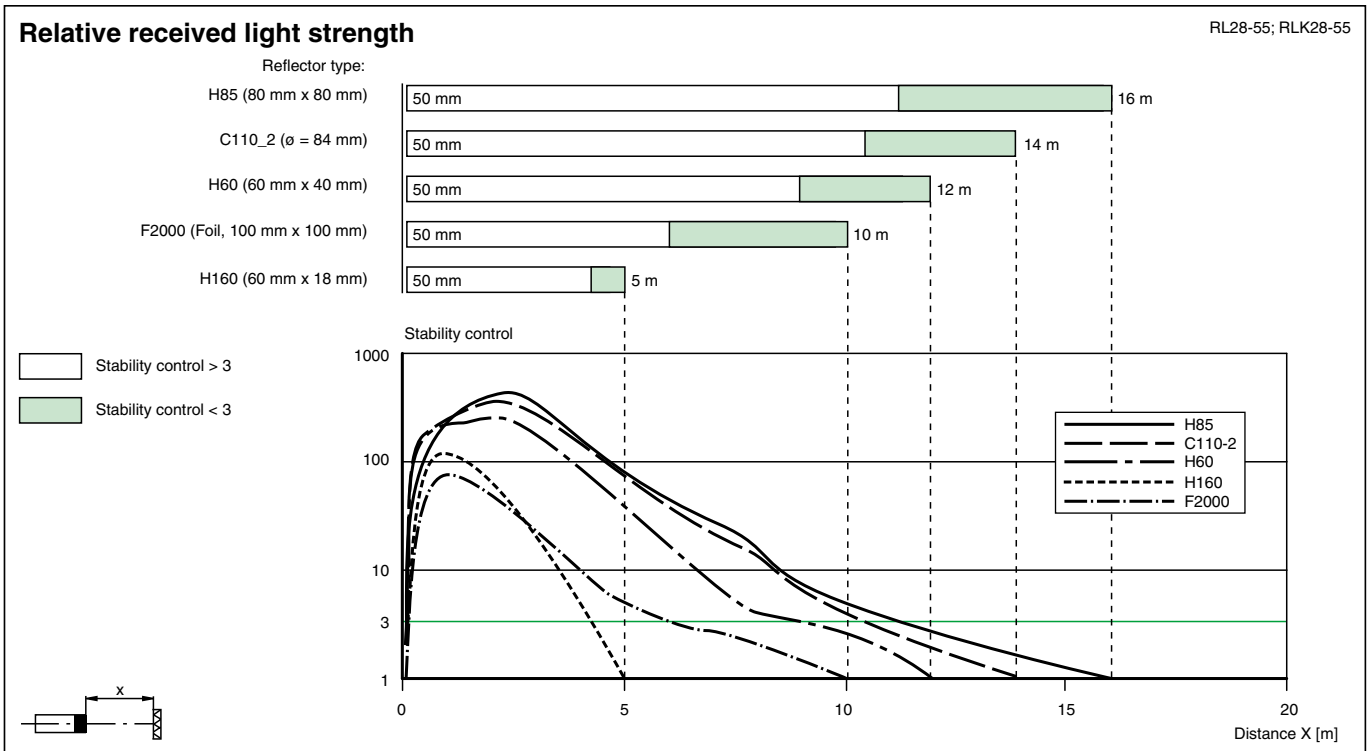
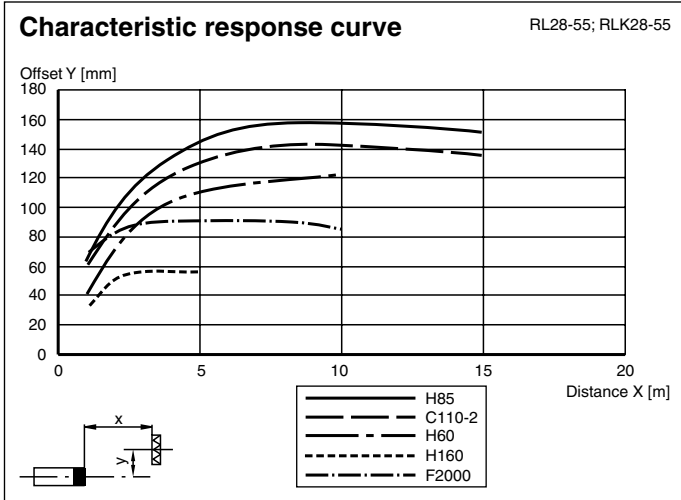
Ordering code		RL28-55/47/74	RL28-55/49/74
Effective detection range	0 ... 12 m	◆	◆
Threshold detection range	16 m (with H85 reflector)	◆	◆
Reflector distance	0.05 ... 12 m	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆
Diameter of the light spot	approx. 200 mm at a distance of 12 m	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Operating display	LED green	◆	◆
Function display	2 LEDs yellow, light up when light beam is free, flash when falling short of the stability control, off when light beam is interrupted	◆	◆
Controls	rotary switch for light/dark	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 40 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	1000 Hz	◆	◆
Response time	0.5 ms	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆
Housing	Plastic ABS	◆	◆
Light exit	Plastic	◆	◆
Mass	70 g	◆	◆

Date of issue: 10/4/01

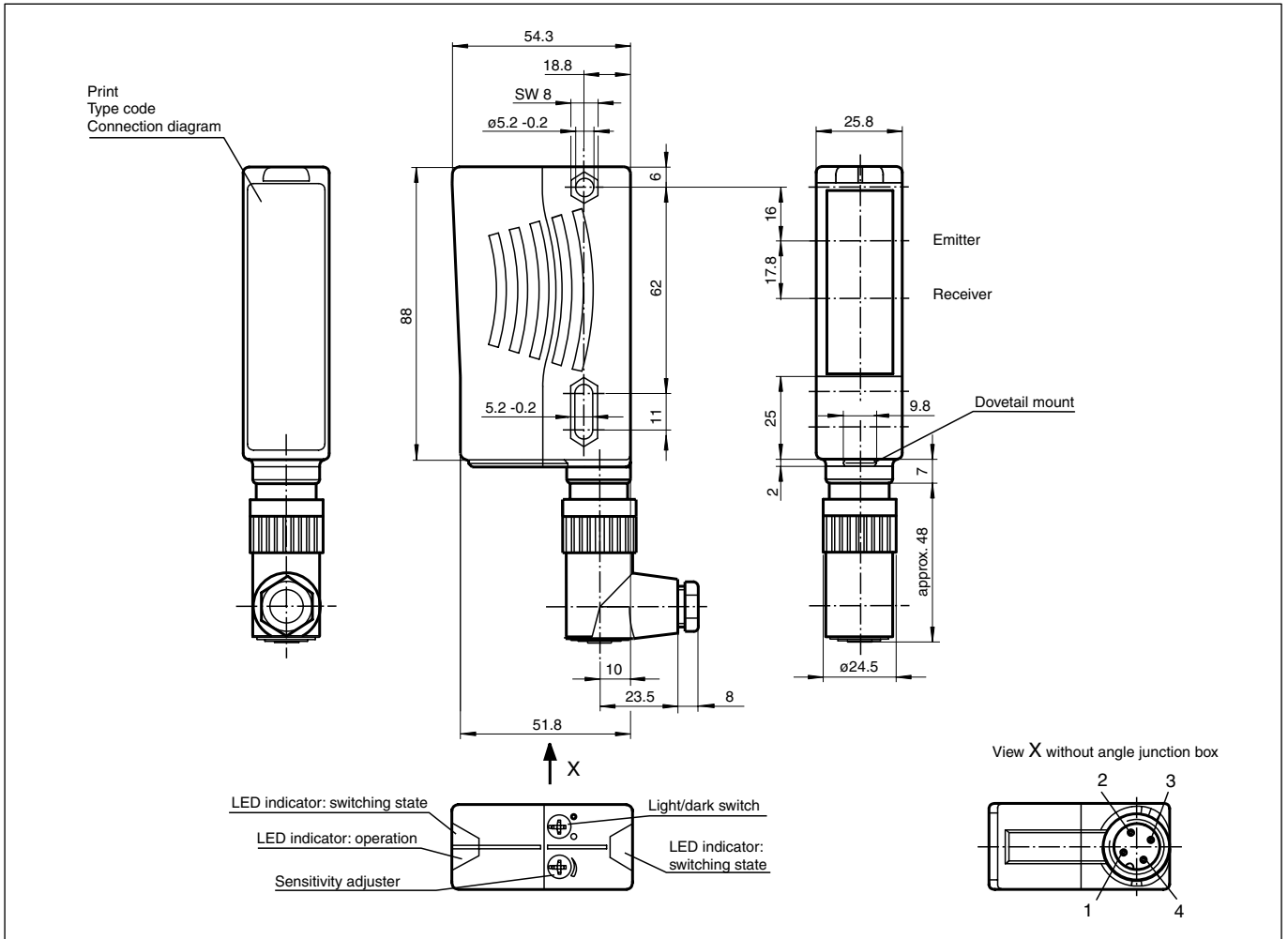


RL28-55/..74

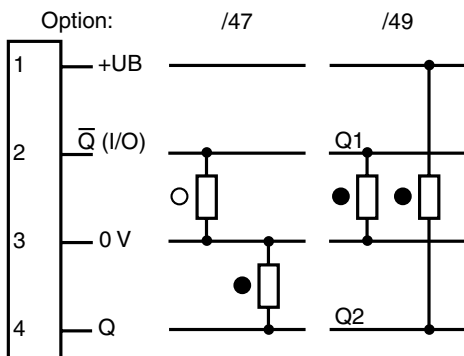
Diagrams



Dimensions



Electrical Connection



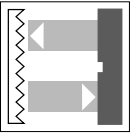
○ = Light ON, ● = Dark ON

Date of issue: 10/4/01

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RL28-55/82b/105/...

Reflection light beam switch with polarisation filter

RL28-55/82b/105/...

with 5-pin, M12 x 1 plastic connector

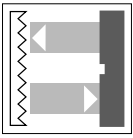


- ◆ Detection range up to 16 m
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Sensitivity adjuster and light/dark switch as standard features of this series
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

Series
28

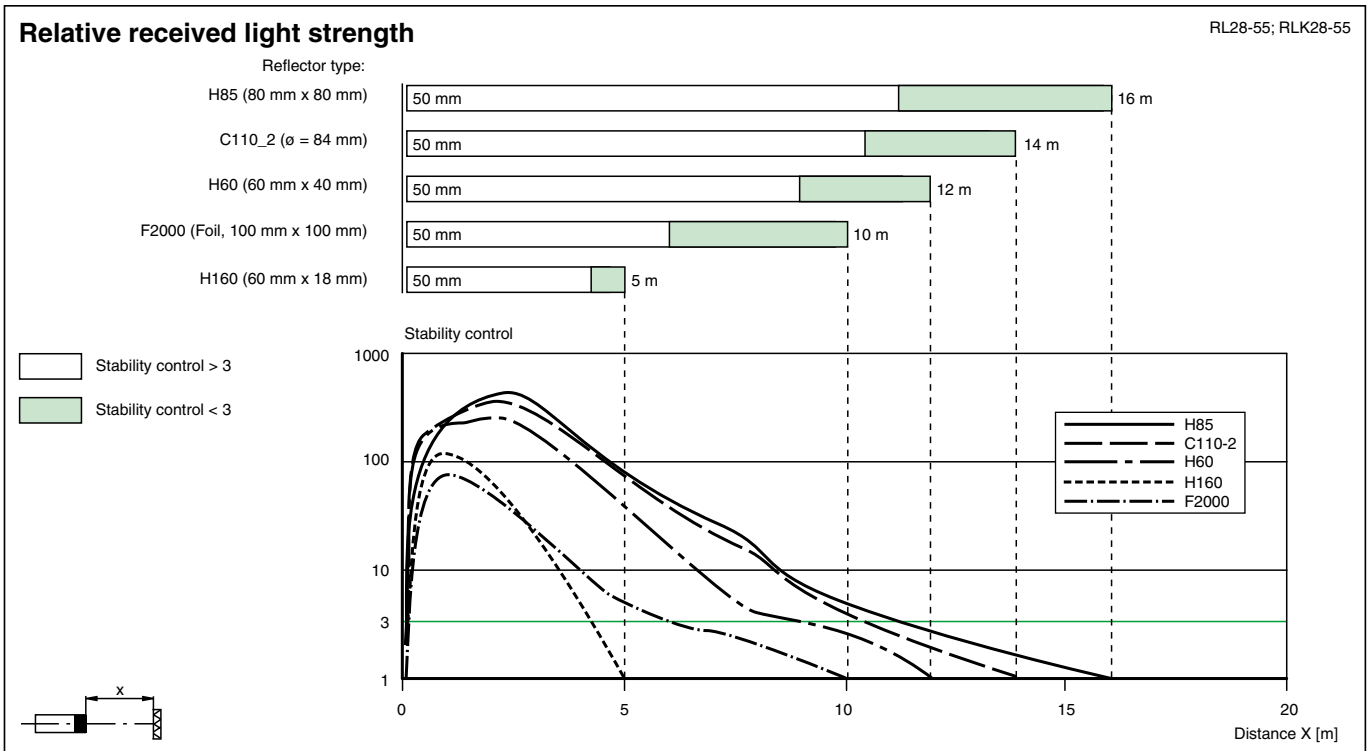
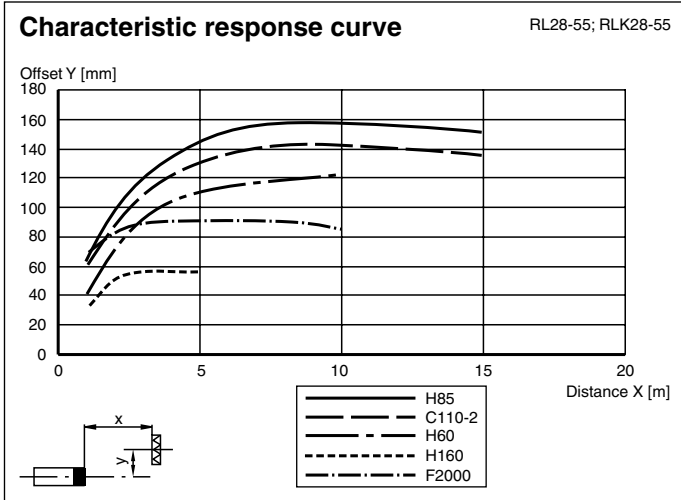
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL28-55/47/82b/105	RL28-55/49/82b/105	RL28-55/82b/105/110
Effective detection range	0 ... 12 m	◆	◆	◆
Threshold detection range	16 m (with H85 reflector)	◆	◆	◆
Reflector distance	50 ... 12000 mm	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆
Light source	LED	◆	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆	◆
Diameter of the light spot	approx. 200 mm at a distance of 12 m	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Operating display	LED green	◆	◆	◆
Function display	2 LEDs yellow, light up when light beam is free, flash when falling short of the stability control, off when light beam is interrupted	◆	◆	◆
Controls	rotary switch for light/dark	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	≤ 40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆	
	1 push-pull output, short-circuit proof, protected against reverse polarity			◆
Switching type	Light/dark ON, switchable	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	1000 Hz	◆	◆	◆
Response time	0.5 ms	◆	◆	◆
Output of the pre-fault indication	1 pnp, inactive when falling short of the stability control for 10 s immediately inactive if 4 light beam interruptions take place	◆	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	◆
Connection type	5-pin, M12 connector	◆	◆	◆
Housing	Plastic ABS	◆	◆	◆
Light exit	Plastic	◆	◆	◆
Mass	70 g	◆	◆	◆

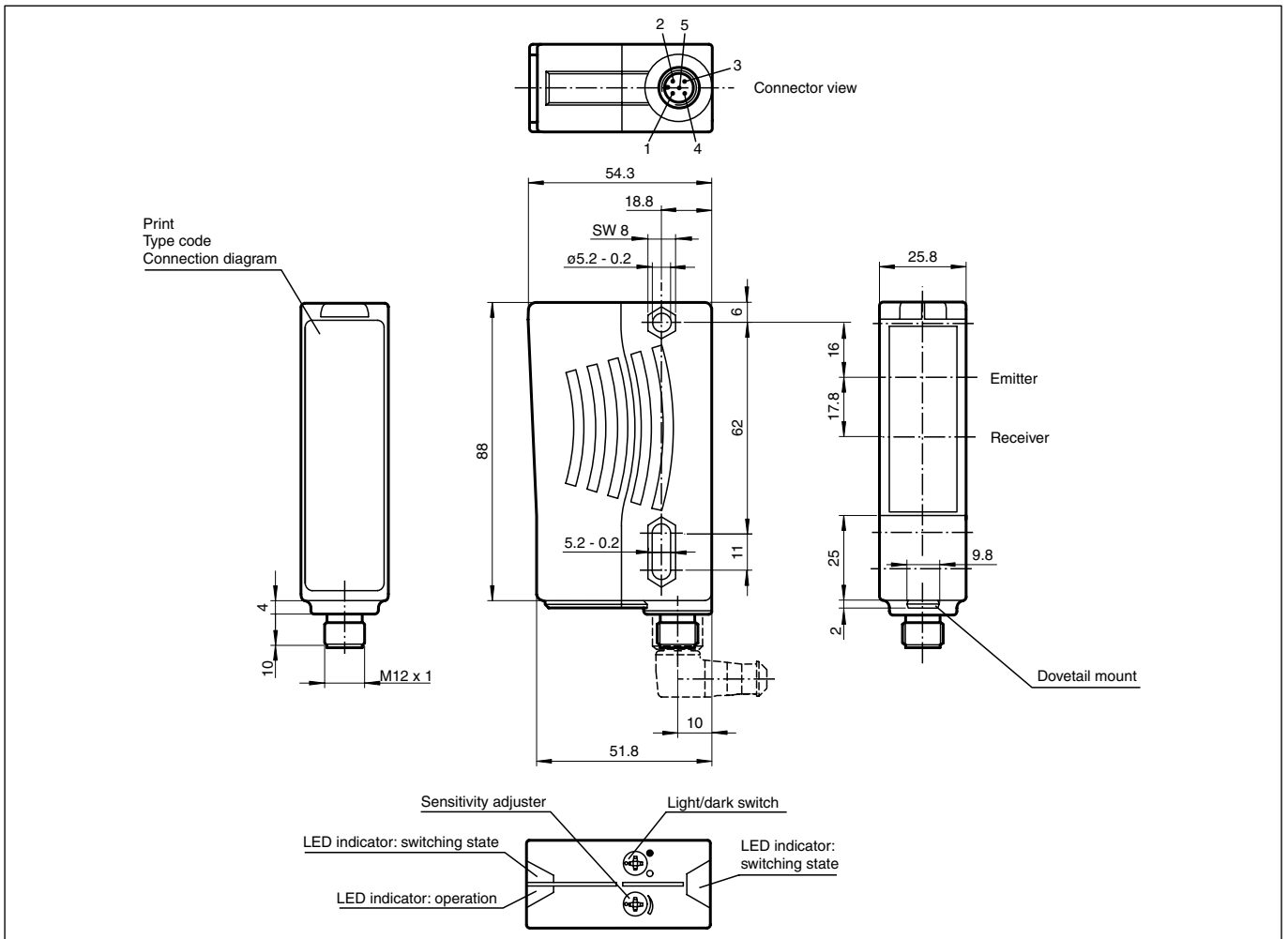


RL28-55/82b/105/...

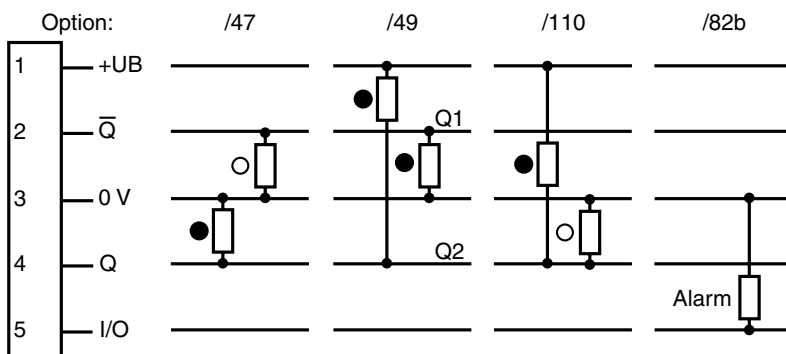
Diagrams



Dimensions

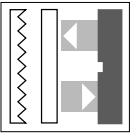


Electrical Connection



Date of issue: 10/4/01

○ = Light ON, ● = Dark ON



RL28-55-V/..74

Reflection light beam switch with polarisation filter

RL28-55-V/..74

with 4-pin, M18 x 1 plastic connector



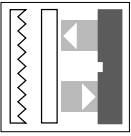
- ◆ Detection range up to 12 m
- ◆ Foreground suppression, suited to recording of sheet-shrink-wrapped objects
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Sensitivity adjuster and light/dark switch as standard features of this series
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

Series
28

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

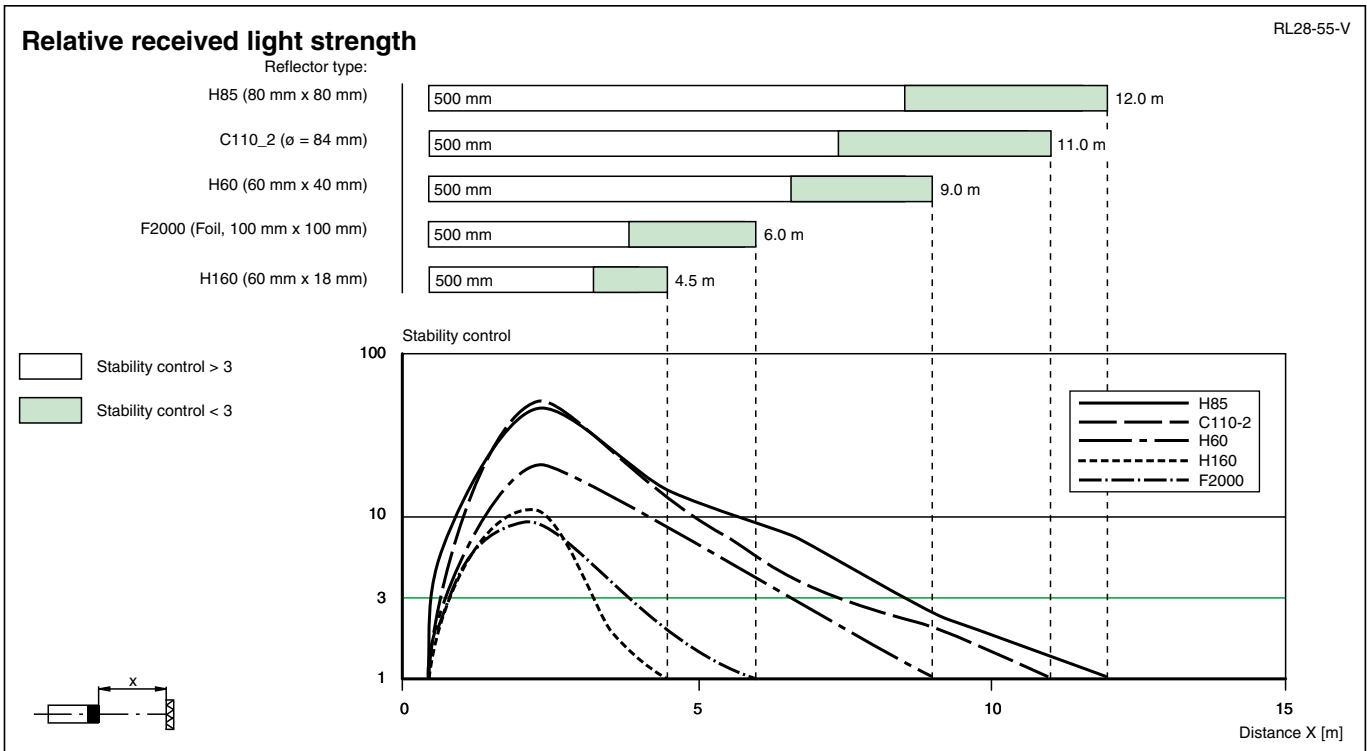
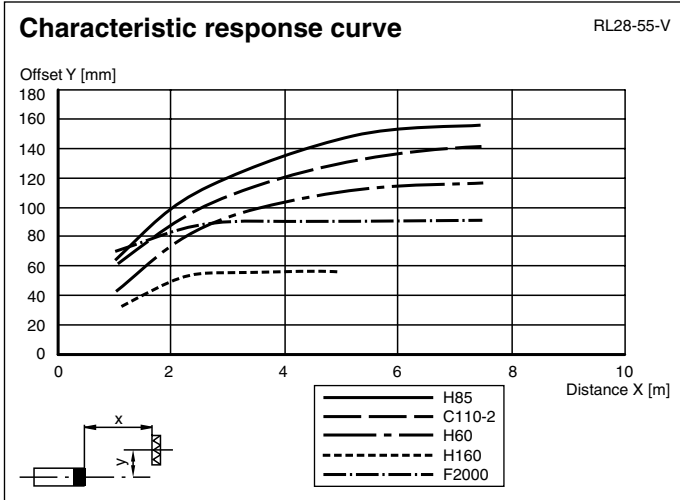
Ordering code		RL28-55-V/47/74	RL28-55-V/49/74
Effective detection range	0.2 ... 9 m	◆	◆
Threshold detection range	12 m (with H85 reflector)	◆	◆
Reflector distance	0.5 ... 9 m (blind range 0 ... 0.2 m faded out)	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆
Diameter of the light spot	approx. 160 mm at a distance of 9 m	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Operating display	LED green	◆	◆
Function display	2 LEDs yellow, light up when light beam is free, flash when falling short of the stability control, off when light beam is interrupted	◆	◆
Controls	rotary switch for light/dark	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 40 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	1000 Hz	◆	◆
Response time	0.5 ms	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆
Housing	Plastic ABS	◆	◆
Light exit	Plastic	◆	◆
Mass	70 g	◆	◆

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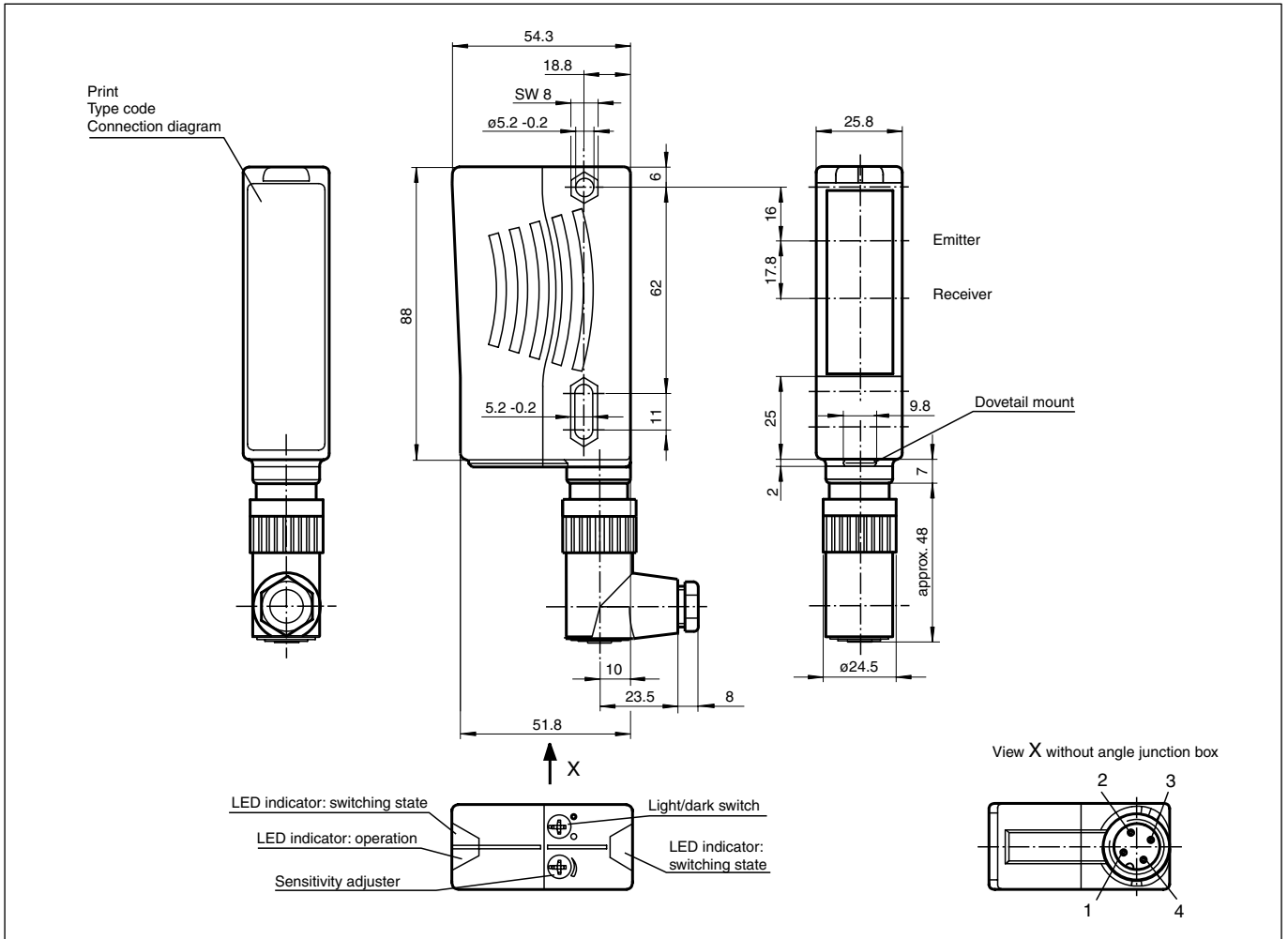


RL28-55-V../74

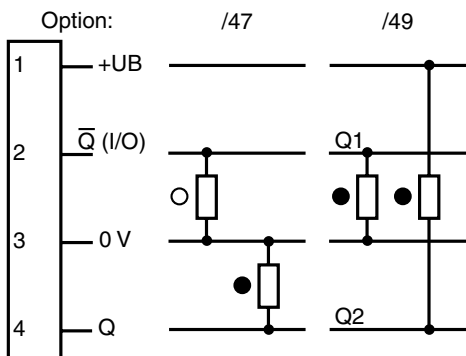
Diagrams



Dimensions



Electrical Connection



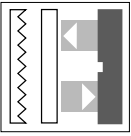
○ = Light ON, ● = Dark ON

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RL28-55-V/82b/105/...

Reflection light beam switch with polarisation filter

RL28-55-V/82b/105/...

with 5-pin, M12 x 1 plastic connector

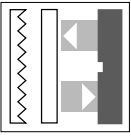


- ◆ Detection range up to 12 m
- ◆ Foreground suppression, suited to recording of sheet-shrink-wrapped objects
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Sensitivity adjuster and light/dark switch as standard features of this series
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

Series
28

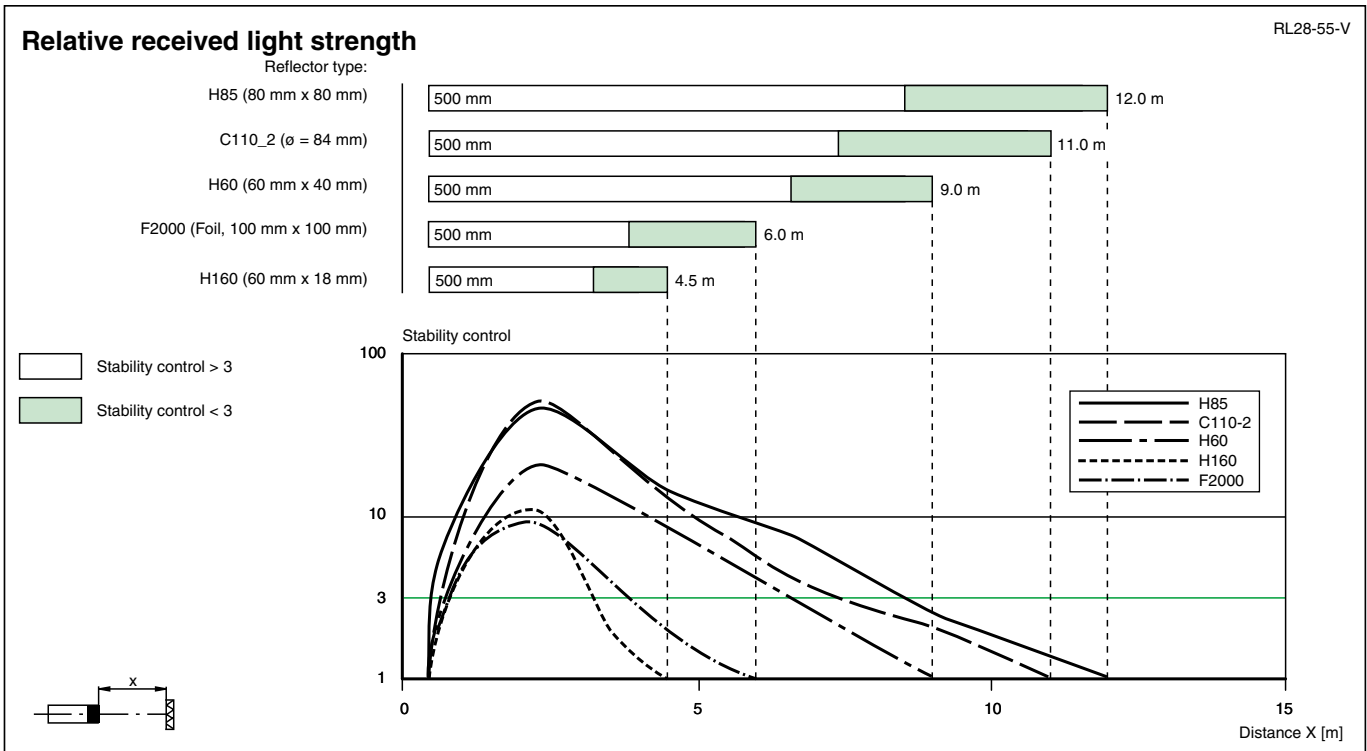
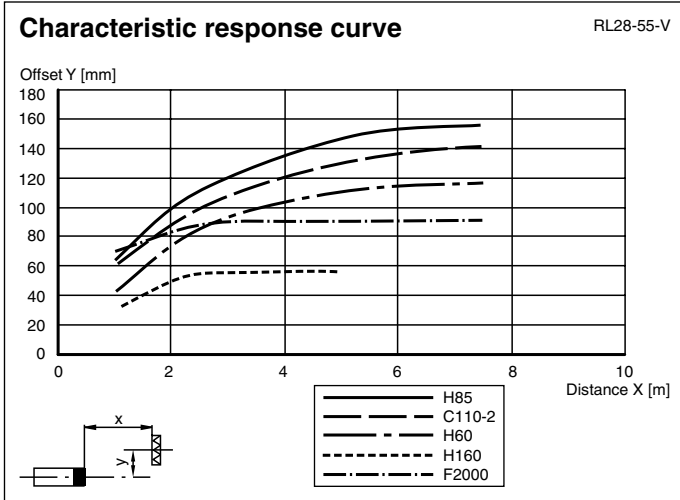
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL28-55-V/47/82b/105	RL28-55-V/49/82b/105	RL28-55-V/82b/105/110
Effective detection range	0.2 ... 9 m	◆	◆	◆
Threshold detection range	12 m (with H85 reflector)	◆	◆	◆
Reflector distance	0.5 ... 9 m (blind range 0 ... 0.2 m faded out)	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆
Light source	LED	◆	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆	◆
Diameter of the light spot	approx. 160 mm at a distance of 9 m	◆	◆	◆
Ambient light limit	80000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Operating display	LED green	◆	◆	◆
Function display	2 LEDs yellow, light up when light beam is free, flash when falling short of the stability control, off when light beam is interrupted	◆	◆	◆
Controls	rotary switch for light/dark	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	≤ 40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆	
	1 push-pull output, short-circuit proof, protected against reverse polarity			◆
Switching type	Light/dark ON, switchable	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	1000 Hz	◆	◆	◆
Response time	0.5 ms	◆	◆	◆
Output of the pre-fault indication	1 pnp, inactive when falling short of the stability control for 10 s immediately inactive if 4 light beam interruptions take place	◆	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	◆
Connection type	5-pin, M12 connector	◆	◆	◆
Housing	Plastic ABS	◆	◆	◆
Light exit	Plastic	◆	◆	◆
Mass	70 g	◆	◆	◆

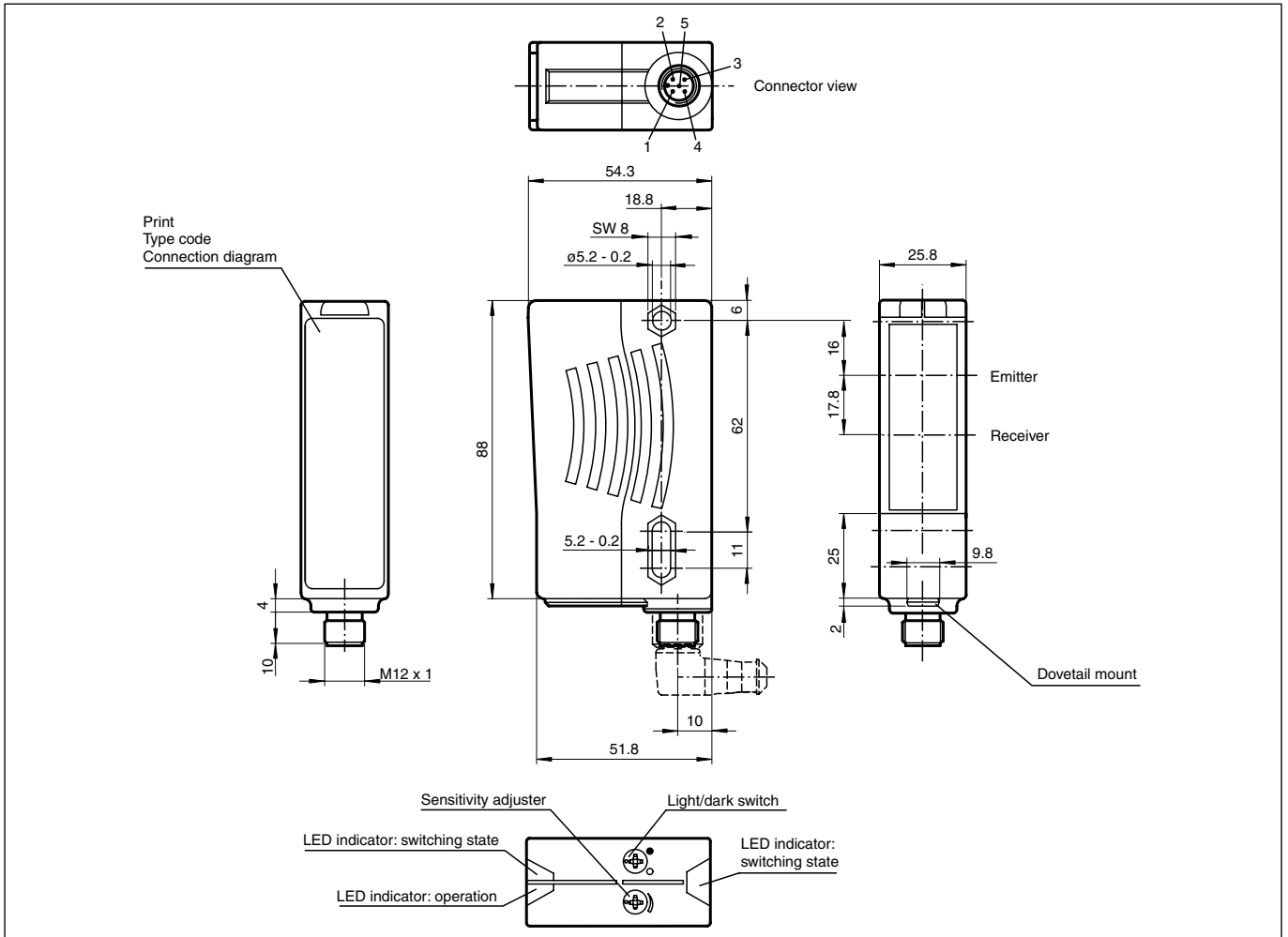


RL28-55-V/82b/105/...

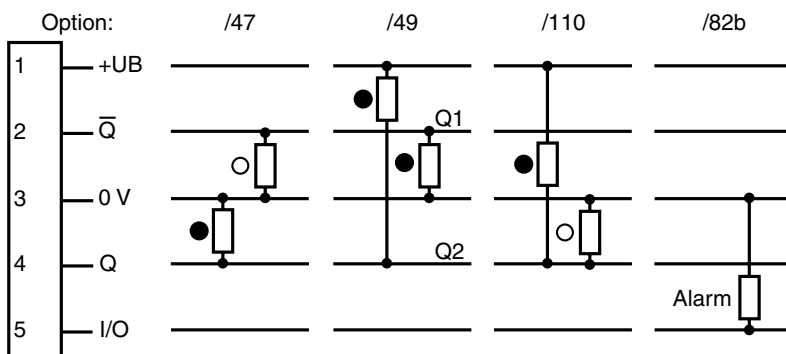
Diagrams



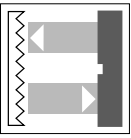
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RLK28-55-./116

Reflection light beam switch with polarisation filter

RLK28-55-./116

with terminal compartment

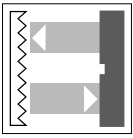


- ◆ Detection range up to 16 m
- ◆ Terminal compartment with 8 spring-loaded terminals
- ◆ Relay output, 1 potential free alternator
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Sensitivity adjuster and light/dark switch as standard features of this series
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67
- ◆ Version -Z: programmable time function GAN, GAB, IAB and GAN-IAB, as well as GAN-GAB for double function

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

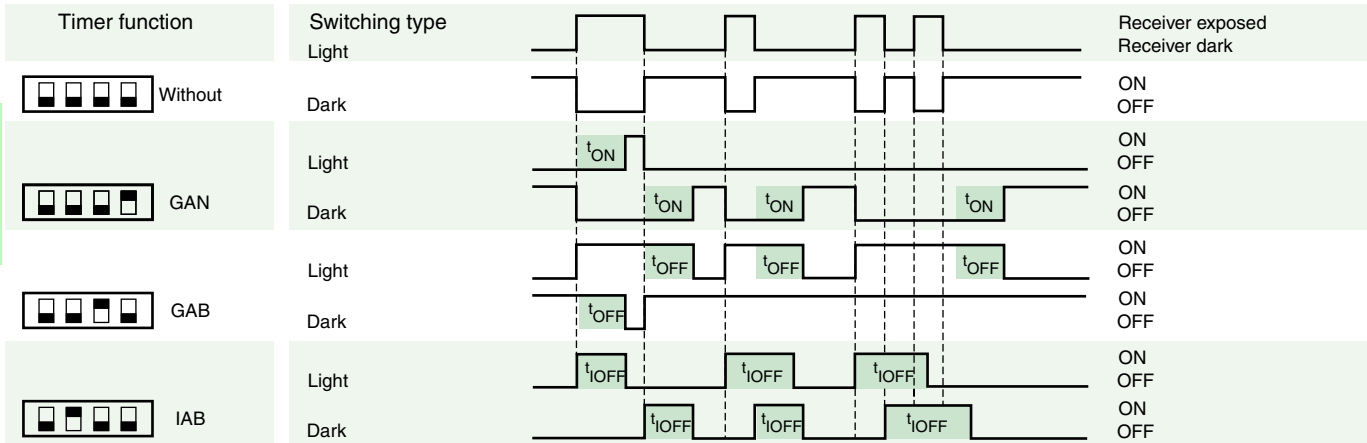
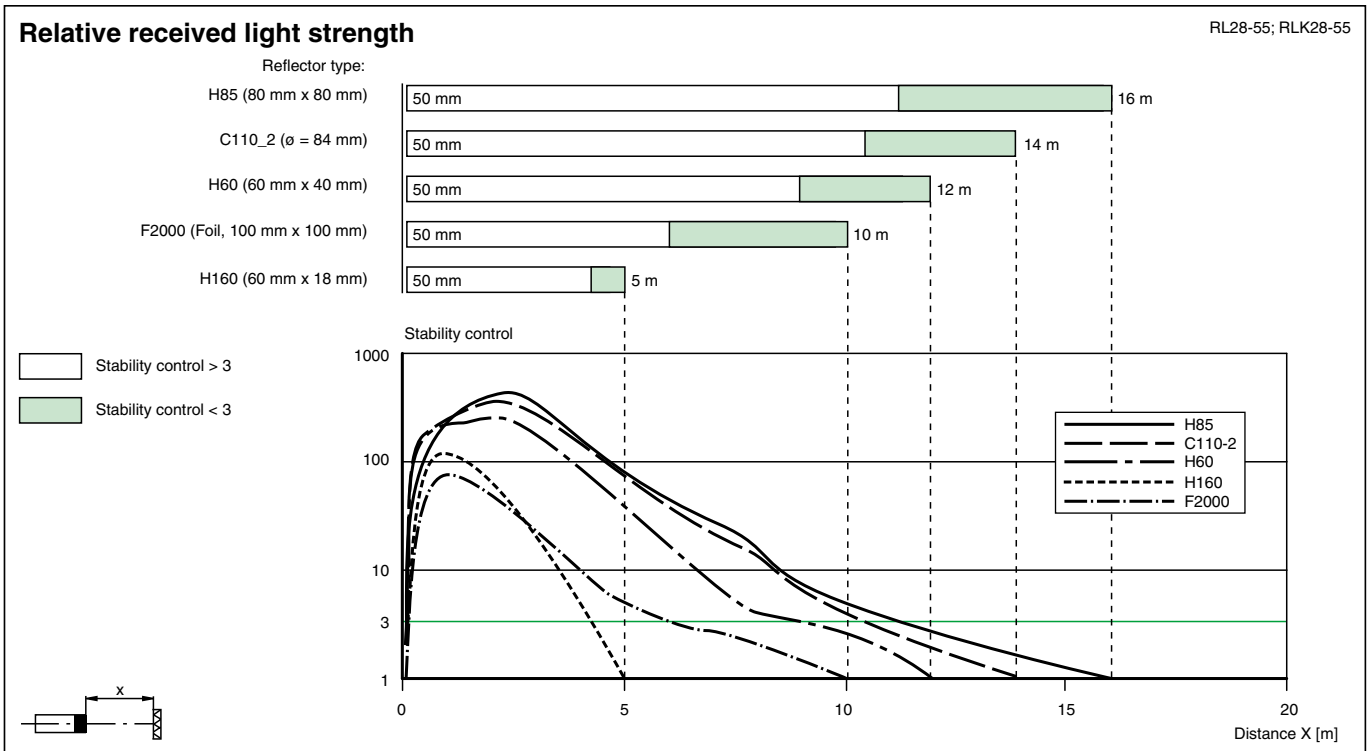
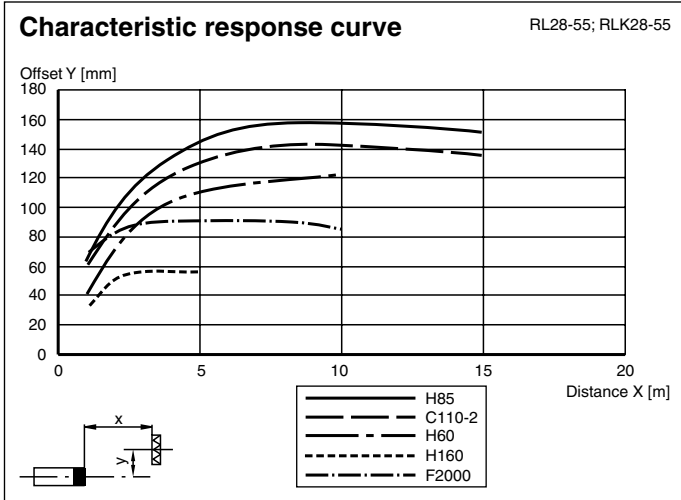
Date of issue: 10/4/01

Ordering code		RLK28-55/116	RLK28-55-Z/116
Effective detection range	0 ... 12 m	◆	◆
Threshold detection range	16 m (with H85 reflector)	◆	◆
Reflector distance	0.05 ... 12 m	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆
Diameter of the light spot	approx. 200 mm at a distance of 12 m	◆	◆
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Operating display	LED green	◆	◆
Function display	2 LEDs yellow, light up when light beam is free, flash when falling short of the stability control, off when light beam is interrupted	◆	◆
Controls	rotary switch for light/dark	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	12 ... 240 V AC/DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 40 mA	◆	◆
Power consumption	≤ 3 VA	◆	◆
Signal output	Relay, 1 alternator	◆	◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	230 V AC	◆	◆
Switching current	max. 2 A	◆	◆
Switching frequency	25 Hz	◆	◆
Response time	20 ms	◆	◆
Timer function	GAN, GAB, IAB, GAN-IAB, GAN-GAB, programmable, adjustment interval 0.1 ... 10 s		◆
Ambient temperature	-40 ... +60 °C	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	terminal compartment	◆	◆
Housing	Plastic ABS	◆	◆
Light exit	Plastic	◆	◆
Mass	100 g	◆	◆



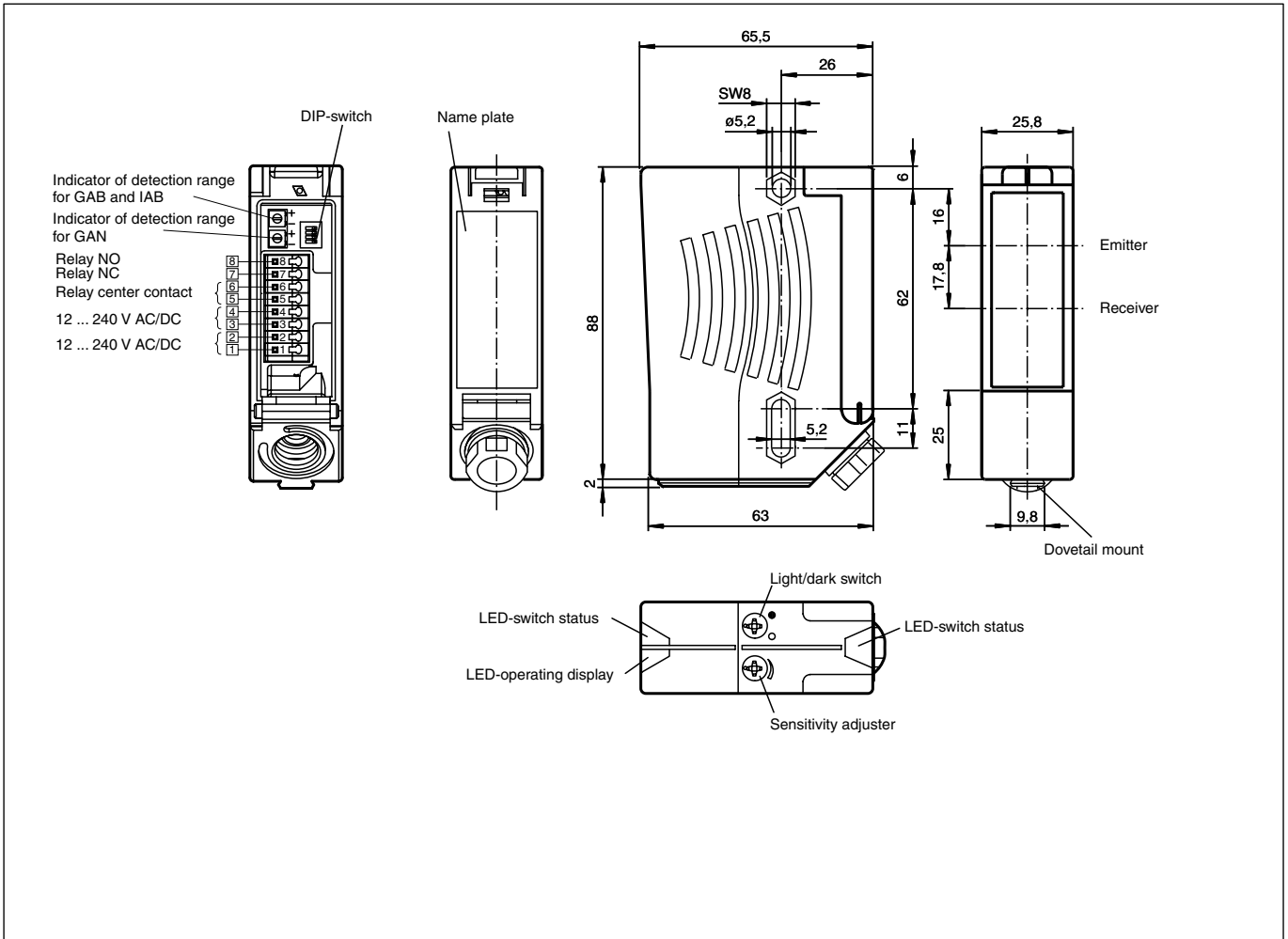
RLK28-55-./116

Diagrams

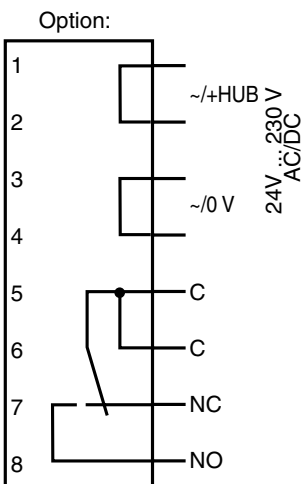


Time t_{ON} , t_{ON} and t_{OFF} are adjustable from 0.1 to 1 seconds.

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/4/01



RL28-8-H-400-.../115

Reflection light scanner with background suppression

RL28-8-H-400-.../115

with 2.5 m fixed cable



- ◆ Sensor range 20 mm ... 400 mm, adjustable
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Design RT: Good alignability by red transmission LED
- ◆ Design IR: Minimal black-white difference through the infrared transmission LED
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

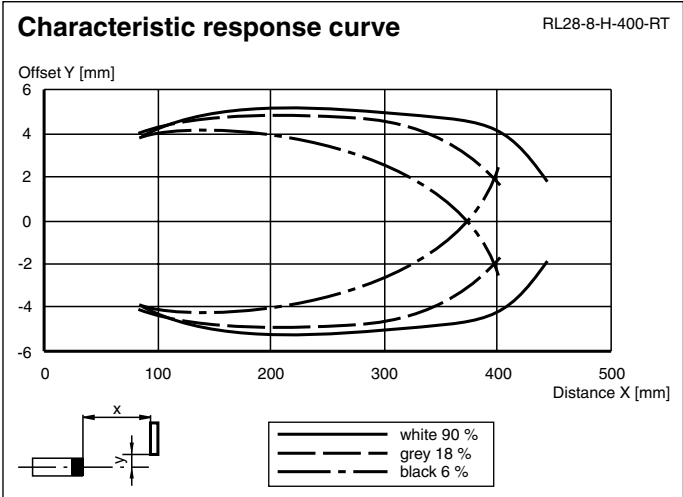
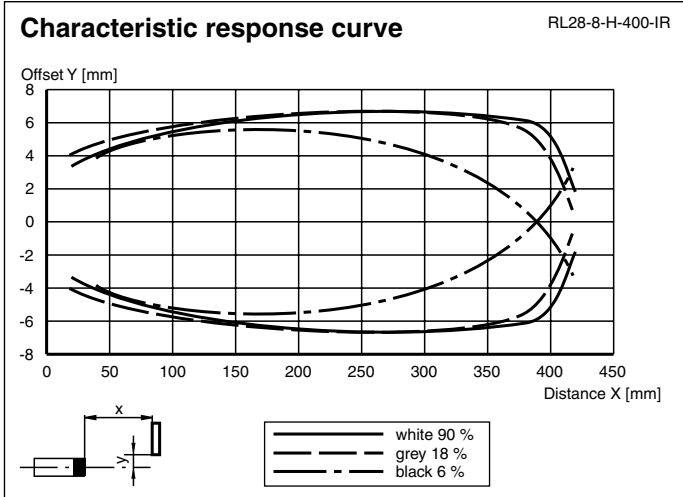
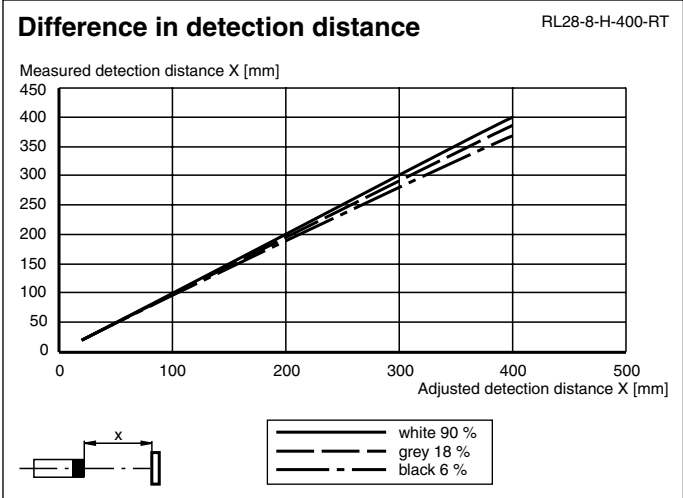
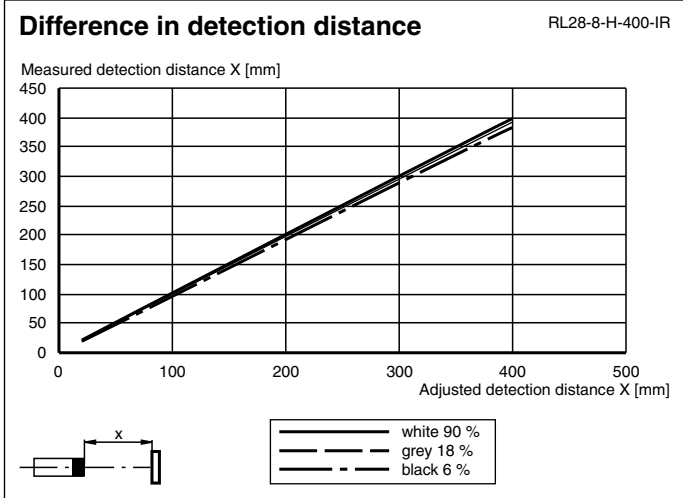
Series
28

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

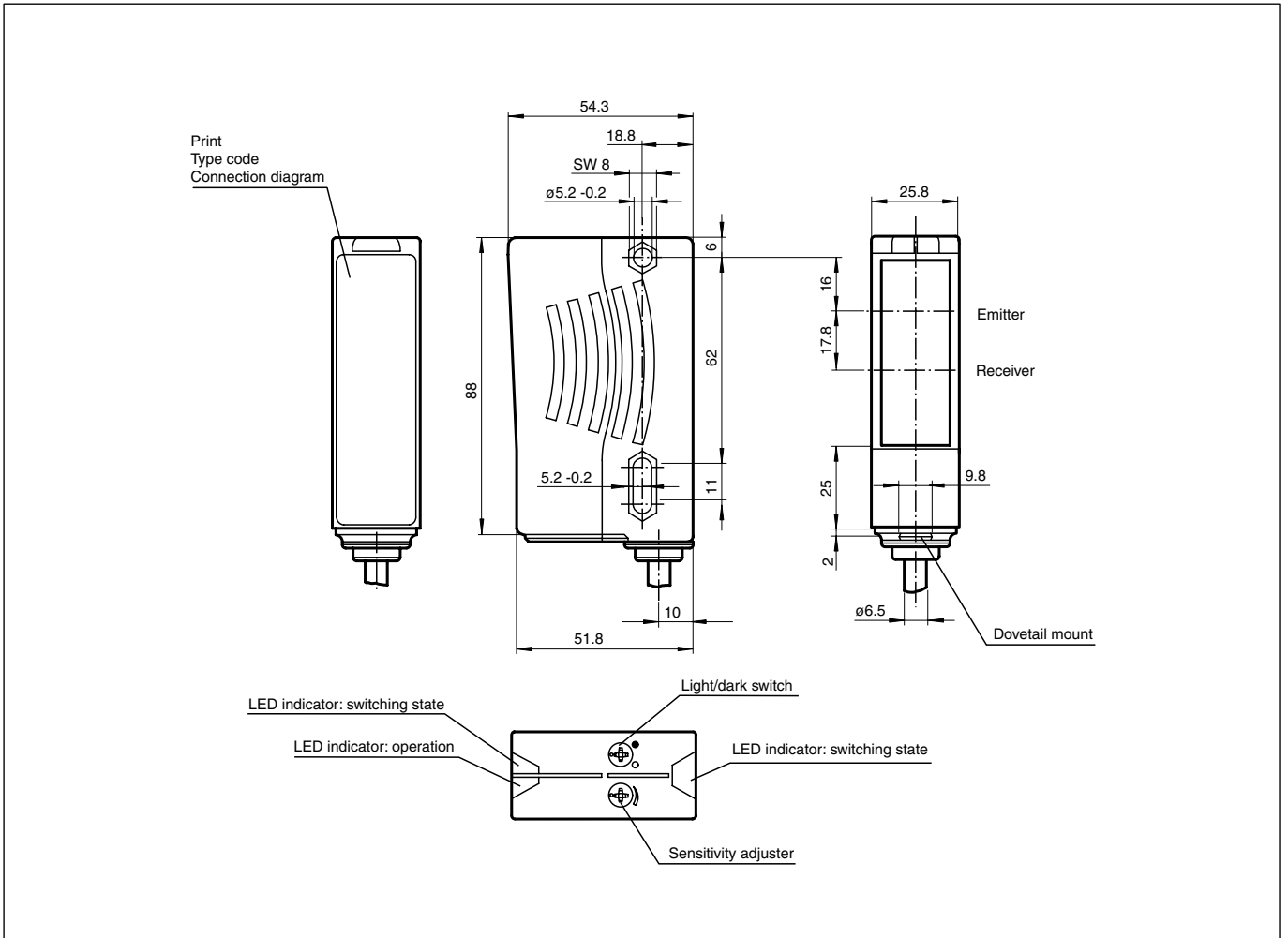
Ordering code		RL28-8-H-400-RT/47/115	RL28-8-H-400-RT/49/115	RL28-8-H-400-RT/110/115	RL28-8-H-400-IR/47/115	RL28-8-H-400-IR/49/115	RL28-8-H-400-IR/110/115
Detection range	20 ... 400 mm	◆	◆	◆	◆	◆	◆
Detection range min.	20 ... 150 mm	◆	◆	◆	◆	◆	◆
Sensor range max.	20 ... 400 mm	◆	◆	◆	◆	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆	◆			
	< 5 %				◆	◆	◆
Light type	Red, alternating light	◆	◆	◆			
	Infrared, alternating light				◆	◆	◆
Light source	LED	◆	◆	◆			
	IREd				◆	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆	◆			
	transmitter 2° receiver 2°				◆	◆	◆
Diameter of the light spot	approx. 12 mm at a distance of 400 mm	◆	◆	◆			
	approx. 14 mm at a distance of 400 mm				◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆	◆	◆
Function display	2 LEDs yellow on: object inside the scanning range off: object outside the scanning range	◆	◆	◆	◆	◆	◆
Controls	rotary switch for light/dark	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆
No-load supply current	≤ 40 mA	◆	◆	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆			◆		
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆			◆	
	1 push-pull output, short-circuit proof, protected against reverse polarity			◆			◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆	◆	◆	◆
Response time	2 ms	◆	◆	◆	◆	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆	◆
Connection type	2.5 m fixed cable, 5 core, Euronorm	◆	◆	◆	◆	◆	◆
Housing	Plastic ABS	◆	◆	◆	◆	◆	◆
Light exit	Plastic	◆	◆	◆	◆	◆	◆
Mass	70 g	◆	◆	◆	◆	◆	◆



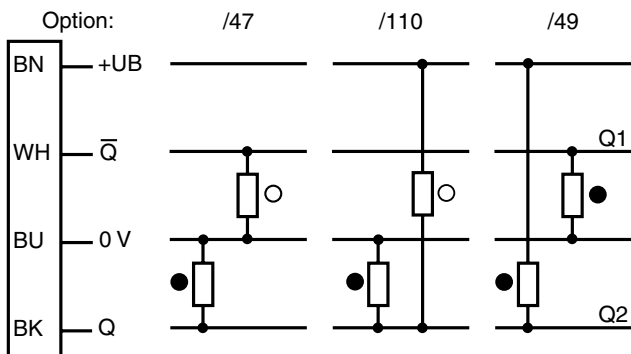
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL28-8-H-400-RT/..J74

Reflection light scanner with background suppression

RL28-8-H-400-RT/..J74

with 4-pin, M18 x 1 plastic connector



- ◆ Sensor range 20 mm ... 400 mm, adjustable
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Design RT: Good alignability by red transmission LED
- ◆ Design IR: Minimal black-white difference through the infrared transmission LED
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

Series
28

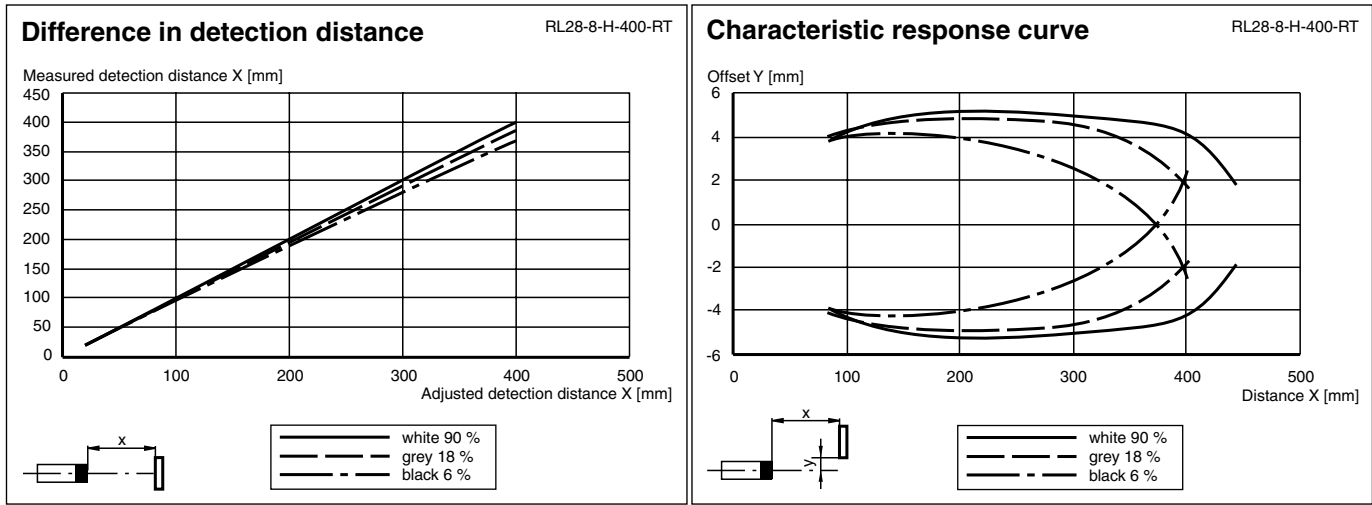
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL28-8-H-400-RT/47/74	RL28-8-H-400-RT/49/74
Detection range	20 ... 400 mm	◆	◆
Detection range min.	20 ... 150 mm	◆	◆
Sensor range max.	20 ... 400 mm	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆
Light type	Red, alternating light	◆	◆
Light source	LED	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆
Diameter of the light spot	approx. 12 mm at a distance of 400 mm	◆	◆
Ambient light limit	50000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Operating display	LED green	◆	◆
Function display	2 LEDs yellow on: object inside the scanning range off: object outside the scanning range	◆	◆
Controls	rotary switch for light/dark	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 40 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	250 Hz	◆	◆
Response time	2 ms	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆
Housing	Plastic ABS	◆	◆
Light exit	Plastic	◆	◆
Mass	70 g	◆	◆

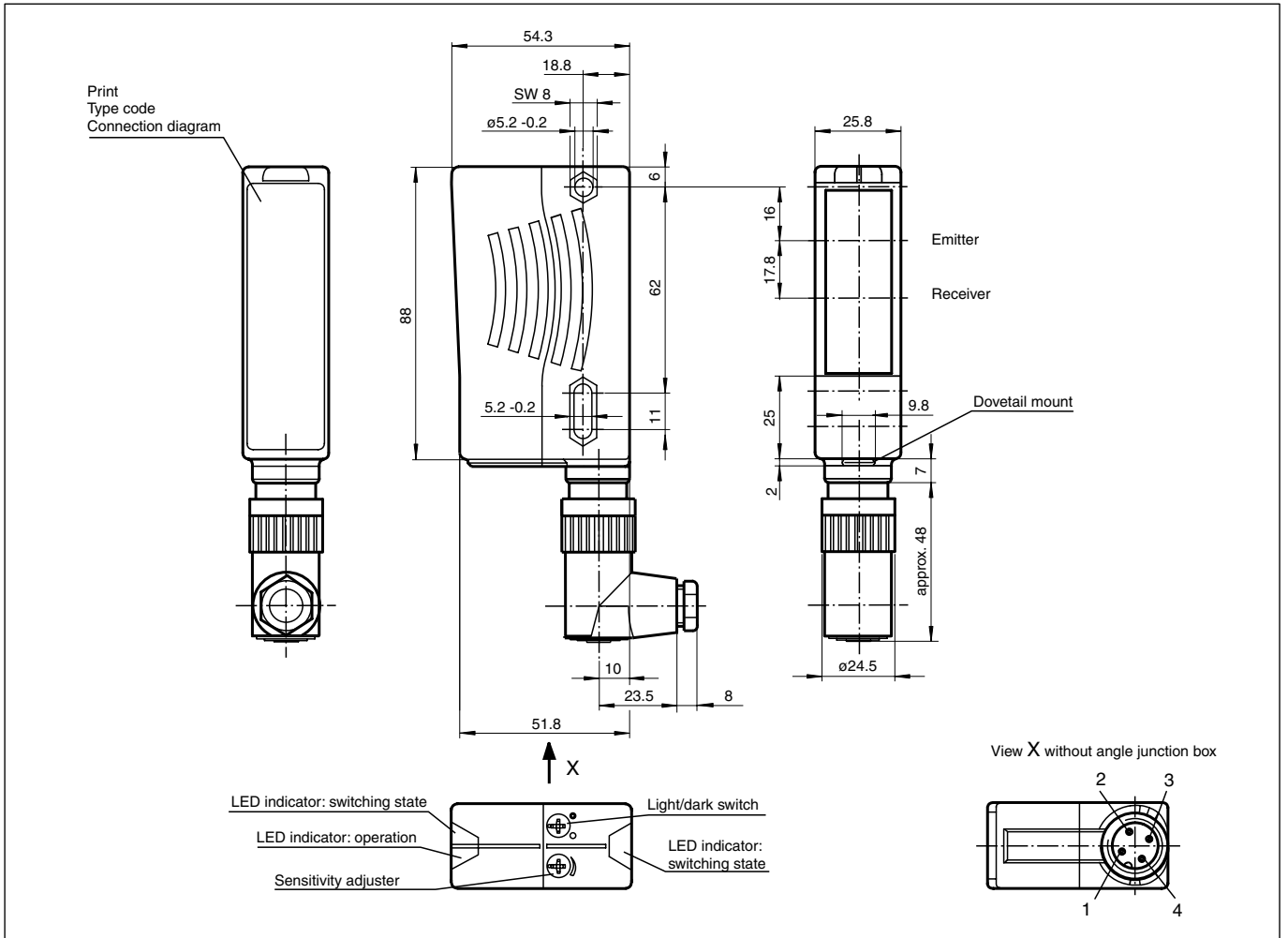


RL28-8-H-400-RT/.J74

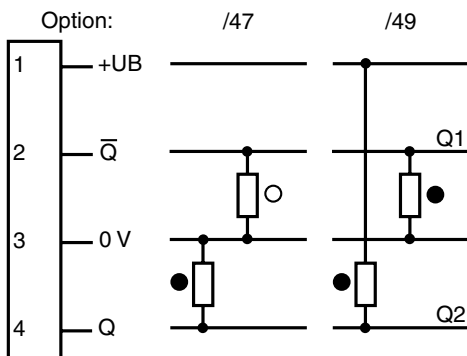
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL28-8-H-400-../105/...

Reflection light scanner with background suppression

RL28-8-H-400-../105/...

with 5-pin, M12 x 1 plastic connector



- ◆ Sensor range 20 mm ... 400 mm, adjustable
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Design RT: Good alignability by red transmission LED
- ◆ Design IR: Minimal black-white difference through the infrared transmission LED
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

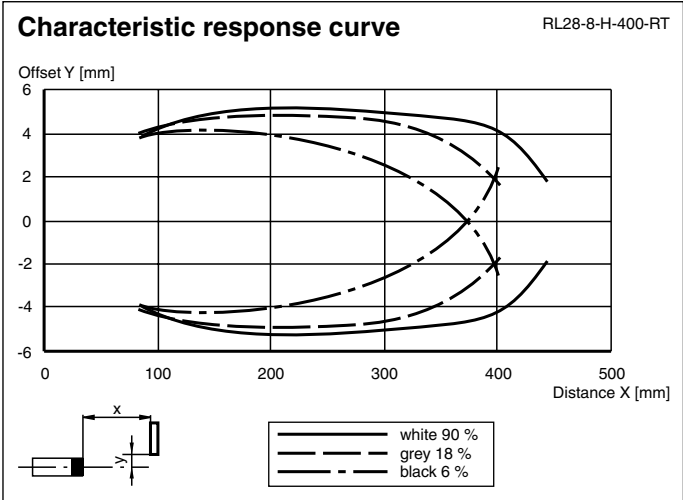
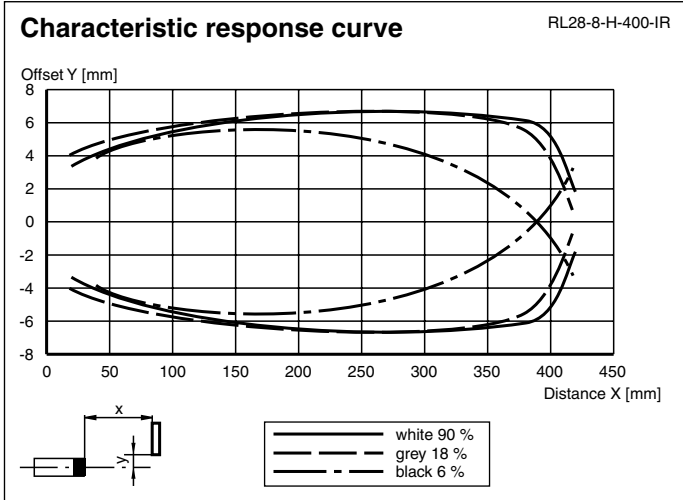
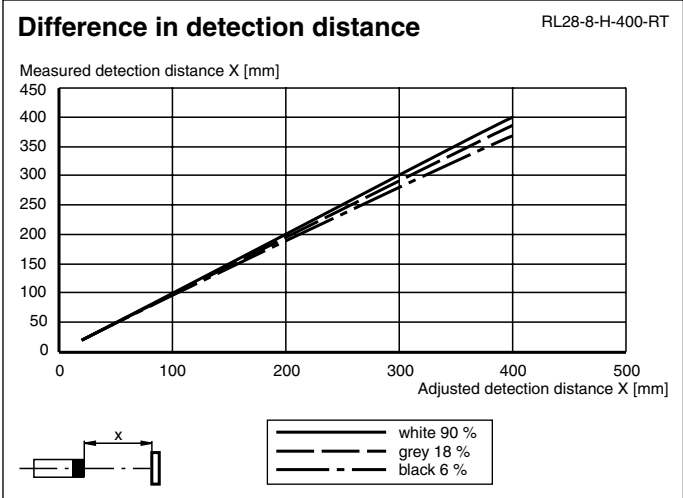
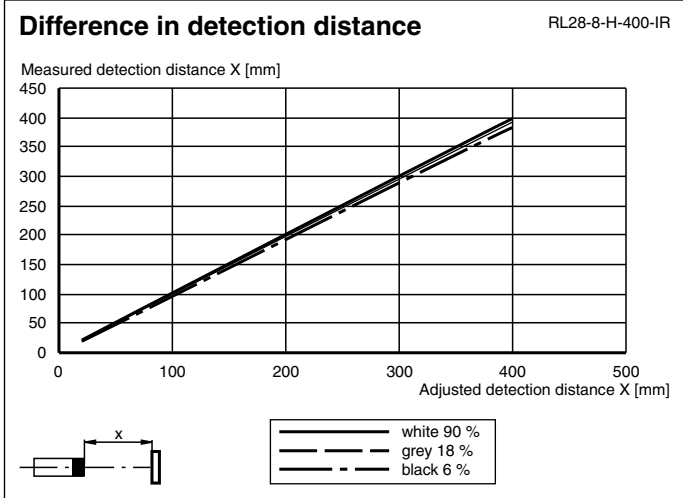
Series
28

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

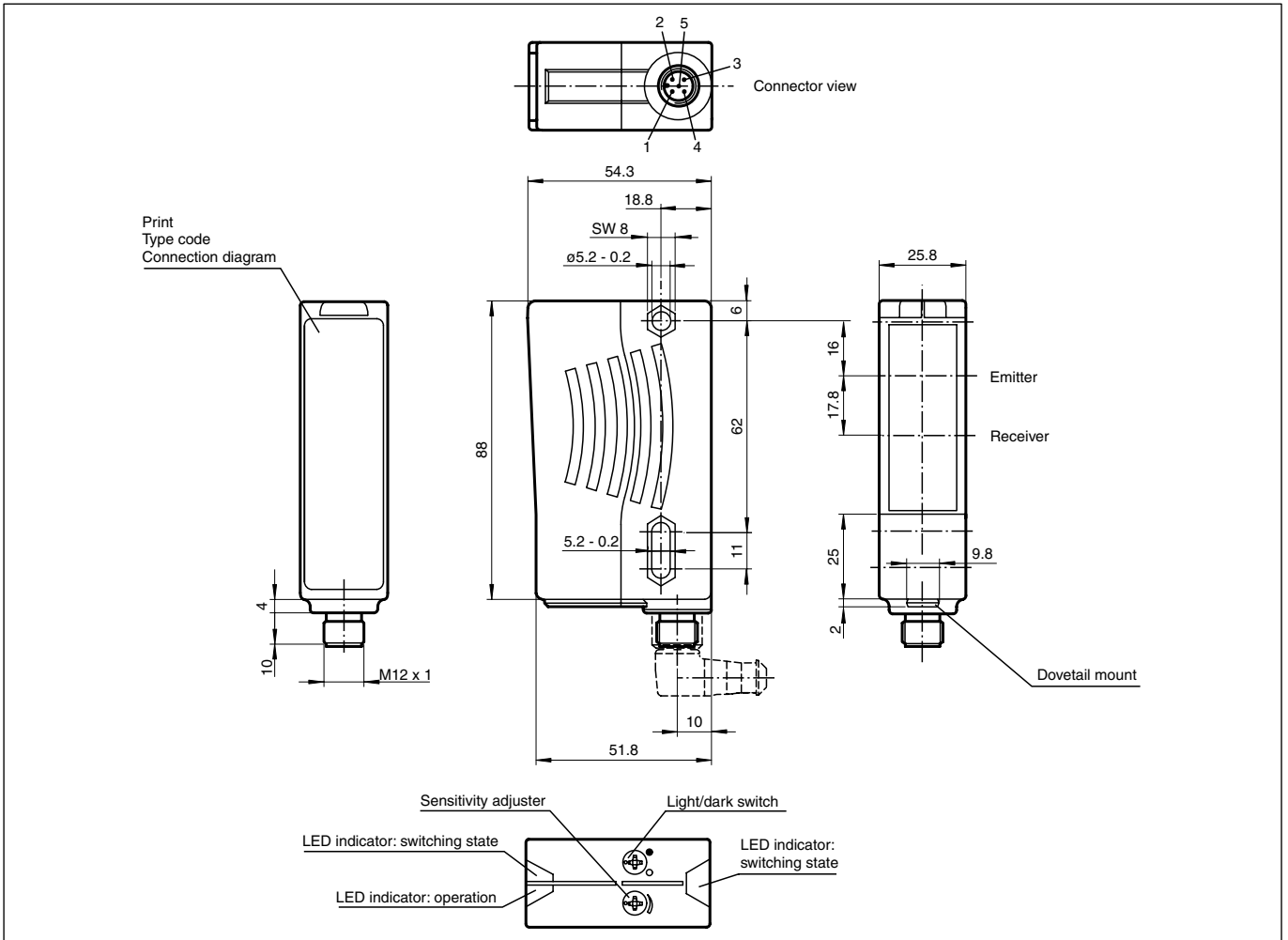
Ordering code		RL28-8-H-400-RT/47/105	RL28-8-H-400-RT/49/105	RL28-8-H-400-RT/105/110	RL28-8-H-400-IR/47/105	RL28-8-H-400-IR/49/105	RL28-8-H-400-IR/105/110
Detection range	20 ... 400 mm	◆	◆	◆	◆	◆	◆
Detection range min.	20 ... 150 mm	◆	◆	◆	◆	◆	◆
Sensor range max.	20 ... 400 mm	◆	◆	◆	◆	◆	◆
Black/white difference (6%/90%)	< 10 %	◆	◆	◆	◆		
	< 5 %					◆	◆
Light type	Red, alternating light	◆	◆	◆			
	Infrared, alternating light				◆	◆	◆
Light source	LED	◆	◆	◆			
	IREd				◆	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆	◆			
	transmitter 2° receiver 2°				◆	◆	◆
Diameter of the light spot	approx. 12 mm at a distance of 400 mm	◆	◆	◆			
	approx. 14 mm at a distance of 400 mm				◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆	◆	◆
Function display	2 LEDs yellow on: object inside the scanning range off: object outside the scanning range	◆	◆	◆	◆	◆	◆
Controls	rotary switch for light/dark	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆
No-load supply current	≤ 40 mA	◆	◆	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆			◆		
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆			◆	
	1 push-pull output, short-circuit proof, protected against reverse polarity			◆			◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆	◆	◆	◆
Response time	2 ms	◆	◆	◆	◆	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆	◆
Connection type	5-pin, M12 connector	◆	◆	◆	◆	◆	◆
Housing	Plastic ABS	◆	◆	◆	◆	◆	◆
Light exit	Plastic	◆	◆	◆	◆	◆	◆
Mass	70 g	◆	◆	◆	◆	◆	◆



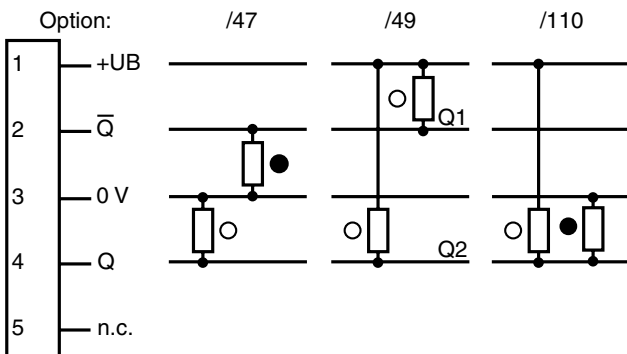
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL28-8-H-700-.../115

Reflection light scanner with background suppression

RL28-8-H-700-.../115

with 2.5 m fixed cable



- ◆ Sensor range 20 mm ... 700 mm, adjustable
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Design RT: Good alignability by red transmission LED
- ◆ Design IR: Minimal black-white difference through the infrared transmission LED
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

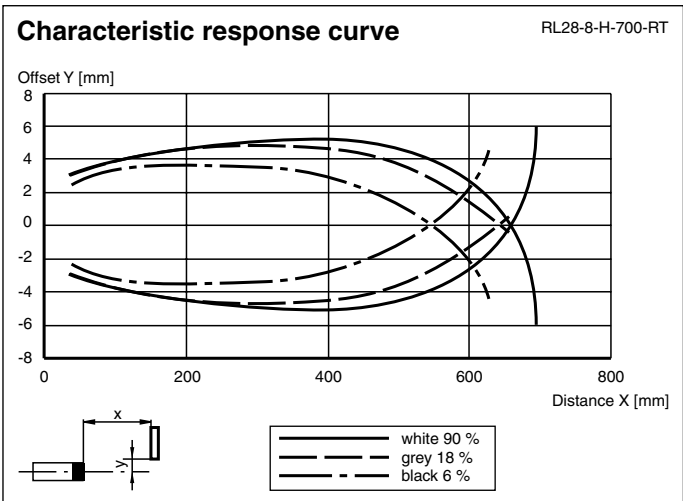
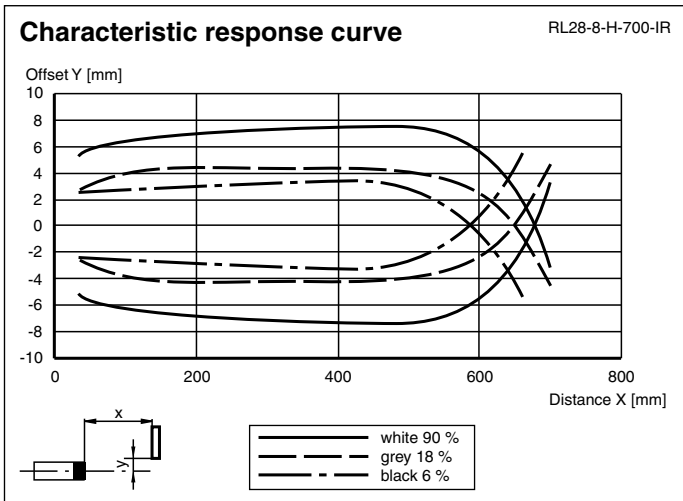
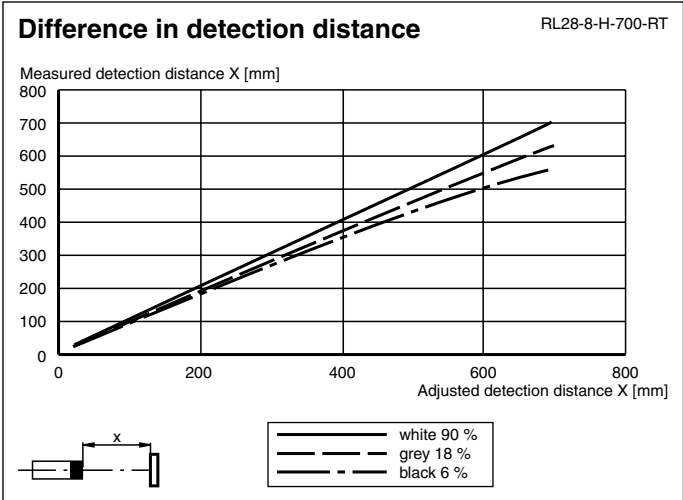
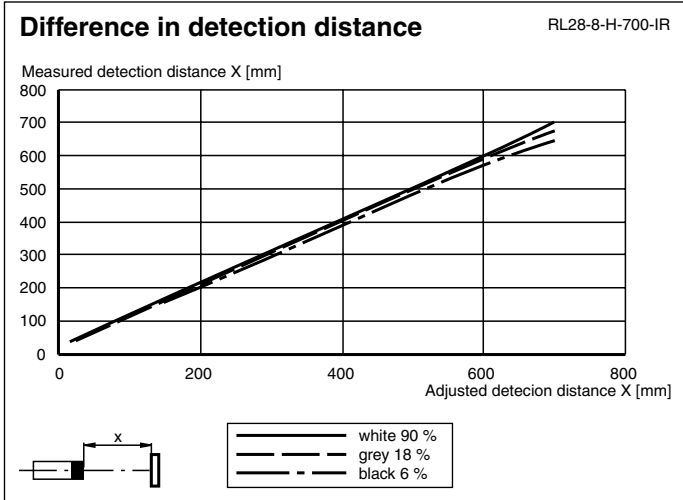
Series
28

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

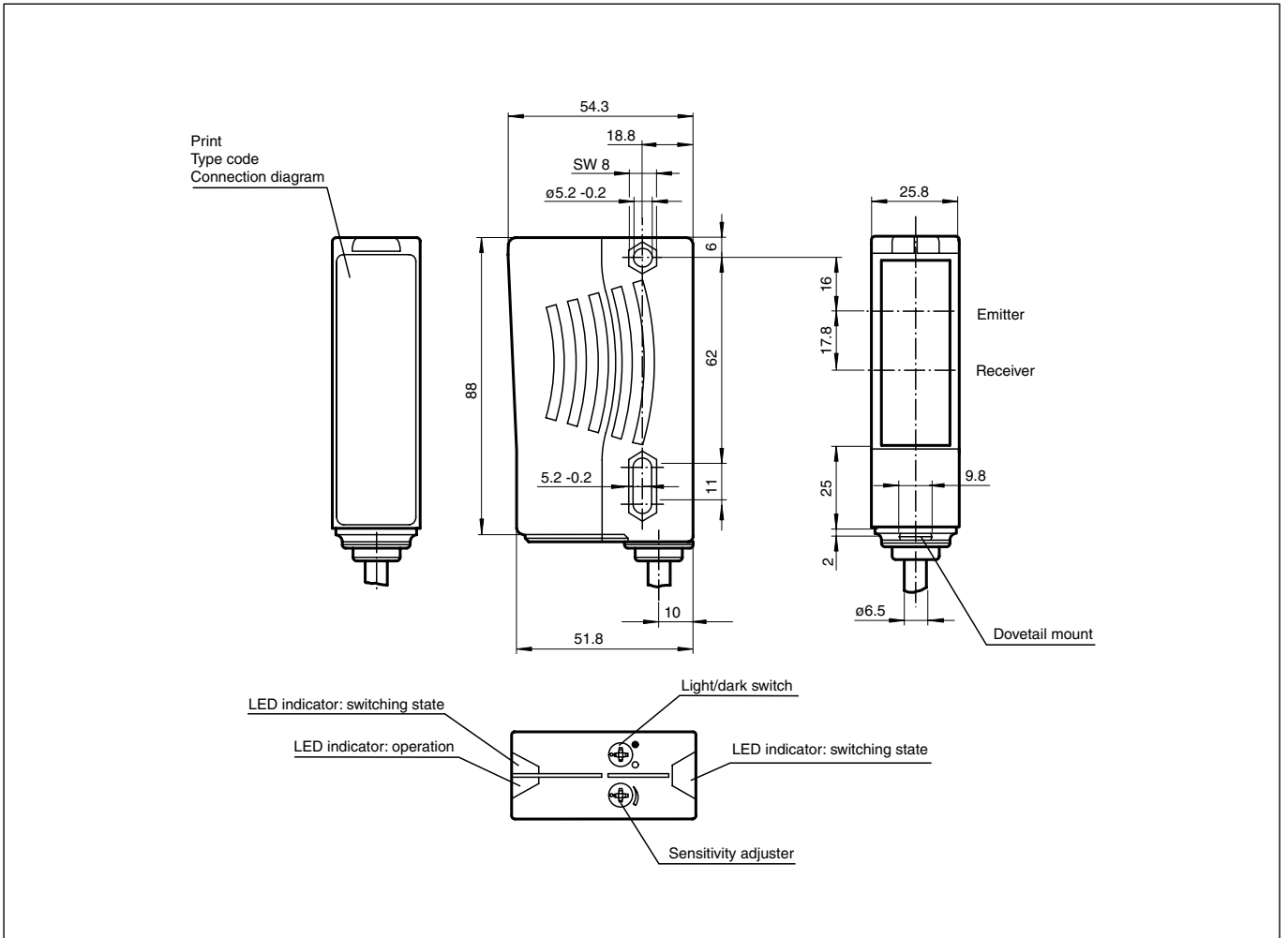
Ordering code		RL28-8-H-700-RT/47/115	RL28-8-H-700-RT/49/115	RL28-8-H-700-RT/110/115	RL28-8-H-700-IR/47/115	RL28-8-H-700-IR/49/115	RL28-8-H-700-IR/110/115
Detection range	20 ... 700 mm	◆	◆	◆	◆	◆	◆
Detection range min.	20 ... 200 mm	◆	◆	◆	◆	◆	◆
Sensor range max.	20 ... 700 mm	◆	◆	◆	◆	◆	◆
Black/white difference (6%/90%)	< 10 %				◆	◆	◆
	< 20 %	◆	◆	◆			
Light type	Red, alternating light	◆	◆	◆			
	Infrared, alternating light				◆	◆	◆
Light source	LED	◆	◆	◆			
	IRE				◆	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆	◆			
	transmitter 2° receiver 2°				◆	◆	◆
Diameter of the light spot	approx. 15 mm at a distance of 700 mm	◆	◆	◆			
	approx. 24 mm at a distance of 700 mm				◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆	◆	◆
Function display	2 LEDs yellow on: object inside the scanning range off: object outside the scanning range	◆	◆	◆	◆	◆	◆
Controls	rotary switch for light/dark	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆
No-load supply current	≤ 40 mA	◆	◆	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆			◆		
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆			◆	
	1 push-pull output, short-circuit proof, protected against reverse polarity			◆			◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆	◆	◆	◆
Response time	2 ms	◆	◆	◆	◆	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆	◆
Connection type	2.5 m fixed cable, 5 core, Euronorm	◆	◆	◆	◆	◆	◆
Housing	Plastic ABS	◆	◆	◆	◆	◆	◆
Light exit	Plastic	◆	◆	◆	◆	◆	◆
Mass	70 g	◆	◆	◆	◆	◆	◆



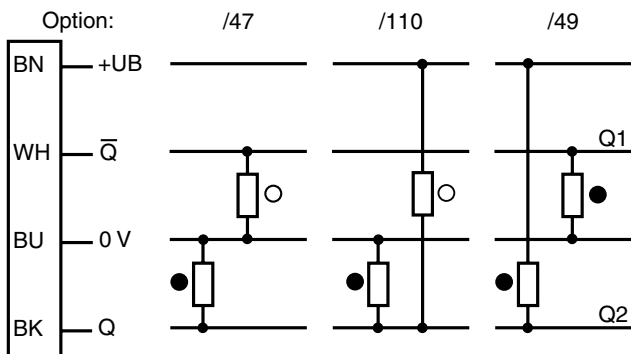
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL28-8-H-700-.../74

Reflection light scanner with background suppression

RL28-8-H-700-.../74

with 4-pin, M18 x 1 plastic connector



- ◆ Sensor range 20 mm ... 700 mm, adjustable
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Design RT: Good alignability by red transmission LED
- ◆ Design IR: Minimal black-white difference through the infrared transmission LED
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

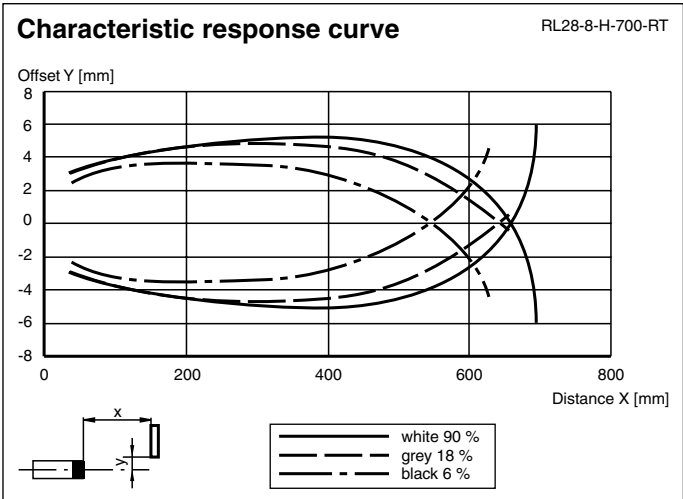
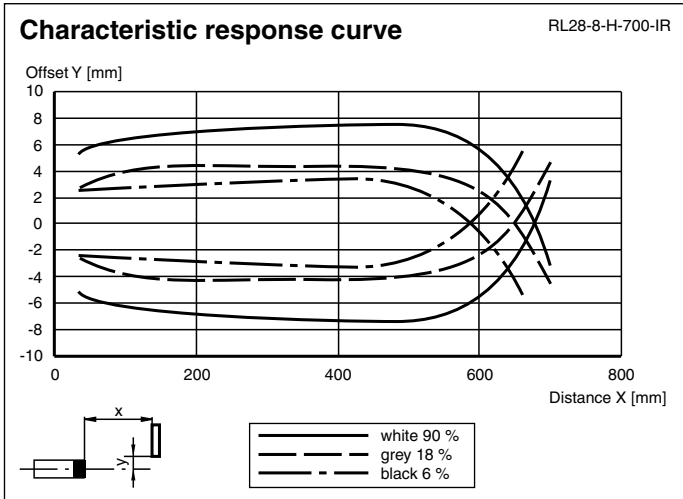
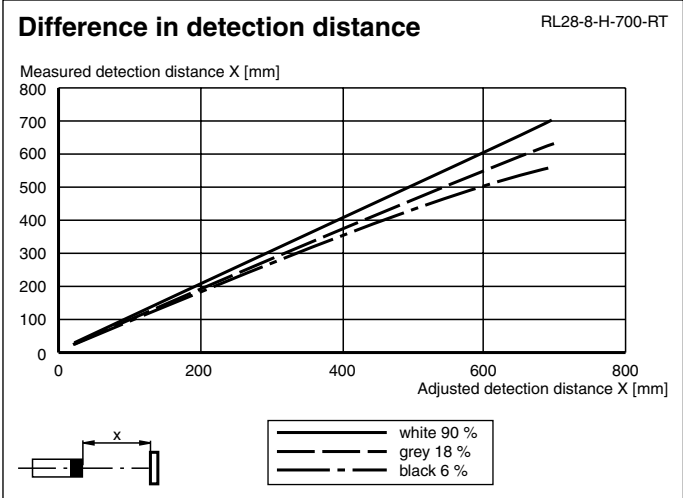
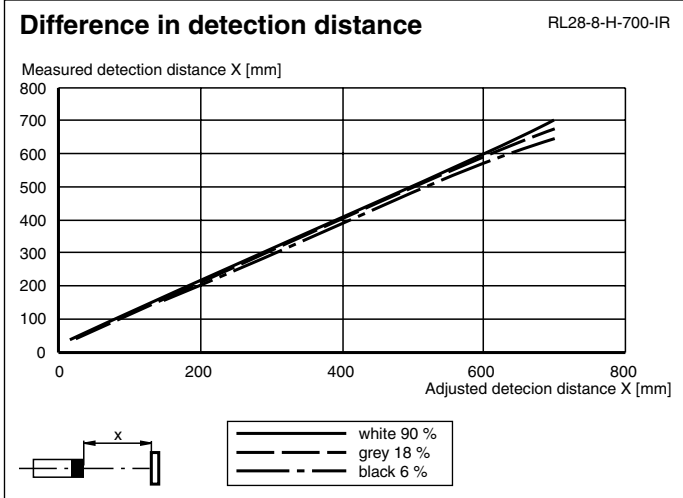
Series
28

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

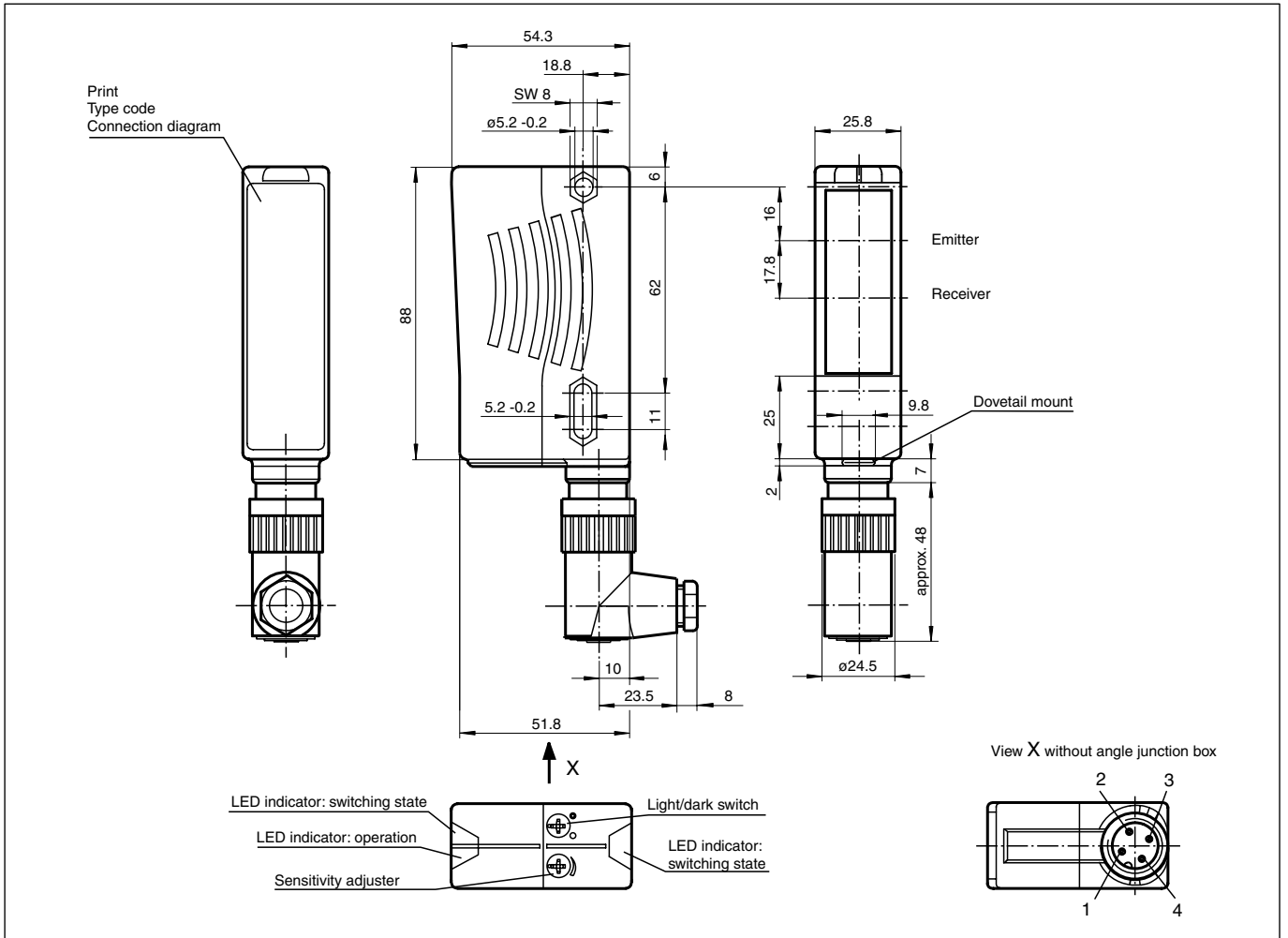
Ordering code		RL28-8-H-700-RT/47/74	RL28-8-H-700-RT/49/74	RL28-8-H-700-IR/47/74	RL28-8-H-700-IR/49/74
Detection range	20 ... 700 mm	◆	◆	◆	◆
Detection range min.	20 ... 200 mm	◆	◆	◆	◆
Sensor range max.	20 ... 700 mm	◆	◆	◆	◆
Black/white difference (6%/90%)	< 10 %			◆	◆
	< 20 %	◆	◆		
Light type	Red, alternating light	◆	◆		
	Infrared, alternating light			◆	◆
Light source	LED	◆	◆		
	IRED			◆	◆
Angle of divergence	transmitter 2° receiver 2°	◆	◆	◆	◆
Diameter of the light spot	approx. 15 mm at a distance of 700 mm	◆	◆		
	approx. 24 mm at a distance of 700 mm			◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆
Function display	2 LEDs yellow on: object inside the scanning range off: object outside the scanning range	◆	◆	◆	◆
Controls	rotary switch for light/dark	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	≤ 40 mA	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆		◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆	◆
Response time	2 ms	◆	◆	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆	◆	◆
Housing	Plastic ABS	◆	◆	◆	◆
Light exit	Plastic	◆	◆	◆	◆
Mass	70 g	◆	◆	◆	◆



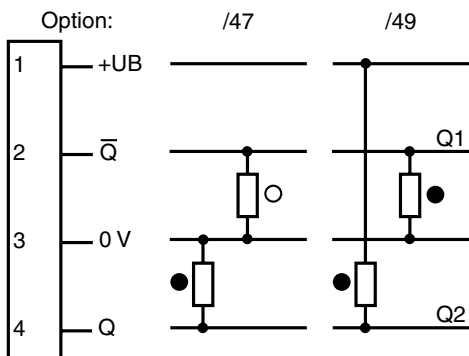
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL28-8-H-700-../105/...

Reflection light scanner with background suppression

RL28-8-H-700-../105/...

with 5-pin, M12 x 1 plastic connector



- ◆ Sensor range 20 mm ... 700 mm, adjustable
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Design RT: Good alignability by red transmission LED
- ◆ Design IR: Minimal black-white difference through the infrared transmission LED
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

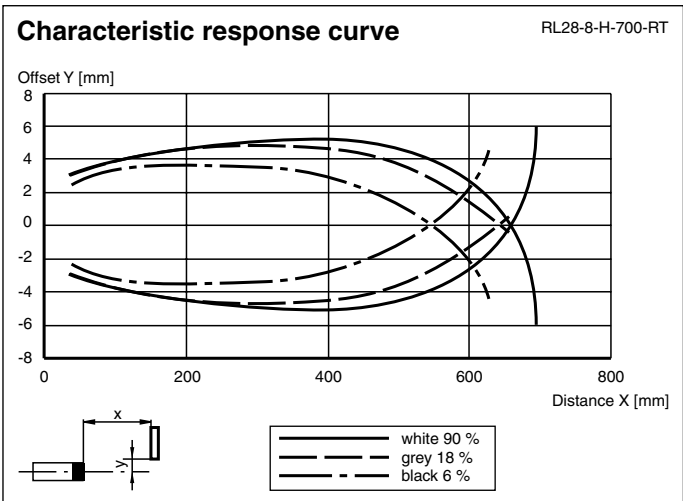
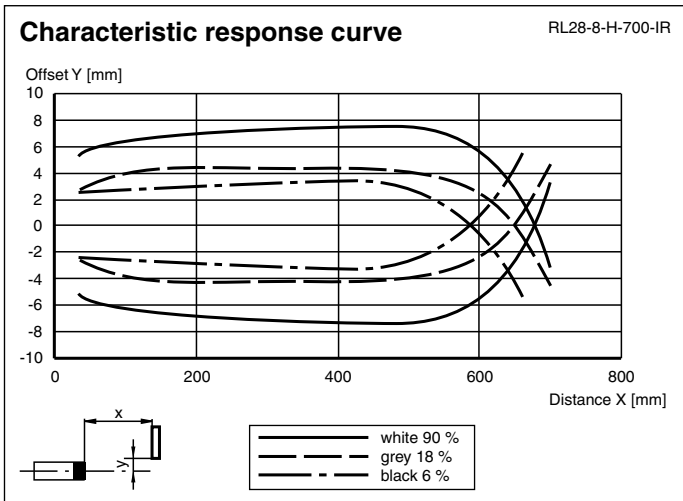
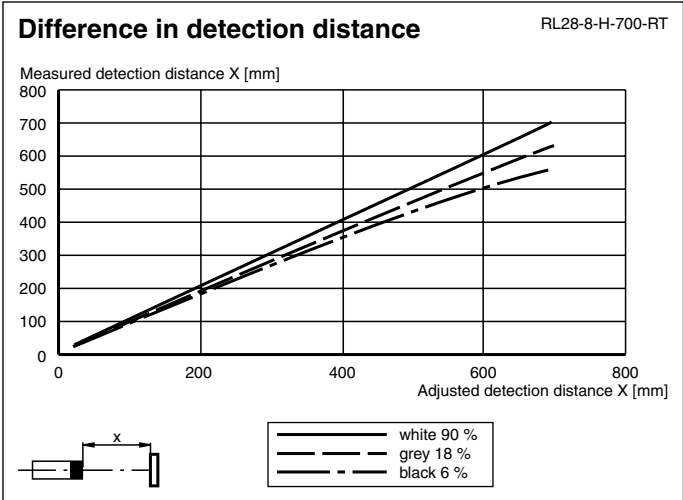
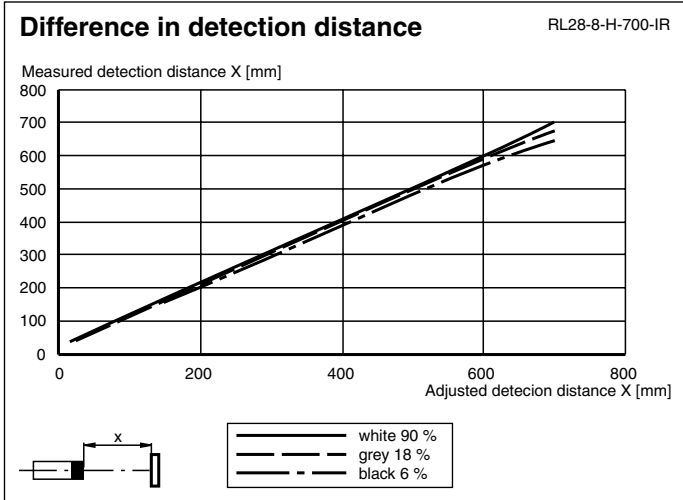
Series
28

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

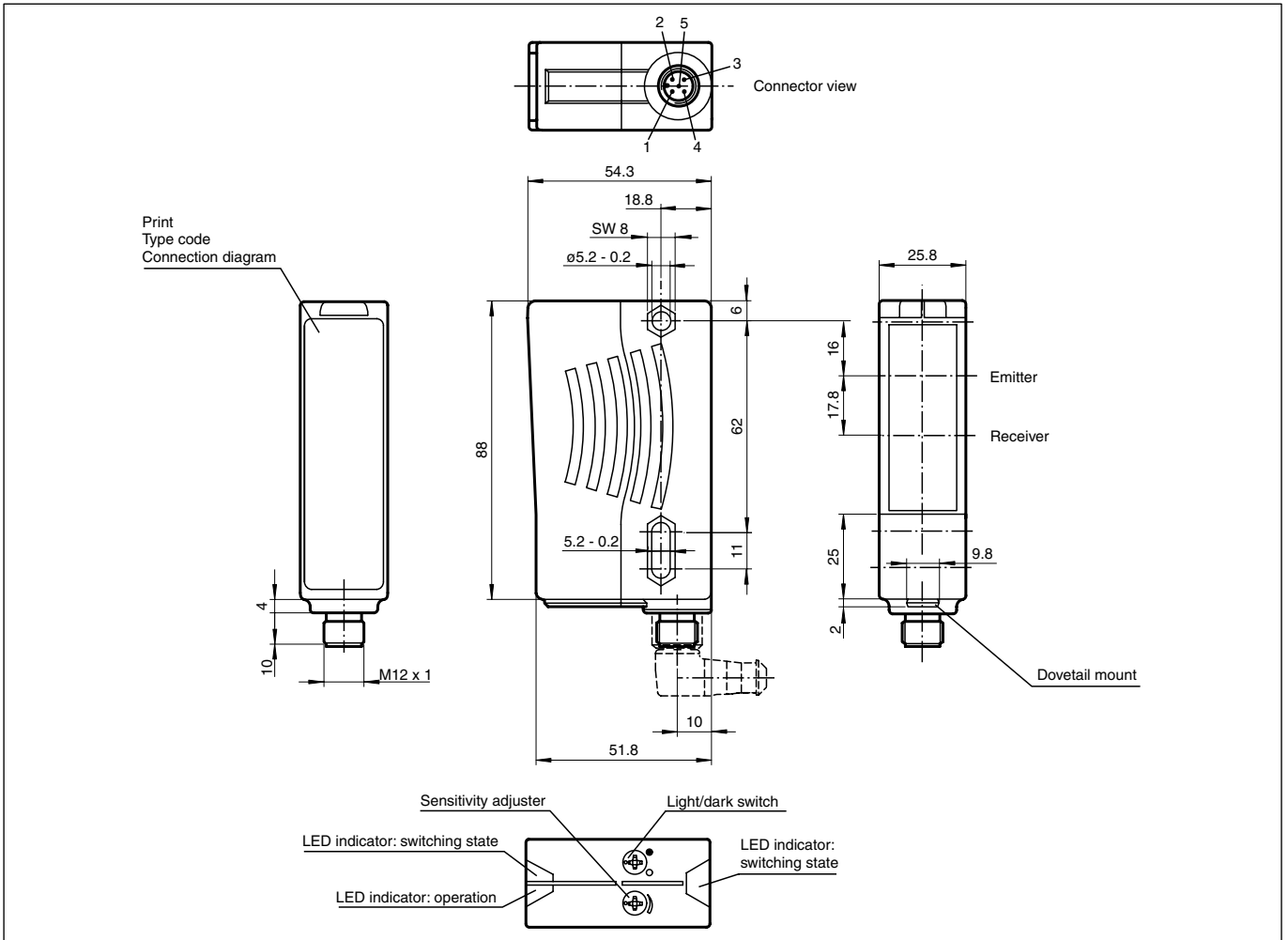
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Detection range	20 ... 700 mm	◆	◆	◆	◆	◆	◆
Detection range min.	20 ... 200 mm	◆	◆	◆	◆	◆	◆
Sensor range max.	20 ... 700 mm	◆	◆	◆	◆	◆	◆
Black/white difference (6%/90%)	< 10 %				◆	◆	◆
	< 20 %	◆	◆	◆			
Light type	Red, alternating light	◆	◆	◆			
	Infrared, alternating light				◆	◆	◆
Light source	LED	◆	◆	◆			
	IRE				◆	◆	◆
Angle of divergence	transmitter 1.2° receiver 2°	◆	◆	◆			
	transmitter 2° receiver 2°				◆	◆	◆
Diameter of the light spot	approx. 15 mm at a distance of 700 mm	◆	◆	◆			
	approx. 24 mm at a distance of 700 mm				◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
USA	UL	◆	◆	◆	◆	◆	◆
Kanada	CSA	◆	◆	◆	◆	◆	◆
Operating display	LED green	◆	◆	◆	◆	◆	◆
Function display	2 LEDs yellow on: object inside the scanning range off: object outside the scanning range	◆	◆	◆	◆	◆	◆
Controls	rotary switch for light/dark	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆
No-load supply current	≤ 40 mA	◆	◆	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆			◆		
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆			◆	
	1 push-pull output, short-circuit proof, protected against reverse polarity			◆			◆
Switching type	Light/dark ON, switchable	◆	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆	◆	◆	◆
Response time	2 ms	◆	◆	◆	◆	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆	◆
Connection type	5-pin, M12 connector	◆	◆	◆	◆	◆	◆
Housing	Plastic ABS	◆	◆	◆	◆	◆	◆
Light exit	Plastic	◆	◆	◆	◆	◆	◆
Mass	70 g	◆	◆	◆	◆	◆	◆



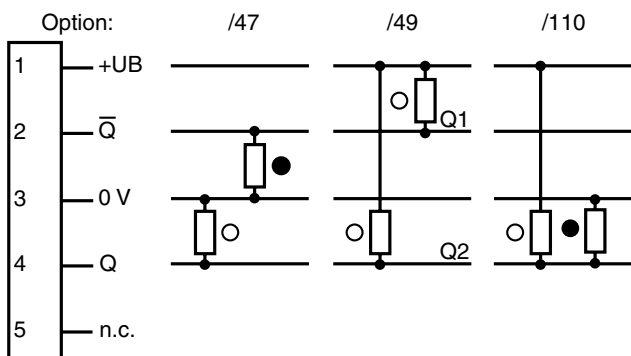
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL28-8-H-2000-IR/.../115

Reflection light scanner with background suppression

RL28-8-H-2000-IR/.../115

with 2.5 m fixed cable



- ◆ Sensor range 20 mm ... 2000 mm, adjustable
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Minimal black-white difference through the infrared transmission LED
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

Series
28

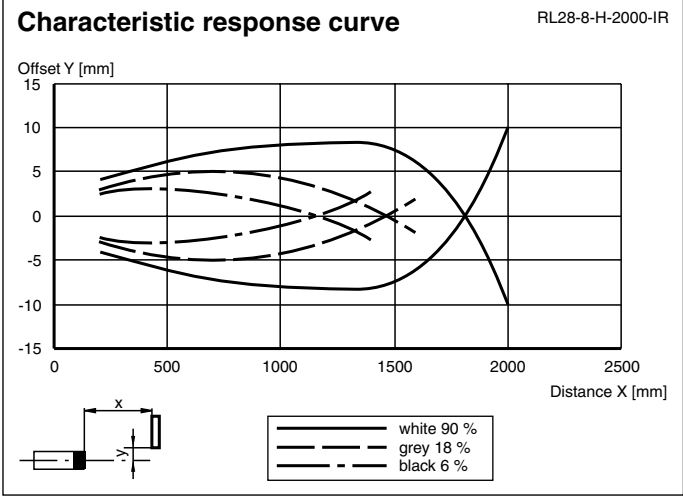
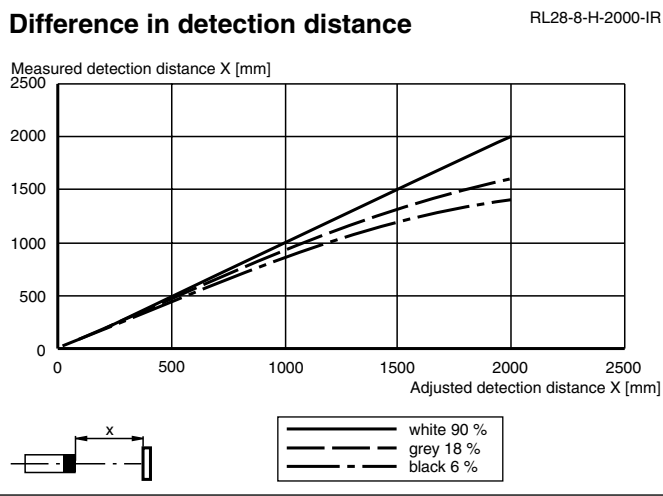
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

Ordering code		RL28-8-H-2000-IR/47/115	RL28-8-H-2000-IR/49/115	RL28-8-H-2000-IR/110/115
Detection range	20 ... 2000 mm	◆	◆	◆
Detection range min.	20 ... 200 mm	◆	◆	◆
Sensor range max.	20 ... 2000 mm	◆	◆	◆
Black/white difference (6%/90%)	< 40 %	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Light source	IREL	◆	◆	◆
Angle of divergence	transmitter 2° receiver 2°	◆	◆	◆
Diameter of the light spot	approx. 70 mm at a distance of 2000 mm	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Operating display	LED green	◆	◆	◆
Function display	2 LEDs yellow on: object inside the scanning range off: object outside the scanning range	◆	◆	◆
Controls	rotary switch for light/dark	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	≤ 40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆	
	1 push-pull output, short-circuit proof, protected against reverse polarity			◆
Switching type	Light/dark ON, switchable	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆
Response time	2 ms	◆	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	◆
Connection type	2.5 m fixed cable, 5 core, Euronorm	◆	◆	◆
Housing	Plastic ABS	◆	◆	◆
Light exit	Plastic	◆	◆	◆
Mass	70 g	◆	◆	◆

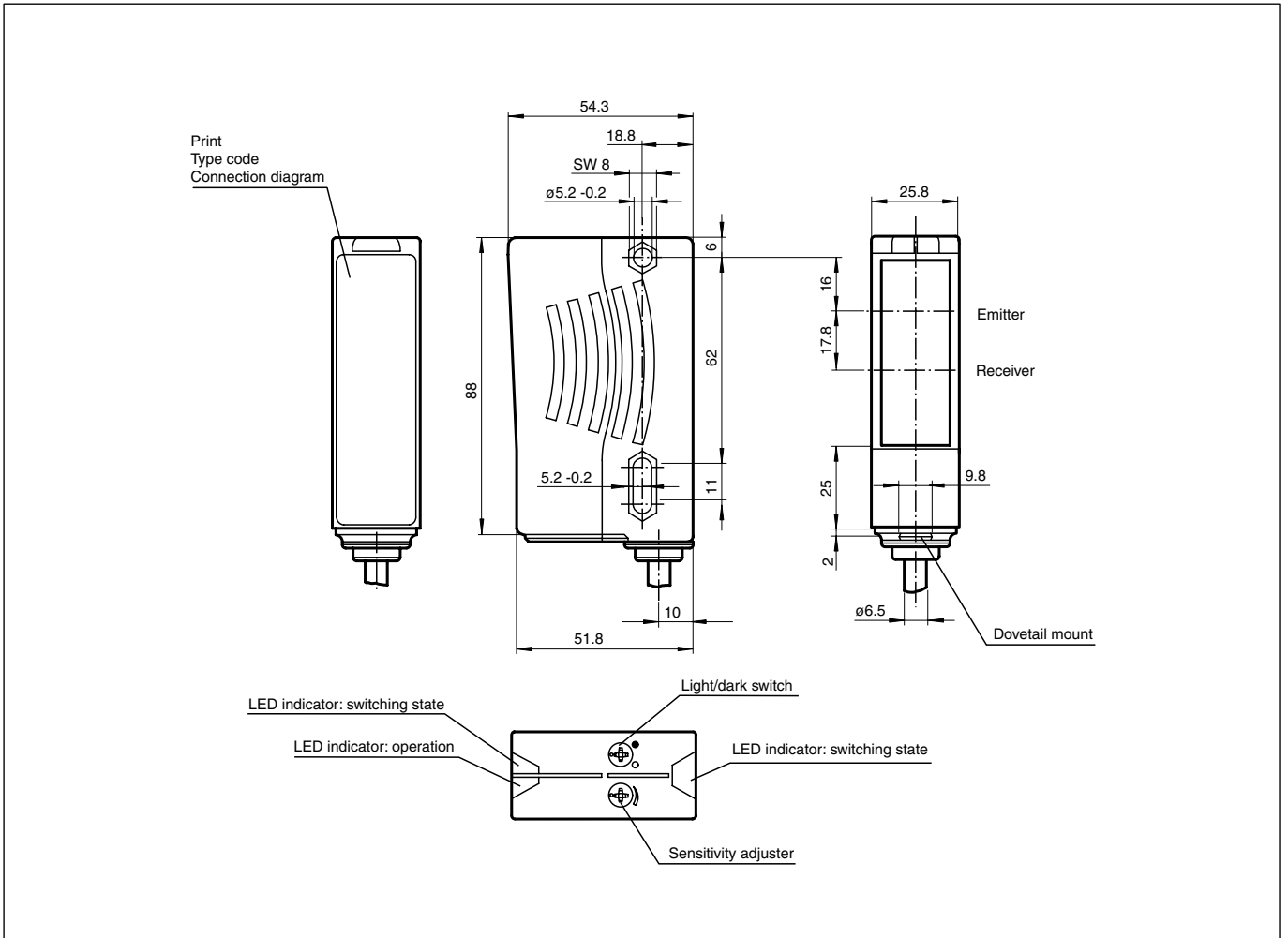


Diagrams

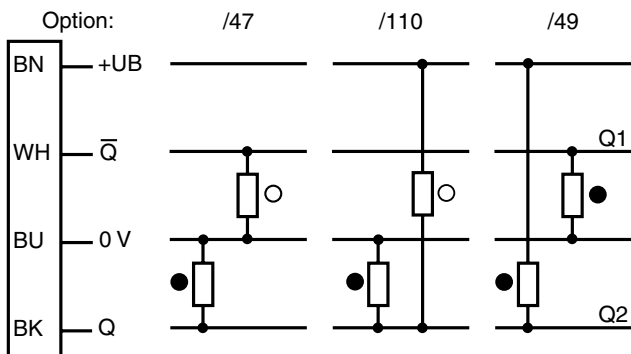


Series 28

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL28-8-H-2000-IR/..74

Reflection light scanner with background suppression

RL28-8-H-2000-IR/..74

with 4-pin, M18 x 1 plastic connector

CE



- ◆ Sensor range 20 mm ... 2000 mm, adjustable
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Minimal black-white difference through the infrared transmission LED
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

Series
28

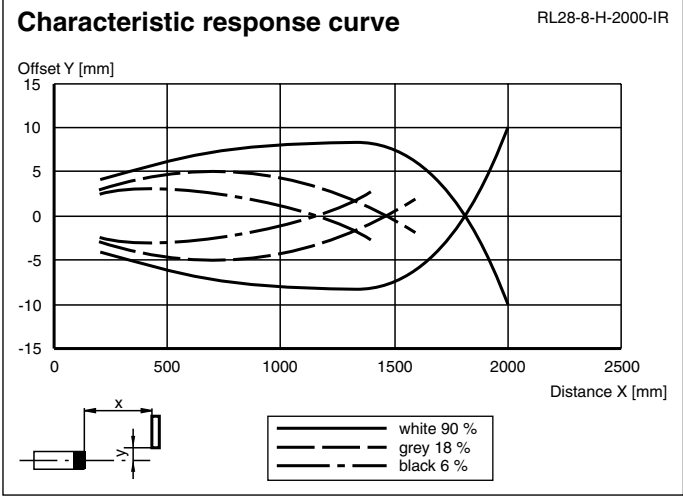
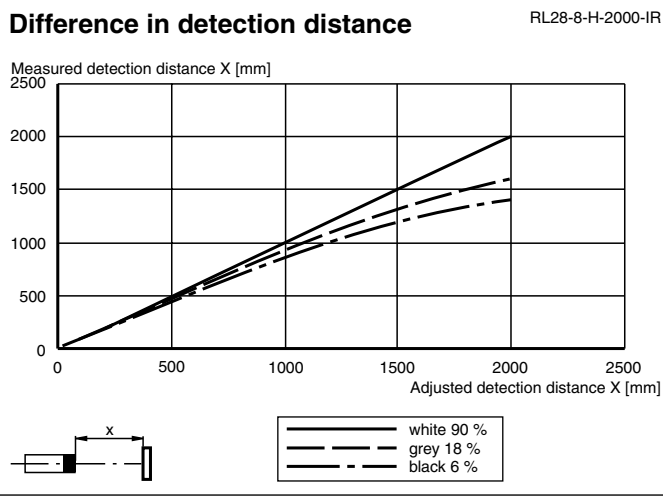
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL28-8-H-2000-IR/4774	RL28-8-H-2000-IR/4974
Detection range	20 ... 2000 mm	◆	◆
Detection range min.	20 ... 200 mm	◆	◆
Sensor range max.	20 ... 2000 mm	◆	◆
Black/white difference (6%/90%)	< 40%	◆	◆
Light type	Infrared, alternating light	◆	◆
Light source	IRED	◆	◆
Angle of divergence	transmitter 2° receiver 2°	◆	◆
Diameter of the light spot	approx. 70 mm at a distance of 2000 mm	◆	◆
Ambient light limit	50000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Operating display	LED green	◆	◆
Function display	2 LEDs yellow on: object inside the scanning range off: object outside the scanning range	◆	◆
Controls	rotary switch for light/dark	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10%	◆	◆
No-load supply current	≤ 40 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	250 Hz	◆	◆
Response time	2 ms	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Flange connector series 714, 4-pin (including unwired, angled cable socket)	◆	◆
Housing	Plastic ABS	◆	◆
Light exit	Plastic	◆	◆
Mass	70 g	◆	◆



RL28-8-H-2000-IR/..74

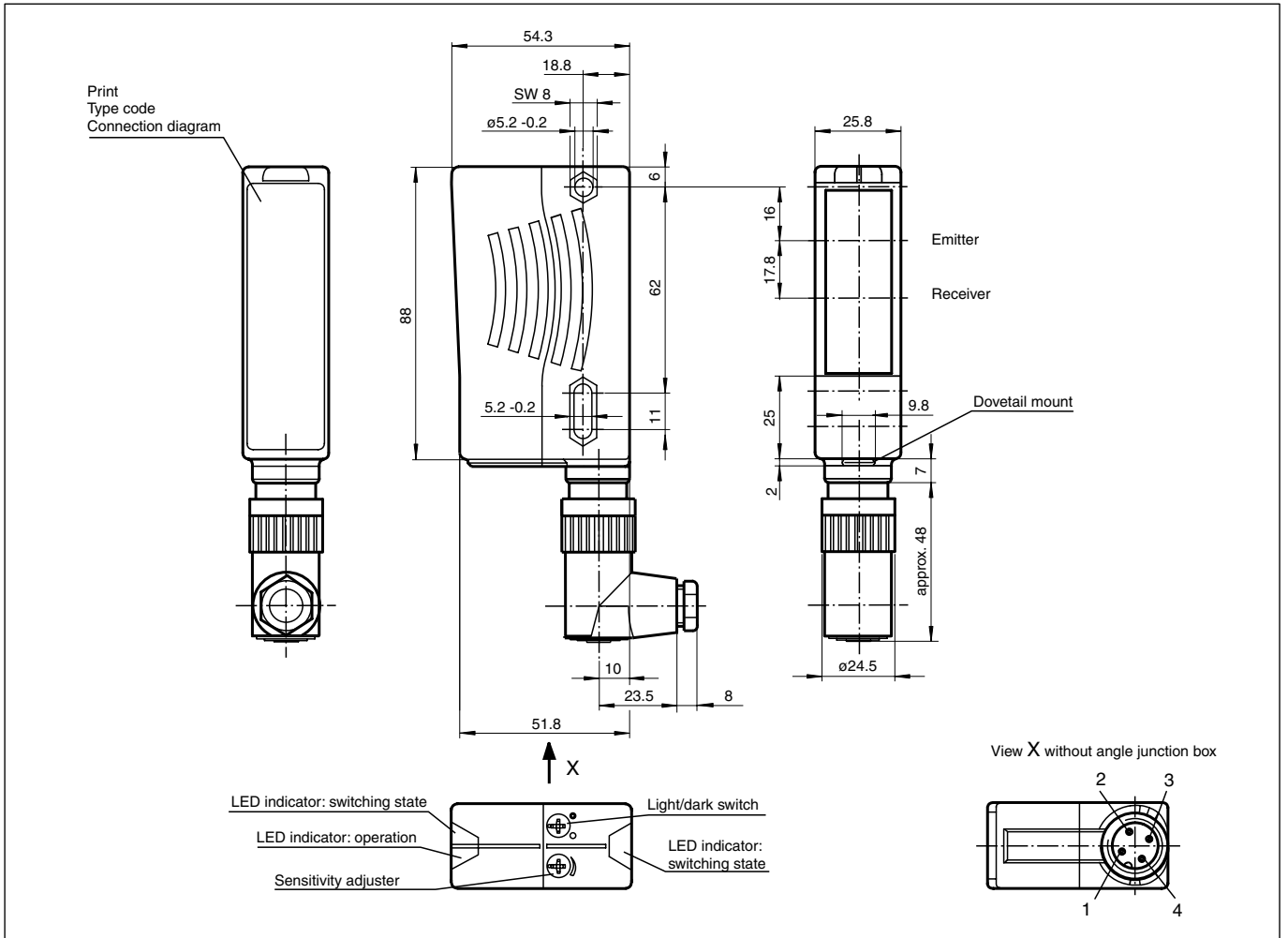
Diagrams



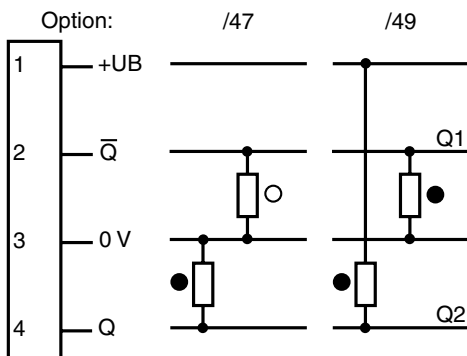
Series
28

Date of issue: 10/4/01

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL28-8-H-2000-IR/105/...

Reflection light scanner with background suppression

RL28-8-H-2000-IR/105/...

with 5-pin, M12 x 1 plastic connector



- ◆ Sensor range 20 mm ... 2000 mm, adjustable
- ◆ PNP and NPN transistor outputs
- ◆ Clearly visible LEDs for Power ON, switching state and stability control
- ◆ Not sensitive to ambient light, even with energy saving lamps
- ◆ Minimal black-white difference through the infrared transmission LED
- ◆ Dove-tail mounts and pass-through mounting holes
- ◆ Large temperature range from -40 °C ... +60 °C
- ◆ Waterproof, protection class IP67

Series
28

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

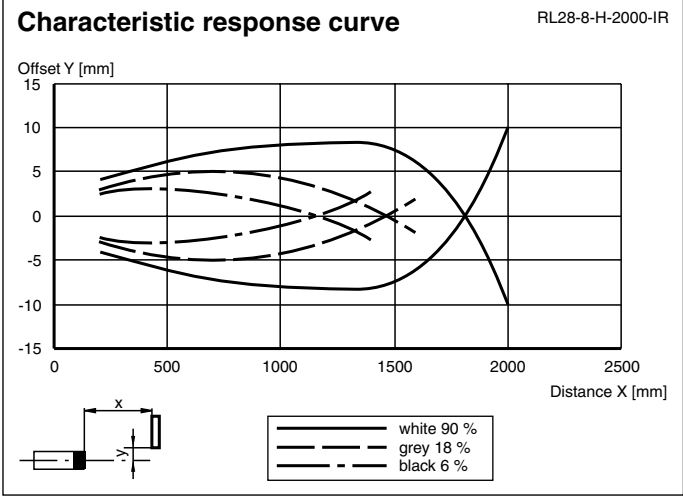
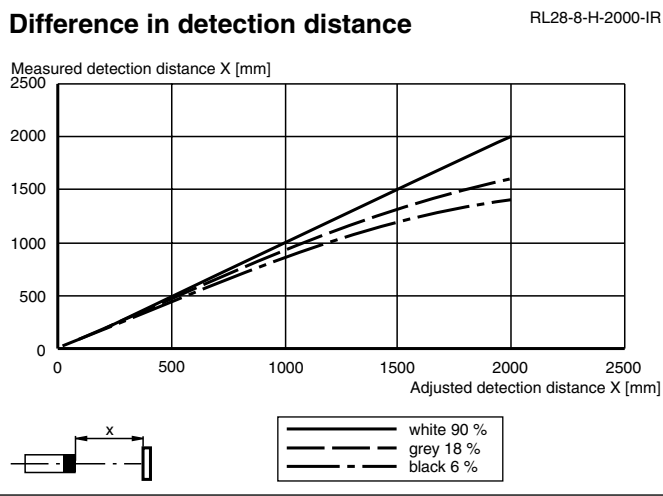
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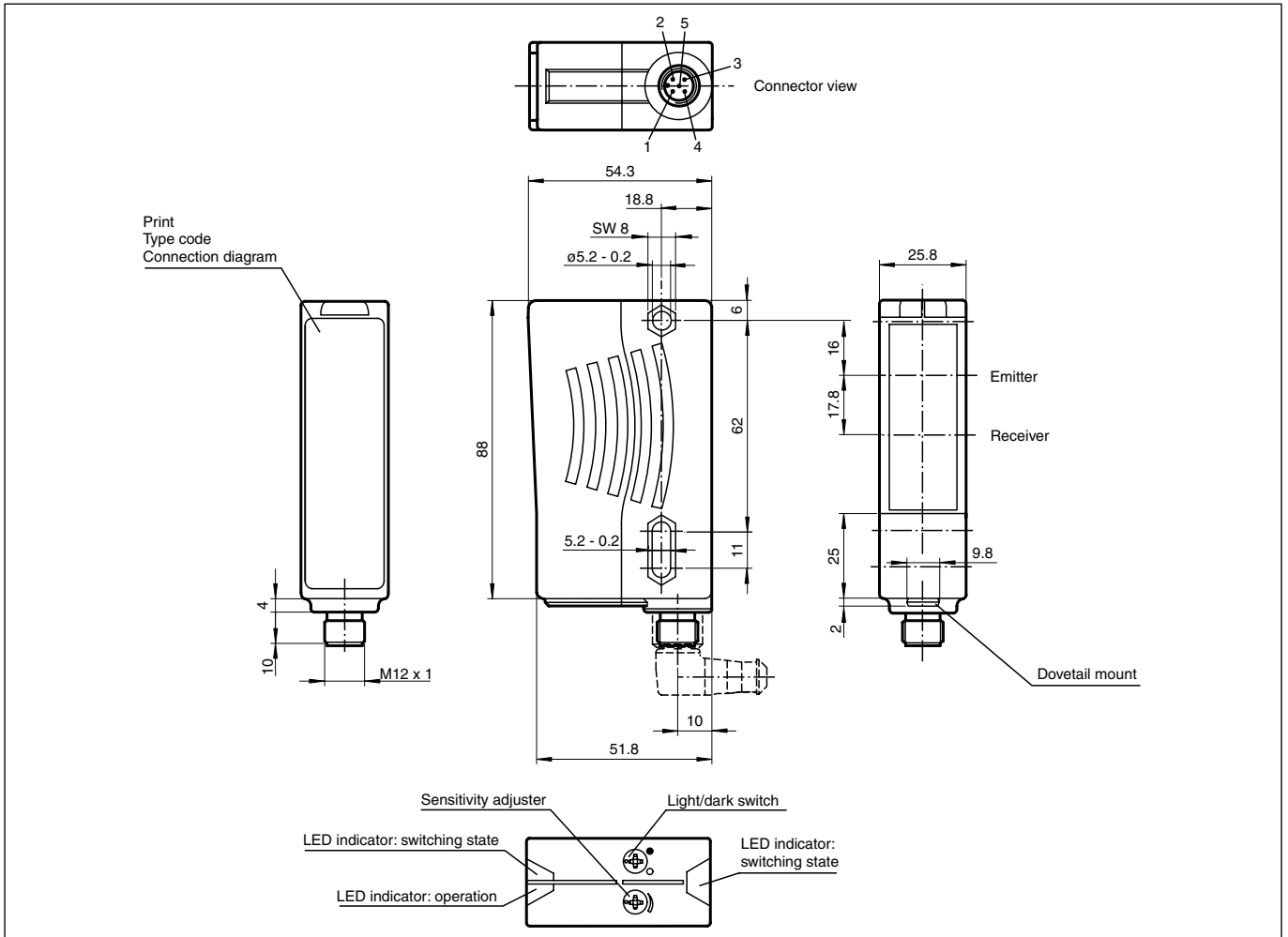
Ordering code		RL28-8-H-2000-IR/47/105	RL28-8-H-2000-IR/49/105	RL28-8-H-2000-IR/105/110
Detection range	20 ... 2000 mm	◆	◆	◆
Detection range min.	20 ... 200 mm	◆	◆	◆
Sensor range max.	20 ... 2000 mm	◆	◆	◆
Black/white difference (6%/90%)	< 40 %	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Light source	IREL	◆	◆	◆
Angle of divergence	transmitter 2° receiver 2°	◆	◆	◆
Diameter of the light spot	approx. 70 mm at a distance of 2000 mm	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Operating display	LED green	◆	◆	◆
Function display	2 LEDs yellow on: object inside the scanning range off: object outside the scanning range	◆	◆	◆
Controls	rotary switch for light/dark	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	≤ 40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆		
	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆	
	1 push-pull output, short-circuit proof, protected against reverse polarity			◆
Switching type	Light/dark ON, switchable	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆
Response time	2 ms	◆	◆	◆
Ambient temperature	-40 ... +60 °C	◆	◆	◆
Storage temperature	-40 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	◆
Connection type	5-pin, M12 connector	◆	◆	◆
Housing	Plastic ABS	◆	◆	◆
Light exit	Plastic	◆	◆	◆
Mass	70 g	◆	◆	◆



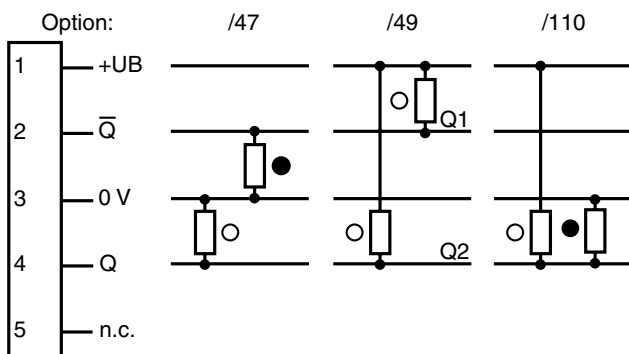
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON





Serie 32 – the jack of all trades for storage and conveyor systems

Series 32 represent a closed product series in a compact design. The matching features in design, functional display and connection type make assembly considerably easier. Economical sensors have been created that work reliably and are not susceptible to environmental influences. Thus, this series includes reflex light beam switches with foreground suppression for reliable detection with a sheet of shrink-wrapped pallets. There is no problem with interference from reflections. The complete family includes single path light beam switches with distinct transmitter and receiver frequencies as well as sensors with adjustable background suppression that are not sensitive to frequency-controlled energy saving lamps.

Important areas of usage are found wherever stringent technical requirements and highly economical operation are in demand.

Principle	Type code	Sensing range/detection range	Page
	L32/LV32	0 m ... 30 m	528
	RL32-54; RL32-55; RL32-55-V	0 m ... 10 m	532
	RL32-8/73c	10 mm ... 800 mm	536
	RL32-8-H	30 mm ... 800 mm	540

Special accessories mating connectors for the series 32

	Model number	Design	Number of pins	Cable length/m	Fig.
Version M12	V1-W-10M-PVC-VIS	Socket, angled	4	10	1
	V1-G-2M-PVC-VIS	Socket, straight	4	2	2
	V1-W-2M-PVC-VIS	Socket, angled	4	2	1
	V1-G-5M-PVC-VIS	Socket, straight	4	5	2
	V1-W-5M-PVC-VIS	Socket, angled	4	5	1

Fig. 1:

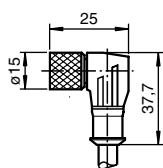
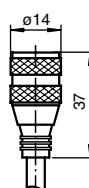
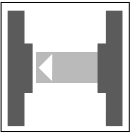


Fig. 2:





L32/LV32/.. /47/73c

Single path light beam switch

L32/LV32/.. /47/73c

with 4-pin, M12 x 1 plastic connector

CE



- ◆ Detection range up to 20 m; optional up to 45 m
- ◆ Sleek design, special for storage and conveyor systems
- ◆ Excellent optical performance data
- ◆ Scratch-resistant and solvent resistant optical covering made of glass

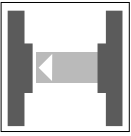
Series
32

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

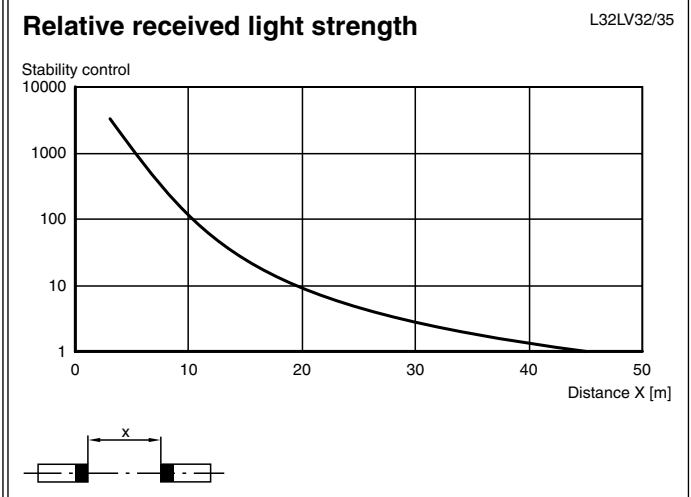
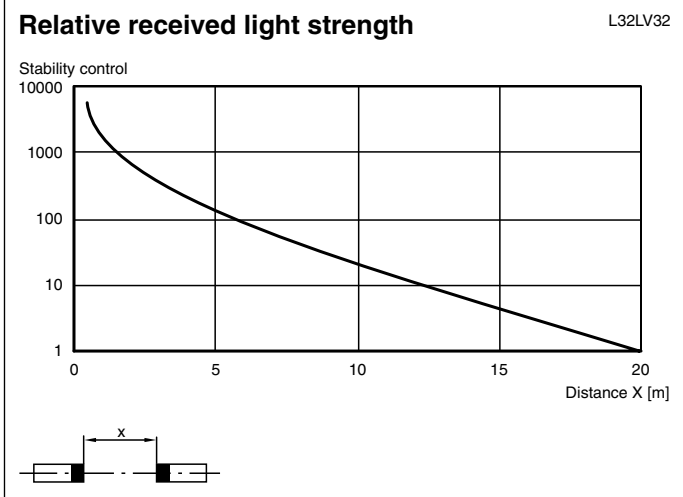
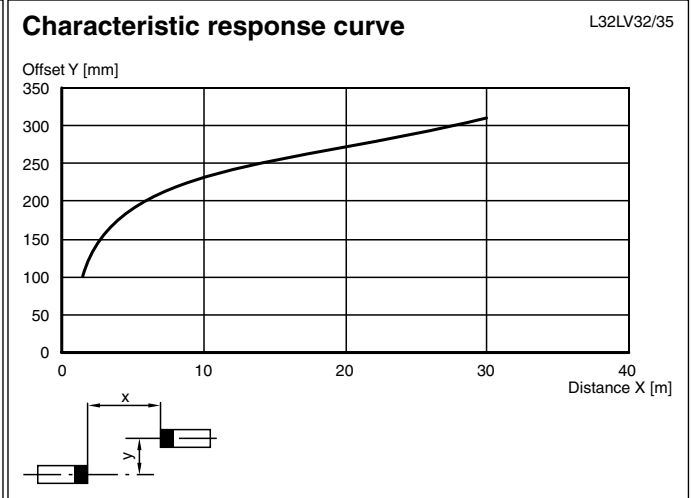
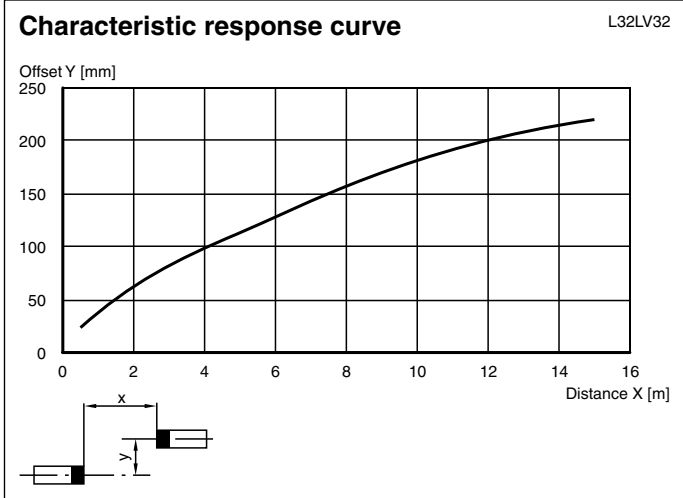
Date of issue: 10/4/01

Ordering code		L32/LV32/47/73c	L32/LV32/85/47/73c
Effective detection range	0 ... 10 m	◆	
	0 ... 30 m		◆
Threshold detection range	20 m	◆	
	45 m		◆
Obstacle size	18 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Angle of divergence	approx. 3 °	◆	◆
Diameter of the light spot	approx. 500 mm at 10 m detection range	◆	◆
Ambient light limit	100000 Lux	◆	
	60000 Lux		◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow, lights up when light beam is free, flashes when falling short of the stability control	◆	◆
Controls	Light/dark switch	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	50 mA each	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	150 Hz	◆	◆
Response time	3 ms	◆	◆
Test input	Emitter deactivation	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	Terluran GV15	◆	◆
Light exit	Glass	◆	◆
Mass	60 g (device)	◆	◆

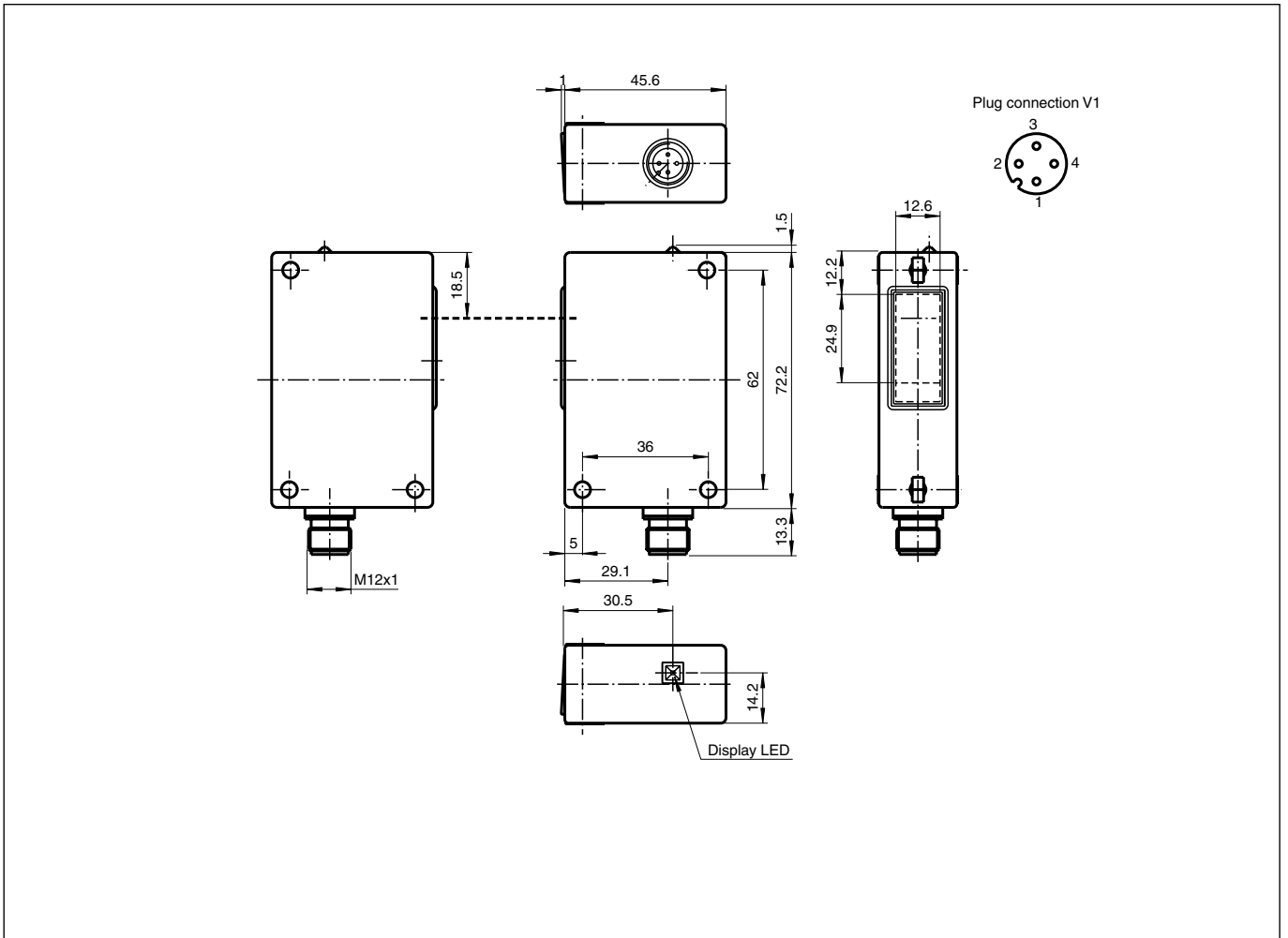


L32/LV32/../47/73c

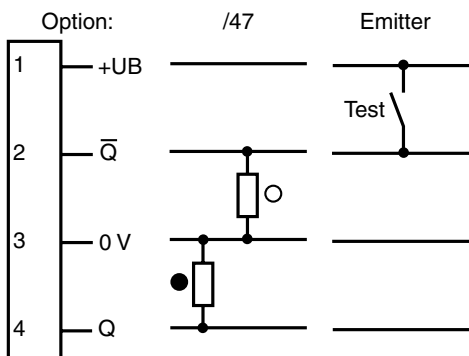
Diagrams



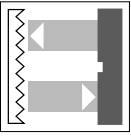
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL32-...-.../47/73c

Reflection light beam switch with polarisation filter

RL32-...-.../47/73c

with 4-pin, M12 x 1 plastic connector



- ◆ Detection range up to 15 m
- ◆ Sleek design, special for storage and conveyor systems
- ◆ Excellent optical performance data
- ◆ Scratch-resistant and solvent resistant optical covering made of glass

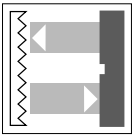
Series
32

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

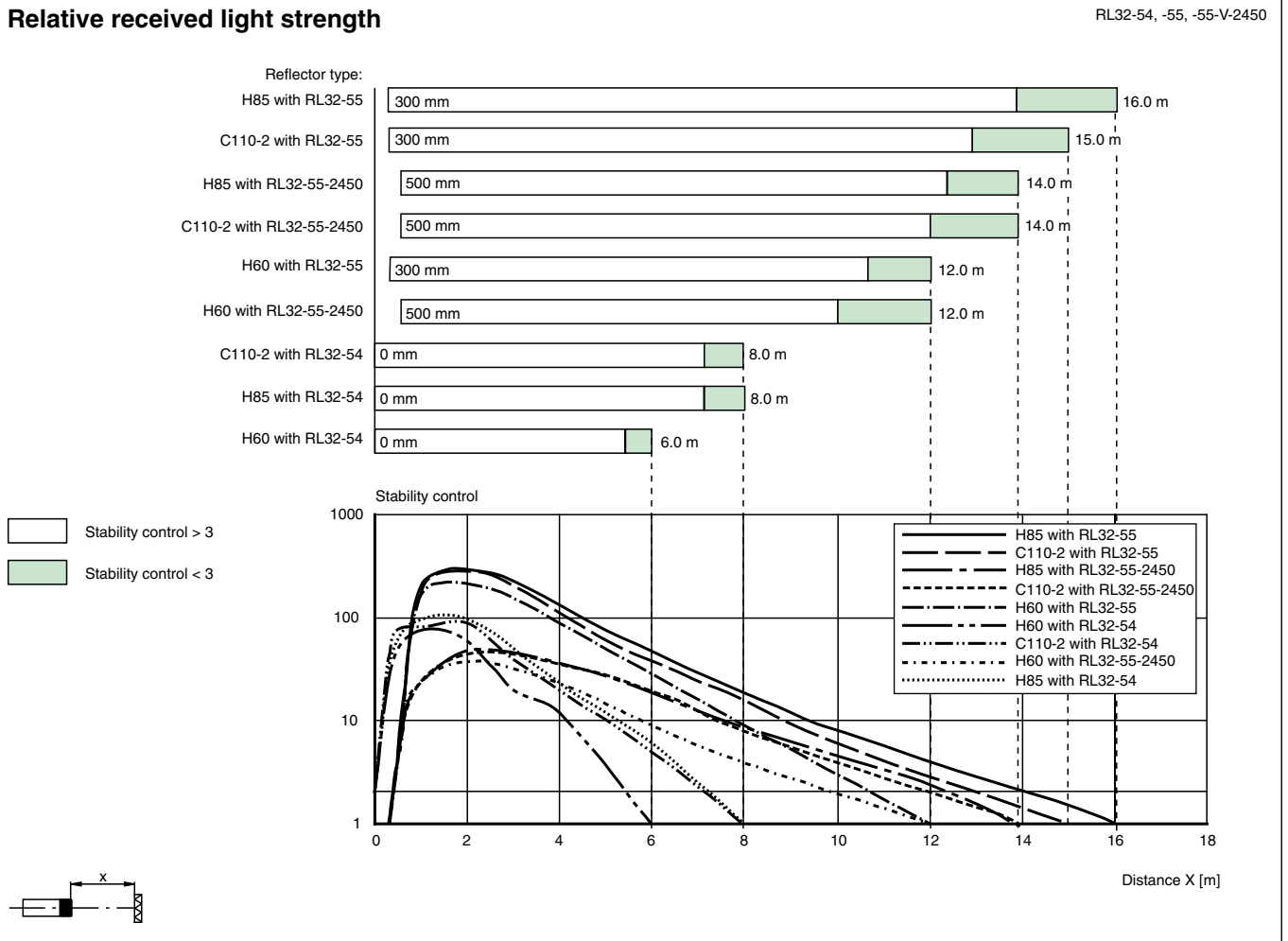
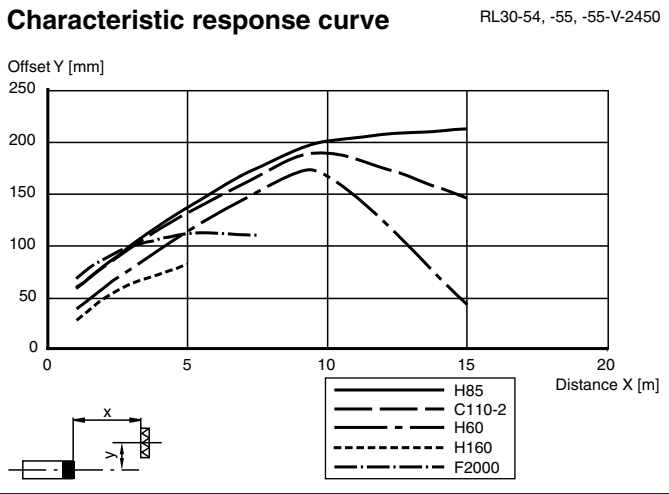
Date of issue: 10/4/01

Ordering code		RL32-54/4/7/73c	RL32-55/4/7/73c	RL32-55-V-2450/47/73c
Effective detection range	0 ... 10 m		◆	
	0 ... 4 m	◆		
	0 ... 8 m			◆
Threshold detection range	14 m (with H85 reflector)			◆
	15 m (with H60 reflector)		◆	
	7 m (with H60 reflector)	◆		
Reflector distance	0 ... 4 m	◆		
	0.3 ... 10 m		◆	
	0.5 ... 8 m			◆
Light source	LED	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆
Angle of divergence	approx. 3 °	◆	◆	◆
Diameter of the light spot	approx. 100 mm at 4000 mm detection range	◆		
	approx. 200 mm at 8000 mm detection range			◆
	approx. 250 mm at 10 m detection range		◆	
Ambient light limit	80000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
USA	UL	◆	◆	◆
Kanada	CSA	◆	◆	◆
Function display	LED yellow, flashes when falling short of the stability control	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆
Ripple	10 %	◆	◆	◆
No-load supply current	40 mA	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	◆	◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆
Switching frequency	250 Hz	◆	◆	◆
Response time	2 ms	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP65	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆
Housing	Terluran GV15	◆	◆	◆
Light exit	Glass	◆	◆	◆
Mass	60 g	◆	◆	◆

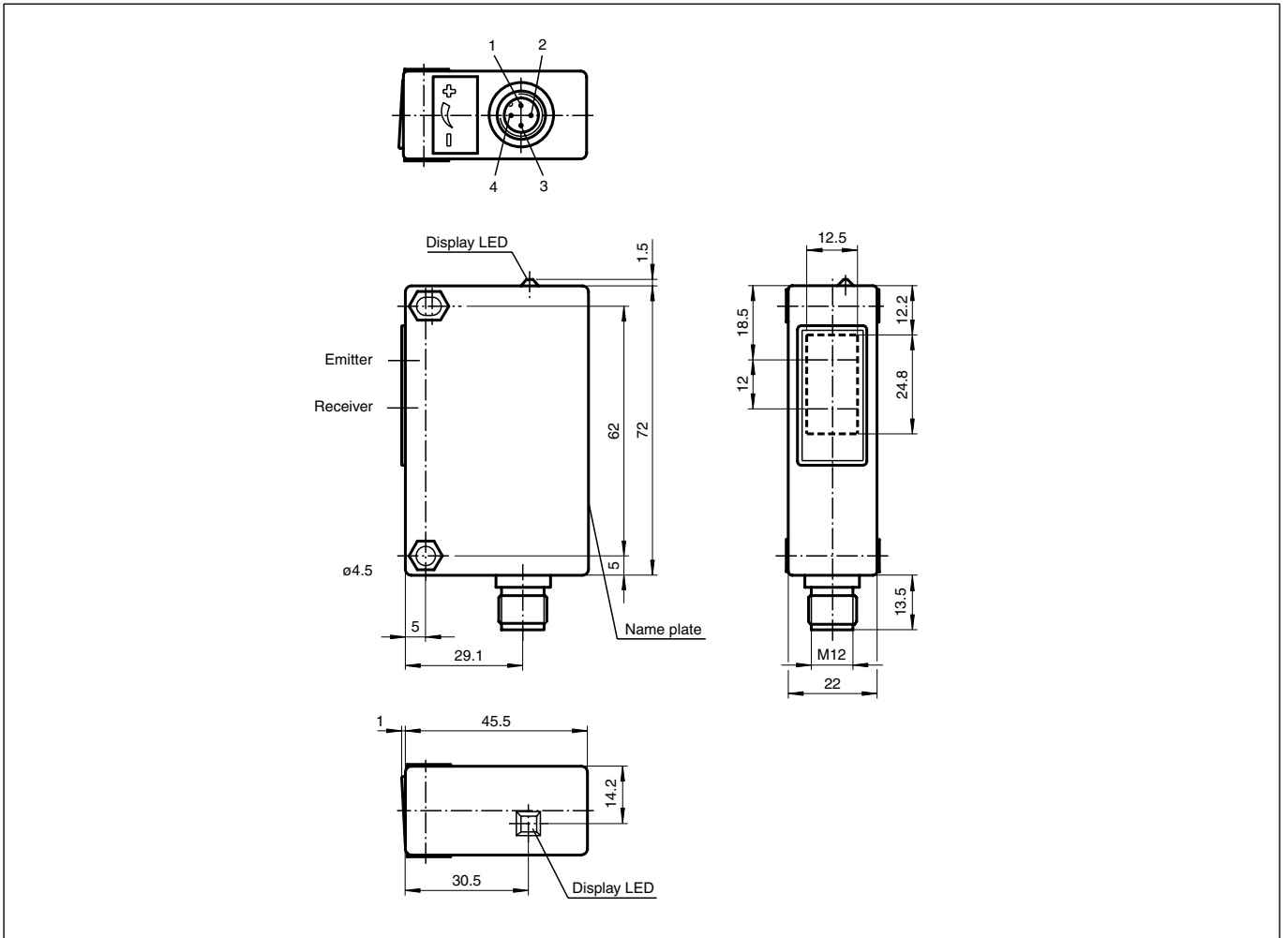


RL32-...-.../4773c

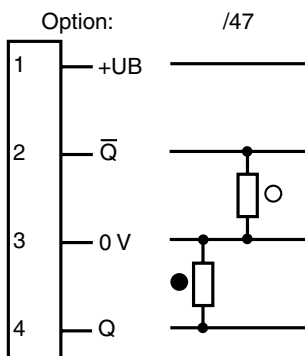
Diagrams



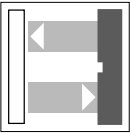
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL32-8-800/47/73c

Reflection light scanner

RL32-8-800/47/73c

with 4-pin, M12 x 1 plastic connector



- ◆ Detection range 10 mm ... 800 mm, adjustable
- ◆ Sleek design, special for storage and conveyor systems
- ◆ Excellent optical performance data
- ◆ Scratch-resistant and solvent resistant optical covering made of glass

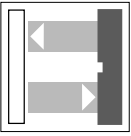
Series
32

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

For suitable reflectors and mounting aids refer to chapter "accessories".

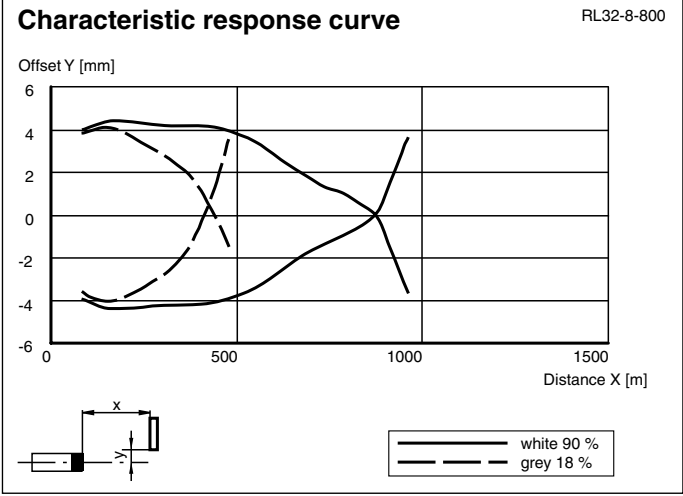
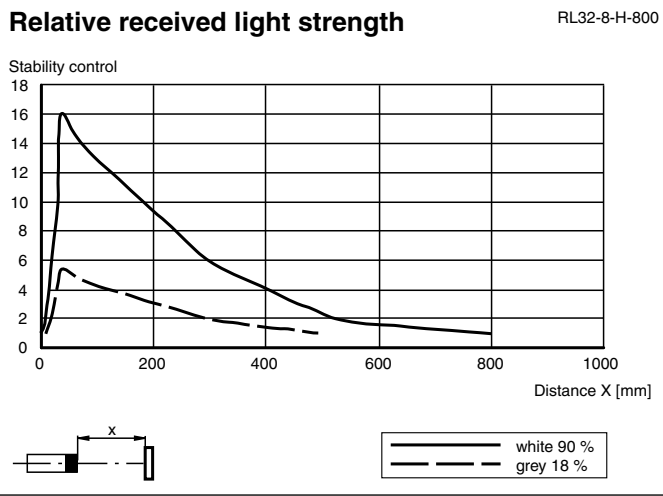
Date of issue: 10/4/01

Ordering code		RL32-8-800/4773c
Detection range	10 ... 800 mm	◆
Adjustment range	300 ... 800 mm	◆
Light source	IREd	◆
Light type	Infrared, alternating light	◆
Angle of divergence	2 °	◆
Diameter of the light spot	approx. 25 mm at 800 mm sensor range	◆
Ambient light limit	50000 Lux	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
USA	UL	◆
Kanada	CSA	◆
Function display	LED, yellow	◆
Controls	sensitivity adjuster	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	40 mA	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆
Switching type	light/dark switching	◆
Switching voltage	max. 30 V DC	◆
Switching current	max. 200 mA	◆
Switching frequency	250 Hz	◆
Response time	2 ms	◆
Ambient temperature	-20 ... +60 °C	◆
Storage temperature	-20 ... +75 °C	◆
Protection degree	IP65	◆
Connection type	4-pin, M12 connector	◆
Housing	Terluran GV15	◆
Light exit	Glass	◆
Mass	60 g	◆

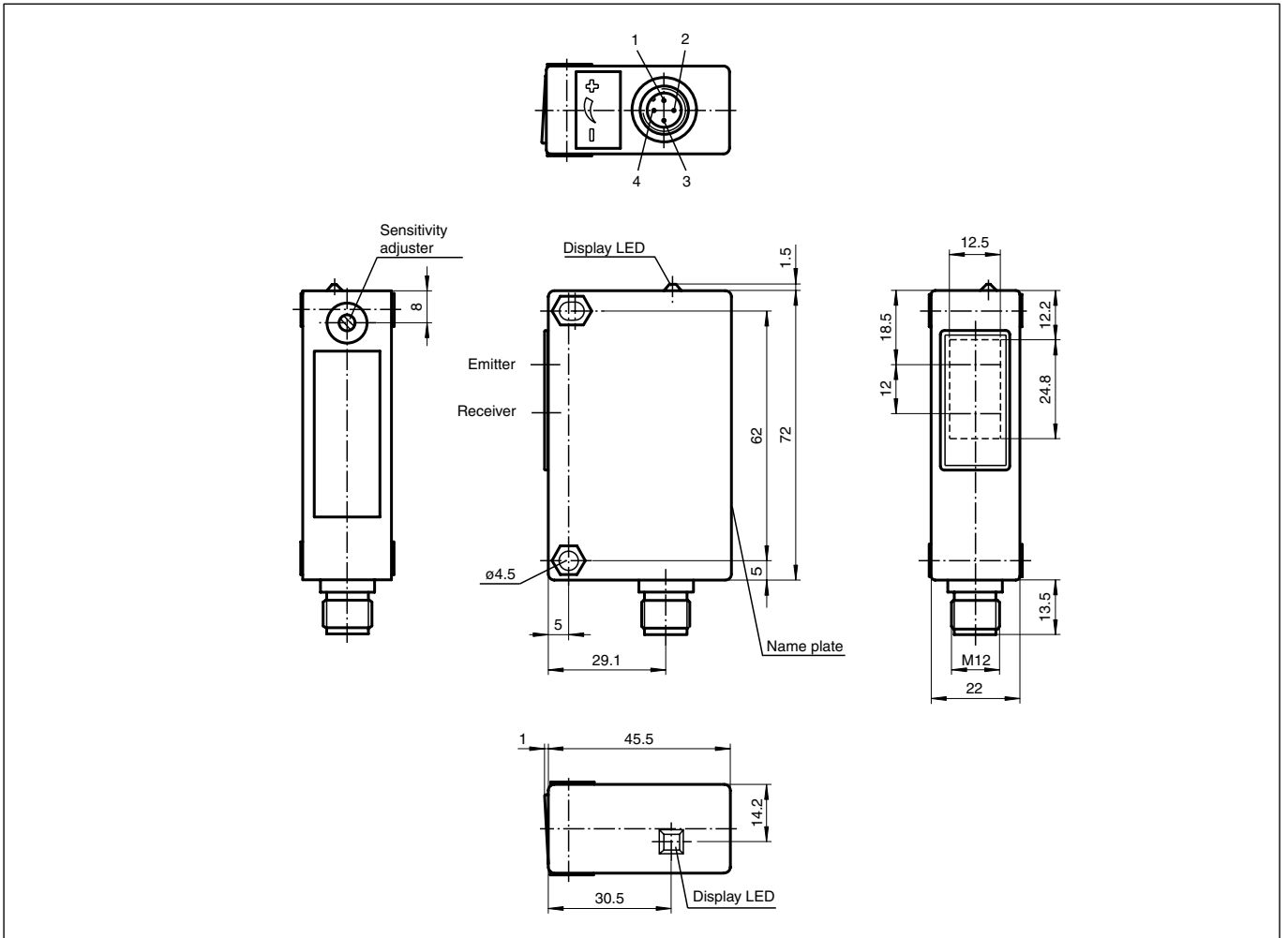


RL32-8-800/47/73c

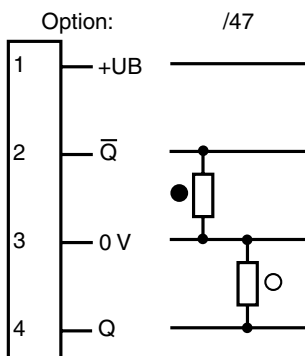
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL32-8-H-.../47/73c

Reflection light scanner with background suppression

RL32-8-H-.../47/73c

with 4-pin, M12 x 1 plastic connector



- ◆ Detection range 30 mm ... 800 mm, adjustable
- ◆ Sleek design, special for storage and conveyor systems
- ◆ Adjustable background suppression
- ◆ Excellent optical performance data
- ◆ Scratch-resistant and solvent resistant optical covering made of glass

Series
32

For an optimal utilisation of the mounting features, we offer a large variety of cable sockets with best suited dimensions. You find them in the prefix of this series.

