HEIDENHAIN

Digital Readouts

Linear Encoders

For Manually Operated
Machine Tools

Digital readouts from HEIDENHAIN are used in a wide variety of applications. They are deployed on machine tools, infeed axes on saws and presses, measuring and inspection equipment, dividing apparatuses, setting tools, production inspection measuring stations, and more. To meet such demands, these digital readouts can also be used in combination with numerous encoders from HEIDENHAIN.

Digital readouts with multiple axes are primarily used on manually operated machine tools, where their practical cycles provide optimal support to the operator during milling, drilling, or turning. By instantly displaying the position in an easy-to-read manner, digital readouts enable a significant increase in productivity. This brochure also includes the major HEIDENHAIN linear encoders for position measurement on manually operated machine tools.

Additional connectable encoders can be found online at www.heidenhain.de, or in the *Linear Encoders For Numerically Controlled Machine Tools, Length Gauges, Angle Encoders*, and *Rotary Encoders* brochures.

In addition to digital readouts, HEIDENHAIN offers evaluation units commonly used on SPC inspection stations, profile projectors, measuring microscopes, and manually operated coordinate measuring machines. These **evaluation units for metrology applications** either feature a built-in display or are connectable to a PC.

You can find more information online at *www.heidenhain.de*, or in the *Evaluation Electronics For Metrology Applications* brochure.

For detailed descriptions of all available interfaces, as well as general electrical information, please refer to the *Interfaces of HEIDENHAIN Encoders* brochure.

This brochure supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the brochure edition valid when the order is placed.

Standards (ISO, EN, etc.) apply only where explicitly stated in the brochure.

Contents

HEIDENHAIN digital readouts
High convenience

Digital readouts from HEIDENHAIN are universally deployable: they can be used in standard milling, drilling, and turning applications, and in many other machine tools and specialized machine applications; in short, on all machines and equipment with manually operated axis slides.

Versatile, ergonomic, and well designed
Digital readouts from HEIDENHAIN are particularly user-friendly.
Typical characteristics:
- Optimally readable display
- Graphical support and help functions
- Conversational user guidance
- Splash-protected front panel (prevents coolant from damaging your digital readout)
- Sturdy housing built for the harshest day-to-day shopfloor conditions

Ease of operation

Fast

HEIDENHAIN digital readouts save you time. Their distance-to-go mode, for example, guides you quickly and reliably to the next nominal position. You simply move the axis until the display reads zero. Presets can be set wherever the reference point for the dimensions may lie. This makes positioning easier, especially on workpieces with complex dimensions.

For milling and drilling, entering the geometric data for hole patterns or rectangular pockets is fast and easy. Afterwards, you simply move to the positions shown in distance-to-go mode.

For lathes, the sum display for the saddle and top slides helps you with precision positioning. If taper dimensions in the drawing are incomplete, the digital readouts can help you calculate the taper angles.

The POSITIP makes small-batch parts particularly fast and easy to manufacture by letting you store repeated machining operations as a program for reuse as often as needed.
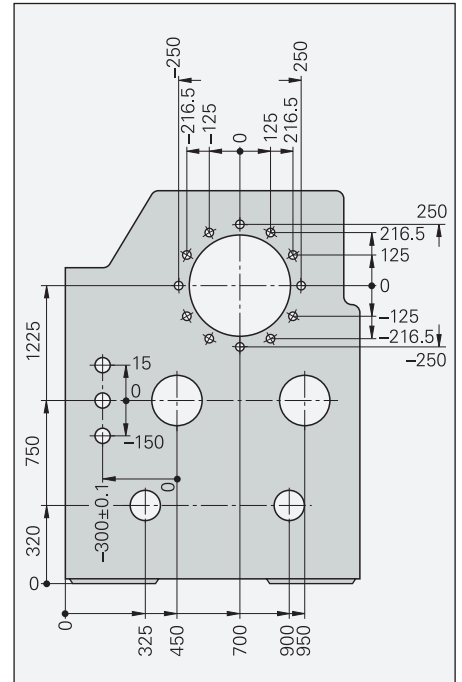
Reliable

The easy-to-read display shows the positions relative to the selected preset, thereby reducing the probability of error and making machining more reliable.

The graphical positioning aid of the POSITIP 8000, ND 5000, and ND 7000 makes distance-to-go mode even faster and more reliable. Graphical illustrations help you correctly enter the geometric data.

Accurate

On older machine tools, precision machining in the hundredths range is often a matter of luck. This is because worn machine elements make exact dial and vernier settings impossible. Linear encoders from HEIDENHAIN, however, measure the motion of the axis slides directly. As a result, any backlash from mechanical transmission elements such as lead screws, racks, or gears has no effect. Being able to directly read the slide position improves your machining accuracy and reduces scrap rates.

Selection guide

	Number of axes	Reference points / tool data	Functions
ND 5000 series Digital readout for milling machines, drilling machines, and lathes with **up to three axes** • Membrane keyboard	Up to 3	10 presets; 16 tools	*General:* • Distance-to-go mode with graphical positioning aid *Milling and drilling:* • Hole patterns (circular and linear) • Tool compensation *Turning:* • Radius/diameter display • Separate/sum display
ND 7000 Digital readout for milling machines, drilling machines, and lathes with **up to three axes** • Touchscreen operation • Switching inputs/outputs (ND 7013 I/O)	Up to 3	100 presets; 100 tools	*General:* • Distance-to-go mode with graphical positioning aid *Milling and drilling:* • Hole patterns (circular and linear) • Tool compensation • Probing functions for presets *Turning:* • Radius/diameter display • Separate/sum display • Constant cutting speed (ND 7013 I/O)
POSITIP 8000 Digital readout for milling machines, drilling machines, and lathes with **up to six axes** • Touchscreen operation • Program memory • Switching inputs/outputs Distance control with the POSITIP 8016 ACTIVE	Up to 6	*Milling and drilling:* 100 presets; 100 tools *Turning:* 100 presets; 100 tools	*General:* • Distance-to-go mode with graphical positioning aid • Contour monitoring • Programming of machining steps *Milling and drilling:* • Hole patterns (circular and linear) • Tool compensation • Probing functions for presets • Roughing out of rectangular pockets *Turning:* • Radius/diameter display • Separate/sum display • Constant cutting speed (POSITIP 8016 ACTIVE)

Encoder inputs	Switching inputs and outputs	Data interface	Page
⎍ TTL	–	USB	**14**
∿ 1 V_{PP} ∿ 11 µA_{PP} EnDat 2.2	• For KT edge finder • Others via ND 7013 I/O	Ethernet, USB	**16**
∿ 1 V_{PP} ∿ 11 µA_{PP} EnDat 2.2	• For KT edge finder • Others via POSITIP 8016 ACTIVE	Ethernet, USB	**20**

# Functions
Probing functions for presets

Setup made easy with probing functions
The HEIDENHAIN KT edge finder makes finding presets especially easy: you simply move the edge finder toward the edge of the workpiece until the stylus deflects. The display automatically stores the exact position, taking into account the direction of approach and the radius of the stylus. In milling-machine mode, the ND 7000 and POSITIP 8000 digital readouts offer the following probing functions:
• Workpiece edge as reference line
• Workpiece centerline as reference line
• Circle center as preset

Preset finding with a tool
The probing functions can also be performed using a tool.
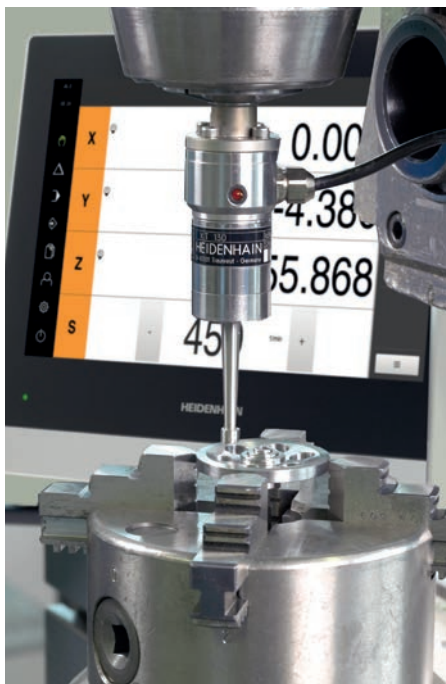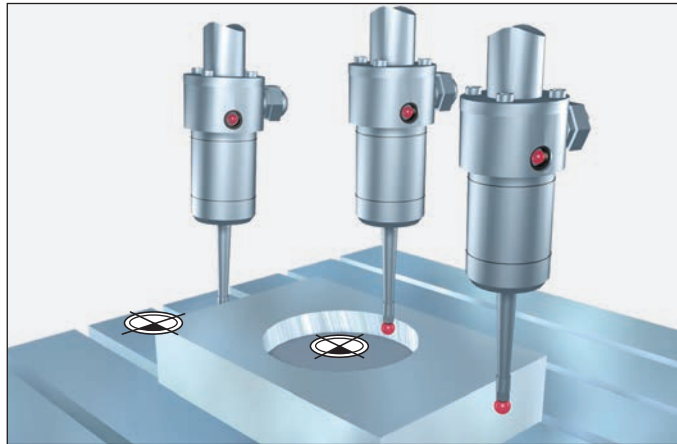
Accessory: KT edge finder
The KT edge finder is a triggering edge finder. Its cylindrical stylus is spring-mounted to the housing of the edge finder. Upon contact with the workpiece, the stylus is deflected, and a switching signal is output to the digital readout over the cable.

