Baumer
Passion for Sensors

Encoders and angle measurement

Flexible, robust, precise

Product overview – Edition 2017

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 sensors – precise, compacte and reliable.

Baumer offers a broad portfolio of standard products based on a multitude of sensor technologies. Our customers benefit from the comprehensive consultation and reliable service we provide around the world. In close collaboration with them we develop specific solutions with distinct advantages in cost and performance. Our customers benefit from our international development teams, the considerable diversity of our production facilities and optimized business processes, which guarantee maximum flexibility and promptness in the implementation of customer requirements.

Learn more.
Detailed technical information, data sheets, tutorials and the Baumer product finder can be found at:
www.baumer.com

Content.

Flexible, robust and precise.

OptoPulse® 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.
Up to 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			
Size (housing)	ø24 mm		ø30 mm	ø40 mm
Voltage supply	5 VDC ±5 %, 8...30 VDC		5 VDC ±10 %, 10...30 VDC	
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	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	
- Cable	Radial / axial	Radial	Radial / axial	Radial
Pulses per revolution	30...1024		10...2048	
Operating temperature	-20...+85 °C			
Protection	IP 54		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.
Up to 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	**BRIV 30** - *EcoMag*	**BRIV 30R** - *EcoMag*	**BRIH 40** - *EcoMag*

Sensing method	Magnetic		
Size (housing)	ø30 mm	ø30 mm	ø40 mm
Voltage supply	5 VDC ±10 %, 20...28 VDC		
Output stage			
- TTL/RS422	■	■	■
- HTL/push-pull	■	■	■
Output signals	A 90° B, N + inverted		
Shaft type			
- Solid shaft	ø5 mm	ø6 mm, ø8 mm	–
- Blind hollow shaft	–	–	ø6 mm, ø12 mm
Connection			
- Flange connector M9	Radial	Radial / axial	Radial
- Cable	Radial / axial	Radial / axial	Radial
Pulses per revolution	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		
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			
Size (housing)	ø58 mm			
Voltage supply	5 VDC ±5 %, 8...30 VDC, 4.75...30 VDC			
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	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
- Cable	Radial / axial / tangential			Radial / tangential
Pulses per revolution	100...5000			
Operating temperature	-40...+85 °C (option: +100 °C)			
Protection	IP 65, IP 67			
Operating speed	≤12 000 rpm (IP 65) ≤6000 rpm (IP 67)		≤8000 rpm (IP 65) ≤6000 rpm (IP 67)	≤6000 rpm (IP 65) ≤3000 rpm (IP 67)
Max. shaft load	≤40 N axial, ≤80 N radial		–	–
Option	Square flange, programmable		Isolated hollow shaft, hybrid bearings, programmable	

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			
Size (housing)	ø58 mm			
Voltage supply	5 VDC ±10 %, 10...30 VDC			
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	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			
- Cable	Radial			
Pulses per revolution	64...2048			
Operating temperature	-20...+85 °C			
Protection	IP 42, IP 65			
Operating speed	≤12 000 rpm (IP 42), ≤6000 rpm (IP 65)			
Max. shaft load	≤40 N axial, ≤60 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 clamping flange ■ Max. 320 000 pulses per revolution	■ Solid shaft with synchro flange ■ Max. 320 000 pulses per revolution
Product family	GI355	GI356	G0355	G0356	BDH HighRes	BDT HighRes
Sensing method	Optical					
Size (housing)	ø58 mm					
Voltage supply	5 VDC ±10 %, 4.75...30 VDC, 10...30 VDC				5 VDC ±10 %, 10...30 VDC	
Output stage						
- TTL/RS422	■		■		■	■
- HTL/push-pull	■		■		■	■
Output signals	A 90° B, N + inverted					
Shaft type						
- Solid shaft	ø10 mm	ø6 mm	ø10 mm	ø6 mm	ø10 mm	ø6 mm
Flange	Clamping flange	Synchro flange	Clamping flange	Synchro flange	Clamping flange	Synchro flange
Connection						
- Flange connector M23	Radial / axial				Radial	
- Cable	Radial / axial				Radial	
Pulses per revolution	5...6000		6000...80 000		7200...320 000	
Operating temperature	-20...+85 °C (-20...+100 °C)				-20...+85 °C	
Protection	IP 54, IP 65				IP 42, IP 65	
Operating speed	≤10 000 rpm				≤6000 rpm	
Max. shaft load	≤20 N axial, ≤40 N radial				≤40 N axial, ≤60 N radial	≤10 N axial, ≤20 N radial
Options	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			
Size (housing)	ø58 mm			
Voltage supply	5 VDC ±10 %, 4.75...30 VDC, 10...30 VDC		5 VDC ±10 %, 10...30 VDC	
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	A 90° B, N + inverted			
Shaft type				
- Blind hollow shaft	–	–	ø12 mm	–
- Through hollow shaft	ø12...14 mm	ø10...14 mm	–	ø12 mm
Connection				
- Flange connector M23	Radial / axial	–	Radial	
- Cable	Radial	Tangential	Radial	
Pulses per revolution	6000...80 000	100...80 000	4096...320 000	
Operating temperature	-25...+85 °C	-30...+100 °C	-20...+85 °C	
Protection	IP 54	IP 54, IP 65	IP 42, IP 65	
Operating speed	≤6000 rpm			
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