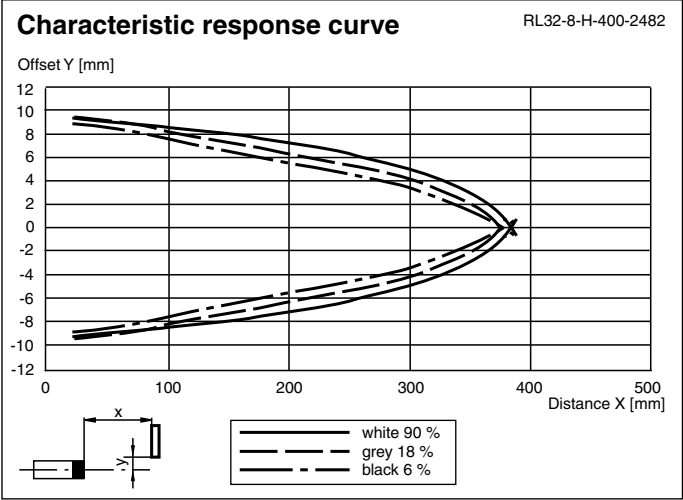
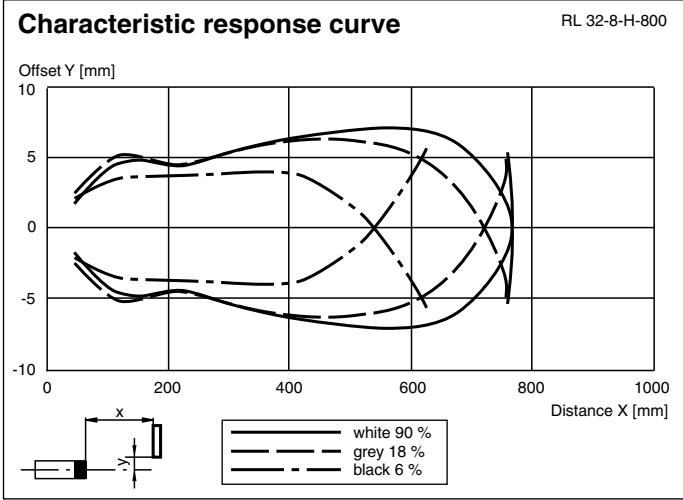
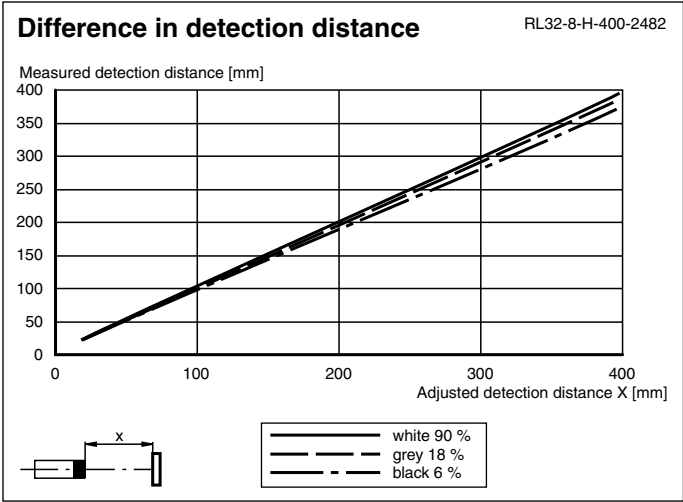
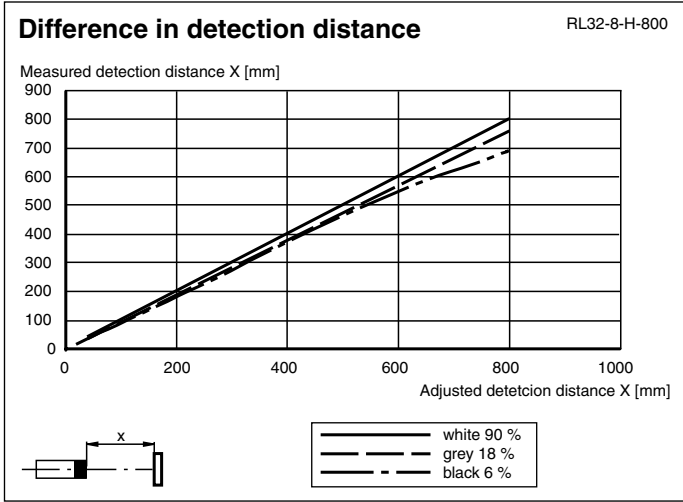
For suitable reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

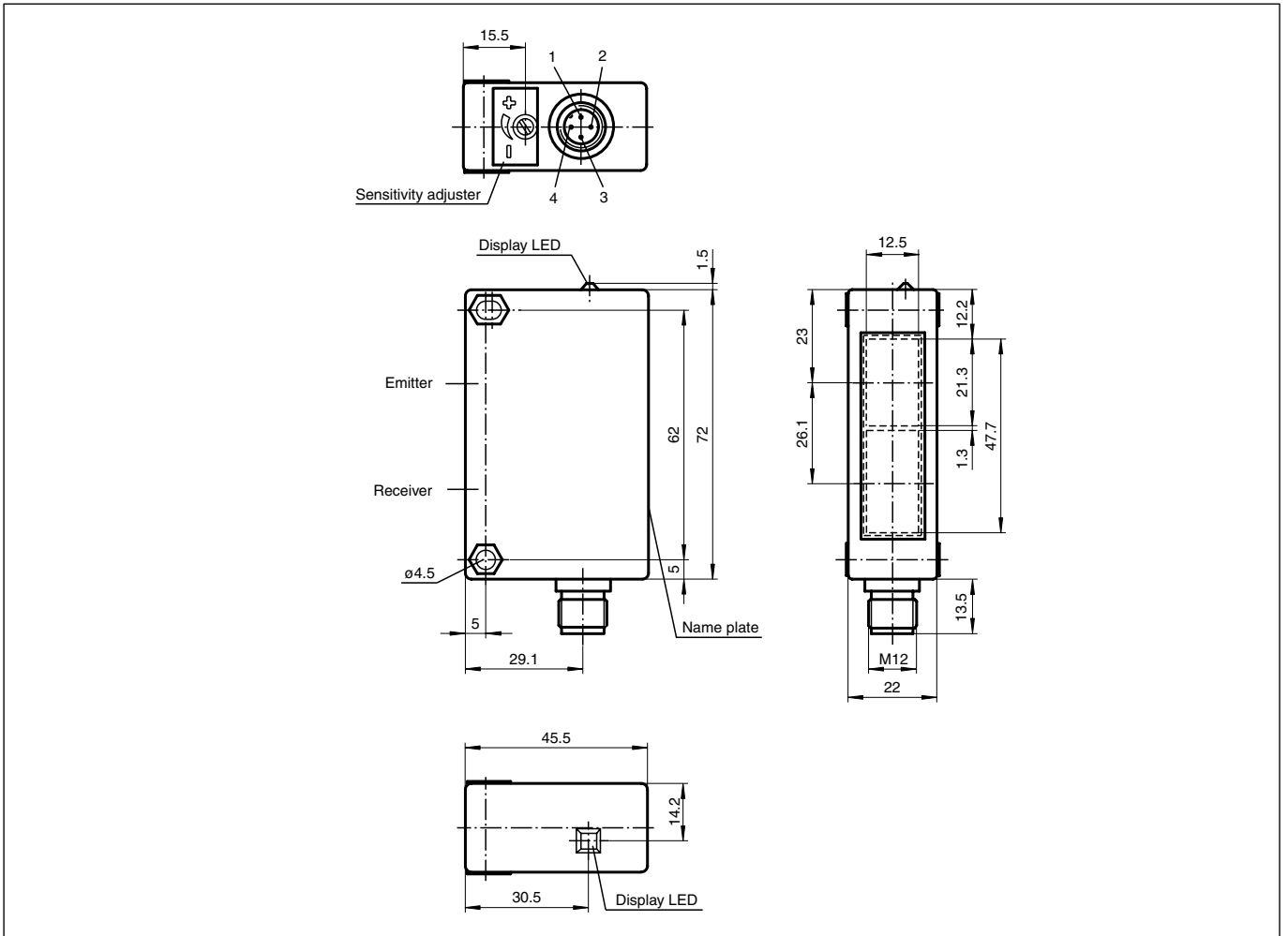
Ordering code		RL32-8-H-800/4773c	RL32-8-H-400-2482/4773c
Detection range	30 ... 400 mm		◆
	30 ... 800 mm	◆	
Detection range min.	30 ... 300 mm	◆	
	30 ... 80 mm		◆
Sensor range max.	30 ... 400 mm		◆
	30 ... 800 mm	◆	
Black/white difference (6%/90%)	< 15 %	◆	◆
Light source	IREC	◆	◆
Light type	Infrared, alternating light	◆	◆
Angle of divergence	approx. 3 °	◆	◆
Diameter of the light spot	approx. 12 mm at 400 mm detection range		◆
	approx. 25 mm at 800 mm sensor range	◆	
Ambient light limit	80000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED, yellow	◆	◆
Controls	Sensing range adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	40 mA	◆	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	250 Hz	◆	◆
Response time	2 ms	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	Terluran GV15	◆	◆
Light exit	Glass	◆	◆
Mass	60 g	◆	◆



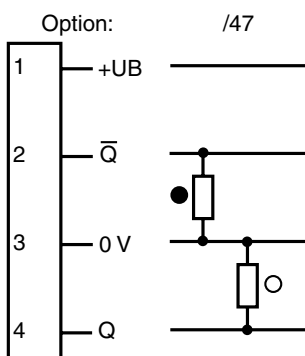
Diagrams



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



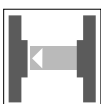
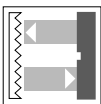
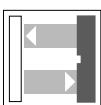


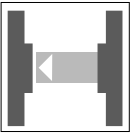
Series 39 – high-performance sensors

The most significant features of the devices of series 39 are their great output capacity, compact design and versatility in availability of optical variants. Available sensors include single path light beam switches with a detection range of 20 m, reflex light beam switches with polarisation filter for a detection range of 5 m, reflection light scanners with a detection range of 800 mm and 2000 mm, as well as a reflection light scanner with background suppression and a detection range of 500 mm. This series, when integrated into a sturdy plastic housing, is most suitable for use in exposed industrial usage.

The devices are available with connection voltages of 10 V to 30 V DC or from 24 V to 240 V AC/DC. A variety of transistor outputs, relay outputs and an AS-Interface are available as signal output. Pre-fault indicator and pre-fault output are included in the series equipment. The switching function can be reversed by means of the light/dark changeover switch.

The possible use of this model line is highly varied. For example, sensors are used in storage and conveyor systems, in the door and gate area and for many other applications.

Principle	Type code	Sensing range/Detection range	Page
	L39/LV39/116; L39/LK39/116	0 m ... 20 m	546
	RL(K)39-55/116	0 mm ... 5000 mm	550
	RL39-55-ASI	0 mm ... 5000 mm	550
	RL39-8-800/116	0 mm ... 800 mm	554
	RLK39-8-800/116	0 mm ... 800 mm	554



L39/L.39/./40a/...

Single path light beam switch

L39/L.39/./40a/...

with terminal compartment or 4-pin, M12 plastic connector

CE

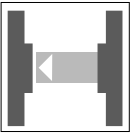


- ◆ Detection range up to 20 m
- ◆ Pre-fault indication and output (static)
- ◆ Light/dark ON, switchable
- ◆ Supplied with mounting accessory
- ◆ Protection degree IP66
- ◆ Direct/alternating voltage
- ◆ Timer function

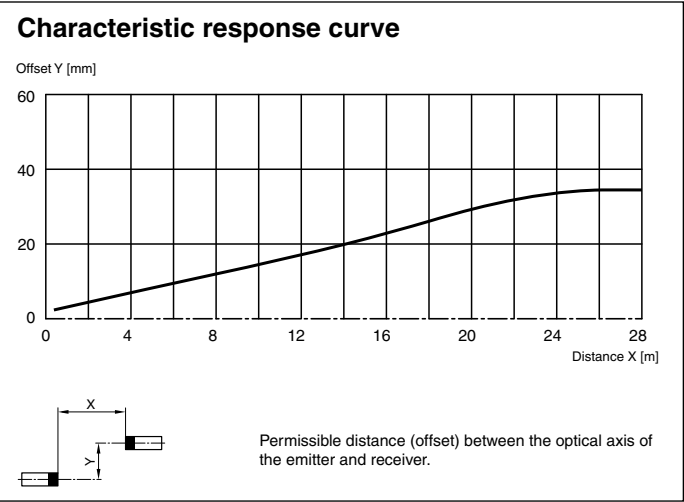
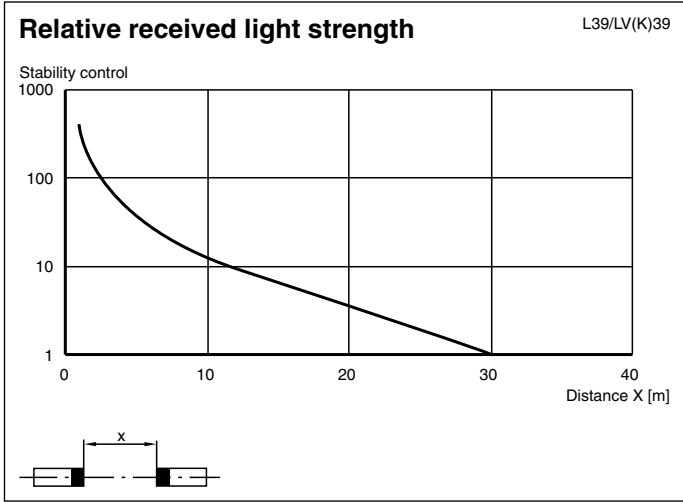
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/4/01

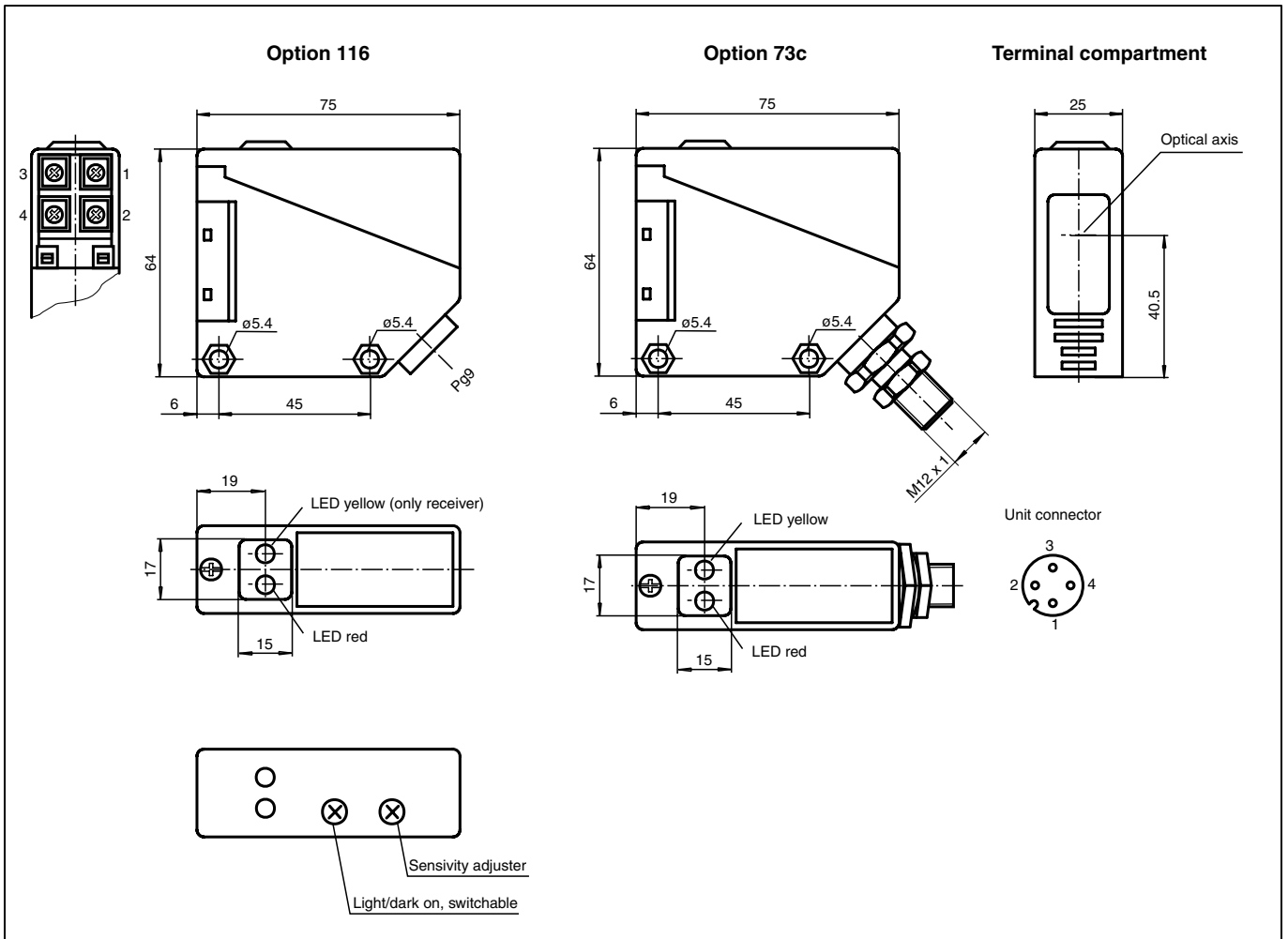
Ordering code		L39/LK39/3/40a/116	L39/LK39-Z/3/140a/116	L39/LY39/30/40a/82a/116	L39/LY39/32/40a/73c/82a
Threshold detection range	30 m	◆	◆	◆	◆
Effective detection range	0 ... 20 m	◆	◆	◆	◆
Adjustment range	800 ... 3000 mm	◆	◆	◆	◆
Reference target	Receiver	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Operating display	LED red (transmitter)	◆	◆	◆	◆
Function display	LED yellow: switching state (receiver) LED red: pre-fault indicator (receiver)	◆	◆	◆	◆
Controls	Switch for timer function		◆		
Controls	sensitivity adjuster	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC			◆	◆
	12 ... 240 V DC 24 ... 240 V AC (50 ... 60 Hz)	◆	◆		
Ripple	10 %	◆	◆	◆	◆
No-load supply current	≤ 55 mA (device)	◆	◆	◆	◆
Power consumption	≤ 3 VA	◆	◆		
Time delay before availability	≤ 50 ms	◆	◆	◆	◆
Signal output	1 switch output npn			◆	
	1 switch output pnp				◆
	1 relay output / NO	◆	◆		
Switching type	light/dark switching	◆	◆	◆	◆
Switching voltage	≤ 240 V AC / ≤ 30 V DC	◆	◆		
	≤ 30 V DC			◆	◆
Switching current	≤ 200 mA			◆	◆
	≤ 3 A	◆	◆		
Voltage drop	≤ 3 V	◆	◆	◆	◆
Switching frequency	≤ 300 Hz	◆	◆	◆	◆
Response time	≤ 1.5 ms	◆	◆	◆	◆
Timer function	On-/off-delay or pulse extension on choice		◆		
Output of the pre-fault indication	NO, static, pnp (≤200 mA)				◆
	NO, static, npn (≤200 mA)			◆	
Ambient temperature	-25 ... +55 °C	◆	◆	◆	◆
Storage temperature	-40... +55 °C	◆	◆	◆	◆
Protection degree	IP66	◆	◆	◆	◆
Connection type	4-pin, M12x1 plastic connector				◆
	Terminal compartment Pg9, ≤ 2.5 mm ²	◆	◆	◆	
Housing	PBT	◆	◆	◆	◆
Light exit	PMMA	◆	◆	◆	◆
Mass	emitter: 90 g receiver: 100 g	◆	◆	◆	◆



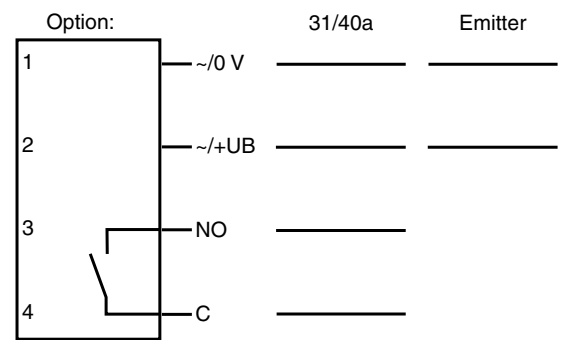
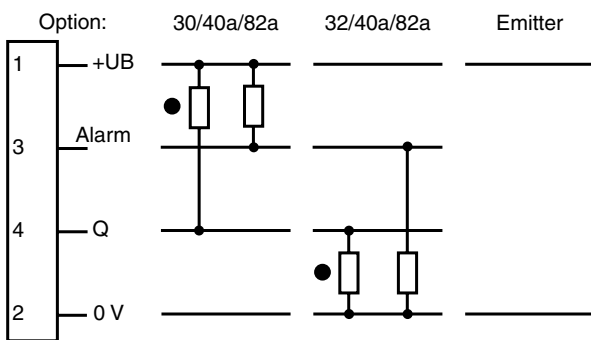
Diagrams



Dimensions

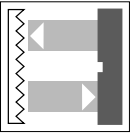


Electrical Connection



○ = Light ON, ● = Dark ON

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RL.39-55/...

Reflection light beam switch

RL.39-55/...

with terminal compartment or 4-pin, M12 connector

CE



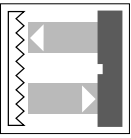
- ◆ Detection range up to 5 m
- ◆ Glare protected with polarisation filter
- ◆ Visible red light
- ◆ Pre-fault indication and output
- ◆ Light/dark ON, switchable
- ◆ Supplied with reflector and mounting accessory
- ◆ Protection degree IP66
- ◆ AS-Interface
- ◆ Direct/alternating voltage
- ◆ Relay output
- ◆ Timer function

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

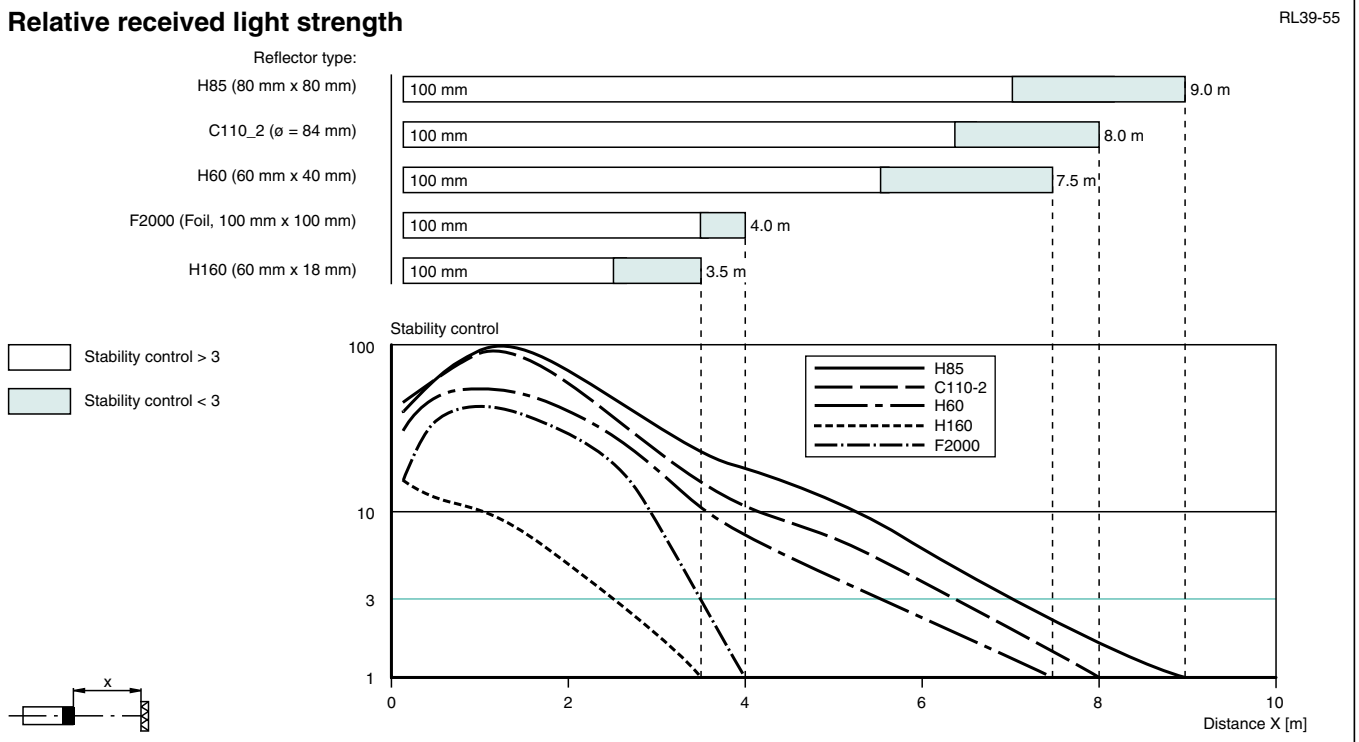
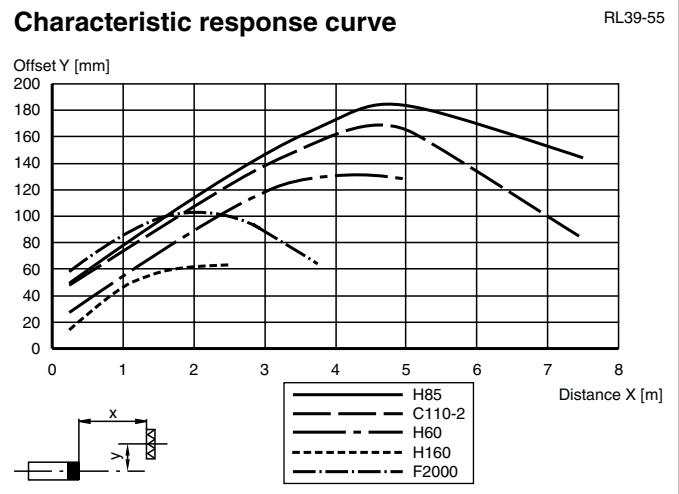
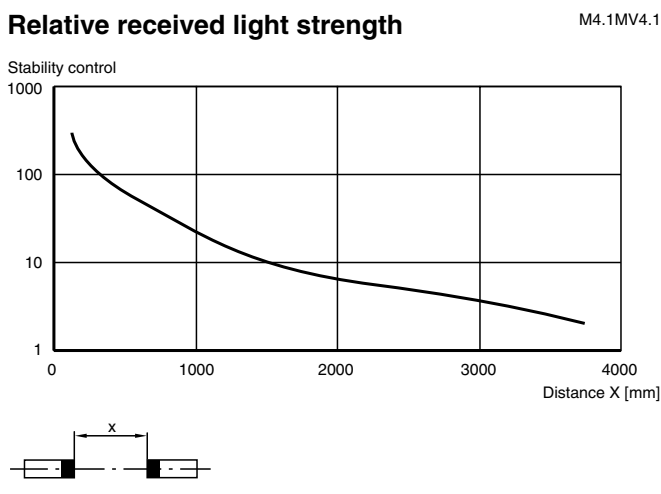
Date of issue: 10/15/01

Ordering code		RL39-55/30/40a/82a/116	RL39-55/32/40a/82a/116	RL39-55-AS-I/116	RL39-55-AS-I/73c	RLK39-55/31/40a/116	RLK39-55-Z/31/40a/116
Threshold detection range	9 m	◆	◆	◆	◆	◆	◆
Effective detection range	0 ... 7 m	◆	◆	◆	◆	◆	◆
Reflector distance	100 ... 9000 mm	◆	◆	◆	◆	◆	◆
Reference target	H85 reflector	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Function display	LED yellow: switching state LED red: pre-fault indication	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆			◆	◆
Controls	Switch for timer function						◆
Operating voltage	via AS-i network			◆	◆		
	10 ... 30 V DC	◆	◆				
	12 ... 240 V DC						
	24 ... 240 V AC (50 ... 60 Hz)					◆	◆
Ripple	10 %	◆	◆	◆		◆	◆
No-load supply current	≤ 35 mA	◆	◆			◆	◆
	≤ 40 mA			◆	◆		
Power consumption	≤ 3 VA					◆	◆
Time delay before availability	≤ 50 ms	◆	◆	◆	◆	◆	◆
Signal output	1 switch output npn	◆					
	1 switch output pnp		◆				
	1 relay output / NO					◆	◆
	AS-Interface			◆	◆		
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆
Switching voltage	≤ 240 V AC / ≤ 30 V DC					◆	◆
	max. 30 V DC	◆	◆				
Switching current	≤ 3 A						◆
	≤ 3 A					◆	
	max. 200 mA	◆	◆			◆	◆
Voltage drop	≤ 3 V	◆	◆			◆	◆
Switching frequency	≤ 100 Hz			◆	◆		
	≤ 25 Hz					◆	◆
	≤ 300 Hz	◆	◆				
Response time	≤ 1.5 ms	◆	◆				
	≤ 20 ms					◆	◆
	≤ 5 ms			◆	◆		
Timer function	On-/off-delay or pulse extension on choice						◆
Output of the pre-fault indication	NO, static, pnp (&lt;200 mA)		◆				
	NO, static, npn (<200 mA)	◆					
Ambient temperature	-25 ... +55 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-25 ... +55 °C			◆			
	-40 ... +55 °C	◆	◆		◆	◆	◆
Protection degree	IP66	◆	◆	◆	◆	◆	◆
Connection type	Connector M12 x 1, 4-pin				◆		
	Terminal compartment Pg9, ≤ 2.5 mm ²	◆	◆	◆		◆	◆
Housing	PBT	◆	◆	◆	◆	◆	◆
Light exit	PMMA	◆	◆	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆		
	110 g					◆	◆

Date of issue: 10/15/01



Diagrams



AS-i Programming

Address preset to 00, can be changed via Busmaster or programming devices

IO-Code 1

ID-Code 1

• Data bit

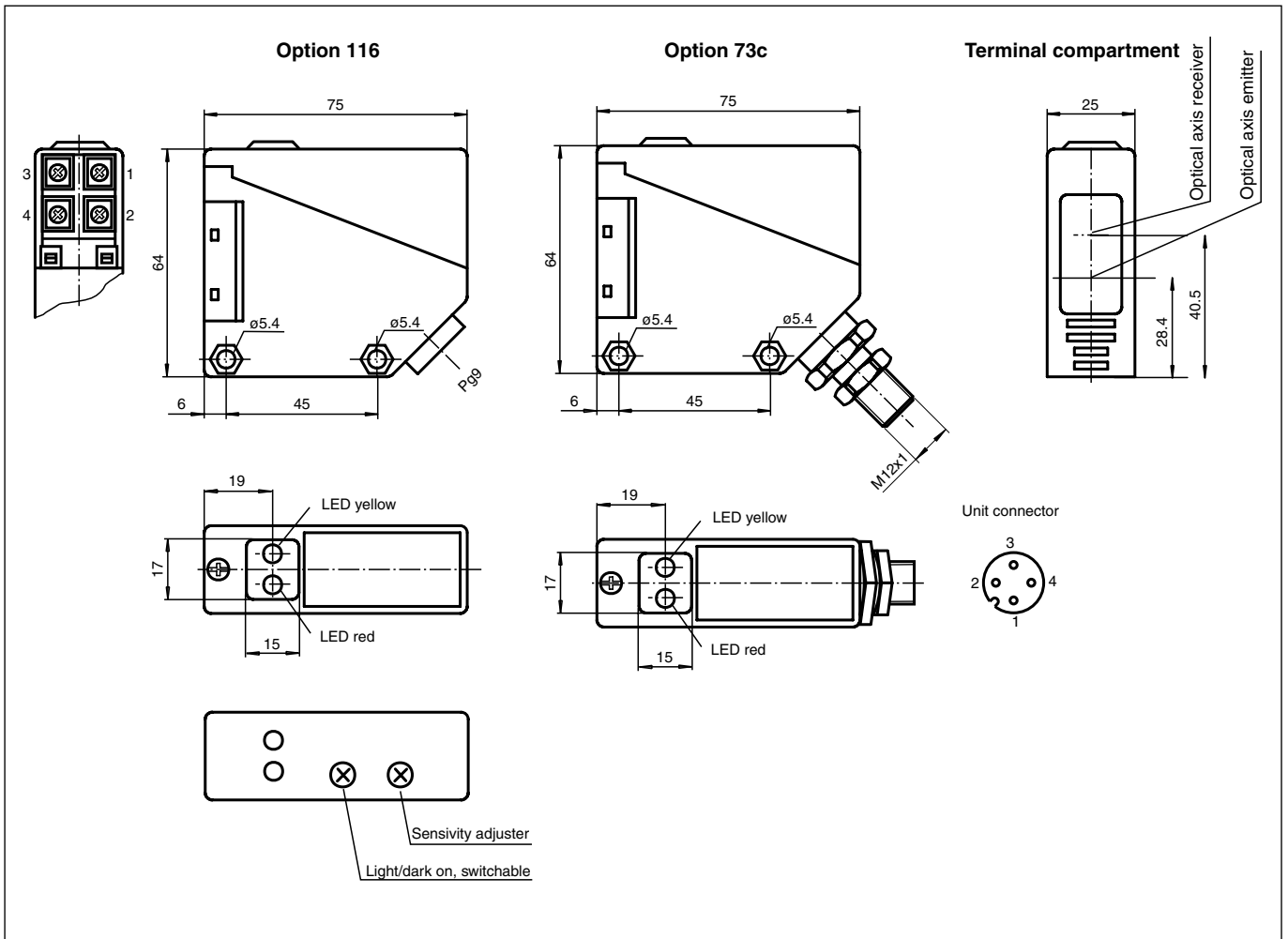
Bit	Function
D0	Switch output
D1	Pre-fault indication (0=ON, 1=OFF)
D2	ready to operate
D3	not used

• Parameter bit

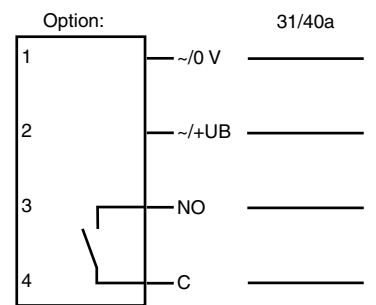
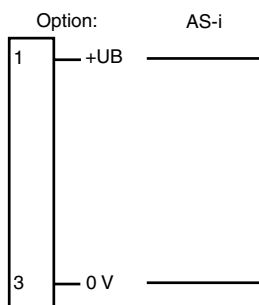
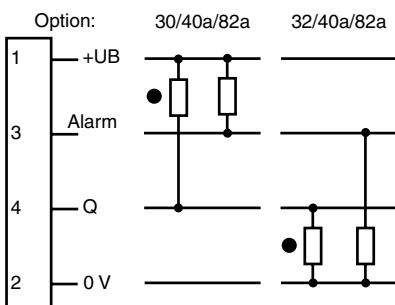
Bit	Function (1/0)
P0	not used
P1	Switch output, light*/dark ON
P2	Pulse extension (20 ms) OFF*/ON
P3	Pulse extension of light*/dark signals (OFF/ON-Delay)

* Default setting

Dimensions



Electrical Connection



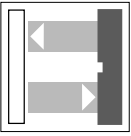
○ = Light ON, ● = Dark ON

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Subject to reasonable modifications due to technical advances.

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RL.39-8-800/...

Reflection light scanner

RL.39-8-800/...

with terminal compartment or 4-pin, M12 connector

CE



- ◆ Detection range up to 800 mm
- ◆ Pre-fault indication and output
- ◆ Light/dark ON, switchable
- ◆ Supplied with mounting accessory
- ◆ Protection degree IP66
- ◆ AS-Interface
- ◆ Direct/alternating voltage
- ◆ Relay output

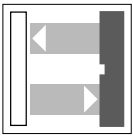
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/15/01

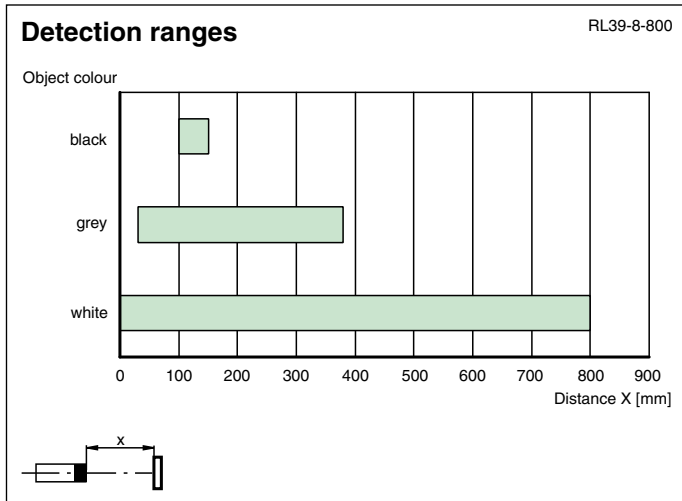
Ordering code		RL 39-8-800/30/40a/82a/116	RL 39-8-800/32/40a/82a/116	RL 39-8-800-AS-I/116	RL 39-8-800-AS-I/73c	RLK39-8-800/31/40a/116	RLK39-8-800-Z/31/40a/116
Detection range	0 ... 800 mm	◆	◆	◆	◆	◆	◆
Adjustment range	65 ... 800 mm	◆	◆	◆	◆	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆	◆	◆	◆	◆
Light source	IRED	◆	◆	◆	◆	◆	◆
Light type	Alternating light	◆	◆	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Function display	LED yellow: switching state LED red: pre-fault indication	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆
Controls	Light/dark switch	◆	◆			◆	◆
Controls	Switch for timer function						◆
Operating voltage	via AS-i network			◆	◆		
	10 ... 30 V DC	◆	◆				
	12 ... 240 V DC						
	24 ... 240 V AC (50 ... 60 Hz)					◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆
No-load supply current	≤ 35 mA	◆	◆			◆	◆
	≤ 40 mA			◆	◆		
Power consumption	≤ 3 VA					◆	◆
Time delay before availability	≤ 50 ms	◆	◆	◆	◆	◆	◆
Signal output	1 switch output npn	◆					
	1 switch output pnp		◆				
	1 relay output / NO					◆	◆
	AS-Interface			◆	◆		
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆
Switching voltage	≤ 240 V AC					◆	◆
	≤ 30 V DC						
	max. 30 V DC	◆	◆				
Switching current	≤ 3 A					◆	◆
	max. 200 mA	◆	◆				
Voltage drop	≤ 3 V	◆	◆				
Switching frequency	≤ 100 Hz			◆	◆		
	≤ 25 Hz					◆	◆
	≤ 300 Hz	◆	◆				
Response time	≤ 1.5 ms	◆	◆				
	≤ 20 ms					◆	◆
	≤ 5 ms			◆	◆		
Timer function	On-/off-delay or pulse extension on choice						◆
Output of the pre-fault indication	NO, static, pnp (&≤ 200 mA)		◆				
	NO, static, npn (≤ 200 mA)	◆					
Ambient temperature	-25 ... +55 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-40 ... +55 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP66	◆	◆	◆	◆	◆	◆
Connection type	Connector M12 x 1, 4-pin				◆		
	Terminal compartment Pg9, ≤ 2.5 mm ²	◆	◆	◆		◆	◆
Housing	PBT	◆	◆	◆	◆	◆	◆
Light exit	PMMA	◆	◆	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆		
	110 g					◆	◆

10/15/01

Date of issue:



Diagrams



AS-i Programming

Address preset to 00, can be changed via Busmaster or programming devices
IO-Code 1
ID-Code 1

• **Data bit**

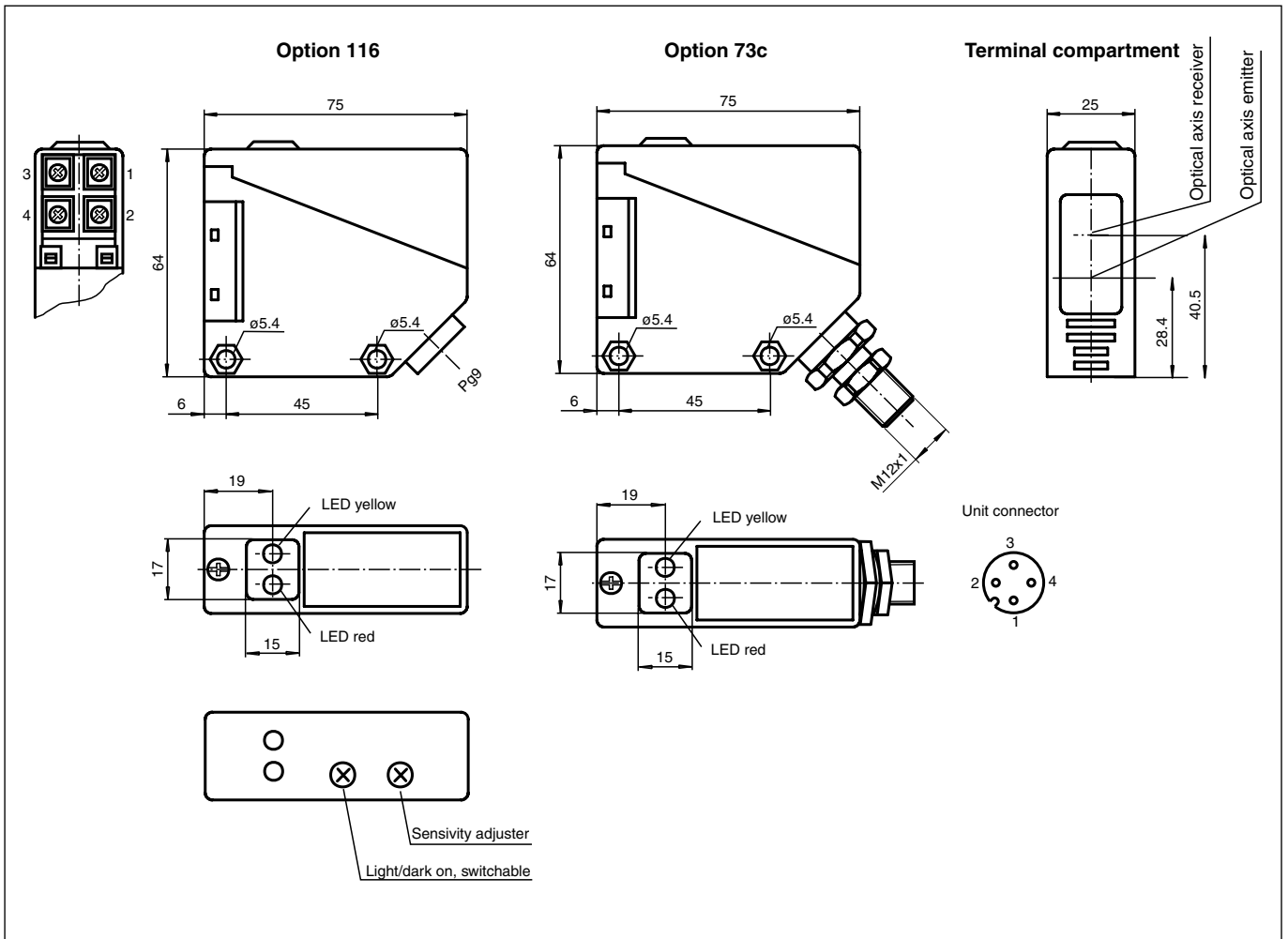
Bit	Function
D0	Switch output
D1	Pre-fault indication (0=ON, 1=OFF)
D2	ready to operate
D3	not used

• **Parameter bit**

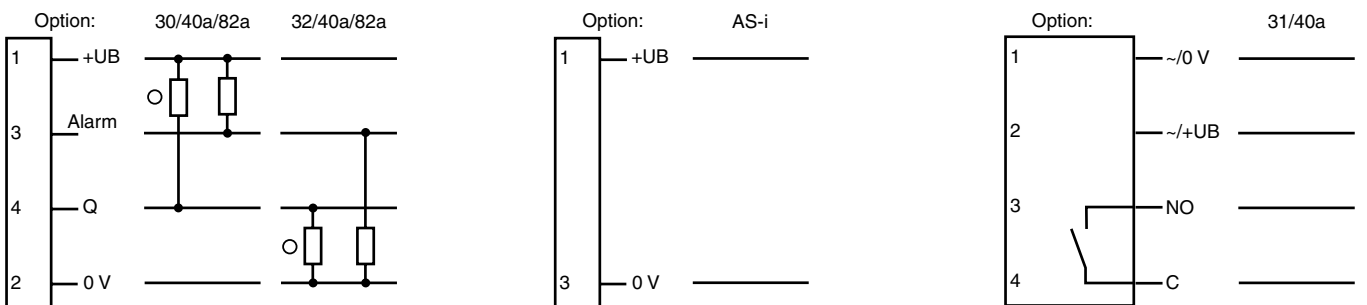
Bit	Function (1/0)
P0	not used
P1	Switch output, light*/dark ON
P2	Pulse extension (20 ms) OFF*/ON
P3	Pulse extension of light*/dark signals (OFF/ON-Delay)

* Default setting

Dimensions



Electrical Connection



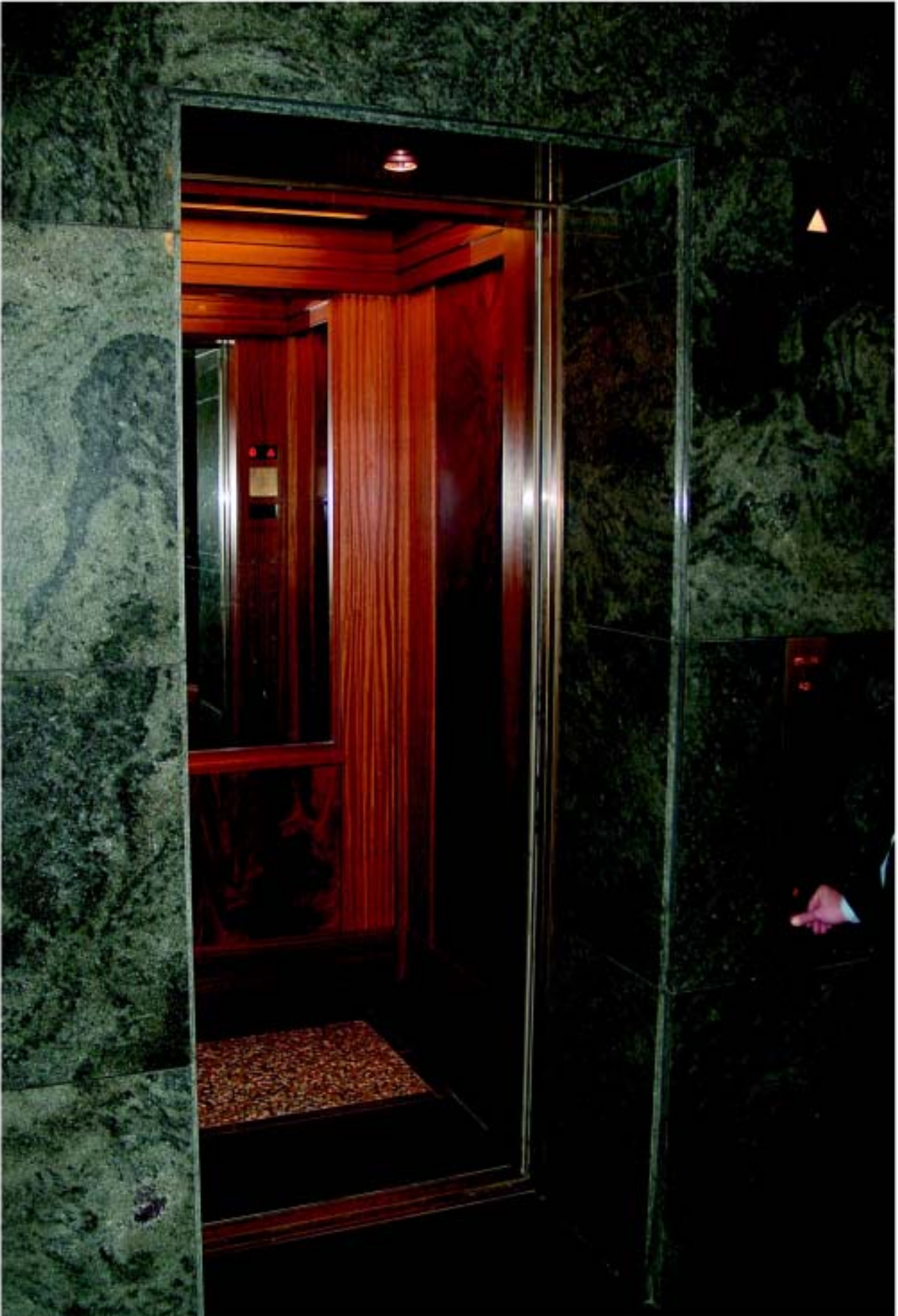
○ = Light ON, ● = Dark ON

Date of issue: 10/15/01

Subject to reasonable modifications due to technical advances.

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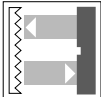


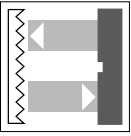
Series 91 – The fashion model: Sleek outfit, modern design

If you need a reflex light beam switch but have only a narrow space in which to install it, or if only the front side is available for fastening it in place, but you still need detection ranges of up to 6 m, the model on the runway for you is the series 91.

The collection includes two reflex light beam switches, with or without polarisation filters, they are available either in the AC version with 96 V bis 264 V AC and relay output or in the low voltage version with 12 V to 30 V DC/18 V to 28 V AC and relay or electronic output. The function LED which is visible from the front and above, flashes if the detection range doesn't "fit".

In spite of these features, the series 91 is not at all a prima donna and is quite ready to work in harsh environments, for example in conveyor systems, in elevators, on escalators and doors, very easy to maintain.

Principle	Type code	Detection range	Page
	RL91-6/115	0 mm ... 6000 mm	560
	RL91-6/73c	0 mm ... 6000 mm	564
	RL91-54/115	0 mm ... 4000 mm	568
	RL91-54/73c	0 mm ... 4000 mm	572
	RLK91-6/115	0 mm ... 6000 mm	560
	RLK91-54/115	0 mm ... 4000 mm	568



Reflection light beam switch

RL.91-6-IR/.../115

with 5 m fixed cable

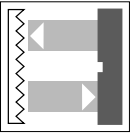
CE



- ◆ Detection range up to 9 m
- ◆ Sturdy and compact design
- ◆ Optimal price/power ratio
- ◆ Various possibilities for mounting

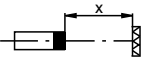
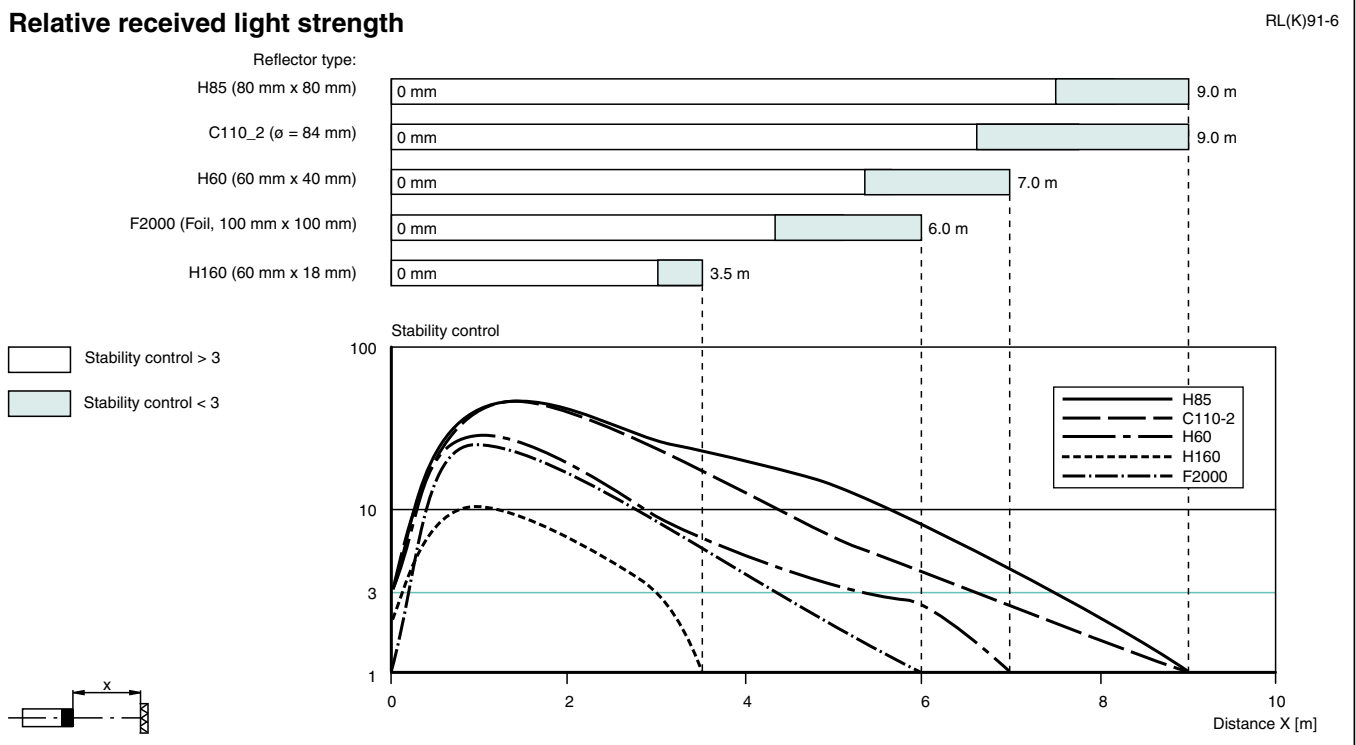
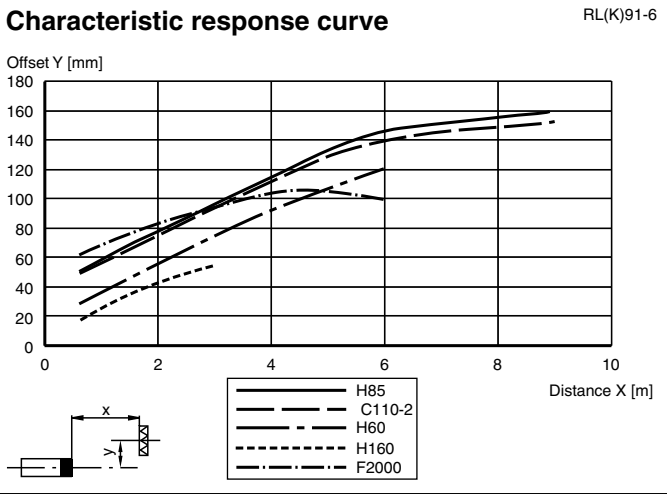
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL91-6-IR/25/49/115	RL91-6-IR/38a/59/115	RL91-6-IR/49/59/115	RL91-6-IR/25/38a/115	RLK91-6-IR/31/59/115	RLK91-6-IR/25/31/115
Effective detection range	0 ... 6 m	◆	◆	◆	◆	◆	◆
Threshold detection range	9 m (with H85 reflector)	◆	◆	◆	◆	◆	◆
Reflector distance	0 ... 6 m	◆	◆	◆	◆	◆	◆
Light source	IREL	◆	◆	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆
Angle of divergence	approx. 2.5 °	◆	◆	◆	◆	◆	◆
Diameter of the light spot	approx. 230 mm at a distance of 6000 mm	◆	◆	◆	◆	◆	◆
Ambient light limit	90000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Conformity to Standards 2	EN50081-1	◆	◆	◆	◆	◆	◆
Conformity to Standards 3	EN50082-2	◆	◆	◆	◆	◆	◆
Conformity to Standards 4	FGN-I	◆	◆	◆	◆	◆	◆
Conformity to Standards 5	FGN-W	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Function display	LED red, flashes when falling short of the stability control	◆	◆	◆	◆	◆	◆
Operating voltage	12 ... 30 V DC	◆		◆			
	12 ... 30 V DC / 18 ... 38 V AC		◆		◆		
	96 ... 264 V AC					◆	◆
No-load supply current	< 100 mA	◆	◆	◆	◆		
Power consumption	12 VA					◆	◆
Signal output	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity	◆		◆			
	Weak current relay, 1 alternator		◆		◆	◆	◆
Switching type	light ON	◆			◆		◆
	dark ON		◆	◆		◆	
Switching voltage	max. 125 V AC		◆		◆		
	max. 240 V AC					◆	◆
	max. 30 V DC	◆		◆			
Switching current	1 A / 24 V DC, 0.5 A / 110 V AC		◆		◆		
	200 mA	◆		◆			
	2.5 A / 240 V AC					◆	◆
Switch power	max. 120 W / 600 VA					◆	◆
	max. 24 W / 55 VA		◆		◆		
Switching frequency	25 Hz	◆	◆	◆	◆	◆	◆
Response time	20 ms	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +55 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆
Connection type	5 m fixed cable	◆	◆	◆	◆	◆	◆
Housing	Luran	◆	◆	◆	◆	◆	◆
Light exit	Luran	◆	◆	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆	◆	◆

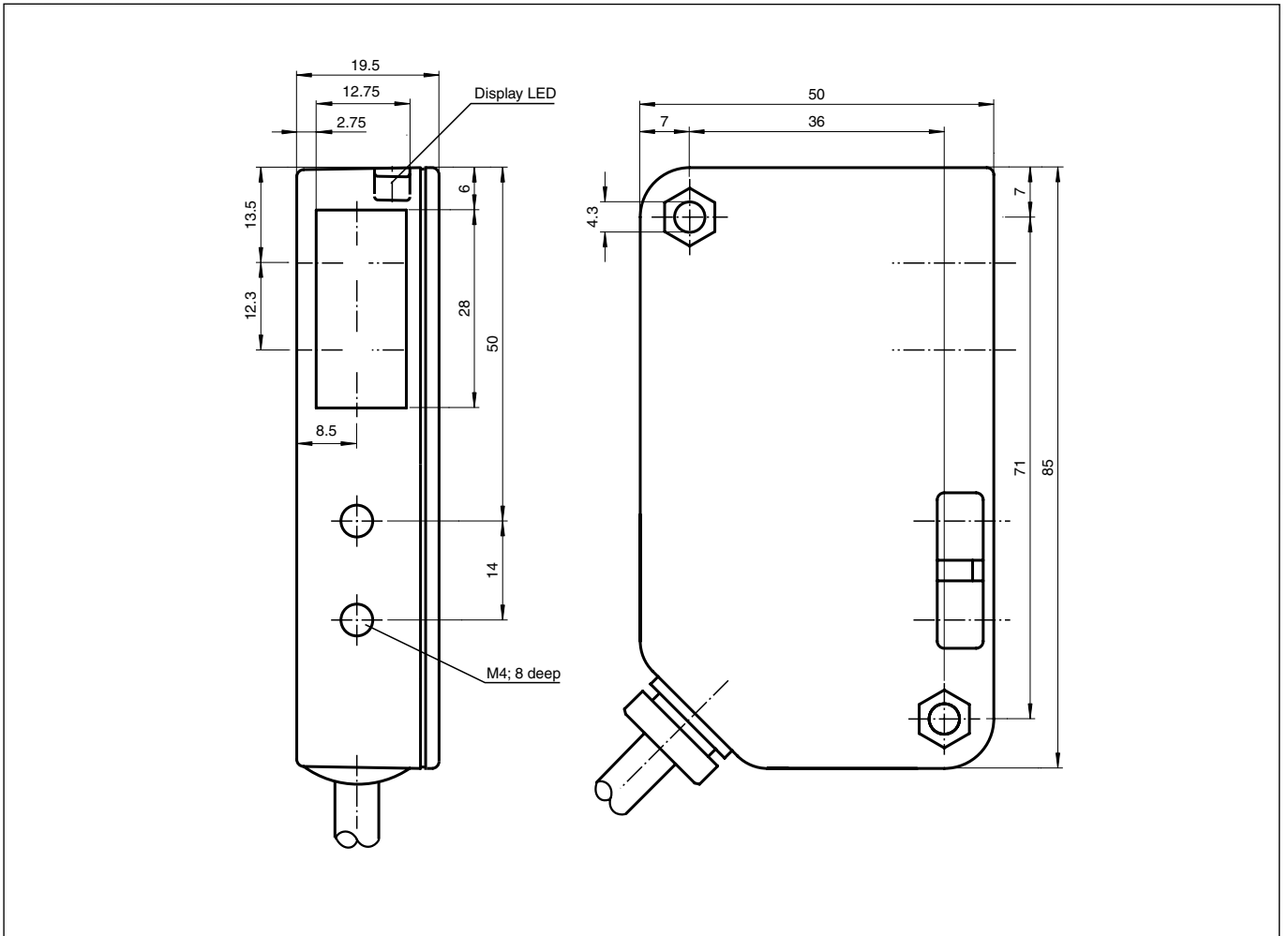


RL.91-6-IR/.../115

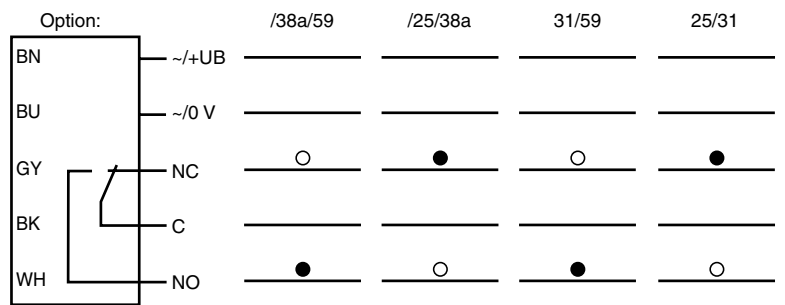
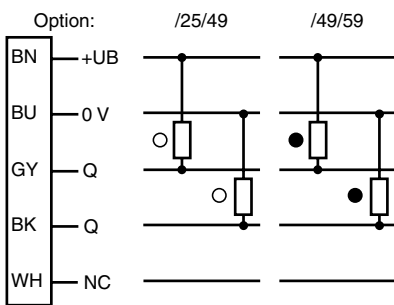
Diagrams



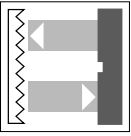
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



Reflection light beam switch

RL91-6-IR/.../73c

with 4-pin, M12 x 1 plastic connector

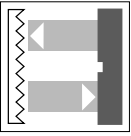
CE



- ◆ Detection range up to 9 m
- ◆ Sturdy and compact design
- ◆ Optimal price/power ratio
- ◆ Various possibilities for mounting

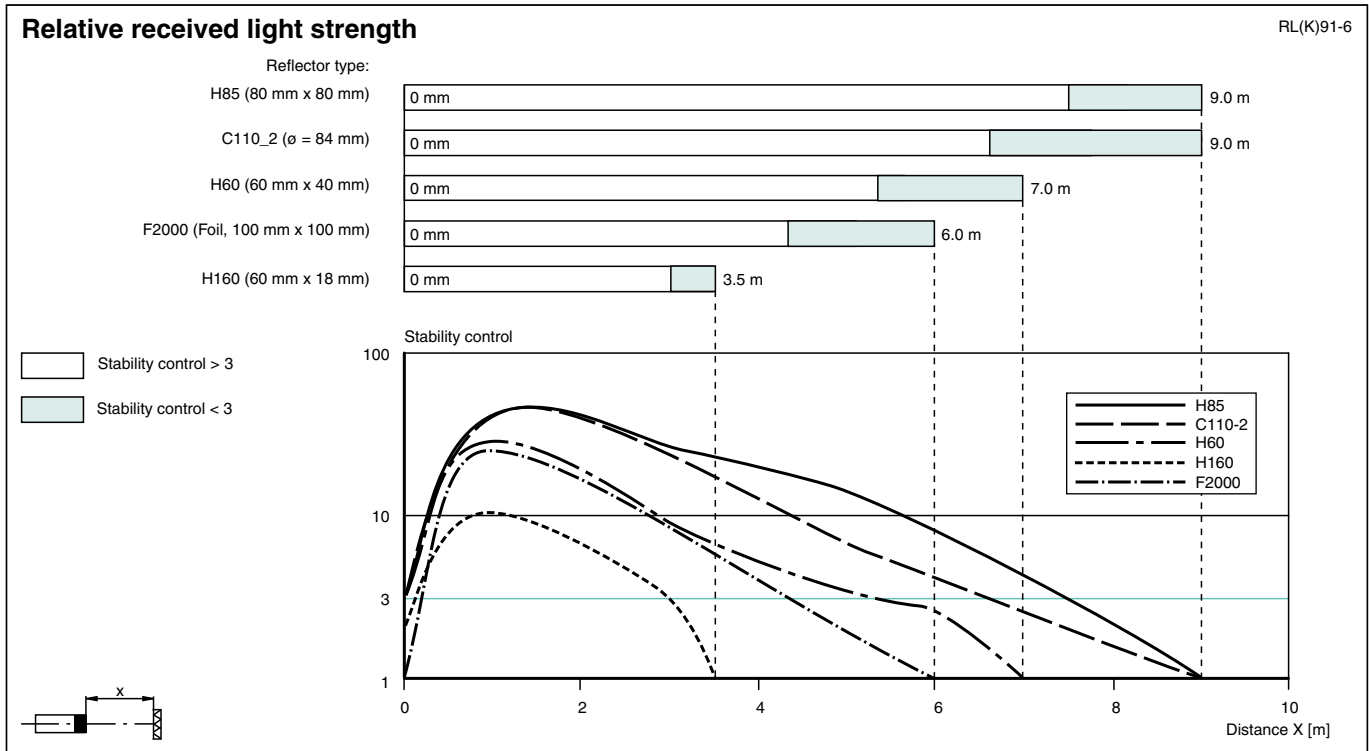
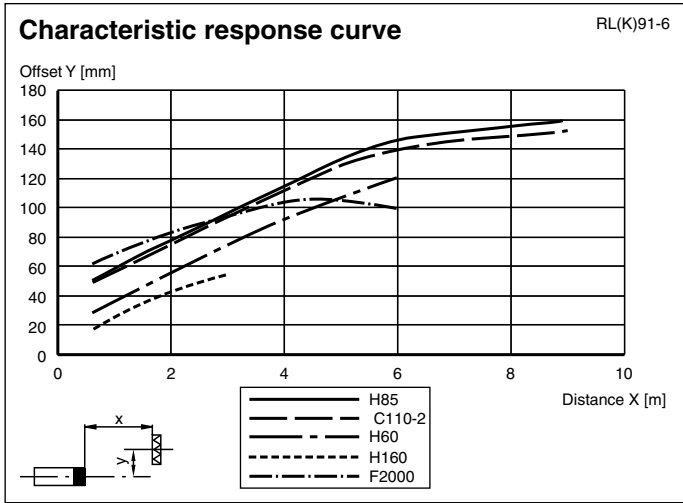
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL91-6-IR/25/49/73c	RL91-6-IR/38a/59/73c	RL91-6-IR/25/38a/73c	RL91-6-IR/49/59/73c
Effective detection range	0 ... 6 m	◆	◆	◆	◆
Threshold detection range	9 m (with H85 reflector)	◆	◆	◆	◆
Reflector distance	0 ... 6 m	◆	◆	◆	◆
Light source	IRED	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆
Angle of divergence	approx. 2.5 °	◆	◆	◆	◆
Diameter of the light spot	approx. 230 mm at a distance of 6000 mm	◆	◆	◆	◆
Ambient light limit	90000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Conformity to Standards 2	EN50081-1	◆	◆	◆	◆
Conformity to Standards 3	EN50082-2	◆	◆	◆	◆
Conformity to Standards 4	FGN-I	◆	◆	◆	◆
Conformity to Standards 5	FGN-W	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Function display	LED red, flashes when falling short of the stability control	◆	◆	◆	◆
Operating voltage	12 ... 30 V DC	◆			◆
	12 ... 30 V DC / 18 ... 38 V AC		◆	◆	
No-load supply current	< 100 mA	◆	◆	◆	◆
Signal output	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity	◆			◆
	Weak current relay, 1 NC		◆	◆	
Switching type	light ON	◆		◆	
	dark ON		◆		◆
Switching voltage	max. 125 V AC		◆	◆	
	max. 30 V DC	◆			◆
Switching current	1 A /24 V DC, 0.5 A /110 V AC		◆	◆	
	200 mA	◆			◆
Switch power	max. 24 W / 55 VA		◆	◆	
Switching frequency	25 Hz	◆	◆	◆	◆
Response time	20 ms	◆	◆	◆	◆
Ambient temperature	-20 ... +55 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆
Housing	Luran	◆	◆	◆	◆
Light exit	Luran	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆

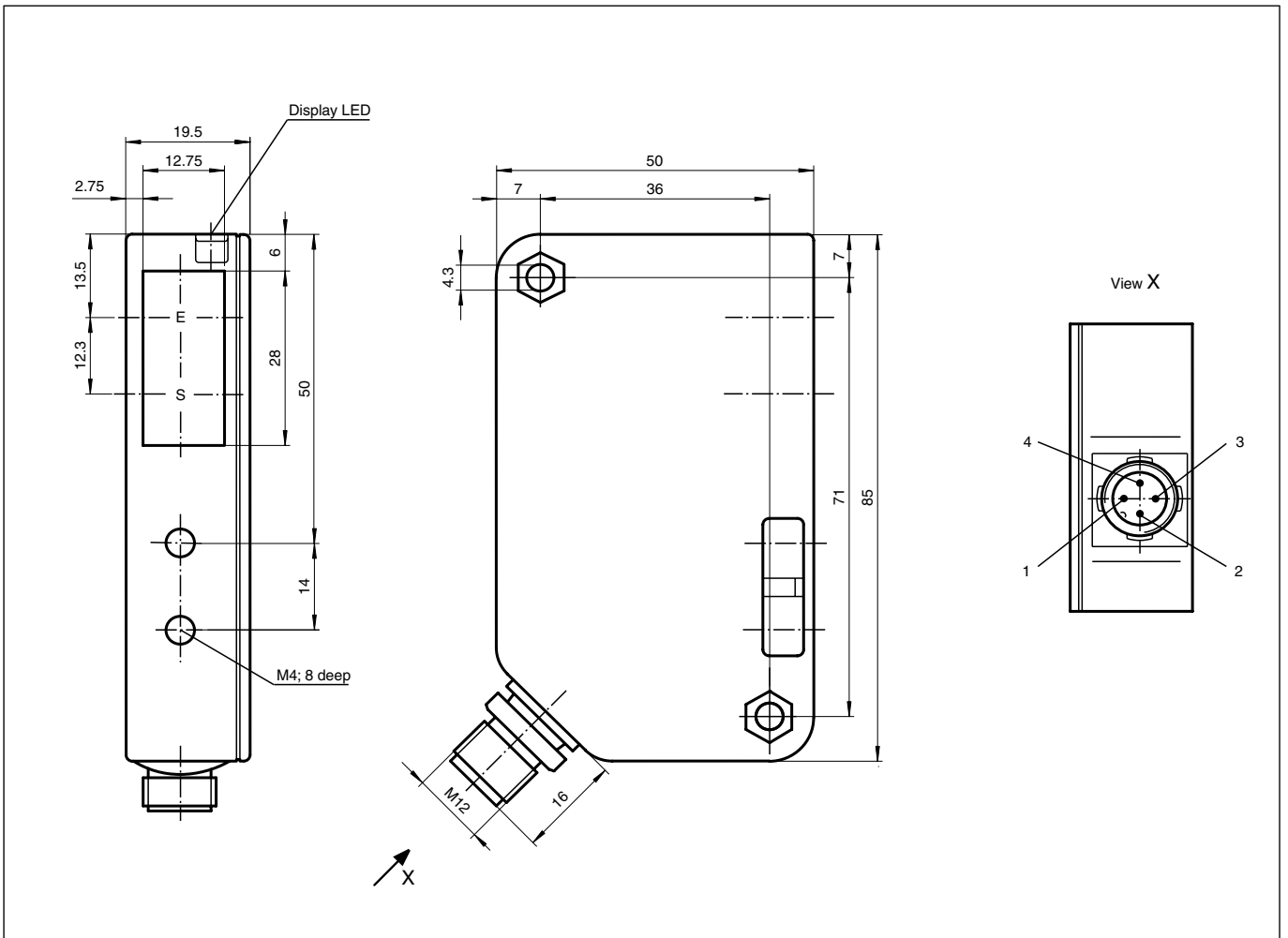


RL91-6-IR/.../73c

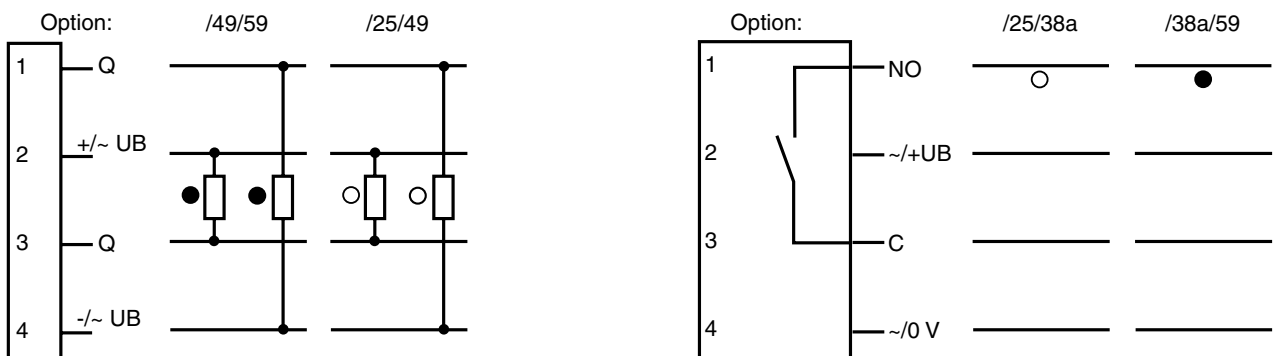
Diagrams



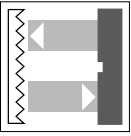
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



Reflection light beam switch with polarisation filter

RL.91-54-RT/.../115

with 5 m fixed cable

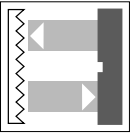
CE



- ◆ Detection range up to 7 m
- ◆ Recording of reflecting objects by means of polarisation filters
- ◆ Sturdy and compact design
- ◆ Optimal price/power ratio
- ◆ Various possibilities for mounting

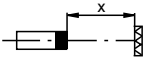
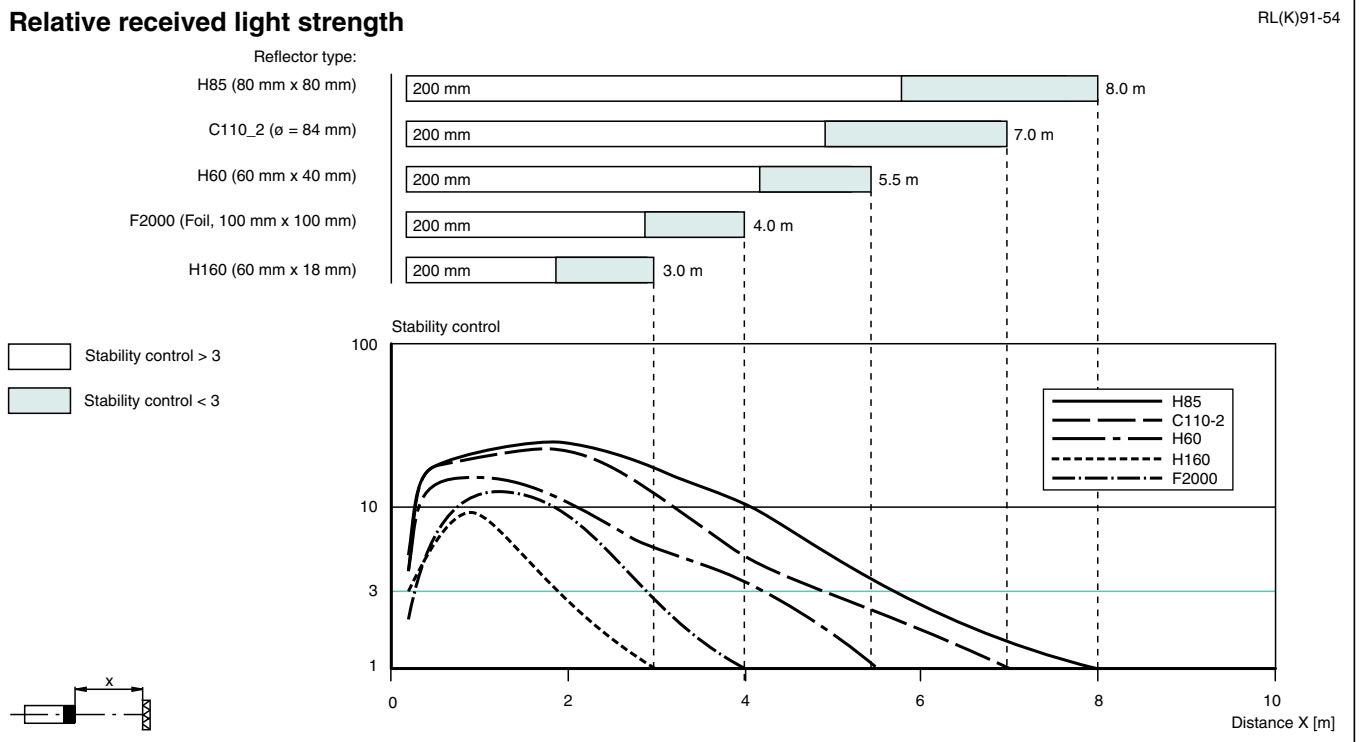
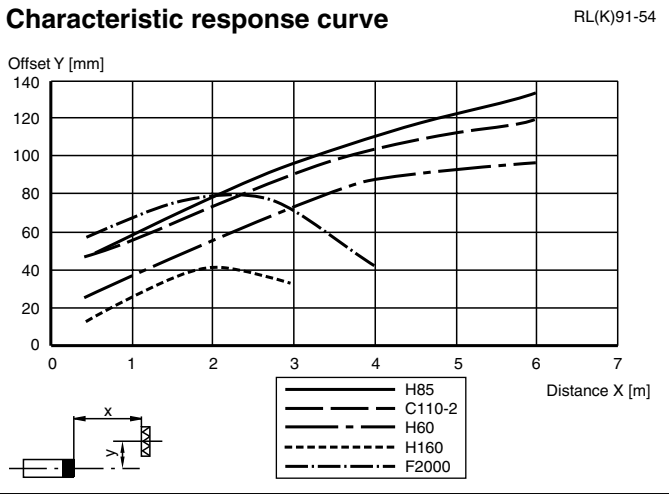
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL91-54-RT/25/49/115	RL91-54-RT/38a/59/115	RL91-54-RT/25/38a/115	RL91-54-RT/49/59/115	RLK91-54-RT/31/59/115	RLK91-54-RT/25/31/115
Effective detection range	0 ... 4 m	◆	◆	◆	◆	◆	◆
Threshold detection range	7 m (with H85 reflector)	◆	◆	◆	◆	◆	◆
Reflector distance	0.2 ... 4000 mm	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆	◆	◆
Angle of divergence	approx. 2.5 °	◆	◆	◆	◆	◆	◆
Diameter of the light spot	approx. 160 mm at a distance of 4000 mm	◆	◆	◆	◆	◆	◆
Ambient light limit	90000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Conformity to Standards 2	EN50081-1	◆	◆	◆	◆	◆	◆
Conformity to Standards 3	EN50082-2	◆	◆	◆	◆	◆	◆
Conformity to Standards 4	FGN-I	◆	◆	◆	◆	◆	◆
Conformity to Standards 5	FGN-W	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Function display	LED red, flashes when falling short of the stability control	◆	◆	◆	◆	◆	◆
Operating voltage	12 ... 30 V DC	◆			◆		
	12 ... 30 V DC / 18 ... 38 V AC		◆	◆			
	96 ... 264 V AC					◆	◆
No-load supply current	< 100 mA	◆	◆	◆	◆		
Power consumption	12 VA					◆	◆
Signal output	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity	◆			◆		
	Weak current relay, 1 alternator		◆	◆		◆	◆
Switching type	light ON	◆		◆			◆
	dark ON		◆		◆	◆	
Switching voltage	max. 125 V AC		◆	◆		◆	
	max. 240 V AC					◆	◆
	max. 30 V DC	◆			◆		
Switching current	1 A /24 V DC, 0.5 A /110 V AC		◆	◆			
	200 mA	◆			◆		
	2.5 A / 240 V AC					◆	◆
Switch power	max. 120 W / 600 VA					◆	◆
	max. 24 W / 55 VA		◆	◆			
Switching frequency	25 Hz	◆	◆	◆	◆	◆	◆
Response time	20 ms	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +55 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆
Connection type	5 m fixed cable	◆	◆	◆	◆	◆	◆
Housing	Luran	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆	◆	◆

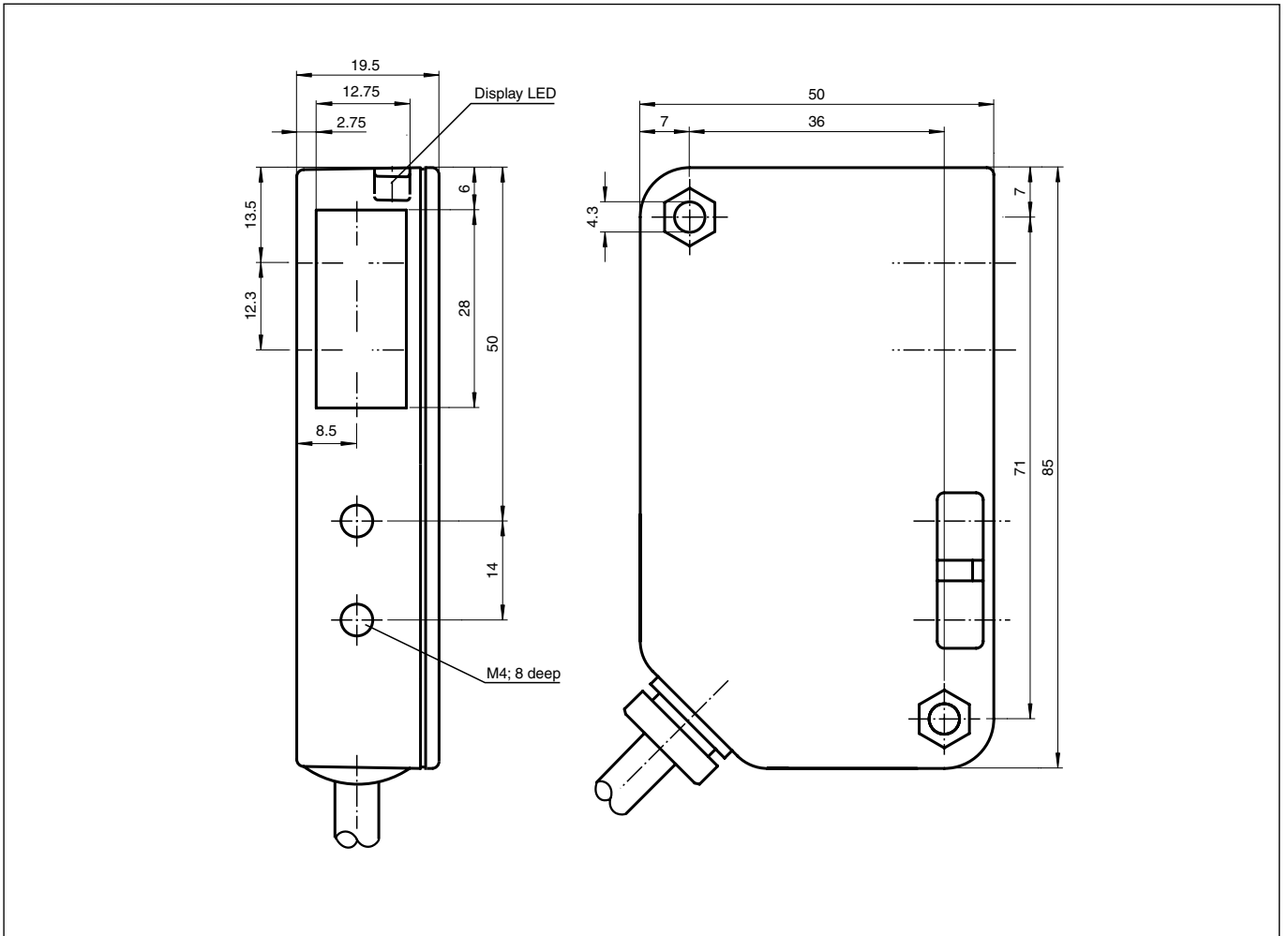


RL.91-54-RT/.../115

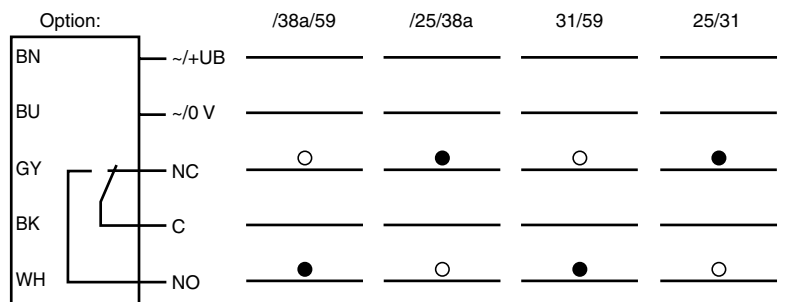
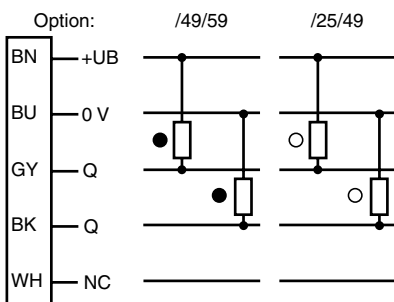
Diagrams



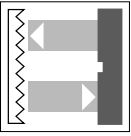
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



RL91-54-RT/.../73c

Reflection light beam switch with polarisation filter

RL91-54-RT/.../73c

with 4-pin, M12 x 1 plastic connector

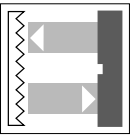
CE



- ◆ Detection range up to 7 m
- ◆ Recording of reflecting objects by means of polarisation filters
- ◆ Sturdy and compact design
- ◆ Optimal price/power ratio
- ◆ Various possibilities for mounting

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL91-54-RT/25/49/73c	RL91-54-RT/38a/59/73c	RL91-54-RT/25/38a/73c	RL91-54-RT/49/59/73c
Effective detection range	0 ... 4 m	◆	◆	◆	◆
Threshold detection range	7 m (with H85 reflector)	◆	◆	◆	◆
Reflector distance	0.2 ... 4000 mm	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Angle of divergence	approx. 2.5 °	◆	◆	◆	◆
Diameter of the light spot	approx. 160 mm at a distance of 4000 mm	◆	◆	◆	◆
Ambient light limit	90000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Conformity to Standards 2	EN50081-1	◆	◆	◆	◆
Conformity to Standards 3	EN50082-2	◆	◆	◆	◆
Conformity to Standards 4	FGN-I	◆	◆	◆	◆
Conformity to Standards 5	FGN-W	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Function display	LED red, flashes when falling short of the stability control	◆	◆	◆	◆
Operating voltage	12 ... 30 V DC	◆			◆
	12 ... 30 V DC / 18 ... 38 V AC		◆	◆	
No-load supply current	< 100 mA	◆	◆	◆	◆
Signal output	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity	◆			◆
	Weak current relay, 1 NC		◆	◆	
Switching type	light ON	◆		◆	
	dark ON		◆		◆
Switching voltage	max. 125 V AC		◆	◆	
	max. 30 V DC	◆			◆
Switching current	1 A /24 V DC, 0.5 A /110 V AC		◆	◆	
	200 mA	◆			◆
Switch power	max. 24 W / 55 VA		◆	◆	
Switching frequency	25 Hz	◆	◆	◆	◆
Response time	20 ms	◆	◆	◆	◆
Ambient temperature	-20 ... +55 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆
Housing	Luran	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	100 g	◆	◆	◆	◆

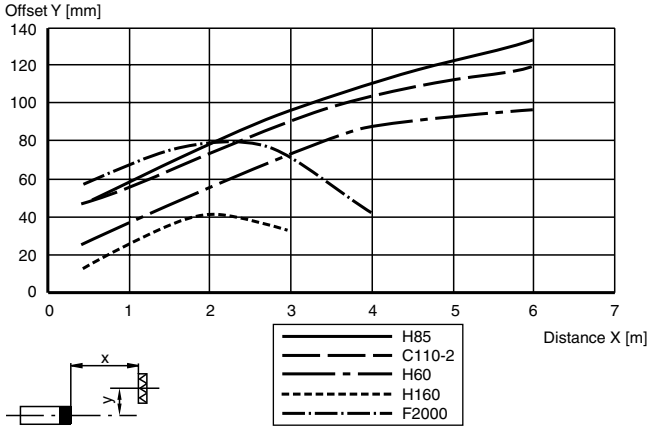


RL91-54-RT/.../73c

Diagrams

Characteristic response curve

RL(K)91-54



Relative received light strength

RL(K)91-54

Reflector type:

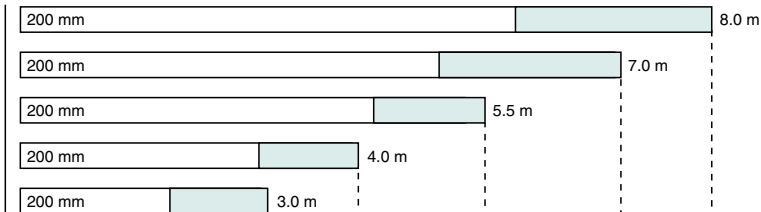
H85 (80 mm x 80 mm)

C110_2 (φ = 84 mm)

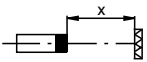
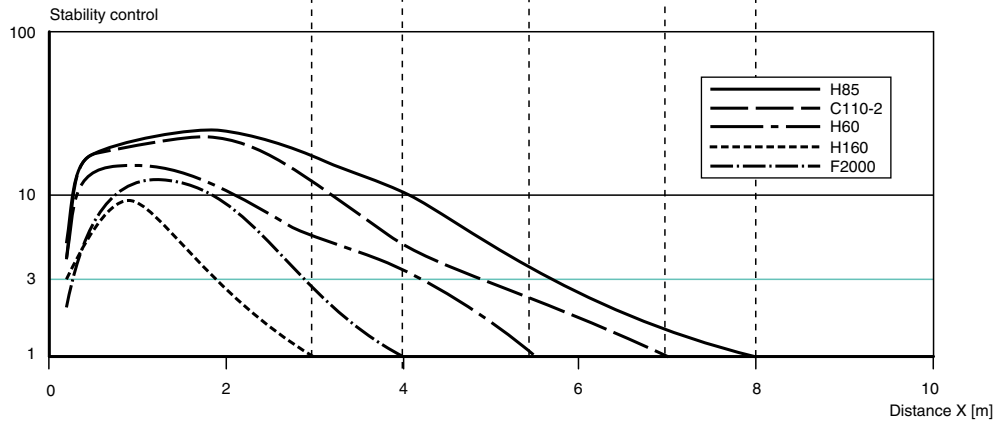
H60 (60 mm x 40 mm)

F2000 (Foil, 100 mm x 100 mm)

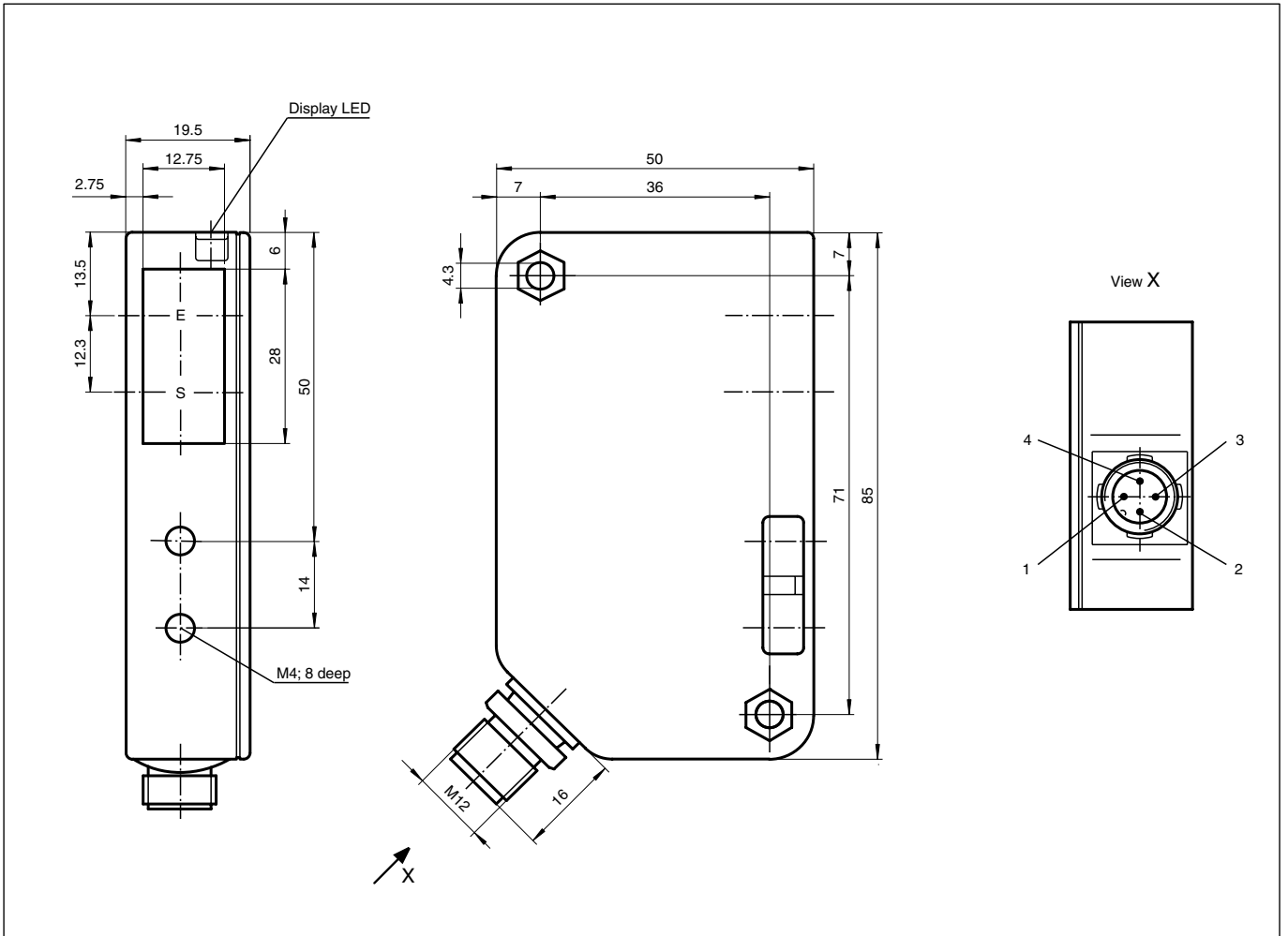
H160 (60 mm x 18 mm)



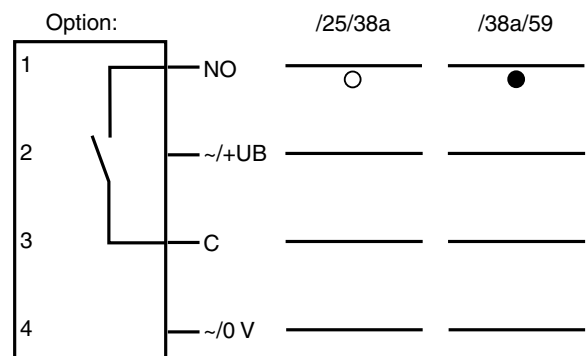
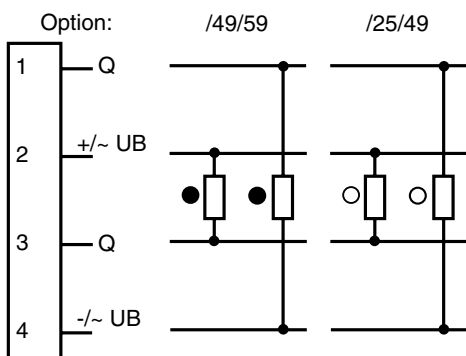
- Stability control > 3
- Stability control < 3



Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



VariKont L® and VariKont M® – flexible sensors

The *VariKont*®-series was developed by Pepperl+Fuchs and has proven itself in day-to-day usage a million times over.

The *VariKont M*®-housing is extremely flexible due to the fact that the head (that means of the active range) can be aligned in five different directions without changing the installation. In contrast to the *VariKont*® housing, the head of the *VariKont L*® can only be moved in two directions. The electronics unit for all *VariKont*® devices can be replaced separately from the sensor base. This eliminates the need to redo the wiring and adjustment.

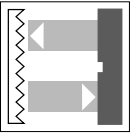
Depending on the application, you can work with different types of sensors for a given installation situation. The wide range of optical models offers the right solution for many applications.

All sensors have a sturdy plastic housing and the light exit surface is protected by a scratch-resistant coated plastic window.

Features of the *VariKont M*® housing include a connection using the terminal compartment and the standard mounting hole arrangement as for mechanical roller lever limit switches (based on EN 60947).

Features of the *VariKont L*® devices include a connection via V1 connector and the mounting bell included with delivery.

Principle	Type code	Detection range	Page
	OBS6000-L2	0 mm ... 6000 mm	578
	OJ3000-M1K	0 mm ... 3000 mm	590
	OCS3000-M1A	0 mm ... 3000 mm	594
	OCS3000-M1A-V1	0 mm ... 3000 mm	594
	OBT400-L2	0 mm ... 400 mm	586
	OJ500-M1K	0 mm ... 500 mm	602
	OCT500-M1A-B3	0 mm ... 500 mm	608
	OCT500-M1A-B3-V1	0 mm ... 500 mm	608
	OBH200-L2	5 mm ... 200 mm	582
	OCH150-M1K	0 mm ... 150 mm	598



OBS6000-L2-..-V1

Series
VariKont®

Reflection light beam switch

OBS6000-L2-..-V1

with 4-pin, M12 connector

CE

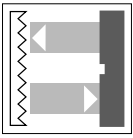


- ◆ Detection range up to 6 m
- ◆ Glare protected with polarisation filter
- ◆ Visible red light
- ◆ Protection degree IP67
- ◆ Positioning of the sensor head is possible in two planes
- ◆ Multitude of mounting possibilities
- ◆ Mounting only with one tool: the screwdriver
- ◆ Light/dark ON, programmable

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/8/01

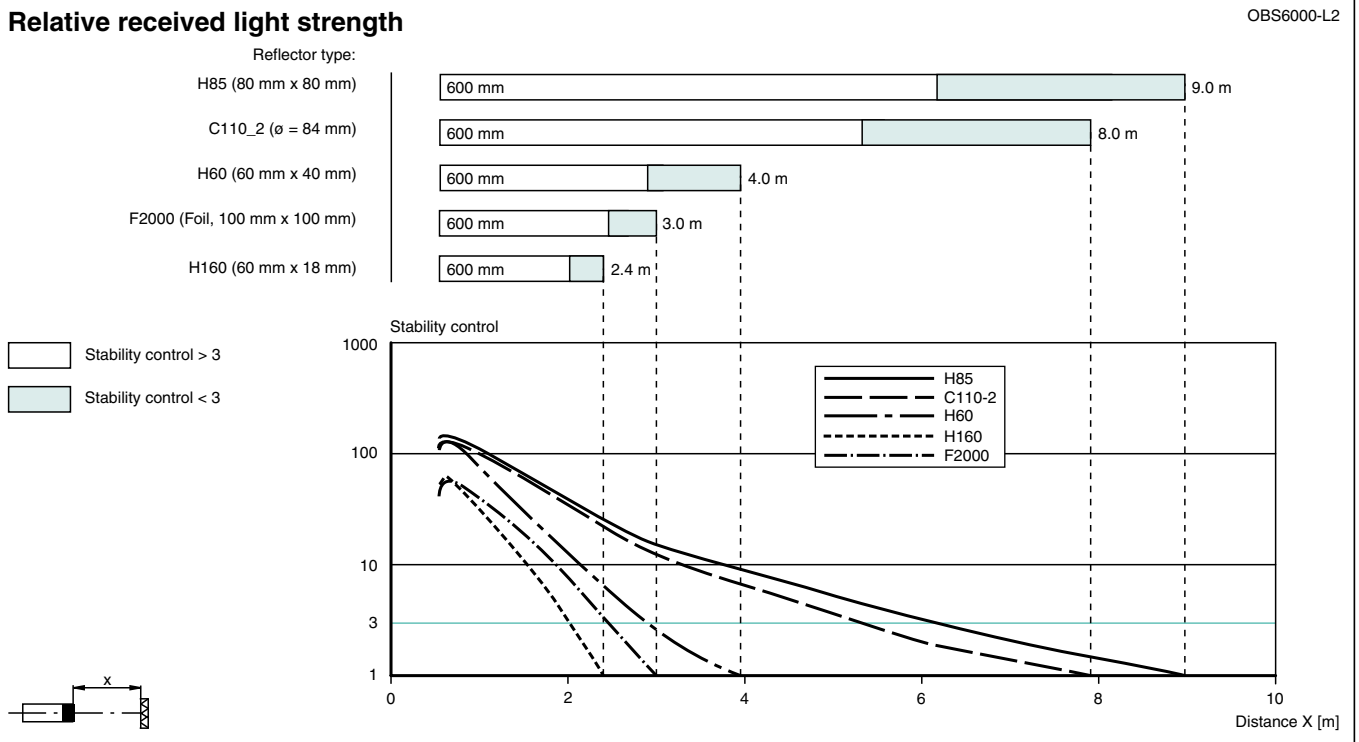
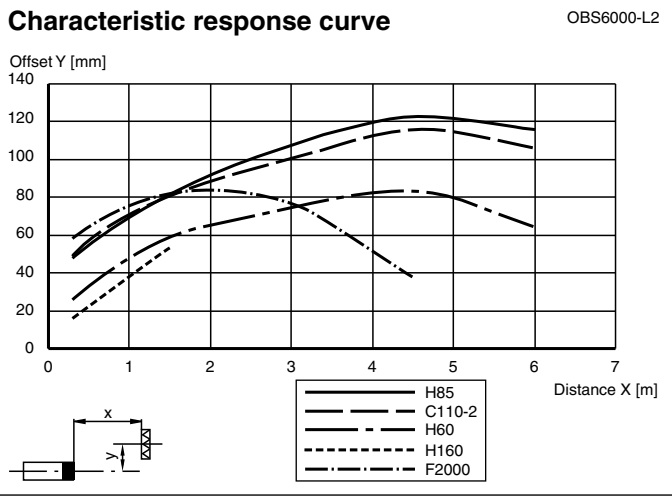
Ordering code		OBS6000-L2-E0-V1	OBS6000-L2-E2-V1	OBS6000-L2-E4-V1	OBS6000-L2-E5-V1
Effective detection range	0 ... 6000 mm	◆	◆	◆	◆
Reflector range	600 ... 6000 mm	◆	◆	◆	◆
Reference target	H85 reflector	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Ambient light limit	15000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Function display	LED yellow: switching state LED red: pre-fault indication	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	≤ 20 mA	◆	◆	◆	◆
Time delay before availability	≤ 20 ms	◆	◆	◆	◆
Signal output	1 switch output npn, NO	◆			
	1 switch output pnp, NO		◆		
	1 switch output, npn, NO/NC			◆	
	1 switch output pnp, NC/NO				◆
Switching type	dark ON	◆	◆		
	light/dark switching			◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 250 mA	◆	◆	◆	◆
Voltage drop	≤ 1.5 V	◆	◆	◆	◆
Switching frequency	≤ 200 Hz	◆	◆	◆	◆
Response time	≤ 2.5 ms	◆	◆	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆	◆	◆
Storage temperature	-40 ... +80 °C	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆	◆	◆
Housing	PBT	◆	◆	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆	◆	◆
Mass	60 g	◆	◆	◆	◆



OBS6000-L2-.-V1

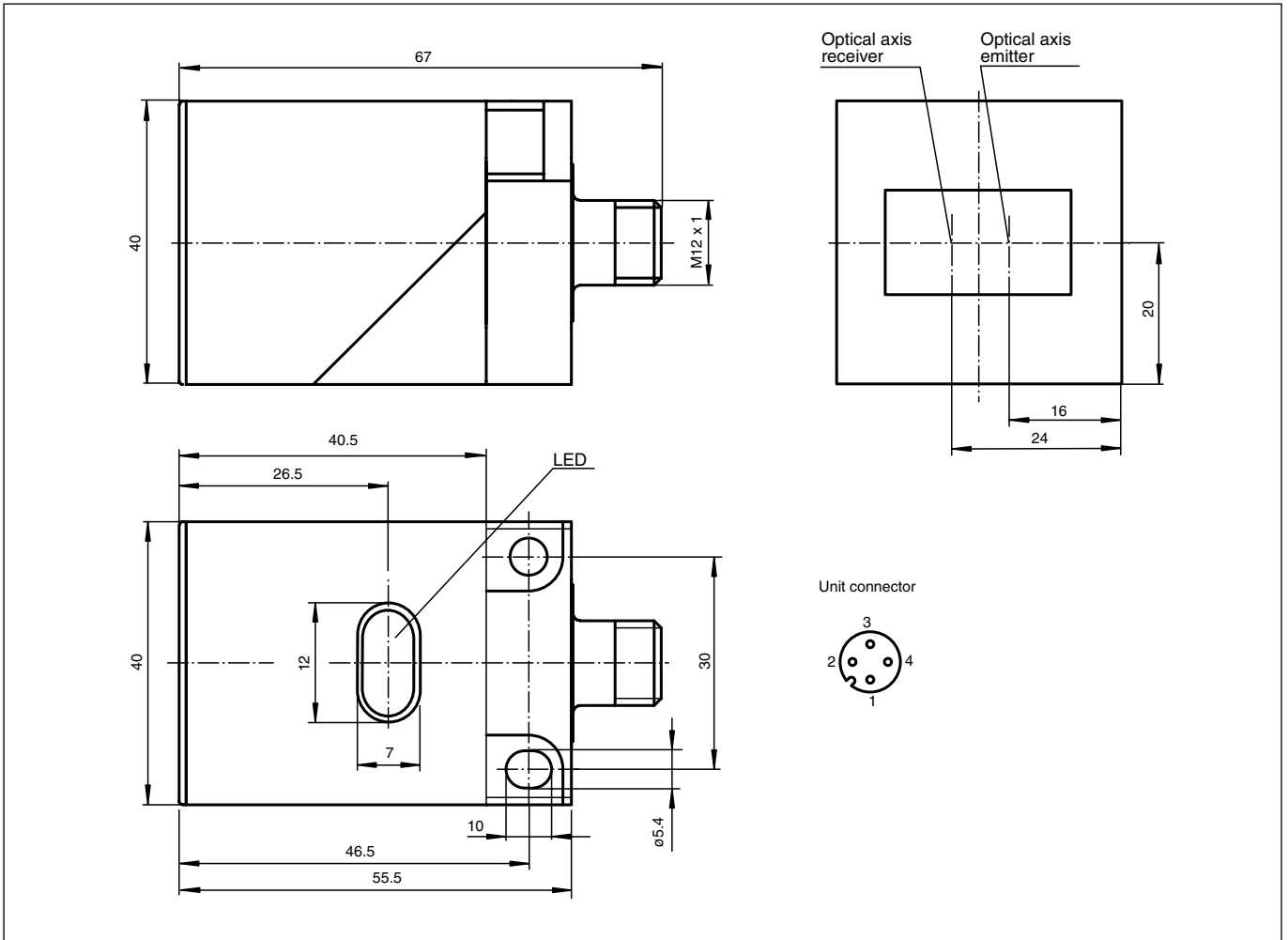
Series VariKont®

Diagrams

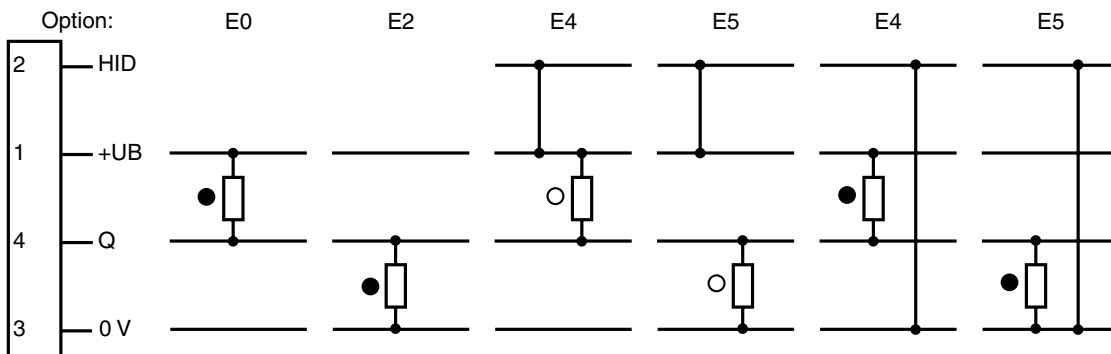


Dimensions

Series VariKomf®

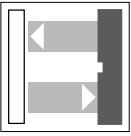


Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/8/01



OBH200-L2-..-V1

Series
VariKont®

Reflection light scanner with background suppression

OBH200-L2-..-V1

with 4-pin, M12 connector

CE

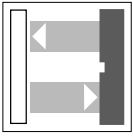


- ◆ Detection range up to 200 mm
- ◆ Background suppression
- ◆ Visible red light
- ◆ Protection degree IP67
- ◆ Positioning of the sensor head is possible in two planes
- ◆ Multitude of mounting possibilities
- ◆ Mounting only with one tool: the screwdriver

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/8/01

Ordering code		OBH200-L2-E4-V1	OBH200-L2-E5-V1
Effective detection range	5 ... 200 mm	◆	◆
Adjustment range	60 ... 200 mm	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Diameter of the light spot	approx. 14 mm at a distance of 200 mm	◆	◆
Ambient light limit	15000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state LED red: pre-fault indication	◆	◆
Controls	Setting of the switch point	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	NC/NO programmable	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 250 mA	◆	◆
Voltage drop	≤ 1.5 V	◆	◆
Switching frequency	≤ 100 Hz	◆	◆
Response time	≤ 2.5 ms	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +80 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	PBT	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆
Mass	60 g	◆	◆

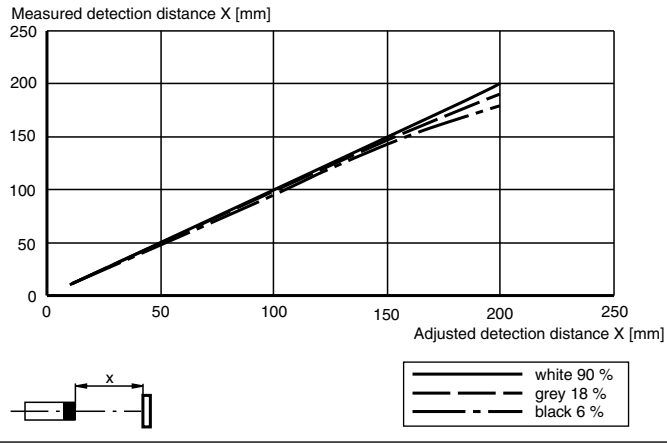


OBH200-L2-.-V1

Series
VariKont®

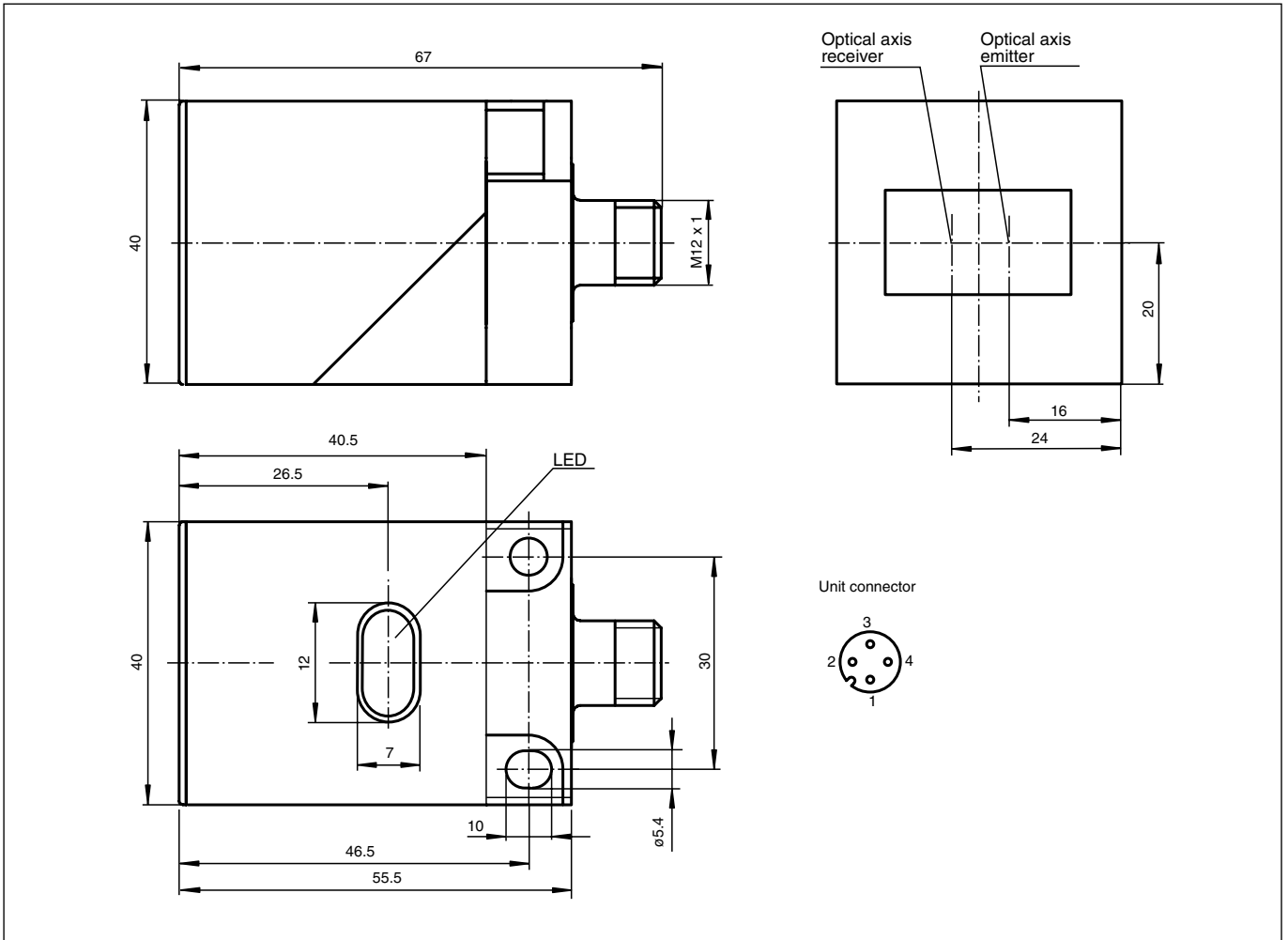
Diagrams

Difference in detection distance

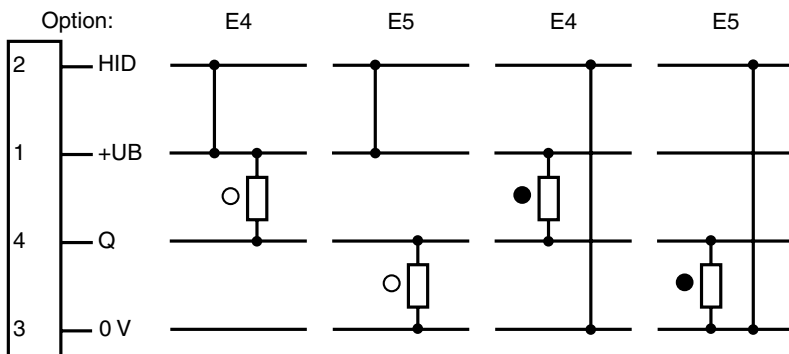


Dimensions

Series VariKomf®

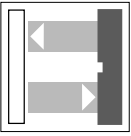


Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/8/01



OBT400-L2-..-V1

Series
VariKont®

Reflection light scanner

OBT400-L2-..-V1

with 4-pin, M12 connector

CE

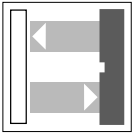


- ◆ Sensing range up to 400 mm
- ◆ Pre-fault indication
- ◆ Visible red light
- ◆ Positioning of the sensor head is possible in two planes
- ◆ Protection degree IP67
- ◆ Mounting only with one tool: the screwdriver
- ◆ Light/dark ON, programmable

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Date of issue: 10/8/01

Ordering code		OBT400-L2-E0-V1	OBT400-L2-E2-V1	OBT400-L2-E4-V1	OBT400-L2-E5-V1
Detection range	0 ... 400 mm	◆	◆	◆	◆
Adjustment range	50 ... 400 mm	◆	◆	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆
Light type	Red, alternating light	◆	◆	◆	◆
Ambient light limit	15000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Function display	LED yellow: switching state LED red: pre-fault indication	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	≤ 20 mA	◆	◆	◆	◆
Time delay before availability	≤ 20 ms	◆	◆	◆	◆
Signal output	1 switch output npn, NO	◆			
	1 switch output pnp, NO		◆		
	1 switch output, npn, NO/NC			◆	
	1 switch output pnp, NC/NO				◆
Switching type	Light on	◆	◆		
	light/dark switching			◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 250 mA	◆	◆	◆	◆
Voltage drop	≤ 1.5 V	◆	◆	◆	◆
Switching frequency	≤ 200 Hz	◆	◆	◆	◆
Response time	≤ 2.5 ms	◆	◆	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆	◆	◆
Storage temperature	-40 ... +80 °C	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆	◆	◆
Housing	PBT	◆	◆	◆	◆
Light exit	Scratch resistant plastic lens	◆	◆	◆	◆
Mass	60 g	◆	◆	◆	◆

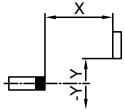
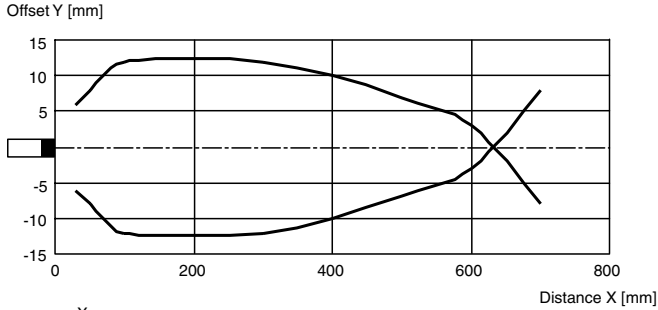


OBT400-L2-..-V1

Series VariKont®

Diagrams

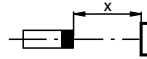
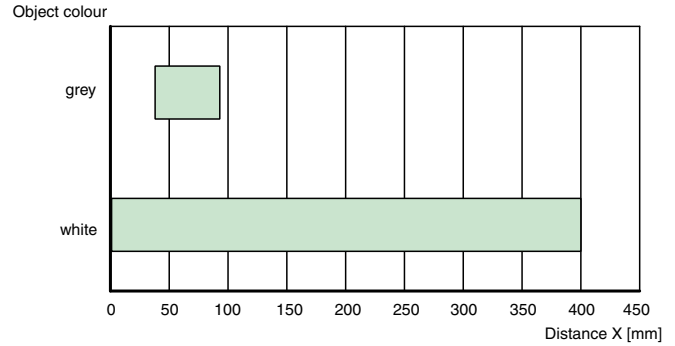
Characteristic response curve



Permissible distance (offset) between optical axis and object.

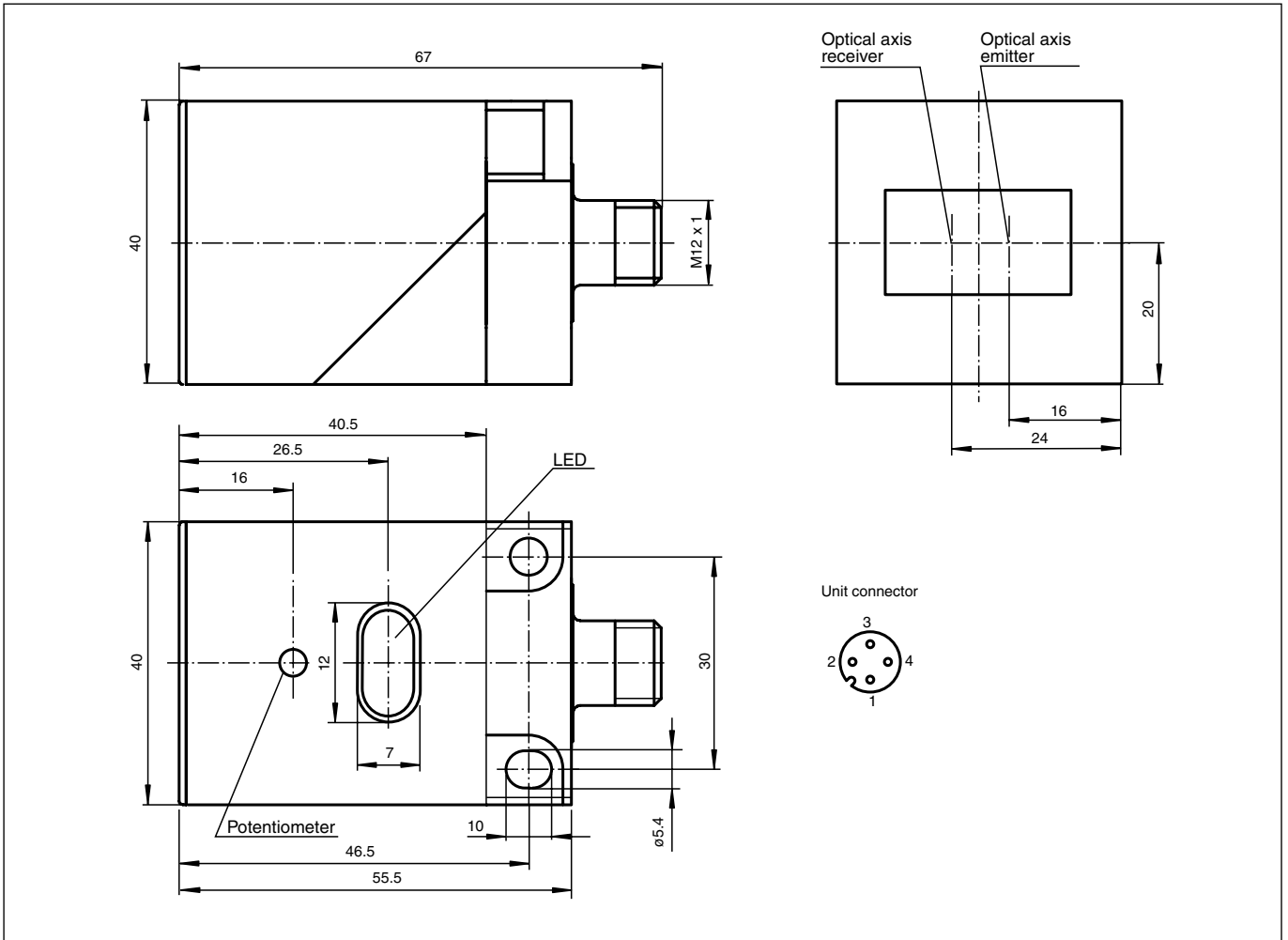
Detection ranges

MLV13-8-400

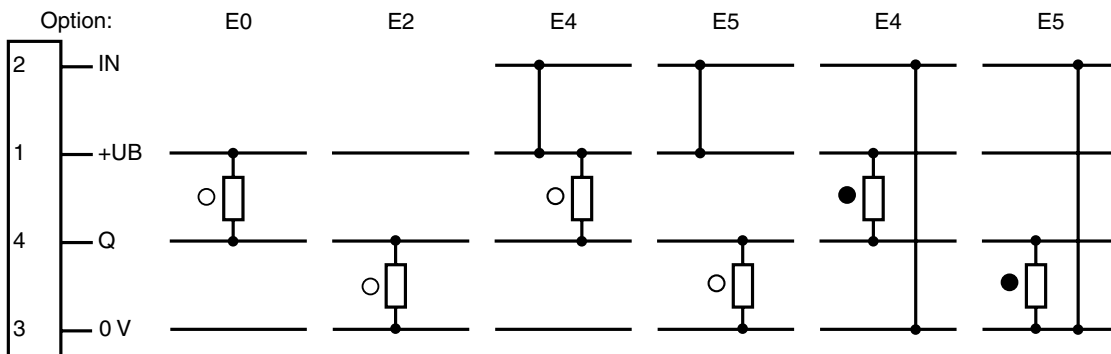


Dimensions

Series
VariKomf®

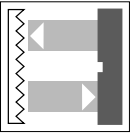


Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/8/01



OJ3000-M1K-...

Series
VariKont®

Reflection light beam switch

OJ3000-M1K-...

with terminal compartment

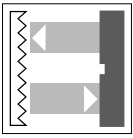
CE



- ◆ Detection range up to 3 m
- ◆ Light/dark ON, switchable
- ◆ Visible red light
- ◆ Glare protected with polarisation filter
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Protected against mutual interferences
- ◆ Removable terminal block
- ◆ Position of the sensor head adjustable
- ◆ Protection degree IP67
- ◆ Scratch resistant mineral glass lens

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OJ3000-M1K-E01	OJ3000-M1K-E23
Effective detection range	0 ... 3000 mm	◆	◆
Reflector range	200 ... 3000 mm	◆	◆
Reference target	ORR80 reflector	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Filter	Polarisation filter	◆	◆
Ambient light limit	10000 Lux	◆	◆
Installation			
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	LED yellow: switching state LED red: stability control (flashing)	◆	◆
Controls	programming switch: bright/dark changeover switch selection of the operating frequency selection of the switching frequency pulse extension stability control dynamic/static	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 35 mA	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	≤ 200 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 1.5 kHz / 200 Hz switchable	◆	◆
Timer function	Pulse extension 20 ms, switchable	◆	◆
Output of the pre-fault indication	1 switch output pnp, NC (10 mA)	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +80 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Terminal compartment Pg13.5, core cross-section ≤ 2.5 mm ²	◆	◆
Housing	PBT	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	100 g	◆	◆



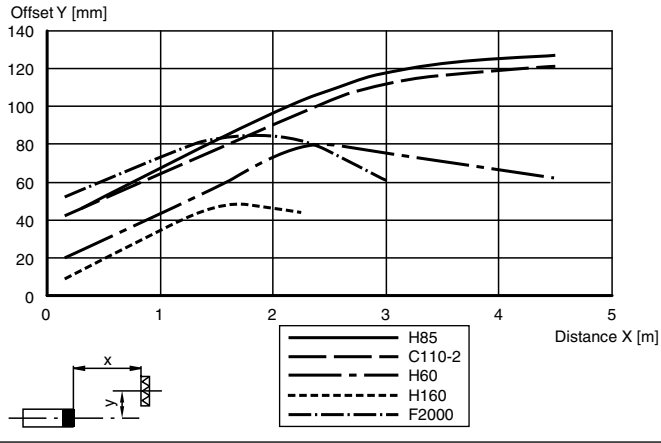
OJ3000-M1K-...

Series VariKont®

Diagrams

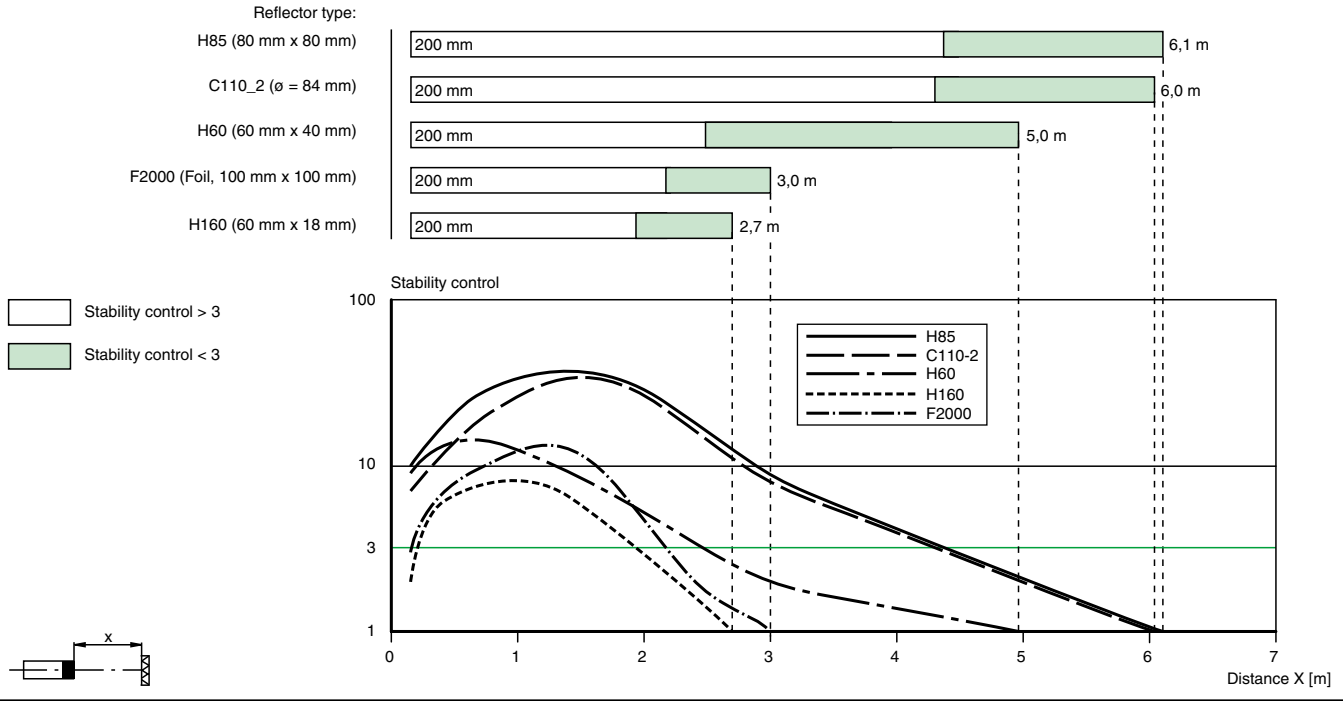
Characteristic response curve

OJ 3000-M1K

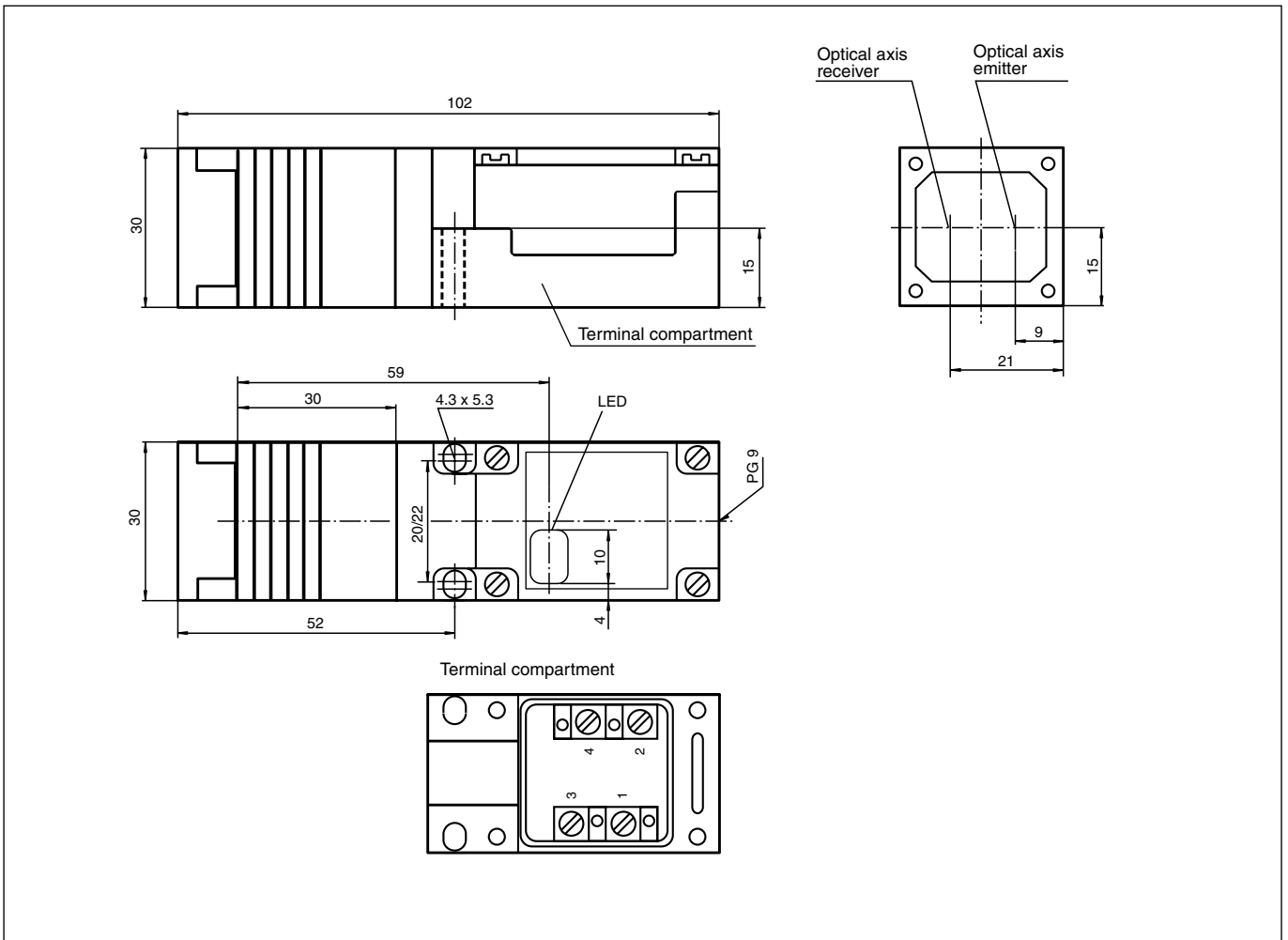


Relative received light strength

OJ 3000-M1K

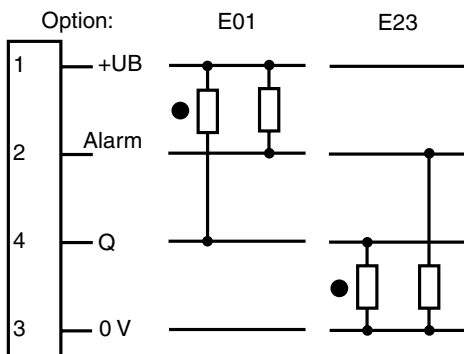


Dimensions

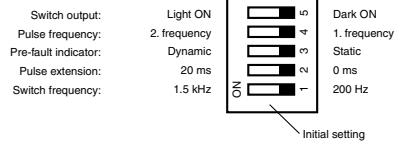


Series VariKont®

Electrical Connection

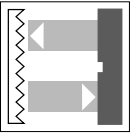


Selector switches in terminal compartment



Date of issue: 10/8/01

○ = Light ON, ● = Dark ON



OCS3000-M1A-B3-..

Series
VariKont®

Reflection light beam switch

OCS3000-M1A-B3-..

with terminal compartment or 4-pin, M12 connector

CE

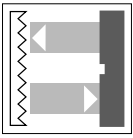


- ◆ Detection range up to 3 m
- ◆ light/dark ON parameterisable
- ◆ AS-Interface-certificate
- ◆ Visible red light
- ◆ Glare protected with polarisation filter
- ◆ Protected against mutual interferences
- ◆ Pre-fault indication (dynamical, static)
- ◆ Position of the sensor head adjustable
- ◆ Protection degree IP67
- ◆ Scratch resistant mineral glass lens
- ◆ Removable terminal block

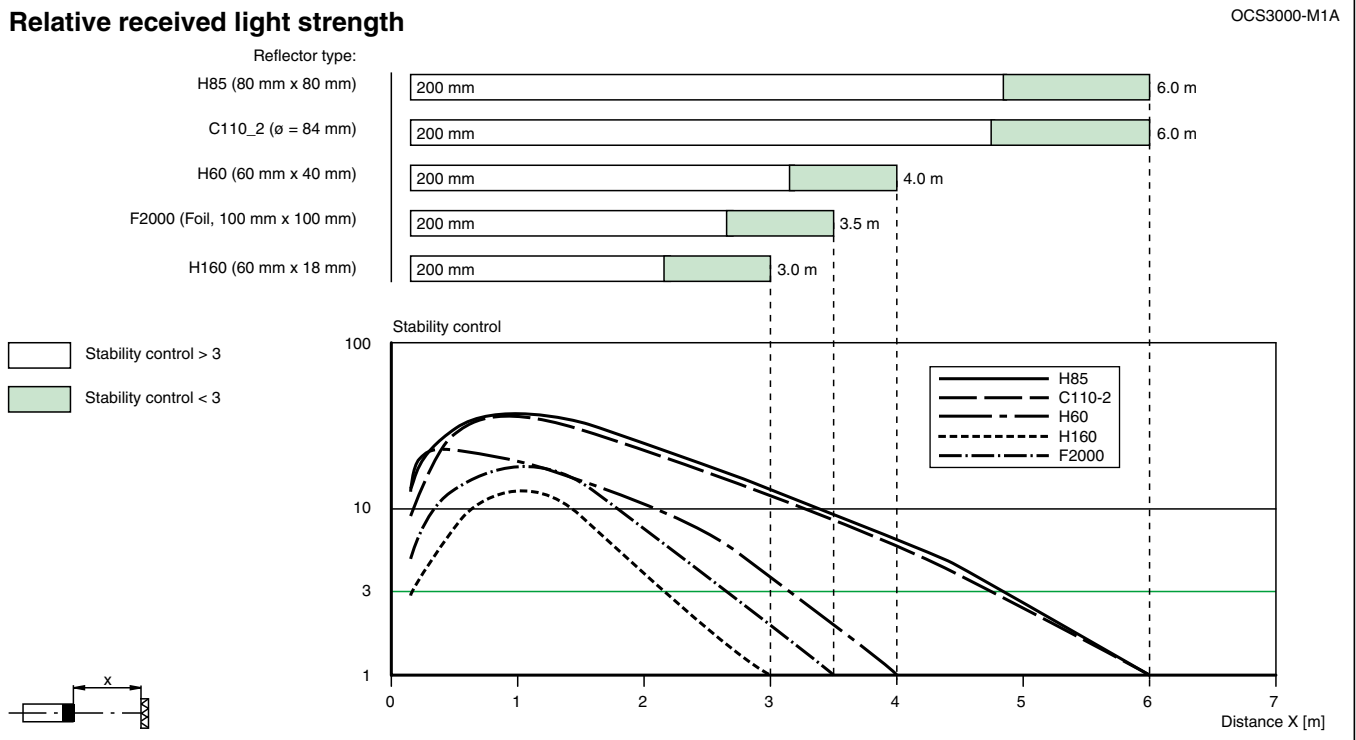
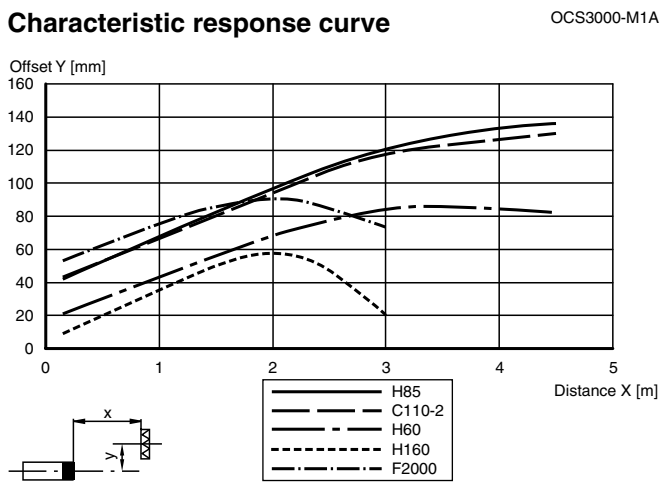
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OCS3000-M1A-B3	OCS3000-M1A-B3-V1
Effective detection range	0 ... 3000 mm	◆	◆
Reflector range	200 ... 3000 mm	◆	◆
Reference target	Reflector C110_2	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Filter	Polarisation filter	◆	◆
Ambient light limit	10000 Lux	◆	◆
Installation			
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	LED yellow: switching state LED red: stability control (flashing)	◆	◆
Operating voltage	via AS-i network	◆	◆
No-load supply current	≤ 40 mA	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	AS-Interface	◆	◆
Switching type	light/dark switching	◆	◆
Switching frequency	≤ 1.5 kHz / 200 Hz parameterisable	◆	◆
Response time	≤ 0.3 ms at 1.5 kHz, ≤ 2.5 ms at 200 Hz	◆	◆
Timer function	Pulse extension 20 ms, configurable	◆	◆
Output of the pre-fault indication	Data bit D1 (not at 1.5 kHz)	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +80 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
	Terminal compartment Pg13.5, core cross-section ≤ 2.5 mm ²	◆	◆
Housing	PBT	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	100 g	◆	◆

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Diagrams



AS-Interface Programming

Address preset to 00, can be changed via Busmaster or programming device

IO-Code 1

ID-Code 1

• **Data bit**

Bit **Function**

D0 switch output

D1 pre-fault indicator (0=ON, 1=OFF)

D2 ready for operation

D3 switch frequency 200 Hz¹⁾/1.5 kHz¹⁾

• **Parameter bit**

Bit **Function (1/2)**

P0 pulse frequency 1¹⁾/2

P1 switch output, light¹⁾/dark ON

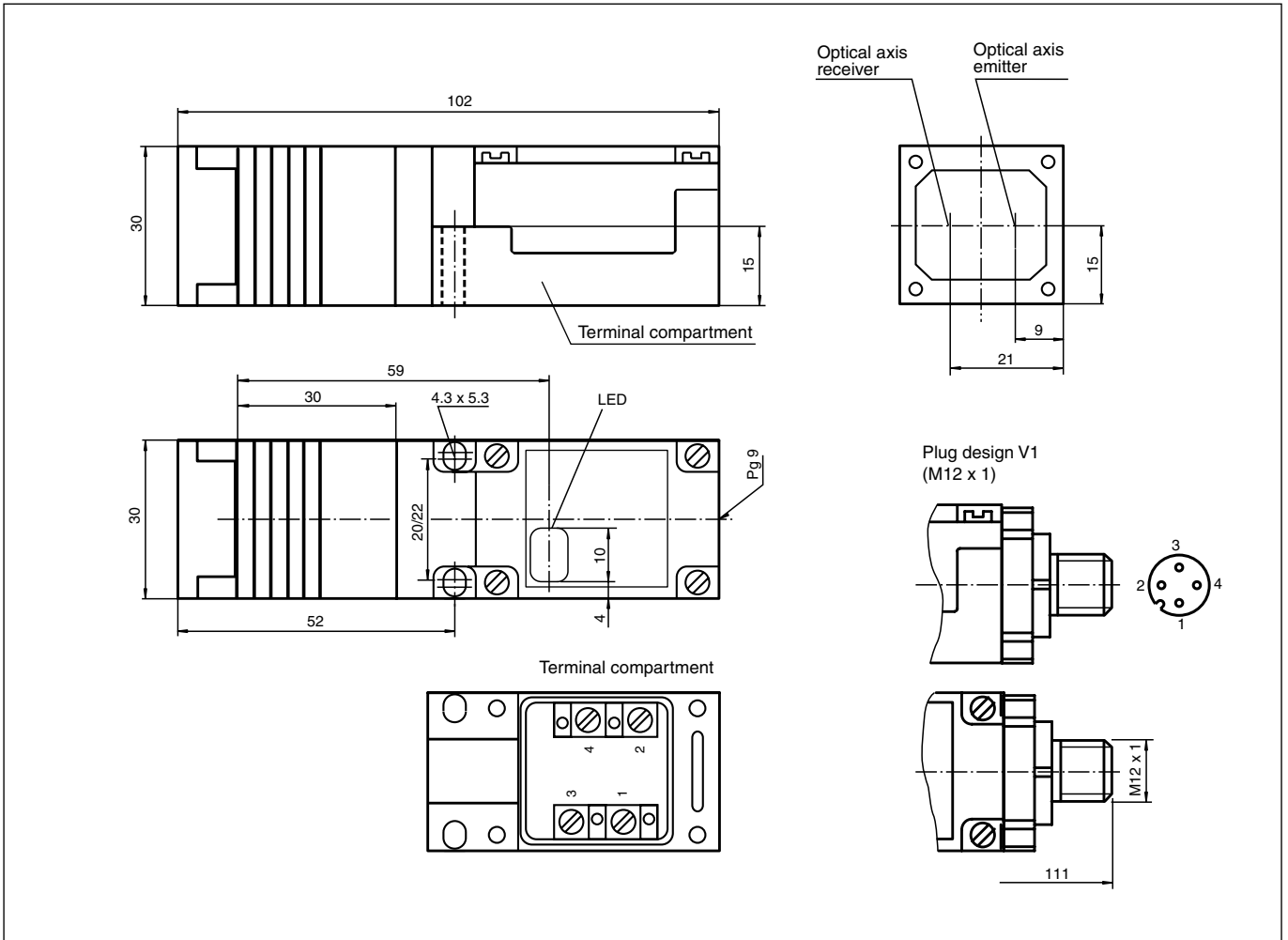
P2 pulse extension (20 ms) OFF¹⁾/ON

P3 pre-fault indicator¹⁾ dynamic¹⁾/static

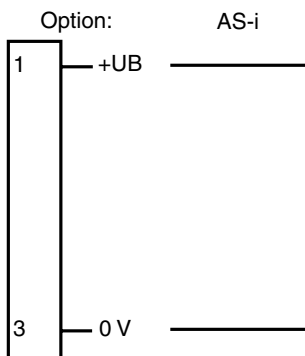
* Standard setting ¹⁾No activation of pre-fault signal at 1.5 kHz.

Dimensions

Series
VariKomf®



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue: 10/8/01



OCH150-M1K-...

Series
VariKont®

Reflection light scanner with background suppression

OCH150-M1K-...

with terminal compartment

CE



- ◆ Sensing range up to 150 mm
- ◆ Background suppression
- ◆ Light/dark ON, switchable
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Protected against mutual interferences
- ◆ Integrated M12 x 1 (V1) connectors
- ◆ Protection degree IP67
- ◆ Position of the sensor head adjustable
- ◆ Scratch resistant mineral glass lens
- ◆ Removable terminal block

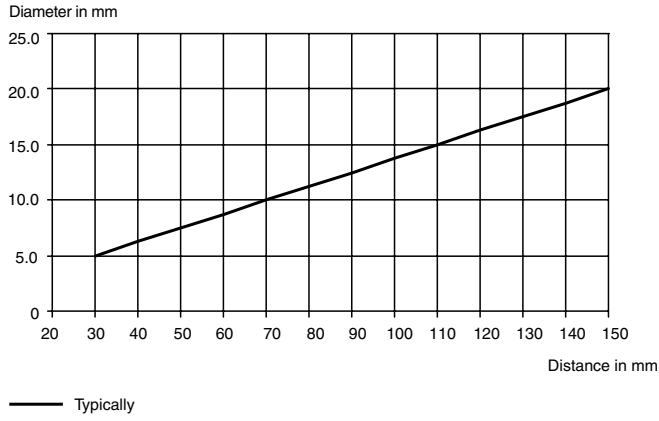
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OCH150-M1K-E01	OCH150-M1K-E23
Detection range	0 ... 150 mm	◆	◆
Adjustment range	30 ... 150 mm	◆	◆
Reference target	Standard white 100 mm x 100 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	LED yellow: switching state LED red: stability control (flashing)	◆	◆
Controls	sensitivity adjuster	◆	◆
Controls	Light/dark changeover switch selection of the operating frequency selection of the switching frequency pulse extension stability control dynamic/static	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 35 mA	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	≤ 200 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 1.5 kHz / 200 Hz switchable	◆	◆
Timer function	Pulse extension 20 ms, switchable	◆	◆
Output of the pre-fault indication	1 switch output npn NO (10 mA)	◆	◆
Ambient temperature	-25 ... +60 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Terminal compartment Pg13.5, core cross-section ≤ 2.5 mm ²	◆	◆
Housing	PBT	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	100 g	◆	◆



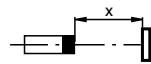
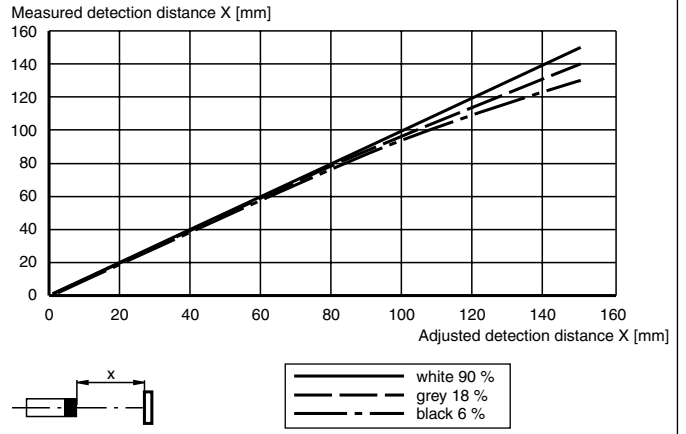
Diagrams

Light spot diameter = f (Distance)



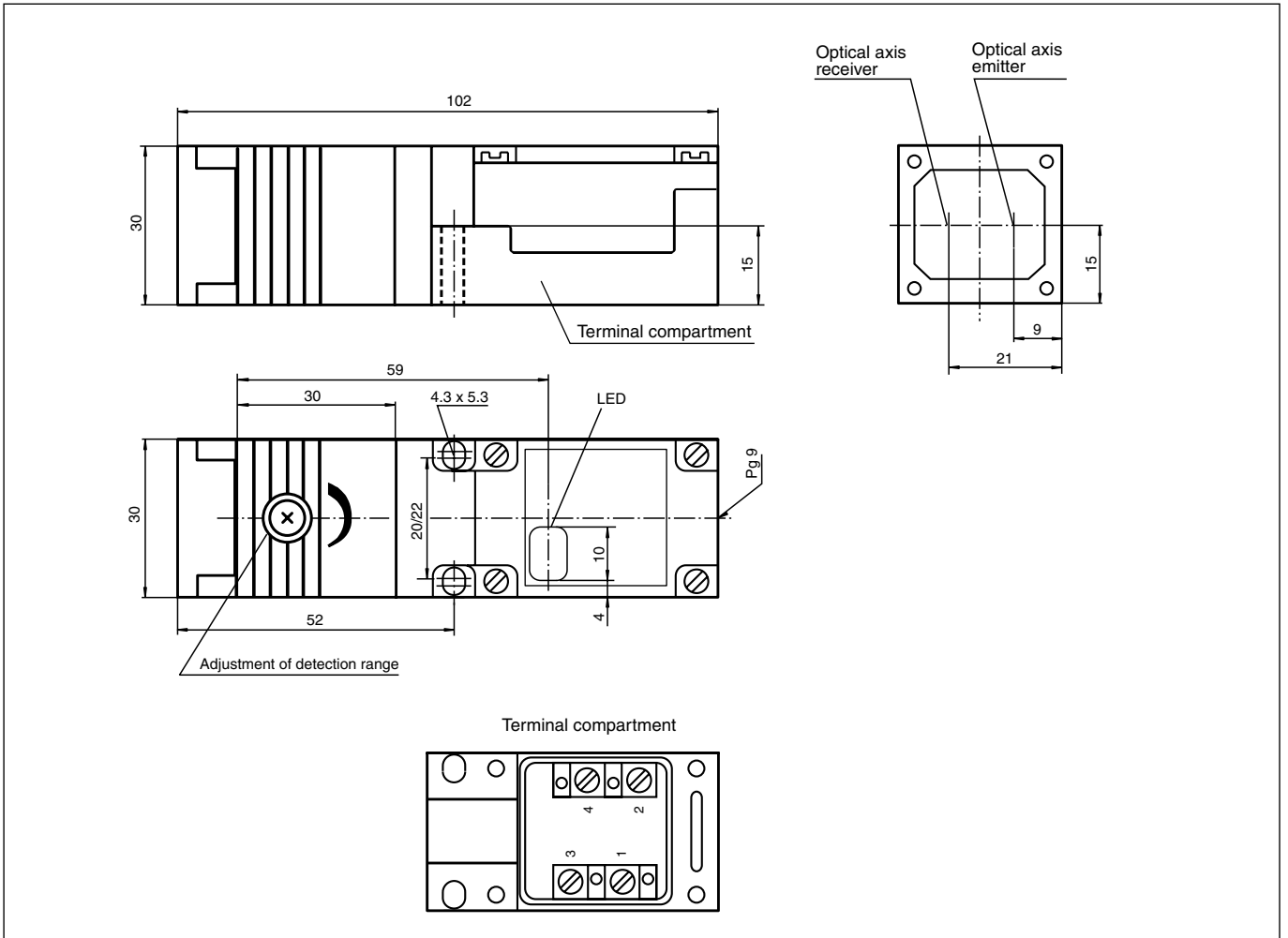
Difference in detection distance

OCH150-M1K

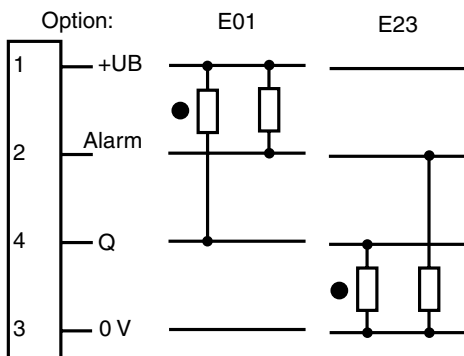


Dimensions

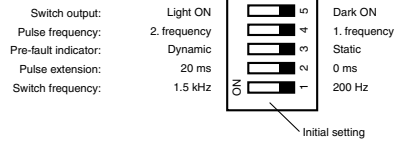
Series VariKont®



Electrical Connection

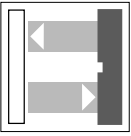


Selector switches in terminal compartment



Date of issue: 10/8/01

○ = Light ON, ● = Dark ON



OJ500-M1K-...

Series
VariKont®

Reflection light scanner

OJ500-M1K-...

with terminal compartment

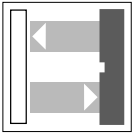
CE



- ◆ Sensing range up to 500 mm without fibre optics
- ◆ For glass fibre light guide
- ◆ Light/dark ON, switchable
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Protected against mutual interferences
- ◆ Position of the sensor head adjustable
- ◆ Protection degree IP67
- ◆ Scratch resistant mineral glass lens
- ◆ Removable terminal block, integrated connector M12x1 (V1) on request

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OJ500-M1K-E01	OJ500-M1K-E23
Detection range	0 ... 500 mm without light guide	◆	◆
Reference target	Standard white 200 mm x 200 mm (only for fibre optics reflex)	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	40000 Lux	◆	◆
Temperature influence	≤ 0.5 mm/K	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	LED yellow: switching state LED red: stability control (flashing)	◆	◆
Controls	sensitivity adjuster	◆	◆
Controls	Light/dark changeover switch selection of the operating frequency selection of the switching frequency pulse extension stability control dynamic/static	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 35 mA	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	≤ 200 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 1.5 kHz / 200 Hz switchable	◆	◆
Response time	≤ 0.3 ms at 1.5 kHz ≤ 2.5 ms at 200 Hz	◆	◆
Repeat accuracy	≤ 0.5 % of the sensing range	◆	◆
Range hysteresis	≤ 10 %	◆	◆
Timer function	Pulse extension 20 ms, switchable	◆	◆
Output of the pre-fault indication	1 switch output npn NO (10 mA)	◆	
	1 switch output pnp, NC (10 mA)		◆
Ambient temperature	-25 ... +70	◆	◆
Storage temperature	-40 ... +80	◆	◆
Protection degree	IP67	◆	◆
Connection type	Terminal compartment Pg13.5, core cross-section ≤ 2.5 mm ²	◆	◆
Housing	PBT	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	100 g	◆	◆

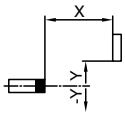
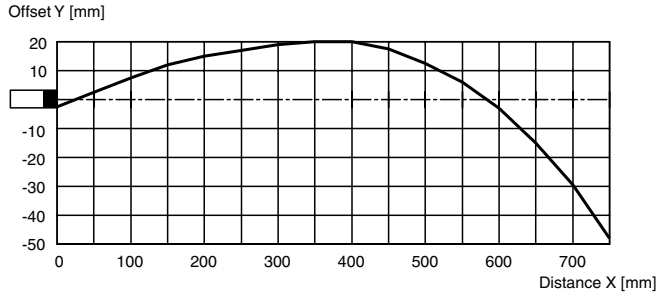


OJ500-M1K-...

Series VariKont®

Diagrams

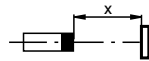
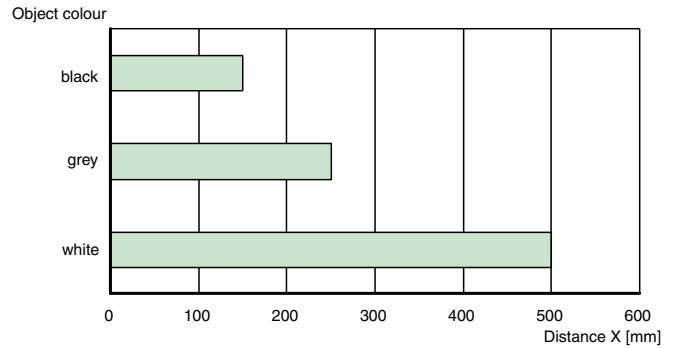
Characteristic response curve



Permissible distance (offset) between optical axis and object.

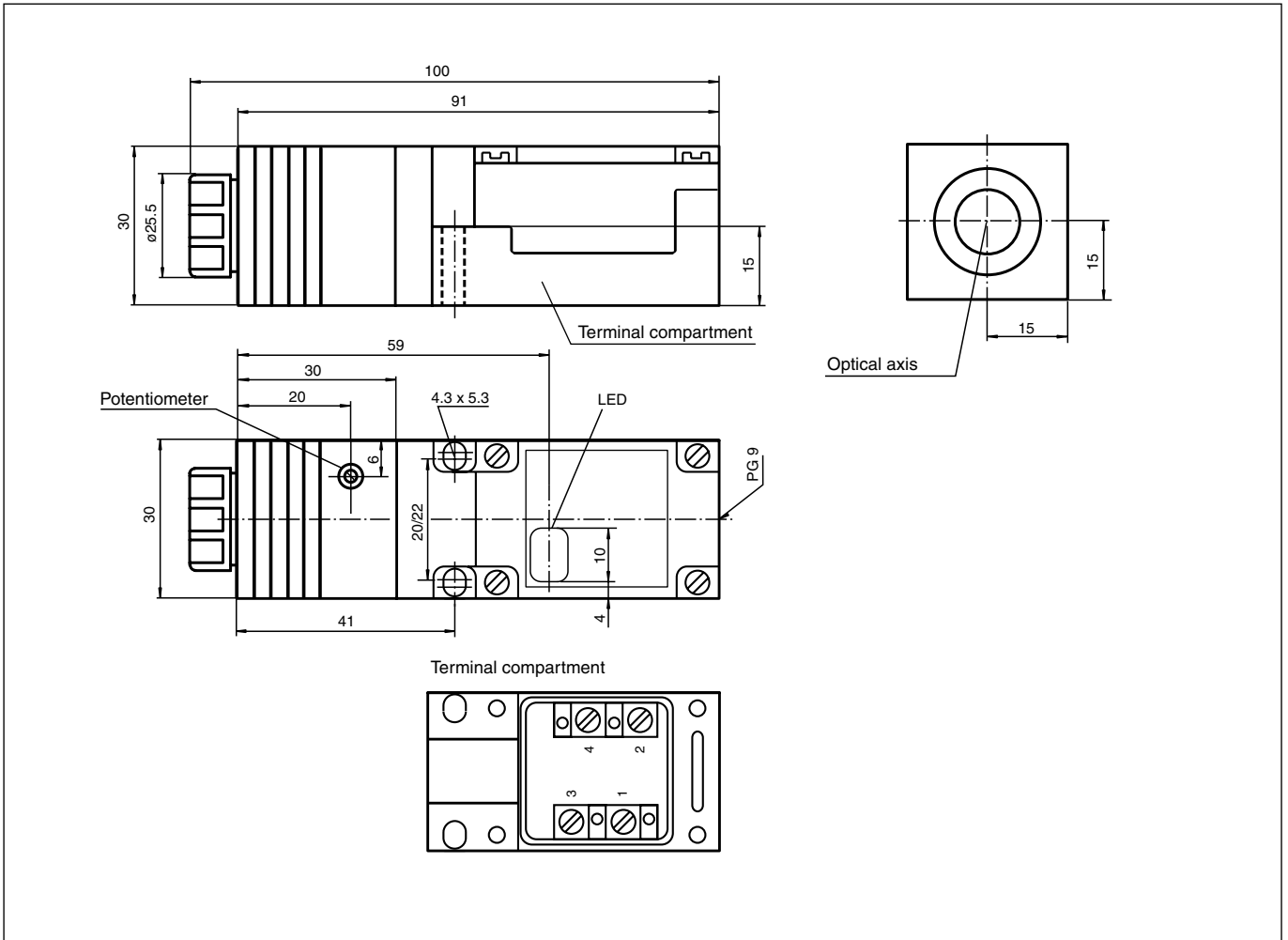
Detection ranges

OJ 500-M1K

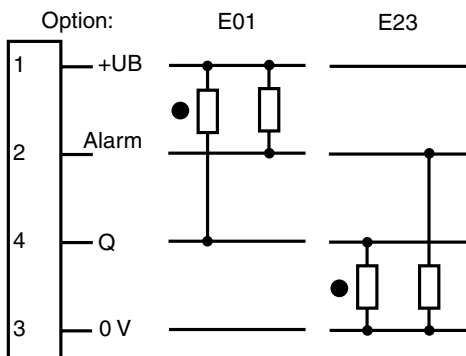


Dimensions

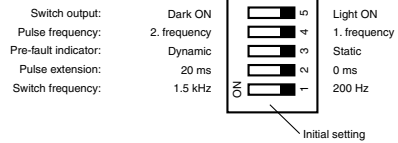
Series VariKont®



Electrical Connection



Selector switches in terminal compartment



Date of issue: 10/15/01

○ = Light ON, ● = Dark ON

Selection table for fibre

	Model number	Sensing range in mm	Detection range in mm	Fig.
fibre optic, single path with PVC coating	LCE 18-2,3-0,5-K2	600		1
	LCE 18-2,3-0,5-K9	600		4
fibre optic, single path with metal coating	LME 18-1,9-0,5-K9	500		4
	LME 18-2,3-0,5-K10	600		5
	LME 18-2,3-0,5-K2	600		1
	LME 18-2,3-0,5-K3	600		2
	LME 18-2,3-0,5-K4	600		3
	LME 18-2,3-1,0-K2	600		1
	LME 18-2,3-2,0-K2	600		1
glass fibre optics, single path with silicone coating	LSE 18-1,1-0,5-K9	100		4
fibre optic, reflex with PVC coating	LCR 18-2,7-1,0-K9		75	12
	LCR 18-3,2-0,5-K1		100	6
	LCR 18-3,2-0,5-K2		100	7
	LCR 18-3,2-2,0-K2		100	7
	LMR 18-1,1-0,5-K3		10	8
	LMR 18-2,3-0,25-K3		45	8
glass fibre optics, reflex with metal coating	LMR 18-2,3-0,5-K2		45	7
	LMR 18-2,3-0,5-K3		45	8
	LMR 18-2,3-0,5-K7		45	11
	LMR 18-2,7-0,5-K9		75	12
	LMR 18-3,2-0,5-K1		100	6
	LMR 18-3,2-0,5-K5		100	10
	LMR 18-3,2-1,0-K1		100	6
	LMR 18-3,2-1,0-K5		100	10
	LMR 18-3,2-2,0-K1		100	6
	LMR 18-3,2-2,0-K4		100	9
	LMR 18-3,2-3,0-K1		100	6
fibre optic, reflex with silicone coating	LSR 18-2,3-0,5-K12		45	13
	LSR 18-3,2-0,5-K1		100	6

Other lengths and end pieces available on request

Fig. 1

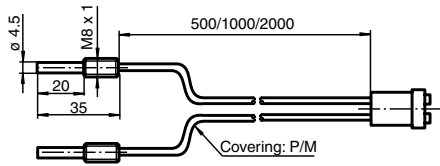


Fig. 2

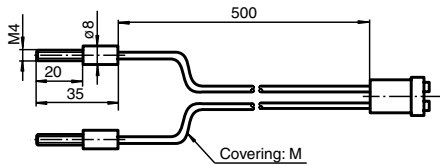


Fig. 3

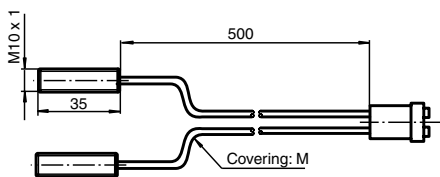


Fig. 4

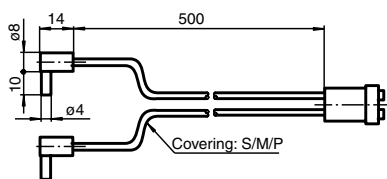


Fig. 5

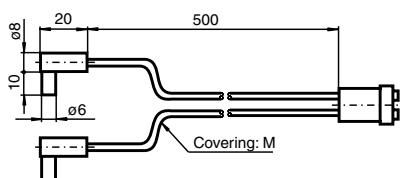


Fig. 6

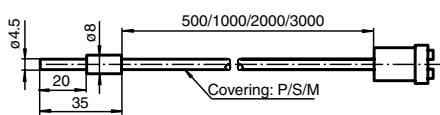


Fig. 7

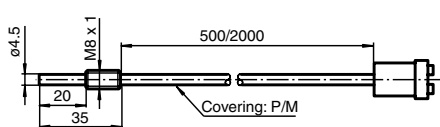


Fig. 8

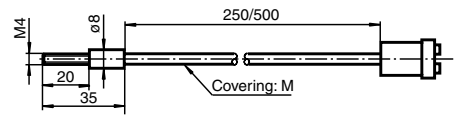


Fig. 9

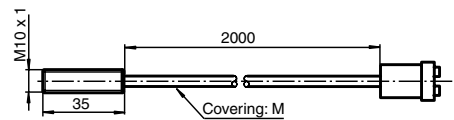


Fig. 10

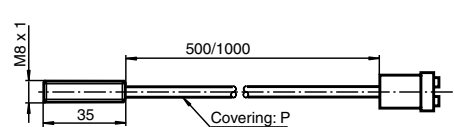


Fig. 11

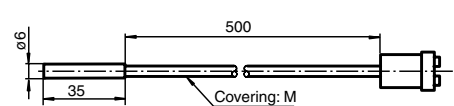


Fig. 12

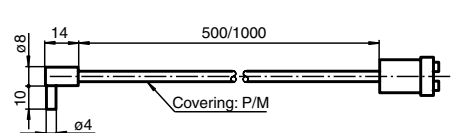
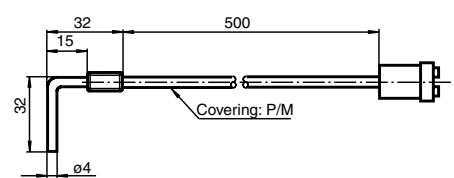
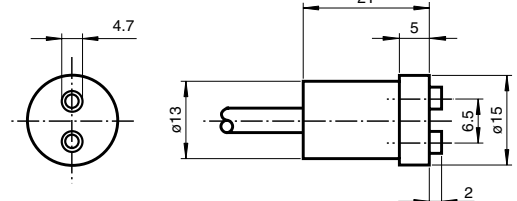


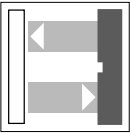
Fig. 13



Adapter



Covering material:
M = metal, P = PVC, S = silicone



OCT500-M1A-B3-..

Series
VariKont®

Reflection light scanner

OCT500-M1A-B3-..

with terminal compartment or 4-pin, M12 connector

CE



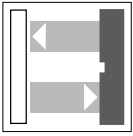
- ◆ Sensing range up to 500 mm without fibre optics
- ◆ light/dark ON parameterisable
- ◆ AS-Interface-certificate
- ◆ Protected against mutual interferences
- ◆ Pre-fault indication (dynamical, static)
- ◆ Position of the sensor head adjustable
- ◆ Protection degree IP67
- ◆ Scratch resistant mineral glass lens
- ◆ Removable terminal block

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OCT500-M1A-B3	OCT500-M1A-B3-V1
Detection range	0 ... 500 mm without light guide	◆	◆
Adjustment range	40 ... 500 mm	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	40000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	LED yellow: switching state LED red: stability control (flashing)	◆	◆
Controls	sensitivity adjuster	◆	
Operating voltage	via AS-i network	◆	◆
No-load supply current	≤ 40 mA	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	AS-Interface	◆	◆
Switching type	light/dark switching	◆	◆
Switching frequency	≤ 1.5 kHz / 200 Hz switchable	◆	◆
Response time	≤ 0.3 ms at 1.5 kHz ≤ 2.5 ms at 200 Hz	◆	◆
Range hysteresis	≤ 10 %	◆	◆
Timer function	Pulse extension 20 ms, configurable	◆	◆
Output of the pre-fault indication	Data bit D1 (not at 1.5 kHz)	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +80 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin		◆
	Terminal compartment Pg13.5, core cross-section ≤ 2.5 mm ²	◆	
Housing	PBT	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	100 g	◆	◆

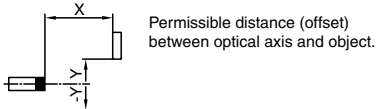
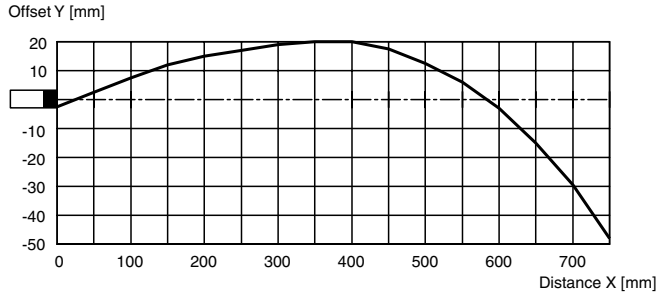
10/15/01

Date of issue:



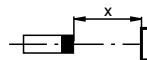
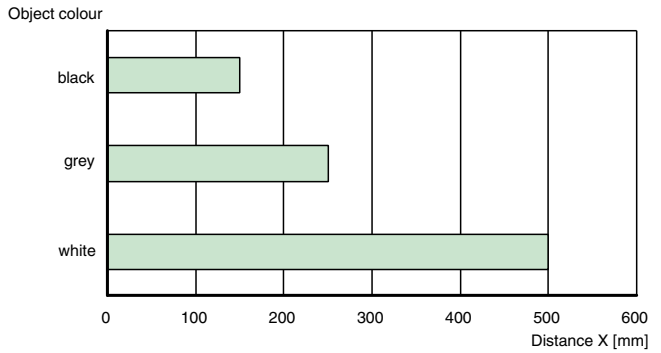
Diagrams

Characteristic response curve



Detection ranges

OCT 500-M1K



AS-Interface Programming

Address preset to 00, can be changed via Busmaster or programming device
 IO-Code 1
 ID-Code 1

• **Data bit**

Bit	Function
D0	switch output
D1	pre-fault indicator (0=ON, 1=OFF)
D2	ready for operation
D3	switch frequency 200 Hz*/1.5 kHz ¹⁾

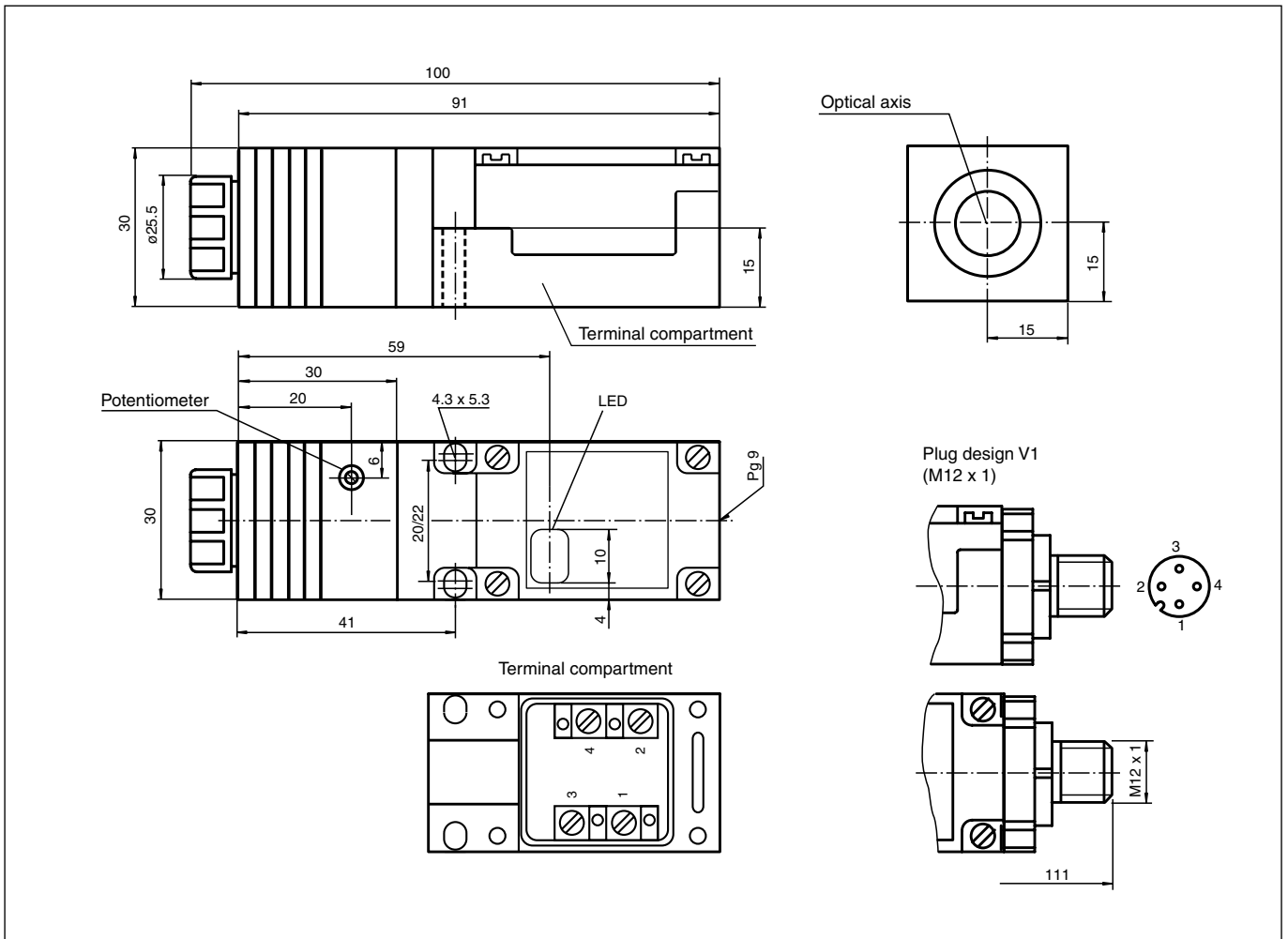
• **Parameter bit**

Bit	Function (1/2)
P0	pulse frequency 1*/2
P1	switch output, light*/dark ON
P2	pulse extension (20 ms) OFF*/ON
P3	pre-fault indicator ¹⁾ dynamic*/static

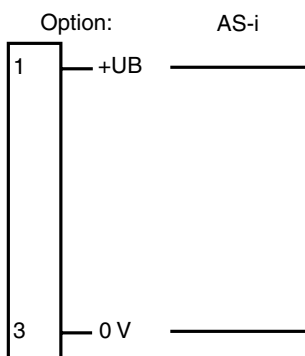
* Standard setting ¹⁾No activation of pre-fault signal at 1.5 kHz.

