Baumer
Passion for Sensors

Encoders and angle measurement

Flexible, robust, precise

Product overview – Edition 2014

Partnership.
Precise.
Pioneering.

Visibly better: Baumer sensors.

The Baumer Group is leading at the international level in the development and production of sensors, shaft encoders, measuring instruments as well as components for automatic image processing. As an owner-managed family business, we employ about 2300 workers worldwide in 37 subsidiaries and 19 countries. With marked customer orientation, consistently high quality and vast innovation potential worldwide, Baumer develops specific solutions for many industries and applications.

Our standards – your benefits.

- Passion coupled with expertise – both have made us a sensor pioneer and technology leader
- Our range of services is hard to beat – we have the right product, developed by our own team, for every task
- Inspiring through innovation – a challenge Baumer employees take on every day
- Reliability, precision and quality – our customers' requirements are what drives us
- Partnership from the start – together with our customers we develop suitable solutions
- Always a step ahead – thanks to our production depth, our flexibility and our delivery reliability
- Available worldwide – Baumer is present across the globe

Baumer – setting standards with innovations.

The success story of the Baumer Group is characterized by innovations. By hardware and software engineers, designers or process engineers who work day in and day out to make our products and systems even better.

Our particular focus is on further miniaturization, enhanced precision as well as improved measuring speed and sensor robustness. That's what our products are characterized by - and something we are proud of.

The Baumer development teams are organized in an international network and are in close contact with well-known universities, recognized research institutes and highly specialized international engineering companies. As the technological leader, Baumer always endeavors to maintain its lead over the long term and protect its numerous innovations through patents.

Comprehensive product range

- Actuators and positioning drives
- Capacitive proximity sensors
- Conductivity sensors
- Counters
- Digital cameras
- Encoders
- Force and strain sensors
- Inductive sensors
- Level measurement
- Magnetic sensors
- Network Components
- OCR and code reader systems
- Optical inspection systems
- Photoelectric sensors
- Precision switches My-Com
- Pressure measurement
- Process analysis
- Process displays
- Resolvers
- Speed switches
- Spindle positioning systems
- Tachogenerators
- Temperature sensors
- Ultrasonic sensors
- Vision sensors

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The Baumer encoder portfolio: There is no «impossible».

Reliable products, extreme precision and competent support - Baumer is up to all such requirements. Our comprehensive encoder portfolio always provides the optimum solution.

Your benefit as a customer: Maximized perfomance at minimized system downtime.

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Customized solutions – our understanding of individual requirements.

Besides our standard portfolio, we specialised in customer-specific products to meet all your individual requirements. You can rely on promptness and efficiency throughout the entire implementation process.

We are present across the globe and always close for competent on-site support.

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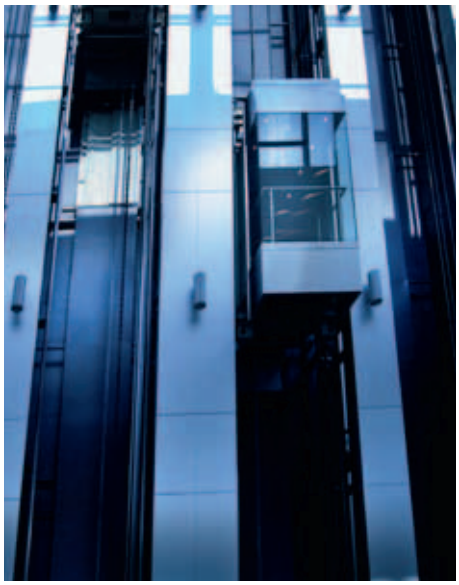

Incremental encoders
Incredibly versatile

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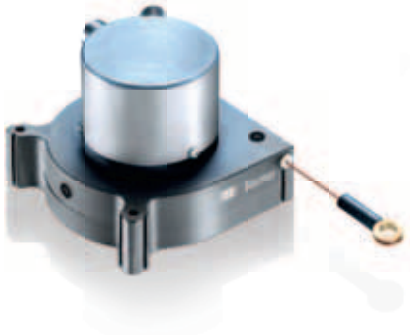

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Safe and individualized

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Solutions for any scenario

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Flexible, robust and precise.

OptoPulse – the new benchmark for encoders:
EIL580-SC with clamping flange and
M23 connector

Incremental encoders

Incredibly versatile.

From cost-efficient standard products on to high-resolution variants with 320 000 pulses per revolution: In our portfolio you always will encounter the matching incremental encoder. Our passion for sensors lays the groundwork for innovative products available in different designs and variants – with robust magnetic or precise optical sensing, optional HTL, TTL or sine signals and with all common mechanical interfaces.

The product portfolio comprises particularly compact designs of mere 24 mm in diameter on to large hollow shaft diameters up to 85 mm. Configurable encoders allow for maximum flexibility in a wide range of applications. In doing so, they contribute towards cutting down on costs in maintenance and inventory.

Service

OptoPulse – quickly available and reliable delivery times.
OptoPulse sets new benchmarks also in ways of delivery. Many stock items are supplied within 24 hours - one working day. More standard items up to the quantity of 10 are available within 5 working days thanks to optimum process harmonization.

Incremental encoders
Size 24...40 mm

Precise optical sensing.
Max. 2048 pulses per revolution.
- Solid shaft, blind or through hollow shaft
- Ideal where space is tight




Features	■ Size 24 mm ■ Solid shaft with synchro flange	■ Size 24 mm ■ Blind hollow shaft	■ Size 30 mm ■ Solid shaft with synchro flange	■ Size 40 mm ■ Blind hollow or through hollow shaft
Product family	ITD 01 B14	ITD 01 A4	BDK 16	BHK 16
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø24 mm	ø24 mm	ø30 mm	ø40 mm
Voltage supply	5 VDC ±5 % 8...30 VDC	5 VDC ±5 % 8...30 VDC	5 VDC ±10 % 10...30 VDC	5 VDC ±10 % 10...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Shaft type				
- Solid shaft	ø4 mm	–	ø5 mm	–
- Blind hollow shaft	–	ø4 mm	–	ø12 mm
- Through hollow shaft	–	–	–	ø6 mm
Connection				
- Flange connector M9	–	–	Radial	Radial
- Cable	Radial / axial	Radial	Radial / axial	Radial
Pulses per revolution	30...1024	30...1024	10...2048	10...2048
Operating temperature	-20...+85 °C	-20...+85 °C	-20...+85 °C	-20...+85 °C
Protection	IP 54	IP 54	IP 42, IP 65	IP 42, IP 65
Operating speed	≤18 000 rpm	≤10 000 rpm	≤12 000 rpm (IP 42) ≤6000 rpm (IP 65)	≤12 000 rpm
Max. shaft load	≤5 N axial, ≤8 N radial	–	≤10 N axial, ≤10 N radial	–

Incremental encoders
Size 24...40 mm

Robust magnetic sensing.
Max. 1024 pulses per revolution.
- Solid shaft or blind hollow shaft
- Ideal where space is tight

EcoMag



Features	■ Size 30 mm ■ Solid shaft with synchro flange	■ Size 30 mm ■ Solid shaft with synchro flange ■ High protection IP 67	■ Size 40 mm ■ Blind hollow shaft
Product family	**BRIV30** - *EcoMag*	**BRIV30 R** - *EcoMag*	**BRIH40** - *EcoMag*

Sensing method	Magnetic	Magnetic	Magnetic
Size (housing)	ø30 mm	ø30 mm	ø40 mm
Voltage supply	5 VDC ±10 % 20...28 VDC	5 VDC ±10 % 20...28 VDC	5 VDC ±10 % 20...28 VDC
Output stage			
- TTL/RS422	■	■	■
- HTL/push-pull	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Shaft type			
- Solid shaft	ø5 mm	ø6 mm, ø8 mm	–
- Blind hollow shaft	–	–	ø6 mm, ø12 mm
- Through hollow shaft	–	–	–
Connection			
- Flange connector M9	Radial	Radial / axial	Radial
- Cable	Radial / axial	Radial / axial	Radial
Pulses per revolution	2...1024	2...1024	2...1024
Operating temperature	-20...+65 °C -20...+85 °C (5 VDC)	-40...+65 °C -40...+85 °C (5 VDC)	-20...+65 °C -20...+85 °C (5 VDC)
Protection	IP 65	IP 67	IP 65
Operating speed	≤6000 rpm	≤6000 rpm	≤6000 rpm
Max. shaft load	≤10 N axial, ≤10 N radial	≤30 N axial, ≤50 N radial	–

EcoMag

EcoMag – robust incremental encoders with resilient magnetic sensing.

Incremental encoders
Size 58 mm

Precise optical sensing.
Max. 5000 pulses per revolution.
- Solid shaft, blind or through hollow shaft
- Robust all-metal housing

OptoPulse – the new benchmark for encoders

OptoPulse




Features	■ Solid shaft with clamping flange	■ Solid shaft with synchro flange	■ Blind hollow shaft	■ Through hollow shaft
Product family	**EIL580-SC** - *OptoPulse*	**EIL580-SY** - *OptoPulse*	**EIL580-B** - *OptoPulse*	**EIL580-T** - *OptoPulse*
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø58 mm	ø58 mm	ø58 mm	ø58 mm
Voltage supply	5 VDC ±5 % 8...30 VDC 4.75...30 VDC	5 VDC ±5 % 8...30 VDC 4.75...30 VDC	5 VDC ±5 % 8...30 VDC 4.75...30 VDC	5 VDC ±5 % 8...30 VDC 4.75...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Shaft type				
- Solid shaft	ø10 mm	ø6 mm	–	–
- Blind hollow shaft	–	–	ø8...15 mm	–
- Through hollow shaft	–	–	–	ø8...15 mm
Connection				
- Flange connector M12, M23	Radial / axial	Radial / axial	Radial / axial	Radial
- Cable	Radial / axial	Radial / axial	Radial / axial	Radial
Pulses per revolution	100...5000	100...5000	100...5000	100...5000
Operating temperature	-40...+85 °C	-40...+85 °C	-40...+85 °C	-40...+85 °C
Protection	IP 65, IP 67	IP 65, IP 67	IP 65, IP 67	IP 65, IP 67
Operating speed	≤12 000 rpm (IP 65) ≤6000 rpm (IP 67)	≤12 000 rpm (IP 65) ≤6000 rpm (IP 67)	≤8000 rpm (IP 65) ≤6000 rpm (IP 67)	≤8000 rpm (IP 65) ≤6000 rpm (IP 67)
Max. shaft load	≤40 N axial, ≤80 N radial	≤40 N axial, ≤80 N radial	–	–

OptoPulse

The innovative optical sensing method utilized by *OptoPulse* incremental encoders ensures ultra-high accuracy and consistently high signal quality throughout the entire temperature range. The heart of this technology is a monolithic OptoASIC with high integration density particularly conceived for high-precision encoders. Thanks to the limited number of discrete components, reliability in the application is decisively improved when it comes to shocks and vibrations.

Incremental encoders
Size 58 mm

Robust magnetic sensing.
Max. 2048 pulses per revolution.
- Solid shaft, blind or through hollow shaft
- Robust all-metal housing

EcoMag




Features	■ Solid shaft with clamping flange	■ Solid shaft with synchro flange	■ Blind hollow shaft	■ Through hollow shaft
Product family	**BRIV 58K** - *EcoMag*	**BRIV 58S** - *EcoMag*	**BRIH 58S** - *EcoMag*	**BRID 58S** - *EcoMag*
Sensing method	Magnetic	Magnetic	Magnetic	Magnetic
Size (housing)	ø58 mm	ø58 mm	ø58 mm	ø58 mm
Voltage supply	5 VDC ±10 % 10...30 VDC	5 VDC ±10 % 10...30 VDC	5 VDC ±10 % 10...30 VDC	5 VDC ±10 % 10...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Shaft type				
- Solid shaft	ø10 mm	ø6 mm	–	–
- Blind hollow shaft	–	–	ø12 mm	–
- Through hollow shaft	–	–	–	ø12 mm
Connection				
- Flange connector M12, M23	Radial	Radial	Radial	Radial
- Cable	Radial	Radial	Radial	Radial
Pulses per revolution	64...2048	64...2048	64...2048	64...2048
Operating temperature	-20...+85 °C	-20...+85 °C	-20...+85 °C	-20...+85 °C
Protection	IP 42, IP 65	IP 42, IP 65	IP 42, IP 65	IP 42, IP 65
Operating speed	≤12 000 rpm (IP 42) ≤6000 rpm (IP 65)	≤12 000 rpm (IP 42) ≤6000 rpm (IP 65)	≤12 000 rpm (IP 42) ≤6000 rpm (IP 65)	≤12 000 rpm (IP 42) ≤6000 rpm (IP 65)
Max. shaft load	≤40 N axial, ≤60 N radial	≤40 N axial, ≤50 N radial	–	–

ShaftLock

The *ShaftLock* locking collar prevents the large high-quality bearing pack from any misalignment by high axial shaft loads during operation or at installation. The *ShaftLock* technology ensures maximum precision and improved service life, keeps code disc and sensing unit safe from damage and avoids cost-intensive downtime.

Incremental encoders
Size 58 mm

Precise optical sensing.
Max. 320 000 pulses per revolution.
- Solid shaft with clamping or synchro flange
- Robust all-metal housing




Features	■ Solid shaft with clamping or synchro flange	■ Solid shaft with clamping or synchro flange	■ Solid shaft with synchro flange	■ Solid shaft with clamping or synchro flange ■ Max. 320 000 pulses per revolution
Product family	**GI355 | GI356**	**G0355 | G0356**	**ITD 21 B14**	**BDH HighRes | BDT HighRes**
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø58 mm	ø58 mm	ø58 mm	ø58 mm
Voltage supply	5 VDC ±10 % 4.75...30 VDC 10...30 VDC	5 VDC ±10 % 4.75...30 VDC 10...30 VDC	5 VDC ±10 % 10...30 VDC	5 VDC ±10 % 10...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Shaft type				
- Solid shaft	ø10 mm | ø6 mm	ø10 mm | ø6 mm	ø6 mm, ø10 mm	ø6 mm, ø10 mm
- Blind hollow shaft	–	–	–	–
- Through hollow shaft	–	–	–	–
Flange	Clamping flange | Synchro flange	Clamping flange | Synchro flange	Clamping flange or synchro flange	Clamping flange | Synchro flange
Connection				
- Flange connector M23	Radial / axial	Radial / axial	Radial	Radial / axial
- Cable	Radial / axial	Radial / axial	Radial / axial	Radial
Pulses per revolution	5...6000	6000...80 000	1000...10 000	4096…320 000
Operating temperature	-20...+85 °C (-20...+100 °C)	-20...+85 °C (-20...+100 °C)	-20...+70 °C (-20...+100 °C)	-20...+85 °C
Protection	IP 54, IP 65	IP 54, IP 65	IP 54	IP 42, IP 65
Operating speed	≤10 000 rpm	≤10 000 rpm	≤6000 rpm	≤6000 rpm
Max. shaft load	≤20 N axial, ≤40 N radial	≤20 N axial, ≤40 N radial	–	≤40 N axial | ≤10 N axial ≤60 N radial | ≤20 N radial
Options	With SIL2 certification: GI357	–	–	–

Incremental encoders
Size 58 mm

Precise optical sensing.
Max. 320 000 pulses per revolution.

- Blind hollow or through hollow shaft
- Robust all-metal housing

HighRes – max. 320 000 pulses per revolution




Features	■ Through hollow shaft	■ Through hollow shaft ■ Tangential cable outlet	■ Blind hollow shaft ■ Max. 320 000 pulses per revolution	■ Through hollow shaft ■ Max. 320 000 pulses per revolution
Product family	**G0333**	**ITD21H00**	**BHF HighRes**	**BHG HighRes**
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø58 mm	ø58 mm	ø58 mm	ø58 mm
Voltage supply	5 VDC ±10 % 4.75...30 VDC 10...30 VDC	5 VDC ±10 % 4.75...30 VDC 10...30 VDC	5 VDC ±10 % 10...30 VDC	5 VDC ±10 % 10...30 VDC
Output stage				
- TTL/RS422	–	■	■	■
- HTL/push-pull	–	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Shaft type				
- Solid shaft	–	–	–	–
- Blind hollow shaft	–	–	ø12 mm	–
- Through hollow shaft	ø12...14 mm	ø10...14 mm	–	ø12 mm
Connection				
- Flange connector M23	Radial / axial	–	Radial	Radial
- Cable	Radial	Tangential	Radial	Radial
Pulses per revolution	6000...80 000	100...80 000	4096...320 000	4096...320 000
Operating temperature	-25...+85 °C	-30...+100 °C	-20...+85 °C	-20...+85 °C
Protection	IP 54	IP 54, IP 65	IP 42, IP 65	IP 42, IP 65
Operating speed	≤6000 rpm	≤6000 rpm	≤6000 rpm	≤6000 rpm
Max. shaft load	–	–	–	–
Options	Stainless steel variant GE333	Operating temperature -30...+120 °C	–	–

Incremental encoders
Large hollow shaft 20...27 mm

Precise optical sensing.
Max. 80 000 pulses per revolution.
- Blind hollow or through hollow shaft
- Easy installation

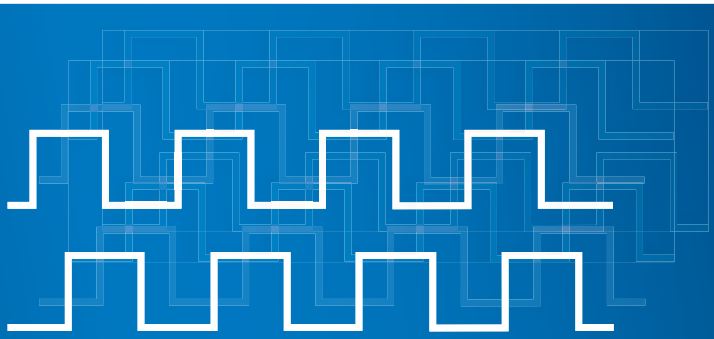
HighRes – max. 80 000 pulses per revolution




Features	■ Through hollow shaft ■ Torque support ■ Max. 2048 pulses per revolution	■ Through hollow shaft ■ Max. 10 000 pulses per revolution	■ Blind hollow or through hollow shaft ■ Max. 16 384 pulses per revolution		■ Through hollow shaft ■ Protection up to IP 67 ■ Max. 80 000 pulses per revolution ■ Isolated shaft
Product family	**ITD 40**	**ITD 41**	**G1I0H**	**G1I0S**	**HS35F**
Sensing method	Optical	Optical	Optical		Optical
Size (housing)	ø80 mm	ø80 mm	ø75 mm		ø3.15" (ø80 mm)
Voltage supply	5 VDC ±5 % 8...30 VDC	5 VDC ±5 % 8...30 VDC	5 VDC ±10 % 4.75...30 VDC		4.75...30 VDC
Output stage					
- TTL/RS422	■	■	■		■
- HTL/push-pull	■	■	■		■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted		A 90° B, N + inverted
Shaft type					
- Blind hollow shaft	–	–	–	ø20 mm, ø25 mm	–
- Through hollow shaft	ø17...27 mm	ø17...27 mm	ø20, ø25 or ø25.4 mm	–	ø0.375...1" (ø9.525...25.4 mm)
Connection					
- Flange connector M23	–	–	Radial		–
- Flange connector MIL	–	–	–		Radial
- Cable	Radial	Radial	Radial		Radial
Pulses per revolution	200...2048	2000...10 000	1024...16 384		1024...80 000
Operating temperature	-20...+70 °C -20...+100 °C	-20...+70 °C -20...+100 °C	-20...+85 °C		-40...+100 °C (-40...+212 °F)
Protection	IP 65	IP 65	IP 54		IP 54, IP 65, IP 67
Operating speed	≤5000 rpm ≤3000 rpm (>70 °C)	≤5000 rpm ≤3000 rpm (>70 °C)	≤3800 rpm		≤5000 rpm
Options	Torque support with electric isolation Stainless steel variant	Torque support with electric isolation Stainless steel variant	–		Function monitoring EMS

Incremental encoders
Large hollow shaft 30...85 mm

Precise optical sensing.
Max. 4096 pulses per revolution.
- Through hollow shaft
- Easy installation



Features	■ Through hollow shaft max. ø50 mm ■ Very flat design	■ Through hollow shaft max. ø65 mm	■ Through hollow shaft max. ø85 mm
Product family	**ITD 61**	**ITD 70**	**ITD 75**
Sensing method	Optical	Optical	Optical
Size (housing)	ø120 mm	ø150 mm	ø150 mm
Voltage supply	5 VDC ±5 % 8...30 VDC	5 VDC ±5 % 8...30 VDC	5 VDC ±5 % 8...30 VDC
Output stage			
- TTL/RS422	■	■	■
- HTL/push-pull	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Shaft type			
- Blind hollow shaft	–	–	–
- Through hollow shaft	ø30...50 mm	ø40...65 mm	ø60...85 mm
Connection			
- Flange connector M23	–	Radial	–
- Cable	Radial	Radial	Radial
Pulses per revolution	1024...4096	1000...2500	1000...2500
Operating temperature	-20...+70 °C	-20...+70 °C	-20...+70 °C
Protection	IP 54	IP 54	IP 54
Operating speed	≤4000 rpm	≤3000 rpm	≤3000 rpm
Options	Stainless steel variant	–	Cable with connector

Incremental encoders
Programmable

Precise optical sensing.
Max. 320 000 pulses per revolution.