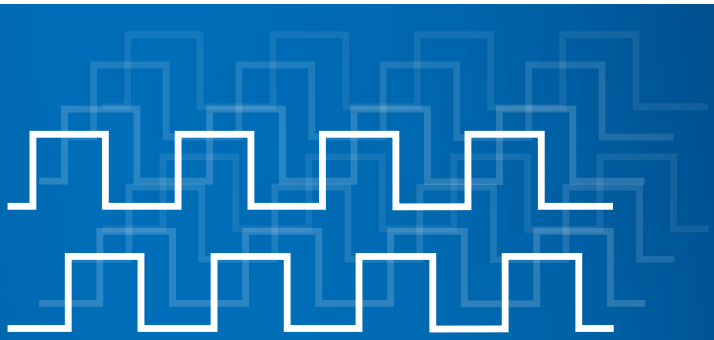
HighRes – max. 80 000 pulses per revolution




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				
Size (housing)	ø80 mm		ø75 mm		ø3.15" (ø80 mm)
Voltage supply	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				
Shaft type					
- Blind hollow shaft	–	–	–	ø20 mm, ø25 mm	–
- Through hollow shaft	ø17...27 mm	ø17...30 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				
Pulses per revolution	200...2048	2000...10 000	1024...16 384		1024...80 000
Operating temperature	-20...+70 °C, -20...+100 °C		-20...+85 °C		-40...+100 °C (-40...+212 °F)
Protection	IP 65		IP 54		IP 54, IP 65, IP 67
Operating speed	≤5000 rpm, ≤3000 rpm (>70 °C)		≤3800 rpm		≤5000 rpm
Options	Torque support with electric isolation Stainless steel variant		–		–

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 ■ Clamping at B side	■ Through hollow shaft max. ø65 mm ■ Clamping at B side	■ Through hollow shaft max. ø85 mm ■ Bearingless
Product family	ITD 61	ITD 70	ITD 75

Sensing method	Optical		
Size (housing)	ø120 mm	ø150 mm	
Voltage supply	4.75...30 VDC	5 VDC ±5 %, 8...30 VDC	
Output stage			
- TTL/RS422	■	■	■
- HTL/push-pull	■	■	■
Output signals	A 90° B, N + inverted		
Shaft type			
- Through hollow shaft	ø30...50 mm	ø38...65 mm	ø60...85 mm
Connection			
- Flange connector M23	–	Radial	–
- Cable	Radial		
Pulses per revolution	1024...4096	1000...2500	
Operating temperature	-20...+85 °C	-20...+70 °C	
Protection	IP 54		
Operating speed	≤4000 rpm (+70 °C) ≤3000 rpm (+85 °C)	≤3000 rpm	
Options	Stainless steel variant Cable with connector	Cable with connector	

Incremental encoders
Programmable

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

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

Features	■ Solid shaft max. ø6 mm	■ Through hollow shaft max. ø12 mm ■ Max. 320 000 pulses per revolution	■ Blind hollow shaft max. ø12 mm ■ Max. 320 000 pulses per revolution	■ Through hollow shaft max. ø14 mm ■ Detachable cable
Product family	**BNIV**	**BHG HighRes**	**BHF HighRes**	**ITD2PH00**