Dimensions

Series
VariKomf®



Electrical Connection



Date of issue: 10/15/01

○ = Light ON, ● = Dark ON

Selection table for fibre

Series
VariKont®

	Model number	Sensing range in mm	Detection range in mm	Fig.
fibre optic, single path with PVC coating	LCE 18-2,3-0,5-K2	600		1
	LCE 18-2,3-0,5-K9	600		4
fibre optic, single path with metal coating	LME 18-1,9-0,5-K9	500		4
	LME 18-2,3-0,5-K10	600		5
	LME 18-2,3-0,5-K2	600		1
	LME 18-2,3-0,5-K3	600		2
	LME 18-2,3-0,5-K4	600		3
	LME 18-2,3-1,0-K2	600		1
	LME 18-2,3-2,0-K2	600		1
glass fibre optics, single path with silicone coating	LSE 18-1,1-0,5-K9	100		4
fibre optic, reflex with PVC coating	LCR 18-2,7-1,0-K9		75	12
	LCR 18-3,2-0,5-K1		100	6
	LCR 18-3,2-0,5-K2		100	7
	LCR 18-3,2-2,0-K2		100	7
	LMR 18-1,1-0,5-K3		10	8
	LMR 18-2,3-0,25-K3		45	8
glass fibre optics, reflex with metal coating	LMR 18-2,3-0,5-K2		45	7
	LMR 18-2,3-0,5-K3		45	8
	LMR 18-2,3-0,5-K7		45	11
	LMR 18-2,7-0,5-K9		75	12
	LMR 18-3,2-0,5-K1		100	6
	LMR 18-3,2-0,5-K5		100	10
	LMR 18-3,2-1,0-K1		100	6
	LMR 18-3,2-1,0-K5		100	10
	LMR 18-3,2-2,0-K1		100	6
	LMR 18-3,2-2,0-K4		100	9
	LMR 18-3,2-3,0-K1		100	6
fibre optic, reflex with silicone coating	LSR 18-2,3-0,5-K12		45	13
	LSR 18-3,2-0,5-K1		100	6

Other lengths and end pieces available on request

Date of issue: 10/15/01

Fig. 1

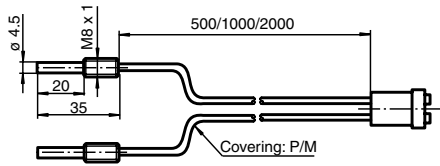


Fig. 2

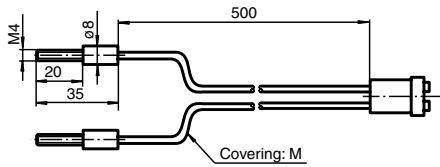


Fig. 3

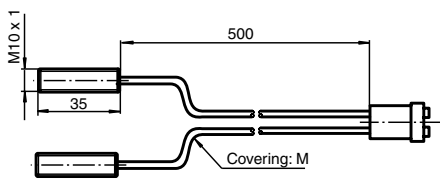


Fig. 4

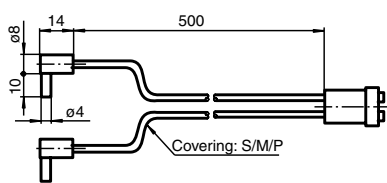


Fig. 5

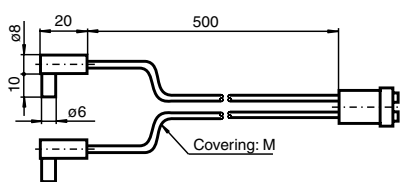


Fig. 6

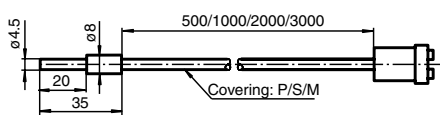


Fig. 7

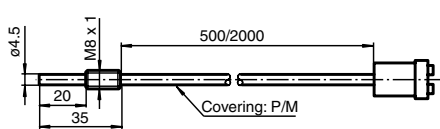


Fig. 8

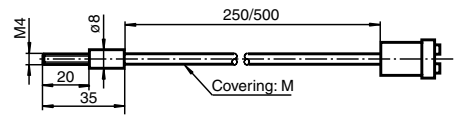


Fig. 9

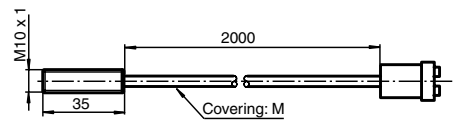


Fig. 10

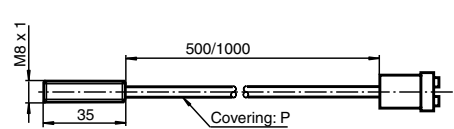


Fig. 11

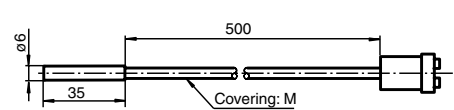


Fig. 12

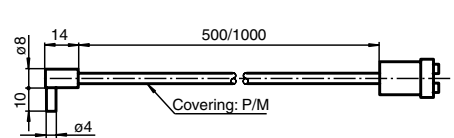
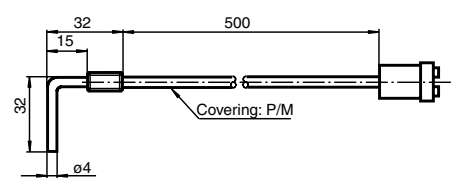
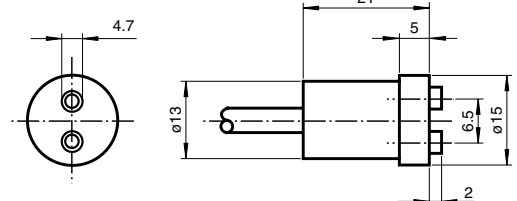


Fig. 13



Adapter



Covering material:
M = metal, P = PVC, S = silicone





SU14, SU15 – Intelligence for fibre optics

Fibre optics are used wherever there is no more space available for traditional light beam switches. They are not sensitive to strong vibrations and can be used at maximum temperatures of up to 300 °C. In addition, they are used in areas subject to the risk of explosions since the corresponding evaluation device cannot be placed in the area subject to the risk of explosion. Depending on the type of fibre optics device, optical fibres or plastic fibre optics can be connected up to several meters. This ensures assembly suitable for the desired function for nearly all types of spaces.

Fibre optics devices themselves are available in a variety of shapes and models depending what is required by the application. The range extends from top hat rail mounting through M18 and M30 threaded designs to compact miniaturised devices with plastic or metal housings featuring a wide range of special features. These include TEACH-IN via membrane keys and programmable timer functions, protection class IP65 and IP67, fixed cable and M8 or M12 connectors as well as PNP or NPN switching and pre-fault outputs. High switching frequencies up to 1500 Hz make it possible to record rapid processes. Fibre optics and evaluation devices are available as single path light beam switches and direct detection light scanners. The appropriate accessories also make it possible to implement reflex light beam switches with polarisation filters.

The use of fibre optics is especially handy for recording small parts in places that are hard to get to and in harsh environmental conditions.

Additional fibre optic light beam switch devices are available for sensor types MLV11, MLV40, VariKont, 18GM and print mark sensors.

Principle	Type code	Detection range	Page
	SU14-IR	depends on the fibre optics being used.	618
	SU14-RT	depends on the fibre optics being used.	626
	SU15-G/115	depends on the fibre optics being used.	632
	SU15-G/95	depends on the fibre optics being used.	638
	SU15-K/115	depends on the fibre optics being used.	644
	SU15-K/95	depends on the fibre optics being used.	650

Fibre optics devices

SU15 parameter setting

Parameters:

-Outputs, inputs

An optical interface (PC or hand-held) is used to set parameters.

Factory setting underlined

- complementary switch outputs
- switch output (NO/NC) and pre-fault output
- switch output (NO/NC) and multifunction input

-Pre-fault signal

- dynamic
- static
- off

-Switching frequency

- 1.5 kHz
- 1 kHz
- 500 Hz
- 250 Hz
- 100 Hz
- 50 Hz
- 20 Hz

for application-optimised interference suppression

-Hysteresis:

- small
- standard
- large

-Timer functions:

- no
 - on delay¹⁾ (0.1 s to 25.5 s in 0.1 s increments)
 - off delay²⁾ (0.1 s to 25.5 s in 0.1 s increments)
 - pulse extension³⁾ (1 ms to 255 ms in 1 ms increments)
 - one-shot output function⁴⁾ (1 ms to 255 ms in 1 ms increments)
- the timer function¹⁾ can be combined with one of the timer functions^{2), 3) or 4)}.

-Pulse frequency:

- pulse frequency 1
- pulse frequency 2
- pulse frequency 3

-Keyboard disabling

- off
- automatic
- always

-Input function:

- no
- test (transmitter deactivation)
- AND logic operation
- OR logic operation
- XOR logic operation
- NC/NO switching
- function reserve test (normal operation with half transmission power)
- TEACH-IN (level controlled)
- LATCH
- D flipflop

-Input inverted

- all control input functions can be inverted

-Parameterisation disable:

- off
- on

-Mode of operation:

- direct detection
- through-beam mode

Adjusting to a target object SU15

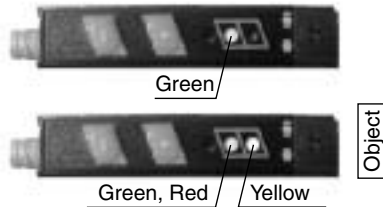
Adjustment options:

- **Manual (with membrane keys)**
- **Automatic (TEACH-IN)**

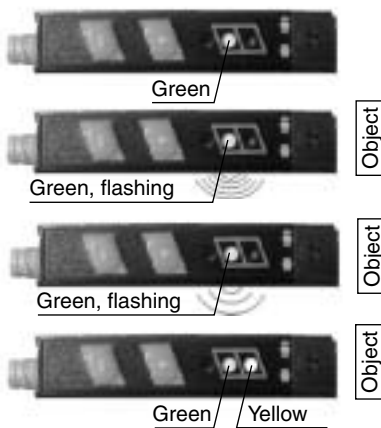
Note:

The sensitivity adjustment is maintained even after the electrical power is turned off.

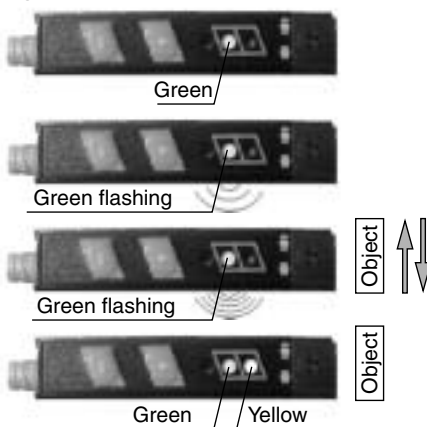
Manual Adjustment



Static TEACH-IN



Dynamic TEACH-IN



Manual adjustment

1. If necessary, press the "+"- and "-" keys at the same time for at least 5 seconds (until the green LED flashes once briefly). The sensor is now "unlocked".
2. Place the object to be recorded in the sensing range at the desired distance. You can now adjust the sensitivity of the sensor with the two "+" and "-" keys (the red LED flashes with each keystroke; the yellow indicates the switch status).
The buttons are equipped with a repeat function (simply hold down the key for repeated actuation).

Note:

If the red LED does not flash when the button is pushed, the sensor is at the end of the adjustable range or the sensor is no longer locked.

TEACH-IN for objects at a fixed distance (static TEACH-IN, only in direct detection)

1. If necessary, press the "+"- and "-" keys at the same time for 5 seconds (until the green LED flashes briefly once). The sensor is now "unlocked".
2. Place the object to be recorded in the sensing range at the desired distance. Simultaneously push the "+" and "-" buttons (for about 1 second) until the red LED that is lit goes out. The sensor is now in "teaching" or programming mode. This is indicated by the green LED flashing.

Note:

If the red LED does not flash when the key is pressed, the sensor is not locked.

3. The green LED flashes briefly at a higher frequency (4 Hz). As soon as the LED flashes again at the output frequency of 2 Hz, the teaching process is complete.
4. To complete TEACH-IN, you must now press either the "+" key or the "-" key. After that, the sensor will work in normal operating mode.

TEACH-IN for moved objects (dynamic TEACH-IN).

1. If necessary, press the "+"- and "-" keys at the same time for 5 seconds (until the green LED flashes briefly once). The sensor is now "unlocked".
2. Simultaneously push the "+" and "-" buttons (for about 1 second) until the red LED that is lit goes out. The sensor is now in "teaching" or programming mode. This is indicated by the green LED flashing (2 Hz).

Note:

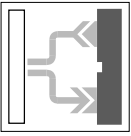
If the red LED does not flash when the key is pressed, the sensor is not locked.

3. Traverse the sensing range at the desired distance with the objects to be recorded (one object is sufficient). The green LED flashes briefly at a higher frequency (4 Hz).
As soon as the LED flashes again with the output frequency, the teaching process is completed even though there is an object in the sensing range.

Note:

The very brief change in flashing frequency is undetectable under certain circumstances.

4. To complete TEACH-IN, you must now press either the "+" key or the "-" key.



SU14-IR/40a/82a/95/...

Fibre optic device

SU14-IR/40a/82a/95/...

with 4-pin, M8 connector

Fibre Optic
Devices



- ◆ Sensor range depends on the fibre optics being used
- ◆ Infrared light-design for glass fibre optics
- ◆ Protection degree IP67
- ◆ Highly exact setting with two potentiometers
- ◆ "Top hat" rail mounting
- ◆ Reflection light beam switch with polarisation filter on fibre optic basis
- ◆ Screw fitting offset lens available

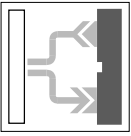
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".
Appropriate optical fibres are listed at the end of this data sheet.

Ordering code		SU14-IR/40a/82a/95/103	SU14-IR/40a/82a/95/102
Detection range	Depends on the fibre optics being used	◆	◆
Adjustment range	Depends on the fibre optics being used	◆	◆
Light source	IRED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	40000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED green, red when falling short of the stability control	◆	◆
Controls	sensitivity adjuster	◆	◆
Controls	Light/dark switching	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	40 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
	1 npn, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	1 kHz	◆	◆
Response time	0.5 ms	◆	◆
Output of the pre-fault indication	1 pnp, active when falling short of the stability control	◆	◆
	1 npn, active when falling short of the stability control	◆	◆
Ambient temperature	-10 ... +60 °C	◆	◆
Storage temperature	-10 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M8 x 1 connector	◆	◆
Housing	PC2800 SW	◆	◆
Mass	30 g	◆	◆

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You find the table of appropriate optical fibres on the next pages.



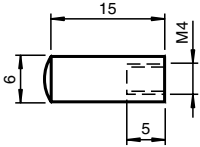
SU14-IR/40a/82a/95/...

Accessories

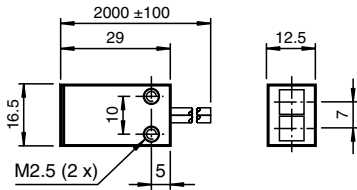
Fibre Optic Devices

Attachment lens for single path fibres

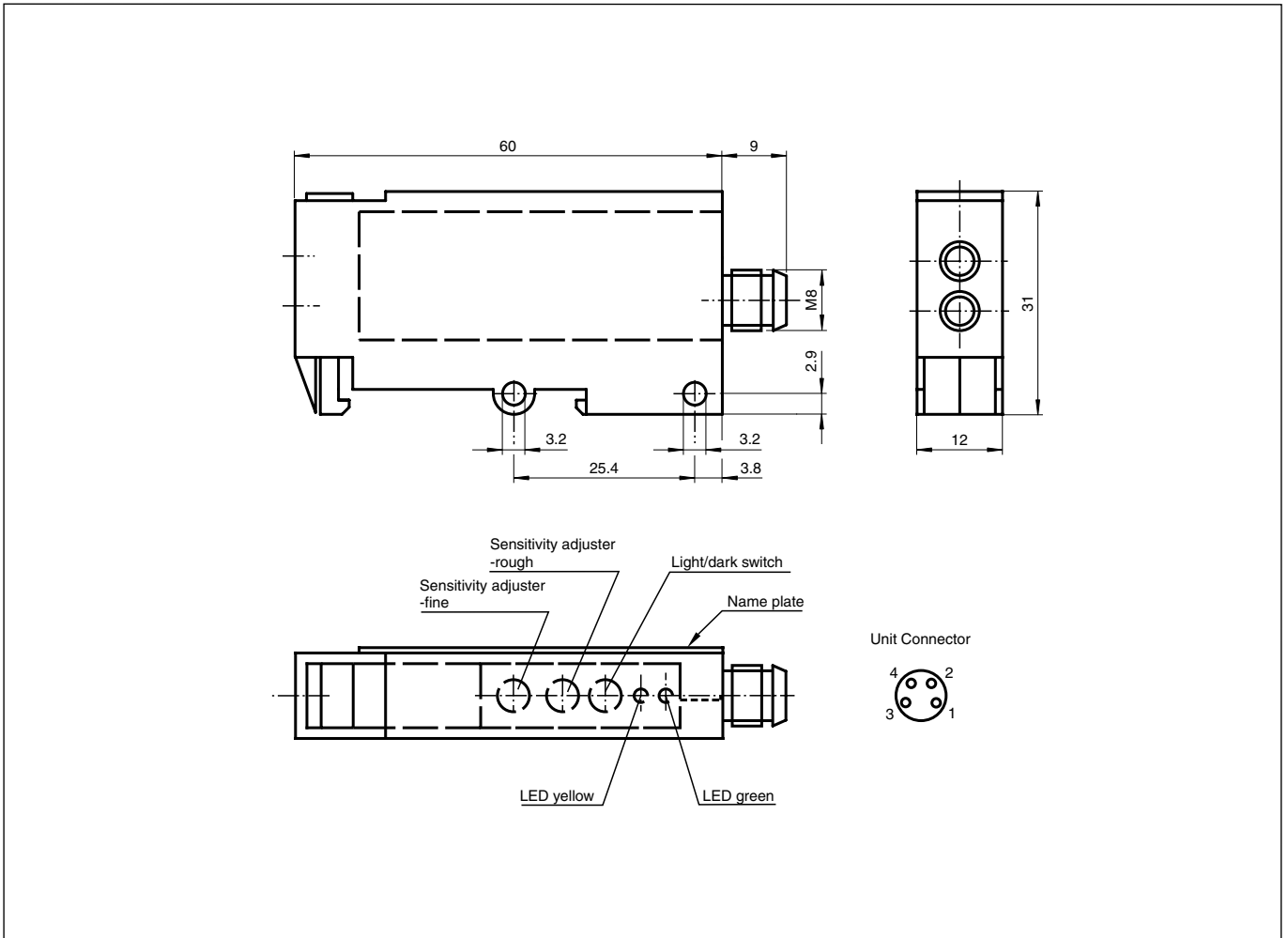
supplies approx. 10-fold sensing range



Reflection attachment lens with polarisation filter KLRV-54

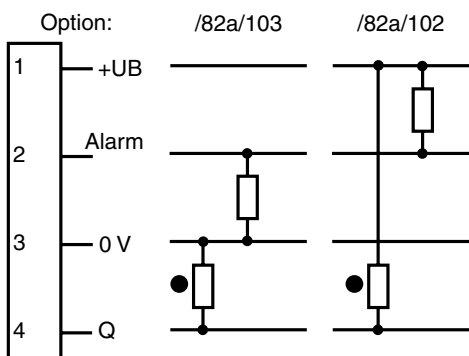


Dimensions



Fibre Optic Devices

Electrical Connection



○ = Light ON, ● = Dark ON

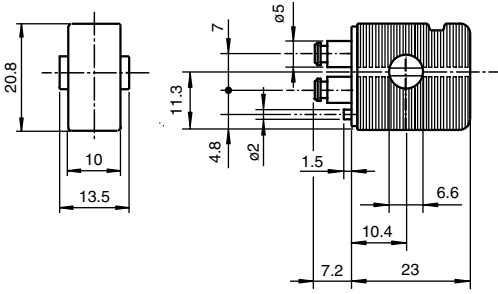
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Selection table for fibre

	Model number	Detection range in mm with			Figure
		MLV40-LL-IR	MLV40-LL-RT	SU14-LL	
Fibre Optic Devices glass fibre optics single path with PVC coating	LCE04-1,1-0,5-WC3	100	50	100	1
	LCE04-1,1-1,5-WC3	110	60	80	1
	LCE04-1,6-0,5-WC3	280	80	160	2
	LCE04-1,6-1,0-WC3	200	60	120	2
	LCE04-1,6-1,0-Z1	280	80	160	3
	LCE04-1,6-1,0-G	280	80	160	4
glass fibre optics reflex with PVC coating	LCR04-1,1-0,5-WC3	50	25	40	5
	LCR04-1,6-1,0-WC3	100	50	80	6
	LCR04-1,6-0,5-WC2	50	20	40	7
	LCR04-1,6-0,5-Z1	80	40	80	8
	LCR04-1,6-1,0-Z1	100	50	80	8
	LCR04-1,6-1,0-G	100	50	80	9
glass fibre optics single path with metal- silicone coating	LLE04-1,6-1,0-G	280	40	160	10
	LLE04-1,6-1,0-Z1	280	40	160	11
	LLE04-1,6-1,0-WC3	280	35	160	12
	LLE04-1,6-1,0-WC15	250	35	140	13
glass fibre optics reflex with metal-silicone coating	LLR04-1,6-0,5-G	90	40	80	14
	LLR04-1,6-1,0-G	100	50	80	14
	LLR04-1,6-0,5-QW1x4	80	35	60	18
	LLR04-1,6-1,0-QW1x4	60	40	40	18
	LLR04-1,6-0,5-WC3	80	35	60	15
	LLR04-1,6-1,0-WC3	100	50	80	15
	LLR04-1,9-1,0-WC5	100	50	70	16
	LLR04-1,6-1,0-Z1	110	50	80	17
glass fibre optics single path with metal- coating	LME04-0,8-0,5-Z1	80	40	60	19
	LME04-0,8-1,0-Z1	60	30	40	19
	LME04-1,6-0,5-Z1	160	80	120	20
	LME04-1,9-0,5-Z1	200	100	150	20
	LME04-1,6-1,0-WC3	120	60	80	23
	LME04-0,8-0,5-WC4	70	35	45	21
	LME04-1,6-1,5-WC4	120	60	80	22
glass fibre optics reflex with metal coating	LMR04-0,5-0,5-WC4	6	5	5	24
	LMR04-0,5-0,5-Z0	7	6	5	26
	LMR04-0,5-0,5-Z1	7	6	5	25
	LMR04-1,6-0,5-Z1	80	35	60	27
	LMR04-1,9-0,5-Z1	90	40	70	28
	LMR04-0,6-0,5- QW0,25/2	5	3	4	29

Other lengths and end pieces available on request

Adapter



Single path



Reflex



Fig. 1

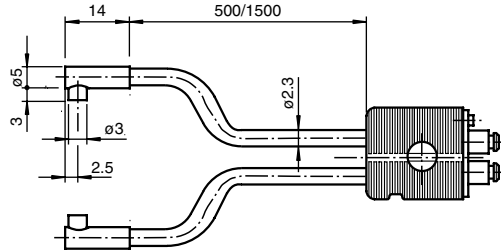


Fig. 2

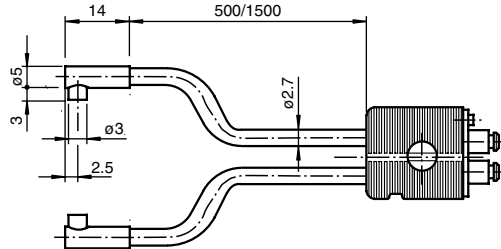


Fig. 3

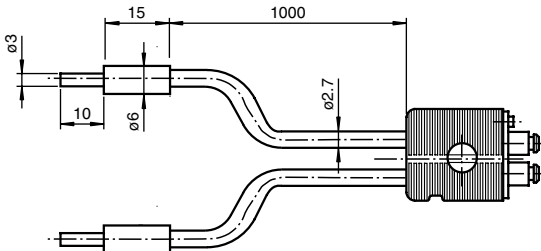


Fig. 4

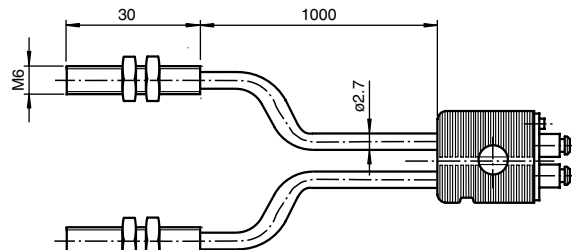


Fig. 5

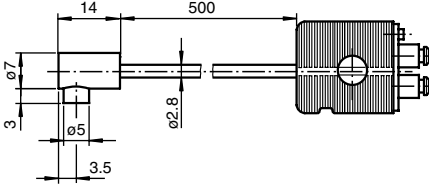


Fig. 6

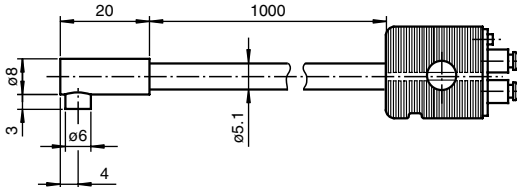


Fig. 7

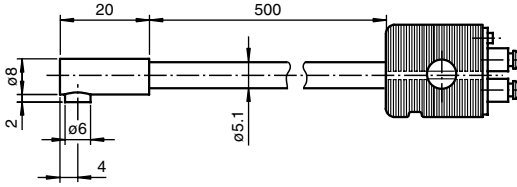


Fig. 8

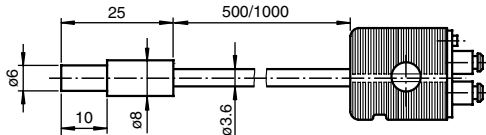
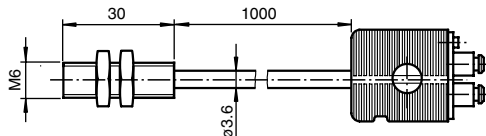


Fig. 9



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Fig. 10

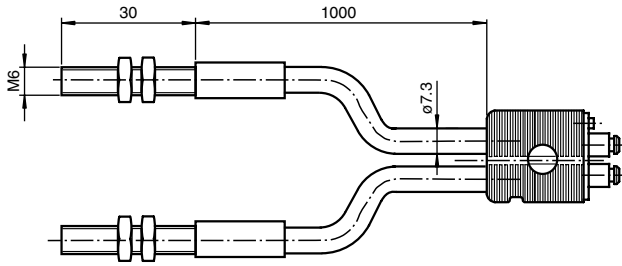


Fig. 11

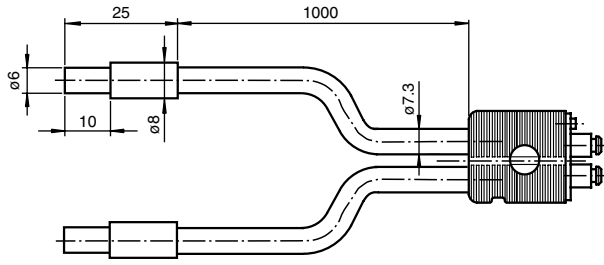


Fig. 12

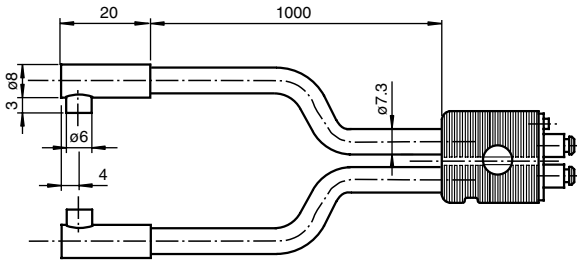


Fig. 13

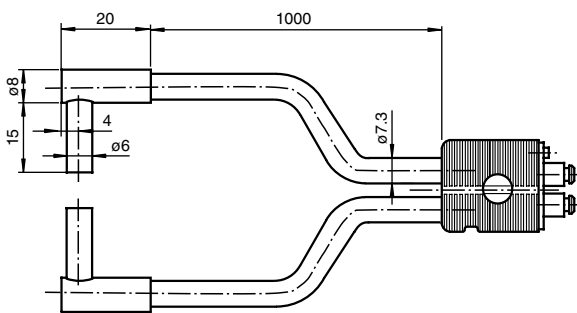


Fig. 14

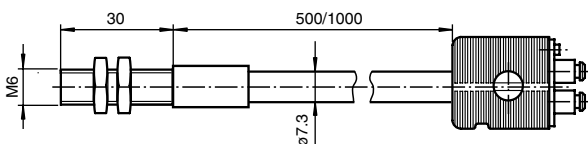


Fig. 15

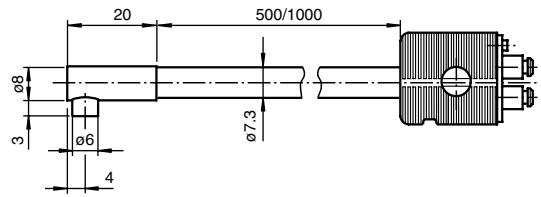


Fig. 16

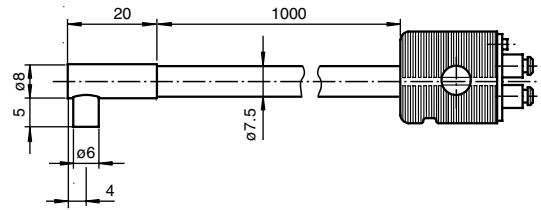


Fig. 17

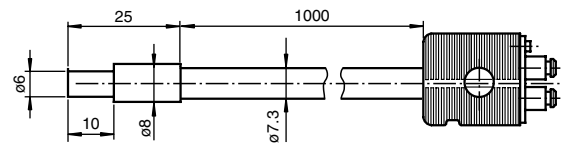


Fig. 18

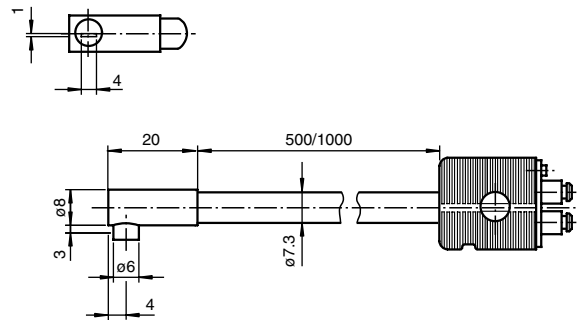


Fig. 19

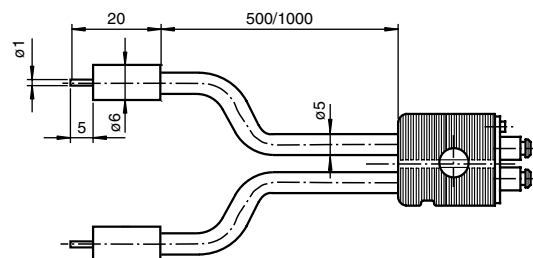


Fig. 20

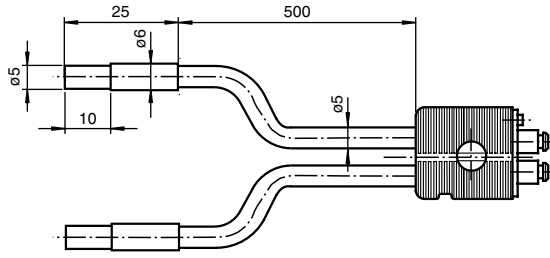


Fig. 25

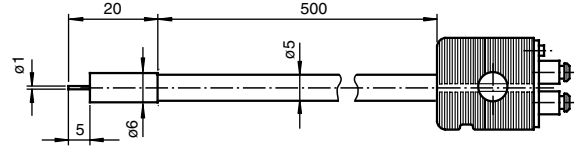


Fig. 21

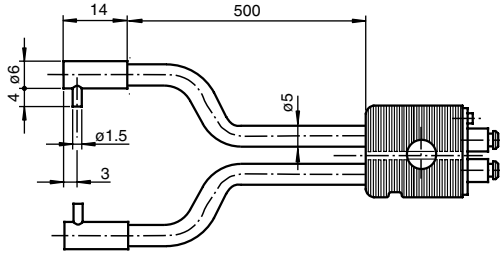


Fig. 26

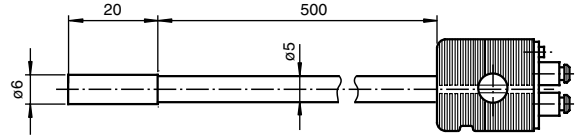


Fig. 22

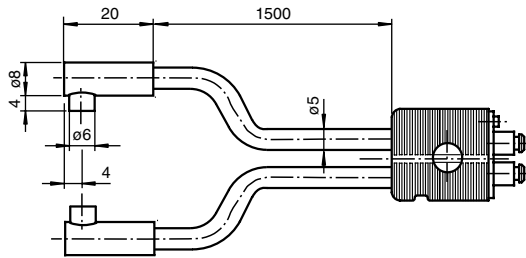


Fig. 27

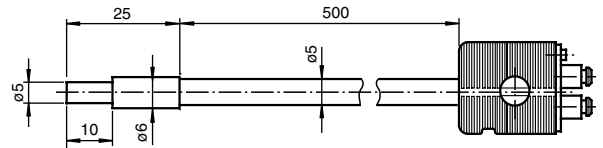


Fig. 23

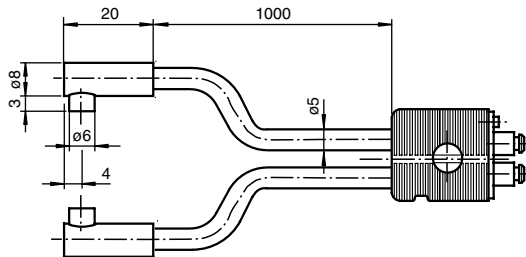


Fig. 28

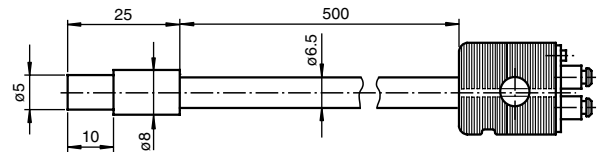


Fig. 24

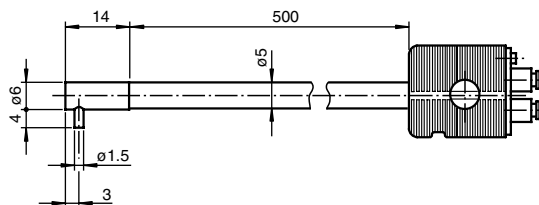
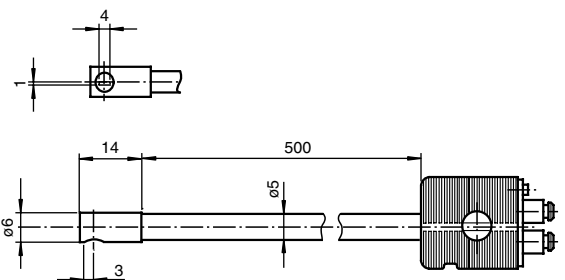
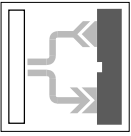


Fig. 29



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SU14-RT/40a/82a/95/...

Fibre optic device

SU14-RT/40a/82a/95/...

with 4-pin, M8 connector

Fibre Optic
Devices

CE



- ◆ Sensor range depends on the fibre optics being used
- ◆ Red light-design for plastic fibre optics
- ◆ Protection degree IP67
- ◆ Highly exact setting with two potentiometers
- ◆ "Top hat" rail mounting
- ◆ Reflection light beam switch with polarisation filter on fibre optic basis
- ◆ Screw fitting offset lens available

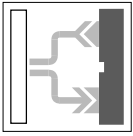
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".
Appropriate optical fibres are listed at the end of this data sheet.

Ordering code		SU14-RT/40a/82a/95/103	SU14-RT/40a/82a/95/102
Detection range	Depends on the fibre optics being used	◆	◆
Adjustment range	Depends on the fibre optics being used	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	40000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED green, red when falling short of the stability control	◆	◆
Controls	sensitivity adjuster	◆	◆
Controls	Light/dark switching	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	40 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	
	1 npn, short-circuit proof, protected against reverse polarity		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	1 kHz	◆	◆
Response time	0.5 ms	◆	◆
Output of the pre-fault indication	1 pnp, active when falling short of the stability control	◆	
	1 npn, active when falling short of the stability control		◆
Ambient temperature	-10 ... +60 °C	◆	◆
Storage temperature	-10 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M8 x 1 connector	◆	◆
Housing	PC2800 SW	◆	◆
Mass	30 g	◆	◆

Fibre Optic Devices

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You find the table of appropriate optical fibres on the next pages.



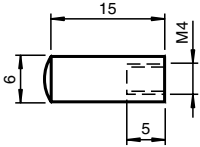
SU14-RT/40a/82a/95/...

Accessories

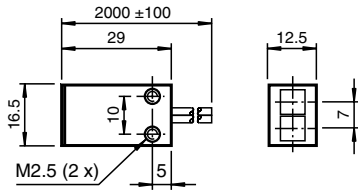
Fibre Optic Devices

Attachment lens for single path fibres

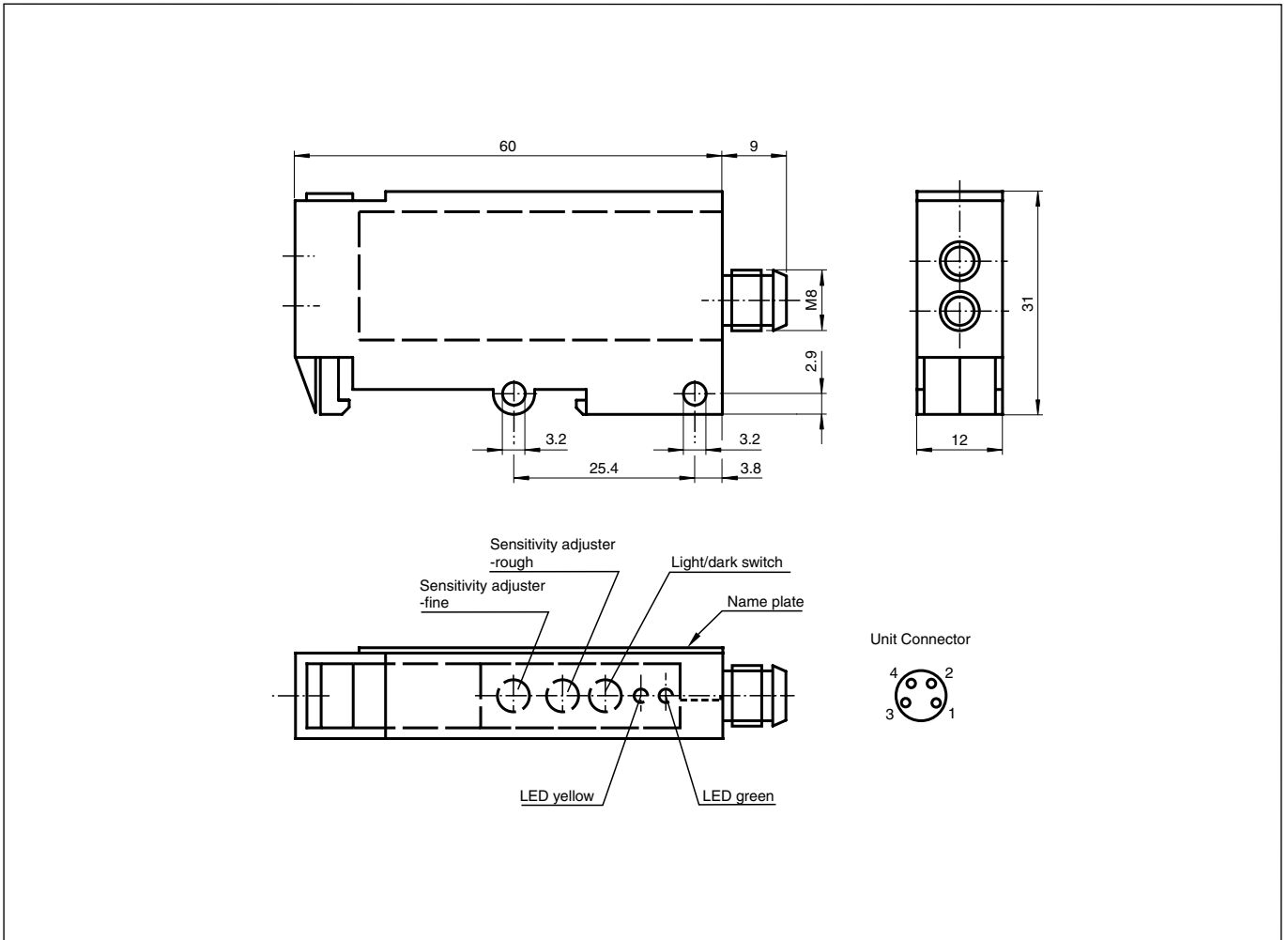
supplies approx. 10-fold sensing range



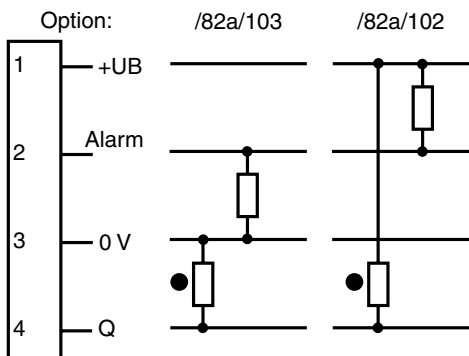
Reflection attachment lens with polarisation filter KLRV-54



Dimensions



Electrical Connection

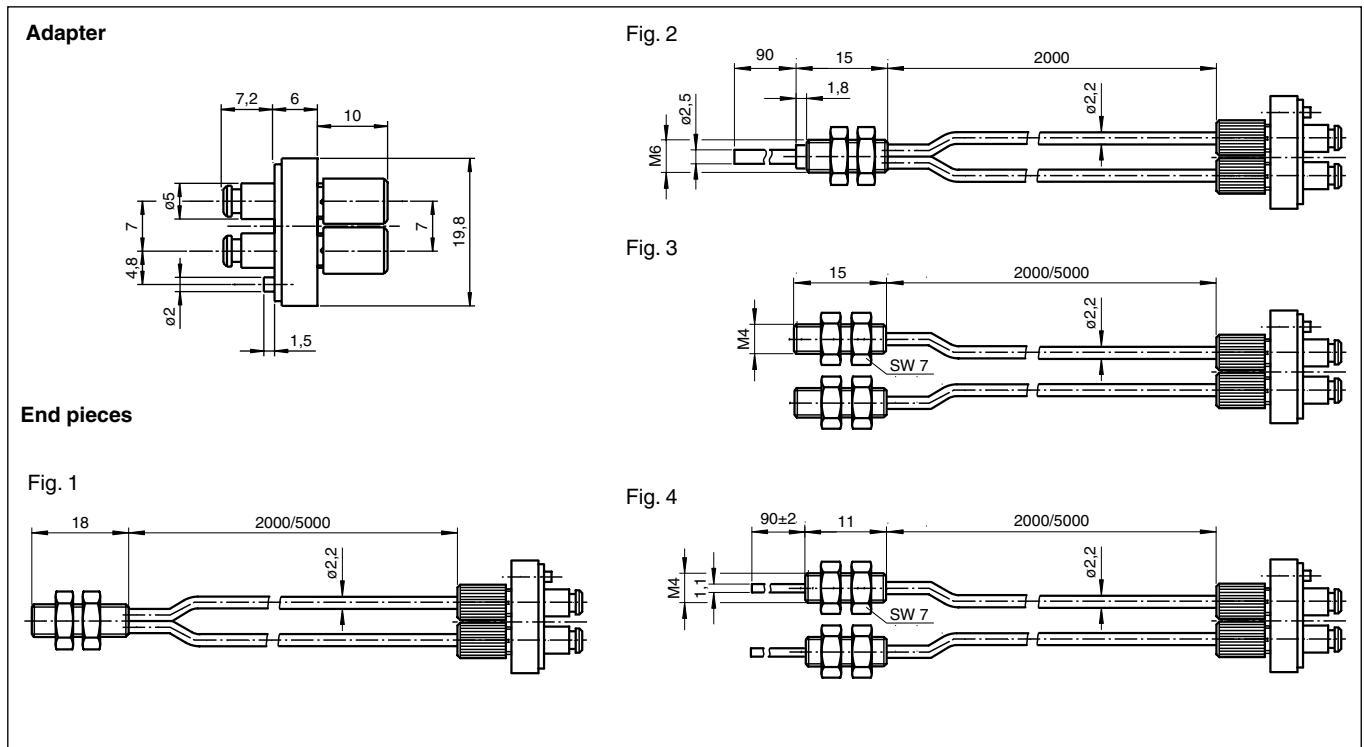


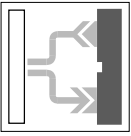
SU14-RT/40a/82a/95/...

Selection table for fibre

	Model number	Range/detection range in mm	Comments	Figure
Fibre Optic Devices plastic fibre optics, reflex	KLR 00-2,2-2,0-G6	50		1
	KLR 00-2,2-5,0-G6	25		1
	KLRF 00-2,2-2,0-G6	50	with fibre bundle	1
	KLRF 00-2,2-5,0-G6	25	with fibre bundle	1
	KLR 00-2,2-2,0-GB6	50		2
	KLRF 00-2,2-2,0-GB6	50	with fibre bundle	2
plastic fibre optics, single path	KLE 00-2,2-2,0-G4	250		3
	KLE 00-2,2-5,0-G4	100		3
	KLEF 00-2,2-2,0-G4	250	with fibre bundle	3
	KLEF 00-2,2-5,0-G4	100	with fibre bundle	3
	KLE 00-2,2-2,0-GB4	100		4
	KLEF 00-2,2-2,0-GB4	100	with fibre bundle	4

Other lengths and end pieces available on request





SU15-G/./82f/115

Fibre optic device

SU15-G/./82f/115

with 2 m fixed cable

CE



- ◆ Detection range depends on the fibre optics being used
- ◆ For glass fibre optics
- ◆ Light/dark ON, switchable
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Visible red light
- ◆ Protected against mutual interferences
- ◆ "Top hat" rail mounting
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Switchable between direct-acting and through-beam operation
- ◆ Protection degree IP65

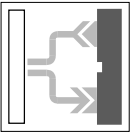
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".
Appropriate optical fibres are listed at the end of this data sheet.

Ordering code		SU15-G/30/82f/115	SU15-G/32/82f/115
Effective detection range	Depends on the fibre optics being used	◆	◆
Reference target	Standard white, 50 mm x 50 mm (in direct detection)	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 26 mA	◆	◆
Time delay before availability	≤ 300 ms	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆	
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2 V DC	◆	◆
Switching frequency	≤ 1.5 kHz	◆	◆
Response time	≤ 0.33 ms	◆	◆
Timer function	parameterisable	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable		◆
	npn, dynamic/static configurable	◆	
Control input	parameterisable	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +80 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	2 m cable, 4 x 0.14 mm ² , PVC	◆	◆
Housing	PBT	◆	◆
Mass	30 g	◆	◆

Fibre Optic Devices

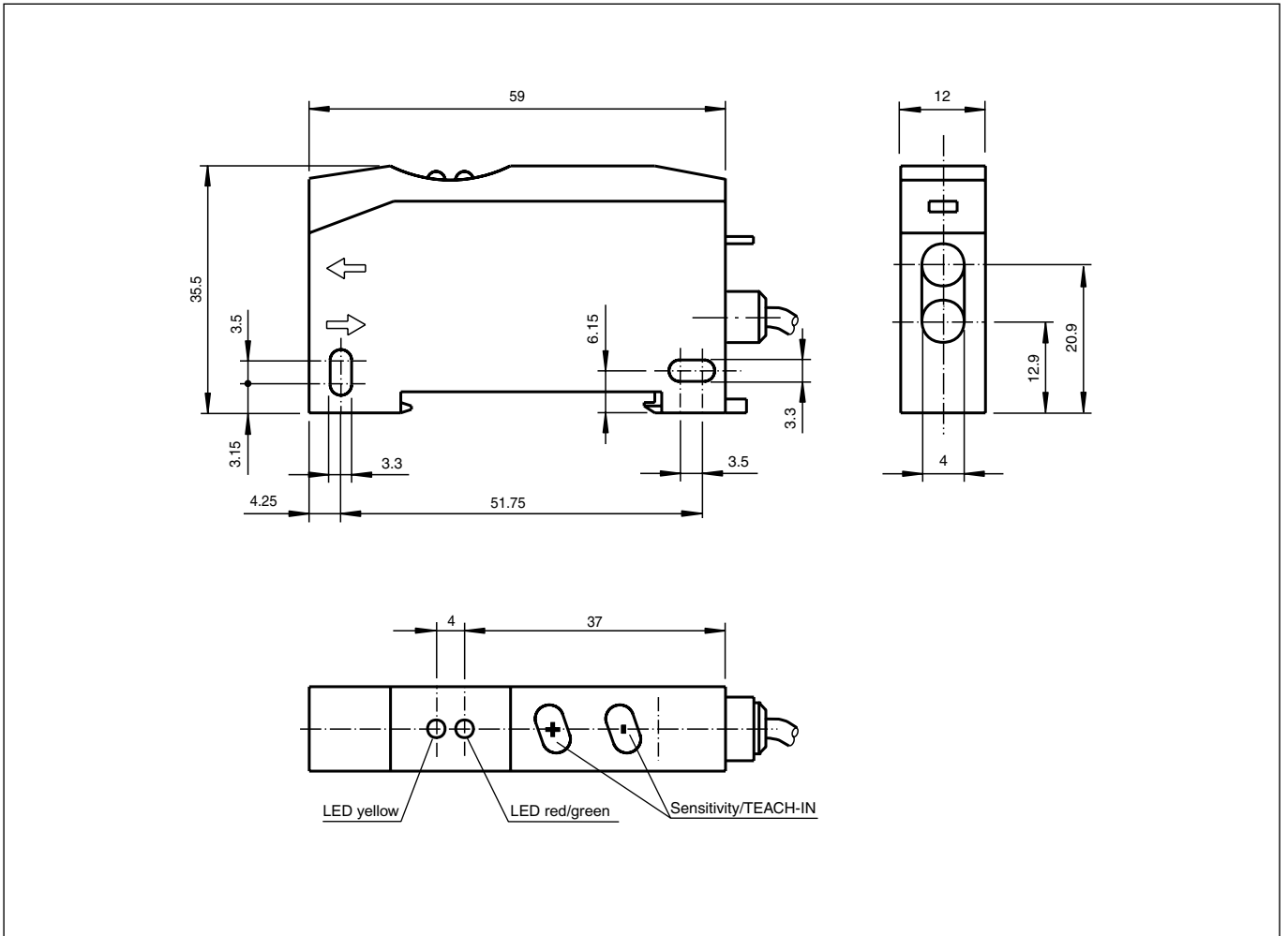
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You find the table of appropriate optical fibres on the next pages.



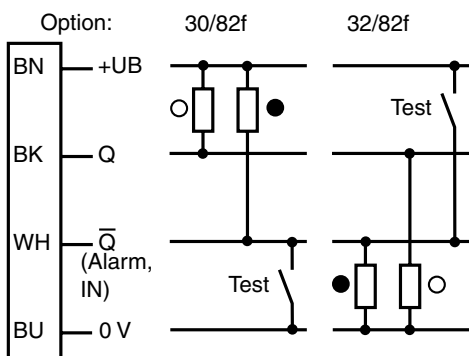
SU15-G/.J82f/115

Dimensions



Fibre Optic Devices

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/15/01

Selection table for fibre

	Model number	Range in mm	Detection range in mm	Fig.
fibre optics, single path with PVC coating	LCE 06-1,9-0,5-K9	500		4
	LCE 06-2,3-0,5-K2	600		1
fibre optics, single path with metal coating	LME 06-1,9-0,5-K9	500		4
	LME 06-2,3-0,5-K10	600		5
	LME 06-2,3-0,5-K2	600		1
	LME 06-2,3-0,5-K3	600		2
	LME 06-2,3-0,5-K4	600		3
	LME 06-2,3-1,0-K2	600		1
	LME 06-2,3-2,0-K2	600		1
glass fibre optics, single path with silicone coating	LSE 06-1,1-0,5-K9	100		4
fibre optics, reflex with PVC coating	LCR 06-2,7-0,5-K9		75	12
	LCR 06-3,2-0,5-K1		100	6
	LCR 06-3,2-0,5-K2		100	7
	LCR 06-3,2-0,5-K5		100	10
	LCR 06-3,2-1,0-K5		100	10
	LCR 06-3,2-2,0-K2		100	7
glass fibre optics, reflex with metal coating	LMR 06-1,1-0,5-K3		10	8
	LMR 06-2,3-0,25-K3		45	8
	LMR 06-2,3-0,5-K3		45	8
	LMR 06-2,3-0,5-K7		45	11
	LMR 06-2,7-0,5-K9		75	12
	LMR 06-3,2-0,5-K1		100	6
	LMR 06-3,2-1,0-K1		100	6
	LMR 06-3,2-2,0-K1		100	6
	LMR 06-3,2-2,0-K4		100	9
LMR 06-3,2-3,0-K1		100	6	
fibre optics, reflex with silicone coating	LSR 06-2,3-0,5-K12		45	13
	LSR 06-3,2-0,5-K1		100	6

Other lengths and end pieces available on request

Fig.1

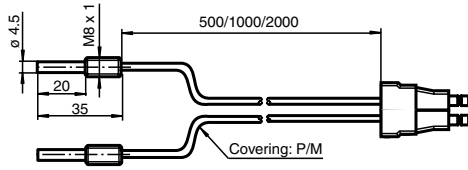


Fig.2

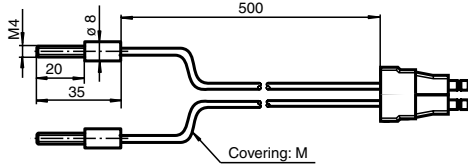


Fig.3

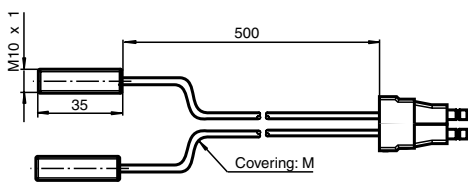


Fig.4

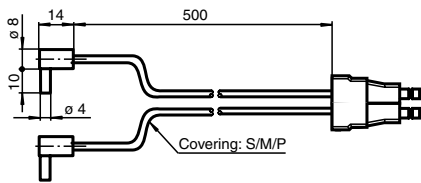


Fig.5

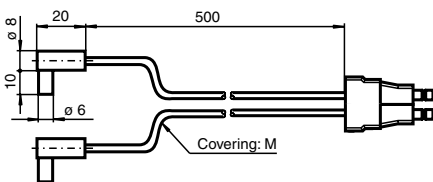


Fig.6

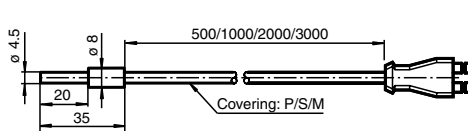


Fig.7

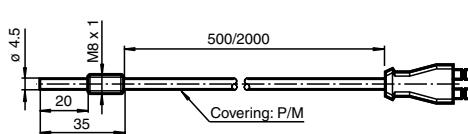


Fig.8

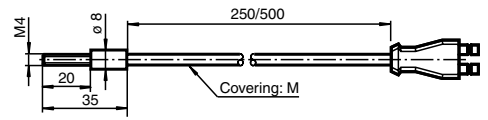


Fig.9

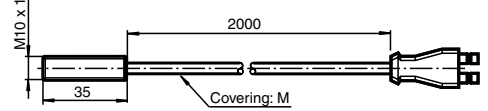


Fig.10

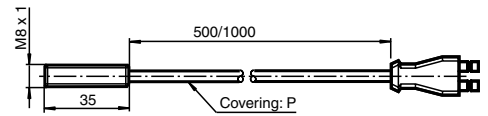


Fig.11

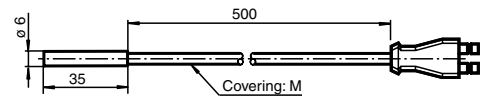


Fig.12

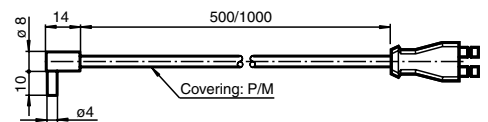
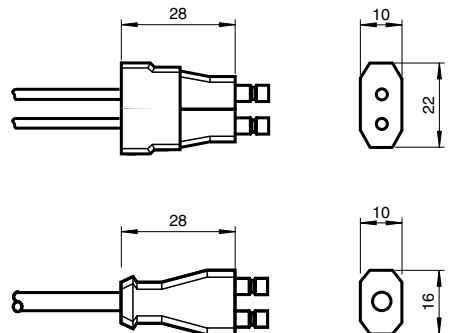
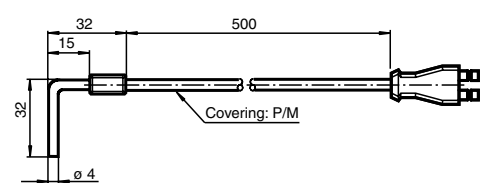
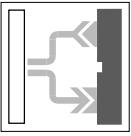


Fig.13



Covering material:
M = metal, P = PVC, S = silicone



SU15-G/./82f/95

Fibre optic device

SU15-G/./82f/95

with 4-pin, M8 connector



- ◆ Detection range depends on the fibre optics being used
- ◆ For glass fibre optics
- ◆ Light/dark ON, switchable
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Visible red light
- ◆ Protected against mutual interferences
- ◆ "Top hat" rail mounting
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Switchable between direct-acting and through-beam operation
- ◆ Protection degree IP65

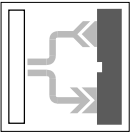
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".
Appropriate optical fibres are listed at the end of this data sheet.

Ordering code		SU15-G/80/82f/95	SU15-G/82/82f/95
Effective detection range	Depends on the fibre optics being used	◆	◆
Reference target	Standard white, 50 mm x 50 mm (in direct detection)	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 26 mA	◆	◆
Time delay before availability	≤ 300 ms	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆	
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2 V DC	◆	◆
Switching frequency	≤ 1.5 kHz	◆	◆
Response time	≤ 0.33 ms	◆	◆
Timer function	parameterisable	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable nnp, dynamic/static configurable		◆
Control input	parameterisable	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +80 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	4-pin, M8 x 1 connector	◆	◆
Housing	PBT	◆	◆
Mass	30 g	◆	◆

Fibre Optic Devices

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You find the table of appropriate optical fibres on the next pages.

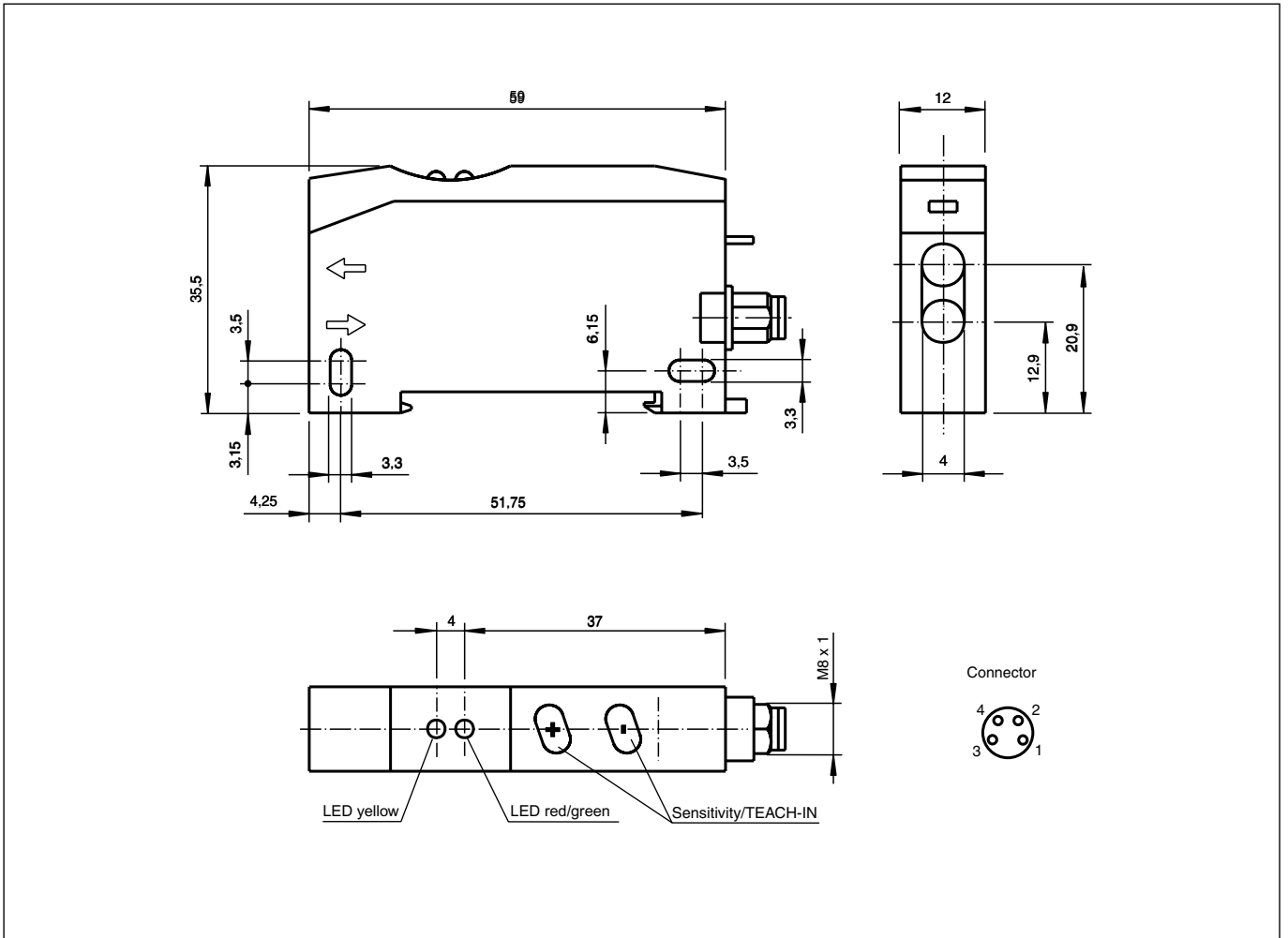


SU15-G/. /82f/95

Fibre Optic
Devices

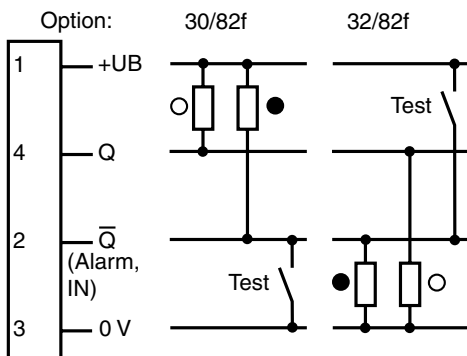
Date of issue 10/15/01

Dimensions



Fibre Optic Devices

Electrical Connection



○ = Light ON, ● = Dark ON

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Selection table for fibre

	Model number	Range in mm	Detection range in mm	Fig.
fibre optics, single path with PVC coating	LCE 06-1,9-0,5-K9	500		4
	LCE 06-2,3-0,5-K2	600		1
fibre optics, single path with metal coating	LME 06-1,9-0,5-K9	500		4
	LME 06-2,3-0,5-K10	600		5
	LME 06-2,3-0,5-K2	600		1
	LME 06-2,3-0,5-K3	600		2
	LME 06-2,3-0,5-K4	600		3
	LME 06-2,3-1,0-K2	600		1
	LME 06-2,3-2,0-K2	600		1
glass fibre optics, single path with silicone coating	LSE 06-1,1-0,5-K9	100		4
fibre optics, reflex with PVC coating	LCR 06-2,7-0,5-K9		75	12
	LCR 06-3,2-0,5-K1		100	6
	LCR 06-3,2-0,5-K2		100	7
	LCR 06-3,2-0,5-K5		100	10
	LCR 06-3,2-1,0-K5		100	10
	LCR 06-3,2-2,0-K2		100	7
glass fibre optics, reflex with metal coating	LMR 06-1,1-0,5-K3		10	8
	LMR 06-2,3-0,25-K3		45	8
	LMR 06-2,3-0,5-K3		45	8
	LMR 06-2,3-0,5-K7		45	11
	LMR 06-2,7-0,5-K9		75	12
	LMR 06-3,2-0,5-K1		100	6
	LMR 06-3,2-1,0-K1		100	6
	LMR 06-3,2-2,0-K1		100	6
	LMR 06-3,2-2,0-K4		100	9
LMR 06-3,2-3,0-K1		100	6	
fibre optics, reflex with silicone coating	LSR 06-2,3-0,5-K12		45	13
	LSR 06-3,2-0,5-K1		100	6

Other lengths and end pieces available on request

Fig.1

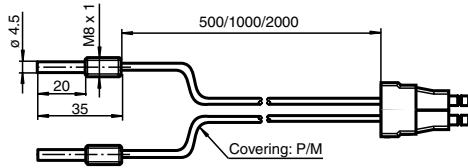


Fig.2

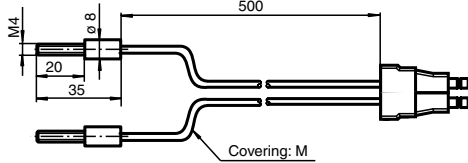


Fig.3

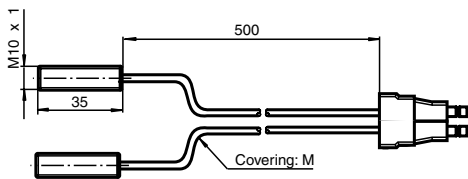


Fig.4

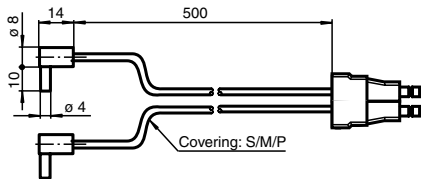


Fig.5

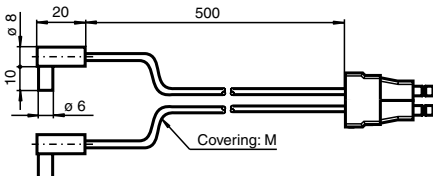


Fig.6

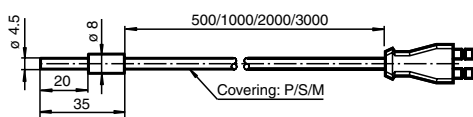


Fig.7

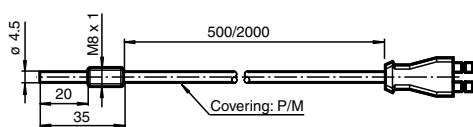


Fig.8

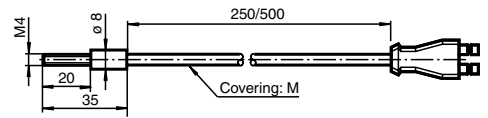


Fig.9

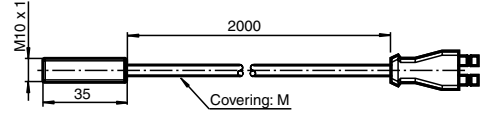


Fig.10

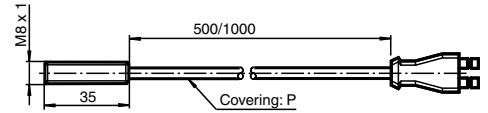


Fig.11

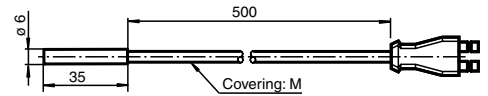


Fig.12

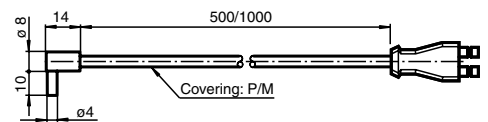
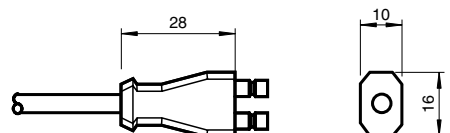
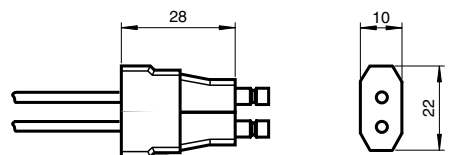
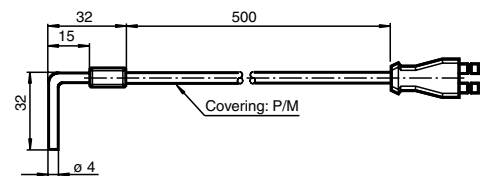
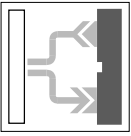


Fig.13



Covering material:
M = metal, P = PVC, S = silicone

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SU15-K/./82f/115

Fibre optic device

SU15-K/./82f/115

with 2 m fixed cable

CE

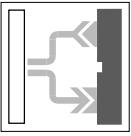


- ◆ Detection range depends on the fibre optics being used
- ◆ For plastic fibre optics
- ◆ Light/dark ON, switchable
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Visible red light
- ◆ Protected against mutual interferences
- ◆ "Top hat" rail mounting
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Switchable between direct-acting and through-beam operation
- ◆ Protection degree IP65

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".
Appropriate optical fibres are listed at the end of this data sheet.

Ordering code		SU15-K/30/82f/115	SU15-K/32/82f/115
Effective detection range	Depends on the fibre optics being used	◆	◆
Reference target	Standard white, 50 mm x 50 mm (in direct detection)	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 26 mA	◆	◆
Time delay before availability	≤ 300 ms	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆	
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2 V DC	◆	◆
Switching frequency	≤ 1.5 kHz	◆	◆
Response time	≤ 0.33 ms	◆	◆
Timer function	parameterisable	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable		◆
	nnp, dynamic/static configurable	◆	
Control input	parameterisable	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +80 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	2 m cable, 4 x 0.14 mm ² , PVC	◆	◆
Housing	PBT	◆	◆
Mass	30 g	◆	◆

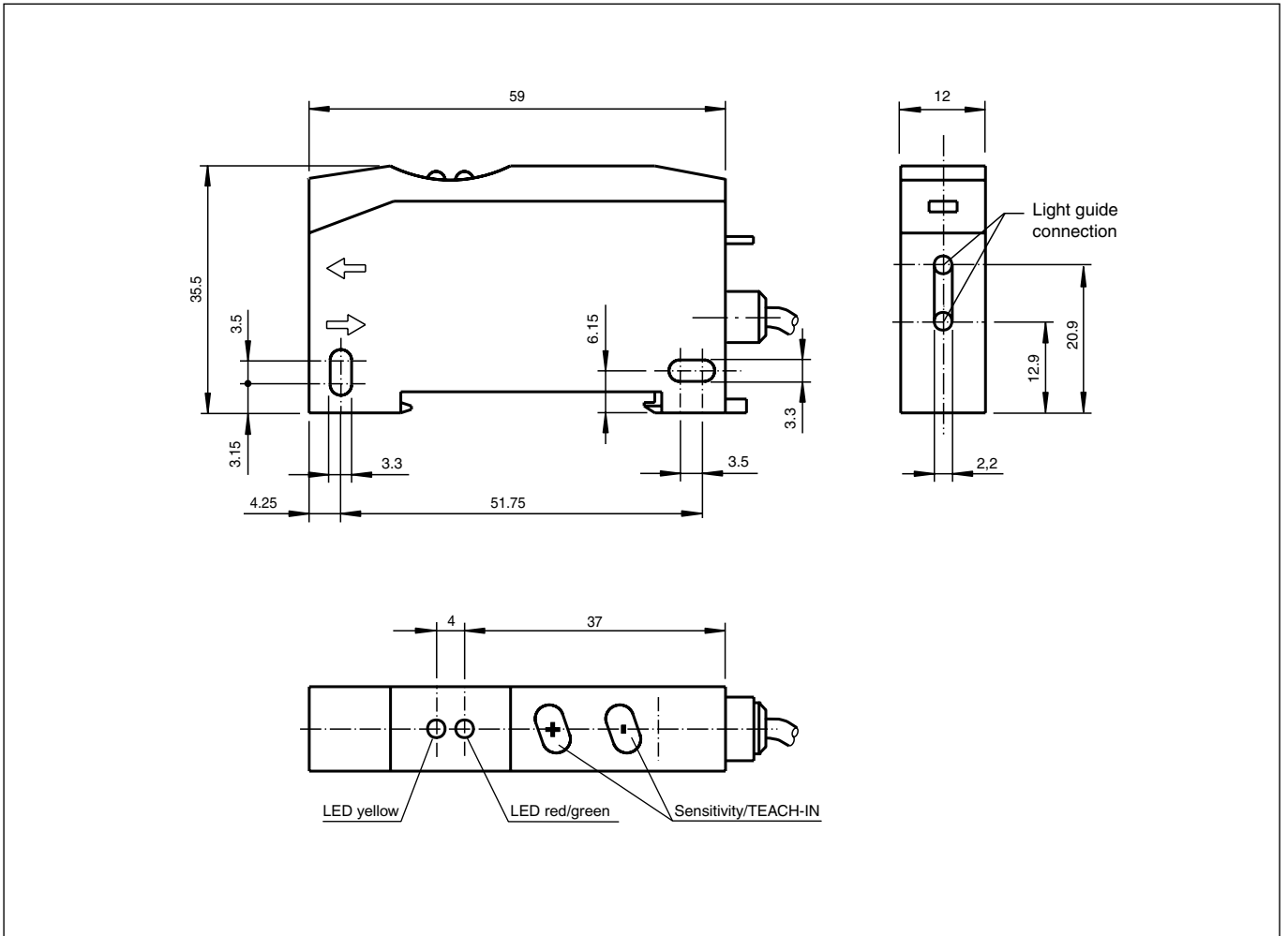
You find the table of appropriate optical fibres on the next pages.



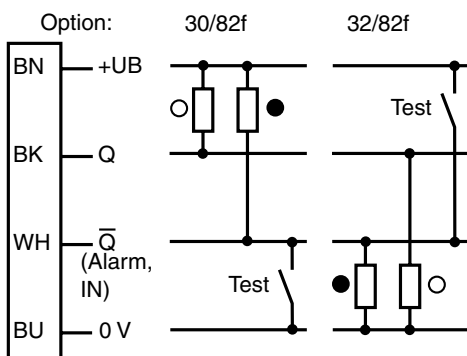
SU15-K/./82f/115

Fibre Optic
Devices

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Selection table for fibre

	Model number	Range in mm	Detection range in mm	Fig.
Fibre Optic Devices plastic fibre optics, single path	KLE 00-2,2-2,0-K53	150		1
	KLE 00-2,2-2,0-K55	150		2
	KLE 00-1,0-2,0-K56	50		3
	KLE 00-2,2-2,0-K52	150		4
	KLE 00-1,0-2,0-K54	50		5
	KLE 00-2,2-2,0-K51	50		6
plastic fibre optics, reflex	KLR 00-2,2-2,0-K57		60	7
	KLR 00-2,2-2,0-K59		70	8
	KLR 00-1,0-2,0-K58		25	9
	KLR 00-2,2-2,0-K60		60	10
	KLR 00-1,0-2,0-K61		20	11
	KLR 00-2,2-2,0-K40		70	12

Other lengths and end pieces available on request

Fig.1

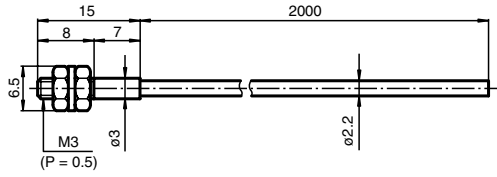


Fig.2

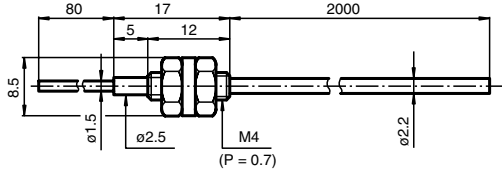


Fig.3

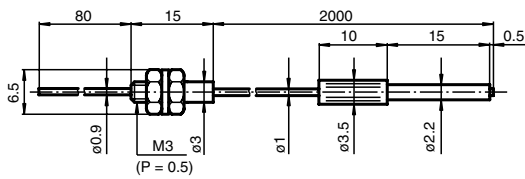


Fig.4

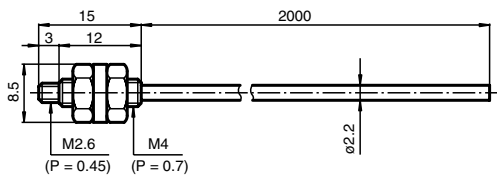


Fig.5

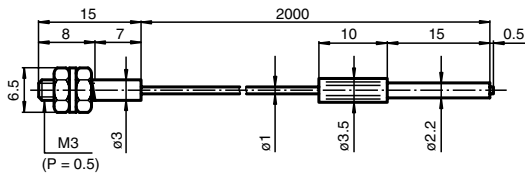


Fig.6

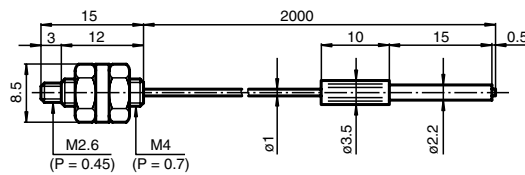


Fig.7

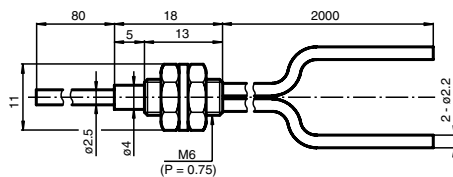


Fig.8

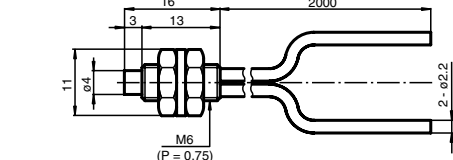


Fig.9

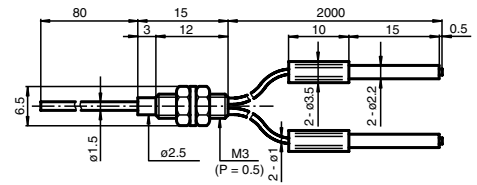


Fig.10

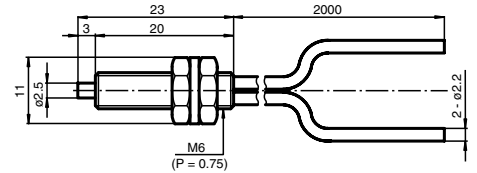


Fig.11

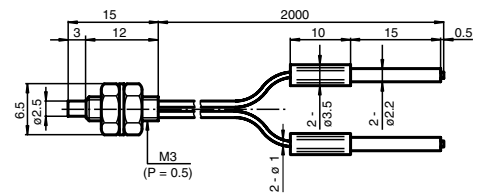
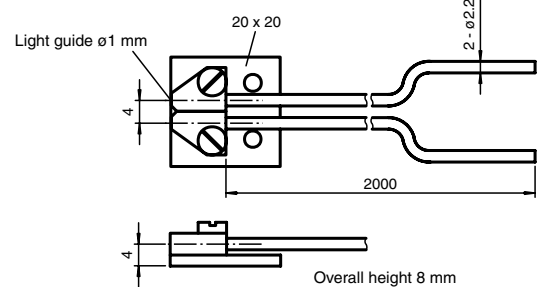
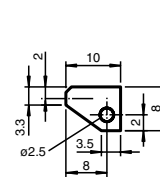


Fig.12



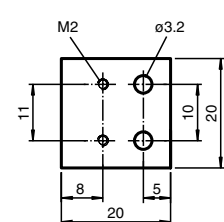
- Direct detection**
If both light guide heads are fixed **parallel** to the base plate, then the direct detection or reflex operation is possible.
- Retro-reflective operation**
A blind zone exists in front of the heads. This is larger in reflex operation than in direct detection (diffuse reflection). The actual size of the zone depends on the application.
- Through-beam operation**
Through-beam operation is achieved by removing the base plate and mounting the heads so that they are mutually opposed on a **common** reference axis.
- Triangulation**
By loosening and changing the positions of the heads on the base plate, the heads can be inclined at an arbitrary angle to each other. The reference axes of the light guides then form a **triangle**. Objects are detected which are located at the point of intersection of the axes.

Head

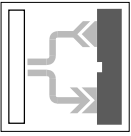


4 mm thick

Base plate



Aluminium 2 mm thick



SU15-K/./82f/95

Fibre optic device

SU15-K/./82f/95

with 4-pin, M8 connector

CE



- ◆ Detection range depends on the fibre optics being used
- ◆ For plastic fibre optics
- ◆ Light/dark ON, switchable
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Visible red light
- ◆ Protected against mutual interferences
- ◆ "Top hat" rail mounting
- ◆ Parameterisation via optical communication link (e.g. free step values for time function)
- ◆ Switchable between direct-acting and through-beam operation
- ◆ Protection degree IP65

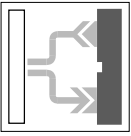
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".
Appropriate optical fibres are listed at the end of this data sheet.

Ordering code		SU15-K/30/82f/95	SU15-K/32/82f/95
Effective detection range	Depends on the fibre optics being used	◆	◆
Reference target	Standard white, 50 mm x 50 mm (in direct detection)	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green	◆	◆
Function display	TEACH-IN: LED green flashing switching state: LED yellow pre-fault indicator: LED red flashing	◆	◆
Controls	Membrane keys for setting sensitivity and TEACH-IN	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 26 mA	◆	◆
Time delay before availability	≤ 300 ms	◆	◆
Signal output	2 switch outputs pnp, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication		◆
	2 switch outputs npn, parameterisable as - NO/NC (antivalent) - NO and pre-fault indication - NC and pre-fault indication	◆	
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Voltage drop	≤ 2 V DC	◆	◆
Switching frequency	≤ 1.5 kHz	◆	◆
Response time	≤ 0.33 ms	◆	◆
Timer function	parameterisable	◆	◆
Output of the pre-fault indication	pnp, dynamic/static configurable		◆
	npn, dynamic/static configurable	◆	
Control input	parameterisable	◆	◆
Ambient temperature	-25 ... +70 °C	◆	◆
Storage temperature	-40 ... +80 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	4-pin, M8 x 1 connector	◆	◆
Housing	PBT	◆	◆
Mass	30 g	◆	◆

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You find the table of appropriate optical fibres on the next pages.

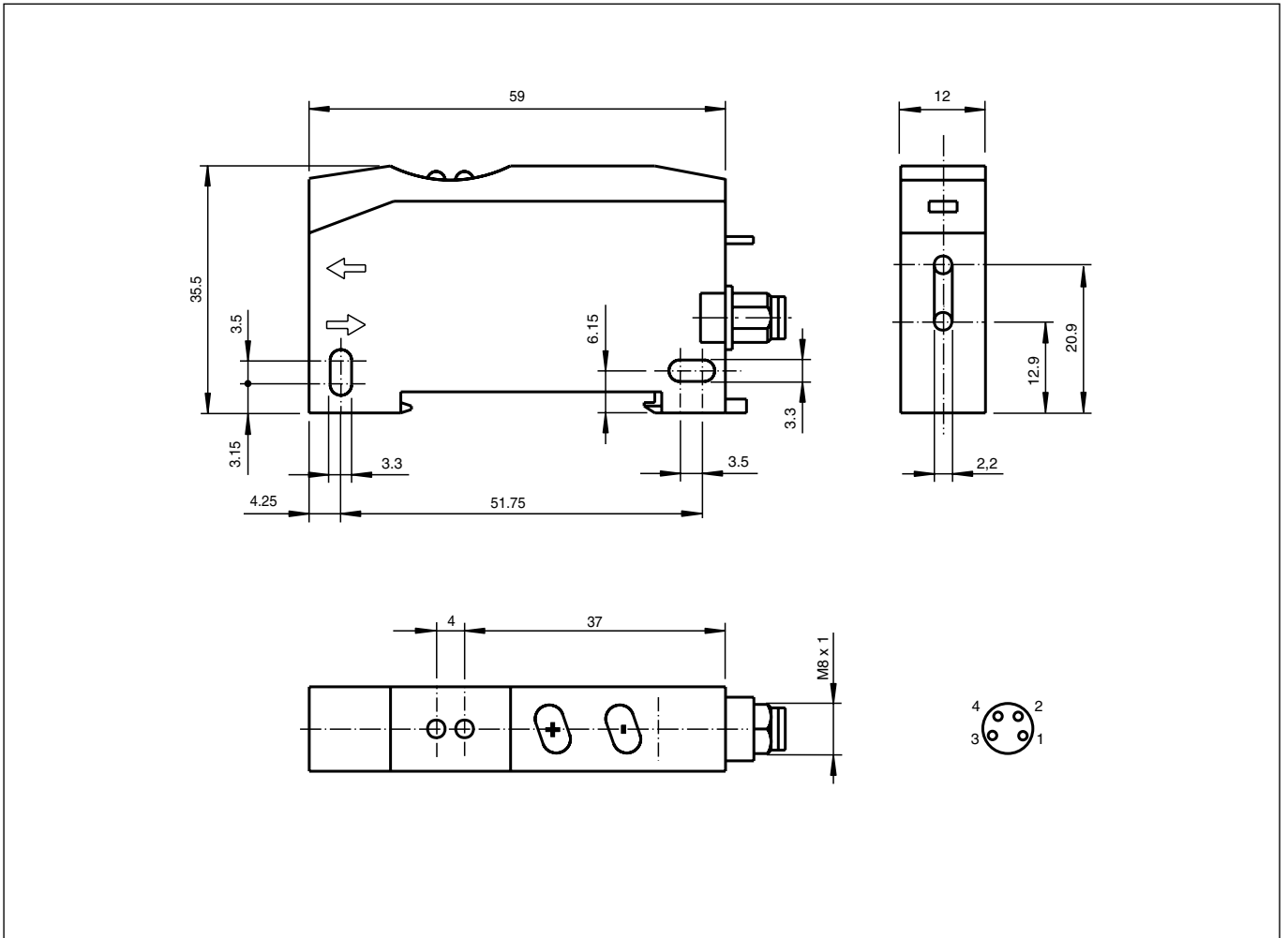


SU15-K/./82f/95

Fibre Optic
Devices

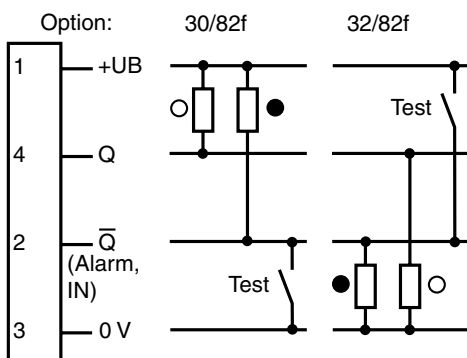
Date of issue 10/15/01

Dimensions



Fibre Optic Devices

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/15/01

Selection table for fibre

	Model number	Range in mm	Detection range in mm	Fig.
Fibre Optic Devices plastic fibre optics, single path	KLE 00-2,2-2,0-K53	150		1
	KLE 00-2,2-2,0-K55	150		2
	KLE 00-1,0-2,0-K56	50		3
	KLE 00-2,2-2,0-K52	150		4
	KLE 00-1,0-2,0-K54	50		5
	KLE 00-2,2-2,0-K51	50		6
plastic fibre optics, reflex	KLR 00-2,2-2,0-K57		60	7
	KLR 00-2,2-2,0-K59		70	8
	KLR 00-1,0-2,0-K58		25	9
	KLR 00-2,2-2,0-K60		60	10
	KLR 00-1,0-2,0-K61		20	11
	KLR 00-2,2-2,0-K40		70	12

Other lengths and end pieces available on request

Fig.1

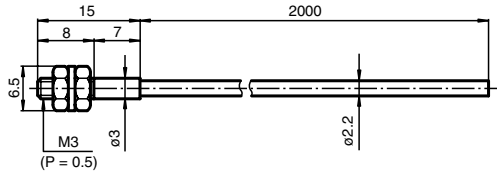


Fig.2

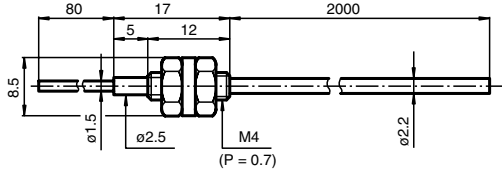


Fig.3

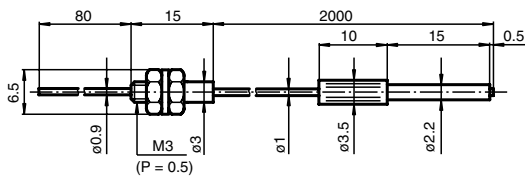


Fig.4

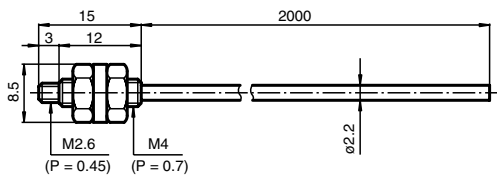


Fig.5

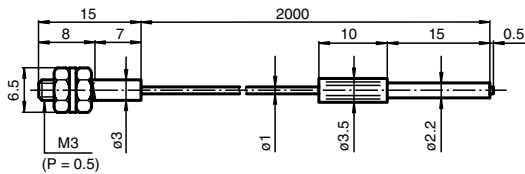


Fig.6

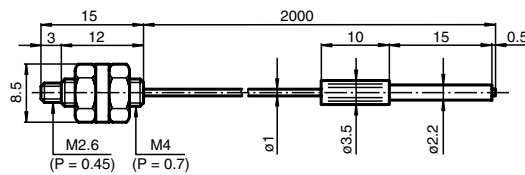


Fig.7

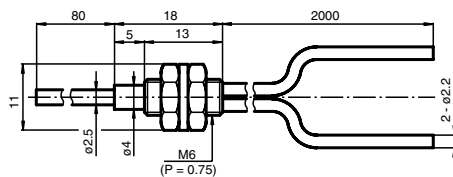


Fig.8

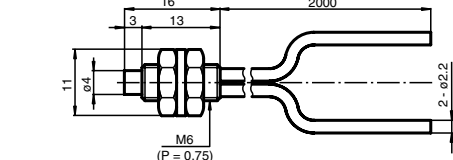


Fig.9

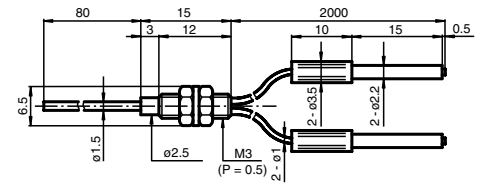


Fig.10

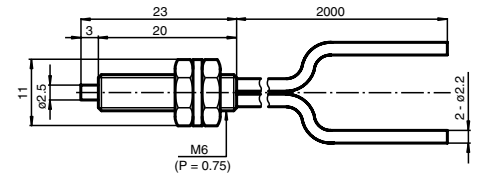


Fig.11

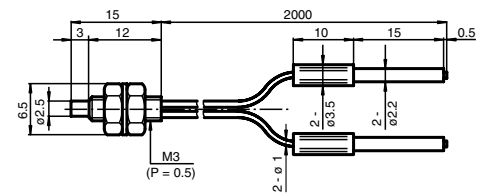
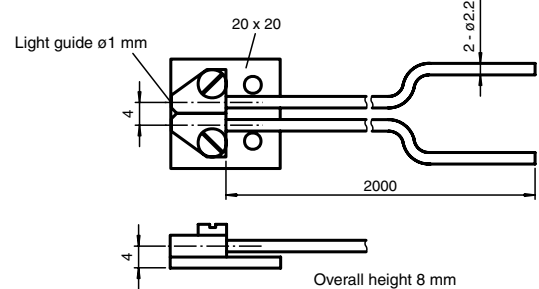
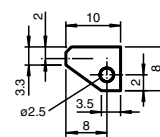


Fig.12



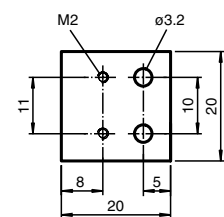
- Direct detection**
If both light guide heads are fixed **parallel** to the base plate, then the direct detection or reflex operation is possible.
- Retro-reflective operation**
A blind zone exists in front of the heads. This is larger in reflex operation than in direct detection (diffuse reflection). The actual size of the zone depends on the application.
- Through-beam operation**
Through-beam operation is achieved by removing the base plate and mounting the heads so that they are mutually opposed on a **common** reference axis.
- Triangulation**
By loosening and changing the positions of the heads on the base plate, the heads can be inclined at an arbitrary angle to each other. The reference axes of the light guides then form a **triangle**. Objects are detected which are located at the point of intersection of the axes.

Head

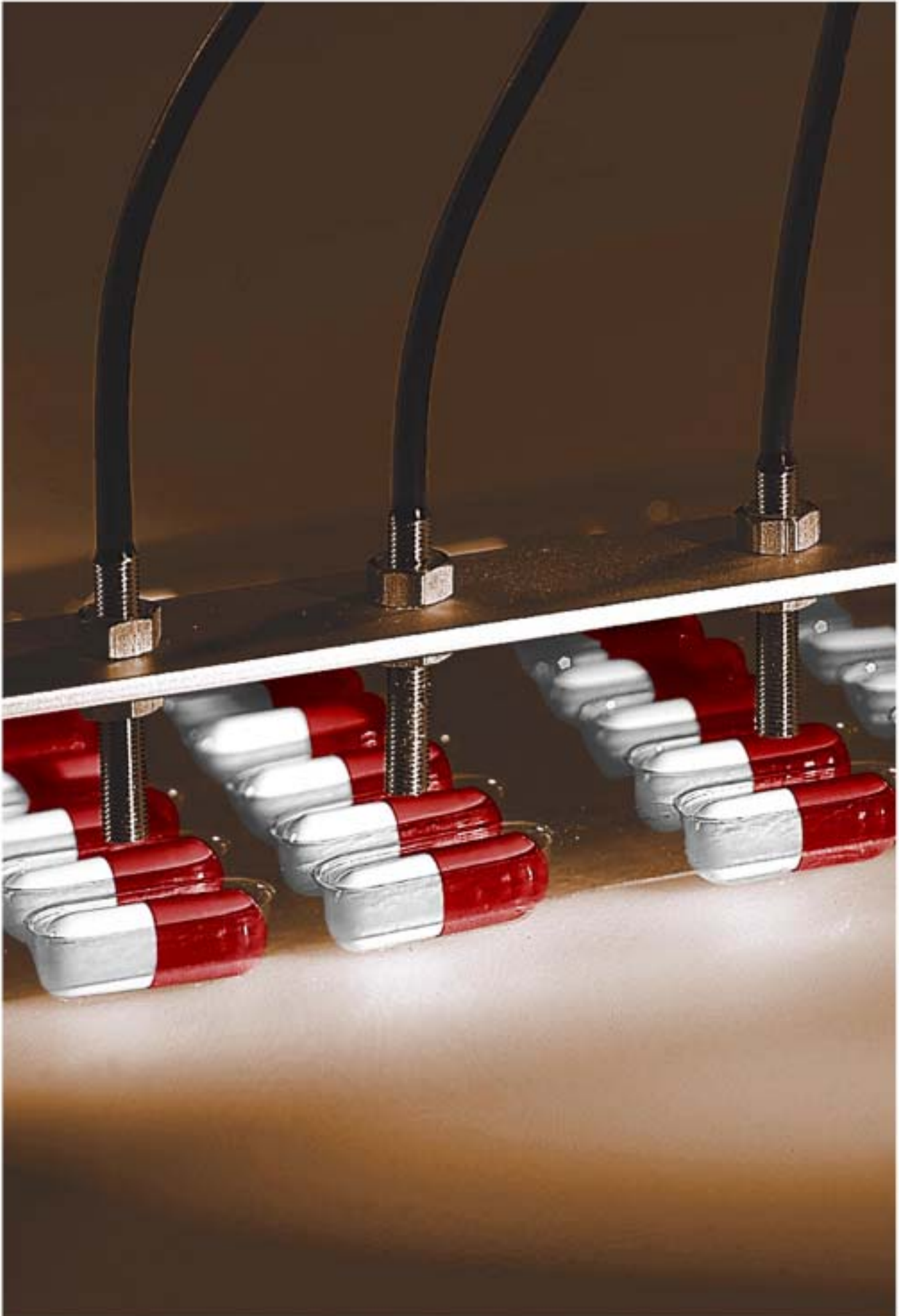


4 mm thick

Base plate



Aluminium 2 mm thick



Series KT9, KT10 and KT11 – our smallest units



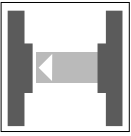
These look like fibre optics, but are actually true light beam switches with optical systems. Three different designs are available. A flat-tube unit with an outlet diameter of 4 mm and two units with M4 and M5 external threading. The sensors are available as single path light beam switches and as energetic light scanners. The series KT10 also includes a light scanner with background suppression.

The unit's housing is made of high-grade steel and the optical system is covered with a scratch resistant glass disk. The fastening nuts of the series KT10 are designed so that they cannot be over-tightened. Sensors of series KT9 and KT11 can be connected either with a fixed cable or with an M8 connector. Series KT10 is only available with a fixed cable and requires a separate signal converter for operation.

The transformer is integrated into the sensor housing for series KT9 and KT11. NPN or PNP transistor outputs are available as a signal output. The separate signal converters SU10 and SU11 have in addition a pre-fault indication feature and a sensitivity controller.

The main areas of application for these sensors include machines for manufacturing printed circuit boards, the packaging industry, assembly and handling systems, printing machines, and special mechanical engineering applications.

Principle	Type code	Detection range	Page
	KS9/KSE9/115	0 mm ... 250 mm	658
	KS9/KSE9/98a	0 mm ... 250 mm	662
	KS10/KSE10	0 mm ... 500 mm	674
	KS11/KSE11/115	0 mm ... 250 mm	692
	KS11/KSE11/98a	0 mm ... 250 mm	696
	KT9-50/115	0 mm ... 50 mm	666
	KT9-50/98a	0 mm ... 50 mm	670
	KT10-8-80	0 mm ... 80 mm	680
	KT11-50/115	0 mm ... 50 mm	700
	KT11-50/98a	0 mm ... 50 mm	704
	KT10-8-H-8	0.5 mm ... 8 mm	686



KS9/KSE9/59/.../115

Single path light beam switch

KS9/KSE9/59/.../115

with 2 m fixed cable

CE

Series
KT



- ◆ Detection range up to 250 mm
- ◆ Large detection range in relation to design
- ◆ Complete device, no amplifier needed
- ◆ Voltage range 10 V ... 30 V DC, output current 100 mA short circuit protected
- ◆ Optical parts made of glass, easy cleaning
- ◆ Protection degree IP67

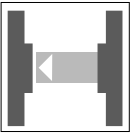
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KS9/KSE9/59/102/115	KS9/KSE9/59/103/115
Effective detection range	0 ... 250 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	Switching state: LED yellow (receiver) Pre-fault indicator: LED yellow flashing (receiver)	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 15 mA (device)	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	dark ON	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	≤ 250 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Test input	inactive: ≤ 4 V; active: ≥ 8 V or unwired (emitter)	◆	◆
Ambient temperature	0 ... +55 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m cable, 3 x 0.14 mm ² , PVC	◆	◆
Housing	V2A	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	76 g (device)	◆	◆

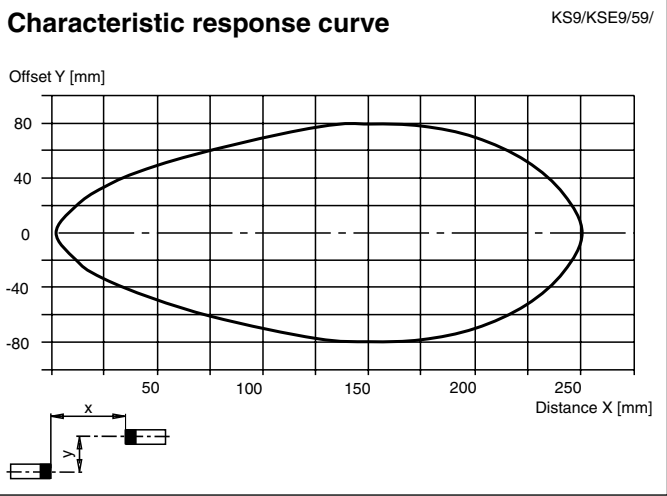
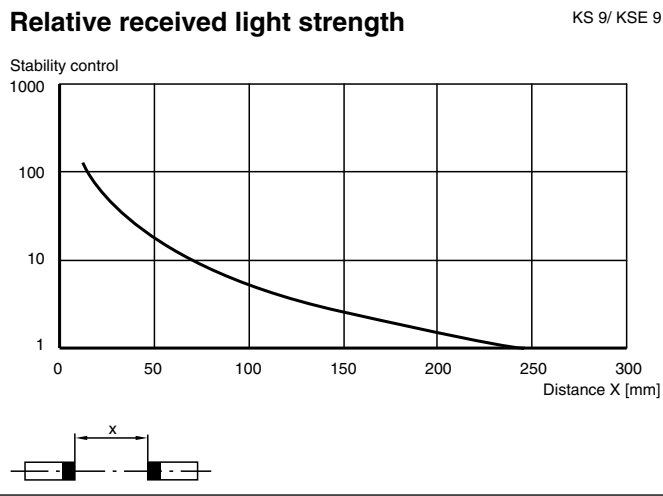
Series
KT

10/8/01

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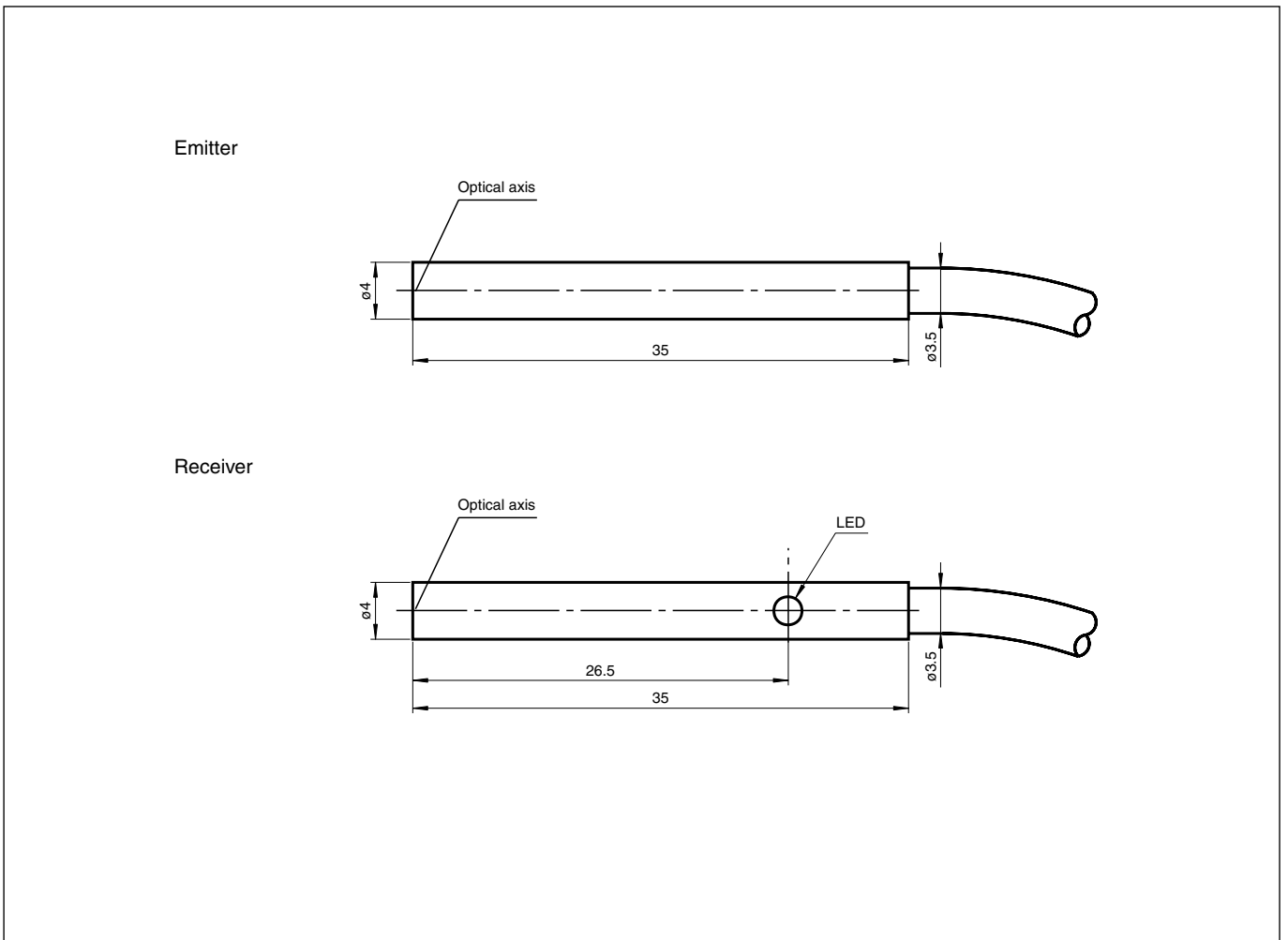


Diagrams



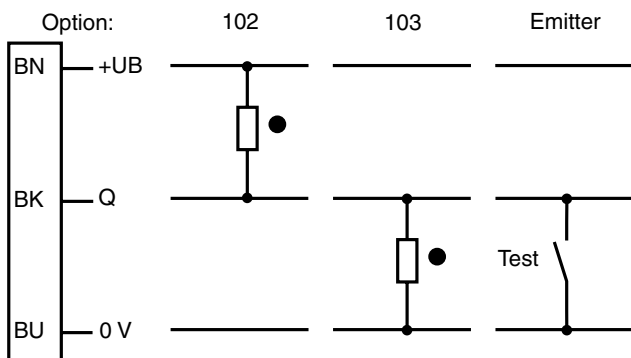
Series
KT

Dimensions



Series
KT

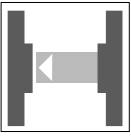
Electrical Connection



10/8/01

Date of issue

○ = Light ON, ● = Dark ON



KS9/KSE9/59/.../98a

Single path light beam switch

KS9/KSE9/59/.../98a

with 3-pin, M8 connector

CE

Series
KT

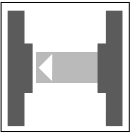


- ◆ Detection range up to 250 mm
- ◆ Large detection range in relation to design
- ◆ Complete device, no amplifier needed
- ◆ Voltage range 10 V ... 30 V DC, output current 100 mA short circuit protected
- ◆ Optical parts made of glass, easy cleaning
- ◆ Protection degree IP67

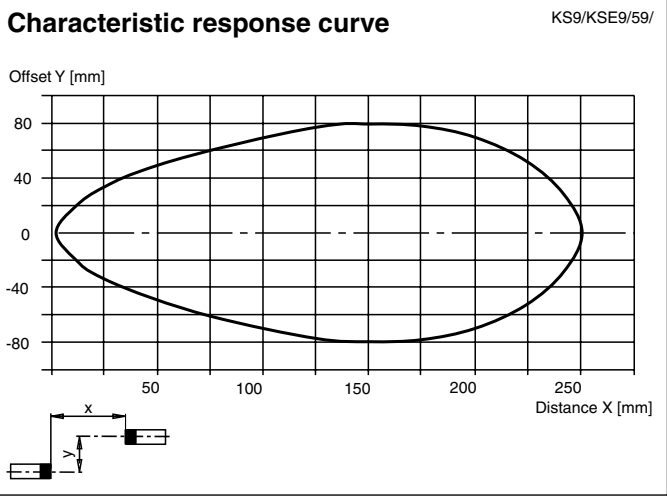
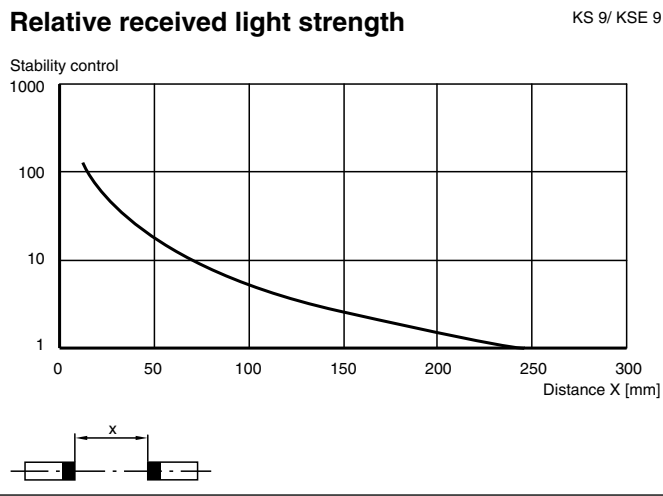
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KS9/KSE9/59/102/98a	KS9/KSE9/59/103/98a
Effective detection range	0 ... 250 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	Switching state: LED yellow (receiver) Pre-fault indicator: LED yellow flashing (receiver)	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 15 mA (device)	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	dark ON	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	≤ 250 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Test input	inactive: ≤ 4 V; active: ≥ 8 V or unwired (emitter)	◆	◆
Ambient temperature	0 ... +55 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M8 x 1, 3-pin	◆	◆
Housing	V2A	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	18 g (device)	◆	◆

Series
KT

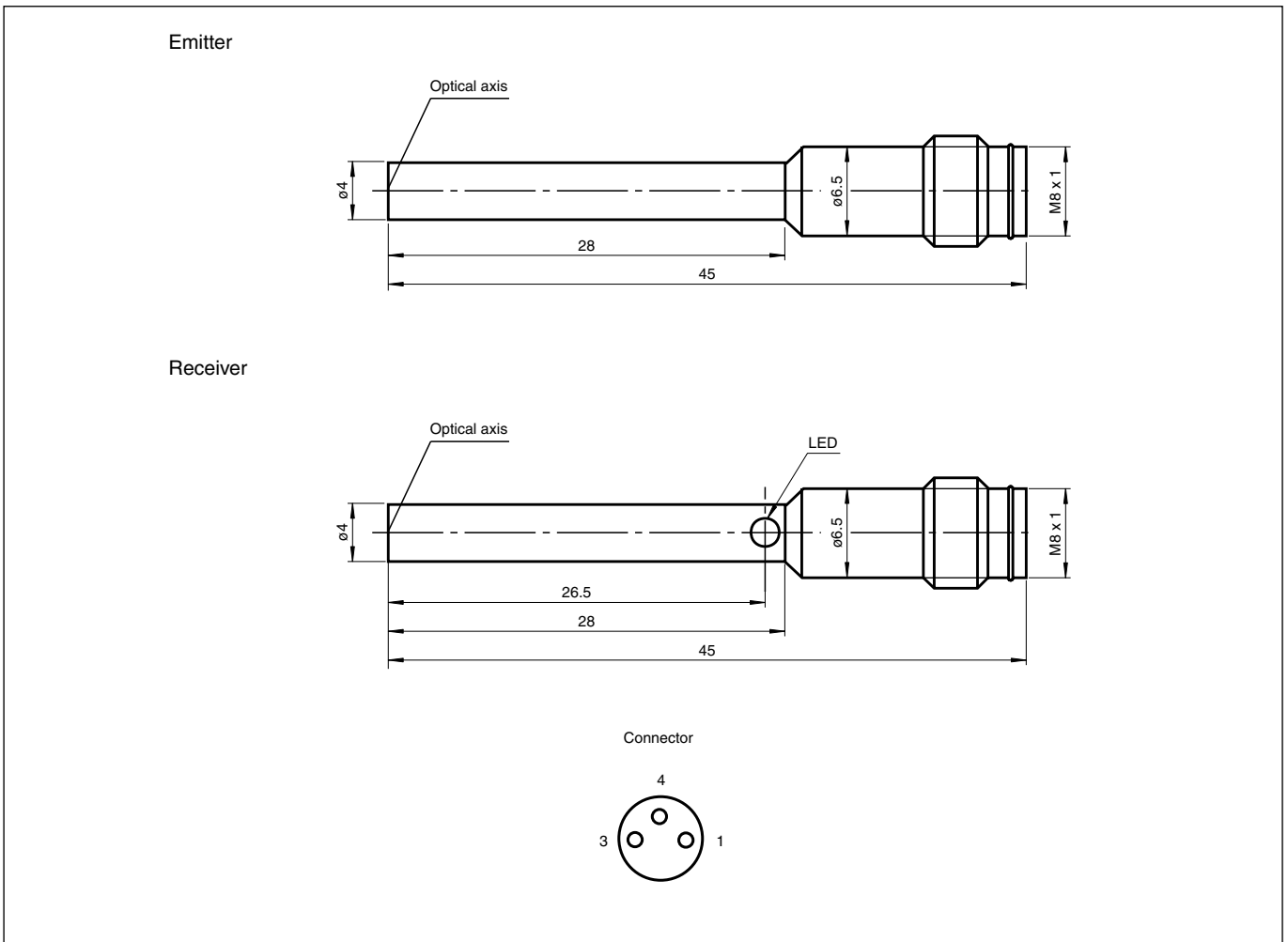


Diagrams



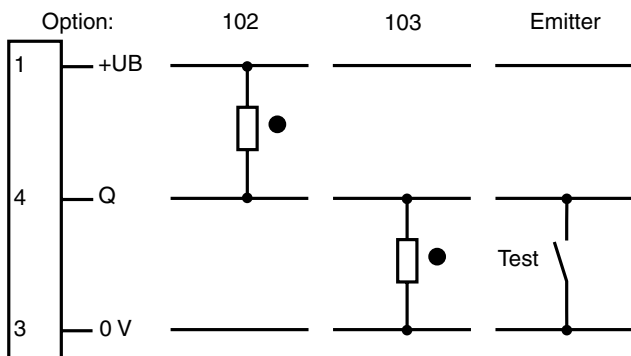
Series KT

Dimensions



Series
KT

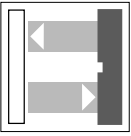
Electrical Connection



10/8/01

Date of issue

○ = Light ON, ● = Dark ON



KT9-50/25/.../115

Reflection light scanner

KT9-50/25/.../115

with 2 m fixed cable

CE

Series
KT



- ◆ Large sensor range up to 50 mm
- ◆ Very small housing
- ◆ Complete device, no amplifier needed
- ◆ Voltage range 10 V ... 30 V DC, output current 100 mA short circuit protected
- ◆ Optical parts made of glass, easy cleaning
- ◆ Protection degree IP67

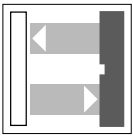
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KT9-50/25/102/115	KT9-50/25/103/115
Detection range	0 ... 50 mm	◆	◆
Reference target	Standard white, 100 mm x 100 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	Switching state: LED yellow pre-fault indicator: LED yellow flashing	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 15 mA	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	light ON	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	≤ 250 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Ambient temperature	0 ... +55 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m cable, 3 x 0.14 mm ² , PVC	◆	◆
Housing	V2A	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	38 g	◆	◆

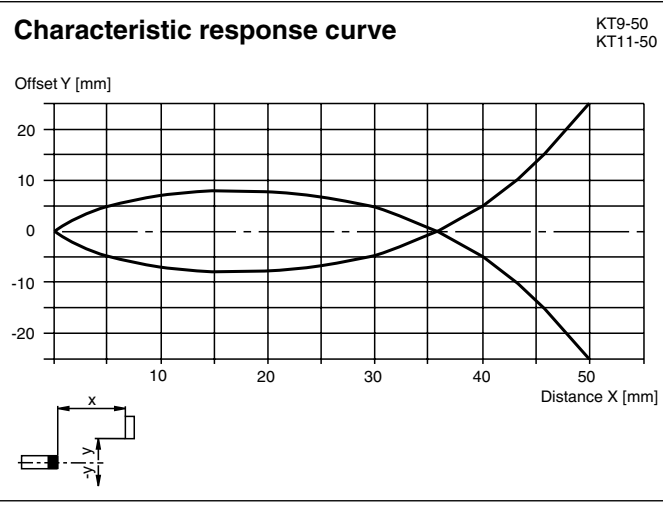
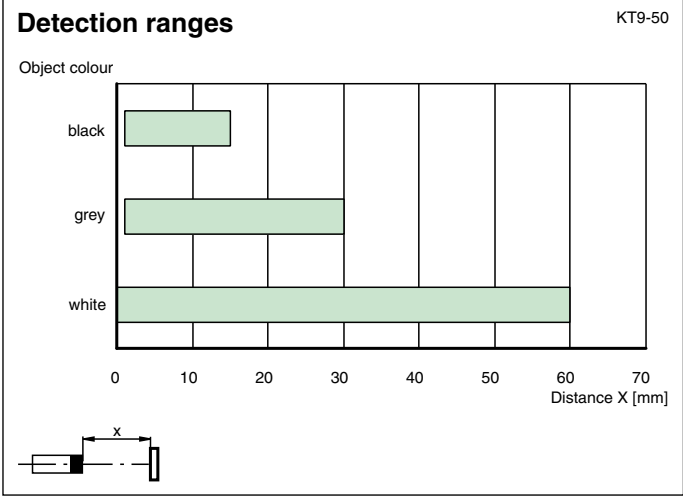
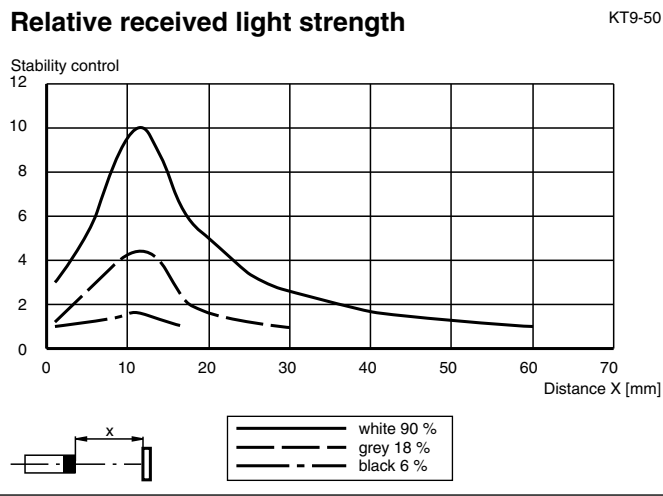
Series
KT

10/8/01

Date of issue

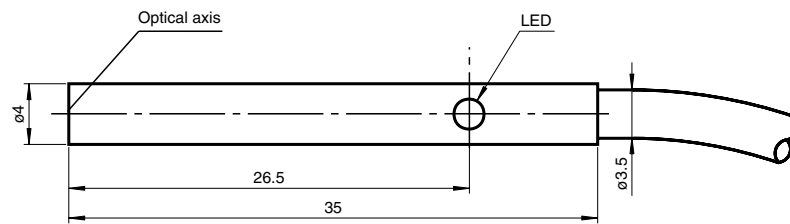


Diagrams



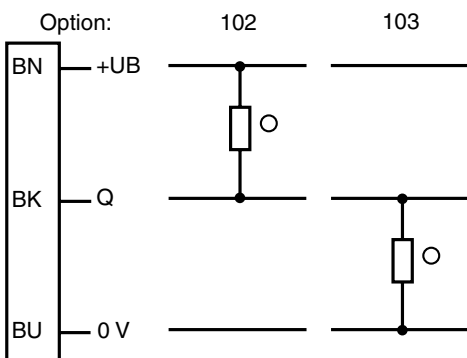
Series
KT

Dimensions



Series
KT

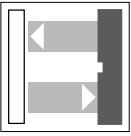
Electrical Connection



10/8/01

Date of issue

○ = Light ON, ● = Dark ON



KT9-50/25/.../98a

Reflection light scanner

KT9-50/25/.../98a

with 3-pin, M8 connector

CE

Series
KT



- ◆ Large sensor range up to 50 mm
- ◆ Very small housing
- ◆ Complete device, no amplifier needed
- ◆ Voltage range 10 V ... 30 V DC, output current 100 mA short circuit protected
- ◆ Optical parts made of glass, easy cleaning
- ◆ Protection degree IP67

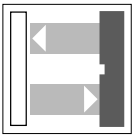
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KT9-50/25/102/98a	KT9-50/25/103/98a
Detection range	0 ... 50 mm	◆	◆
Reference target	Standard white, 100 mm x 100 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	Switching state: LED yellow pre-fault indicator: LED yellow flashing	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 15 mA	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	light ON	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	≤ 250 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Ambient temperature	0 ... +55 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M8 x 1, 3-pin	◆	◆
Housing	V2A	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	9 g	◆	◆

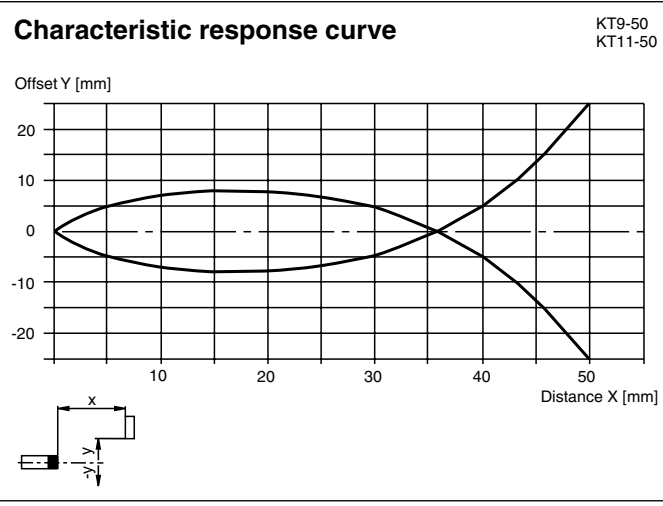
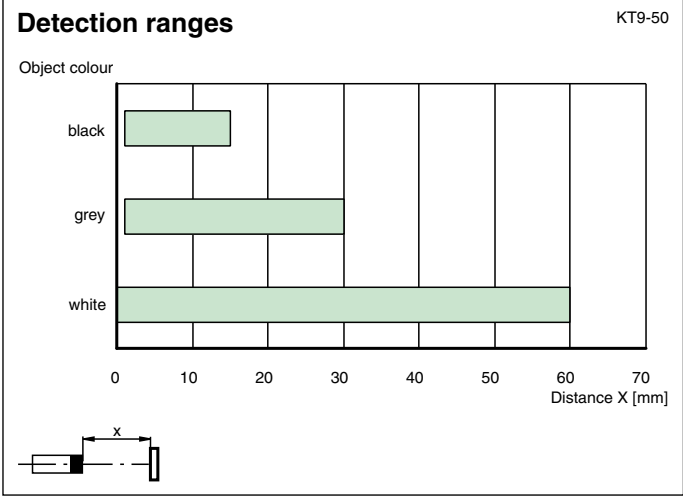
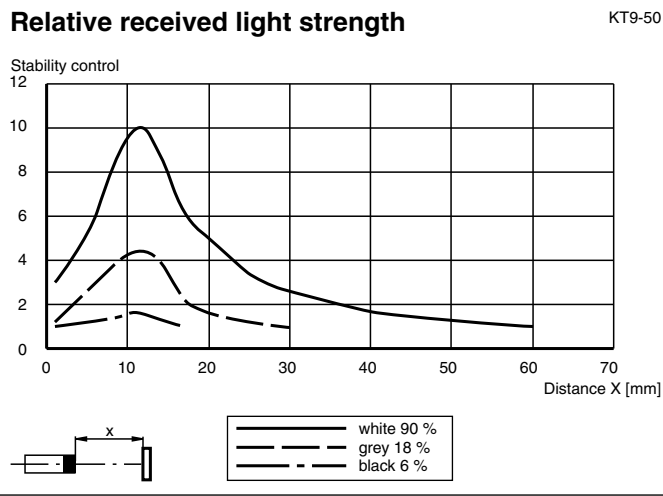
Series
KT

10/8/01

Date of issue

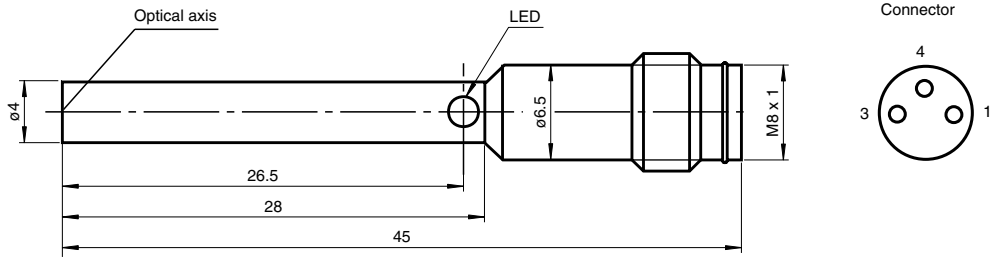


Diagrams

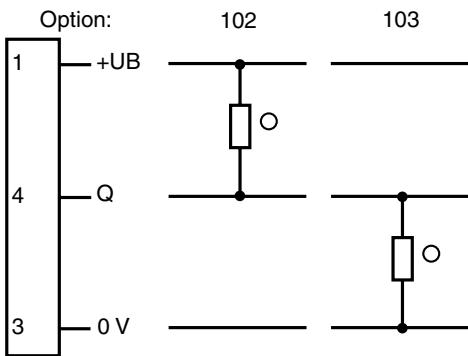


Series KT

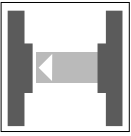
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



KS/KSE10

Single path light beam switch

KS/KSE10

with 2 m fixed cable

CE

Series
KT

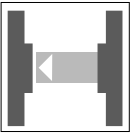


- ◆ Detection range up to 1500 mm
- ◆ Miniature design in M4 housing
- ◆ Housing material high-grade steel
- ◆ Fastening nuts designed so that they cannot be over-tightened
- ◆ Signal converters SU10... or SU11... are suitable to operate

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KS/KSE10	SU10/40a/49/116	SU11/32/40a/82b/115	SU11/32/40a/82b/92	SU11/40a/49/115	SU11/40a/49/92
Effective detection range	0 ... 500 mm	◆					
Threshold detection range	1500 mm	◆					
Obstacle size	6 mm	◆					
Light source	IREd	◆					
Light type	Infrared, alternating light	◆					
Angle of divergence	approx. 10 °	◆					
Diameter of the light spot	approx. 100 mm at 500 mm detection range	◆					
Ambient light limit	100000 Lux	◆					
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Function display	LED red: 1-fold stability control LED green triple stability control		◆	◆	◆	◆	◆
Controls	sensitivity adjuster		◆	◆	◆	◆	◆
Controls	Light/dark switch		◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC		◆	◆	◆	◆	◆
Ripple	10 %		◆	◆	◆	◆	◆
No-load supply current	40 mA		◆	◆	◆	◆	◆
Signal output	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity 1 pnp, short-circuit proof, open collector		◆			◆	◆
Switching type	light/dark switching		◆	◆	◆	◆	◆
Switching voltage	30 V DC		◆	◆	◆	◆	◆
Switching current	200 mA		◆	◆	◆	◆	◆
Switching frequency	70 Hz		◆	◆	◆	◆	◆
Response time	5 ms		◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP40		◆				
	IP65	◆		◆	◆	◆	◆
Connection type	4-pin, M12 connector				◆		◆
	Fixed cable 2 m	◆					
	Fixed cable 2500 mm			◆		◆	
	screw terminals		◆				
Housing	Aluminium			◆	◆	◆	◆
	PVC		◆				
	V2A	◆					
Light exit	Glass	◆					
Mass	20 g (device)	◆					
	50 g		◆				
	60 g			◆	◆	◆	◆

Series
KT

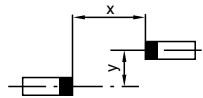
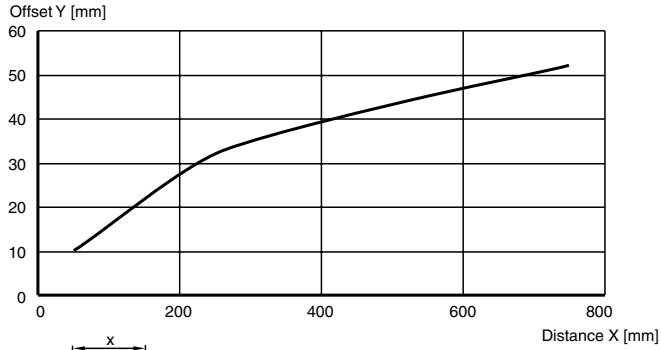


KS/KSE10

Diagrams

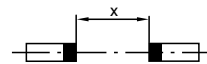
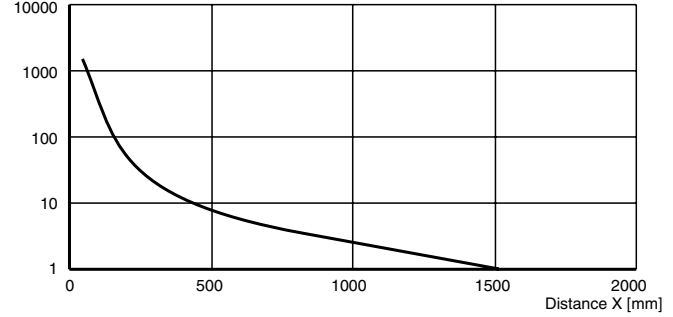
Characteristic response curve

KS/KSE10



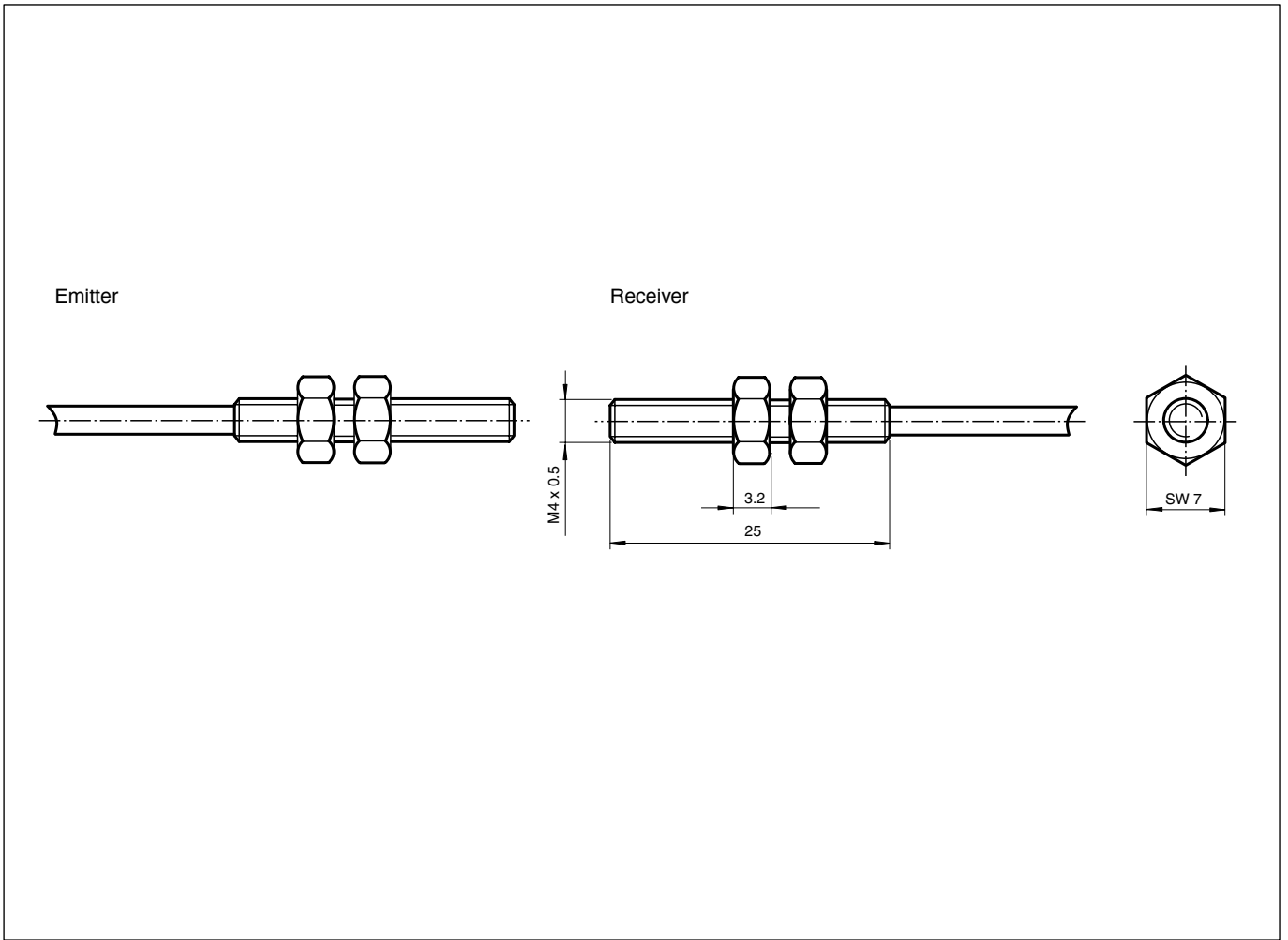
Relative received light strength

Stability control



Series
KT

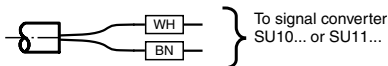
Dimensions



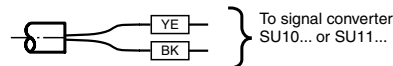
Series
KT

Electrical Connection

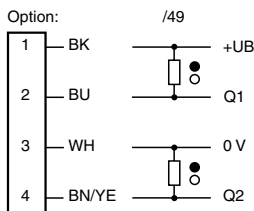
KS/KSE10
Emitter



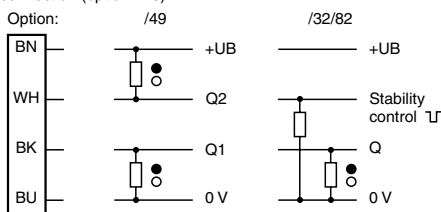
Receiver



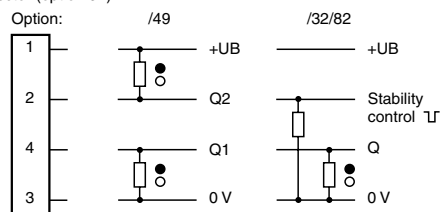
Signal converter SU10 ...



Signal converter SU11 ...
Cable connection (option 115)



Connector (option 92)



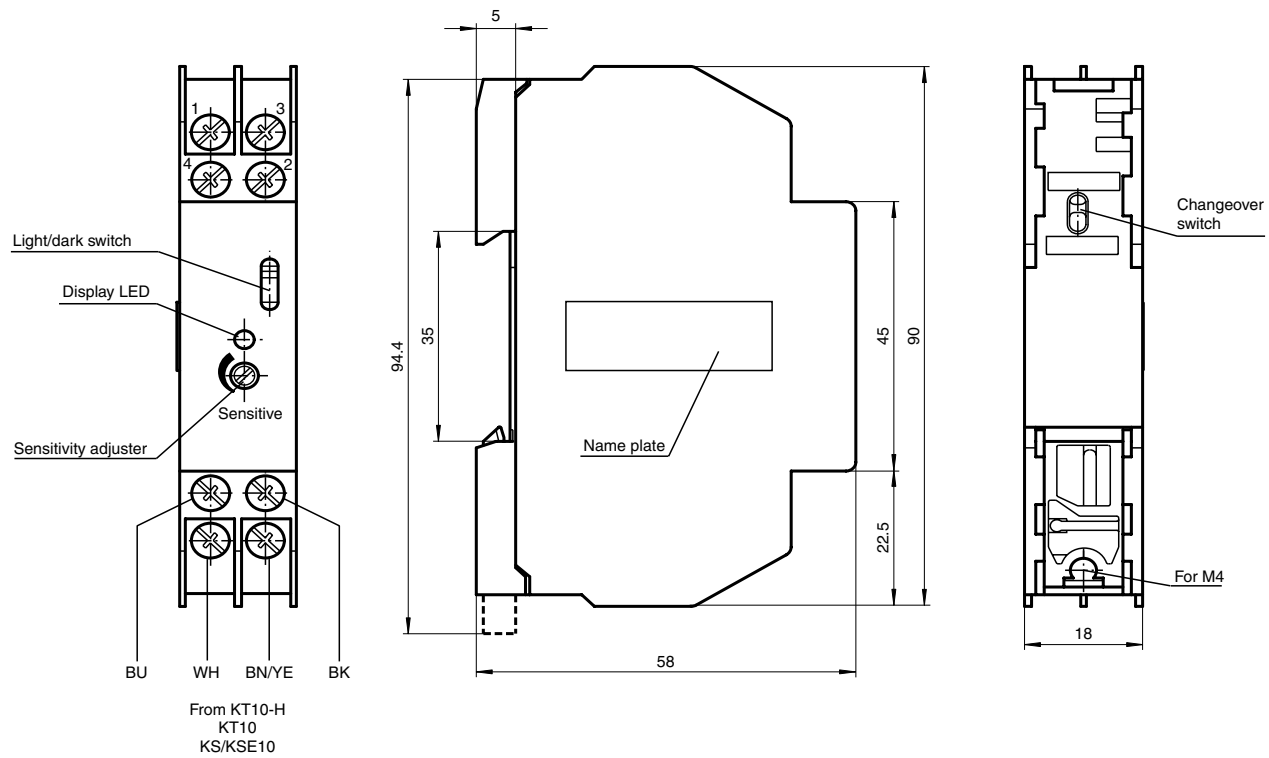
○ = Light ON, ● = Dark ON

Date of issue 10/15/01

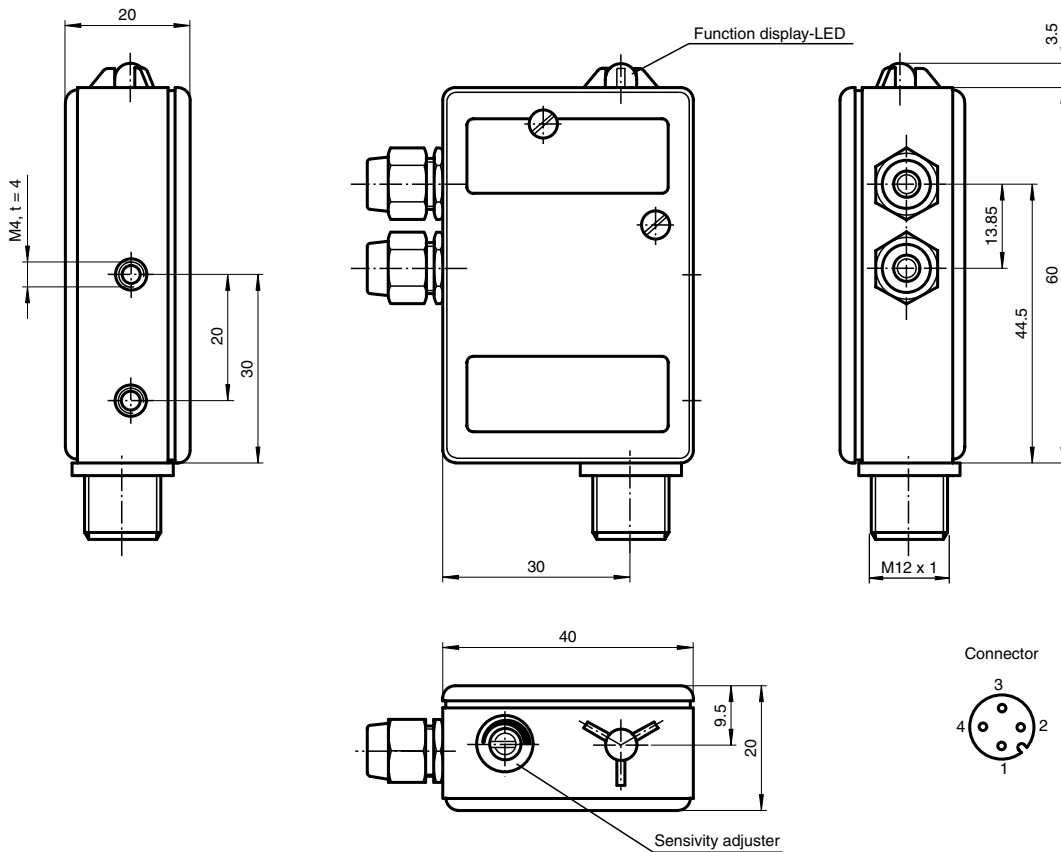
KS/KSE10

Dimensions of the signal converters

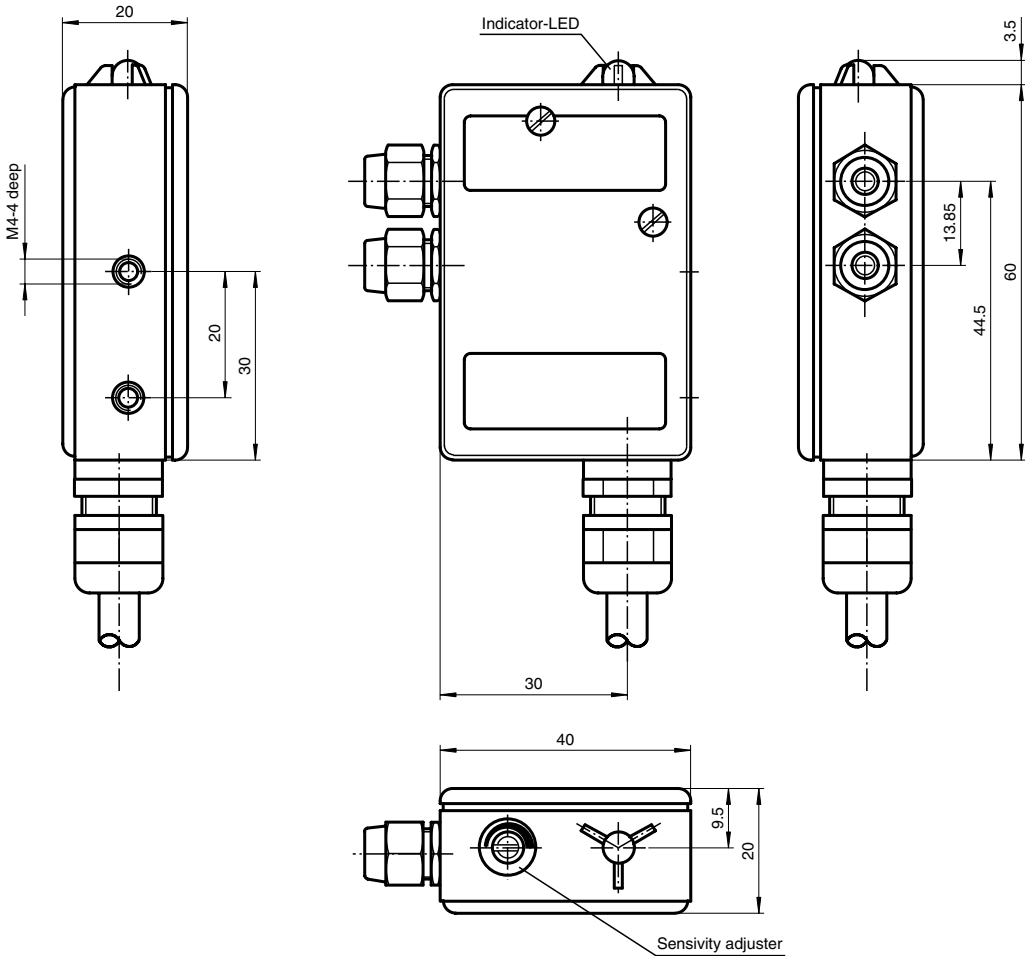
Signal converter SU10/40a/49/116



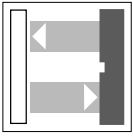
Signal converter SU11/.../92



Signal converter SU11/.../115



Series
KT



KT10-8-80

Reflection light scanner

KT10-8-80

with 1.5 m fixed cable

CE

Series
KT

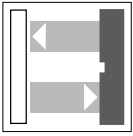


- ◆ Detection range 0 mm ... 80 mm, adjustable
- ◆ Miniature design in M4 housing
- ◆ Housing material high-grade steel
- ◆ Fastening nuts designed so that they cannot be over-tightened
- ◆ Signal converters SU10... or SU11... are suitable to operate

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KT10-8-80	SU10/40a/49/116	SU11/32/40a/82b/115	SU11/32/40a/82b/92	SU11/40a/49/115	SU11/40a/49/92
Detection range	0 ... 80 mm	◆					
Adjustment range	40 ... 80 mm	◆					
Light source	IRED	◆					
Light type	Infrared, alternating light	◆					
Angle of divergence	approx. 10 °	◆					
Diameter of the light spot	15 mm at 80 mm detection range	◆					
Ambient light limit	70000 Lux	◆					
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Function display	LED red: 1-fold stability control LED green triple stability control		◆	◆	◆	◆	◆
Controls	sensitivity adjuster		◆	◆	◆	◆	◆
Controls	Light/dark switch		◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC		◆	◆	◆	◆	◆
Ripple	10 %		◆	◆	◆	◆	◆
No-load supply current	40 mA		◆	◆	◆	◆	◆
Signal output	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity		◆			◆	◆
	1 pnp, short-circuit proof, open collector			◆	◆		
Switching type	light/dark switching		◆	◆	◆	◆	◆
Switching voltage	30 V DC		◆	◆	◆	◆	◆
Switching current	200 mA		◆	◆	◆	◆	◆
Switching frequency	70 Hz		◆	◆	◆	◆	◆
Response time	5 ms		◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP40		◆				
	IP65	◆		◆	◆	◆	◆
Connection type	4-pin, M12 connector				◆		◆
	Fixed cable 1500 mm	◆					
	Fixed cable 2500 mm			◆		◆	
	screw terminals		◆				
Housing	Aluminium			◆	◆	◆	◆
	PVC		◆				
	V2A	◆					
Light exit	Glass	◆					
Mass	20 g	◆					
	50 g		◆				
	60 g			◆	◆	◆	◆

Series
KT

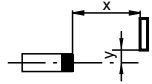
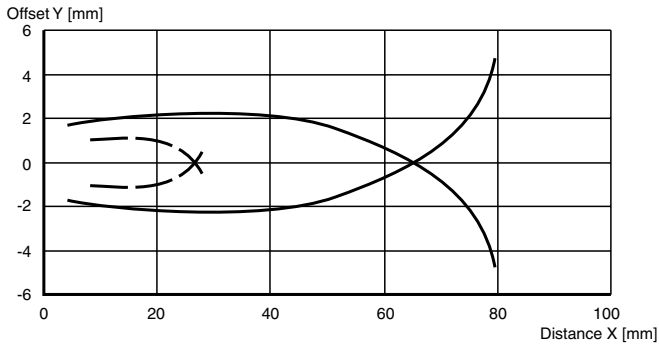


KT10-8-80

Diagrams

Characteristic response curve

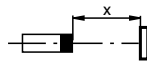
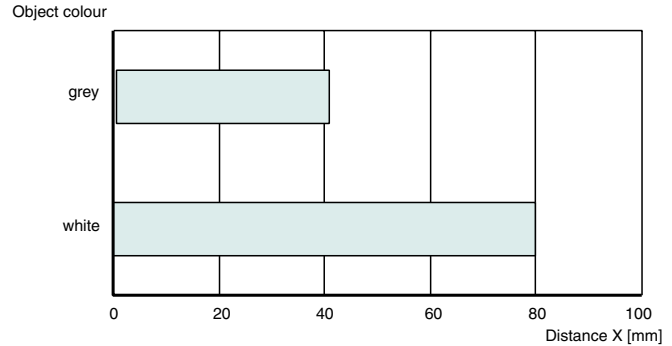
KT10-8



— white 90 %
 - - - grey 18 %

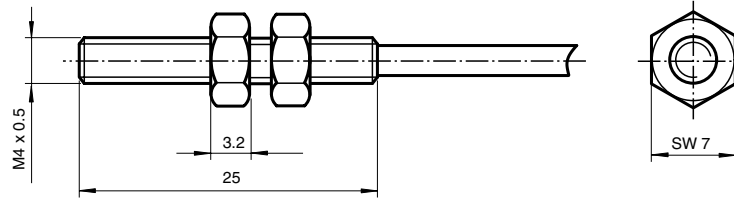
Detection ranges

KT10-8



Series
KT

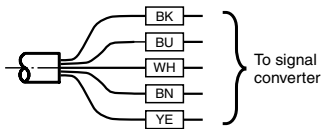
Dimensions



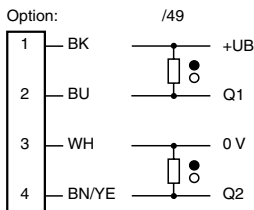
Series
KT

Electrical Connection

KT10-H/KT10-80

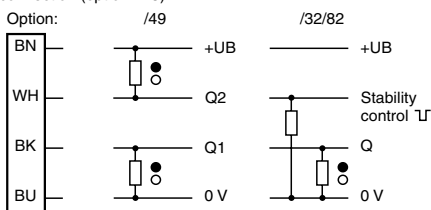


Signal converter SU10 ...

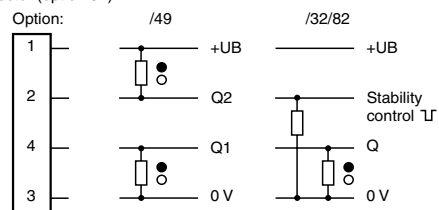


Signal converter SU11 ...

Cable connection (option 115)



Connector (option 92)



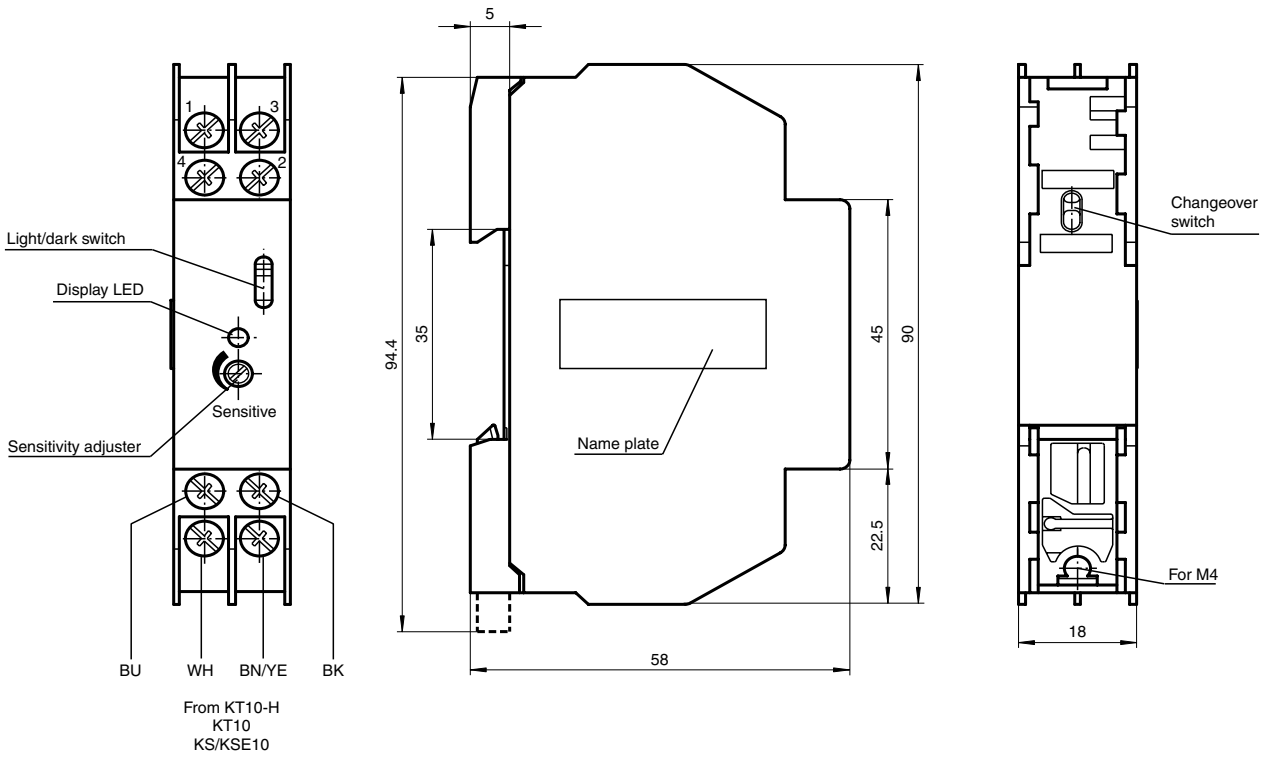
○ = Light ON, ● = Dark ON

Date of issue 10/15/01

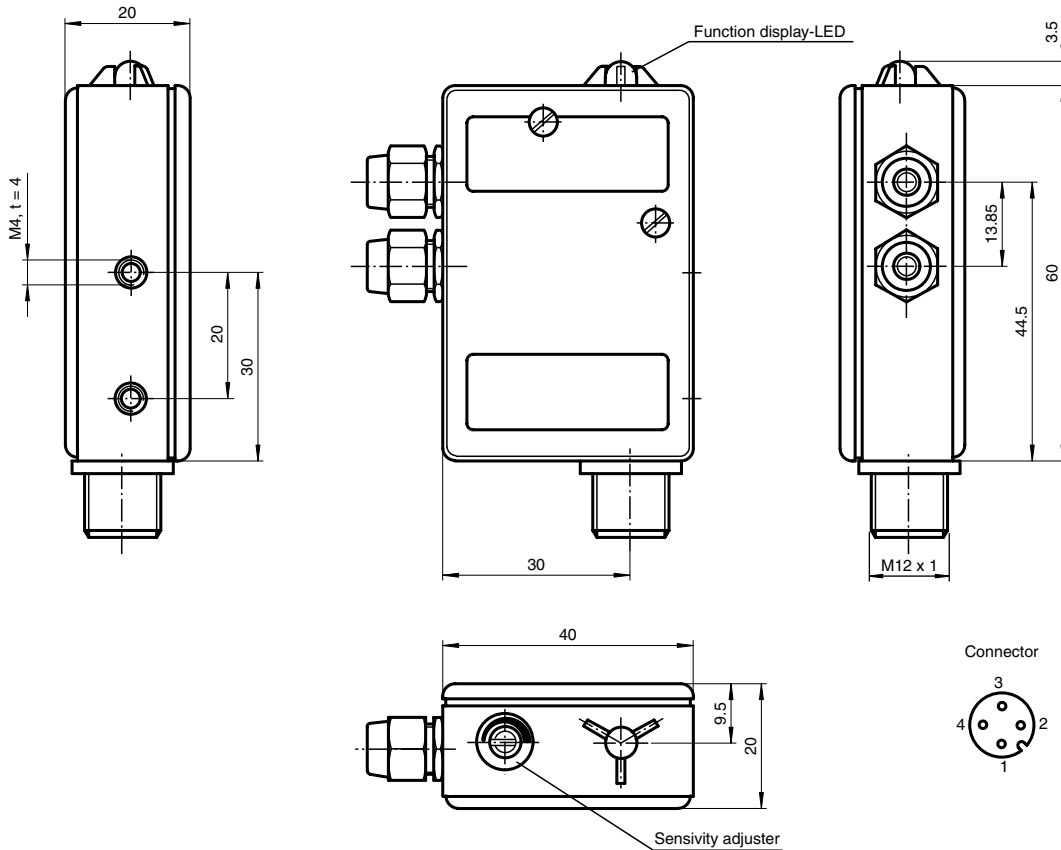
KT10-8-80

Dimensions of the signal converters

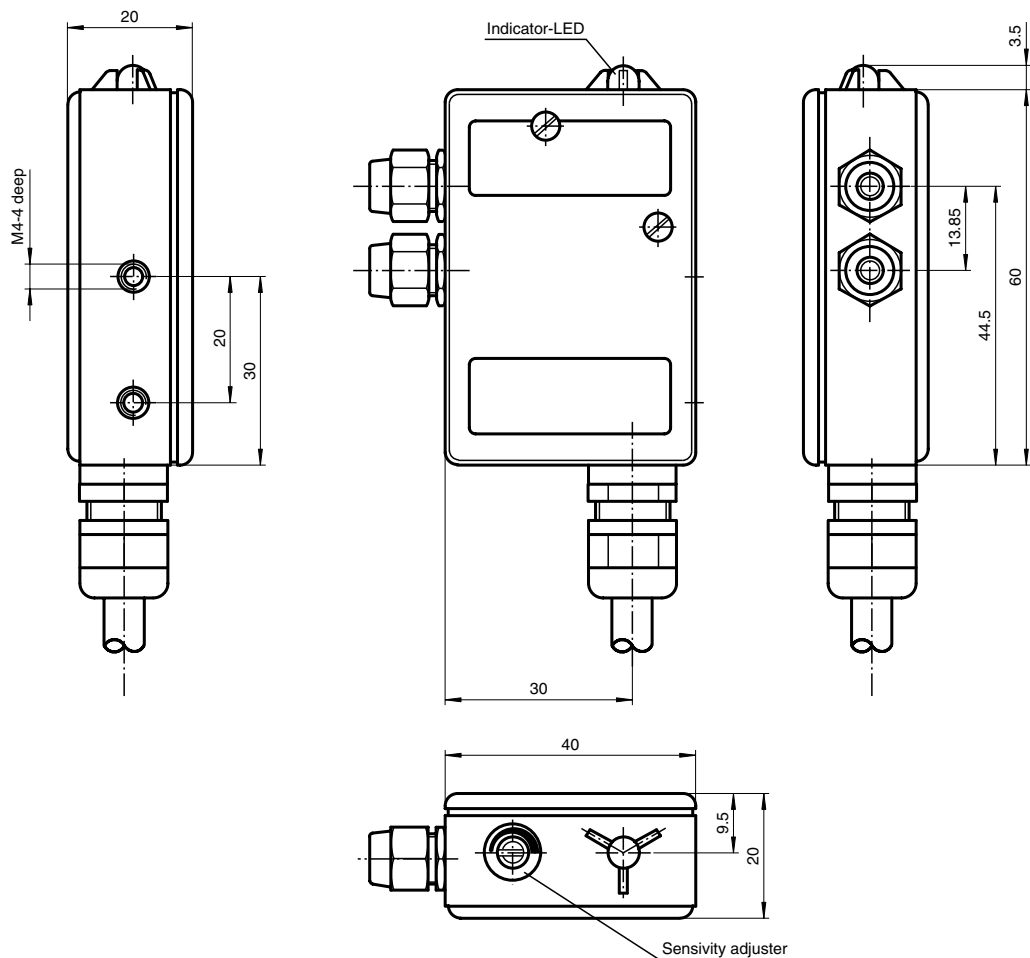
Signal converter SU10/40a/49/116



Signal converter SU11/.../92



Signal converter SU11/.../115



Series
KT



KT10-8-H-8

Reflection light scanner with background suppression

KT10-8-H-8

with 1.5 m fixed cable

CE

Series
KT



- ◆ Detection range 0.5 mm ... 8 mm
- ◆ Miniature design in M4 housing
- ◆ Housing material high-grade steel
- ◆ Fastening nuts designed so that they cannot be over-tightened
- ◆ Signal converters SU10... or SU11... are suitable to operate

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KT10-8-H-8	SU10/40a/49/116	SU11/32/40a/82b/115	SU11/32/40a/82b/92	SU11/40a/49/115	SU11/40a/49/92
Detection range	0.5 ... 8 mm	◆					
Detection range min.	0.5 ... 8 mm	◆					
Sensor range max.	0.5 ... 9 mm	◆					
Background suppression	starts from 10 mm	◆					
Black/white difference (6%/90%)	≤ 10 %	◆					
Light source	IREd	◆					
Light type	Infrared, alternating light	◆					
Angle of divergence	approx. 12 °	◆					
Diameter of the light spot	2 mm at 8 mm sensor range	◆					
Ambient light limit	50000 Lux	◆					
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Function display	LED red: 1-fold stability control LED green triple stability control		◆	◆	◆	◆	◆
Controls	sensitivity adjuster		◆	◆	◆	◆	◆
Controls	Light/dark switch		◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC		◆	◆	◆	◆	◆
Ripple	10 %		◆	◆	◆	◆	◆
No-load supply current	40 mA		◆	◆	◆	◆	◆
Signal output	1 npn, 1 pnp synchronised-switching, short-circuit proof, protected against reverse polarity 1 pnp, short-circuit proof, open collector		◆			◆	◆
Switching type	light/dark switching		◆	◆	◆	◆	◆
Switching voltage	30 V DC		◆	◆	◆	◆	◆
Switching current	200 mA		◆	◆	◆	◆	◆
Switching frequency	70 Hz		◆	◆	◆	◆	◆
Response time	5 ms		◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP40		◆				
	IP65	◆		◆	◆	◆	◆
Connection type	4-pin, M12 connector				◆		◆
	Fixed cable 1500 mm	◆					
	Fixed cable 2500 mm			◆		◆	
	screw terminals		◆				
Housing	Aluminium			◆	◆	◆	◆
	PVC		◆				
	V2A	◆					
Light exit	Glass	◆					
Mass	20 g	◆					
	50 g		◆				
	60 g			◆	◆	◆	◆

Series
KT

10/15/01

Date of issue

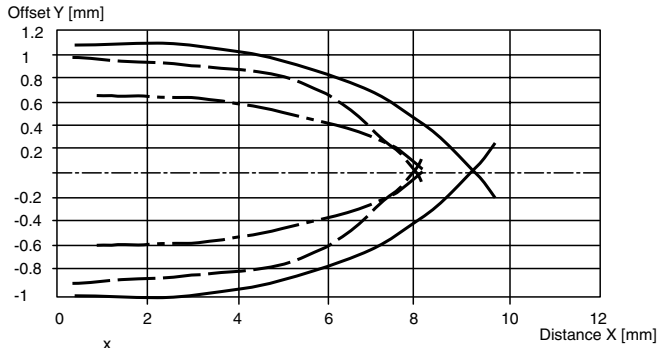


KT10-8-H-8

Diagrams

Characteristic response curve

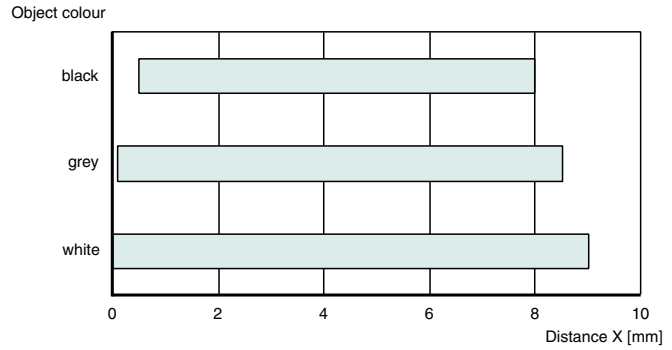
RT10-H-8



- white 90 %
- - - grey 18 %
- · - black 6 %

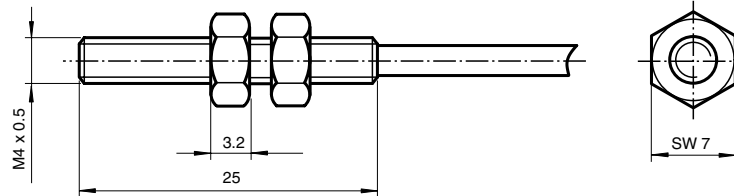
Detection ranges

KT10-H-8



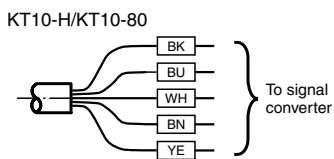
Series
KT

Dimensions

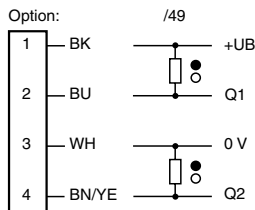


Series
KT

Electrical Connection

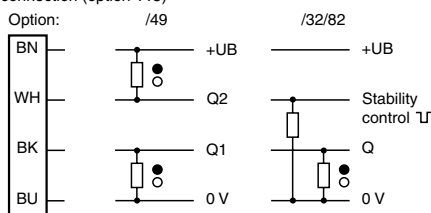


Signal converter SU10 ...

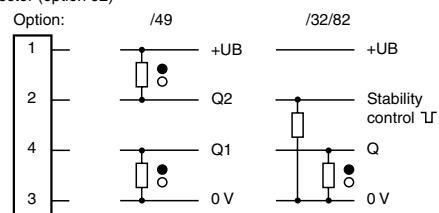


Signal converter SU11 ...