The KT edge finder allows you to find presets with greater speed and convenience without leaving marks on the workpiece.
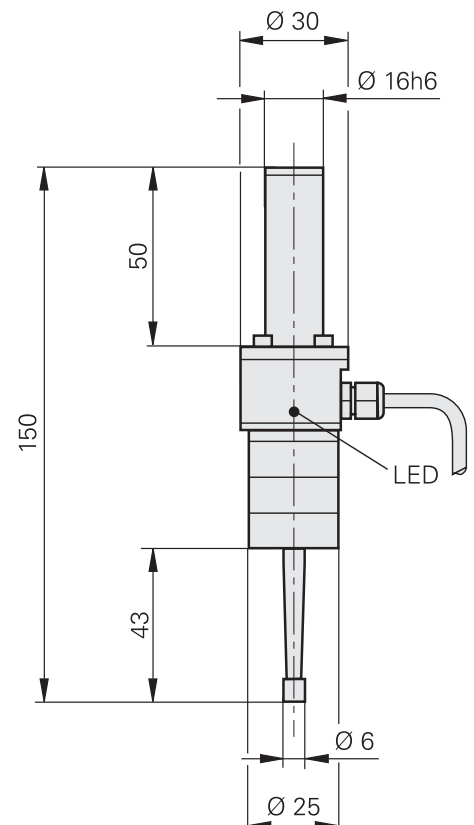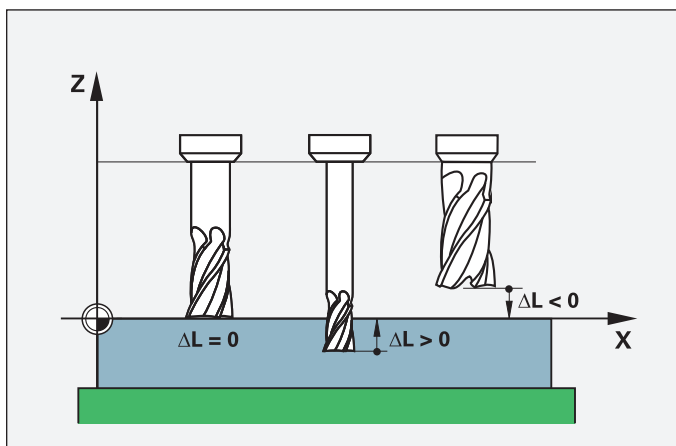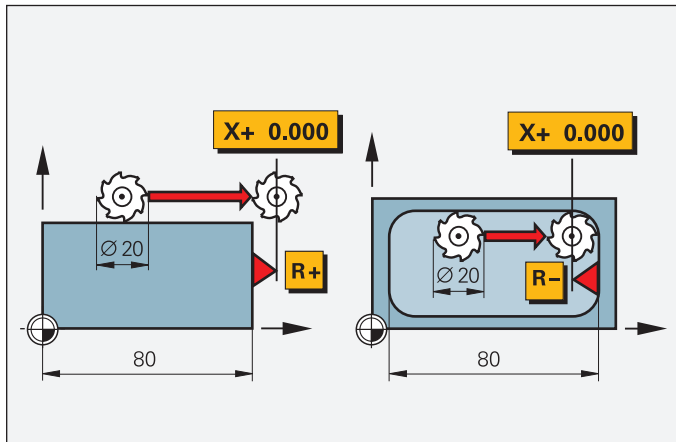
Tool compensation

Tool compensation for milling machines
The ND 5000, ND 7000, and POSITIP 8000 digital readout series can store tool data (i.e., the diameter and length of the deployed tool). Data from already preset tools or tool data collected on the machine can be conveniently stored in a tool table and re-activated at any time.

During positioning in distance-to-go mode, the readouts take into account the tool radius (R+ or R–) in the machining plane, as well as the tool length (ΔL) in the spindle axis.

Determining and storing tool compensation values on lathes
The data of the tools stored for machining in the revolver or quick-change holder can be stored with the ND 5000 or ND 7000 and the POSITIP 8000:
- To do so, directly enter the tool position when turning the first diameter, or
- "freeze" the current axis position value, retract the tool, measure the turned diameter, and then enter the value into the readout.

Changing presets
You can define a new preset for a new workpiece or a preset change. The tool data are automatically referenced to the new preset and do not need to be modified.

9
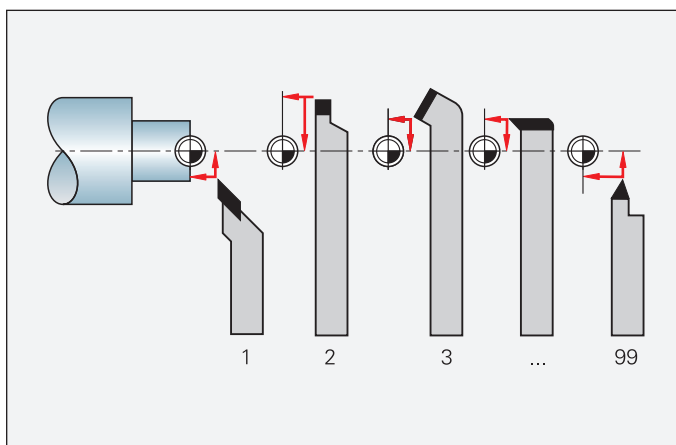
Functions
Distance-to-go display

Distance-to-go display for turning and milling

The distance-to-go display greatly simplifies your work: after you have entered the next nominal position, the digital readout shows you the distance remaining to the target position. You simply move the axes until the display reads zero.

In milling, the display can also compensate for the cutter radius. This allows you to work directly with the drawing dimensions without having to calculate conversions. You no longer need to remember any complicated values.
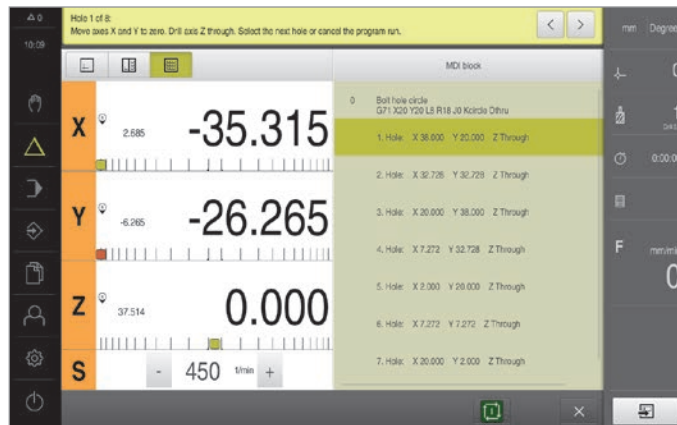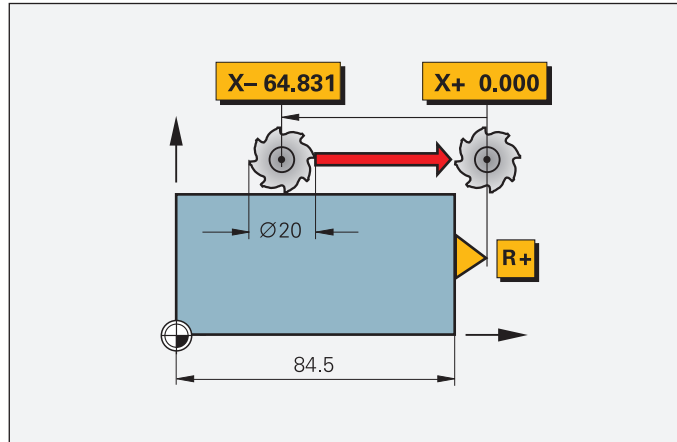
Hole patterns

Automatic calculation of hole patterns for milling and drilling

In milling-machine mode, you can machine **circular hole patterns** (full circle or circle segments) and **linear hole patterns** without much need for calculations:

You simply enter the geometric dimensions and the number of holes shown on the drawing. Based on these data, the readout calculates the coordinates of each hole in the working plane. You then simply move the axis to "zero" and drill. Afterwards, the display shows the next position. The **graphical display** is a particularly useful feature: it lets you verify all of your entered data for hole patterns prior to machining.
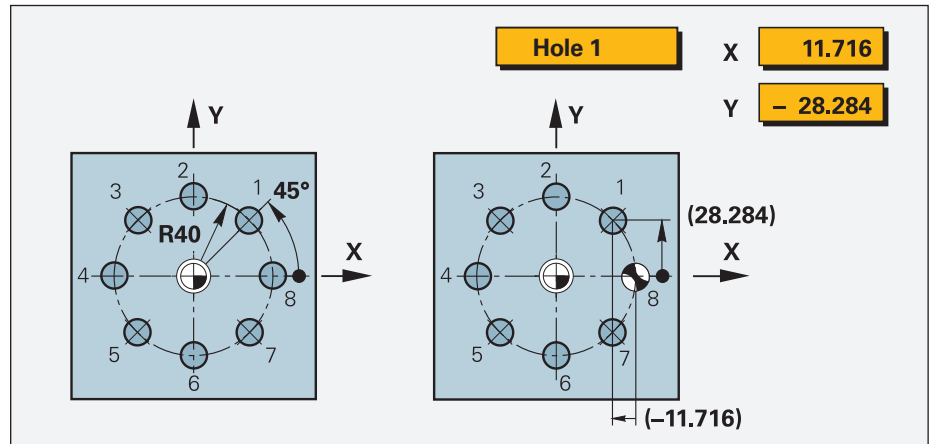
Functions
Aids for working with lathes

Radius/diameter display
In lathe mode, the positions of the cross slide can be displayed either as radius or diameter values. A button allows you to switch between them.

Sum display for longitudinal axes
In lathe mode, you can display the positions of the saddle and top slide either separately or as a sum:

- When **displayed separately**, the position values are referenced to the datum set for each axis slide. If the saddle alone is moved, the displayed value for the top slide remains unchanged.
- When **displayed as a sum**, the positions of both slides are added, taking their algebraic signs into account. You can then read the absolute position of the tool relative to the workpiece datum without performing calculations.
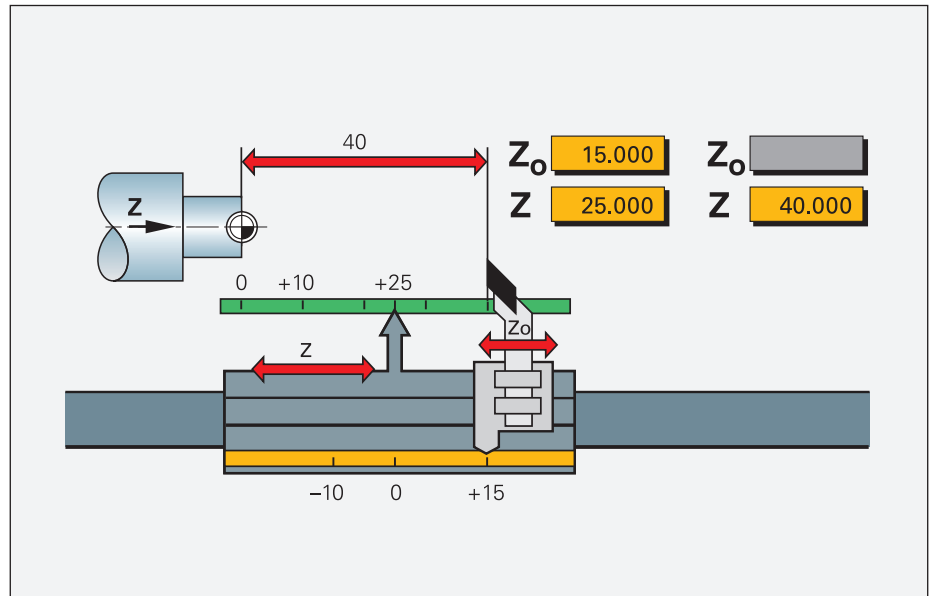

Taper turning made easy
If the taper dimensions do not directly provide the taper angle, then the integrated taper calculator helps you calculate it. You simply enter the taper ratio or both diameters and the length of the taper. You then immediately receive the angle that must be configured for the top slide.