Configurable parameters	Pulses per revolution			Pulses per revolution, output stage HTL or TTL, zero pulse, signal sequence
Configuration	HEX switch	Programming software, programming tool		
Sensing method	Optical			
Size (housing)	ø40 mm			
Voltage supply	4.75...30 VDC	5 VDC ±10 %, 10...30 VDC		4.75...30 VDC
Output stage				
- TTL/RS422	■	■	■	–
- HTL/push-pull	■	■	■	■
Output signals	A 90° B, N + inverted			
Shaft type				
- Solid shaft	ø6 mm	–	–	–
- Blind hollow shaft	–	–	ø12 mm	–
- Through hollow shaft	–	ø12 mm	–	ø10 mm, ø12 mm, ø14 mm
Connection				
- Flange connector M12	Radial	–	Radial	–
- Flange connector M23	–	Radial	–	–
- Cable	Radial			Tangential
Pulses per revolution	100...25 000	4096...320 000		1...65536
Operating temperature	-20...+85 °C			-30...+100 °C
Protection	IP 64	IP 42, IP 65		IP 65
Operating speed	≤3000 rpm	≤6000 rpm		
Max. shaft load	≤10 N axial, ≤40 N radial	–	–	–

Incremental encoders
Programmable

Maximum flexibility by versatile configuration options.

HighRes – max. 320 000 pulses per revolution



Features	■ Through hollow shaft max. ø25.4 mm	■ Solid shaft with clamping flange max. ø10 mm or synchro flange max. ø6 mm		■ Blind or through hollow shaft max. ø15 mm	
Product family	**HS35P**	**EIL580P-SC**	**EIL580P-SY**	**EIL580P-B**	**EIL580P-T**
Configurable parameters	Pulses per revolution, output stage HTL or TTL, zero pulse	Pulses per revolution, output stage HTL or TTL, zero pulse, signal sequence			
Configuration	Programming software, programming tool				
Sensing method	Optical				
Size (housing)	ø3.15" (ø80 mm)	ø58 mm			
Voltage supply	4.75...30 VDC				
Output stage					
- TTL/RS422	■	■	■	■	■
- HTL/push-pull	■	■	■	■	■
Output signals	A 90° B, N + inverted	A 90° B, R + inverted			
Shaft type					
- Solid shaft	–	ø10 mm	ø6 mm	–	–
- Blind hollow shaft	–	–	–	ø8...15 mm	–
- Through hollow shaft	ø0.375...1" (ø9.525...25.4 mm)	–	–	–	ø8...15 mm
Connection					
- Flange connector M23	–	Radial / axial			Radial
- Flange connector MIL	Radial	–		–	
- Cable	Radial	Radial / axial / tangential			Radial / tangential
Pulses per revolution	1...8192	1...65536			
Operating temperature	-40...+100 °C (-40...+212 °F)	-40...+100 °C			
Protection	IP 65, IP 67				
Operating speed	≤5000 rpm	≤12 000 rpm (IP 65) ≤6000 rpm (IP 67)		≤8000 rpm (IP 65), ≤6000 rpm (IP 67)	≤6000 rpm (IP 65), ≤3000 rpm (IP 67)
Max. shaft load	–	≤40 N axial, ≤80 N radial		–	–
Option	–	Isolated hollow shaft, flange variant, connector variant			

Incremental encoders
Sine/Cosine

				
Features	■ Solid shaft with synchro flange	■ Blind hollow shaft up to ø12 mm	■ Through hollow shaft	■ Blind hollow shaft up to ø10 mm ■ Inside flexible coupling
Product family	**BDT Sine**	**BHF Sine**	**BHG Sine**	**BHT Sine**

Sensing method	Optical			
Size (housing)	ø58 mm			
Voltage supply	5 VDC ±5 %			
Output stage	SinCos 1 Vpp			
Shaft type				
- Solid shaft	ø6 mm	–	–	–
- Blind hollow shaft	–	ø12 mm	–	ø9.52 mm, ø10 mm
- Through hollow shaft	–	–	ø12 mm	–
Connection				
- Flange connector M12	–	Radial		
- Flange connector M23	Radial / axial	Radial		
- Cable	Radial / axial	Radial		
Sine waves per revolution	1000...5000			
Operating temperature	-20...+85 °C			
Protection	IP 42, IP 65			IP 65
Operating speed	≤12 000 rpm (IP 42), ≤6000 rpm (IP 65)			≤6000 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	■ Through hollow shaft
Product family	**ITD22H00**	**HS35S**	**ITD 42 A4 Y79**