Cable connection (option 115)



Connector (option 92)



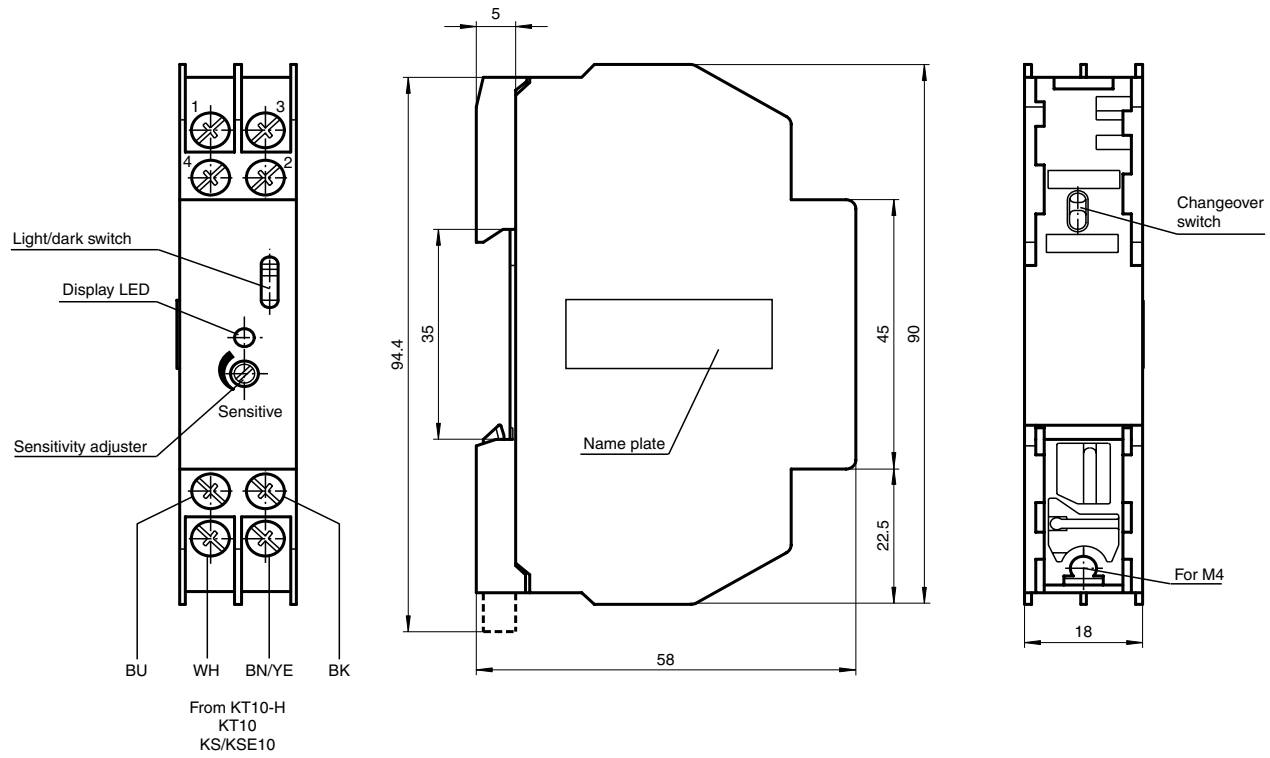
○ = Light ON, ● = Dark ON

Date of issue 10/15/01

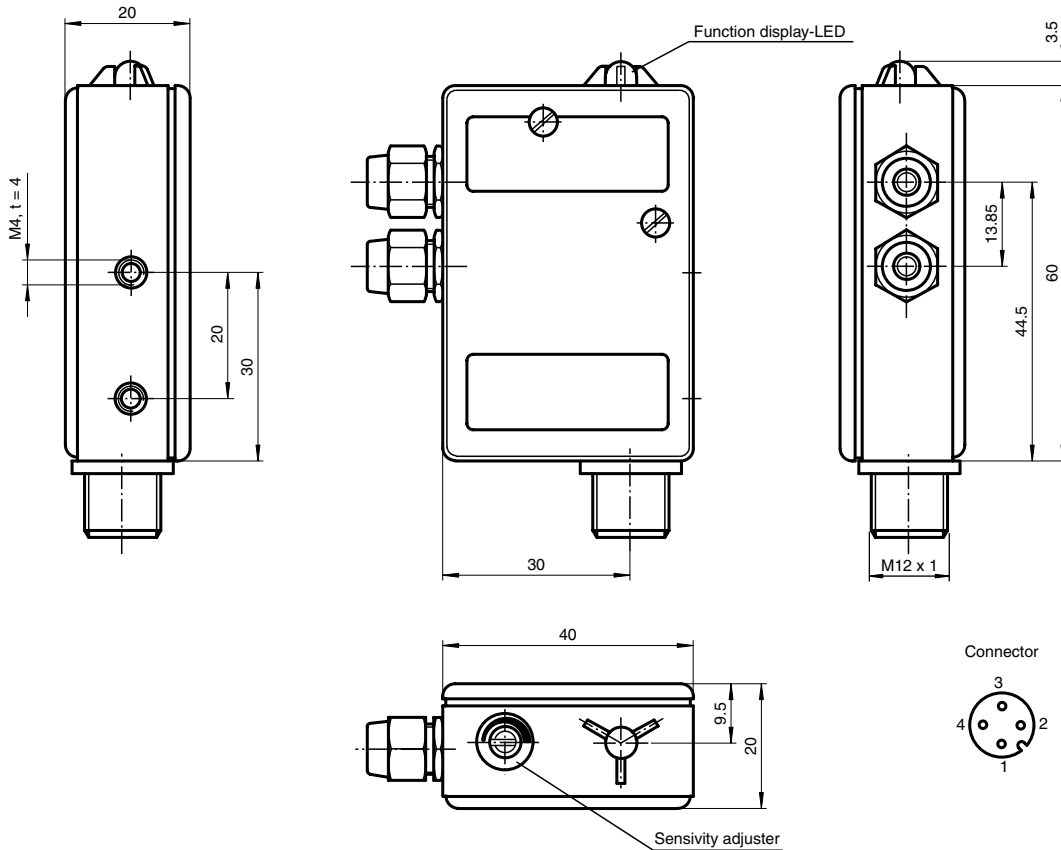
KT10-8-H-8

Dimensions of the signal converters

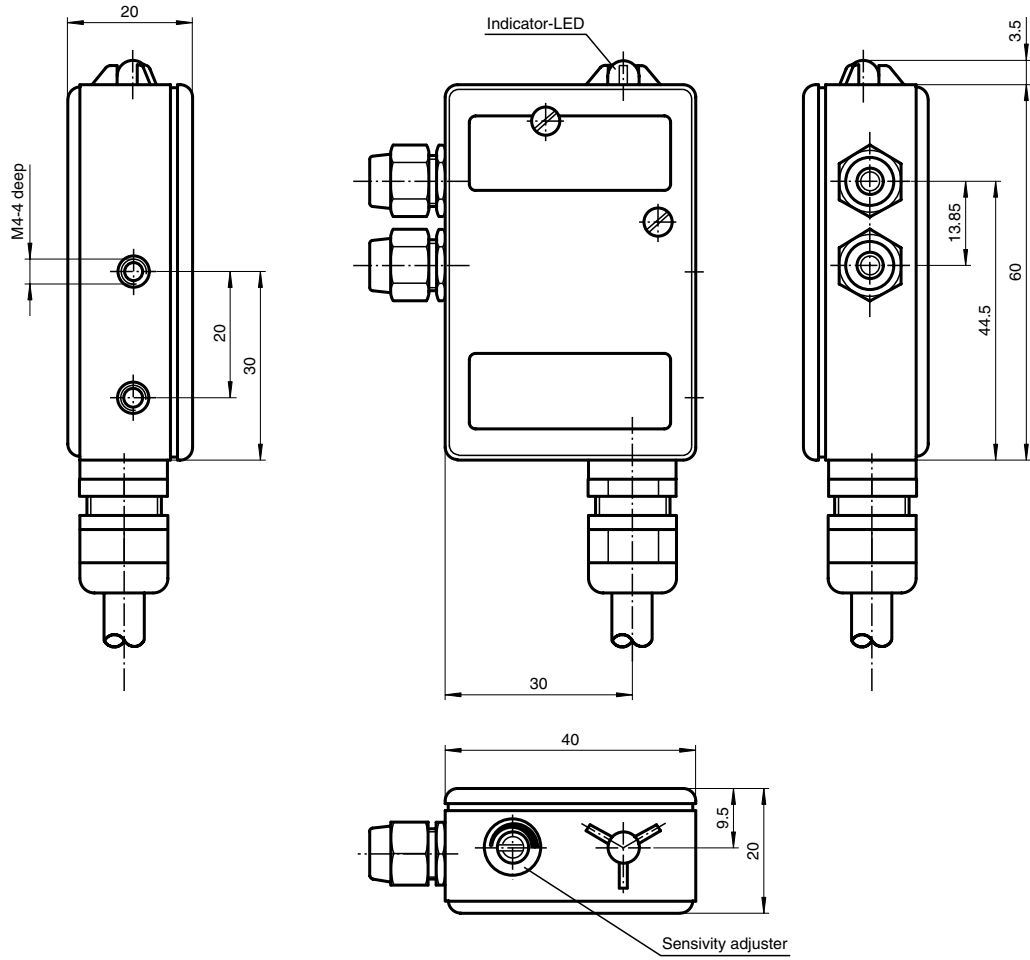
Signal converter SU10/40a/49/116



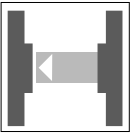
Signal converter SU11/.../92



Signal converter SU11/.../115



Series
KT



KS11/KSE11/59/.../115

Single path light beam switch

KS11/KSE11/59/.../115

with 2 m fixed cable

CE

Series
KT



- ◆ Large detection range up to 250 mm
- ◆ Very small housing
- ◆ Complete device, no amplifier needed
- ◆ Voltage range 10 V ... 30 V DC, output current 100 mA short circuit protected
- ◆ Optical parts made of glass, easy cleaning
- ◆ Protection degree IP67

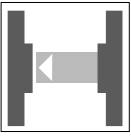
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KS11/KSE11/59/102/115	KS11/KSE11/59/103/115
Effective detection range	0 ... 250 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	Switching state: LED yellow (receiver) Pre-fault indicator: LED yellow flashing (receiver)	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 15 mA (device)	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	dark ON	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	≤ 250 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Test input	inactive: ≤ 4 V; active: ≤ 8 V or unwired (emitter)	◆	◆
Ambient temperature	0 ... +55 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m PVC cable, 3 x 0.14 mm ²	◆	◆
Housing	V2A	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	76 g (device)	◆	◆

Series
KT

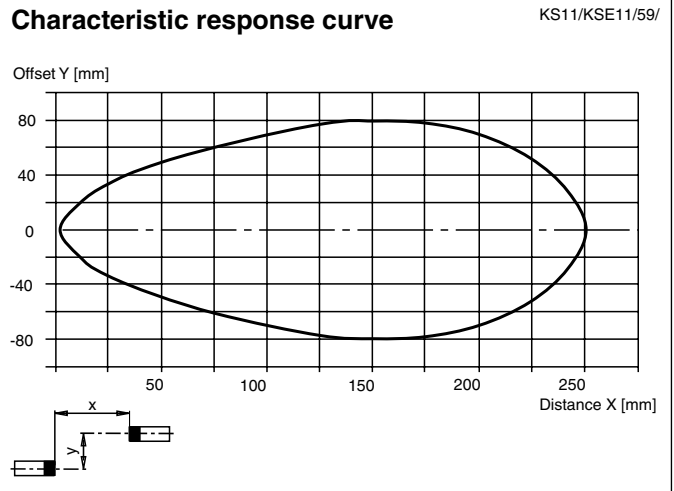
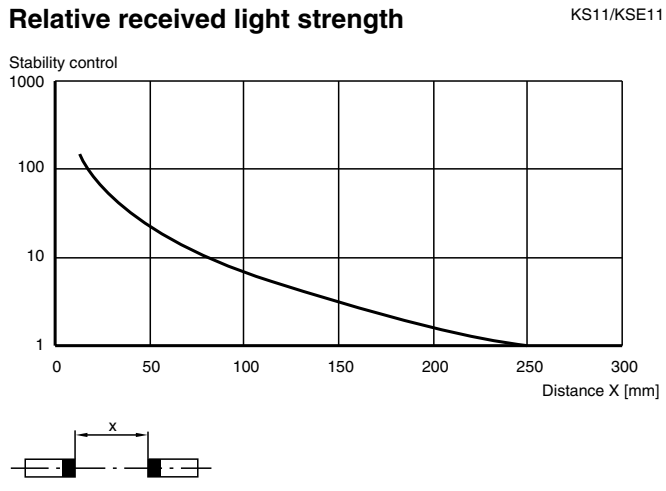
10/8/01

Date of issue



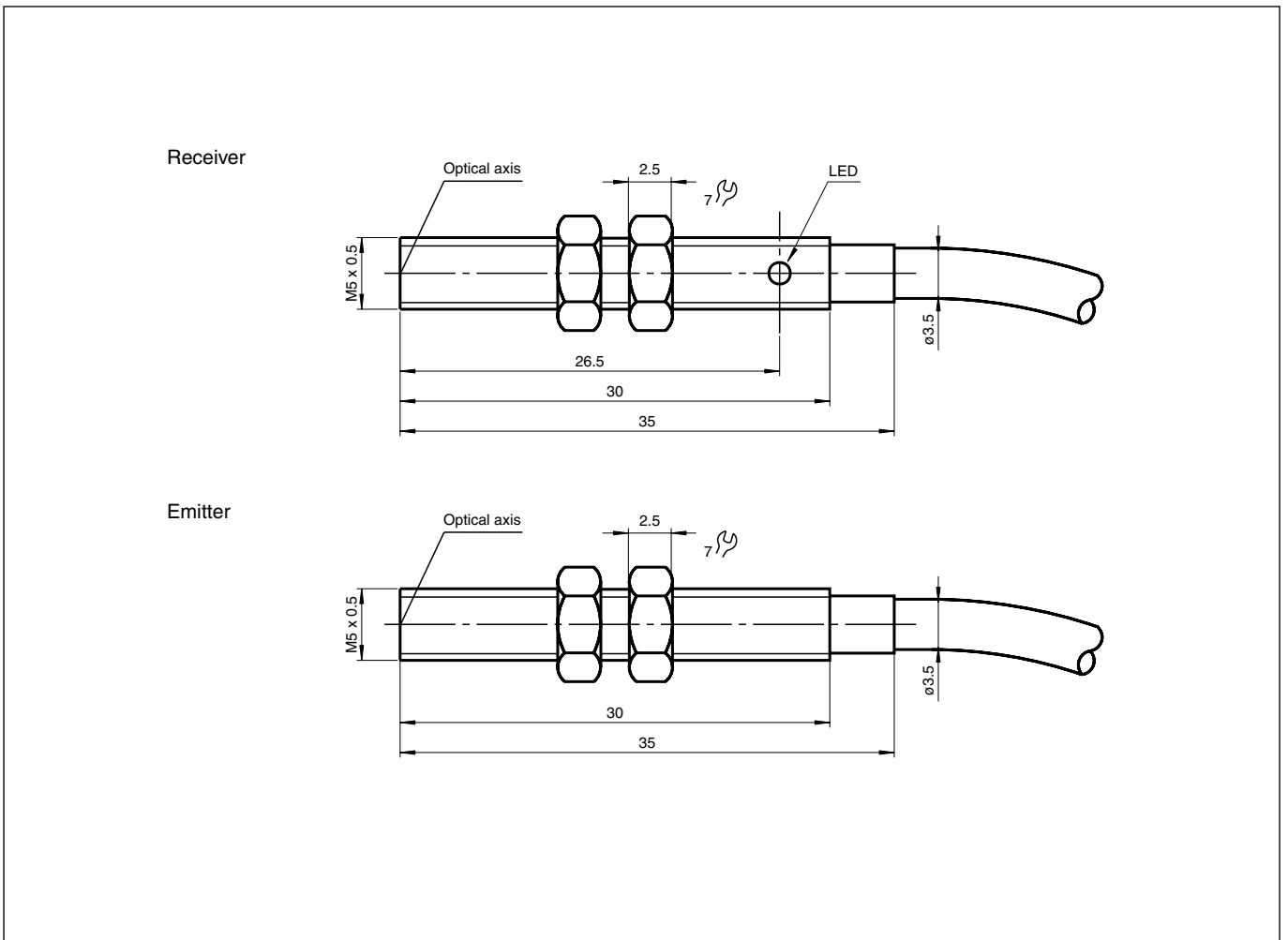
KS11/KSE11/59/.../115

Diagrams



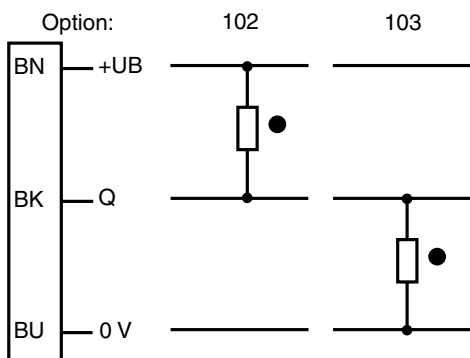
Series
KT

Dimensions

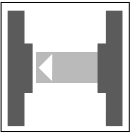


Series
KT

Electrical Connection



○ = Light ON, ● = Dark ON



KS11/KSE11/59/.../98a

Single path light beam switch

KS11/KSE11/59/.../98a

with 3-pin, M8 connector

CE

Series
KT



- ◆ Large detection range up to 250 mm
- ◆ Very small housing
- ◆ Complete device, no amplifier needed
- ◆ Voltage range 10 V ... 30 V DC, output current 100 mA short circuit protected
- ◆ Optical parts made of glass, easy cleaning
- ◆ Protection degree IP67

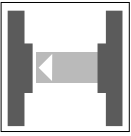
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KS11/KSE11/59/102/98a	KS11/KSE11/59/103/98a
Effective detection range	0 ... 250 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	Switching state: LED yellow (receiver) Pre-fault indicator: LED yellow flashing (receiver)	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 15 mA (device)	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	dark ON	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	≤ 250 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Test input	inactive: ≤ 4 V; active: ≤ 8 V or unwired (emitter)	◆	◆
Ambient temperature	0 ... +55 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector (M8 x 1), 3-pin	◆	◆
Housing	V2A	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	18 g (device)	◆	◆

Series
KT

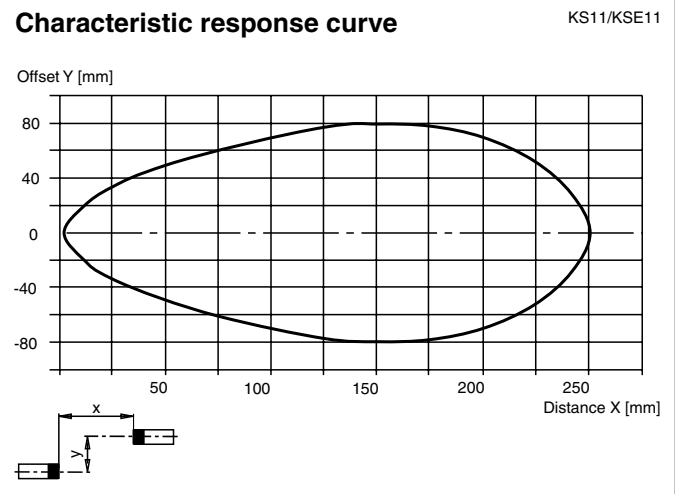
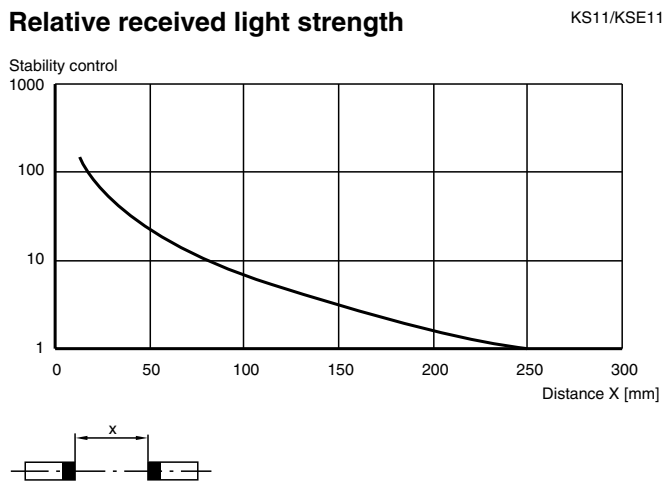
10/8/01

Date of issue



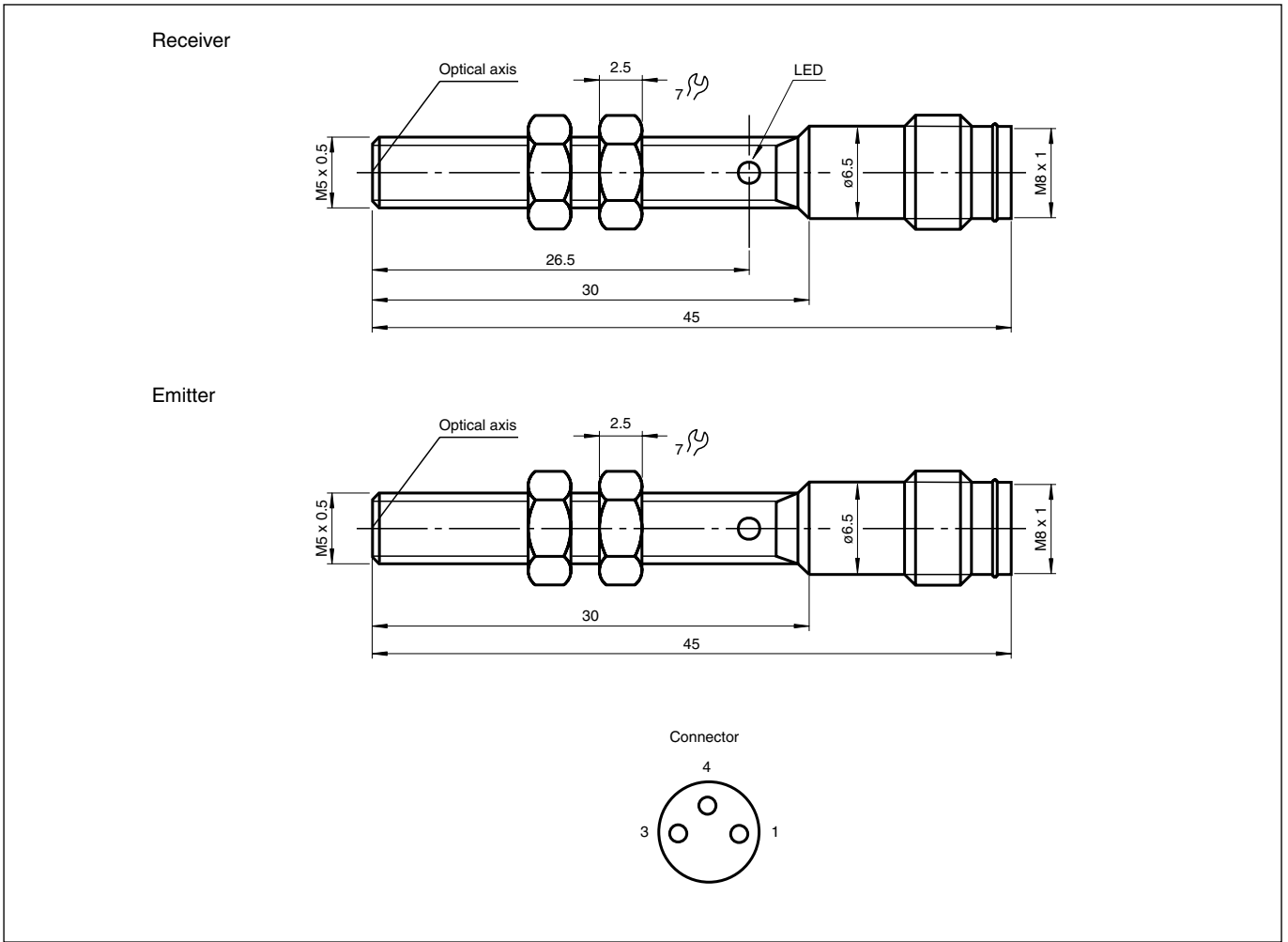
KS11/KSE11/59/.../98a

Diagrams



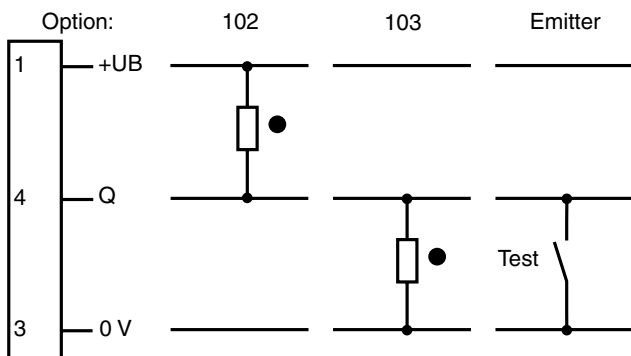
Series
KT

Dimensions

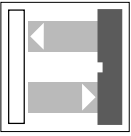


Series
KT

Electrical Connection



○ = Light ON, ● = Dark ON



KT11-50/25/.../115

Reflection light scanner

KT11-50/25/.../115

with 2 m fixed cable

CE

Series
KT



- ◆ Large sensor range up to 50 mm
- ◆ Very small housing
- ◆ Complete device, no amplifier needed
- ◆ Voltage range 10 V ... 30 V DC, output current 100 mA short circuit protected
- ◆ Optical parts made of glass, easy cleaning
- ◆ Protection degree IP67

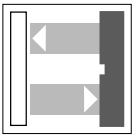
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KT11-50/25/102/115	KT11-50/25/103/115
Detection range	0 ... 50 mm	◆	◆
Reference target	Standard white, 100 mm x 100 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	Switching state: LED yellow pre-fault indicator: LED yellow flashing	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 15 mA	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	◆
	1 switch output pnp		◆
Switching type	light ON	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	≤ 250 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Ambient temperature	0 ... +55 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m PVC cable, 3 x 0.14 mm ²	◆	◆
Housing	V2A	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	38 g	◆	◆

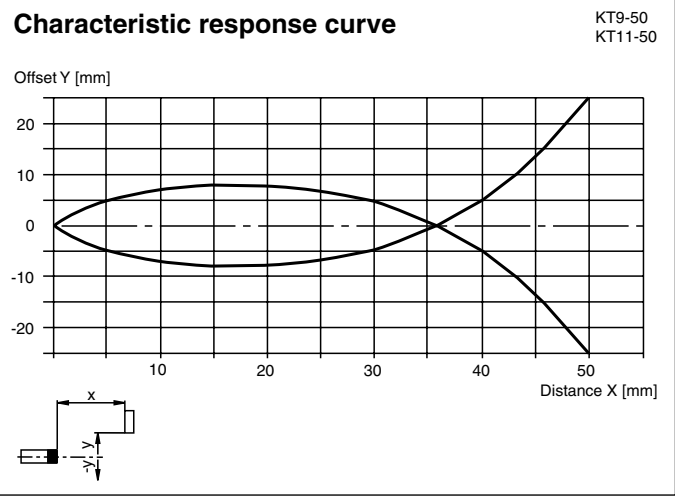
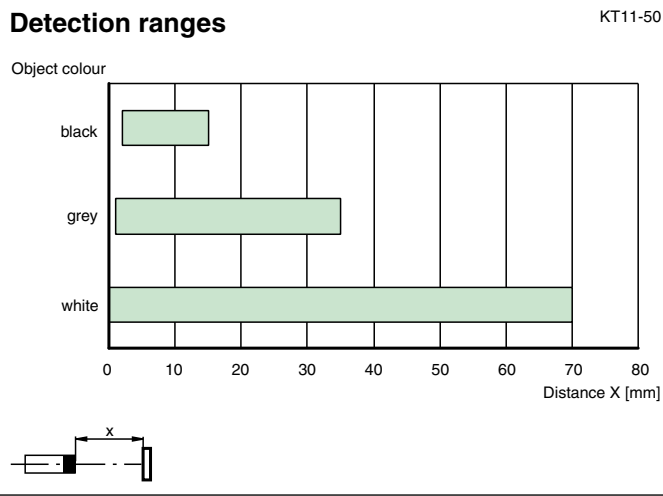
Series
KT

10/8/01

Date of issue

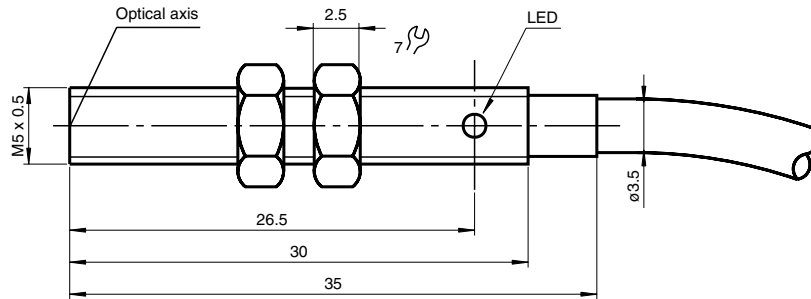


Diagrams



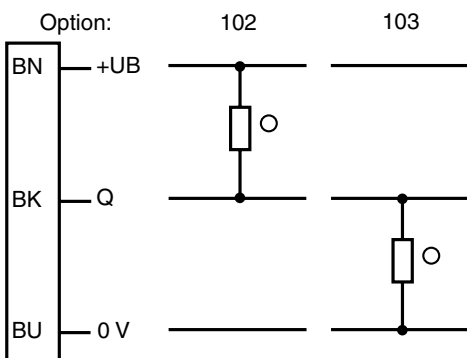
Series
KT

Dimensions



Series
KT

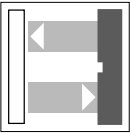
Electrical Connection



10/8/01

Date of issue

○ = Light ON, ● = Dark ON



KT11-50/25/.../98a

Reflection light scanner

KT11-50/25/.../98a

with 3-pin, M8 connector

CE

Series
KT



- ◆ Large sensor range up to 50 mm
- ◆ Very small housing
- ◆ Complete device, no amplifier needed
- ◆ Voltage range 10 V ... 30 V DC, output current 100 mA short circuit protected
- ◆ Optical parts made of glass, easy cleaning
- ◆ Protection degree IP67

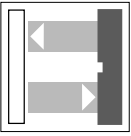
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		KT11-50/25/f02/98a	KT11-50/25/f03/98a
Detection range	0 ... 50 mm	◆	◆
Reference target	Standard white, 100 mm x 100 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	Switching state: LED yellow pre-fault indicator: LED yellow flashing	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 15 mA	◆	◆
Time delay before availability	≤ 20 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	light ON	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	≤ 250 Hz	◆	◆
Response time	≤ 3 ms	◆	◆
Ambient temperature	0 ... +55 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector (M8 x 1), 3-pin	◆	◆
Housing	V2A	◆	◆
Light exit	Scratch resistant mineral glass lens	◆	◆
Mass	9 g	◆	◆

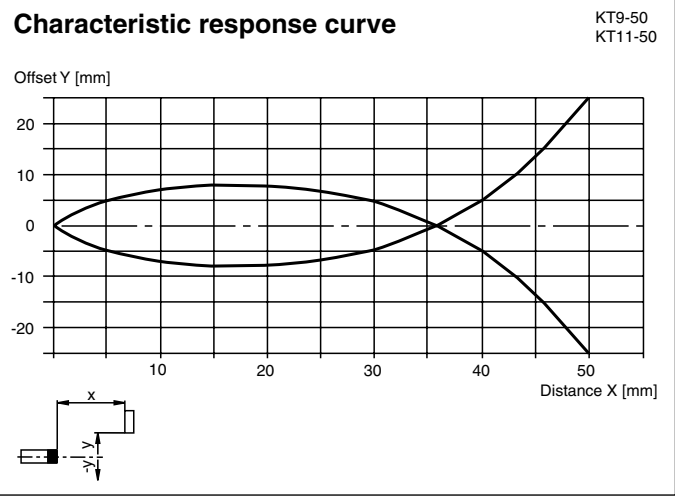
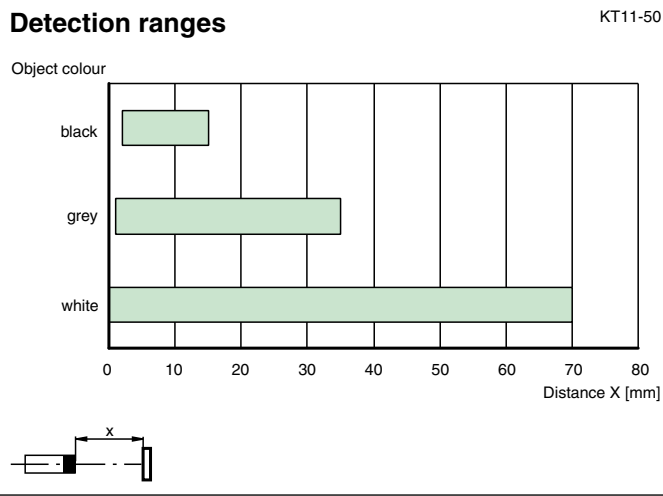
Series
KT

10/8/01

Date of issue

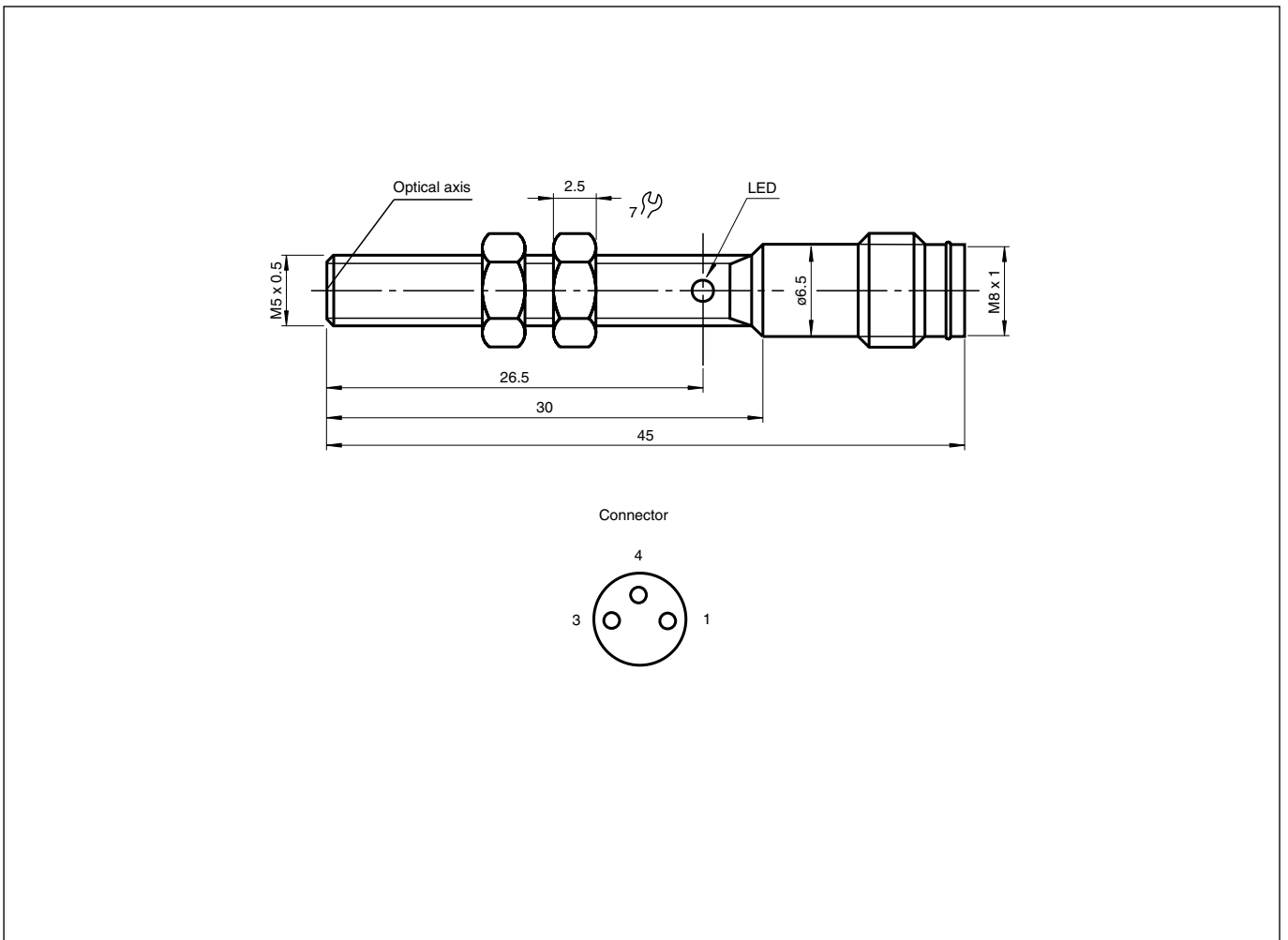


Diagrams



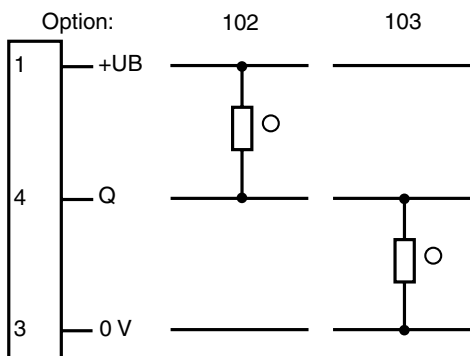
Series
KT

Dimensions



Series
KT

Electrical Connection

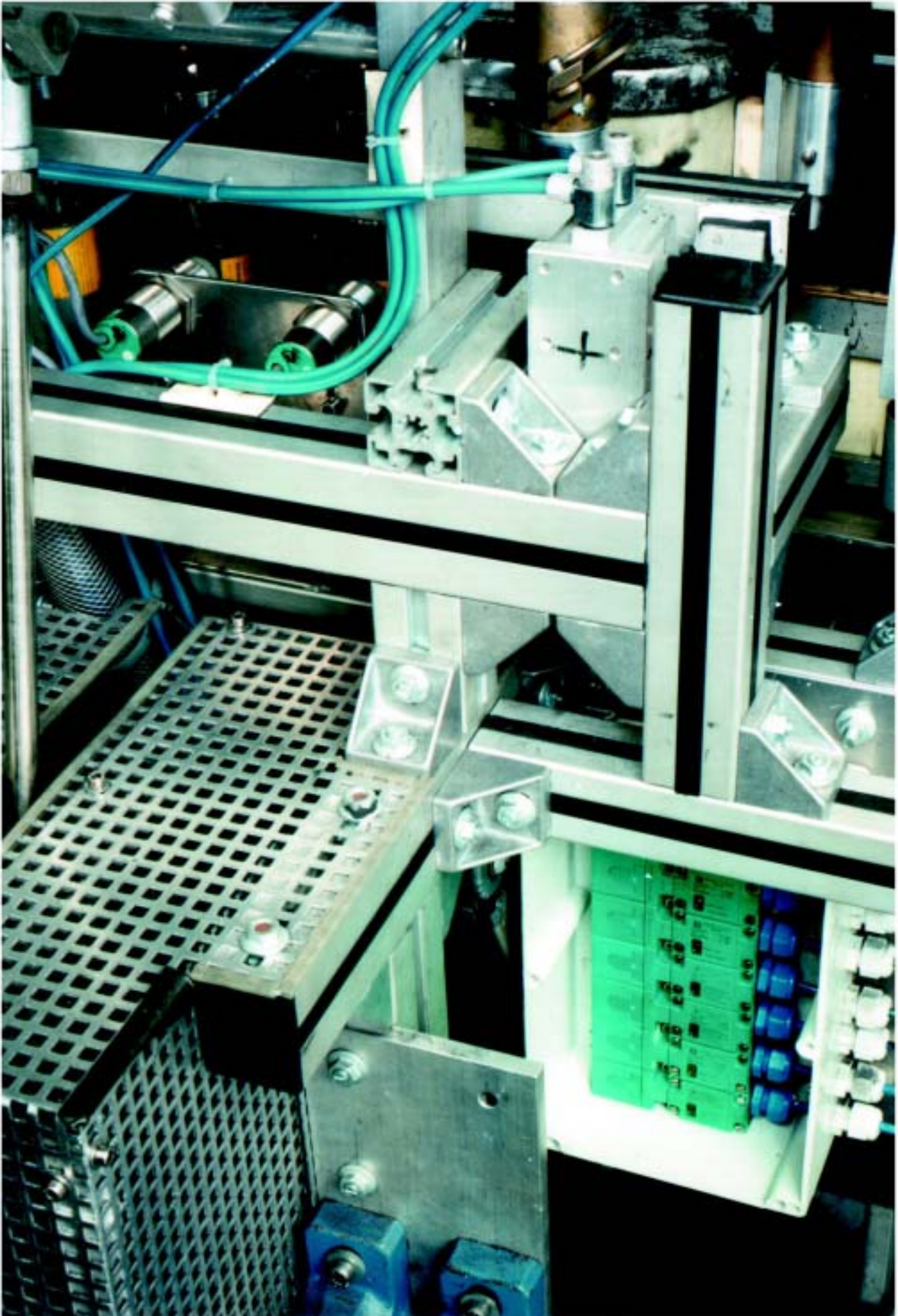


10/8/01

Date of issue

○ = Light ON, ● = Dark ON

Sensors in Threaded Housings



Sensors in threaded housings

Date of issue 10/12/2001

Series GLV12, VL18, 18GM and GLV30 – The world of light beam switches in threaded housing



The complete range of light beam switches in threaded housing M12, M18 and M30, offers the user practically unlimited versatility. This is also reflected in the areas of application for these light beam switches, which may be found in almost all branches of industry.

The series includes single path light beam switches, reflex light beam switches, with and without a polarisation filter, reflection light scanners without and with adjustable background suppression, and fibre optic light beam switches. One highlight of this series is the single path laser light beam switch in the M18 housing with automatic switching threshold tracking. The current status of the sensor is retained even when the unit is without electrical power. This makes it possible to lengthen times between service and to increase the availability of printers, for example.

Most devices are available in sturdy plastic and tough metal cases.

Sensors in threaded housings



GLV12



VL18 with frontal light exit



VL18 with lateral light exit



E18/EV18




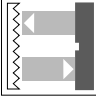
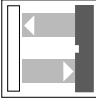
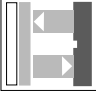
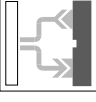
Serie 18GM...

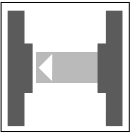


GLV30

Date of issue 10/12/2001

Sensors in Threaded Housings

Principle	Type code	Detection range	Page
	G12/GV12/115	0 mm ... 5000 mm	712
	G12/GV12/92	0 mm ... 5000 mm	716
	VS/VSE18/92	0 m ... 10 m	752
	VS/VSE18/73	0 m ... 15 m	748
	VS/VSE18/115	0 m ... 15 m	744
	E18/EV18/LAS	0 m ... 10 m	784
	OBE5000-18GM70	0 mm ... 5000 mm	788
	OBE5000-18GM70-V1	0 mm ... 5000 mm	792
	GLV12-54/115	0 mm ... 1000 mm	728
	GLV12-54/92	0 mm ... 1000 mm	732
	GLV12-6/115	0 mm ... 2000 mm	720
	GLV12-6/92	0 mm ... 2000 mm	724
	VL18-54/92	0 mm ... 2000 mm	764
	VL18-6/115	0 mm ... 4000 mm	756
	VL18-6/73	0 mm ... 4000 mm	760
	OBS1500-18GM70	0 mm ... 1500 mm	796
	OBS1500-18GM70-V1	0 mm ... 1500 mm	800
	OBS3000-18GM70	0 mm ... 3000 mm	804
	OBS3000-18GM70-V1	0 mm ... 3000 mm	808
		GLV12-8-200/115	0 mm ... 200 mm
GLV12-8-200/92		0 mm ... 200 mm	740
VT18/92		3 mm ... 400 mm	776
VT18/115		10 mm ... 100 mm	768
VT18/73c		10 mm ... 100 mm	772
OBT200-18GM70-E0/E2		0 mm ... 200 mm	812
OBT200-18GM70-E0/E2-V1		0 mm ... 200 mm	822
OBT200-18GM70-E4/E5		0 mm ... 200 mm	816
OBT200-18GM70-E4/E5-V1		0 mm ... 200 mm	826
OBT500-18GM70		0 mm ... 500 mm	832
OBT500-18GM70-V1		0 mm ... 500 mm	832
GLV30-8		100 mm ... 2500 mm	840
	VT18-H/92	10 mm ... 120 mm	780
	OCH100-18GM70-V1	30 mm ... 100 mm	836
	GLV30-8-H	20 mm ... 150 mm	840
	OBT200L-18GM70-E4/E5	0 mm ... 200 mm	816
	OBT200L-18GM70-E4/E5-V1	0 mm ... 200 mm	826
	GLV30-LL	0 mm ... 1700 mm (without fibre optics)	840



G12/GV12/./40b/115

Single path light beam switch

G12/GV12/./40b/115

with 2 m fixed cable

CE

Sensors in
threaded housings



- ◆ Detection range up to 5 m
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Protection degree IP67

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

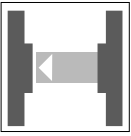
Date of issue 10/8/01

Ordering code		G12/GV12/36/40b/115	G12/GV12/37/40b/115
Effective detection range	0 ... 5000 mm	◆	◆
Reference target	Receiver	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	20000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state (receiver)	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 25 ms	◆	◆
Signal output	1 npn	◆	◆
	1 npn	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 300 mA	◆	◆
Voltage drop	≤ 3 V	◆	◆
Switching frequency	≤ 500 Hz	◆	◆
Response time	≤ 1 ms	◆	◆
Control input	Light on: +UB	◆	◆
	Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2000 mm PVC cable, 4 x 0.14 mm ²	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PMMA	◆	◆
Mass	45 g (device)	◆	◆

Sensors in threaded housings

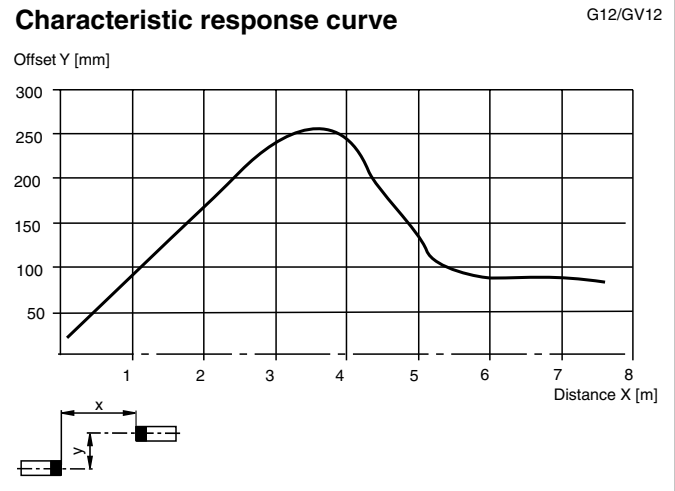
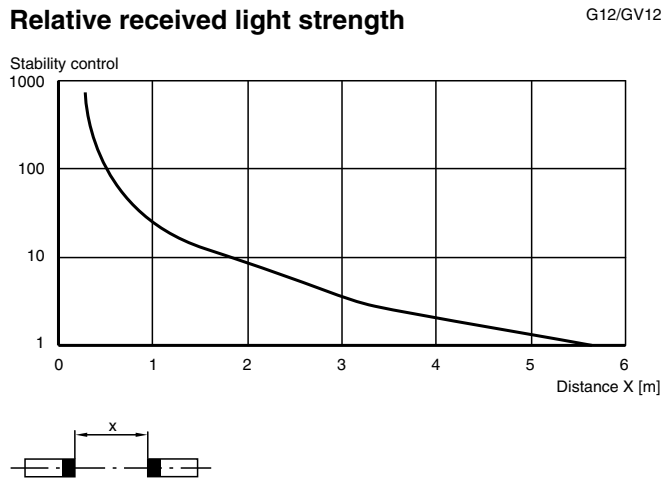
10/8/01

Date of issue



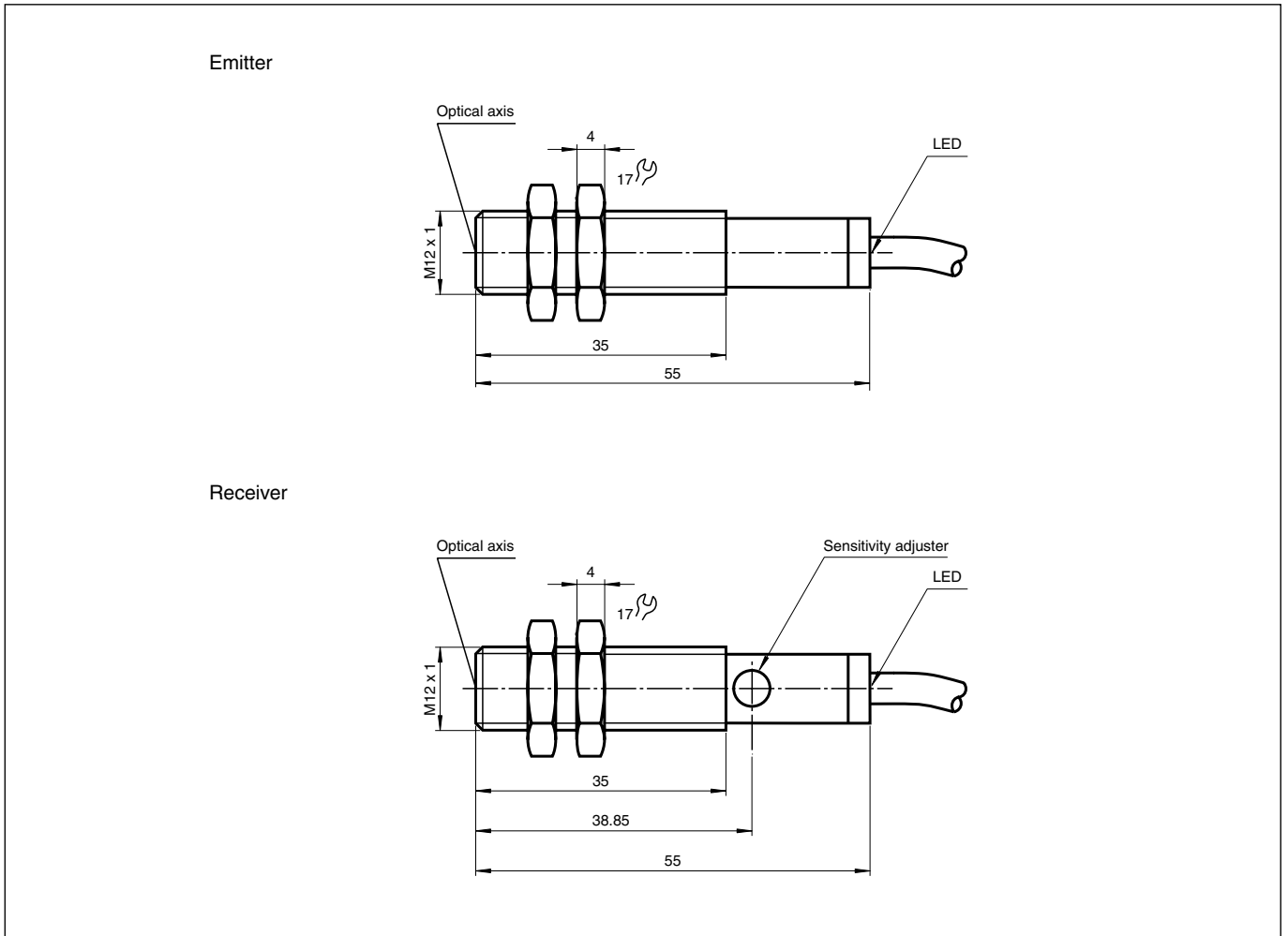
G12/GV12../40b/115

Diagrams



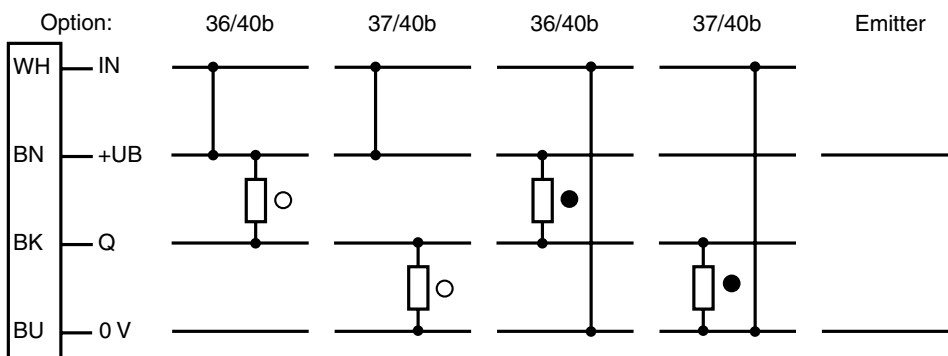
Sensors in threaded housings

Dimensions



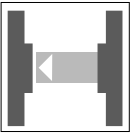
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



G12/GV12/./40b/92

Single path light beam switch

G12/GV12/./40b/92

with 4-pin, M12 connector

CE

Sensors in
threaded housings



- ◆ Detection range up to 5 m
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Protection degree IP67

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

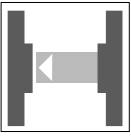
Date of issue 10/8/01

Ordering code		G12/GV12/36/40b/92	G12/GV12/37/40b/92
Effective detection range	0 ... 5000 mm	◆	◆
Reference target	Receiver	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	20000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state (receiver)	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 25 ms	◆	◆
Signal output	1 pnp	◆	◆
	1 npn	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 300 mA	◆	◆
Voltage drop	≤ 3 V	◆	◆
Switching frequency	≤ 500 Hz	◆	◆
Response time	≤ 1 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PMMA	◆	◆
Mass	45 g (device)	◆	◆

Sensors in threaded housings

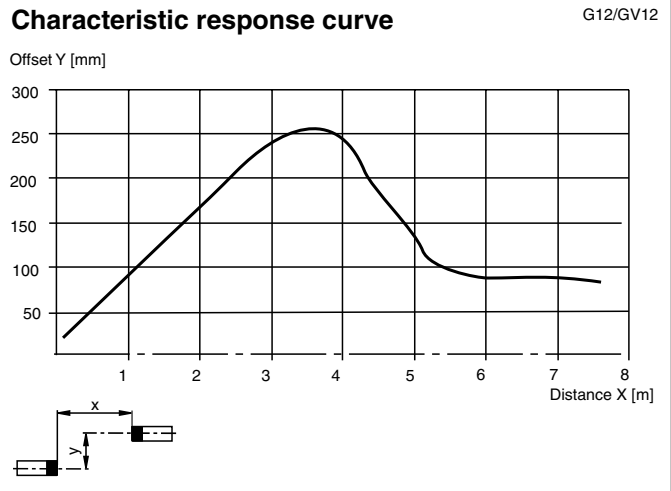
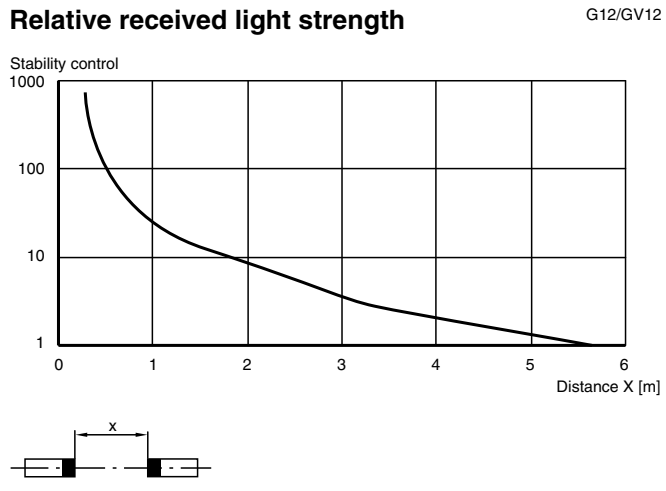
10/8/01

Date of issue



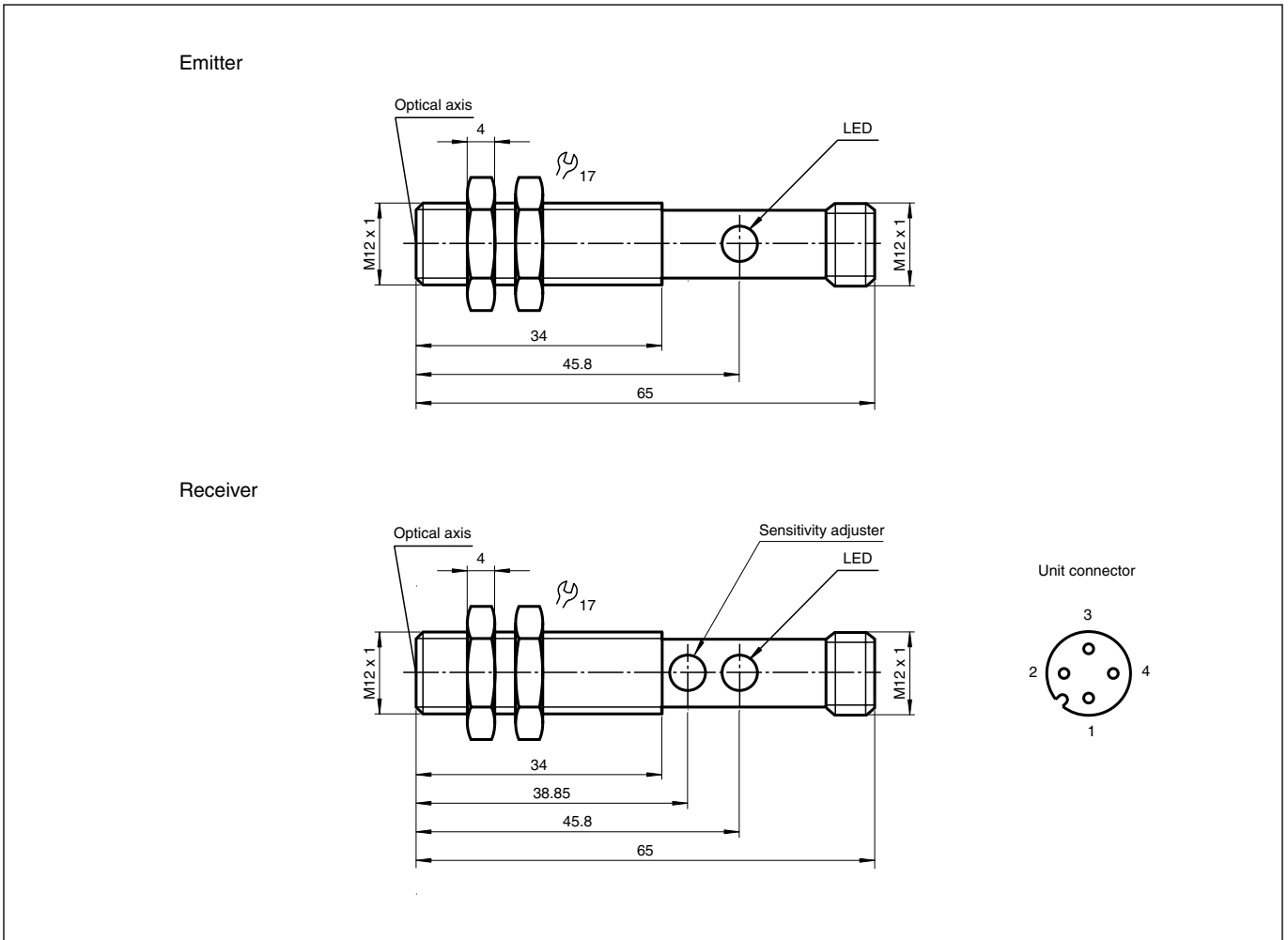
G12/GV12/./40b/92

Diagrams



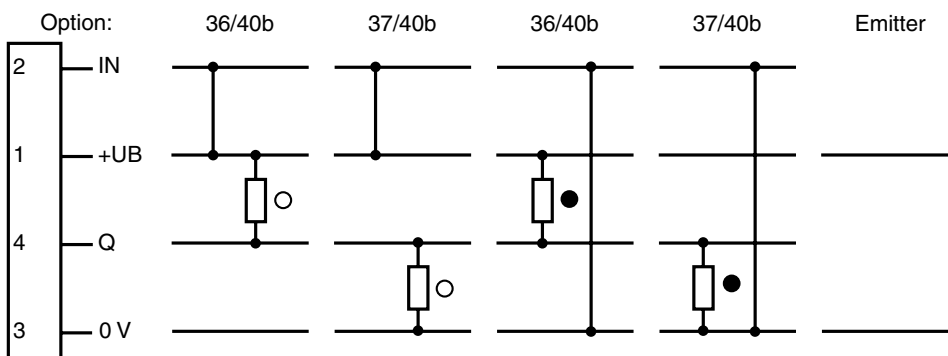
Sensors in threaded housings

Dimensions



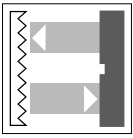
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



GLV12-6/././40b/115

Reflection light beam switch

GLV12-6/././40b/115

with 2 m fixed cable

CE

Sensors in
threaded housings



- ◆ Detection range up to 2 m
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Protection degree IP67

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

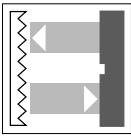
Date of issue 10/8/01

Ordering code		GLV12-6/36/40b/115	GLV12-6/37/40b/115
Effective detection range	0 ... 2000 mm	◆	◆
Reference target	H85 reflector	◆	◆
Reflector distance	0 ... 2000 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	20000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 25 ms	◆	◆
Signal output	1 pnp		◆
	1 npn	◆	
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 300 mA	◆	◆
Voltage drop	≤ 3 V	◆	◆
Switching frequency	≤ 700 Hz	◆	◆
Response time	≤ 0.7 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2000 mm PVC cable, 4 x 0.14 mm ²	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PMMA	◆	◆
Mass	45 g	◆	◆

Sensors in threaded housings

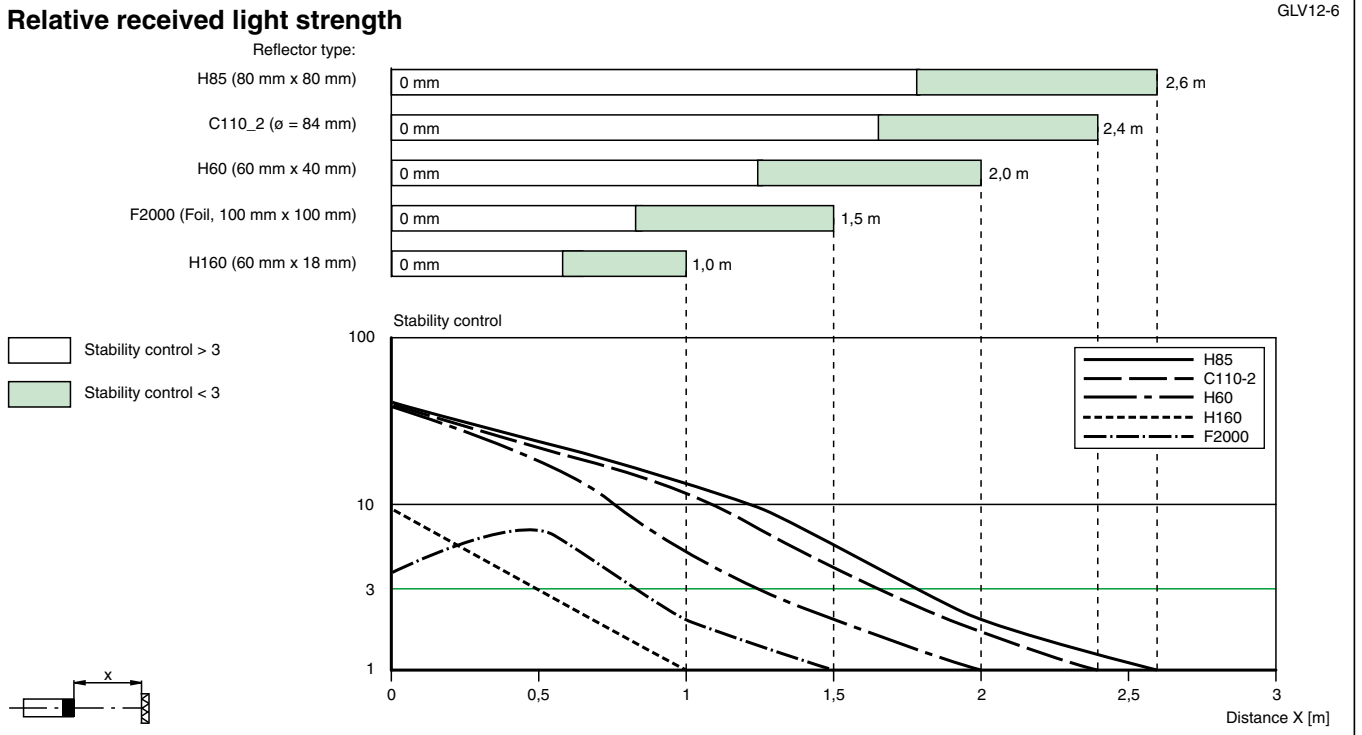
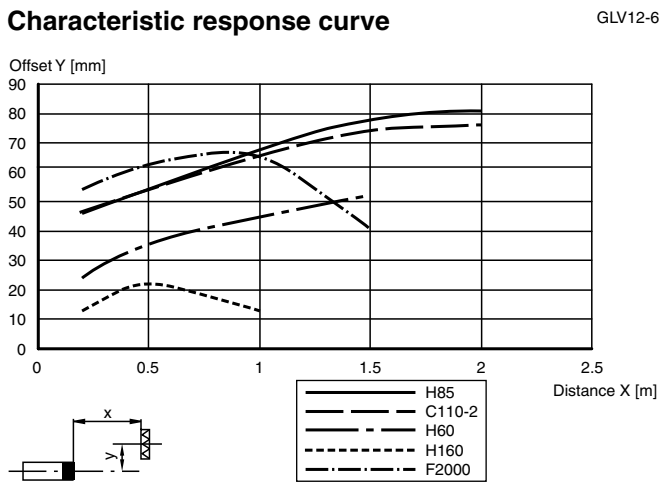
10/8/01

Date of issue



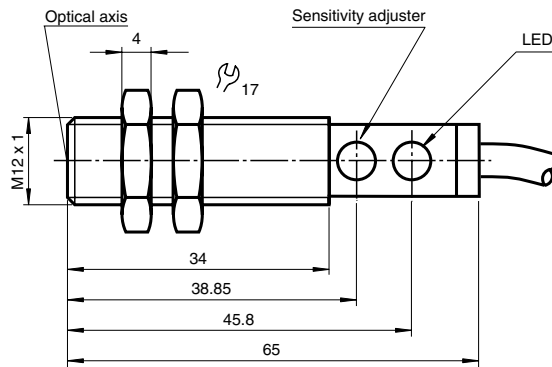
GLV12-6/./40b/115

Diagrams



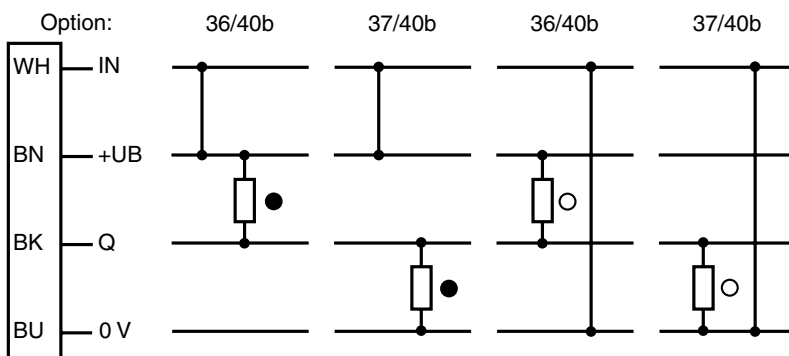
Sensors in threaded housings

Dimensions



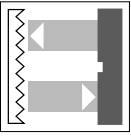
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



GLV12-6/./40b/92

Reflection light beam switch

GLV12-6/./40b/92

with 4-pin, M12 connector

CE

Sensors in
threaded housings



- ◆ Detection range up to 2 m
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Protection degree IP67

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

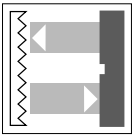
Date of issue 10/8/01

Ordering code		GLV12-6/36/40b/92	GLV12-6/37/40b/92
Effective detection range	0 ... 2000 mm	◆	◆
Reference target	H85 reflector	◆	◆
Reflector distance	0 ... 2000 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	20000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 25 ms	◆	◆
Signal output	1 npn	◆	◆
	1 npn	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 300 mA	◆	◆
Voltage drop	≤ 3 V	◆	◆
Switching frequency	≤ 700 Hz	◆	◆
Response time	≤ 0.7 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PMMA	◆	◆
Mass	15 g	◆	◆

Sensors in threaded housings

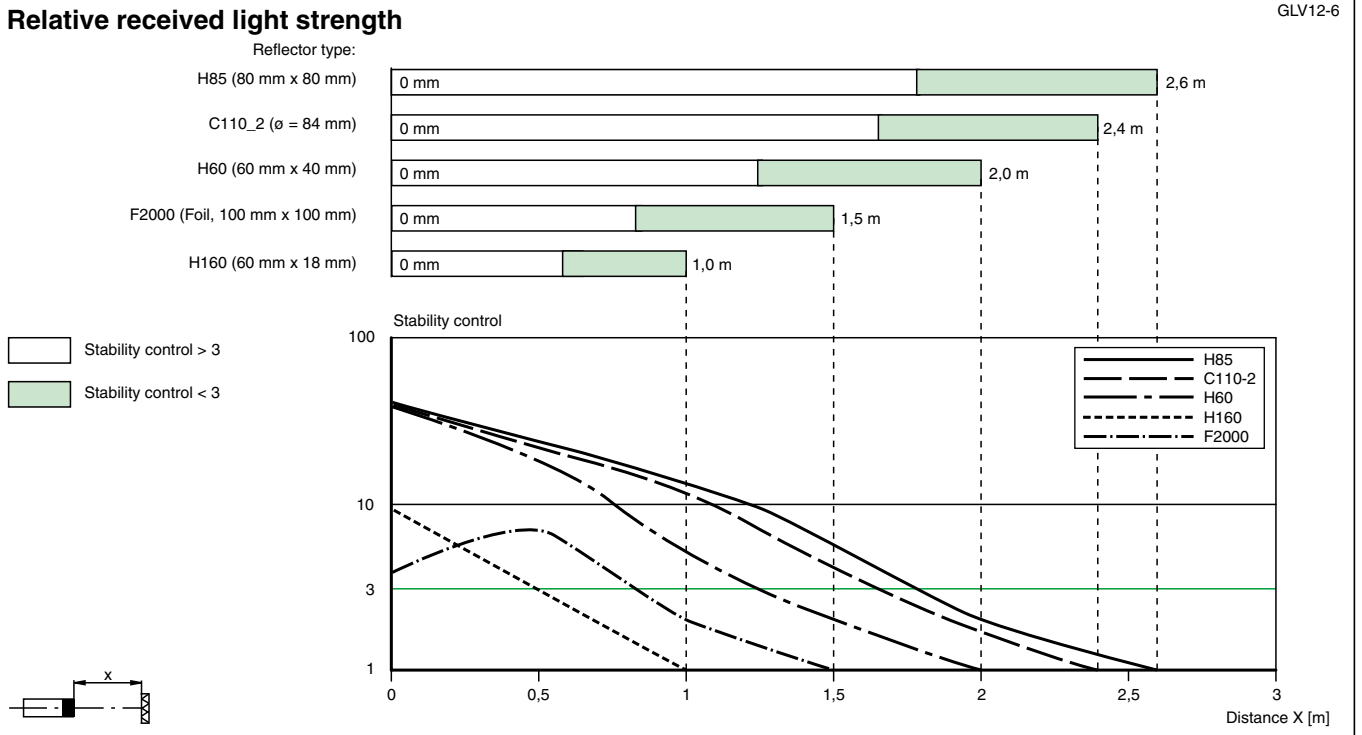
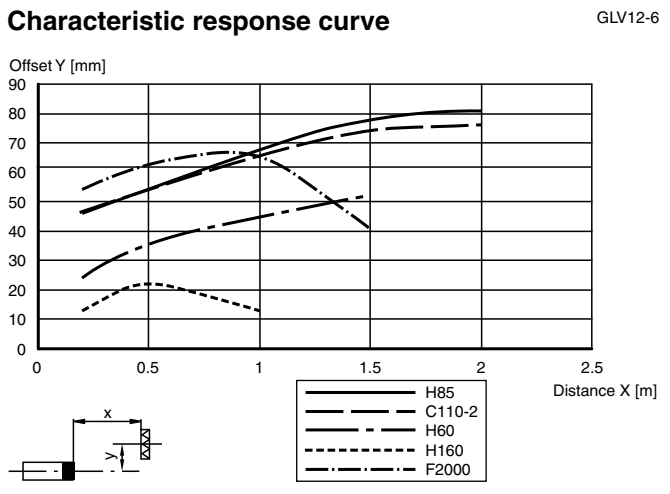
10/8/01

Date of issue



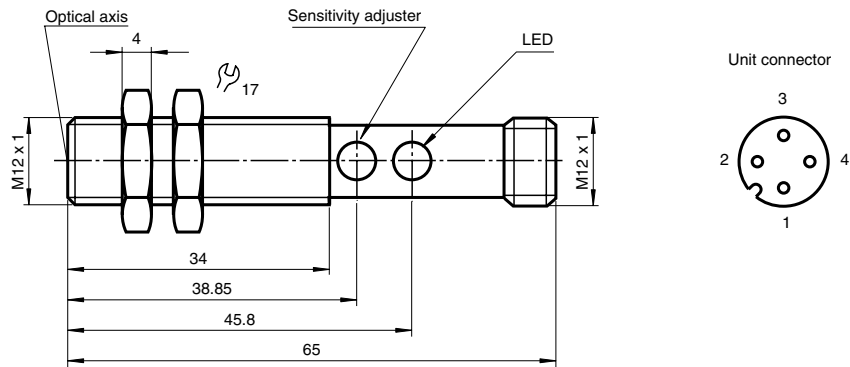
GLV12-6/./40b/92

Diagrams



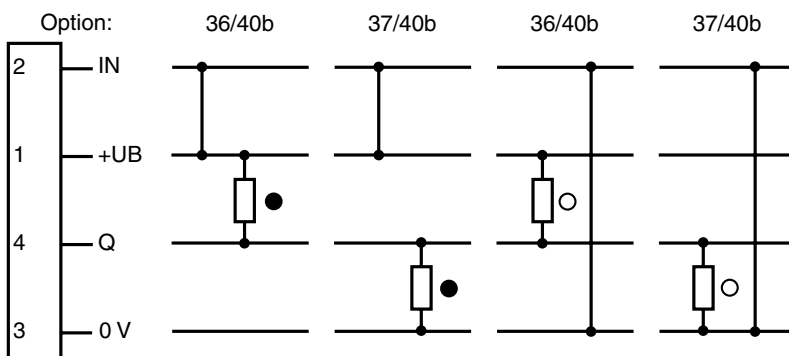
Sensors in threaded housings

Dimensions



Sensors in threaded housings

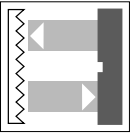
Electrical Connection



10/8/01

Date of issue

○ = Light ON, ● = Dark ON



GLV12-54/./40b/115

Reflection light beam switch

GLV12-54/./40b/115

with 2 m fixed cable

CE

Sensors in
threaded housings



- ◆ Detection range up to 1000 mm
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Protection degree IP67
- ◆ Glare protected with polarisation filter

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

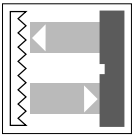
Date of issue 10/8/01

Ordering code		GLV12-54/36/40b/115	GLV12-54/37/40b/115
Effective detection range	0 ... 1000 mm	◆	◆
Reference target	H85 reflector	◆	◆
Reflector distance	50 ... 1000 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	20000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 25 ms	◆	◆
Signal output	1 pnp	◆	◆
	1 npn	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 300 mA	◆	◆
Voltage drop	≤ 3 V	◆	◆
Switching frequency	≤ 700 Hz	◆	◆
Response time	≤ 0.7 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2000 mm PVC cable, 4 x 0.14 mm ²	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PMMA	◆	◆
Mass	45 g	◆	◆

Sensors in threaded housings

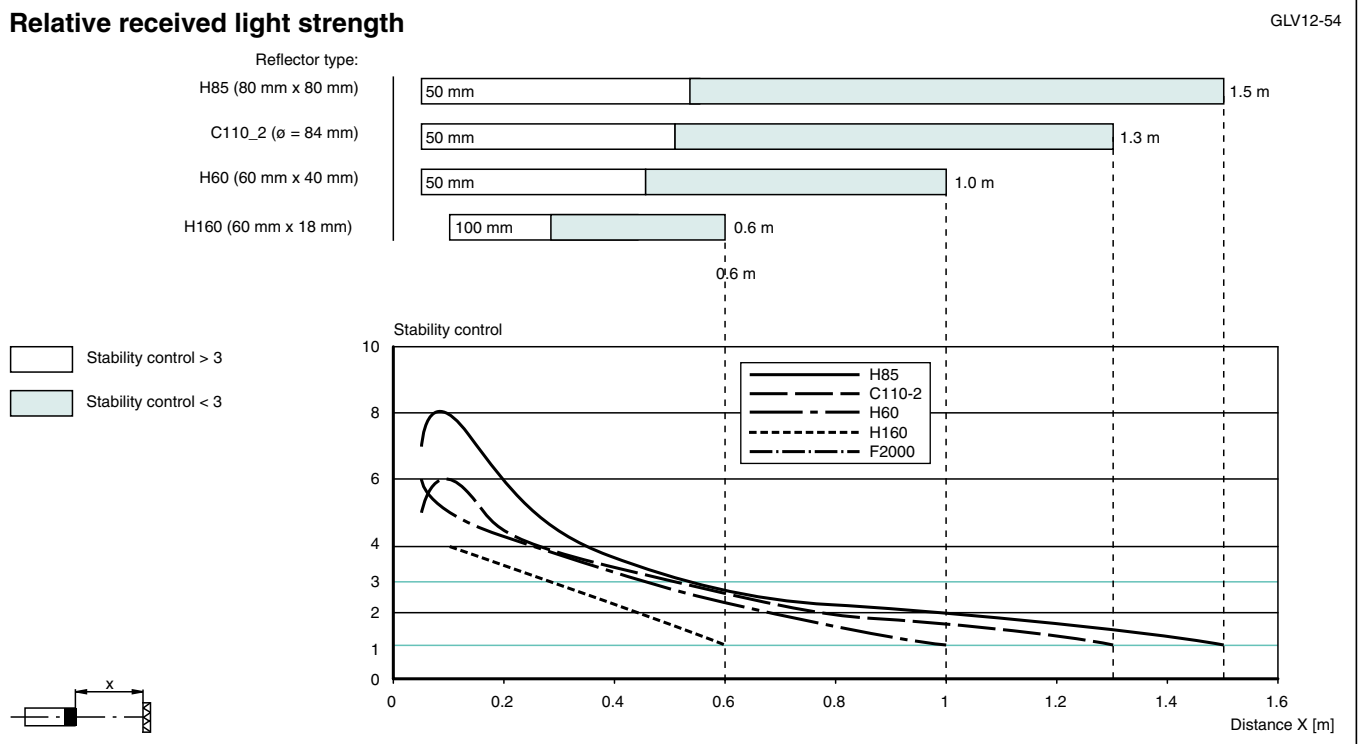
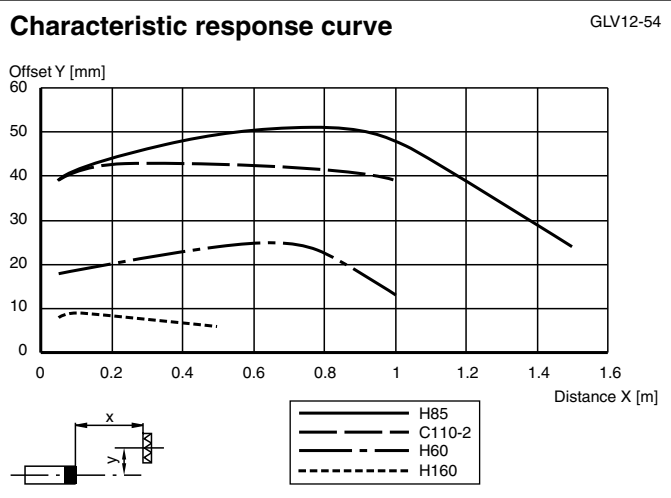
10/8/01

Date of issue



GLV12-54/./40b/115

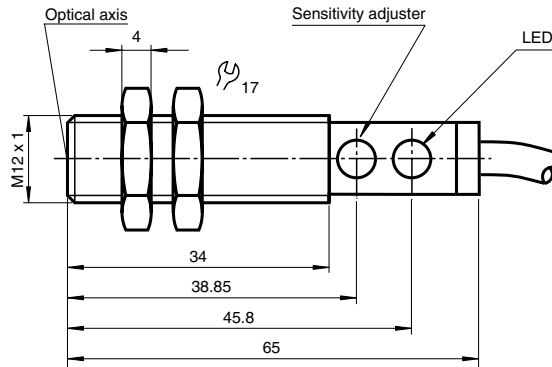
Diagrams



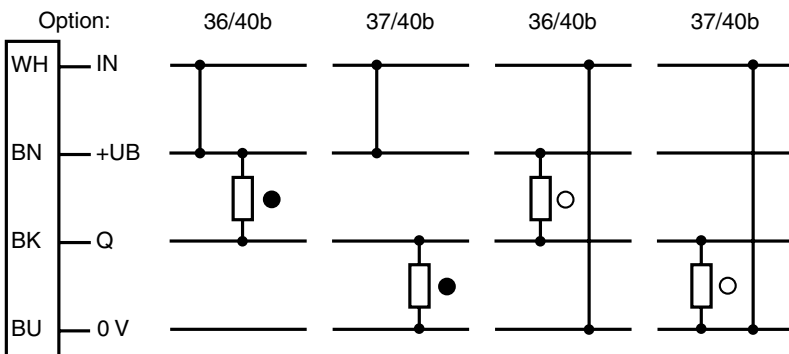
Sensors in threaded housings

Date of issue 10/8/01

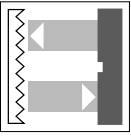
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



GLV12-54/./40b/92

Reflection light beam switch

GLV12-54/./40b/92

with 4-pin, M12 connector

CE

Sensors in
threaded housings



- ◆ Detection range up to 1000 mm
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Protection degree IP67
- ◆ Glare protected with polarisation filter

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

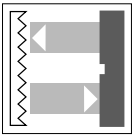
Date of issue 10/8/01

Ordering code		GLV12-54/36/40b/92	GLV12-54/37/40b/92
Effective detection range	0 ... 1000 mm	◆	◆
Reference target	H85 reflector	◆	◆
Reflector distance	50 ... 1000 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	20000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 25 ms	◆	◆
Signal output	1 pnp	◆	◆
	1 npn	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 300 mA	◆	◆
Voltage drop	≤ 3 V	◆	◆
Switching frequency	≤ 700 Hz	◆	◆
Response time	≤ 0.7 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PMMA	◆	◆
Mass	15 g	◆	◆

Sensors in threaded housings

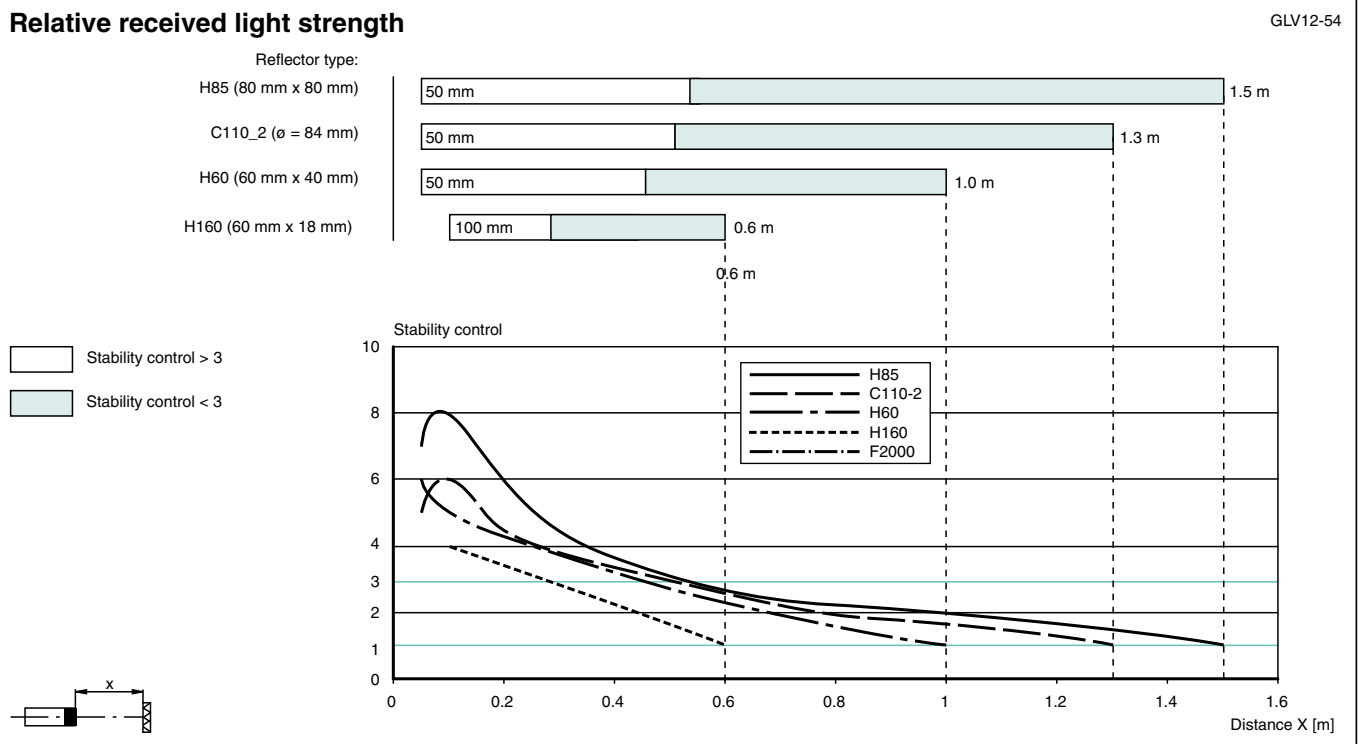
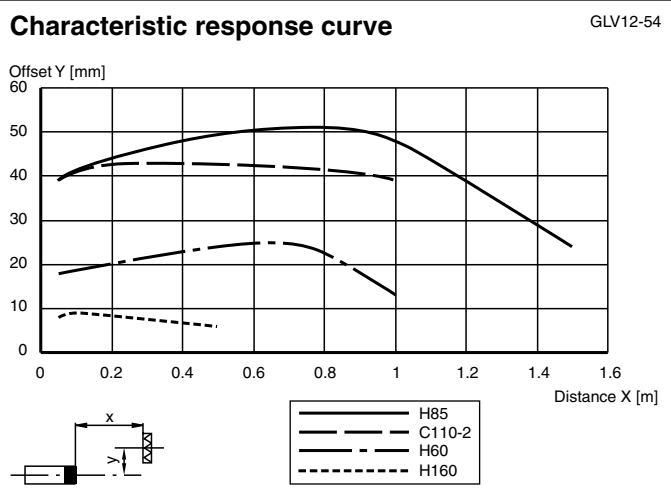
10/8/01

Date of issue



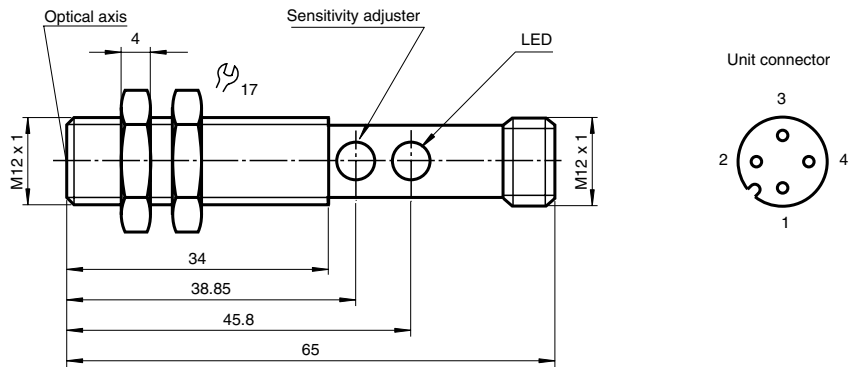
GLV12-54/./40b/92

Diagrams



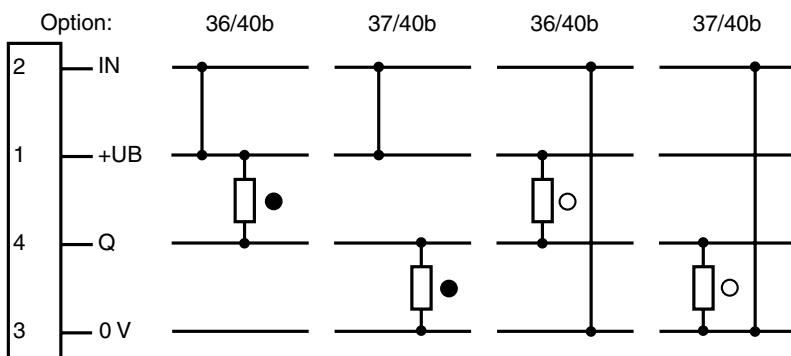
Sensors in threaded housings

Dimensions



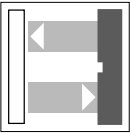
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



GLV12-8-200/.. /40b/115

Reflection light scanner

GLV12-8-200/.. /40b/115

with 2 m fixed cable

CE

Sensors in
threaded housings



- ◆ Sensing range up to 200 mm
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Protection degree IP67

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

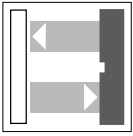
Date of issue 10/8/01

Ordering code		GLV12-8-200/36/40b/115	GLV12-8-200/37/40b/115
Detection range	0 ... 200 mm	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	20000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 25 ms	◆	◆
Signal output	1 pnp	◆	◆
	1 npn	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 300 mA	◆	◆
Voltage drop	≤ 3 V	◆	◆
Switching frequency	≤ 700 Hz	◆	◆
Response time	≤ 0.7 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2000 mm PVC cable, 4 x 0.14 mm ²	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PMMA	◆	◆
Mass	45 g	◆	◆

Sensors in threaded housings

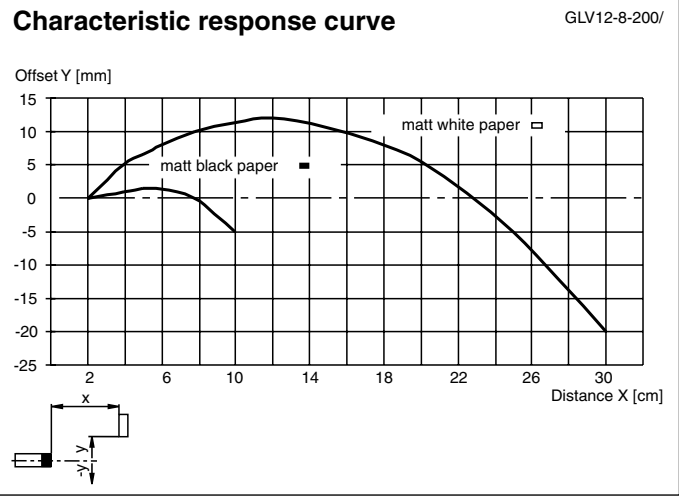
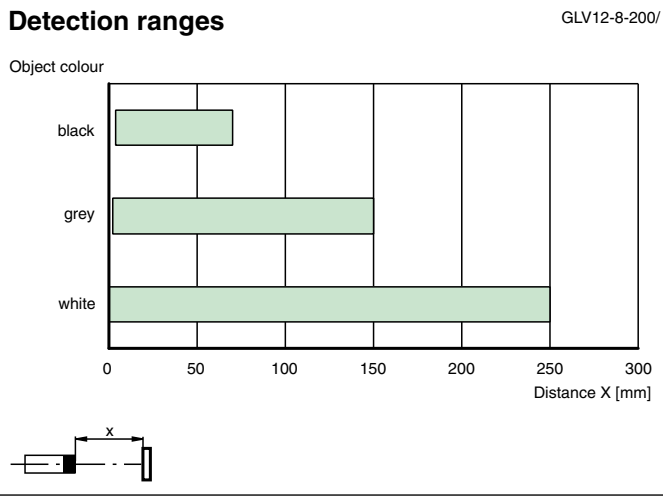
10/8/01

Date of issue



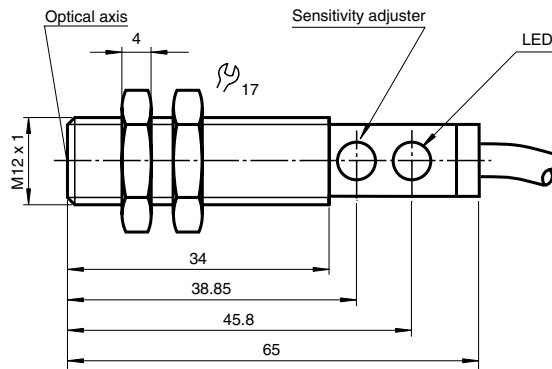
GLV12-8-200/./40b/115

Diagrams



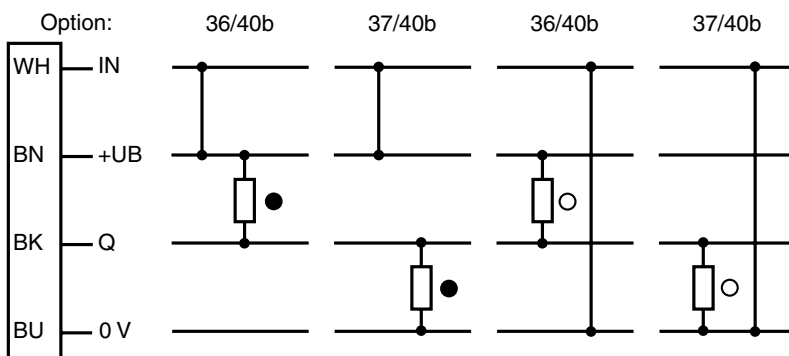
Sensors in threaded housings

Dimensions



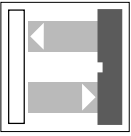
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



GLV12-8-200/.. /40b/92

Reflection light scanner

GLV12-8-200/.. /40b/92

with 4-pin, M12 connector

CE

Sensors in
threaded housings



- ◆ Sensing range up to 200 mm
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Protection degree IP67

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

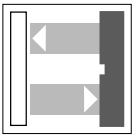
Date of issue 10/8/01

Ordering code		GLV12-8-200/36/40b/92	GLV12-8-200/37/40b/92
Detection range	0 ... 200 mm	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	20000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 25 ms	◆	◆
Signal output	1 pnp	◆	◆
	1 npn	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 300 mA	◆	◆
Voltage drop	≤ 3 V	◆	◆
Switching frequency	≤ 700 Hz	◆	◆
Response time	≤ 0.7 ms	◆	◆
Control input	Light on: +UB Dark on: 0 V	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PMMA	◆	◆
Mass	15 g	◆	◆

Sensors in threaded housings

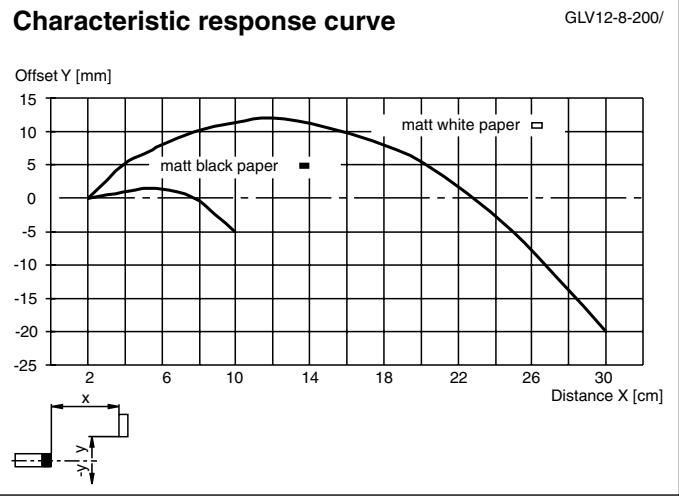
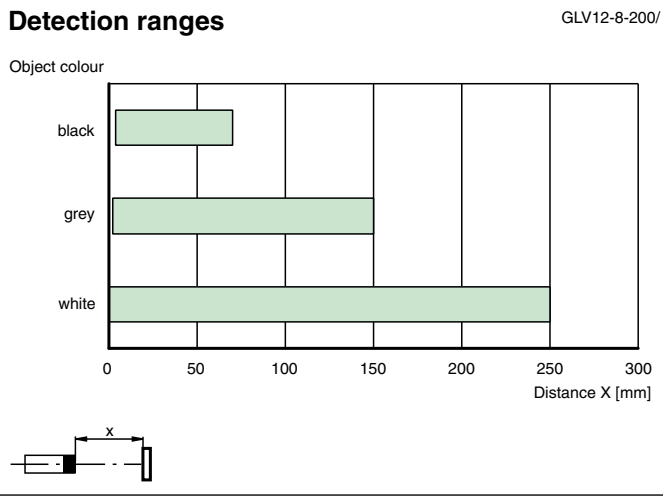
10/8/01

Date of issue



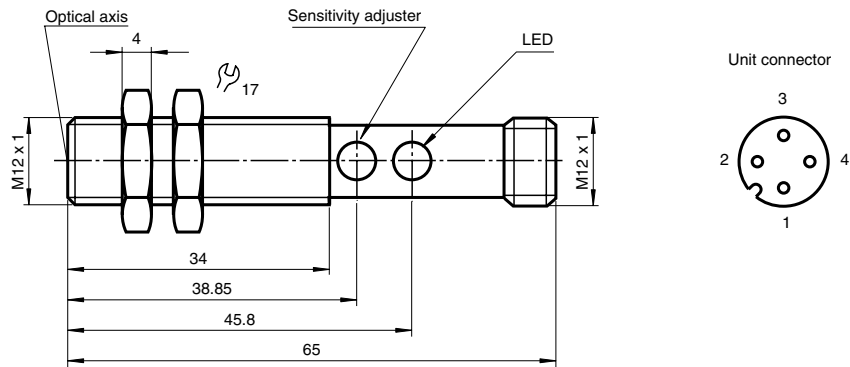
GLV12-8-200/. /40b/92

Diagrams

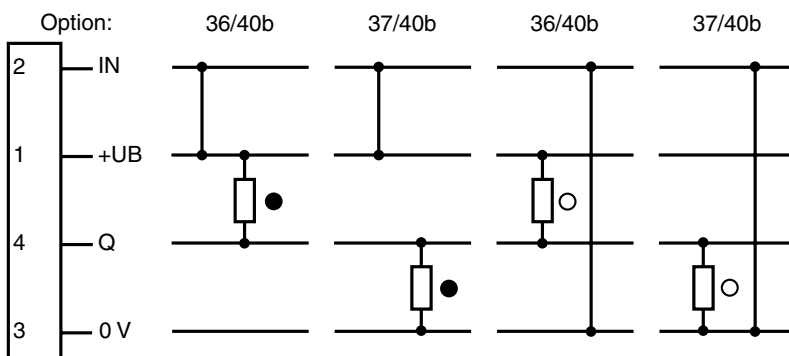


Sensors in threaded housings

Dimensions



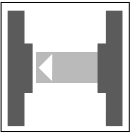
Electrical Connection



10/8/01

Date of issue

○ = Light ON, ● = Dark ON



VS/VSE18-../32/40b/115

Single path light beam switch

VS/VSE18-../32/40b/115

with 2 m fixed cable



Sensors in threaded housings



- ◆ Detection range up to 30 m
- ◆ M18 threaded housing made of plastic
- ◆ Infrared light design
- ◆ Electrical light-/dark switching
- ◆ Test input
- ◆ Light exit alternatively lateral or frontal

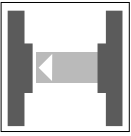
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		VS/VSE18-L/32/40b/115	VS/VSE18-LS/32/40b/115
Effective detection range	0 ... 15 m	◆	◆
Threshold detection range	30 m	◆	◆
Obstacle size	25 mm	◆	◆
Light source	IRED	◆	◆
Light type	Infrared, alternating light	◆	◆
Light exit	frontal	◆	◆
	lateral		◆
Angle of divergence	2 °	◆	◆
Diameter of the light spot	500 mm at 15 m detection range	◆	◆
Ambient light limit	100000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED red	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	< 25 mA emitter. receiver < 50 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark on selectable programmable	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Test input	Emitter deactivation	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +60 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m fixed cable	◆	◆
Housing	Plastic	◆	◆
Light exit	Plastic	◆	◆
Mass	60 g (device)	◆	◆

Sensors in threaded housings

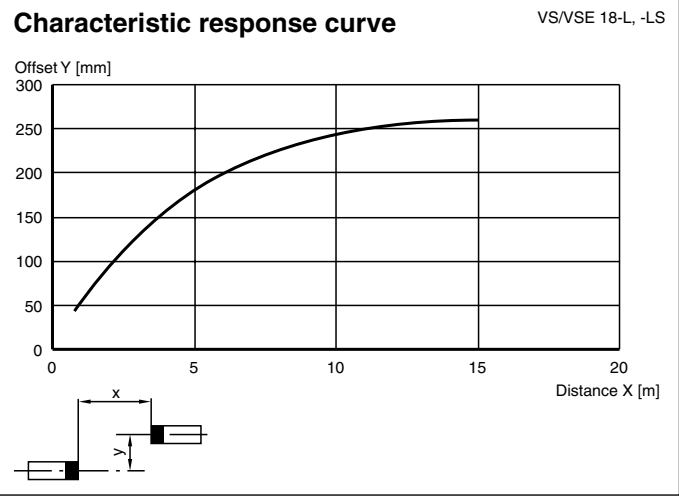
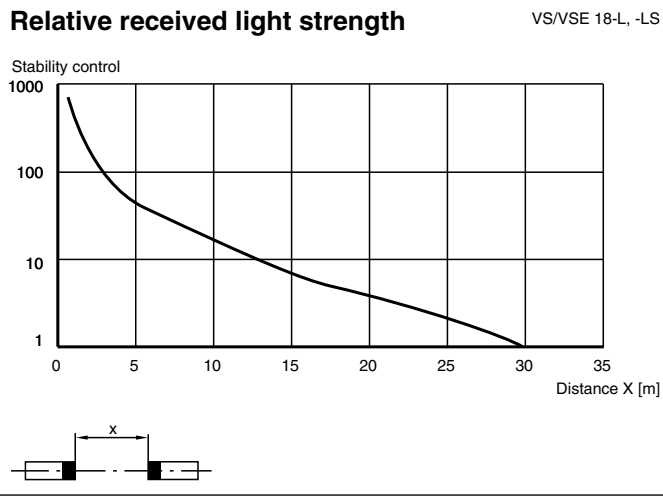
10/8/01

Date of issue



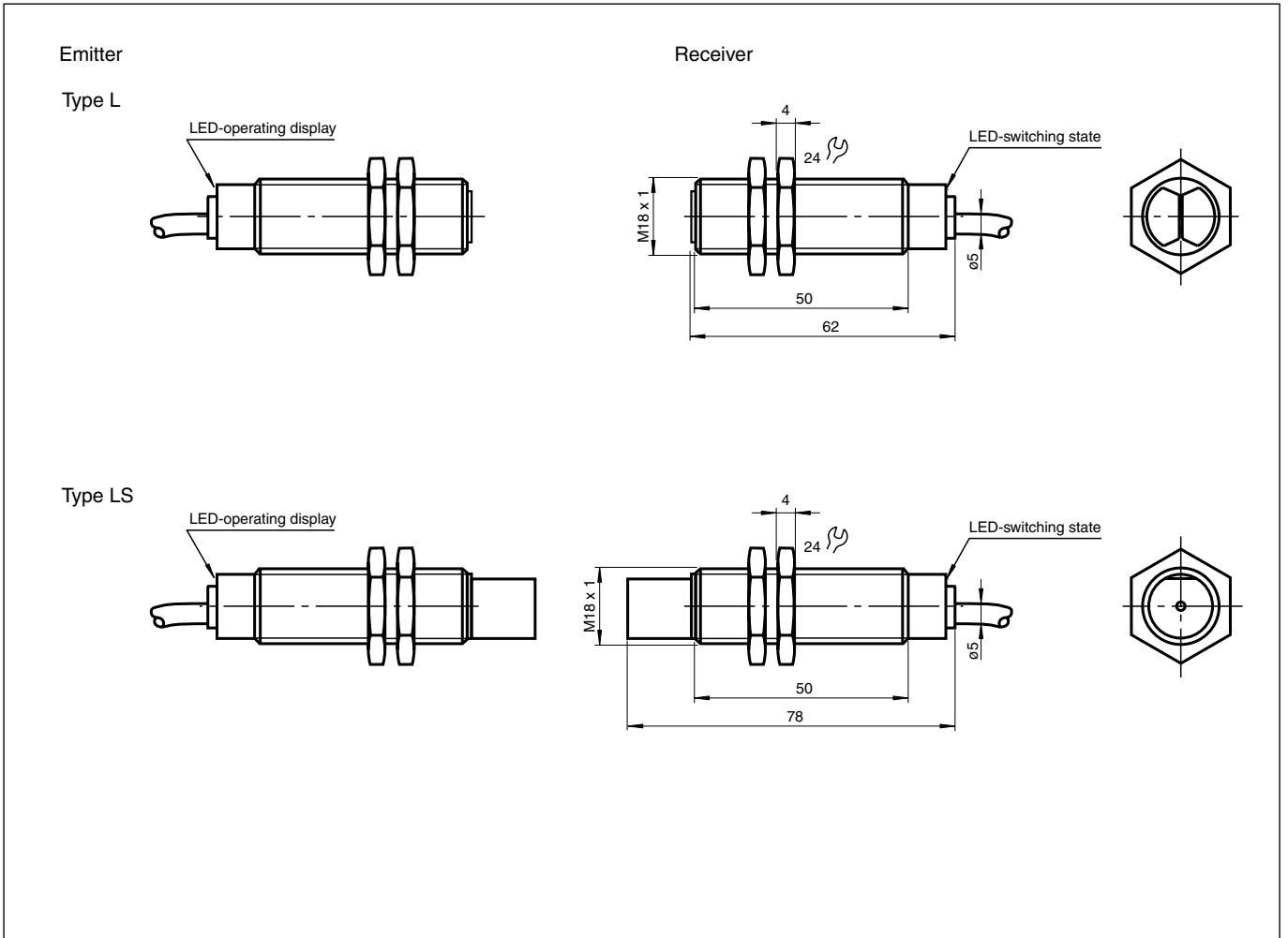
VS/VSE18-../32/40b/115

Diagrams



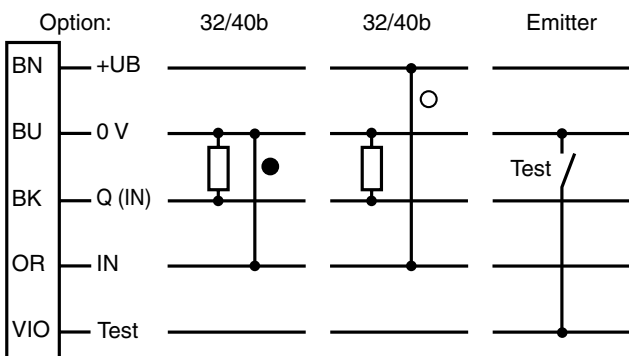
Sensors in threaded housings

Dimensions



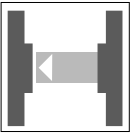
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



VS/VSE18-../32/40b/73

Single path light beam switch

VS/VSE18-../32/40b/73

with 4-pin, M12 x 1 plastic connector



Sensors in threaded housings

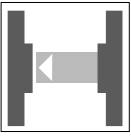


- ◆ Detection range up to 30 m
- ◆ M18 threaded housing made of plastic
- ◆ Infrared light design
- ◆ Electrical light-/dark switching
- ◆ Test input
- ◆ Light exit alternatively lateral or frontal
- ◆ Optical surface flush with housing

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

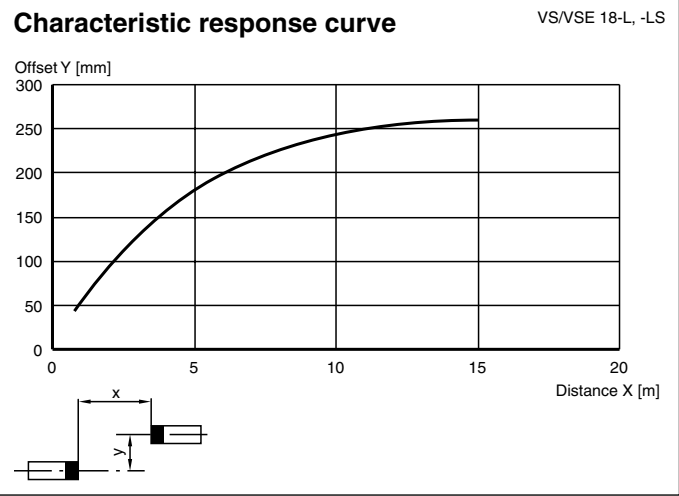
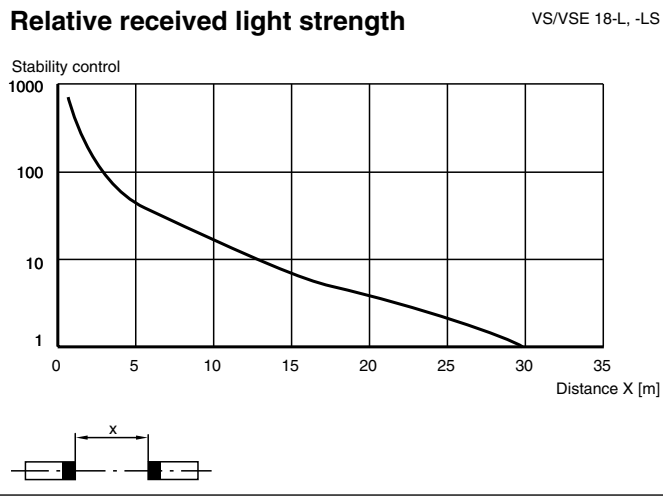
Ordering code		VS/VSE18-L/32/40b/73	VS/VSE18-LS/32/40b/73
Effective detection range	0 ... 15 m	◆	◆
Threshold detection range	30 m	◆	◆
Obstacle size	25 mm	◆	◆
Light source	IREd	◆	◆
Light type	Infrared, alternating light	◆	◆
Light exit	frontal	◆	
	lateral		◆
Angle of divergence	2 °	◆	◆
Diameter of the light spot	500 mm at 15 m detection range	◆	◆
Ambient light limit	100000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED red	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	< 25 mA emitter. receiver < 50 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark on selectable programmable	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Test input	Emitter deactivation	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +60 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	Plastic	◆	◆
Light exit	Plastic	◆	◆
Mass	60 g (device)	◆	◆

Sensors in threaded housings



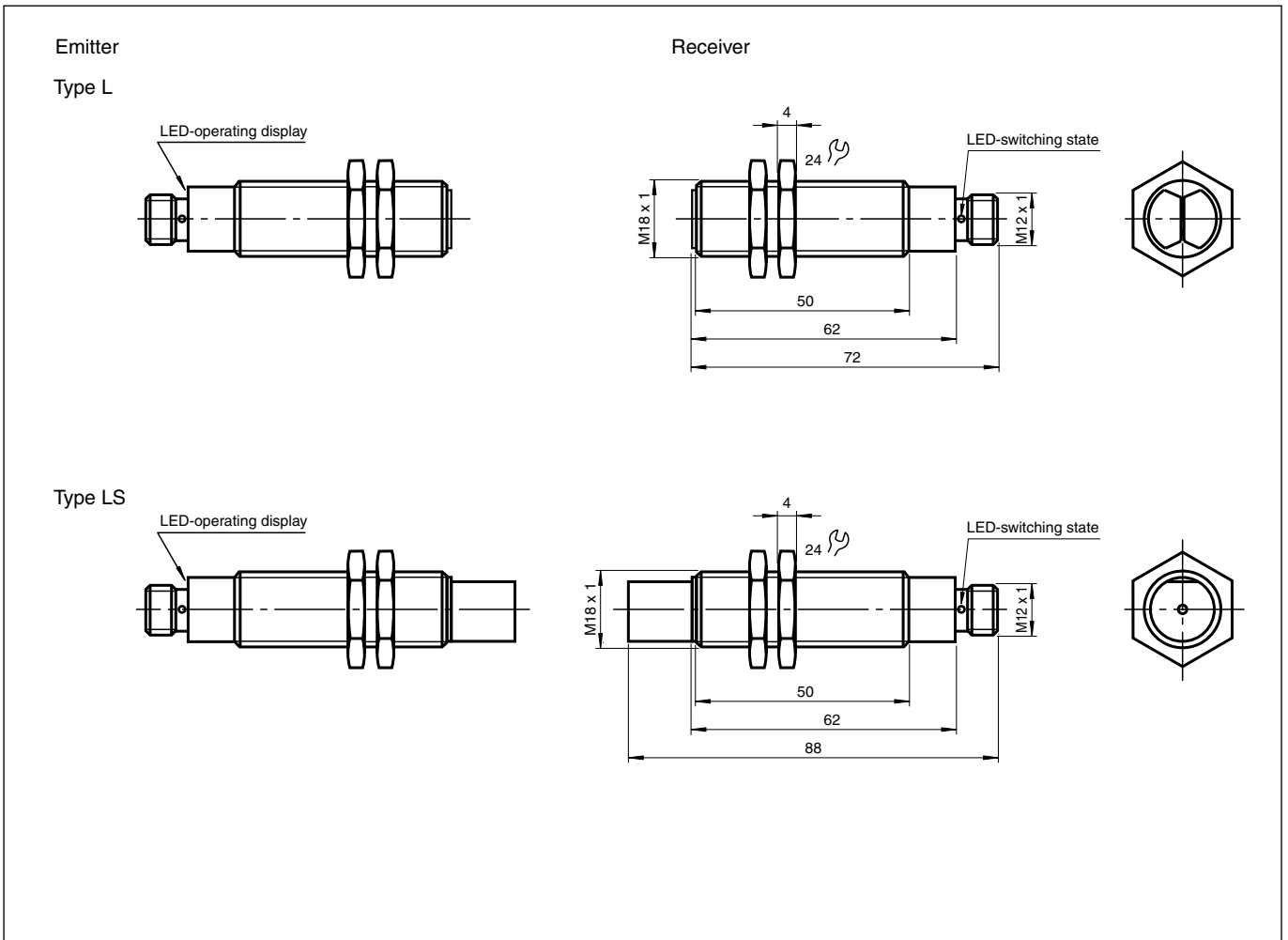
VS/VSE18-../32/40b/73

Diagrams



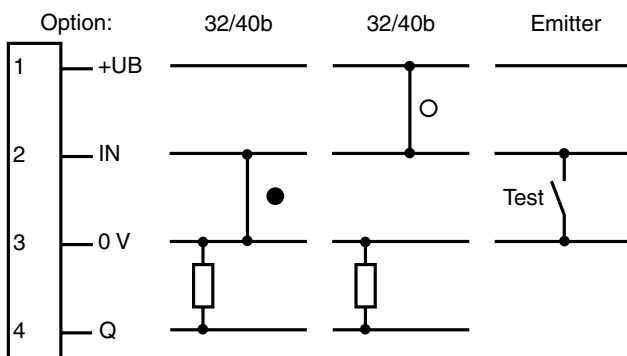
Sensors in threaded housings

Dimensions



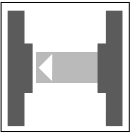
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



VS/VSE18-../32/40b/92

Single path light beam switch

VS/VSE18-../32/40b/92

with M12, 4-pin metal connector



Sensors in threaded housings



- ◆ Detection range up to 15 m
- ◆ M18 threaded housing made of brass, nickel plated
- ◆ Red light design
- ◆ Electrical light-/dark switching
- ◆ Test input
- ◆ Light exit alternatively lateral or frontal
- ◆ Optical surface flush with housing

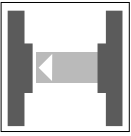
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		VS/VSE18-M/32/40b/92	VS/VSE18-MS/32/40b/92
Effective detection range	0 ... 10 m	◆	◆
Threshold detection range	15 m	◆	◆
Obstacle size	25 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Light exit	frontal	◆	◆
	lateral		◆
Angle of divergence	2 °	◆	◆
Diameter of the light spot	approx. 350 mm at a distance of 10 m	◆	◆
Ambient light limit	100000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow: switching state LED red: stability control display	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	< 25 mA emitter. receiver < 50 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark on selectable programmable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Test input	Emitter deactivation	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	Plastic	◆	◆
Mass	60 g (device)	◆	◆

Sensors in threaded housings

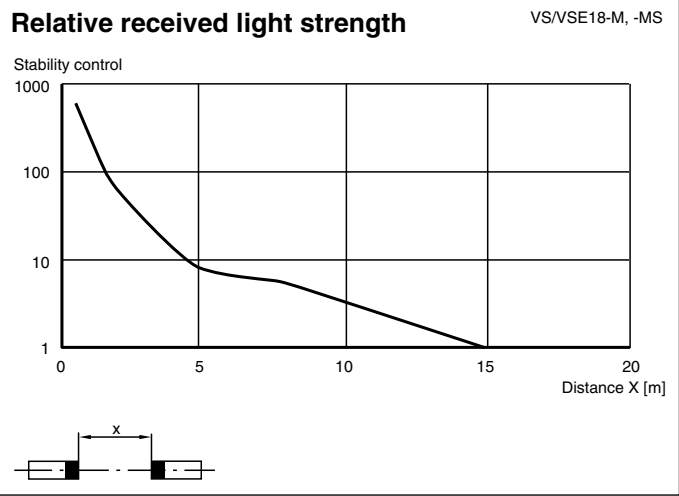
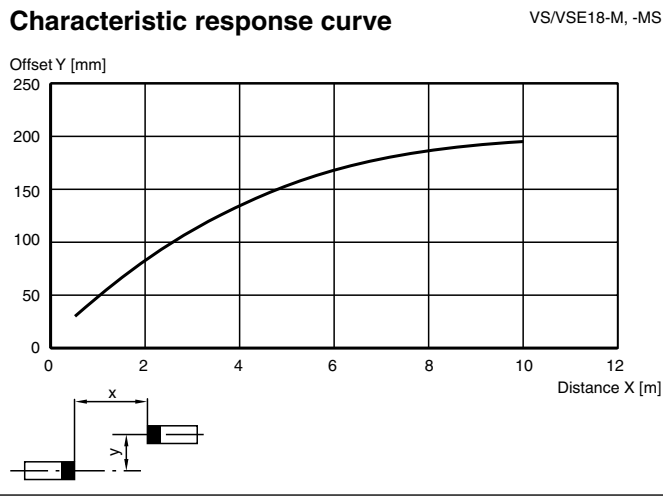
10/8/01

Date of issue



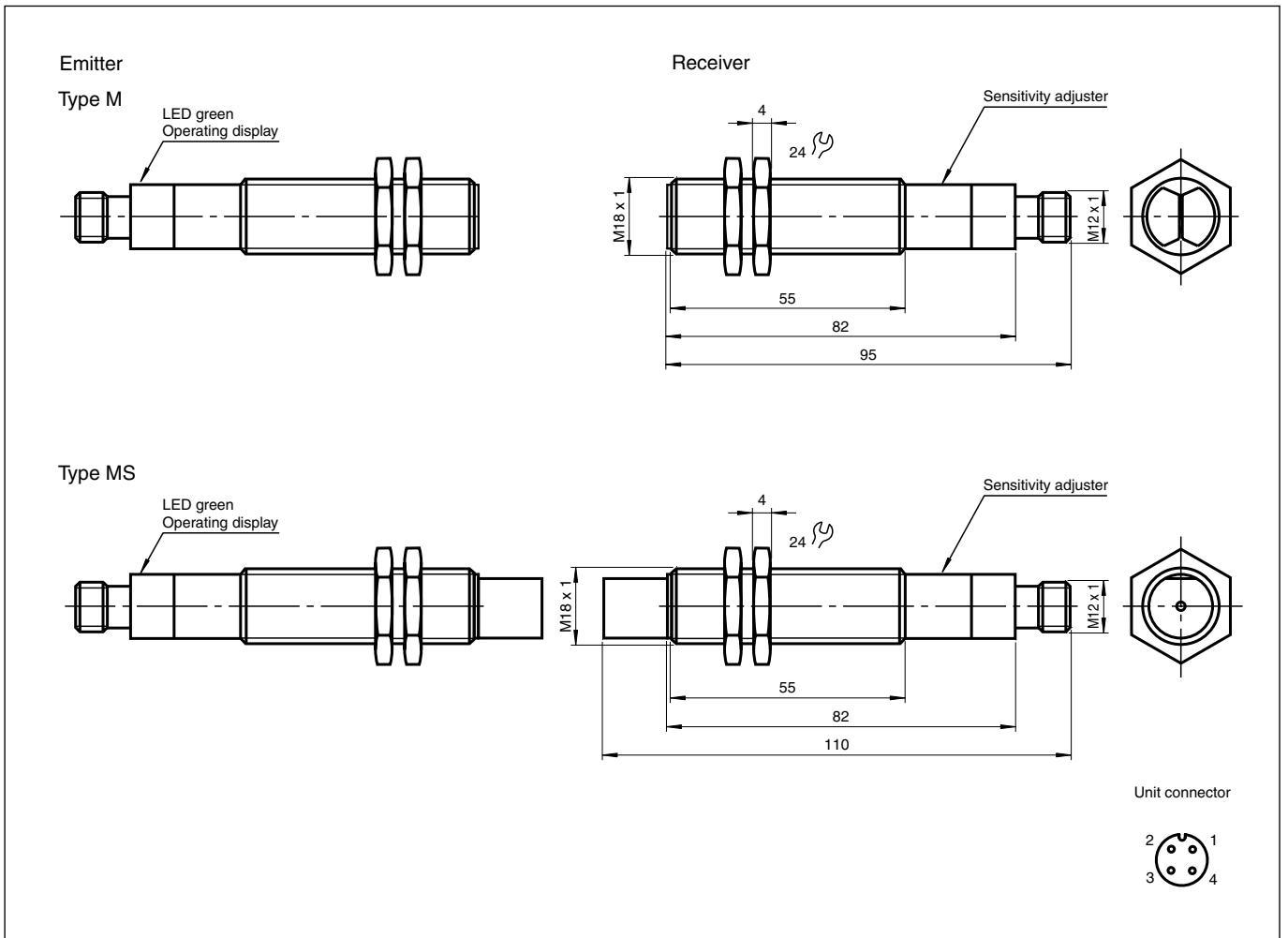
VS/VSE18-../32/40b/92

Diagrams



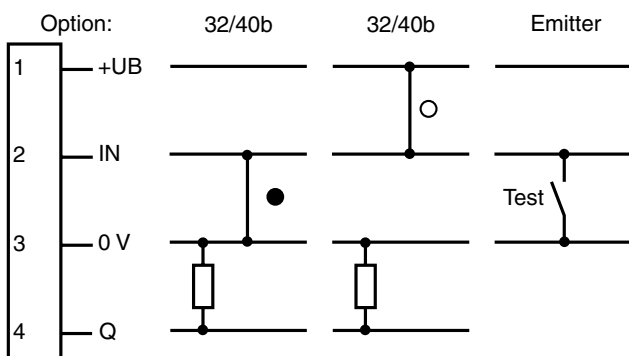
Sensors in threaded housings

Dimensions



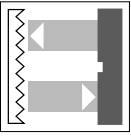
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



VL18-6-../32/40b/115

Reflection light beam switch

VL18-6-../32/40b/115

with 2 m fixed cable



Sensors in
threaded housings



- ◆ Detection range up to 6000 mm
- ◆ M18 threaded housing made of plastic
- ◆ Infrared light design
- ◆ Electrical light-/dark switching
- ◆ Light exit alternatively lateral or frontal
- ◆ Optical surface flush with housing

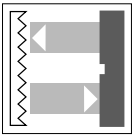
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		VL18-6-L/32/40b/115	VL18-6-LS/32/40b/115
Effective detection range	0 ... 4 m	◆	◆
Threshold detection range	6 m (with C110-2 reflector)	◆	◆
Reflector distance	0.1 ... 4 m	◆	◆
Light source	IREL	◆	◆
Light type	Infrared, alternating light	◆	◆
Light exit	frontal	◆	
	lateral		◆
Angle of divergence	approx. 4 °	◆	◆
Diameter of the light spot	approx. 200 mm at 4000 mm detection range	◆	◆
Ambient light limit	90000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED red	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	5 %	◆	◆
No-load supply current	< 35 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark on selectable programmable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Ambient temperature	-35 ... +60 °C	◆	◆
Storage temperature	-20 ... +60 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m fixed cable	◆	◆
Housing	Plastic	◆	◆
Light exit	Plastic	◆	◆
Mass	30 g	◆	◆

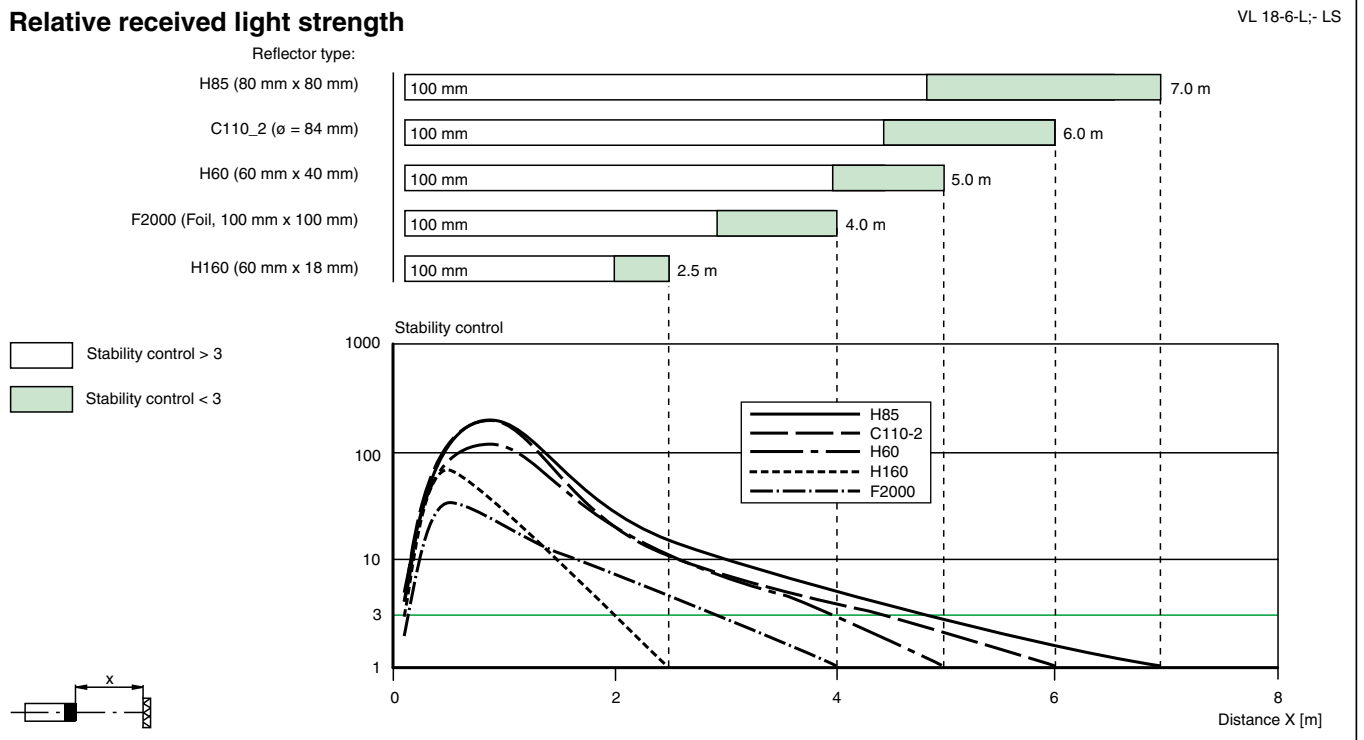
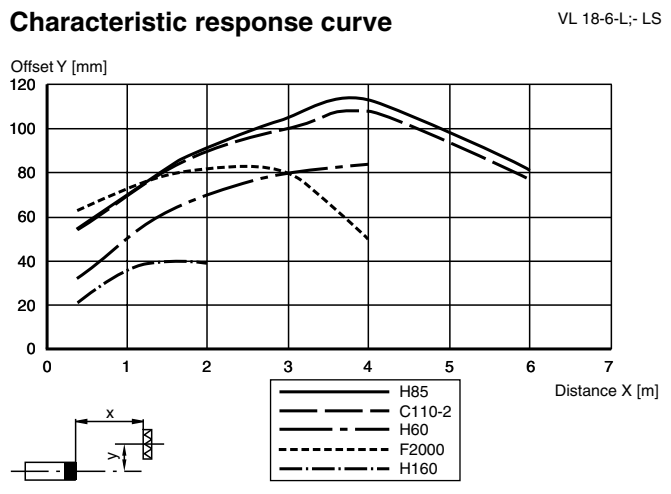
Sensors in threaded housings

10/8/01

Date of issue

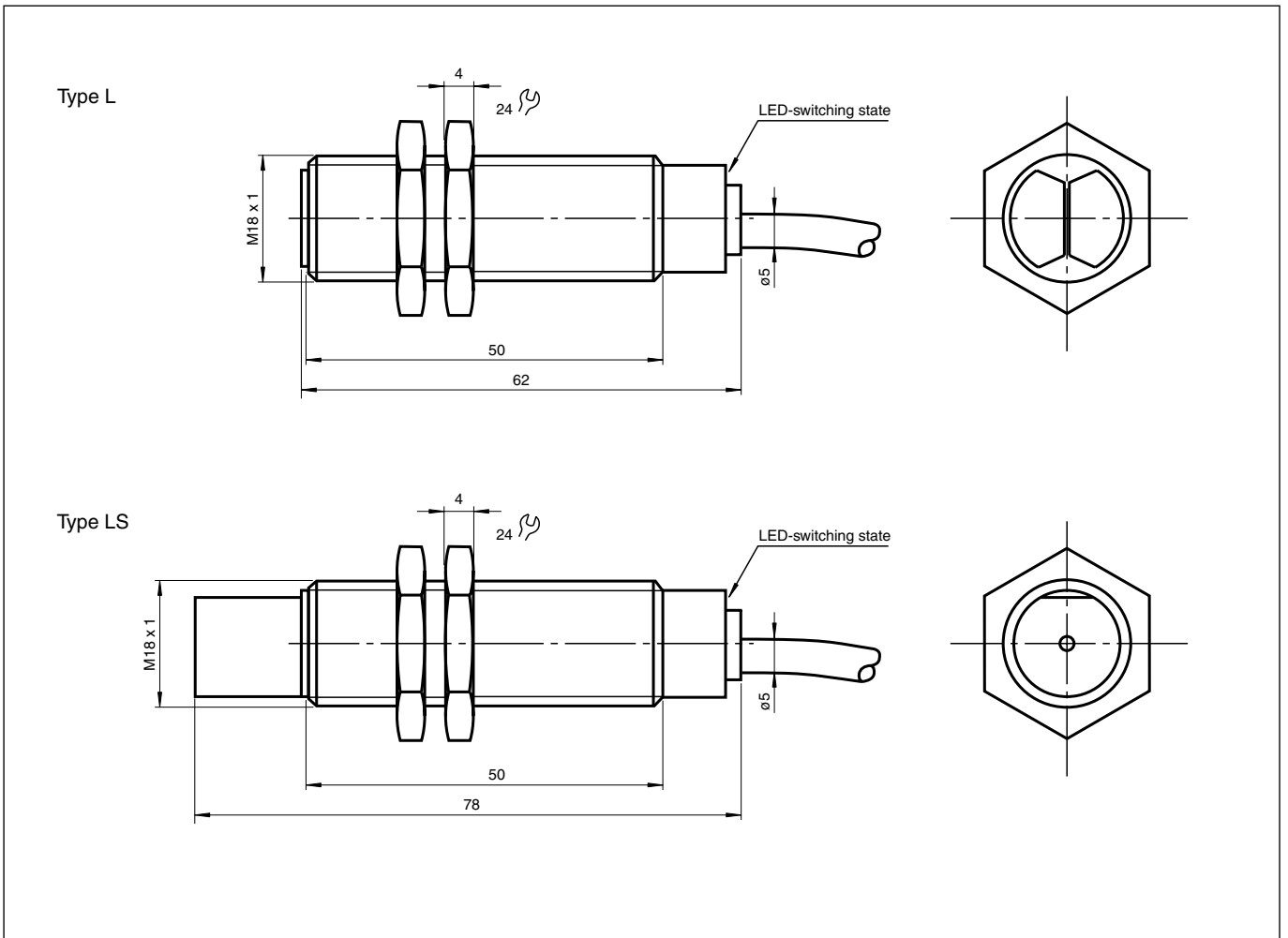


Diagrams



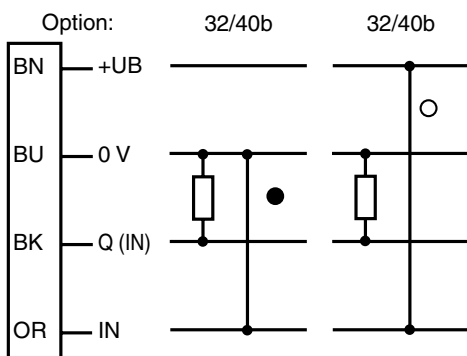
Sensors in threaded housings

Dimensions

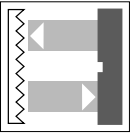


Sensors in threaded housings

Electrical Connection



Date of issue 10/8/01



VL18-6-../32/40b/73

Reflection light beam switch

VL18-6-../32/40b/73

with 4-pin, M12 x 1 plastic connector



Sensors in threaded housings



- ◆ Detection range up to 6000 mm
- ◆ M18 threaded housing made of plastic
- ◆ Infrared light design
- ◆ Electrical light-/dark switching
- ◆ Light exit alternatively lateral or frontal
- ◆ Optical surface flush with housing

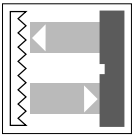
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		VL18-6-L/32/40b/73	VL18-6-LS/32/40b/73
Effective detection range	0 ... 4 m	◆	◆
Threshold detection range	6 m (with C110-2 reflector)	◆	◆
Reflector distance	0.1 ... 4 m	◆	◆
Light source	IREAD	◆	◆
Light type	Infrared, alternating light	◆	◆
Light exit	frontal	◆	◆
	lateral		◆
Angle of divergence	approx. 4 °	◆	◆
Diameter of the light spot	approx. 200 mm at 4000 mm detection range	◆	◆
Ambient light limit	90000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED red	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	5 %	◆	◆
No-load supply current	< 35 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark on selectable programmable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Ambient temperature	-35 ... +60 °C	◆	◆
Storage temperature	-20 ... +60 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	Plastic	◆	◆
Light exit	Plastic	◆	◆
Mass	30 g	◆	◆

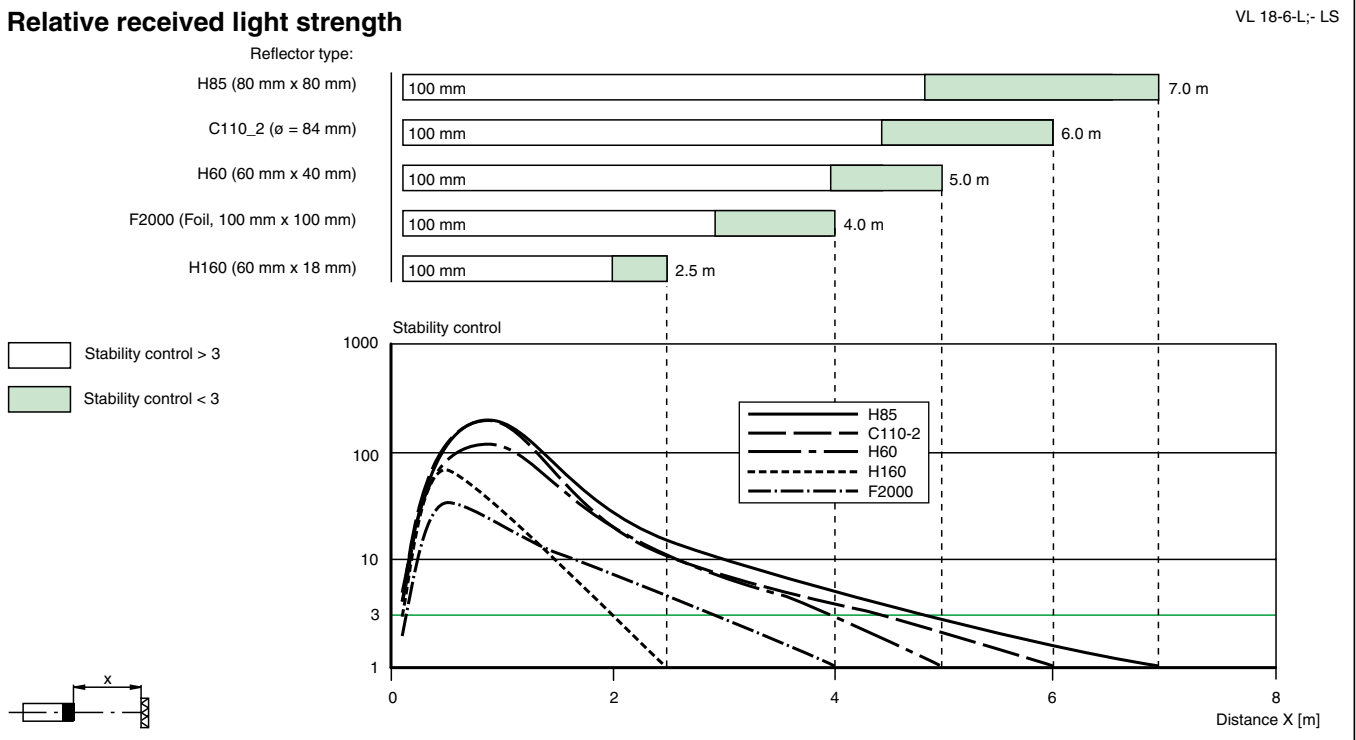
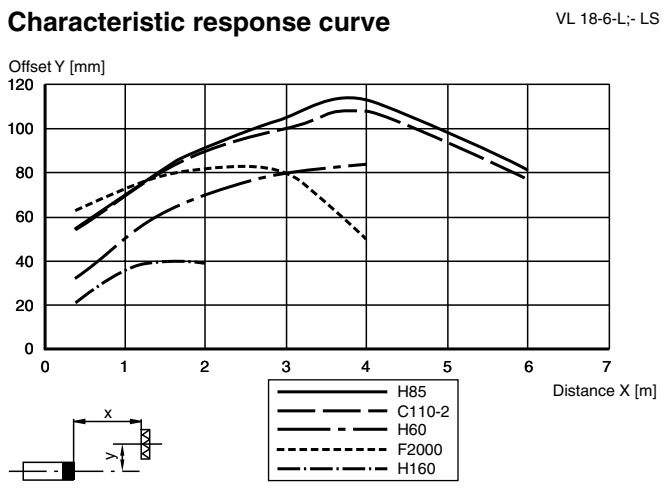
Sensors in threaded housings

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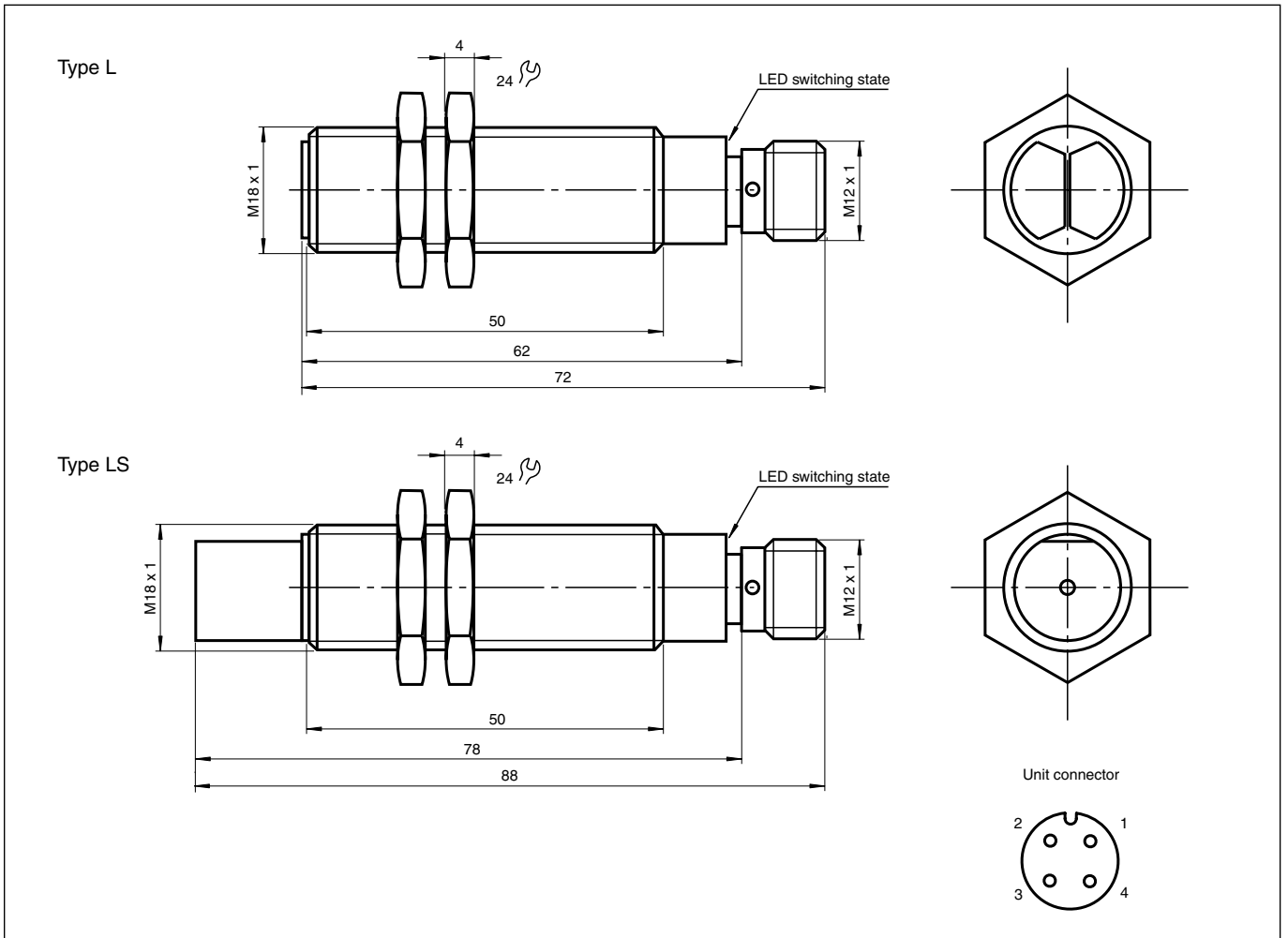


Diagrams



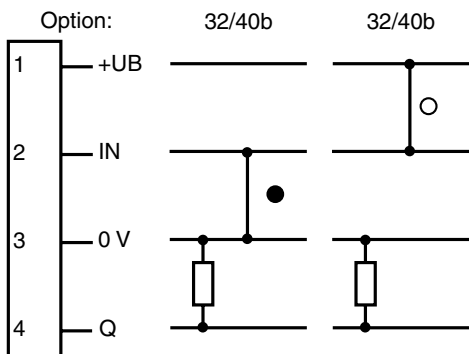
Sensors in threaded housings

Dimensions



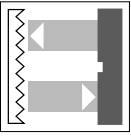
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

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VL18-54-../32/40b/92

Reflection light beam switch with polarisation filter

VL18-54-../32/40b/92

with M12, 4-pin metal connector



Sensors in threaded housings



- ◆ Detection range up to 4 m
- ◆ M18 threaded housing made of brass, nickel plated
- ◆ Red light design
- ◆ Electrical light-/dark switching
- ◆ Light exit alternatively lateral or frontal
- ◆ Optical surface flush with housing

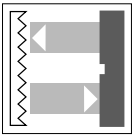
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		VL18-54-M/32/40b/92	VL18-54-MS/32/40b/92
Effective detection range	0 ... 2 m	◆	◆
Threshold detection range	4 m (with C110-2 reflector)	◆	◆
Reflector distance	0.1 ... 2 m	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Light exit	frontal	◆	◆
	lateral		◆
Angle of divergence	approx. 4 °	◆	◆
Diameter of the light spot	approx. 100 mm at a distance of 2000 mm	◆	◆
Ambient light limit	90000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED red	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	< 35 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark on selectable programmable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Ambient temperature	-35 ... +60 °C	◆	◆
Storage temperature	-20 ... +60 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	Plastic	◆	◆
Mass	60 g	◆	◆

Sensors in threaded housings

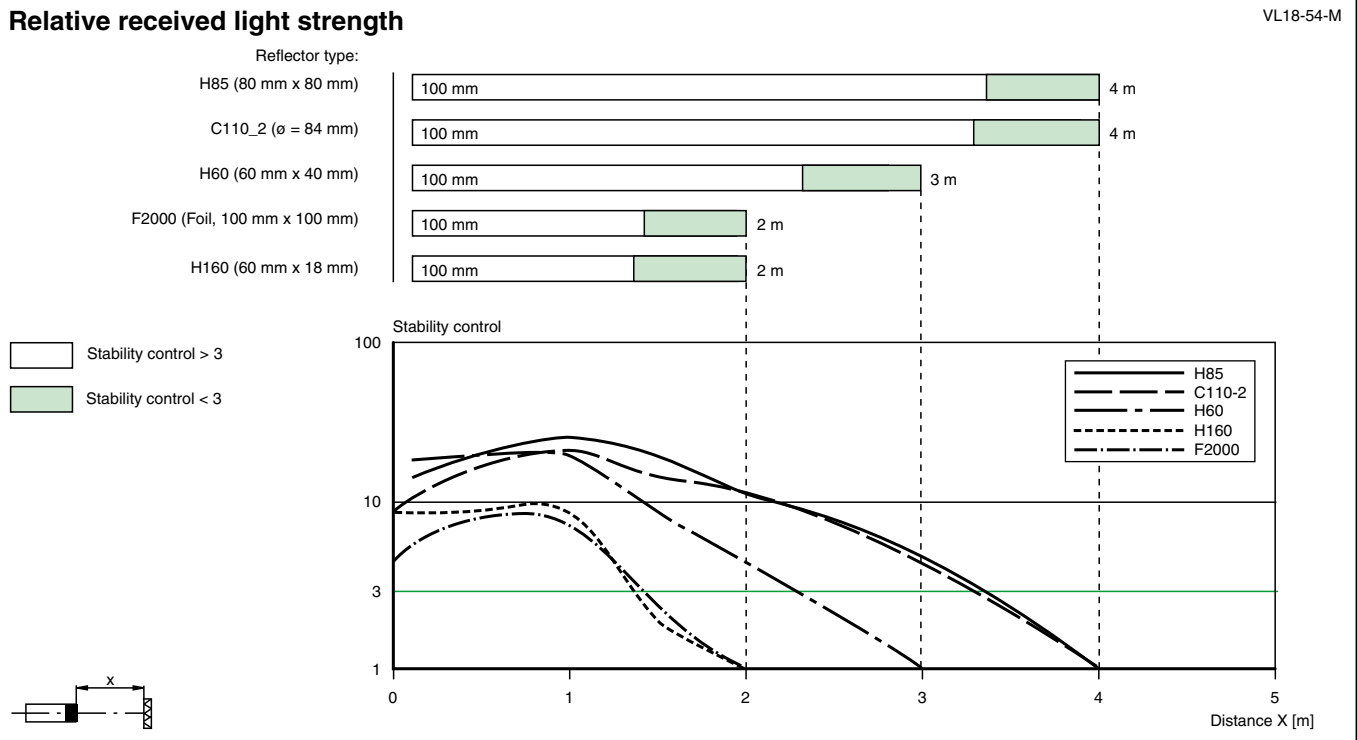
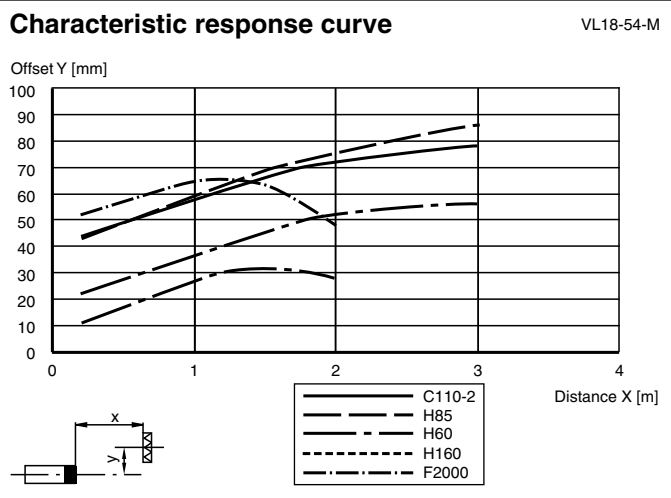
10/8/01

Date of issue



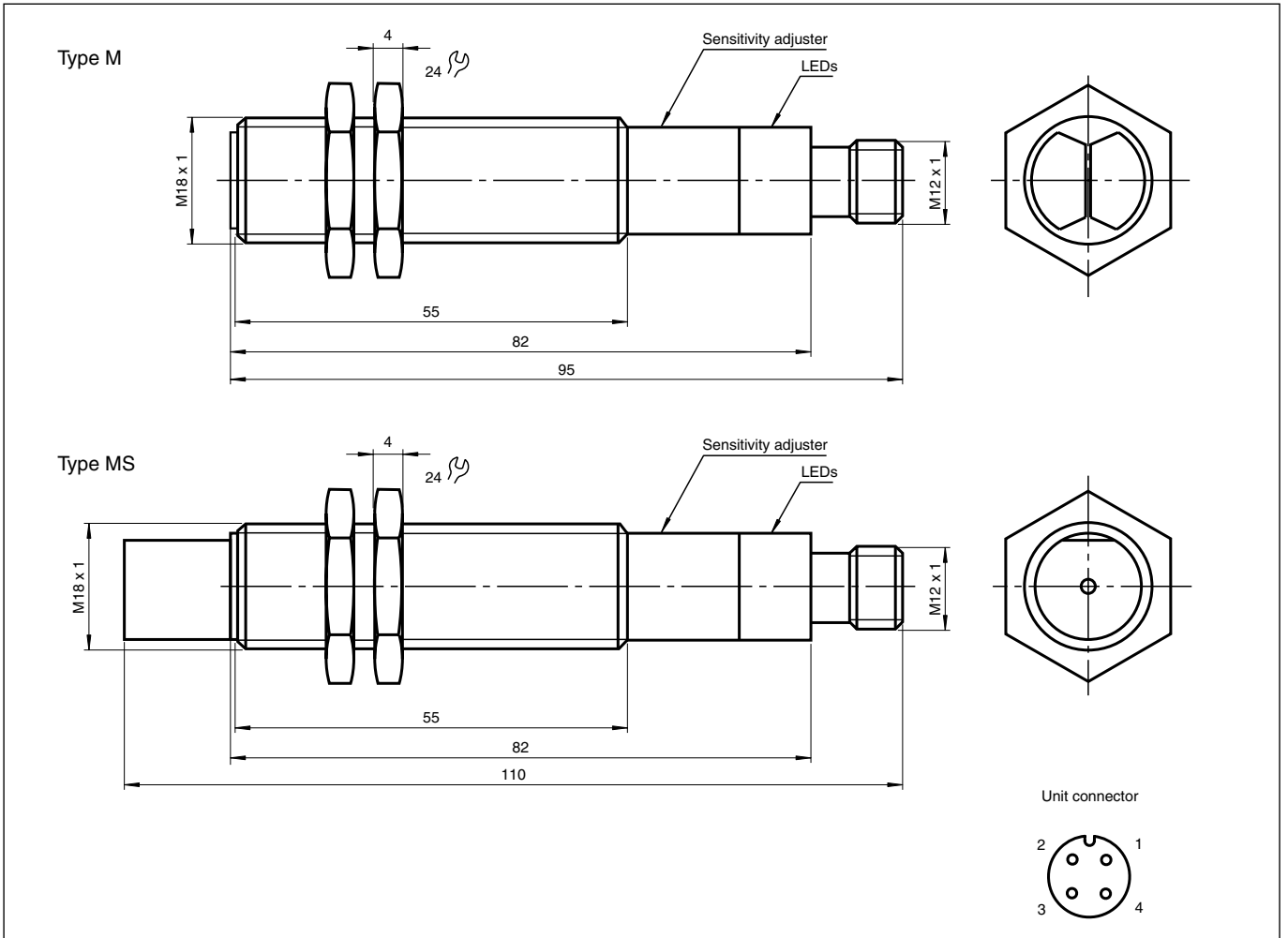
VL18-54-../32/40b/92

Diagrams



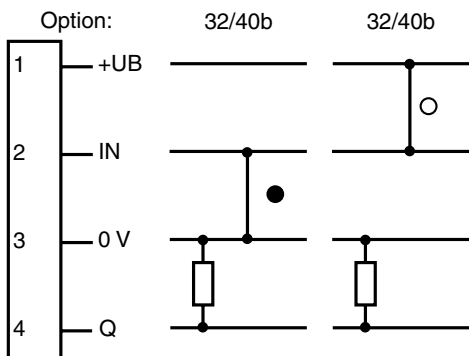
Sensors in threaded housings

Dimensions



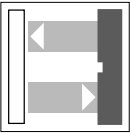
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



VT18-..-100/32/40b/115

Reflection light scanner

VT18-..-100/32/40b/115

with 2 m fixed cable



Sensors in
threaded housings

- ◆ Sensing range 10 mm up to 100 mm
- ◆ M18 threaded housing made of plastic
- ◆ Infrared light design
- ◆ Optical surface flush with housing
- ◆ Electrical light-/dark switching
- ◆ Light exit alternatively lateral or frontal



For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

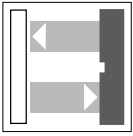
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Ordering code		VT18-L-100/32/40b/115	VT18-LS-100/32/40b/115
Detection range	10 ... 100 mm	◆	◆
Light source	IREd	◆	◆
Light type	Infrared, alternating light	◆	◆
Light exit	frontal	◆	
	lateral		◆
Angle of divergence	approx. 4 °	◆	◆
Diameter of the light spot	approx. 30 mm at a distance of 400 mm	◆	◆
Ambient light limit	60000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED red	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	< 35 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark on selectable programmable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Ambient temperature	-25 ... +60 °C	◆	◆
Storage temperature	-25 ... +60 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Fixed cable 2 m	◆	◆
Housing	Plastic	◆	◆
Light exit	Plastic	◆	◆
Mass	30 g	◆	◆

Sensors in threaded housings

10/8/01

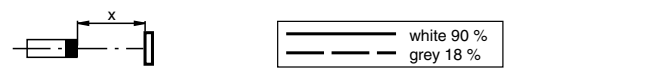
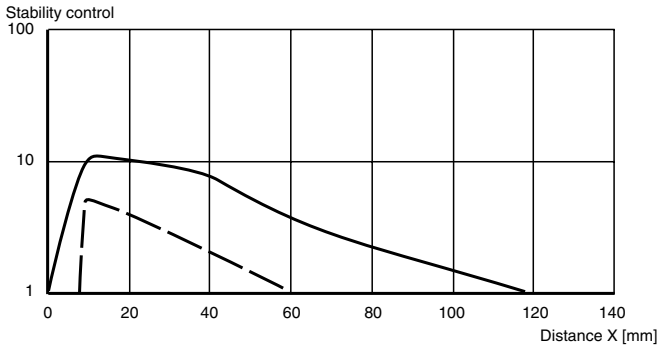
Date of issue



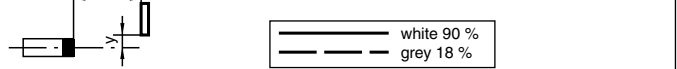
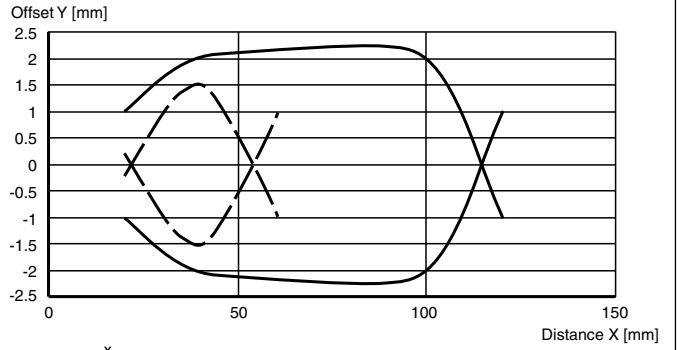
VT18-..-100/32/40b/115

Diagrams

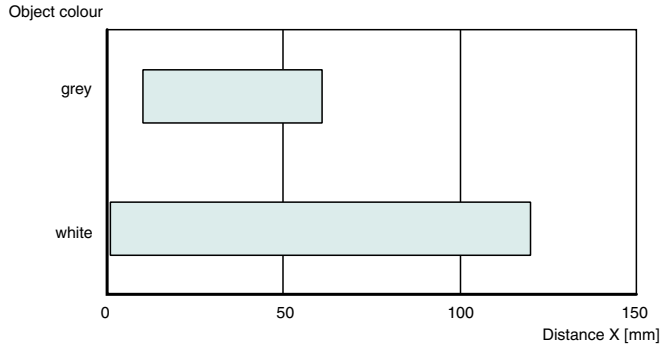
Relative received light strength VT18-L-100



Characteristic response curve VT18-L-100

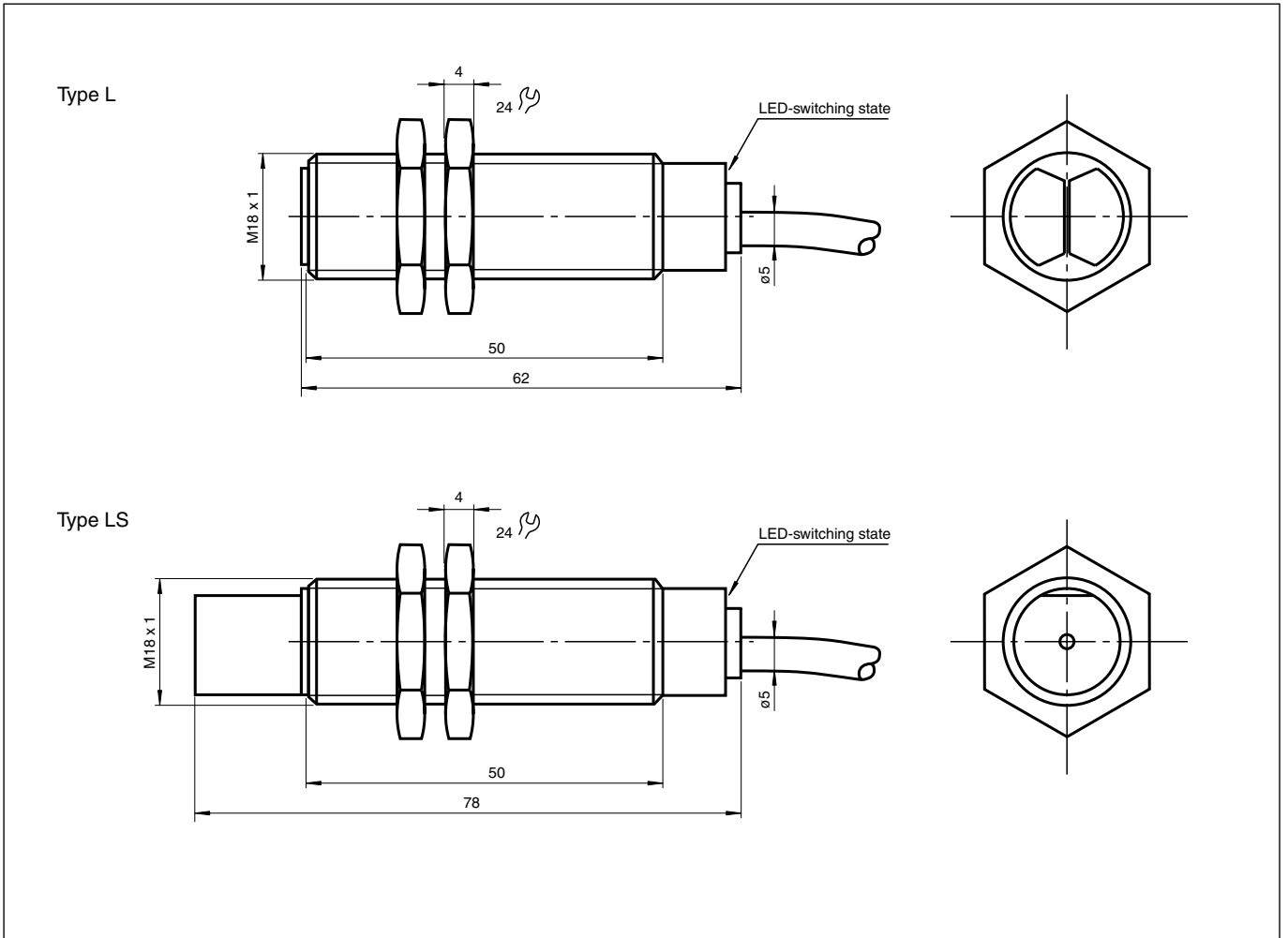


Detection ranges VT18-L-100



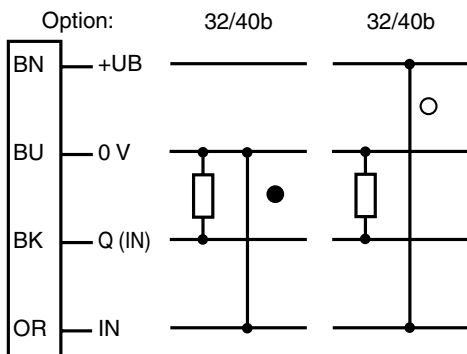
Sensors in threaded housings

Dimensions



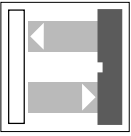
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



VT18-..-100/32/40b/73c

Reflection light scanner

VT18-..-100/32/40b/73c

with M12, 4-pin metal connector



Sensors in
threaded housings



- ◆ Sensing range 10 mm up to 100 mm
- ◆ M18 threaded housing made of plastic
- ◆ Infrared light design
- ◆ Optical surface flush with housing
- ◆ Electrical light-/dark switching
- ◆ Light exit alternatively lateral or frontal

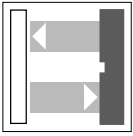
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		VT18-L-100/32/40b/73c	VT18-LS-100/32/40b/73c
Detection range	10 ... 100 mm	◆	◆
Light source	IREd	◆	◆
Light type	Infrared, alternating light	◆	◆
Light exit	frontal	◆	
	lateral		◆
Angle of divergence	approx. 4 °	◆	◆
Diameter of the light spot	approx. 30 mm at a distance of 400 mm	◆	◆
Ambient light limit	60000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED red	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	< 35 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark on selectable programmable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Ambient temperature	-25 ... +60 °C	◆	◆
Storage temperature	-25 ... +60 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	Plastic	◆	◆
Light exit	Plastic	◆	◆
Mass	30 g	◆	◆

Sensors in threaded housings

10/8/01

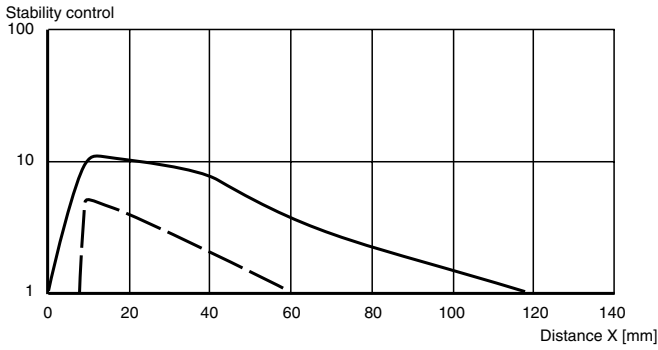
Date of issue



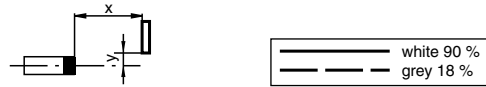
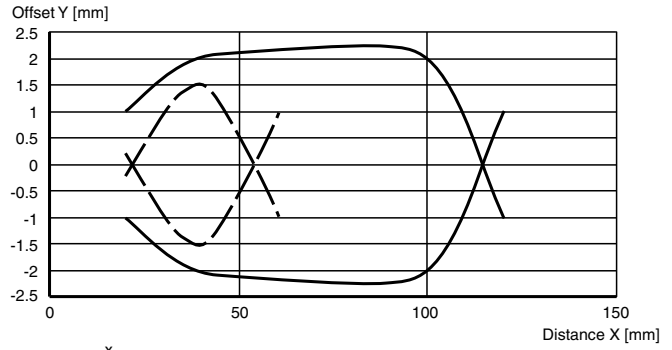
VT18-.-100/32/40b/73c

Diagrams

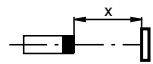
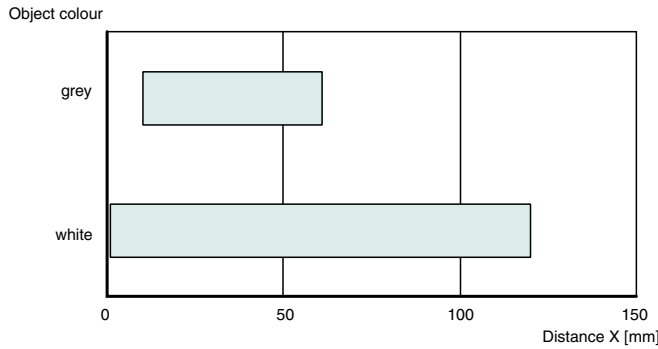
Relative received light strength VT18-L-100



Characteristic response curve VT18-L-100

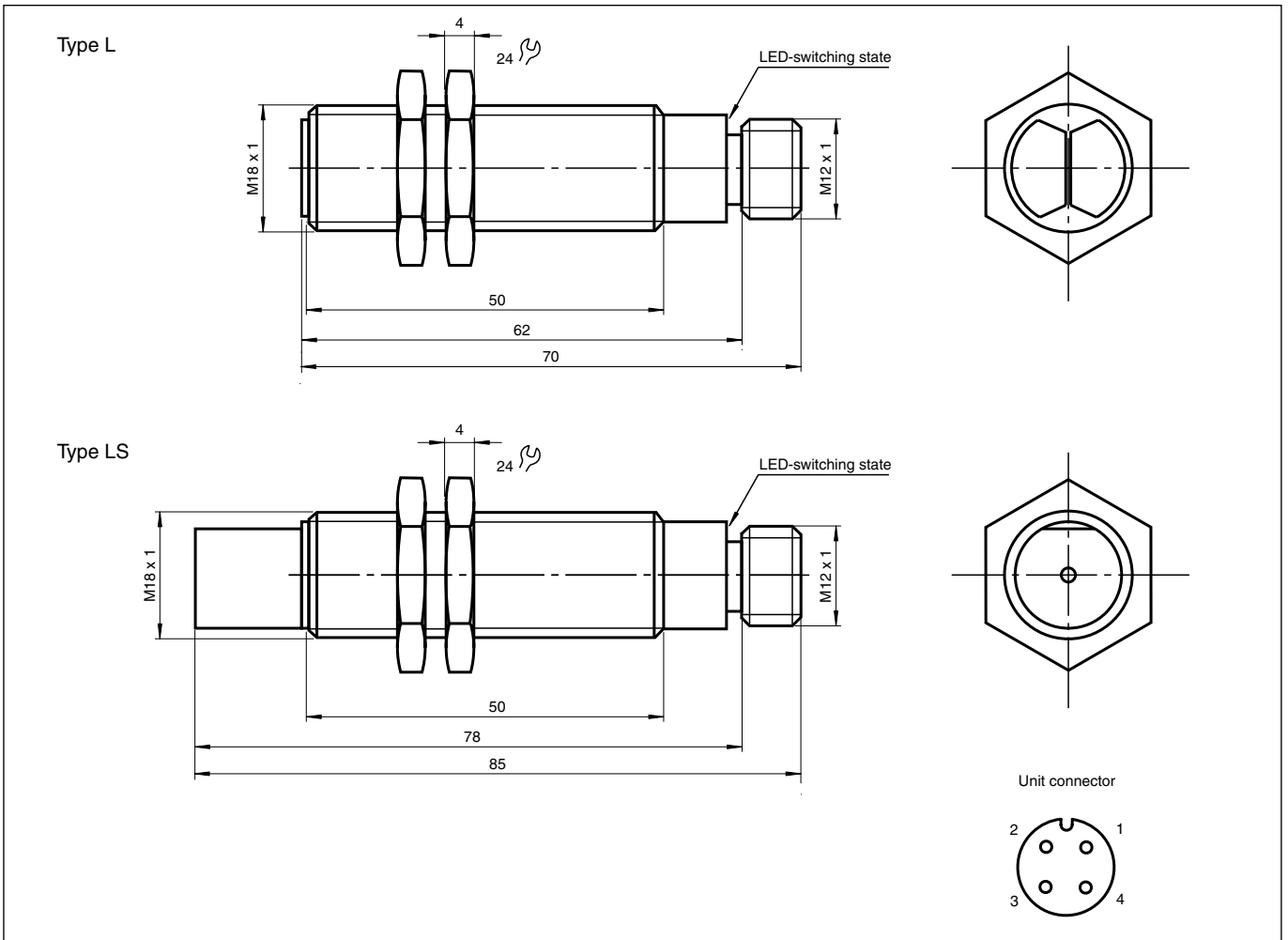


Detection ranges VT18-L-100



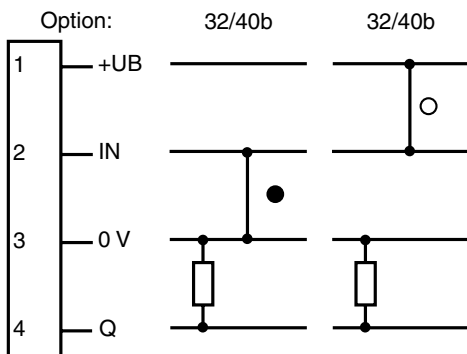
Sensors in threaded housings

Dimensions

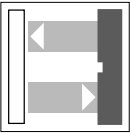


Sensors in threaded housings

Electrical Connection



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VT18-..-400/32/40b/92

Reflection light scanner

VT18-..-400/32/40b/92

with M12, 4-pin metal connector



Sensors in threaded housings



- ◆ Sensing range up to 400 mm, adjustable
- ◆ M18 threaded housing made of brass, nickel plated
- ◆ Infrared light design
- ◆ Electrical light-/dark switching
- ◆ Light exit alternatively lateral or frontal
- ◆ Optical surface flush with housing

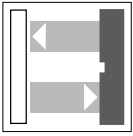
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		VT18-M-400/32/40b/92	VT18-MS-400/32/40b/92
Detection range	3 ... 400 mm	◆	◆
Adjustment range	0 ... 400 mm	◆	◆
Light source	IREd	◆	◆
Light type	Infrared, alternating light	◆	◆
Light exit	frontal	◆	◆
	lateral		◆
Angle of divergence	approx. 4 °	◆	◆
Diameter of the light spot	approx. 30 mm at a distance of 400 mm	◆	◆
Ambient light limit	60000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow: switching state LED red:	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	< 35 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark on selectable programmable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Ambient temperature	-25 ... +60 °C	◆	◆
Storage temperature	-25 ... +60 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	Plastic	◆	◆
Mass	60 g	◆	◆

Sensors in threaded housings

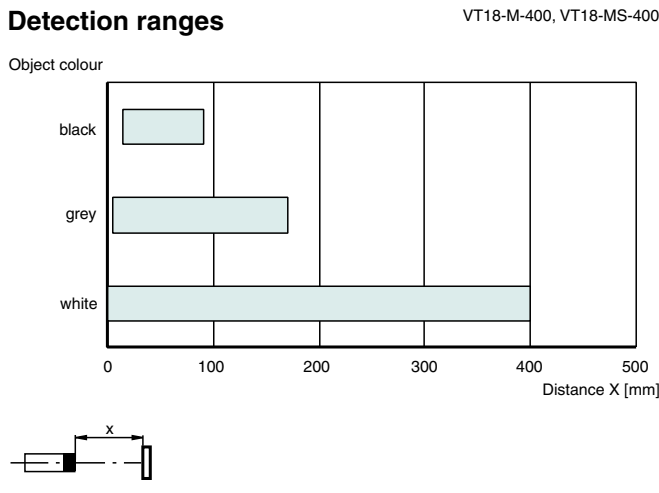
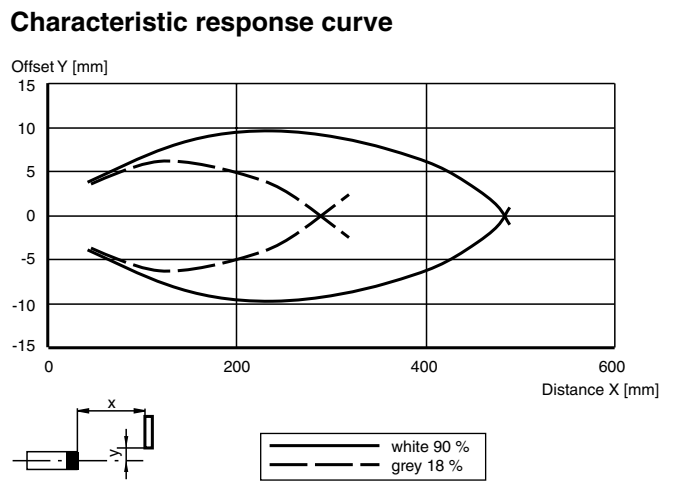
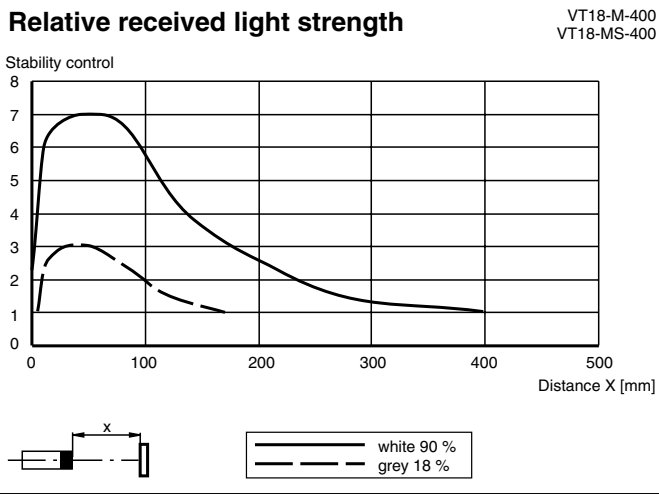
10/8/01

Date of issue



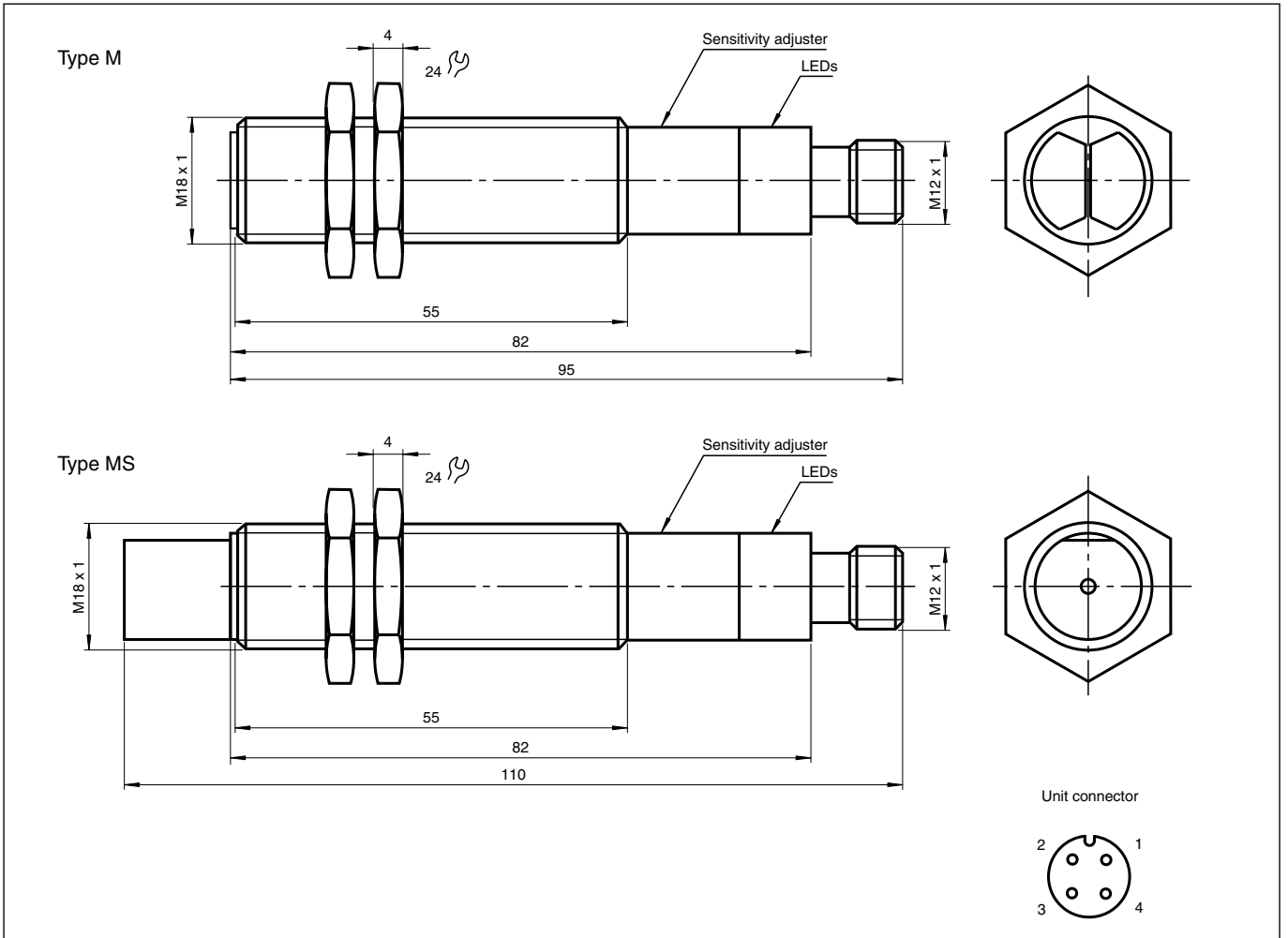
VT18-.-400/32/40b/92

Diagrams



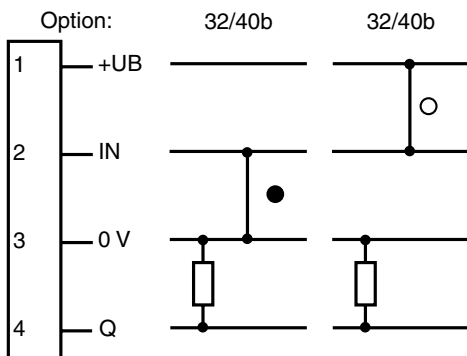
Sensors in threaded housings

Dimensions



Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

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VT18-H-..-120/32/40b/92

Reflection light scanner with background suppression

VT18-H-..-120/32/40b/92

with M12, 4-pin metal connector



Sensors in threaded housings



- ◆ Sensing range 10 mm up to 120 mm
- ◆ M18 threaded housing made of brass, nickel plated
- ◆ Infrared light design
- ◆ Electrical light-/dark switching
- ◆ Light exit alternatively lateral or frontal
- ◆ Optical surface flush with housing

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		VT18-H-M-120/32/40b/92	VT18-H-MS-120/32/40b/92
Detection range	10 ... 120 mm	◆	◆
Detection range min.	10 ... 80 mm	◆	◆
Sensor range max.	10 ... 120 mm	◆	◆
Black/white difference (6%/90%)	< 45 %	◆	◆
Light source	IRED	◆	◆
Light type	Infrared, alternating light	◆	◆
Light exit	frontal	◆	◆
	lateral	◆	◆
Angle of divergence	approx. 4 °	◆	◆
Diameter of the light spot	approx. 10 mm at a distance of 120 mm	◆	◆
Ambient light limit	40000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
USA	UL	◆	◆
Kanada	CSA	◆	◆
Function display	LED yellow: LED red: stability control display	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	< 35 mA	◆	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆	◆
Switching type	Light/dark on selectable programmable	◆	◆
Switching voltage	30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Switching frequency	500 Hz	◆	◆
Response time	1 ms	◆	◆
Ambient temperature	-25 ... +60 °C	◆	◆
Storage temperature	-25 ... +60 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	Plastic	◆	◆
Mass	60 g	◆	◆

Sensors in threaded housings

10/8/01

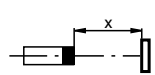
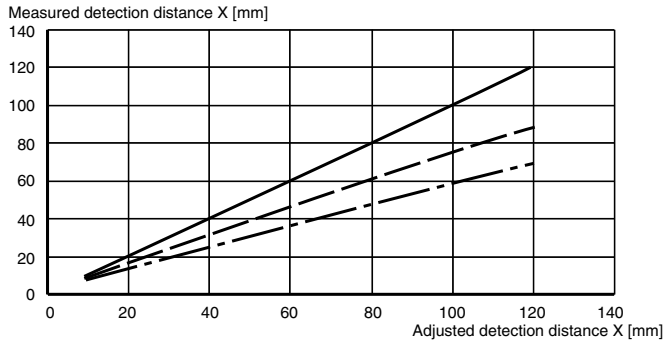
Date of issue



VT18-H-.-120/32/40b/92

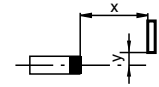
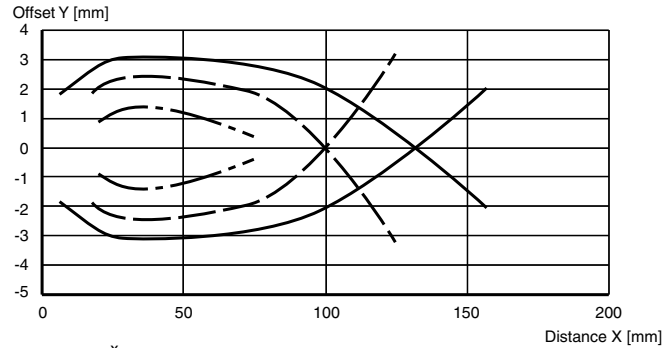
Diagrams

Difference in detection distance VT18-H-M,-MS



- white 90 %
- - - grey 18 %
- · - · black 6 %

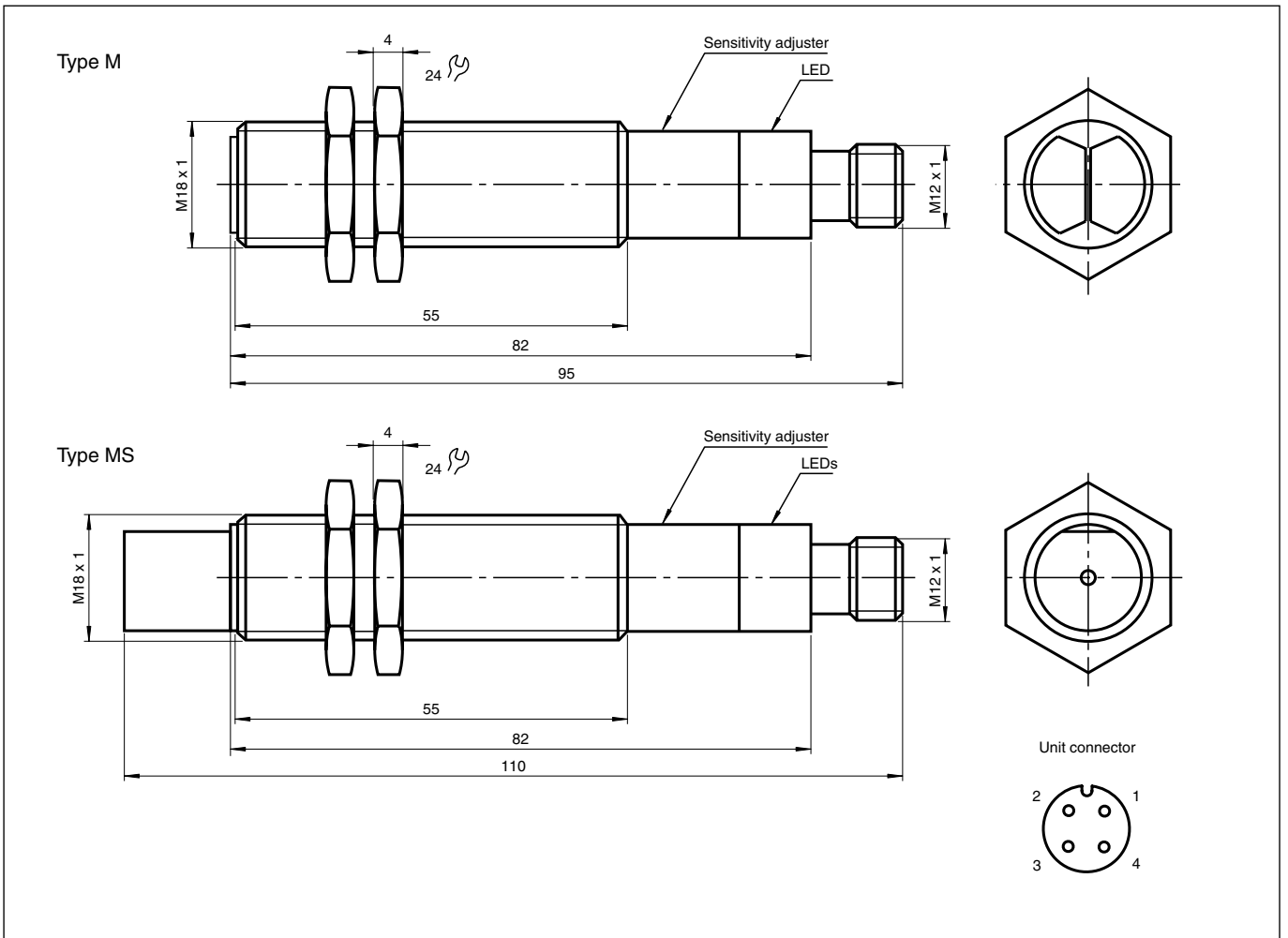
Characteristic response curve



- white 90 %
- - - grey 18 %
- · - · black 6 %

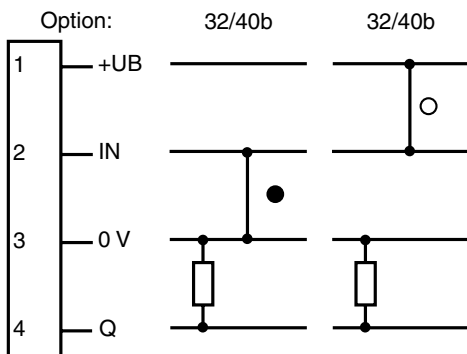
Sensors in threaded housings

Dimensions



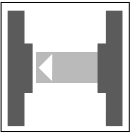
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

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E18-LAS/EV18-LAS/25/32/76a/92

Single path light beam switch

E18-LAS/EV18-LAS/25/32/76a/92

with M12, 4-pin metal connector

CE

Sensors in
threaded housings



- ◆ Detection range up to 18 m
- ◆ Laser single path light beam switch in the M18 housing
- ◆ Metal design
- ◆ Automatic threshold value adaptation
- ◆ Very high switching accuracy
- ◆ Light beam diameter < 1.5 mm
- ◆ Test input

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

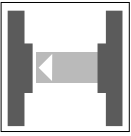
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Ordering code		E18-LAS/EV18-LAS/25/32/76a/92
Effective detection range	0 ... 10 m	◆
Threshold detection range	18 m	◆
Obstacle size	1.2 mm	◆
Light source	Laser diode	◆
Light type	Red, alternating light	◆
Angle of divergence	Receiver +/-2°	◆
Diameter of the light spot	< 1.5 mm at 1.5 m	◆
Ambient light limit	100000 Lux	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
Function display	LED yellow, flashes when falling short of the stability control	◆
Controls	sensitivity adjuster	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	emitter < 25 mA, receiver < 60 mA	◆
Signal output	1 pnp, short-circuit proof, protected against reverse polarity	◆
Switching type	light ON	◆
Switching voltage	max. 30 V DC	◆
Switching current	max. 200 mA	◆
Switching frequency	1000 Hz	◆
Response time	0.5 ms	◆
Test input	Emitter deactivation	◆
Ambient temperature	0 ... +60 °C	◆
Storage temperature	-40 ... +85 °C	◆
Protection degree	IP65	◆
Housing	brass, nickel plated	◆
Light exit	Glass	◆
Mass	Per 45 g	◆

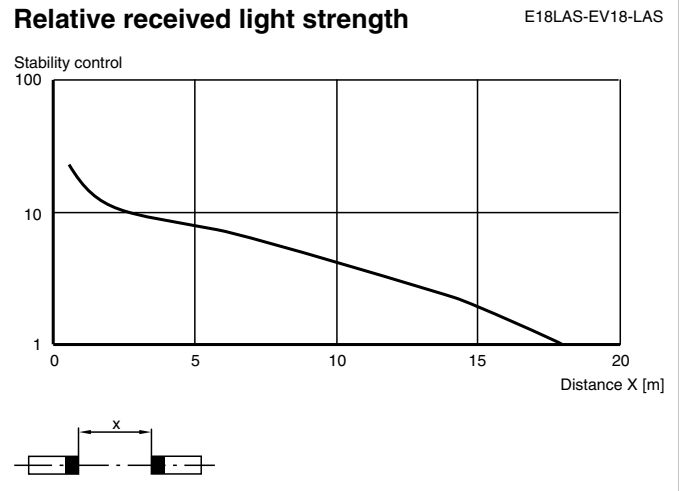
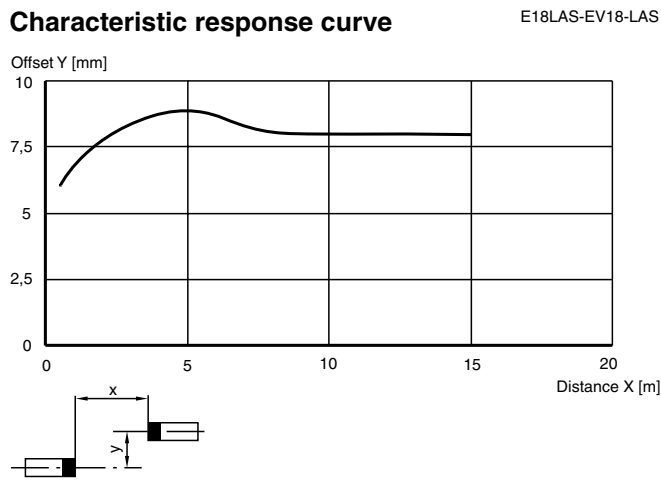
Sensors in threaded housings

10/8/01

Date of issue

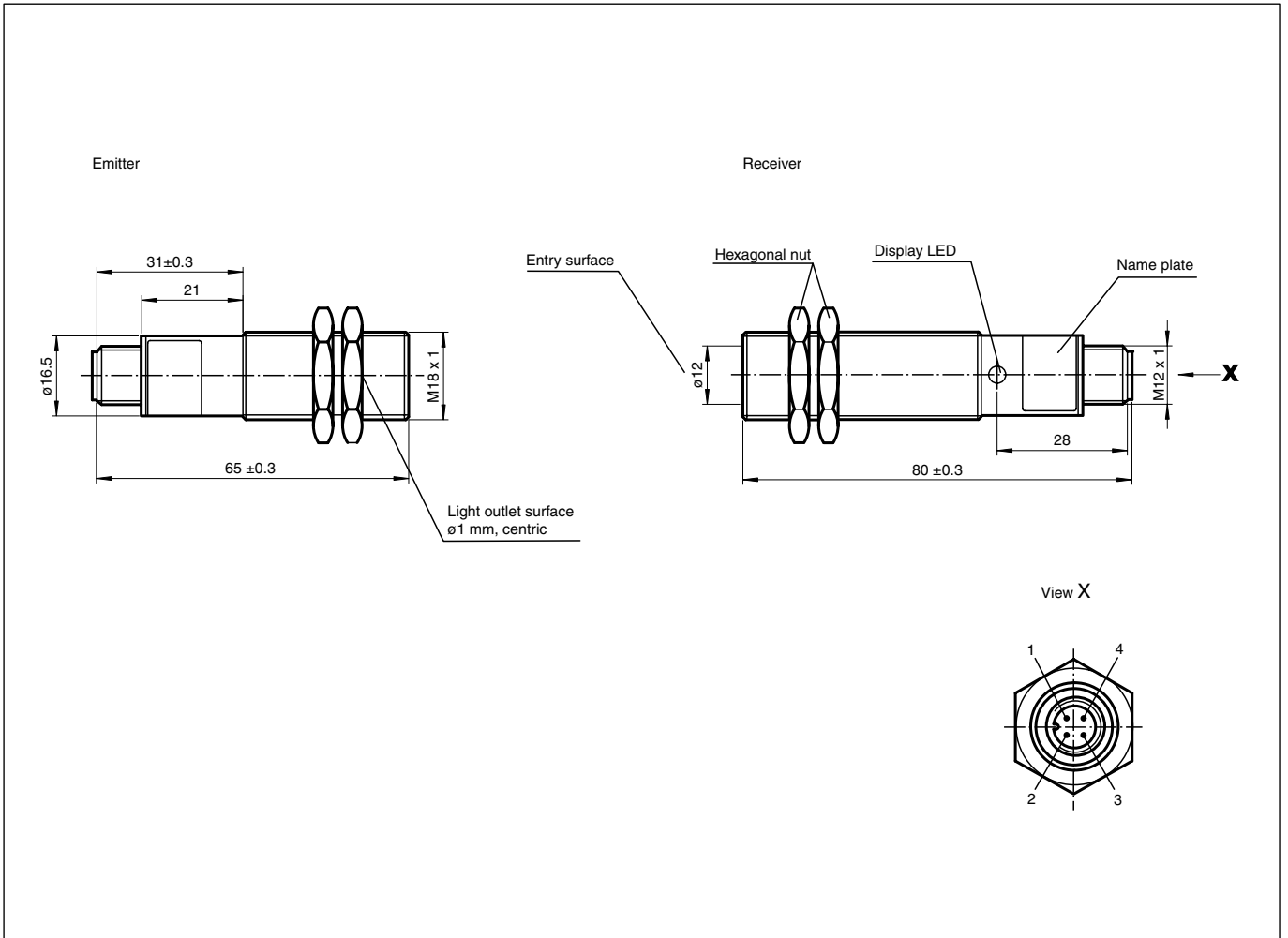


Diagrams



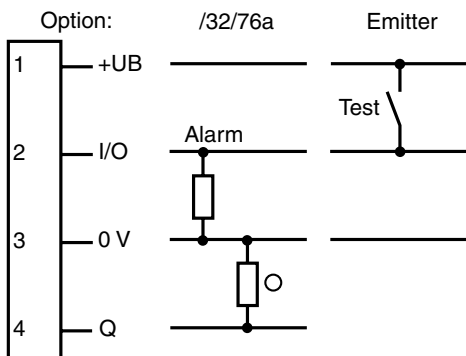
Sensors in threaded housings

Dimensions



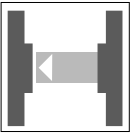
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



OBE5000-18GM70-...