Turning
For turning, simply enter the target dimensions, and POSITIP will show you the distance to go in the longitudinal and transverse axes. You determine the best infeed increment.

Constant surface speed
Particularly in taper turning or parting, the surface speed changes based on the diameter. Yet a constant cutting speed is essential for attaining optimal machining results and long tool life. That's why the ND 7013 I/O and POSITIP 8016 ACTIVE digital readouts enable constant cutting-speed control based on the current workpiece diameter.
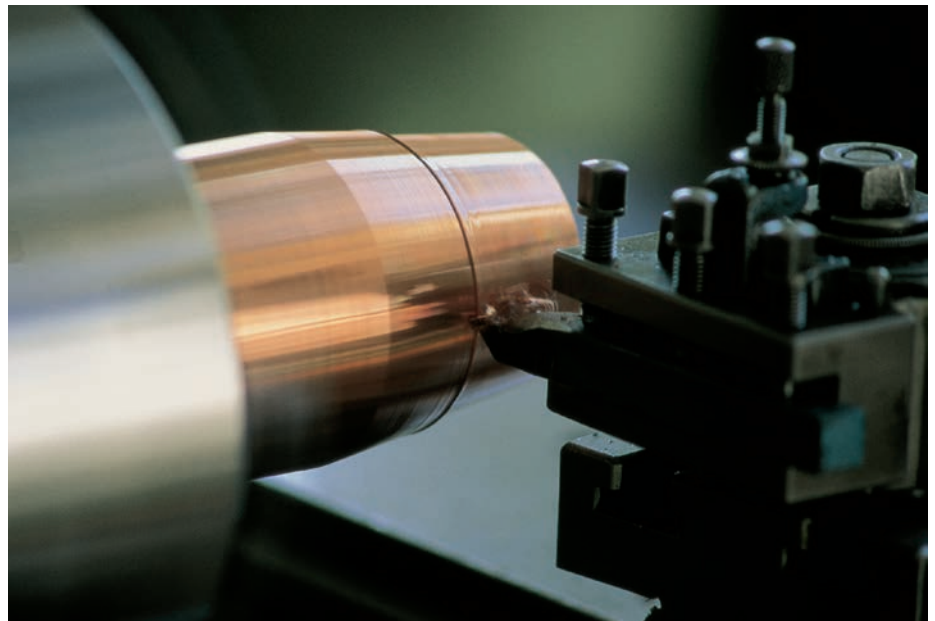
Programming of machining steps (POSITIP 8000)

The programming function of the POSITIP 8000 make it easy for you to save recurring machining steps. For a small-batch part, for example, all of the operating sequences can be complied into a single program. In programming mode, the distance-to-go display guides you to the programmed positions in sequence.

You can create programs by manually entering each position or by simply saving the actual position value (teach-in programming).

With the **POSITIP 8000**, you can even create program section repeats and subprograms. For machining point patterns, you can repeat already programmed incremental dimensions as often as needed (program section repeat). If you need to run the same program sequence at separate locations on the workpiece, you can simply write a subprogram. This saves you entry work and reduces data entry errors. In addition, canned cycles such as "Bolt hole circle," "Row of holes," or "Rectangular pocket" (drilling and milling), as well as "Positioning" (turning) significantly shorten the actual program and programming time. During program execution, all of the nominal positions are provided in their correct sequence. All you need to do is move the axes from one position to the next.

The **POSITIP 8016 ACTIVE** also supports the execution of programs with NC-controlled axes, allowing you to machine your workpieces particularly fast and effectively using automation. The program can also control the spindle.
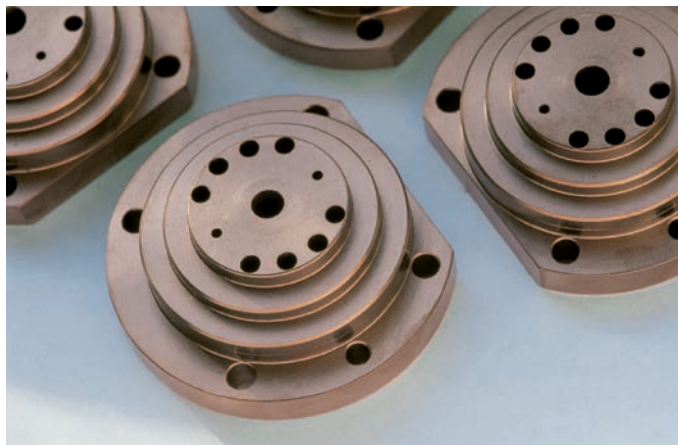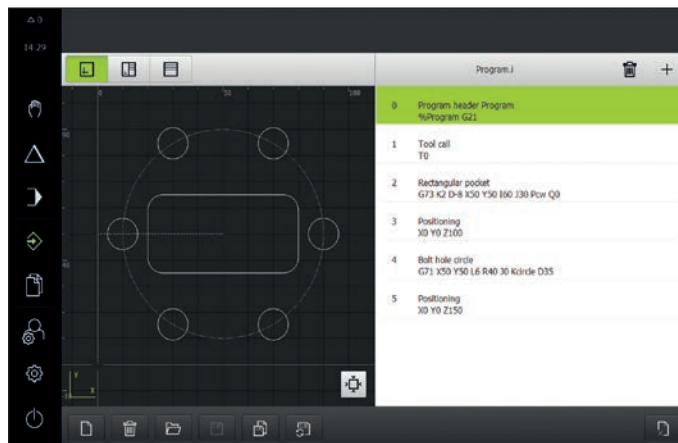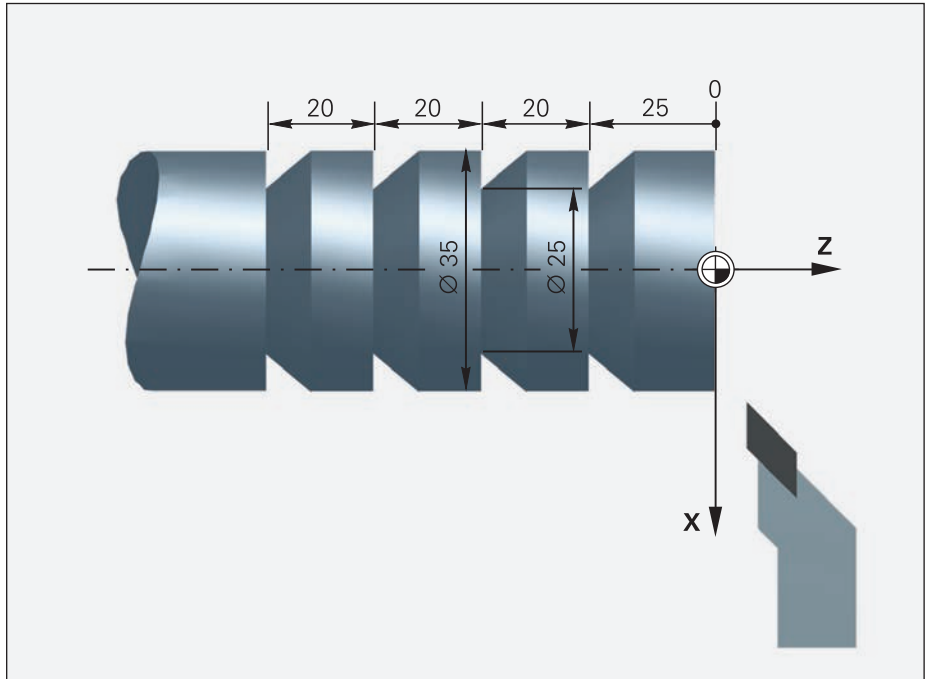
ND 5000
Digital readout for milling machines, drilling machines, and lathes with up to three axes

The ND 5000 digital readout is suitable for use on manually operated milling and drilling machines, as well as on lathes with up to three axes. Due to the TTL encoder input, the LS 328 C and LS 628 C linear encoders with a measuring step of 5 µm are primarily used.

Design
The ND is designed for harsh shop environments. It features a sturdy aluminum housing and a splash-proof membrane keyboard. With their intuitive and user-friendly interface, the ND digital readouts are particularly easy to operate. The 7-inch screen displays all of the information you need in order to machine your workpieces.

The symmetrical design of the ND ensures ergonomic operation. The ND digital readout's keyboard is conveniently accessible, and its screen is easy to read.

Functions
The ND offers many useful functions for machining with manually operated machine tools. The most important functions are readily accessible directly through function keys. Soft keys with language-sensitive information in plain language enable context-sensitive operation. Distance-to-go mode comes to your aid during positioning tasks. With it, you can easily and reliably arrive at the next position by simply moving the axes until the display reads zero.

Of course, the ND also offers special functions for milling and turning operations, such as:
- Hole patterns (linear, circular)
- Radius/diameter switching
- Sum display for the top slide

You can individually configure the display of the ND and save your settings in the user administration.
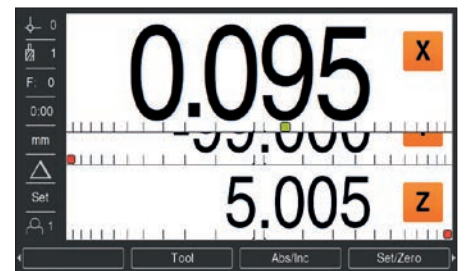
Data interface
A USB interface permits the import and export of parameters and tables to memory or to a PC.

Dynamic zoom
The axis currently in motion can be graphically highlighted. In "dynamic zoom" mode, the position value is enlarged to its maximum size based on the number of digits. This greatly improves readability—especially from far away.
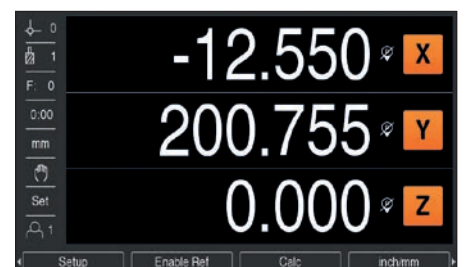
Installation guide
When you turn on the digital readout for the first time, the ND supports you with its installation guide, which leads you step by step through the most important settings until the device is ready for operation.