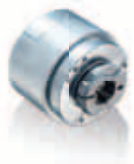
- Configurable by programming software, DIP or HEX switch
- Solid shaft, blind or through hollow shaft
- Configurable electric interface level (TTL or HTL)

Features	■ Solid shaft max. ø8 mm	■ Solid shaft max. ø6 mm	■ Blind hollow shaft max. ø6 mm	■ Through hollow shaft max. ø12 mm ■ Max. 320 000 pulses per revolution
Product family	BVK programmable	BNIV	BHK programmable	BHG HighRes
Configurable parameters	Pulses per revolution	Pulses per revolution	Pulses per revolution	Pulses per revolution
Configuration	DIP switch	HEX switch	DIP switch	Programming software
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø40 mm	ø40 mm	ø40 mm	ø58 mm
Voltage supply	5 VDC ±10 % 4.5...30 VDC	4.75...30 VDC	5 VDC ±10 % 4.5...30 VDC	5 VDC ±10 % 10...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Shaft type				
- Solid shaft	ø6 mm / ø8 mm	ø6 mm	–	–
- Blind hollow shaft	–	–	ø6 mm	–
- Through hollow shaft	–	–	–	ø12 mm
Connection				
- Flange connector M12	Radial	Radial	Radial	–
- Flange connector M23	–	–	–	Radial
- Cable	Radial / axial	Radial	Radial / axial	Radial
Pulses per revolution	360...5120	100...25 000	360...5120	4096...320 000
Operating temperature	-20...+85 °C	-20...+85 °C	-20...+85 °C	-20...+85 °C
Protection	IP 64	IP 64	IP 64	IP 42, IP 65
Operating speed	≤12 000 rpm	≤3000 rpm	≤12 000 rpm	≤6000 rpm
Max. shaft load	≤10 N axial, ≤40 N radial	≤10 N axial, ≤40 N radial	–	–

Incremental encoders
Programmable

Maximum flexibility by versatile configuration options.

HighRes – max. 320 000 pulses per revolution.


Features	■ Blind hollow shaft max. ø12 mm ■ Max. 320 000 pulses per revolution	■ Through hollow shaft max. ø14 mm	■ Through hollow shaft max. ø25.4 mm
Product family	**BHF HighRes**	**ITD2PH00**	**HS35P**
Configurable parameters	Pulses per revolution	Pulses per revolution Output stage HTL or TTL Zero pulse	Pulses per revolution Output stage HTL or TTL Zero pulse
Configuration	Programming software	Programming software	Programming software
Sensing method	Optical	Optical	Optical
Size (housing)	ø58 mm	ø58 mm	ø3.15" (ø80 mm)
Voltage supply	5 VDC ±10 % 10...30 VDC	4.75...30 VDC	4.75...30 VDC
Output stage			
- TTL/RS422	■	–	■
- HTL/push-pull	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Shaft type			
- Solid shaft	–	–	–
- Blind hollow shaft	ø12 mm	–	–
- Through hollow shaft	–	ø10 mm, ø12 mm, ø14 mm	ø0.375...1" (ø9.525...25.4 mm)
Connection			
- Flange connector M23	Radial	–	–
- Flange connector MIL	–	–	Radial
- Cable	Radial	Tangential	Radial
Pulses per revolution	4096...320 000	1...4096	1...8192
Operating temperature	-20...+85 °C	-30...+100 °C	-40...+100 °C (-40...+212 °F)
Protection	IP 42, IP 65	IP 65	IP 54, IP 65, IP 67
Operating speed	≤6000 rpm	≤6000 rpm	≤5000 rpm

Incremental encoders
Sine/Cosine

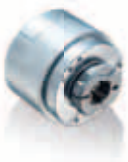



Features	■ Solid shaft with synchro flange	■ Blind or through hollow shaft		■ Blind hollow shaft	■ Blind hollow shaft
Product family	**BDT Sine**	**BHF Sine**	**BHG Sine**	**BHT Sine**	**ITD 22 A4 Y36**
Sensing method	Optical	Optical		Optical	Optical / *LowHarmonics*
Size (housing)	ø58 mm	ø58 mm		ø58 mm	ø58 mm
Voltage supply	5 VDC ±5 %	5 VDC ±5 %		5 VDC ±5 %	5 VDC ±10 % 8...30 VDC
Output stage	SinCos 1 Vpp	SinCos 1 Vpp		SinCos 1 Vpp	SinCos 1 Vpp
Shaft type					
- Solid shaft	ø6 mm	–	–	–	–
- Blind hollow shaft	–	ø12 mm	–	ø9.52 mm, ø10 mm	ø10 mm, ø12 mm, ø14 mm
- Through hollow shaft	–	–	ø12 mm	–	–
Connection					
- Flange connector M12	–	Radial		Radial	–
- Flange connector M23	Radial	Radial		Radial	–
- Cable	Radial / axial	Radial		Radial	Radial
Sine waves per revolution	1000...5000	1000...5000		1000...5000	1024...5000
Operating temperature	-20...+85 °C	-20...+85 °C		-20...+85 °C	-20...+85 °C
Protection	IP 42, IP 65	IP 42, IP 65		IP 65	IP 65
Operating speed	≤12 000 rpm (IP 42) ≤6000 rpm (IP 65)	≤12 000 rpm (IP 42) ≤6000 rpm (IP 65)		≤6000 rpm	≤8000 rpm
Max. shaft load	≤10 N axial, ≤20 N radial	–		–	–

Incremental encoders
Sine/Cosine

Precise optical sensing.
Highest signal quality.

- Size ø58...80 mm
- Maximum speed 12 000 rpm
- Robust all-metal housing



Features	■ Through hollow shaft ■ Tangential cable outlet	■ Through hollow shaft ■ Inch size ■ Protection up to IP 67	■ Blind hollow shaft	■ Through hollow shaft
Product family	**ITD22H00**	**HS35S**	**ITD 42 A4**	**ITD 42 A4 Y79**
Sensing method	Optical / *LowHarmonics*	Optical / *LowHarmonics*	Optical / *LowHarmonics*	Optical / *LowHarmonics*
Size (housing)	ø58 mm	ø3.15" (ø80 mm)	ø80 mm	ø80 mm
Voltage supply	5 VDC ±10 %	4.75...30 VDC	5 VDC ±10 % 8...30 VDC	5 VDC ±10 % 8...30 VDC
Output stage	SinCos 1 Vpp	SinCos 1 Vpp	SinCos 1 Vpp	SinCos 1 Vpp
Shaft type				
- Solid shaft	–	–	–	–
- Blind hollow shaft	–	–	ø10...16 mm	
- Through hollow shaft	ø10 mm, ø12 mm, ø14 mm	ø0.375...1" (ø9.525...25.4 mm)	–	ø20...27 mm
Connection				
- Flange connector MIL	–	Radial	–	–
- Cable	Tangential	Radial	Radial / axial	Radial
Sine waves per revolution	1024...2048	1024...5000	1024...2048	1024...2048
Operating temper ature	-30...+100 °C	-40...+100 °C (-40...+212 °F)	-30...+85 °C	-20...+85 °C
Protection	IP 65	IP 54, IP 65, IP 67	IP 65	IP 65
Operating speed	≤6000 rpm	≤5000 rpm	≤8000 rpm	≤5000 rpm
Max. shaft load	–	–	–	–

LowHarmonics

LowHarmonics is leading cutting-edge technology by generating sine signals with negligible harmonic content.
Sine encoders with *LowHarmonics* ensure improved control quality, less drive heating and higher energy efficiency.

Incremental encoders
Inch size




Features	■ Solid shaft with square flange ■ Inch size ■ Max. 6000 pulses per revolution	■ Blind hollow shaft	■ Through hollow shaft	■ Through hollow shaft ■ Inch size ■ Max. 80 000 pulses per revolution ■ Isolated shaft
Product family	G25	EIL580-B - *OptoPulse*	EIL580-T - *OptoPulse*	HS35
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	2.5 x 2.5" (63.5 x 63.5 mm)	2.28" (ø58 mm)	2.28" (ø58 mm)	ø3.15" (ø80 mm)
Voltage supply	5 VDC ±10 % 4.75...30 VDC	5 VDC ±5 % 8...30 VDC 4.75...30 VDC	5 VDC ±5 % 8...30 VDC 4.75...30 VDC	4.75...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	A, B, Z + inverted	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Shaft type				
- Solid shaft	ø0.375" (ø9.52 mm)	–	–	–
- Blind hollow shaft	–	ø0.315...0.591" (ø8...15 mm)	–	–
- Through hollow shaft	–	–	ø0.315...0.591" (ø8...15 mm)	ø0.375...1" (ø9.525...25.4 mm)
Connection				
- Flange connector MIL	Radial	–	–	Radial
- Cable	Radial	Radial	Radial	Radial
Pulses per revolution	5...6000	100...5000	100...5000	1024...80 000
Sine waves per revolution	–	–	–	1024...5000
Operating temperature	-30...+100 °C (5 VDC) -30...+85 °C (24 VDC)	-40...+85 °C	-40...+85 °C	-40...+100 °C (-40...+212 °F)
Protection	IP 54 (without shaft seal) IP 67 (with shaft seal)	IP 65, IP 67	IP 65, IP 67	IP 54, IP 65, IP 67
Operating speed	≤10 000 rpm (IP 54) ≤6000 rpm (IP 67)	≤8000 rpm (IP 65) ≤6000 rpm (IP 67)	≤8000 rpm (IP 65) ≤6000 rpm (IP 67)	≤5000 rpm
Max. shaft load	≤80 lbs (350 N) axial/radial ≤100 lbs (450 N) axial or ≤150 lbs (670 N) radial	–	–	–
Options	–	–	–	Function monitoring EMS Configurable

Incremental encoders
Other designs

Features	■ Solid shaft with EURO flange B10 ■ Max. 2048 pulses per revolutions	■ Solid shaft with EURO flange B10 ■ Max. 6000 pulses per revolution	■ Measuring wheel encoder comprising encoder, tether arm and measuring wheel ■ Contact pressure fully adjustable
Product family	ITD 40 B10	ITD 41 B10	MA20
Configurable parameters	–	–	16 pre-defined resolutions
Configuration	–	–	HEX switch
Sensing method	Optical	Optical	Optical
Size (housing)	ø82 mm	ø82 mm	ø40 mm (encoder)
Voltage supply	5 VDC ±5 % 8...30 VDC	5 VDC ±5 % 8...30 VDC	4.75...30 VDC
Output stage			
- TTL/RS422	–	–	–
- HTL/push-pull	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B
Shaft type			
- Solid shaft	ø11 mm	ø11 mm	ø6 mm
- Through hollow shaft	–	–	–
Connection			
- Flange connector M12	–	–	Radial
- Cable	Radial	Radial	Radial
Pulses per revolution	200...2048	1000...6000	100...25 000
Operating temperature	-20...+70 °C (-20...+100 °C)	-20...+70 °C (-20...+100 °C)	-20...+85 °C
Protection	IP 65	IP 65	IP 64
Operating speed	≤12 000 rpm	≤6000 rpm	≤3000 rpm
Max. shaft load	≤40 N axial, ≤60 N radial	≤40 N axial, ≤60 N radial	–
Options	–	–	Measuring wheels available with different rubber surface

Absolute flexibility.

Absolute encoders in ø58 mm size:
GXMMW with clamping flange and
bus cover

Absolute encoders

All current interfaces, device-integrated or by modular bus covers.

With Baumer, you will always encounter the absolute encoder that is just right for your requirements – with conventional point-to-point interface or realtime EtherNet, with precise optical or robust magnetic sensing, from compact ø30 mm size on to large hollow shafts of ø50 mm. The products are optimized for maximum performance and hence predestined for demanding applications where they measurably contribute towards increased productivity.

Reliable quality and flexible delivery times for any interface or mechanical product variant: This involves qualified and committed people, intelligent technologies and the latest production methods.

Sensing technologies

Optical or magnetic sensing

Optical encoders ensure ultimate precision and maximum magnetic field immunity in parallel. They allow for resolutions up to 18 bits per revolution at an accuracy as high as ±0.01°. Magnetic encoders of the *MAGRES* series are particularly robust and always provide reliable operation even under heavy shocks and vibrations or where there is dew and condensation.

Absolute encoders
Robust magnetic sensing

Size 30 mm.
Integrated interface.
- Solid shaft and blind hollow shaft
- Compact housing where space is tight

MAGRES




Features	■ Solid shaft max. ø8 mm	■ Solid shaft max. ø8 mm ■ High resistance against shocks and vibrations	■ Blind hollow shaft ■ Multiturn	■ Blind hollow shaft ■ Singleturn
Product family	**BMMV 30 | BMSV 30**	**BMMV 30R | BMSV 30R**	**BMMH 30**	**BMSH 30**
Interface				
- SSI	■	■	■	■
- CANopen®	■	■	■	■
- DeviceNet	–	–	–	–
Function principle	Multiturn | Singleturn	Multiturn | Singleturn	Multiturn	Singleturn
Sensing method	Magnetic	Magnetic	Magnetic	Magnetic
Size (housing)	ø30 mm	ø30 mm	ø30 mm	ø30 mm
Voltage supply	10...30 VDC	10...30 VDC	10...30 VDC	10...30 VDC
Shaft type				
- Solid shaft	ø5 mm, ø6 mm, ø8 mm	ø5 mm, ø6 mm, ø8 mm	–	–
- Blind hollow shaft	– | –	– | –	ø4 mm, ø6 mm	ø4 mm, ø6 mm
Connection				
- Flange connector M12	Radial, axial	Radial, axial	Radial, axial	Radial, axial
- Cable	Radial, axial	Radial, axial	Radial, axial	Radial, axial
Resolution[1)]	≤30 bit | ≤12 bit	≤30 bit | ≤12 bit	≤30 bit	≤12 bit
Steps per turn	≤4096/12 bit	≤4096/12 bit	≤4096/12 bit	≤4096/12 bit
Number of turn	≤262144/18 bit | –	≤262144/18 bit | –	≤262144/18 bit	–
Absolute accuracy	±1°	±1	±1°	±1°
Operating temperature	-20...+85 °C	-40...+65 °C	-20...+85 °C	-20...+85 °C
Protection	IP 65	IP 67	IP 65	IP 65
Operating speed	≤6000 rpm	≤6000 rpm	≤6000 rpm	≤6000 rpm
Max. shaft load	≤10 N axial, ≤10 N radial	≤30 N axial, ≤50 N radial	–	–

MAGRES

The *MAGRES* absolute encoders operate on both magnetic singleturn and multiturn sensing – entirely non-contact and with high resolutions up to 12 bit singleturn.

Absolute encoders
Robust magnetic sensing

Size 42 mm.
Integrated interface.
- Solid shaft and blind hollow shaft
- Compact housing where space is tight

MAGRES




Features	■ Solid shaft max. ø10 mm ■ Multiturn	■ Solid shaft max. ø10 mm ■ Singleturn	■ Blind hollow shaft ■ Multiturn	■ Blind hollow shaft ■ Singleturn
Product family	**BMMV 42**	**BMSV 42**	**BMMH 42**	**BMSH 42**
Interface				
- SSI	■	■	■	■
- CANopen®	■	■	■	■
- DeviceNet	■	■	■	■
Function principle	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Magnetic	Magnetic	Magnetic	Magnetic
Size (housing)	ø42 mm	ø42 mm	ø42 mm	ø42 mm
Voltage supply	10...30 VDC	10...30 VDC	10...30 VDC	10...30 VDC
Shaft type				
- Solid shaft	ø6 mm, ø10 mm	ø6 mm, ø10 mm	–	–
- Blind hollow shaft	–	–	ø12 mm	ø12 mm
Connection				
- Flange connector M12	Radial	Radial	Radial	Radial
- Cable	Radial	Radial	Radial	Radial
Resolution[1)]	≤30 bit	≤12 bit	≤30 bit	≤12 bit
Steps per turn	≤4096/12 bit	≤4096/12 bit	≤4096/12 bit	≤4096/12 bit
Number of turn	≤262 144/18 bit	–	≤262 144/18 bit	–
Absolute accuracy	±1°	±1°	±1°	±1°
Operating temperature	-20...+85 °C	-20...+85 °C	-20...+85 °C	-20...+85 °C
Protection	IP 65	IP 65	IP 65	IP 65
Operating speed	≤6000 rpm	≤6000 rpm	≤6000 rpm	≤6000 rpm
Max. shaft load	≤10 N axial, ≤25 N radial	≤10 N axial, ≤25 N radial	–	–

1) depending on interface

Absolute encoders
Robust magnetic sensing

Size 58 mm.
Integrated interface and modular bus covers.
- Solid shaft and blind hollow shaft

Power over EtherCAT · EtherNet/IP · PROFIBUS · EtherCAT · DeviceNet · PROFINET · CANopen · SSI · ETHERNET POWERLINK · SAE J1939

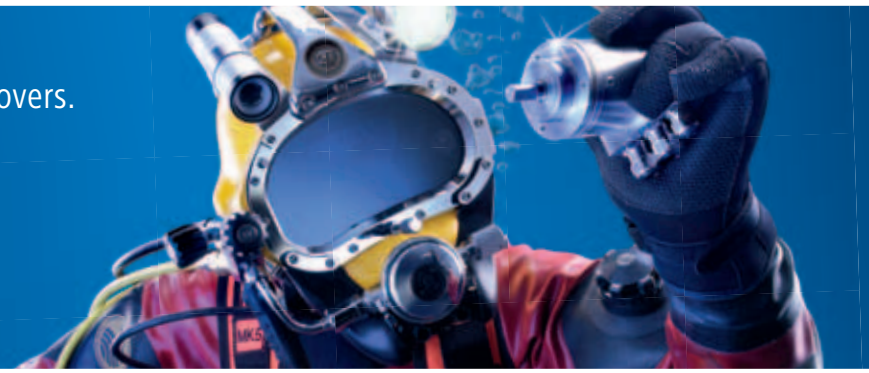
MAGRES




Features	■ Solid shaft with clamping or synchro flange ■ Integrated interface		■ Blind hollow shaft ■ Integrated interface		■ Solid shaft with clamping or synchro flange ■ Modular bus cover		■ Blind hollow shaft ■ Modular bus cover	
Product family	**BMMV 58**	**BMSV 58**	**BMMH 58**	**BMSH 58**	**BMMV 58 flexible**	**BMSV 58 flexible**	**BMMH 58 flexible**	**BMSH 58 flexible**
Interface								
- SSI	■		■		–		–	
- Analog / redundant	■ / ■		■ / ■		– / –		– / –	
- CANopen® / redundant	■ / ■		■ / ■		■ / –		■ / –	
- DeviceNet	■		■		■		■	
- Profibus-DP	■		■		■		■	
- SAEJ1939	–		–		■		■	
- EtherCAT / PoE	–		–		■		■	
- EtherNet/IP	–		–		■		■	
- Powerlink	–		–		■		■	
- Profinet	–		–		■		■	
Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Magnetic		Magnetic		Magnetic		Magnetic	
Size (housing)	ø58 mm		ø58 mm		ø58 mm		ø58 mm	
Voltage supply	10...30 VDC 8...30 VDC (analog)		10...30 VDC 8...30 VDC (analog)		10...30 VDC		10...30 VDC	
Shaft type								
- Solid shaft	ø6 mm, ø10 mm		–		ø6 mm, ø10 mm		–	
- Blind hollow shaft	–		ø12 mm		–		ø12 mm	
Connection	Flange connector M12, M23, SUB-D or cable (depending on product and variant)							
Resolution[1)]	≤30 bit	≤12 bit	≤30 bit	≤12 bit	≤30 bit	≤12 bit	≤30 bit	≤12 bit
Steps per turn	≤4096/12 bit		≤4096/12 bit		≤4096/12 bit		≤4096/12 bit	
Number of turn	≤262144/18 bit	–	≤262144/18 bit	–	≤262144/18 bit	–	≤262144/18 bit	–
Absolute accuracy	±1°		±1°		±1°		±1°	
Operating temperature	-20...+85 °C		-20...+85 °C		-20...+85 °C		-20...+85 °C	
Protection	IP 65		IP 65		IP 65		IP 65	
Operating speed	≤6000 rpm		≤6000 rpm		≤6000 rpm		≤6000 rpm	
Max. shaft load Solid shaft ø6 mm (ø10 mm)	≤10 N axial, ≤20 N radial (≤40 N axial, ≤60 N radial)		–		≤10 N axial, ≤20 N radial (≤40 N axial, ≤60 N radial)		–	

Absolute encoders
Robust magnetic sensing

Size 58 mm.
Integrated interface and modular bus covers.
- Solid shaft with clamping flange
- Operating temperature down to -40 °C
- Hermetically sealed, compliance up to IP 69K
- Stainless steel design



MAGRES hermetic

Features	■ Solid shaft with clamping flange ■ Multiturn ■ Hermetically sealed ■ Integrated interfaces	■ Solid shaft with clamping flange ■ Singleturn ■ Hermetically sealed ■ Integrated interfaces	■ Solid shaft with clamping flange ■ Multiturn ■ Hermetically sealed ■ Modular bus cover
Product family	**BMMV 58 -** *MAGRES hermetic*	**BMSV 58 -** *MAGRES hermetic*	**BMMV 58 flexible -** *MAGRES hermetic*
Interface			
- SSI	■	■	–
- Analog	–	–	–
- CANopen®	■	–	■
- DeviceNet	–	–	■ 2)
- Profibus-DP	■	–	■
- SAEJ1939	–	–	■
- EtherCAT/PoE	–	–	■ 2)
- EtherNet/IP	–	–	■
- Powerlink	–	–	■ 2)
- Profinet	–	–	■
Function principle	Multiturn	Singleturn	Multiturn
Sensing method	Magnetic	Magnetic	Magnetic
Size (housing)	ø58 mm	ø58 mm	ø58 mm
Voltage supply	10...30 VDC	10...30 VDC	10...30 VDC
Shaft type			
- Solid shaft	ø10 mm	ø10 mm	ø10 mm
- Blind hollow shaft	–	–	–
Connection	Flange connector M12	Flange connector M12	Flange connector M12
Resolution[1)]	≤29 bit	≤12 bit	≤30 bit
Steps per turn	≤8192/13 bit	≤4096/12 bit	≤4096/12 bit
Number of turn	≤65536/16 bit	–	≤262 144/18 bit
Absolute accuracy	±1°	±1°	±1°
Operating temperature	-40...+85 °C	-40...+85 °C	-40...+85 °C
Protection	IP 68, IP 69 K	IP 68, IP 69 K	IP 68, IP 69 K
Operating speed	≤6000 rpm	≤6000 rpm	≤6000 rpm
Max. shaft load	≤120 N axial ≤280 N radial	≤120 N axial ≤280 N radial	≤120 N axial ≤280 N radial

1) depending on interface
2) on request

Absolute encoders
Precise optical sensing

Size 58 mm.
Integrated interface.