Single path light beam switch

OBE5000-18GM70-...

with 2 m fixed cable

CE

Sensors in
threaded housings



- ◆ Detection range up to 5 m
- ◆ Light/dark ON, programmable
- ◆ Protection degree IP67
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ LED indicating for a simple operation start

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

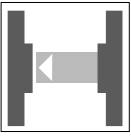
Date of issue
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Ordering code		OBE5000-18GM70-SE4	OBE5000-18GM70-SE5
Effective detection range	0 ... 5 m	◆	◆
Reference target	Receiver	◆	◆
Adjustment range	500 ... 5000 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green (transmitter)	◆	◆
Function display	LED yellow: switching state (receiver)	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA (device)	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 300 Hz	◆	◆
Switch-on delay	1.5 ms	◆	◆
Response time	≤ 1.5 ms	◆	◆
Range hysteresis	≤ 10 %	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m cable, 3 x 0.34 mm ² , PVC	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PC	◆	◆
Mass	45 g (device)	◆	◆

Sensors in threaded housings

10/8/01

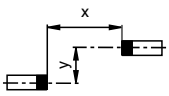
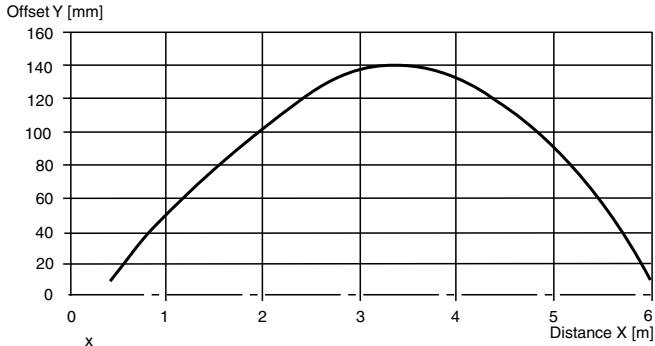
Date of issue



OBE5000-18GM70-...

Diagrams

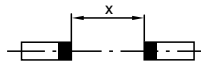
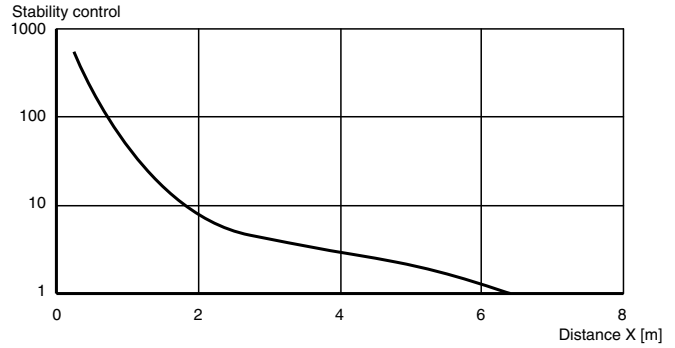
Characteristic response curve



Permissible separation (offset) between the optical axis of the emitter and receiver.

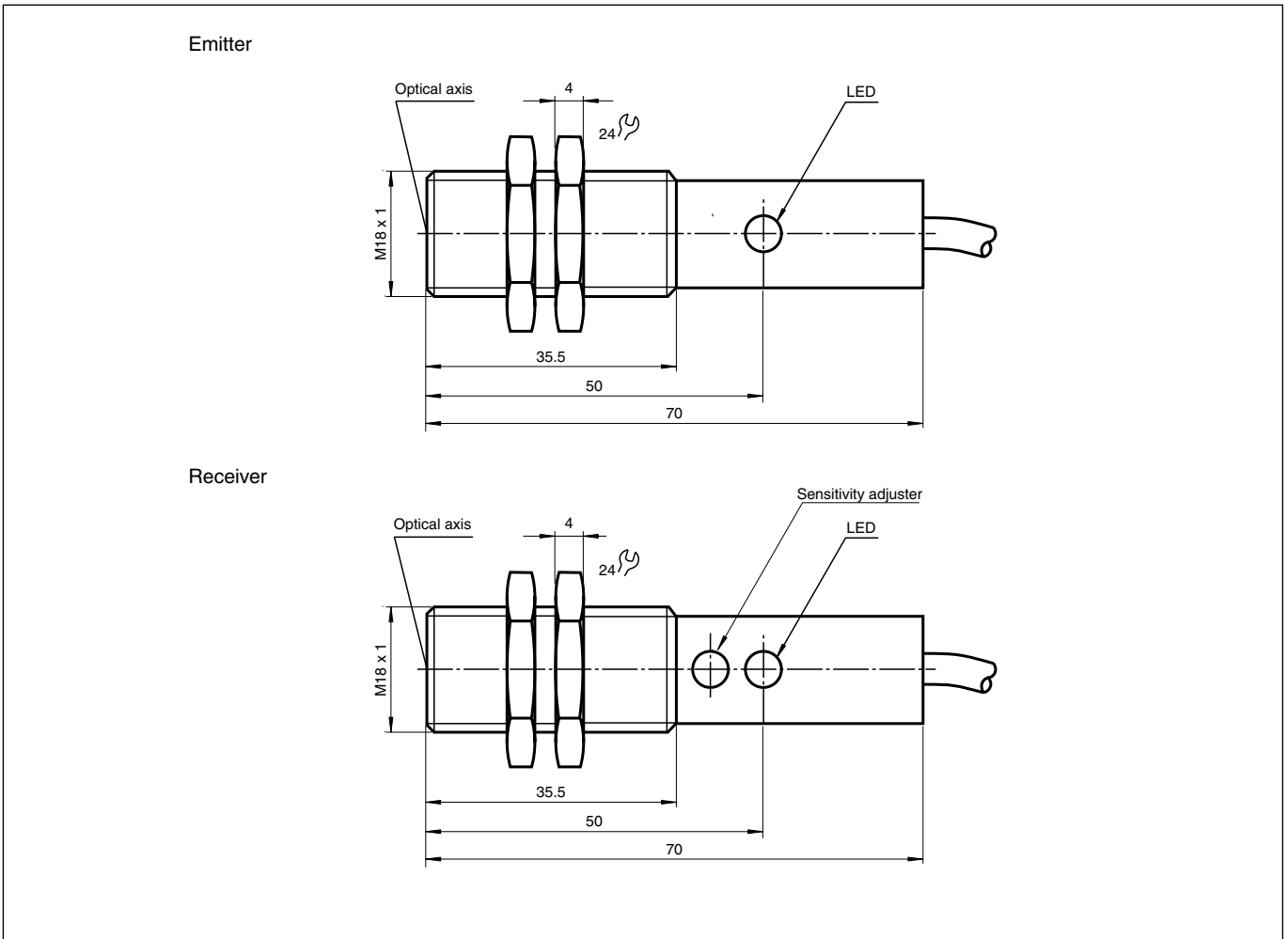
Relative received light strength

OBE 5000-18GM70

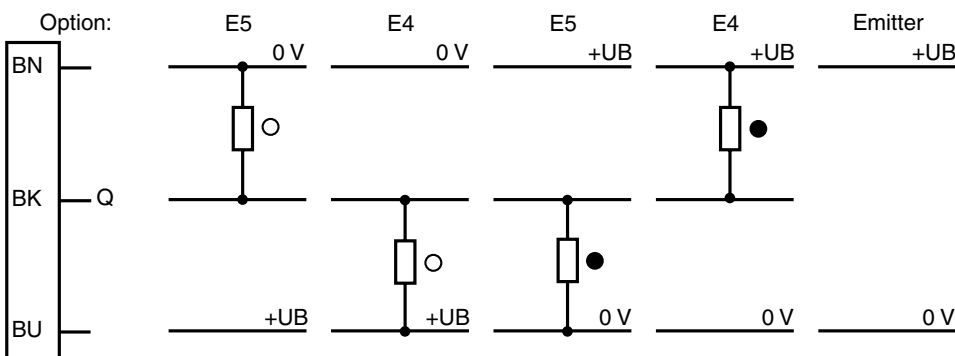


Sensors in threaded housings

Dimensions

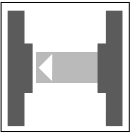


Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



OBE5000-18GM70-...-V1

Single path light beam switch

OBE5000-18GM70-...-V1

with M12 x 1 connector

CE

Sensors in threaded housings



- ◆ Light/dark ON, programmable
- ◆ Protection degree IP67
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ LED indicating for a simple operation start

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

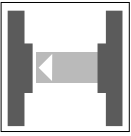
Date of issue 10/8/01

Ordering code		OBE5000-18GM70-SE4-V1	OBE5000-18GM70-SE5-V1
Effective detection range	0 ... 5 m	◆	◆
Reference target	Receiver	◆	◆
Adjustment range	500 ... 5000 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Operating display	LED green (transmitter)	◆	◆
Function display	LED yellow: switching state (receiver)	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA (device)	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	1 switch output npn	◆	◆
	1 switch output pnp		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 300 Hz	◆	◆
Switch-on delay	1.5 ms	◆	◆
Response time	≤ 1.5 ms	◆	◆
Range hysteresis	≤ 10 %	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PC	◆	◆
Mass	45 g (device)	◆	◆

Sensors in threaded housings

10/8/01

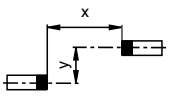
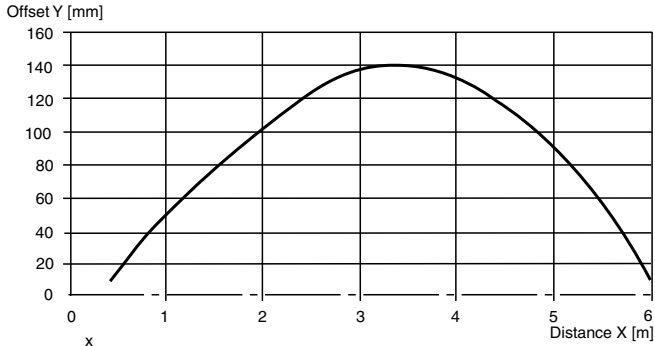
Date of issue



OBE5000-18GM70-...-V1

Diagrams

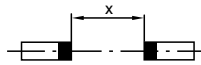
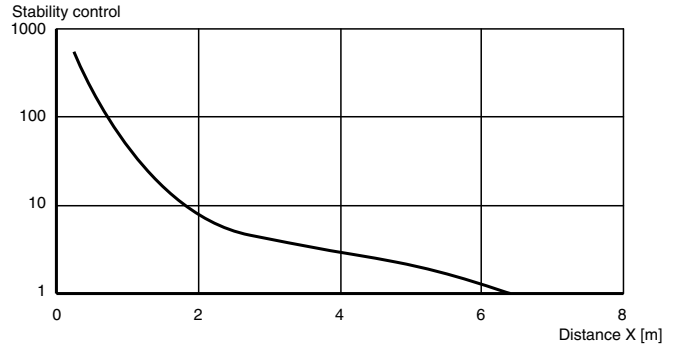
Characteristic response curve



Permissible separation (offset) between the optical axis of the emitter and receiver.

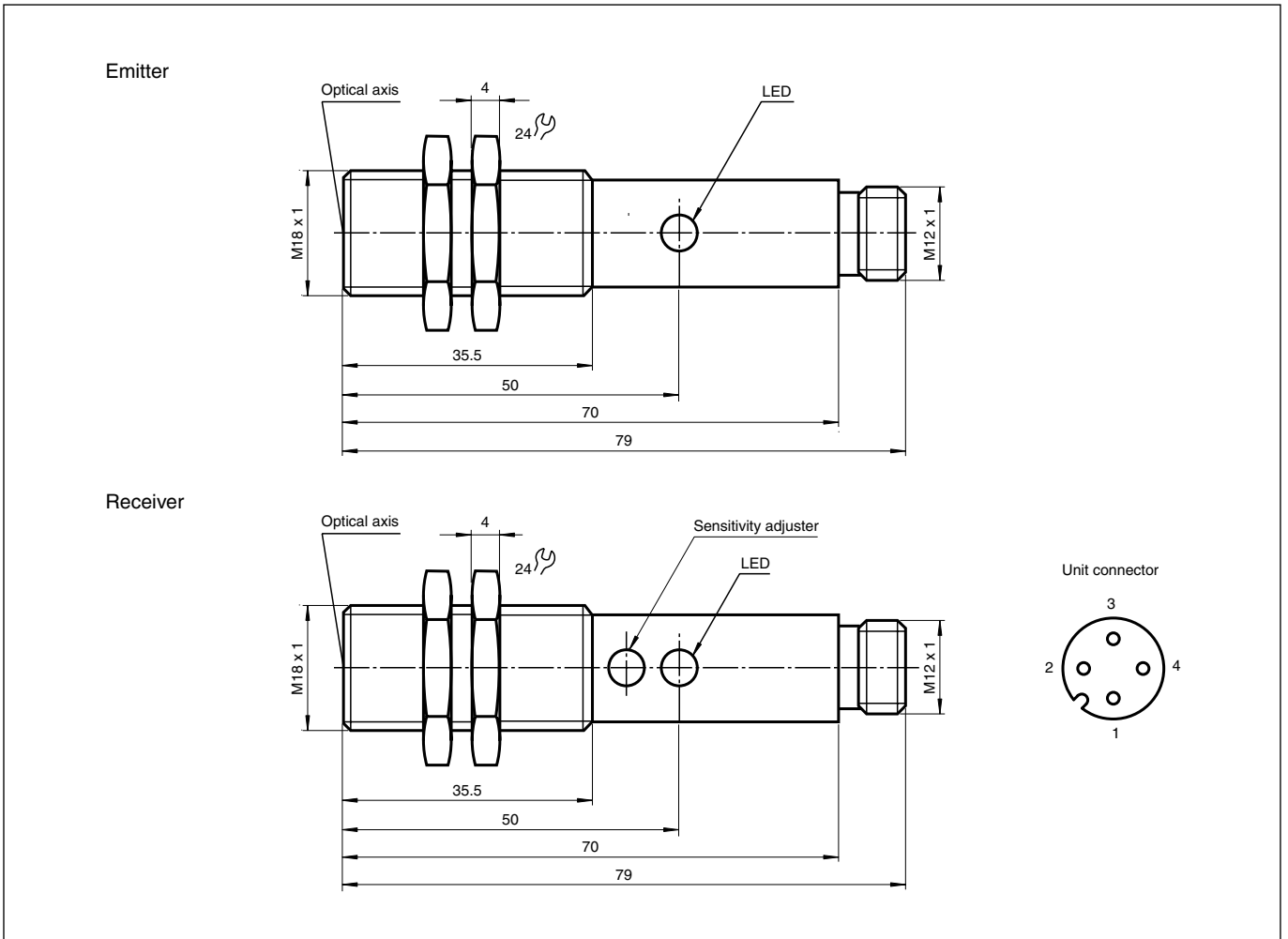
Relative received light strength

OBE 5000-18GM70



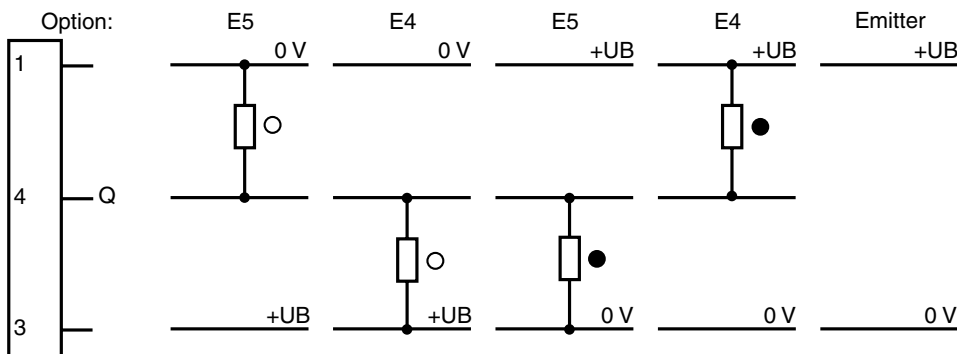
Sensors in threaded housings

Dimensions



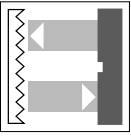
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



OBS1500-18GM70-..

Reflection light beam switch

OBS1500-18GM70-..

with 2 m fixed cable

CE

Sensors in
threaded housings



- ◆ Detection range up to 1500 mm
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Glare protected with polarisation filter
- ◆ Protection degree IP67
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ LED indicating for a simple operation start

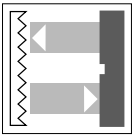
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OBS1500-18GM70-E4	OBS1500-18GM70-E5
Effective detection range	0 ... 1500 mm	◆	◆
Reference target	Reflector C110_2	◆	◆
Reflector distance	100 ... 1500 mm	◆	◆
Reflector range	100 ... 1500 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	1 switch output npn	◆	◆
	1 switch output pnp	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 300 Hz	◆	◆
Switch-on delay	1.5 ms	◆	◆
Response time	≤ 1.5 ms	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m cable, 3 x 0.34 mm ² , PVC	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PMMA	◆	◆
Mass	45 g	◆	◆

Sensors in threaded housings

10/8/01

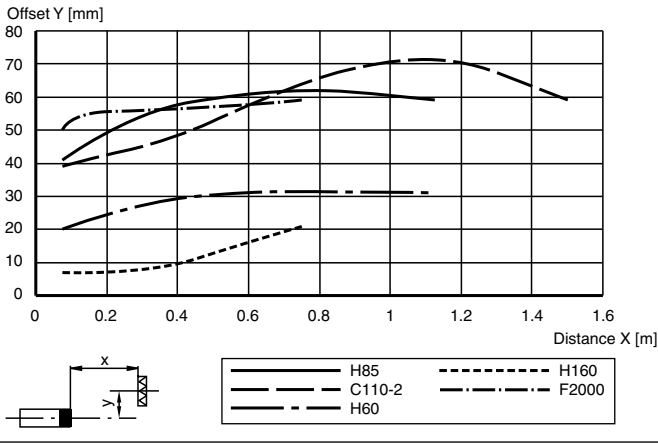
Date of issue



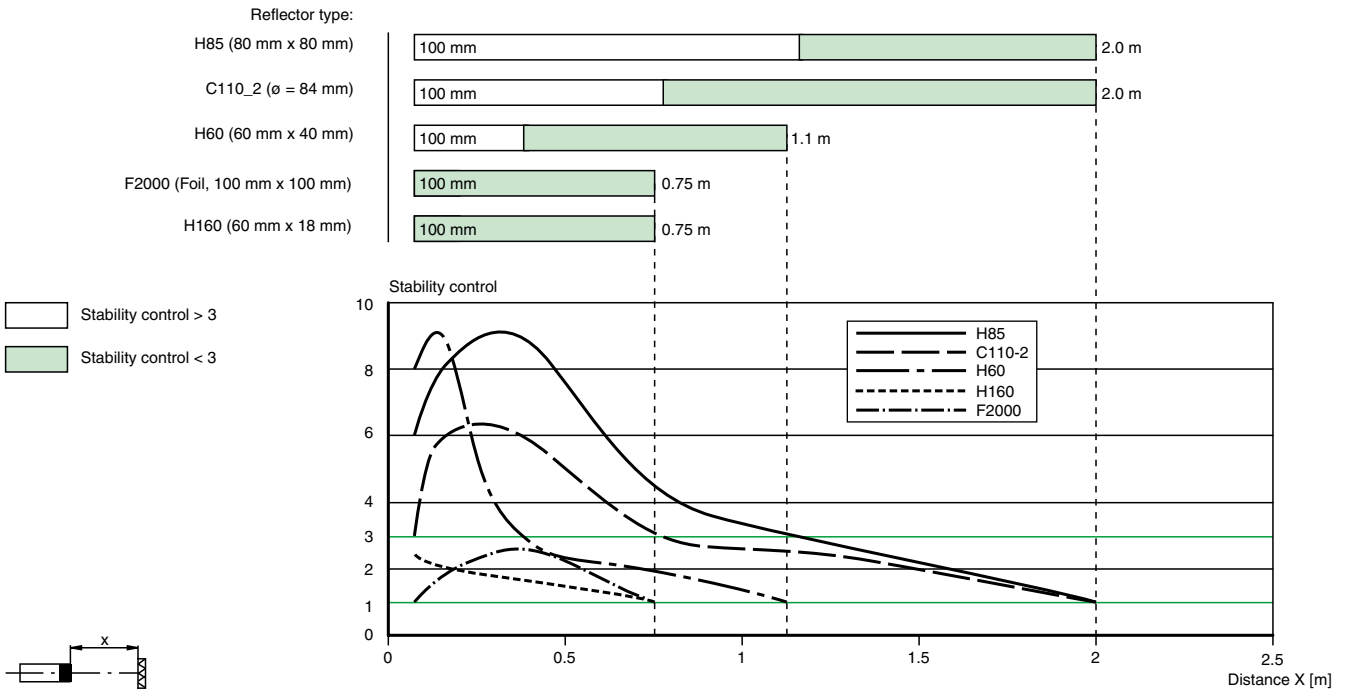
OBS1500-18GM70-..

Diagrams

Characteristic response curve OBS1500-18GM70

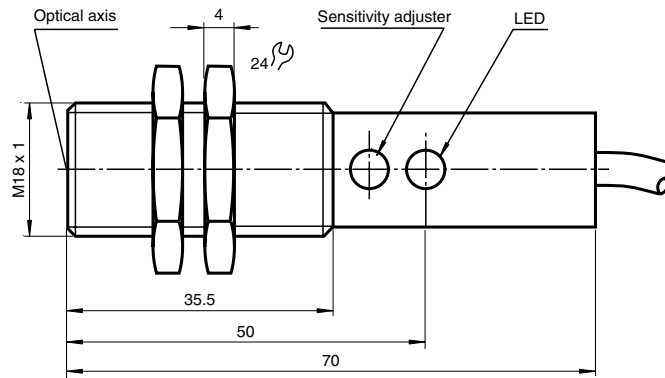


Relative received light strength OBS1500-18GM70



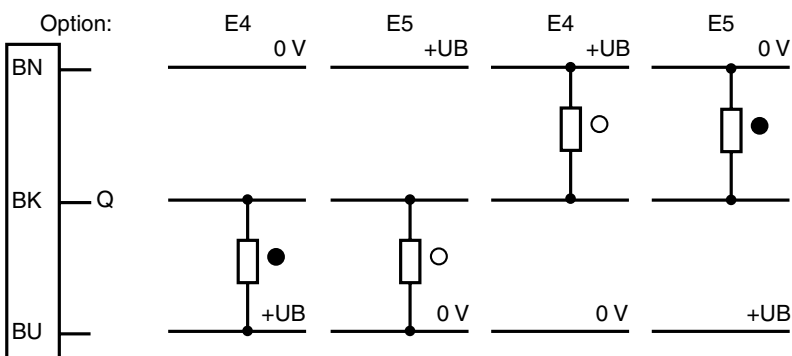
Sensors in threaded housings

Dimensions

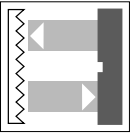


Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON



OBS1500-18GM70-..-V1

Reflection light beam switch

OBS1500-18GM70-..-V1

with 4-pin, M12 connector

CE

Sensors in
threaded housings



- ◆ Detection range up to 1500 mm
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Glare protected with polarisation filter
- ◆ Protection degree IP67
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ LED indicating for a simple operation start

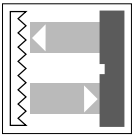
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OBS1500-18GM70-E4-V1	OBS1500-18GM70-E5-V1
Effective detection range	0 ... 1500 mm	◆	◆
Reference target	Reflector C110_2	◆	◆
Reflector distance	100 ... 1500 mm	◆	◆
Reflector range	100 ... 1500 mm	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	light/dark switching	◆	
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 300 Hz	◆	◆
Switch-on delay	1.5 ms	◆	◆
Response time	≤ 1.5 ms	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PMMA	◆	◆
Mass	45 g	◆	◆

Sensors in threaded housings

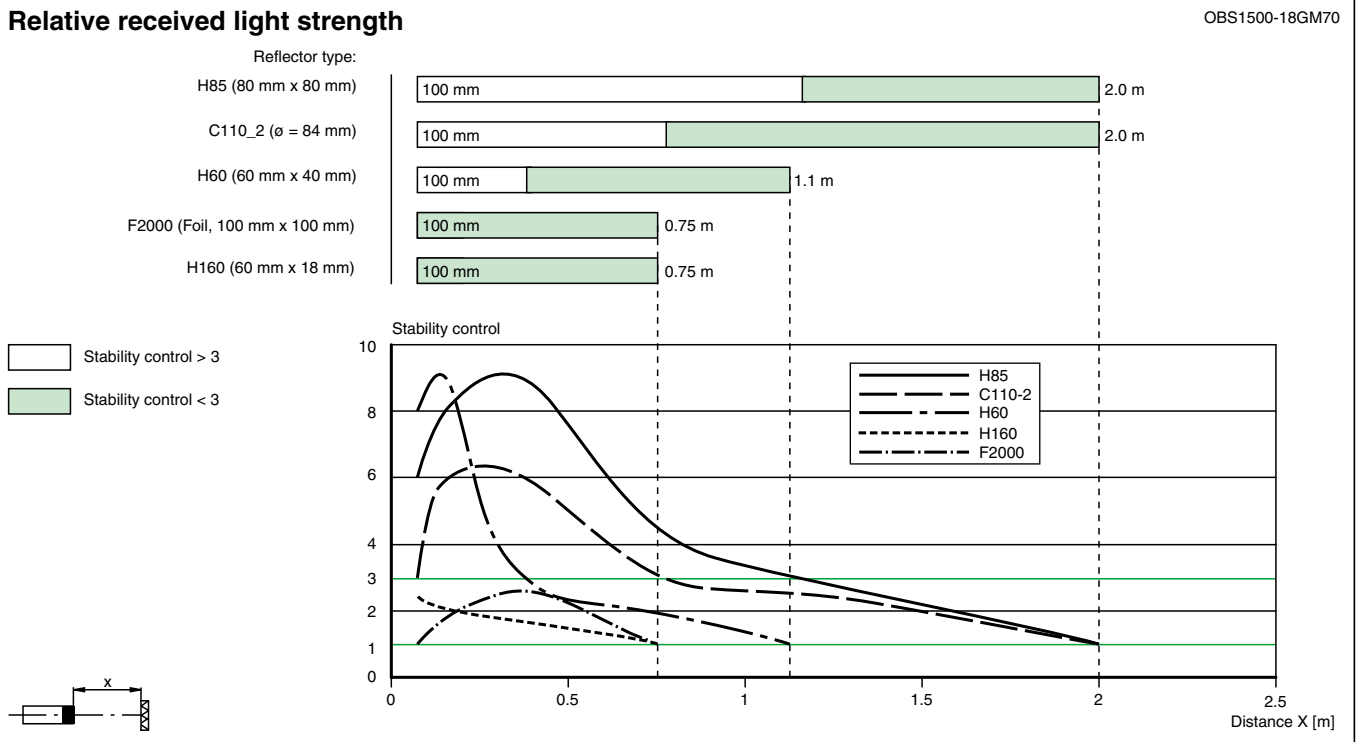
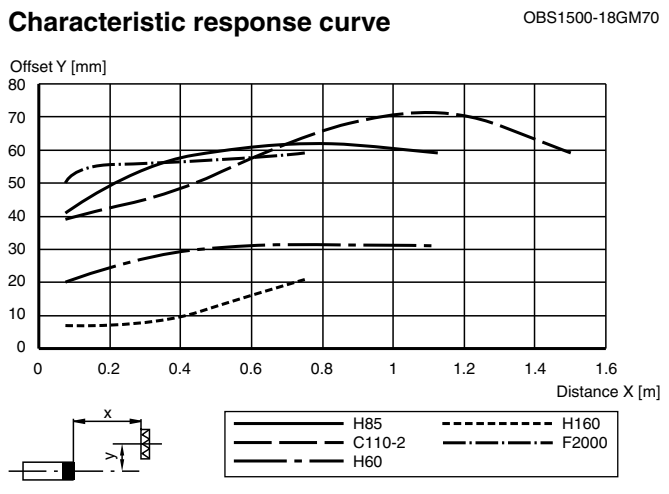
10/8/01

Date of issue



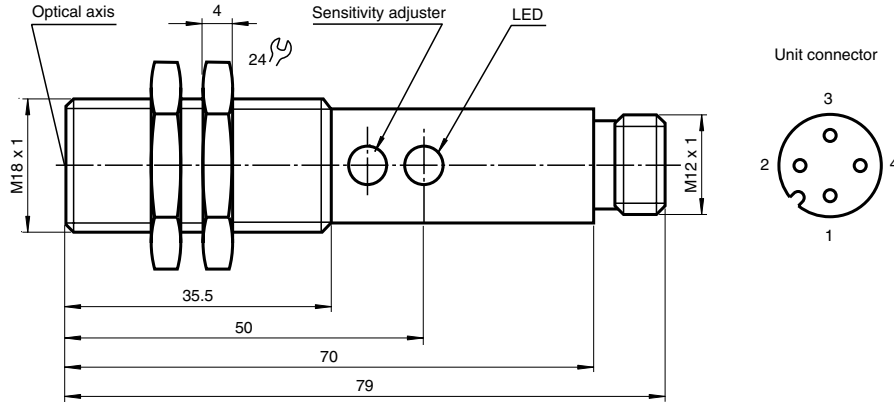
OBS1500-18GM70-..-V1

Diagrams

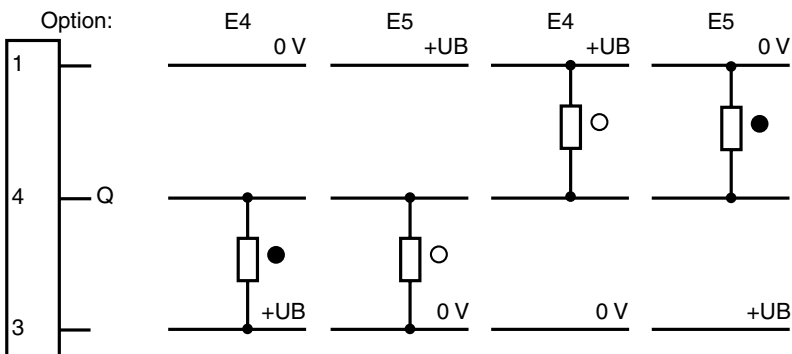


Sensors in threaded housings

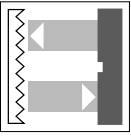
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



OBS3000-18GM70-..

Reflection light beam switch

OBS3000-18GM70-..

with 2 m fixed cable

CE

Sensors in
threaded housings



- ◆ Detection range up to 3000 mm
- ◆ Light/dark ON, programmable
- ◆ Protection degree IP67
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ LED indicating for a simple operation start

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

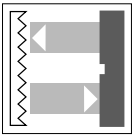
Date of issue 10/8/01

Ordering code		OBS3000-18GM70-E4	OBS3000-18GM70-E5
Effective detection range	0 ... 3 m	◆	◆
Reference target	Reflector C110_2	◆	◆
Reflector distance	100 ... 3000 mm	◆	◆
Reflector range	100 ... 3000 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	1 switch output npn	◆	◆
	1 switch output pnp	◆	◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 300 Hz	◆	◆
Switch-on delay	1.5 ms	◆	◆
Response time	≤ 1.5 ms	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m cable, 3 x 0.34 mm ² , PVC	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PC	◆	◆
Mass	45 g	◆	◆

Sensors in threaded housings

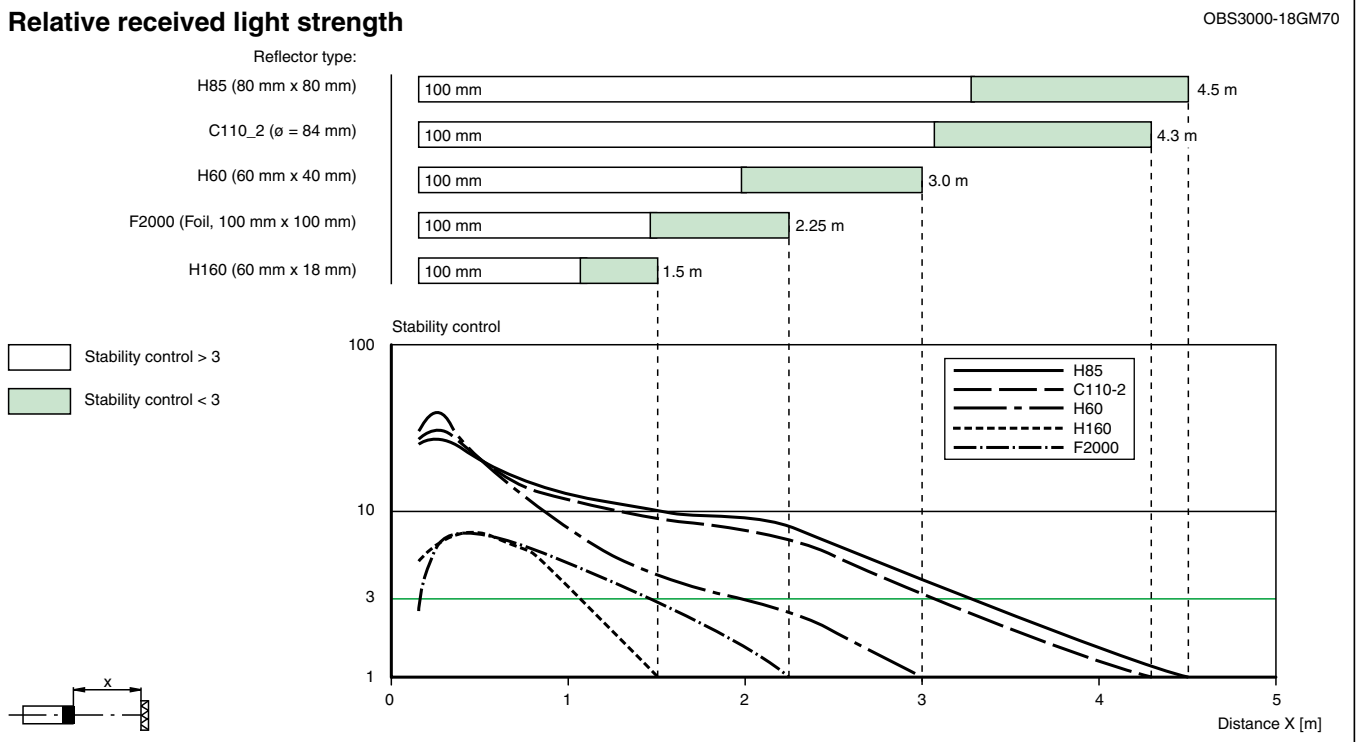
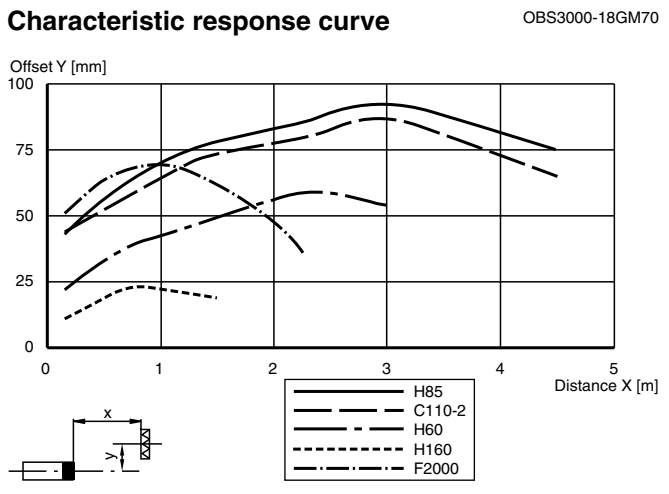
10/8/01

Date of issue



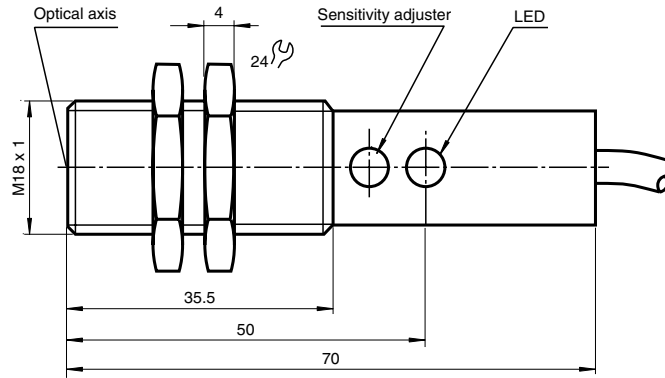
OBS3000-18GM70-..

Diagrams



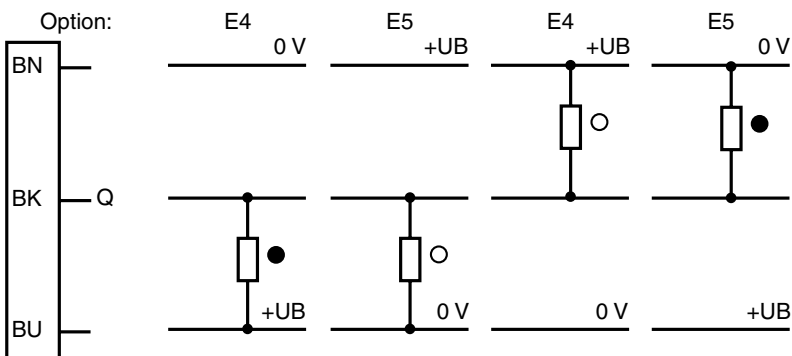
Sensors in threaded housings

Dimensions

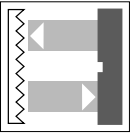


Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON



OBS3000-18GM70-..-V1

Reflection light beam switch

OBS3000-18GM70-..-V1

with 4-pin, M12 connector

CE

Sensors in
threaded housings



- ◆ Detection range up to 3000 mm
- ◆ Light/dark ON, programmable
- ◆ Protection degree IP67
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ LED indicating for a simple operation start

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

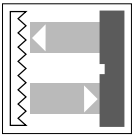
Date of issue 10/8/01

Ordering code		OBS3000-18GM70-E4-V1	OBS3000-18GM70-E5-V1
Effective detection range	0 ... 3 m	◆	◆
Reference target	Reflector C110_2	◆	◆
Reflector distance	100 ... 3000 mm	◆	◆
Reflector range	100 ... 3000 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 300 Hz	◆	◆
Switch-on delay	1.5 ms	◆	◆
Response time	≤ 1.5 ms	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PC	◆	◆
Mass	45 g	◆	◆

Sensors in threaded housings

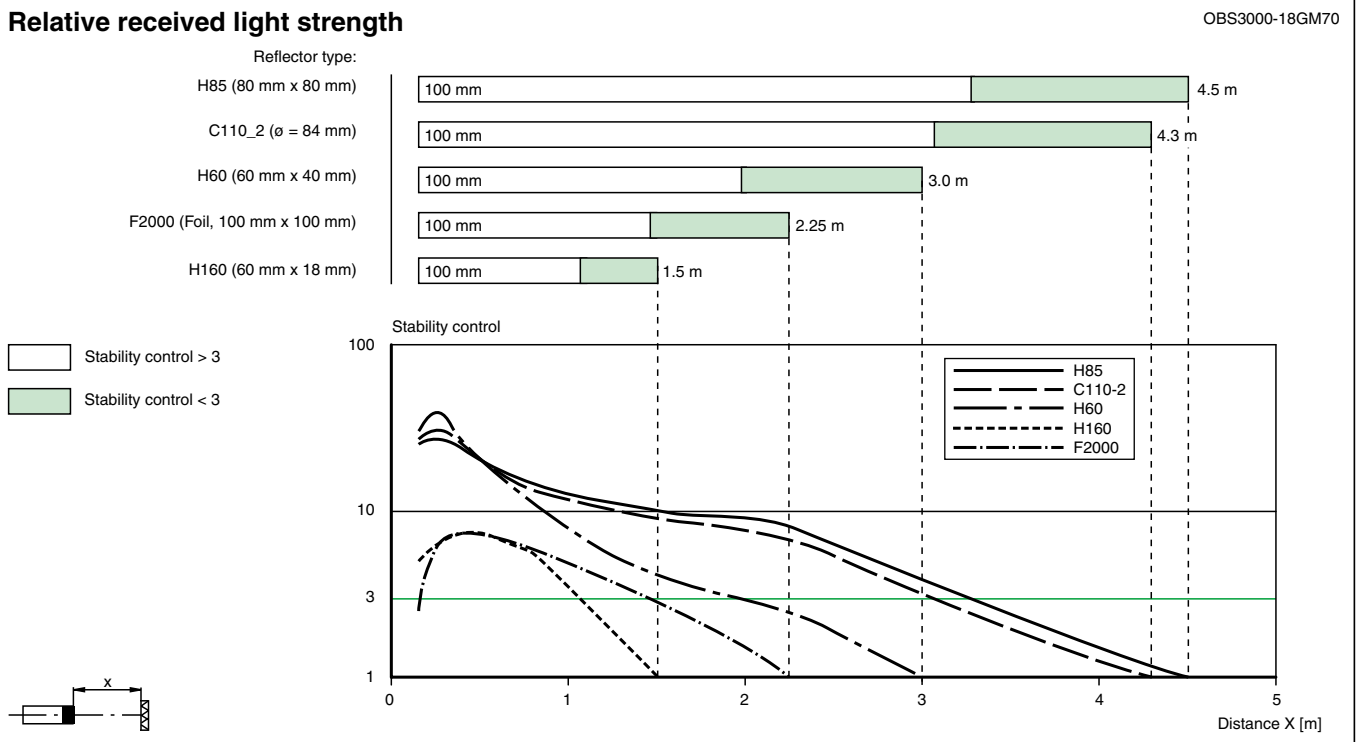
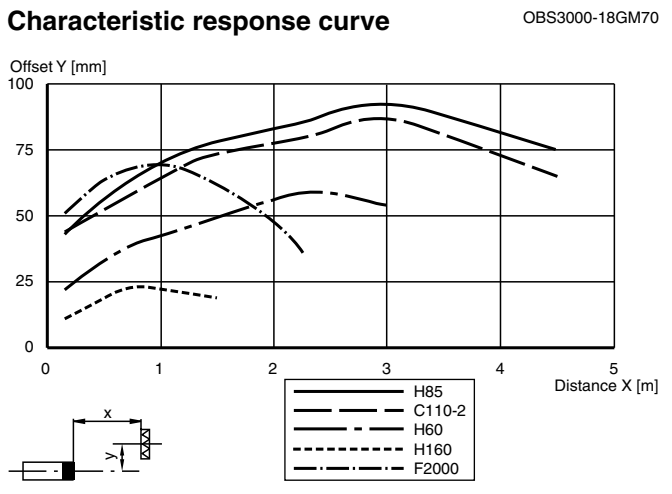
10/8/01

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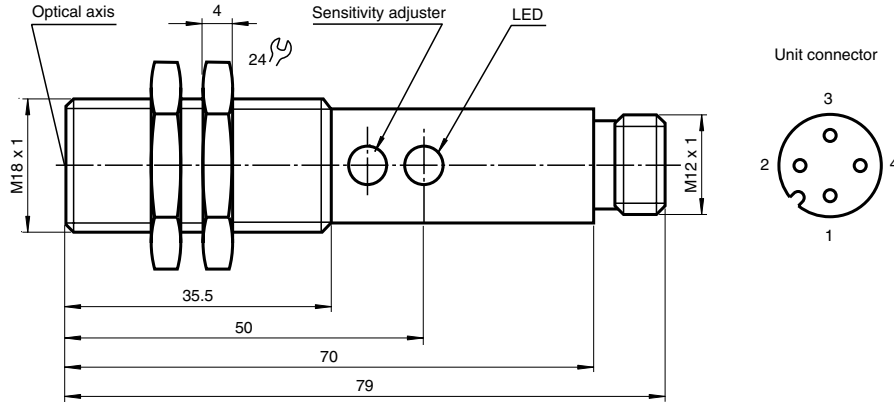
OBS3000-18GM70-..-V1

Diagrams

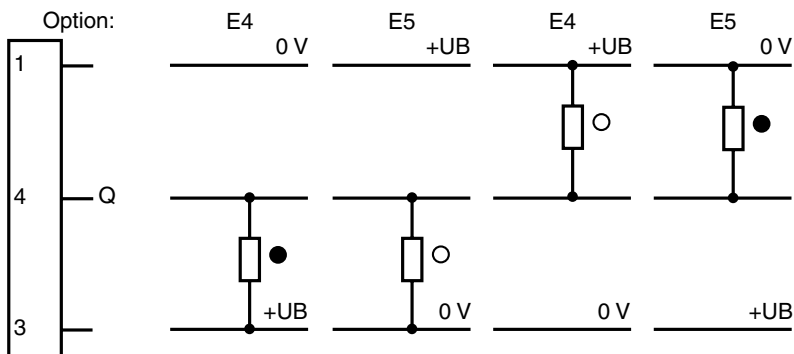


Sensors in threaded housings

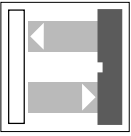
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



OBT200-18GM70-..

Reflection light scanner

OBT200-18GM70-..

with 2 m fixed cable

CE

Sensors in
threaded housings



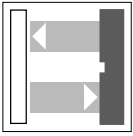
- ◆ Sensing range up to 200 mm
- ◆ Light on
- ◆ Protection degree IP67
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ LED indicating for a simple operation start

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

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Ordering code		OBT200-18GM70-E0	OBT200-18GM70-E2
Detection range	0 ... 200 mm	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆
Adjustment range	5 ... 200 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	Light on	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 300 Hz	◆	◆
Switch-on delay	1.5 ms	◆	◆
Response time	≤ 1.5 ms	◆	◆
Range hysteresis	≤ 10 %	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	2 m cable, 3 x 0.34 mm ² , PVC	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PC	◆	◆
Mass	45 g	◆	◆

Sensors in threaded housings

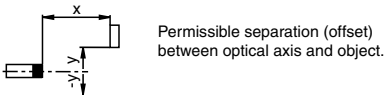
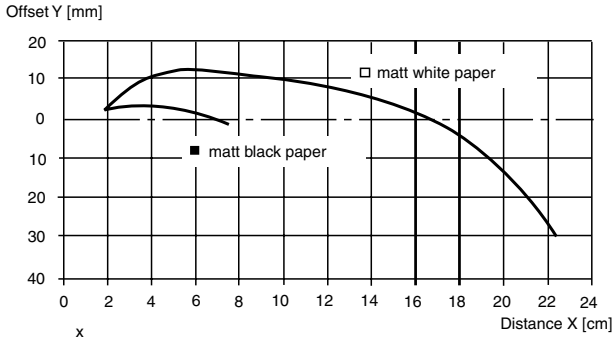


OBT200-18GM70-..

Diagrams

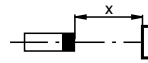
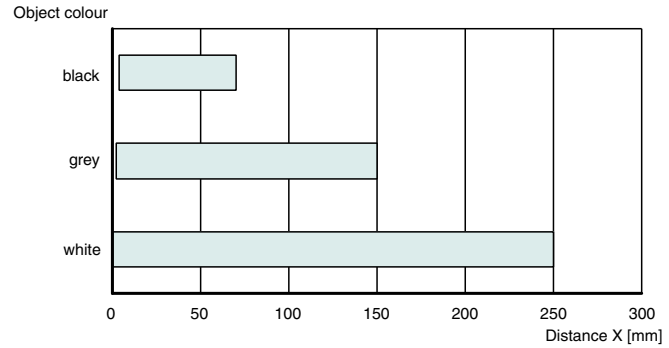
Characteristic response curve

OBT200-18GM70



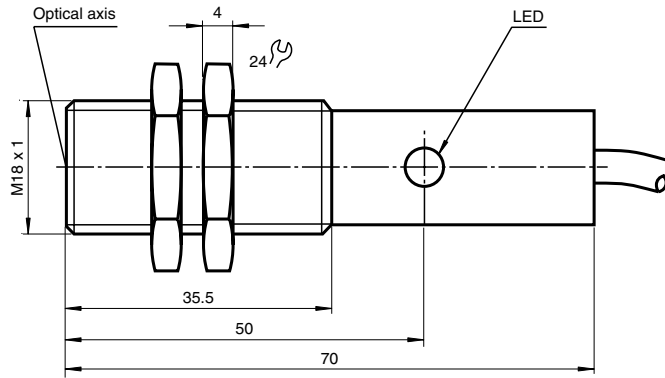
Detection ranges

OBT200-18GM70



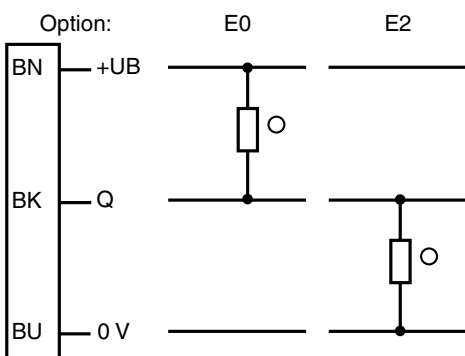
Sensors in threaded housings

Dimensions



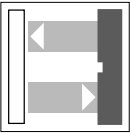
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/8/01



OBT200.-18GM70-..

Reflection light scanner

OBT200.-18GM70-..

with 2 m fixed cable

CE

Sensors in
threaded housings



- ◆ Sensing range up to 200 mm
- ◆ Light/dark ON, programmable
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ LED indicating for a simple operation start
- ◆ Protection degree IP67
- ◆ For glass fibre optics
- ◆ Sensing range depends on the fibre optics being used

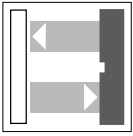
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OBT200-18GM70-E4	OBT200-18GM70-E5	OBT200L-18GM70-E4	OBT200L-18GM70-E5
Detection range	Depends on the fibre optics being used				
	0 ... 200 mm	◆	◆	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆		
	Standard white 50 mm x 50 mm (in direct detection)			◆	◆
Adjustment range	20 ... 200 mm			◆	◆
	5 ... 200 mm	◆	◆		
Light source	LED	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Function display	LED yellow: switching state	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	≤ 20 mA	◆	◆	◆	◆
Time delay before availability	≤ 50 ms	◆	◆	◆	◆
Signal output	1 switch output npn	◆		◆	
	1 switch output pnp		◆		◆
Switching type	Light/dark ON, programmable	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 100 mA	◆	◆	◆	◆
Voltage drop	≤ 2.5 V	◆	◆	◆	◆
Switching frequency	≤ 300 Hz	◆	◆	◆	◆
Switch-on delay	1.5 ms	◆	◆	◆	◆
Response time	≤ 1.5 ms	◆	◆	◆	◆
Range hysteresis	≤ 10 %	◆	◆	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆
Connection type	2 m cable, 3 x 0.34 mm ² , PVC	◆	◆	◆	◆
Housing	brass, nickel plated	◆	◆	◆	◆
Light exit	PC	◆	◆		
	PMMA			◆	◆
Mass	45 g	◆	◆	◆	◆

Sensors in threaded housings

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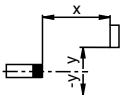
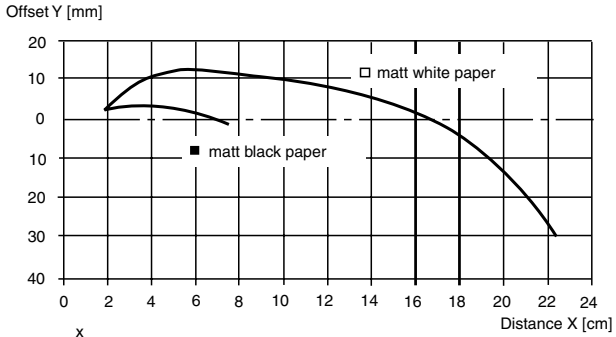


OBT200.-18GM70-..

Diagrams

Characteristic response curve

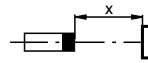
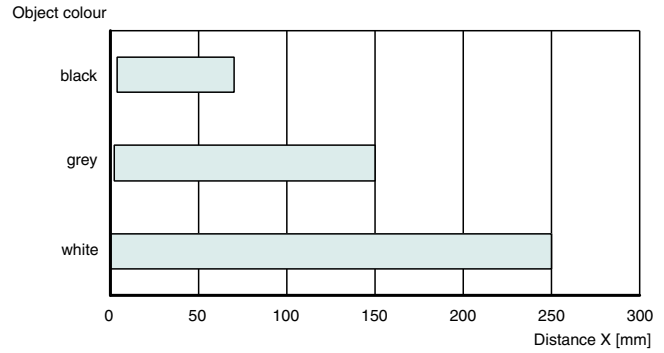
OBT200-18GM70



Permissible separation (offset) between optical axis and object.

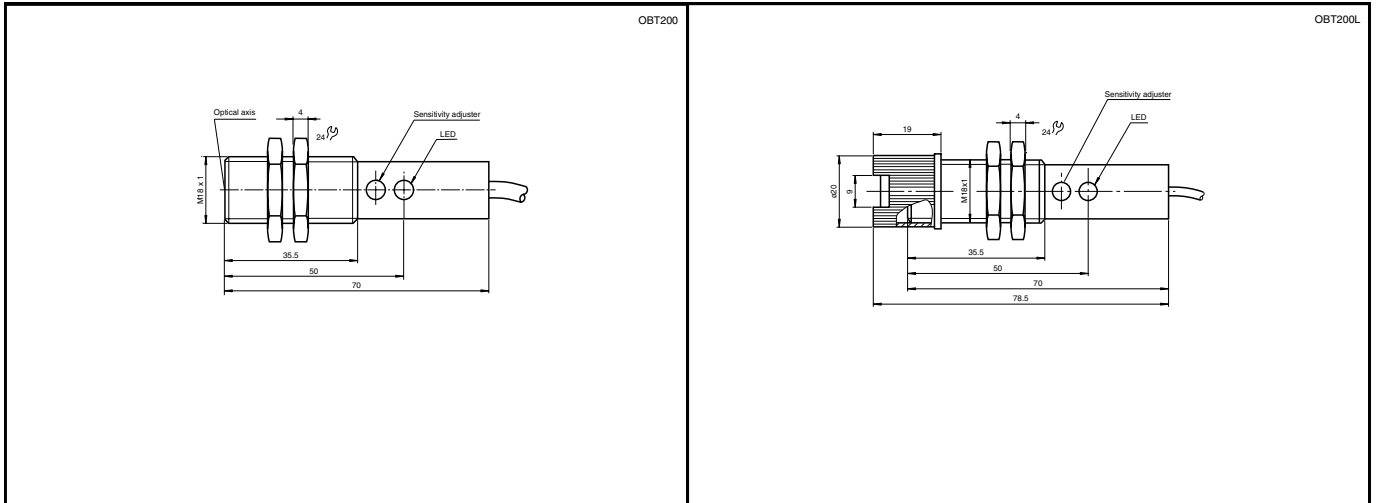
Scanning range without fibre optics

OBT200-18GM70

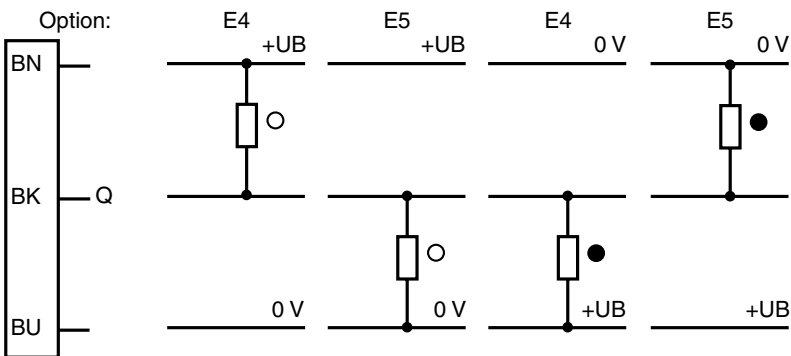


Sensors in threaded housings

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

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Selection table for fibre

	Model number	Sensing range in mm	Detection range in mm	Fig.
fibre optic, single path with PVC coating	LCE 18-2,3-0,5-K2	600		1
	LCE 18-2,3-0,5-K9	600		4
fibre optic, single path with metal coating	LME 18-1,9-0,5-K9	500		4
	LME 18-2,3-0,5-K10	600		5
	LME 18-2,3-0,5-K2	600		1
	LME 18-2,3-0,5-K3	600		2
	LME 18-2,3-0,5-K4	600		3
	LME 18-2,3-1,0-K2	600		1
	LME 18-2,3-2,0-K2	600		1
glass fibre optics, single path with silicone coating	LSE 18-1,1-0,5-K9	100		4
fibre optic, reflex with PVC coating	LCR 18-2,7-1,0-K9		75	12
	LCR 18-3,2-0,5-K1		100	6
	LCR 18-3,2-0,5-K2		100	7
	LCR 18-3,2-2,0-K2		100	7
	LMR 18-1,1-0,5-K3		10	8
	LMR 18-2,3-0,25-K3		45	8
glass fibre optics, reflex with metal coating	LMR 18-2,3-0,5-K2		45	7
	LMR 18-2,3-0,5-K3		45	8
	LMR 18-2,3-0,5-K7		45	11
	LMR 18-2,7-0,5-K9		75	12
	LMR 18-3,2-0,5-K1		100	6
	LMR 18-3,2-0,5-K5		100	10
	LMR 18-3,2-1,0-K1		100	6
	LMR 18-3,2-1,0-K5		100	10
	LMR 18-3,2-2,0-K1		100	6
	LMR 18-3,2-2,0-K4		100	9
	LMR 18-3,2-3,0-K1		100	6
fibre optic, reflex with silicone coating	LSR 18-2,3-0,5-K12		45	13
	LSR 18-3,2-0,5-K1		100	6

Other lengths and end pieces available on request

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Fig. 1

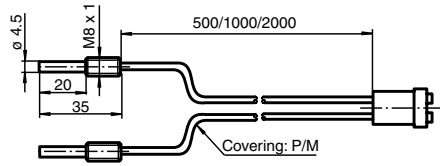


Fig. 2

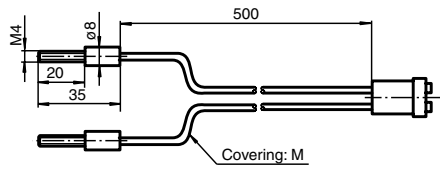


Fig. 3

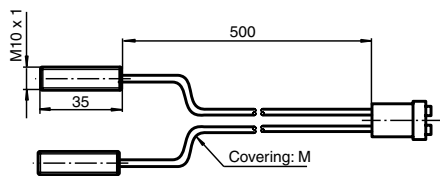


Fig. 4

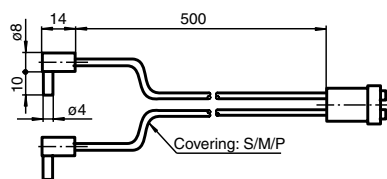


Fig. 5

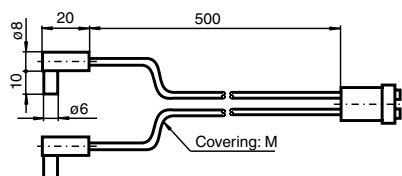


Fig. 6

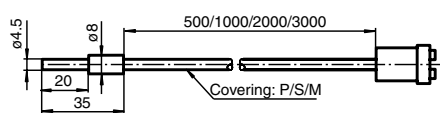


Fig. 7

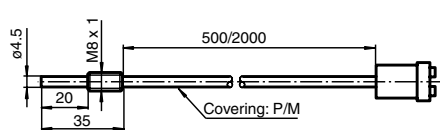


Fig. 8

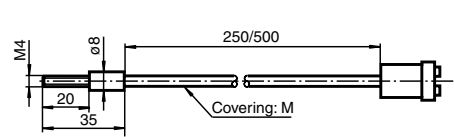


Fig. 9

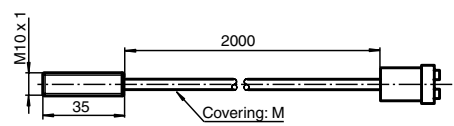


Fig. 10

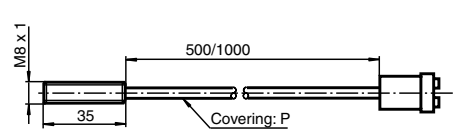


Fig. 11

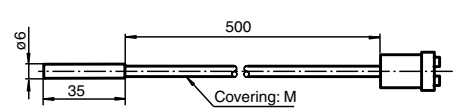


Fig. 12

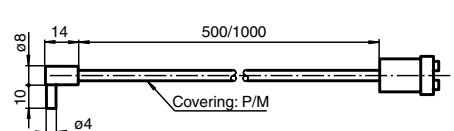
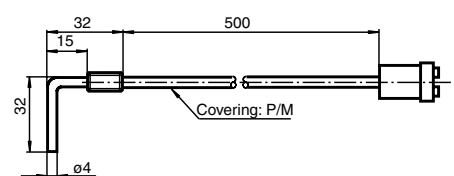
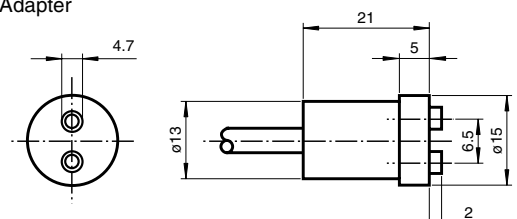


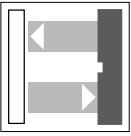
Fig. 13



Adapter



Covering material:
M = metal, P = PVC, S = silicone



OBT200-18GM70-..-V1

Reflection light scanner

OBT200-18GM70-..-V1

with 4-pin, M12 connector

CE

Sensors in
threaded housings



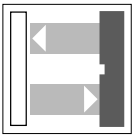
- ◆ Sensing range up to 200 mm
- ◆ Light on
- ◆ Protection degree IP67
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ LED indicating for a simple operation start

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

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Ordering code		OBT200-18GM70-E0-V1	OBT200-18GM70-E2-V1
Detection range	0 ... 200 mm	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆
Adjustment range	5 ... 200 mm	◆	◆
Light source	LED	◆	◆
Light type	Infrared, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
	10 ... 30 V DC		◆
Ripple	10 %	◆	◆
No-load supply current	≤ 20 mA	◆	◆
Time delay before availability	≤ 50 ms	◆	◆
Signal output	1 switch output npn	◆	
	1 switch output pnp		◆
Switching type	Light on	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 300 Hz	◆	◆
Switch-on delay	1.5 ms	◆	◆
Response time	≤ 1.5 ms	◆	◆
Range hysteresis	≤ 10 %	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	PC	◆	◆
Mass	15 g	◆	◆

Sensors in threaded housings

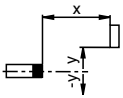
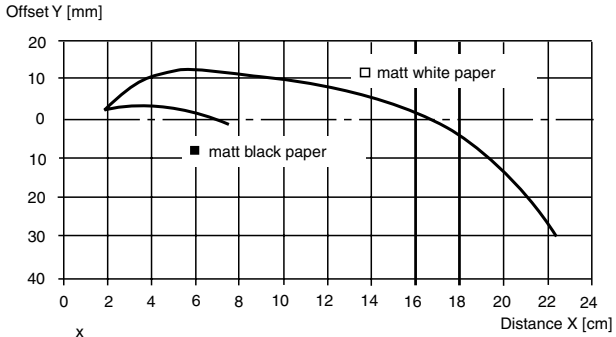


OBT200-18GM70-.-V1

Diagrams

Characteristic response curve

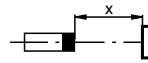
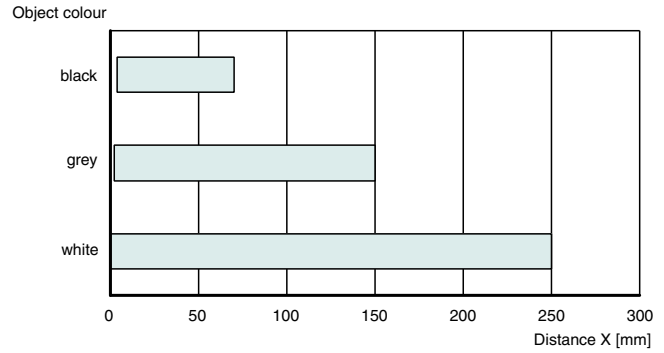
OBT200-18GM70



Permissible separation (offset) between optical axis and object.

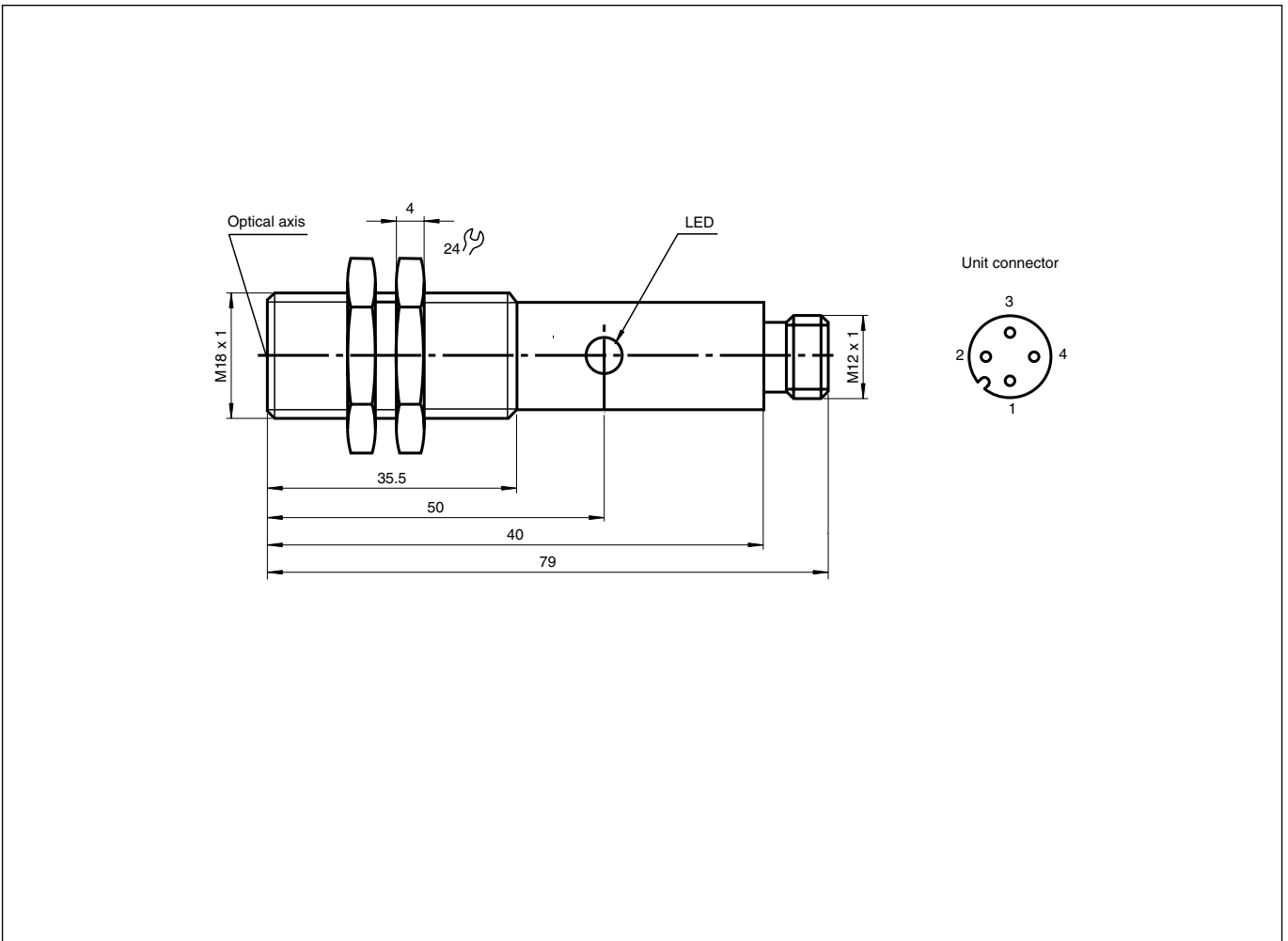
Scanning range without fibre optics

OBT200-18GM70



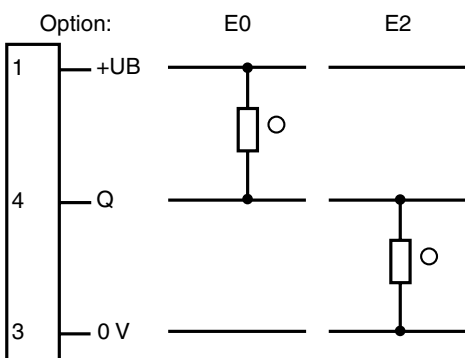
Sensors in threaded housings

Dimensions



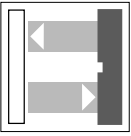
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

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OBT200.-18GM70-.-V1

Reflection light scanner

OBT200.-18GM70-.-V1

with 4-pin, M12 connector

CE

Sensors in
threaded housings

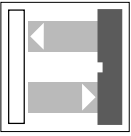


- ◆ Sensing range up to 200 mm
- ◆ Light/dark ON, programmable
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ LED indicating for a simple operation start
- ◆ Protection degree IP67
- ◆ For glass fibre optics
- ◆ Sensing range depends on the fibre optics being used

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OBT200-18GM70-E4-V1	OBT200-18GM70-E5-V1	OBT200L-18GM70-E4-V1	OBT200L-18GM70-E5-V1
Detection range	Depends on the fibre optics being used				
	0 ... 200 mm	◆	◆	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆		
	Standard white 50 mm x 50 mm (in direct detection)			◆	◆
Adjustment range	20 ... 200 mm			◆	◆
	5 ... 200 mm	◆	◆		
Light source	LED	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆
Ambient light limit	10000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Function display	LED yellow: switching state	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆		◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
No-load supply current	≤ 20 mA	◆	◆	◆	◆
Time delay before availability	≤ 50 ms	◆	◆	◆	◆
Signal output	1 switch output npn	◆		◆	
	1 switch output pnp		◆		◆
Switching type	Light/dark ON, programmable	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	max. 100 mA	◆	◆	◆	◆
Voltage drop	≤ 2.5 V	◆	◆	◆	◆
Switching frequency	≤ 300 Hz	◆	◆	◆	◆
Switch-on delay	1.5 ms	◆	◆	◆	◆
Response time	≤ 1.5 ms	◆	◆	◆	◆
Range hysteresis	≤ 10 %	◆	◆	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆	◆	◆
Storage temperature	-40 ... +70 °C	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆	◆	◆
Housing	brass, nickel plated	◆	◆	◆	◆
Light exit	PC	◆	◆		
	PMMA			◆	◆
Mass	15 g	◆	◆		
	45 g			◆	◆

Sensors in threaded housings

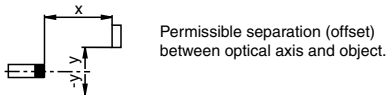
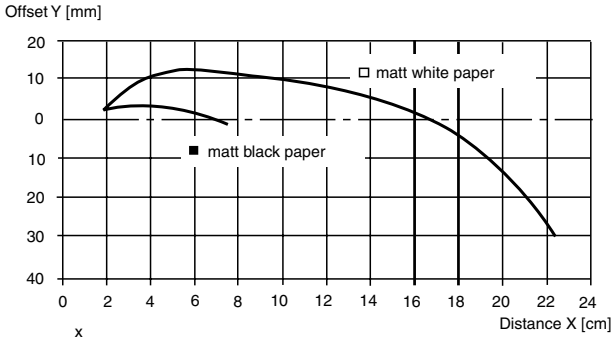


OBT200.-18GM70-.-V1

Diagrams

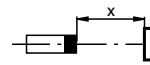
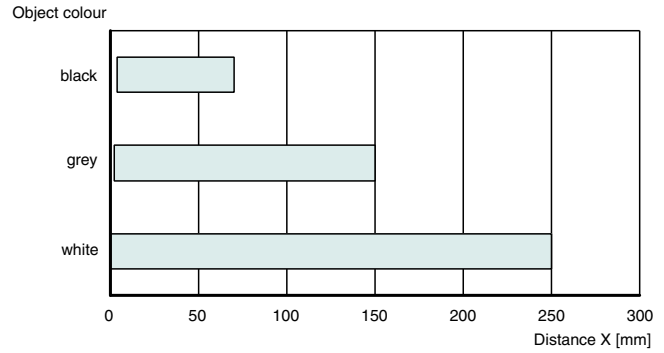
Characteristic response curve

OBT200-18GM70



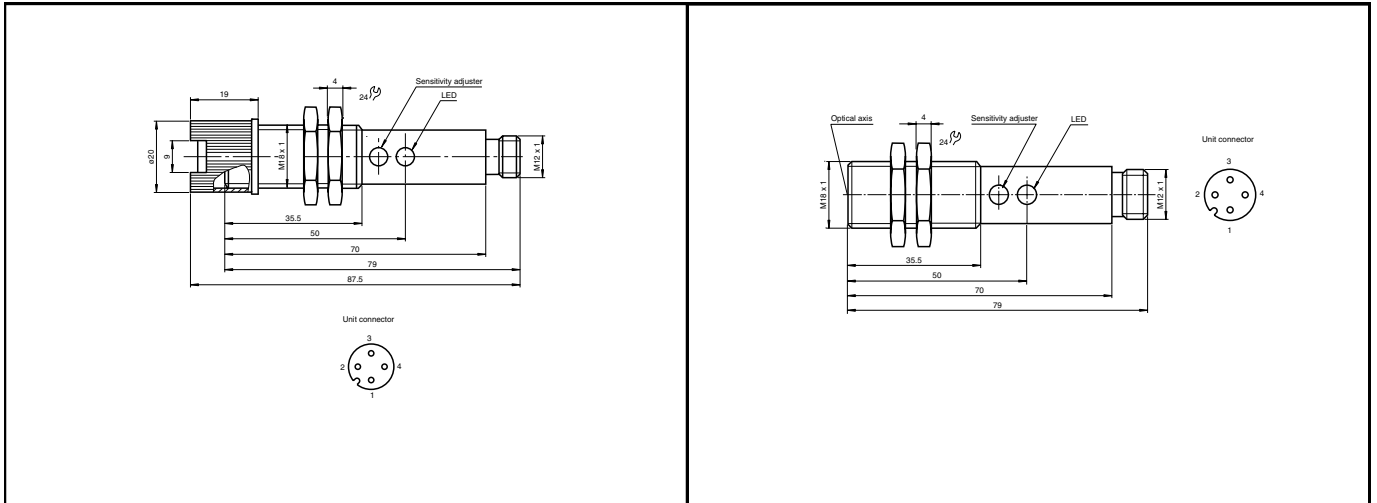
Scanning range without fibre optics

OBT200-18GM70

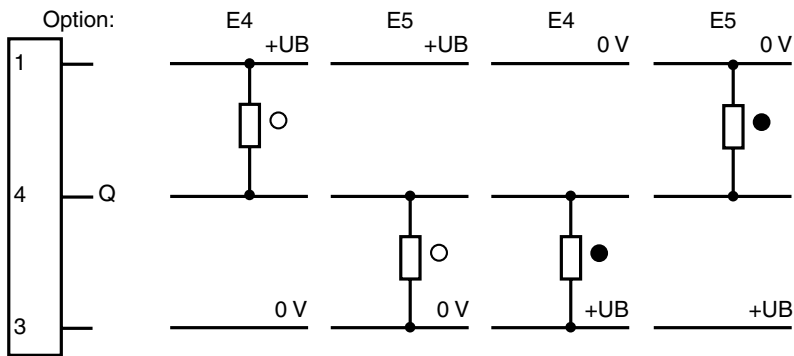


Sensors in threaded housings

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Selection table for fibre

	Model number	Sensing range in mm	Detection range in mm	Fig.
fibre optic, single path with PVC coating	LCE 18-2,3-0,5-K2	600		1
	LCE 18-2,3-0,5-K9	600		4
fibre optic, single path with metal coating	LME 18-1,9-0,5-K9	500		4
	LME 18-2,3-0,5-K10	600		5
	LME 18-2,3-0,5-K2	600		1
	LME 18-2,3-0,5-K3	600		2
	LME 18-2,3-0,5-K4	600		3
	LME 18-2,3-1,0-K2	600		1
	LME 18-2,3-2,0-K2	600		1
glass fibre optics, single path with silicone coating	LSE 18-1,1-0,5-K9	100		4
fibre optic, reflex with PVC coating	LCR 18-2,7-1,0-K9		75	12
	LCR 18-3,2-0,5-K1		100	6
	LCR 18-3,2-0,5-K2		100	7
	LCR 18-3,2-2,0-K2		100	7
	LMR 18-1,1-0,5-K3		10	8
	LMR 18-2,3-0,25-K3		45	8
glass fibre optics, reflex with metal coating	LMR 18-2,3-0,5-K2		45	7
	LMR 18-2,3-0,5-K3		45	8
	LMR 18-2,3-0,5-K7		45	11
	LMR 18-2,7-0,5-K9		75	12
	LMR 18-3,2-0,5-K1		100	6
	LMR 18-3,2-0,5-K5		100	10
	LMR 18-3,2-1,0-K1		100	6
	LMR 18-3,2-1,0-K5		100	10
	LMR 18-3,2-2,0-K1		100	6
	LMR 18-3,2-2,0-K4		100	9
	LMR 18-3,2-3,0-K1		100	6
fibre optic, reflex with silicone coating	LSR 18-2,3-0,5-K12		45	13
	LSR 18-3,2-0,5-K1		100	6

Other lengths and end pieces available on request

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Fig. 1

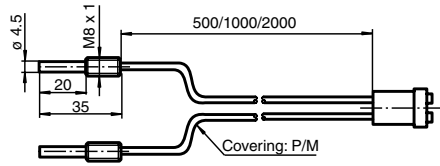


Fig. 2

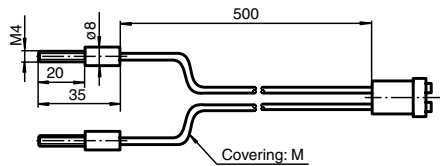


Fig. 3

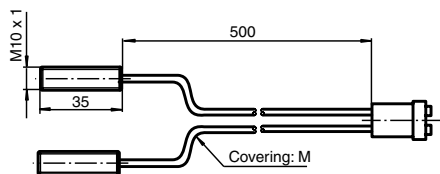


Fig. 4

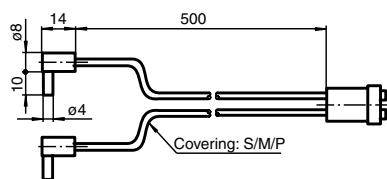


Fig. 5

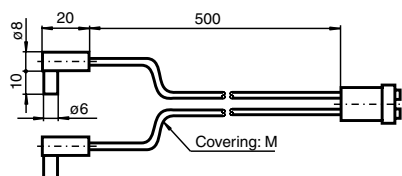


Fig. 6

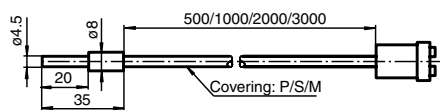


Fig. 7

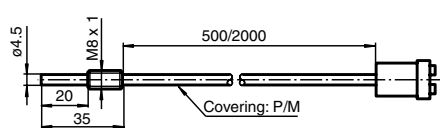


Fig. 8

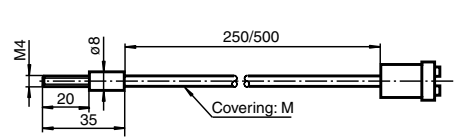


Fig. 9

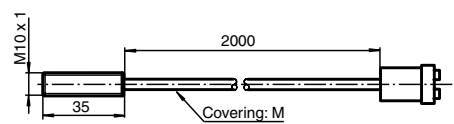


Fig. 10

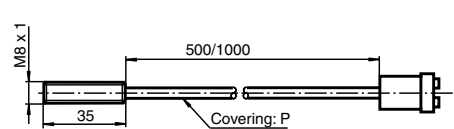


Fig. 11

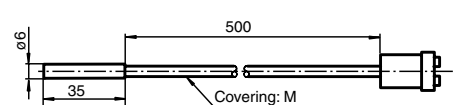


Fig. 12

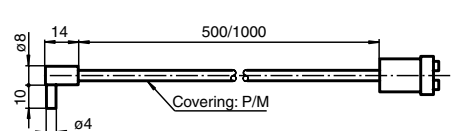
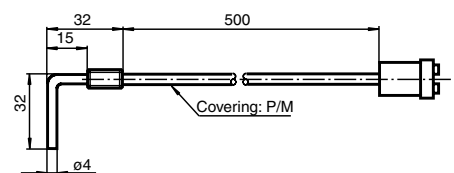
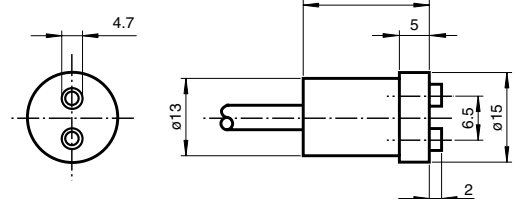


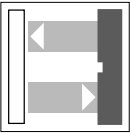
Fig. 13



Adapter



Covering material:
M = metal, P = PVC, S = silicone



OBT500-18GM70-...

Reflection light scanner

OBT500-18GM70-...

with 2 m fixed cable or 4-pin, M12 connector

CE

Sensors in
threaded housings

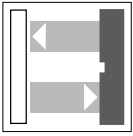


- ◆ Sensing range up to 500 mm
- ◆ Light/dark ON, programmable
- ◆ Protection degree IP67
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ LED indicating for a simple operation start

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OBT500-18GM70-E4	OBT500-18GM70-E4-V1	OBT500-18GM70-E5	OBT500-18GM70-E5-V1
Detection range	0 ... 500 mm	◆	◆	◆	◆
Reference target	Standard white 200 mm x 200 mm	◆	◆	◆	◆
Adjustment range	5 ... 500 mm	◆	◆	◆	◆
Light type	IR-light 940 nm	◆	◆	◆	◆
Ambient light limit	≤ 10000 Lux sun light ≤ 3000 Lux halogen light	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Function display	LED yellow: switching state	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
No-load supply current	≤ 20 mA	◆	◆	◆	◆
Time delay before availability	50 ms	◆	◆	◆	◆
Switching type	Light/dark ON, programmable	◆	◆	◆	◆
Voltage drop	≤ 2.5 V	◆	◆	◆	◆
Switching frequency	≤ 300 Hz	◆	◆	◆	◆
Switch-on delay	1.5 ms	◆	◆	◆	◆
Range hysteresis	≤ 10 %	◆	◆	◆	◆
Ambient temperature	-25 ... +55	◆	◆	◆	◆
Storage temperature	-40 ... +70	◆	◆	◆	◆
Protection degree	IP67 according to EN 60529	◆	◆	◆	◆
Connection type	Connector M12 x 1		◆		◆
	2 m cable, 3 x 0.34 mm ² , PVC	◆		◆	
Housing	brass, nickel plated	◆	◆	◆	◆
Light exit	PC	◆	◆	◆	◆
Mass	45 g	◆	◆	◆	◆

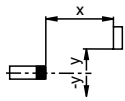
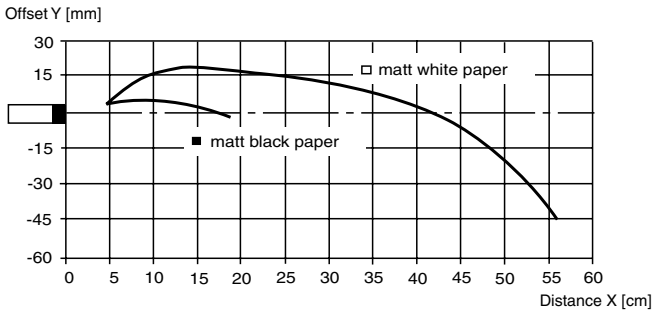
Sensors in threaded housings



OBT500-18GM70-...

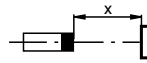
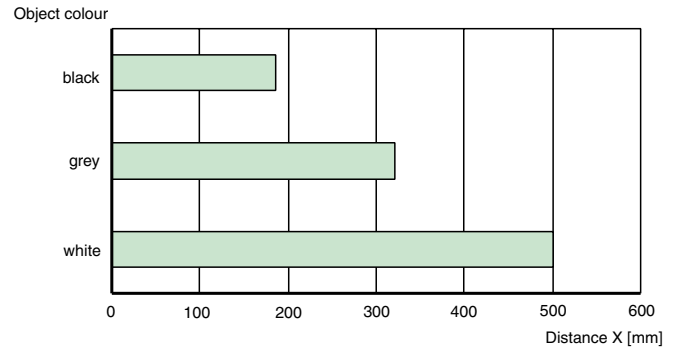
Diagrams

Characteristic response curve OBT500-18GM70



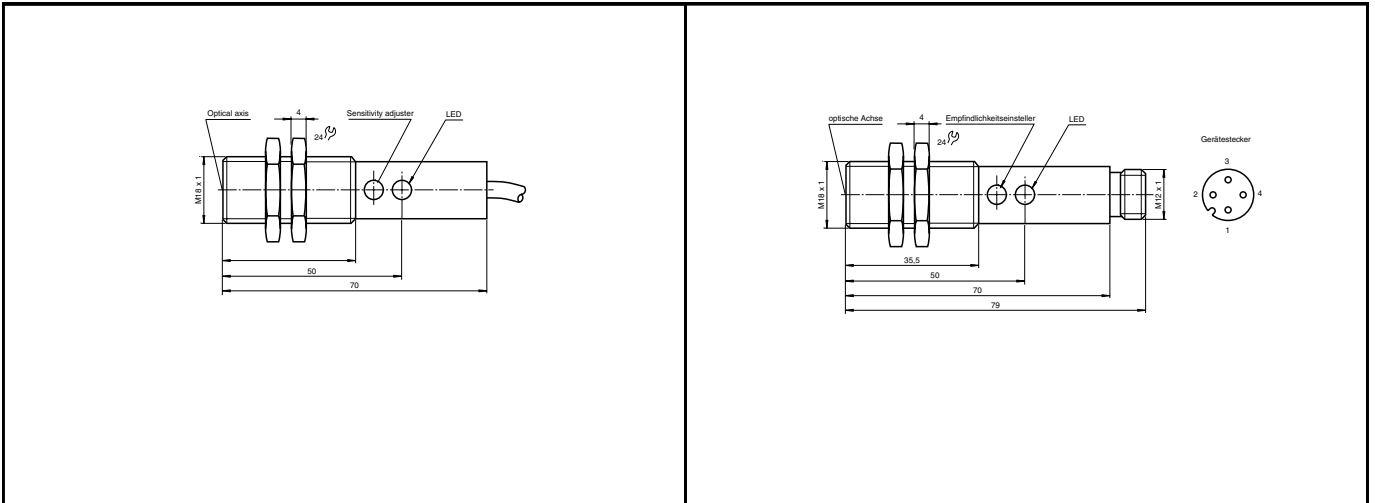
Permissible separation (offset) between optical axis and object.

Detection ranges OBT500-18GM70

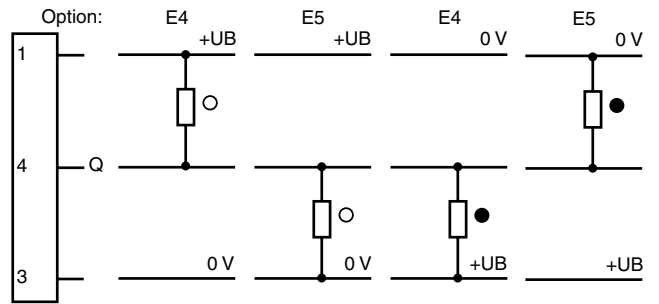
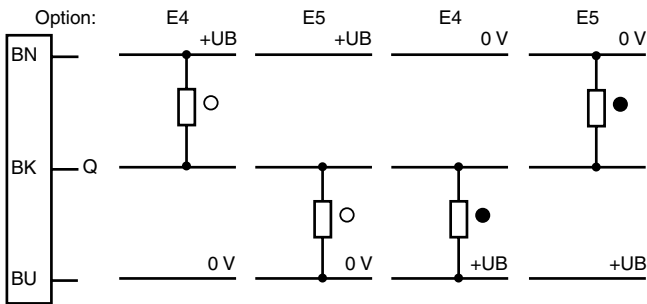


Sensors in threaded housings

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



OCH100-18GM70-..-V1

Reflection light scanner with background suppression

OCH100-18GM70-..-V1

with 4-pin, M12 connector

CE

Sensors in
threaded housings



- ◆ Sensing range up to 100 mm
- ◆ Reflection light scanner with adjustable background suppression
- ◆ Visible red light
- ◆ Strong metallic housing in cylindrical shape M18 x 1
- ◆ Sensitivity adjuster for optimal adaptation to the application
- ◆ LED indicating for a simple operation start
- ◆ Connector M12 x 1 for fast mounting
- ◆ Antivalent outputs for light/dark ON operation or as control function
- ◆ High switching frequency for the detection of fast moving objects

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OCH100-18GM70-A0-V1	OCH100-18GM70-A2-V1
Detection range	30 ... 100 mm	◆	◆
Reference target	Standard white 100 mm x 100 mm	◆	◆
Adjustment range	30 ... 100 mm	◆	◆
Operating distance difference	< 13 % (grey 18 %/ white 90 %)	◆	◆
Grey/white difference (18%/90%)	13 % (by 100 mm)	◆	◆
Light source	LED	◆	◆
Light type	Red, alternating light	◆	◆
Ambient light limit	10000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: switching state	◆	◆
Controls	sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 40 mA	◆	◆
Time delay before availability	≤ 100 ms	◆	◆
Signal output	2 switch outputs npn, normally open/closed (complementary)	◆	◆
	2 switch outputs pnp, normally open/closed (complementary)		◆
Switching type	light/dark switching	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 100 mA	◆	◆
Voltage drop	≤ 2.5 V	◆	◆
Switching frequency	≤ 1 kHz	◆	◆
Switch-on delay	0.5 ms	◆	◆
Response time	≤ 0.5 ms	◆	◆
Range hysteresis	6 % Grey (18%)	◆	◆
Ambient temperature	-25 ... +55 °C	◆	◆
Storage temperature	-30 ... +70 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	Connector M12 x 1, 4-pin	◆	◆
Housing	brass, nickel plated	◆	◆
Light exit	Glass lens	◆	◆
Mass	80 g	◆	◆

Sensors in threaded housings

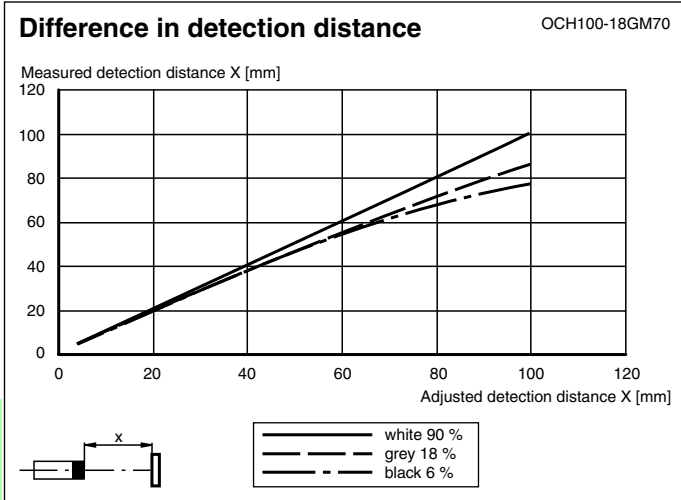
10/8/01

Date of issue



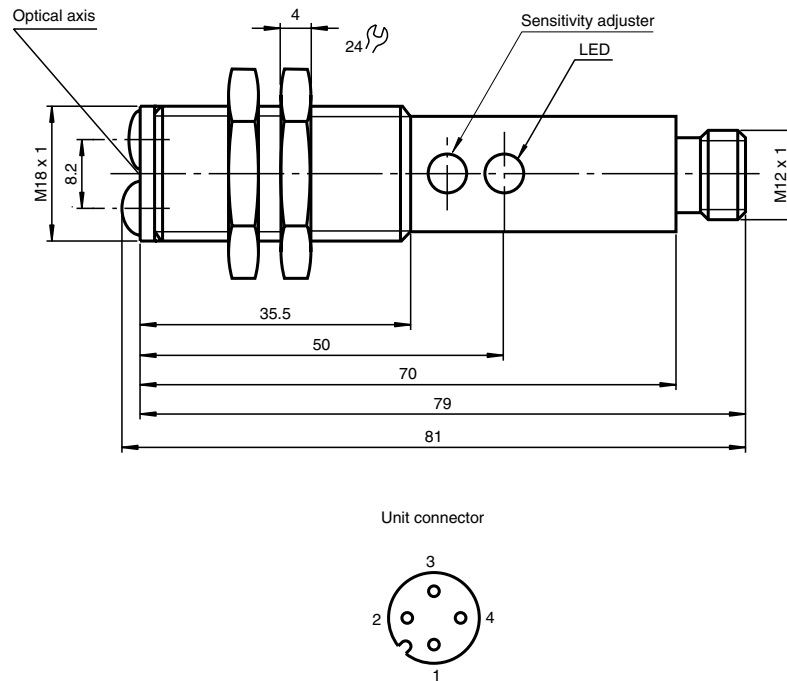
OCH100-18GM70-..-V1

Diagrams



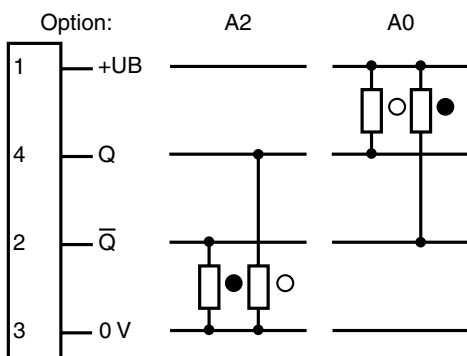
Sensors in threaded housings

Dimensions



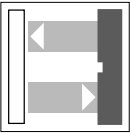
Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

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GLV30-...-...

Reflection light scanner

GLV30-...-...

with M12, 4-pin metal connector

CE

Sensors in
threaded housings

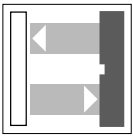


- ◆ Sensing range up to 2500 mm, adjustable
- ◆ As direct detection light scanner, direct detection light scanner available with background suppression and fibre optic device
- ◆ Fibre optic device for connection of glass fibre optics
- ◆ Light/dark switching
- ◆ M30 housing
- ◆ Version - 1227: housing - brass nickel plated

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

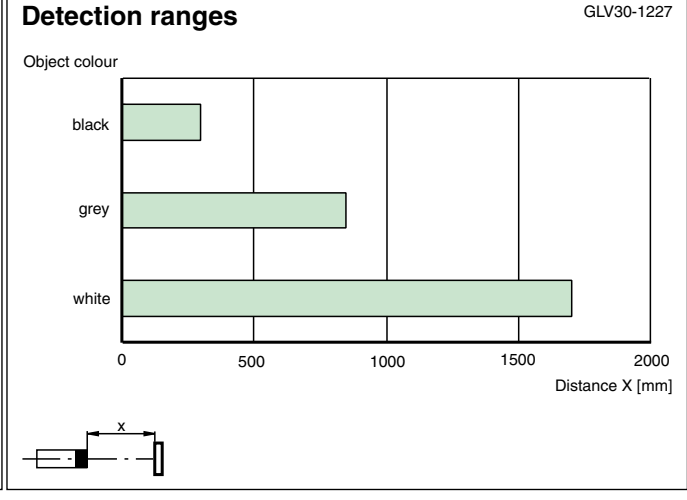
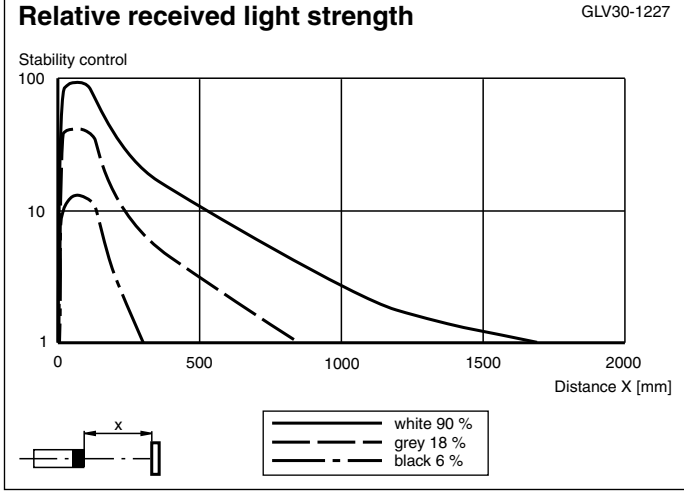
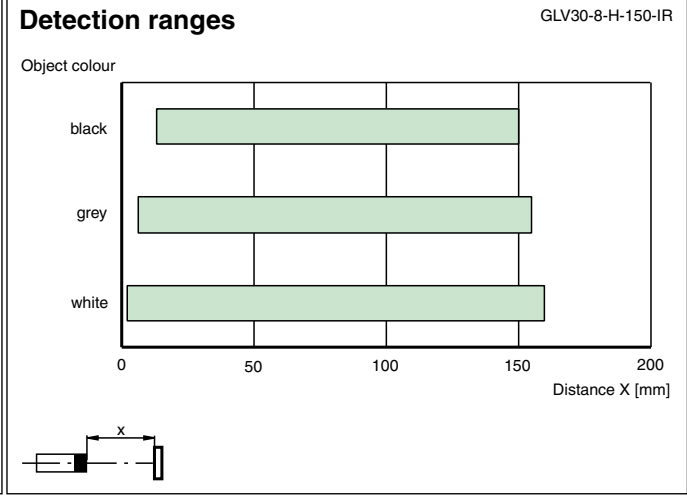
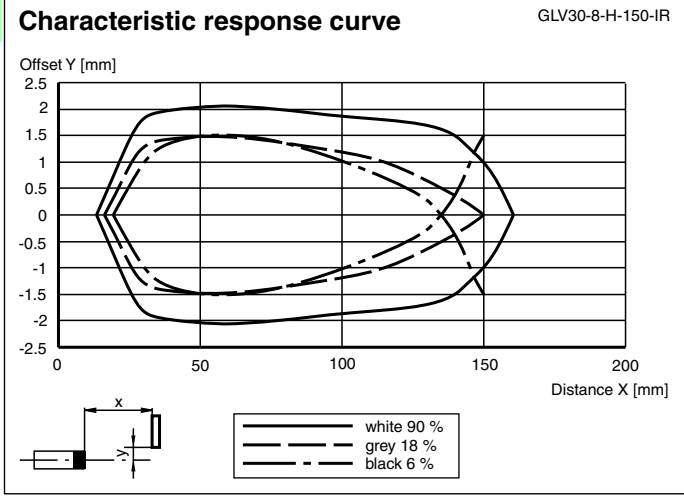
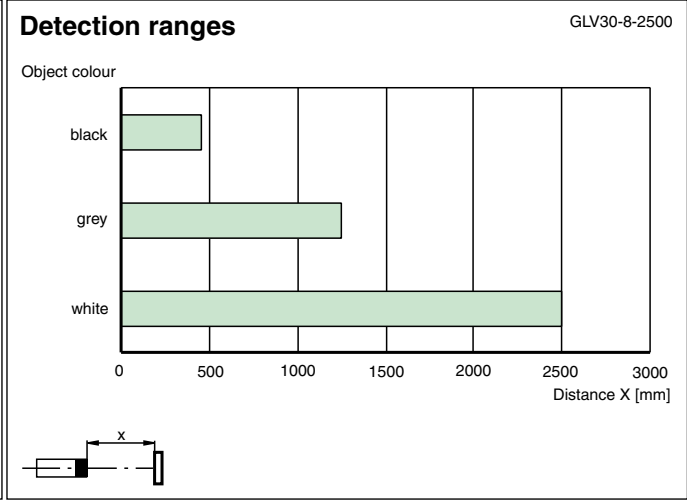
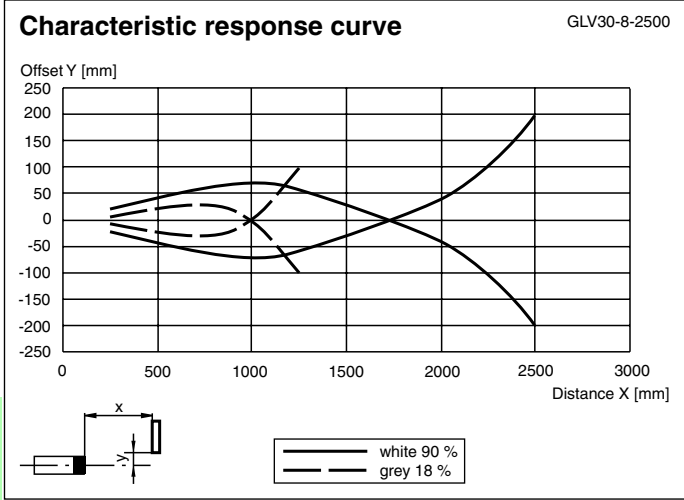
Ordering code		GLV30-8-2500/47/73c	GLV30-8-H-150-IR/47/73c	GLV30-LL-1227/40a/53/92
Detection range	0 ... 1700 mm (on use without fibre optics)			◆
	100 ... 2500 mm	◆		
	20 ... 150 mm		◆	
Detection range min.	0 ... 145 mm		◆	
Sensor range max.	0 ... 170 mm		◆	
Adjustment range	250 ... 1700 mm			◆
	500 ... 2500 mm	◆		
Black/white difference (6%/90%)	< 10 mm		◆	
Light source	IREd	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	approx. 15 °			◆
	+/- 1 °		◆	
	+/- 7 °	◆		
Diameter of the light spot	approx. 400 mm at 1700 mm sensor range			◆
	approx. 450 mm at a distance of 2000 mm	◆		
	4 mm at a distance of 150 mm		◆	
Ambient light limit	30000 Lux	◆	◆	
	50000 Lux			◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
Function display	LED yellow, lights up with receiver lit			◆
	LED yellow, lights up if receiver is not lit	◆	◆	
Controls	sensitivity adjuster	◆		
	Sensitivity adjuster, light/dark switch			◆
Operating voltage	10 ... 30 V DC			◆
	24 V DC ±20 %	◆	◆	
Ripple	10 %	◆	◆	◆
No-load supply current	30 mA	◆	◆	
	40 mA			◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆	◆	
	1 pnp, not short-circuit proof			◆
Switching type	light/dark switching	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	max. 200 mA	◆	◆	
	max. 500 mA			◆
Switching frequency	35 Hz	◆	◆	
Response time	10 ms	◆	◆	
	2 ms			◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	
	IP65			◆
Connection type	Connector M12 x 1, 4-pin	◆	◆	◆
Housing	brass, nickel plated			◆
	ABS	◆	◆	
Light exit	Glass (on operation without fibre optics)			◆
	Plastic lenses	◆	◆	
Mass	approx. 70 g	◆	◆	
	370 g			◆

Sensors in threaded housings

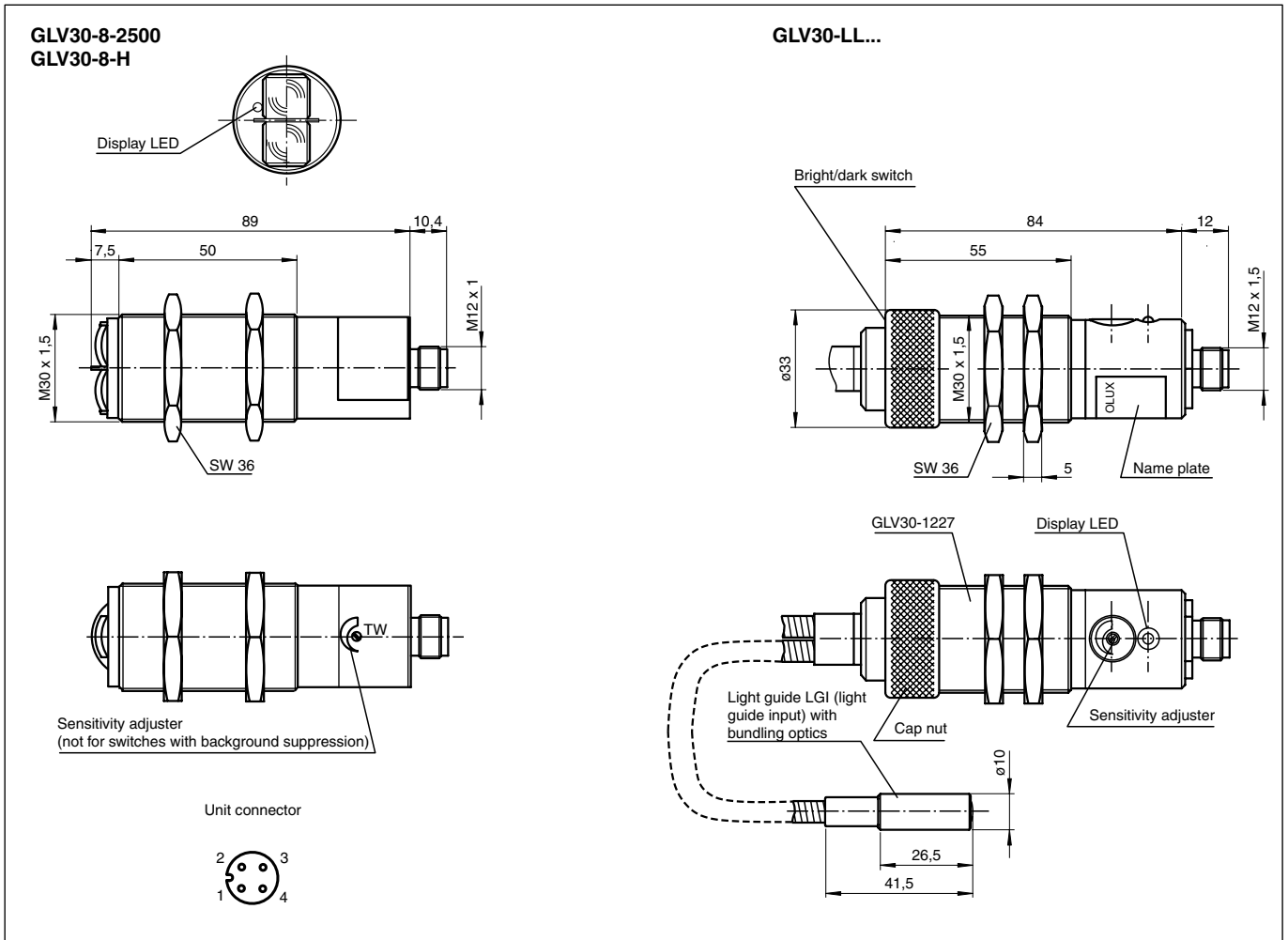


Diagrams

Sensors in threaded housings

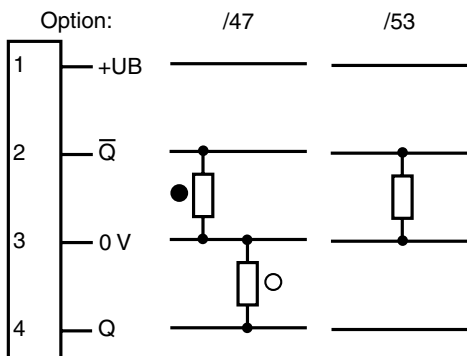


Dimensions



Sensors in threaded housings

Electrical Connection



○ = Light ON, ● = Dark ON

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Selection table for fibre

	Model number	Max. sensing range/detection range in mm	Figure
glass fibre optics, single path with metal-silicone coating	LLE 18/30-2,3-0,5-Z1	420	1
	LLE 18/30-2,3-1,0-Z 1	300	1
	LLE 18/30-2,3-2,0-Z 1	200	1
	LLE 18/30-2,3-1,0-WR	300	2
	LLE 18/30-2,3-0,5-WC3	400	3
	LLE 18/30-2,3-1,0-WC14	300	4
	LLE 18/30-2,3-1,0-WC32	250	5
	LLE 18/30-2,3-1,0-WC5	300	6
	LLE 18/30-2,3-1,0-WC10	300	7
	LLE 18/30-2,3-1,0-WC0	230	8
	LLE 18/30-2,3-1,0-WC20	250	9
	LLE 18/30-2,3-1,0-WC3	300	3
	LLE 18/30-1,6-0,5-Z1	200	1
	LLE 18/30-1,1-2,0-G	100	10
LLE 18/30-2,3-1,5-G	250	10	
glass fibre optics, reflex with metal-silicone coating	LLE 18/30-1,9-0,5-Z1	130	15
	LLE 18/30-1,9-1,0-Z1	120	15
	LLR 18/30-1,9-0,5-WC0	70	16
	LLR 18/30-1,9-1,0-WC2	90	17
	LLR 18/30-1,9-0,5-WC5	90	18
	LLR 18/30-1,9-1,0-WR	90	19
	LLR 18/30-1,9-1,5-G	100	20
	LLR 18/30-1,6-1,0-QW 1x4	70	21
glass fibre optics single path with metal coating	LME 18/30-2,3-1,0-WC0	230	8
	LME 18/30-2,3-0,5-WC5	400	6
	LME 18/30-2,3-1,0-WC14	300	4
	LME 18/30-1,6-3,0-Z1	70	13
	LME 18/30-2,3-0,5-G	420	14
glass fibre optics reflex with metal coating	LMR 18/30-1,9-1,0-Z1	120	15
	LMR 18/30-1,9-2,0-Z1	90	15
	LMR 18/30-1,9-3,0-Z1	85	15
	LMR 18/30-1,9-1,5-Z1	100	15
	LMR 18/30-1,9-0,5-G	130	20
glass fibre optics reflex with PVC coating	LCR 18/30-1,1-0,5-WC5.5 M30	60	11
	LCR 18/30-1,1-1,5-WC5.5 M18	40	11
	LCR 18/30-1,1-0,5-WC2	60	12
	LCR 18/30-1,1-1,5-WC2	40	12

Other lengths and end pieces available on request

10/15/01

Date of issue

Fig. 1

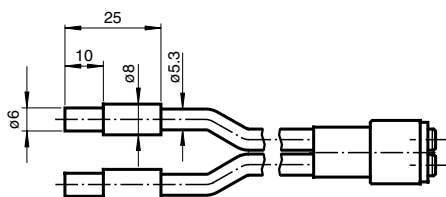


Fig. 5

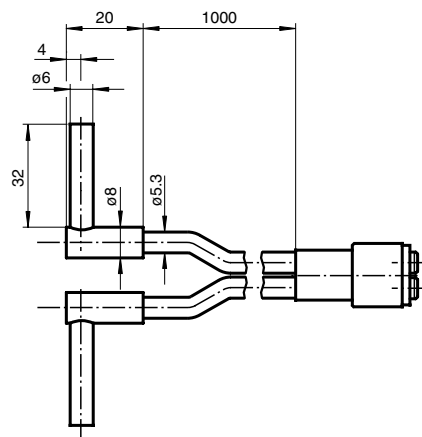


Fig. 2

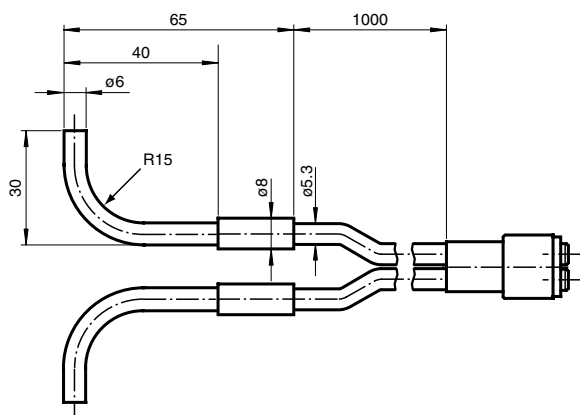


Fig. 6

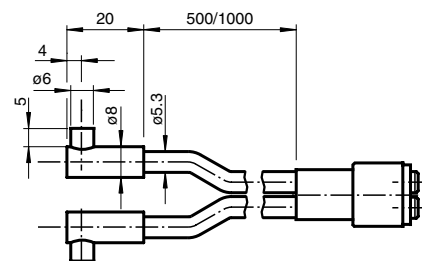


Fig. 3

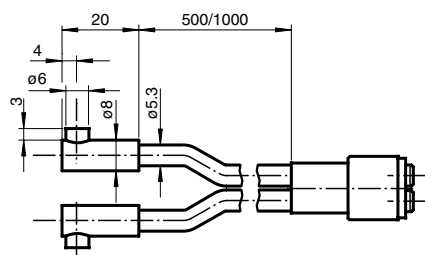


Fig. 7

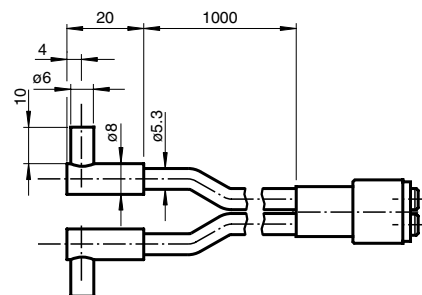


Fig. 4

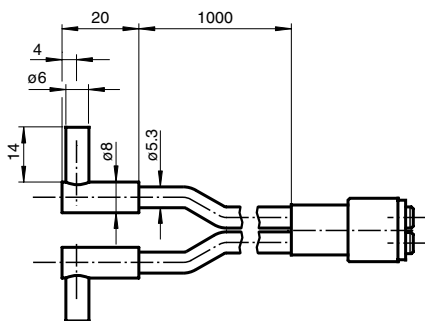
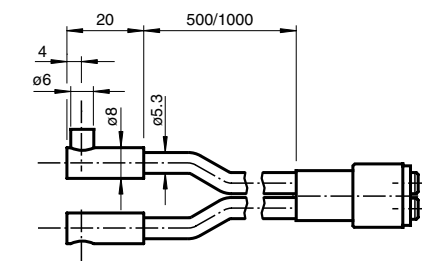


Fig. 8



Sensors in threaded housings

Fig. 9

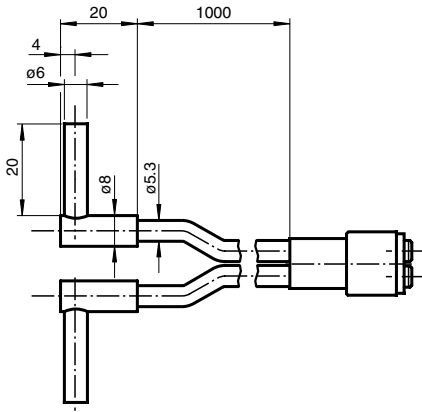


Fig. 13

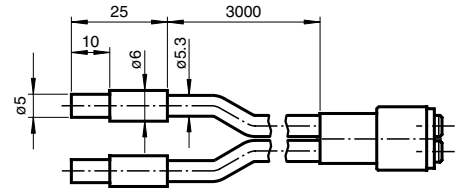


Fig. 10

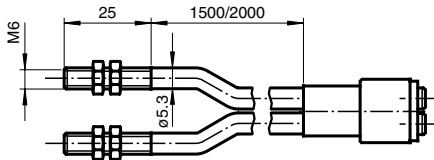


Fig. 14

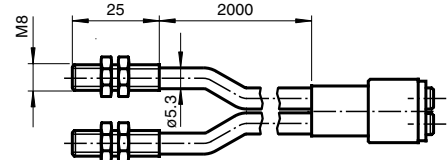


Fig. 11

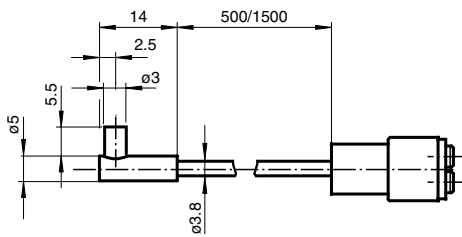


Fig. 15

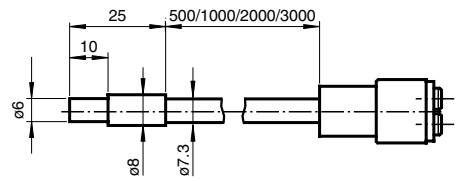


Fig. 12

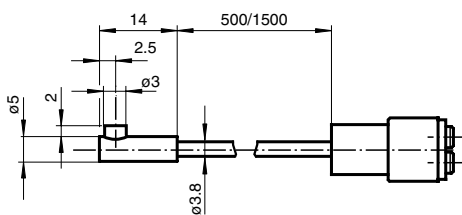


Fig. 16

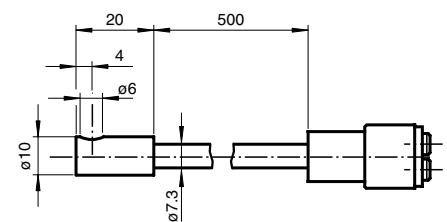


Fig. 17

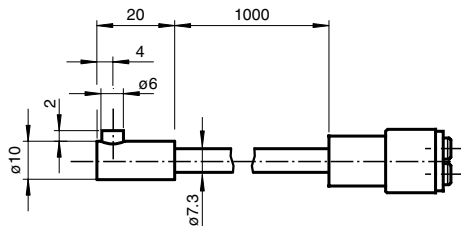


Fig. 20

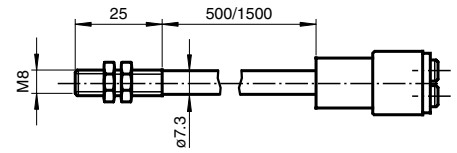


Fig. 18

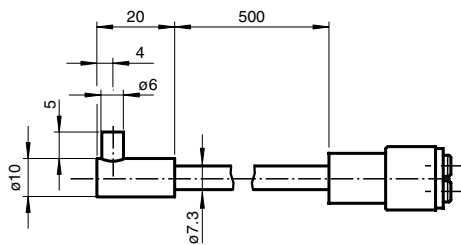


Fig. 21

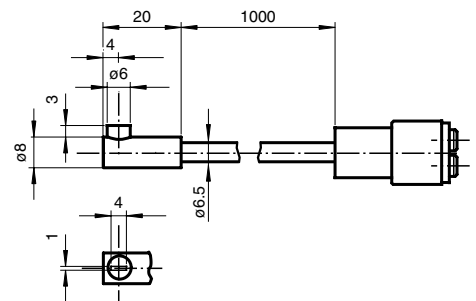
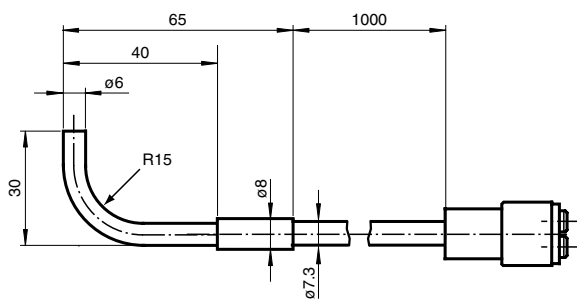
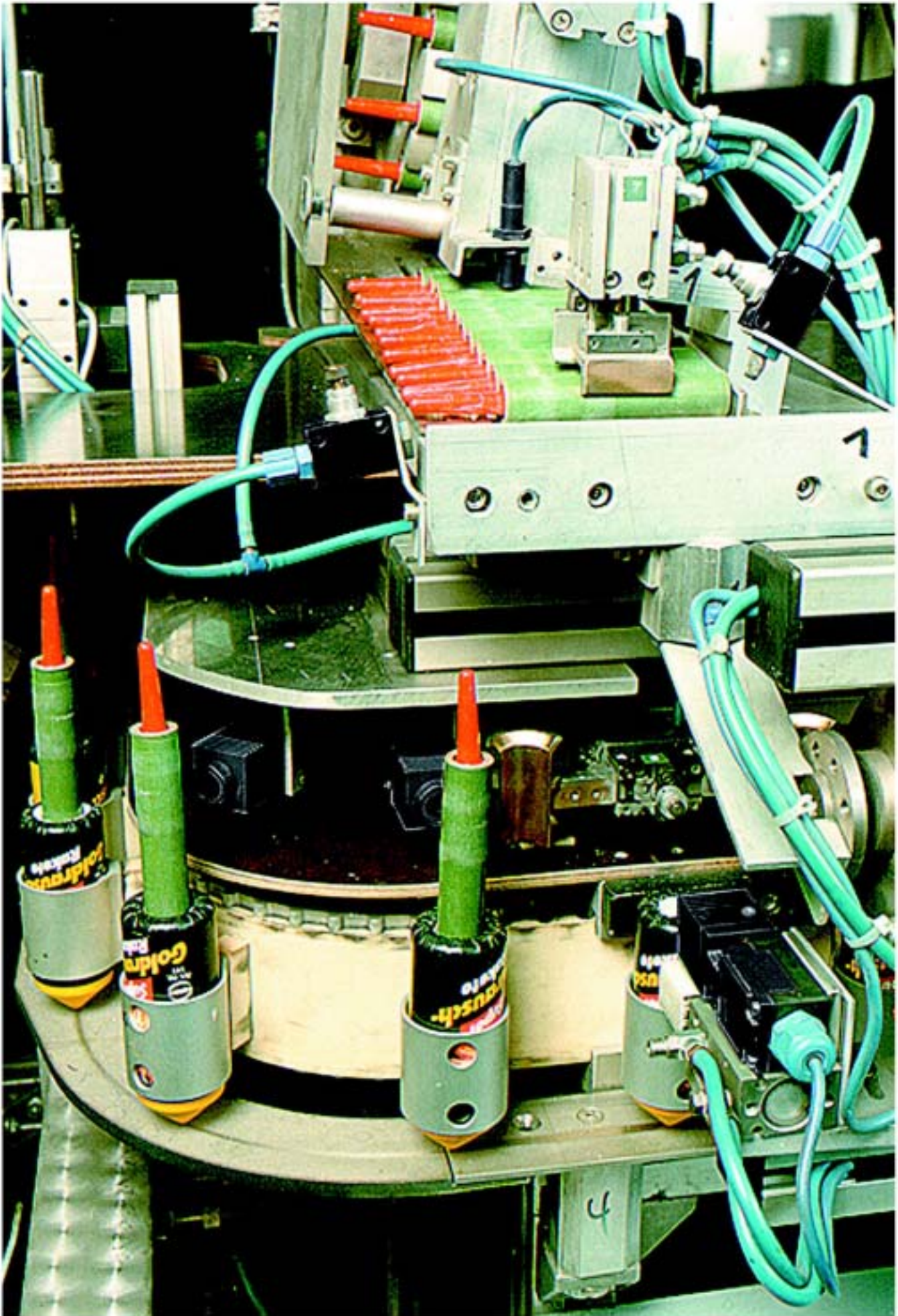


Fig. 19



Sensors in threaded housings



Ex-Devices/
NAMUR

Date of issue 10/12/2001

Sensors for the Ex-area/NAMUR

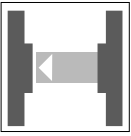


Modern photoelectrical sensors are also an indispensable pre-requisite for automated manufacturing in hazardous areas. Uses range from object recording in production facilities for filling systems to motion detection in conveyor systems.

The intrinsically safe photoelectric sensors of Pepperl+Fuchs are available in various models for use in areas subject to the risk of explosion. They feature a small, compact design and external interference protection. Intrinsically safe sensors allow for adjustment during normal operation without restricting protection against explosion.

Equipping Ex photoelectric sensors with NAMUR interfaces allows them to be connected to the standard isolated switch amplifier with a NAMUR control circuit. You will find the appropriate consumable materials in the Pepperl+Fuchs Interface DIN-Rail Housing catalogue.

Principle	Type code	Detection range	Page
	L36/LV36-Ex	0 m ... 30 m	862
	M11/MV11-Ex	0 m ... 10 m	850
	MLV11-54-Ex/112	0 mm ... 3000 mm	854
	OCS2000-M1K-N2	0 mm ... 2000 mm	874
	RL36-55-Ex/40b/116	0 mm ... 8000 mm	866
	OJ200-M1K-E23-Ex	0 mm ... 200 mm	882
	MLV11-8-500-Ex/112	0 mm ... 500 mm	858
	OCT300-M1K-N2	0 mm ... 300 mm	878
	RL36-8-2000-Ex/40b/116	0 mm ... 2000 mm	870



M11/MV11-Ex/40b/112

Single path light beam switch, NAMUR

M11/MV11-Ex/40b/112

with 4-pin M12 connector, 90° adjustable position



Ex-Devices/
NAMUR



- ◆ Recording range up to 10 m
- ◆ Intrinsically safe, EEx ia IIC T6
- ◆ Visible red light
- ◆ Light/dark ON, programmable
- ◆ Adjustable sensitivity
- ◆ Detection of partially transparent objects
- ◆ Protection degree IP67

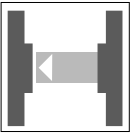
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		M11/MV11-Ex/40b/112
Sensing range	0 ... 10000 mm	◆
Reference target	Receiver	◆
Operating mode	Light/dark ON, programmable	◆
Light type	Red light 660 nm	◆
Ambient light limit	≤ 10000 Lux sun light ≤ 7500 Lux halogen light	◆
Standard conformity	DIN EN 60947-5-6/EN 60947-5-2 EN 50020:1994/EN 50014:1997	◆
Operating display	LED green: power on	◆
Function display	LED yellow: switching state (receiver)	◆
Controls	sensitivity adjuster	◆
Operating voltage	6 ... 16 V DC (R _i approx. 0 Ohm), ripple 5 % _{SS}	◆
Nominal voltage	8 V DC (R _i approx. 1 kOhm)	◆
Time delay before availability	20 ms	◆
Signal output	1 NAMUR output NC/NO programmable	◆
Current consumption	≥ 2.2 mA emitter	◆
Reference target detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA	◆
Reference target not detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA	◆
Switching frequency	≤ 100 Hz	◆
Switch-on delay	5 ms	◆
Ambient temperature	-25 ... +70 °C (see operating instructions for the use in the area exposed to danger of explosion, footnote ¹⁾)	◆
Storage temperature	-40 ... +80 °C	◆
Protection degree	IP67 according to EN 60529 (see operating instructions for the use in the area exposed to danger of explosion, footnote ²⁾)	◆
Connection type	V1 connector (M12 x 1), 4-pin, rotatable through 90° (see operating instructions for the use in the area exposed to danger of explosion, footnote ²⁾)	◆
Housing	PBT	◆
Light exit	Scratch resistant plastic lens	◆
Dove tail	AISi	◆
Mass	60 g (device)	◆

Ex-Devices/
NAMUR

10/12/01

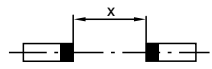
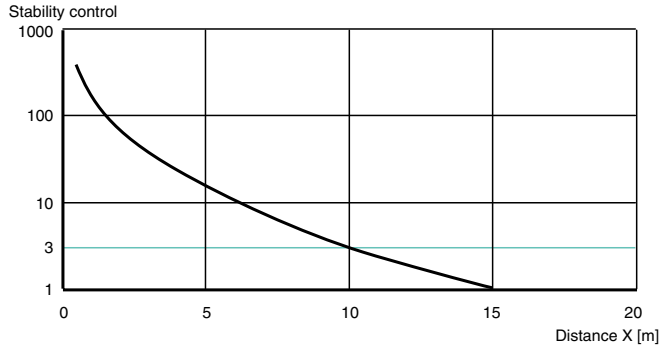
Date of issue



M11/MV11-Ex/40b/112

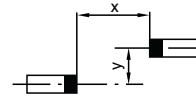
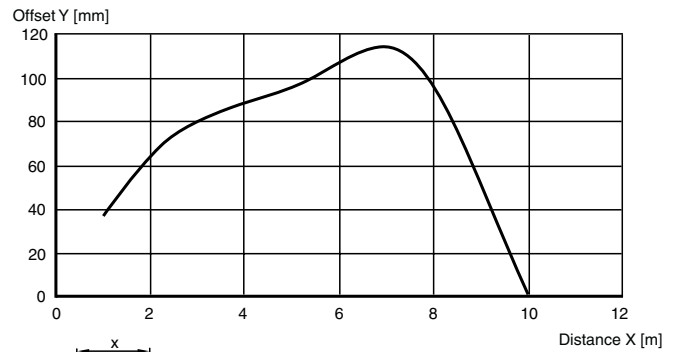
Relative received light strength

M11 / MV11-Ex



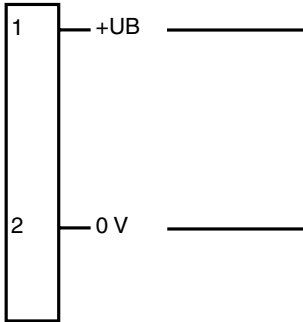
Characteristic response curve

M11 / MV11-Ex

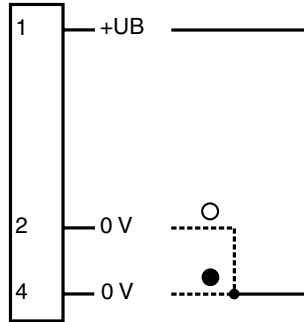


Ex-Devices/
NAMUR

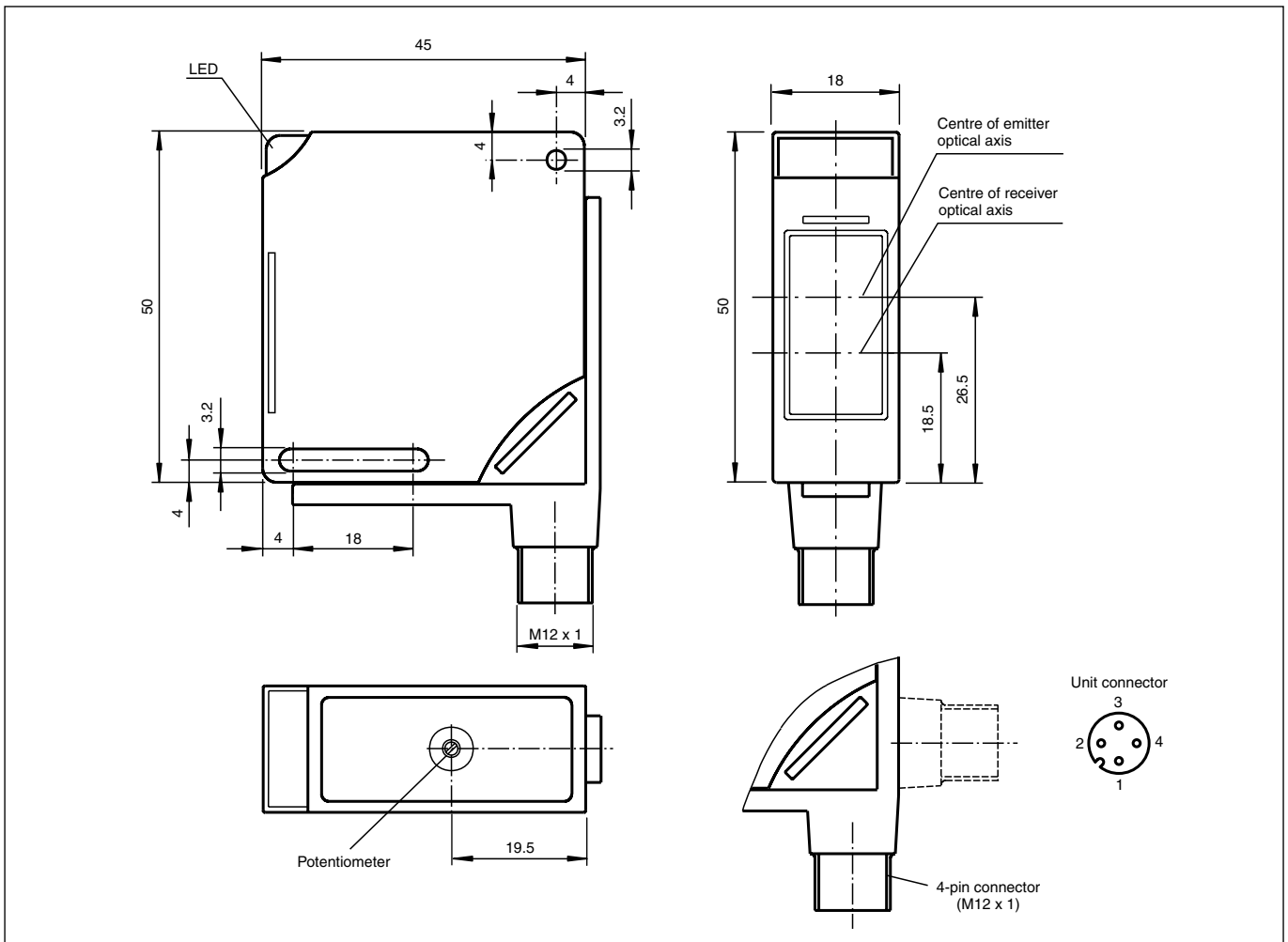
Option: Emitter



Option: 40b



○ = Light ON, ● = Dark ON



Instructions for the use in hazardous areas

EC type-examination certificate	PTB 99 ATEX 2036 X	
Effective internal capacity C_i	Emitter 42 nF Receiver 110 nF	
Effective internal inductivity L_i	negligible	
	Type 1	Type 2
Voltage U_i	15.5 V	15.5 V
Current I_i	20 mA	52 mA
Power P_i	64 mW	169 mW
Ambient temperature	-25 °C < T_a < 70 °C for T6	-25 °C < T_a < 50 °C for T6
T6	70 °C	50 °C
T5	70 °C	65 °C
T4-T1	70 °C	70 °C
	For additional information, please see the EC type examination certificate	
Marking	II 2G EEx ia IIC T6	

Installation, commissioning

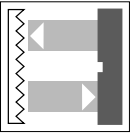
This product has been developed and approved for use in areas which are exposed to danger of explosion with the protection method for intrinsic safety as per EN 50014 and EN 50020. The intrinsic safety is only ensured in combination with the corresponding and appropriate consumable materials and in accordance with the Proof of Intrinsic Safety. The data and notes of the EC-Declaration of conformity and the national installation directions should be observed. Special apparatus you will find in the DIN-Rail Housing catalogue of Pepperl+Fuchs. The device must be protected from high-power electromagnetic fields and mechanical damage. The housing must be protected from dangerous electrostatic discharge. A dangerous electrostatic discharge can be avoided by grounding the metallic connector section by means of an electrically conductive mounting aid for the M11/MV11 housing.

Maintenance

Neither changes nor repairs must be made to devices that are operated in areas which are exposed to danger of explosion.

Attention!

- 1) During use in areas which are exposed to danger of explosion, the device must be protected within the temperature range -25 °C to -20 °C by installing an additional housing to protect it from the effects of shock.
- 2) The connection parts must be assembled in such a manner that at least protection class IP20 is achieved as defined by IEC Publication 60529:1889.



MLV11-54-Ex/40b/112

Reflection light beam switch, NAMUR

MLV11-54-Ex/40b/112

with 4-pin M12 connector, 90° adjustable position



Ex-Devices/
NAMUR



- ◆ Recording range up to 3 m
- ◆ Intrinsically safe, EEx ia IIC T6
- ◆ Glare protected with polarisation filter
- ◆ Visible red light
- ◆ Adjustable sensitivity
- ◆ Light/dark ON, programmable
- ◆ Protection degree IP67

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

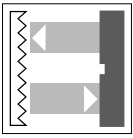
Date of issue 10/12/01

Ordering code		MLV11-54-Ex/40b/112
Sensing range	0 ... 3000 mm	◆
Reference target	H85 reflector	◆
Reflector range	300 ... 3000 mm	◆
Operating mode	Light/dark ON, programmable	◆
Light type	Red light 660 nm	◆
Ambient light limit	≤ 10000 Lux sun light ≤ 7500 Lux halogen light	◆
Standard conformity	DIN EN 60947-5-6/EN 60947-5-2 EN 50020:1994/EN 50014:1997	◆
Approvals	CE	◆
Function display	LED yellow: switching state	◆
Controls	sensitivity adjuster	◆
Operating voltage	6 ... 20 V DC (R _i approx. 0 Ohm), ripple 5 % _{SS}	◆
Nominal voltage	8 V DC (R _i approx. 1 kOhm)	◆
Time delay before availability	20 ms	◆
Signal output	1 NAMUR output NC/NO programmable	◆
Current consumption		
Reference target detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA	◆
Reference target not detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA	◆
Switching frequency	≤ 100 Hz	◆
Switch-on delay	5 ms	◆
Ambient temperature	-25 ... +70 °C (see operating instructions for the use in the area exposed to danger of explosion, footnote ¹⁾)	◆
Storage temperature	-40 ... +80 °C	◆
Protection degree	IP67 according to EN 60529 (see operating instructions for the use in the area exposed to danger of explosion, footnote ²⁾)	◆
Connection type	V1 connector (M12 x 1), 4-pin, rotatable through 90° (see operating instructions for the use in the area exposed to danger of explosion, footnote ²⁾)	◆
Housing	PBT	◆
Light exit	Scratch resistant plastic lens	◆
Dove tail	AISI	◆
Mass	60 g	◆

Ex-Devices/
NAMUR

10/12/01

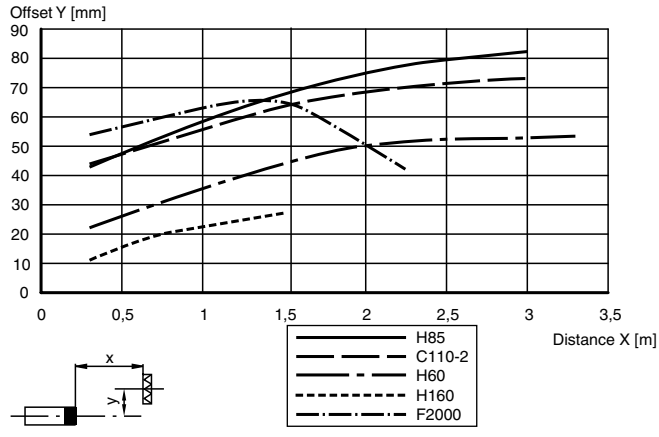
Date of issue



MLV11-54-Ex/40b/112

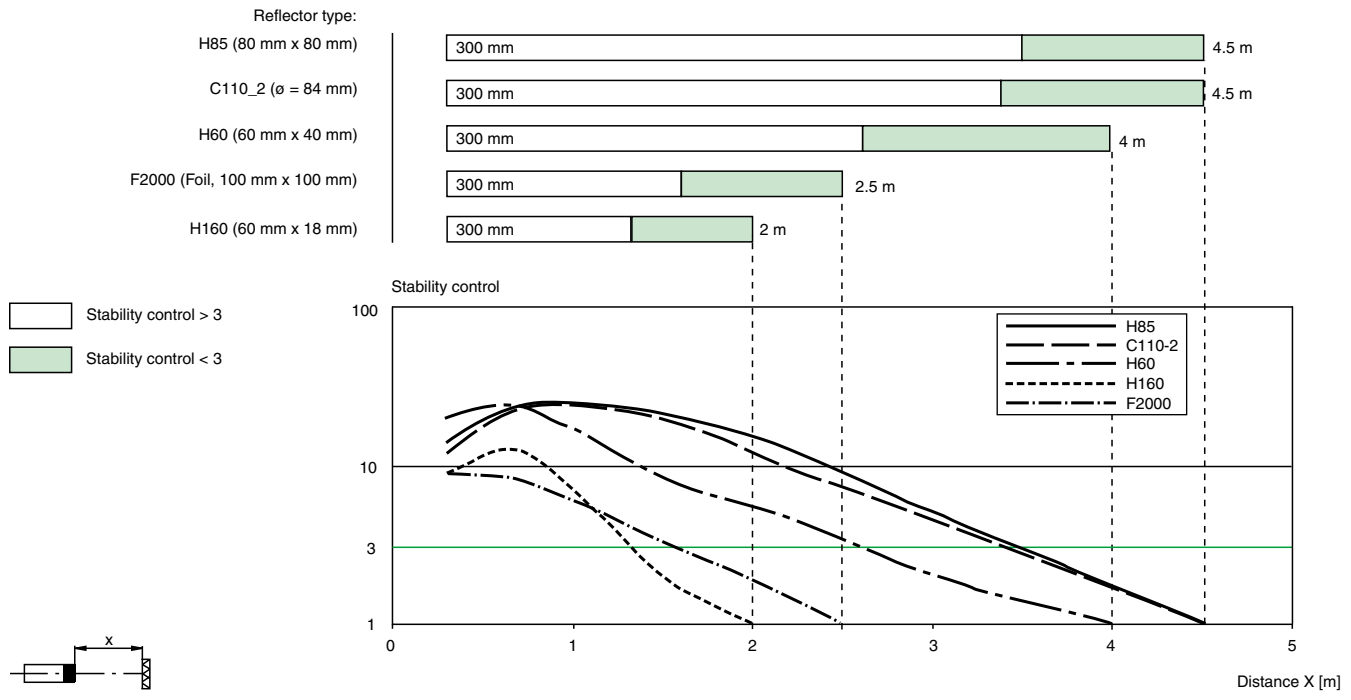
Characteristic response curve

MLV11-54-Ex

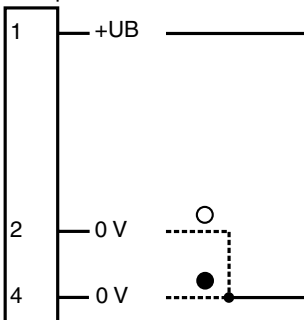


Relative received light strength

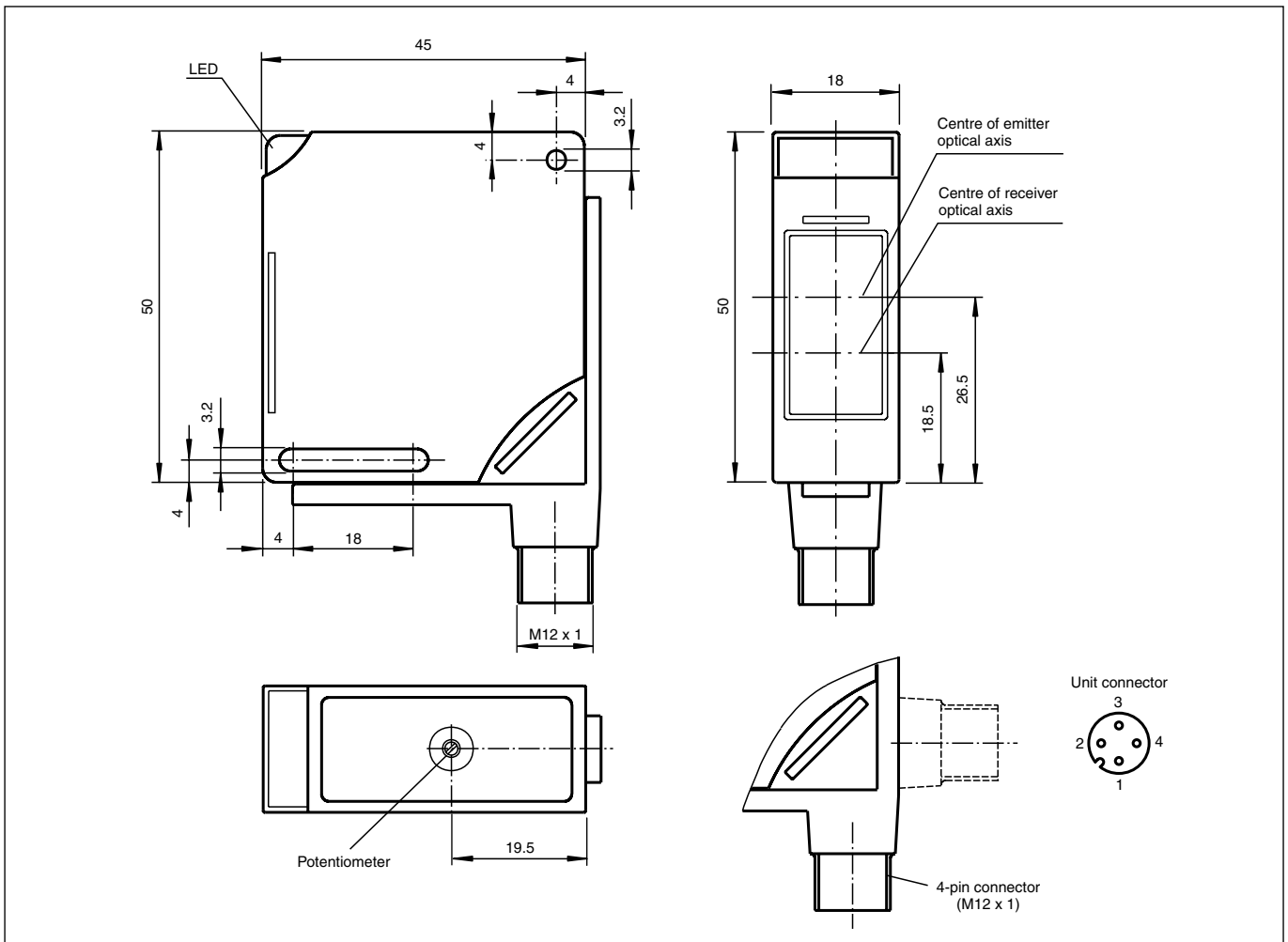
MLV11-54-Ex



Option: 40b



○ = Light ON, ● = Dark ON



Ex-Devices/
NAMUR

Instructions for the use in hazardous areas

EC type-examination certificate	PTB 99 ATEX 2036 X	
Effective internal capacity C_i	90 nF	
Effective internal inductivity L_i	negligible	
	Type 1	Type 2
Voltage U_i	15.5 V	15.5 V
Current I_i	20 mA	52 mA
Power P_i	64 mW	169 mW
Ambient temperature	-25 °C < T_a < 70 °C for T6	-25 °C < T_a < 60 °C for T6
T6	70 °C	60 °C
T5	70 °C	70 °C
T4-T1	70 °C	70 °C
	For additional information, please see the EC type examination certificate	
Marking	⊕ II 2G EEx ia IIC T6	

Installation, commissioning

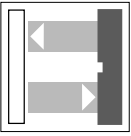
This product has been developed and approved for use in areas which are exposed to danger of explosion with the protection method for intrinsic safety as per EN 50014 and EN 50020. The intrinsic safety is only ensured in combination with the corresponding and appropriate consumable materials and in accordance with the Proof of Intrinsic Safety. The data and notes of the EC-Declaration of conformity and national installation directions should be observed. Special apparatus you will find in the DIN-Rail Housing catalogue of Pepperl+Fuchs. The device must be protected from high-power electromagnetic fields and mechanical damage. The housing must be protected from dangerous electrostatic discharge. A dangerous electrostatic discharge can be avoided by grounding the metallic connector section by means of an electrically conductive mounting aid for the MLV11 housing.

Maintenance

Neither changes nor repairs must be made to devices that are operated in areas which are exposed to danger of explosion.

Attention!

- During use in areas which are exposed to danger of explosion, the device must be protected within the temperature range -25 °C to -20 °C by installing an additional housing to protect it from the effects of shock.
- The connection parts must be assembled in such a manner that at least protection class IP 20 is achieved as defined by IEC Publication 60529:1889.



MLV11-8-500-Ex/40b/112

Reflection light scanner, NAMUR

MLV11-8-500-Ex/40b/112

with 4-pin M12 connector, 90° adjustable position



- ◆ Recording range up to 0.5 m
- ◆ Intrinsically safe, EEx ia IIC T6
- ◆ Diffuse reflective sensor for standard applications
- ◆ Adjustable sensitivity
- ◆ Light/dark ON, programmable
- ◆ Protection degree at least IP67

Ex-Devices/
NAMUR

For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

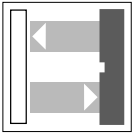
Date of issue 10/12/01

Ordering code		MLV11-8-500-Ex/40b/112
Sensing range	0 ... 500 mm	◆
Reference target	Standard white 200 mm x 200 mm	◆
Adjustment range	120 ... 500 mm	◆
Operating mode	Light/dark ON, programmable	◆
Light type	IR-light 860 nm	◆
Filter	Red filter	◆
Ambient light limit	≤ 10000 Lux sun light ≤ 7500 Lux halogen light	◆
Standard conformity	DIN EN 60947-5-6/EN 60947-5-2 EN 50020:1994/EN 50014:1997	◆
Approvals	CE	◆
Function display	LED yellow: switching state	◆
Controls	sensitivity adjuster	◆
Operating voltage	6 ... 20 V DC (R _i approx. 0 Ohm), ripple 5 % _{SS}	◆
Nominal voltage	8 V DC (R _i approx. 1 kOhm)	◆
Time delay before availability	20 ms	◆
Signal output	1 NAMUR output NC/NO programmable	◆
Current consumption		
Reference target detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA	◆
Reference target not detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA	◆
Switching frequency	≤ 100 Hz	◆
Switch-on delay	5 ms	◆
Range hysteresis	≤ 10 %	◆
Ambient temperature	-25 ... +70 °C (see operating instructions for the use in the area exposed to danger of explosion, footnote ¹⁾)	◆
Storage temperature	-40 ... +80 °C	◆
Protection degree	IP67 according to EN 60529 (see operating instructions for the use in the area exposed to danger of explosion, footnote ²⁾)	◆
Connection type	V1 connector (M12 x 1), 4-pin, rotatable through 90° (see operating instructions for the use in the area exposed to danger of explosion, footnote ²⁾)	◆
Housing	PBT	◆
Light exit	Scratch resistant plastic lens	◆
Mass	60 g	◆

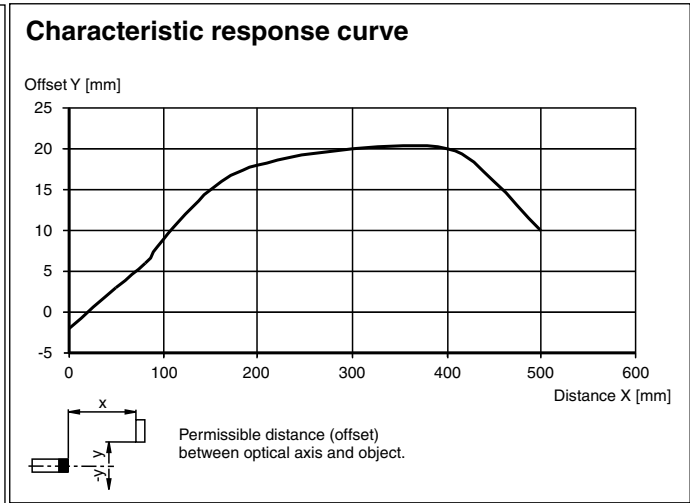
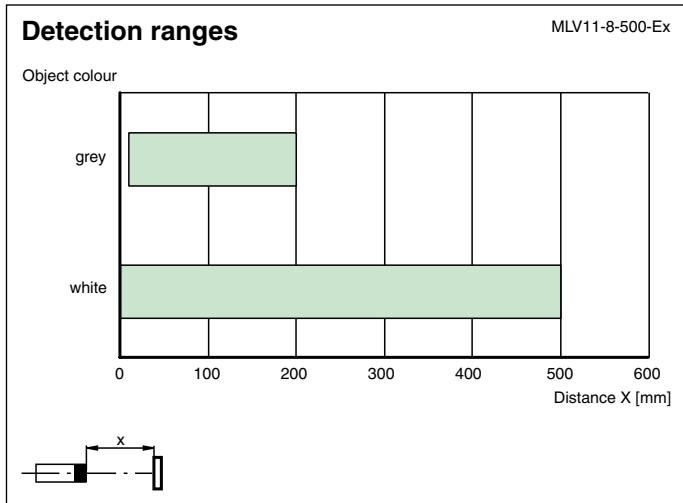
Ex-Devices/
NAMUR

10/12/01

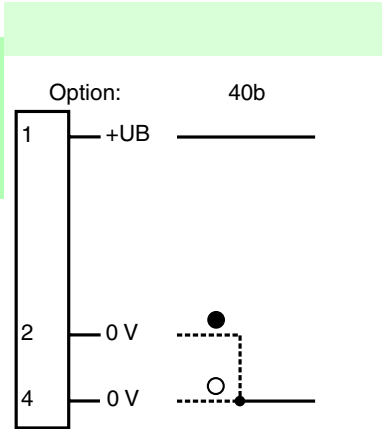
Date of issue



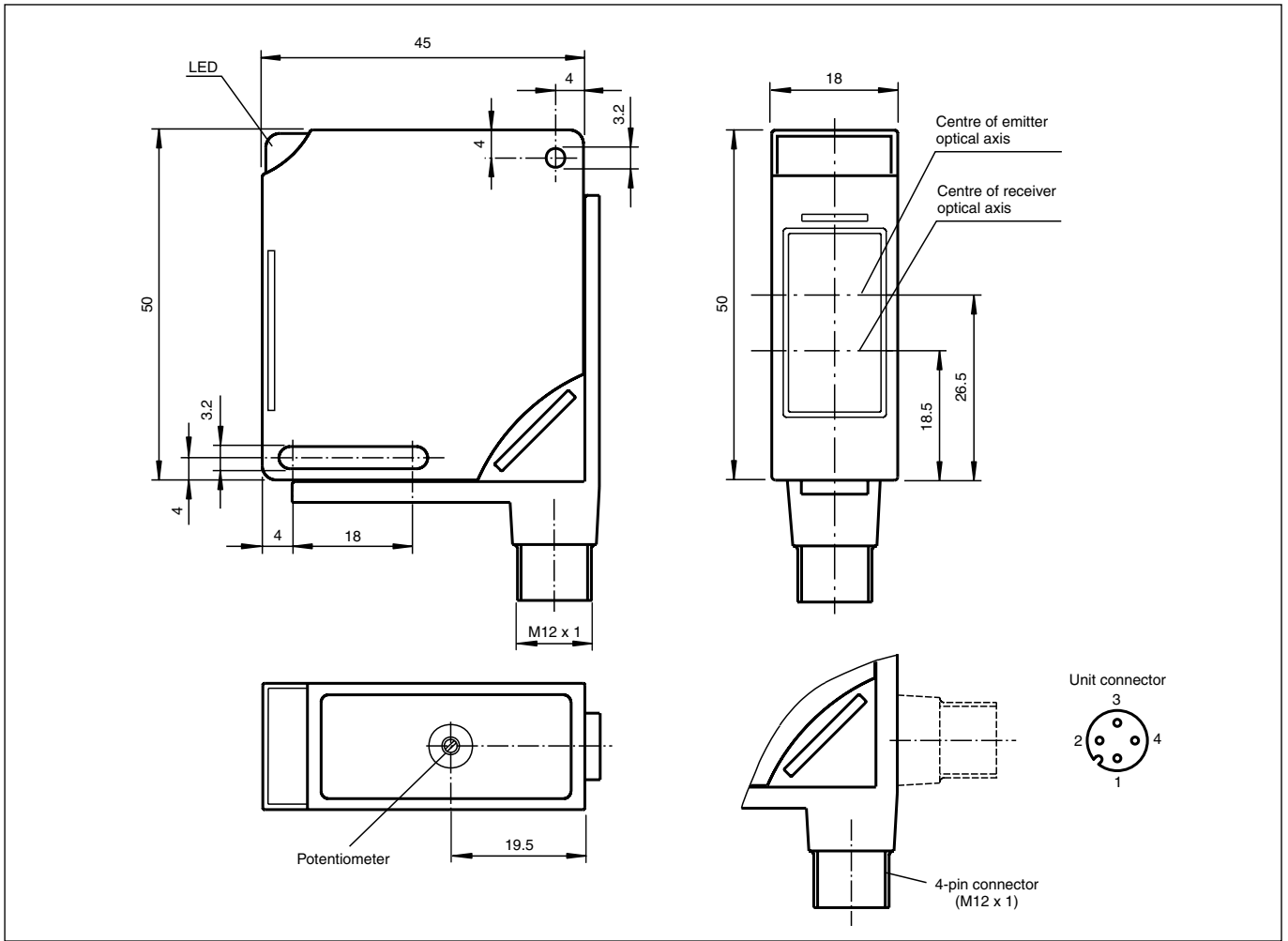
MLV11-8-500-Ex/40b/112



Ex-Devices/
NAMUR



○ = Light ON, ● = Dark ON



Instructions for the use in hazardous areas

EC type-examination certificate	PTB 99 ATEX 2036 X	
Effective internal capacity C_i	90 nF	
Effective internal inductivity L_i	negligible	
	Type 1	Type 2
Voltage U_i	15.5 V	15.5 V
Current I_i	20 mA	52 mA
Power P_i	64 mW	169 mW
Ambient temperature	-25 °C < T_a < 70 °C for T6	-25 °C < T_a < 60 °C for T6
T6	70 °C	60 °C
T5	70 °C	70 °C
T4-T1	70 °C	70 °C
	For additional information, please see the EC type examination certificate	
Marking	II 2G EEx ia IIC T6	

Installation, commissioning

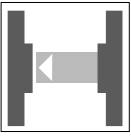
This product has been developed and approved for use in areas which are exposed to danger of explosion with the protection method for intrinsic safety as per EN 50014 and EN 50020. The intrinsic safety is only ensured in combination with the corresponding and appropriate consumable materials and in accordance with the Proof of Intrinsic Safety. The data and notes of the EC-Declaration of conformity and national installation directions should be observed. Special apparatus you will find in the DIN-Rail Housing catalogue of Pepperl+Fuchs. The device must be protected from high-power electromagnetic fields and mechanical damage. The housing must be protected from dangerous electrostatic discharge. A dangerous electrostatic discharge can be avoided by grounding the metallic connector section by means of an electrically conductive mounting aid for the MLV11 housing.

Maintenance

Neither changes nor repairs must be made to devices that are operated in areas which are exposed to danger of explosion.

Attention!

- 1) During use in areas which are exposed to danger of explosion, the device must be protected within the temperature range -25 °C to -20 °C by installing an additional housing to protect it from the effects of shock.
- 2) The connection parts must be assembled in such a manner that at least protection class IP 20 is achieved as defined by IEC Publication 60529:1889.