Day/night switching
You can also switch the screen of the ND to a light or dark background depending on the amount of ambient light at the machine.

	ND 5023
Axes	Up to 3 axes
Encoder inputs	⎍TTL
Input frequency	≤ 500 kHz
Signal period	2 µm, 4 µm, 10 µm, 20 µm, 40 µm, 100 µm, 10 240 µm, 12 800 µm
Line count	Any
Display step[1]	*Linear axis:* 1 mm to 0.0001 mm; 0.005 mm with LS 328 C/LS 628 C *Rotary axis:* 1° to 0.0001° (00° 00′ 01″)
Display	7-inch color wide screen (15:9), resolution: 800 x 480 pixels for position values, dialog messages, data entry, and graphical functions
Functions	• User administration and file management • 10 presets, 16 tools • Reference mark evaluation for distance-coded and single reference marks • Distance-to-go display with nominal position input in absolute or incremental dimensions • Graphical positioning aid • Scaling factor • Integrated help system
For milling and drilling	• Calculation of positions for hole patterns (circular, linear) • Tool radius compensation • Cutting data calculator
For turning	• Freeze tool position during retraction • Sum display of axes in the top slide • Inclined top slide • Taper calculator
Error compensation	Linear (LEC) and segmented linear (SLEC) via up to 200 compensation points
Data interface	USB 2.0 Type C
Accessories	Single-Pos stand, Multi-Pos holder, mounting frame, protective cover, power cable
Power connection	AC 100 V to 240 V (±10 %), 50 Hz to 60 Hz (±5 %), ≤ 33 W
Operating temperature	0 °C to +45 °C (storage temperature: –20 °C to +70 °C)
Protection EN 60529	IP54; back panel: IP40
Mounting	Single Pos stand, Multi-Pos holder; fastening systems compatible with VESA MIS-D 100
Mass	≈ 1.7 kg

[1] Depends on the signal period or line count of the connected encoder

ND 7000

Digital readout for milling machines, drilling machines, and lathes with up to three axes

The ND 7000 digital readouts are suitable for use on manually operated milling and drilling machines, as well as on lathes with up to three axes. Integrated switching inputs and outputs permit interaction with the machine and enable the implementation of simple automated tasks.

Design

The ND 7000 digital readouts are designed for harsh shop environments. They feature a sturdy aluminum housing with touchscreen operation. With their intuitive and user-friendly interface, the ND digital readouts are particularly easy to operate. The 7-inch screen displays all of the information you need in a clear format for machining your workpiece. The low-profile aluminum housing with an integrated power supply unit and fanless passive cooling system is extremely rugged and durable. The well laid-out touchscreen made of specially hardened glass can even be operated with gloves.

Functions

The ND digital readouts offer many useful functions for machining with manually operated machine tools. Self-explanatory operating elements and language-sensitive information in plain language permit context-sensitive operation. Distance-to-go mode comes to your aid during positioning tasks. With it, you can easily and reliably arrive at the next position by simply moving the axes until the display reads zero.

Of course, the ND digital readouts also offer special functions for milling and turning operations, such as:
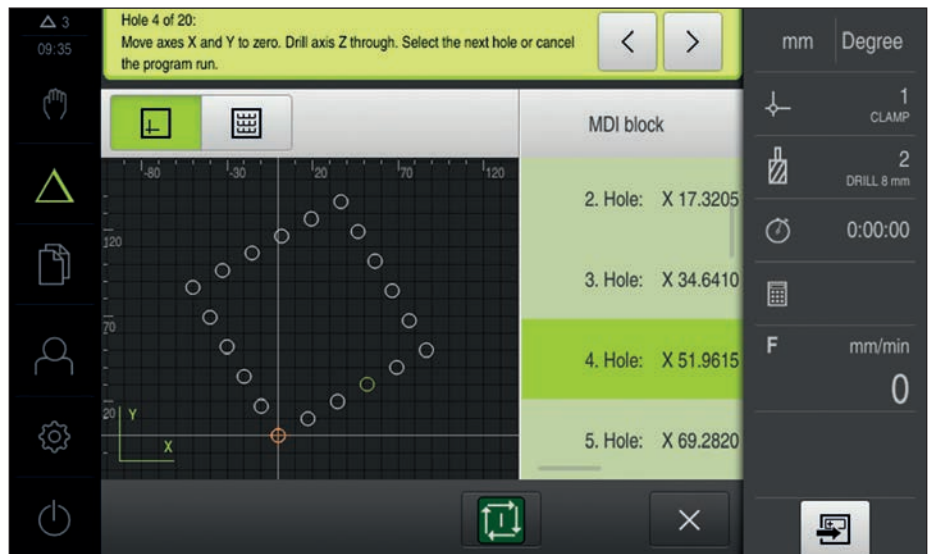- Hole patterns (linear, circular)
- Radius/diameter switching
- Sum display for the top slide

Presets can be found fast and accurately with an edge finder. The ND digital readouts support you with special probing functions.

You can individually configure the display of the ND digital readouts and save your settings in the user administration.

Data interface

A USB port allows you to import and export configuration files.

	ND 7013	ND 7013 I/O
Axes	Up to 3 axes	
Encoder inputs	$\sim$ 1 V$_{PP}$, $\sim$ 11 µA$_{PP}$	
Display step [1]	*Linear axis:* 1 mm to 0.00001 mm	
Display	7-inch screen for touch operation; resolution: 800 x 480 pixels for position values, dialog messages, data entry, and graphical functions	
Functions	• User administration and file management • 100 presets, 100 tools • Reference mark evaluation for distance-coded and single reference marks • Distance-to-go display with nominal position input in absolute or incremental dimensions • Graphical positioning aid • Scaling factor, mirror image, magnification	
For milling and drilling	• Calculation of positions for hole patterns (circular, linear) • Tool radius compensation • Cutting data calculator • Probing functions for preset finding (edge, centerline, and circle)	
	–	Control of spindle speed, switching functions
For turning	• Measurement of tool dimensions • Sum display of axes in the top slide • Taper calculator	
	–	Constant surface speed, switching functions
Error compensation	Linear (LEC) and segmented linear (SLEC)	
Data interface	1 x Ethernet 100 Mbit / 1 Gbit (RJ45), 1 x USB 2.0 (Type A)	
Accessories	Single-Pos, Duo-Pos, Multi-Pos stands, Multi-Pos holder, mounting frame, power cable, adapter connector	
Power connection	AC 100 V to 240 V (±10 %), 50 Hz to 60 Hz (±5 %), ≤ 38 W	
Operating temperature	0 °C to +45 °C (storage temperature: –20 °C to +70 °C)	
Protection EN 60529	IP65; back panel: IP40	
Mounting	Single-Pos stand, Duo-Pos stand, Multi-Pos stand, Multi-Pos holder, fastening systems with a 50 mm x 50 mm hole pattern	
Mass	≈ 1.30 kg	≈ 1.50 kg

[1] Depends on the signal period or line count of the connected encoder

Connectivity comparison: ND 7013 versus ND 7013 I/O

18	ND 7013	ND 7013 I/O
Encoder inputs Position measurement	3	3
Switching functions		
Edge finder[1]	✓	✓
4 logic inputs		
1 logic output		
24 logic inputs	–	✓
8 logic outputs		
2 relay outputs		
4 analog inputs		
4 analog outputs		
USB Type A Import and export of data	✓	✓
Ethernet Network connection	✓	✓
Power connection Power supply	✓	✓

[1] Connection of KT 130

📖 **Further information:**

Operating instructions
ND 7000   ID 1244208

User-controlled functions

Type	Function	ND 7013	ND 7013 I/O
Logo	Call-up of operating instructions or OEM service information	✓	✓
Spindle speed	Pre-assignment of spindle speeds (radio buttons)	–	✓
M function	Freely definable functions	–	✓
Special functions	Selection between thread cutting, direction of spindle rotation, coolant during spindle operation, or clamping of axes	–	✓
	Zeroing of the tool axis	✓	✓
Document	Display of tables (e.g., thread tables, cutting speeds)	✓	✓

POSITIP 8000
Digital readout for milling machines, drilling machines, and lathes with up to six axes

POSITIP 8000 digital readouts are suitable for manually operated milling machines, drilling machines, and lathes with up to six axes. Integrated switching inputs and outputs permit interaction with the machine and enable the implementation of simple automated tasks.

With the POSITIP 8016 ACTIVE, up to three NC axes plus a spindle can be configured and controlled. The simultaneous movement of multiple axes and functions for machine safety are not supported.

Design
The POSITIP 8000 digital readouts are designed for harsh shop environments. They feature a sturdy aluminum housing with touchscreen operation.

Thanks to its intuitive, user-friendly graphical user interface, the POSITIP digital readouts are particularly easy to operate. The 12-inch screen displays all of the information you need in a clear format for machining your workpiece.

The low-profile aluminum housing with an integrated power supply unit and fanless passive cooling system is extremely rugged and durable. The well laid-out touchscreen made of specially hardened glass can even be operated with gloves.

Functions
The POSITIP 8000 digital readouts offer many useful functions for machining with manually operated machine tools. Self-explanatory operating elements and language-sensitive information in plain language permit context-sensitive operation.

Distance-to-go mode comes to your aid during positioning tasks. With it, you can easily and reliably arrive at the next position by simply moving the axes until the display reads zero. This feature is particularly useful during the execution of programs.

Of course, the POSITIP 8000 digital readouts also offer special functions for milling and turning operations, such as:
- Hole patterns (linear, circular)
- Radius/diameter switching
- Sum display for the top slide

Presets can be found fast and accurately with an edge finder. The POSITIP digital readouts support you with special probing functions.

You can individually configure the POSITIP 8000 digital readouts and save your settings in the user administration.

Data interface
A USB port allows you to import and export configuration files and programs. The Ethernet interface allows programs to be saved or imported over a network.