Sensing method	Optical / *LowHarmonics*		
Size (housing)	ø58 mm	ø3.15" (ø80 mm)	ø80 mm
Voltage supply	5 VDC ±10 %	4.75...30 VDC	5 VDC ±10 %, 8...30 VDC
Output stage	SinCos 1 Vpp		
Shaft type			
- 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
Sine waves per revolution	1024...2048	1024...5000	1024...2048
Operating temperature	-30...+100 °C	-40...+100 °C (-40...+212 °F)	-20...+85 °C
Protection	IP 65	IP 65, IP 67	IP 65
Operating speed	≤6000 rpm	≤5000 rpm (IP 65) ≤3000 rpm (IP 67)	≤5000 rpm

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	■ Solid shaft with square flange ■ Inch size ■ Max. 5000 pulses per revolution	■ Blind or through hollow shaft ■ Max. 5000 pulses per revolution		■ Through hollow shaft ■ Inch size ■ Max. 80 000 pulses per revolution ■ Isolated shaft
Product family	**G25**	**EIL580-SQ** - *OptoPulse®*	**EIL580-B**	**EIL580-T**	**HS35**
Sensing method	Optical				
Size (housing)	2.5 x 2.5" (63.5 x 63.5 mm)	2.5 x 2.5" (63.5 x 63.5 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, R + inverted			A 90° B, N + inverted
Shaft type					
- Solid shaft	ø0.375" (ø9.52 mm)	ø10 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
- Flange connector M12, M23	–	Radial / axial	Radial / axial	Radial	–
- Cable	Radial	Radial / axial / tangential	Radial / axial / tangential	Radial / tangential	–
Pulses per revolution	5...6000	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 (optional +100 °C)			-40...+100 °C (-40...+212 °F)
Protection	IP 54 (without shaft seal) IP 67 (with shaft seal)	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)			≤5000 rpm
Max. shaft load	≤80 lbs (350 N) axial/radial ≤100 lbs (450 N) axial or ≤150 lbs (670 N) radial	–	–		–
Options	–	Programmable	Programmable Isolated hollow shaft		Programmable

Incremental encoders
Other designs




Features	■ Solid shaft with EURO flange B10 ■ Max. 5000 pulses per revolutions	■ Solid shaft with EURO flange B10 ■ Max. 2048 pulses per revolution	■ 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	**EIL580-S1** - *OptoPulse®*	**ITD 40 B10**	**ITD 41 B10**	**MA20**
Configurable parameters	–	–	–	16 pre-defined resolutions
Configuration	–	–	–	HEX switch
Sensing method	Optical			
Size (housing)	ø58 mm	ø82 mm		ø40 mm (encoder)
Voltage supply	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, R + inverted	A 90° B, N + inverted		A 90° B
Shaft type				
- Solid shaft	ø11 mm			ø6 mm
Connection				
- Flange connector M12	Radial	–	–	Radial
- Flange connector M23	Radial	–	–	–
- Cable	Radial			
Pulses per revolution	100...5000	200...2048	1000...6000	100...25 000
Operating temperature	-40...+85 °C (optional +100 °C)	-20...+70 °C (-20...+100 °C)		-20...+85 °C
Protection	IP 65, IP 67	IP 65		IP 64
Operating speed	≤12 000 rpm (IP 65) ≤6000 rpm (IP 67)	≤12 000 rpm	≤6000 rpm	≤3000 rpm
Max. shaft load	≤40 N axial, ≤80 N radial	≤40 N axial, ≤60 N radial		–
Options	–	Seawater resistant Cable with connector		Measuring wheels available with different rubber surface

Absolute flexibility.

Absolute encoders in ø58 mm size:
EAL580 with clamping flange

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 turn 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
Size up to 36 mm

Robust magnetic precise sensing.
Integrated interface.