L36/LV36-Ex/40b/116

Single path light beam switch, NAMUR

L36/LV36-Ex/40b/116

with terminal compartment



- ◆ Recording range up to 30 m
- ◆ Intrinsically safe, EEx ia IIC T6
- ◆ Visible red light
- ◆ Light/dark ON, programmable
- ◆ Adjustable sensitivity
- ◆ Resistant against noise
- ◆ Protection degree IP64



Ex-Devices/
NAMUR

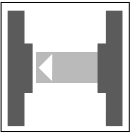
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		L36/LV36-Ex/40b/116
Sensing range	0 ... 30000 mm	◆
Reference target	Receiver	◆
Operating mode	Light/dark ON, programmable	◆
Light type	Red light 660 nm	◆
Lifetime	Light source: 100000 h	◆
Ambient light limit	≤ 10000 Lux sun light ≤ 7500 Lux halogen light	◆
Standard conformity	DIN EN 60947-5-6/EN 60947-5-2 EN 50020/EN 50014	◆
Approvals	CE	◆
Operating display	LED green: power on in emitter	◆
Function display	LED yellow: switching state (receiver)	◆
Controls	sensitivity adjuster	◆
Operating voltage	6 ... 16 V DC (R _i approx. 0 Ohm), ripple 5 % _{SS}	◆
Nominal voltage	8 V DC (R _i approx. 1 kOhm)	◆
Time delay before availability	20 ms	◆
Signal output	1 NAMUR output NC/NO programmable	◆
Current consumption	emitter: ≥ 2.2 mA Receiver:	◆
Reference target detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA	◆
Reference target not detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA	◆
Switching frequency	≤ 100 Hz	◆
Switch-on delay	5 ms	◆
Ambient temperature	-25 ... +70 °C	◆
Storage temperature	-40 ... +80 °C	◆
Protection degree	IP64 according to EN 60529	◆
Connection type	Terminal compartment Pg9, ≤ 2.5 mm ²	◆
Housing	PMMA	◆
Light exit	PMMA	◆
Mass	200 g (device)	◆

Ex-Devices/
NAMUR

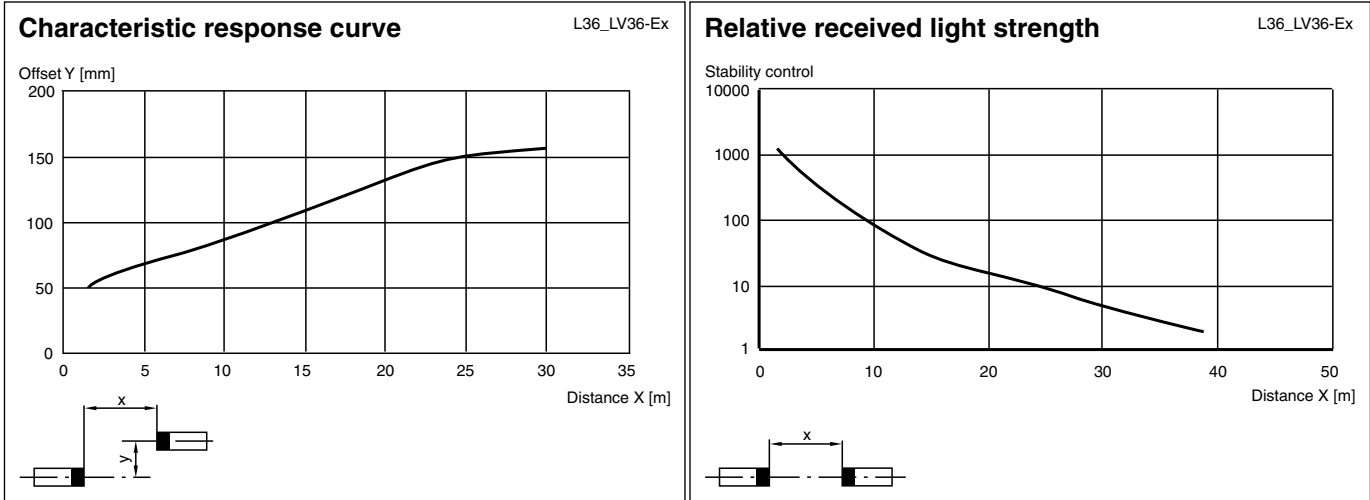
10/15/01

Date of issue



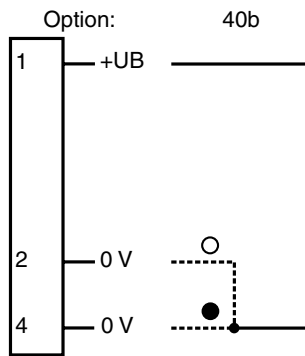
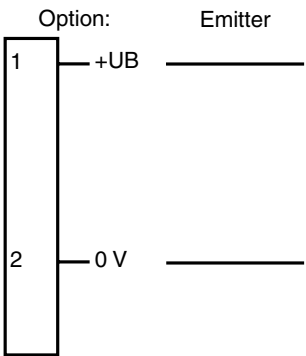
L36/LV36-Ex/40b/116

Diagrams



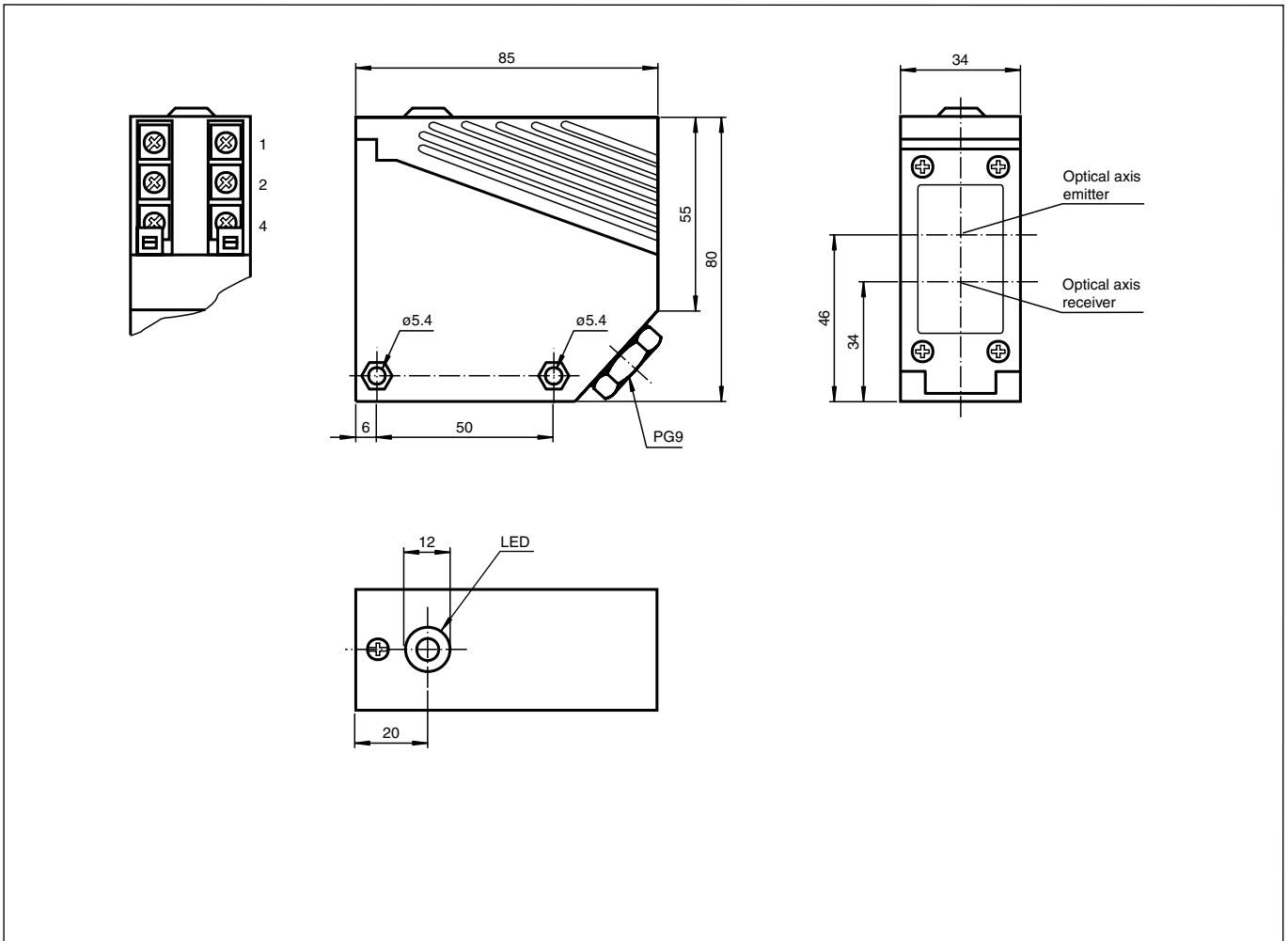
Electrical Connection

Ex-Devices/
NAMUR




○ = Light ON, ● = Dark ON

Dimensions



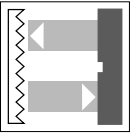
Ex-Devices/
NAMUR

Instructions for use in hazardous areas

Type-examination certificate	PTB Nr. Ex-97.D.2264
Maximum values	
Effective internal capacitance C_i	≤ 60 nF ≤ 42 nF (only emitter)
Effective internal inductance L_i	negligible
Voltage U_i	12.7 V
Current I_i	53,23 mA
Power P_i	169 mW
Ambient temperature	-25 °C ... +70 °C (248 K ... 343 K)
Marking	 EEx ia IIC T6

Note

In the case of a fault, the sensor should always be regarded as being active.
The maximum values are given in the Certificate of Conformity.



RL36-55-Ex/40b/116

Reflection light beam switch, NAMUR

RL36-55-Ex/40b/116

with terminal compartment



Ex-Devices/
NAMUR

- ◆ Recording range up to 8 m
- ◆ Intrinsically safe, EEx ia IIC T6
- ◆ Visible red light
- ◆ Glare protected with polarisation filter
- ◆ Light/dark ON, programmable
- ◆ Adjustable sensitivity
- ◆ Resistant against noise
- ◆ Protection degree IP64
- ◆ Scratch resistant mineral glass lens

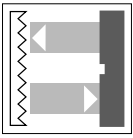
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL36-55-Ex/40b/116
Sensing range	0 ... 8000 mm	◆
Reference target	H85 reflector	◆
Reflector range	800 ... 8000 mm	◆
Operating mode	Light/dark ON, programmable	◆
Light type	Red light 660 nm	◆
Lifetime	Light source: 100000 h	◆
Filter	Polarisation filter	◆
Ambient light limit	≤ 10000 Lux sun light ≤ 7500 Lux halogen light	◆
Standard conformity	DIN EN 60947-5-6/EN 60947-5-2 EN 50020/EN 50014	◆
Approvals	CE	◆
Function display	LED yellow: switching state	◆
Controls	sensitivity adjuster	◆
Operating voltage	6 ... 20 V DC (R _i approx. 0 Ohm), ripple 5 % _{SS}	◆
Nominal voltage	8 V DC (R _i approx. 1 kOhm)	◆
Time delay before availability	20 ms	◆
Signal output	1 NAMUR output NC/NO programmable	◆
Current consumption		
Reference target detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA	◆
Reference target not detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA	◆
Switching frequency	≤ 100 Hz	◆
Switch-on delay	5 ms	◆
Ambient temperature	-25 ... +70 °C	◆
Storage temperature	-40 ... +80 °C	◆
Protection degree	IP64 according to EN 60529	◆
Connection type	Terminal compartment Pg9, ≤ 2.5 mm ²	◆
Housing	PMMA	◆
Light exit	Scratch resistant mineral glass lens	◆
Mass	200 g	◆

Ex-Devices/
NAMUR

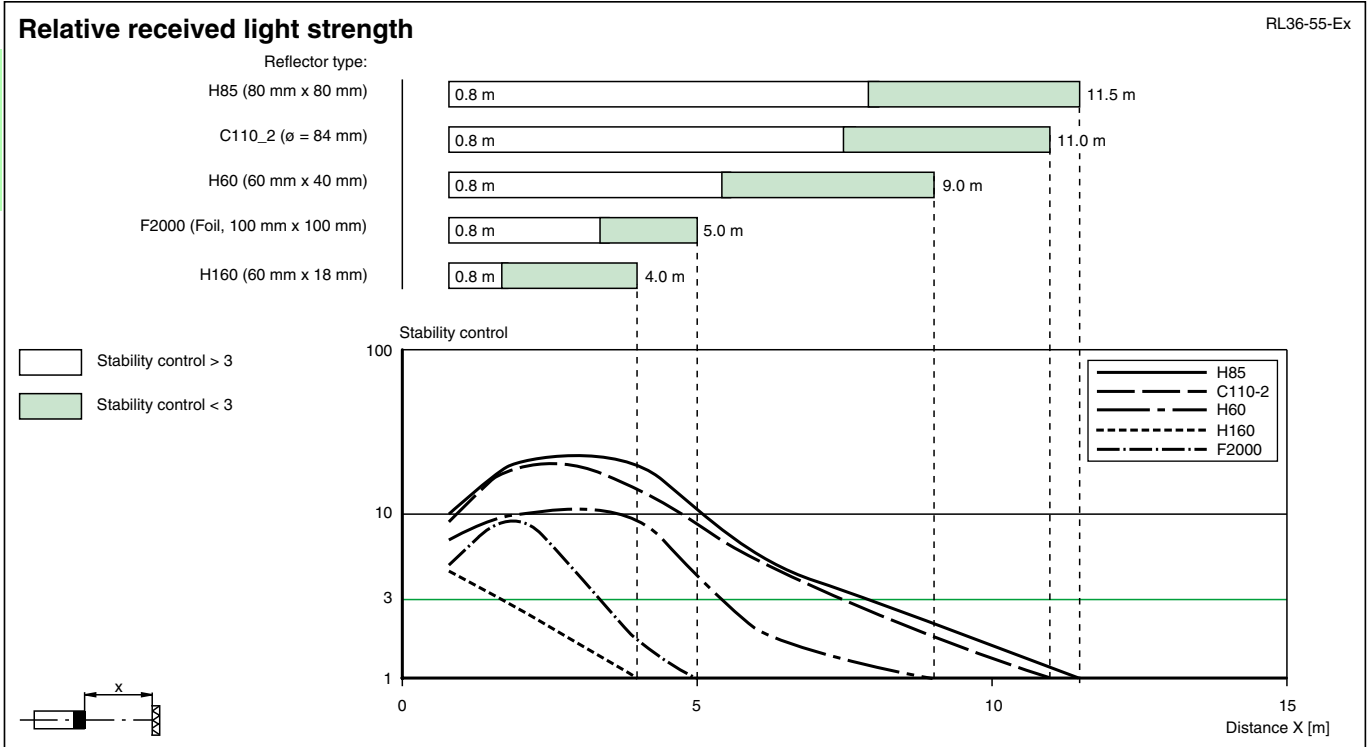
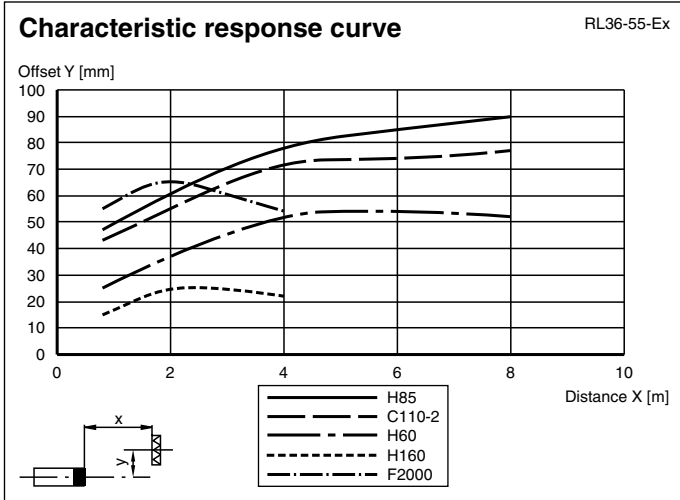
10/15/01

Date of issue

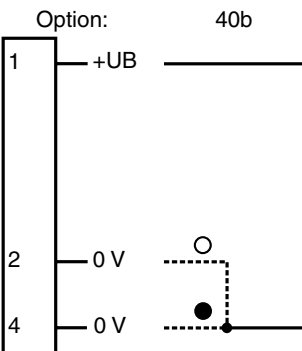


RL36-55-Ex/40b/116

Diagrams

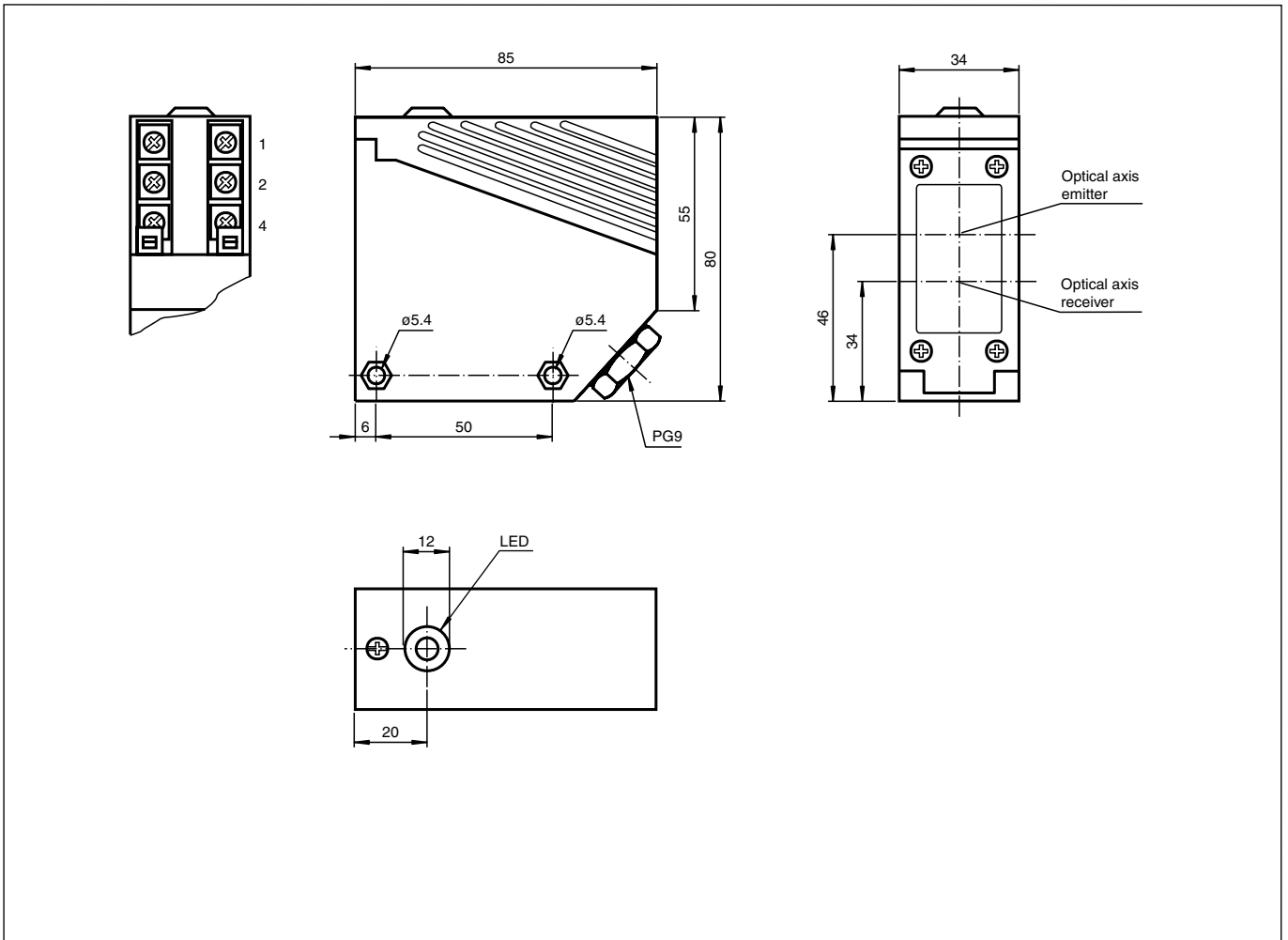


Electrical Connection



○ = Light ON, ● = Dark ON

Dimensions



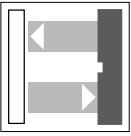
Ex-Devices/
NAMUR

Instructions for the use in hazardous areas

Type-examination certificate	PTB No. Ex-97.D.2264
Maximum values	
Effective internal capacity C_i	≤ 60 nF
Effective internal inductivity L_i	negligible
Voltage U_i	12.7 V
Current I_i	53.23 mA
Power P_i	169 mW
Ambient temperature	-25 °C ... +70 °C (248 K ... 343 K)
Marking	EEx ia IIC T6

Notes

In the case of an error, the sensor should also be regarded as active.
For the maximum values, please refer to the certificate of conformity.



RL36-8-2000-Ex/40b/116

Reflection light scanner, NAMUR

RL36-8-2000-Ex/40b/116

with terminal compartment



Ex-Devices/
NAMUR

- ◆ Recording range up to 2 m
- ◆ Intrinsically safe, EEx ia IIC T6
- ◆ Light/dark ON, programmable
- ◆ Adjustable sensitivity
- ◆ Resistant against noise
- ◆ Protection degree IP64

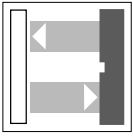
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		RL36-8-2000-Ex/40b/116
Sensing range	0 ... 2000 mm	◆
Reference target	Standard white 200 mm x 200 mm	◆
Adjustment range	350 ... 2000 mm	◆
Operating mode	Light/dark ON, programmable	◆
Light type	IR-light 860 nm	◆
Lifetime	Light source: 100000 h	◆
Ambient light limit	≤ 10000 Lux sun light ≤ 7500 Lux halogen light	◆
Temperature influence	≤ 5 mm/K	◆
Standard conformity	DIN EN 60947-5-6/EN 60947-5-2 EN 50020/EN 50014	◆
Approvals	CE	◆
Function display	LED yellow: switching state	◆
Controls	sensitivity adjuster	◆
Operating voltage	6 ... 20 V DC (R _i approx. 0 Ohm), ripple 5 % _{SS}	◆
Nominal voltage	8 V DC (R _i approx. 1 kOhm)	◆
Time delay before availability	20 ms	◆
Signal output	1 NAMUR output NC/NO programmable	◆
Current consumption		
Reference target detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA	◆
Reference target not detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA	◆
Switching frequency	≤ 100 Hz	◆
Switch-on delay	5 ms	◆
Range hysteresis	≤ 10 %	◆
Repeat accuracy	≤ 5 %	◆
Ambient temperature	-25 ... +70 °C	◆
Storage temperature	-40 ... +80 °C	◆
Protection degree	IP64 according to EN 60529	◆
Connection type	Terminal compartment Pg9, ≤ 2.5 mm ²	◆
Housing	PMMA	◆
Light exit	PMMA	◆
Mass	200 g	◆

Ex-Devices/
NAMUR

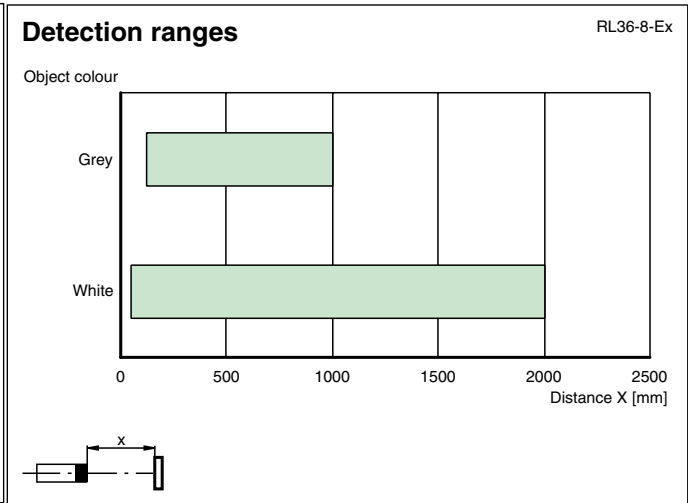
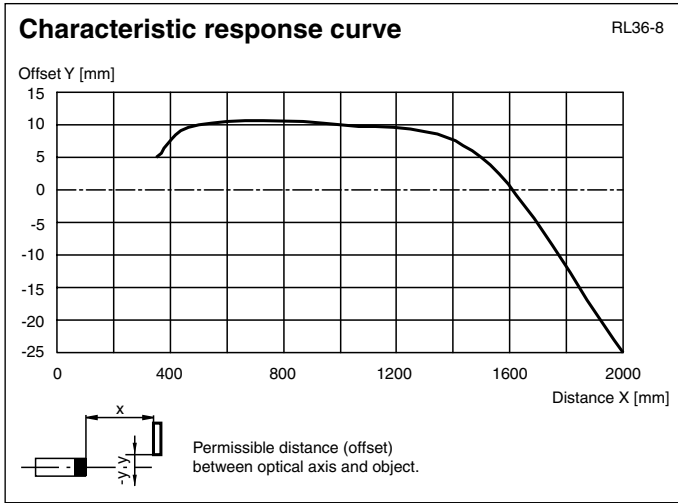
10/15/01

Date of issue

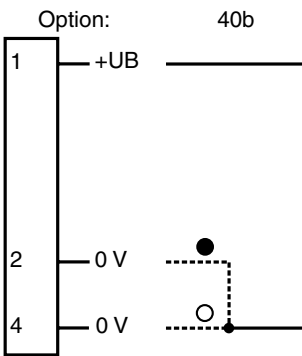


RL36-8-2000-Ex/40b/116

Diagrams

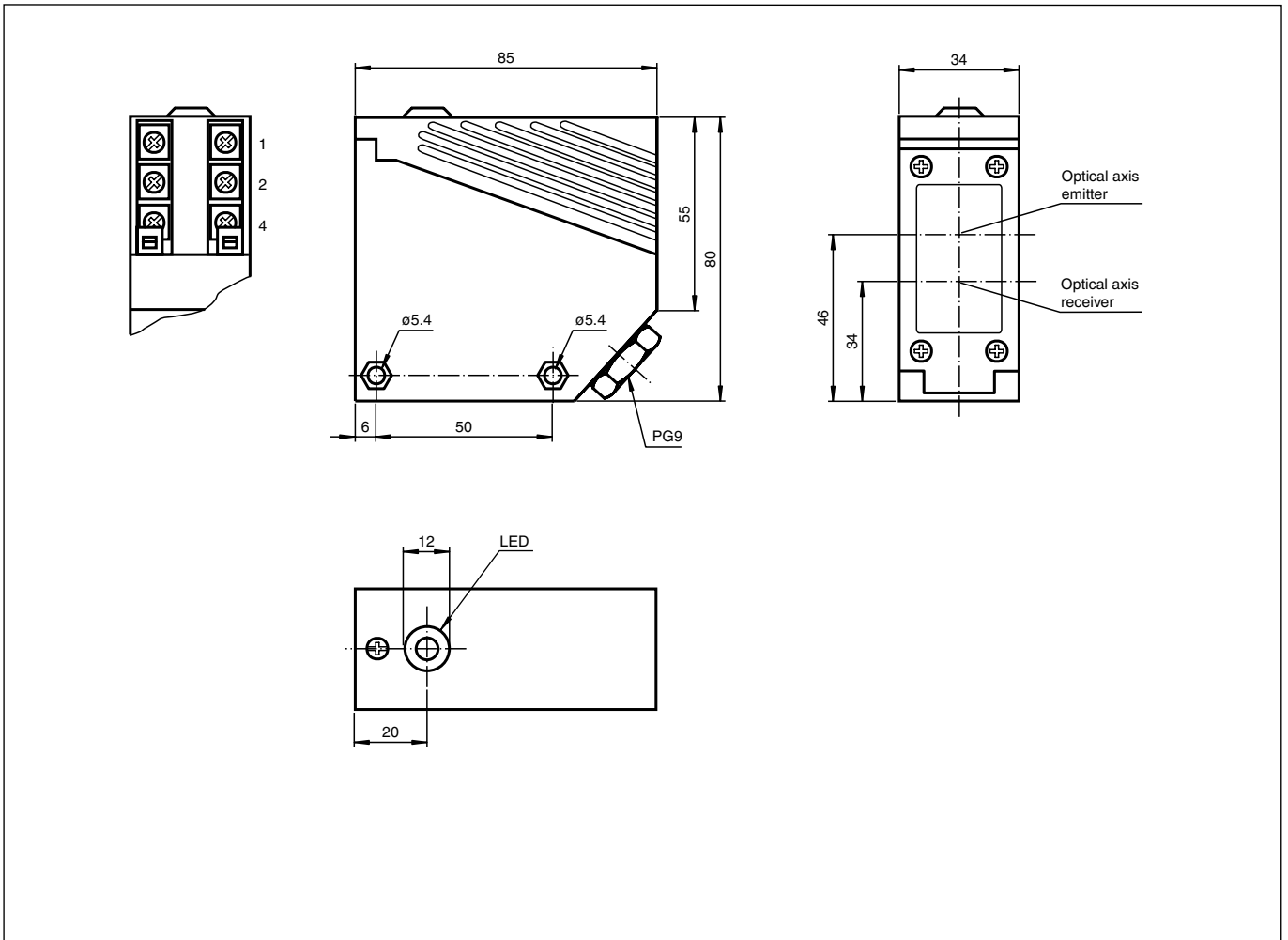


Electrical Connection



○ = Light ON, ● = Dark ON

Dimensions



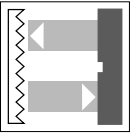
Ex-Devices/
NAMUR

Instructions for the use in hazardous areas

Type-examination certificate	PTB No. Ex-97.D.2264
Maximum values	
Effective internal capacity C_i	≤ 60 nF
Effective internal inductivity L_i	negligible
Voltage U_i	12.7 V
Current I_i	53.23 mA
Power P_i	169 mW
Ambient temperature	-25 °C ... +70 °C (248 K ... 343 K)
Marking	EEx ia IIC T6

Notes

In the case of an error, the sensor should also be regarded as active.
For the maximum values, please refer to the certificate of conformity.



OCS2000-M1K-N2

Reflection light beam switch, NAMUR

OCS2000-M1K-N2

with terminal compartment



Ex-Devices/
NAMUR



- ◆ Recording range up to 2 m
- ◆ Intrinsically safe, EEx ia IIC T6
- ◆ Electrical values according to DIN EN 60947-5-6
- ◆ Light/dark ON, programmable
- ◆ Visible red light
- ◆ Glare protected with polarisation filter
- ◆ Position of the sensor head adjustable
- ◆ Protection degree IP67
- ◆ Scratch resistant mineral glass lens

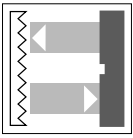
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OCS2000-M1K-N2
Sensing range	0 ... 2000 mm	◆
Reference target	Retro-reflector C110-2	◆
Reflector range	100 ... 2000 mm	◆
Light type	Red light 660 nm	◆
Filter	Polarisation filter	◆
Ambient light limit	≤ 10000 Lux sun light ≤ 7500 Lux halogen light	◆
Standard conformity	DIN EN 60947-5-6/EN 60947-5-2 EN 50020/EN 50014	◆
Approvals	CE	◆
Function display	LED yellow: switching state	◆
Operating voltage	6 ... 20 V DC (R _i approx. 0 Ohm), ripple 5 % _{SS}	◆
Nominal voltage	8 V DC (R _i approx. 1 kOhm)	◆
Time delay before availability	20 ms	◆
Signal output	1 NAMUR output N2, NO/NC, cabling programmable	◆
Current consumption		
Reference target detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA	◆
Reference target not detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA	◆
Switching frequency	≤ 100 Hz	◆
Switch-on delay	5 ms	◆
Ambient temperature	-25 ... +70 °C	◆
Storage temperature	-40 ... +80 °C	◆
Protection degree	IP67 according to EN 60529, Class II insulation	◆
Connection type	Terminal compartment Pg9, ≤ 2.5 mm ²	◆
Housing	PBT	◆
Light exit	Scratch resistant mineral glass lens	◆
Mass	100 g	◆

Ex-Devices/
NAMUR

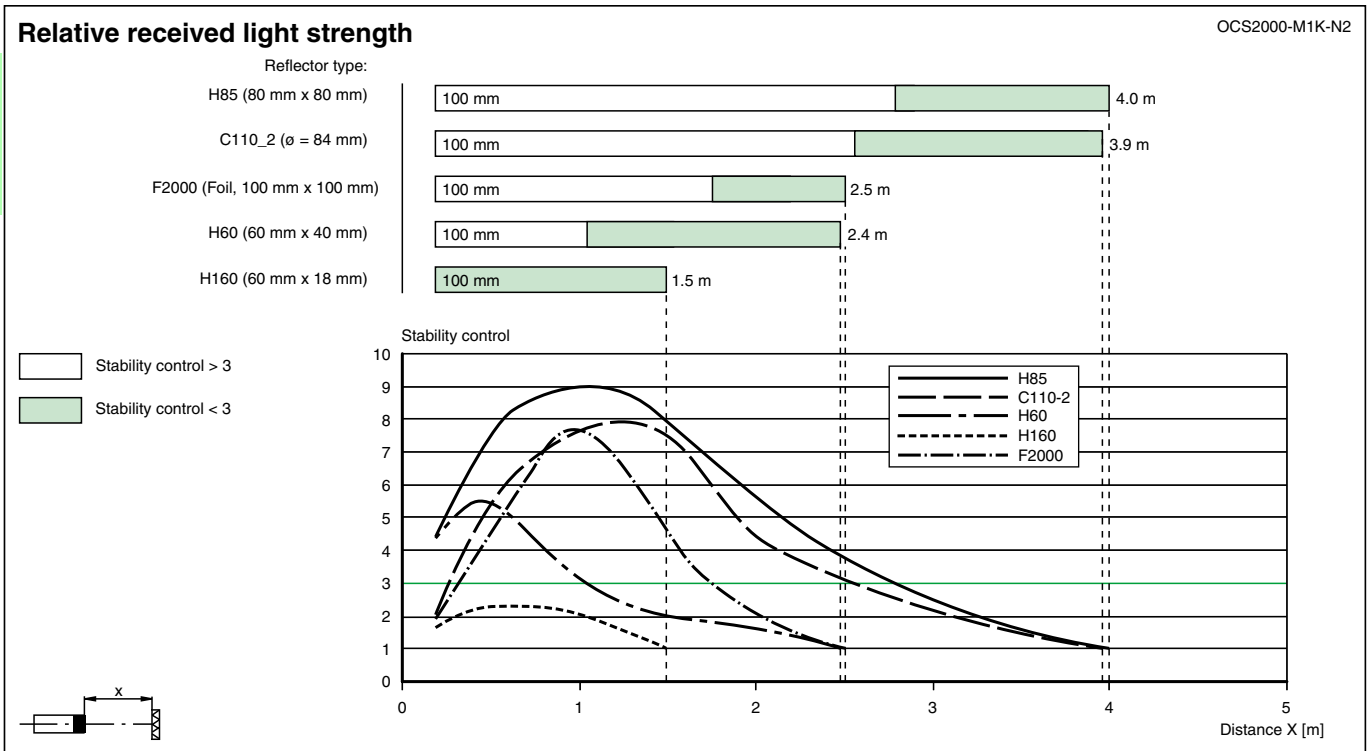
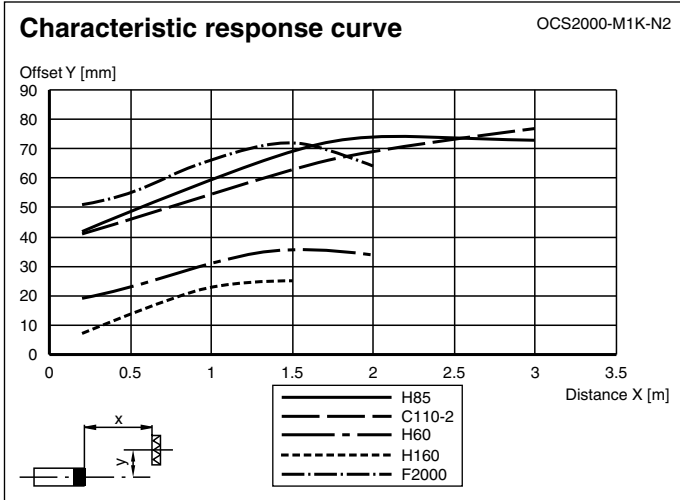
10/15/01

Date of issue

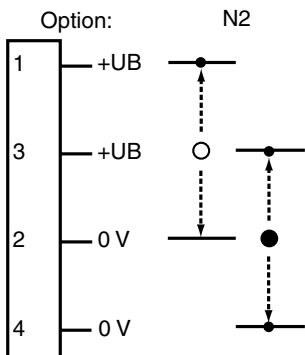


OCS2000-M1K-N2

Diagrams

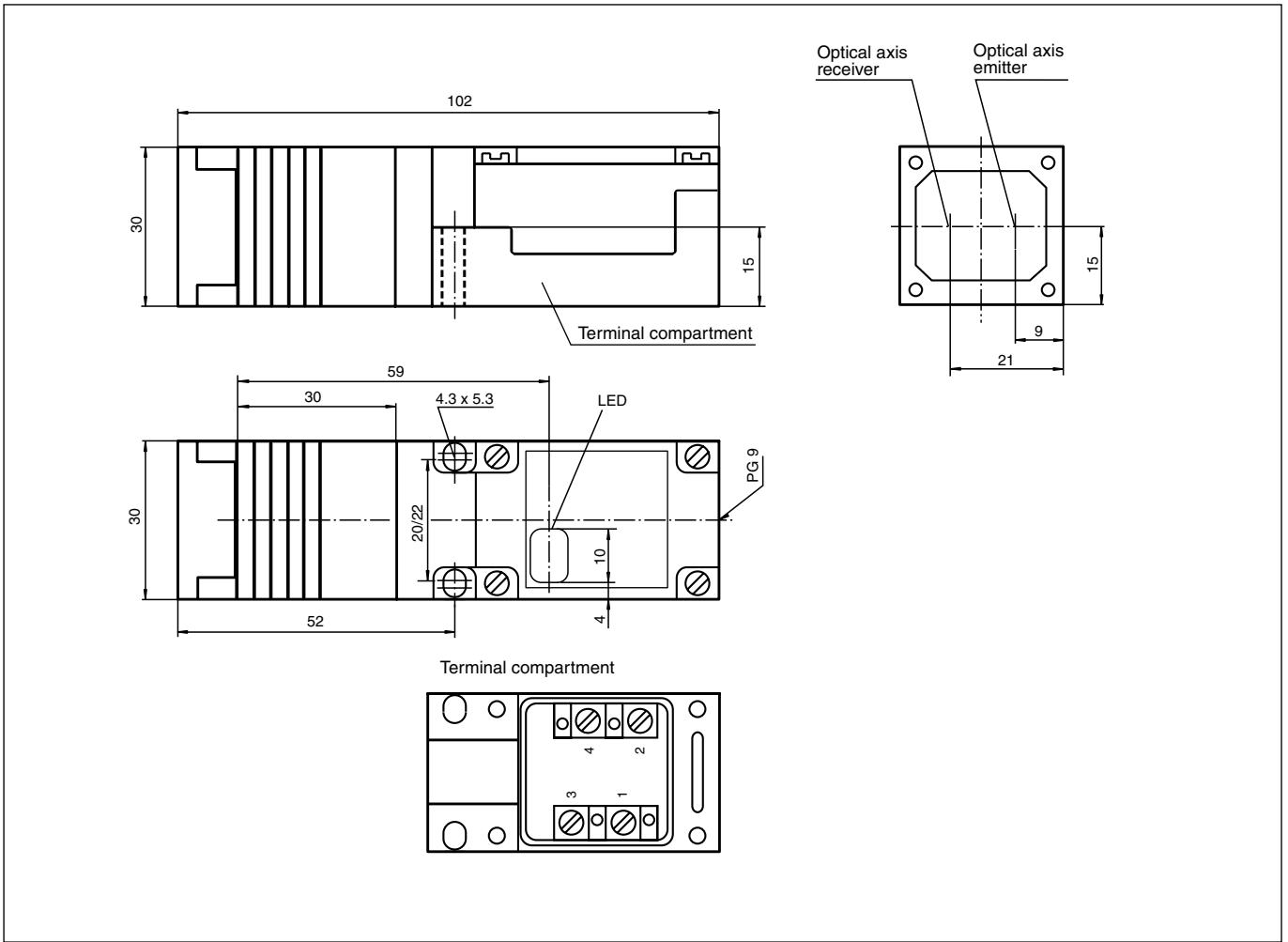


Electrical Connection



○ = Light ON, ● = Dark ON

Dimensions



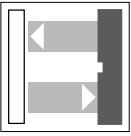
Ex-Devices/
NAMUR

Instructions for the use in hazardous areas

Type-examination certificate	PTB No. Ex-93.C.2118
Maximum values	
Effective internal capacity C_i	negligible
Effective internal inductivity L_i	negligible
Voltage U_i	15.5 V
Current I_i	52 mA
Power P_i	169 mW
Ambient temperature	-25 °C ... +70 °C (248 K ... 343 K)
Marking	EEx ia IIC T6

Note

In the case of an error, the sensor should also be regarded as active.
For the maximum values, please refer to the certificate of conformity.



OCT300-M1K-N2

Reflection light scanner, NAMUR

OCT300-M1K-N2

with terminal compartment



Ex-Devices/
NAMUR



- ◆ Recording range up to 0.3 m
- ◆ Intrinsically safe, EEx ia IIC T6
- ◆ Electrical values according to DIN EN 60947-5-6
- ◆ For glass fibre light guide
- ◆ Light/dark ON, programmable
- ◆ Adjustable sensitivity
- ◆ Position of the sensor head adjustable
- ◆ Protection degree IP67
- ◆ Scratch resistant mineral glass lens

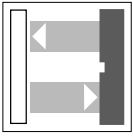
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OCT300-M1K-N2
Sensing range	0 ... 300 mm	◆
Reference target	Standard white 200 mm x 200 mm	◆
Adjustment range	70 ... 300 mm	◆
Operating mode	Light/dark ON, programmable	◆
Light type	IR-light 880 nm	◆
Filter	Red filter	◆
Ambient light limit	≤ 40000 Lux sun light ≤ 30000 Lux halogen light	◆
Temperature influence	≤ 0.5 mm/K	◆
Standard conformity	DIN EN 60947-5-6/EN 60947-5-2 EN 50020/EN 50014	◆
Approvals	CE	◆
Function display	LED yellow: switching state	◆
Controls	sensitivity adjuster	◆
Operating voltage	6 ... 20 V DC (R _i approx. 0 Ohm), ripple 5 % _{SS}	◆
Nominal voltage	8 V DC (R _i approx. 1 kOhm)	◆
Time delay before availability	20 ms	◆
Signal output	1 NAMUR output N2, NO/NC, cabling programmable	◆
Current consumption		
Reference target detected	connection 1, 2: ≤ 1 mA connection 3, 4: ≥ 2.7 mA	◆
Reference target not detected	connection 1, 2: ≥ 2.7 mA connection 3, 4: ≤ 1 mA	◆
Switching frequency	≤ 100 Hz	◆
Switch-on delay	5 ms	◆
Repeat accuracy	≤ 0.5 % of the sensing range	◆
Range hysteresis	≤ 10 %	◆
Ambient temperature	-25 ... +70 °C	◆
Storage temperature	-40 ... +80 °C	◆
Protection degree	IP67 according to EN 60529	◆
Connection type	Terminal compartment Pg9, ≤ 2.5 mm ²	◆
Housing	PBT	◆
Light exit	Scratch resistant mineral glass lens	◆
Mass	100 g	◆

Ex-Devices/
NAMUR

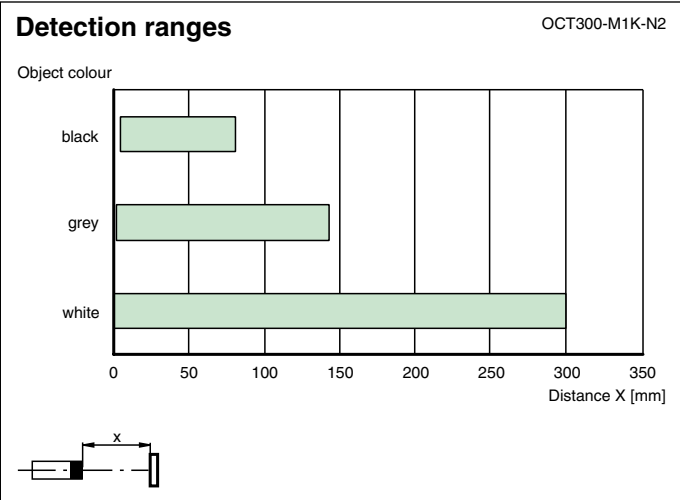
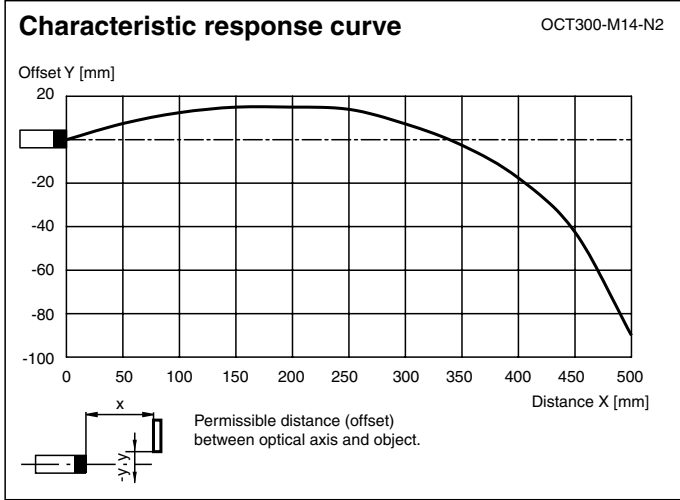
10/15/01

Date of issue

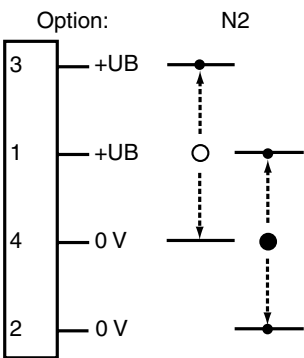


OCT300-M1K-N2

Diagrams

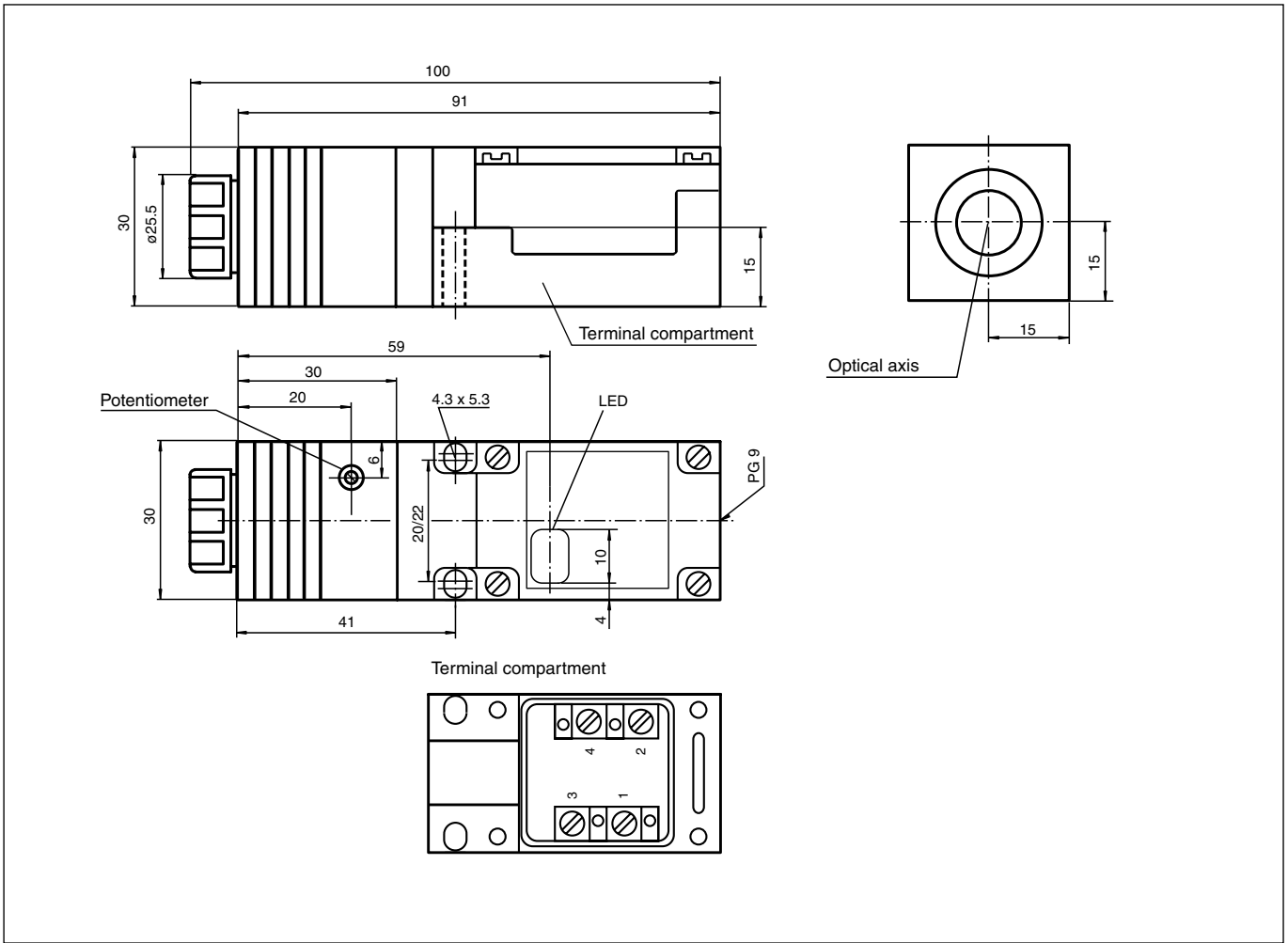


Electrical Connection



○ = Light ON, ● = Dark ON

Dimensions



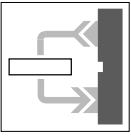
Ex-Devices/
NAMUR

Instructions for the use in hazardous areas

Type-examination certificate	PTB No. Ex-93.C.2118
Maximum values	
Effective internal capacity C_i	negligible
Effective internal inductivity L_i	negligible
Voltage U_i	15.5 V
Current I_i	52 mA
Power P_i	169 mW
Ambient temperature	-25 °C ... +70 °C (248 K ... 343 K)
Marking	EEx ia IIC T6

Note

In the case of an error, the sensor should also be regarded as active.
For the maximum values, please refer to the certificate of conformity.



OJ200-M1K-E23/Ex

Fibre optics sensor

OJ200-M1K-E23/Ex

with terminal compartment

CE

Ex-Devices/
NAMUR



- ◆ Recording range depends on the fibre optics being used
- ◆ With light guide suited for the use in hazardous areas Group II, Ex-Zone 1
- ◆ Pre-fault indication and output (dynamic and static)
- ◆ Light/dark ON, switchable
- ◆ Protected against mutual interferences
- ◆ Position of the sensor head adjustable
- ◆ Protection degree IP67

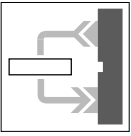
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".

Ordering code		OJ200-M1K-E23/Ex
Sensing range	sensing range is dependent on the fitted light guide	◆
Reference target	Standard white 200 mm x 200 mm	◆
Adjustment range		◆
Operating mode	Light/dark ON, switchable	◆
Light type	IR-light 950 nm	◆
Filter	Red filter	◆
Ambient light limit	≤ 40000 Lux sun light ≤ 30000 Lux halogen light	◆
Temperature influence	≤ 0.5 mm/K	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
Operating display	LED green: power on	◆
Function display	LED yellow: switching state LED red: pre-fault indicator (2 Hz flashing)	◆
Controls	sensitivity adjuster	◆
Controls	Light/dark changeover switch selection of the operating frequency selection of the switching frequency pulse extension stability control dynamic/static	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	5 %	◆
Rated operational voltage	10 ... 30 V DC, ripple 5 % _{SS}	◆
No-load supply current	≤ 40 mA	◆
Time delay before availability	≤ 20 ms	◆
Signal output	1 switch output E2/E3, pnp NO/NC switchable pre-fault output: npn, NO	◆
Voltage drop	≤ 2.5 V	◆
Switching frequency	≤ 1.5 kHz switchable (S1)	◆
Switch-on delay	2.5 ms by 200 kHz 0,3 ms at 1.5 kHz	◆
Repeat accuracy	≤ 0.5 % of the sensing range	◆
Range hysteresis	≤ 10 %	◆
Pulse extension	20 ms switchable (S2)	◆
Ambient temperature	-25 ... +70	◆
Storage temperature	-40 ... +80	◆
Protection degree	IP67 according to EN 60529	◆
Connection type	Terminal compartment Pg9, ≤ 2.5 mm ²	◆
Housing	PBT	◆
Light exit	Scratch resistant mineral glass lens	◆
Mass	100 g	◆

Ex-Devices/
NAMUR

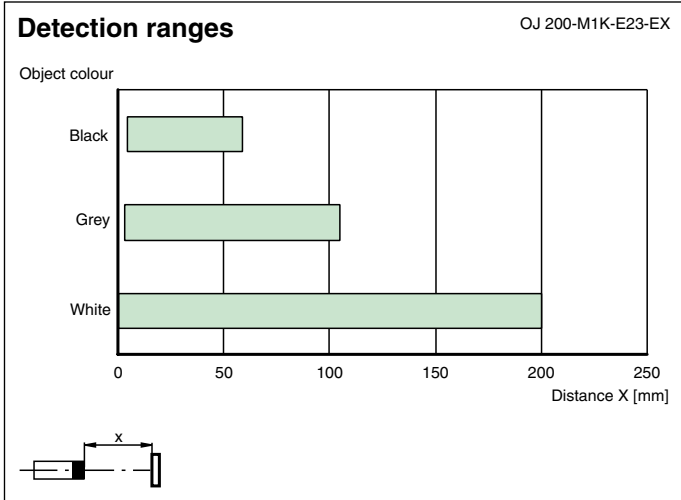
10/15/01

Date of issue



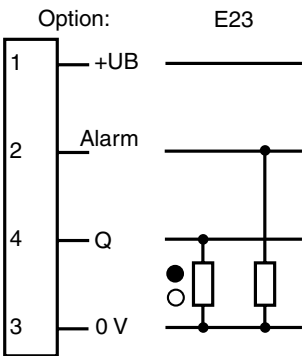
OJ200-M1K-E23/Ex

Diagrams



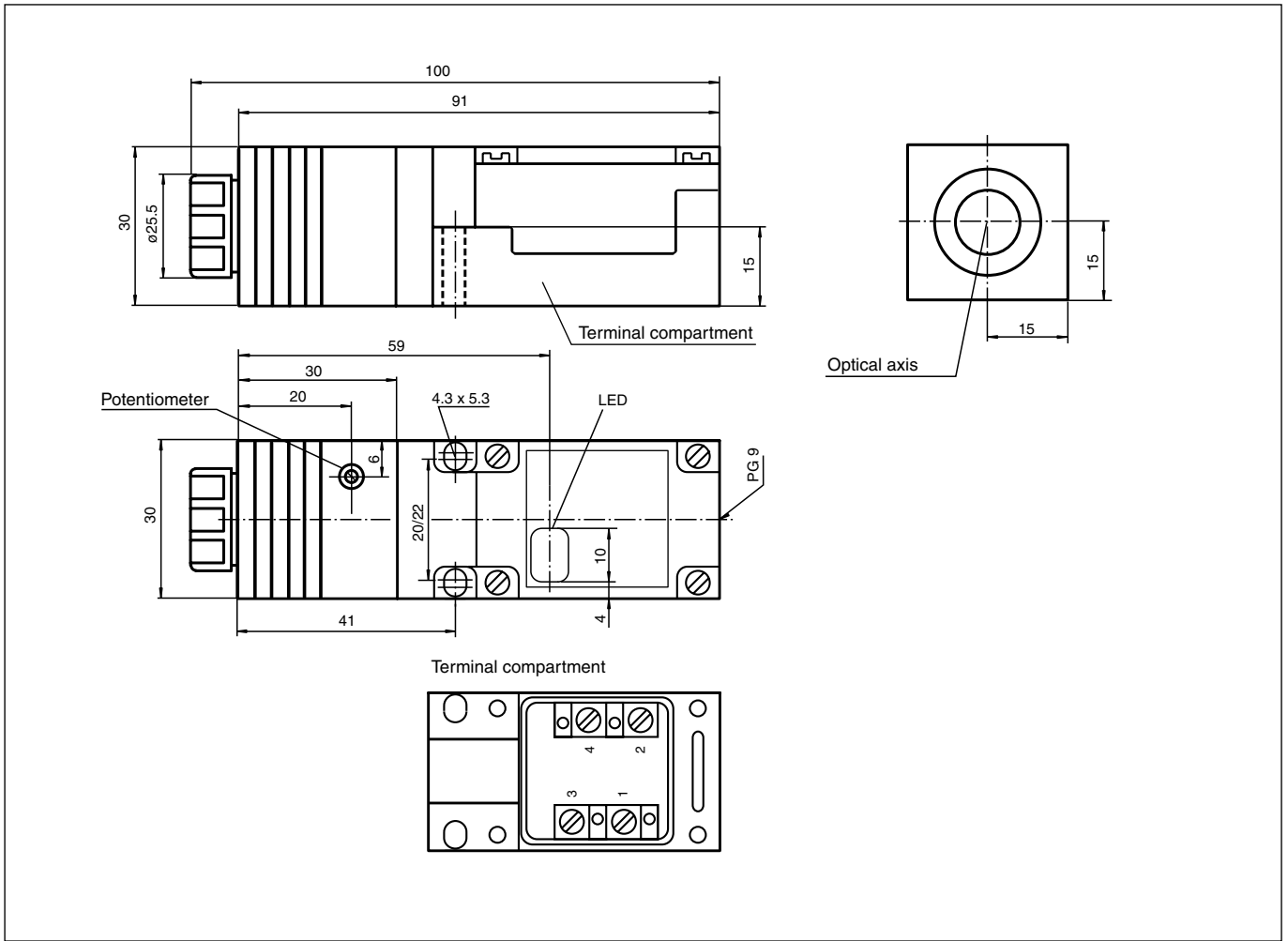
Electrical Connection

Ex-Devices/
NAMUR



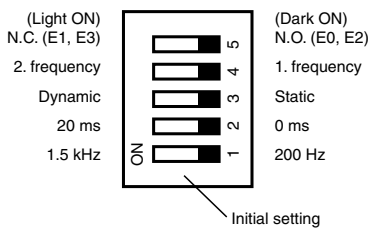
○ = Light ON, ● = Dark ON

Dimensions



Ex-Devices/
NAMUR

Note



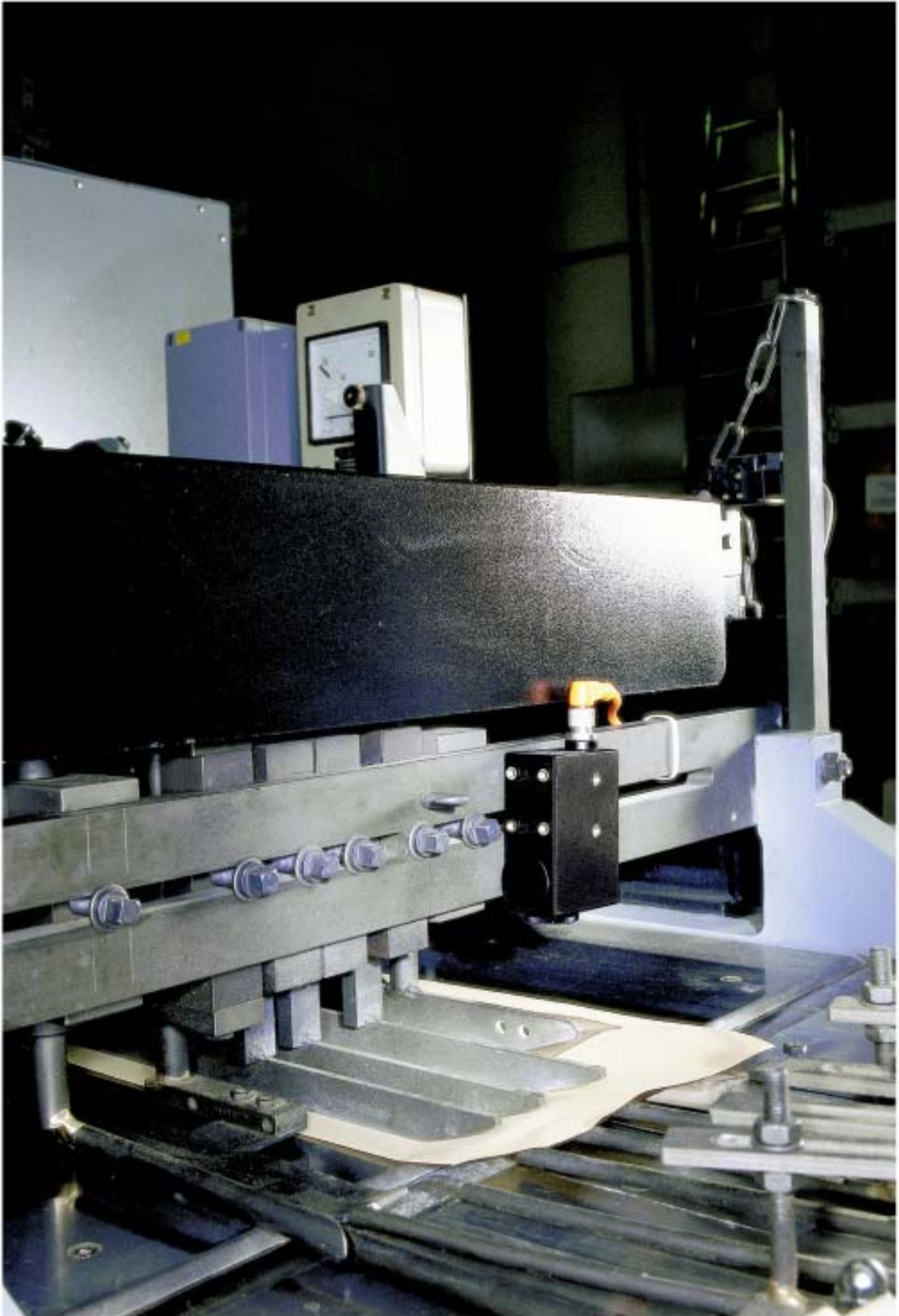
Selector switches in terminal compartment

- S5** Switch output
- S4** Pulse frequency
- S3** Pre-fault indicator
- S2** Pulse extension
- S1** Switch frequency

Pepperl+Fuchs GmbH series TLG and ELG light guides for use in conjunction with type OJ200-M1K-E23/Ex direct detection photoelectric sensor, can be installed in hazardous areas of Group II, Zone 1.

The limit of radiation intensity conforms to E2.3.9 of the "Explosion Protection Guidelines" of the chemical industry.

The direct detection photoelectric sensor itself must be installed **outside** the hazardous area.



Print Mark
Scanners

Date of issue 10/12/2001

**DK series – Print mark readers
for secure detection of control marks**



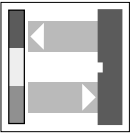
Print mark readers are used mainly in automated packaging systems or print machines. The main requirements on the devices are high resolution of grayscale values, short response times, low sensitivity to fluctuations in height and angle of the material web, and ease of operation. All these requirements have been taken into account in the development of the DK series. All the devices have a sturdy water-proof plastic housing with a replaceable optics (except for DK10-LAS) and a front-side or right angle light outlet.

The device is connected with an M12 metal connector. The short response time of 30 μs is the same for all devices. A push-pull output stage is available as a signal output. In the basic design, the device has only one optical transmission source and the switching threshold must be adjusted manually by means of a potentiometer. In another more user-friendly design, the device contains three optical transmission sources.

A TEACH-IN process can be used to select the optimal colour for the existing contrast and to adjust the switching threshold automatically. Depending on the design of the device, the TEACH-IN is performed either statically or dynamically. Devices of the DKE series that incorporate both a stainless steel case and the TEACH-IN function are best suited for special application cases with exposed and corrosive environmental conditions.

The main areas of application are processing machines in the food, beverage and pharmaceutical industries.

Principle	Type code	Sensing range/detection range	Page
	DK10-9,5	9.5 mm ...	888
	DK20-9,5	9.5 mm ...	892
	DK20-25; DK21-25	25 mm ...	900
	DK21-9.5	9.5 mm ...	896
	DK10-LAS	3 mm ... 300 mm	904
	DK10-LAS-54	0 ... 12 m	908
	RL-UV	0 mm ... 130 mm	918
	RL5-LL-1773	depends on the fibre optics being used	912
	RL5-LL/92	depends on the fibre optics being used	912



DK10-9,5/.../92/110

Print mark contrast scanner

DK10-9,5/.../92/110

with M12, 4-pin metal connector

CE



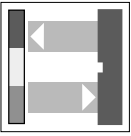
- ◆ Sensor distance 9.5 mm \pm 3 mm
- ◆ Reflection light scanner for recording any print mark
- ◆ Multiturn potentiometer for adjustment of the switching threshold
- ◆ Optical system exchangeable by 90°
- ◆ Green transmission diode
- ◆ 30 μ s response time, suitable for extremely rapid scanning processes
- ◆ Sturdy plastic housing
- ◆ Protection degree IP67

Print Mark
Scanners

For suitable cable sockets, mounting aids and others refer to chapter "Accessories".

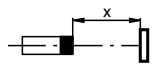
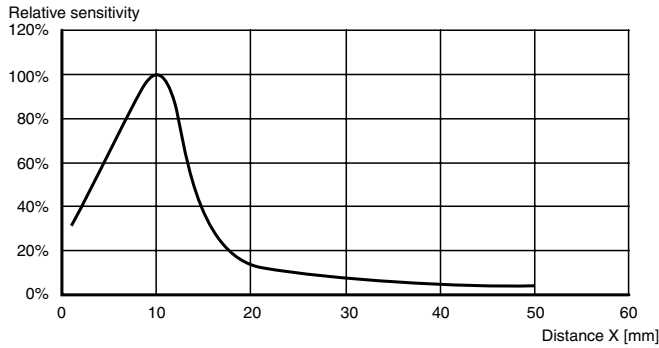
Ordering code		DK10-9,5/92/110	DK10-9,5/A/92/110	DK10-9,5/9S20/92/110	DK10-9,5/79B/92/110	DK10-9,5/A/79B/92/110
Sensor range	9.5 mm +/-3 mm	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆
Light type	green, alternating light	◆	◆	◆	◆	◆
Light spot representation	1 x 4 mm	◆		◆	◆	
	1 x 4 mm, light spot crossways to longitudinal direction		◆			◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆
Function display	LED yellow; switching operation: lights up if print mark is detected	◆	◆	◆	◆	◆
Controls	Sensitivity adjuster, light-/dark switch	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆
No-load supply current	≤ 55 mA	◆	◆	◆	◆	◆
Protection class	2 / UL94 V0	◆	◆	◆	◆	◆
Signal output	Push-pull output	◆	◆	◆	◆	◆
Switching type	light/dark switching	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆
Switching frequency	16.5 kHz	◆	◆	◆	◆	◆
Response time	30 μs	◆	◆	◆	◆	◆
Timer function	Impulsed time element off-delay 20 ms			◆		
Measurement output	Analogue output 0.3 ... 10 mA, (RL ≤ 600 Ohm)				◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆	◆	◆	◆
Housing	PC (Makrolon, glas-fibre-reinforced)	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆
Mass	200 g	◆	◆	◆	◆	◆

Print Mark
Scanners

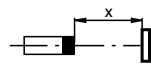
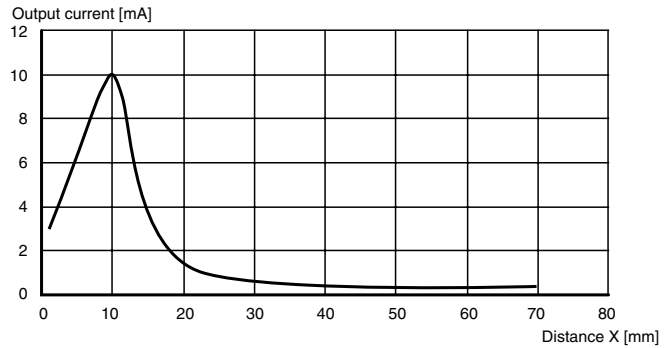


Diagrams

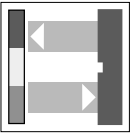
Relative received light strength DK10-9,5



Analogue output DK10-9,5



Print Mark
Scanners



DK.20-9,5/110/124

Print mark contrast scanner

DK.20-9,5/110/124

with M12, 5-pin metal connector

CE

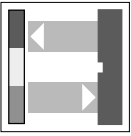


- ◆ Sensor distance 9.5 mm \pm 3 mm
- ◆ Reflection light scanner for recording any print mark
- ◆ TEACH-IN procedure for automatic threshold value setting and selection of emitter colours; static
- ◆ 3 emitter colours: green, red and blue
- ◆ Optical system exchangeable by 90°
- ◆ 30 μ s response time, suitable for extremely rapid scanning processes
- ◆ Sturdy, waterproof plastic housing or stainless steel case

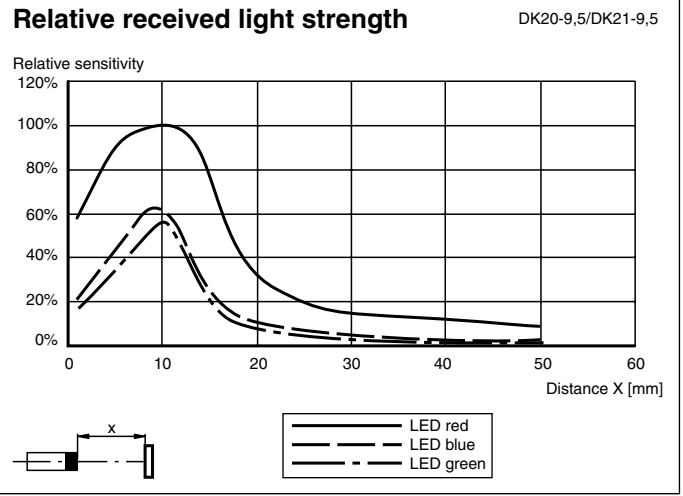
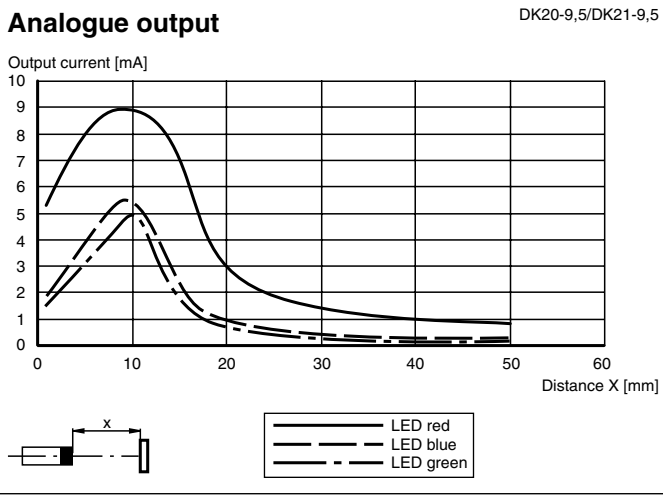
Print Mark
Scanners

For suitable cable sockets, mounting aids and others refer to chapter "Accessories".

Ordering code		DK20-9,5/110/124	DK20-9,5/A/110/124	DK20-9,5/B/110/124	DK20-9,5/79B/110/124	DK20-9,5/A/79B/110/124	DK20-9,5/B/79B/110/124	DK20-9,5/9S20/110/124	DKE20-9,5/110/124
Sensor range	9.5 mm +/-3 mm	◆	◆	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆	◆	◆	◆
Light type	Visible green/red/blue, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Light spot representation	Light spot, point-shaped, diameter 1.5 mm			◆			◆		
	1 x 4 mm	◆			◆			◆	◆
	1 x 4 mm, light spot crossways to longitudinal direction		◆			◆			
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED yellow; switching operation: lights up if print mark is detected	◆	◆	◆	◆	◆	◆	◆	◆
	TEACH-IN operation: flashing slowly	◆	◆	◆	◆	◆	◆	◆	◆
	alarm display: flashing quickly, if no safe operation is possible								
Controls	TEACH-IN key	◆	◆	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆	◆	◆
No-load supply current	≤ 70 mA	◆	◆	◆	◆	◆	◆	◆	◆
Protection class	2 / UL94 V0	◆	◆	◆	◆	◆	◆	◆	◆
Signal output	Push-pull output	◆	◆	◆	◆	◆	◆	◆	◆
Switching type	light/dark on switchable, results from the order of the TEACH-IN	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆	◆	◆
Switching frequency	16.5 kHz	◆	◆	◆	◆	◆	◆	◆	◆
Response time	30 μs	◆	◆	◆	◆	◆	◆	◆	◆
Timer function	Impulsed time element off-delay 20 ms							◆	
Measurement output	Analogue output 0.3 ... 10 mA, (RL ≤ 600 Ohm)				◆	◆	◆		
Function input	TEACH-IN input	◆	◆	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	5-pin, M12 connector	◆	◆	◆	◆	◆	◆	◆	◆
Housing	PC (Makrolon, glas-fibre-reinforced)	◆	◆	◆	◆	◆	◆	◆	◆
	high grade steel								◆
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆	◆
Mass	200 g	◆	◆	◆	◆	◆	◆	◆	◆
	530 g								◆



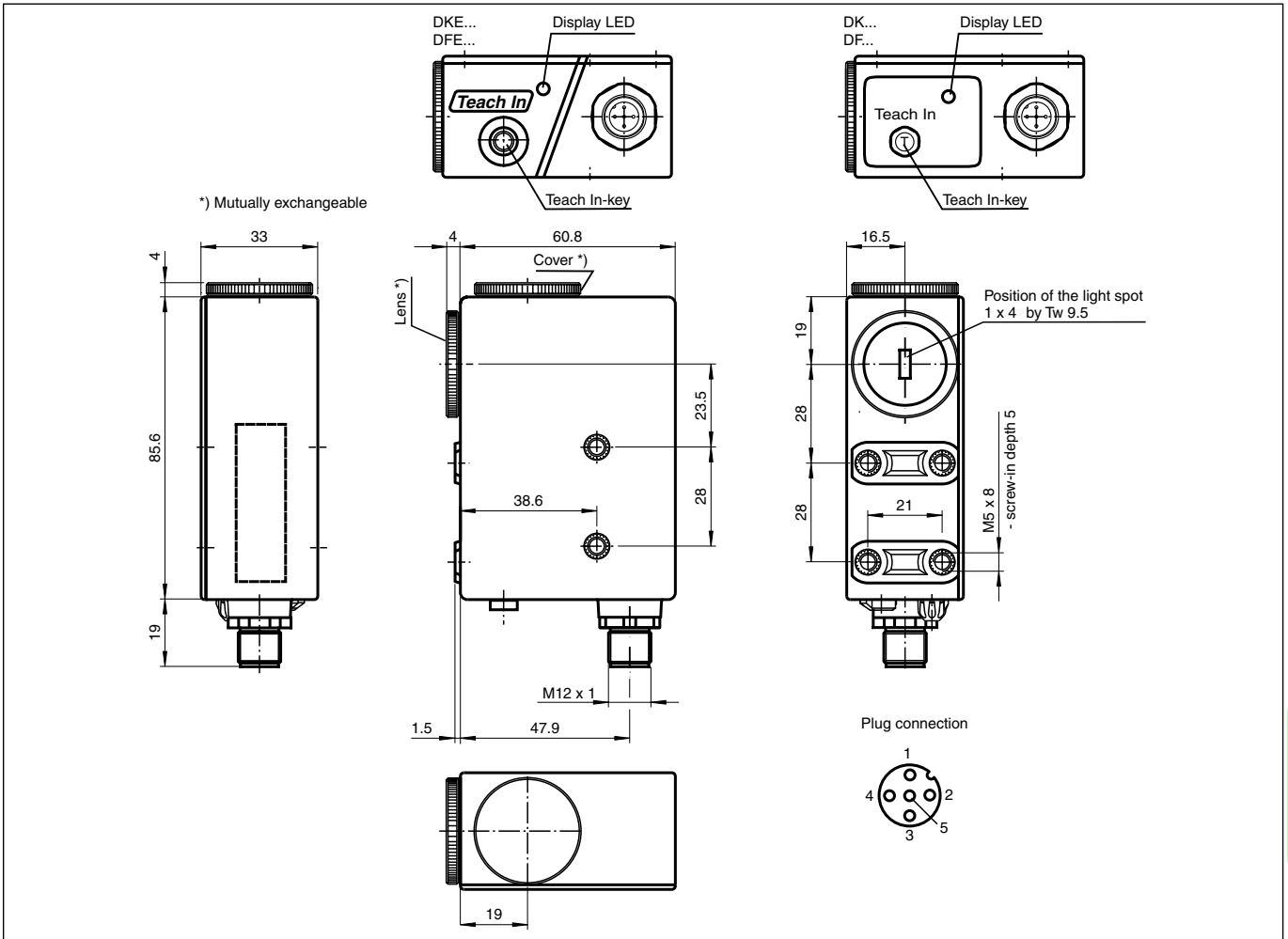
Diagrams



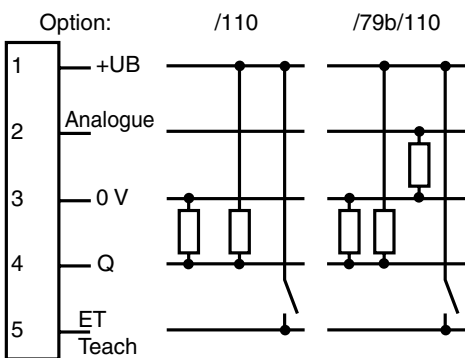
Print Mark Scanners

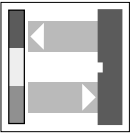
Date of issue 10/12/01

Dimensions



Electrical Connection





DK.21-9,5/110/124

Print mark contrast scanner

DK.21-9,5/110/124

with M12, 5-pin metal connector

CE



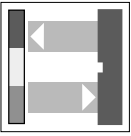
- ◆ Sensor distance 9.5 mm \pm 3 mm
- ◆ Reflection light scanner for recording any print mark
- ◆ TEACH-IN procedure for automatic threshold value setting and selection of emitter colours; dynamic
- ◆ 3 emitter colours: green, red and blue
- ◆ Optical system exchangeable by 90°
- ◆ 30 μ s response time, suitable for extremely rapid scanning processes
- ◆ Sturdy, waterproof plastic housing or stainless steel case

Print Mark
Scanners

For suitable cable sockets, mounting aids and others refer to chapter "Accessories".

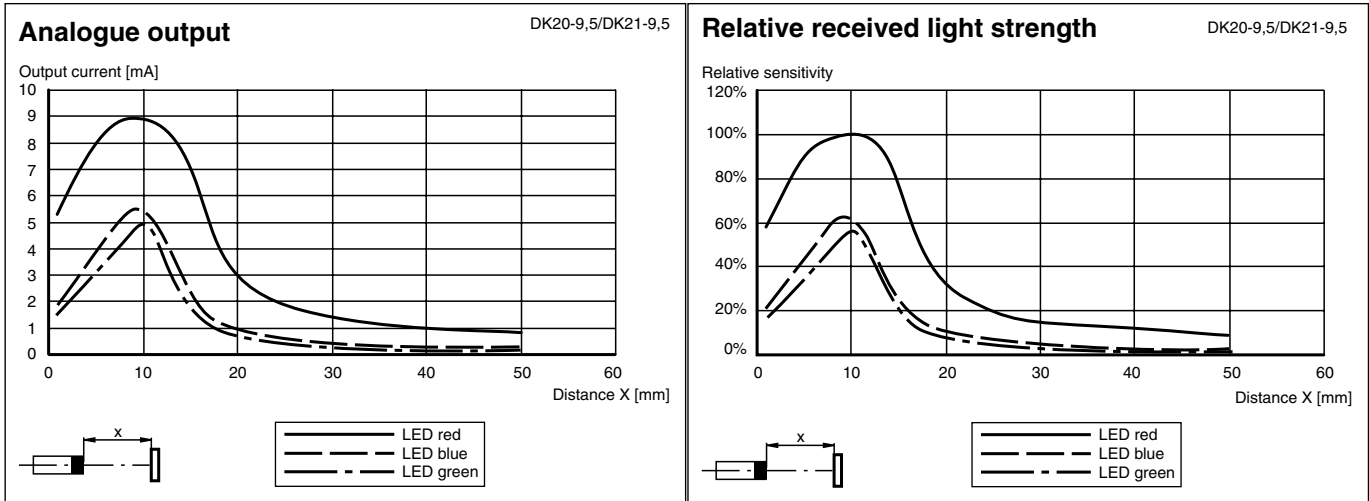
Ordering code		DK21-9,5/110/124	DK21-9,5/A/110/124	DK21-9,5/B/110/124	DK21-9,5/S20/110/124	DKE21-9,5/110/124
Sensor range	9.5 mm +/-3 mm	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆
Light type	Visible green/red/blue, alternating light	◆	◆	◆	◆	◆
Light spot representation	Light spot, point-shaped, diameter 1.5 mm			◆		
	1 x 4 mm	◆			◆	◆
	1 x 4 mm, light spot crossways to longitudinal direction		◆			
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆
Function display	LED yellow; switching operation: lights up if print mark is detected alarm display: flashing quickly, if no safe operation is possible	◆	◆	◆	◆	◆
Controls	TEACH-IN key	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆
No-load supply current	≤ 60 mA	◆	◆	◆	◆	◆
Protection class	2 / UL94 V0	◆	◆	◆	◆	◆
Signal output	Push-pull output	◆	◆	◆	◆	◆
Switching type	light/dark on switchable, results from the order of the TEACH-IN	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆
Switching frequency	16.5 kHz	◆	◆	◆	◆	◆
Response time	30 μs	◆	◆	◆	◆	◆
Timer function	Impulsed time element off-delay 20 ms				◆	
Function input	TEACH-IN input	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆
Connection type	5-pin, M12 connector	◆	◆	◆	◆	◆
Housing	PC (Makrolon, glas-fibre-reinforced)	◆	◆	◆	◆	
	high grade steel					◆
Light exit	Glass	◆	◆	◆	◆	◆
Mass	200 g	◆	◆	◆	◆	
	530 g					◆

Print Mark
Scanners



DK.21-9,5/110/124

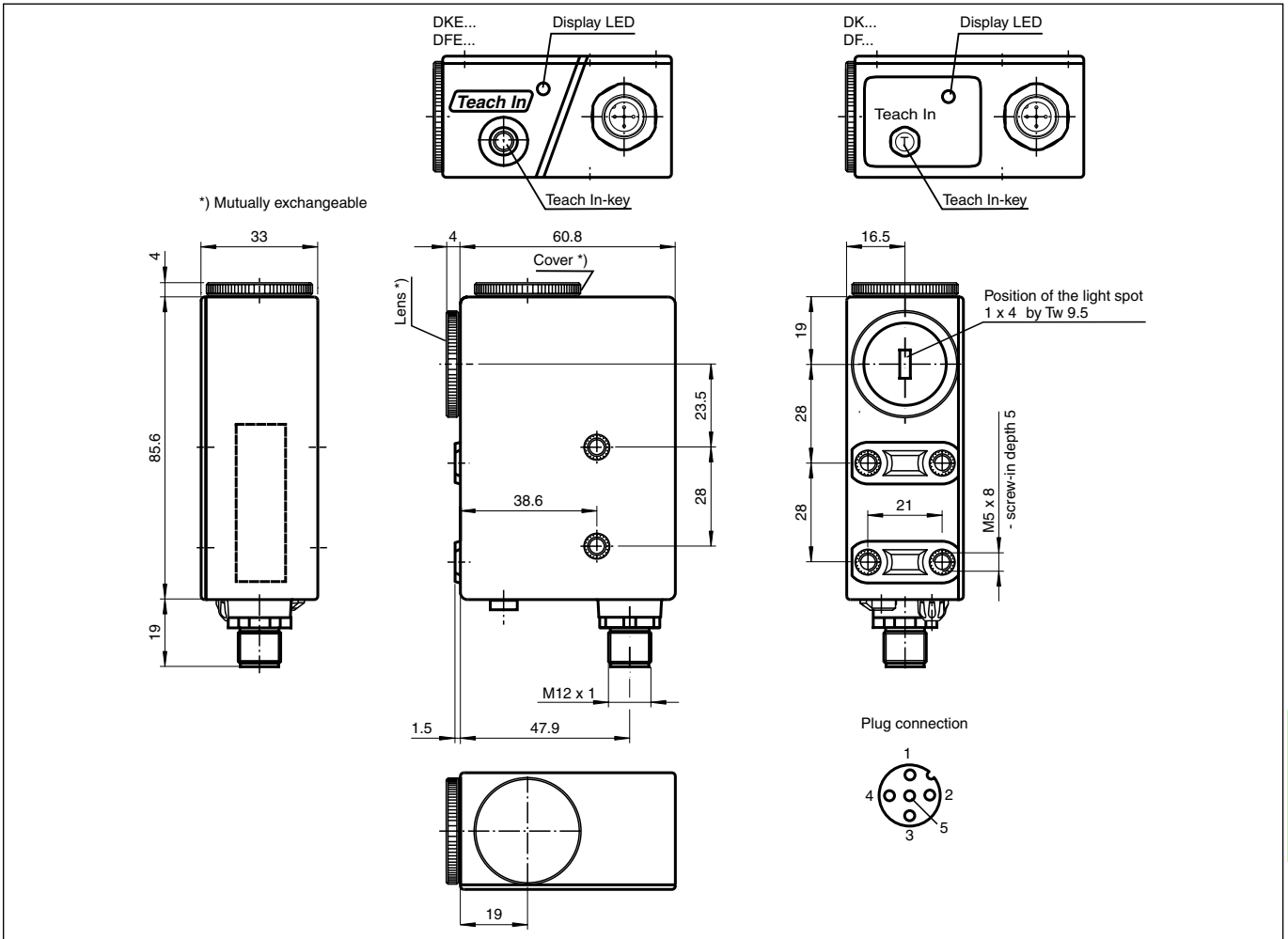
Diagrams



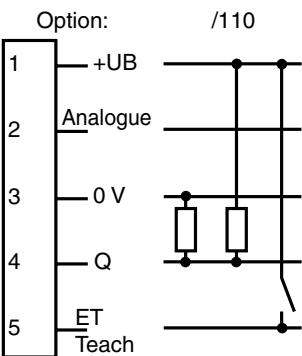
Print Mark Scanners

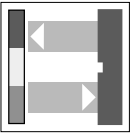
Date of issue 10/12/01

Dimensions



Electrical Connection





DK2.-25/110/124

Print mark contrast scanner

DK2.-25/110/124

with M12, 5-pin metal connector

CE



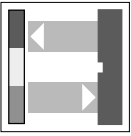
- ◆ Operating distance 25 mm \pm 6 mm
- ◆ Reflection light scanner for recording any print mark
- ◆ TEACH-IN procedure for automatic threshold value setting and selection of emitter colours; static or dynamic
- ◆ 3 emitter colours: green, red and blue
- ◆ Optical system exchangeable by 90°
- ◆ 30 μ s response time, suitable for extremely rapid scanning processes
- ◆ Sturdy, waterproof plastic housing

Print Mark
Scanners

For suitable cable sockets, mounting aids and others refer to chapter "Accessories".

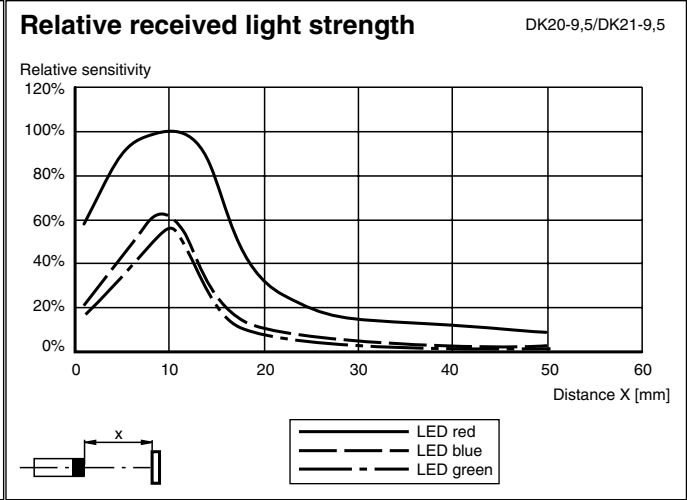
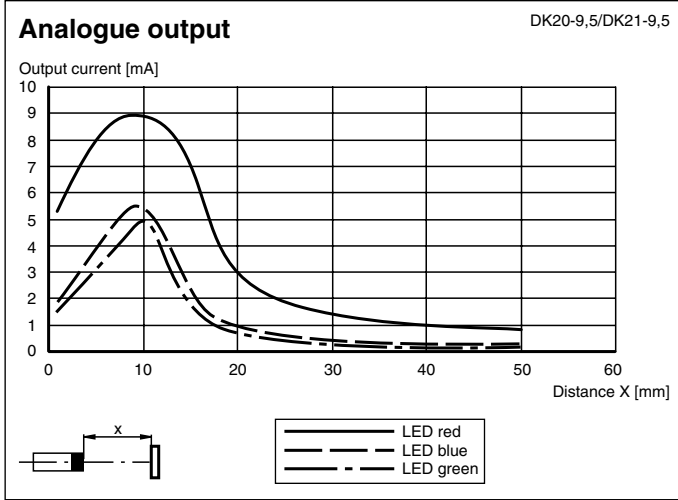
Ordering code		DK20-25/110/124	DK20-25/A/110/124	DK20-25/B/110/124	DK21-25/110/124	DK21-25/A/110/124	DK21-25/B/110/124
Sensor range	25 mm +/- 6 mm	◆	◆	◆	◆	◆	◆
Light source	LED	◆	◆	◆	◆	◆	◆
Light type	Visible green/red/blue, alternating light	◆	◆	◆	◆	◆	◆
Light spot representation	Light spot, point-shaped, diameter 3 mm			◆			◆
	2 x 8.5 mm	◆			◆		
	2 x 8.5 mm, light spot crossways to longitudinal direction		◆			◆	
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Function display	LED yellow; switching operation: lights up if print mark is detected	◆	◆	◆			
	TEACH-IN operation: flashing slowly						
	alarm display: flashing quickly, if no safe operation is possible						
	LED yellow; switching operation: lights up if print mark is detected				◆	◆	◆
	alarm display: flashing quickly, if no safe operation is possible						
Controls	TEACH-IN key	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆
No-load supply current	≤ 60 mA				◆	◆	◆
	≤ 70 mA	◆	◆	◆			
Protection class	2 / UL94 V0	◆	◆	◆	◆	◆	◆
Signal output	Push-pull output	◆	◆	◆	◆	◆	◆
Switching type	light/dark on switchable, results from the order of the TEACH-IN	◆	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆	◆
Switching frequency	16.5 kHz	◆	◆	◆	◆	◆	◆
Response time	30 μs	◆	◆	◆	◆	◆	◆
Function input	TEACH-IN input	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆	◆
Connection type	5-pin, M12 connector	◆	◆	◆	◆	◆	◆
Housing	PC (Makrolon, glas-fibre-reinforced)	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆
Mass	200 g	◆	◆	◆	◆	◆	◆

Print Mark Scanners



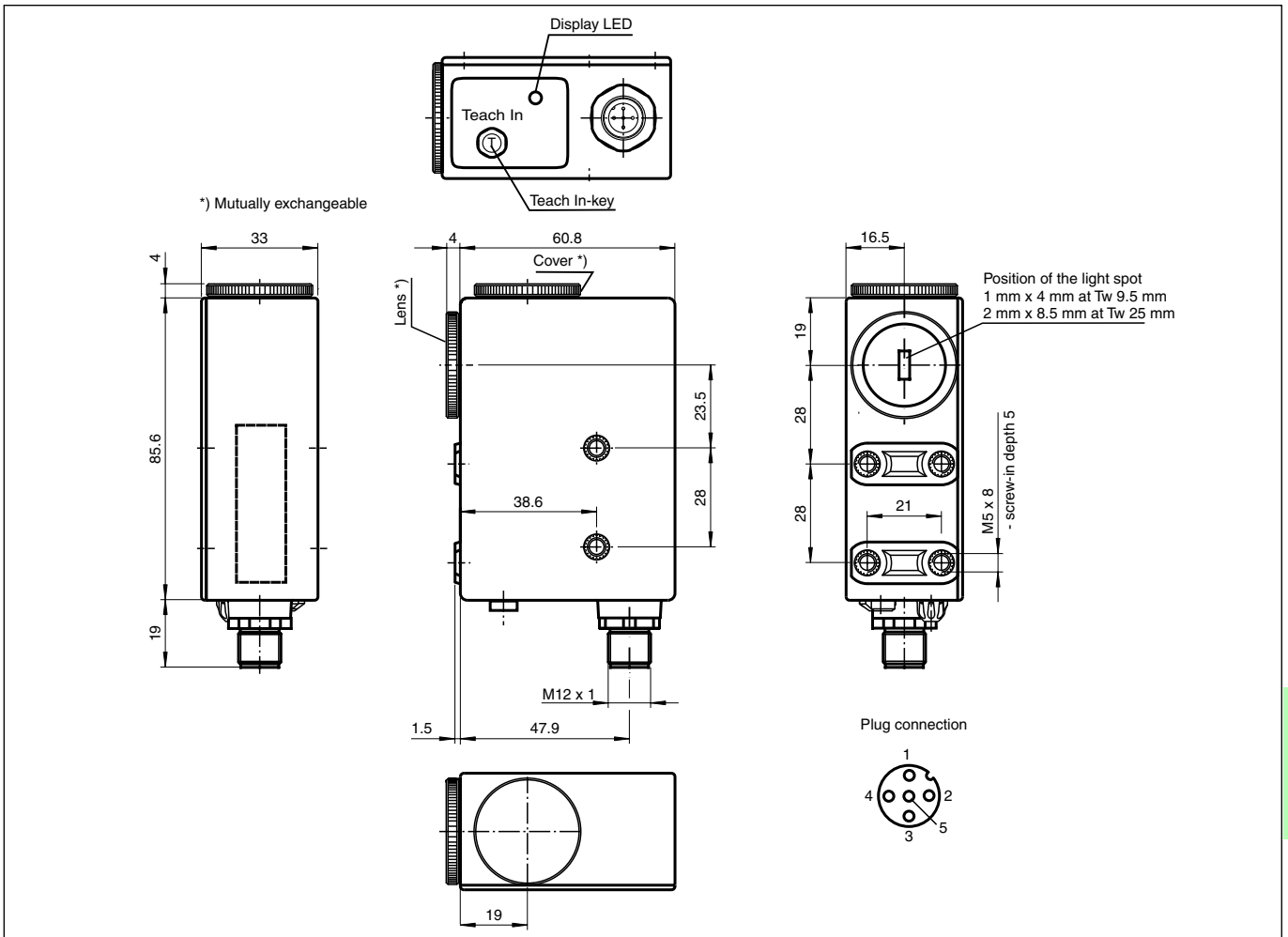
DK2.-25/110/124

Diagrams

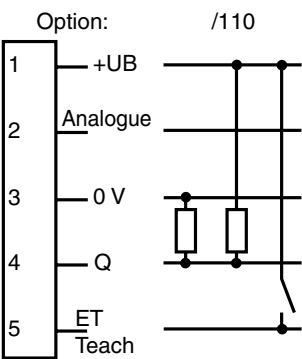


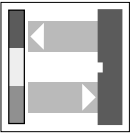
Print Mark
Scanners

Dimensions



Electrical Connection





DK10-LAS/76a/.../110/124

Laser print mark contrast sensor

DK10-LAS/76a/.../110/124

with M12, 5-pin metal connector

CE



- ◆ Sensing range up to 300 mm
- ◆ Laser print mark contrast sensor for recording very small print marks
- ◆ Large focus depth range from 3 mm ... 300 mm
- ◆ Multiturn potentiometer for adjustment of the switching threshold
- ◆ Laser class 2, eyesafe
- ◆ 30 µs response time, suitable for extremely rapid scanning processes
- ◆ Sturdy, waterproof plastic housing

Print Mark
Scanners

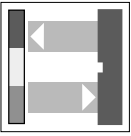
For suitable cable sockets, mounting aids and others refer to chapter "Accessories".

Ordering code		DK10-LAS/76a/110/124	DK10-LAS/76a/79b/110/124
Detection range	3 ... 300 mm	◆	◆
Light source	Laser diode	◆	◆
Laser class	2	◆	◆
Light type	Red, alternating light	◆	◆
Diameter of the light spot	approx. 0.8 mm at a distance of 300 mm	◆	◆
Angle of divergence	approx. 1 mrad	◆	◆
Ambient light limit	40000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: lights up if receiver is lit (light on), lights up if receiver is not lit (dark on)	◆	◆
Controls	Light/dark switch, sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 55 mA	◆	◆
Protection class	2 / UL94 V0	◆	◆
Signal output	Push-pull output, short-circuit proof	◆	◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	16.5 kHz	◆	◆
Response time	30 μs	◆	◆
Measurement output	Analogue output 0.3 ... 10 mA, (RL ≤ 600 Ohm)	◆	◆
Test input	emitter deactivation with +Ub	◆	◆
Ambient temperature	-10 ... +50 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	5-pin, M12 connector	◆	◆
Housing	PC (Makrolon, glas-fibre-reinforced)	◆	◆
Light exit	Glass	◆	◆
Mass	200 g	◆	◆

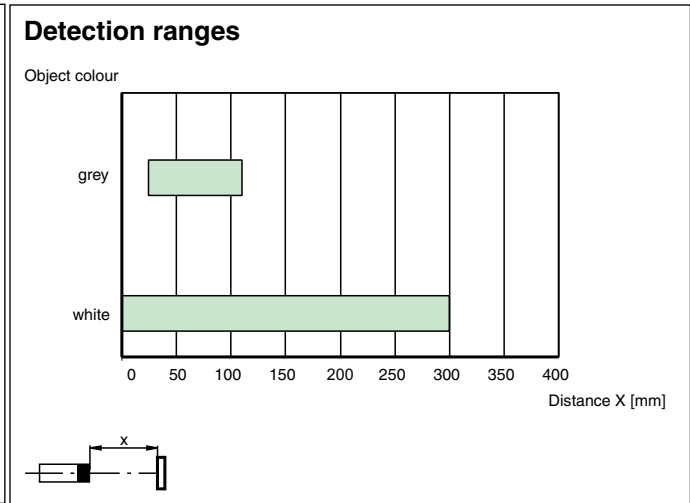
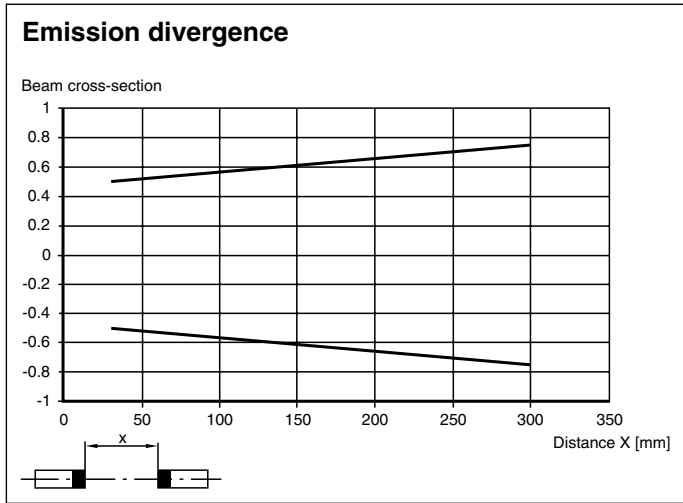
Print Mark
Scanners

10/12/01

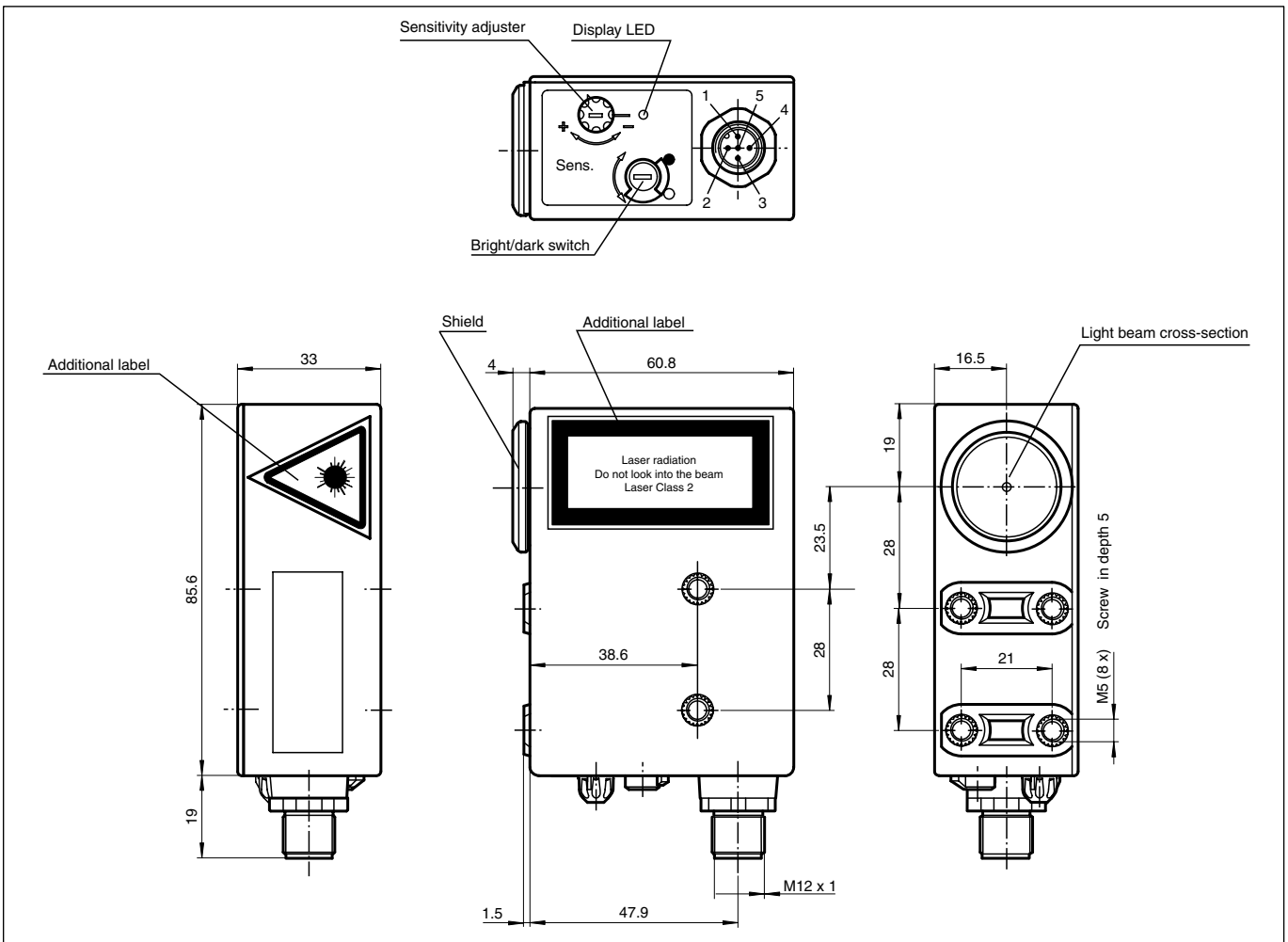
Date of issue



Diagrams

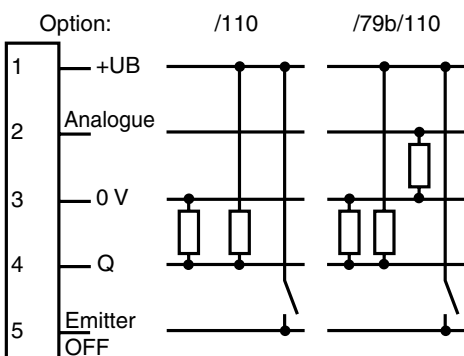


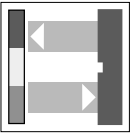
Dimensions



Print Mark
Scanners

Electrical Connection





DK10-LAS-54/76/.../110/124

Laser print mark contrast sensor

DK10-LAS-54/76/.../110/124

with M12, 5-pin metal connector

CE



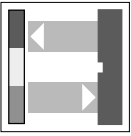
- ◆ Detection range up to 12 m
- ◆ Laser print mark contrast sensor for recording very small print marks
- ◆ Multiturn potentiometer for adjustment of the switching threshold
- ◆ Laser class 2, eyesafe
- ◆ 30 μ s response time, suitable for extremely rapid scanning processes
- ◆ Sturdy, waterproof plastic housing

Print Mark
Scanners

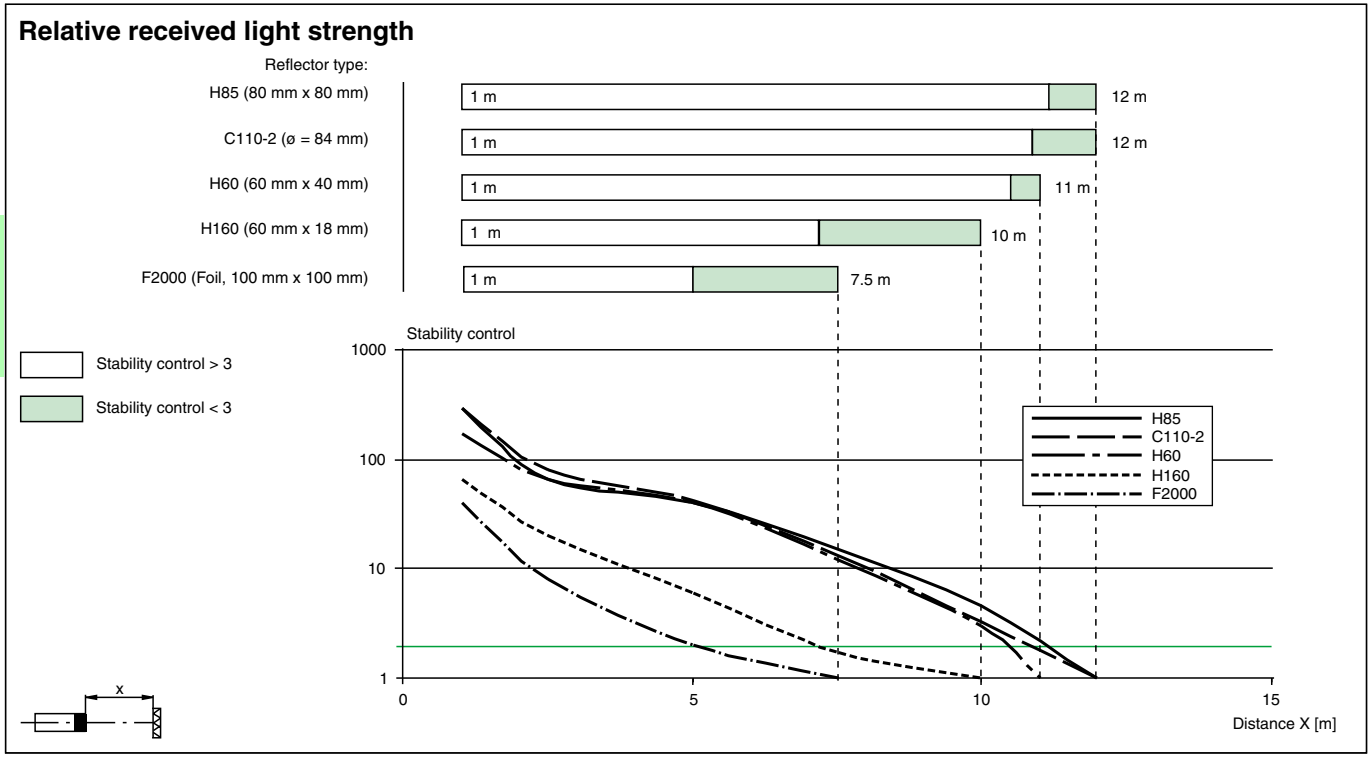
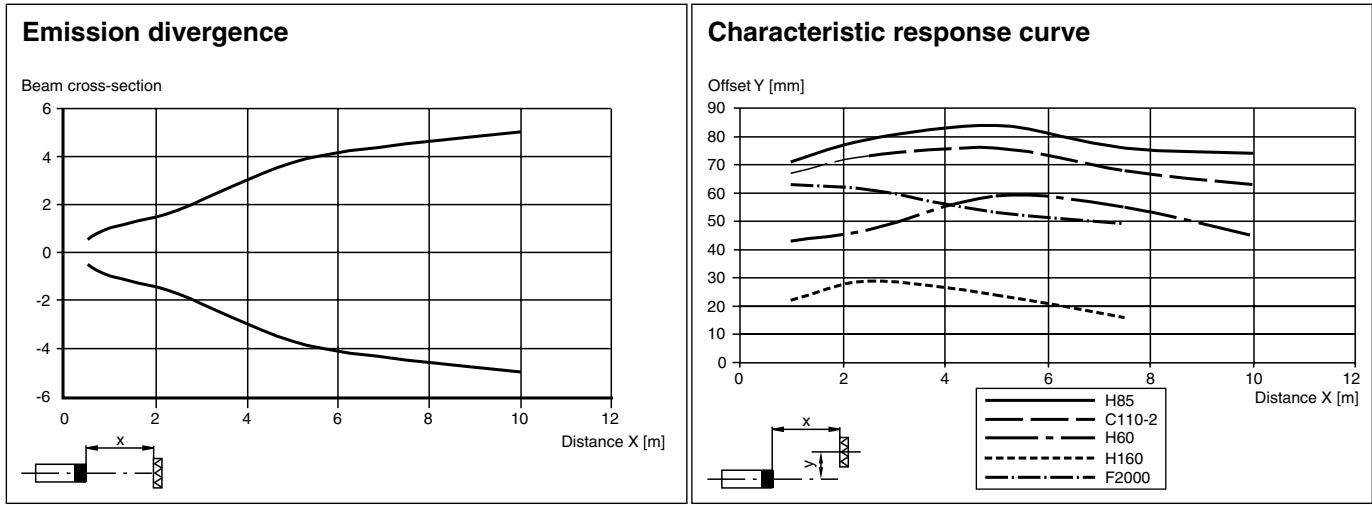
For suitable cable sockets, mounting aids and others refer to chapter "Accessories".

Date of issue 10/12/01

Ordering code		DK10-LAS-54/76/110/124	DK10-LAS-54/76/79b/110/124
Threshold detection range	12 m with reflector C110-2	◆	◆
Effective detection range	0 ... 10 m	◆	◆
Reflector distance	0 ... 10 m	◆	◆
Light source	Laser diode	◆	◆
Laser class	2	◆	◆
Light type	Red, alternating light	◆	◆
Diameter of the light spot	approx. 10 mm at a distance of 10 m	◆	◆
Angle of divergence	approx. 1 mrad	◆	◆
Ambient light limit	40000 Lux	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED yellow: lights up if receiver is lit (light on), lights up if receiver is not lit (dark on)	◆	◆
Controls	Light/dark switch, sensitivity adjuster	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	≤ 55 mA	◆	◆
Protection class	2 / UL94 V0	◆	◆
Signal output	Push-pull output, short-circuit proof	◆	◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 200 mA	◆	◆
Switching frequency	16.5 kHz	◆	◆
Response time	30 μs	◆	◆
Measurement output	Analogue output 0.3 ... 10 mA, (RL ≤ 600 Ohm)		◆
Test input	emitter deactivation with +Ub	◆	◆
Ambient temperature	-10 ... +50 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	5-pin, M12 connector	◆	◆
Housing	PC (Makrolon, glas-fibre-reinforced)	◆	◆
Light exit	Glass	◆	◆
Mass	200 g	◆	◆



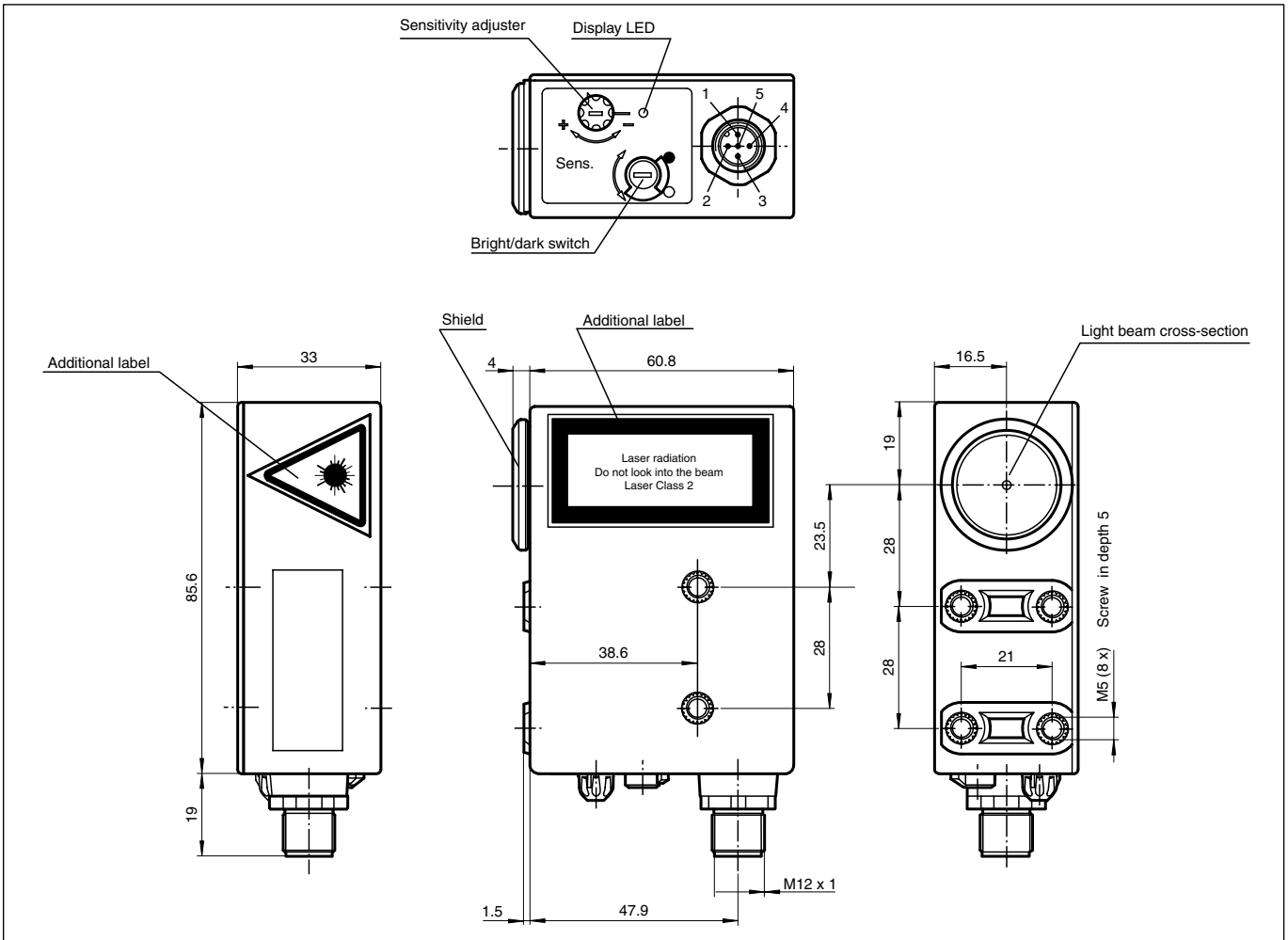
Diagrams



Print Mark Scanners

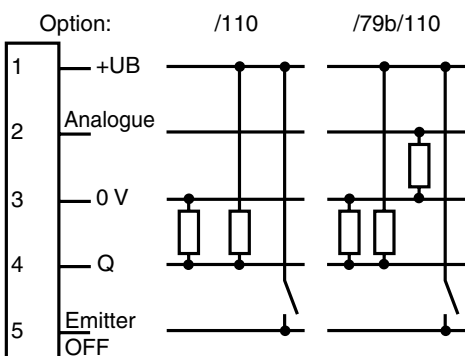
Date of issue 10/12/01

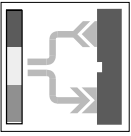
Dimensions



Print Mark Scanners

Electrical Connection





RL5-LL/...

Print mark contrast scanner for fibre optic connection

RL5-LL/...

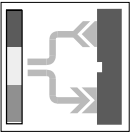
with M12, 4-pin metal connector

CE



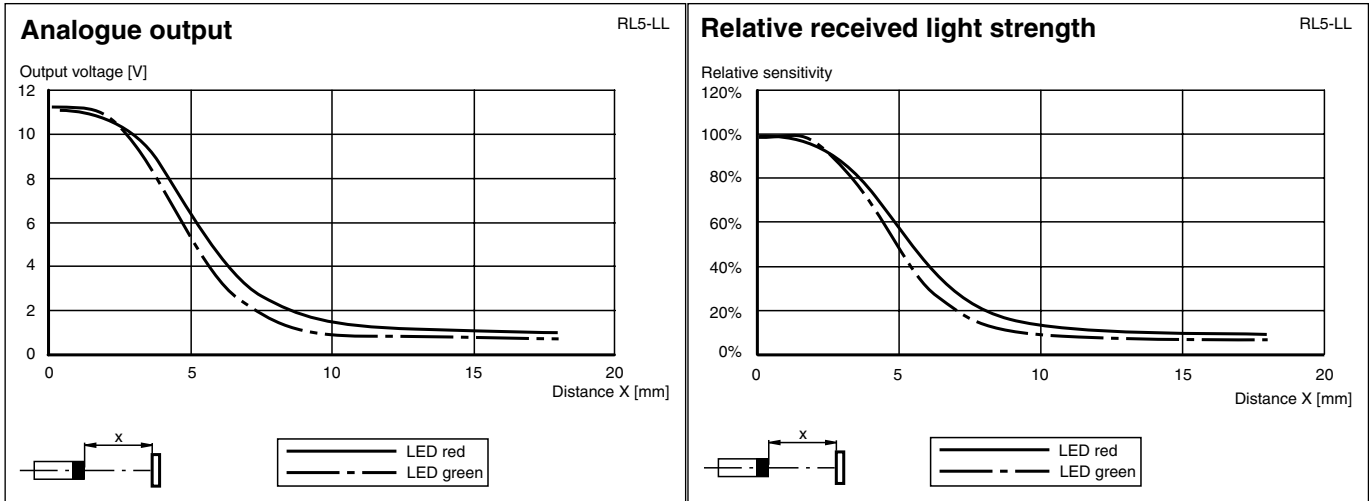
- ◆ Sensing range depends on the fibre optics being used
- ◆ Reflection light scanner for recording any print mark
- ◆ Multiturn potentiometer for adjustment of the switching threshold
- ◆ 2 emitter colours, green und red, adjustable by switch
- ◆ Switch output with 10 kOhm pull-down resistance
- ◆ Analogue output 1 V ... 8 V
- ◆ Fibre optic connection adapter, form 30
- ◆ Sturdy, waterproof aluminium pressure moulded housing

Ordering code		RL5-LL-1773	RL5-LL/3792
Detection range	see selection table for fibre optics	◆	◆
Light source	LED	◆	◆
Light type	Visible green/red switchable, alternating light	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Function display	LED green, lights up with receiver lit	◆	◆
Controls	light/dark switch, sensitivity adjuster, colour changeover switch	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	85 mA	◆	◆
Signal output	1 pnp, short-circuit proof, with 10 kOhm pull-down-resistance	◆	
	1 pnp, short-circuit proof		◆
Switching type	Light/dark ON, switchable	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 300 mA	◆	◆
Switching frequency	5 kHz	◆	◆
Response time	100 µs	◆	◆
Measurement output	Analogue output, 1 V ... 8 V DC/≤10 mA	◆	
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP67	◆	◆
Connection type	4-pin, M12 connector	◆	◆
Housing	Aluminium pressure moulding	◆	◆
Mass	330 g	◆	◆



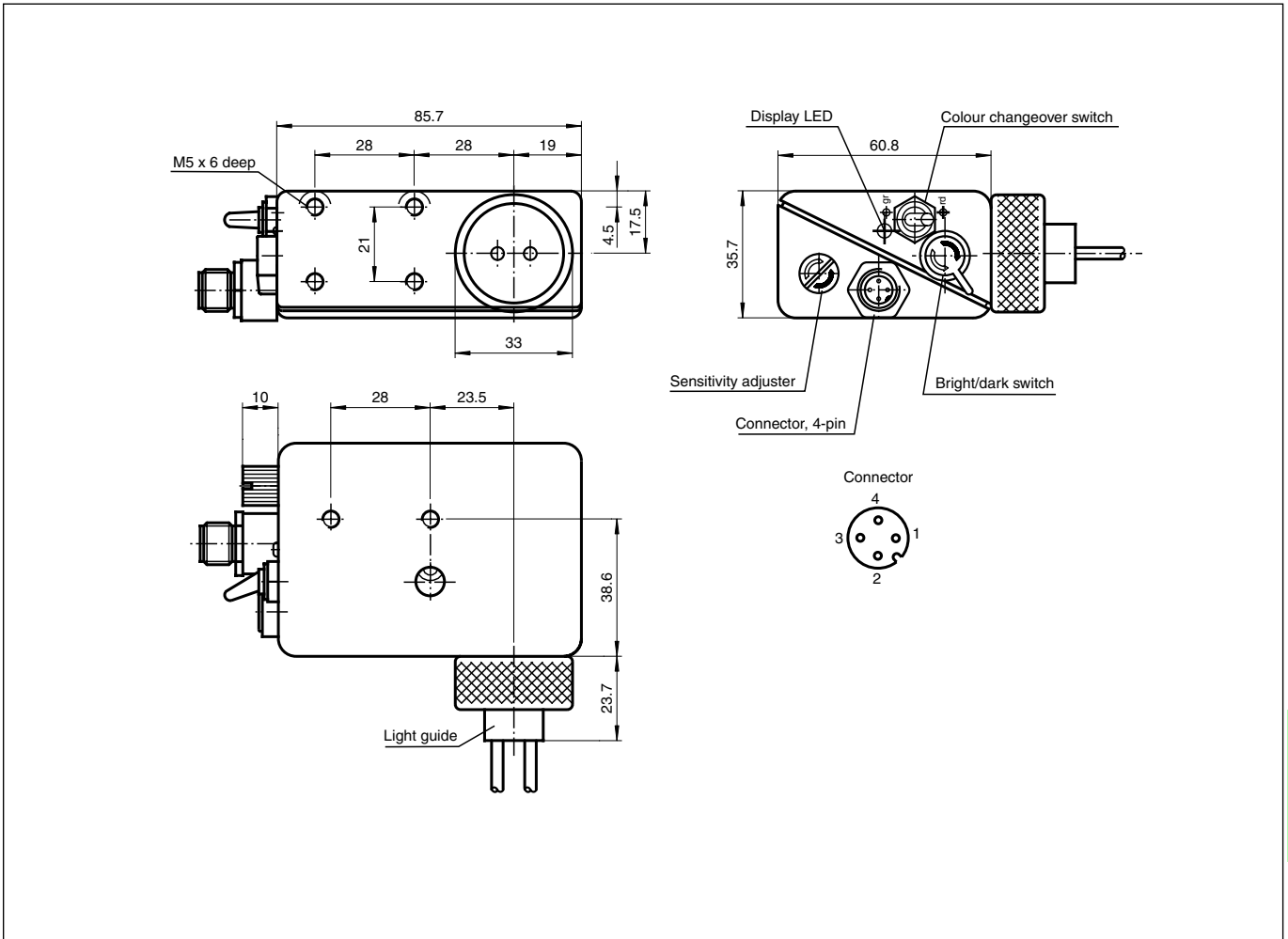
RL5-LL/...

Diagrams



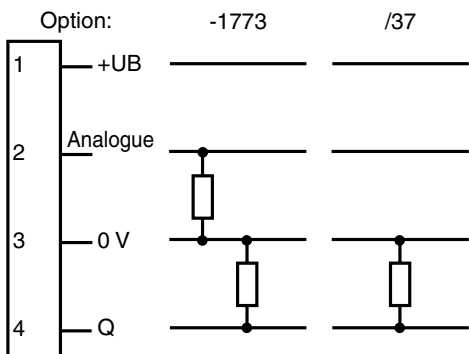
Print Mark Scanners

Dimensions



Print Mark Scanners

Electrical Connection



Selection table for fibre

	Operating temperature in °C	Model number	Detection range in mm	Figure
Glass fibre optics reflex with PVC coating	85	LCR30-7/1-1.0-Z1	1.5	1
		LCR30-7/1-1.5-Z1	1.5	1
		LCR30-7/1-0.5-Z1	1.5	1
		LCR30-7/1-3.0-Z1	1.5	2
		LCR30-7/1-0.5-G	1.5	3
		LCR30-7/1-1.5-G	1.5	3

Adapter

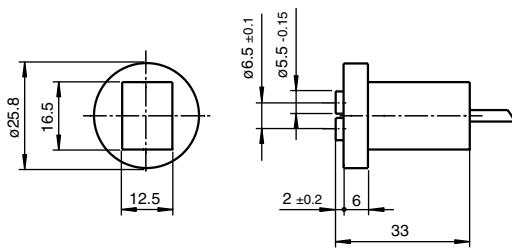


Fig. 1

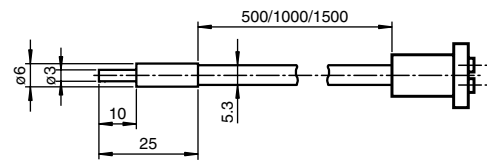


Fig. 2

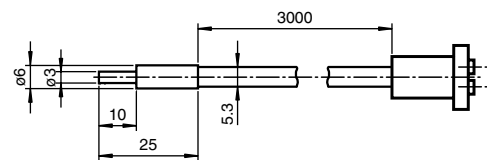
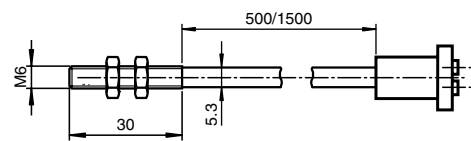
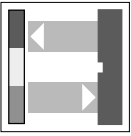


Fig. 3



Printing Mark Readers



RL-UV./...

Print mark contrast scanner

RL-UV./...

with M12, 4-pin metal connector or fixed cable

CE

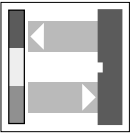


- ◆ Detection range 0 mm ... 130 mm
- ◆ Reflection light scanner for recording fluorescent marks or materials
- ◆ Multiturn potentiometer for adjustment of the switching threshold
- ◆ UV, emitter light
- ◆ Switch output and analogue output
- ◆ Emitter deactivation
- ◆ Sturdy, waterproof metal housing

Print Mark
Scanners

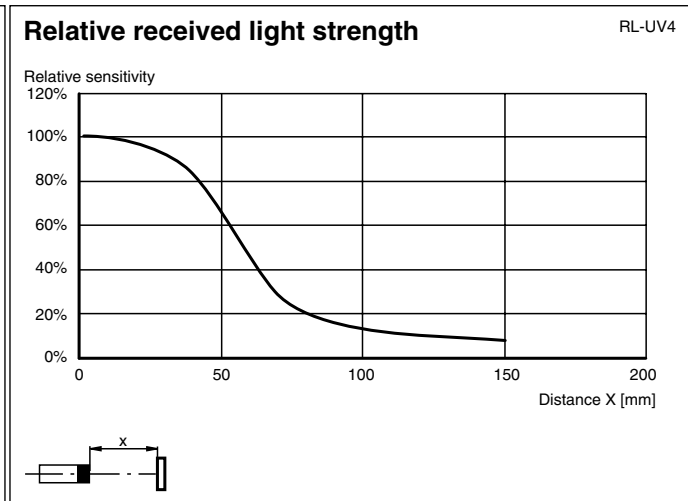
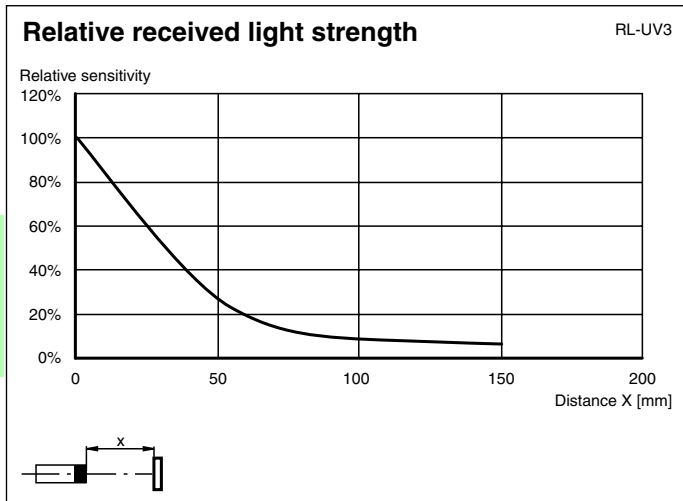
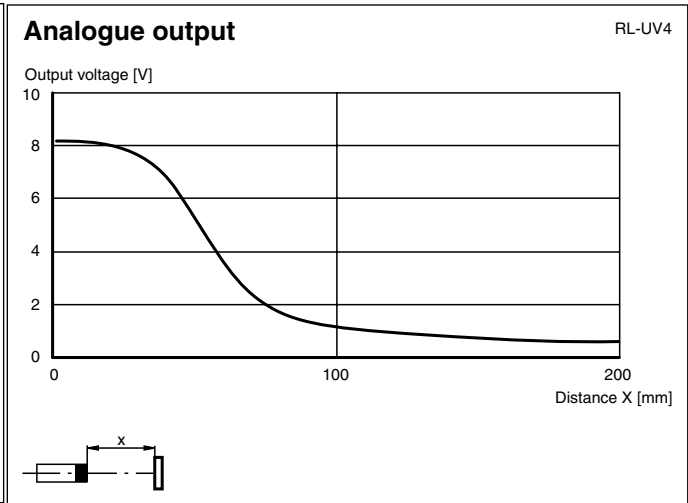
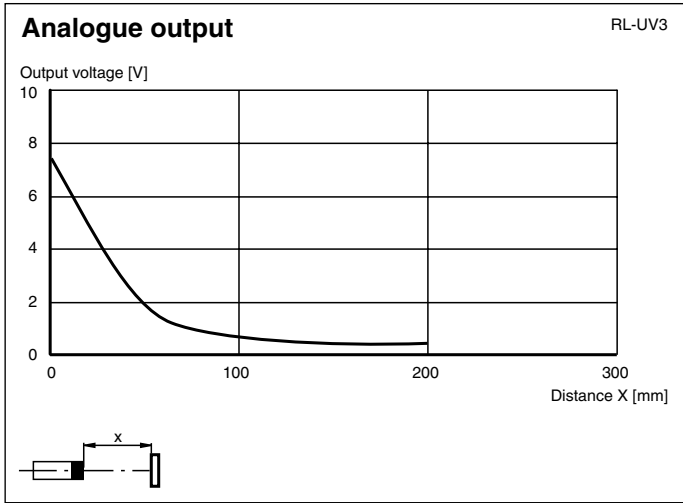
For suitable cable sockets, mounting aids and others refer to chapter "Accessories".

Ordering code		RL-UV3/32/92	RL-UV3/H/9s/32/92	RL-UV3/45/115	RL-UV4/32/92
Detection range	28 mm +/- 3 mm				◆
	0 ... 130 mm	◆		◆	
	0 ... 80 mm		◆		
Light source	Fluorescent lamp	◆	◆	◆	◆
Light type	UV, alternating light	◆	◆	◆	◆
Light spot representation	17 mm at 20 mm sensor range	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Function display	LED green, lights up with receiver lit	◆	◆	◆	◆
Controls	Sensitivity adjuster, light/dark switch	◆	◆	◆	◆
Operating voltage	22 ... 26 V DC	◆	◆	◆	◆
Ripple	5 %	◆	◆	◆	◆
No-load supply current	200 mA	◆	◆	◆	◆
Signal output	1 npn			◆	
	1 pnp, short-circuit proof	◆	◆		◆
Switching type	light/dark switching	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆
Switching current	200 mA	◆	◆	◆	◆
Switching frequency	90 Hz	◆	◆	◆	◆
Response time	0.7 ms				◆
	4 ms	◆	◆	◆	
Timer function	Impulsed off-delay IAB, 70 ms		◆		
Measurement output	Analogue output 0.5 ... 8 V DC	◆	◆		◆
Test input	emitter deactivation: modulation is switched off, lamp continues to light up			◆	
Ambient temperature	-20 ... +50 °C	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆
Connection type	4-pin, M12 connector	◆	◆		◆
	2 m fixed cable			◆	
Housing	Aluminium pressure moulding	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆
Mass	290 g	◆	◆	◆	◆



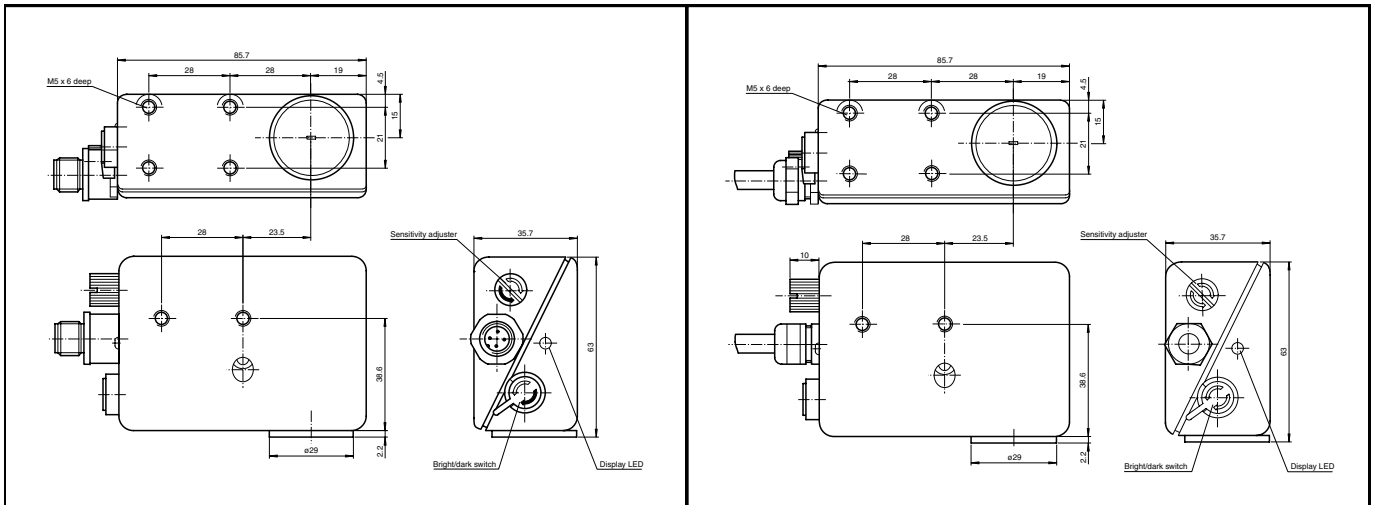
RL-UV/...

Diagrams

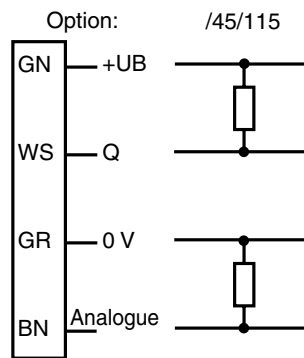
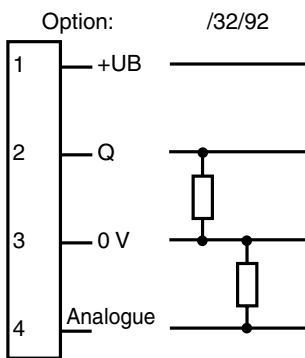


Print Mark
Scanners

Dimensions



Electrical Connection



Print Mark
Scanners



Colour sensors



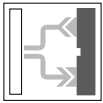
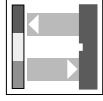
Confidently detecting and distinguishing between colours has become increasingly important in all areas of industry. The applications are very diverse. Whether a colour marker has to be queried at a fixed distance, or parts verified at varying distances, we can offer you a customer specific solution for each of these cases.

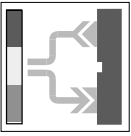
Thanks to extended optical fibre line lengths, you can detect colours without any problems and achieve great detection ranges even in unfavourable ambient conditions.

If multiple colours are involved, it is possible to save up to 10 colours, thus creating the functionality of ten single-channel devices.

The low response times of our devices enable reliable online colour identification even with fast processes.

Of course all devices are very easy to operate, since all colours to be evaluated can be saved in the sensor by means of TEACH-IN. Tolerances can be accurately taken into account by additional programming after initial TEACH-IN. Saved colour values remain stored in the sensor even after the power supply has been turned off.

Principle	Type code	Sensor width	Page
	VCS110	Up to max. 100 mm	924
	DF(E)20	9.5 mm/25 mm	930



VCS110-..

Colour sensor

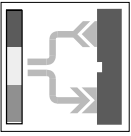
VCS110-..

with two 7-pin, M12 x 1 connectors



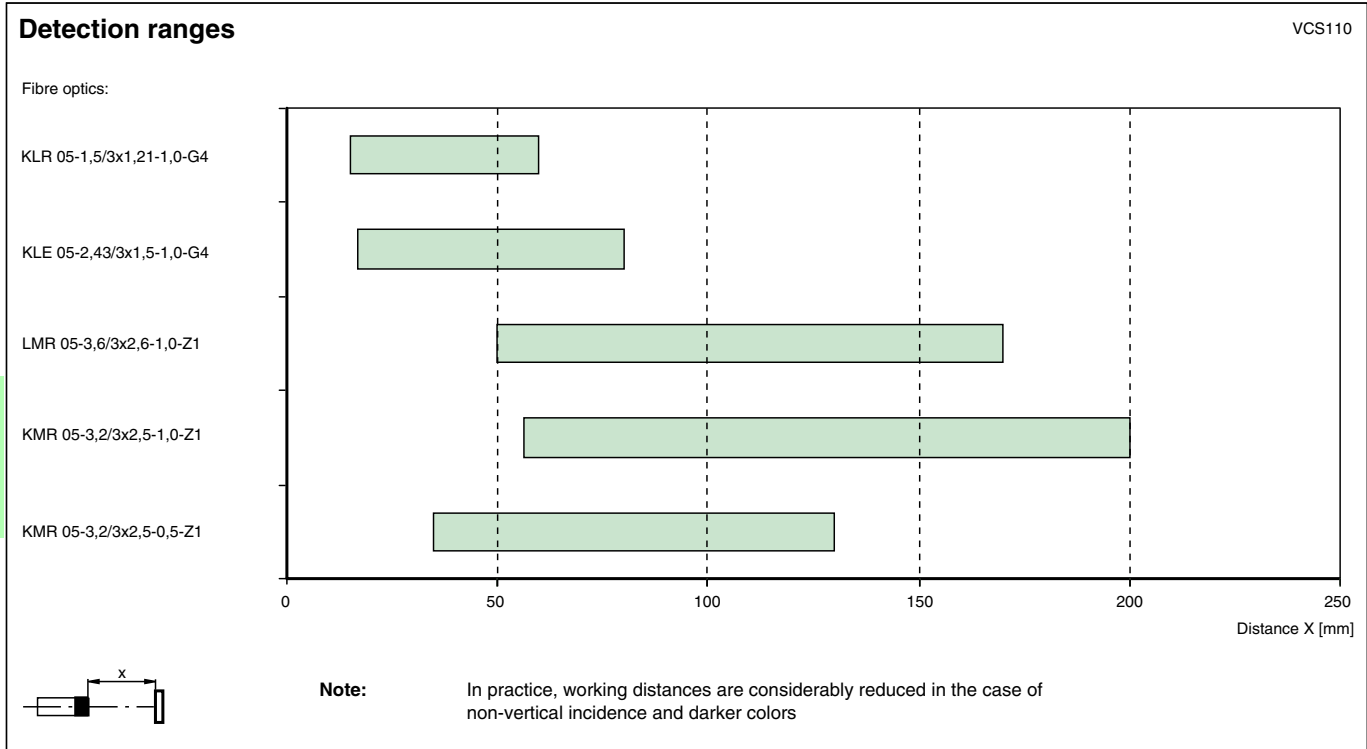
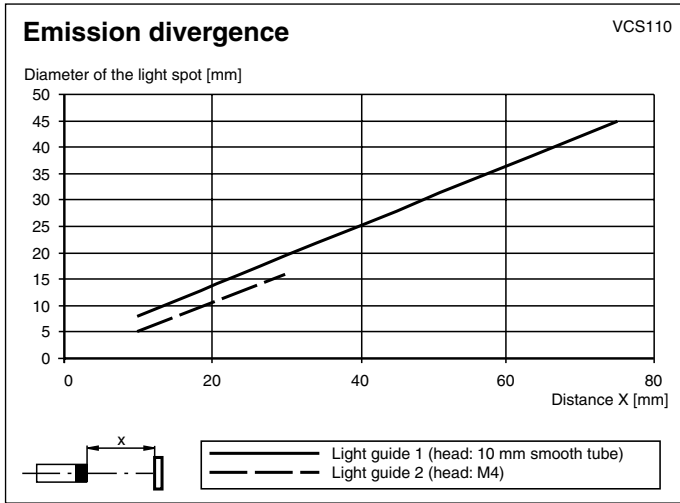
- ◆ Sensing range up to 100 mm
- ◆ Colour saving by TEACH-IN key
- ◆ Programmable up to 10 channels
- ◆ Colour tolerances memorisable
- ◆ Light source white-light LED
- ◆ Signal outputs direct or binary coded

Ordering code		VCS110-5	VCS110-10
Sensor range	max. 100 mm	◆	◆
Light source	LED	◆	◆
Light type	White light, alternating light	◆	◆
Light spot representation	approx. 5 ... 60 mm (depends on sensor range and fibre optics)	◆	◆
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE, UL	◆	◆
Operating display	LED for power on	◆	◆
Function display	one yellow LED each per colour channel lights up if colour detected, three LEDs as adjustment accessories	◆	◆
Controls	Membrane keys	◆	◆
Operating voltage	18 ... 30 V DC	◆	◆
Ripple	10 %	◆	◆
No-load supply current	max. 500 mA	◆	◆
Signal output	5 pnp, short-circuit proof, each with two assigned value memory slots The last activated channel is exported.	◆	
	4 pnp, short-circuit proof, binary coded, assigned to the value memory slots		◆
Switching type	according to +U _B switching, if colour detected	◆	◆
Switching voltage	max. 30 V DC	◆	◆
Switching current	max. 400 mA	◆	◆
Switching frequency	40 Hz	◆	◆
Response time	1.2 ms	◆	◆
De-energised delay	20 ms	◆	◆
Output of the pre-fault indication	pnp, active in Teach-in mode or if all value memory slots are empty	◆	◆
Function input	Trigger, keyboard disable	◆	◆
Ambient temperature	-10 ... +50 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP65	◆	◆
Connection type	2 connectors M12 x 1, 7-pin	◆	◆
Housing	Aluminium	◆	◆
Light exit	Fibre optics	◆	◆
Mass	300 g	◆	◆



VCS110-..

Diagrams



Accessories

Connection cable (7-pin, 2m):

Plastic light guide, silicone covering, M4 head, length 1 m:

Transmission or triangulation light guide, 2 separate fibres for emitter and receiver with silicone covering and M4 head:

Glass light guide, head 10 mm smooth tube, high-grade steel covering, length 1 m:

Plastic light guide, head 10 mm smooth tube, high-grade steel covering, length 1 m:

Plastic light guide, head 10 mm smooth tube, high-grade steel covering, length 5000 mm: KMR 05-3,2/3x2,5-0,5-Z1

Ordering code

V17-G-VCS110-VIS

KLR 05-1,5/3x1,21-1,0-G4

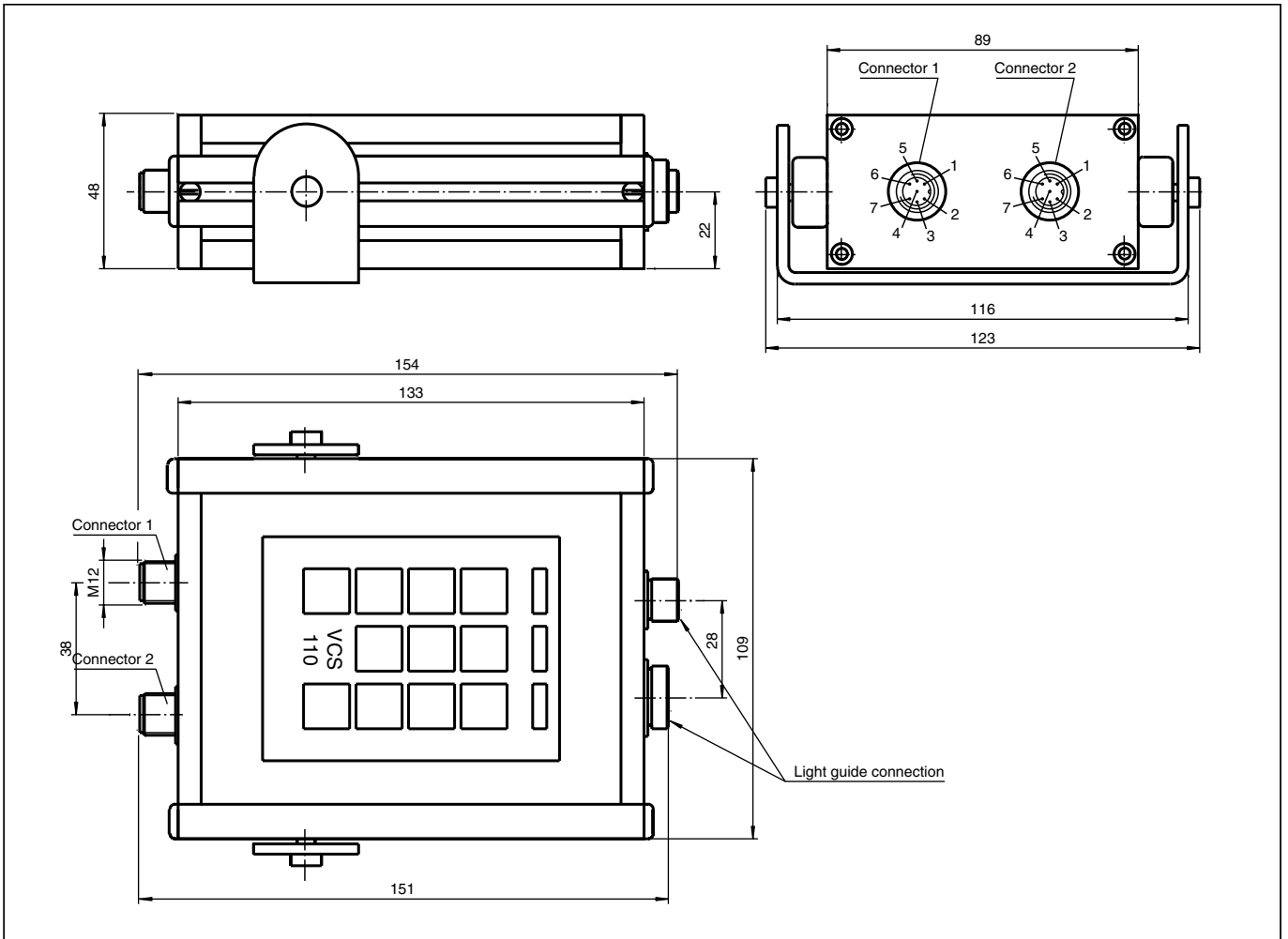
KLE 05-2,43/3x1,5-1,0-G4

LMR 05-3,6/3x2,6-1,0-Z1

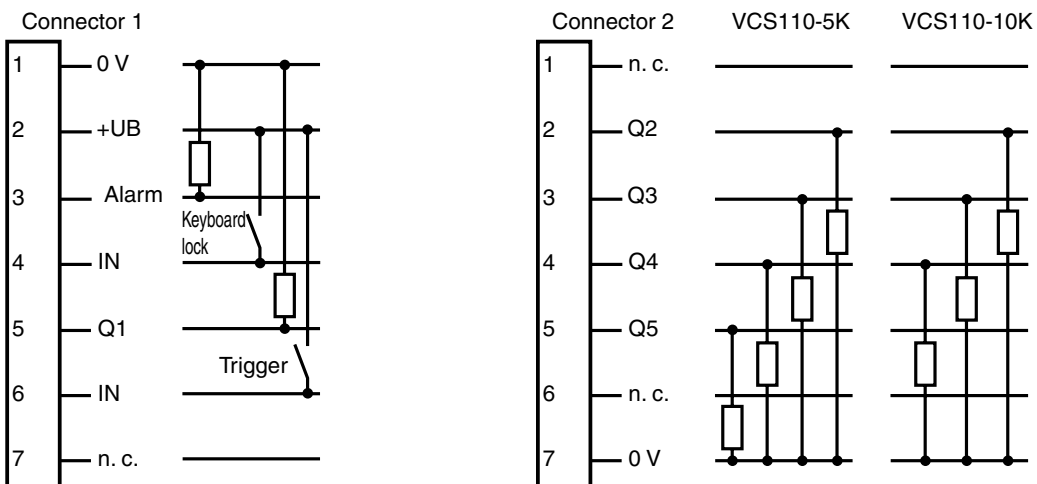
KMR 05-3,2/3x2,5-1,0-Z1

KMR 05-3,2/3x2,5-0,5-Z1

Dimensions



Electrical Connection



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○ = Light ON, ● = Dark ON

Function

The VCS is a colour sensor which is used to distinguish up to 10 colours. The colours can be programmed using 10 channels with the TEACH-IN key on the evaluation and control unit. A long-life white-light LED with greater light intensity is used for lighting.

The light reflected by the test object returns to the head of the fibre optic, which forwards it to the three-channel receiver. There the spectral portions of red, green and blue (RGB) are evaluated, digitised and processed in the microprocessor of the control interface.

To achieve contiguous colour detection, colour filters are used in the three-range procedure for red, green and blue.

On the output side, a model is available (VCS110- 5K) with five direct outputs for five different colours that can be selected from 10 saved colours, and a design (VCS110-10K) is also available with binary-coded outputs for up to 10 different colours.

Colour spectrum

The frequency range or the colour spectrum of the VCS110 is designed so that the evaluation takes place in the visible range of the spectrum. The wave range from 400 nm to about 700 nm is covered without any gaps.

TEACH-IN

The distance between the light wave guide end-piece and the test object must be adjusted so that the LED lights up with "OK". Depending on the type of light wave guide, the detection ranges are between 10 mm and 100 mm.

To put the device in TEACH-IN mode, press the INP key. The LED of the INP key flashes. Press the desired memory key. The corresponding LED flashes and the sampled colour undergoes TEACH-IN.

Relearning and adjusting of the tolerance ranges

Relearning is recommended for variations of the colour and for detection range. To do this, repeat the procedure described in the previous section (Teach-in). A tolerance field is automatically assigned to the teach-in colour template. Performing Teach-in twice for the same colour in a single memory slot at different distances results in Teach-in for the entire distance range.

Complete the Teach-in process:

In order to complete the Teach-in process, press the INP key again. The corresponding LED stops flashing and the device is in evaluation mode. As long as the device is in Teach-in mode, the alarm output is set.

Evaluation

VCS110-10K:

All 10 memory slots can be used separately and 10 different colours can be evaluated. The outputs are coded in binary in the following manner.

Memory slots	Output (Q)
	4 3 2 1
1	0 0 0 1
2	0 0 1 0
3	0 0 1 1
4	0 1 0 0
5	0 1 0 1
6	0 1 1 0
7	0 1 1 1
8	1 0 0 0
9	1 0 0 1
10	1 0 1 0

VCS110-5K:

Teach-in can be performed for colours on all 10 channels. Two channels are assigned to each output, but only one channel can be activated. Press the desired memory key. The LED flashes and the output assigned to the memory slot is active. Then the output of the not selected memory cell is blocked.

Channel	Output (Q)
1+6	1
2+7	2
3+8	3
4+9	4
5+10	5

Alarm output:

If the device is in TEACH-IN mode or all memory slots in the channel are empty, the alarm output is set.

Delete memory**Delete the memory content of all memory slots:**

The VCS110 is placed in the evaluation mode. Continue pressing the INP key until all LEDs are lit and have gone out again. The memory slots are deleted and the device is back in evaluation mode. If the INP key is released while the LEDs are lit, all memory slots are deleted, the device is back in TEACH-IN mode and the alarm output is set.

Delete the memory content of a memory slot:

Do not press the INP key, the device remains in evaluation mode. Continue pressing the memory key of the memory slot to be deleted until the LED changes from flashing to being lit up continuously.

Adjusting and Aligning

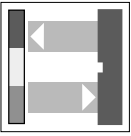
If the VCS110 is receiving a power supply 18 V ... 30 V, the distance between the colour mark to be detected and the output of the fibre optic is elected until the LED lights up with "OK". For glossy surfaces, you should select a detection angle of about 30° ... 60°.

Keyboard disable

The keyboard disable can be activated by applying +U_{ST} to connector 1/pin4. No more keys can be pressed, but it is possible to continue the evaluation.

External trigger:

The outputs can be disabled by applying +UB to connector 1/pin6. The LEDs of the memory keys continue to indicate the evaluation states. If the +24V is removed, the outputs are enabled and can be set when detected.



DF(E)20/35A/49/124

Print mark color scanner

DF(E)20/35A/49/124

with 5-pin, M12 x 1 connector

CE

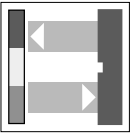


- ◆ Reflection light scanner for recording coloured print marks on backgrounds with different colours
- ◆ TEACH-IN procedure for automatic threshold value setting
- ◆ Long-life LED light source (red, green, blue)
- ◆ Optical system exchangeable by 90°
- ◆ Sturdy, waterproof plastic housing
- ◆ Sensor distance 9.5 mm ± 3 mm
- ◆ Operating distance 25 mm ± 6 mm

Colour Sensors

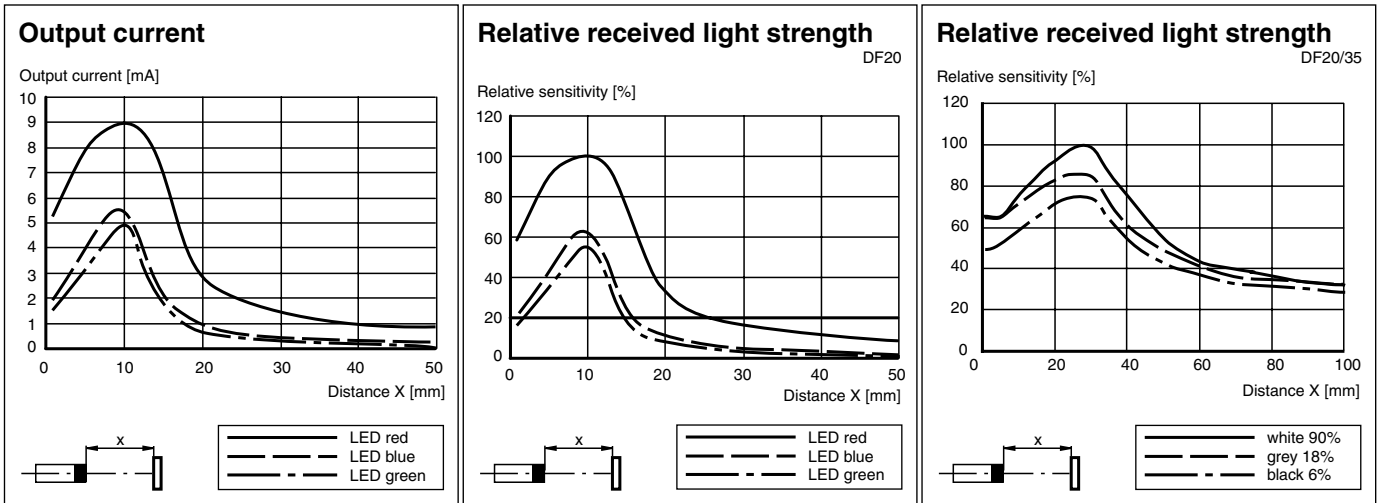
For suitable cable sockets, reflectors and mounting aids refer to chapter "accessories".
Sensor specific cable sockets can be found in the sensor data sheets.

Ordering code		DF20/35A/49/124	DF20/9S20/49/124	DF20/A/49/124	DF20/B/49/124	DFE20/49/124
Sensor range	25 mm ± 6 mm	◆				
	9.5 mm ± 3 mm		◆	◆	◆	◆
Light source	3 LEDs (R.G.B)	◆	◆	◆	◆	◆
Light type	Alternating light	◆	◆	◆	◆	◆
Light spot representation	Light spot, point-shaped, diameter 1.5 mm				◆	
	rectangular 1 x 4 mm	◆	◆	◆		◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆
Function display	LED yellow, lights up if print mark is detected flashes, if no safe operation is possible	◆	◆	◆	◆	◆
Controls	TEACH-IN key	◆	◆	◆	◆	◆
Operating voltage	10 ... 30 V DC	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆
No-load supply current	≤ 55 mA	◆	◆	◆	◆	
	55 mA					◆
Protection class	2 / UL94 V0	◆	◆	◆	◆	
Signal output	1 pnp and 1 npn short-circuit proof, open collector, synchronized-switching	◆	◆	◆	◆	◆
Switching type	pnp switches according to +U _B , npn according to 0 V for detected mark	◆	◆	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆	◆	◆
Switching current	max. 200 mA	◆	◆	◆	◆	◆
Switching frequency	1.65 kHz	◆	◆	◆	◆	◆
Response time	300 μs	◆	◆	◆	◆	◆
Timer function	Impulsed time element off-delay 20 ms		◆			
Function input	TEACH-IN input	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆
Connection type	Connector M12 x 1, 5-pin	◆	◆	◆	◆	◆
Housing	PC (Makrolon, glas-fibre-reinforced)	◆	◆	◆	◆	
	high grade steel					◆
Light exit	Glass	◆	◆	◆	◆	◆
Mass	200 g	◆	◆	◆	◆	
	530 g					◆



DF(E)20/35A/49/124

Diagrams



Function

The colour sensor DF 20 operates according to the „active three-range procedure“. This means that its three transmission LEDs are switched one after the other and are evaluated individually. The light of the three different emitters is reflected from colored objects with different intensities. The reflected light of the individual emitters causes three different reception signals that are compared with the programmed (teach-in) values. Only if all three values (red, green and blue transmission light) correspond with the teach-in values both the switching outputs and the indicator LED will be activated. The reference values are stored in non-volatile memory and are thus available each time the DF20 is put into operation.

Arrangement

The device is equipped with an exchangeable optical system that can be screwed onto the front or the side of the print mark sensor depending on the application.

Setting

TEACH-IN procedure

Align the light spot to the print mark. For reflective or shiny objects, the sensor should be inclined to the surface of the material by 10° to 15°.

The TEACH-IN key on the device confirms whether a positive pulse (UB+) was present on the external TEACH-In input for at least 50 ms, the DF20 evaluates the reception signals of the individual transmitters and saves these in non-volatile memory. After the TEACH-IN signal is complete, the DF20 detects the programmed print mark and activates the two switching outputs. The display LED lights statically.

Alarm function

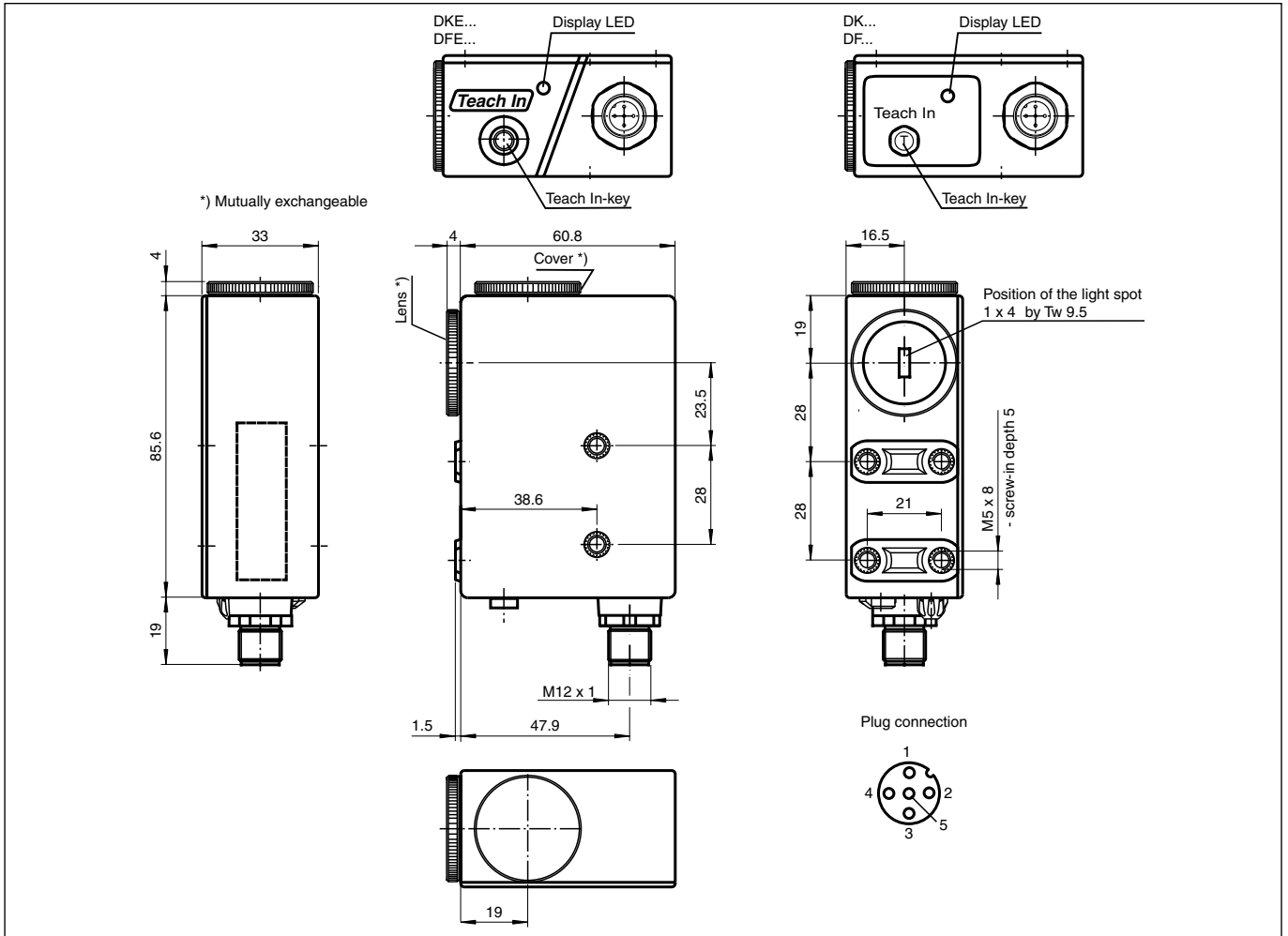
The display-LED of the DF20 flashes if no evaluation of the colour programmed with TEACH-IN is possible. You can return to switching operation by pressing a key or by using an external TEACH-IN signal.

Emitter test function

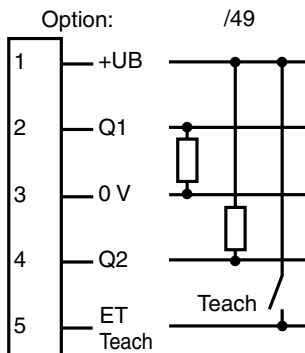
If an emitter test function needs to be performed, the TEACH-IN key must be held down while voltage is applied and then released again.

If the TEACH-IN key is pressed again, the green LED lights up, then the red LED during the next TEACH-IN and after that the blue LED. After testing the 3 transmission LEDs, the TEACH-IN key is pressed one more time and the device is back in switching operation with the last TEACH-IN values. Switching of outputs is suppressed in direct detection mode.

Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON

Date of issue 10/15/01



Date of issue 10/15/2001

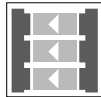


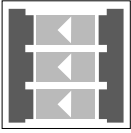
One light grid for all applications

The extensive range of light grid products means you can find the right solution for any application.

The features of the individual light grids differ greatly: Large angles of divergence ensure the devices are easy to adjust, TEACH-IN functions allow quick settings of the devices, crossed optical paths significantly increase the resolution of the light grid, and the automatic switching threshold adjustment eliminates dirt spots. All in all, these are the features that make it possible to use light grids efficiently in industry with an excellent return on investment.

Areas of applications range from door controls in elevators through detection of transparent sheets in packaging machines and small parts to detection of paper tears in printing machines. We also offer a solution for storage and conveyor systems for profile and height monitoring of, for example, pallets.

Principle	Type code	Detection range	Page
	ELG-E/ELG-S	0 mm ... 90 mm	936
	LG8, LG16	0 mm ... 1500 mm	940
	PR4	0 mm ... 1500 mm	944
	PR16	0 mm ... 1500 mm	948
	PRS	0 mm ... 60 mm	952
	PLVscan beam distance 20 mm	0 mm ... 4000 mm	956
	PLVscan beam distance 42.5 mm	0 mm ... 4000 mm	962
	PLVscan beam distance 48 mm	0 mm ... 8000 mm	968



ELG-E/ELG-S

Single path light grid

ELG-E/ELG-S

with 9-pin sub-D connector

CE

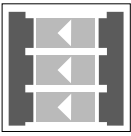


- ◆ Detection range up to 125 mm
- ◆ High-resolution light grid
- ◆ Beam spacing 5 mm
- ◆ Detection of programmed objects by TEACH-IN
- ◆ Micro processor controlled beam evaluation

Ordering code		ELG-E/ELG-S
Effective detection range	0 ... 90 mm	◆
Threshold detection range	125 mm	◆
Sensing range	0 ... 90 mm	◆
Field height	240 mm	◆
Number of beams	48	◆
Beam spacing	5 mm	◆
Obstacle size	5 mm	◆
Light source	IREL	◆
Light type	Infrared	◆
Angle of divergence	approx. ± 10 °	◆
Ambient light limit	100000 Lux	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
Function display	LED yellow	◆
Operating voltage	24 V DC	◆
Ripple	10 %	◆
Current consumption	300 mA	◆
Signal output	2 pnp antivalent, short-circuit proof, protected against reverse polarity	◆
Switching type	light/dark switching	◆
Switching voltage	24 V DC	◆
Switching current	200 mA	◆
Switching frequency	350 Hz	◆
Response time	1 ms	◆
Test input	Emitter deactivation	◆
Function input	TEACH-IN input	◆
Ambient temperature	0 ... +60 °C	◆
Storage temperature	0 ... +75 °C	◆
Protection degree	IP65	◆
Connection type	9-pin sub-D connector	◆
Housing	metal	◆
Light exit	Plastic	◆
Mass	1000 g (device)	◆

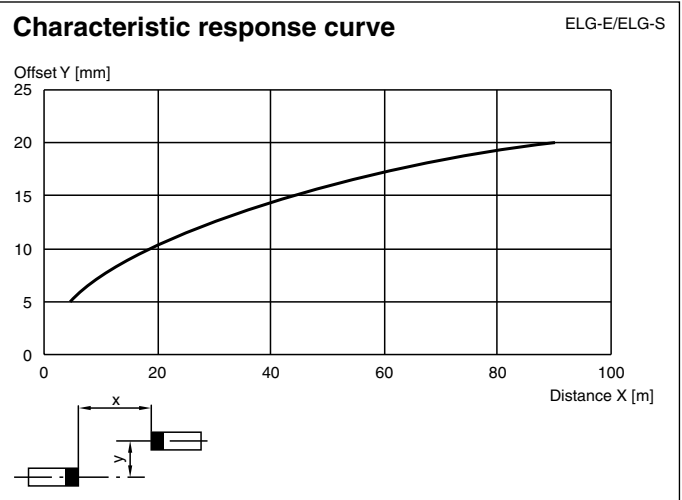
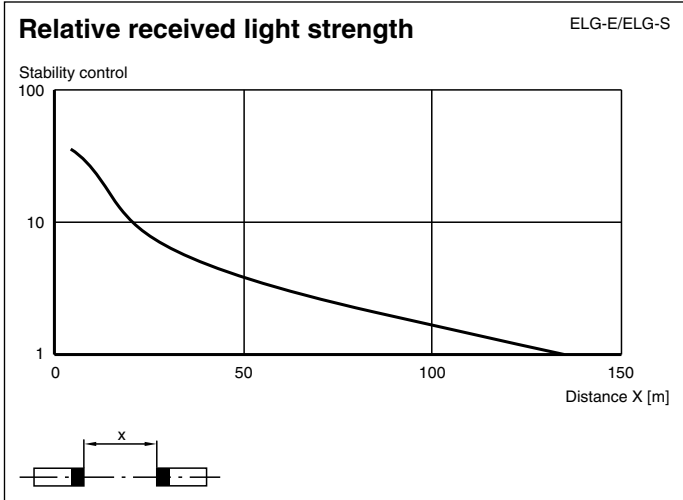
10/15/01

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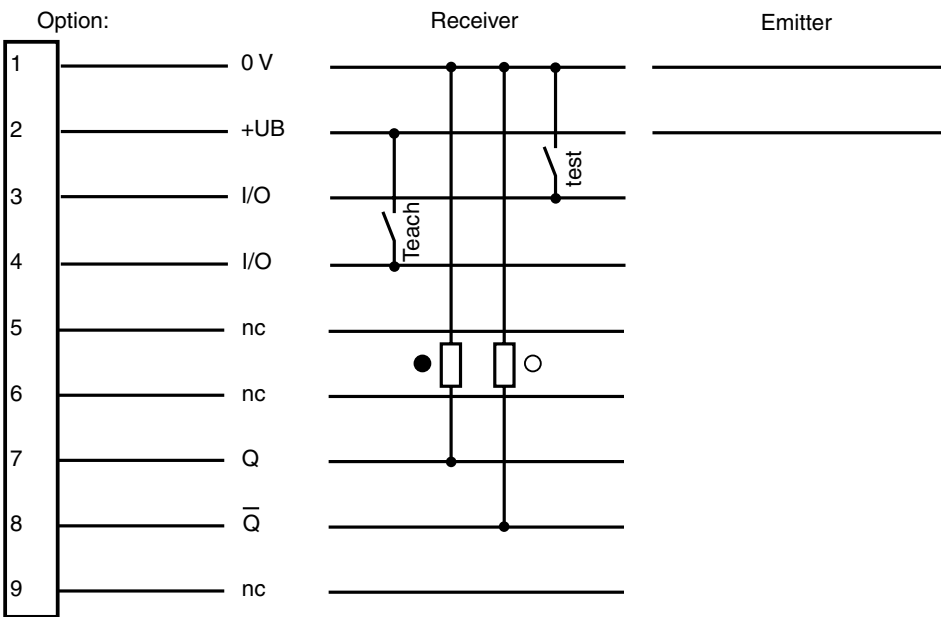


ELG-E/ELG-S

Diagrams

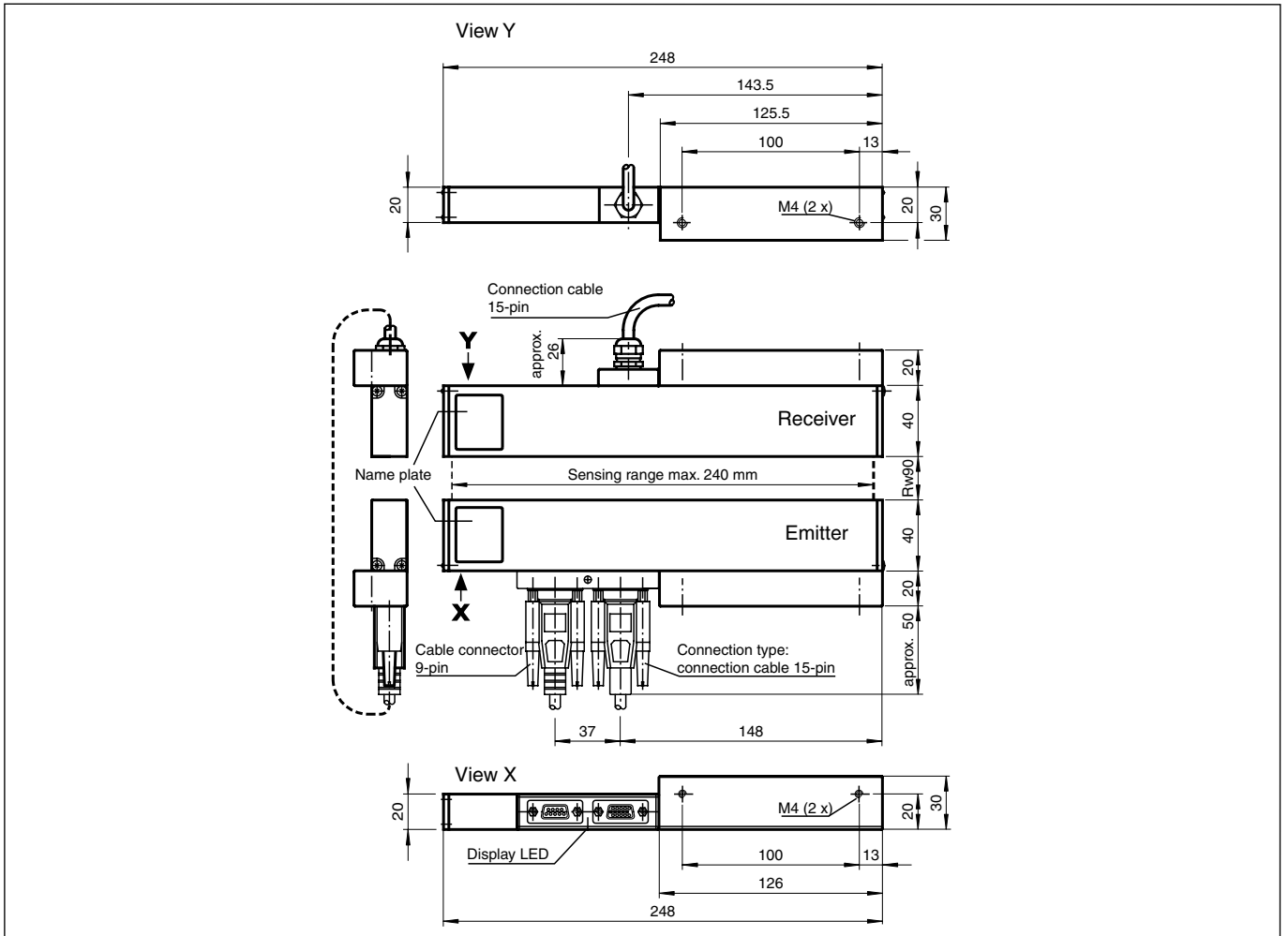


Electrical Connection



Light Grids

Dimensions



Accessories

Cable connector for light grid ELG: **Model number** SUBD-ELG-VIS



LG..-G-150-K-2-.