	POSITIP 8016	POSITIP 8016 ACTIVE
Axes	Up to 6 axes (4 axes in the standard version; 2 additional axes available as an option)	
Encoder inputs	$\sim$ 1 V_{PP} $\sim$ 11 μA_{PP} EnDat 2.2	
Display step [1]	*Linear axis:* 1 mm to 0.00001 mm	
Display	12-inch screen for touch operation; resolution: 1280 x 800 pixels for position values, dialog messages, data entry, and graphical functions	
Functions	• Creation and execution of programs • User administration and file management • 100 presets, 100 tools • Reference mark evaluation for distance-coded and single reference marks • Distance-to-go mode with nominal position input in absolute or incremental values • Graphical positioning aid • Scaling factor, mirror image, magnification	
For milling and drilling	• Calculation of positions for hole patterns (circular, linear) • Tool radius compensation • Cutting data calculator • Probing functions for preset finding (edge, centerline, and circle)	
	–	Control of up to 3 NC axes and a spindle; switching functions
For turning	• Measurement of tool dimensions • Sum display of axes in the top slide • Taper calculator	
	–	Control of up to 3 NC axes and a spindle; constant surface speed; switching functions
Error compensation	Linear (LEC) and segmented linear (SLEC)	
Data interface	2 x Ethernet 100 Mbit/1 Gbit (RJ45), 4 x USB 2.0 (Type A)	
Accessories	Single-Pos, Duo-Pos, Multi-Pos stands, Multi-Pos holder, mounting frame, power cable, adapter connector	
Power connection	AC 100 V to 240 V (±10 %), 50 Hz to 60 Hz (±5 %) *POSITIP 8016 ACTIVE:* ≤ 79 W; *POSITIP 8016:* ≤ 38 W	
Operating temperature	0 °C to +45 °C (storage temperature: –20 °C to +70 °C)	
Protection EN 60529	IP65; back panel: IP40	
Mounting	Single-Pos stand, Duo-Pos stand, Multi-Pos stand, Multi-Pos holder, fastening systems compatible with VESA MIS-D 100	
Mass	≈ 3.50 kg	

[1] Depends on the signal period or line count of the connected encoder

Connectivity comparison: POSITIP 8016 versus POSITIP 8016 ACTIVE

	POSITIP 8016	POSITIP 8016 ACTIVE
Encoder interfaces (11 µA$_{PP}$, 1 V$_{PP}$, EnDat 2.2-22)	4 2 additional ones as option	4 2 additional ones as option
Digital inputs		
TTL 0 V to 5 V	8	8
HIGH: DC 11 V to 30 V, 2.1 mA to 6.0 mA LOW: DC 3 V to 2.2 V, 0.43 mA	–	24
Digital outputs		
TTL 0 V to +5 V, maximum load = 1 kΩ	16	16
DC 24 V (20.4 V to 28.8 V, max. 150 mA per channel)	–	8
Relay outputs Max. switching voltage: AC/DC 30 V; max.: 0.5 A; max. 15 W; max. continuous current: 0.5 A	–	2
Analog inputs Voltage range DC 0 V to 5 V Resistance range 100 Ω ≤ R ≤ 50 kΩ	–	4
Analog outputs Voltage range DC –10 V to +10 V Maximum load 1 kΩ	–	4 (option)
5 V voltage outputs Voltage tolerance: ±5 %; maximum current: 100 mA	1	2

📖 **Further information:**

POSITIP 8000
Installation instructions   ID 1251619-xx

User-controlled functions

Type	Function	PT 8016	PT 8016 ACTIVE
Logo	Call-up of operating instructions or OEM service information	✓	✓
Programming	–	✓	✓
Spindle speed	Pre-assignment of spindle speeds (radio buttons)	–	✓
M function	Freely definable functions	✓	✓
	Direction of spindle rotation	–	✓
	Coolant during spindle operation	–	✓
	Clamping of axes	–	Only with NC option
	Coolant	–	✓
	Zeroing of the tool axis	✓	✓
Document	Display of tables (e.g., thread tables, cutting speeds)	✓	✓

Mounting and accessories

Types of mounting

The digital readouts feature setup flexibility thanks to the Single-Pos, Duo-Pos, and Multi-Pos stands. The Multi-Pos holder or the mounting frame is suitable for mounting onto the machine.

ND 5000 mounting types
- Single-Pos stand
- Multi-Pos holder on mounting arm
- Mounting frame

ND 7000 mounting types
- Single-Pos, Duo-Pos, and Multi-Pos stands
- Multi-Pos holder on mounting arm
- Mounting frame

POSITIP 8000 mounting types
- Single-Pos, Duo-Pos, and Multi-Pos stands
- Multi-Pos holder on mounting arm
- Mounting frame
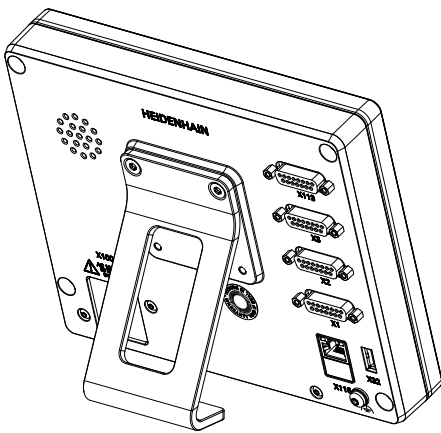
Single-Pos stand
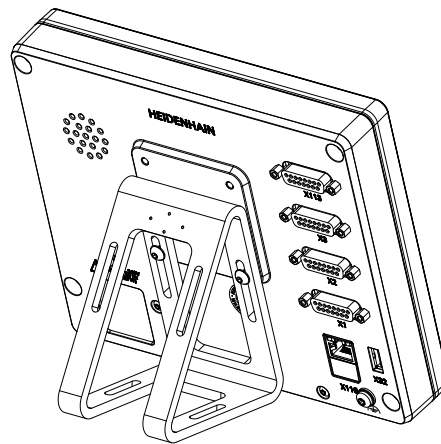
Duo-Pos stand
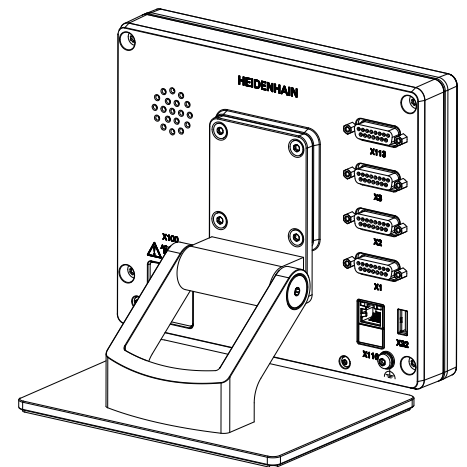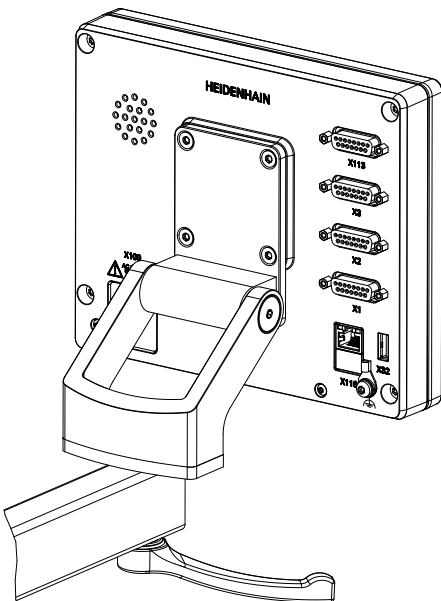
Multi-Pos stand

Multi-Pos holder on mounting arm
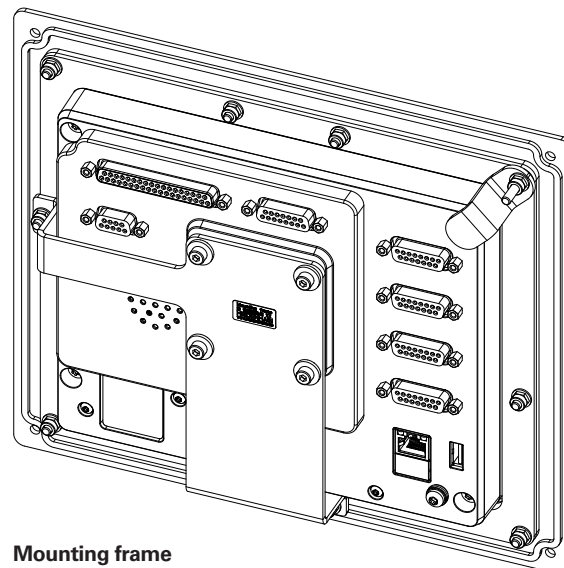
Mounting frame

ND 5000 dimensions
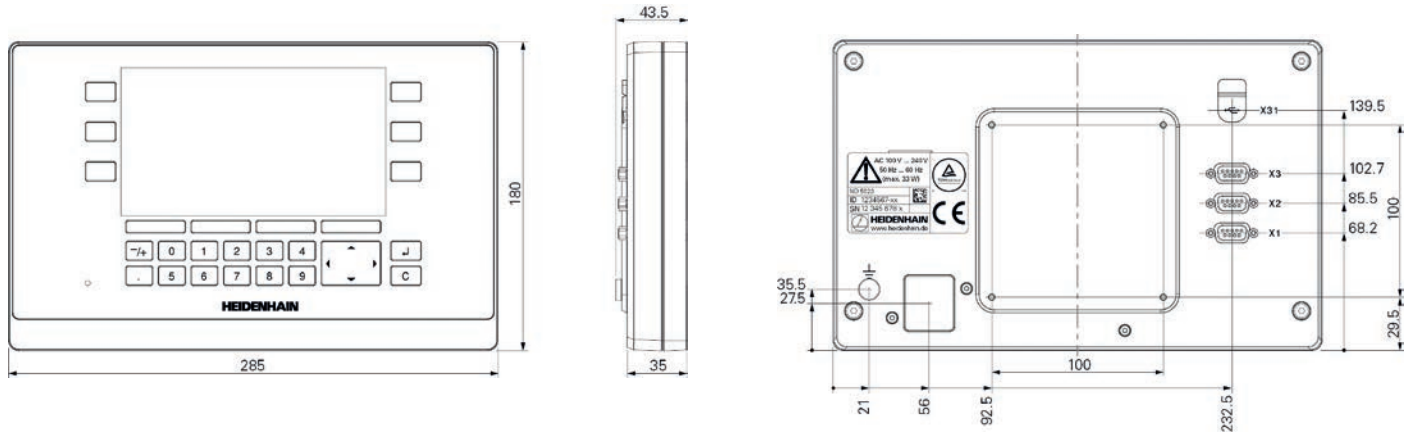
ND 5000 accessories

Single-Pos stand
Included in delivery.
For setup on and fastening to a surface
(20° tilt).