- Resolution up to 14 bit per turn
- High accuracy ±0.025°
- Operating temperature down to -40 °C
- Additional incremental signals




Features	■ Solid shaft with clamping flange		■ Solid shaft with synchro flange		■ Blind hollow shaft		■ Through hollow shaft	
Interface	Product family							
- SSI or (SSI / incremental)	GM400	GA240	GM401	GA241	GXM2S	GXA2S	G0M2H	G0A2H
- RS485	GXM7W	GXA7W	GXM7W	GXA7W	GXM7S	–	–	–
- Analog	–	–	–	ATD 2A B14	–	–	ATD 2A A4	ATD2AH00
- Parallel	GXP1W	GA240	GXP1W	GA241	–	–	–	–
- CANopen®	GXP5W	GXU5W	GXP5W	GXU5W	GXP5S	–	G0P5H	–
- DeviceNet	GXP8W	–	GXP8W	–	–	–	–	–

Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical		Optical		Optical		Optical	
Size (housing)	ø58 mm		ø58 mm		ø58 mm		ø58 mm	
Voltage supply	10...30 VDC		10...30 VDC		10...30 VDC		10...30 VDC	
Shaft type								
- Solid shaft	ø10 mm		ø6 mm		–		–	
- Blind hollow shaft	–		–		ø12-14 mm		–	
- Through hollow shaft	–		–		–		ø12-14 mm	
Connection	Flange connector M12, M23, M27, D-SUB or cable (depending on product and variant)							
Resolution[1)]	≤29 bit	≤13 bit	≤29 bit	≤13 bit	≤29 bit	≤13 bit	≤29 bit	≤14 bit
Steps per turn	≤8192/13 bit		≤8192/13 bit		≤8192/13 bit		≤8192/13 bit	≤16384/14 bit
Number of turn	≤65536/16 bit	–	≤65536/16 bit	–	≤65536/16 bit	–	≤65536/16 bit	–
Absolute accuracy	±0.025°		±0.025°		±0.025°		±0.025°	
Protection	IP 65		IP 65		IP 54		IP 54	
Operating temperature	-25...+85 °C		-25...+85 °C		-25...+85 °C		-25...+85 °C	
Operating speed	≤6000 rpm		≤8000 rpm		≤8000 rpm		≤8000 rpm	
Max. shaft load	≤20 N axial, ≤40 N radial		≤20 N axial, ≤40 N radial		–		–	
Options	Operating temperature -40...+85 °C Stainless steel, Offshore		Operating temperature -40...+85 °C		Operating temperature -40...+85 °C		Operating temperature -40...+85 °C Protection IP 65	

Absolute encoders
Precise optical sensing

Size 58 mm.
Integrated interface.

- High resolution up to 18 bit per turn
- High accuracy ±0.01°
- Operating temperature max. -40 °C
- Additional incremental signals

HighRes – up to 18 bit singleturn resolution




Features	■ Solid shaft with clamping flange ■ High resolution		■ Solid shaft with synchro flange ■ High resolution		■ Blind hollow shaft ■ High resolution		■ Through hollow shaft ■ High resolution	
Interface	Product family							
- SSI or (SSI / incremental)	GBM2W	GBA2W	GBM2W	GBA2W	GBM2S	GBA2S	GBM2H	GBA2H
- RS485	GBM7W[2)]	–	GBM7W[2)]	–	GBM7S[2)]	–	–	–
- CANopen®	GBP5W	GBU5W	GBP5W	GBU5W	GBP5S	–	GBP5H	–
- EtherCAT / PoE	ATD 2B B14	–	ATD 2B B14	–	ATD 2B A4	–	ATD 4B A4	–
- BiSS-C	GBPAW	GBUAW	GBPAW	GBUAW	GBPAS	GBUAS	GBPAH	GBUAH

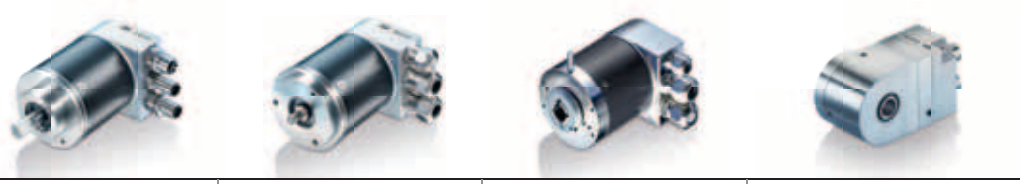
Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical		Optical		Optical		Optical	
Size (housing)	ø58 mm		ø58 mm		ø58 mm		ø58 mm	
Voltage supply	10...30 VDC		10...30 VDC		10...30 VDC		10...30 VDC	
Shaft type								
- Solid shaft	ø10 mm		ø6 mm		–		–	
- Blind hollow shaft	–		–		ø12-14 mm		–	
- Through hollow shaft	–		–		–		ø12-14 mm	
Connection	Flange connector M12, M23, D-SUB or cable (depending on product and variant)							
Resolution[1)]	≤32 bit	≤18 bit	≤32 bit	≤18 bit	≤32 bit	≤18 bit	≤32 bit	≤18 bit
Steps per turn	≤262144/18 bit		≤262144/18 bit		≤262144/18 bit		≤262144/18 bit	
Number of turn	≤16384/14 bit	–	≤16384/14 bit	–	≤16384/14 bit	–	≤16384/14 bit	–
Absolute accuracy	±0.01°		±0.01°		±0.025°...±0.01°		±0.025°	
Protection	IP 65		IP 65		IP 54 (IP 65 optional)		IP 54	
Operating temperature	-25...+85 °C		-25...+85 °C		-25...+85 °C		-25...+85 °C	
Operating speed	≤6000 rpm		≤8000 rpm		≤8000 rpm		≤8000 rpm	
Max. shaft load	≤20 N axial, ≤40 N radial		≤20 N axial, ≤40 N radial		–		–	
Options	Operating temperature -40...+85 °C		Operating temperature -40...+85 °C		Operating temperature -40...+85 °C		Operating temperature -40...+85 °C	

1) depending on interface
2) on request

Absolute encoders
Precise optical sensing

Size 58 mm.
Modular bus cover.

- Resolution up to 14 bit per turn
- High accuracy ±0.025°
- Operating temperature down to -40 °C
- Additional incremental signals



Features	■ Solid shaft with clamping flange		■ Solid shaft with synchro flange		■ Blind hollow shaft		■ Through hollow shaft	
Product family	**GXMMW**	**GXAMW**	**GXMMW**	**GXAMW**	**GXMMS**	**GXAMS**	**G0MMH**	**G0AMH**
Interface								
- SSI	■		■		■		–	
- CANopen®	■		■		■		■	
- DeviceNet	■		■		■		■	
- Profibus-DP	■		■		■		■	
- SAEJ1939	■		■		■		–	
- EtherCAT / PoE	■		■		■		–	
- EtherNet/IP	■		■		■		■	
- Powerlink	■		■		■		–	
- Profinet	■		■		■		■	
Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical		Optical		Optical		Optical	
Size (housing)	ø58 mm		ø58 mm		ø58 mm		ø58 mm	
Voltage supply	10...30 VDC		10...30 VDC		10...30 VDC		10...30 VDC	
Shaft type								
- Solid shaft	ø10 mm		ø6 mm		–		–	
- Blind hollow shaft	–		–		ø12-14 mm		–	
- Through hollow shaft	–		–		–		ø12-14 mm	
Connection	Bus cover with M12 or cable gland (depending on product and variant)							
Resolution	≤29 bit	≤13 bit	≤29 bit	≤13 bit	≤29 bit	≤13 bit	≤29 bit	≤13 bit
Steps per turn	≤8192/13 bit		≤8192/13 bit		≤8192/13 bit		≤8192/13 bit	
Number of turn	≤65536/16 bit	–	≤65536/16 bit	–	≤65536/16 bit	–	≤65536/16 bit	–
Absolute accuracy	±0.025°		±0.025°		±0.025°		±0.025°	
Protection	IP 54, IP 65		IP 54, IP 65		IP 54, IP 65		IP 54	
Operating speed	≤6000 rpm		≤6000 rpm		≤6000 rpm		≤6000 rpm	
Operating temperature	-25...+85 °C		-25...+85 °C		-25...+85 °C		-25...+85 °C	
Max. shaft load	≤20 N axial, ≤40 N radial		≤20 N axial, ≤40 N radial		–		–	
Options	Incremental outputs Stainless steel variant Operating temperature -40...+85 °C		Incremental outputs Stainless steel variant Operating temperature -40...+85 °C		Incremental outputs Stainless steel variant Operating temperature -40...+85 °C		Protection IP 69K Stainless steel variant Operating temperature -40...+85 °C	

Absolute encoders
Precise optical sensing

Size 58 mm.
Modular bus cover.

- High resolution up to 18 bit per turn
- High accuracy ±0.01°
- Operating temperature down to -40 °C
- Additional incremental signals

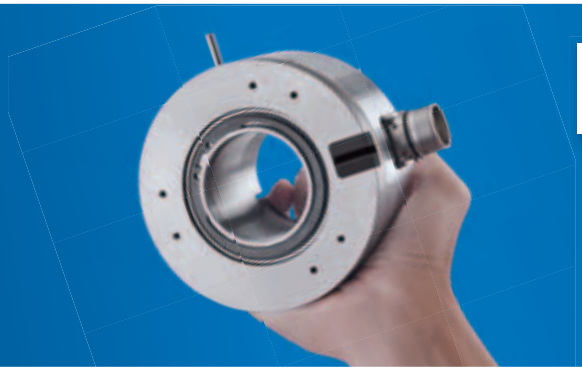
HighRes – up to 18 bit singleturn resolution




Features	■ Solid shaft with clamping flange ■ High resolution		■ Solid shaft with synchro flange ■ High resolution		■ Blind hollow shaft ■ High resolution		■ Through hollow shaft ■ High resolution	
Product family	**GBMMW**	**GBAMW**	**GBMMW**	**GBAMW**	**GBMMS**	**GBAMS**	**GBMMH**	**GBAMH**
Interface								
- SSI	■		■		■		–	
- CANopen®	■		■		■		■	
- DeviceNet	■		■		■		■	
- Profibus-DP	■		■		■		■	
- SAEJ1939	■		■		■		–	
- EtherCAT / PoE	■		■		■		–	
- EtherNet/IP	■		■		■		■	
- Powerlink	■		■		■		–	
- Profinet	■		■		■		■	
Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical		Optical		Optical		Optical	
Size (housing)	ø58 mm		ø58 mm		ø58 mm		ø58 mm	
Voltage supply	10...30 VDC		10...30 VDC		10...30 VDC		10...30 VDC	
Shaft type								
- Solid shaft	ø10 mm		ø6 mm		–		–	
- Blind hollow shaft	–		–		ø12-14 mm		–	
- Through hollow shaft	–		–		–		ø12-14 mm	
Connection	Bus cover with M12 or cable gland (depending on product and variant)							
Resolution	≤31 bit	≤18 bit	≤31 bit	≤18 bit	≤31 bit	≤18 bit	≤31 bit	≤18 bit
Steps per turn	≤262144/18 bit		≤262144/18 bit		≤262144/18 bit		≤262144/18 bit	
Number of turn	≤8192/13 bit	–	≤8192/13 bit	–	≤8192/13 bit	–	≤8192/13 bit	–
Absolute accuracy	±0.01°		±0.01°		±0.01°		±0.01°	
Protection	IP 54, IP 65		IP 54, IP 65		IP 54, IP 65		IP 54	
Operating speed	≤6000 rpm		≤6000 rpm		≤6000 rpm		≤6000 rpm	
Operating temperature	-25...+85 °C		-25...+85 °C		-25...+85 °C		-25...+85 °C	
Max. shaft load	≤20 N axial, ≤40 N radial		≤20 N axial, ≤40 N radial		–		–	
Options	Incremental outputs Operating temperature -40...+85 °C		Incremental outputs Operating temperature -40...+85 °C		Incremental outputs Operating temperature -40...+85 °C		Protection IP 69K Stainless steel variant Operating temperature -40...+85 °C	

Absolute encoders
Large hollow shafts 20...50.8 mm

Precise optical sensing.
SSI interface.
- Shallow installation depth
- Easy installation
- Wide range of accessories

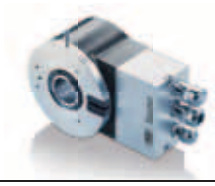
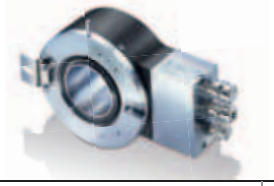


Features	■ Through hollow shaft max. ø25.4 mm ■ Integrated interface SSI	■ Through hollow shaft max. ø50.8 mm ■ Integrated interface SSI	■ Through hollow shaft max. ø27 mm ■ Integrated interface SSI and optional incremental signals
Product family	G1M2H	G2M2H	ATD 4S A4 Y10
Interface			
- SSI	■	■	■
Function principle	Multiturn	Multiturn	Singleturn / Multiturn
Sensing method	Optical	Optical	Optical
Size (housing)	ø90 mm	ø116 mm	ø80 mm
Voltage supply	10...30 VDC	10...30 VDC	10...30 VDC
Shaft type			
- Through hollow shaft	ø25.4 mm	ø50.8 mm	ø20...27 mm
Connection	Flange connector M23	Flange connector M23	Flange connector M23
Resolution	≤25 bit	≤25 bit	≤25 bit
Steps per turn	≤8192/13 bit	≤8192/13 bit	≤8192/13 bit
Number of turn	≤4096/12 bit	≤4096/12 bit	≤4096/12 bit
Absolute accuracy	±0.025°	±0.025°	±0,02°
Operating temperature	-25...+85 °C	-25...+85 °C	-20...+85 °C
Protection	IP 54	IP 54	IP 65
Operating speed	≤3800 rpm	≤2000 rpm	≤5000 rpm
Options	Operating temperature -40...+85 °C Protection IP 65	Operating temperature -40...+85 °C Protection IP 65	Incremental signals: HTL, TTL, or sine Resolution: Steps per turn max. 15 bit Number of turn max. 24 bit

Absolute encoders
Large hollow shaft 20...50.8 mm

Precise optical sensing.
Realtime Ethernet and fieldbus.

- Shallow installation depth
- Easy installation
- Wide range of accessories


Features	■ Through hollow shaft max. ø25.4 mm ■ Modular bus cover	■ Through hollow shaft max. ø50.8 mm ■ Modular bus cover	■ Through hollow shaft max. ø27 mm ■ Integrated interface EtherCAT
Product family	G1MMH	G2MMH	ATD 4B A4 Y11
Interface			
- CANopen®	■	■	–
- DeviceNet	■	■	–
- Profibus-DP	■	■	–
- EtherCAT	–	–	■
Function principle	Multiturn	Multiturn	Multiturn
Sensing method	Optical	Optical	Optical
Size (housing)	ø90 mm	ø116 mm	ø80 mm
Voltage supply	10...30 VDC	10...30 VDC	10...30 VDC
Shaft type			
- Through hollow shaft	ø25.4 mm	ø50.8 mm	ø20...27 mm
Connection	Bus cover with M12 or cable gland (depending on product and variant)		
Resolution	≤29 bit	≤29 bit	≤29 bit
Steps per turn	≤8192/13 bit	≤8192/13 bit	≤131072/17 bit
Number of turn	≤65536/16 bit	≤65536/16 bit	≤65536/16 bit
Absolute accuracy	±0.025°	±0.025°	±0.02°
Operating temperature	-25...+85 °C	-25...+85 °C	-20...+85 °C
Protection	IP 54	IP 54	IP 65
Operating speed	≤3800 rpm	≤2000 rpm	≤5000 rpm
Configurable parameters	Steps per turn Number of turn Rotational direction Preset	Steps per turn Number of turn Rotational direction Preset	Steps per turn Number of turn Rotational direction Operating modes
Options	Operating temperature -40...+85 °C Protection IP 65	Operating temperature -40...+85 °C Protection IP 65	–

Tough where it's rough. Precise during operation.

Incremental encoder
HOG 10 with blind
hollow shaft

HeavyDuty encoders, speed switches, tachogenerators and combinations.

For decades, Baumer HeavyDuty encoders have been proving unrivalled reliability under most adverse conditions. Whether at gantry cranes, vertical lift bridges, steel plants or windpower stations – these encoders are extremely robust, failsafe and durable. Product combinations merging several sensing methods or twin encoders can take over specific tasks and safety functions.
In drive applications where besides the speed information additional control signals are required, HeavyDuty product combinations of encoders, tachogenerators and speed switches will provide you with the decisive impulse thanks to their integrated additional functions.
Durable and reliable thanks to proven HeavyDuty technology.

- Solid aluminium or stainless steel housing
- Dual bearings
- HeavyDuty connection technology
- Isolated against shaft currents
- Explosion protection against gases and dust
- Protected against sea and tropical climate

HÜBNER BERLIN
A Baumer Brand

Baumer Hübner

Hübner Berlin, now Baumer Hübner, is the Baumer Group competence center for HeavyDuty sensors particularly conceived for drive engingeering. We have been world-leading in this industry for more than 50 years, setting new benchmarks for reliable encoders, tachogenerators and speed switches in HeavyDuty technology. Our unrivalled resilient products are optimized to match your individual application and merge longtime branch expertise with cutting-edge technology. For dependable operation you can always rely on.

HeavyDuty
Incremental encoders

Size 58...120 mm.
Solid shaft from ø6...11 mm.

- Precision signals in drive engineering
- Robust electrical and mechanical design
- EURO flange B10
- Redundant sensing
- Integrated function monitoring EMS

HÜBNER BERLIN
A Baumer Brand

HTL TTL




Features	■ Solid shaft with synchro flange	■ Solid shaft with EURO flange B10 ■ Shallow installation depth	■ Solid shaft with EURO flange B10 ■ Max. 2500 pulses per revolution	■ Solid shaft with EURO flange B10 ■ High protection
Product family	OG 71	OG 9	POG 9	POG 10
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø58 mm	ø115 mm	ø115 mm	ø115 mm
Voltage supply	5 VDC ±5 % 9...26 VDC	5 VDC ±5 % 9...26 VDC / 9...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	–	–	–
- HTL-P/Power Linedriver	–	■	■	■
- LWL/fiber-optic interface	–	■	■	■
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted
Shaft type				
- Solid shaft	ø6 mm	ø11 mm	ø11 mm	ø11 mm
Flange	Synchro flange	EURO flange B10	EURO flange B10	EURO flange B10
Connection	Terminals	Terminal box	Terminal box	Terminal box, rotatable
Pulses per revolution	100...1024	1...1250	300...2500	300...2500
Operating temperature	-20...+85 °C	-30...+100 °C	-30...+100 °C	-40...+100 °C -50...+100 °C (optional)
Protection	IP 66	IP 55	IP 56	IP 66, IP 67
Operating speed	≤10 000 rpm	≤12 000 rpm	≤12 000 rpm	≤12 000 rpm
Max. shaft load	≤30 N axial, ≤40 N radial	≤250 N axial, ≤450 N radial	≤250 N axial, ≤450 N radial	≤300 N axial, ≤450 N radial
Explosion protection	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)
Options	–	Redundant output	Function monitoring EMS Dual shaft	Function monitoring EMS Redundant sensing Dual shaft

HTL/TTL

To ensure optimum HTL or TTL signal quality via RS422 even at extended cable length we deploy short circuit proof power drivers with max. 300 mA peak current. The high-current power drivers HTL-P are fully compatible to HTL/push-pull and allow for long-distance lines up to 350 m.

Incremental encoders

Unrivalled longevity and reliability thanks to proven HeavyDuty technology.

- Solid aluminium or stainless steel housing
- Dual bearings
- Explosion protection against gases and dust
- HeavyDuty connection technology
- Isolated against shaft currents
- Protected against sea and tropical climate

Features	■ Solid shaft with EURO flange B10 ■ Offshore & seawater resistant	■ Solid shaft with EURO flange B10 ■ Max. 5000 pulses per revolution	■ Solid shaft with EURO flange B10 ■ IECEx certification
Product family	**POG 11**	**POG 90**	**EEx OG 9**
Sensing method	Optical	Optical	Optical
Size (housing)	ø115 mm	ø105 mm	ø120 mm
Voltage supply	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC
Output stage			
- TTL/RS422	■	■	■
- HTL/push-pull	■	■	■
- HTL-P/Power Linedriver	■	–	■
- LWL/fiber-optic interface	■	■	–
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted
Shaft type			
- Solid shaft	ø11 mm	ø11 mm	ø11 mm
Flange	EURO flange B10	EURO flange B10	EURO flange B10
Connection	Terminal box, rotatable	Terminal box, rotatable	Terminal box, rotatable
Pulses per revolution	300...2500	720...5000	1...5000
Operating temperature	-40...+100 °C -50...+100 °C (optional)	-20...+85 °C	-20...+55 °C
Protection	IP 66, IP 67	IP 66, IP 67	IP 56
Operating speed	≤12 000 rpm	≤12 000 rpm	≤6000 rpm
Max. shaft load	≤300 N axial, ≤450 N radial	≤300 N axial, ≤450 N radial	≤200 N axial, ≤350 N radial
Explosion protection	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 2G (ATEX/IECEx)
Options	Function monitoring EMS Redundant sensing Dual shaft	Function monitoring EMS Dual shaft SinCos outputs Redundant sensing	SinCos outputs Redundant sensing

EURO flange B10

EURO flange B10 is the world-wide mounting standard for HeavyDuty shaft encoders.

HeavyDuty
Incremental encoders

Size 60...158 mm.
Hollow shaft ø12...38 mm.