Single path light grid

LG..-G-150-K-2-.

with terminal compartment

CE



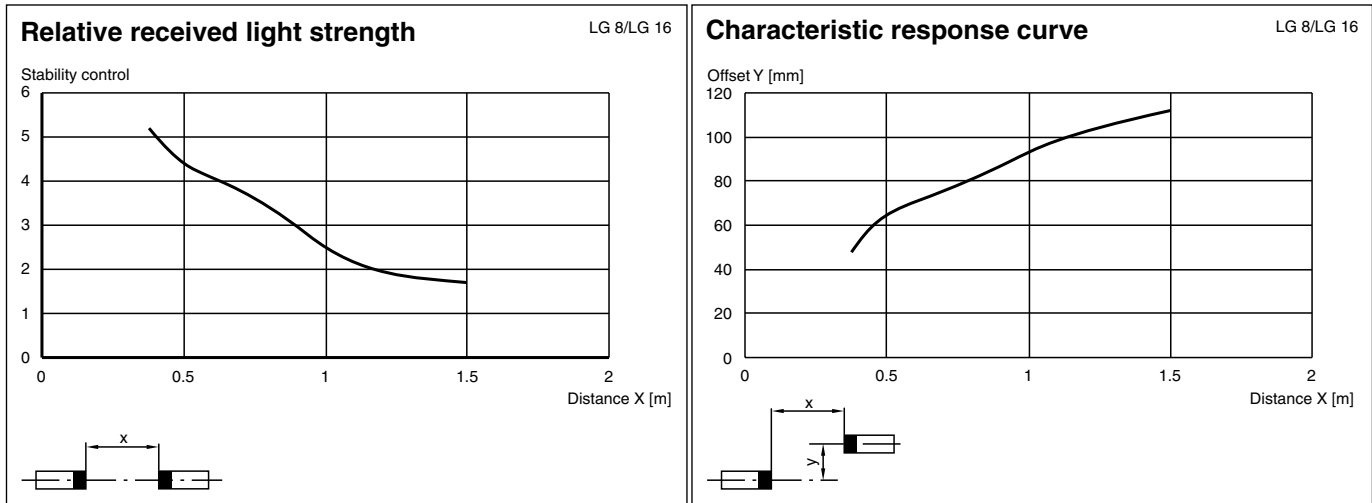
- ◆ Detection range up to 1500 mm
- ◆ High-resolution light grid
- ◆ Suited for recording of transparent objects
- ◆ Smallest obstacle size 14 mm
- ◆ Automatic switching threshold adaptation eliminates soiling effects
- ◆ Light grid with 8 beams, crossed or parallel
- ◆ Light grid with 16 beams, crossed or parallel

Ordering code		LG8-G-150-K-2-F	LG8-G-150-K-2-W	LG16-G-150-K-2-F	LG16-G-150-K-2-W
Effective detection range	800 ... 1500 mm	◆	◆	◆	◆
Threshold detection range	1500 mm	◆	◆	◆	◆
Sensing range	0 ... 1500 mm	◆	◆	◆	◆
Field height	235 mm	◆	◆		
	470 mm			◆	◆
Number of beams	16			◆	◆
	8	◆	◆		
Beam spacing	30 mm	◆	◆	◆	◆
Obstacle size	14 mm	◆	◆	◆	◆
Light source	IREL	◆	◆	◆	◆
Light type	Infrared	◆	◆	◆	◆
Angle of divergence	emitter ± 8 °, Receiver ± 24 °	◆	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Function display	LED yellow, functional readiness, LED red, switching state, lights up when the beam field is interrupted	◆	◆	◆	◆
Operating voltage	24 ... 28 V DC	◆	◆	◆	◆
Ripple	5 %	◆	◆	◆	◆
Current consumption	200 mA	◆	◆	◆	◆
Signal output	1 pnp, short-circuit proof, open collector	◆	◆	◆	◆
Switching type	dark ON	◆	◆	◆	◆
Switching voltage	max. 28 V DC	◆	◆	◆	◆
Switching current	100 mA	◆	◆	◆	◆
Switching frequency	12 Hz			◆	◆
	25 Hz	◆	◆		
Response time	10 ms	◆	◆		
	20 ms			◆	◆
Function input	Calibration input > 10 ms, ground active, fixed saving the switching threshold	◆		◆	
	Automatic calibration according to application of the power supply, duration approx. 5 s		◆		◆
Ambient temperature	-15 ... +50 °C	◆	◆	◆	◆
Storage temperature	-20 ... +70 °C	◆	◆	◆	◆
Protection degree	IP54	◆	◆	◆	◆
Connection type	Terminal compartment Pg9 with screw terminals	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆
Light exit	PMMA	◆	◆	◆	◆
Mass	emitter 550 g, Receiver 600 g	◆	◆		
	emitter 900 g, Receiver 950 g			◆	◆
Dimensions	38 x 415 x 45 mm (W x H x D)	◆	◆		
	38 x 650 x 45 mm (W x H x D)			◆	◆



LG..-G-150-K-2-

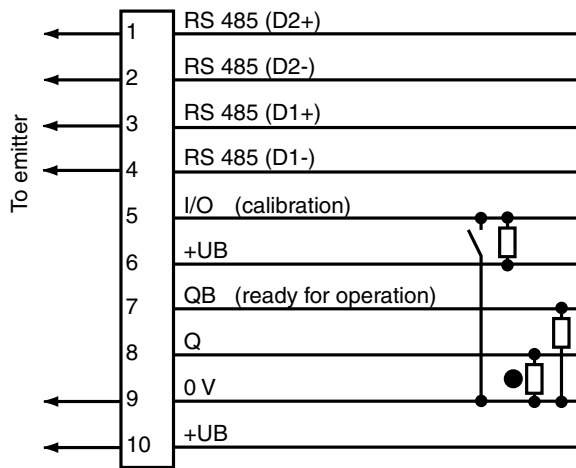
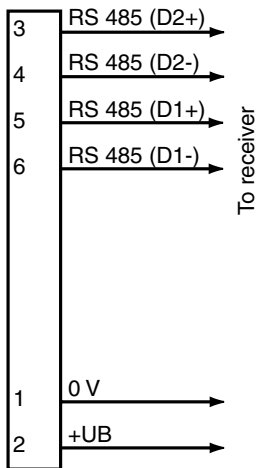
Diagrams



Electrical Connection

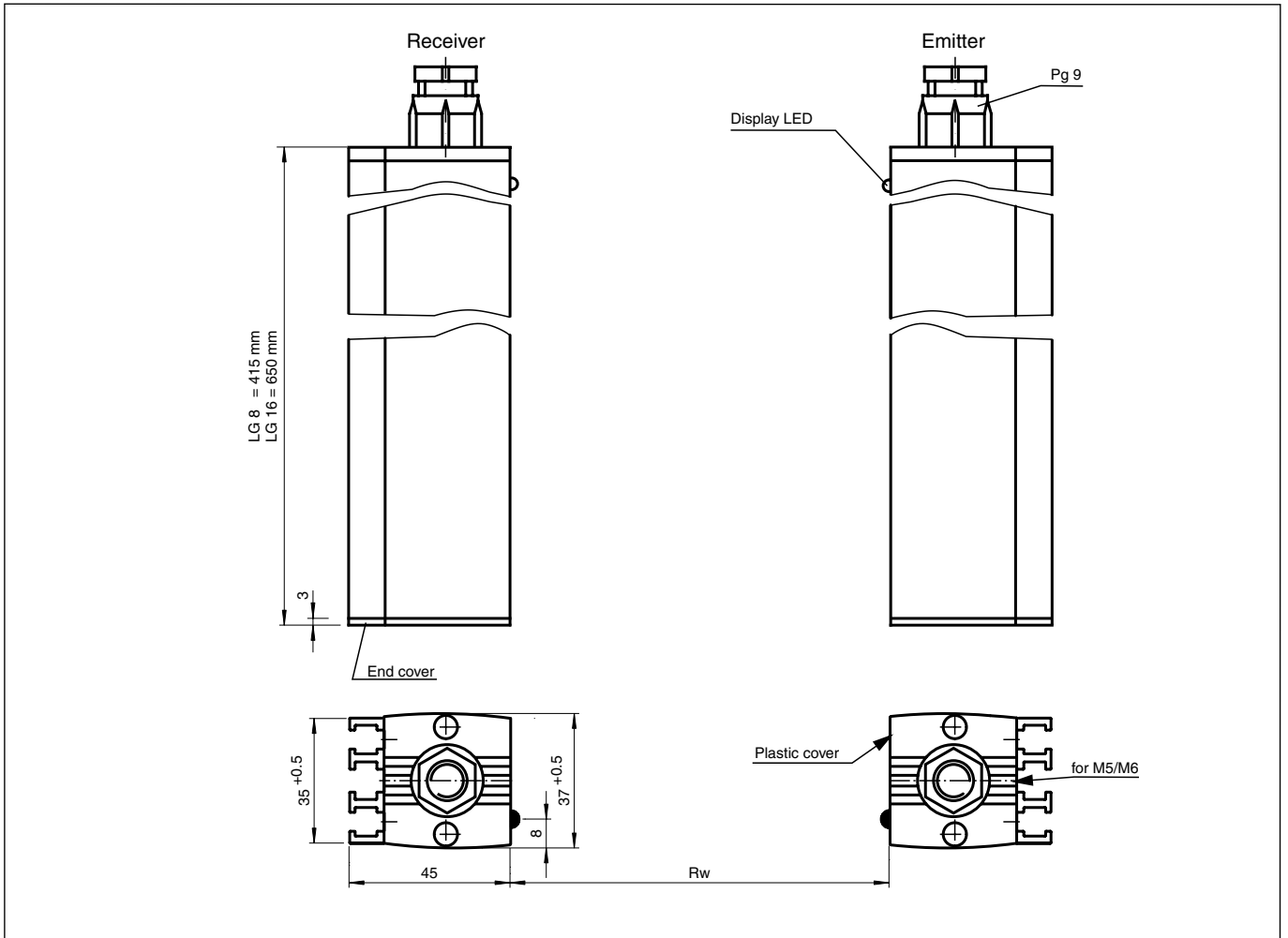
Emitter

Receiver



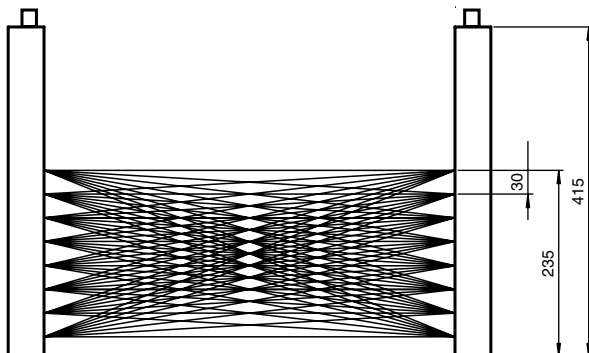
Light Grids

Dimensions

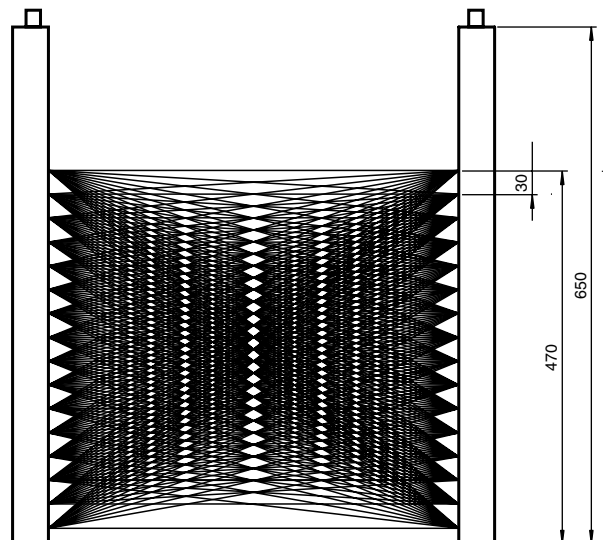


Course of the beam

LG8-G



LG16-G





PR4-...-K-2-.-F

Single path light grid

PR4-...-K-2-.-F

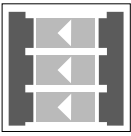
with fixed cable 2.5 m or with 7-pin connector

CE

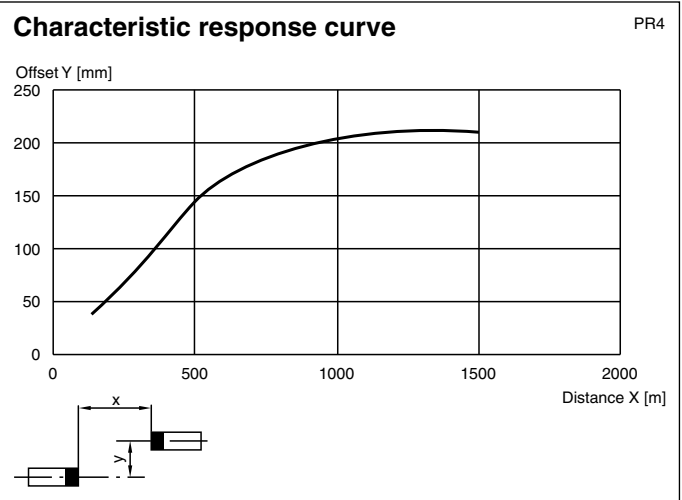
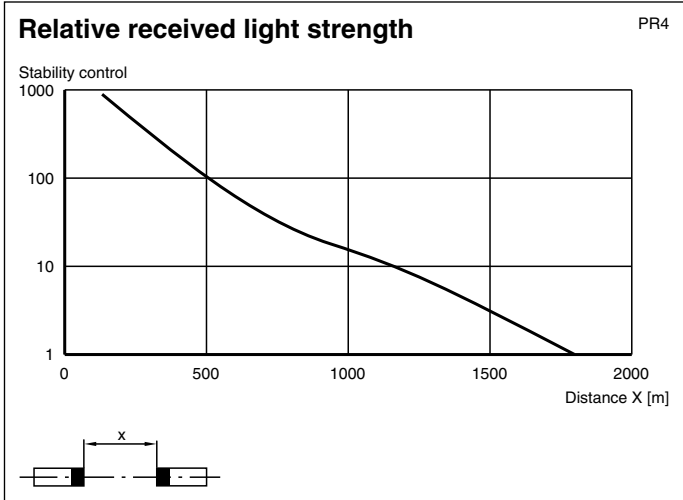


- ◆ Detection range up to 1500 mm
- ◆ High-resolution light grid
- ◆ Suited for recording of transparent objects
- ◆ Light grid with 4 beams, crossed or parallel
- ◆ Smallest obstacle size 15 mm
- ◆ Automatic switching threshold adaptation eliminates soiling effects

Ordering code		PR4-30-K-2-F-F	PR4-30-K-2-F-S	PR4-30-K-2-W-F	PR4-30-K-2-W-S	PR4-150-K-2-F-F	PR4-150-K-2-F-S	PR4-150-K-2-W-F	PR4-150-K-2-W-S
Effective detection range	300 ... 500 mm	◆	◆	◆	◆				
	500 ... 1500 mm					◆	◆	◆	◆
Threshold detection range	1500 mm					◆	◆	◆	◆
	500 mm	◆	◆	◆	◆				
Sensing range	0 ... 1500 mm					◆	◆	◆	◆
	0 ... 500 mm	◆	◆	◆	◆				
Field height	102 mm	◆	◆	◆	◆	◆	◆	◆	◆
Number of beams	4	◆	◆	◆	◆	◆	◆	◆	◆
Beam spacing	33 mm	◆	◆	◆	◆	◆	◆	◆	◆
Obstacle size	15 mm	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IRED	◆	◆	◆	◆	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	± 8 °	◆	◆	◆	◆	◆	◆	◆	◆
Ambient light limit	20000 Lux	◆	◆	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED yellow, functional readiness, LED red, switching state, lights up when the beam field is interrupted	◆	◆	◆	◆	◆	◆	◆	◆
Operating voltage	24 ... 28 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Ripple	5 %	◆	◆	◆	◆	◆	◆	◆	◆
Current consumption	100 mA	◆	◆	◆	◆	◆	◆	◆	◆
Signal output	1 pnp, short-circuit proof, open collector	◆	◆	◆	◆	◆	◆	◆	◆
Switching type	dark ON	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 28 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Switching current	100 mA	◆	◆	◆	◆	◆	◆	◆	◆
Switching frequency	100 Hz	◆	◆	◆	◆	◆	◆	◆	◆
Response time	2 ms	◆	◆	◆	◆	◆	◆	◆	◆
Function input	Calibration input > 10 ms, ground active, fixed saving the switching threshold	◆	◆			◆	◆		
	Automatic calibration according to application of the power supply, duration approx. 5 s			◆	◆			◆	◆
Ambient temperature	-15 ... +50 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	2.5 m cable	◆		◆		◆		◆	
	7-pin connector		◆		◆		◆		◆
Housing	ABS	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	PMMA	◆	◆	◆	◆	◆	◆	◆	◆
Mass	120 g (device)	◆	◆	◆	◆	◆	◆	◆	◆

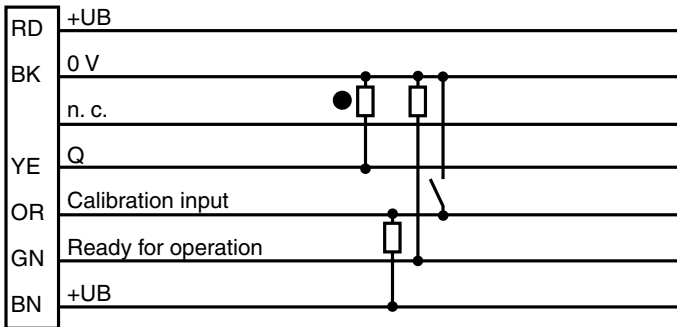


Diagrams

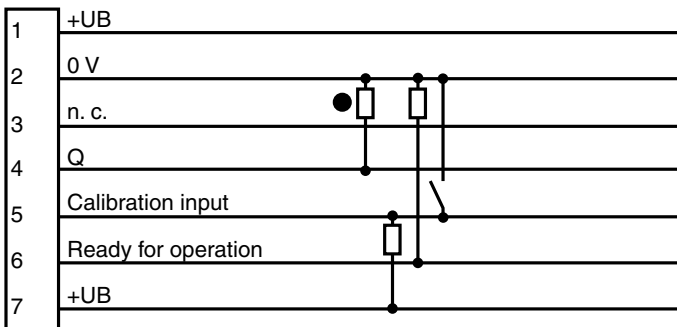


Electrical Connection

Cable version

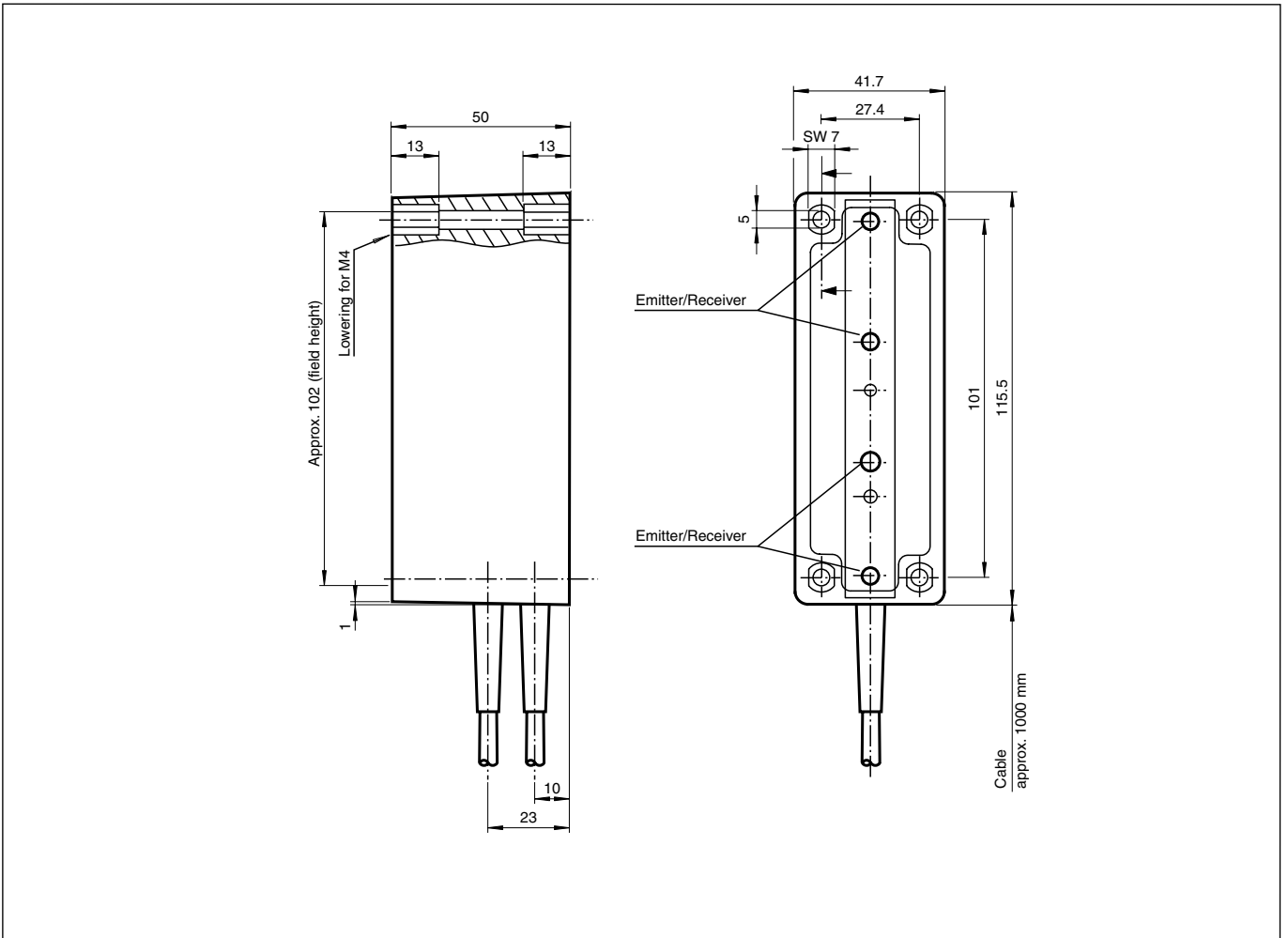


Connector version

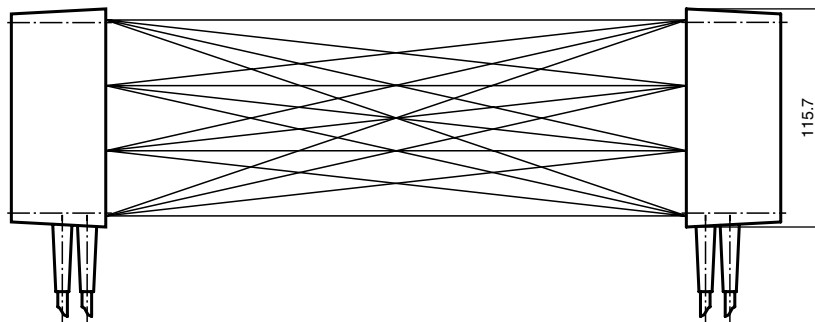


Light Grids

Dimensions



Course of the beams



Light Grids

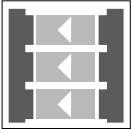
Accessories

Model number

- Cable connector for light grid PR: V18-PR-ASK-VIS
- Interconnecting cable for light grid PR: V18-PR-Verb-VIS

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PR16-...-K-2-.-F

Single path light grid

PR16-...-K-2-.-F

with fixed cable 2.5 m or with 7-pin connector

CE



- ◆ Detection range up to 1500 mm
- ◆ High-resolution light grid
- ◆ Suited for recording of transparent objects
- ◆ Light grid with 16 beams, crossed or parallel
- ◆ Smallest obstacle size 2 mm
- ◆ Automatic switching threshold adaptation eliminates soiling effects

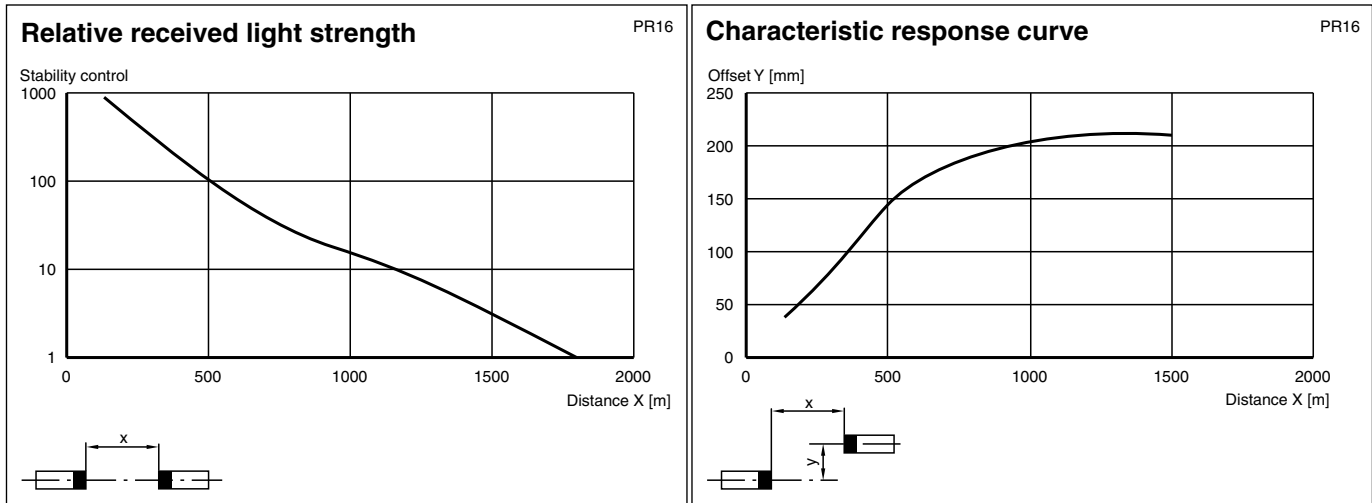
Ordering code		PR16-30-K-2-F-F	PR16-30-K-2-F-S	PR16-30-K-2-W-F	PR16-30-K-2-W-S	PR16-150-K-2-F-F	PR16-150-K-2-F-S	PR16-150-K-2-W-F	PR16-150-K-2-W-S
Effective detection range	300 ... 500 mm	◆	◆	◆	◆				
	500 ... 1500 mm					◆	◆	◆	◆
Threshold detection range	1500 mm					◆	◆	◆	◆
	500 mm	◆	◆	◆	◆				
Sensing range	0 ... 1500 mm					◆	◆	◆	◆
	0 ... 500 mm	◆	◆	◆	◆				
Field height	97 mm	◆	◆	◆	◆	◆	◆	◆	◆
Number of beams	16	◆	◆	◆	◆	◆	◆	◆	◆
Beam spacing	6.5 mm	◆	◆	◆	◆	◆	◆	◆	◆
Obstacle size	2 mm	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IREL	◆	◆	◆	◆	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	± 8 °	◆	◆	◆	◆	◆	◆	◆	◆
Ambient light limit	20000 Lux	◆	◆	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED yellow, functional readiness, LED red, switching state, lights up when the beam field is interrupted	◆	◆	◆	◆	◆	◆	◆	◆
Operating voltage	24 ... 28 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Ripple	5 %	◆	◆	◆	◆	◆	◆	◆	◆
Current consumption	100 mA	◆	◆	◆	◆	◆	◆	◆	◆
Signal output	1 pnp, short-circuit proof, open collector	◆	◆	◆	◆	◆	◆	◆	◆
Switching type	dark ON	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 28 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Switching current	100 mA	◆	◆	◆	◆	◆	◆	◆	◆
Switching frequency	25 Hz	◆	◆	◆	◆				
	6 Hz					◆	◆	◆	◆
Response time	10 ms	◆	◆	◆	◆				
	40 ms					◆	◆	◆	◆
Function input	Calibration input > 10 ms, ground active, fixed saving the switching threshold	◆	◆			◆	◆		
	Automatic calibration according to application of the power supply, duration approx. 5 s			◆	◆			◆	◆
Ambient temperature	-15 ... +50 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP67	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	2.5 m cable	◆		◆		◆		◆	
	7-pin connector		◆		◆		◆		◆
Housing	ABS	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	PMMA	◆	◆	◆	◆	◆	◆	◆	◆
Mass	150 g (device)	◆	◆	◆	◆	◆	◆	◆	◆

Light Grids



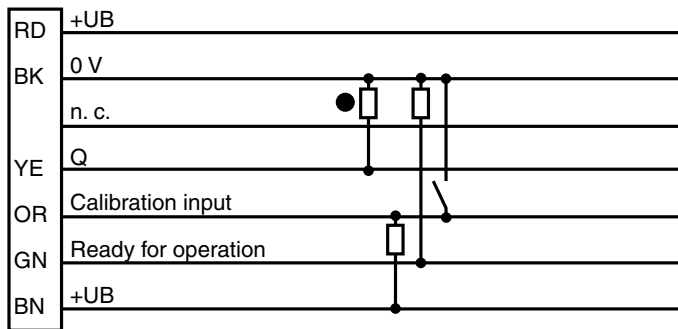
PR16-...-K-2-.-F

Diagrams

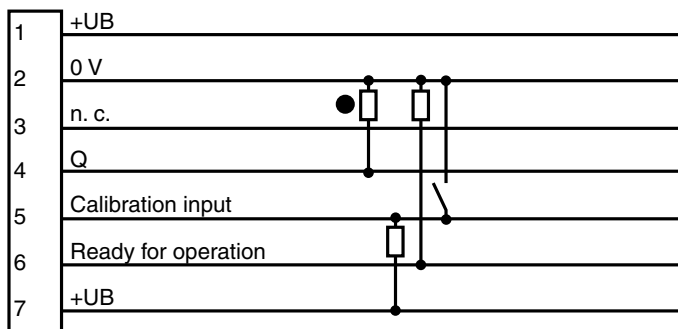


Electrical Connection

Cable version

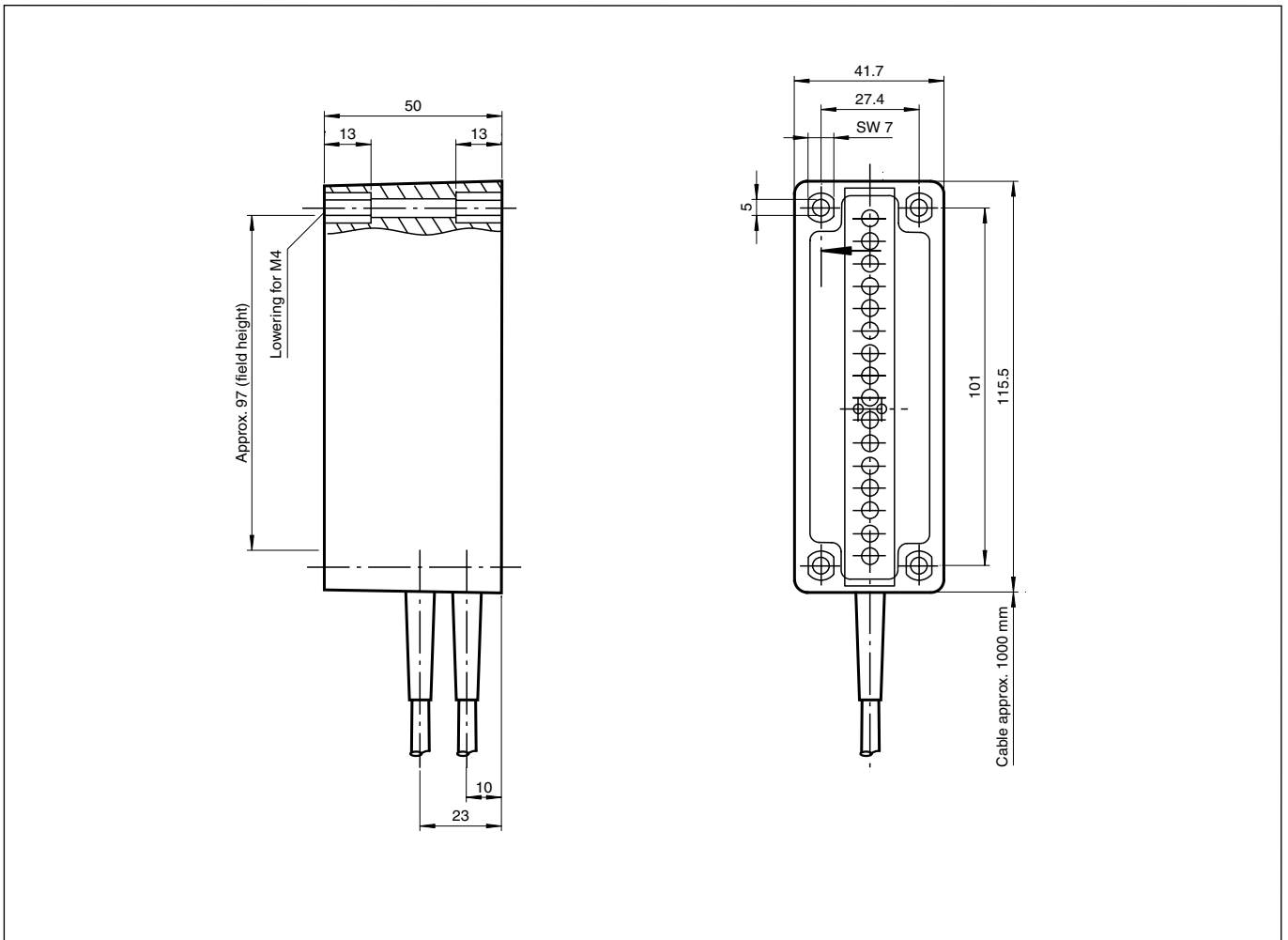


Connector version

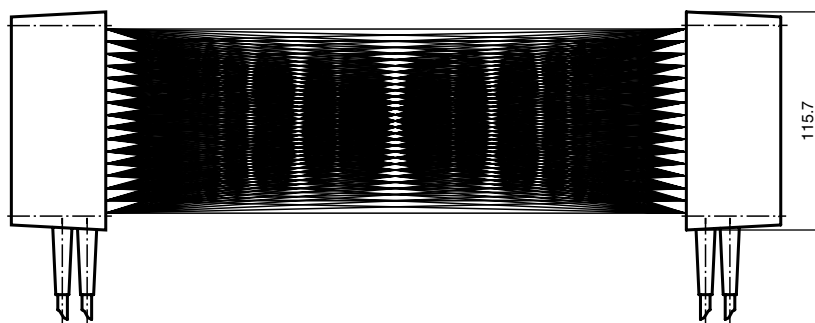


Light Grids

Dimensions



Course of the beams



Light Grids

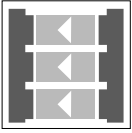
Accessories

Model number

- Cable connector for light grid PR: V18-PR-ASK-VIS
- Interconnecting cable for light grid PR: V18-PR-Verb-VIS

10/15/01

Date of issue



PRS2.1

Paper tear safety

PRS2.1

with 12-pin flange connector

CE



- ◆ Detection range up to 60 mm
- ◆ High-resolution light grid
- ◆ Modular design
- ◆ 3 different heights
- ◆ Detection of track width via TEACH-IN

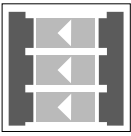
Light Grids

For mounting aids and other accessory items refer to chapter "accessories".

Date of issue 10/12/01

Ordering code		PRS201	PRS251	PRS301
Effective detection range	0 ... 60 mm	◆	◆	◆
Threshold detection range	60 mm	◆	◆	◆
Sensing range	0 ... 60 mm	◆	◆	◆
Field height	1200 mm	◆		
	1440 mm		◆	
	1680 mm			◆
Number of beams	240	◆		
	288		◆	
	336			◆
Beam spacing	5 mm	◆	◆	◆
Obstacle size	> 30 mm	◆	◆	◆
Light source	IREDD	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆
Angle of divergence	45 °	◆	◆	◆
Ambient light limit	5000 Lux	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆
Approvals	CE	◆	◆	◆
Operating voltage	24 V DC ±20 %	◆	◆	◆
Ripple	10 %	◆	◆	◆
Current consumption	450 mA	◆		
	550 mA		◆	
	650 mA			◆
Signal output	1 pnp break, 1 pnp fault, short-circuit proof, protected against reverse polarity	◆	◆	◆
Switching type	dark ON	◆	◆	◆
Switching voltage	max. 30 V DC	◆	◆	◆
Switching current	200 mA	◆	◆	◆
Switching frequency	10/5 Hz	◆	◆	◆
Response time	45 / 75 ms, adjustable via input monitoring time	◆	◆	◆
Test input	emitter test	◆	◆	◆
Function input	TEACH-IN: measuring width	◆	◆	◆
Function type 1	Activation input release	◆	◆	◆
Function type 2	Input monitoring time	◆	◆	◆
Ambient temperature	0 ... +60 °C	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆
Protection degree	IP67	◆	◆	◆
Connection type	Flange connector, 12-pin	◆	◆	◆
Housing	Aluminium	◆	◆	◆
Light exit	Plastic	◆	◆	◆
Mass	3000 g	◆		
	3500 g		◆	
	4000 g			◆

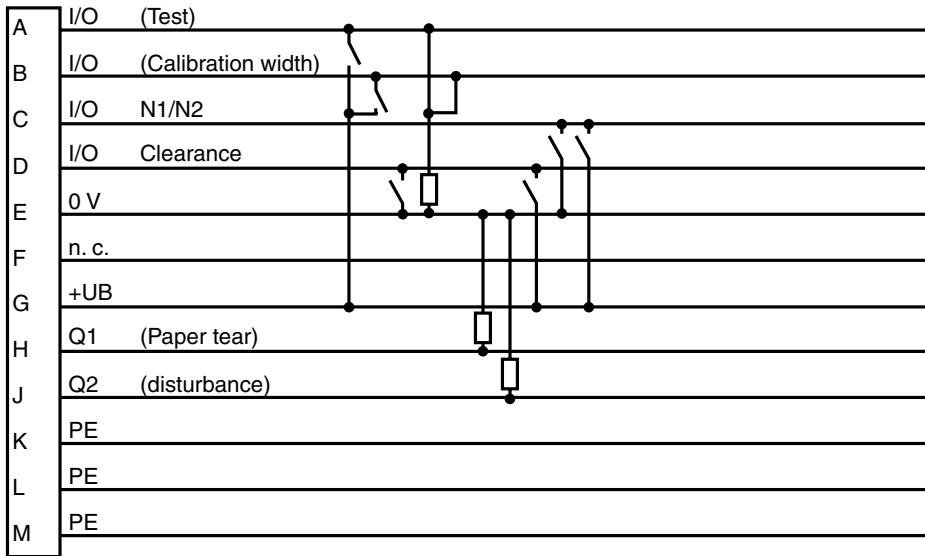
Light Grids

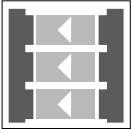


PRS2.1

Electrical Connection

Option:





Profile light grid

PLVscan P .../20/20/K-/50/4538/1

with terminal compartment

CE



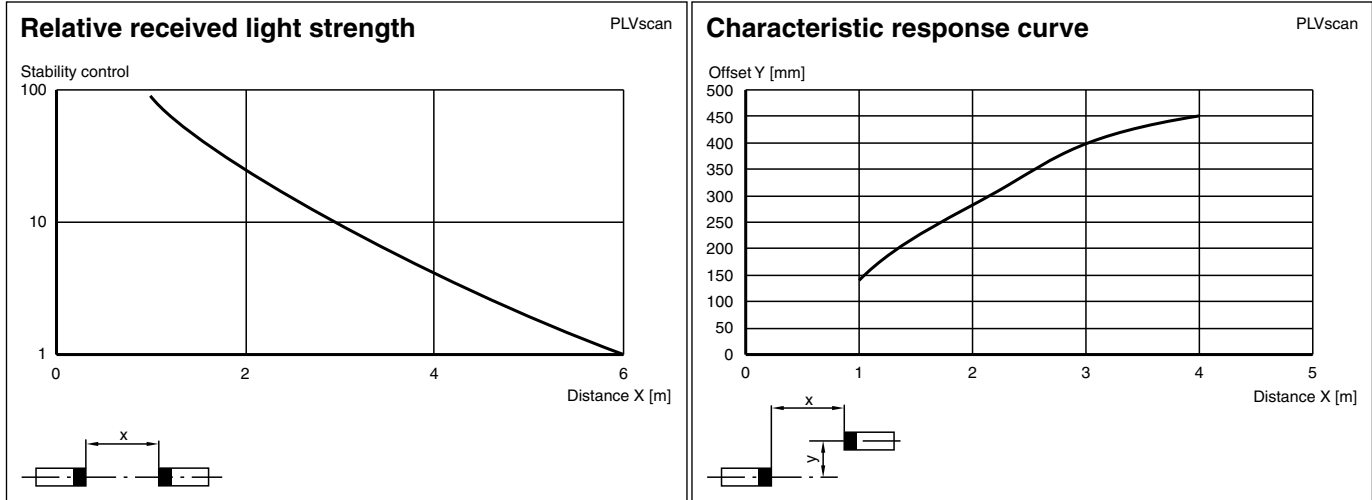
- ◆ Detection range up to 6000 mm
- ◆ Beam spacing 20 mm
- ◆ Light grid for profile monitoring
- ◆ Application specific, available in various lengths
- ◆ Separate outputs for height monitoring
- ◆ Parameterisable via Windows software
- ◆ Made suitable for measuring purposes by RS 232 interface
- ◆ Rugged housing

Ordering code		PLVscan P 16P/432/300/20/20/K-/50/4538/1	PLVscan P 32P/752/620/20/20/K-/50/4538/1	PLVscan P 48P/1072/940/20/20/K-/50/4538/1	PLVscan P 64P/1392/1260/20/20/K-/50/4538/1
Effective detection range	1500 ... 4000 mm, can be reduced to > 0.3 m	◆	◆	◆	◆
Threshold detection range	6000 mm	◆	◆	◆	◆
Sensing range	0 ... 4000 mm	◆	◆	◆	◆
Field height		300 mm	620 mm	940 mm	1260 mm
Number of beams		16	32	48	64
Beam spacing	20 mm	◆	◆	◆	◆
Obstacle size	0 mm for triple crossing of beams, see diagram	◆	◆	◆	◆
Light source	IREL	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆
Angle of divergence	± 8 °	◆	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Function display	LED green: power on LED yellow (emitter) flashes when stability control is insufficient, otherwise on, LED yellow (receiver) flashes when the beam field is interrupted, otherwise off	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆
Operating voltage	15 ... 30 V DC	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆
Power consumption	max. 7 W	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof (beam field). 4 pnp, short-circuit proof, light on (height monitoring)	◆	◆	◆	◆
Switching type	light/dark switching	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆
Switching current	200 mA	◆	◆	◆	◆
Switching frequency		20 Hz	10 Hz	6 Hz	5 Hz
Response time	for triple crossing of beams	24 ms	48 ms	72 ms	96 ms
Timer function	Off-delay programmable from 0 ... 1.25 s in 5 ms steps	◆	◆	◆	◆
Test input	emitter deactivation with +U _B on terminal 3 or -U _B on terminal 4	◆	◆	◆	◆
Function input	RS 232 interface for system programming	◆	◆	◆	◆
Ambient temperature	-10 ... +60 °C	◆	◆	◆	◆
Storage temperature	-20 ... +70 °C	◆	◆	◆	◆
Protection degree	IP50	◆	◆	◆	◆
Connection type	Terminal compartment Pg9 with screw terminals	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆
Light exit	PMMA	◆	◆	◆	◆
Mass	(device)	900 g	1500 g	2100 g	2700 g
Dimensions	1072 x 45 x 38 mm (W x H x D)			◆	
	1392 x 45 x 38 mm (W x H x D)				◆
	432 x 45 x 38 mm	◆			
	752 x 45 x 38 mm		◆		

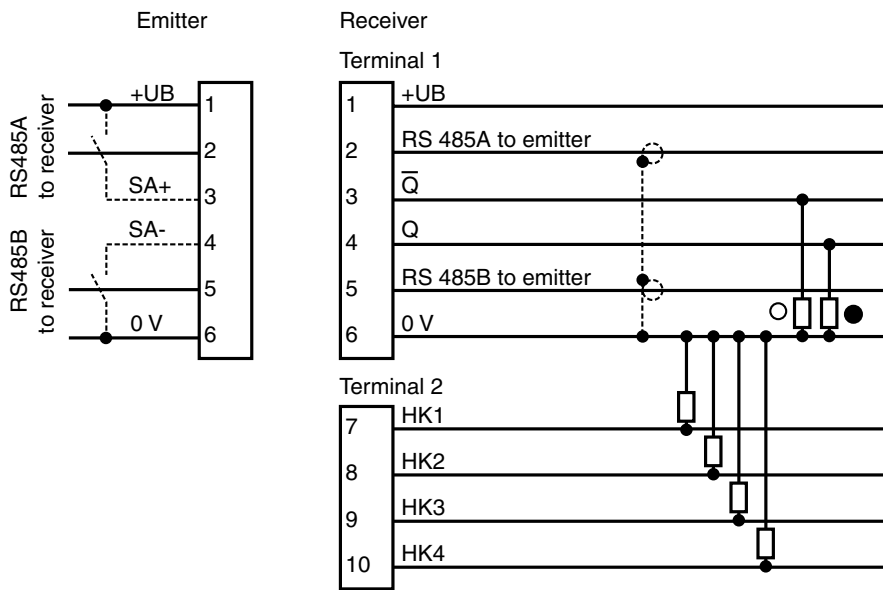
Light Grids



Diagrams

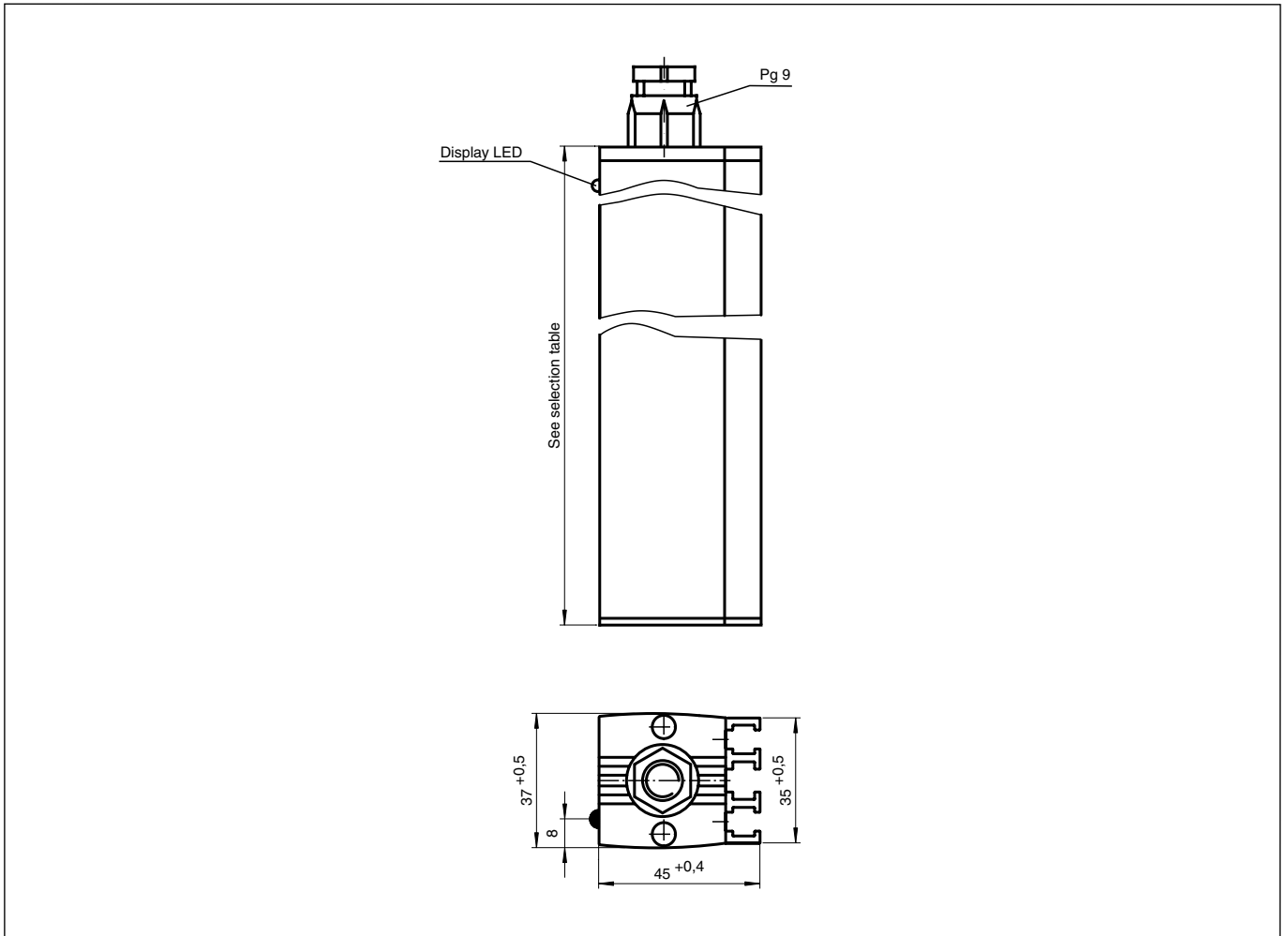


Electrical Connection



Light Grids

Dimensions



Selection table

Height of the protected area	Number of emitters	Housing length
300 mm	16	432 mm
620 mm	32	752 mm
940 mm	48	1072 mm
1260 mm	64	1392 mm

Arrangement and function

The PLVscan series consists of high-resolution single-path grid light-beam switches for surface-covering monitoring of a protected area and for profile monitoring. Even small objects in surfaces with large areas can be detected with high resolution. The switching command is initiated if an object is present in the protected area or if it has penetrated.

The housings consist of two aluminum section bars that are each equipped with infrared emitters or receivers. The control interface is integrated into the bars. The emitter and receiver bar communicate over an RS 485 interface. The RS 485 A and B connections of the emitter and receiver must be connected by a highly twisted cable. The receiver has separate outputs for height monitoring.

LED functional displays

A green LED for function display of Power ON and a yellow Status LED with a diagnostic function are located on the connection side of the profiles behind the optical system covering.

In normal operation, the yellow LED in the emitter is continuously lit if there is sufficient functional reserve.

The yellow LED in the receiver indicates the switching state of the light grid.

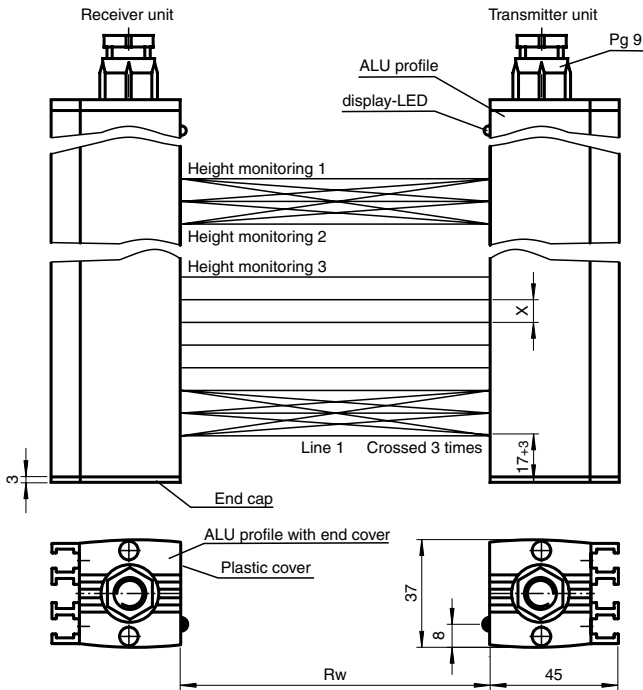
Diagnostic function of the yellow LED

Function	Diagnostic description
The LED of the emitter is lit statically. The LED of the receiver is not lit.	Normal status with free protected area, system is active, all light lines are free and have sufficient function reserve.
LED of the emitter is flashing.	Insufficient function reserve because of poor alignment of the light grid, receiver or RS 485 bus is incorrectly connected.
LED of the receiver not lit, output protected area active.	Transmitter or RS bus connected incorrectly.
LED of the receiver flashes, output protected area active.	At least one light line is covered.
LED on the receiver is flashing (about 2 Hz).	The system is in test mode and the programming connector is plugged in.
LED on the receiver is flashing quickly (about 7 Hz).	No valid values in EEPROM or the system is not programmed ⇒ Re-Program
LED on the receiver flashes continuously.	The system is in programming mode.

Resolution and beam distance

The mechanical beam distance determines the smallest size of object that can still be detected. For PLVscan-P.../20/... the beam distances are 20 mm (see illustration, dimension X). The resolution of the light grid can be increased by crossing light beams. The detection ranges can be adjusted on the transmission unit with a potentiometer.

The units are delivered without any programming for height monitoring. The course of the beam is not crossed.

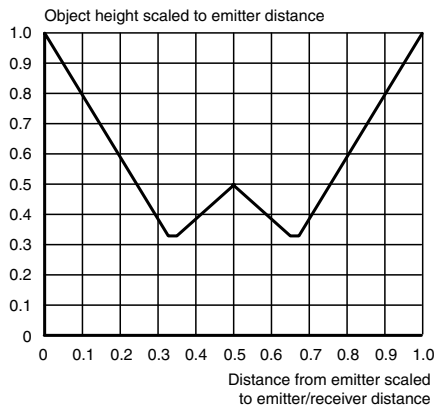


Representation of the course of the beam as straight/crossed, design example with three light lines for height monitoring

Resolution of the crossed beam arrangement

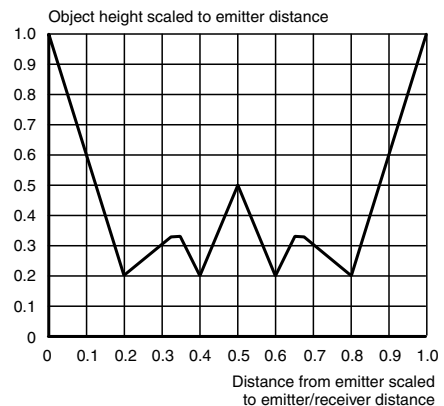
Triple crossing

If a triple crossing of beams is programmed, the resolution is increased. To be able to use the increased resolution, you should select the distance between the emitter and receiver so that the resolution that is offered is actually used in the work area. For a triple crossing this means that the increased resolution is available after about 25% of the emitter or receiver distance RW . You must therefore ensure that all objects fit with the emitter or receiver with a distance of this magnitude.

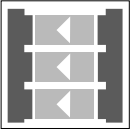


Five-fold crossing

If a five-fold crossing of beams is programmed, the resolution is increased. To be able to use the increased resolution, you should select the distance between the emitter and receiver so that the resolution that is offered is actually used in the work area. For a five-fold crossing this means that the increased resolution is available after 15 % of the emitter or receiver distance RW . You must therefore ensure that all objects fit with the emitter or receiver with a distance of this magnitude.



Date of issue 10/15/01



Profile light grid

PLVscan P .../20/42/K-/50/4538/1

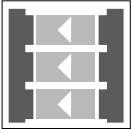
with terminal compartment

CE

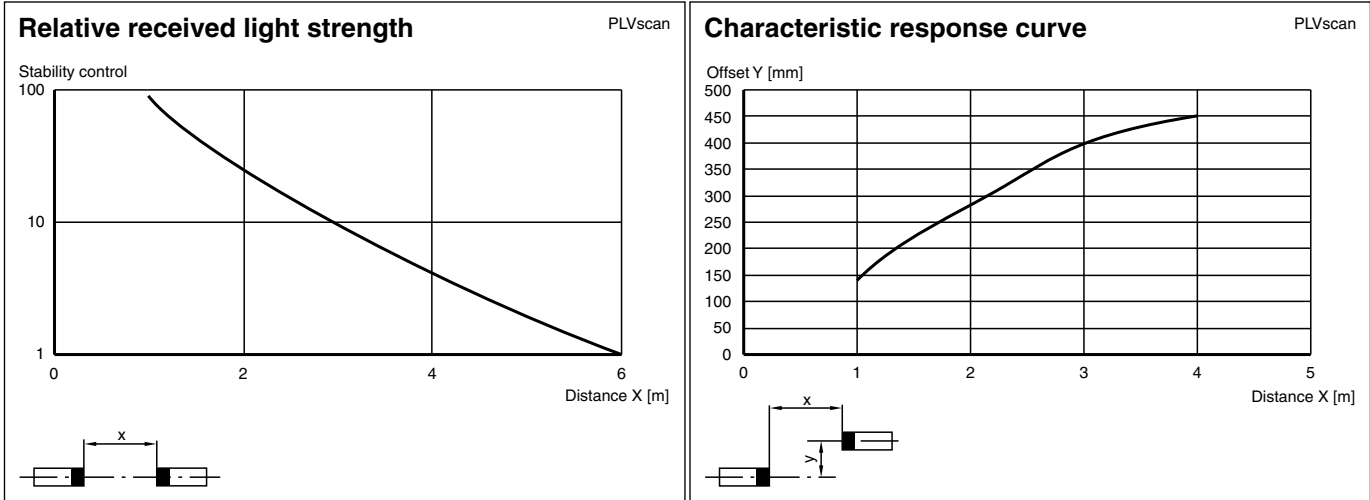


- ◆ Detection range up to 6000 mm
- ◆ Beam spacing 42.5 mm
- ◆ Light grid for profile monitoring
- ◆ Application specific, available in various lengths
- ◆ Separate outputs for height monitoring
- ◆ Parameterisable via Windows software
- ◆ Made suitable for measuring purposes by RS 232 interface
- ◆ Rugged housing

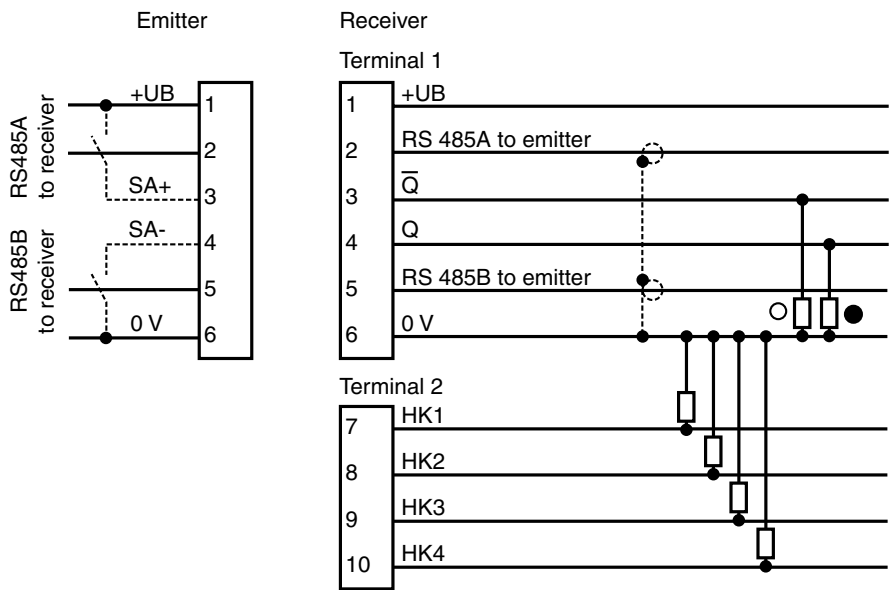
Ordering code		PLVscan P 08P/387/300/20/42/K-/50/4538/1	PLVscan P 16P/727/640/20/42/K-/50/4538/1	PLVscan P 24P/1067/980/20/42/K-/50/4538/1	PLVscan P 32P/1407/1320/20/42/K-/50/4538/1	PLVscan P 40P/1747/1660/20/42/K-/50/4538/1	PLVscan P 48P/2087/2000/20/42/K-/50/4538/1	PLVscan P 56P/2427/2340/20/42/K-/50/4538/1	PLVscan P 64P/2767/2680/20/42/K-/50/4538/1
Effective detection range	1500 ... 4000 mm, can be reduced to > 0.3 m	◆	◆	◆	◆	◆	◆	◆	◆
Threshold detection range	6000 mm	◆	◆	◆	◆	◆	◆	◆	◆
Sensing range	0 ... 4000 mm	◆	◆	◆	◆	◆	◆	◆	◆
Field height		300 mm	640 mm	980 mm	1320 mm	1660 mm	2000 mm	2340 mm	2680 mm
Number of beams		8	16	24	32	40	48	56	64
Beam spacing	42.5 mm	◆	◆	◆	◆	◆	◆	◆	◆
Obstacle size	26 mm for triple crossing of beams, see diagram	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IREL	◆	◆	◆	◆	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	± 8 °	◆	◆	◆	◆	◆	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED green: power on LED yellow (emitter) flashes when stability control is insufficient, otherwise on, LED yellow (receiver) flashes when the beam field is interrupted, otherwise off	◆	◆	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆	◆	◆
Operating voltage	15 ... 30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆	◆	◆
Power consumption	max. 7 W	◆	◆	◆	◆	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof (beam field). 4 pnp, short-circuit proof, light on (height monitoring)	◆	◆	◆	◆	◆	◆	◆	◆
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Switching current	200 mA	◆	◆	◆	◆	◆	◆	◆	◆
Switching frequency		40 Hz	20 Hz	13 Hz	10 Hz	8 Hz	6 Hz	5 Hz	5 Hz
Response time	for triple crossing of beams	12 ms	24 ms	36 ms	48 ms	60 ms	72 ms	84 ms	96 ms
Timer function	Off-delay programmable from 0 ... 1.25 s in 5 ms steps	◆	◆	◆	◆	◆	◆	◆	◆
Test input	emitter deactivation with +U _B on terminal 3 or -U _B on terminal 4	◆	◆	◆	◆	◆	◆	◆	◆
Function input	RS 232 interface for system programming	◆	◆	◆	◆	◆	◆	◆	◆
Ambient temperature	-10 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +70 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP50	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	Terminal compartment Pg9 with screw terminals	◆	◆	◆	◆	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	PMMA	◆	◆	◆	◆	◆	◆	◆	◆
Mass	(device)	700 g	1100 g	1500 g	1900 g	2300 g	2700 g	3100 g	3500 g
Dimensions	1067 x 45 x 38 mm (W x H x D)			◆					
	1407 x 45 x 38 mm (W x H x D)				◆				
	1747 x 45 x 38 mm (W x H x D)					◆			
	2087 x 45 x 38 mm (W x H x D)						◆		
	2427 x 45 x 38 mm (W x H x D)							◆	
	2767 x 45 x 38 mm (W x H x D)								◆
	387 x 45 x 38 mm (W x H x D)	◆							
	727 x 45 x 38 mm (W x H x D)		◆						



Diagrams

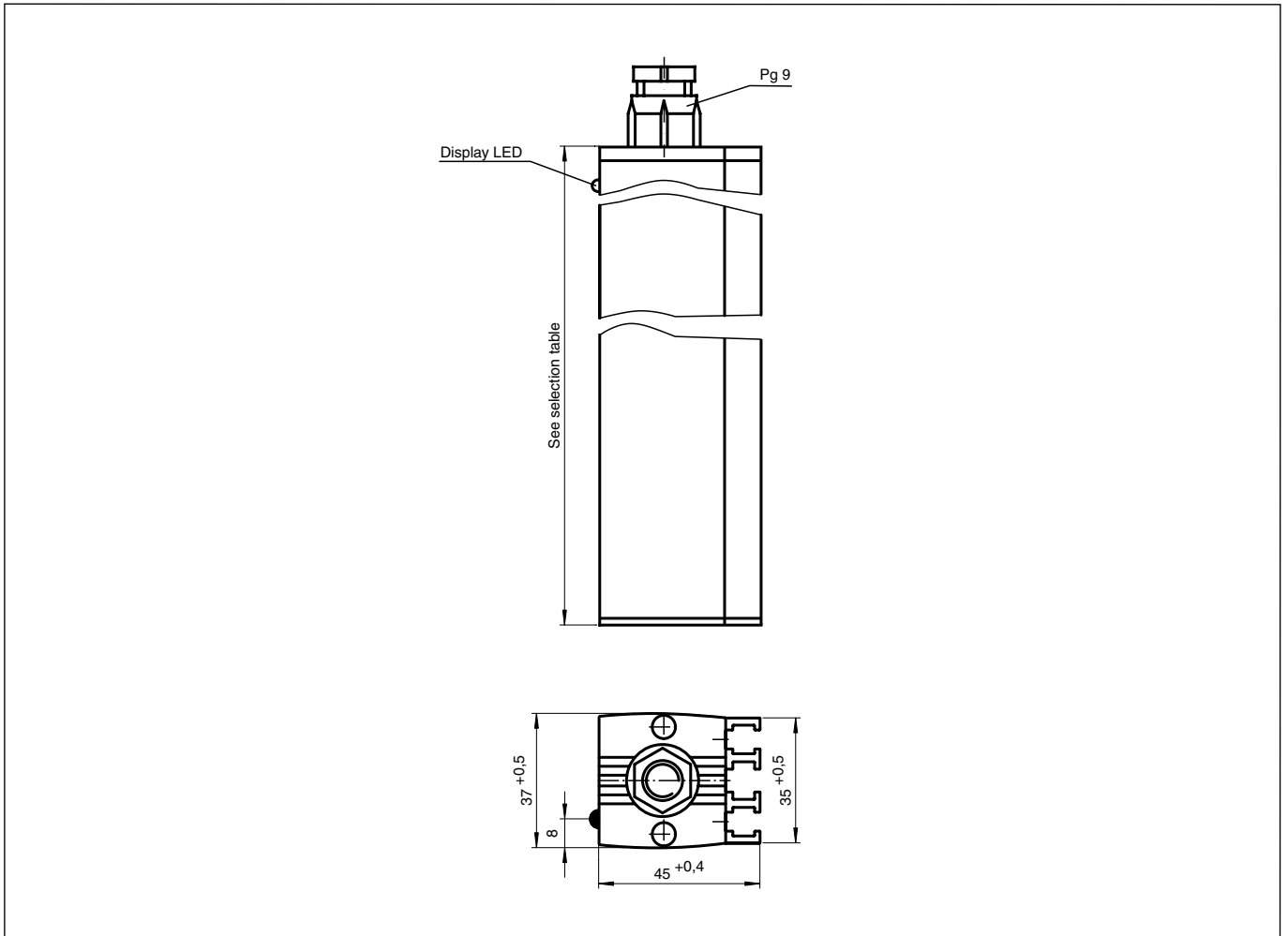


Electrical Connection



Light Grids

Dimensions



Selection table

Height of the protected area	Number of emitters	Housing length
300 mm	8	387 mm
640 mm	16	727 mm
980 mm	24	1067 mm
1320 mm	32	1407 mm
1660 mm	40	1747 mm
2000 mm	48	2087 mm
2340 mm	56	2427 mm
2680 mm	64	2767 mm

Arrangement and function

The PLVscan series consists of high-resolution single-path grid light-beam switches for surface-covering monitoring of a protected area and for profile monitoring. Even small objects in surfaces with large areas can be detected with high resolution. The switching command is initiated if an object is present in the protected area or if it has penetrated.

The housings consist of two aluminum section bars that are each equipped with infrared emitters or receivers. The control interface is integrated into the bars. The emitter bar and the receiver bar communicate via an RS 485-Interface. The RS485 A and B connections of the emitter and receiver must be connected by a highly twisted cable. The receiver has separate outputs for height monitoring.

LED functional displays

A green LED for function display of Power ON and a yellow Status LED with a diagnostic function are located on the connection side of the profiles behind the optical system covering.

In normal operation, the yellow LED in the emitter is continuously lit if there is sufficient functional reserve.

The yellow LED in the receiver indicates the switching state of the light grid.

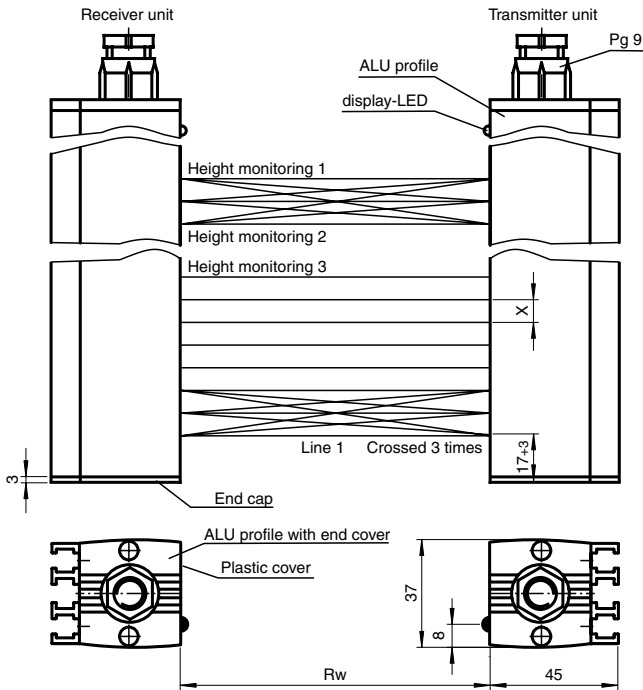
Diagnostic function of the yellow LED

Function	Diagnostic description
The LED of the emitter is lit statically. The LED of the receiver is not lit.	Normal status with free protected area, system is active, all light lines are free and have sufficient function reserve.
LED of the emitter is flashing.	Insufficient function reserve because of poor alignment of the light grid, receiver or RS 485 bus is incorrectly connected.
LED of the receiver not lit, output protected area active.	Emitter or RS bus connected incorrectly.
LED of the receiver flashes, output protected area active.	At least one light line is covered.
LED on the receiver is flashing (about 2 Hz).	The system is in test mode and the programming connector is plugged in.
LED on the receiver is flashing quickly (about 7 Hz).	No valid values in EEPROM or the system is not programmed⇒ Re-program.
LED on the receiver flashes continuously.	The system is in programming mode.

Resolution and beam distance

The mechanical beam distance determines the smallest size of object that can still be detected. For PLVscan-P.../42/... the beam distances are 42.5 mm (see illustration, dimension X). The resolution of the light grid can be increased by crossing light beams. The detection ranges can be adjusted on the transmission unit with a potentiometer.

The units are delivered without any programming for height monitoring. The course of the beam is not crossed.

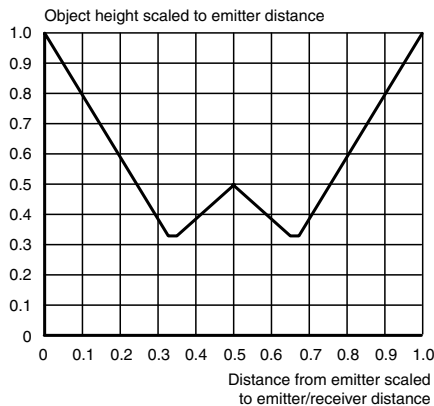


Representation of the course of the beam as straight/crossed, design example with three light lines for height monitoring

Resolution of the crossed beam arrangement

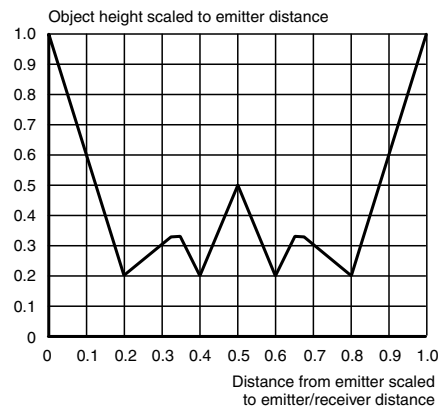
Triple crossing

If a triple crossing of beams is programmed, the resolution is increased. To be able to use the increased resolution, you should select the distance between the emitter and receiver so that the resolution that is offered is actually used in the work area. For a triple crossing this means that the increased resolution is available after 25% of the emitter or receiver distance RW. You must therefore ensure that all objects fit with the emitter or receiver with a distance of this magnitude.



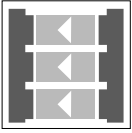
Five-fold crossing

If a five-fold crossing of beams is programmed, the resolution is increased. To be able to use the increased resolution, you should select the distance between the emitter and receiver so that the resolution that is offered is actually used in the work area. For a 5-fold crossing, this means that the increased resolution is available after 15 % of the emitter or receiver distance RW. You must therefore ensure that all objects fit with the emitter or receiver with a distance of this magnitude.



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Light Grids



PLVscan P .../20/48/K-/50/4538/1

Profile light grid

PLVscan P .../20/48/K-/50/4538/1

with terminal compartment

CE



- ◆ Detection range up to 11 m
- ◆ Beam spacing 48 mm
- ◆ Light grid for profile monitoring
- ◆ Application specific, available in various lengths
- ◆ Separate outputs for height monitoring
- ◆ Parameterisable via Windows software
- ◆ Made suitable for measuring purposes by RS 232 interface
- ◆ Rugged housing

Light Grids

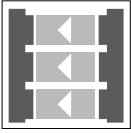
For mounting aids and other accessory items refer to chapter "accessories".

Ordering code		PLVscan P 08P/429/340/20/48/K-/50/4538/1	PLVscan P 16P/817/728/20/48/K-/50/4538/1	PLVscan P 24P/1205/1116/20/48/K-/50/4538/1	PLVscan P 32P/1593/1504/20/48/K-/50/4538/1	PLVscan P 40P/1981/1892/20/48/K-/50/4538/1	PLVscan P 48P/2369/2280/20/48/K-/50/4538/1	PLVscan P 56P/2757/2668/20/48/K-/50/4538/1	PLVscan P 64P/3145/3056/20/48/K-/50/4538/1
Effective detection range	3000 ... 8000 mm	◆	◆	◆	◆	◆	◆	◆	◆
Threshold detection range	11 m	◆	◆	◆	◆	◆	◆	◆	◆
Sensing range	0 ... 8000 mm	◆	◆	◆	◆	◆	◆	◆	◆
Field height		340 mm	728 mm	1116 mm	1504 mm	1892 mm	2280 mm	2628 mm	3056 mm
Number of beams		8	16	24	32	40	48	56	64
Beam spacing	48.5 mm	◆	◆	◆	◆	◆	◆	◆	◆
Obstacle size	30 mm for triple crossing of beams, see diagram	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IREC	◆	◆	◆	◆	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	± 8 °	◆	◆	◆	◆	◆	◆	◆	◆
Ambient light limit	50000 Lux	◆	◆	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
Function display	LED green: power on LED yellow (emitter) flashes when stability control is insufficient, otherwise on, LED yellow (receiver) flashes when the beam field is interrupted, otherwise off	◆	◆	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆	◆	◆
Operating voltage	15 ... 30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Ripple	10 %	◆	◆	◆	◆	◆	◆	◆	◆
Power consumption	max. 7 W	◆	◆	◆	◆	◆	◆	◆	◆
Signal output	2 pnp antivalent, short-circuit proof (beam field). 4 pnp, short-circuit proof, light on (height monitoring)	◆	◆	◆	◆	◆	◆	◆	◆
Switching type	light/dark switching	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	30 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Switching current	200 mA	◆	◆	◆	◆	◆	◆	◆	◆
Switching frequency		40 Hz	20 Hz	13 Hz	10 Hz	8 Hz	6 Hz	5 Hz	5 Hz
Response time	for triple crossing of beams	12 ms	24 ms	36 ms	48 ms	60 ms	72 ms	84 ms	96 ms
Timer function	Off-delay programmable from 0 ... 1.25 s in 5 ms steps	◆	◆	◆	◆	◆	◆	◆	◆
Test input	emitter deactivation with +U _B on terminal 3 or -U _B on terminal 4	◆	◆	◆	◆	◆	◆	◆	◆
Function input	RS 232 interface for system programming	◆	◆	◆	◆	◆	◆	◆	◆
Ambient temperature	-10 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +70 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP50	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	Terminal compartment Pg9 with screw terminals	◆	◆	◆	◆	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	PMMA	◆	◆	◆	◆	◆	◆	◆	◆
Mass	(device)	800 g	1200 g	1600 g	2000 g	2400 g	2800 g	3200 g	3600 g
Dimensions	429 x 45 x 38 mm (W x H x D)	◆							
	1205 x 45 x 38 mm (W x H x D)			◆					
	1593 x 45 x 38 mm (W x H x D)				◆				
	1981 x 45 x 38 mm (W x H x D)					◆			
	2369 x 45 x 38 mm (W x H x D)						◆		
	2757 x 45 x 38 mm (W x H x D)							◆	
	3145 x 45 x 38 mm (W x H x D)								◆
	817 x 45 x 38 mm (W x H x D)		◆						

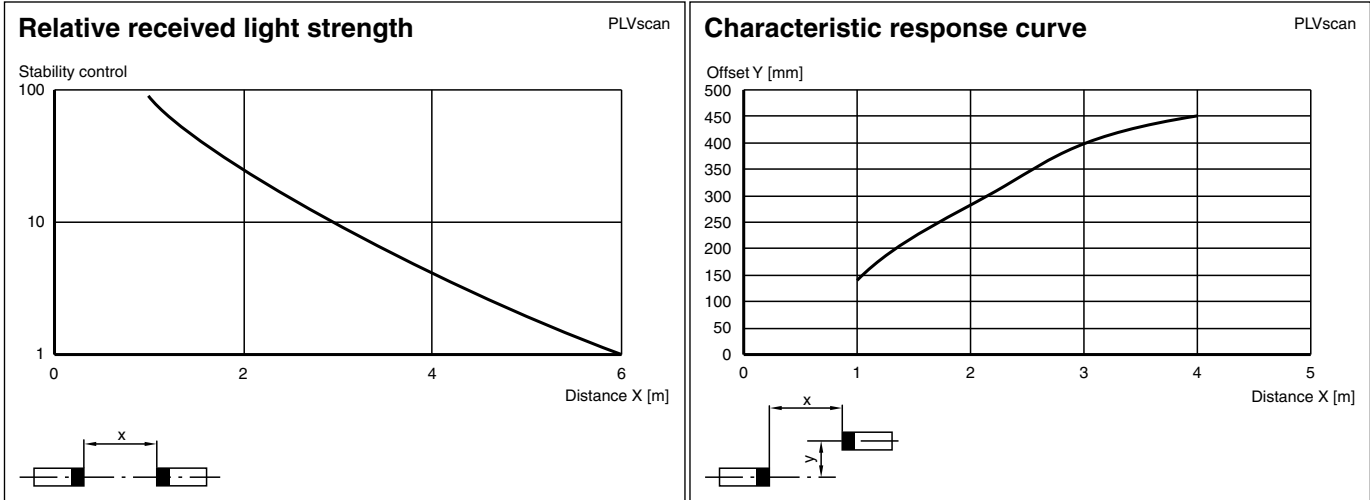
Light Grids

10/15/01

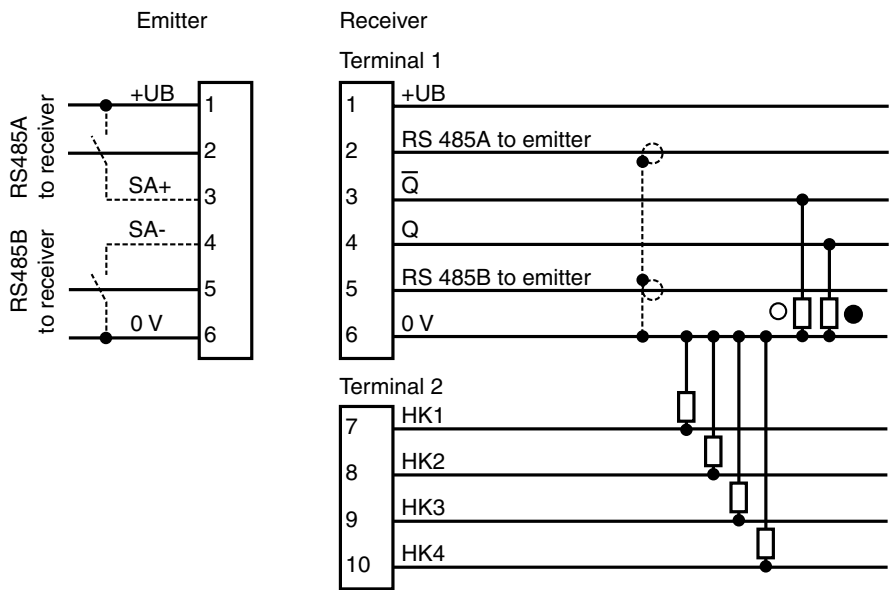
Date of issue



Diagrams

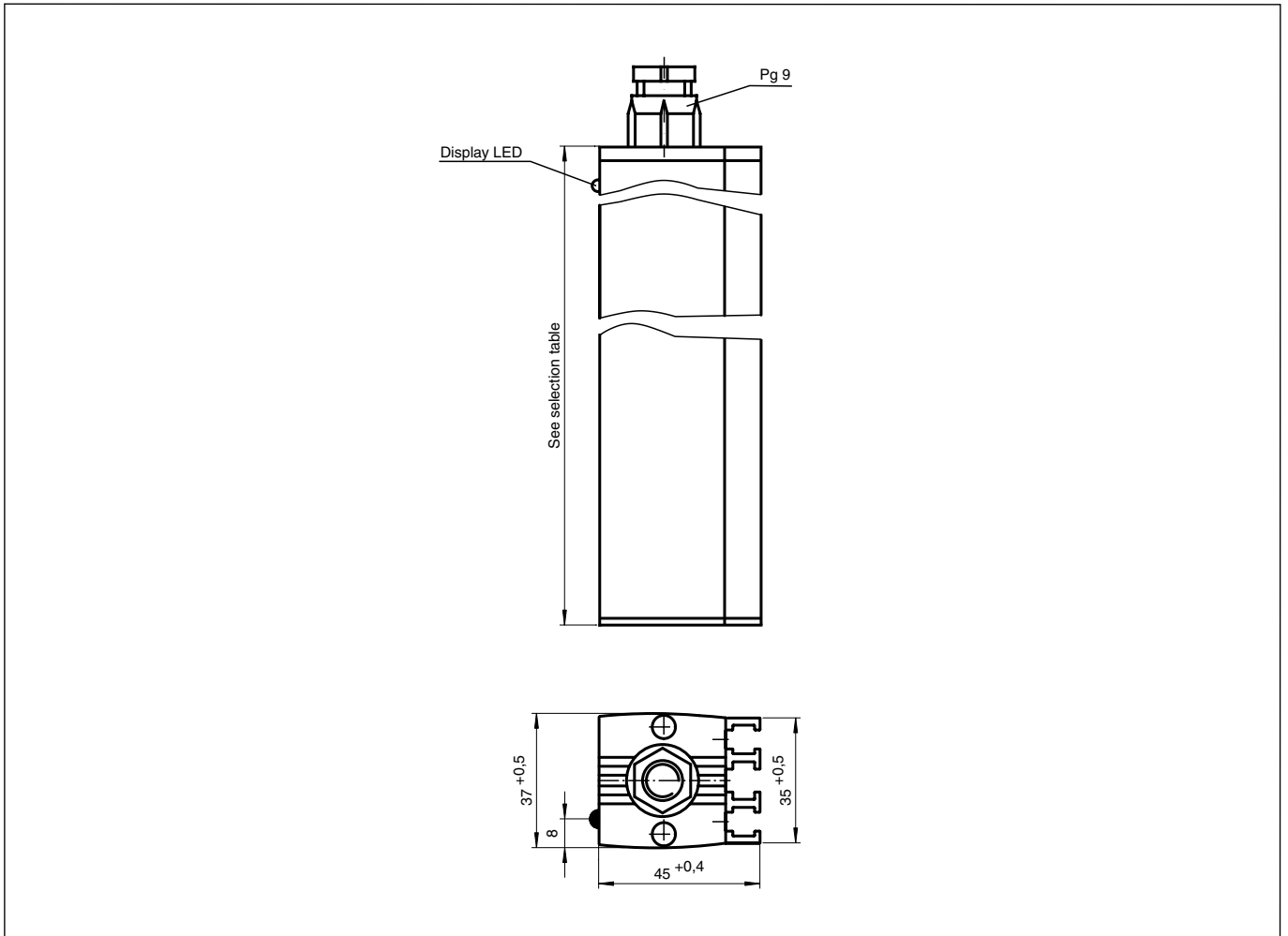


Electrical Connection



Light Grids

Dimensions



Selection table

Height of the protected area	Number of emitters	Housing length
340 mm	8	429 mm
728 mm	16	817 mm
1116 mm	24	1205 mm
1504 mm	32	1593 mm
1892 mm	40	1981 mm
2280 mm	48	2369 mm
2628 mm	56	2757 mm
3056 mm	64	3145 mm

Arrangement and function

The PLVscan series consists of high-resolution single-path grid light-beam switches for surface-covering monitoring of a protected area and for profile monitoring. Even small objects in surfaces with large areas can be detected with high resolution. The switching command is initiated if an object is present in the protected area or if it has penetrated.

The housings consist of two aluminum section bars that are each equipped with infrared emitters or receivers. The control interface is integrated into the bars. The emitter bar and the receiver bar communicate via an RS 485-Interface. The RS485 A and B connections of the emitter and receiver must be connected by a highly twisted cable. The receiver has separate outputs for height monitoring.

LED functional displays

A green LED for function display of power ON and a yellow status LED with a diagnostic function are located on the connection side of the profiles behind the optical system covering.

In normal operation, the yellow LED in the emitter is continuously lit if there is sufficient functional reserve.

The yellow LED in the receiver indicates the switching state of the light grid.

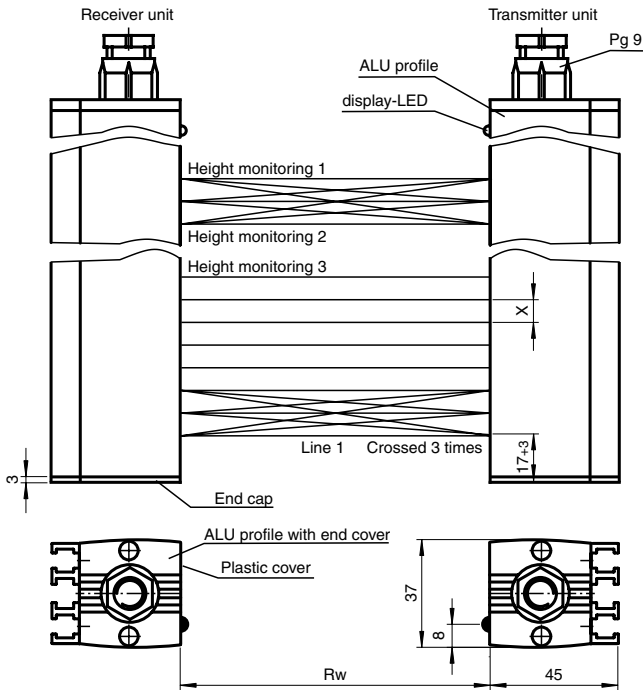
Diagnostic function of the yellow LED

Function	Diagnostic description
The LED of the emitter is lit statically. The LED of the receiver is not lit.	Normal status with free protected area, system is active, all light lines are free and have sufficient function reserve.
LED of the emitter is flashing.	Insufficient function reserve because of poor alignment of the light grid, receiver or RS485 bus is incorrectly connected.
LED of the receiver not lit, output protected area active.	Emitter or RS bus connected incorrectly.
LED of the receiver flashes, output protected area active.	At least one light line is covered.
LED on the receiver is flashing (about 2 Hz).	The system is in test mode and the programming connector is plugged in.
LED on the receiver is flashing quickly (about 7 Hz).	No valid values in EEPROM or the system is not programmed ⇒ Re-program.
LED on the receiver flashes continuously.	The system is in programming mode.

Resolution and beam distance

The mechanical beam distance determines the smallest size of object that can still be detected. For PLVscan-P.../48/... the beam distances are 48.5 mm (see illustration, dimension X). The resolution of the light grid can be increased by crossing light beams. The detection ranges can be adjusted on the transmission unit with a potentiometer.

The units are delivered without any programming for height monitoring. The course of the beam is not crossed.

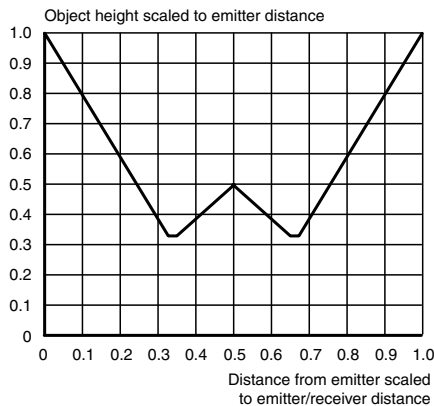


Representation of the course of the beam as straight/crossed, design example with three light lines for height monitoring

Resolution of the crossed beam arrangement

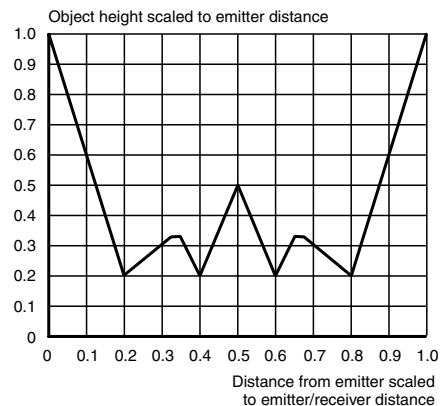
Triple crossing

If a triple crossing of beams is programmed, the resolution is increased. To be able to use the increased resolution, you should select the distance between the emitter and receiver so that the resolution that is offered is actually used in the work area. For a triple crossing this means that the increased resolution is available after 25% of the emitter or receiver distance RW. You must therefore ensure that all objects fit with the emitter or receiver with a distance of this magnitude.



Five-fold crossing

If a five-fold crossing of beams is programmed, the resolution is increased. To be able to use the increased resolution, you should select the distance between the emitter and receiver so that the resolution that is offered is actually used in the work area. For a five-fold crossing this means that the increased resolution is available after 15 % of the emitter or receiver distance RW. You must therefore ensure that all objects fit with the emitter or receiver with a distance of this magnitude.



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Light Grids



Data transmission light beam switches

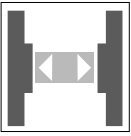


Data transmission light beam switches are the first choice wherever there is a communication with vehicles such as control operating devices (COD), processing cars, unmanned transport systems (UTS) or suspended electrical tracks (SET). They ensure a problem-free data exchange also over great distances.

The interfaces used in the different control concepts are shown in our product program. We offer solutions with standard interfaces for point-to-point connections as well as for fieldbus systems such as PROFIBUS and INTERBUS often used in the industry.

Typical for all these devices are robust design as well as easy handling, e.g. concerning the used method of connection, the easy alignment and the enormous reliability.

Principle	Type code	Threshold detection range	Page
	DAD10-8P	0 m ... 3 m	976
	DAD30	0 m ... 45 m	982
	LS230-DA	0 m ... 450 m	988
	LS600-DA-P	0 m ... 250 m	994
	LS600-DA-P-1,5	0 m ... 190 m	1000
	LS600-DA-IBS	0 m ... 270 m	1006



DAD10-8-P-...

Data transmission light beam switch

DAD10-8-P-...

CE



- ◆ Detection range up to 5 m
- ◆ 8 bit parallel data transfer
- ◆ Very large angle of divergence
- ◆ Operating voltage range
10 V ... 60 V DC
- ◆ Connection with spring-loaded terminals, optional 25-pin sub-D-connector
- ◆ Galvanically isolated inputs
- ◆ Protection degree IP67

Data
Transmission

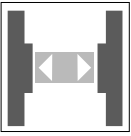
For suitable cable sockets and mounting aids refer to chapter "accessories".

Ordering code		DAD10-8-P	DAD10-8-P/35	DAD10-8-P-SDS	DAD10-8-P-SDS/35	DAD10-8-P-SDB	DAD10-8-P-SDB/35	DAD10-8-P-HD	DAD10-8-P-HD/35
Effective detection range	0 ... 1500 mm	◆		◆		◆		◆	
	0 ... 3000 mm		◆		◆		◆		◆
Threshold detection range	3000 mm	◆		◆		◆		◆	
	5000 mm		◆		◆		◆		◆
Alignment aid	LED green (sufficient stability control)	◆	◆	◆	◆	◆	◆	◆	◆
Interface type	8 bit parallel, bidirectional								
	inputs: 8 opto-coupler	◆	◆	◆	◆	◆	◆	◆	◆
	Outputs: 8 pnp, not short-circuit proof								
Transmission mode	FSK	◆	◆	◆	◆	◆	◆	◆	◆
Cycle time	3 ms	◆	◆	◆	◆	◆	◆	◆	◆
Light source	IREAD	◆	◆	◆	◆	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆	◆	◆
Angle of divergence	± 20 °	◆		◆		◆		◆	
	± 8 °		◆		◆		◆		◆
Diameter of the light spot	approx. 1250 mm at 1.5 m	◆		◆		◆		◆	
	approx. 600 mm at 2 m		◆		◆		◆		◆
Ambient light limit	5000 Lux	◆	◆	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
Data flow display	Inputs: 8 LEDs red	◆	◆	◆	◆	◆	◆	◆	◆
	outputs: 8 LEDs green:								
Function display	LED green: power on	◆	◆	◆	◆	◆	◆	◆	◆
Pre-fault indication	LED yellow (simple stability control)	◆	◆	◆	◆	◆	◆	◆	◆
Controls	sensitivity adjuster	◆	◆	◆	◆	◆	◆	◆	◆
Controls	coding switch: behavior when light beam is interrupted	◆	◆	◆	◆	◆	◆	◆	◆
Operating voltage	10 ... 60 V DC	◆	◆	◆	◆	◆	◆	◆	◆
No-load supply current	160 mA	◆	◆	◆	◆	◆	◆	◆	◆
Operation frequency	232 kHz	◆	◆	◆	◆	◆	◆	◆	◆
Data sampling blanking	Enable input transmitter deactivation	◆	◆	◆	◆	◆	◆	◆	◆
Data rate	2400 Bit/s	◆	◆	◆	◆	◆	◆	◆	◆
Switching voltage	max. 60 V DC	◆	◆	◆	◆	◆	◆	◆	◆
Switching current	max. 100 mA	◆	◆	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	1 pnp (switches if there is sufficient stability control)	◆	◆	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP42			◆	◆	◆	◆		
	IP67	◆	◆					◆	◆
Connection type	2 PG9-screwed connections, spring-loaded terminals in the terminal space	◆	◆						
	25-pin sub-D connector			◆	◆				
	25-pin sub-D socket					◆	◆		
	for top hat rail mounting with 25-pin sub-D socket							◆	◆
Housing	Terluran, black	◆	◆	◆	◆	◆	◆	◆	
Light exit	Glass	◆	◆	◆	◆	◆	◆	◆	
Mass	170 g	◆	◆	◆	◆	◆	◆	◆	

Data Transmission

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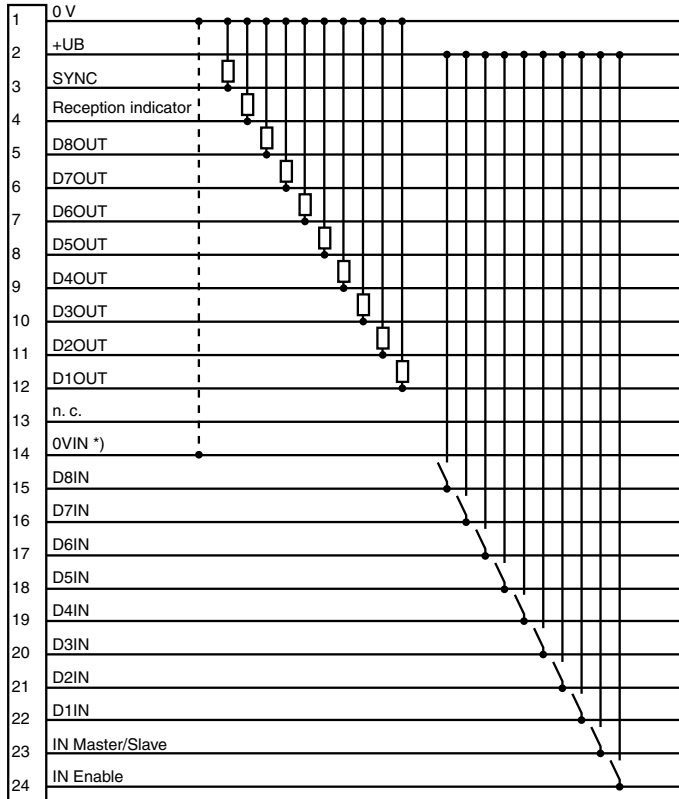
Date of issue



DAD10-8-P-...

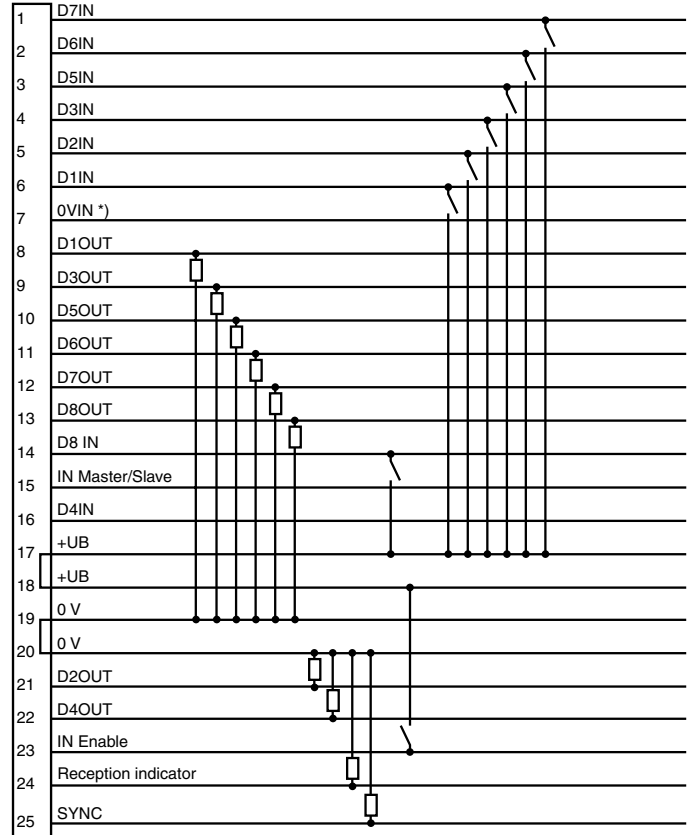
Electrical connection

Version DAD10-8P(35) and ...-HD...



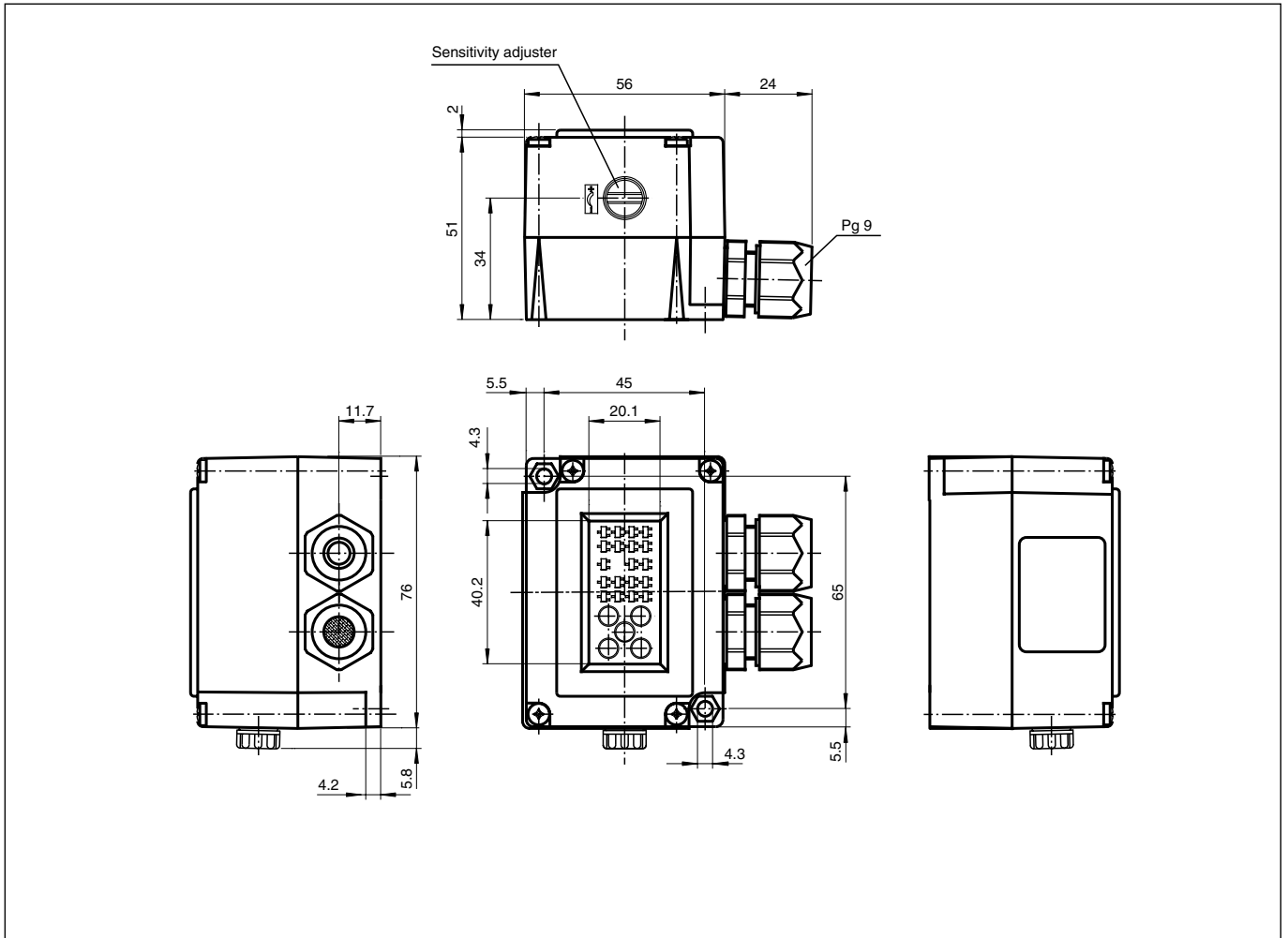
*) Reference potential for data inputs

Version ...-SDS... and ...-SDB...

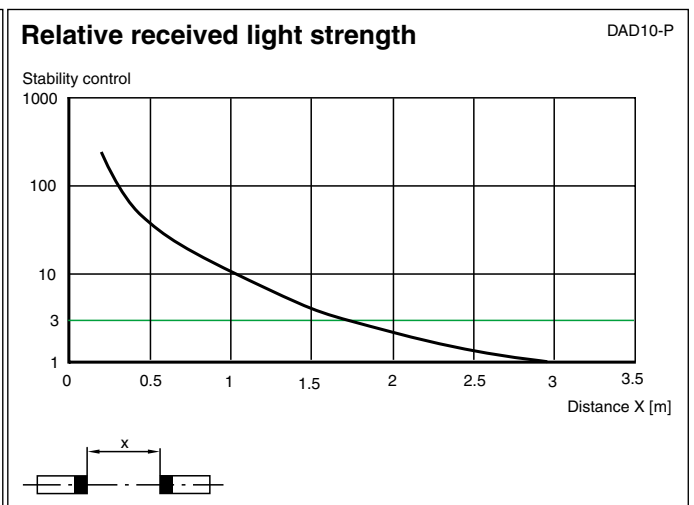
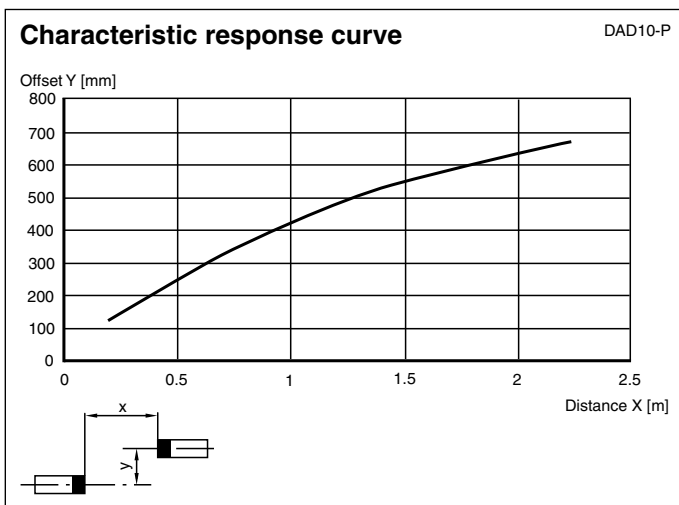


*) Reference potential for data inputs

Dimensions



Diagrams



10/15/01

Date of issue

Function

Data words that are 8 bits wide can be transferred bidirectionally with the DAD 10-8P. Two devices are required to set up a transmission route.

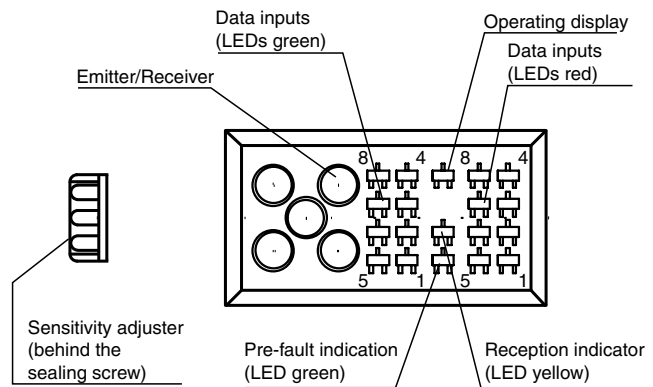
All parallel applied binary control signals at the inputs D1 ... D8 are converted serially into an 8-bit string in the device and transmitted via the light transmission link. In the receiver the signals are converted into parallel data again and applied to the outputs D1 ... D8. An interference immune FSK modulation is used for transmission. The complete cycle for the successive transmission of both current 8-bit words in both directions using the time-multiplex procedure takes 3 ms. The last data received is stored and provided at the outputs until the next modification.

Function display

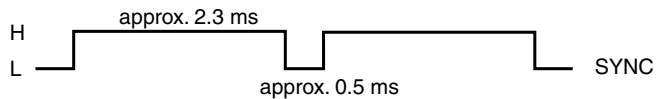
The states of the data inputs and outputs are displayed with LEDs. The states of the data inputs are displayed with green LEDs, while those of the data outputs are displayed with red LEDs. Lit up indicates an active status. The reception display – (yellow LED) and the function reserve display (yellow/green LED) are located between the data input and data output LEDs.

Notes on the function display:

- LED yellow: Single function reserve
- LED green: Sufficient function reserve



The SYNC output indicates the times at which the input data is read (positive signal edge) or when the output data is valid (negative signal edge).



Output behavior when the beam of light is interrupted

The behavior of the data outputs when the light beam is interrupted is set with a switch.

- Switch position 1: Data outputs are turned off
- Switch position 2: The last data received remains at the outputs.

The switch is found on the back of the electronics unit.

Mode of operation Master/Slave

A high-level ENABLE input (enable input) is required to operate the DAD10-8P. If a low level is present on the ENABLE input, the emitter is turned off.

If the emitter is turned off for MASTER, the SLAVE emitter is also turned off automatically.

If the emitter is turned off for SLAVE, the MASTER device continues to send data, which the SLAVE device receives.

Arrangement and mounting

The DAD10-8P data transfer optical barrier consists of an upper and a lower section, with 4 varieties available for the lower section

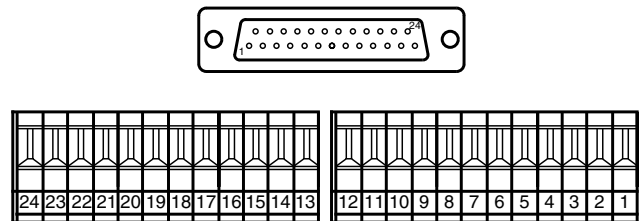
- standard: two PG9 screwed connections on the bottom of the housing
- with 25-pin Sub-D-socket
- with 25-pin Sub-D-socket
- for top hat rail mounting

Two pass-through mounting holes for M5 screws are provided in the housing for mounting.

Because of the very large angle of divergence of the emitter and receiver optics, the light beam switch also works with a very large lateral offset between the two units. For this reason, a rough alignment of the devices performed with the LED function display is sufficient.

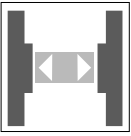
The leads are connected to the spring-loaded terminals in the lower section of the housing according to the assignment diagram. For devices with connector the electrical connection is carried out by means of a 25-pin Sub-D connector or a socket. After that, the upper section of the housing is fastened in place with 4 screws.

Connections:



Accessories:

Mounting bracket OMH-DAD10



DAD30-...

Data transmission light beam switch

DAD30-...

CE



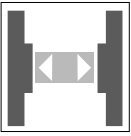
- ◆ Detection range up to 150 m
- ◆ compact, flat aluminium housing
- ◆ 3 interfaces in a device can be selected via DIP switches
- ◆ wide-angle version available
- ◆ Infrared and red light devices for parallel routes
- ◆ Mating connector with protective cover included delivery

Data
Transmission

For suitable cable sockets and mounting aids refer to chapter "accessories".

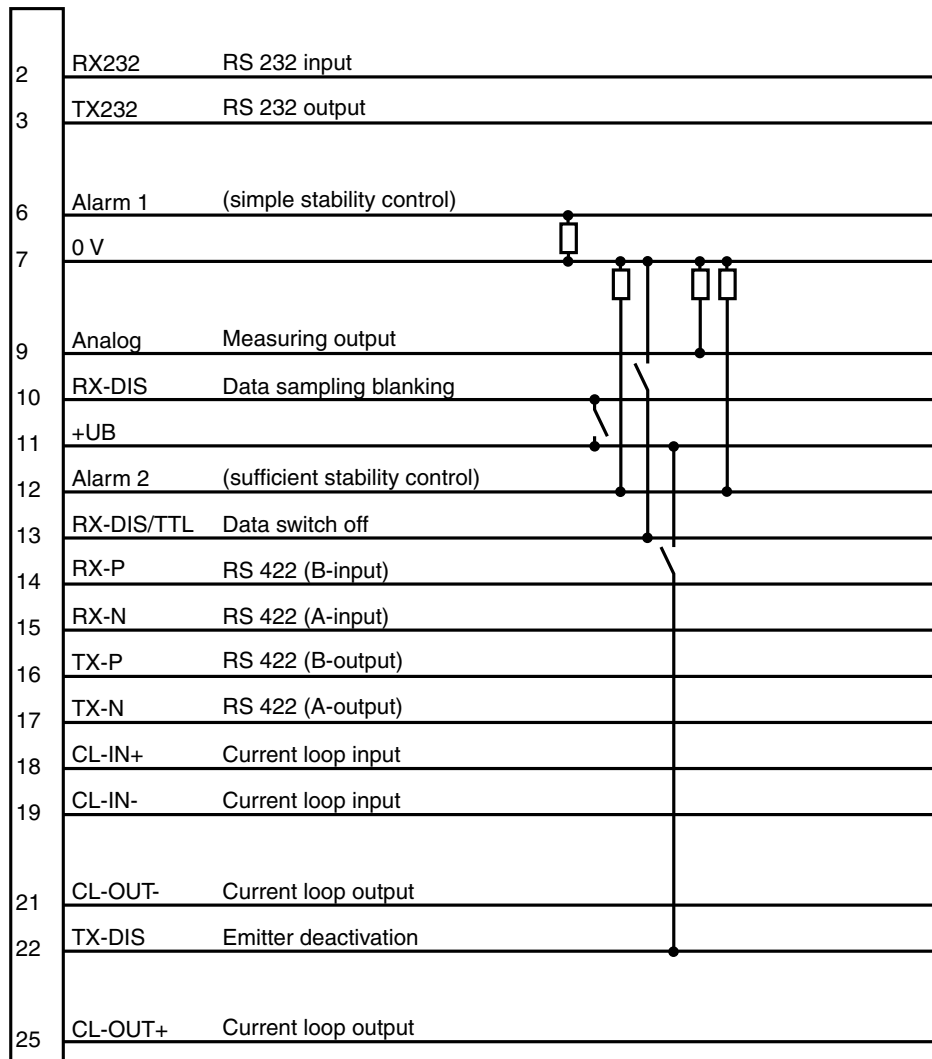
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Ordering code		DAD30	DAD30/35	DAD30-W	DAD30-RT	DAD30-RT/35	DAD30-RT-W
Effective detection range	0 ... 100 m		◆			◆	
	0 ... 15 m			◆			◆
	0 ... 30 m	◆			◆		
Threshold detection range	150 m		◆			◆	
	20 m			◆			◆
	45 m	◆			◆		
Alignment aid	with function display	◆	◆	◆	◆	◆	◆
Interface type	RS 232, RS 422, CL20 mA active/passive switchable	◆	◆	◆	◆	◆	◆
Transmission mode	FSK	◆	◆	◆	◆	◆	◆
Response delay	40 µs	◆	◆	◆	◆	◆	◆
Light source	IREd	◆	◆	◆	◆	◆	◆
Light type	Red, alternating light				◆	◆	◆
	Infrared, alternating light	◆	◆	◆			
Angle of divergence	emitter: 1 ° Receiver: 5 °	◆	◆		◆	◆	
	emitter: 16 ° Receiver: 16 °			◆			◆
Diameter of the light spot	1800 mm at a distance of 100 m		◆			◆	
	4200 mm at a distance of 15 m			◆			◆
	500 mm at a distance of 30 m	◆			◆		
Ambient light limit	30000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Function display	LED red: switch point	◆	◆	◆	◆	◆	◆
	LED green: sufficient stability control	◆	◆	◆	◆	◆	◆
Pre-fault indication	with function display	◆	◆	◆	◆	◆	◆
Controls	8-fold DIP-switch for selection of transmission frequency and interface	◆	◆	◆	◆	◆	◆
Operating voltage	24 V DC ± 25 %	◆	◆	◆	◆	◆	◆
No-load supply current	200 mA	◆	◆	◆	◆	◆	◆
Operation frequency	F1 = 83 kHz F2 = 118 kHz	◆	◆	◆	◆	◆	◆
Data sampling blanking	Input for incoming data blanking with +24 V DC	◆	◆	◆	◆	◆	◆
Data rate	0 ... 19.2 kBit/s	◆	◆	◆	◆	◆	◆
Measurement output	+1.8 ... 5.8 V DC, max. 10 mA,	◆	◆	◆	◆	◆	◆
	simple stability control: 2.5 V triple stability control: 4.2 V						
Output of the pre-fault indication	2 pnp-outputs, short-circuit proof, 30 V DC 0.1 A activated for single or sufficient stability control	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆	◆	◆	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆
Connection type	25-pin sub-D-connector	◆	◆	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆	◆	◆
Light exit	Glass			◆			◆
	Plastic lens	◆	◆		◆	◆	
Mass	500 g	◆	◆	◆	◆	◆	◆

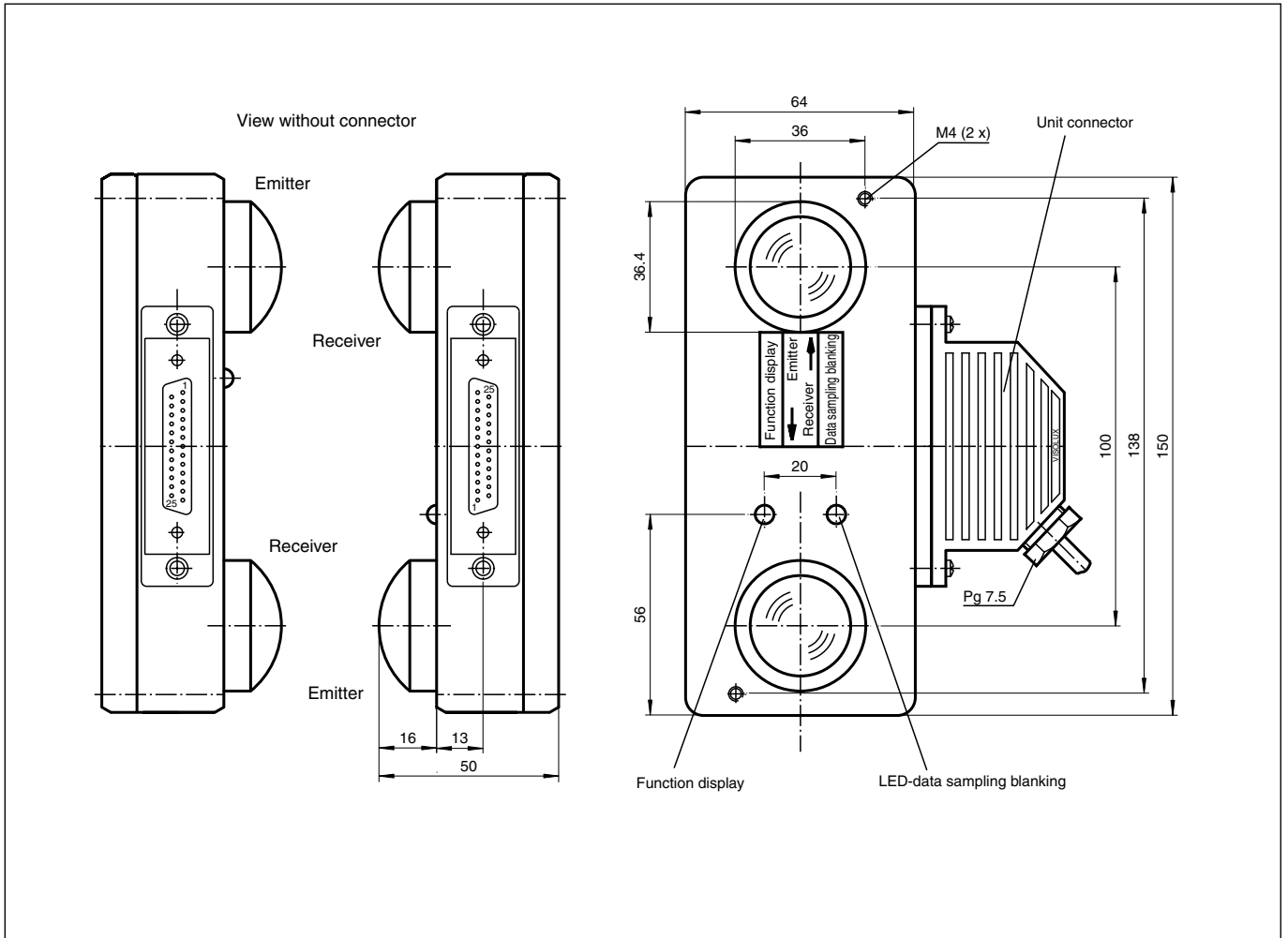


Electrical connection

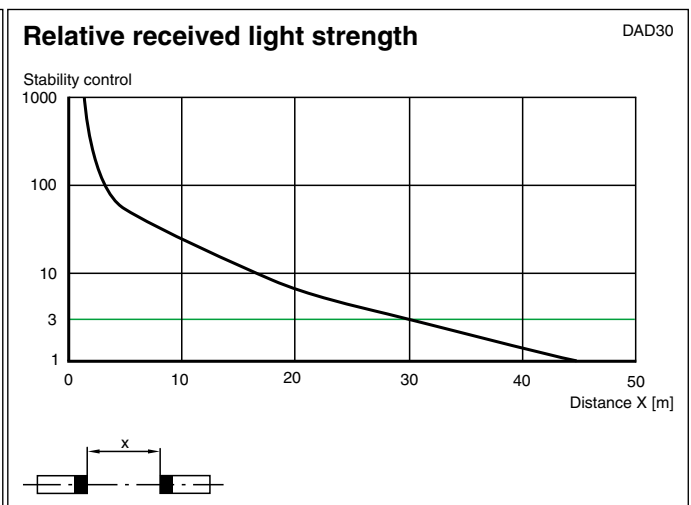
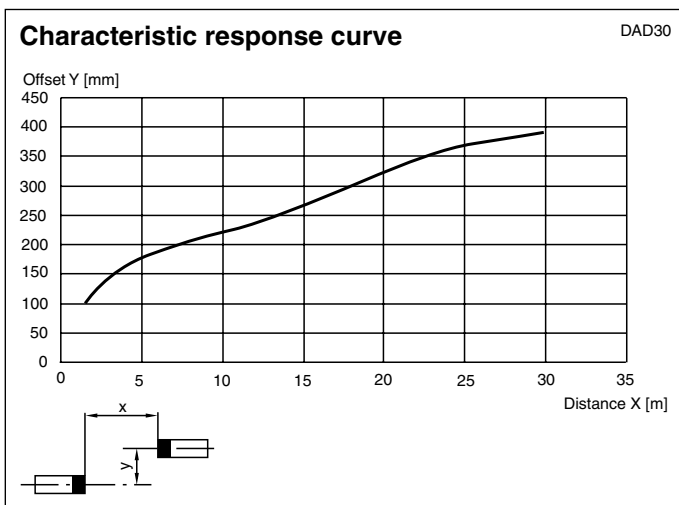
Option:



Dimensions



Diagrams



Data Transmission

Function

The DAD 30 is a device for serial data transfer for data rates up to 19.2 kBaud and ranges up to 100 m. The device can also be used without problems for data rates and effective operating distances below these values. The transmission is protocol-free. If two full-duplex routes are to be installed in parallel, infrared should be selected for one route and visible emitter light for the other.

Data transfer

In order to avoid mutual interference of the two transfer channels, emitter and receiver of a device are operated at different centre frequencies F1/F2. The frequency is adjusted with the S1 DIP switch..

S1: ON = emitter F1, receiver F2
 OFF = emitter F2, receiver F1

LED functional display / functional reserve

A two-color LED is used as the functional and alignment control. It is lit and red if the level of the received signal is assured for a simple transfer. If the LED is lit and green, sufficient functional reserve is present. The indicator is independent of the data transfer.

Interface

The DAD30 contains a standard interface module for serial transfer. The data lines have to be connected to the corresponding pins of the connector according to the desired interface. All output interfaces are controlled at the same time. To select the input interface, the appropriate DIP switch S4-S6 should be moved to the ON position.

20-mA electrical circuit (CL)

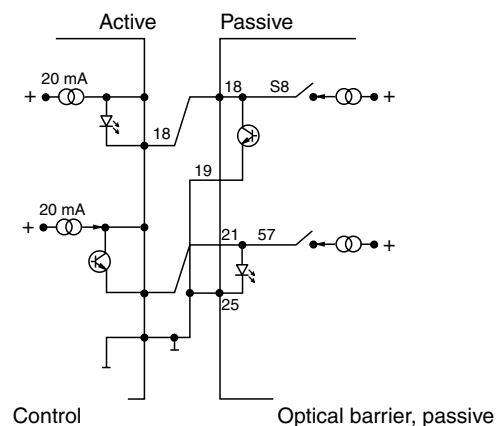
S4: ON = data in, 20 mA current loop

Serial interface with defined current level (Low = 0 mA, High = 20 mA) and for connection to an opposite station. It transfers data on lines over lengths of up to 1 km. With the DAD 30, the 20 mA interfaces can be operated in either active or passive mode.

For the selection the DIP switches S7 and S8 are used.

The interface, that feeds the current is designated as active. Only one of the two communication partners can be active (optical data coupler or control system). By means of the DIP-switches S7 and S8 the DAD 30 can be operated with active as well as with passive CL 20 mA interface. It is also possible to operate one interface in the active mode and the other one in the passive mode.

Example:



S7: ON = input interface active, 20 mA current loop
 OFF= input interface passive

S8: ON = output interface active, 20 mA current loop
 OFF= output interface passive

RS 422

S5: ON = data in, RS 422

Serial voltage interface, suited for rapid transmission over great distances (up to 1.5 km). The logical states can be defined by comparing voltages.

RS 232

S6: ON = data in, RS 232

Serial voltage interface (one or two data lines) with the normal levels in the PC periphery (low = 3 to 15V, high = -3 V to -15 V), in reference to a common ground. It is designed for distances of up to 20 m in range and connection to an opposite station.

Caution! Only one of the switches S4–S6 should be turned on!

With either one S2 or S3 switch, it is possible to invert data signals for special applications.

S2 ON = input signal of the emitter, inverted
OFF = input signal of the emitter, not inverted

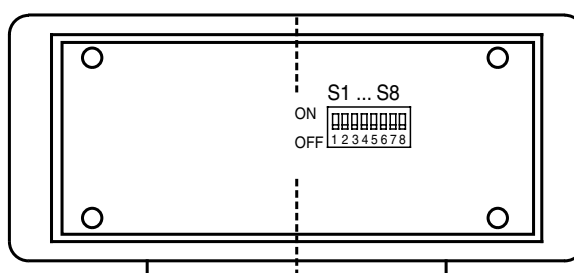
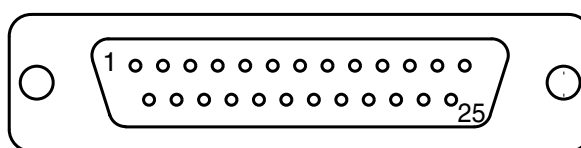
S3 ON = output signal of the receiver, inverted
OFF = output signal of the receiver, not inverted

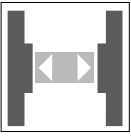
When the light beam is interrupted, the light beam switch on the receiver side goes into pause status. This status is logically high for non-inverted data lines, in other words for the RS 232 – 3 V ... 15 V interface, for the RS 422 interface, the difference in level is under 3 V ($A \leq B$) and for the CL-interface a conducting 20 mA electrical circuit.

All previously defined switching positions can be set with the programming switch (S1-S8), which is located on the print. The programming switch is visible on the print after the housing cover has been removed.

Data blanking receiver

An additional input is available for blanking the received data. This input must be wired with high level (+24 V) to activate blanking. Blanked status is indicated by a red LED.

Connector bar:



LS230-DA-...

Data transmission light beam switch

LS230-DA-...

CE



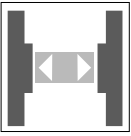
- ◆ Detection range up to 450 m
- ◆ 3 interfaces in a device can be selected via DIP switches
 - RS 232
 - RS 422
 - CL
- ◆ High detection ranges achievable
- ◆ Easy adjustment by integrated alignment LED and finder scope
- ◆ Band display for signal strength
- ◆ Connection with spring-loaded terminals
- ◆ Sturdy aluminium housing
- ◆ Mounting bracket included in delivery

Data
Transmission

For suitable cable sockets and mounting aids refer to chapter "accessories".

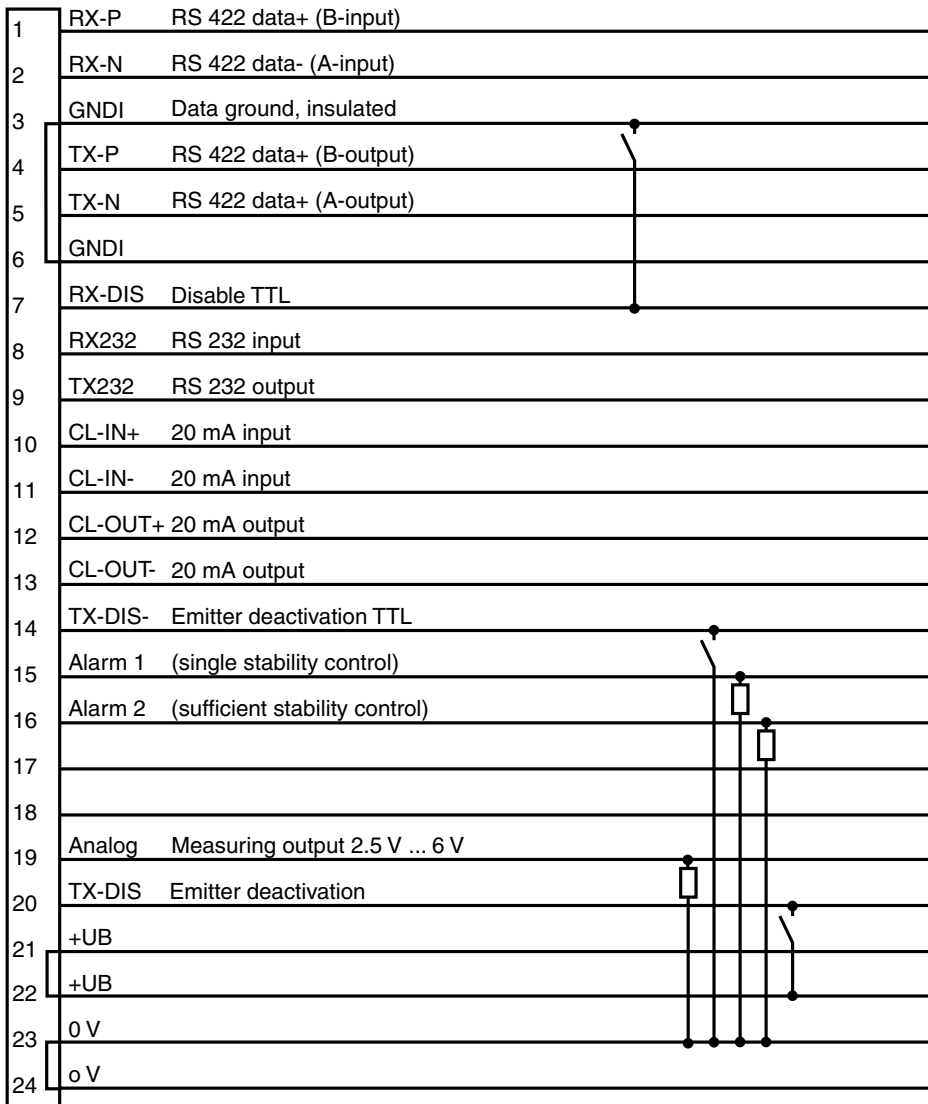
Ordering code		LS230-DA	LS230-DA-RT	LS230-DA-GUF	LS230-DA/35
Effective detection range	0 ... 180 m		◆		
	0 ... 230 m	◆			
	0 ... 350 m			◆	
Threshold detection range	230 m		◆		
	340 m	◆		◆	
	450 m				◆
Alignment aid	Telescopic sight, frontal red LED flashing, off with Signal > sufficient stability control	◆	◆	◆	◆
Interface type	RS 232, RS 422, CL20 mA active/passive switchable	◆	◆	◆	◆
Transmission mode	FSK	◆	◆	◆	◆
Response delay	40 μs	◆	◆	◆	◆
Light source	LED		◆		
	IRED	◆		◆	◆
Light type	Infrared, alternating light	◆		◆	◆
	red		◆		
Angle of divergence	emitter 2 °, receiver 5 °	◆	◆	◆	◆
Diameter of the light spot	6300 mm at a distance of 350 m		◆		◆
	8000 mm at a distance of 230 m	◆		◆	
Ambient light limit	3000 Lux	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆
Data flow display	LED green: emitter	◆	◆	◆	◆
	LED yellow: receiver				
Function display	LED band display 3-color,	◆	◆	◆	◆
	LED red: single switching point				
	LEDs yellow, 4-stage: sufficient switching point				
	LED green: 3-fold switching point				
Pre-fault indication	with function display	◆	◆	◆	◆
Controls	8-fold DIP-switch for selection of transmission frequency and interface in the terminal compartment	◆	◆	◆	◆
Operating voltage	24 V DC ± 25 %				◆
	24 V DC ± 25 %	◆	◆	◆	
No-load supply current	max. 1000 mA			◆	
	250 mA	◆	◆		◆
Operation frequency	F1 = 83 kHz, F2 = 118 kHz	◆	◆	◆	◆
Data sampling blanking	emitter deactivation for +U _B , emitter deactivation TTL-compatible, receiver deactivation TTL-compatible	◆	◆	◆	◆
Data rate	0 ... 19.2 kBit/s	◆	◆	◆	◆
Measurement output	2.5 ... 6 V DC, max. 10 mA, single stability control 3.5 V, Sufficient stability control 5 V	◆	◆	◆	◆
Output of the pre-fault indication	2 pnp-outputs, short-circuit proof, 30 V DC 0.1 A activated for single or sufficient stability control	◆	◆	◆	◆
Ambient temperature	-20 ... +50 °C	◆	◆		◆
	-20 ... +50 °C with heated housing			◆	
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆
Connection type	4 Pg9 screwed connections, spring-loaded terminals in the terminal compartment	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆
Light exit	Plastic lenses, glass disks	◆	◆	◆	◆
Mass	1600 g	◆	◆	◆	◆

Data Transmission



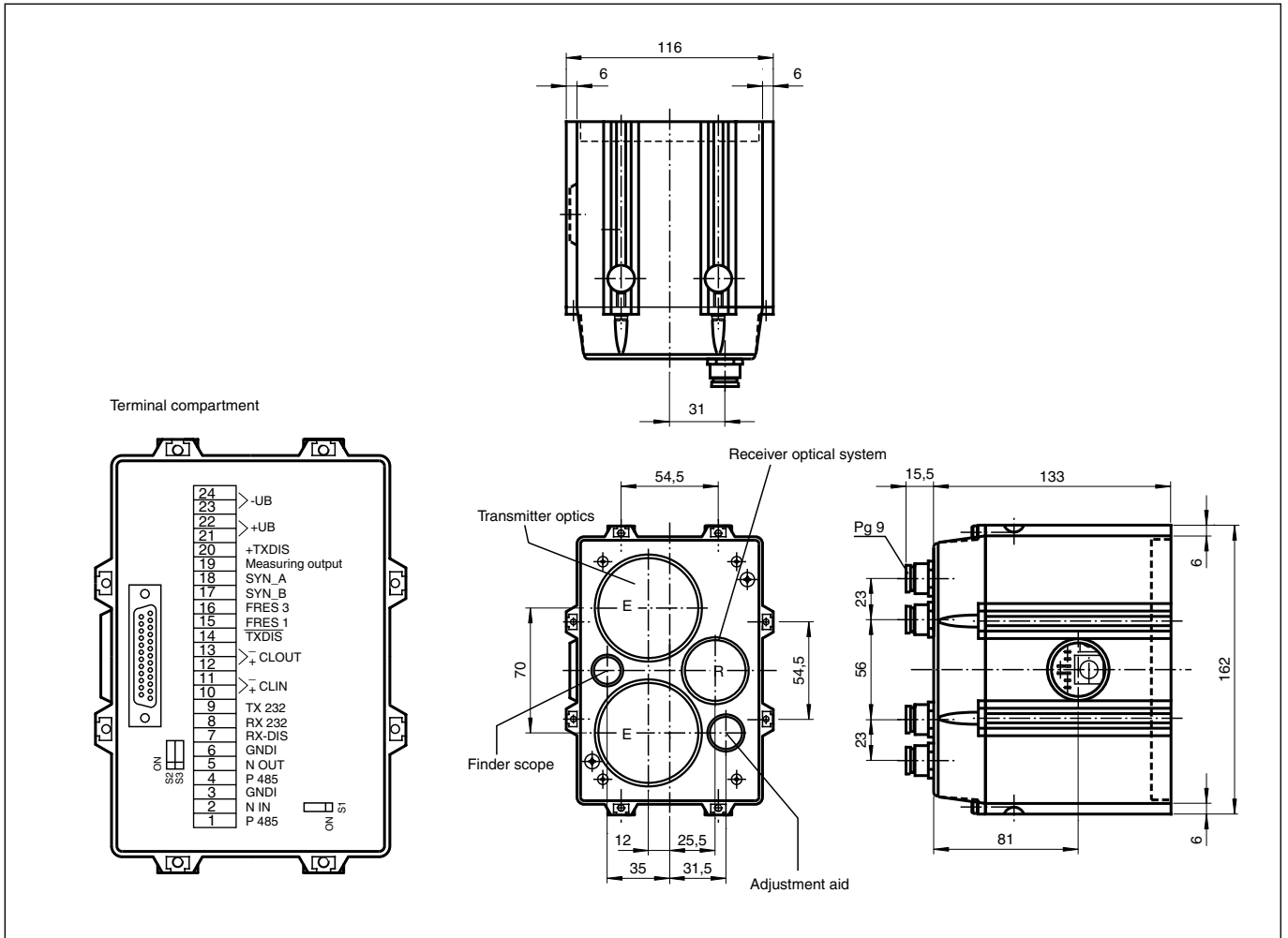
Electrical connection

Option:

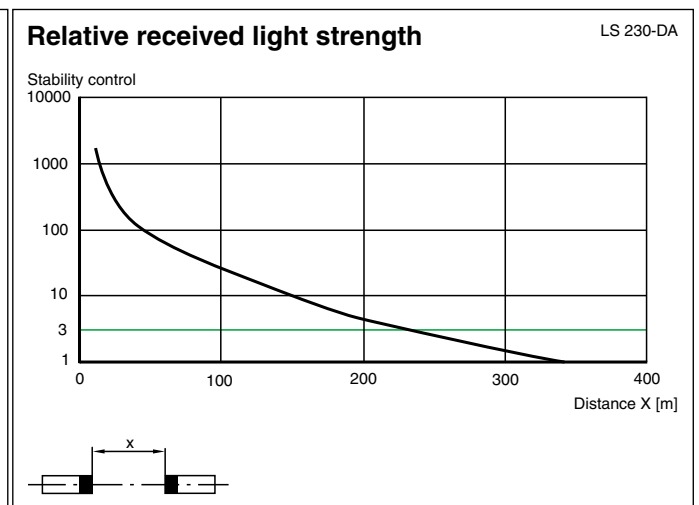
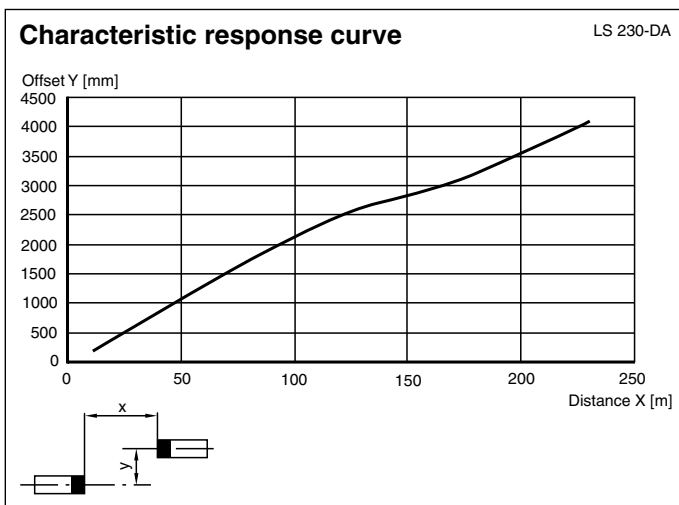


Data
Transmission

Dimensions



Diagrams



10/15/01

Date of issue

Function

The LS230-DA is a device for serial data transfer up to 19.2 kBaud and a detection range up to 100 m. The device can easily be employed at data rates and effective operating distances below of these values. The transfer occurs protocol-free. If two full-duplex routes are to be installed in parallel, infrared should be selected for one route and visible emitter light for the other.

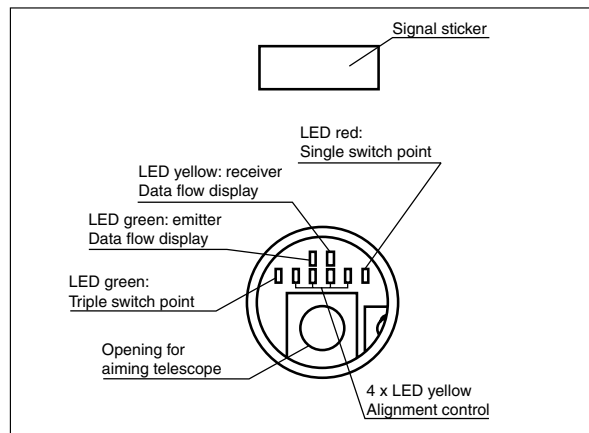
Data transfer

To avoid mutual interference between the two transfer channels, the emitter and receiver of each device are operated with different average frequencies F1/F2. The frequency is adjusted with the S1 DIP switch.

S1: ON = emitter F1, receiver F2
 OFF = emitter F2, receiver F1

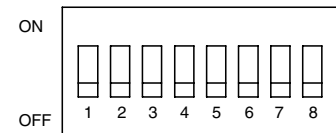
Function display/function reserve

The red LED of the band display lights up if the level of the received signal is sufficient for an error-free transfer. The transfer is enabled beginning at this level. If the green LED lights up, this indicates that sufficient functional reserve has been achieved.



Interface

The LS 230-DA contains a standard interface module for serial transfer. The output interfaces are controlled simultaneously. To select the input interface, the appropriate DIP switch S2-S4 should be moved to the ON position.



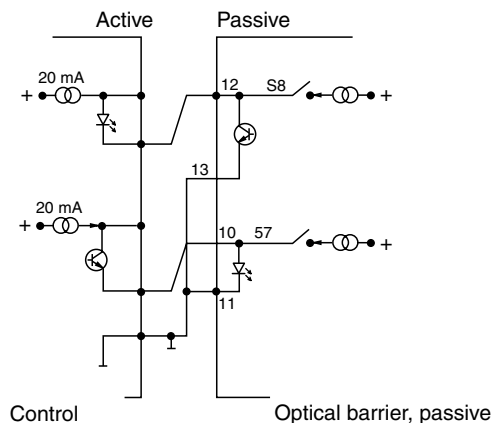
20 mA current loop (CL)

S2: ON = 20 mA current loop

Serial interface with defined current level (low = 0 mA, high = 20 mA) and for connection to an opposite station. It transfers data on lines over lengths of up to 1 km. For the LS-230-DA, the 20 mA interfaces can be operated either in active or in passive mode. This is adjusted with DIP switches S7 and S8.

The interface, that feeds the current is designated as active. Only one of the two communication partners can be active at the same time (optical data coupler or control system). By means of the DIP switches S7 and S8 the DAD 30 can be operated with an active as well as with a passive CL 20 mA interface. It is also possible to operate one interface in the active and one in the passive mode.

Example:



S7: ON = input interface active, 20 mA current loop
 OFF = input interface passive

S8: ON = output interface active, 20 mA current loop
 OFF = output interface passive

Data Transmission

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RS 232

S3 ON = RS 232

Serial voltage interface (one or two data lines) with the normal levels in the PC periphery (low = 3 V to 15 V, high = -3 V to -15 V), in reference to a common ground. It is designed for distances of up to 20 m detection range and connection to an opposite station.

RS 422

S4 ON = RS 422

Serial voltage interface, suitable for rapid transfers over great distances (up to 1.5 km). The logical states can be defined by comparing voltages.

Caution! Only one of the switches S2 – S4 should be turned on!

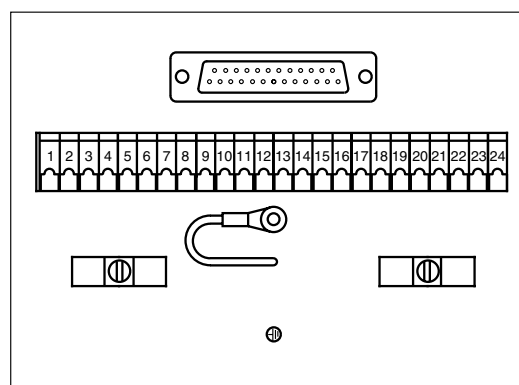
With one additional switch, it is possible to invert data signals for special applications. The data stream is displayed separately for the emitter and receiver status with LEDs.

S5 ON = input signal of the transmitter, inverted
 OFF = input signal of the transmitter, not inverted

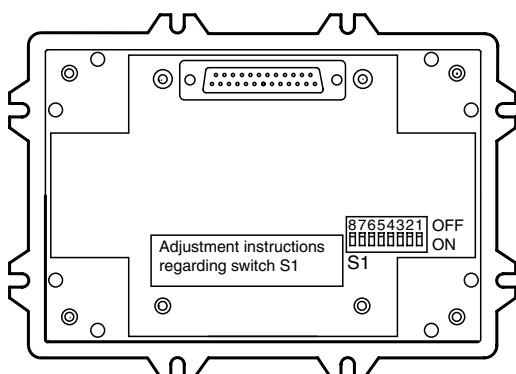
S6 ON = output signal of the receiver, inverted
 OFF = output signal of the receiver, not inverted

The optical barrier goes into pause status when the light beam is interrupted. This is logically high for transmission systems i.e. for RS 232 -3 V ...15 V, for RS 422 the difference in level is less than 3 V ($A \leq B$) and for the CL interface it is conducting 20 mA electrical circuit.

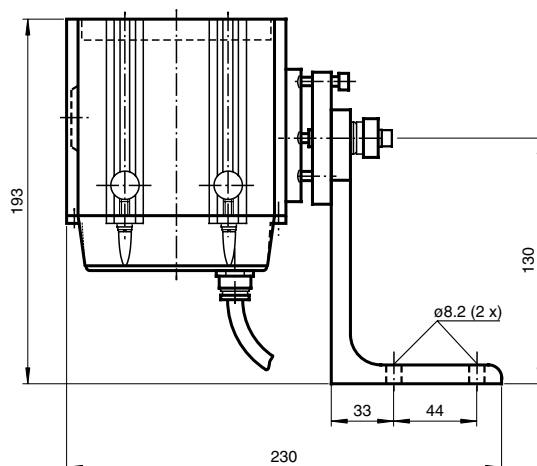
All settings that are described here are made on DIP switches that are located on the interface print. The switches are visible after the housing cover has been removed.



View of the housing without cover:

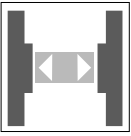


Mounting bracket:



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Data Transmission



LS600-DA-P-...

Data transmission light beam switch

LS600-DA-P-...

CE

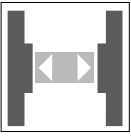


- ◆ Detection range up to 250 m
- ◆ Data transmission up to 500 kbit/s
- ◆ Devices for PROFIBUS
- ◆ Easy adjustment by integrated alignment LED and finder scope
- ◆ Connection with spring-loaded terminals
- ◆ Sturdy aluminium housing
- ◆ Problem-free light beam interruption possible
- ◆ Mounting bracket included in delivery

Data
Transmission

For suitable cable sockets and mounting aids refer to chapter "accessories".

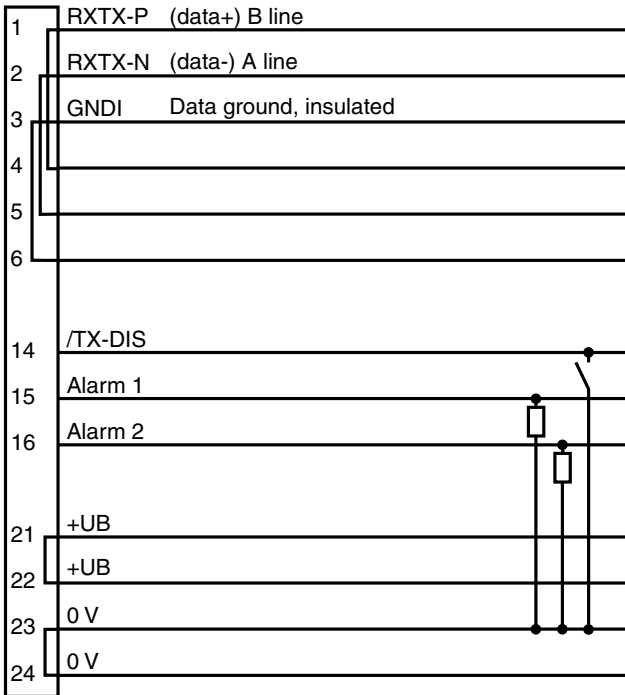
Ordering code		LS600-DA-P/F1	LS600-DA-P/F2	LS600-DA-P-GUFF1	LS600-DA-P-GUFF2	LS600-DA-P-RT/F1	LS600-DA-P-RT/F2
Effective detection range	0.5 ... 100 m					◆	◆
	0.5 ... 200 m	◆	◆	◆	◆		
Threshold detection range	130 m					◆	◆
	250 m	◆	◆	◆	◆		
Alignment aid	Telescopic sight, frontal red LED flashing, off with Signal > sufficient stability control	◆	◆	◆	◆	◆	◆
Interface type	PROFIBUS, galvanically isolated	◆	◆	◆	◆	◆	◆
Transmission mode	FSK	◆	◆	◆	◆	◆	◆
Light source	LED					◆	◆
	IRED	◆	◆	◆	◆		
Light type	Red, alternating light					◆	◆
	Infrared, alternating light	◆	◆	◆	◆		
Angle of divergence	1.4 °	◆	◆	◆	◆	◆	◆
Diameter of the light spot	2500 mm at a distance of 100 m					◆	◆
	5000 mm at a distance of 200 m	◆	◆	◆	◆		
Ambient light limit	1000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Data flow display	LED green: emitter	◆	◆	◆	◆	◆	◆
	LED yellow: receiver	◆	◆	◆	◆	◆	◆
Function display	LED red: 1-fold stability control	◆	◆	◆	◆	◆	◆
	LEDgreen: Sufficient stability control	◆	◆	◆	◆	◆	◆
Pre-fault indication	with function display	◆	◆	◆	◆	◆	◆
Controls	8-fold DIP-switch	◆	◆	◆	◆	◆	◆
Operating voltage	24 V DC ± 25 %	◆	◆	◆	◆	◆	◆
No-load supply current	1500 mA			◆	◆		
	450 mA	◆	◆			◆	◆
Operation frequency	F1 = 8.5 MHz	◆		◆		◆	
	F2 = 13.5 MHz		◆		◆		◆
Data sampling blanking	emitter deactivation at 0 V	◆	◆	◆	◆	◆	◆
Data rate	9.6 ... 500 kBit/s, adjustable	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	2 pnp-outputs, short-circuit proof, 30 V DC 0.1 A activated for single or sufficient stability control	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +50 °C	◆	◆			◆	◆
	-35 ... +50 °C with heated housing			◆	◆		
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆
Connection type	4 Pg9 screwed connections, spring-loaded terminals in the terminal compartment	◆	◆	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆	◆	◆
Light exit	Plastic lenses, glass disks	◆	◆	◆	◆	◆	◆
Mass	2000 g	◆	◆	◆	◆	◆	◆



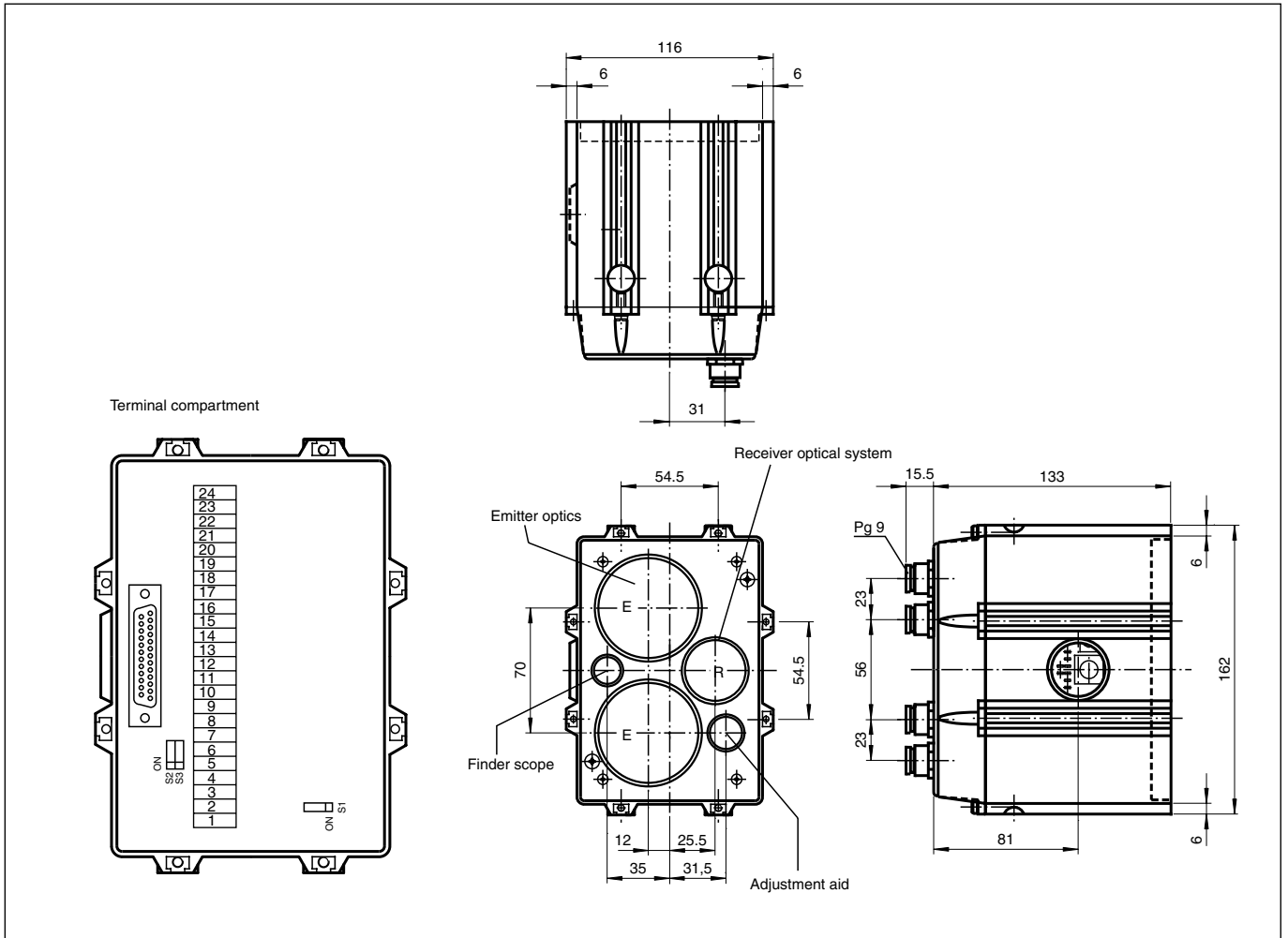
LS600-DA-P-...

Electrical connection

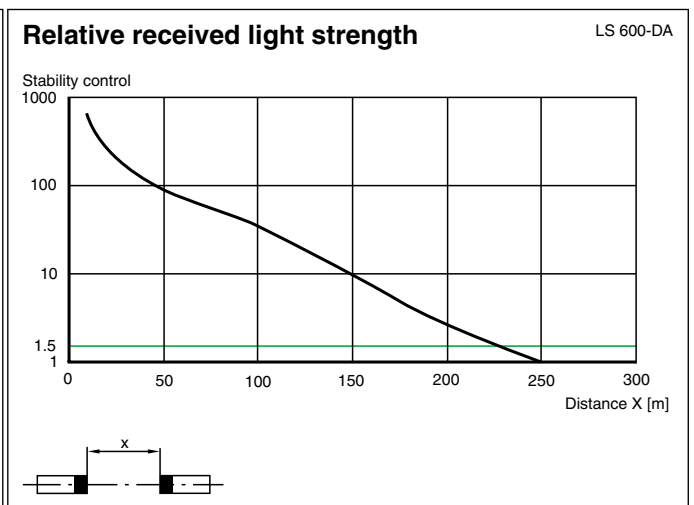
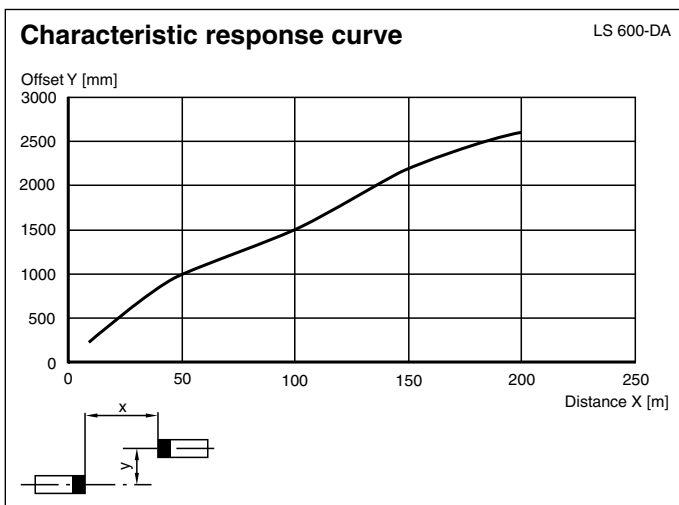
Option:



Dimensions



Diagrams

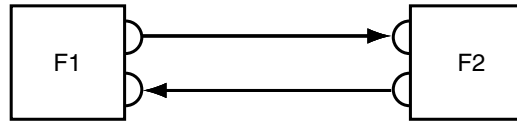


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Date of issue

Function

The LS600-DA-P is a device for serial data transfer for PROFIBUS-systems with transfer rates up to 500 kbit/s and detection range up to 200 m. The device can easily be employed for data rates and effective operating distances below these values. An LS 600-DA-P with an average frequency F1 and an LS 600-DA-P with an average frequency F2 are required for a data transfer route.



Data transfer

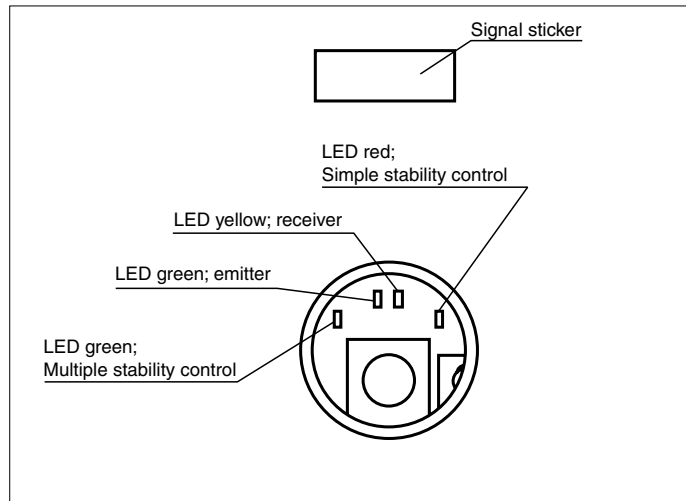
The data is transferred in both directions with modulated infrared light. The information that is present on the input interface is modulated to the carrier signal by means of the frequency shift keying (FSK). The corresponding demodulation and output to the output interface take place in the receiver. The complete transfer process takes place without the use of a protocol.

Function display/stability control

The red function display LED lights up if the level of the received signal is sufficient for an error-free transfer. The transfer is enabled beginning at this signal level. The green LED lights up for a sufficient stability control.

This system flashes red after the device is turned on and thus makes the receiver clearly visible at a great distance. If the reception level for the transfer exceeds the minimum required value, the flashing alignment aid is turned off. If the reception level for the transfer exceeds the minimum required value, the flashing alignment aid is turned off.

If data is received, a yellow LED lights up, if data is transmitted, a green LED lights up.



Switch position in the terminal compartment

The housing connection of the data shield can be switched from galvanic (ON) to capacitive (OFF) with the S1 switch on the terminal print (10 nF/630 V).

- | | |
|-----------|--|
| S1 | ON = cable shield directly on the housing |
| | OFF = cable shield capacitive on the housing |
| S2 and S3 | ON = PROFIBUS inputs and outputs, connected (for commissioning of tested electronics unit) |
| | OFF = PROFIBUS inputs and outputs, not connected (standard-PROFIBUS) |

Interface

The LS 600 DA-P has an interface adapter. To be able to ensure that the PROFIBUS telegrams are monitored on the light reception side and telegrams that are not correct for the PROFIBUS are suppressed, the repeater function must be activated. The signals are then regenerated in the correct bit and character format. Telegrams are transmitted on the bus with quartz stabilisation.

If the repeater function is activated, the baud rate must be correctly adjusted with the Sd switch. If the setting is incorrect, there is no transfer.

A bus short-circuit involving a segment, for example, is not transferred to the other side.

If the repeater function is deactivated, you can select the behaviour on the bus side when the light beam is interrupted with the Sa switch.

ON = "BREAK" (duration low)
 OFF = Data output Tri-state

Each PROFIBUS line must have a termination. With an optical data coupler at the end of a bus line, the PROFIBUS has to be provided with a termination combination.

The bus termination can be turned on and off with the Sb and Sc switch on the interface print.

Switches Sb, Sc: PROFIBUS termination:

On: active
 Off: without terminal resistor

The Sb and Sc switches must only be used together!

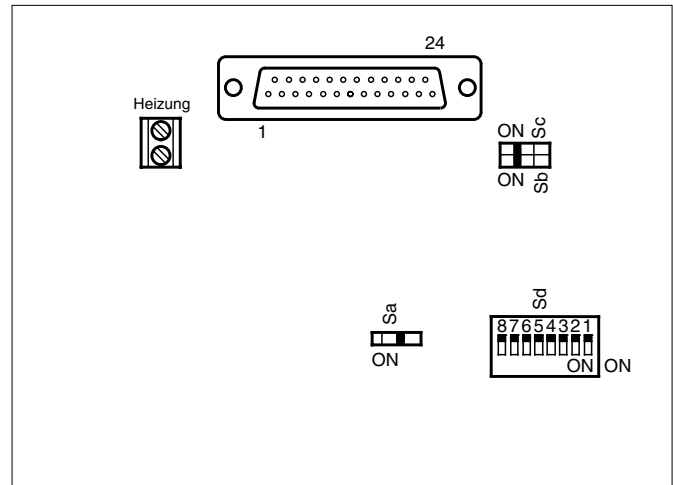
Switch Sd: Baudrate setting

Sd.1: n. c.
 Sd.2: 500 k
 Sd.3: 375 k
 Sd.4: 187.5 k
 Sd.5: 93.75 k
 Sd.6: 19.2 k
 Sd.7: 9.6 k

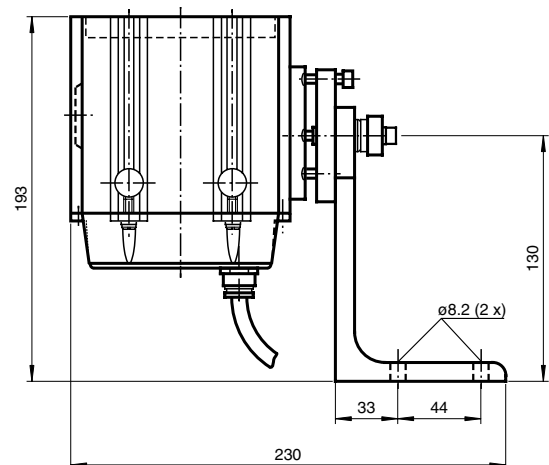
Sd.8 = "off": repeater active
 Sd.8 = "on": repeater inactive

Switch Sa: Behaviour when light beam is interrupted

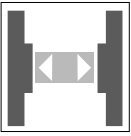
On: special behaviour
 Off: high-ohm (Tri-state)



Mounting bracket



Data Transmission



LS600-DA-P-1,5-...

Data transmission light beam switch

LS600-DA-P-1,5-...

CE



- ◆ Detection range up to 190 m
- ◆ Data transmission up to 1.5 Mbit/s
- ◆ Devices for PROFIBUS
- ◆ Easy adjustment by integrated alignment LED and finder scope
- ◆ Connection with spring-loaded terminals
- ◆ Sturdy aluminium housing
- ◆ Problem-free light beam interruption possible
- ◆ Mounting bracket included in delivery

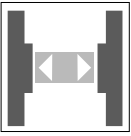
Data
Transmission

For suitable cable sockets and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

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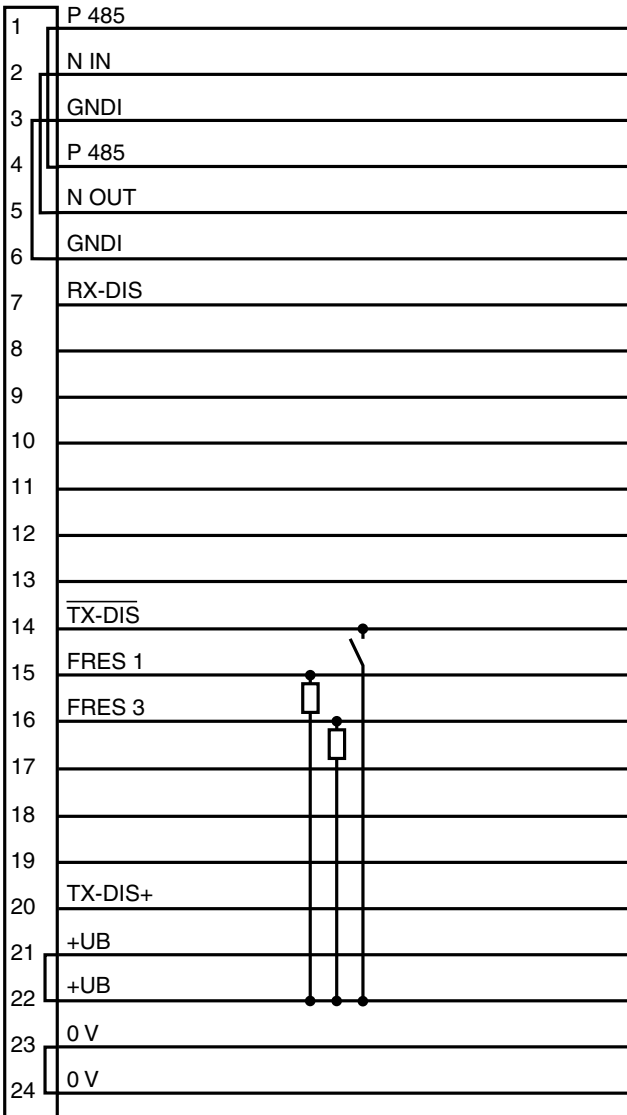
Ordering code		LS600-DA-P-1,5/F1	LS600-DA-P-1,5/F2	LS600-DA-P-1,5-GUFF1	LS600-DA-P-1,5-GUFF2	LS600-DA-P-1,5/35/F1	LS600-DA-P-1,5/35/F2
Effective detection range	0.5 ... 100 m	◆	◆	◆	◆		
	0.5 ... 150 m					◆	◆
Threshold detection range	130 m	◆	◆	◆	◆		
	190 m					◆	◆
Alignment aid	Telescopic sight, frontal red LED flashing, off with Signal > sufficient stability control	◆	◆	◆	◆	◆	◆
Interface type	PROFIBUS, galvanically isolated	◆	◆	◆	◆	◆	◆
Transmission mode	FSK	◆	◆	◆	◆	◆	◆
Light source	IREDD	◆	◆	◆	◆	◆	◆
Light type	Infrared, alternating light	◆	◆	◆	◆	◆	◆
Angle of divergence	1.4 °	◆	◆	◆	◆	◆	◆
Diameter of the light spot	2500 mm at a distance of 100 m	◆	◆	◆	◆		
	3700 mm at a distance of 150 m					◆	◆
Ambient light limit	1000 Lux	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆
Data flow display	LED green: emitter LED yellow: receiver	◆	◆	◆	◆	◆	◆
Function display	LED red: 1-fold stability control LEDgreen: Sufficient stability control	◆	◆	◆	◆	◆	◆
Pre-fault indication	with function display	◆	◆	◆	◆	◆	◆
Controls	8-fold DIP-switch	◆	◆	◆	◆	◆	◆
Operating voltage	24 V DC ± 25 %	◆	◆	◆	◆	◆	◆
No-load supply current	1500 mA			◆	◆		
Operation frequency	450 mA	◆	◆			◆	◆
	F1 = 8.25 MHz F2 = 13.5 MHz	◆	◆	◆	◆	◆	◆
Data sampling blanking	emitter deactivation at 0 V	◆	◆	◆	◆	◆	◆
Data rate	9.6 ... 1500 kBit/s, adjustable	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	2 pnp-outputs, short-circuit proof, 30 V DC 0.1 A activated for single or sufficient stability control	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +50 °C	◆	◆			◆	◆
	-35 ... +50 °C with heated housing			◆	◆		
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆
Connection type	4 Pg9 screwed connections, spring-loaded terminals in the terminal compartment	◆	◆	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆	◆	◆
Light exit	Glass	◆	◆	◆	◆	◆	◆
Mass	2000 g	◆	◆	◆	◆	◆	◆



LS600-DA-P-1,5-...