ID 1197273-01
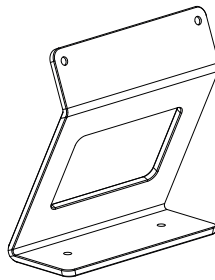
Mounting arm, straight
For mounting onto a machine.

ID 1089207-01
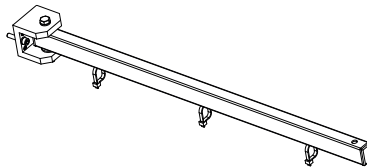
Holder for mounting arm
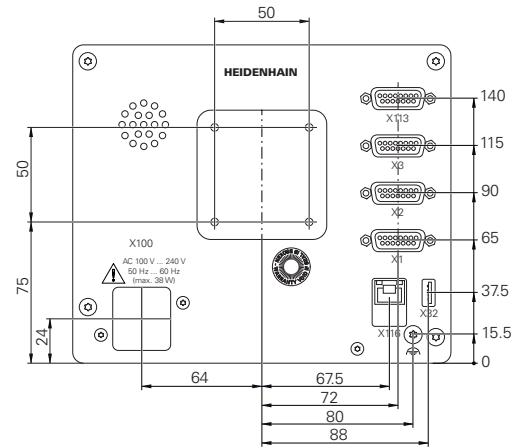For fastening onto the mounting arm.
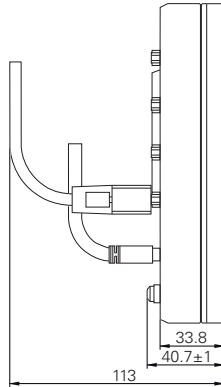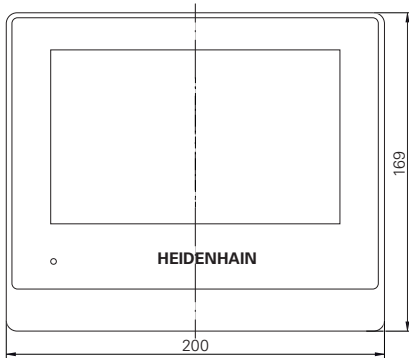
ID 1197273-02
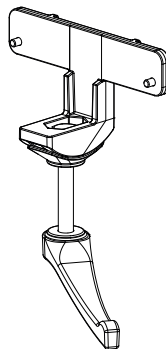
Mounting frame
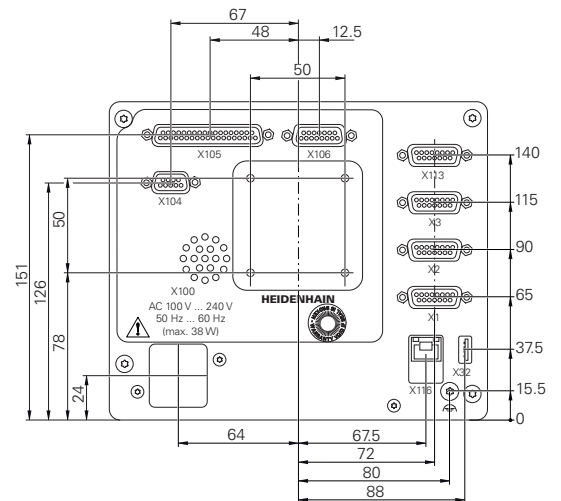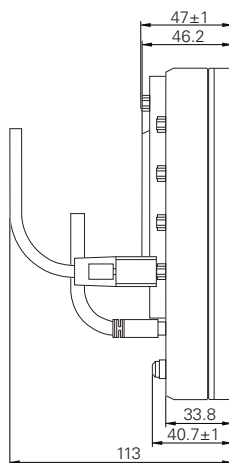For integration into a panel.

ID 1197274-01
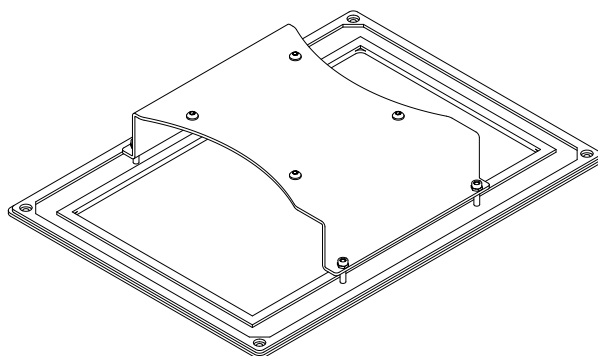
Mounting and accessories

ND 7000 dimensions

Rear panel of the ND 7013

Rear panel of the ND 7013 I/O

ND 7000 accessories

Single-Pos stand
Included in delivery.
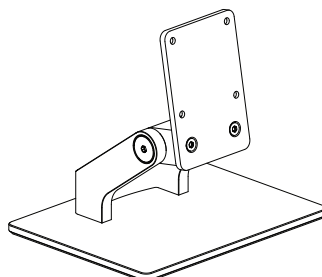For setup on and fastening to a surface
(20° tilt).

ID 1089230-05

Multi-Pos stand
For setup on and fastening to a horizontal
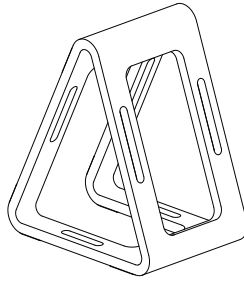surface (90° continuous tilt range).

ID 1089230-07

Duo-Pos stand
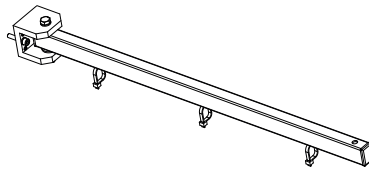For setup on and fastening to a horizontal surface (20° or 45° tilt).

ID 1089230-06

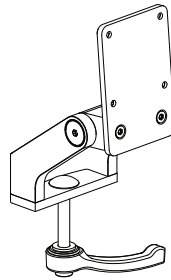**Mounting arm, straight**
For mounting onto a machine.

ID 1089207-01

Multi-Pos holder
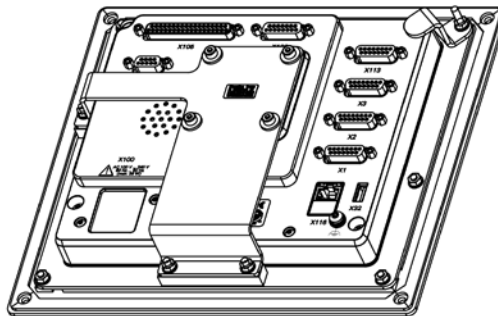For fastening to an arm (90° continuous tilt range).

ID 1089230-08

Mounting frame
For integration into a panel.

ID 1089208-01

Adapter connector
For pin layout conversion after a replacement (e.g., from ND 780 to ND 7000).
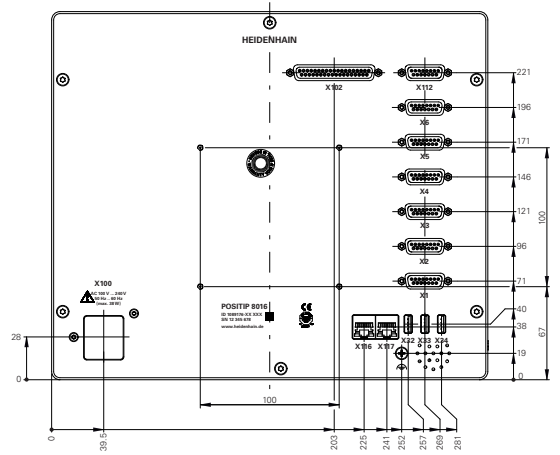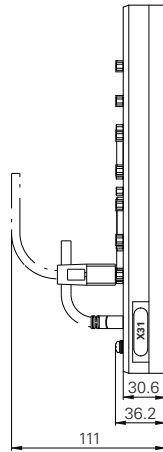
ID 1089214-01

PC demo software under
https://www.heidenhain.de/de_EN/software/
▶ *Digital Readouts* ▶ *ND 7000* ▶ *Software DEMO*

Mounting and accessories

POSITIP 8000 dimensions
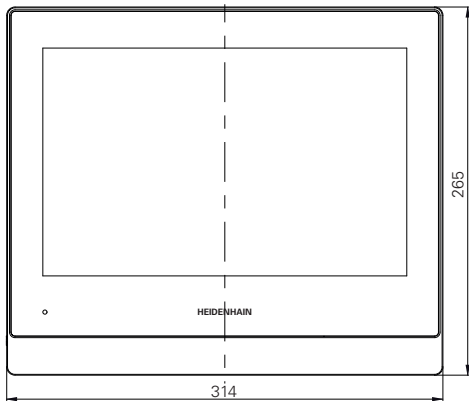
POSITIP 8016
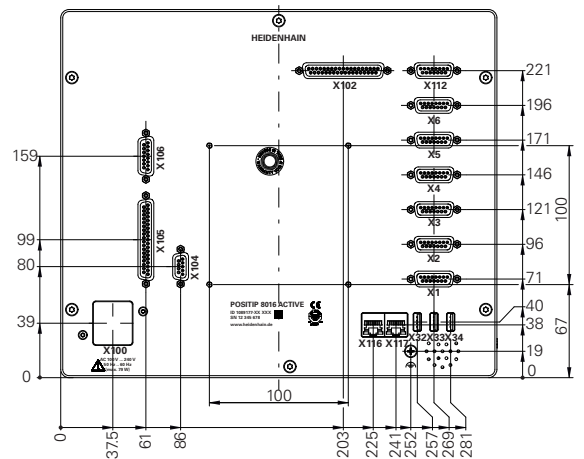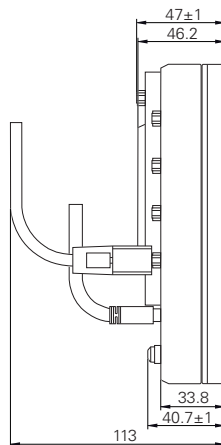
POSITIP 8016 ACTIVE

POSITIP 8000 accessories

Single-Pos stand
Included in delivery.
For setup on and fastening to a surface
(20° tilt).

ID 1089230-01
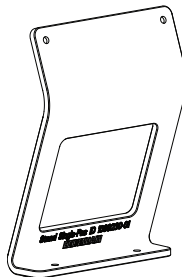
Multi-Pos stand
For setup on and fastening to a horizontal
surface (90° continuous tilt range).