- Precision signals in drive engineering
- Robust electrical and mechanical design
- Redundant sensing
- Integrated function monitoring EMS

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HTL TTL




Features	■ Blind hollow shaft ■ High shock and vibration resistance	■ Cone shaft or through hollow shaft	■ Cone shaft or blind hollow shaft ■ Rotatable terminal box	■ Cone shaft or blind hollow shaft ■ Rotatable terminal box ■ Fiber-optic interface
Product family	HOG 71	HOG 75	HOG 86	HOG 86L
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø60 mm	ø75 mm	ø99 mm	ø99 mm
Voltage supply	5 VDC ±5 % 9...26 VDC	5 VDC ±5 % 9...26 VDC	5 VDC ±5 % 9...30 VDC	9...30 VDC
Output stage				
- TTL/RS422	■	■	■	–
- HTL/push-pull	■	■	–	–
- HTL-P/Power Linedriver	–	–	■	■
- LWL/fiber-optic interface	–	–	–	■
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted
Shaft type				
- Cone shaft 1:10	–	ø17 mm	ø17 mm	ø17 mm
- Blind hollow shaft	ø12...14 mm	–	ø12...16 mm	ø12...16 mm
- Through hollow shaft	–	ø12...26 mm	–	–
Connection	Terminals	Terminals	Terminal box, rotatable, flange connector M23 or cable	Terminal box, rotatable with ST connector, glass-fiber Multimode
Pulses per revolution	64...2048	250...2500	500...2500	250...2500
Operating temperature	-20...+85 °C	-30...+85 °C	-40...+100 °C	-20...+70 °C
Protection	IP 66	IP 65	IP 66, IP 67	IP 66, IP 67
Operating speed	≤10 000 rpm	≤10 000 rpm	≤10 000 rpm	≤10 000 rpm
Max. shaft load	≤30 N axial, ≤40 N radial	≤80 N axial, ≤150 N radial	≤350 N axial, ≤450 N radial	≤350 N axial, ≤450 N radial
Explosion protection	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)
Options	–	Hybrid bearings	Function monitoring EMS Hybrid bearings Redundant sensing	Function monitoring EMS Hybrid bearings Redundant sensing

Redundant sensing

Encoders with two sensing units for redundant signal acquisition ensure ever-present availability in demanding applications.

Fiber-optic transmission

Encoders with fiber-optic interface (LWL) provide top-grade signal quality in long-distance transmission, particularly in EMC-critical environments.

Incremental encoders

50 years of HeavyDuty expertise brought into being encoder platform HOG 86, a complete product family with outstanding flexibility in selection and mounting options.

Features	■ Cone shaft or blind hollow shaft ■ Hybrid bearings as standard	■ Cone shaft or blind hollow shaft ■ 10 000 ppr ■ Hybrid bearings as standard	■ Cone shaft or blind hollow shaft ■ Offshore & seawater resistant ■ Hybrid bearings as standard	■ Through hollow shaft max. ø38 mm
Product family	HOG 9	HOG 10 | HOG 100	HOG 11	HOG 16
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø97 mm	ø105 mm	ø105 mm	ø158 mm
Voltage supply	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC | 5 VDC ±5 % 9...26 VDC 9...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC
Output stage				
- TTL/RS422	■	■ | ■	■	■
- HTL/push-pull	–	– | ■	–	–
- HTL-P/Power Linedriver	■	■ | –	■	■
- LWL/fiber-optic interface	–	■ | –	■	■
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted
Shaft type				
- Cone shaft 1:10	ø17 mm	ø17 mm	ø17 mm	–
- Blind hollow shaft	ø12...16 mm	ø12...20 mm	ø12...20 mm	–
- Through hollow shaft	–	–	–	ø20...38 mm
Connection	Flange connector M23	Terminal box	Terminal box, rotatable	Terminal box, rotatable
Pulses per revolution	30...2500	300...2500 | 1024...10 000	300...2500	250...2500
Operating temperature	-30...+100 °C	-40...+100 °C | -30...+85 °C	-30...+85 °C	-20...+85 °C
Protection	IP 56	IP 66, IP 67	IP 66, IP 67	IP 66, IP 67
Operating speed	≤10 000 rpm	≤6000 rpm | ≤10 000 rpm	≤6000 rpm	≤6000 rpm
Max. shaft load	≤400 N axial, ≤500 N radial	≤450 N axial, ≤600 N radial	≤450 N axial, ≤600 N radial	≤450 N axial, ≤600 N radial
Explosion protection	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)
Options	Function monitoring EMS	Function monitoring EMS SinCos outputs Redundant sensing	Function monitoring EMS Redundant sensing DNV certification	Redundant sensing

EMS

Enhanced Monitoring System EMS in incremental encoders monitors all crucial encoder functionalities throughout the encoder's entire speed range. EMS will signal connection errors and speed up commissioning. During operation, EMS facilitates error tracking and prevents cost-intensive downtime.

HeavyDuty
Incremental encoders

Size 130...287 mm.
Hollow shaft ø16...150 mm.

- Precision signals in drive engineering
- Robust electrical and mechanical design
- Redundant sensing
- Integrated function monitoring EMS
- Hybrid bearings as standard enable 5 times the service life of conventional products

HTL TTL



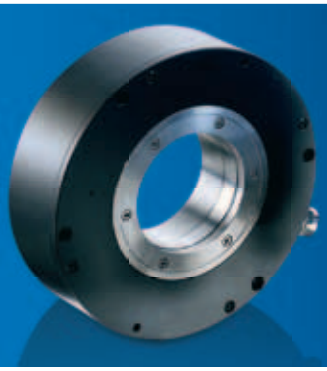

Features	■ Through hollow shaft ■ Offshore & seawater resistant	■ Through hollow shaft ■ Rotatable terminal box ■ Offshore & seawater resistant	■ Through hollow shaft ■ Rotatable terminal box ■ Offshore & seawater resistant	■ Through hollow shaft ■ Rotatable terminal box ■ Robust light metal housing
Product family	**HOG 131**	**HOG 163**	**HOG 165**	**HOG 220**
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø130 mm	ø158 mm	ø165 mm	ø227 mm
Voltage supply	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...26 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	–	–	–	–
- HTL-P/Power Linedriver	■	■	■	■
- LWL/fiber-optic interface	■	■	■	■
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted
Shaft type				
- Through hollow shaft	ø16...36 mm	ø38...75 mm	ø20...25 mm	ø80...115 mm
Connection	Terminal box	Terminal box, rotatable	Terminal box, rotatable	Terminal box, rotatable
Pulses per revolution	2048...3072	250...5000	250...5000	1024
Operating temperature	-40...+100 °C	-30...+85 °C	-30...+100 °C	-30...+85 °C
Protection	IP 56	IP 56	IP 67	IP 54
Operating speed	≤6000 rpm	≤6000 rpm	≤6000 rpm	≤3800 rpm
Max. shaft load	≤300 N axial, ≤500 N radial	≤300 N axial, ≤500 N radial	≤300 N axial, ≤500 N radial	≤450 N axial, ≤700 N radial
Explosion protection	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)
Options	Function monitoring EMS Redundant sensing	Redundant sensing	Redundant sensing	Isolated through hollow shaft Redundant sensing

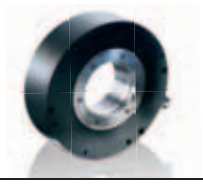
Hybrid bearings

Hybrid bearings consist of a steel race hosting high-strength ceramic balls. Hybrid bearings enable 5 times the service life of conventional steel bearings. In parallel, hybrid bearings provide high-voltage proof isolation of the encoder shaft.

Size 130...287 mm.
Hollow shaft ø16...150 mm.

- Precision signals in drive engineering
- Robust electrical and mechanical design
- Redundant sensing
- Integrated function monitoring EMS
- Hybrid bearings as standard enable 5 times the service life of conventional products





Features	■ Through hollow shaft ø120...150 mm
Product family	HOG 28

Sensing method	Optical
Size (housing)	ø287 mm
Voltage supply	5 VDC ±10 % 9...26 VDC
Output stage	
- TTL/RS422	■
- HTL/push-pull	–
- HTL-P/Power Linedriver	■
- LWL/fiber-optic interface	■
Output signals	K1, K2, K0 + inverted
Shaft type	
- Through hollow shaft	ø120...150 mm
Connection	Terminal box, mating connector M23
Pulses per revolution	1024...2048
Operating temperature	-30...+85 °C
Protection	IP 56
Operating speed	≤3600 rpm
Max. shaft load	≤250 N axial, ≤320 N radial
Explosion protection	Ex II 3G/3D (ATEX)
Options	Redundant sensing

HeavyDuty
Incremental encoders – Sine/Cosine

Size 58...168 mm.
Solid shaft ø6...11 mm, hollow shaft ø12...75 mm.
- Precise optical sensing
- Extremely high signal quality

HÜBNER BERLIN
A Baumer Brand

Low Harmonics

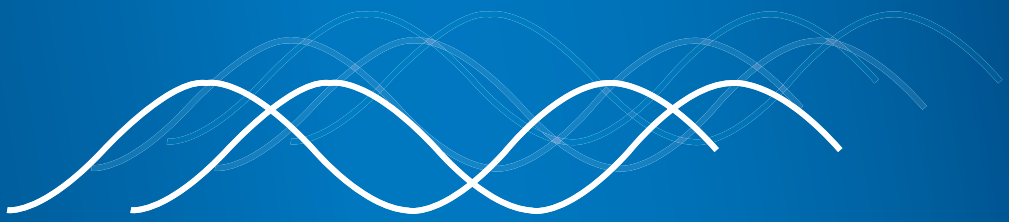



Features	■ Solid shaft with synchro flange	■ Solid shaft with EURO flange B10	■ Blind hollow shaft max. ø14 mm ■ High shock and vibration resistance	■ Cone shaft or through hollow shaft max. ø26 mm ■ Hybrid bearings as standard
Product family	OGS 71	POGS 90	HOGS 71	HOGS 75
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø58 mm	ø105 mm	ø60 mm	ø75 mm
Voltage supply	5 VDC ±10 % 9...30 VDC	5 VDC ±10 % 9...30 VDC	5 VDC ±10 % 9...26 VDC	5 VDC ±10 % 9...26 VDC
Output stage				
- SinCos 1 Vpp	■	■	■	■
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted
Shaft type				
- Solid shaft	ø6 mm	ø11 mm	–	–
- Cone shaft 1:10	–	–	–	ø17 mm
- Blind hollow shaft	–	–	ø12...14 mm	–
- Through hollow shaft	–	–	–	ø14...26 mm
Flange	Synchro flange	EURO flange B10	–	–
Connection	Terminals	Terminal box, rotatable	Terminals	Terminals
Sine waves per revolution	1024...5000	720...5000	1024...5000	1024...2048
Operating temperature	-20...+85 °C	-20...+85 °C	-20...+85 °C	-20...+70 °C
Protection	IP 66	IP 66	IP 66	IP 56
Operating speed	≤10 000 rpm	≤10 000 rpm	≤10 000 rpm	≤10 000 rpm
Max. shaft load	≤30 N axial, ≤40 N radial	≤250 N axial, ≤350 N radial	≤30 N axial, ≤40 N radial	≤80 N axial, ≤150 N radial ≤170 N axial, ≤250 N radial (cone shaft)
Explosion protection	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)
Options	–	Dual shaft	–	Cable outlet

Incremental encoders – Sine/Cosine

Size 58...168 mm.
Solid shaft ø6...11 mm, hollow shaft ø12...75 mm.

- Precise optical sensing
- Extremely high signal quality



Features	■ Cone shaft or blind hollow shaft max. ø20 mm	■ Through hollow shaft max. ø75 mm	■ Through hollow shaft max. ø70 mm
Product family	**HOGS 100**	**HOGS 14**	**HOGS 151**
Sensing method	Optical	Optical	Optical
Size (housing)	ø105 mm	ø158 mm	ø168 mm
Voltage supply	5 VDC ±10 % 9...30 VDC	5 VDC ±5 % 9...26 VDC	5 VDC ±10 % 9...26 VDC
Output stage			
- SinCos 1 Vpp	■	■	■
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	A+, B+, R+, A-, B-, R-
Shaft type			
- Cone shaft 1:10	ø17 mm	–	–
- Blind hollow shaft	ø12...20 mm	–	–
- Through hollow shaft	–	ø40...75 mm	ø60...70 mm
Connection	Terminal box, rotatable	Terminal box, rotatable	Round connector, cable
Sine waves per revolution	720...5000	1024...5000	1024...5000
Operating temperature	-20...+85 °C	-20...+85 °C	-20...+85 °C
Protection	IP 66	IP 55	IP 54
Operating speed	≤10 000 rpm	≤6300 rpm	≤6300 rpm
Max. shaft load	≤450 N axial, ≤600 N radial	≤150 N axial, ≤200 N radial	≤350 N axial, ≤500 N radial
Explosion protection	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)
Options	–	–	–

LowHarmonics

LowHarmonics is leading cutting-edge technology by generating sine signals with negligible harmonic content.
Sine encoders with *LowHarmonics* ensure improved control quality, less drive heating and higher energy efficiency.

HeavyDuty
Absolute encoders

Size 60...160 mm.
Solid shaft max. ø11 mm, hollow shaft max. ø70 mm.

- EURO flange B10
- Blind and through hollow shaft
- Precise optical multiturn sensing
- Power-autonomous *MicroGen* revolution counter

HÜBNER BERLIN
A Baumer Brand

absolute




Features	■ Solid shaft with synchro flange	■ Solid shaft with EURO flange B10 ■ Axial bus cover	■ Solid shaft with EURO flange B10 ■ Corrosion & seawater proof	■ Cone shaft or blind hollow shaft ■ Corrosion & seawater proof
Product family	**AMG 71**	**AMG 81**	**AMG 11**	**HMG 11**
Interface				
- SSI	■	■	■	■
- CANopen®	–	■	■	■
- DeviceNet	–	–	–	■
- Profibus-DP	–	■	■	■
Function principle	Singleturn / Multiturn	Singleturn / Multiturn	Singleturn / Multiturn	Singleturn / Multiturn
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø60 mm	ø115 mm	ø122 mm	ø122 mm
Voltage supply	7...30 VDC	9...30 VDC	9...30 VDC	9...30 VDC
Shaft type				
- Solid shaft	ø6 mm	ø11 mm	ø11 mm	–
- Cone shaft 1:10	–	–	–	ø17 mm
- Blind hollow shaft	–	–	–	ø16...20 mm
Flange	Synchro flange	EURO flange B10	EURO flange B10	–
Connection	Terminal cover with cable gland	Axial bus cover Mating connector M23	Bus cover Terminal box	Bus cover Terminal box
Resolution	≤29 bit	≤29 bit	≤29 bit	≤29 bit
Steps per turn	≤8192/13 bit	≤8192/13 bit	≤8192/13 bit	≤8192/13 bit
Number of turn	≤4096/12 bit ≤65 536/16 bit (Option)	≤4096/12 bit ≤65 536/16 bit	≤65 536/16 bit	≤65 536/16 bit
Protection	IP 66	IP 55	IP 66, IP 67	IP 66, IP 67
Operating temperature	-20...+85 °C	-20...+85 °C	-20...+85 °C	-20...+85 °C
Operating speed	≤5000 rpm	≤3500 rpm	≤3500 rpm	≤3500 rpm
Max. shaft load	≤50 N axial, ≤120 N radial	≤50 N axial, ≤60 N radial	≤250 N axial, ≤350 N radial	≤250 N axial, ≤400 N radial
Explosion protection	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)
Options	SinCos signal Additional incremental signals	Additional incremental signals	Redundant sensing Additional incremental signals	Redundant sensing Additional incremental signals

Absolute encoders

Robust mechanics and innovative technology – our absolute HeavyDuty encoders are not only ultra-reliable and durable but in parallel excel with unique *MicroGen* technology. *MicroGen* is completely wear-free and this way opens up new application potential.

Features	■ Through hollow shaft ■ Corrosion & seawater proof ■ Isolated bearings
Product family	HMG 161

Interface	
- SSI	■
- CANopen®	■
- DeviceNet	■
- Profibus-DP	■
Sensing method	Optical
Size (housing)	ø160 mm
Voltage supply	9...30 VDC
Shaft type	
- Solid shaft	–
- Cone shaft 1:10	–
- Through hollow shaft	ø38...70 mm
Flange	–
Connection	Bus cover Terminal box
Resolution	≤29 bit
Steps per turn	≤8192/13 bit
Number of turn	≤65 536/16 bit
Protection	IP 56
Operating temperature	-20...+85 °C
Operating speed	≤3500 rpm
Max. shaft load	≤350 N axial, ≤500 N radial
Explosion protection	Ex II 3G/3D (ATEX)
Options	Additional incremental signals Isolated bearings

MicroGen

Patented revolution counter *MicroGen* is the heartbeat in the next generation of gearless absolute multiturn encoders without battery. *MicroGen* uses the motion of the encoder shaft for autonomous engergy generation.
MicroGen excels with outstanding robustness and a simplified design, is free from wear and immune to magnetic fields throughout a wide temperature range.

HeavyDuty
Speed switches

Mechanical and electronic speed switches.

- Mechanical centrifugal switches without auxiliary power supply
- Electronic speed switches, up to three outputs
- Solid shaft
- EURO flange B10

HÜBNER BERLIN
A Baumer Brand




Features	■ Mechanical centrifugal switch ■ Operating temperature max. +130 °C	■ Electronic speed switch ■ Max. 6000 rpm	■ Electronic speed switch ■ 3 outputs	■ Electronic speed switch
Product family	FS90	ES90	ES93	ES100
Voltage supply	–	–	–	–
Switching outputs	1 output, speed-controlled	1 output, speed-controlled	3 outputs, speed-controlled	1 output, speed-controlled
Output switching capacity	≤6 A / 230 VAC ≤1 A / 125 VDC	≤6 A / 250 VAC ≤1 A / 48 VDC	–	≤6 A / 250 VAC ≤1 A / 48 VDC
Minimum switching current	50 mA	100 mA	40 mA	100 mA
Size (housing)	ø87 mm	ø103 / 105 mm	ø103 / 105 mm	ø105 mm
Shaft type				
- Solid shaft	ø11 mm	ø11 mm	ø11 mm	ø11 mm
Flange	EURO flange B10	EURO flange B10	EURO flange B10	EURO flange B10
Connection	Terminal box	Terminal box	Terminal box	Terminal box
Operating temperature	-30...+130 °C	-20...+85 °C	-20...+85 °C	-20...+85 °C
Protection	IP 55	IP 55	IP 55	IP 55
Operating speed (n)	≤1.25 x ns	≤6000 rpm	≤5000 rpm	≤500 rpm
Switching speed range (ns)	850...4900 rpm	650...6000 rpm	200...5000 rpm	110...500 rpm
Max. shaft load	≤150 N axial, ≤250 N radial	≤150 N axial, ≤250 N radial	≤150 N axial, ≤250 N radial	≤150 N axial, ≤250 N radial
Options	Product combination with encoder or tachogenerator	Product combination with encoder or tachogenerator	Product combination with encoder or tachogenerator	Product combination with encoder or tachogenerator

Digital speed switch as stand-alone product.

- HTL/TTL signal evaluation
- Integrated speed display
- Robust housing for surface mount

Features	■ Configurable speed monitoring ■ Housing box ■ With speed display
Product family	DS93

Voltage supply	15...26 VDC
Switching outputs	3 outputs, speed-controlled
Output switching capacity	12 V High: ns 0 V Low: n≥ns ≤40 mA
Minimum switching current	50 mA
Size (housing)	122 x 122 x 80 mm
Connection	Terminals with cable gland
Operating temperature	-20...+70 °C
Protection	IP 65
Switching speed range (ns)	≤20 000 rpm
Options	Relay module with three floating relay contacts

SAFETY

Besides the encoder itself, mechanical or electronic *SAFETY* speed switches can perform decisive safety-relevant functions at excess or insufficient speed. For applications in the field of functional safety, Baumer offers sensors approved by the German Technical Inspection Agency (TÜV). The portfolio is subject to continuous expansion.

HeavyDuty
Speed switches

Incremental encoders with digital speed switch.

- Encoder-integrated for a space-saving solution
- Fully configurable switch on/off speed
- Up to three switching outputs

HÜBNER BERLIN
A Baumer Brand

SAFETY




Features	■ Blind hollow shaft ■ 2 switching outputs	■ Blind hollow shaft ■ 3 switching outputs	■ Through hollow shaft ■ 2 switching outputs	■ Through hollow shaft ■ 3 switching outputs
Product family	**HOG 10+DSL.E**	**HOG 10+DSL.R**	**HOG 165+DSL.E**	**HOG 165+DSL.R**
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø105 mm	ø105 mm	ø165 mm	ø165 mm
Voltage supply	9...30 VDC	15...30 VDC	9...30 VDC	15...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Shaft type				
- Blind hollow shaft	ø16 mm	ø16 mm	–	–
- Through hollow shaft	–	–	ø25 mm	ø25 mm
Connection	Terminal box	Terminal box	Terminal box	Terminal box
Pulses per revolution	512...2500	512...2500	512...4096	512...4096
Operating temperature	-30...+85 °C	-30...+85 °C	-30...+85 °C	-30...+85 °C
Protection	IP 66, IP 67	IP 66, IP 67	IP 66, IP 67	IP 66, IP 67
Operating speed (n)	≤6000 rpm	≤6000 rpm	≤6000 rpm	≤6000 rpm
Switching speed range (ns)	3...6000 rpm	3...6000 rpm	3...6000 rpm	3...6000 rpm
Max. shaft load	≤250 N axial, ≤450 N radial	≤250 N axial, ≤450 N radial	≤150 N axial, ≤200 N radial	≤150 N axial, ≤200 N radial
Switching outputs	2 outputs, speed-controlled, 1 control output transistor output	3 outputs, speed-controlled transistor outputs	2 outputs, speed-controlled, 1 control output transistor output	3 outputs, speed-controlled transistor outputs
Output switching capacity	5...230 VAC/VDC 5...250 mA	12 V high: ns 0 V low: n≥ns ≤40 mA	5...230 VAC/VDC 5...250 mA	12 V high: ns 0 V low: n≥ns ≤40 mA
Explosion protection	ATEX II 3G/3D	ATEX II 3G/3D	ATEX II 3G/3D	ATEX II 3G/3D
Options	–	Relay module DS 93 R	–	Relay module DS 93 R

Incremental encoders with digital speed switch.