Electrical connection

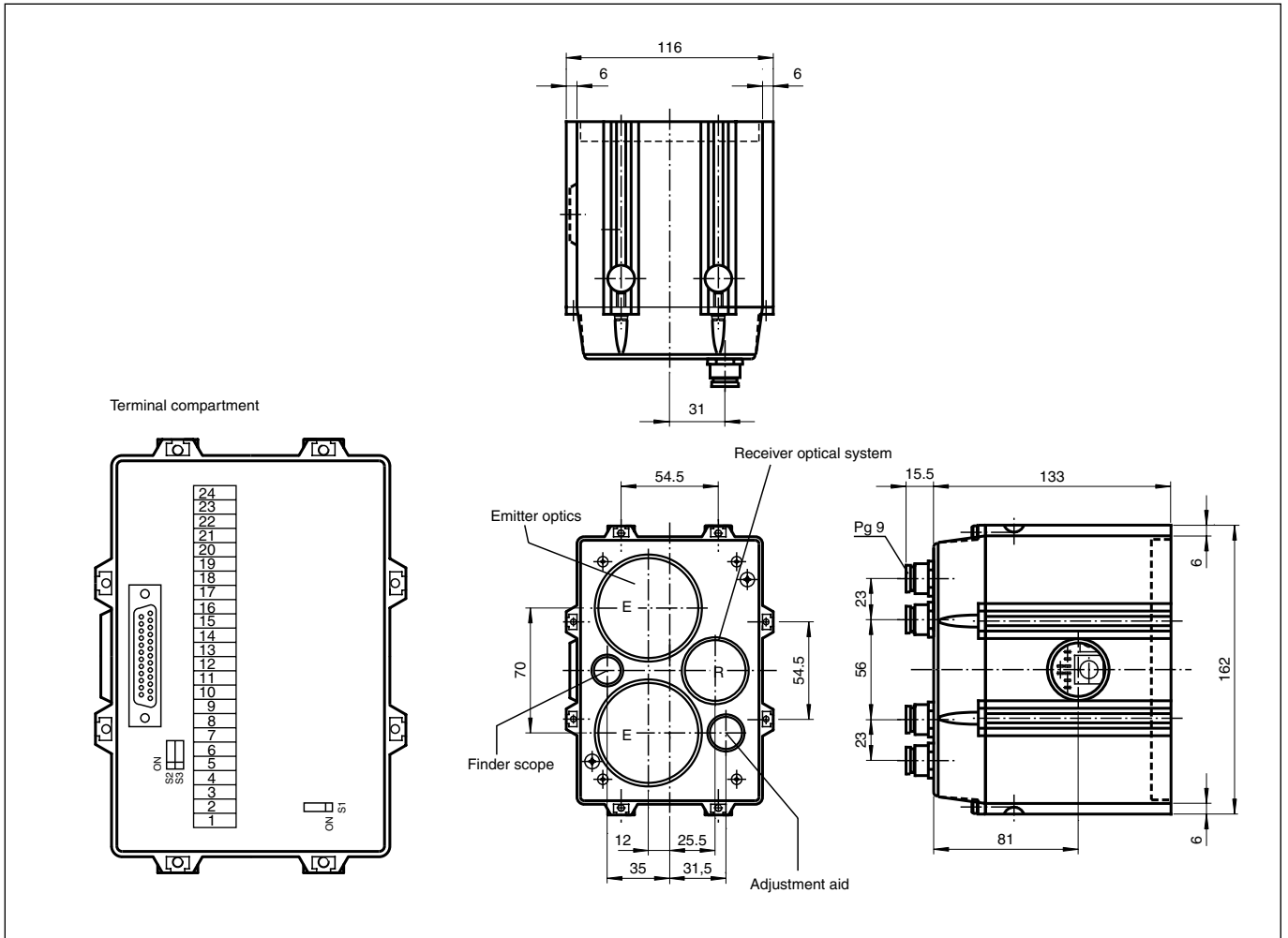
Option:



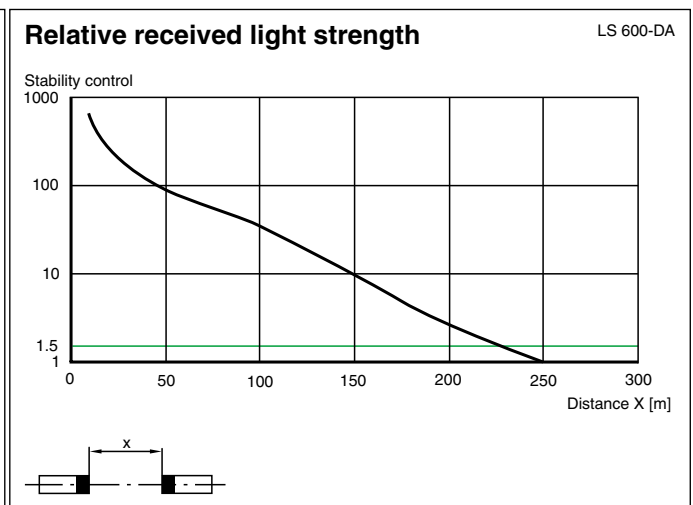
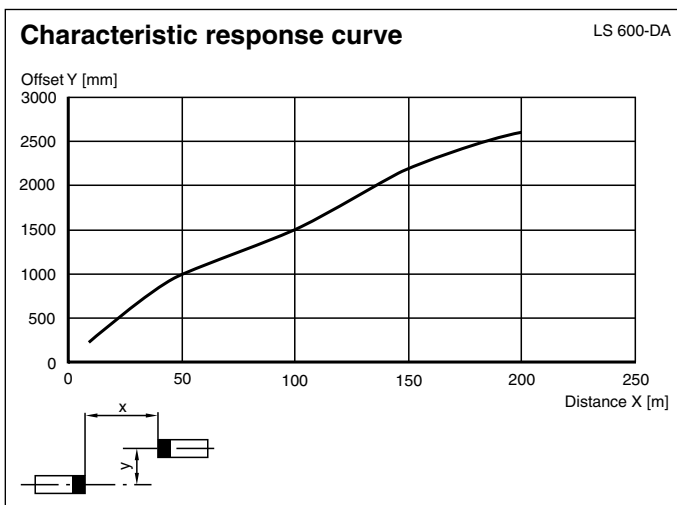
Data Transmission

Date of issue 10/15/01

Dimensions



Diagrams

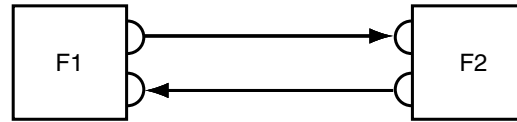


10/15/01

Date of issue

Function

The LS600-DA-P-1,5 is a device for serial data transfer for PROFIBUS Systems with transfer rates up to 1.5 Mbit/s and detection range up to 190 m. The device can easily be employed for data rates and effective operating distances below these values. An LS 600-DA-P-1,5 with an average frequency F1 and an LS 600-DA-P-1,5 with an average frequency F2 are required for a data transfer route.



Data transfer

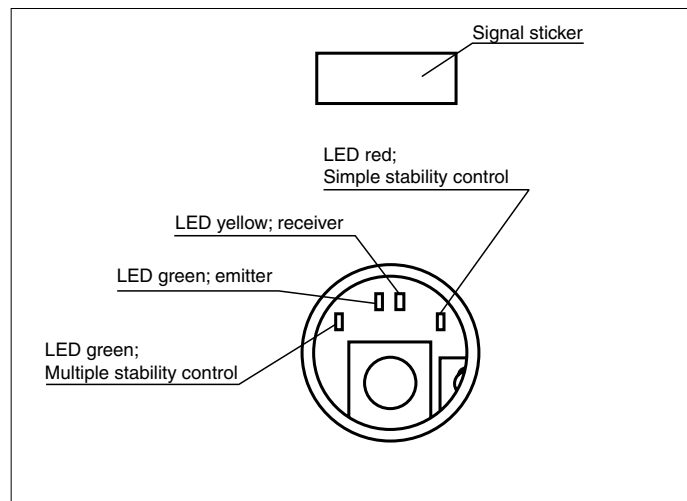
The data is transferred in both directions with modulated infrared light. The information that is present on the input interface is modulated to the carrier signal by means of the frequency shift keying (FSK). The corresponding demodulation and output to the output interface take place in the receiver. The complete transfer process takes place without the use of a protocol.

Function display/stability control

The red function display LED lights up if the level of the received signal is sufficient for an error-free transfer. The transfer is enabled beginning at this signal level. The green LED lights up for a sufficient stability control.

This system flashes red after the device is turned on and thus makes the receiver clearly visible at a great distance. If the reception level for the transfer exceeds the minimum required value, the flashing alignment aid is turned off. If the reception level for the transfer exceeds the minimum required value, the flashing alignment aid is turned off.

If data is received, a yellow LED lights up, if data is transmitted, a green LED lights up.



Switch position in the terminal compartment

The housing connection of the data shield can be switched from galvanic (ON) to capacitive (OFF) with the S1 switch on the terminal print (10 nF/630 V).

S1 ON = cable shield directly on the housing

OFF = cable shield capacitive on the housing

S2 and S3 ON = PROFIBUS inputs and outputs, connected (for commissioning of tested electronics unit)

OFF = PROFIBUS inputs and outputs, not connected (standard-PROFIBUS)

Interface

The LS 600 DA-P has an interface adapter. To be able to ensure that the PROFIBUS telegrams are monitored on the light reception side and telegrams that are not correct for the PROFIBUS are suppressed, the repeater function must be activated.

The signals are then regenerated in the correct bit and character format. Telegrams are transmitted on the bus with quartz stabilisation.

If the repeater function is activated, the baud rate must be correctly adjusted with the Sd switch. If the setting is incorrect, there is no transfer.

A bus short-circuit involving a segment, for example, is not transferred to the other side. During a light beam interruption the data transfer is blocked in both directions.

If the repeater function is deactivated, you can select the behaviour on the bus side when the light beam is interrupted with the Sa switch.

ON = "BREAK" (duration low)
 OFF = data output Tri-state

Each PROFIBUS line must have a termination. With an optical data coupler at the end of a bus line, the PROFIBUS has to be provided with a termination combination.

The bus termination can be turned on and off with the Sb and Sc switch on the interface print.

Switches Sb, Sc: PROFIBUS termination:

On: active
 Off: without terminal resistor

The Sb and Sc switches must only be used together!

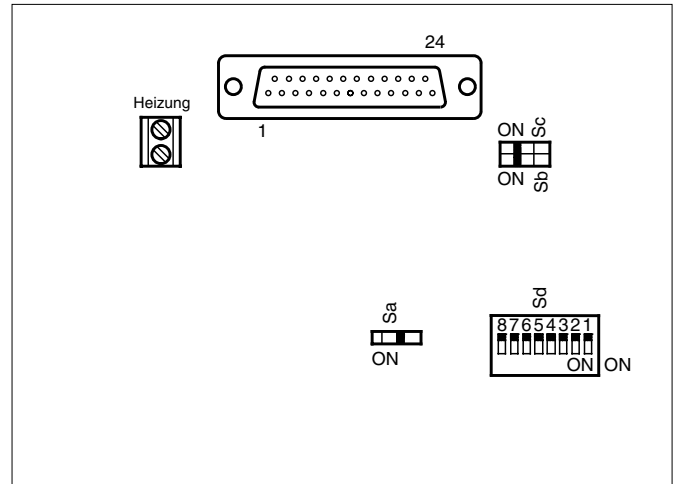
Switch Sd: Baudrate setting

- Sd.1: 1.5 MB
- Sd.2: 500 k
- Sd.3: 375 k
- Sd.4: 187.5 k
- Sd.5: 93.75 k
- Sd.6: 19.2 k
- Sd.7: 9.6 k

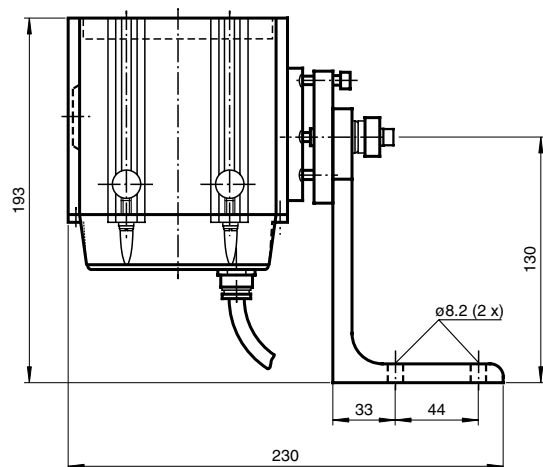
Sd.8 = "off": repeater active
 Sd.8 = "on": repeater inactive

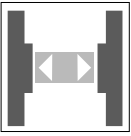
Switch Sa: Behavior when light beam is interrupted

On: special behaviour
 Off: high-ohm



Mounting bracket





LS600-DA-IBS-...

Data transmission light beam switch

LS600-DA-IBS-...

CE



- ◆ Detection range up to 270 m
- ◆ Data transmission up to 500 kbit/s
- ◆ Devices for interbus
- ◆ Easy adjustment by integrated alignment LED and finder scope
- ◆ Connection with spring-loaded terminals

Data
Transmission

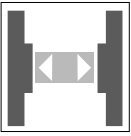
For suitable cable sockets and mounting aids refer to chapter "accessories".

Subject to reasonable modifications due to technical advances.

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Ordering code		LS600-DA-IBS/F1	LS600-DA-IBS/F2	LS600-DA-IBS-RT/F1	LS600-DA-IBS-RT/F2	LS600-DA-IBS/35/F1	LS600-DA-IBS/35/F2	LS600-DA-IBS-GUF/F1	LS600-DA-IBS-GUF/F2
Effective detection range	0 ... 100 m			◆	◆				
	0 ... 200 m	◆	◆						
	0 ... 230 m					◆	◆		
Threshold detection range	130 m			◆	◆				
	250 m	◆	◆					◆	◆
	270 m					◆	◆		
Alignment aid	Telescopic sight, frontal red LED flashing, off with Signal > sufficient stability control	◆	◆	◆	◆	◆	◆	◆	◆
Interface type	RS422	◆	◆	◆	◆	◆	◆	◆	◆
Transmission mode	FSK	◆	◆	◆	◆	◆	◆	◆	◆
Light source	LED			◆	◆				
	IREDD	◆	◆			◆	◆	◆	◆
Light type	Red, alternating light			◆	◆				
	Infrared, alternating light	◆	◆			◆	◆	◆	◆
Angle of divergence	1.4 °	◆	◆	◆	◆	◆	◆	◆	◆
Diameter of the light spot	approx. 6000 mm at a distance of 230 m					◆	◆		
	2500 mm at a distance of 100 m			◆	◆				
	5000 mm at a distance of 200 m	◆	◆					◆	◆
Ambient light limit	1000 Lux	◆	◆	◆	◆	◆	◆	◆	◆
Standard conformity	EN 60947-5-2	◆	◆	◆	◆	◆	◆	◆	◆
Approvals	CE	◆	◆	◆	◆	◆	◆	◆	◆
Data flow display	LED green: emitter	◆	◆	◆	◆	◆	◆	◆	◆
	LED yellow: receiver								
Function display	LED red: 1-fold stability control	◆	◆	◆	◆	◆	◆	◆	◆
	LEDgreen: Sufficient stability control								
Pre-fault indication	with function display	◆	◆	◆	◆	◆	◆	◆	◆
Controls	Switch for bus bridging and grounding in terminal compartment	◆	◆	◆	◆	◆	◆	◆	◆
Operating voltage	24 V DC ± 25 %	◆	◆	◆	◆	◆	◆	◆	◆
No-load supply current	1500 mA							◆	◆
	450 mA	◆	◆	◆	◆	◆	◆		
Operation frequency	F1 = 8.5 MHz	◆		◆		◆		◆	
	F2 = 13.5 MHz		◆		◆		◆		◆
Data sampling blanking	emitter deactivation at 0 V	◆	◆	◆	◆		◆	◆	◆
Data rate	0 ... 500 kBit/s	◆	◆	◆	◆	◆	◆	◆	◆
Output of the pre-fault indication	2 pnp-outputs, short-circuit proof, 30 V DC 0.1 A activated for single or sufficient stability control	◆	◆	◆	◆	◆	◆	◆	◆
Ambient temperature	-20 ... +50 °C	◆	◆	◆	◆	◆	◆		
	-35 ... +50 °C, with heated housing							◆	◆
Storage temperature	-20 ... +75 °C	◆	◆	◆	◆	◆	◆	◆	◆
Protection degree	IP65	◆	◆	◆	◆	◆	◆	◆	◆
Connection type	4 Pg9 screwed connections, spring-loaded terminals in the terminal compartment	◆	◆	◆	◆	◆	◆	◆	◆
Housing	Aluminium	◆	◆	◆	◆	◆	◆	◆	◆
Light exit	Plastic lenses, glass disks	◆	◆	◆	◆	◆	◆	◆	◆
Mass	2000 g	◆	◆	◆	◆	◆	◆	◆	◆

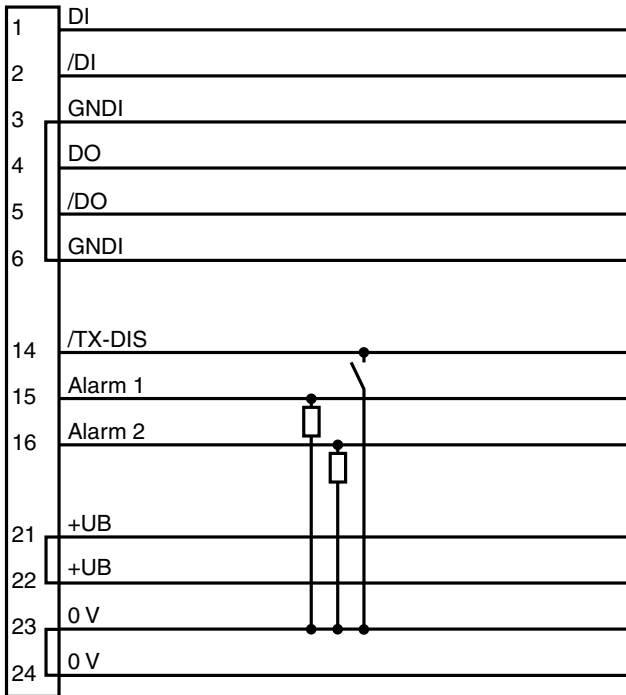
Data Transmission



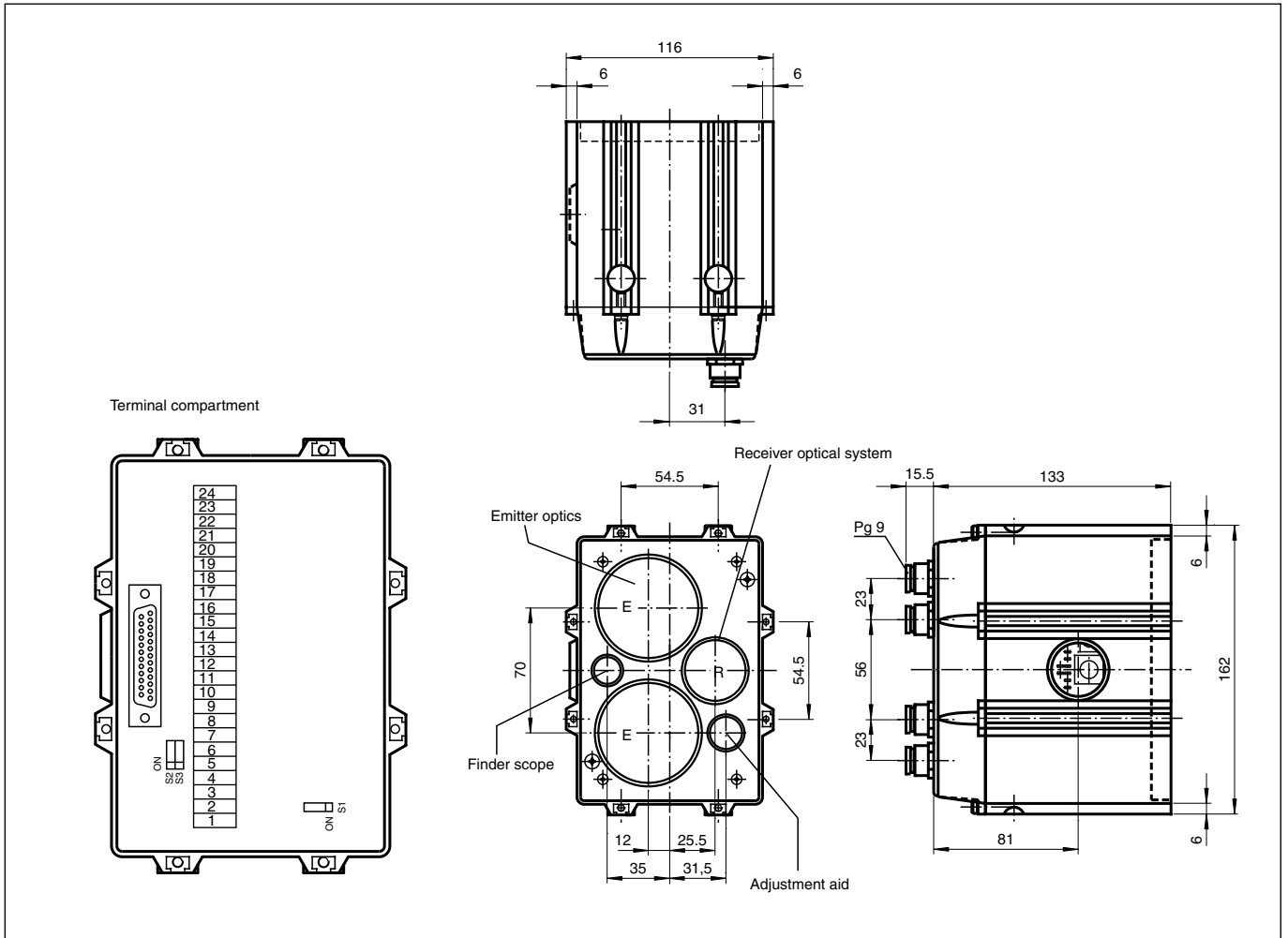
LS600-DA-IBS-...

Electrical connection

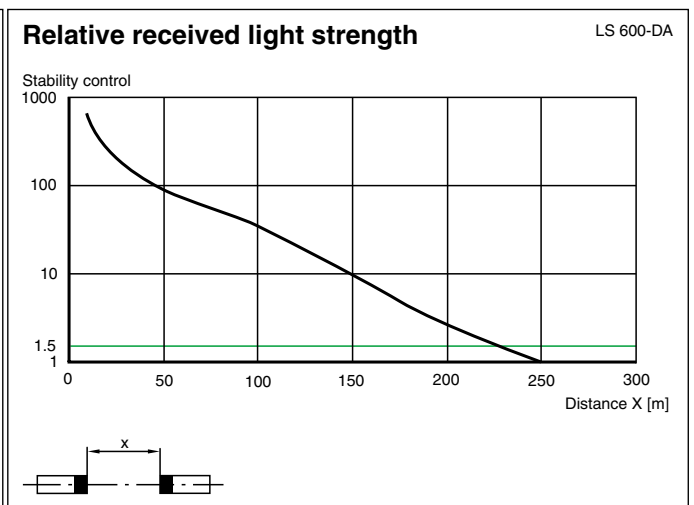
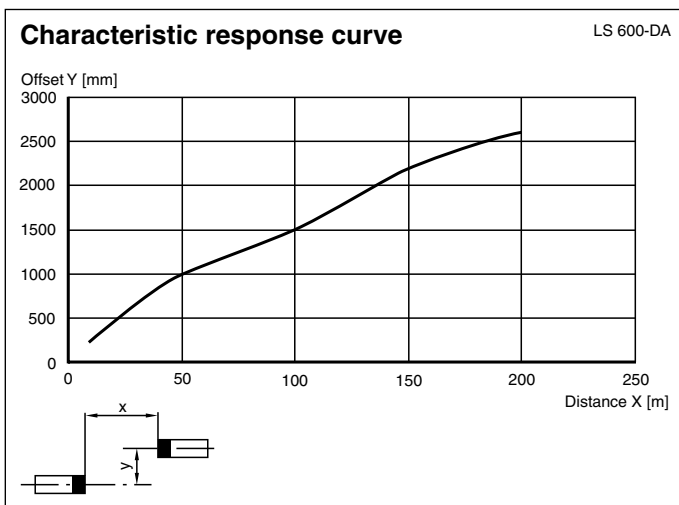
Option:



Dimensions



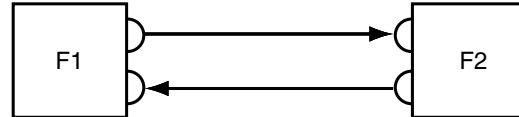
Diagrams



Data Transmission

Function

An LS 600-DA-IBS with an average frequency F1 and an LS 600-DA-IBS with an average frequency F2 are required for a data transfer route.



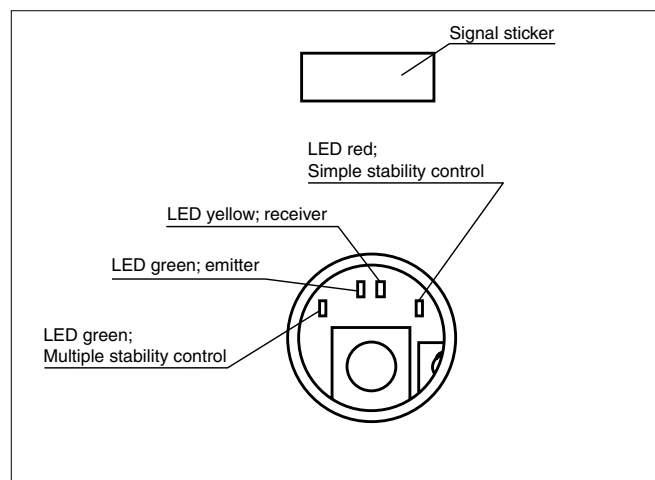
Data transfer

The data is transferred in both directions with modulated infrared light. The information that is present on the input interface is modulated to the carrier signal by means of the frequency shift keying (FSK). The corresponding demodulation and output to the output interface take place in the receiver. The complete transfer process takes place without the use of a protocol.

Function display/function reserve

The red function display LED lights up if the level of the received signal is sufficient for an error-free transfer. The transfer is enabled beginning at this signal level. If the green LED lights up, this indicates that functional reserve has been achieved.

An additional optical system has been integrated as an alignment aid. This system flashes red after the device is turned on and thus makes the device that is situated opposite clearly visible at a great distance. After the device has been adjusted for sufficient functional reserve, the indicator goes out.



Interface

The 600 DA-IBS includes level regeneration as well as complete galvanic separation of the data stream circuits from the operating power supply.

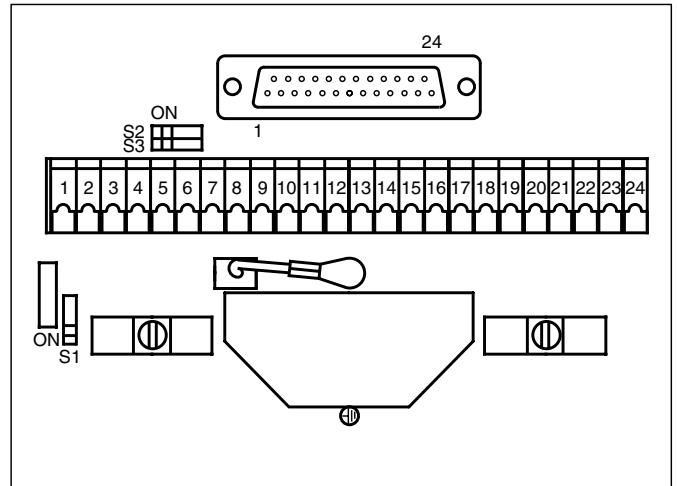
The housing connection of the data shield can be switched from galvanic (ON) to capacitive (OFF) with the S1 switch on the terminal space.

If the bus is active, a yellow LED lights up for the reception data and a green LED for the transmission data.

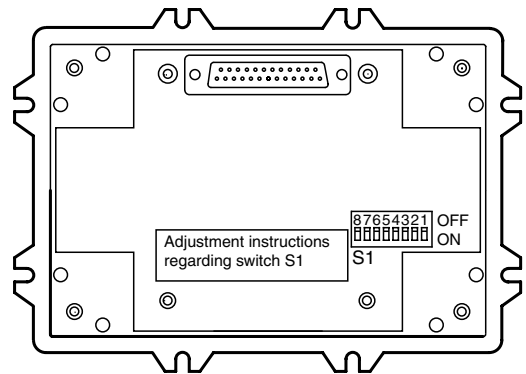
The emitter deactivation (0V on terminal 14) can be used to avoid interference from data telegrams that can occur when the light beam is interrupted. For this reason, emitter deactivation should be activated before a corresponding event takes place. Then the idle level "low" should be set on the output interface.

Switches S2 and S3 can be closed in the terminal space as an installation aid, this connects incoming and outgoing data lines with each other. This ensures that the signal will run through the loop during the installation as long as the data transmission light beam switches have not yet been placed in operation.

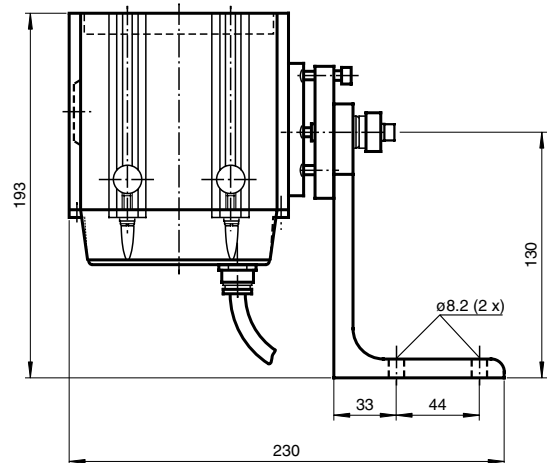
Terminal compartment:



View of the housing without cover:



Mounting bracket





Distance
Sensors

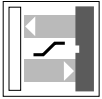
Date of issue 10/15/2001

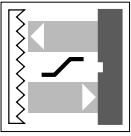
Distance measuring devices



Our distance measuring devices of the EDM series work according to the phase correlation method. They are used to monitor distances and to ensure that these distances do not exceed or fall short of any of the preset tolerances. A distinction is made for these devices between a measurement with retro-reflectors and a measurement with diffusely reflecting objects. Our range of devices includes the suitable unit for your particular application.

One feature all devices have in common is an analogue measurement value output. In addition, you can select a switching threshold for one or two switch outputs for which a binary signal is generated. This may be used with suspended electrical tracks (SETs) to generate a stop signal, or with signals for generating a slow travel command.

Principle	Type code	Detection range	Page
	EDM3,5	0 m ... 3.5 m	1014
	EDM5	0 m ... 5 m	1018
	EDM20	0 m ... 20 m	1022



EDM3,5-R

Distance sensor

EDM3,5-R

with 5-pin, M12 connector

CE

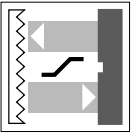


- ◆ Measurement range 300 ... 3500 mm
- ◆ Adjustable switch outputs
- ◆ Preset switching points,
A: 970 mm, B: 1720 mm
- ◆ Not sensitive to ambient light

Ordering code		EDM3,5-R
Measurement range	300 ... 3500 mm	◆
Reflector distance	350 ... 3500 mm	◆
Reference target	Foil reflector 200 mm x 200 mm Type Diamond Grade 3000 X	◆
Light source	LED	◆
Light type	IR-light 880 nm	◆
Filter	IR-filter	◆
Diameter of the light spot	100 mm at a distance of 3500 mm	◆
Ambient light limit	≤ 15000 Lux	◆
Temperature influence	≤ 3 mm/K	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
Function display	2 LEDs yellow: switching state (per output) LED red: display of level of reception	◆
Potentiometer	12-way potentiometer switch points A and B	◆
Operating voltage	15 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	≤ 60 mA	◆
Time delay before availability	200 ms	◆
Signal output	2 switch outputs pnp, NC	◆
Switching frequency	≤ 50 Hz	◆
Range hysteresis	80 ... 150 mm	◆
Switching type	dark ON	◆
Switching current	max. 100 mA, short circuit/overload protected	◆
Voltage drop	≤ 2.5 V	◆
Output of the pre-fault indication	1 switch output pnp, max. 10 mA, short circuit/overload protected	◆
Ambient temperature	0 ... +50 °C	◆
Storage temperature	-25 ... +70 °C	◆
Protection degree	IP64	◆
Connection type	Connector (M12 x 1), 5-pin	◆
Housing	PMMA	◆
Light exit	PMMA	◆
Mass	200 g	◆

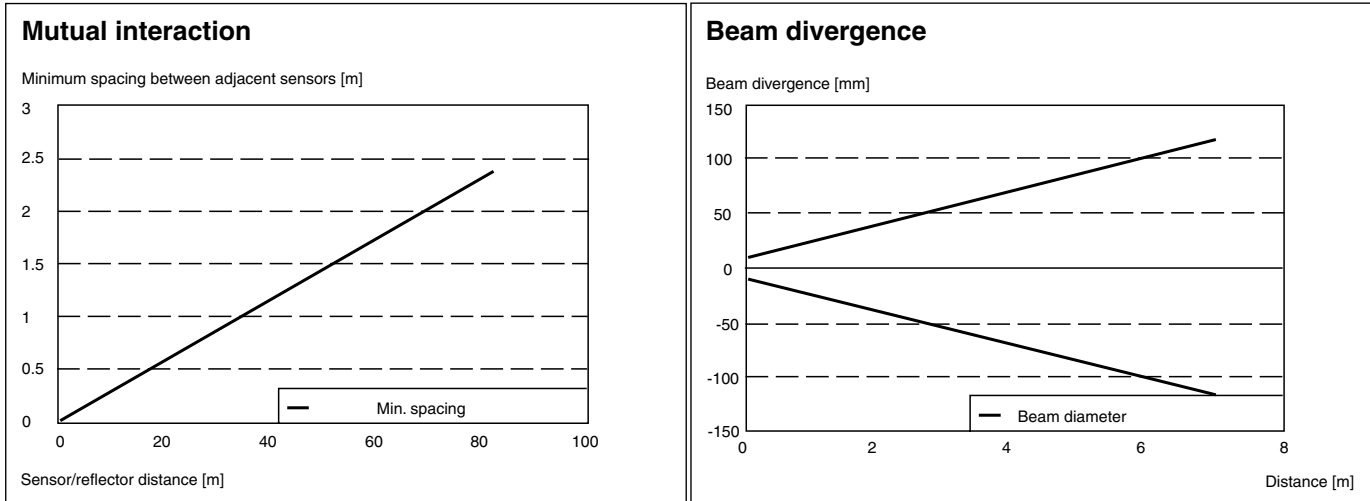
10/15/01

Date of issue



EDM3,5-R

Diagrams

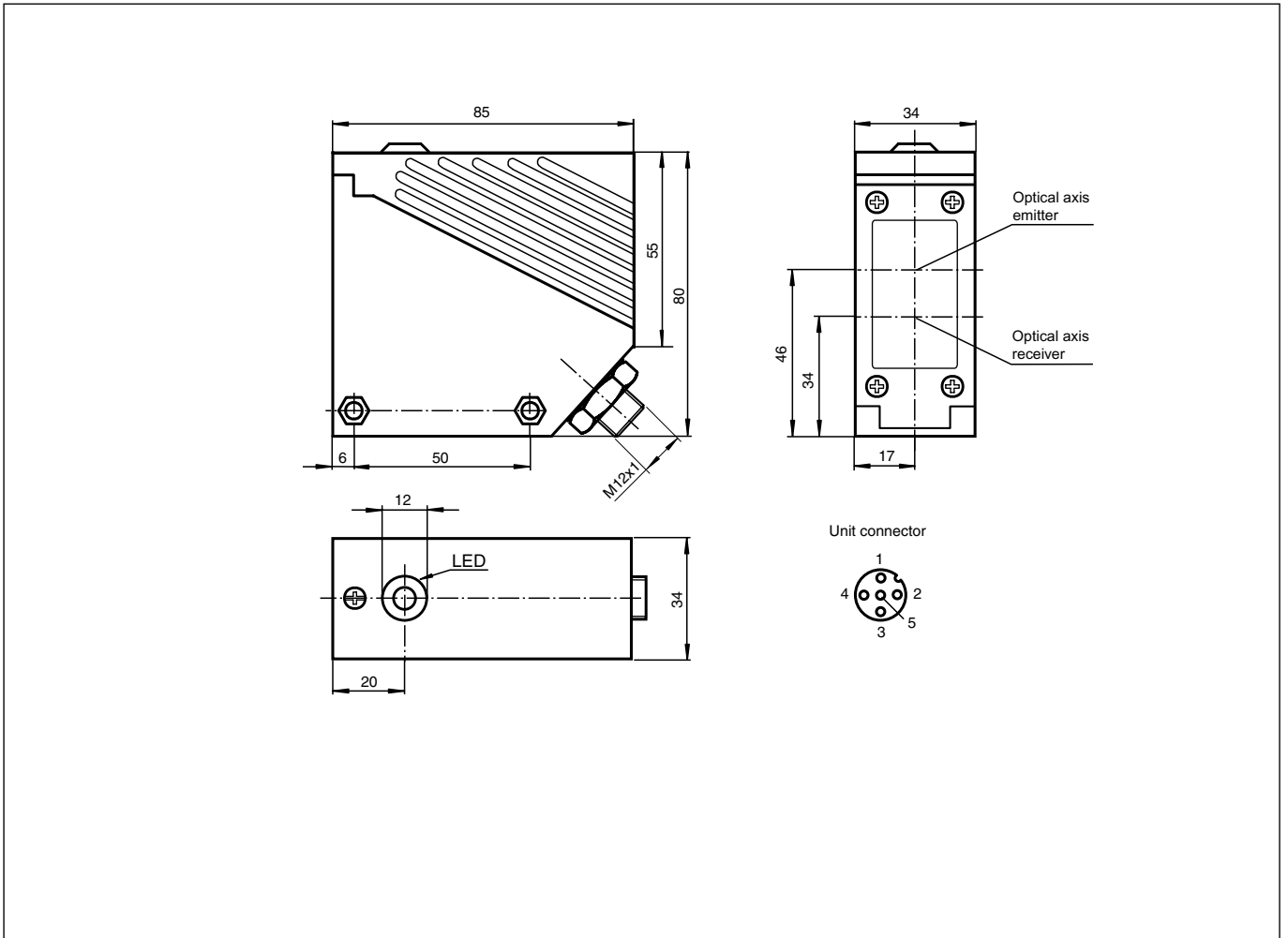


Notes

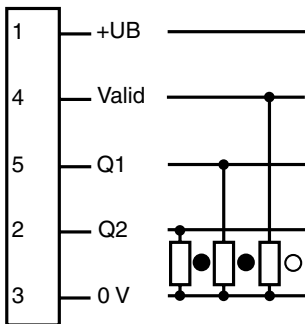
The EDM3,5R determines the distance to a retro-reflector (the preferred type is a foil-reflector of type 3M, Diamond Grade 3000 x). This reflector must be installed on the target object.

The sensor is calibrated in the factory at a distance of 800 mm.

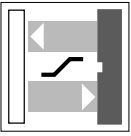
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



EDM5-P/122

Distance sensor

EDM5-P/122

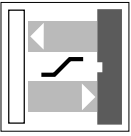
with terminal compartment

CE



- ◆ Measurement range 30 ... 5000 mm
- ◆ Analogue output 4 mA ... 20 mA
- ◆ Operating distance adjustable
- ◆ Pre-fault indication and output
- ◆ Protection degree IP64
- ◆ Application specific devices available on request

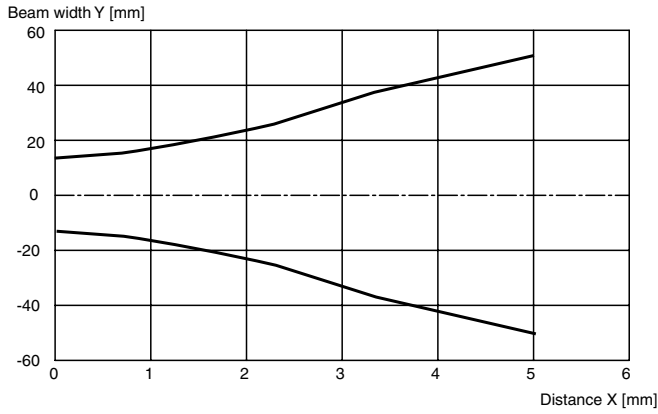
Ordering code		EDM5-P/122
Measurement range	30 ... 5000 mm	◆
Reference target	Grey card 18 % (grey) ... 90 % (white) reflection, 200 mm x 200 mm	◆
Light source	LED	◆
Light type	IR-light 880 nm	◆
Filter	IR-filter	◆
Diameter of the light spot	100 mm at a distance of 5000 mm	◆
Ambient light limit	≤ 13000 Lux sun light ≤ 10000 Lux halogen light	◆
Temperature influence	≤ 7 mm/K	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
Operating display	LED green	◆
Function display	LED yellow: switching state LED red: stability control (2 Hz flashing)	◆
Potentiometer	2 x switch point (rough/fine)	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	≤ 150 mA by $U_B = 10$ ≤ 65 mA by $U_B = 30$ V	◆
Time delay before availability	200 ms	◆
Measurement output	1 analogue output 4 ... 20 mA, short circuit/overload protected	◆
Signal output	1 switch output pnp	◆
Cutoff frequency	Analogue output: 20 Hz	◆
Switching frequency	Switch output E2: ≤ 10 Hz	◆
Resolution	Analogue output: ≤ 10 mm	◆
Repeat accuracy	Analogue output: ≤ 5 % of the measurement range	◆
Deviation of the characteristic curve	± 5 % by 90 % reflection (white) ± 10 % by 18 % reflection (grey)	◆
Switching type	Light on	◆
Switching current	max. 100 mA	◆
Voltage drop	≤ 2.5 V	◆
Output of the pre-fault indication	1 switch output pnp, max. 10 mA	◆
Ambient temperature	0 ... +50 °C	◆
Storage temperature	-25 ... +70 °C	◆
Protection degree	IP64 according to EN 60529	◆
Connection type	Terminal compartment Pg9, ≤ 2.5 mm ²	◆
Housing	PMMA	◆
Light exit	PMMA	◆
Mass	200 g	◆



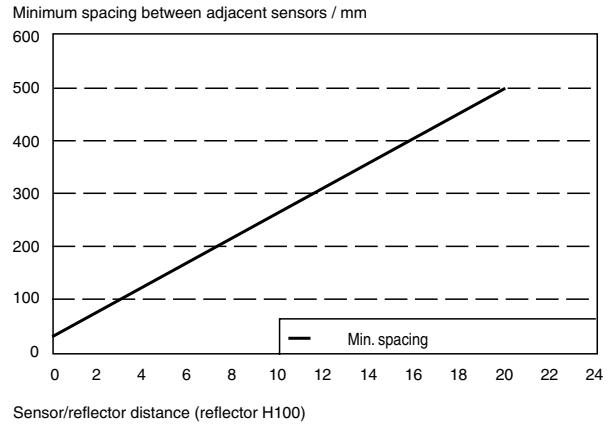
EDM5-P/122

Diagrams

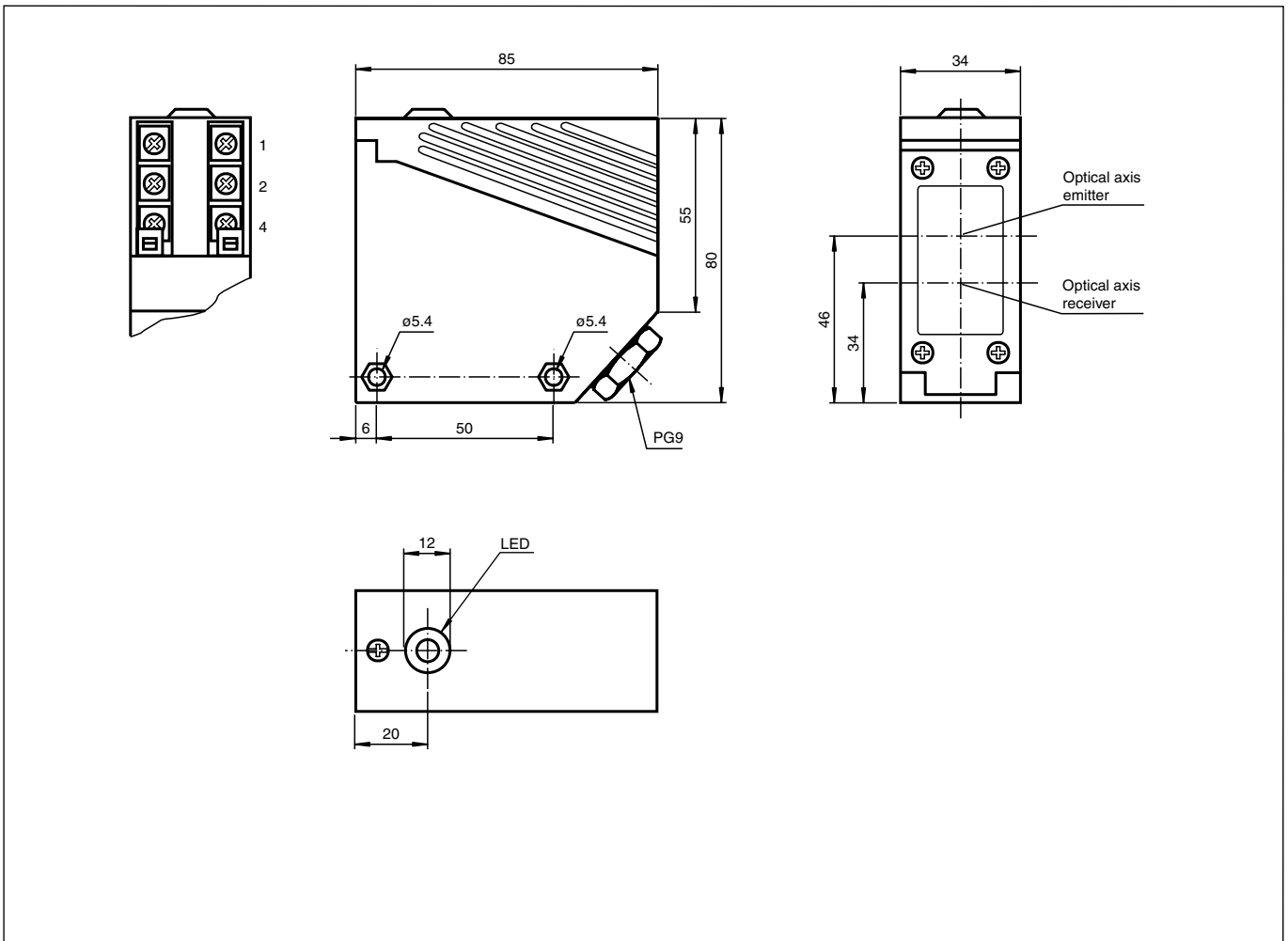
Beam divergence



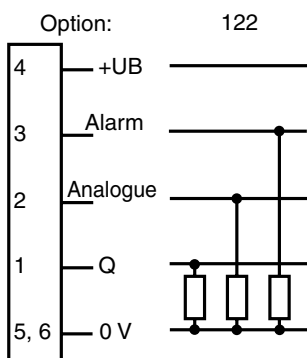
Mutual interaction



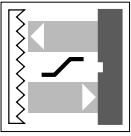
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



EDM20-R/122

Distance sensor

EDM20-R/122

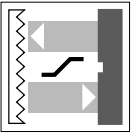
with terminal compartment

CE



- ◆ Measurement range 0.1 m ... 20 m
- ◆ Analogue output 4 mA ... 20 mA
- ◆ Operating distance adjustable
- ◆ Pre-fault indication and output
- ◆ Translation of the characteristic curve
- ◆ Protection degree IP64
- ◆ Supplied with reflector
- ◆ Application specific devices available on request

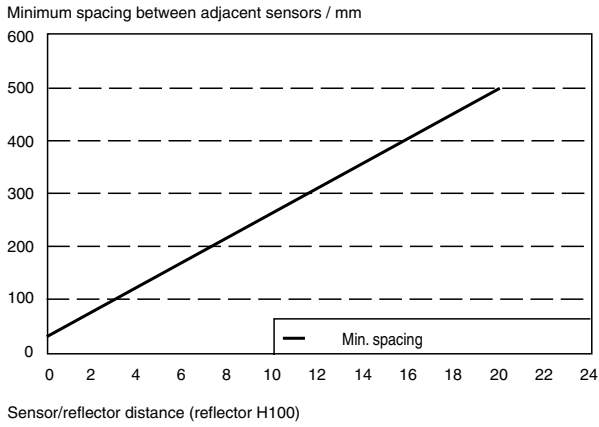
Ordering code		EDM20-R/122
Measurement range	100 ... 20000 mm	◆
Reference target	Retro-reflector 100 mm x 100 mm Type H100	◆
Light source	LED	◆
Light type	IR-light 880 nm	◆
Filter	IR-filter	◆
Diameter of the light spot	400 mm at a distance of 20000 mm	◆
Ambient light limit	≤ 15000 Lux	◆
Temperature influence	≤ 10 mm/K	◆
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
Operating display	LED green	◆
Function display	LED yellow: switching state LED red: stability control (2 Hz flashing)	◆
Potentiometer	1 x switching point. 1 x characteristic translation	◆
Operating voltage	10 ... 30 V DC	◆
Ripple	10 %	◆
No-load supply current	≤ 60	◆
Time delay before availability	200 ms	◆
Measurement output	1 analogue output 4 ... 20 mA, short circuit/overload protected	◆
Signal output	1 switch output pnp	◆
Cutoff frequency	Analogue output: 20 Hz	◆
Switching frequency	≤ 50 Hz	◆
Range hysteresis	Switch output E2: 0.5 ... 2.5 % (Switching point independent)	◆
Resolution	Analogue output: ≤ 40 mm	◆
Repeat accuracy	Analogue output: ≤ 2 % of the measurement range	◆
Translation of the characteristic curve	Analogue output : -0.8 ... +2.4 mA, adjustable with potentiometer	◆
Deviation of the characteristic curve	± 2 % of the measurement range	◆
Switching type	light ON	◆
Switching current	max. 100 mA	◆
Voltage drop	≤ 2.5 V	◆
Output of the pre-fault indication	1 switch output pnp, max. 10 mA	◆
Ambient temperature	0 ... +50 °C	◆
Storage temperature	-25 ... +70 °C	◆
Protection degree	IP64 according to EN 60529	◆
Connection type	Terminal compartment Pg9, ≤ 2.5 mm ²	◆
Housing	PMMA	◆
Light exit	PMMA	◆
Mass	200 g	◆



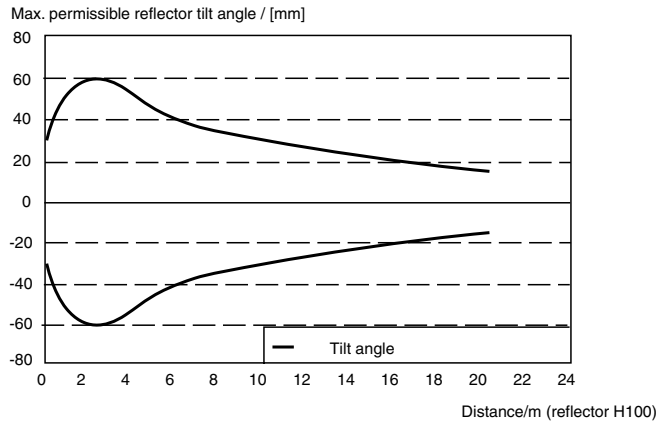
EDM20-R/122

Diagrams

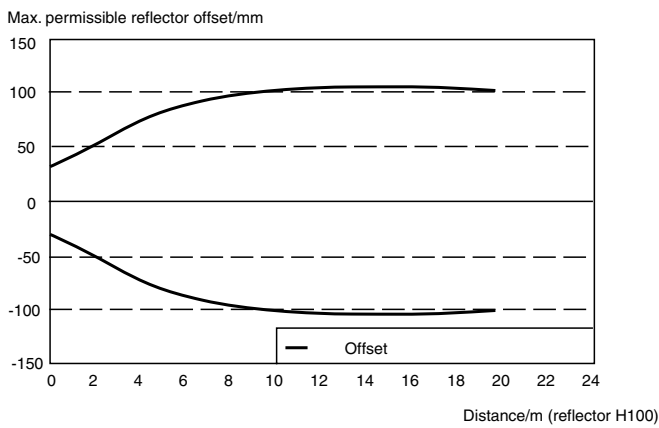
Mutual interaction



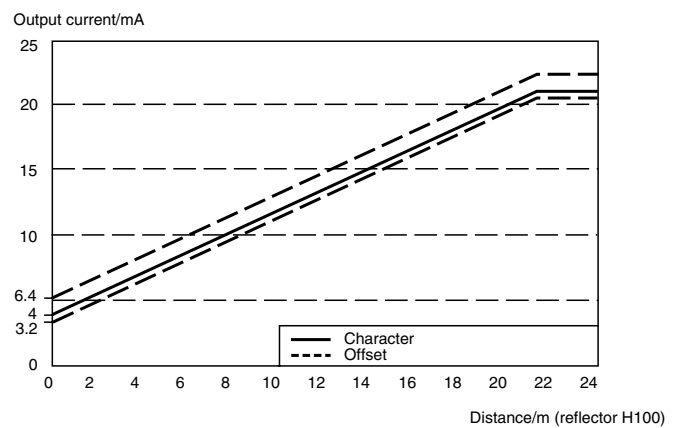
Angular tolerance of the reflector



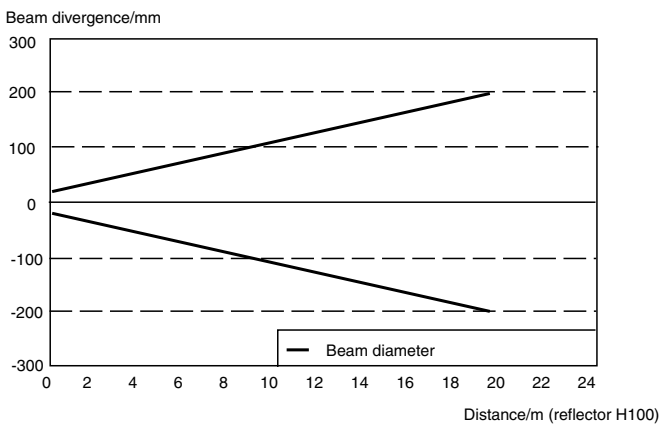
Reflector lateral offset



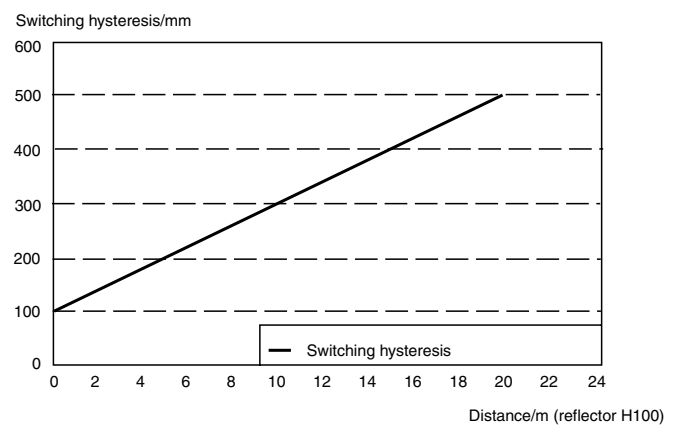
Output characteristics



Beam divergence



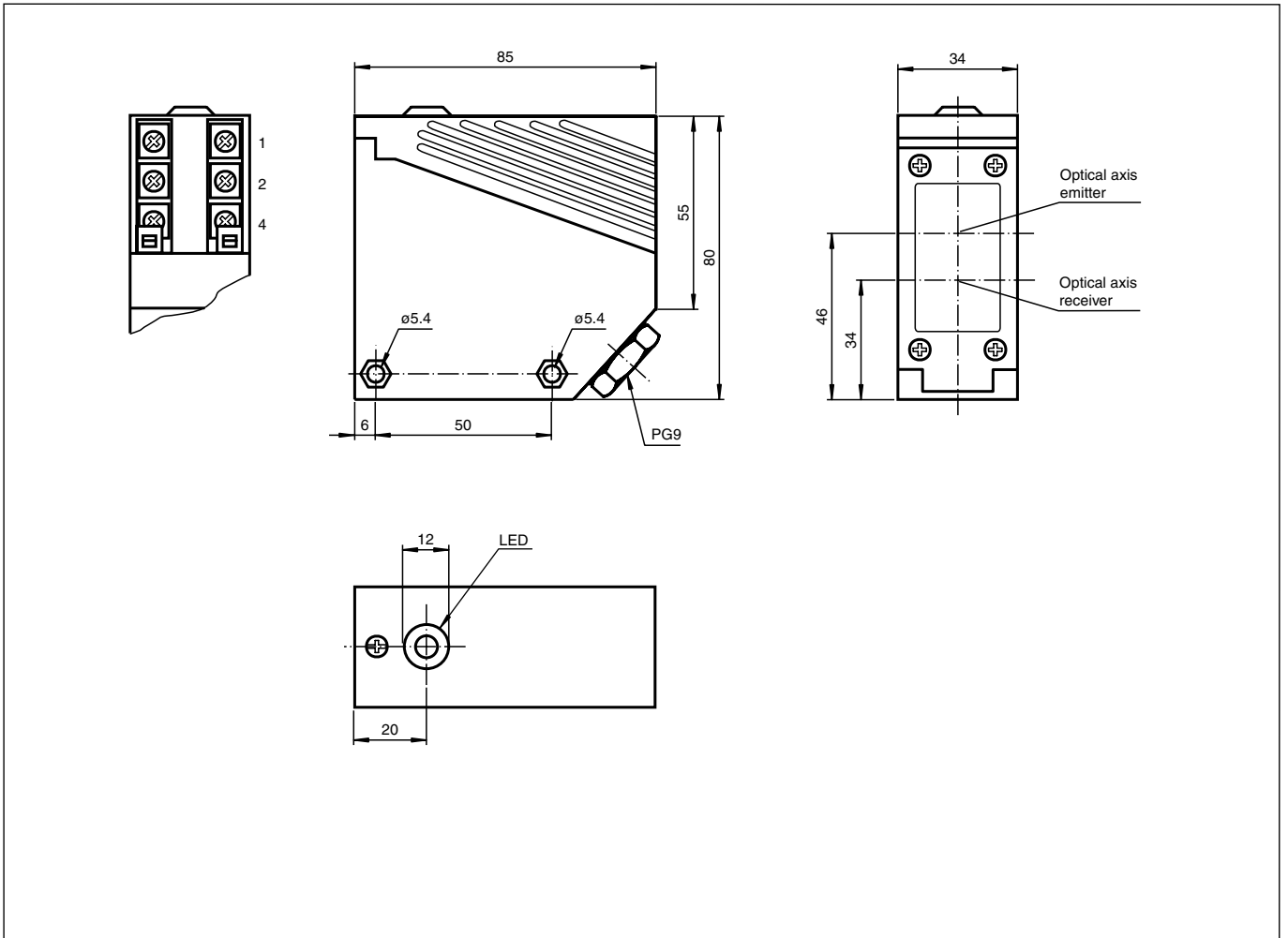
E2 output switching hysteresis



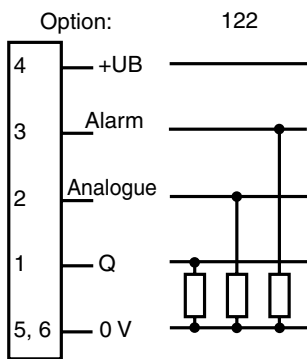
Note

The EDM20M-R/122 determines the distance to a retro-reflector (preferred type is H100). This reflector must be installed on the target object.

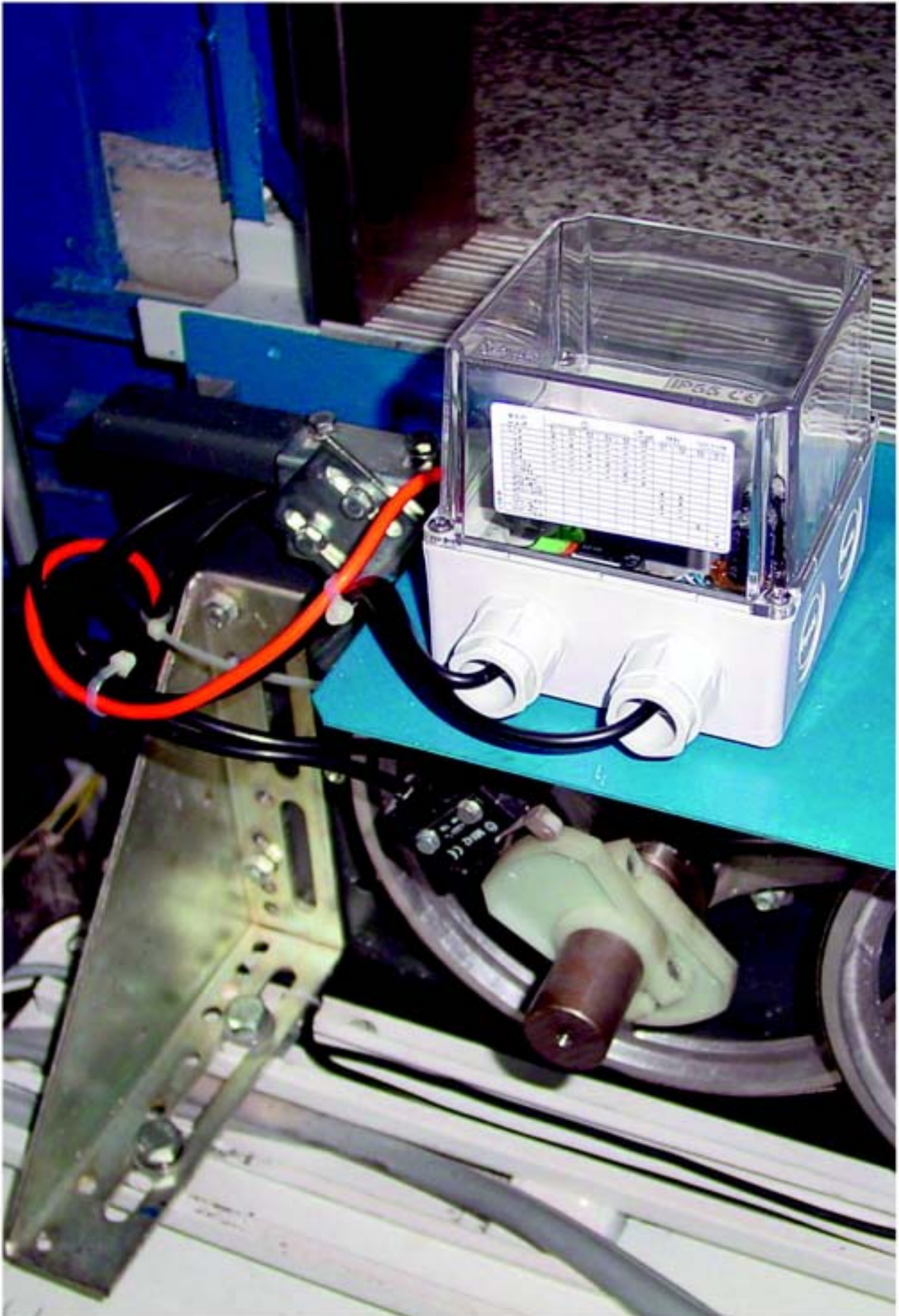
Dimensions



Electrical Connection



○ = Light ON, ● = Dark ON



Power packs



Our power packs make it easy to connect our sensors electrically and support initial signal processing on-site. Depending on the design, the devices can be directly adjusted by means of a built-in switch, thus making it possible to implement, e. g. complex time functions. In addition, a number of devices are provided for top hat rail mounting. This makes it easy to integrate them into the switch cabinet of the control system. Typically, these devices are used wherever a galvanic separation between the power supply and the signal evaluation of the sensors is required.

Type code	Input voltage range	Output voltage	Special feature	Page
VS-GA power pack	230 V AC	12 V DC	adjustable time functions and switching types	1028
PS1 power pack	115 V AC/230 V AC	12 V DC	adjustable time functions and switching types, test input	1030

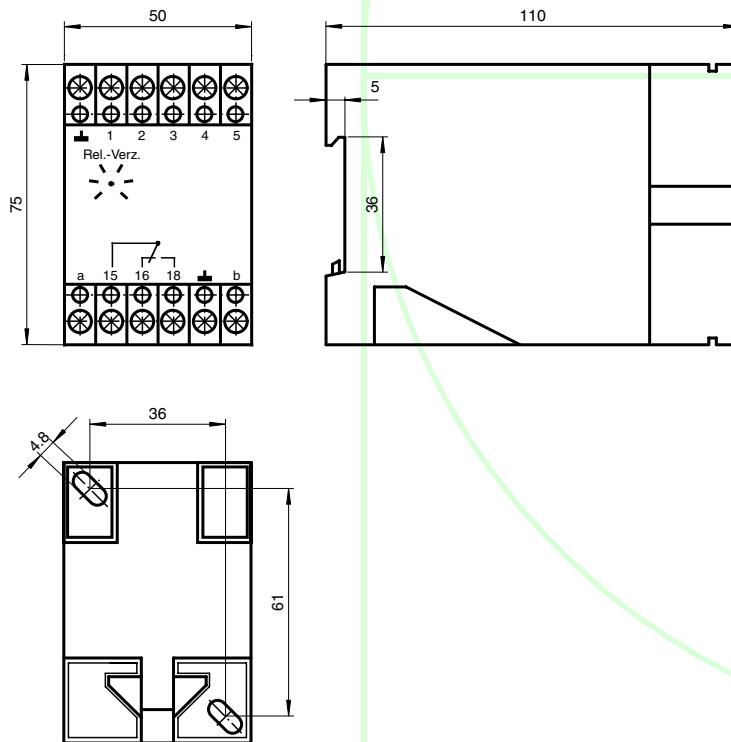
Power supply/Power supply module

VS-GA/31/40a/.-230VAC

- ◆ Various possibilities for mounting
- ◆ Relay output for high power
- ◆ Adjustable timer functions



Dimensions



Date of issue: 8/24/01

Ordering code		VS-GA/31/40a-230VAC	VS-GA/31/40a/Z-230VAC
Standard conformity	EN 60947-5-2	◆	◆
Approvals	CE	◆	◆
Controls	Light/dark switch	◆	
	Light/dark switch, programming switch, time element, time adjuster		◆
Operating voltage	230 V AC	◆	◆
Power consumption	max. 5 VA	◆	◆
Signal output	Relay, 1 alternator	◆	◆
Switching type	Light/dark on selectable	◆	◆
Switching voltage	max. 250 V AC	◆	◆
Switching current	max. 2 A	◆	◆
Switching frequency	25 Hz	◆	◆
Response time	20 ms	◆	◆
Timer function	GAN, GAB, IAB, 0.1 ... 10 s programmable		◆
Other outputs	Light beam-power supply 12 VDC	◆	◆
Input type	npn	◆	◆
Ambient temperature	-20 ... +60 °C	◆	◆
Storage temperature	-20 ... +75 °C	◆	◆
Protection degree	IP40	◆	◆
Connection type	Connection terminals, max. conductor cross-sectional area 2.5 mm ²	◆	◆
Housing	Plastic	◆	◆
Installation	Screw fixing with 2 mounting screw holes (4.8 mm), top hat rail mounting	◆	◆
Mass	300 g	◆	◆

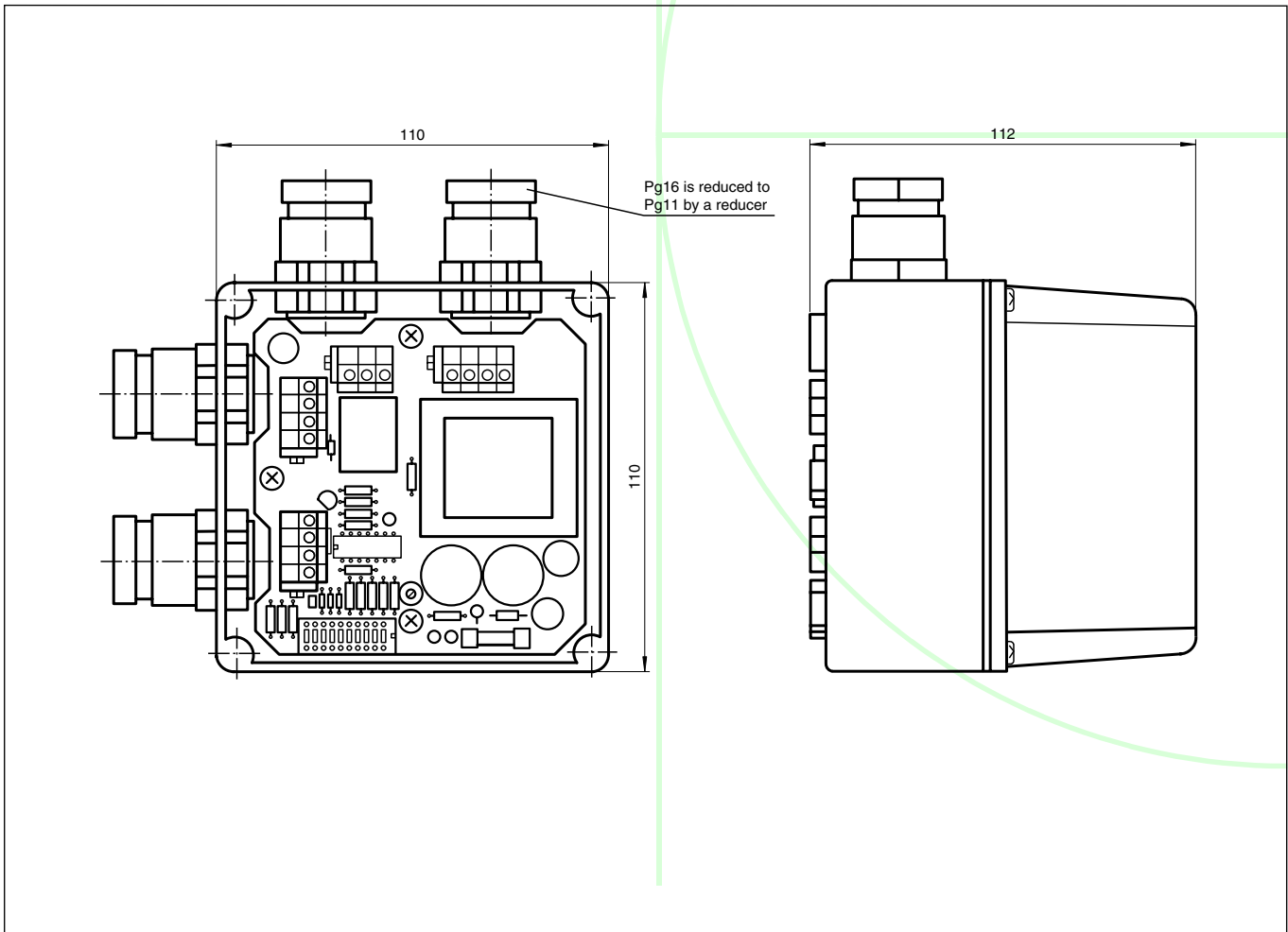
Power supply/Power supply module

PS1/31

- ◆ Relay output for high power
- ◆ Adjustable timer functions



Dimensions



Ordering code		PS1/31
Standard conformity	EN 60947-5-2	◆
Approvals	CE	◆
Function display	LED green: Power On (according to safety) LED yellow: Switching state, lights up for energized relay	◆
Controls	10-fold programming switch for timer functions and switching type	◆
Operating voltage	115 und 230 V AC	◆
Power consumption	5 VA	◆
Signal output	Relay, 1 alternator	◆
Switching type	Light/dark on selectable programmable	◆
Switching voltage	240 V AC	◆
Switching current	1 A	◆
Switching frequency	20 Hz	◆
Response time	20 ms	◆
Timer function	GAN, GAB, GAN-GAB, 0.1 ... 15 s programmable	◆
Other outputs	Light beam-power supply 24 VDC	◆
Test input	Test signal for light beam switches transmitter	◆
Input type	Programmable for npn or pnp	◆
Ambient temperature	0 ... +60 °C	◆
Storage temperature	-20 ... +75 °C	◆
Protection degree	IP55	◆
Connection type	4 Pg16-screwed connections, cage tension terminals in the terminal space	◆
Housing	Plastic with transparent cover	◆
Installation	Screw fixing	◆
Mass	600 g	◆

Date of issue: 10/15/01



<u>Contents</u>	<u>Page</u>
Cable and mating connectors	1034
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Mounting flanges	1047
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Sensor tester	1056
Special accessories for series MLV11, RL27 and SU15	1057
PC-programming software	1057
OPUS-HH-E hand-held programmer	1058
Programming clip (optical serial interface)	1060

Accessories – Cables, connectors, mating connectors

Screw terminal connectors in M8, M12, M18 and Rd24 x 1/8:

Design	Model number	Design	Connection system	Number of pins	Conductor cross section (mm ²)	Fig.
M8	V3-G	Socket, straight	Penetration system	3-pin	0.25 ... 0.34	1
	V3-W	Socket, angled	Penetration system	3-pin	0.25 ... 0.34	2
M12	V1-G	Socket, straight	Screw terminal system, PG7 screwed connection	4-pin	max. 2.5	3
	V1-W	Socket, angled		4-pin	max. 2.5	4
	V1S-G	Connector, straight		4-pin	max. 2.5	-
	V1S-W	Angled connector		4-pin	max. 2.5	-
	V1-E-LED	LED printed circuit board (npn)	Suitable for installation into V1-G and V1-W	-	-	-
	V1-E2-LED	LED printed circuit board (pnp)		-	-	-
	V1-G-Q2	Socket, straight	Penetration system	4-pin	0.34 ... 0.75	5
	V1S-G-Q2	Connector, straight	Penetration system	4-pin	0.34 ... 0.75	-
	V1S-W-PG9	Socket, angled	Screw terminal system	5-pin	max. 0.75	-
Rd24 x 1/8	V16-G	Rd24 x 1/8 socket, straight	Screw terminal system	6-pin + PE	max. 0.75	6
	V16S-G	Rd24 x 1/8 connector, straight	Screw terminal system	6-pin + PE	max. 0.75	-
M18	V18-G	Socket, straight	Screw terminal system	4-pin	max. 1.5	7
	V18-W	Socket, angled	Screw terminal system	4-pin	max. 1.5	8
With central screw	V-W	Socket with central screw, angled	Screw terminal system	5-pin	max. 2.5	-
	V-W-E2	Socket with central screw, angled	Screw terminal system, with integrated LED	5-pin	max. 2.5	-
	V-W-N	Socket with central screw, angled	Screw terminal system	5-pin	max. 2.5	-



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8

For pin assignment see page 1038

Technical data for connectors with injected cable

Connectors and sockets

Number of pins	2-, 3-, 4- or 5-pin
Settings	Screw settings
Self-locking	With O-ring in cap nut
Colour of the body of the handle	Green
Material of the body of the handle	PUR
Material of the contacts	CuSn/Au
Material of the contact surface	Au
Material of the cap nut	CuSn/Ni
Material of the sealing ring	NBR
Protection class as per DIN 40050	IP68 in screwed state
Max. operating voltage	60 V DC or 250 V AC (for V13-... types)
Max. operating current	4 A
Contact resistance	< 5 mΩ
Insulation resistance	As per VDE 0295
Test voltage	1500 V _{eff.} AC, 50 Hz




Lead

Lead structure	Fine wires, flexible
Conductor cross-section	Leads for M12 connections: 0.34 mm ² For NAMUR cable sockets, however: 0.50 mm ² Leads for M8 connections: 0.25 mm ²
Colour of coating	Black for M12 and grey for M8
Temperature range for PVC leads	With motion: -5 °C to +70 °C With no motion: -30 °C to +80 °C
Temperature range for PUR leads ¹⁾	With motion: -5 °C to +70 °C With no motion: -30 °C to +100 °C
Minimum permissible bending radius	> 10 x diameter of the lead
Diameter of coating	Ø4.6 mm for M8 and Ø4.8 mm for M12, however Ø5.2 mm for 5-pin version
Material of the conductor insulation	PVC
Conductor colours as per VDE 293	2-pin: BN, BU 3-pin: BN, BU, BK 4-pin: BN, BU, BK, WH 5-pin: BN, BU, BK, WH, GY

¹⁾ For PUR cables, reduced mechanical values must be taken into consideration for temperatures above +80 °C.

Accessories – Cables, connectors, mating connectors



Cable sockets in M8 design with metal cap nut ¹⁾

Suitable for sensors using 2, 3 and 4-wire system						
Cable coating	Length	No. of conductors	Ø (mm ²)	Design straight	Design angled	Design angled with 2 LEDs
PUR, grey	2 m	3	0.25			V3-WM-E2-2M-PUR
	5 m	3	0.25	V3-GM-5M-PUR	V3-WM-5M-PUR	V3-WM-E2-5M-PUR
	10 m	3	0.25			V3-WM-E2-10M-PUR
PVC, grey	2 m	3	0.25	V3-GM-2M-PVC	V3-WM-2M-PVC	
	5 m	3	0.25	V3-GM-5M-PVC	V3-WM-5M-PVC	
	10 m	3	0.25	V3-GM-10M-PVC	V3-WM-10M-PVC	
PUR, grey	2 m	4	0.25			
	5 m	4	0.25	V31-GM-5M-PUR	V31-WM-5M-PUR	
	10 m	4	0.25			
PVC, grey	2 m	4	0.25	V31-GM-2M-PVC	V31-WM-2M-PVC	
	5 m	4	0.25	V31-GM-5M-PVC	V31-WM-5M-PVC	
	10 m	4	0.25	V31-GM-10M-PVC	V31-WM-10M-PVC	

1) M8 cable sockets with clasp lock on request.

For pin assignment see page 1038




Cable sockets in M12 design for NAMUR sensors

Suitable for NAMUR sensors Body of handle and cable coating in blue					
Cable coating	Length	No. of conductors	Ø (mm ²)	Design straight	Design angled
PVC, blue	5 m	4	0.5		V1-W-N4-5M-PVC
	10 m	4	0.5		V1-W-N4-10M-PVC
PUR, blue	2 m	2	0.5	V1-G-N-2M-PUR	V1-W-N-2M-PUR
	5 m	2	0.5	V1-G-N-5M-PUR	V1-W-N-5M-PUR
	10 m	2	0.5	V1-G-N-10M-PUR	V1-W-N-10M-PUR

For pin assignment see page 1038




Date of issue 10/15/2001

Cable connectors in M12 design for DC sensors

Suitable for DC sensors using 2, 3 and 4-wire system						
Cable coating	Length	No. of conductors	Ø (mm ²)	Design straight	Design angled	Design angled with 2 LEDs
PVC, black	2 m	4	0.34	V1-G-2M-PVC	V1-W-2M-PVC	
	5 m	4	0.34	V1-G-5M-PVC	V1-W-5M-PVC	
	10 m	4	0.34	V1-G-10M-PVC	V1-W-10M-PVC	
PUR, black	2 m	4	0.34	V1-G-2M-PUR	V1-W-2M-PUR	V1-W-A2-2M-PUR
	5 m	4	0.34	V1-G-5M-PUR	V1-W-5M-PUR	V1-W-A2-5M-PUR V1-A0-5M-PUR V1-W-E2/E3-5M-PUR
	10 m	4	0.34	V1-G-10M-PUR	V1-W-10M-PUR	V1-W-A2-10M-PUR
PUR, black	2 m	3	0.34			V1-W-E2-2M-PUR
	5 m	3	0.34			V1-W-E2-5M-PUR V1-W-E-5M-PUR
	10 m	3	0.34			V1-W-E2-10M-PUR
PVC, black	2 m	5	0.34	V15-G-2M-PVC	V15-W-2M-PVC	
	5 m	5	0.34	V15-G-5M-PVC	V15-W-5M-PVC	
	10 m	5	0.34	V15-G-10M-PVC	V15-W-10M-PVC	
PUR, black	2 m	5	0.25		V15-W-2M-PUR	
	5 m	5	0.25		V15-W-5M-PUR	

For pin assignment see page 1038

M12 connection cable in PUR 4 x 0.34 mm², coating colour black

Suitable for all DC sensors using 2, 3 and 4-wire systems				
	Connector, straight	Length	Socket, straight	Socket, angled
		1 m	V1-G-1M-PUR-V1-G	V1-W-1M-PUR-V1-G
		2 m	V1-G-2M-PUR-V1-G	V1-W-2M-PUR-V1-G
		5 m	V1-G-5M-PUR-V1-G	V1-W-5M-PUR-V1-G

For pin assignment see page 1038

These connection cables can be used together with DC proximity switches using 2, 3 and 4-wire systems.

Accessories – Cables, connectors, mating connectors

Electrical accessories for AS-Interface

Model number	Description	Figure
VAZ-FK-CL1	Fastening clip for mechanical fastening of the AS-Interface flat cable via a rear-side adhering surface.	
VAZ-2FK-B1	Distributor for 2 AS interface flat cables with protection class IP65 with screw fixing	
VAZ-T1-FK-V1	M12 x 1 cable connection to the AS-Interface flat cable with protection class IP67, spring terminals and screw fixing	
VAZ-G6F-V1	M12 x 1 cable connection to the AS-Interface flat cable with protection class IP67 and screw fixing	
VAZ-G6F-W2M	2 m cable output with 2 x 1.5 mm ² conductor cross-section from the AS-Interface flat cable for connecting AS-Interface-capable sensors with protection class IP67.	
VAZ-T1-FK-PG9	Cable connection for AS-Interface flat cable on PG9 screwed connection with protection class IP67	
VAZ-T1-FK-PG13.5	Cable connection for AS-Interface flat cable on PG13.5 screwed connection with protection class IP67	
VAZ-T1-G2F	Assembled cable output housing from AS-Interface flat cable with protection class IP52 for conductor cross-sections 0.14 mm ² ... 0.34 mm ² and diameter of coating between 5 mm and 6 mm	
VAZ-2T1-FK-V1	2 m cable output with ready to use assembled M12 x 1 cable socket from AS-Interface flat cable with parallel power supply.	

Conductor colours and connection assignment (EN 60947-5-2)

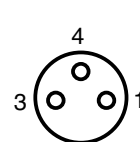
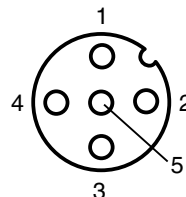
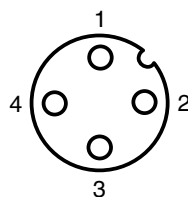
Colour assignment for pre-assembled plug connectors V1, V15, V3

Steckverbindung -V1
(Rundsteckverbindung M12)

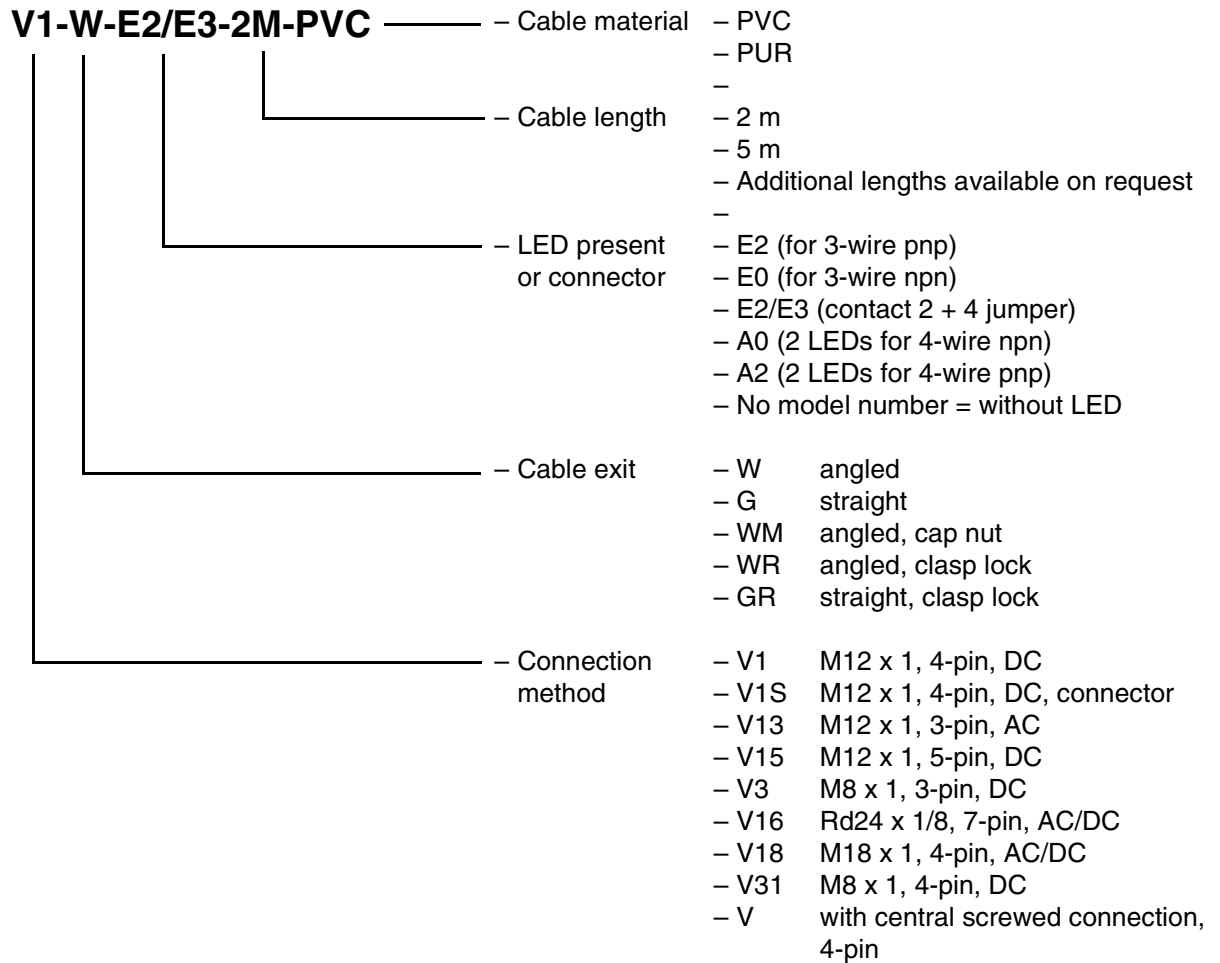
Steckverbindung -V15
(Rundsteckverbindung M12)

Steckverbindung -V3
(Rundsteckverbindung M8)

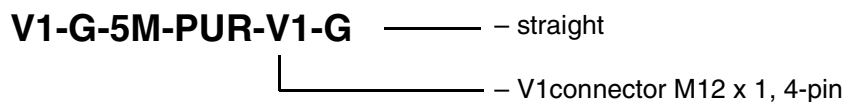
Pin	Colour	Abbreviation
1	Brown	BN
2	White	WH
3	Blue	BU
4	Black	BK
5	Grey	GR



Type code for mating connectors



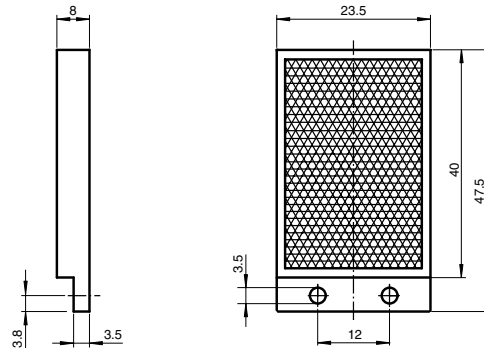
Type code for connection cable



Accessories - Reflectors

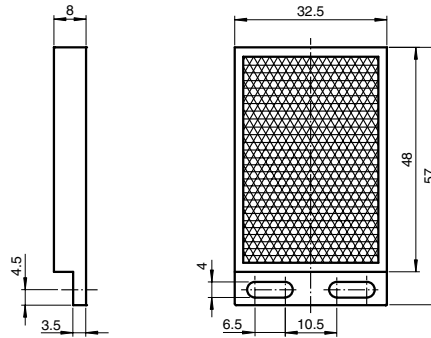
H40

Rectangular reflector with one fixing strap and fastening holes
47.5 mm x 23.5 mm



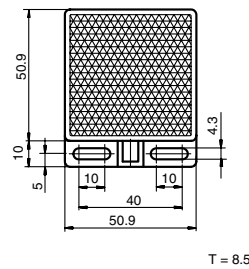
H48

Rectangular reflector with fixing strap and fastening holes
32.5 mm x 57 mm



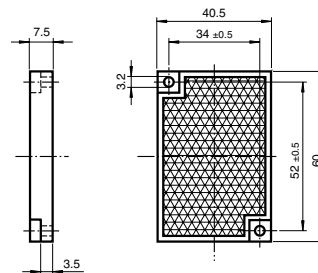
H50

Rectangular reflector with one fixing strap and 2 mounting screw holes
50.9 mm x 50.9 mm



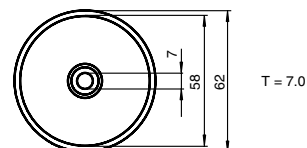
H60

Reflector with diagonal fastening holes
60 mm x 40.5 mm



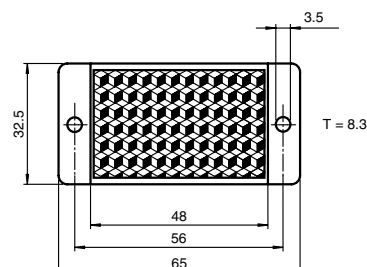
H62

Round reflector with one central fastening hole
Ø = 62 mm



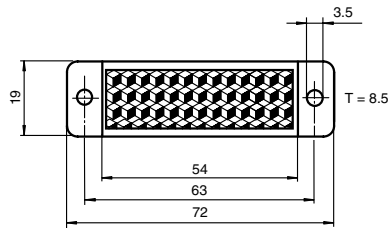
H65

Reflector with lateral fastening holes
65 mm x 32.5 mm



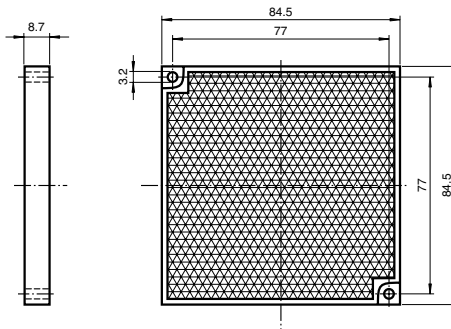
H72

Retroreflector with 2 lateral fastening holes
72 mm x 19 mm



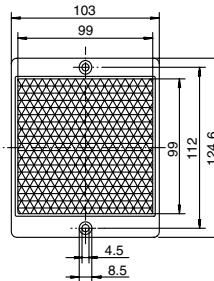
H85

Rectangular reflector 2 with fastening holes
84.5 mm x 84.5 mm



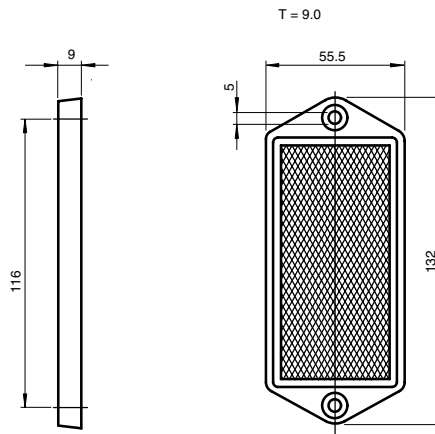
H100

Rectangular reflector with 2 fastening holes and a mounting screw hole
124.6 mm x 103.1 mm



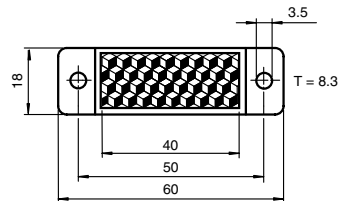
H116HT

Plug-in reflector (rivet 6.5)
56 mm x 116 mm, 110 °C



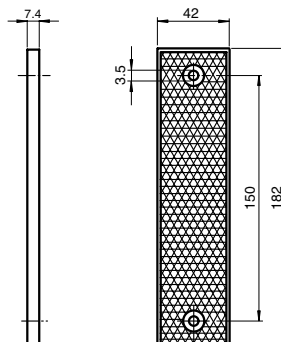
H160

Reflector with 2 lateral fastening holes
60 mm x 18 mm



H180

Rectangular reflector with 2 fastening holes
180 mm x 40 mm

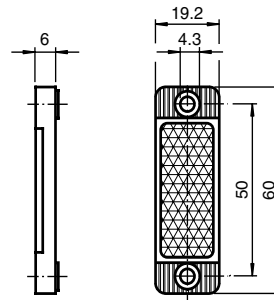


Date of issue 10/15/2001

Accessories - Reflectors

VR10

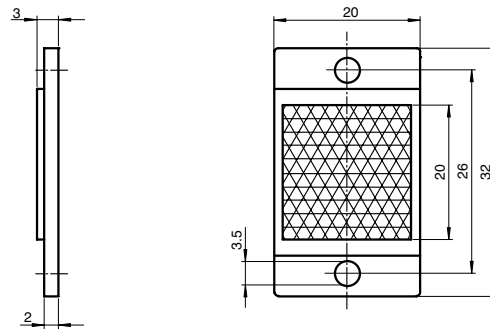
Rectangular reflector, even surface with 2 fastening holes
60 mm x 19 mm



MH 20

Reflector with 2 fastening holes
32 mm x 20 mm

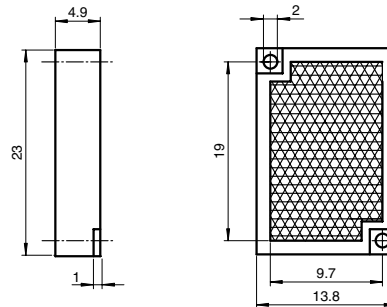
Micro-structure, especially suitable for laser optical barriers



MH 23

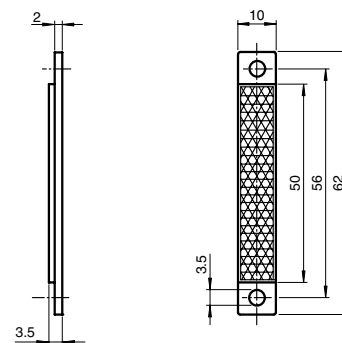
Reflector with 2 fastening holes
23 mm x 13.8 mm

Micro-structure, especially suitable for laser optical barriers



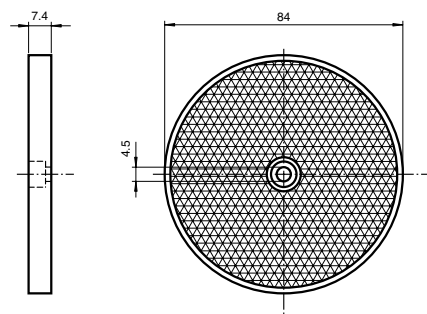
MH 56

Reflector with 2 fastening holes
62 mm x 10 mm
Micro-structure



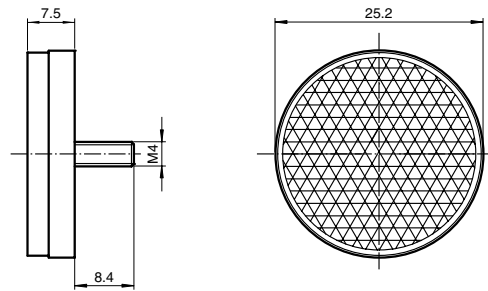
C 110-2

Round reflector with one central fastening hole
Ø = 84 mm



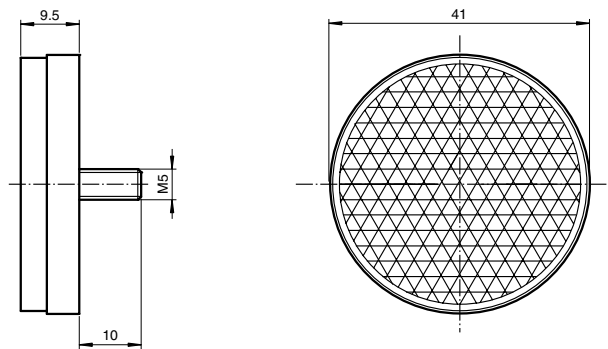
S 25

Reflector with M4 screw fixing
 $\varnothing = 25 \text{ mm}$



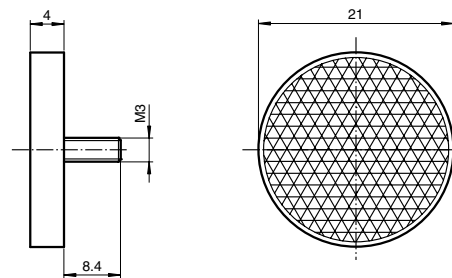
S 42

Reflector with M5 screw fixing
 $\varnothing = 42 \text{ mm}$



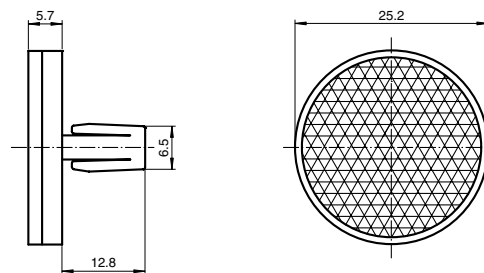
MS 21

Reflector with M3 screw fixing
 $\varnothing = 21 \text{ mm}$
 Micro-structure



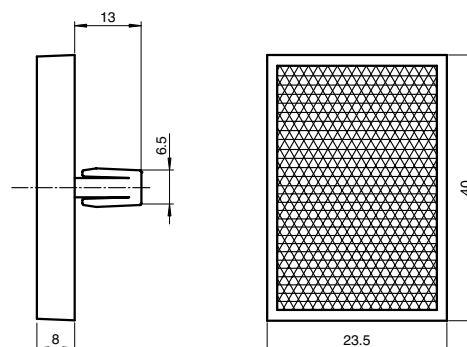
Clip 25

Plug-in reflector (rivet 6.5 mm)
 $\varnothing = 25.2 \text{ mm}$



Clip 40

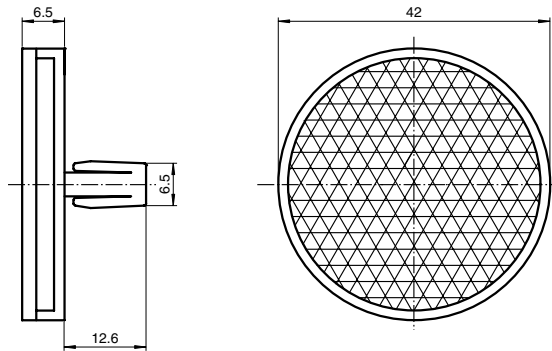
Plug-in reflector (rivet 6.5)
 40 mm x 23.5 mm



Accessories - Reflectors

Clip 42

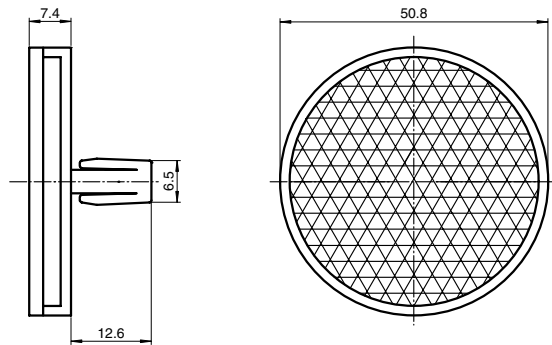
Plug-in reflector (rivet 6.5)
Ø = 42 mm



Clip 50HT

Plug-in reflector (rivet 6.5)
Ø = 50 mm

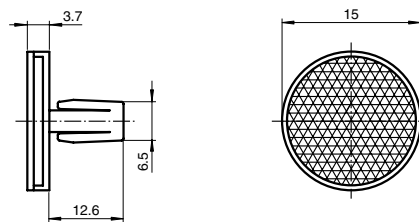
Micro-structure
Highest temperature = 110 °C



MClip 15HT

Plug-in reflector (rivet 6.5)
Ø = 15 mm

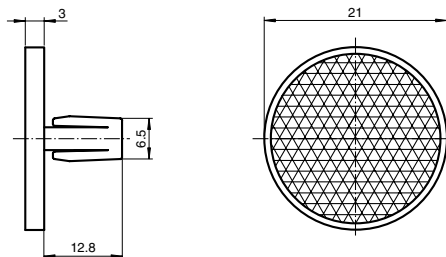
Micro-structure
Highest temperature = 110 °C



MClip 21

Plug-in reflector (rivet 6.5)
Ø = 21 mm

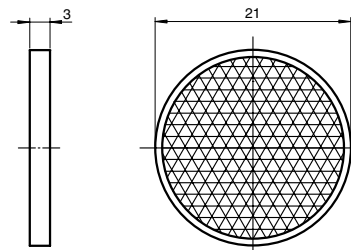
Micro-structure



MA21

Self-adhesive reflector
Ø = 21 mm

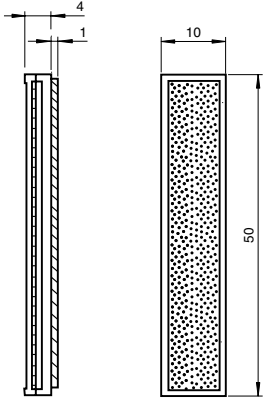
Micro-structure



MA50

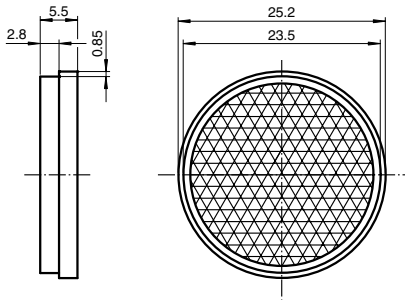
Self-adhesive reflector
10 mm x 50 mm

Micro-structure



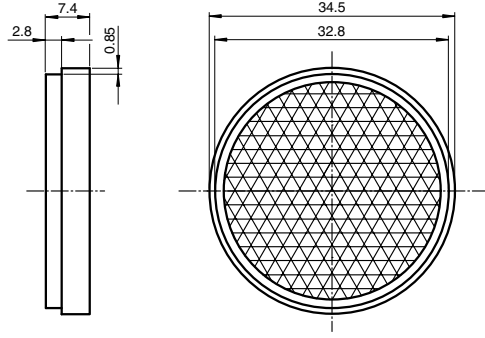
A25

Self-adhesive reflector
Ø = 25 mm



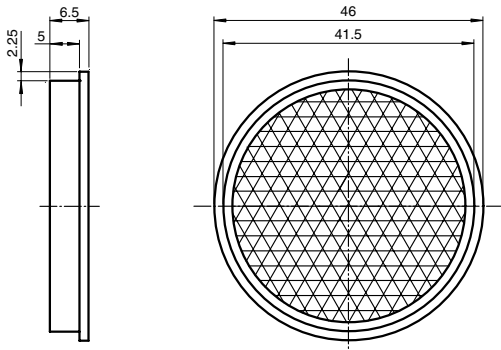
A35

Self-adhesive reflector
Ø = 35 mm



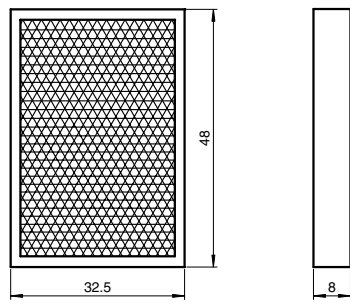
A46

Self-adhesive reflector
Ø = 46 mm



A48

Self-adhesive reflector
48 mm x 32.5 mm



Date of issue 10/15/2001

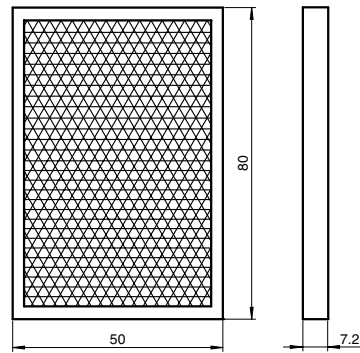
Subject to reasonable modifications due to technical advances.

Copyright Pepperl+Fuchs, Printed in Germany

Accessories - Reflectors

A80

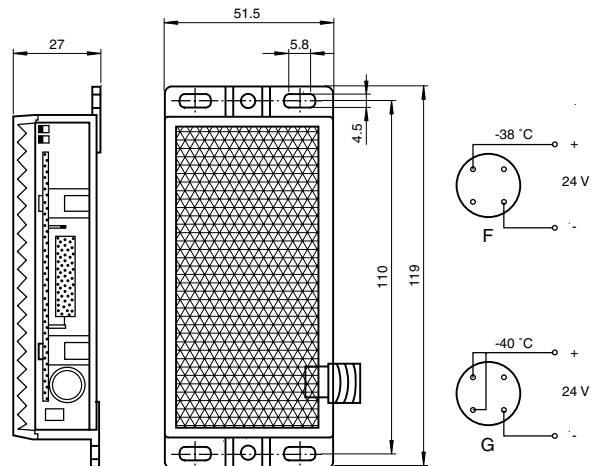
Self-adhesive reflector
80 mm x 50 mm



Heater120

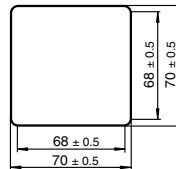
Reflector
120 mm x 51 mm

Heatable, UB = 24 V



OFR70

Foil reflector
70 mm x 70 mm



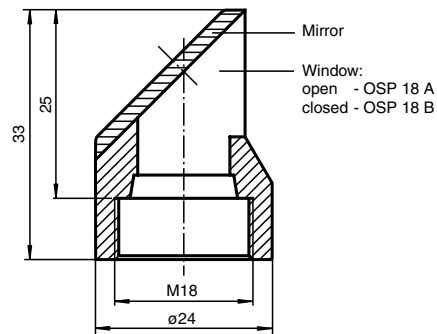
F6000

Self-adhesive reflector foil with triple
structure
Sheet 1.0 m x 1.0 m

(without illustration)

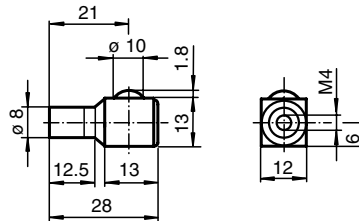
OSP 18 A OSP 18 B

90°-adjustable mirror for threaded sensors M18
Closed version OSP 18 B for infrared light only and only for through-beam sensors or reflex photoelectric sensors



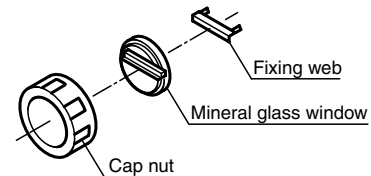
OVR-4GK

Radial offset lens for fibre optics
5-fold range increase in through-beam operation
Simple screw fitting



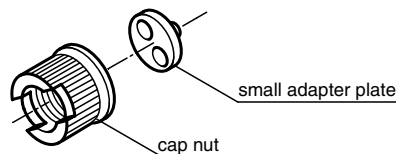
OTS18

Switch set for VariKont M (r)
Replacement for damaged or lost parts (only OJ500-M1K-...).



OLA18

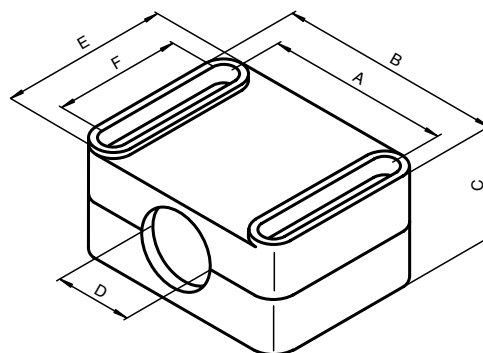
Adapter set M18
Adapter for connecting fibre optics to threaded sensors M18 (OBT200L-18GM70-...).



Mounting flanges

The fixing flanges make it possible to mount and adjust photoelectric sensors in the M12/M18 housing easily and without problems.

Material:
BF... PBT (Polybutyleneterephthalate)
4-342 POM (Polyoxymethylen)



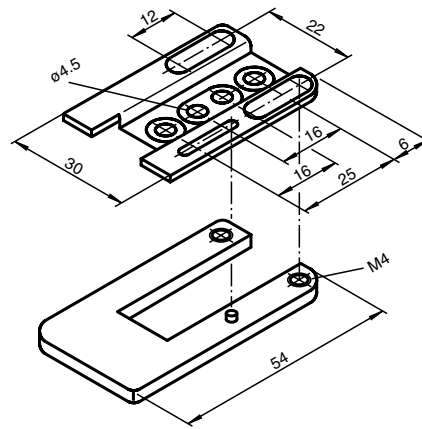
Model number	A	B	C	D	E	F	For housing diameter	Suitable for screws
BF4.5 (for fibre optics)	10	18	10	4.5	15	7	4.5	M3 x 15
BF12 upper section transp.	24	36	19	12	30	16	12	M4 x 20
BF18 upper section transparent	30	44	24	18	40	26	18	M5 x 25

Accessories – Mounting brackets

Mounting bracket MH4-3742

The mounting bracket type 4-3742 simplifies adjustment of the photoelectric sensors (*VariKont-M*[®], model line -M1K-), to EN 50047.

It permits the fitted and wired sensor to be repositioned by up to 12 mm. By partially releasing the M4 x 20 sensor mounting screws, the sensor can be easily moved backwards and forwards, thus enabling the switch point to be set exactly. The screws are then tightened to secure the sensor in position. Fixing screws for VariKont M are included in the delivery package.



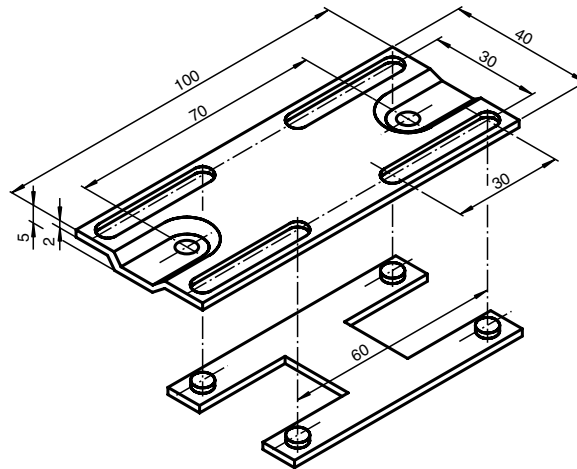
Mounting bracket MH4-2057

The mounting bracket type 4-2057 simplifies adjustment of the photoelectric sensors (*VariKont*[®], model line +U1+), in accordance with DIN 43694, EN 50041.

It permits the fitted and wired sensor to be repositioned by up to 30 mm. Partial release of the M5 x 16 sensor mounting screws allows backward and forward movement of the sensor, thus enabling the switch point to be set exactly. The screws are then tightened to secure the sensor in position.

The material for the setting slide is corrosion resistant aluminium.

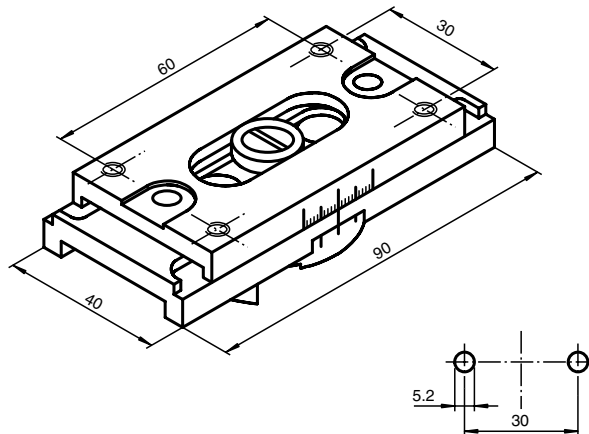
Fixing screws for VariKont are included with delivery.



Mounting bracket MH4-2681

The type 4-2681 mounting bracket simplifies the task of adjusting photo-electric sensors (*VariKont*[®] series +U1+) per DIN 43694, EN 50025 or EN 50037.

The simple mounting will be done onto well-ried and tested C section rail¹⁾ as per EN 50024 (15 x 30 x 1.5). The attachment is equally suitable for use in existing installations which now use the C section rail¹⁾ according to the expiring DIN 43662 (15 x 30 x 2). Great ample movement in the X and Y directions and 360° turning range reduces fitting and adjustment work. The final position of the sensor is fixed by tightening the sensor mounting screws (included in the delivery package). Alternatively, two point fitting may be used instead of C-rail. The corresponding mounting screw holes are accessible through the slot in the sliding plate. M5 x 16 mm screws are suitable for two point fixing.



Height for two-point fixing approximately 28 mm.

Technical data

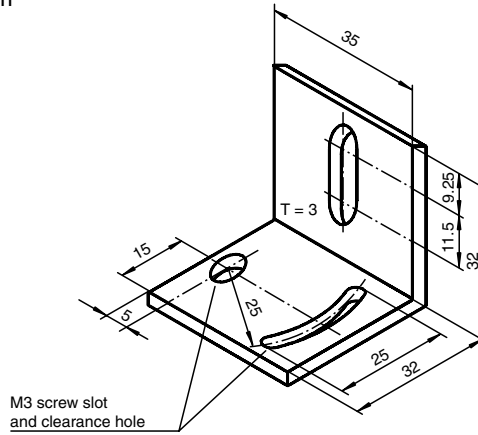
Material	Chromated zinc alloy die casting
Permissible shock and vibration loading	b < 30 g, T < 11 ms f < 55 Hz, a < 1 mm as per IEC 68-2-6 and IEC 68-2-27
Weight	aprox. 270 g

¹⁾ for example NIEDAX GmbH

OMH-GL mounting bracket

Mounting bracket for adjusting the glass fibre optics horizontally and vertically.

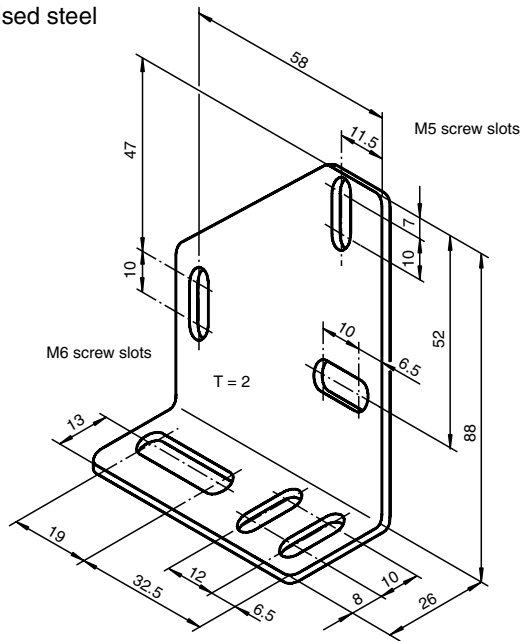
Material: aluminium



OMH-RL36 mounting bracket

Mounting bracket for photoelectric sensors of the 36 series.

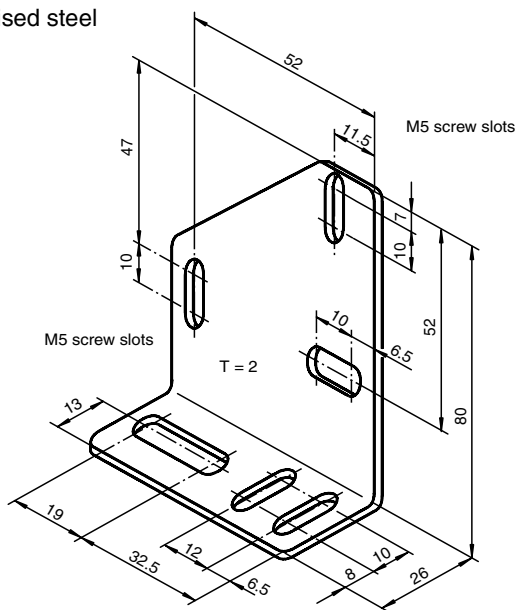
Material: galvanised steel



OMH-RL39 mounting bracket

Mounting bracket for photoelectric sensors of series 39.

Material: galvanised steel



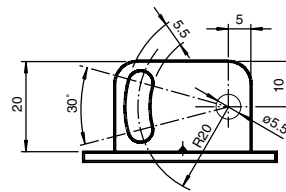
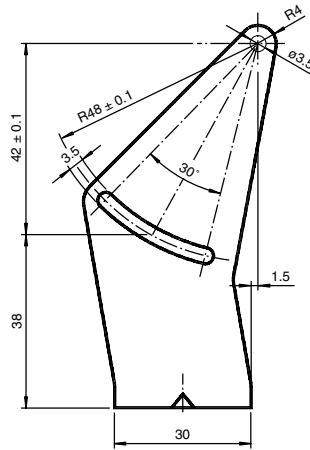
Accessories – Mounting brackets

OMH-MLV11 mounting bracket

Mounting bracket for photoelectric sensors of the MLV11.. series

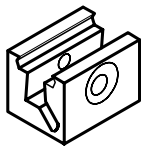


Material: stainless steel (1.4571)

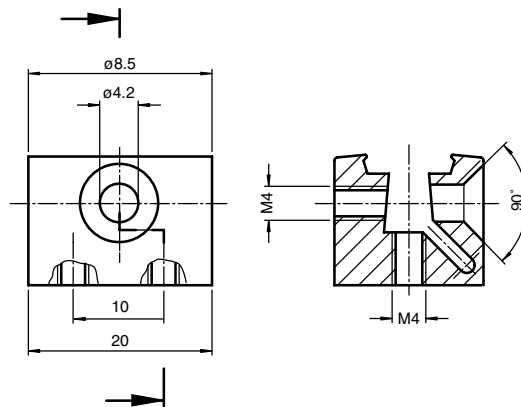


OMH-MLV11-K

Clamps for photoelectric sensors of the 11 and 28 series.



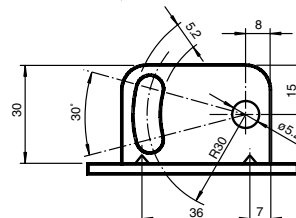
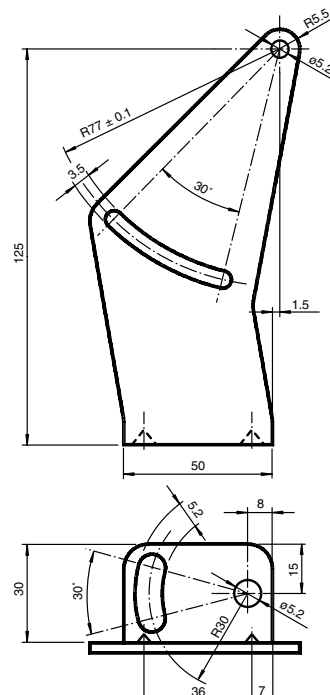
Material: aluminium



OMH-RL27 mounting bracket

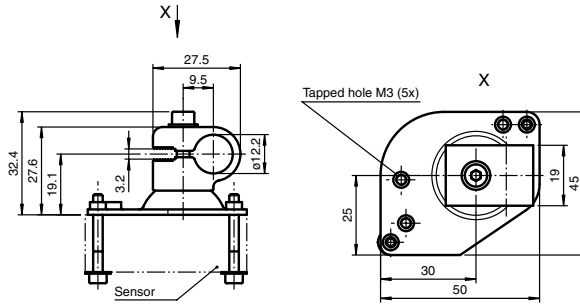
Mounting bracket for photoelectric sensors of the 27 series.

Material: stainless steel (1.4571)



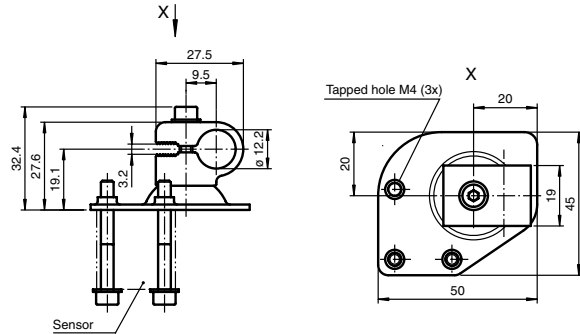
OMH-01 mounting bracket

For mounting on $\varnothing 12$ mm round bar or sheet metal (plate thickness 1.5 mm ... 3 mm). Suitable for sensors of series 11 and 13.



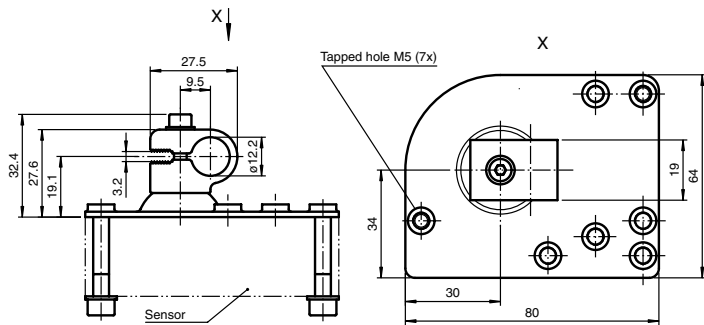
OMH-02 mounting bracket

For mounting on $\varnothing 12$ mm round bar or sheet metal (plate thickness 1.5 mm ... 3 mm). Suitable for sensors of the VariKont M[®] series.



OMH-03 mounting bracket

For mounting on $\varnothing 12$ mm round bar or sheet metal (plate thickness 1.5 mm ... 3 mm). Suitable for sensors of series 27, 36 und 39.



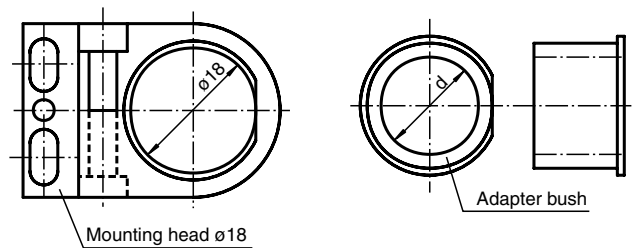
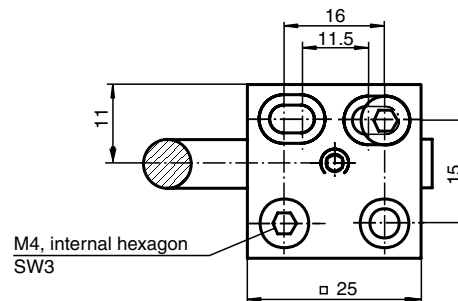
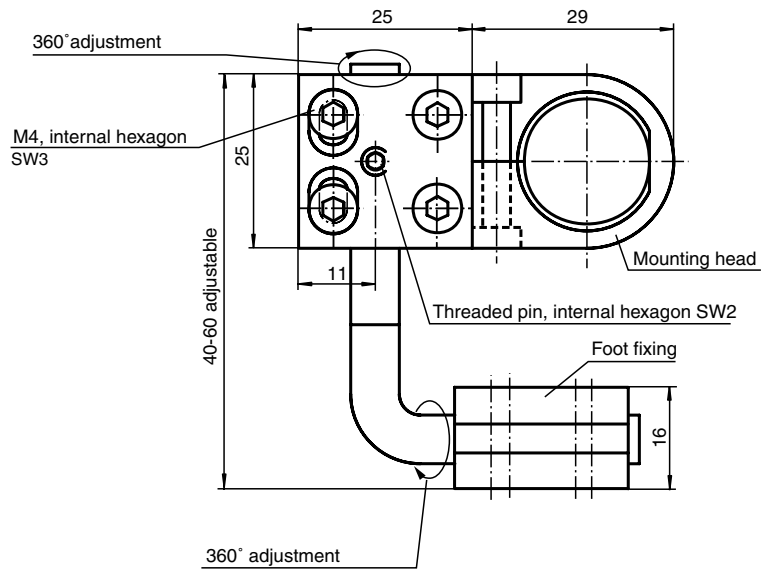
Accessories – Mounting brackets

Universal support BF5-30

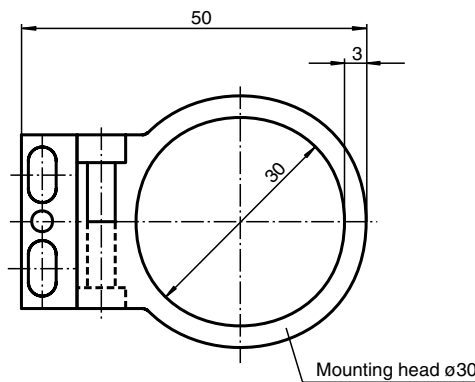
Universal mounting for all cylindrical sensors with $\varnothing 5$ mm to $\varnothing 30$ mm

- **Secure fixing**
- **Easy mounting**
- **Adjustable 360° rotation of mounting head and foot fixing**
- **Sturdy construction**

The mounting adapter BF 5-30 is supplied with 2 mounting heads ($\varnothing 18$ mm, $\varnothing 30$ mm) and 4 adapter bushes ($\varnothing 5$ mm, $\varnothing 8$ mm, $\varnothing 12$ mm, $\varnothing 14$ mm).



$d = 5$ mm, 8 mm, 12 mm, 14 mm



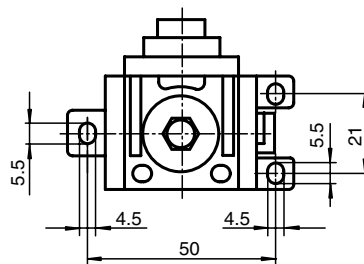
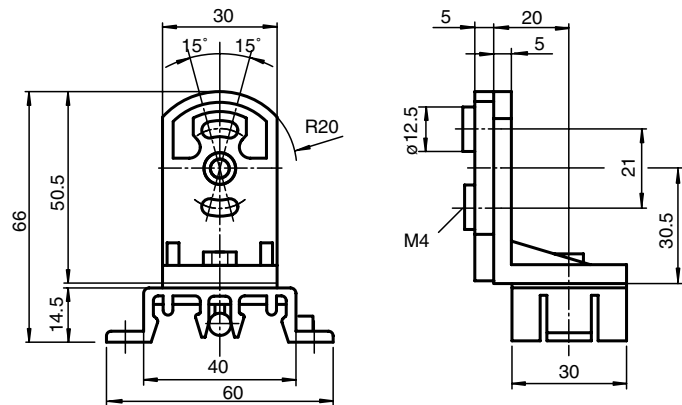
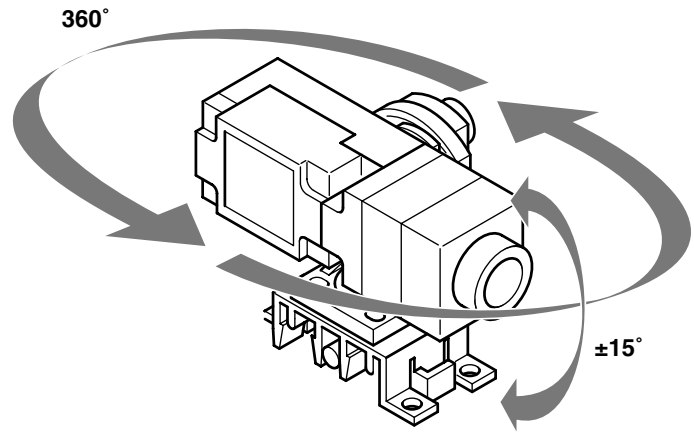
OMH-VariKont-M mounting bracket

- Precise adjustment
- Can be infinitely rotated horizontally through 360°
- Infinitely variable, may be inclined by $\pm 15^\circ$
- Easy, reliable mounting optionally
 - on C section rail
 - on "top hat" rail
 - or with screw fixing.

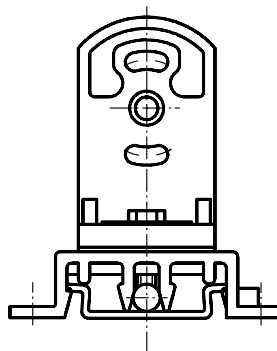
The mounting bracket OMH-VariKont M enables precise adjustment of photoelectric sensors of the *VariKont M*[®] series, Model line M1K-, as per EN 50047. The completely fitted and wired sensor may be rotated through 360° in the horizontal plane and inclined at any angle between $\pm 15^\circ$. Shifting the sensor head provides further positioning options. Fitting is simple using the well-tried and tested C section rail¹⁾ as per EN 20024 (15 x 30 x 1.5) or the 35 mm "top hat" rail as per EN 50022. For existing installations, the mounting bracket is suitable for the C section rail¹⁾ according to the expiring DIN EN 43622 (15 x 30 x 2). Instead of the DIN rail, a three-point screw fixing using M5 screws is also possible. The material of the mounting bracket is sturdy, corrosion free plastic.

Fixing screw for *VariKont-M*[®] included in the delivery package.

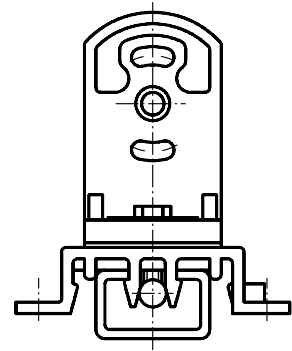
¹⁾ for example NIEDAX GmbH



"Top hat" rail mounting



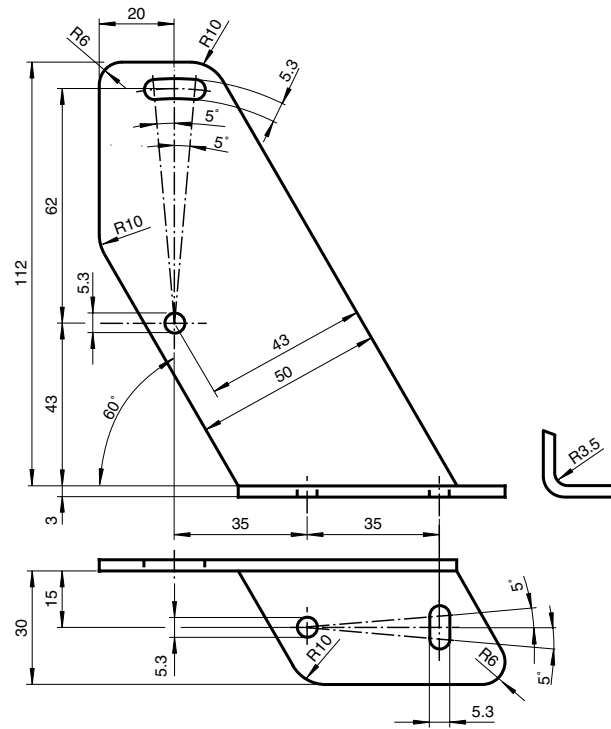
"C" rail mounting



Accessories – Mounting brackets

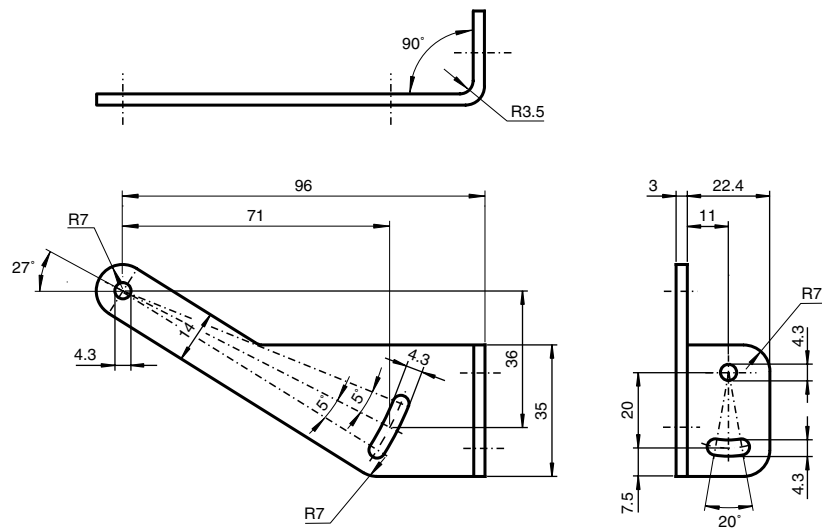
OMH-21 mounting bracket

Suitable for sensors of series 21, 23, 24 and 28.



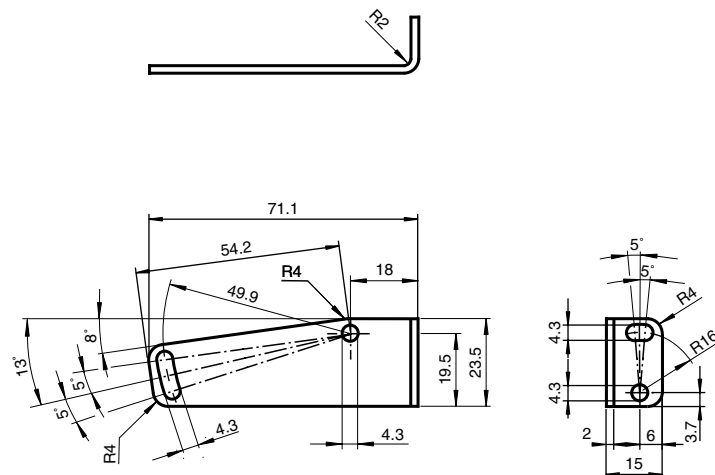
OMH-91 mounting bracket

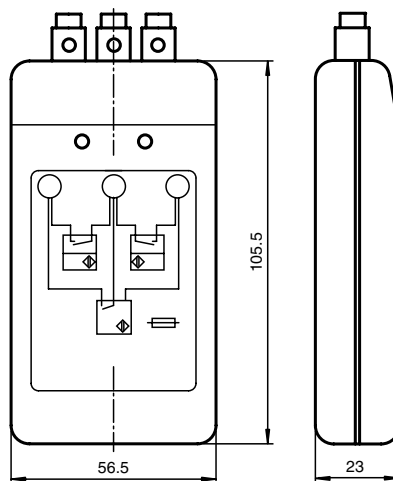
Suitable for sensors of series 91.



OMH-40 mounting bracket

Suitable for sensors of series 40.



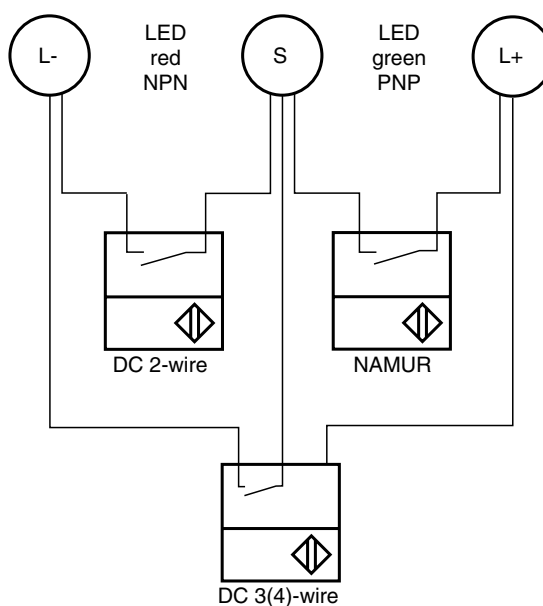


ST-03

The ST-03 sensor tester allows for rapid testing of the switching function of direct voltage sensors:

- NAMUR (EN 50227)
- Two-wire
- Four-wire

The sensors are connected to the contact terminals of the tester in accordance with the connection diagram. Depending on the output stage (pnp/npn) and switching function (N.O./N.C.), on actuation of the proximity switch, the left, LED red (npn) or the right, green LED (pnp) are illuminated, simultaneously accompanied by an acoustic signal.



The layout of the connections, terminal numbering or colour of the wire of the different output stage types are standardised. The adjacent table shows typical examples.

Malfunctions in the tester function may result from the following causes:

- Incorrect sensor connected (for example sensor for alternating voltage), sensor defective.
- Sensor is incorrectly connected.
- The fine-wire fuse in the tester has been activated.
- The batteries have insufficient charge.

Check the type designation and connection diagram on the sensor.

To check or exchange the fuse (100 mA) or the batteries (2 x 9 V, e.g. E-block 6F 22, 9 V), remove the four screws on the back of the tester.

Switch type	Operating voltage		Switch output	
	L+	L-	NC	NO
NAMUR	BN/1	BU/2		
DC 2-wire	BN/1 BN/3		BU/4	BU/2
DC 3-wire	BN/1	BU/3	BK/4	BK/2
DC 4-wire	BN/1	BU/3	BK/4	WH/2

PC programming software

The program is a multi-lingual user interface with which the parameters of the MLV11, RL27 and SU15 series photoelectric sensors can be easily read and edited. The menu driven program contains comprehensive help functions for easy reference.

The sensors communicate with the PC by means of an optical serial interface.

The program displays which sensor is connected.

The program parameters that are used and the sensor parameters that are read can be saved to a hard drive or diskette, printed out, or exported to databases for further processing, etc.

After a brief phase of becoming acquainted with the software, it offers you a wealth of options for setting parameters of sensors of the MLV11, RL27 and SU15 series, for example:

- output function selection: normally closed/normally open/pre-fault
- type of pre-fault determination: dynamic/static
- switching frequency: 1.5 kHz ... 20 Hz
- hysteresis: small/standard/large
- ON delay: no/ 0.1 s ... 25.5 s
- OFF delay/pulse extension/one-shot output function
- 3 various pulse frequencies
- keyboard disabling: OFF/automatic/always
- selection of function type: input: test/logic/div.
- parameterisation disable: ON/OFF
- read/restore factory settings

Sensors that can communicate with this software:

Series MLV11, RL27 and SU15

- single path light beam switch standard, laser
- reflex light beam switch standard, clear glass, laser
- AS-Interface
- energetic reflex light beam switch, laser, AS-Interface
- fibre optics amplifier

System requirements:

The product selection OPUS Parameter 2.0 runs on any PC or laptop, running with Windows 3.x95 and a free serial interface.

Included in the delivery package are:
two disks 3.5", 1.44 MB for installation.

In addition to the two installation diskettes, the MLV11/RL27 combiclip or the SU15 clip and the OPUS-R2 interface converter will be included in the delivery package, if you order the appropriate PC programming tool.

Additional literature

- Notes on setting parameters in the data sheets
- Comprehensive on-line help in the software





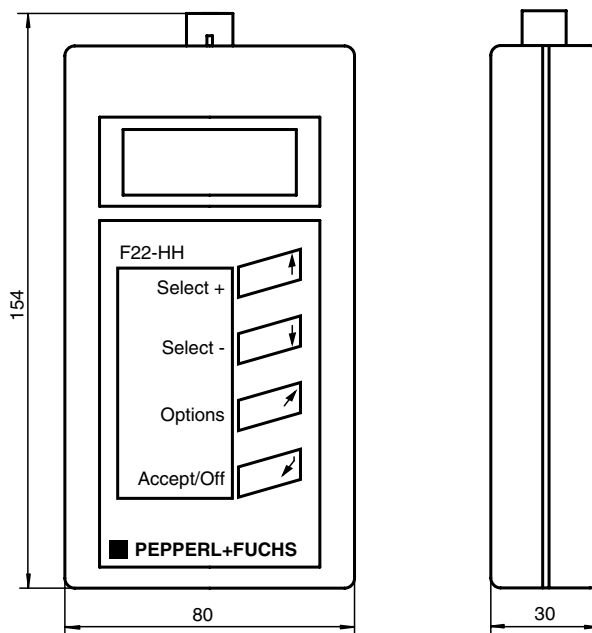
OPUS-HH

- Indicating, editing all parameters
- Problem-free connection to all sensors of the MKV11, RL27 and SU15 series via an optical interface (clip).
- Saving/loading sensor parameters

The hand-held unit is a compact device for setting parameters of photoelectric sensors of the MLV11, RL27 and SU15 series.

Communication with the sensor takes place via the optical serial interface and the attached clip. The clip is simply snapped onto the sensor housing and connected to the hand-held unit via a connector.

The hand-held unit can read and edit the same parameter as the OPUS sensor parameterisation PC software. The basic set of parameters, valid for all sensors, is expanded by sensor-specific parameters, depending on sensor type and series.



Model number

Display

Keyboard

Power supply

Operating time

Protection class as per IED 60529

Operating temperature

Storage temperature

Weight

OPUS-HH

LCD, 2 x 12 digits, alphanumeric, height of characters 6 mm

Membrane keys, 4 keys

9 V block battery

30 h / > 100 read/write functions

IP54

0 °C ... +50 °C

-20 °C ... +60 °C

circa. 300 g

Operation:

Switch on

- pressing any key

Switch off

- independently 5 min. after the last key stroke or actuation of the Accept/OFF key for > 1s

Key function

Key ↑

- **Select +:** up function in menu

Key ↓

- **Select -:** down function in menu

Key ↗

- **Options:** to subordinate menu

Key ↘

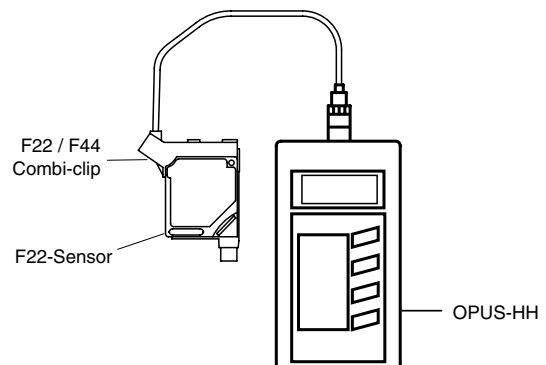
- **Accept/Off:** enter, initiate function, set parameter, to superordinate menu, switch-off device

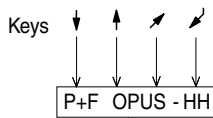
Accessory:

Parameter assignment clip.

For parameter assignment using the hand-held unit, you also need a clip to match the sensor housing:
Universal clip MLV1/RL27 (adjustable) or SU15 clip.

Example: MLV11 sensor



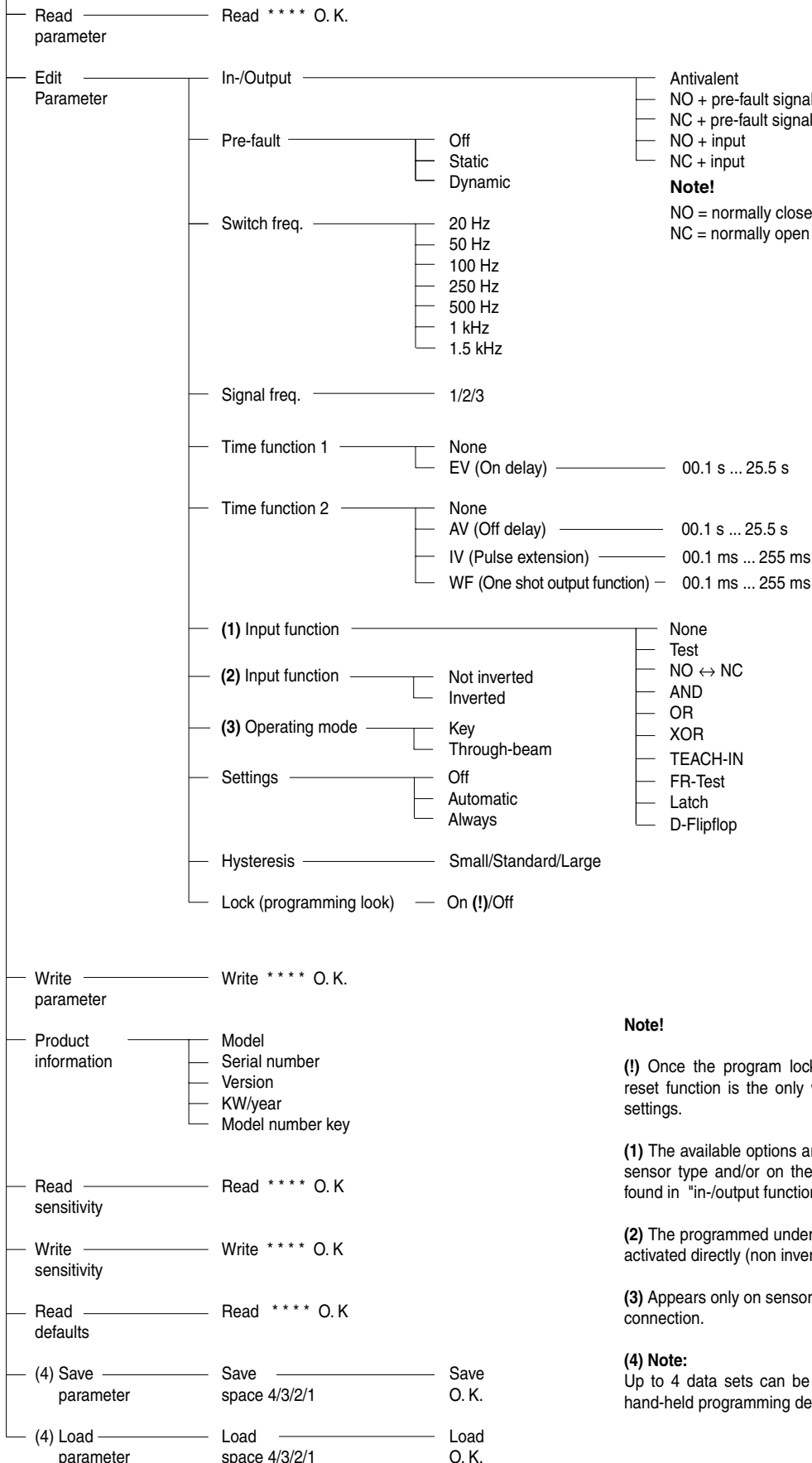


Note!

Depending on the type of the connected sensor, some parameters may not be available for editing.

Key functions

- ↓ ↑ - up or down function in menu
- ↖ - brings up subordinate menu
- ↗ - enter, clear function, set parameter, brings up next menu



Note!

(!) Once the program lock is activated, the sensor reset function is the only way to restore the default settings.

(1) The available options are dependent either on the sensor type and/or on the in-/output behavior to be found in "in-/output function".

(2) The programmed under (1) input functions can be activated directly (non inverted) or inverted.

(3) Appears only on sensors with light guide connection.

(4) Note:
Up to 4 data sets can be stored non volatile in the hand-held programming device.

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Accessories – Parameterisation

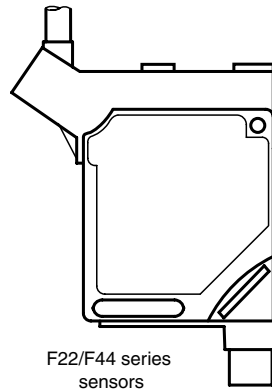
MLV11/RL27 Combi-clip and SU15 clip

The clip creates a quick connection via an optical serial interface to a device for setting parameters (OPUS-HH) or to a PC (via the OPUS-R2 Interface converter).

This makes it possible to read or modify the parameters of photoelectric sensors of the MLV11, RL27 and SU15 series easily.

Dimensions:

Clip: L/W/H 64 mm/18 mm/30 mm
Connector: \varnothing 12 mm/32 mm

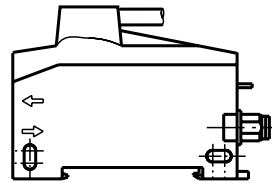


F22/F44 series sensors

Cable length about 2 m

Dimensions:

Clip: L/W/H 64 mm/12 mm/23 mm



F66 series sensors

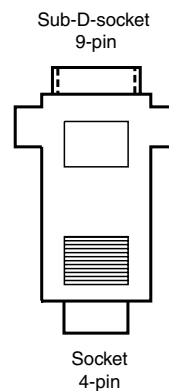
Connector 4-pin

OPUS-R2 Interface converter

The converter is connected to the MLV11 clip as a connection between the optical interface and the free COM interface on the PC.

Dimensions:

L/W/H 50 mm/31 mm/16 mm



Sub-D-socket 9-pin

Socket 4-pin

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Additional Information

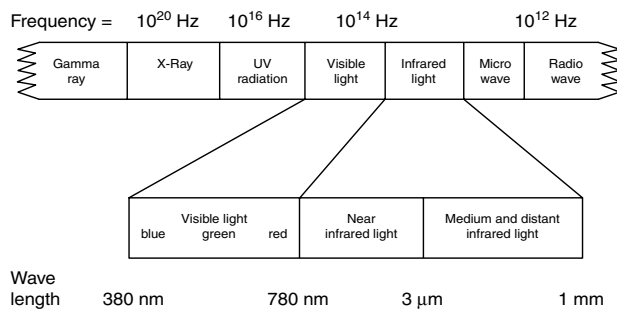
<u>Contents</u>	<u>Page</u>
Physical basis	1064
AS-Interface sensors	1065
General conditions of explosion protection.	1066
Protection class provided by housing	1067
Glossary.	1068

Additional Information

Physical basis

Light is a mode of electromagnetic radiation, just like radio waves or X-rays. The range of wave lengths visible to the human eye reaches from 380 nm to 780 nm. Radiation with shorter wavelengths (10 nm to 380 nm) is called ultraviolet radiation, radiation with longer wavelengths (780 nm to 1 mm) is referred to as infrared light. (To be physically correct, it should actually be called infrared *radiation*.) Both radiation spectra are invisible to the human eye. Photoelectric sensors most commonly work in the red or infrared (i.e. invisible) range.

Light propagates at a speed of approximately 300,000 km/sec. It is therefore safe to consider practically all applications using light on earth as if the light is received at the very moment it is transmitted.



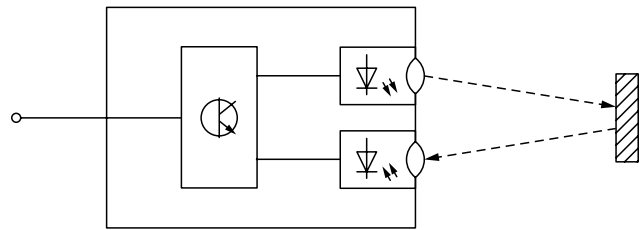
To be able to work with light, a **light source** (emitter) and a **light receiver** are required. The source of light might be the sun, an electric light bulb, a light emitting diode (LED) or a semiconductor laser, the receiver could be the eye, a photographic film or a light sensitive electronic compartment such as a photo diode.

A decisive factor in working with light is its **intensity**. Humans are unable to see if it is too dark, and photoelectric devices no longer function reliably if the radiation output that is received is too small. The most important factors effecting the intensity of the light in an optical sensor are:

1. Dirt on the optical elements or in the medium between the optical elements.
2. The reflective capability of the object.
3. The length of the path covered by the light in passing from the emitter to the receiver.

The components of a photoelectric sensor

Photoelectric sensors consist of three function groups: emitter, receiver and evaluation electronics.



The emitter generally consists of a semiconductor light source, i.e. a light emitting diode (LED) or a laser diode. When a voltage is applied, they emit light in specific wave length ranges. A semiconductor light source can emit light continuously or in short pulses. If pulsed light is emitted, the intensity of illumination ("level of radiated power per unit of time") can be selected at a significantly higher level than in the continuous range, similar to a flash of light in photography. LEDs are ideal for photoelectric applications, since they are relatively cheap, small and easy to control. Optical elements (for example lenses) are usually assigned to the light sources.

The receiver consists of a photo diode or a photo transistor. It converts received light energy into a current. Optical elements are positioned in front of the receiver, for example lenses or apertures. **Evaluation electronics**, which are included further downstream in the circuit, are used to filter and evaluate the usable signal.

Additional components used with photoelectric sensors include reflectors and fibre optics. Reflex light beam switches require a **reflector**. Pepperl+Fuchs GmbH offers reflectors in the form of triple retro-reflectors or as self-adhesive reflector foil.

Triple retro-reflectors offer the greatest reflective capability because of their structure. They consist of many small pyramids and reflect the light back in the same direction from which it came. This means, in practice, that even with an incident angle of up to 25° to the optical axis of the light beam, it is reflected back almost completely onto itself.

Fibre optics (also light wave guides LWL) significantly enlarge the scope of uses for photoelectric sensors and are used in the solution of special problems, for example detecting small objects, at high ambient temperatures or where installation is required in a confined space.

AS interface sensors

The trend in automation systems is moving away from the use of wiring looms towards the use of bus systems. **AS-Interface** has developed into the industry standard in this area for integrating sensors, actuators and command devices into machines and systems.

Its installation philosophy, its manufacturer-independent components, its connection to the first control level and to higher field busses as well as its options for diagnostics have turned it into the simplest networking solution in automation.

AS-Interface is an industrial development derived from 11 original companies. In the course of extending the system to industrial standards the "Verein zur Förderung busfähiger Interfaces für binäre Sensoren und Aktuatoren e.V." (AS-Interface Association) was founded in 1991, which is open to manufacturers and users as a network association. Companies from Europe, USA and Japan have already joined this organisation during its developmental phase. The central organisation now counts over 80 members (April 1998). There are also subsidiary organisations in the most important industrial countries that support local marketing activities and have additional members. The organisation offers the opportunity to manufacturers and users to optimise their productions and applications through numerous contacts.

Pepperl+Fuchs GmbH has been involved in the development of this system from the very beginning and provides many components (see the Pepperl+Fuchs sensor systems 2 catalogue: Actuator-Sensor-Interface).

The benefits to you: Reduction of engineering effort

- The same system structure with different host field buses does not require a new engineering effort each time.
- If sensors/actuators are networked over AS-Interface, only the master or the gateway has to be replaced if you switch to another field bus.
- Simplified planning, documentation, installation and commissioning of systems
- 31 AS-Interface slaves, i. e. up to 248 sensors/actuators
- Transmission of analogue and binary signals
- Coupling of Ex and non-Ex branches in a single network
- AS-Interface master for control of smaller systems or partial systems directly on-site

Reduction of installation costs

- Drastically reduced expenditure on wiring. Instead of a complex wiring loom, just one cable with 2 wires and without a terminal resistor and shield.
- Replacement of the parallel wiring
- The coded flat cable protects against reverse-polarity
- Less space required for cabling
- Electrical power and communication are transmitted through a single cable.
- Flexible, i.e. easy to adapt to the installation criteria
- Less installation time
- Easy connection and quick installation of modules and sensors using the insulation penetration technique
- 4-bit parameterisation of AS-Interface stations

Reduction of maintenance costs

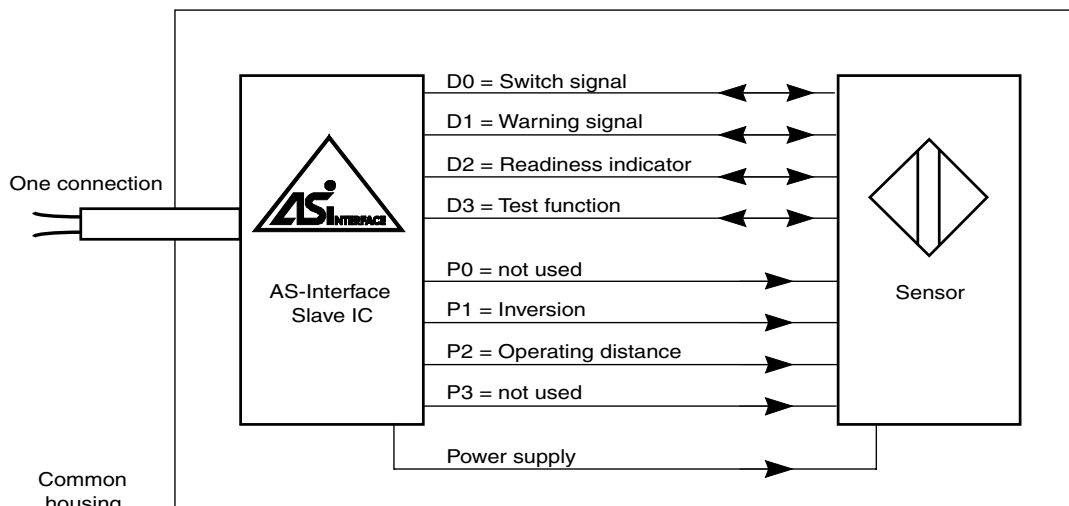
- The diagnostic options of the master save time.
- Monitoring of sensor failure, cable breaks and short-circuits depending on the type of field device that is connected
- Rapid, secure and interference-free data transmission
- Error bits are made available by the system and reduce down times.
- Self-addressing during the replacement of faulty slaves
- Saves money for your service and maintenance tasks
- Rapid diagnosis via LED and LC display

AS-Interface works according to the master/slave access principle with a maximum of 31 stations. Four data bits are transferred from the master to each slave and back during each cycle.

In addition, there is a parameter call that sends 4 bits to the slave as parameter value. Special functions of the slave can be controlled with this call, e.g. the transfer of the switching distance on photoelectric sensors or a filter function. Parameter calls are acyclic; only one slave can receive new parameter values in each AS-Interface cycle

AS-Interface capable sensors have the B3 extension in the type code. They can be connected directly to the AS-Interface line.

To ensure correct functionality and interchangeability of AS-Interface products, they can be presented at an independent certification station. Successful completion of the test is expressed by the use of the certification logo (the AS-Interface logo with a silhouette) on products and data sheets.



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Additional Information

General conditions of explosion protection

	European Union	North America
Division of hazards	Explosive mixtures in Explosion group I: mines susceptible to firedamp Explosion group II: other areas outside of mines	Explosive mixtures of air with CLASS I: gases and vapours CLASS II: dusts CLASS III: fibres or flyings
Ignition hazards due to Sparks	Subdivision for ignition protection type intrinsic safety/ flame proof enclosure based on the minimum ignition current/threshold gap width with assignment of the minimum ignition energy of representative gases. Group I methane Group IIA propane IIB ethylene IIC hydrogen, acetylene	Subdivision of the CLASS based on igni- tion power: CLASS I Group A acetylene B hydrogen C ethylene D methane CLASS II Group E metallic dust F coal dust G grain dust CLASS III no grouping
Ignition hazards due to hot surfaces	Classification into temperature classes based on IEC 79-8 for maximum surface temperatures with an ambient temperature of 40 °C under error conditions: T1 ≤ 450 °C T2 ≤ 300 °C T3 ≤ 200 °C T4 ≤ 135 °C T5 ≤ 100 °C T6 ≤ 85 °C	
Classification of hazard areas	The following categorisation is based on the probability of the occurrence of an explosive atmosphere:	
	For gases, vapours, mist: (EN 60079-10) zone 0 constant or long term 1 occasional 2 seldom and short-term For dust: (EN 1127-1) Zone 20 constant or long term or frequent 21 occasional 22 short-term or accumulations or layers of dust	For gases and dust: } Division 1 } Division 2
	Note (see IEC 79-10): constant or long term corresponds to > 1000 h/year, Occasional corresponds to 10 ... 1000 h/year, seldom or short term corresponds to < 10 h/year	
Intrinsic safety ID numbers	The characteristic values of flammable gases and vapours as the basis for categorization based on ignition power and temperature as well as the flash point, see:	
	Redeker, Nabert, Schön / Sicherheitstechnische Kennzahlen brennbarer Gase und Dämpfe	NFPA 497 M CSA No. C22-1
Approval sites	PTB Physikalisch-Technische Bundesanstalt BVS Bergbauversuchsstrecke BASEEFA British Approvals Service for Electrical Equipment in Flammable Atmosphere	UL Underwriters Laboratories, USA FM Factory Mutual Research, USA CSA Canadian Standards Association
Installation requirements	DIN EN 60079-14 (VDE 0165 Part 1) for explosive gas environments DIN EN 50281-1-2 (VDE 0165 Part 2) For environments with flammable dust	NFPA 70 National Electrical Code Art. 500 NFPA 493 Standard for intrinsically safe operations...

Protection class provided by housing

(DIN VDE 0470 Part 1, EN 60529)

IP 6 7

Protection against contact and foreign bodies	Degree of protection against water
0 - Not protected	0 - Not protected
1 - Protected against access to hazardous parts with the back of the hand - Protection against fixed foreign bodies with diameters of 50 mm and greater	1 - Protection against dripping water
2 - Protected against access to hazardous parts with the back of the hand - Protection against foreign bodies with a diameter of 12.5 mm and greater	2 - Protection against dripping water if the housing is inclined up to 15°
3 - Protection against access to hazardous parts with a tool - Protection against fixed foreign bodies with diameters of 2.5 mm and greater	3 - Protection against sprayed water
4 - Protection against access to hazardous parts with a wire - Protection against fixed foreign bodies with diameters of 1.0 mm and greater	4 - Protection against splash water
5 - Protection against access to hazardous parts with a wire - Dustproof	5 - Protection against water jets
6 - Protection against access to hazardous parts with a wire - Protection against dust	6 - Protection against strong water jets
	7 - Protection against temporary submersion in water
	8 - Protection against continuous submersion in water
	9 - Protection against water in high pressure steam jet cleaning

Notes:

- Wherever an identifying number does not need to be specified, it is replaced by "X".
- Devices that are designated with the second figure 7 or 8 do not need to fulfill the requirements of the second figures 5 or 6 unless they have been given a double designation (for example IPX6/IPX7).

Glossary

Accuracy of measurement

The max. value of deviation from the ideal characteristic curve. It is specified for measuring sensors and refers to the maximum measuring range.

Adjustment accessories

The optical failure warning indicator can be used as a means of assisting adjustment. Sensors which operate with visible red light, can be visually adjusted. Adjustment is easily achieved using the mounting brackets which are offered in the catalogue.

Adjustment range

Indicates the minimum and maximum adjustable upper detection range limit for direct detection light scanners with background suppression.

Alignment aid

The sum total of all measures supporting the optical alignment of a sensor (for example LED, telescopic sight, sighting groove).

Alternating light

Light with a level of radiated power that alternates due to modulation.

Ambient light

Ambient light is defined as the optical radiation that is received by the receiver of a photoelectric sensor but which is not emitted by its emitter. It may consist of constant light (sun, incandescent lamps) and/or alternating sources (fluorescent lamps, other sensors).

Ambient light limit

The maximum permissible incoming radiation from ambient light.

Ambient temperature (operating)

Indicates the temperature range in which the sensor may be operated while maintaining the rest of the technical data.

Ambient temperature (storage)

Indicates the temperature range in which the sensor may be stored.

Analogue output

The voltage or current output whose size depends on the amount of light received.

Angle of divergence

The maximum angular divergence from the optical axis of the light emitted from the emitter and the light received by the receiver in which the optical barrier works during normal operation.

Approvals

Permission to operate the sensor under defined ambient conditions. Different approval conditions must be met for different countries.

Background suppression

Objects can be reliably detected within the detection range by a spatially separated arrangement of emitter and two receiver elements (triangulation) independently of their reflection behaviour. Objects outside of the detection range (beyond the specified detection range) will not be detected.

Background evaluation

An optical procedure similar to "background suppression" except that in this case objects are recorded without any gaps in the entire detection range, including DR 0 mm. The procedure necessarily requires that the background/bottom remain as constant as possible, since its reflection signal will be evaluated. This allows not only for testing of normal functionality (emitter failure signal), but also detection of objects in the detection range that are difficult to detect because they reflect light off in other directions. The typical maximum DR to be set is about 90 % of the distance from the sensor to the background/bottom.

Beam spacing

The distance between the emitter and receiver elements for light grids.

Black-white difference

If the detection range is set for Kodak white (reflection level of 90 %) and the detection range is then measured for Kodak black (reflection level of 6 %), the result is a detection range difference, which is referred to as the black-white difference. It is also a scale of quality for direct detection light scanner, and its value in an ideal case would be zero.

Blind area for retro-reflector

The zone in front of a reflex light beam switch, within which the retroreflector is not detected.

CE symbol

The CE symbol is the manufacturer's declaration that the so designated product conforms to the European and international standards and directives that are applicable to the product. For products of

Pepperl+Fuchs GmbH, the following standards and directives apply:

89/336/EEC EMC Directive (see IEC 801)

73/23/EEC Low voltage guideline (see VDE 0160, EN 60947-5-2)

94/9/EG Devices and protective systems subject to the risk of explosion

Connection

The type of connection of the sensor to the consumer and the power supply, for example plug, cable, terminals.

Controls

Setting or buttons for adjusting the detection range or the time period.

Data flow display

The LED that indicates whether data will be transmitted or received via a digital interface. The data flow display takes into consideration only whether the corresponding signal level is present, but not its logical relevance.

Data rate

The quantity of data that is transferred over an interface during a given period of time. The information is typically given in bits/s = baud.

Dark ON

The output of a light beam switch is switched (leading, activated) if the light receiver sees "dark", in other words if the light beam is interrupted (for single path or reflex light beam switches) or if there is no sensor material in the working range (for light scanners).

Detection range

The range, within which the operating distance can be set. According to EN 60947-5-2, the German terms 'Reichweite und Tastweite' (detection range and sensing range) have been replaced by the term "Erfassungsbereich" (also translated detection range).

This range is determined by applying the operating voltage U_o and at an ambient temperature of $(23 + 5) ^\circ\text{C}$. In the case of single path light beam switches, the receiver is moved axially against the sensor.

... Detection range

The switching element must actuate reliably in the detection range and without influence of an extraneous light source (5000 Lux).

Detection width hysteresis

It denotes the separation of the switching points between the lateral approach and removal of the measuring plate, i.e. between approach and removal perpendicular to the reference axis.

Deviation of the characteristic curve

⇒ Accuracy of measurement

Diameter of the light spot

The diameter of the light spot is significant for many applications. The figure is always based on a specific detection or sensing range and is always specified together with it.

Effective operating distance

Detection range with sufficient function reserve

EMC classification

The electromagnetic compatibility is the capacity of an electrical device to function satisfactorily in an electromagnetic environment, without interfering with other devices and without receiving interference itself. The EMC classification is obtained from tests for emission and resistance to interference in various test gradings. Grade 3 e.g. corresponds to a normal industrial environment

(see EN 60947-5-2 Appendix X).

Fibre optics

(also: light wave guide, LWL)

Glass light guides consist of a number of glass fibres comprising a bundle. Each of these glass or optical fibres has an optically dense glass core and a less optically dense glass covering. Due to the total reflection, the light follows the longitudinal axis of the light guide, even if this is curved. Plastic light guides operate in accordance with the basic principle, but consist of one fibre only.

⇒ The section "Structure and functional principle of optical sensors"

Field height

The height of the protective field with light grids.

Fork width

The distance between the transmitter and receiver for fork type light beam switches.

Function display

A display of the switching state of an optical sensor by an integrated LED.

Hysteresis

⇒ Range hysteresis

⇒ Detection width hysteresis

Infrared light (IR or IRED)

Radiation having a longer wavelength than visible light ($\lambda = 780 \text{ nm to } 1 \text{ mm}$). IR emitter diodes radiate at wavelength of e.g. 880, 940 or 950 nm.

Input type

The functionality of the input, for example a test input, control input, etc.

Insensitivity to adjustment

Retro-reflectors allow for an installation/adjustment deviation of $+25^\circ$ from the reference axis.

Laser class

Categorisation of a sensor depending on the output intensity of the emitted laser light. For example laser class I designates sensors with the lowest level of emission. These sensors are therefore referred to safe for the eye.

LED (abbreviation for Light Emitting Diode)

The light emitting diode is a semiconductor radiation source, easily modulated and with a long life. LEDs in photoelectric sensors preferably operate in the red or infrared spectral range.

Lifetime

The lifetime of a LED is defined as the period of time within which the light output declines to 50 % of the original value. This time interval is specified for an operating temperature of $+25^\circ \text{C}$.

Light exit

A transparent window in the housing within the wavelength range determined by the type of light behind which the transmitting and/or receiving elements are located.

Light ON

The output of a light beam switch is switched (leading, activated) if the light receiver sees "bright", thus if the light beam is not interrupted (for single path or reflex light beam switches) or if there is sensor material in the working range (for light scanners).

Light receiver

Describes the type of light-sensitive components in an optical sensor (for example a photo diode or photo transistor).

Light scanner

⇒ Direct detection light scanner

Light spot representation

Describes the shape of the transmitter image on the focus plane (for example, round, square, etc.)

Light transmitter

Describes the light-emitting component (for example a laser diode, IRED).

Light type

Indicates the emission wavelength of the light source used in the sensor.

Linearity

⇒ Accuracy of measurement

Linearity fault

Figure for measuring sensors. Indicates the maximum deviation of the measurement value from a standardised characteristic linear curve.

Lux

Lux is the unit of measurement for illumination intensity, i.e. a measure of the incident luminous flux per unit of receiver area. Sunlight can result in up to 100 000 Lux, while a cloudy winter sky may mean 1 000 to 2 000 Lux, the lighting intensity in average living areas is 50 Lux to 100 Lux.

Maximum detection range

The guaranteed detection range of a sensor with adjustable background suppression at the maximum setting of the detection range adjuster.

Maximum read rate

Specifies how much data can be read from an interface per unit of time. This figure is a significant criterion for describing the physics of a data interface. The maximum read rate depends on the refresh rate of the interface in question.

Measurement range

Detection range of measuring sensors.

Minimum detection range

The guaranteed detection range of a sensor with adjustable background suppression at the minimum setting of the detection range adjuster.

NAMUR

Standards work group for measurement and control systems (German Normenarbeitsgemeinschaft Mess- und Regelungstechnik) in the chemical industry; this determines, among other things, the guidelines for devices that operate in areas subject to the risk of explosion.

No load current

This indicates the power consumption of the sensor and is measured at zero load.

Number of beams

Indicates the number of emitter beams of a sensor. The number of beams is of particular relevance for light grids and curtains.

Obstacle size

The minimum detectable size of an object.

Operating display

The LED that indicates whether operating voltage is present.

Operating frequency

When transferring data based on the FSK procedure, data is coded into a frequency. Different frequencies are transmitted depending on the logical levels. This results in a specific average frequency. To prevent mirror effects, two different operation frequencies are always used for a full duplex transmission.

⇒ The section "Structure and functional principle of optical sensors"

Operating voltage

The voltage for which the sensor is designed (without ripple).

Optical outlet material

Identifies the material of which the sensors light exit surface is made (e.g. glass, plastic).

Optical surface

The surface from which the emitted light leaves the housing or through which the received light enters the housing of the sensor.

Output of the pre-fault indication

The output switches before failure of the sensor because of inadequate sensor reserve because of dirt and dust or misadjustment. It can therefore be used as an aid in adjustment as well.

Phase correlation

Measuring method, in which the distance to the object obtained indirectly from a measurement of elapsed time. The phase shift between intensity modulated transmitted steady light and the reflected signal is the measurement for the distance.

Polarisation filter

A filter for generating polarised light.

Power consumption

Information for sensors with low-voltage power supply. The recorded power includes only power to supply the sensor with current and is indicated in watts.

The electrical power required to operate a sensor without load (no load supply current).

Precision

A measurement of the maximum deviation of the measurement value when determining a distance with distance measuring devices.

Pre-fault indication

Indicates inadequate signal reserve before the failure of the sensor because of dirt and dust or misadjustment. It can therefore be used as an aid in adjustment as well.

Protection class

Housing and insulation class subdivided into different classes.

Protection class 0:

No longer permitted in Germany for about 30 years. Still permitted in some circumstances in a few other countries of the EC. Protection against electrical shock is based on the basic insulation; a ground lead cannot be connected. Protection in event of failure of the basic insulation must be ensured by the environment.

Protection class I:

Protection is based not only on the basic insulation, but also on the fact that all parts capable of conducting a current (bodies) must be connected to the protective conductor of the fixed installation. In the event of failure of the basic insulation, it is thus not possible for any contact voltage to remain.

Protection class II:

Protection is based not only on the basic insulation, but also on the fact that double or increased insulation is arranged in such a manner as to fulfill the function of protective insulation.

... Protection class

Protection class III:

Protection is based on the use of low protective voltage. The nominal voltage must not exceed 50 V AC or 120 V DC.

Protection type

EN 40050 classifies the protection of electrical equipment against contact, ingress of objects or water through the housing, covering, etc. The IP abbreviation consists of the letters IP (International Protection) and two numbers:

1. number - Protection against contact and foreign bodies.
2. number - Degree of protection against ingress of water.

⇒ Protection class provided by housing

Range hysteresis

This denotes the separation of the switch points between the condition when the measuring plate approaches the sensor and the condition when it is moving away from the sensor. The hysteresis is given as a percentage of the operating distance (range).

Reflection light scanners

consist of an active device with integrated light emitter and light receiver. The light is diffusely reflected by an object within range.

⇒ See section "Structure and functional principle of optical sensors"

Reflector distance

The distance between the optical surface/light output surface and the reflector.

Reflector range

The range within which the retro-reflector of a reflex light beam switch must be positioned to ensure that it will be reliably detected. The reflector range extends from the end of the blind range for the retro-reflector to the end of the detection range.

Reflex light beam switch

Consists of an active device with an integrated light emitter and light receiver as well as a passive reflector, on which the light is reflected.

⇒ See section "Structure and functional principle of optical sensors"

Refresh cycle of the measurement value output

Indicates how often the value of an interface is updated with a new measurement value. This is independent of the read rate of the interface.

Repeatability

also called repeat accuracy, this indicates the magnitude of the deviation of a measurement value when the measurement of the same physical value is performed several times with the very same sensor. The repeatability is a decisive criterion in selecting a measuring sensor.

⇒ Repeat accuracy

Repeat accuracy

The difference between two measurements taken one after the other under defined (frequently identical) ambient conditions.

⇒ Repeatability

Residual current

The current flowing in the load circuit of the sensor when it is in locked state.

Resolution

The smallest difference between two measurement values that can be presented. This value is specified with an analogue or digital interface with sensors used for distance measurement.

Response delay

The amount of time the sensor requires from when the object enters the detection area to the point at which switching occurs.

Response time

The time between the release or interruption of the light beam and the change of signal on the output.

Retro-reflector

Retro-reflectors (also called triple mirrors) return the incident light parallel to the direction of incidence. They can be rotated up to a specific angle relative to the reference axis without the function of a reflex photoelectric sensor thereby limited.

Ripple

Indicates the percentage of the alternating current of the sensor's operating voltage that can be superimposed without causing interference in functionality. It is specified as a % of the operating voltage.

Sensors of Pepperl+Fuchs conform to the standard of EN 50008 having a maximum ripple of 10 %.

Sampling frequency

The switching sequence, expressed in Hertz with a light/darkratio 1 : 1

Scanning range

The total usable range of a reflection light scanner, between the smallest detection distance on Kodak black (reflection level 6 %) and the largest detection distance on Kodak white (reflection level 90 %).

Sensor range

The detection range of a reflection light scanner for diffusely reflecting objects with a defined level of re-emission. When the detection range is adjusted, the adjustment range is also indicated. This specifies the upper limits of the detection range with minimum and maximum setting of the detection range adjuster.

Short-circuit protection

Many sensors of Pepperl+Fuchs GmbH are provided with pulsing short circuit protection. If the limiting current value is exceeded, the output is periodically blocked and then switched free again, until the short-circuit has been eliminated.

Single path light beam switch

Through beam photoelectric sensors consist of two separate, active devices: light emitter and light receiver.

⇒ See section "Structure and functional principle of optical sensors"

Switch-on delay

(previously: Response time)
Period of time required by the sensor from the point at which the object enters the detection area, to the point at which switching occurs (Switch-off delay is analogous to this).

Switching type

⇒ Dark ON

⇒ Light ON

Switching voltage

The maximum voltage that can be switched through the signal output.

Test input

The test input can be used to verify sensor function externally, either with UB+ or 0 V, depending on the design. If the test is successful, there is a change of signal at the output during the test operation.

Threshold detection range

The maximum detection range with single path and reflex light beam switches, without stability control.

Timer function

Timer functions with adjustable parameters for switch outputs of sensors.

- The IAB function generates an output pulse of defined length.
- The GAN function causes a breaking delay.
- The GAB function causes an off-delay of the output.

Total reflection

May occur with high-gloss and reflective objects. The angle at which the light enters is the same as the angle at which the light exists, and the light is lost for sensor functions. In critical cases, these reflection losses reduce the detection range of sensors to a measurable degree.

Translation of the characteristic curve

An adjustable offset by which the output characteristic of a measuring sensor can be shifted.

Transmission mode

Describes the procedure with which data is transmitted from a communication station to another. For example, in the case of data transfer light beam switches, the light in the FSK procedure (frequency shift keying) must be ensured by transmission that is immune to interference.

Triangulation

A measuring method in which the distance to the object is obtained determined by means of the angle geometry.

Weight

Mass

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