- Solid shaft and blind hollow shaft
- Compact housing where space is tight
- Shock resistant up to 500 g
- Angular accuracy up to ±0.15°

CANopen
SAE J1939
SSI

MAGRES

New

New

New

New

Features	■ Solid shaft with flat mounting flange	■ Solid shaft with synchro flange	■ Solid shaft with synchro flange ■ E1 compliant design ■ Corrosion protection C5-M	■ Blind hollow shaft
Product family	**EAM280**	**EAM360** - *MAGRES*	**EAM360R** - *MAGRES*	**EAM360** - *MAGRES*
Interface				
- SSI	–	■	–	■
- Analog	■	–	■	–
- CANopen® / redundant	– / ■	■ / –	■ / –	■ / –
- CANopen® Lift	–	■	–	■
- SAE J1939	–	–	■	–
Function principle	Singleturn	Multiturn | Singleturn	Multiturn | Singleturn	Multiturn | Singleturn
Sensing method	Magnetic			
Size (housing)	ø28.6 mm	ø36 mm		
Voltage supply	10...30 VDC (CANopen®) 12...30 VDC (Analog) 5 VDC ±5 % (Analog)	4.5 ... 30 VDC (CANopen®, SAE J1939, SSI) 8 ... 30 VDC / 14 ... 30 VDC (Analog - depending on type)		
Shaft type				
- Solid shaft	ø6 mm	ø10 mm	ø10 mm	–
- Blind hollow shaft	–	–	–	ø12 mm, ø14 mm, ø15 mm
Connection				
- Flange connector M12	Radial	Radial	Radial	Radial
- Cable	Radial	Radial (0.14 mm²)	Radial (0.5 mm²)	Radial (0.14 mm²)
Total resolution	≤12 bit (Analog) ≤14 bit (CANopen®)	≤32 bit | ≤14 bit	≤32 bit | ≤14 bit	≤32 bit | ≤14 bit
Steps per turn	4096/12 bit (Analog) 16384/14 bit (CANopen®)	≤16384/14 bit | ≤16384/14 bit	≤16384/14 bit | ≤16384/14 bit	≤16384/14 bit | ≤16384/14 bit
Number of turn	–	≤262144/18 bit | –	≤262144/18 bit | –	≤262144/18 bit | –
Absolute accuracy	±1.8°	Up to ±0.25° (+25 °C)		
Operating temperature	-40...+85 °C			
Protection	IP 65, IP 67	IP 65, IP 67	IP 67	IP 65, IP 67
Operating speed	≤800 rpm	≤6000 rpm		
Max. shaft load	≤25 N axial, ≤25 N radial	≤40 N axial, ≤80 N radial		
Options	Cable with Deutsch connector	Additional incremental signals (SSI, CANopen®)	Additional incremental signals (SSI, CANopen®) Cable with Deutsch connector	Additional incremental signals (SSI, CANopen®)

Absolute encoders
Size up to 36 mm

Robust magnetic precise sensing.
Integrated interface.

- Solid shaft and blind hollow shaft
- Compact housing where space is tight
- Shock resistant up to 500 g
- Angular accuracy up to ±0.15°

New

MAGRES

Features	■ Blind hollow shaft ■ E1 compliant design ■ Corrosion protection C5-M
Product family	EAM360R - *MAGRES*

Interface		
- Analog	■	
- CANopen® / redundant	■ / –	
- SAE J1939	■	
Function principle	Multiturn	Singleturn
Sensing method	Magnetic	
Size (housing)	ø36 mm	
Voltage supply	4.5 ... 30 VDC (CANopen®, SAE J1939, SSI) 8 ... 30 VDC / 14 ... 30 VDC (Analog - depending on type)	
Shaft type		
- Blind hollow shaft	ø12 mm, ø14 mm, ø15 mm	
Connection		
- Flange connector M12	Radial	
- Cable	Radial (0.5 mm²)	
Total resolution	≤32 bit	≤14 bit
Steps per turn	≤16384/14 bit	≤16384/14 bit
Number of turn	≤262144/18 bit	–
Absolute accuracy	Up to ±0.25° (+25 °C)	
Operating temperature	-40...+85 °C	
Protection	IP 67	
Operating speed	≤6000 rpm	
Max. shaft load	≤40 N axial, ≤80 N radial	
Options	Additional incremental signals (SSI, CANopen®) Cable with Deutsch connector	

MAGRES

The *MAGRES* absolute encoders operate on both magnetic singleturn and multiturn sensing – entirely non-contact and with high resolutions up to 14 bit singleturn.

Absolute encoders
Size 58 mm

Robust magnetic precise sensing.
Integrated interface.