- Encoder-integrated for a space-saving solution
- Fully configurable switch on/off speed
- Up to three switching outputs

Configurable by PC software

Features	■ Solid shaft with EURO flange B10 ■ 2 switching outputs	■ Solid shaft with EURO flange B10 ■ 3 switching outputs
Product family	POG 10+DSL.E	POG 10+DSL.R
Sensing method	Optical	Optical
Size (housing)	ø120 mm	ø120 mm
Voltage supply	15...26 VDC	15...26 VDC
Output stage		
- TTL/RS422	■	■
- HTL/push-pull	■	■
Shaft type		
- Solid shaft	ø11 mm	ø11 mm
Flange	EURO flange B10	EURO flange B10
Connection	Terminal box	Terminal box
Pulses per revolution	512...2500	512...2500
Operating temperature	-30...+85 °C	-30...+85 °C
Protection	IP 66, IP 67	IP 66, IP 67
Operating speed (n)	≤6000 rpm	≤6000 rpm
Switching speed range (ns)	3...6000 rpm	3...6000 rpm
Max. shaft load	≤300 N axial, ≤450 N radial	≤300 N axial, ≤450 N radial
Switching outputs	2 outputs, speed-controlled, 1 control output transistor output	3 outputs, speed-controlled transistor outputs
Output switching capacity	5...230 VAC/VDC 5...250 mA	12 V high: ns 0 V low: n≥ns ≤40 mA
Explosion protection	ATEX II 3G/3D	ATEX II 3G/3D
Options	–	Relay module DS 93 R

HeavyDuty
Tachogenerators

Solid shaft and EURO flange B10.
Idle voltage up to 200 mV/rpm.

- Ultimate lifetime thanks to *LongLife* commutator with embedded silver track
- Real-time acquisition of speed and rotational direction
- Operating temperature max. +130 °C

HÜBNER BERLIN
A Baumer Brand

LongLife




Features	■ Solid shaft with EURO flange B10		■ Solid shaft with EURO flange B10 ■ Redundant output (TDPZ)		■ Solid shaft with EURO flange B10 ■ Redundant output (TDPZ)		■ Solid shaft with EURO flange B10 ■ Redundant output (TDPZ)	
Product family	**GTF 7.08**	**GTF 7.16**	**TDP 0.09**	**TDPZ 0.09**	**TDP 0.2**	**TDPZ 0.2**	**TDP 13**	**TDPZ 13**
Voltage supply	No		No		No		No	
Size (housing)	ø115 mm		ø85 mm		ø115 mm		ø115...175 mm	
Shaft type								
- Solid shaft	ø11 mm		ø6 mm		ø7...14 mm		ø14...18 mm	
Flange	EURO flange B10		EURO flange B10		EURO flange B10		EURO flange B10	
Idle voltage	10...60 mV rpm		10...60 mV rpm		10...150 mV rpm	20...100 mV rpm	10...200 mV rpm	
Performance								
- Speed ≥5000 rpm	0.3 W	0.6 W	–	–	–	–	–	–
- Speed ≥3000 rpm	–	–	1.2 W	2 x 0.3 W	12 W	2 x 0.3 W	–	–
- Speed ≥2000 rpm	–	–	–	–	–	–	40 W	2 x 0.2 W
Rotor moment of inertia	0.4 kgcm²	0.6 kgcm²	0.25 kgcm²	0.29 kgcm²	1.1 kgcm²	1.2 kgcm²	0.4 kgcm²	0.2 kgcm²
Connection	Screw terminals		Terminal box		Terminal box		Terminal box	
Operating temperature	-30...+130 °C		-30...+130 °C		-30...+130 °C		-30...+130 °C	
Protection	IP 56		IP 56		IP 55, IP 56 (optional)		IP 55	
Operating speed	≤9000 rpm		≤10 000 rpm		≤10 000 rpm		≤6000 rpm	
Options	–		–		Sea/tropical climate protection Dual shaft		–	

HeavyDuty
Tachogenerators

Analog tachogenerators by Baumer stand out by ultra-accurate conversion of tacho voltage throughout the entire speed range. *LongLife* transmission technology contributes a major share.

Features	■ Solid shaft with EURO flange B10 ■ Ex-approved	■ Solid shaft with EURO flange B10 ■ Redundant output (TDPZ)
Product family	EEx GP 0.2	TG74
Voltage supply	No	No
Size (housing)	ø90 mm	ø90 mm
Shaft type		
- Solid shaft	ø11 mm	ø14 mm
Flange	EURO flange B10	EURO flange B10
Idle voltage	20...150 mV rpm	20...150 mV rpm
Performance		
- Speed ≥5000 rpm	12 W	12 W
- Speed ≥3000 rpm	–	–
- Speed ≥2000 rpm	–	–
Rotor moment of inertia	1.15 kgcm²	1.15 kgcm²
Connection	Screw terminals	Screw terminals
Operating temperature	-20...+55 °C	-20...+55 °C
Explosion protection	ATEX II 2G Ex de IIC T6 Gb	–
Protection	IP 54	IP 54
Operating speed	≤8000 rpm	≤8000 rpm
Options	–	–

LongLife

LongLife technology in HeavyDuty tachogenerators is based on a commutator-embedded silver track which reduces wear virtually to zero. *LongLife* tachogenerators combine very high signal quality for optimum dynamic control with outstanding resilience and unrivalled longevity.

HeavyDuty
Tachogenerators

Bearingless hollow shaft designs.
Idle voltage up to 60 mV/rpm.

- Ultimate longevity thanks to *LongLife* commutator with embedded silver track
- Operating temperature max. +130 °C
- Very high accuracy throughout the entire speed range

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A Baumer Brand

LongLife




Features	■ Tachogenerator ■ Bearingless ■ Blind hollow shaft	■ Tachogenerator ■ Bearingless ■ Blind hollow shaft	■ Tachogenerator ■ Bearingless ■ Blind hollow shaft	■ Tachogenerator ■ Bearingless ■ Blind hollow shaft
Product family	GT 5	GT 7.08 | GT 7.16	GT 9	GTB 9.06 | GTB 9.16
Voltage supply	No	No	No	No
Size (housing)	ø52 mm	ø85 mm	ø89 mm	ø95 mm
Shaft type				
- Cone shaft 1:10	–	–	ø17 mm	ø17 mm
- Blind hollow shaft	ø8...12 mm	ø12...16 mm	ø7...14 mm	ø12...16 mm
Idle voltage	7...10 mV rpm	10...60 mV rpm	10...20 mV rpm	10...20 mV rpm | 16...60 mV rpm
Performance				
- Speed ≥5000 rpm	0.075 W	0.3 W | 0.6 W	0.3 W	0.3 W
Rotor moment of inertia	0.05 kgcm²	0.4 kgcm² | 0.55 kgcm²	0.95 kgcm²	0.95 kgcm²
Connection	Plug-in terminals	Screw terminals	Plug-in terminals	Connector
Operating temperature	-30...+130 °C	-30...+130 °C	-30...+130 °C	-30...+130 °C
Protection	IP 00	IP 55	IP 00	IP 68
Operating speed	≤10 000 rpm	≤9000 rpm	≤9000 rpm	≤9000 rpm
Options	–	Protection IP 44 with Protective cover	Protection IP 44 with Protective cover	–

Tachogenerators & Resolver

Resolvers.

Resolvers are the classical feedback systems for harsh environments and also very robust against mechanical impact.

- Encoder-compatible
- Operating temperature max. 100 °C
- Precision analog signals




Features	■ Tachogenerator ■ Bearingless ■ Blind hollow shaft	■ Tachogenerator ■ Blind hollow shaft	■ Resolver ■ Solid shaft with synchro flange	■ Resolver ■ Blind hollow shaft
Product family	**GTR 9**	**KTD 4**	**RTD 1 B14 Y1**	**RTD 4 A4 Y2**
Voltage supply/frequency	No	No	7 Vms / 10 kHz	7 Vms / 10 kHz
Size (housing)	ø95 mm	ø86 mm	ø58 mm	ø80 mm
Shaft type				
- Solid shaft	–	–	ø6 mm	–
- Blind hollow shaft	ø16 mm	ø10...16 mm	–	ø10...16 mm
Idle voltage	20...60 mV rpm	10...60 mV rpm	–	–
Performance				
- Speed ≥5000 rpm	0.9 W	–	–	–
Rotor moment of inertia	1.95 kgcm²	600 kgcm²	≤0.01 Nm (+20 °C)	≤0.015 Nm (+20 °C)
Connection	Connector	Cable, radial	Connector M23	Connector M23
Operating temperature	-30...+130 °C	-15...+100 °C	-20...+100 °C	-40...+100 °C
Protection	IP 56	IP 54	IP 65	IP 65
Operating speed	≤9000 rpm	≤6000 rpm	≤10 000 rpm	≤8000 rpm
Options	–	–	–	–

HeavyDuty
Combinations

Incremental twin encoders.
Blind or cone shaft.

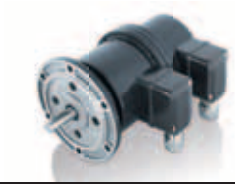
- Two encoders on a common shaft
- Redundant sensing systems with galvanic isolation
- Several output signal options
- Integrated function monitoring EMS

HÜBNER BERLIN
A Baumer Brand

Features	■ Cone shaft or blind hollow shaft	■ Cone shaft or blind hollow shaft	■ Cone shaft or blind hollow shaft ■ Offshore & seawater resistant
Product family	HOG 9 G	HOG 10 G	HOG 11 G
Sensing method	Optical	Optical	Optical
Size (housing)	ø97 mm	ø105 mm	ø105 mm
Voltage supply	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC
Output stage			
- TTL/RS422	■	■	■
- HTL/push-pull	■	■	■
Shaft type			
- Cone shaft	ø17 mm	ø17 mm	ø17 mm
- Blind hollow shaft	ø16 mm	ø12...20 mm	ø12...20 mm
Connection	Flange connector M23	Terminal box	Terminal box
Pulses per revolution	300...2500	300...2500	300...2500
Operating temperature	-30...+100 °C	-40...+100 °C	-40...+100 °C
Protection	IP 56	IP 66	IP 67
Operating speed	≤10 000 rpm	≤6000 rpm	≤6000 rpm
Max. shaft load	≤200 N axial, ≤300 N radial	≤250 N axial, ≤400 N radial	≤250 N axial, ≤400 N radial
Explosion protection	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)
Options	–	Redundant sensing system, two terminal boxes each	Redundant sensing system, two terminal boxes each

Incremental twin encoders.
Solid shaft with EURO flange B10.

- Two encoders share a common shaft
- Redundant sensing systems with galvanic isolation
- Several output signal options
- Integrated function monitoring EMS



Features	■ Solid shaft with EURO flange B10	■ Solid shaft with EURO flange B10	■ Solid shaft with EURO flange B10 ■ Offshore & seawater resistant
Product family	**POG 9 G**	**POG 10 G**	**POG 11 G**
Sensing method	Optical	Optical	Optical
Size (housing)	ø90 mm	ø115 mm	ø115 mm
Voltage supply	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC
Output stage			
- TTL/RS422	■	■	■
- HTL/push-pull	■	■	■
Shaft type			
- Solid shaft	ø11 mm	ø11 mm	ø11 mm
Flange	EURO flange B10	EURO flange B10	EURO flange B10
Connection	Terminal box	Terminal box	Terminal box
Pulses per revolution	300...2500	300...2500	300...2500
Operating temperature	-30...+100 °C	-40...+100 °C	-40...+100 °C
Protection	IP 56	IP 66	IP 67
Operating speed	≤12 000 rpm	≤12 000 rpm	≤6000 rpm
Max. shaft load	≤200 N axial, ≤300 N radial	≤300 N axial, ≤450 N radial	≤300 N axial, ≤450 N radial
Explosion protection	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)
Options	–	Redundant sensing system, two terminal boxes each	Redundant sensing system, two terminal boxes each

1 + 1 = 1

1+1=1 translates into HeavyDuty product combinations where HeavyDuty encoders, tachogenerators and speed switches are combined into a robust unit. Hence, besides speed feedback, the application may involve more signals for drive regulation. In parallel, HeavyDuty combinations provide different output signals and sharing a common shaft to save space, they excel with ultimate reliability and longevity.

HeavyDuty
Combinations

Incremental encoders with speed switch.

- Electronic speed switch ESL with up to three switching outputs
- Mechanical centrifugal switch FSL with one switching output
- Permanently configured switching speeds

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Features	■ Cone shaft or blind hollow shaft	■ Cone shaft or blind hollow shaft ■ Offshore & seawater resistant	■ Solid shaft with EURO flange B10	■ Solid shaft with EURO flange B10 ■ Offshore & seawater resistant
Product family	HOG 10+FSL | HOG 10+ESL	HOG 11+FSL | HOG 11+ESL	POG 10+FSL | POG 10+ESL	POG 11+FSL | POG 11+ESL

Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø105 mm	ø105 mm	ø115 mm	ø115 mm
With centrifugal switch	■ | –	■ | –	■ | –	■ | –
With speed switch	– | ■	– | ■	– | ■	– | ■
Voltage supply	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL-P/Power Linedriver	■	■	■	■
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted
Shaft type				
- Solid shaft	–	–	ø11 mm	ø11mm
- Cone shaft 1:10	ø17 mm	ø17 mm	–	–
- Blind hollow shaft	ø12...20 mm	ø12...20 mm	–	–
Flange	–	–	EURO flange B10	EURO flange B10
Connection	Terminal box	Terminal box	Terminal box	Terminal box
Pulses per revolution	300...2500	300...2500	300...2500	300...2500
Operating temperature	-40...+100 °C | -20...+85 °C	-40...+100 °C | -20...+85 °C	-40...+100 °C | -20...+85 °C	-40...+100 °C | -20...+85 °C
Protection	IP 66	IP 67	IP 67	IP 67
Operating speed	≤6000 rpm	≤6000 rpm	≤6000 rpm	≤6000 rpm
Switching speed range (ns)	850...4900 rpm (FSL) 650...6000 rpm (ESL)	850...4900 rpm (FSL) 650...6000 rpm (ESL)	850...4900 rpm (FSL) 650...6000 rpm (ESL)	850...4900 rpm (FSL) 650...6000 rpm (ESL)
Max. shaft load	≤250 N axial, ≤400 N radial	≤250 N axial, ≤400 N radial	≤300 N axial, ≤450 N radial	≤300 N axial, ≤450 N radial
Switching outputs (speed-controlled)	1 output | 1 or 3 outputs	1 output | 1 or 3 outputs	1 output | 1 or 3 outputs	1 output | 1 or 3 outputs
Output circuit	Norm. open/ Norm. closed | Transistor outputs	Norm. open/ Norm. closed | Transistor outputs	Norm. open/ Norm. closed | Transistor outputs	Norm. open/ Norm. closed | Transistor outputs
Options	Function monitoring EMS Redundant sensing	Function monitoring EMS Redundant sensing	Function monitoring EMS Redundant sensing	Function monitoring EMS Redundant sensing

Absolute encoders with speed switch.

- Electronic speed switch ESL with up to three switching outputs
- Mechanical centrifugal switch FSL with one switching output
- Permanently configured switching speeds
- *MicroGen* multiturn sensing

Features	■ Solid shaft with EURO flange B10 ■ 2 parallel fieldbus systems ■ Offshore & seawater resistant		■ Cone shaft or blind hollow shaft ■ 2 parallel fieldbus systems	
Product family	**AMG 11+FSL**	**AMG 11+ESL***	**HMG 11+FSL**	**HMG 11+ESL***
Interface				
- SSI	■		■	
- CANopen®	■		■	
- DeviceNet	■		■	
- Profibus-DP	■		■	
Function principle	Singleturn / Multiturn		Singleturn / Multiturn	
With centrifugal switch	■	–	■	–
With speed switch	–	■	–	■
Sensing method	Optical		Optical	
Size (housing)	ø122 mm		ø122 mm	
Voltage supply	9...30 VDC		9...30 VDC	
Shaft type				
- Solid shaft	ø11 mm		–	
- Cone shaft 1:10	–		ø17 mm	
- Blind hollow shaft	–		ø16...20 mm	
Flange	EURO flange B10		–	
Connection	Bus cover / Terminal box		Bus cover / Terminal box	
Resolution	≤29 bit		≤29 bit	
Steps per turn	≤8192/13 bit		≤8192/13 bit	
Number of turn	≤65536/16 bit		≤65536/16 bit	
Operating temperature	-20...+85 °C		-20...+85 °C	
Protection	IP 67		IP 67	
Operating speed	≤6000 rpm		≤6000 rpm	
Switching speed range (ns)	850...2800 rpm		850...2800 rpm (FSL) 850...2800 rpm (ESL 90) 3x 200...3500 rpm (ESL 93)	
Max. shaft load	≤250 N axial, ≤350 N radial		≤250 N axial, ≤350 N radial	
Switching outputs (speed-controlled)	1 output		1 output	1 or 3 outputs
Output circuit	Normally open/ Normally closed		Norm. open/ Norm. closed	Transistor outputs
Options	Redundant sensing		Redundant sensing	

*on request

HeavyDuty
Combinations

Tachogenerator with speed switch.

- Electronic speed switch ESL with up to three switching outputs
- Mechanical centrifugal switch FSL with one switching output
- Permanently configured switching speeds

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Features	■ Tachogenerator with integrated mechanical centrifugal switch ■ Solid shaft	■ Tachogenerator with integrated mechanical centrifugal switch ■ Solid shaft with EURO flange B10	■ Tachogenerator with electronic speed switch ■ Solid shaft with EURO flange B10
Product family	TDP 0.09+FSL	TDP 0.2+FSL	TDP 0.2+ESL
Sensing method	Optical	Optical	Optical
Size (housing)	ø85 mm	ø115 mm	ø115 mm
With centrifugal switch	■	■	–
With speed switch	–	–	■
Voltage supply	No	No	12 VDC ±10 % /only TDP 0.2 +ESL 93)
Idle voltage	10...60 mV rpm	10...150 mV rpm	10...150 mV rpm
Performance (Speed >3000 rpm)	1.2 W	12 W	13 W
Shaft type			
- Solid shaft	ø6 mm	ø11 mm	ø11 mm
Flange	ø85 mm	EURO flange B10	EURO flange B10
Connection	2 x terminal box	3 x terminal box	2 x terminal box
Operating temperature	-30...+130 °C	-30...+130 °C	-20...+85 °C
Protection	IP 56	IP 55	IP 55
Operating speed (n)	≤1.25 x ns	≤1.25 x ns	≤6000 rpm
Switching speed range (ns)	850...4900 rpm	850...4900 rpm	650...6000 rpm (ESL 90) 200...5000 rpm (ESL)
Max. shaft load	≤40 N axial, ≤60 N radial	≤60 N axial, ≤80 N radial	≤60 N axial, ≤80 N radial
Switching outputs (speed-controlled)	1 output	1 output	1 output (ESL 90) 3 outputs (ESL 93)
Output circuit	Normally open / Normally closed	Normally open / Normally closed	Normally open / Normally closed (ESL 90) Transistor outputs (ESL 93)
Options	–	Redundant output Housing base (B3)	Housing base (B3)

Tachogenerator with incremental encoder.

- Precision signals in drive engineering
- Robust electrical and mechanical design

Features	■ Tachogenerator with encoder ■ Solid shaft with EURO flange B10
Product family	TDP 0,2+OG9

Sensing method	Optical
Size (housing)	ø115 mm
Voltage supply	5 VDC ±5 % 8...30 VDC
Idle voltage	10...150 mV rpm
Performance (Speed >3000 rpm)	12 W
Output stage	HTL-P/Power Linedriver TTL/RS422
Output frequency	≤120 kHz
Output signals	K1, K2, K0 + inverted
Shaft type	
- Solid shaft	ø11 mm
Flange	EURO flange B10
Connection	2 x terminal box
Pulses per revolution	1...1250
Operating temperature	-30...+100 °C
Protection	IP 55
Operating speed (n)	≤10 000 rpm
Max. shaft load	≤60 N axial, ≤80 N radial
Options	Housing base (B3)

Durable and space-saving.

Bearingless absolute encoder:
MHAD 50

Bearingless encoders

Non-contact, wear-free and compact.

Bearingless encoders by Baumer operate on the non-contact method, most utlilize magnetic sensing and virtually all are free from wear. No dust, dirt or condensation will impair their reliable operation. They even withstand harmful fibres dominating any envirionment in the textile industry. Our bearingless encoders are particularly resistant to shocks and vibrations with a virtually unlimited service life.

Forgoing any mechanical components prone to wear, these encoders master also highspeed applications. The portfolio comprises incremental encoders with square wave and sinusodial signals as well as absolute product variants with most common interfaces.

Fit into the smallest gap

Their extremely shallow installation depth, sometimes less than 20 mm, makes bearingless encoders with ring magnet and sensor an ideal solution where installation space is very limited – whether on shafts with 6 or 600 mm diameter. The narrow ring magnet and the lean sensor head even allow for attachment to the A-end of the shaft, for example between gearing and the machine part to be driven.