ID 1089230-03
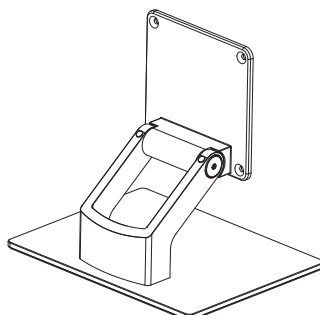
Duo-Pos stand
For setup on and fastening to a horizontal surface (20° or 45° tilt).

ID 1089230-02
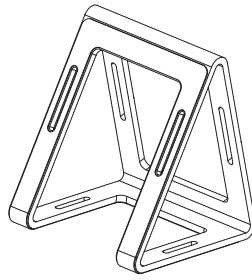
Mounting arm, straight
For mounting onto a machine.
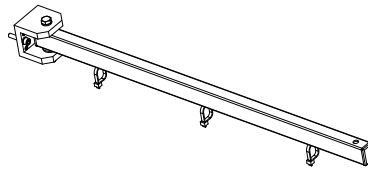
ID 1089207-01

Multi-Pos holder
For fastening to an arm (90° continuous tilt range).

ID 1089230-04
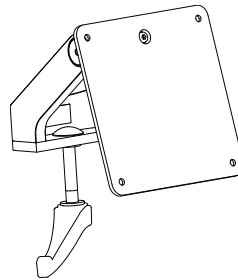
Mounting frame
For integration into a panel.

ID 1089208-02
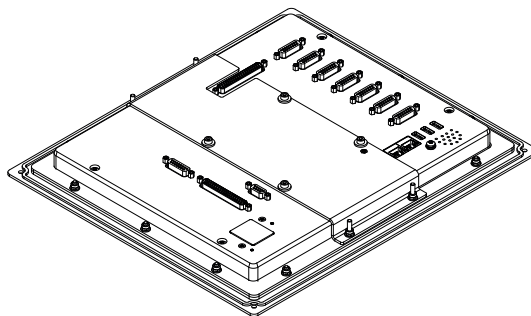
Adapter connector
For pin layout conversion after a replacement (e.g., from PT 880 to POSITIP 8000).

ID 1089214-01

PC demo software under
www.heidenhain.de/de_DE/software/
▶ *Digital Readouts* ▶ *POSITIP 8000* ▶ *Software DEMO*

Linear encoders
For machine tools

For typical applications on manually operated machine tools such as milling or turning operations, **display steps of 10 µm or 5 µm** are sufficient. Suitable for these display steps are the LS 300 and LS 600 series linear encoders with an accuracy grade of ±10 µm per meter of traverse.

Jig boring machines, grinding machines, and measuring and inspection tasks normally require **display steps of 1 µm** and finer. Suitable linear encoders for these more stringent requirements typically feature accuracy grades of ±5 µm per meter of traverse. These linear encoders (e.g., the LS 487 or LS 187) can be found in the *Linear Encoders For Numerically Controlled Machine Tools* brochure.

For **limited installation space** (e.g., on the slide of a lathe), the linear encoders with a slimline scale housing are suitable.

The linear encoders with a full-size scale housing are deployed as universal linear encoders under **normal mounting conditions**.
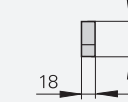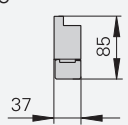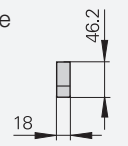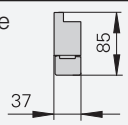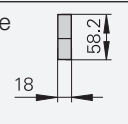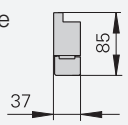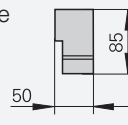
Linear encoders for large traverses
Long traverses of over three meters can be found on large boring mills or milling machines, but also on the long Z axes of lathes. HEIDENHAIN offers suitable linear encoders for specialized applications of this type as well.

LB 382 or **LC 200** encoders with a full-size scale housing enable **measuring lengths of up to 30 040 mm** or **28 040 mm.** The housing is assembled on the machine in sections, and the single-piece steel scale tape is pulled through. The LB 382 and LC 200 can be found in the *Linear Encoders For Numerically Controlled Machine Tools* brochure.

Absolute linear encoders
Encoders for absolute position measurement are used on machines and equipment for which the axis positions must be known upon switch-on. The LC 415, LC 115, and LC 200 linear encoders are described in the *Linear Encoders For Numerically Controlled Machine Tools* brochure. A Product Information document is available for the LC 183 and LC 483.

	Scale housing	Accuracy grade	Measuring lengths
Linear encoders for manually operated machine tools			
Incremental linear measurement • Glass scale	Slimline LS 388: 46.2 LS 328: 58.1 18	±10 µm	70 mm to 1240 mm
	Full-size 85 37	±10 µm	140 mm to 3040 mm
Linear encoders for numerically controlled machine tools			
Incremental linear measurement • Glass scale	Slimline 46.2 18	±5 µm ±3 µm	70 mm to 1240 mm *With mounting spar:* 70 mm to 2040 mm
	Full-size 85 37	±5 µm ±3 µm	140 mm to 3040 mm
Absolute linear measurement • Glass scale	Slimline 58.2 18	±5 µm ±3 µm	70 mm to 1240 mm *With mounting spar or clamping elements:* 70 mm to 2040 mm
	Full-size 85 37	±5 µm ±3 µm	140 mm to 3040 mm
Incremental linear measurement for large measuring lengths • Steel scale tape	Full-size 85 50	±5 µm	440 mm to 30 040 mm
Absolute linear measurement for large measuring lengths • Steel scale tape			4240 mm to 28 040 mm

Interface	Signal period	Model	Further information
⌒ 1 V_{PP}	20 µm	**LS 388 C**	Page 32
⊓⊔ TTL	20 µm	**LS 328 C**	
⌒ 1 V_{PP}	20 µm	**LS 688 C**	Page 34
⊓⊔ TTL	20 µm	**LS 628 C**	
⌒ 1 V_{PP}	20 µm	**LS 487**	*Linear Encoders* For Numerically Controlled Machine Tools brochure
⊓⊔ TTL	Down to 1 µm	**LS 477**	
⌒ 1 V_{PP}	20 µm	**LS 187**	
⊓⊔ TTL	Down to 1 µm	**LS 177**	
EnDat 2.2	–	**LC 415**	
EnDat 2.2	–	**LC 115**	
⌒ 1 V_{PP}	40 µm	**LB 382**	*Linear Encoders* For Numerically Controlled Machine Tools brochure
EnDat 2.2 with ⌒ 1 V_{PP}	40 µm	**LC 281**	
EnDat 2.2	–	**LC 211**	

LS 388 C

LS 688 C

LS 487/LC 415

LS 187/LC 115

LC 281/LC 211

LB 382

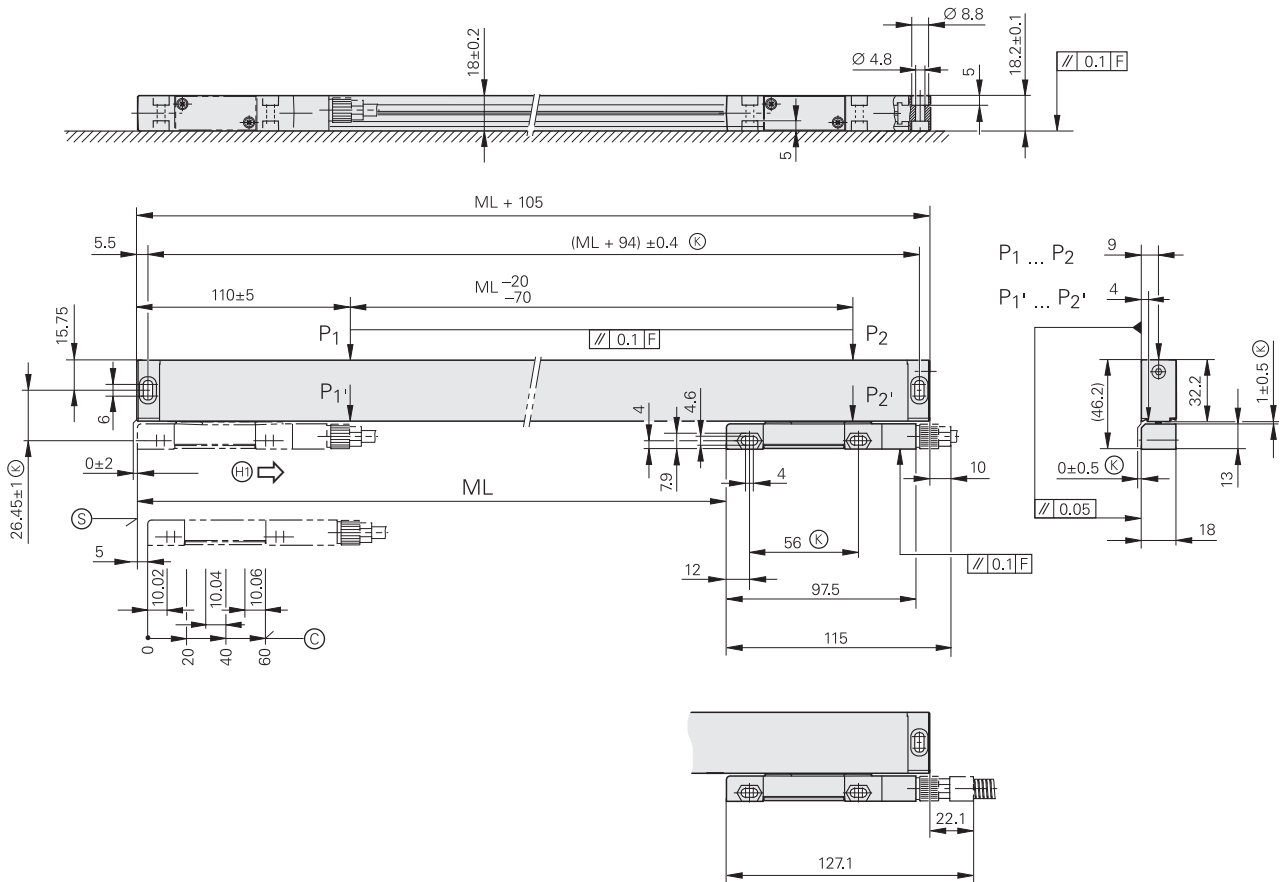**MSA 684 C with rigid cable assembly (RSF Elektronik)**
www.rsf.at