- Solid shaft and blind hollow shaft
- Compact housing where space is tight
- Shock resistant up to 500 g
- Angular accuracy up to ±0.15°

PROFINET® SSI SAE J1939 CANopen

MAGRES

New

New

New

New

Features	■ Solid shaft with clamping or synchro flange	■ Solid shaft with clamping or synchro flange ■ E1 compliant design ■ Corrosion protection C5-M	■ Blind hollow shaft	■ Blind hollow shaft ■ E1 compliant design ■ Corrosion protection C5-M
Product family	**EAM580** - *MAGRES*	**EAM580R** - *MAGRES*	**EAM580** - *MAGRES*	**EAM580R** - *MAGRES*
Interface				
- SSI	■	–	■	–
- Analog	–	■	–	■
- CANopen® / redundant	■ / –	■ / ■	■ / –	■ / ■
- CANopen® Lift	■	–	■	–
- SAE J1939	–	■	–	■
- Profinet	■	–	■	–
Function principle	Multiturn | Singleturn	Multiturn | Singleturn	Multiturn | Singleturn	Multiturn | Singleturn
Sensing method	Magnetic			
Size (housing)	ø58 mm			
Voltage supply	4.5 ... 30 VDC (CANopen, SAE J1939, SSI) 8 ... 30 VDC / 14 ... 30 VDC (Analog - depending on type) 10 ... 30 VDC (Ethernet)			
Shaft type				
- Solid shaft	ø6 mm, ø10 mm		–	
- Blind hollow shaft	–		ø12 mm, ø14 mm, ø15 mm	
Connection				
- Flange connector M12	Radial	Radial	Radial	Radial
- Flange connector M23	Radial	–	Radial	–
- Cable	Radial (0.14 mm²)	Radial (0.5 mm²)	Radial (0.14 mm²)	Radial (0.5 mm²)
Total resolution[1)]	≤32 bit | ≤14 bit	≤32 bit | ≤14 bit	≤32 bit | ≤14 bit	≤32 bit | ≤14 bit
Steps per turn	≤16384/14 bit | ≤16384/14 bit	≤16384/14 bit | ≤16384/14 bit	≤16384/14 bit | ≤16384/14 bit	≤16384/14 bit | ≤16384/14 bit
Number of turn	≤262144/18 bit | –	≤262144/18 bit | –	≤262144/18 bit | –	≤262144/18 bit | –
Absolute accuracy	Up to ±0.25° (+25 °C)			
Operating temperature	-40...+85 °C			
Protection	IP 65, IP 67	IP 67	IP 65, IP 67	IP 67
Operating speed	≤6000 rpm			
Max. shaft load	≤40 N axial, ≤80 N radial			
Options	Additional incremental signals (SSI, CANopen®)	Additional incremental signals (SSI, CANopen®) Cable with Deutsch connector	Additional incremental signals (SSI, CANopen®)	Additional incremental signals (SSI, CANopen®) Cable with Deutsch connector

Absolute encoders
Size 58 mm

Robust magnetic sensing.
Integrated interface and modular bus covers.

- Solid shaft with clamping and synchro flange
- Blind hollow shaft
- Operating temperature down to -40 °C
- Hermetically sealed, compliance up to IP 69K
- Stainless steel design

MAGRES




Features	■ Solid shaft with clamping or synchro flange ■ Modular bus cover		■ Blind hollow shaft ■ Modular bus cover		■ Solid shaft with clamping flange ■ Multiturn ■ Hermetically sealed ■ Integrated interfaces	■ Solid shaft with clamping flange ■ Multiturn ■ Hermetically sealed ■ Modular bus cover
Product family	**BMMV 58 flexible**	**BMSV 58 flexible**	**BMMH 58 flexible**	**BMSH 58 flexible**	**BMMV 58 -** *MAGRES hermetic*	**BMMV 58 flexible -** *MAGRES hermetic*
Interface						
- SSI	–		–		■	–
- CANopen®	■		■		■	■
- DeviceNet	■		■		–	■ 2)
- Profibus-DP	■		■		■	■
- SAE J1939	■		■		–	■
- EtherCAT/PoE	■		■		–	■ 2)
- EtherNet/IP	■		■		–	■
- Powerlink	■		■		–	■ 2)
- Profinet	■		■		–	■
Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Multiturn
Sensing method	Magnetic					
Size (housing)	ø58 mm					
Voltage supply	10...30 VDC					
Shaft type						
- Solid shaft	ø6 mm, ø10 mm		–		ø10 mm	
- Blind hollow shaft	–		ø12 mm		–	
Connection	Bus cover with cable gland				Flange connector M12	
Total resolution[1]	≤30 bit	≤12 bit	≤30 bit	≤12 bit	≤29 bit	≤30 bit
Steps per turn	≤4096/12 bit				≤4096/12 bit ≤8192/13 bit (Profibus)	≤4096/12 bit
Number of turn	≤262144/18 bit	–	≤262144/18 bit	–	≤65536/16 bit (Profibus) ≤262 144/18 bit	≤65536/16 bit ≤262 144/18 bit (CANopen®)
Absolute accuracy	±1°					
Operating temperature	-40...+85 °C					
Protection	IP 65, IP 67				IP 68, IP 69 K	
Operating speed	≤6000 rpm					
Max. shaft load	≤40 N axial, ≤80 N radial		–		≤120 N axial, ≤280 N radial	