Bearingless encoders
Incremental

Hollow shaft max. ø140 mm.
Max. 8192 pulses per revolution.
- Square wave and sine signals
- High protection on to IP 67
- Compact designs




Features	■ Max. 720 pulses per revolution ■ Hollow shaft max. ø47.8 mm	■ Max. 1024 pulses per revolution ■ Hollow shaft max. ø47.8 mm	■ Max. 4096 pulses per revolution ■ Hollow shaft max. ø47.8 mm	■ Max. 4096 pulses per revolution ■ Metal sensor housing ■ Hollow shaft max. ø47.8 mm
Product family	**MEFK 10**	**MDFK 08**	**MDFK 10**	**MIR 10**
Sensing method	Magnetic	Magnetic	Magnetic	Magnetic
Magnetic wheel diameter	ø30.5...56 mm	ø30.5...56 mm	ø30.5...56 mm	ø30.5...56 mm
Size (sensing head)	15 x 10 x 40 mm	15 x 8,5 x 45.5 mm	15 x 10 x 40 mm	15 x 10 x 45.5 mm
Voltage supply	8...28 VDC	8...30 VDC 5 VDC ±5 %	8...30 VDC 5 VDC ±5 %	8...30 VDC 5 VDC ±5 %
Output stage				
- TTL/RS422	–	■	■	■
- HTL/push-pull	■	■	■	■
- SinCos 1 Vpp	–	–	–	–
Output signals	A 90° B	A 90° B, N + inverted	A 90° B, N + inverted	A 90° B, N + inverted
Output frequency	≤250 kHz	≤250 kHz	≤350 kHz	≤350 kHz
Shaft type				
- Through hollow shaft	ø6...47.8 mm	ø6...47.8 mm	ø6...47.8 mm	ø6...47.8 mm
Connection				
- Cable	Radial	Radial	Radial	Radial
Pulses per revolution	20...720	256...1024	1024...4096	1024...4096
Sine waves per revolution	–	–	–	–
Operating temperature	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
Protection	IP 67	IP 67	IP 67	IP 67
Operating speed	≤20 000 rpm	≤20 000 rpm	≤20 000 rpm	≤20 000 rpm
Options	–	–	–	–

Bearingless encoders
Incremental

Bearingless encoders by Baumer operate on non-contact sensing technology and are virtually wearfree. They withstand shocks and vibrations and are predestined for applications where space is tight.




Features	■ Max. 50 pulses per revolution ■ Hollow shaft max. ø45 mm	■ Max. 2048 pulses per revolution ■ SinCos output circuit ■ Hollow shaft max. ø28 mm		■ Max. 4095 pulses per revolution ■ SinCos output circuit ■ Hollow shaft max. ø65 mm		■ Max. 8192 pulses per revolution ■ SinCos output circuit ■ Hollow shaft max. ø140 mm	
Product family	**ITD 67**	**ITD49H00**	**ITD49H00 Sine**	**ITD69H00**	**ITD69H00 Sine**	**ITD89H00**	**ITD89H00 Sine**
Sensing method	Magnetic	Magnetic		Magnetic		Magnetic	
Magnetic wheel diameter	ø72 mm	ø40 mm		ø81 mm		ø162 mm	
Size (sensing head)	20 x 11 x 75 mm	12 x 16 x 48 mm		12 x 16 x 48 mm		12 x 16 x 48 mm	
Voltage supply	8...26 VDC	5 VDC ±5 % 8...26 VDC	5 VDC ±10 %	5 VDC ±5 % 8...26 VDC	5 VDC ±10 %	5 VDC ±5 % 8...26 VDC	5 VDC ±10 %
Output stage							
- TTL/RS422	–	■	–	■	–	■	–
- HTL/push-pull	■	■	–	■	–	■	–
- SinCos 1 Vpp	–	–	■	–	■	–	■
Output signals	A, B	A 90° B, N A 90° B, N + inverted		A 90° B, N A 90° B, N + inverted		A 90° B, N A 90° B, N + inverted	
Output frequency	≤160 kHz	≤300 kHz (TTL) ≤160 kHz (HTL)	≤180 kHz	≤300 kHz (TTL) ≤160 kHz (HTL)	≤180 kHz	≤300 kHz (TTL) ≤160 kHz (HTL)	≤180 kHz
Shaft type							
- Through hollow shaft	ø10...45 mm	ø9...28 mm		ø40...65 mm		ø70...140 mm (ø150 mm)	
Connection							
- Cable	Radial	Radial		Radial		Radial	
Pulses per revolution	20, 50	64...2048		128...4096		256...8192	
Sine waves per revolution	–	64		128		256	
Operating temperature	-20...+85 °C	-40...+100 °C		-40...+100 °C		-40...+100 °C	
Protection	IP 67	IP 67		IP 67		IP 67	
Operating speed	≤10 000 rpm	≤30 000 rpm		≤15 000 rpm		≤7500 rpm	
Options	Redundant variant	Cable with connector		Cable with connector		Cable with connector	

Bearingless encoders
Incremental

Hollow shaft max. ø740 mm.
Max. 32 768 pulses per revolution.

- Precision signals for drive engineering
- Square wave and sine signals
- Optional with DNV certification

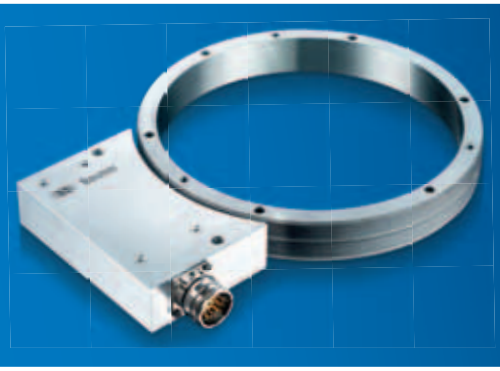
HÜBNER BERLIN
A Baumer Brand

HDmag

Features	■ Through hollow shaft ø16...80 mm ■ Pulses per revolution 64...4096	■ Through hollow shaft ø50...180 mm ■ Pulses per revolution 128...8192	■ Through hollow shaft ø70...340 mm ■ Pulses per revolution 256...16 384	■ Through hollow shaft ø650...740 mm ■ Pulses per revolution 512...32 768
Product family	**MHGE 100** - *HDmag*	**MHGE 200** - *HDmag*	**MHGE 400** - *HDmag*	**MHGE 800** - *HDmag*
Sensing method	Magnetic	Magnetic	Magnetic	Magnetic
Magnetic wheel diameter	ø99.9 mm	ø201.7 mm	ø405.4 mm	ø813 mm
Size (sensing head)	100 x 40 x 65 mm	100 x 40 x 65 mm	100 x 40 x 65 mm	100 x 40 x 65 mm
Voltage supply	Rectangular: 4.75...30 VDC Sine: 5 VDC	Rectangular: 4.75...30 VDC Sine: 5 VDC	Rectangular: 4.75...30 VDC Sine: 5 VDC	Rectangular: 4.75...30 VDC Sine: 5 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL-P/Power Linedriver	■	■	■	■
- SinCos 1 Vpp	■	■	■	■
Output signals	A+, B+, R+ , A-, B-, R-	A+, B+, R+ , A-, B-, R-	A+, B+, R+ , A-, B-, R-	A+, B+, R+ , A-, B-, R-
Output frequency	≤300 kHz	≤300 kHz	≤300 kHz	≤300 kHz
Shaft type				
- Through hollow shaft	ø16...80 mm	ø50...180 mm	ø70...340 mm	ø650...740 mm
Connection				
- Flange connector M23	Radial	Radial	Radial	Radial
Pulses per revolution	64...4096	128...8192	256...16 384	512...32 768
Sine waves per revolution	64	128	256	512
Operating temperature	-40...+100 °C	-40...+100 °C	-40...+100 °C	-40...+100 °C
Protection	IP 66, IP 67	IP 66, IP 67	IP 66, IP 67	IP 66, IP 67
Operating speed	≤8000 rpm	≤4000 rpm	≤2000 rpm	≤100 rpm
Options	DNV certification	DNV certification	DNV certification	DNV certification

Hollow shaft max. ø340 mm.
Max. 524 288 pulses per revolution.

- Precision signals for drive engineering
- Square wave and sine signals
- Particularly high resolution



Features	■ Through hollow shaft ø16...80 mm ■ Pulses per revolution 64...131 072	■ Through hollow shaft ø50...180 mm ■ Pulses per revolution 128...262 144	■ Through hollow shaft ø70...340 mm ■ Pulses per revolution 256...524 288
Product family	MHGP 100 - *HDmag*	MHGP 200 - *HDmag*	MHGP 400 - *HDmag*

Sensing method	Magnetic	Magnetic	Magnetic
Magnetic wheel diameter	ø99.9 mm	ø201.7 mm	ø405.4 mm
Size (sensing head)	120 x 30 x 90 mm	120 x 30 x 90 mm	120 x 30 x 90 mm
Voltage supply	Rectangular: 4.5...30 VDC Sine: 4.5...30 VDC	Rectangular: 4.5...30 VDC Sine: 4.5...30 VDC	Rectangular: 4.5...30 VDC Sine: 4.5...30 VDC
Output stage			
- TTL/RS422	■	■	■
- HTL-P/Power Linedriver	■	■	■
- SinCos 1 Vpp	■	■	■
Output signals	A+, B+, R+ , A-, B-, R-	A+, B+, R+ , A-, B-, R-	A+, B+, R+ , A-, B-, R-
Output frequency	≤2 MHz	≤2 MHz	≤2 MHz
Shaft type			
- Through hollow shaft	ø16...80 mm	ø50...180 mm	ø70...340 mm
Connection			
- Flange connector M23	Radial	Radial	Radial
Pulses per revolution	64...131 072	128...262 144	256...524 288
Sine waves per revolution	8192	16384	32768
Operating temperature	-20...+85 °C	-20...+85 °C	-20...+85 °C
Protection	IP 66, IP 67	IP 66, IP 67	IP 66, IP 67
Operating speed	≤8000 rpm	≤4000 rpm	≤2000 rpm
Options	–	–	–

HDmag

The bearingless *HDmag* encoders operate on high-resolution sensing of a precision magnetic measure combined with digital signal processing in real time. *HDmag* encoders are available as incremental and absolute variants, provide outstanding high resolution and fit virtually any shaft diameter.

Bearingless encoders
Incremental

Hollow shaft ø20...120 mm.
Non-contact optical sensing.

- Wearfree and virtually unlimited service life
- High accuracy even at radial runout
- Easy retrofit in existing systems

HÜBNER BERLIN
A Baumer Brand



Features	■ Through hollow shaft ø20...45 mm ■ Pulses per revolution 250...2048 ■ Operating temperature -30...100 °C	■ Through hollow shaft ø65...85 mm ■ Pulses per revolution 250...2500	■ Through hollow shaft ø90...120 mm ■ Pulses per revolution 720...4000
Product family	HG 16	HG 18	HG 22
Sensing method	Optical	Optical	Optical
Size (housing)	ø158 mm	ø186 mm	ø227 mm
Voltage supply	5 VDC ±5 % 9...26 VDC 9...30 VDC	5 VDC ±5 % 9...26 VDC	5 VDC ±5 % 9...26 VDC
Output stage			
- TTL/RS422	■	■	■
- HTL-P/Power Linedriver	■	■	■
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted
Shaft type			
- Through hollow shaft	ø20...45 mm	ø65...85 mm	ø90...120 mm
Connection	Terminal box	Terminal box	Terminal box
Pulses per revolution	250...2048	250...2500	720...4000
Operating temperature	-30...+100 °C	-30...+70 °C	-30...+70 °C
Protection	IP 23 (≤30 000 rpm) IP 54 (≤12 000 rpm) IP 56 (≤9000 rpm)	IP 54	IP 44
Operating speed	≤30 000 rpm (IP 23) ≤12 000 rpm (IP 54) ≤9000 rpm (IP 56)	≤12 000 rpm	≤12 000 rpm
Options	Redundant sensing Flange connector M23	Redundant sensing Flange connector M23	Redundant sensing Flange connector M23

Hollow shaft max. ø3183 mm.
Max. 131762 pulses per revolution.

- Precision signals for drive engineering
- Square wave, sine and SSI interface
- Position and speed feedback
- Any shaft diameter as a standard

Another **WORLD FIRST** from Baumer

HDmag flex

Features	■ Magnetic belt encoder ■ Incremental ■ Max. 131072 pulses per revolution	■ Magnetic belt encoder ■ Quasi-absolute ■ Max. resolution 16 bit singleturn
Product family	MIR 3000F	MQR 3000F

Sensing method	Magnetic	Magnetic
Size (sensing head)	165 x 25 x 93 mm	165 x 25 x 93 mm
Voltage supply	4.75...30 VDC	4.75...30 VDC
Output stage		
- TTL/RS422	■	■
- HTL-P/Power Linedriver	■	■
- SinCos 1 Vpp	■	■
- SSI	–	Linedriver RS485
Output signals	A+, B+, R+, A-, B-, R-	0...16 bit singleturn 0...24 bit speedsignal
Shaft type		
- Magnetic belt	ø300...3183 mm	ø300...3183 mm
Connection	Flange connector M23	Flange connector M23
Pulses per revolution	512...131 072	1024...4096
Sine waves per revolution	512...16 384	1024...4096
Operating temperature	-40...+85 °C	-40...+85 °C
Protection sensing head	IP 66, IP 67	IP 66, IP 67
Operating speed	≤1850 rpm	≤1850 rpm
Options	Corrosion protected for offshore use	Corrosion protected for offshore use Additional incremental signals

HDmag flex

HDmag flex magnetic belt encoders operate on the proven *HDmag* technology. The sensor head will fit any shaft diameter thanks to both sensing elements being permanently aligned at the factory. The magnetic measure is buckled on the shaft like a belt. *HDmag flex* magnetic belt encoders provide: short lead times and easy installation, absolute robustness and reliability, precise position and speed feedback, high signal resolution

Bearingless encoders
Absolute

Hollow shaft max. ø340 mm.
Singleturn variants.
- SSI and CANopen® interface
- Additional square wave and sine signals

HDmag




Features	■ Through hollow shaft ø30 mm ■ Max. singleturn resolution 16 bit	■ Through hollow shaft ø16...80 mm ■ Max. singleturn resolution 17 bit	■ Through hollow shaft ø50...180 mm ■ Max. singleturn resolution 17 bit	■ Through hollow shaft ø70...340 mm ■ Max. singleturn resolution 17 bit
Product family	**MHAD 50** - *HDmag*	**MHAP 100** - *HDmag*	**MHAP 200** - *HDmag*	**MHAP 400** - *HDmag*
Interface				
- SSI	■	■	■	■
- CANopen®	■	–	–	–
Function principle	Singleturn	Singleturn	Singleturn	Singleturn
Sensing method	Magnetic	Magnetic	Magnetic	Magnetic
Magnetic wheel diameter	ø50 mm	ø101.3 mm	ø203.1 mm	ø406.8 mm
Size (sensing head)	55 x 36 x 20 mm	120 x 30 x 90 mm	120 x 30 x 78 mm	120 x 30 x 78 mm
Voltage supply	4.5...30 VDC	4.5...30 VDC	4.5...30 VDC	4.5...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
- SinCos 1 Vpp	–	■	■	■
Output signals	A+, B+, A-, B-	A+, B+, A-, B-	A+, B+, A-, B-	A+, B+, A-, B-
Shaft type				
- Through hollow shaft	ø30 mm	ø16...80 mm	ø50...180 mm	ø70...340 mm
Connection				
- Flange connector M12	Radial	–	–	–
- Flange connector M23	–	Radial	Radial	Radial
- Cable	Radial	–	–	–
Resolution	≤65536 / 16 bit	≤131072 / 17 bit	≤131072 / 17 bit	≤131072 / 17 bit
Absolute accuracy	±0.3° (-40...+85 °C) ±0.25° (+20 °C)	–	–	–
Pulses per revolution	1024...8192	1...131 072	1...262 144	1...524 288
Sine waves per revolution	–	1...8192	1...16 384	1...32 768
Operating temperature	-40...+85 °C	-20...+85 °C	-20...+85 °C	-20...+85 °C
Protection	IP 67	IP 66, IP 67	IP 66, IP 67	IP 66, IP 67
Operating speed	≤6000 rpm	≤8000 rpm	≤4000 rpm	≤2000 rpm

Compact kit design 30...58 mm. Singleturn and multiturn variants.

- All common fieldbus & EtherNet interfaces
- Integrated interface or modular bus covers
- Hollow shaft ø12 mm
- SSI and parallel interface

MAGRES




Features	■ Encoder kit ø30 mm ■ Integrated interfaces		■ Encoder kit ø55 mm ■ Integrated interfaces		■ Encoder kit ø58 mm ■ Integrated interfaces		■ Encoder kit ø58 mm ■ Modular bus cover	
Product family	**BMMK 30** *- MAGRES*	**BMSK 30** *- MAGRES*	**BMMK 55** *- MAGRES*	**BMSK 55** *- MAGRES*	**BMMK 58** *- MAGRES*	**BMSK 58** *- MAGRES*	**BMMK 58** **flexible**	**BMSK 58** **flexible**
Interface								
- SSI	■		■		■		–	
- Parallel	–		–		–	■	–	
- CANopen®	–		■		■		■	
- DeviceNet	–		–		–		■	
- Profibus-DP	–		–		–		■	
- SAEJ1939	–		–		–		■	
- EtherCAT/PoE	–		–		–		■	
- EtherNet/IP	–		–		–		■	
- Powerlink	–		–		–		■	
- Profinet	–		–		–		■	
Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Magnetic		Magnetic		Magnetic		Magnetic	
Size (housing)	ø30 mm		ø55 mm		ø58 mm		ø58 mm	
Voltage supply	5 VDC ±10 % 10...30 VDC		10...30 VDC		10...30 VDC		10...30 VDC	
Shaft type								
- Ring magnet bore	ø5...8 mm		ø6 mm		ø12 mm		ø12 mm	
Connection								
- Flange connector M9	Radial, axial		–		–		–	
- Flange connector M12	–		Radial		Radial, axial		–	
- Cable	Radial, axial		Radial		Radial, axial		–	
- Bus cover	–		–		–		Radial	
Resolution	≤25 bit	≤10 bit	≤30 bit	≤12 bit	≤30 bit	≤12 bit	≤30 bit	≤12 bit
Steps per turn	≤1024/10 bit		≤4096/12 bit		≤4096/12 bit		≤4096/12 bit	
Number of turn	≤32768/15 bit	–	≤262144/18 bit	–	≤262144/18 bit	–	≤262144/18 bit	–
Absolute accuracy	±1°		±1°		±1°		±1°	
Operating temperature	-20...+85 °C		-20...+85 °C		-20...+85 °C		-20...+85 °C	
Protection	IP 67		IP 69K		IP 67		IP 67	
Operating speed	≤6000 rpm		≤6000 rpm		≤6000 rpm		≤6000 rpm	

Magnetic rotary encoders
Absolute

Miniature designs down to 20 mm.
Angular range through 360°.

- Linearized analog output signals
- Max. resolution 0.09°
- With magnet rotor

Features	■ Sensor housing M18x1 ■ Linear angular range 270° ■ Output signal 4...20 mA	■ Sensor housing M18x1 ■ Linear angular range 360° linear ■ Output signal 0...4.3 VDC	■ Sensor housing rectangular ■ Linear angular range 270° ■ Output signal 4...20 mA	■ Sensor housing rectangular ■ Linear angular range 360° ■ Output signal 0...4.3 VDC
Product family	**MDRM 18 (I-Typ270°)**	**MDRM 18 (U-Typ360°)**	**MDFM 20 (I-Typ270°)**	**MDFM 20 (U-Typ360°)**
Sensor housing	Cylindrical threaded	Cylindrical threaded	Rectangular	Rectangular
Size	18 mm	18 mm	20 x 30 x 8 mm	20 x 30 x 8 mm
Sensing distance	5 mm (with magnet rotor MSFS)	5 mm (with magnet rotor MSFS)	4 mm (with magnet rotor MSFS)	4 mm (with magnet rotor MSFS)
Output circuit	Current output	Voltage output	Current output	Voltage output
Output signal	4...20 mA	0...4.3 VDC	4...20 mA	0...4.3 VDC
Angular range	270° linear	360° linear	270° linear	360° linear
Resolution	1.41°	1.41°	0.09°	0.09°
Response time	<2 ms	<2 ms	<4 ms	<4 ms
Connection	Cable, 2 m mating connector M12	Cable, 2 m mating connector M12	Cable, 2 m mating connector M8	Cable, 2 m mating connector M12
Voltage supply	15...30 VDC	4.7...7.5 VDC	15...30 VDC	4.7...7.5 VDC
Operating temperature	-40...+85 °C	-40...+85 °C	-40...+85 °C	-40...+85 °C
Protection	IP 67	IP 67	IP 67	IP 67

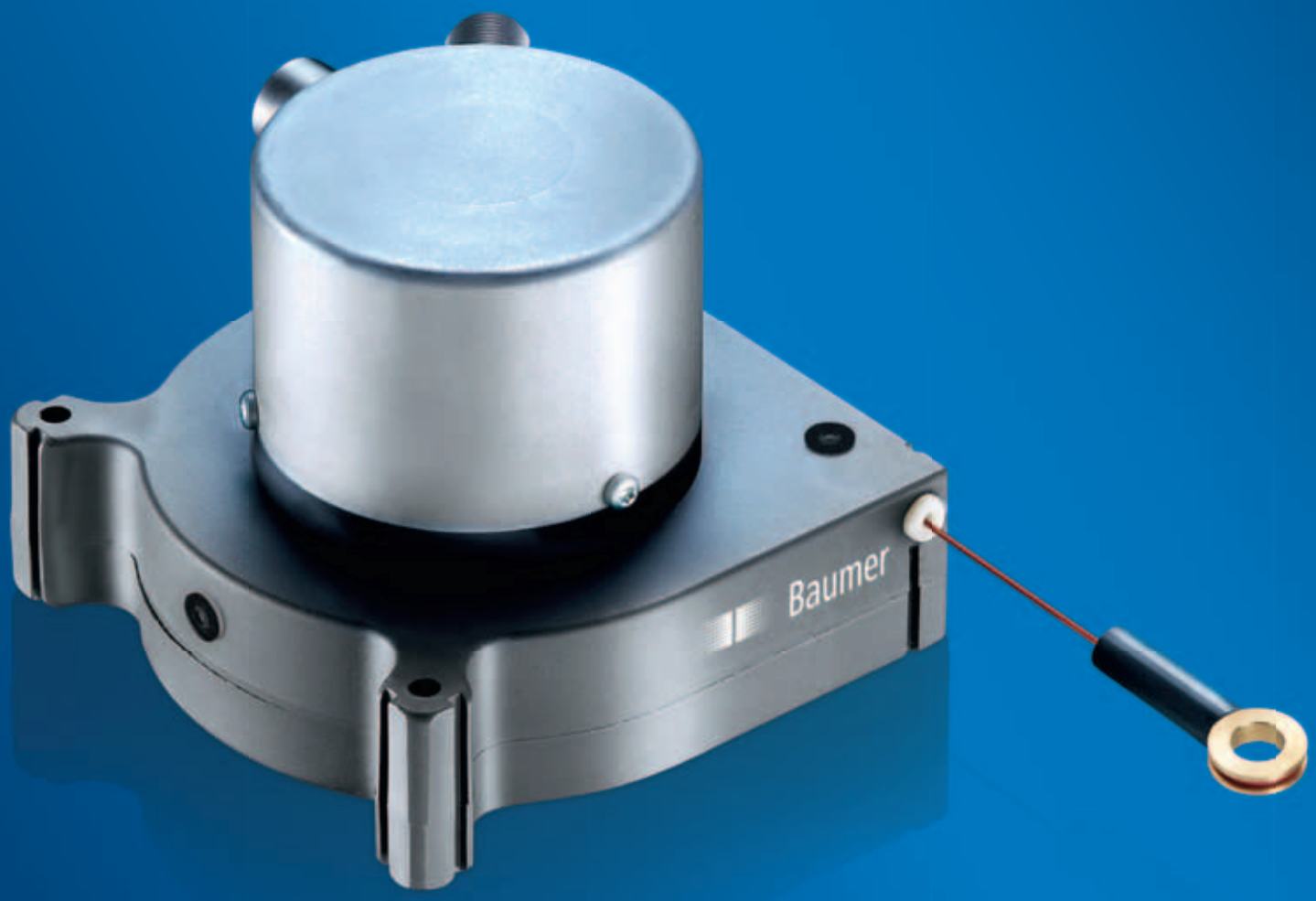
Linear bearingless encoders
Incremental

Size 10 mm.
Unlimited measuring range.