31

LS 300 series

mm

Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ±0.2 mm

Ⓢ = Beginning of measuring length (ML)
Ⓒ = Reference mark position
F = Machine guideway
P = Measuring points for alignment
Ⓚ = Required mating dimensions
1 = Direction of scanning-unit motion for output signals in accordance with the interface description

| Specifications | Incremental | |
	LS 388C	**LS 328C**
Measuring standard	Glass scale with DIADUR graduation	
Accuracy grade	±10 μm	
Measuring length ML*	70 120 170 220 270 320 370 420 470 520 570 620 670 720 770 820 870 920 970 1020 1140 1240	
Interface	$\sim$ 1 V$_{PP}$	$\sqcap\sqcup$ TTL
Grating period	20 μm	
Edge separation *a*	–	≤ 5 μs
Reference mark	Distance-coded	
Recommended measuring step[1]	10 μm, 5 μm	
Supply voltage	DC 5 V ±0.25 V/< 100 mA (without load)	
Electrical connection	Separate adapter cable connectable to mounting block	
Cable length	≤ 30 m (with HEIDENHAIN cable)	
Traversing speed	≤ 60 m/min	
Required moving force	≤ 5 N	
Vibration 55 Hz to 2000 Hz **Shock** 6 ms	≤ 150 m/s^2 (EN 60068-2-6) ≤ 300 m/s^2 (EN 60068-2-27)	
Operating temperature	0 °C to 50 °C	
Protection EN 60529	IP53 when mounted as per the mounting instructions	
Mass	0.27 kg + 0.67 kg/m measuring length	

* Please select when ordering
[1] For position measurement

Please refer to the *General electrical information* in the *Interfaces of HEIDENHAIN Encoders* brochure, especially when connecting non-HEIDENHAIN electronics.

LS 600 series

Ⓘ, Ⓘ,
Ⓘ   = Mounting options
F   = Machine guideway
P, Q = Measuring point for alignment
Ⓐ   = Cable connection usable at either end
Ⓓ   = Compressed air inlet usable at either end
Ⓚ   = Required mating dimensions
Ⓢ   = Beginning of measuring length (ML)
Ⓒ   = Reference-mark position on LS 6x8 C
1   = Direction of scanning-unit motion for output signals in accordance with the
          interface description

Specifications	Incremental	
	LS 688 C	**LS 628 C**
Measuring standard	Glass scale with DIADUR graduation	
Accuracy grade	±10 µm	
Measuring length ML*	170 220 270 320 370 420 470 520 570 620 670 720 770 820 870 920 970 1020 1140 1240 1340 1440 1540 1640 1740 1840 2040 2240 2440 2640 2840 3040	
Interface	$\sim$ 1 V$_{PP}$	$\sqcap\sqcup$ TTL
Grating period	20 µm	
Edge separation *a*	–	≤ 5 µs
Reference mark	Distance-coded	
Recommended measuring step[1]	10 µm, 5 µm	
Supply voltage	DC 5 V ±0.25 V/< 100 mA (without load)	
Electrical connection	Separate adapter cable connectable to mounting block	
Cable length	≤ 30 m (with HEIDENHAIN cable)	
Traversing speed	≤ 60 m/min	
Required moving force	≤ 5 N	
Vibration 55 Hz to 2000 Hz **Shock** 6 ms	≤ 150 m/s^2 (EN 60068-2-6) ≤ 300 m/s^2 (EN 60068-2-27)	
Operating temperature	0 °C to 50 °C	
Protection EN 60529	IP53 when mounted as per the mounting instructions	
Mass	0.7 kg + 2 kg/m ML	

* Please select when ordering
[1] For position measurement

Please refer to the *General electrical information* in the *Interfaces of HEIDENHAIN Encoders* brochure, especially when connecting non-HEIDENHAIN electronics.

HEIDENHAIN

DR. JOHANNES HEIDENHAIN GmbH
Dr.-Johannes-Heidenhain-Straße 5
83301 Traunreut, Germany
☎ +49 8669 31-0
FAX +49 8669 32-5061
E-mail: info@heidenhain.de

www.heidenhain.de

Vollständige und weitere Adressen siehe www.heidenhain.de
For complete and further addresses see www.heidenhain.de

DE **HEIDENHAIN Vertrieb Deutschland**
83301 Traunreut, Deutschland
☎ 08669 31-3132
FAX 08669 32-3132
E-Mail: hd@heidenhain.de

HEIDENHAIN Technisches Büro Nord
12681 Berlin, Deutschland
☎ 030 54705-240

HEIDENHAIN Technisches Büro Mitte
07751 Jena, Deutschland
☎ 03641 4728-250

HEIDENHAIN Technisches Büro West
44379 Dortmund, Deutschland
☎ 0231 618083-0

HEIDENHAIN Technisches Büro Südwest
70771 Leinfelden-Echterdingen, Deutschland
☎ 0711 993395-0

HEIDENHAIN Technisches Büro Südost
83301 Traunreut, Deutschland
☎ 08669 31-1337

AR **NAKASE SRL.**
B1653AOX Villa Ballester, Argentina
www.heidenhain.com.ar

AT **HEIDENHAIN Techn. Büro Österreich**
83301 Traunreut, Germany
www.heidenhain.de

AU **FCR MOTION TECHNOLOGY PTY LTD**
Laverton North Victoria 3026, Australia
E-mail: sales@fcrmotion.com

BE **HEIDENHAIN NV**
1760 Roosdaal, Belgium
www.heidenhain.be

BG **ESD Bulgaria Ltd.**
Sofia 1172, Bulgaria
www.esd.bg

BR **HEIDENHAIN Brasil Ltda.**
04763-070 – São Paulo – SP, Brazil
www.heidenhain.com.br

BY **GERTNER Service GmbH**
220026 Minsk, Belarus
www.heidenhain.by

CA **HEIDENHAIN CORPORATION**
Mississauga, OntarioL5T2N2, Canada
www.heidenhain.com

CH **HEIDENHAIN (SCHWEIZ) AG**
8603 Schwerzenbach, Switzerland
www.heidenhain.ch

CN **DR. JOHANNES HEIDENHAIN (CHINA) Co., Ltd.**
Beijing 101312, China
www.heidenhain.com.cn

CZ **HEIDENHAIN s.r.o.**
102 00 Praha 10, Czech Republic
www.heidenhain.cz

DK **TP TEKNIK A/S**
2670 Greve, Denmark
www.tp-gruppen.dk

ES **FARRESA ELECTRONICA S.A.**
08028 Barcelona, Spain
www.farresa.es

FI **HEIDENHAIN Scandinavia AB**
01740 Vantaa, Finland
www.heidenhain.fi

FR **HEIDENHAIN FRANCE sarl**
92310 Sèvres, France
www.heidenhain.fr

GB **HEIDENHAIN (G.B.) Limited**
Burgess Hill RH15 9RD, United Kingdom
www.heidenhain.co.uk

GR **MB Milionis Vassilis**
17341 Athens, Greece
www.heidenhain.gr

HR Croatia → **SL**

HU **HEIDENHAIN Kereskedelmi Képviselet**
1239 Budapest, Hungary
www.heidenhain.hu

ID **PT Servitama Era Toolsindo**
Jakarta 13930, Indonesia
E-mail: ptset@group.gts.co.id

IL **NEUMO VARGUS MARKETING LTD.**
Holon, 58859, Israel
E-mail: neumo@neumo-vargus.co.il

IN **HEIDENHAIN Optics & Electronics India Private Limited**
Chetpet, Chennai 600 031, India
www.heidenhain.in

IT **HEIDENHAIN ITALIANA S.r.l.**
20128 Milano, Italy
www.heidenhain.it

JP **HEIDENHAIN K.K.**
Tokyo 102-0083, Japan
www.heidenhain.co.jp

KR **HEIDENHAIN Korea LTD..**
Gasan-Dong, Seoul, Korea, 153-782
www.heidenhain.co.kr

MX **HEIDENHAIN CORPORATION MEXICO**
20290 Aguascalientes, AGS., Mexico
E-mail: info@heidenhain.com

MY **ISOSERVE SDN. BHD.**
43200 Balakong, Selangor
E-mail: sales@isoserve.com.my

NL **HEIDENHAIN NEDERLAND B.V.**
6716 BM Ede, Netherlands
www.heidenhain.nl

NO **HEIDENHAIN Scandinavia AB**
7300 Orkanger, Norway
www.heidenhain.no

NZ **Llama ENGINEERING Ltd**
5012 Wellington, New Zealand
E-mail: info@llamaengineering.co.nz

PH **MACHINEBANKS' CORPORATION**
Quezon City, Philippines 1113
E-mail: info@machinebanks.com

PL **APS**
02-384 Warszawa, Poland
www.heidenhain.pl

PT **FARRESA ELECTRÓNICA, LDA.**
4470 - 177 Maia, Portugal
www.farresa.pt

RO **HEIDENHAIN Reprezentanţă Romania**
Braşov, 500407, Romania
www.heidenhain.ro

RS Serbia → **BG**

RU **OOO HEIDENHAIN**
115172 Moscow, Russia
www.heidenhain.ru

SE **HEIDENHAIN Scandinavia AB**
12739 Skärholmen, Sweden
www.heidenhain.se

SG **HEIDENHAIN PACIFIC PTE LTD**
Singapore 408593
www.heidenhain.com.sg

SK **KOPRETINA TN s.r.o.**
91101 Trencin, Slovakia
www.kopretina.sk

SL **NAVO d.o.o.**
2000 Maribor, Slovenia
www.heidenhain.si

TH **HEIDENHAIN (THAILAND) LTD**
Bangkok 10250, Thailand
www.heidenhain.co.th

TR **T&M Mühendislik San. ve Tic. LTD. ŞTİ.**
34775 Y. Dudullu –
Ümraniye-Istanbul, Turkey
www.heidenhain.com.tr

TW **HEIDENHAIN Co., Ltd.**
Taichung 40768, Taiwan R.O.C.
www.heidenhain.com.tw

UA **Gertner Service GmbH Büro Kiev**
02094 Kiev, Ukraine
www.heidenhain.ua

US **HEIDENHAIN CORPORATION**
Schaumburg, IL 60173-5337, USA
www.heidenhain.com

VN **AMS Co. Ltd**
HCM City, Vietnam
E-mail: davidgoh@amsvn.com

ZA **MAFEMA SALES SERVICES C.C.**
Kyalami 1684, South Africa
www.heidenhain.co.za