- Square wave output signals
- Max. resolution 0.005 mm
- With magnetic belt

		
Features	■ Linear measuring system ■ Output signals A 90° B ■ Output circuit push-pull	■ Linear measuring system ■ Output signals A 90° B + inverted ■ Output circuit RS422
Product family	MLFK 10 - push-pull	MLFK 10 - RS422
Sensor housing	Rectangular	Rectangular
Size	15 x 10 x 40 mm	15 x 10 x 40 mm
Sensing distance	0.6 mm	0.6 mm
Interpolation	Factor 50, 100	Factor 50, 100
Movement speed	<5 m/s (interp. factor 100) <10 m/s (interp. factor 50)	<5 m/s (interp. factor 100) <10 m/s (interp. factor 50)
Output circuit	Push-pull	RS422
Output signal	A 90° B	A 90° B + inverted
Resolution	0.02 mm (interp. factor 100) 0.04 mm (interp. factor 50)	0.02 mm (interp. factor 100) 0.04 mm (interp. factor 50)
System-Accuracy	±0.04 mm	±0.04 mm
Connection	Cable, 2 m	Cable, 2 m
Voltage supply	8...30 VDC	5 VDC ±5 %
Operating temperature	-25...+85 °C	-25...+85 °C
Protection	IP 67	IP 67

Linear measurement made easy.



Absolute cable-pull encoders BMMS K50
with max. 5 m measuring length.

Cable-pull encoders

Easy attachment – reliable results.

Baumer cable-pull encoders are the easiest and most reliable solution to acquire linear distance and position. Linear measurement covers virtually the entire range up to 50 meters. Particularly conceived for industrial applications, the high-quality cable-pulls are extremely durable. They always provide reliable measuring results and allow for both system integration and retrofit. Cable-pulls go together with virtually any encoder. You have the choice – the cable-pull with optimum measuring length used in combination with the matching incremental encoder or absolute interface.

Redundant variants

MAGRES BMMS redundant encoders utilize two robust magnetic sensing systems. Each provides an individual output signal to ensure ultimate signal availability. An integrated monitoring system compares these two values and will output an error message in the event of failure. The monitoring system will relieve the master control, simultaneously cutting down on cabling effort and cost.

Cable-pull encoders
Absolute

Size up to 120 mm.
Max. measuring length 7.5 m.

- Cable-pulls with absolute multiturn encoder
- Analog and CANopen
- Compact housing

Features	■ Measuring length max. 3.4 m ■ Absolute encoders	■ Measuring length max. 5 m ■ Absolute encoders	■ Measuring length max. 7.5 m ■ Absolute encoders
Product family	**BMMS K34**	**BMMS K50**	**BMMS M75**
Interface			
- SSI	■	■	■
- Analog / redundant	■ / ■	■ / ■	■ / ■
- CANopen® / redundant	■ / ■	■ / ■	■ / ■
- DeviceNet	–	–	–
- Profibus-DP	–	–	–
- SAEJ1939	–	–	–
- EtherCAT / PoE	–	–	–
- EtherNet/IP	–	–	–
- Powerlink	–	–	–
- Profinet	–	–	–
Sensing method	Magnetic	Magnetic	Magnetic
Size	88 x 88 x 66 mm	88 x 88 x 66 mm	120 x 120 x 70 mm
Voltage supply	8...30 VDC	8...30 VDC	8...30 VDC
Output stage			
- TTL/RS422	–	–	–
- HTL/push-pull	–	–	–
Connection			
- Flange connector M12	Radial	Radial	Radial
- Cable	Radial	Radial	Radial
- Bus cover	–	–	–
Measuring length	3400 mm	5000 mm	7500 mm
Resolution			
- SSI, CANopen®	0.1 mm/step	0.1 mm/step	0.1 mm/step
- Analog	12 bit	12 bit	12 bit
Linearity	±0.6 %	±0.5 %	±0.2 %
Operating temperature	-40...+85 °C	-40...+85 °C	-40...+85 °C
Protection (encoder)	IP 65	IP 65	IP 65
Materials	Cable-pull housing: PA6 GF30 Encoder: Aluminium Cable: Stainless steel	Cable-pull housing: PA6 GF30 Encoder: Aluminium Cable: Stainless steel	Cable-pull housing: PA6 GF30 Encoder: Aluminium Cable: Stainless steel

Cable-pull encoders
Absolute & incremental

Size up to 200 mm.
Max. measuring length 50 m.

- Utmost flexilbility in the combination of encoder and cable-pull
- High operational reliability and longlife
- Highest resolution and linearity




Features	■ Measuring length 2.1 m ■ Absolute or incremental encoder		■ Measuring length 3 m ■ Absolute or incremental encoder		■ Measuring length 5...15 m ■ Absolute or incremental encoder		■ Measuring length 30...50 m ■ Absolute or incremental encoder	
Product family	**GCI610**	**GCA610**	**GCI960**	**GCA960**	**GCI1150**	**GCA1150**	**GCI2000**	**GCA2000**
Interface								
- SSI	–	■	–	■	–	■	–	■
- BiSS-C	–	■	–	■	–	■	–	■
- CANopen® / SAEJ1939	–	■ / ■	–	■ / ■	–	■ / ■	–	■ / ■
- DeviceNet	–	■	–	■	–	■	–	■
- Profibus-DP	–	■	–	■	–	■	–	■
- EtherCAT / PoE	–	■	–	■	–	■	–	■
- EtherNet/IP	–	■	–	■	–	■	–	■
- Powerlink	–	■	–	■	–	■	–	■
- Profinet	–	■	–	■	–	■	–	■
Function principle	Incremental	Absolute	Incremental	Absolute	Incremental	Absolute	Incremental	Absolute
Sensing method	Optical		Optical		Optical		Optical	
Size	60 x 60 mm		96 x 96 x 56 mm		115 x 115 x 82.5 - 180.5 mm		200 x 200 x 268 - 333.5 mm	
Voltage supply	5 VDC 4.75..30 VDC	10...30 VDC	5 VDC 4.75..30 VDC	10...30 VDC	5 VDC 4.75..30 VDC	10...30 VDC	5 VDC 4.75..30 VDC	10...30 VDC
Output stage								
- TTL/RS422	■	–	■	–	■	–	■	–
- HTL/push-pull	■	–	■	–	■	–	■	–
Connection								
- Flange connector M12, M23	Radial, axial		Radial, axial		Radial, axial		Radial, axial	
- Cable	Radial, axial		Radial, axial		Radial, axial		Radial, axial	
- Bus cover	Radial		Radial		Radial		Radial	
Measuring length	2100 mm		3000 mm		5000...15 000 mm		30 000...50 000 mm	
Pulses per revolution	≤80 000	–	≤80 000	–	≤80 000	–	≤80 000	–
Resolution	–	≤36 bit	–	≤36 bit	–	≤36 bit	–	≤36 bit
Linearity	±0.01 %		±0.02 %		±0.01 %		±0.01 %	
Operating temperature	-20...+85 °C		-20...+85 °C		-20...+85 °C		-20...+85 °C	
Protection (encoder)	IP 65		IP 65		IP 65		IP 65	
Materials	Cable-pull housing: PA6 GF30 Encoder: Aluminium Cable: Stainless steel		Cable-pull housing: Aluminium Encoder: Aluminium Cable: Stainless steel		Cable-pull housing: Aluminium Encoder: Aluminium Cable: Stainless steel		Cable-pull housing: Aluminium Encoder: Aluminium Cable: Stainless steel	
Options	Operating temperature -40...85 °C		Operating temperature -40...85 °C		Operating temperature -40...85 °C		Operating temperature -40...85 °C	

Solutions for every scenario.

Absolute encoder / ATEX
X 700 with bus cover

For very special applications.

SIL, Ex, stainless steel and offshore encoders Signal processing

Whether in hazardous areas, extremely corrosive environments or for demanding functional safety requirements – we are your strong partner.

Baumer is competent in all fields of application, for example offshore oil rigs or wind turbines. This expertise is confirmed by relevant certifications of compliance to SIL, ATEX, IECEx, DNV and UL standards approved by recognized testing institutes.

Certifications

Ever-extending IECEx certification of our explosion-protected HeavyDuty incremental encoders ensures compliance to most demanding international safety directives. Hence , the encoders are approved for use throughout all 30 countries supporting the IECEx standard. International certification provides particular benefit to OEMs when exporting their machines and systems.

For very special applications
Explosion-proof incremental encoders

Explosion protection Ex II 2G / 2D.
With ATEX and IECEx certification.
- Size 63...160 mm
- Square wave and sine signals




Features	■ Solid shaft with EURO flange B10 ■ ATEX-/IECEx certification	■ Solid shaft with EURO flange B10 ■ ATEX-/IECEx certification ■ SinCos signal with *LowHarmonics*	■ Through hollow shaft ■ ATEX-/IECEx approval	■ Solid shaft with clamping flange ■ Stainless steel housing ■ ATEX certification
Product family	**EEx OG9**	**EEx OG9 S**	**EEx HOG 161**	**X 700 - inkremental**
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø120 mm	ø115 mm	ø160 mm	ø70 mm
Voltage supply	5 VDC ±5 % 9...26 VDC 9...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...26 VDC 9...30 VDC	4.75...30 VDC
Output stage				
- TTL/RS422	■	–	■	■
- HTL/push-pull	■	–	■	■
- SinCos 1 Vpp	–	■	–	–
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted	A 90° B, N + inverted
Shaft type				
- Solid shaft	ø11 mm	ø11 mm	–	ø10 mm
- Through hollow shaft	–	–	ø30...70 mm	–
Flange	EURO flange B10	EURO flange B10	–	Clamping flange
Connection				
- Terminal box	Radial	Radial	Radial	–
- Cable	–	–	–	Axial
Pulses per revolution	1...5000	–	250...5000	5...5000
Sine waves per revolution	–	1024...2048	–	–
Operating temperature	-20...+55 °C	-20...+55 °C	-20...+58 °C (IP 56) -20...+66 °C (IP 54)	-25...+70 °C
Protection	IP 56	IP 56	IP 54, IP 56	IP 67
Operating speed	≤5600 rpm	≤5600 rpm	≤5600 rpm	≤6000 rpm
Max. shaft load	≤450 N axial, ≤650 N radial	≤450 N axial, ≤650 N radial	≤450 N axial, ≤650 N radial	≤60 N axial, ≤50 N radial
Explosion protection	Ex II 2G (ATEX/IECEx)	Ex II 2G (ATEX/IECEx)	Ex II 2G (ATEX/IECEx)	Ex II 2D/2G (ATEX)
Options	Cable gland M20x1.5	–	Cable gland M20x1.5	–

For very special applications
Explosion-proof absolute encoders

Explosion protection Ex II 2G / 2D.
With ATEX and IECEx certification.

- Size 70 mm
- SSI, CANopen®, RS485, Profibus-DP

Features	■ Solid shaft with clamping flange ■ Stainless steel housing ■ ATEX certification	■ Solid shaft with clamping flange ■ Stainless steel housing ■ ATEX certification	■ Solid shaft with clamping flange ■ Stainless steel housing ■ ATEX certification	■ Solid shaft with clamping flange ■ Stainless steel housing ■ ATEX certification
Product family	**X 700 SSI**	**X 700 RS485**	**X 700 CANopen**	**X 700 Profibus-DP**
Interface				
- SSI	■	–	–	–
- RS485	–	■	–	–
- CANopen®	–	–	■	–
- Profibus-DP	–	–	–	■
Function principle	Multiturn | Singleturn	Multiturn | Singleturn	Multiturn | Singleturn	Multiturn | Singleturn
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø70 mm	ø70 mm	ø70 mm	ø70 mm
Voltage supply	10...30 VDC	10...30 VDC	10...30 VDC	10...30 VDC
Shaft type				
- Solid shaft	ø10 mm	ø10 mm	ø10 mm	ø10 mm
Flange	Clamping flange	Clamping flange	Clamping flange	Clamping flange
Connection				
- Cable gland	Axial	Radial	Axial	Radial
Resolution	≤25 bit | ≤14 bit	≤25 bit | ≤14 bit	≤25 bit | ≤14 bit	≤25 bit | ≤14 bit
Steps per turn	≤8192/13 bit | ≤16384/14 bit	≤8192/13 bit | ≤16384/14 bit	≤8192/13 bit | ≤16384/14 bit	≤8192/13 bit | ≤16384/14 bit
Number of turn	≤4096/12 bit | –	≤4096/12 bit | –	≤4096/12 bit | –	≤4096/12 bit | –
Absolute accuracy	±0.025°	±0.025°	±0.025°	±0.025°
Operating temperature	-25...+60 °C	-25...+60 °C	-25...+60 °C	-25...+60 °C
Protection	IP 67	IP 67	IP 67	IP 67
Operating speed	≤6000 rpm	≤6000 rpm	≤6000 rpm	≤6000 rpm
Max. shaft load	≤60 N axial, ≤50 N radial	≤60 N axial, ≤50 N radial	≤60 N axial, ≤50 N radial	≤60 N axial, ≤50 N radial
Explosion protection	Ex II 2D/2G (ATEX)	Ex II 2D/2G (ATEX)	Ex II 2D/2G (ATEX)	Ex II 2D/2G (ATEX)

For very special applications
Redundant absolute encoders

Two sensing systems.
For maximum application availability.
- Size 50...120 mm
- SSI, CANopen®, analog




Features	■ Absolute encoders ■ Solid shaft with clamping or synchro flange ■ Blind hollow shaft	■ Cable-pull encoders ■ Measuring length 3.4...7.5 m	■ Absolute encoders ■ Solid shaft with clamping flange ■ SSI / integrated resolver	■ Bearingless encoders with two sensor heads ■ Through hollow shaft ø30 mm
Product family	**BMMV 58 | BMMH 58 BMSV 58 | BMSH 58**	**BMMS K34 | BMMS M75 BMMS K50**	**ATD 2S B14 Y24**	**MHAD 50 - *HDmag***

Interface				
- Analog redundant	■	■	–	–
- SSI redundant	–	–	–	■
- SSI + Resolver	–	–	■	–
- CANopen® redundant	■	■	–	■
Function principle	Multiturn or singleturn	Multiturn	Multiturn or singleturn	Singleturn
Sensing method	Magnetic	Magnetic	Magnetic	Magnetic
Size (housing)	ø58 mm	ø58 mm (encoder)	ø58 mm	ø55 x 36 x20 mm
Voltage supply	8...30 VDC	8...30 VDC	10...30 VDC	4.5...30 VDC
Output stage				
- Analog	0...10 V / 0.5...4.5 V / 4...20 mA	0...10 V / 0.5...4.5 V / 4...20 mA	–	–
- Absolute	CANopen	CANopen	SSI-Daten: Linedriver RS485	SSI-Daten: Linedriver RS485 CANopen: CAN-Bus, LV (3.3 V)
- Resolver	–	–	Pole pairs 1 = 2 poles	–
Shaft type				
- Solid shaft	ø6 / ø10 mm | –	–	ø10 mm	–
- Blind hollow shaft	– | ø12 mm	–	–	–
- Through hollow shaft	– | –	–	–	ø30 mm
Connection				
- Flange connector M12	Radial	Radial	–	Radial
- Flange connector M23	–	–	Radial	–
- Cable	Radial	Radial	–	Radial
Resolution	≤30 bit	–	≤24 bit	≤16 bit
Steps per turn	≤4096/12 bit	–	4096/12 bit	≤65 536/16 bit
Number of turn	≤262 144/18 bit	–	4096/12 bit	–
Absolute accuracy	±1°	0.1 mm/step	–	±0.3° (-40...+85 °C) ±0.25° (+20 °C)
Operating temperature	-20...+65 °C	-40...+65 °C	-30...+85 °C	-40...+85 °C
Protection	IP 65	IP 65	IP 65	IP 67
Operating speed	≤6000 rpm	–	≤5000 rpm	≤6000 rpm
Max. shaft load	≤40 N axial ≤60 N radial | –	–	≤40 N axial ≤60 N radial	–

For very special applications
SIL encoders incremental

With SIL2 and SIL3 certification.
For quick implementation of your system concepts.

- Size 58...105 mm
- Square wave and sine signals

SIL Safety Integrity Level
IEC 62061



Features	■ Sine encoders ■ Through hollow shaft	■ Incremental encoders ■ Solid shaft with clamping or synchro flange	■ Sine encoders ■ Cone shaft ■ Blind hollow shaft
Product family	**ITD22H00 SIL**	**GI357**	**HOGS 100S**
Sensing method	Optical	Optical	Optical
Size (housing)	ø58 mm	ø58 mm	ø105 mm
Voltage supply	5 VDC ±10 % 7...30 VDC	24 VDC +20/-50 %	5 VDC ±10 %
Output stage			
- TTL/RS422	–	■	–
- HTL/push-pull	–	■	–
- SinCos 1 Vpp	■	–	■
Output signals	A, B, N	A 90° B + inverted	K1 (A+), K2 (B+), K0 (R+) + inverted
Shaft type			
- Cone shaft 1:10	–	–	ø17 mm
- Solid shaft	–	ø6 mm / ø10 mm	–
- Blind hollow shaft	–	–	ø16 mm
- Through hollow shaft	ø10, ø12, ø14 mm	–	–
Flange	–	Clamping or synchro flange	–
Connection			
- Terminal box	–	–	Radial
- Mating M12, M23	–	Radial, axial	–
- Cable	Tangential	–	–
Pulses per revolution	–	5...5000	–
Sine waves per revolution	1024, 2048	–	1024...5000
Operating temperature	-30...+100 °C	-25...+85 °C	-25...+85 °C
Protection	IP 65	IP 54 (without shaft seal) IP 65 (with shaft seal)	IP 66
Operating speed	≤6000 rpm	≤10000 rpm	≤10000 rpm
Max. shaft load	–	≤20 N axial, ≤40 N radial	≤250 N axial, ≤400 N radial
Approval	SIL3 compliant to IEC 61508	SIL2 compliant to IEC 61508	Pld/SIL2 certification

For very special applications
Stainless steel incremental encoders




Features	■ Through hollow shaft ■ Pulses per revolution 5...6000 ■ Stainless steel: 1.4305	■ Solid shaft with clamping flange ■ Pulses per revolution 5...6000 ■ Stainless steel: 1.4305	■ Blind hollow shaft ■ Pulses per revolution max. 10 000 ■ Stainless steel: 1.4305	■ Blind hollow shaft ■ Sine waves per revolution 1024...2048 ■ Sine/Cosine signal ■ Stainless steel
Product family	**GE333**	**GE355**	**ITD 40 A4 Y141 | ITD 41 A4 Y141**	**ITD 42 A4 Y141**
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø58 mm	ø58 mm	ø89 mm	ø89 mm
Voltage supply	5 VDC ±10 % 4.75...30 VDC 10...30 VDC	5 VDC ±10 % 4.75...30 VDC 10...30 VDC	5 VDC ±5 % 8...30 VDC	5 VDC ±5 % 8...30 VDC
Output stage				
- TTL/RS422	■	■	■	–
- HTL/push-pull	■	■	■	–
- SinCos 1 Vpp	–	–	–	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A, B, N + inverted	A, B, N
Shaft type				
- Solid shaft	–	ø10 mm	–	–
- Blind hollow shaft	–	–	ø20...27 mm	–
- Through hollow shaft	ø12 mm	–	–	ø20...27 mm
Connection				
- Cable	Radial	Radial / axial	Radial	Radial
Pulses per revolution	5...6000	5...6000	200...2048 | 2000...10000	–
Sine waves per revolution	–	–	– | –	1024...2048
Operating temperature	-25...+100 °C (5 VDC) -25...+85 °C (24 VDC)	-25...+85 °C	-20...+70 °C	-20...+85 °C
Protection	IP 54	IP 67	IP 67	IP 67
Operating speed	≤6000 rpm	≤10 000 rpm	≤2500 rpm	≤2500 rpm
Max. shaft load	–	≤20 N axial, ≤40 N radial	–	–
Options	–	–	Cable with connector	Cable with connector

For very special applications
Stainless steel absolute encoders

V2A and V4A.

- Size 58 mm
- SSI, fieldbus, real time EtherNet

Power over EtherCAT · EtherNet/IP · PROFIBUS · EtherCAT · DeviceNet · PROFINET · CANopen · SSI · ETHERNET POWERLINK · SAE J1939

MAGRES hermetic




Features	■ Solid shaft with clamping flange ■ Integrated interfaces		■ Solid shaft with clamping or synchro flange ■ Through hollow shaft ■ Modular bus cover		■ Solid shaft with clamping flange ■ Hermetically sealed ■ Integrated interfaces	■ Solid shaft with clamping flange ■ Hermetically sealed ■ Modular bus cover
Product family	**GE244**	**GE404**	**GEMMW**	**GEMMH**	**BMMV 58 -** *MAGRES hermetic*	**BMMV 58 flexible -** *MAGRES hermetic*
Interface						
- SSI	■		–		■	–
- CANopen®	–		■		■	■
- DeviceNet	–		■		–	■ 1)
- Profibus-DP	–		■		■	■
- SAEJ1939	–		–		–	■
- EtherCAT/PoE	–		–		–	■ 1)
- EtherNet/IP	–		–		–	■
- Powerlink	–		–		–	■ 1)
- Profinet	–		–		–	■
Function principle	Singleturn	Multiturn	Multiturn		Multiturn	Multiturn
Sensing method	Optical		Optical		Magnetic	Magnetic
Size (housing)	ø58 mm		ø58 mm		ø58 mm	ø58 mm
Voltage supply	10...30 VDC		10...30 VDC		10...30 VDC	10...30 VDC
Shaft type						
- Solid shaft	ø10 mm		ø6, ø10 mm	–	ø10 mm	ø10 mm
- Through hollow shaft	–		–	ø12...14 mm	–	–
Connection	M23 radial		Bus cover cable gland		Bus cover M12	Bus cover M12
Resolution	14 bit	26 bit	29 bit		≤29 bit	≤30 bit
Steps per turn	≤16384/14 bit	≤4096/12 bit	≤8192/13 bit		≤8192/13 bit	≤4096/12 bit
Number of turn	–	≤16384/14 bit	≤65 536/16 bit		≤65 536/16 bit	≤262 144/18 bit
Absolute accuracy	±0.025°		±0.025°		±1°	±1°
Operating temperature	-25...85 °C		-25...85 °C		-40...+85 °C	-40...+85 °C
Protection	IP 67		IP 67		IP 68, IP 69 K	IP 68, IP 69 K
Operating speed	≤6000 rpm		≤6000 rpm		≤6000 rpm	≤6000 rpm
Max. shaft load	≤20 N axial ≤40 N radial		≤20 N axial ≤40 N radial	– –	≤120 N axial (combined) ≤280 N radial (combined) ≤270 N axial (single load)	≤120 N axial (combined) ≤280 N radial (combined) ≤270 N axial (single load)
Material	Stainless steel: 1.4435 / 1.4404		Stainless steel: 1.4305		Stainless steel: 1.4305	Stainless steel: 1.4305

1) on request

For very special applications
Offshore incremental encoders




Features	■ Solid shaft with clamping or synchro flange	■ Cone shaft or blind hollow shaft ■ High protection IP 67	■ Through hollow shaft	■ Through hollow shaft ■ Bearingless encoders ■ Pulses per revolution 64...32 768
Product family	**GI355-C** | GI356-C	**HOG 11**	**HOG 131**	**MHGE 100 -** *HDmag* | **MHGE 800 -** *HDmag*
Sensing method	Optical	Optical	Optical	Magnetic
Size (housing) **Size (magnetic wheel)**	ø58 mm	ø105 mm	ø130 mm	100 x 40 x 65 mm ø99.9...813 mm
Voltage supply	5 VDC ±10 % 4.75...30 VDC 10...30 VDC	5 VDC ±5 % 9...30 VDC	5 VDC ±5 % 9...26 VDC 9...30 VDC	Rectangular: 4.75...30 VDC Sine: 5 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	–	–	–
- HTL-P/Power Linedriver	–	■	■	■
- SinCos 1 Vpp	–	–	–	■
Output signals	A 90° B, N + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted	A+, B+, R+ , A-, B-, R-
Output frequency	≤150 kHz	≤120 kHz	≤120 kHz	≤300 kHz
- Solid shaft	ø10 mm | ø6 mm	–	–	–
- Cone shaft 1:10	–	ø17 mm	–	–
- Blind hollow shaft	–	ø12...20 mm	–	–
- Through hollow shaft	–	–	ø16...36 mm	ø16...80 mm | ø650...740 mm
Flange	Clamping flange | Synchro flange	–	–	–
Connection				
- Flange connector M23	Radial / axial	–	–	Radial
- Cable	Radial / axial	–	–	–
- Terminal box	–	Radial	Radial	–
Pulses per revolution	5...6000	300...2500	2048...3072	64...4096 | 512..32 768
Sine waves per revolution	–	–	–	64 | 512
Operating temperature	-25...+85 °C (-25...+100 °C)	-30...+85 °C	-40...+100 °C	-40...+100 °C
Protection	IP 54, IP 65	IP 67	IP 56	IP 67 (sensor head)
Operating speed	≤10 000 rpm	≤6000 rpm	≤6000 rpm	≤8000 rpm | ≤1000 rpm
Max. shaft load	≤20 N axial, ≤40 N radial	≤250 N axial, ≤400 N radial	≤300 N axial, ≤500 N radial	–
Explosion protection	–	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)	–
Corrosion protection	For C5M environments compliant to ISO 12944-2	Corrosion and seawater proof	Corrosion and seawater proof	Corrosion and seawater proof
Options	With SIL2 certification: GI357	DNV certification	–	DNV certification

For very special applications
Offshore absolute encoders

For use in C5M environments.

- Size 58...122 mm
- SSI, fieldbus, real time Ethernet




Features	■ Solid shaft with clamping or synchro flange	■ Through hollow shaft	■ Solid shaft with EURO flange B10	■ Cone shaft or blind hollow shaft
Product family	GM400-C | GM401-C	G0M2H-C | G0A2H-C	AMG 11	HMG 11
Interface				
- SSI / SSI with incremental	■ / ■	■ / ■	■ / ■	■ / ■
- CANopen®	–	–	■	■
- DeviceNet	–	–	■	■
- Profibus-DP	–	–	■	■
Function principle	Multiturn	Multiturn | Singleturn	Multiturn | Singleturn	Multiturn | Singleturn
Sensing method	Optical	Optical	Optical	Optical
Size (housing)	ø58 mm	ø58 mm	ø115 mm	ø122 mm
Voltage supply	10...30 VDC	10...30 VDC	9...30 VDC	9...30 VDC
Shaft type				
- Solid shaft	ø10 mm | ø6 mm	–	ø11 mm	–
- Cone shaft 1:10	–	–	–	ø17 mm
- Blind hollow shaft	–	–	–	ø16...20 mm
- Through hollow shaft	–	ø12-14 mm	–	–
Flange	Clamping flange | Synchro flange	–	EURO flange B10	–
Connection	Flange connector M23 cable	Flange connector M23 cable	Bus cover Terminal box	Bus cover Terminal box
Resolution	≤30 bit	≤26 bit | ≤14 bit	≤28 bit | ≤13 bit	≤28 bit | ≤13 bit
Steps per turn	≤16384/14 bit	≤16384/14 bit | ≤16384/14 bit	≤4096/12 bit | ≤8192/13 bit	≤4096/12 bit | ≤8192/13 bit
Number of turn	≤65536/16 bit	≤4096/12 bit | –	≤65536/16 bit | –	≤65536/16 bit | –
Absolute accuracy	±0.025°	±0.025°	–	–
Protection	IP 54, IP 65	IP 54 (IP 65 optional)	IP 67	IP 67
Operating temperature	-25...+85 °C	-25...+85 °C	-20...+85 °C	-20...+85 °C
Operating speed	≤6000 rpm	≤6000 rpm	≤3500 rpm	≤3500 rpm
Max. shaft load	≤20 N axial, ≤40 N radial	–	≤250 N axial, ≤350 N radial	–
Explosion protection	–	–	Ex II 3G/3D (ATEX)	Ex II 3G/3D (ATEX)
Corrosion protection	For C5M environments compliant to ISO 12944-2	For C5M environments compliant to ISO 12944-2	Corrosion and seawater proof	Corrosion and seawater proof
Options	Additional incremental signals	Additional incremental signals	Additional incremental signals	Additional incremental signals

For very special applications
Signal processing

Digital converters.
- Level conversion and potential separation
- For extended signal transmission length
- TTL, HTL and SinCos

HÜBNER BERLIN
A Baumer Brand




Features	■ Conversion TTL to TTL ■ Signal generation	■ Conversion HTL to TTL ■ Signal generation	■ Conversion TTL to HTL ■ Signal generation	■ Conversion HTL to HTL ■ Signal generation
Product family	HEAG 151	HEAG 152	HEAG 153	HEAG 154
Size	DIN rail housing 50 x 75 x 55 mm	DIN rail housing 50 x 75 x 55 mm	DIN rail housing 50 x 75 x 55 mm	DIN rail housing 50 x 75 x 55 mm
Voltage supply	5 VDC ±5%	5 VDC ±5%	9...26 VDC	9...26 VDC
Inputs				
- Number	1	1	1	1
- TTL/RS422	■	–	■	–
- HTL/push-pull	–	■	–	■
Outputs				
- Number	1	1	1	1
- TTL/RS422	■	■	–	–
- HTL/push-pull	–	–	■	■
Input signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted
Output signals	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted	K1, K2, K0 + inverted
Output circuit	Optocoupler	Optocoupler	Optocoupler	Optocoupler
Connection	Screw terminals	Screw terminals	Screw terminals	Screw terminals
Consumption	≤5 mA	≤5 mA	≤5 mA	≤5 mA
Input frequency	200 kHz	120 kHz	200 kHz	120 kHz
Operating temperature	-20...+50 °C	-20...+50 °C	-20...+50 °C	-20...+50 °C
Protection	IP 20	IP 20	IP 20	IP 20

Signal processing

Precision interpolators and signal converter.

- Enhanced resolution and signal interpolation
- Up to three signal outputs
- TTL, HTL and SinCos

Features	■ Precision interpolator ■ Splitter for signal conversion SinCos to TTL/HTL ■ Additional signal interpolation	■ Precision sine multiplier ■ Converter SinCos to multiple SinCos	■ Precision interpolator ■ Precision splitter ■ Converter SinCos to multiple SinCos ■ Additional HTL or TTL signal interpolation
Product family	HEAG 158	HEAG 159	HEAG 160
Size	Surface mount housing 122 x 122 x 80 mm	Surface mount housing 122 x 122 x 80 mm	Surface mount housing 122 x 122 x 80 mm
Voltage supply	10...30 VDC	5 VDC ±5% 10...30 VDC	5 VDC ±5 % 10...30 VDC
Inputs			
- Number	2	2	2
- TTL/RS422	–	–	–
- HTL/push-pull	–	–	–
- SinCos 1 Vpp	■	■	■
Outputs			
- Number	3	2	4
- TTL/RS422	■	–	■
- HTL/push-pull	■	–	■
- SinCos 1 Vpp	–	■	■
- Error output	■	–	■
Input signals	A+, A-, B+, B-, R+, R-	A+, A-, B+, B-, R+, R-	A+, A-, B+, B-, R+, R-
Output signals	A+, A-, B+, B-, R+, R-	A+, A-, B+, B-, R+, R-	A+, A-, B+, B-, R+, R-
Connection	Mating 3-pin connector M23	Mating 3-pin connector M23	Mating 3-pin connector M23
Consumption	≤150 mA (15 VDC)	≤500 mA (5 VDC) ≤300 mA (10...30 VDC)	≤500 mA (5 VDC) ≤300 mA (10...30 VDC)
Input frequency	400 kHz	400 kHz	400 kHz
Operating temperature	0...+50 °C	0...+50 °C	0...+50 °C
Protection	IP 65	IP 65	IP 65
Options	A+, A-, B+, B-, R+, R-, Error	A+, A-, B+, B-, R+, R-, Error	A+, A-, B+, B-, R+, R-, Error

For very special applications
Signal processing

Fiber-optic transmitter.
- Interference-resistant fiber-optic transmitter
- For long-distance transmission and EMC-critical environments
- TTL and HTL

HÜBNER BERLIN
A Baumer Brand




Features	■ Signal conversion TTL to LWL ■ For EMC- critical environments	■ Signal conversion HTL to LWL ■ For EMC- critical environments	■ Signal conversion LWL to TTL ■ For EMC- critical environments	■ Signal conversion LWL to HTL ■ For EMC- critical environments
Product family	HEAG 171	HEAG 172	HEAG 173	HEAG 174
Size	Surface mount housing 122 x 122 x 80 mm	Surface mount housing 122 x 122 x 80 mm	DIN rail housing 50 x 75 x 55 mm	DIN rail housing 50 x 75 x 55 mm
Voltage supply	5 VDC ±5% 9...26 VDC	9...26 VDC	5 VDC ±5%	10...30 VDC
Inputs				
- Number	4	4	3	3
- TTL/RS422	■	–	–	–
- HTL/push-pull	–	■	–	–
- LWL	–	–	■	■
Outputs				
- Number	4	4	3	3
- TTL/RS422	–	–	■	–
- HTL/push-pull	–	–	–	■
- LWL	■	■	–	–
Input signals	K1, K2, K3, K4 + inverted	K1, K2, K3, K4 + inverted	LWL 1, 2, 3	LWL 1, 2, 3
Output signals	LWL 1, 2, 3, 4	LWL 1, 2, 3, 4	K1, K2, K3 + inverted	K1, K2, K3 + inverted
Connection				
- Screw terminals connection	–	–	■	■
- Cable gland M16	■	■	–	–
- Cable gland M20	■	■	–	–
Max. load current	200 mA	200 mA	60 mA	60 mA
Operating temperature	-20...+70 °C	-20...+70 °C	-20...+50 °C	-20...+50 °C
Protection	IP 65	IP 65	IP 20	IP 20

Fiber-optic transmitter.

- Interference-resistant fiber-optic transmitter
- For long-distance transmission and EMC-critical environments
- TTL and HTL

Features	■ Signal conversion TTL to LWL ■ For EMC- critical environments	■ Signal conversion HTL to LWL ■ For EMC- critical environments
Product family	HEAG 175	HEAG 176
Size	DIN rail housing 50 x 75 x 55 mm	DIN rail housing 50 x 75 x 55 mm
Voltage supply	5 VDC ±5% 9...26 VDC	9...26 VDC
Inputs		
- Number	3	3
- TTL/RS422	■	–
- HTL/push-pull	–	■
- LWL	–	–
Outputs		
- Number	3	3
- TTL/RS422	–	–
- HTL/push-pull	–	–
- LWL	■	■
Input signals	K1, K2, K3 + inverted	K1, K2, K3 + inverted
Output signals	LWL 1, 2, 3	LWL 1, 2, 3
Connection		
- Screw terminals connection	■	■
- Cable gland M16	–	–
- Cable gland M20	–	–
Max. load current	75 mA	75 mA
Operating temperature	-20...+50 °C	-20...+50 °C
Protection	IP 20	IP 20

Inclination sensors.

Position safely under control.

For very special applications
Inclination sensors

One and two-dimensional.
Compact design.
- CANopen® and Profibus-DP
- Robust all-metal housing

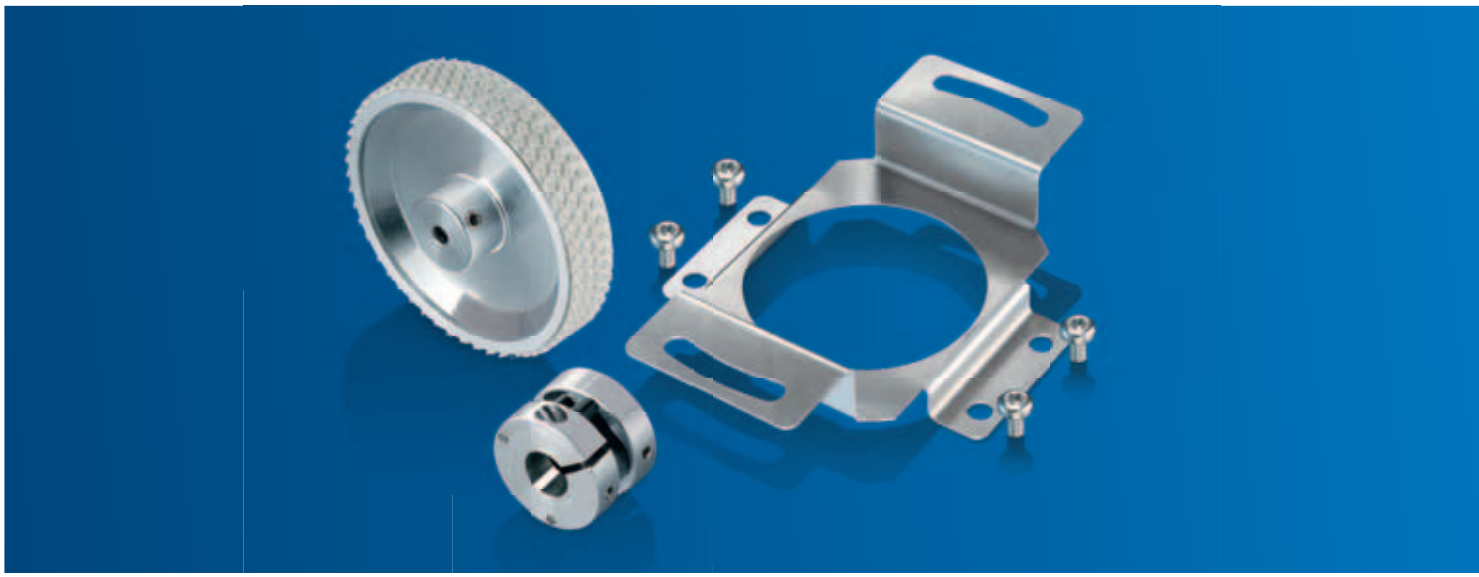
Features	■ Sensing range 360° ■ One-dimensional	■ Sensing range ±15° / ±30° / ±60° ■ Two-dimensional
Product family	GNAMG	GNAMG

Interface		
- CANopen®	■	■
- Profibus-DP	■	■
Sensing method	MEMS	MEMS
Size (housing)	99 x 60 x 5 mm	99 x 60 x 5 mm
Voltage supply	10...30 VDC	10...30 VDC
Connection	Cable gland Flange connector M12	Cable gland Flange connector M12
Resolution	0.1°	0.001...1°
Accuracy		
- Sensing range 360°	±0.2°	–
- Sensing range ±15°	–	±0.1°
- Sensing range ±30°, ±60°	–	±0.2°
Operating temperature	-25...+85 °C	-25...+85 °C
Protection	IP 66 (flange connector M12) IP 67 (cable gland)	IP 66 (flange connector M12) IP 67 (cable gland)
Options	Stainless steel Operating temperature -40...+85 °C	Stainless steel Operating temperature -40...+85 °C

Electronic water scales

Inclination sensors are electronic water scales: By sensing the misalignment to the horizontal line they crucially contribute towards enhanced safety. Integrated common fieldbus interfaces such as CANopen® and Profibus simplify the use of inclination sensors in measuring and sensing technology. The tasks for inclination sensors are manifold, ranging from accident prevention at cranes, excavators and floor conveyors up to level sensing tasks and machine monitoring.

Accessories



Mounting accessories for hollow shaft encoders

Matching accessories for
hollow shaft mount

- Stator couplings for ultra-precise mount with maximum installation flexibility
- Safe and easy anti-torsion spring washers and pins
- Torque supports for industry and HeavyDuty variants

Mounting accessories for solid shaft encoders

Matching accessories for
solid shaft mount

- Shaft couplings to link drive shaft and encoder shaft
- Mounting clamp to secure encoder flange
- Adatpor flange and mounting angle for quick and safe encoder mount
- Flange adaptor, for example to change a clamping flange into a synchro flange

Programming and diagnostic tools

For encoder commissioning
and configuration

- Signal processing for interpolation, conversion, regenerating and as a switching relay, HTL, TTL, SinCos and fiber-optic
- Programming tools with GSD-/EDS-/XML files as well as instruction manuals, USB adatpor and PC software
- Testing equipment for incremental encoders for consistent monitoring of encoder data
- PC software for display and evaluation

Encoders and angular sensors

Several mechanical and electric interface concepts as well as increasingly demanding applications call for appropriate accessories. With Baumer you will always encounter the matching mounting accessories like torque supports, spring washers, connectors and cables.

Deployed in conjunction with incremental encoders, measuring wheels perform the task of length measurement or speed monitoring. Learn more at: www.baumer.com

Varied connectors and cables

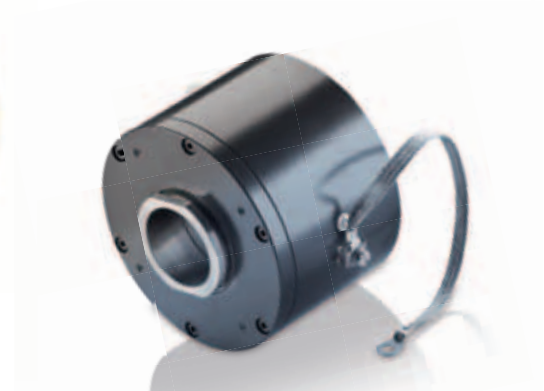
Matching all encoders and angular sensors

- Mating connector M12, M23, MIL and other standards
- Mating connector pre-assembled or for self-assembly
- Different cables, non-assembled

Small and large measuring wheels

Measuring wheels – for any surface the optimum grip

- Wheel material and surface profile depending on the application
- Circumference 20 or 50 cm
- For shaft diameters from 4 to 12 mm



Motor earthing units with hollow shaft

To discharge parasetic shaft currents

- For use in potentially explosive areas
- Hollow shafts from ø20 to ø42 mm

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Worldwide presence.

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Baumer
Passion for Sensors

Baumer Group
International Sales
P.O. Box · Hummelstrasse 17 · CH-8501 Frauenfeld
Phone +41 (0)52 728 1122 · Fax +41 (0)52 728 1144
sales@baumer.com · www.baumer.com

Represented by:

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