1) depending on interface
2) on request

Absolute encoders
Size 58 mm

Precise optical sensing.
Integrated interface.

- Resolution up to 13 bit per turn
- High accuracy up to ±0.025°
- Operating temperature down to -40 °C
- Additional incremental signals

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



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	–	–	–	–	–
- Profinet	EAL580-SC		EAL580-SY		EAL580-B		EAL580-T	
Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical							
Size (housing)	ø58 mm							
Voltage supply	10...30 VDC							
Shaft type								
- Solid shaft	ø10 mm		ø6 mm		–		–	
- Blind hollow shaft	–		–		ø10...15 mm		–	
- Through hollow shaft	–		–		–		ø10...14 mm	
Connection	Flange connector M12, M23, M27, D-SUB or cable (depending on product and variant)							
Total resolution[1)]	≤29 bit	≤13 bit	≤29 bit	≤13 bit	≤29 bit	≤13 bit	≤29 bit	≤13 bit
Steps per turn	≤8192/13 bit							
Number of turn	≤65536/16 bit	–	≤65536/16 bit	–	≤65536/16 bit	–	≤65536/16 bit	–
Absolute accuracy	±0.025°							
Protection	IP 65				IP 54			
Operating temperature	-40...+85 °C (depending on product and variant)							
Operating speed	≤6000 rpm							
Max. shaft load	≤20 N axial, ≤40 N radial				–			
Options	Stainless steel, Offshore		–		–		Protection IP 65	

Absolute encoders
Size 58 mm

Precise optical sensing.
Integrated interface.

- 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	
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	ATD 2B B14	–	ATD 2B B14	–	ATD 2B A4	–	ATD 4B A4	–
- BiSS C	GBPAW	GBUAW	GBPAW	GBUAW	GBPAS	GBUAS	GBPAH	GBUAH
- Profinet	EAL580-SC		EAL580-SY		EAL580-B		EAL580-T	

Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical							
Size (housing)	ø58 mm							
Voltage supply	10...30 VDC							
Shaft type								
- Solid shaft	ø10 mm		ø6 mm		–		–	
- Blind hollow shaft	–		–		ø10...15 mm		–	
- Through hollow shaft	–		–		–		ø10...14 mm	
Connection	Flange connector M12, M23, D-SUB or cable (depending on product and variant)							
Total resolution[1)]	≤32 bit	≤18 bit	≤32 bit	≤18 bit	≤32 bit	≤18 bit	≤32 bit	≤18 bit
Steps per turn	≤262144/18 bit							
Number of turn	≤16384/14 bit	–	≤16384/14 bit	–	≤16384/14 bit	–	≤16384/14 bit	–
Absolute accuracy	±0.01°							
Protection	IP 65				IP 54 (IP 65 optional)		IP 54	
Operating temperature	-40...+85 °C (depending on product and variant)							
Operating speed	≤6000 rpm							
Max. shaft load	≤20 N axial, ≤40 N radial				–			

1) depending on interface
2) on request

Absolute encoders
Size 58 mm

Precise optical sensing.
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	■		■		■		■	
- SAE J1939	■		■		■		–	
- EtherCAT	■		■		■		–	
- EtherNet/IP	■		■		■		■	
- Powerlink	■		■		■		–	
Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical							
Size (housing)	ø58 mm							
Voltage supply	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)							
Total resolution	≤29 bit	≤13 bit	≤29 bit	≤13 bit	≤29 bit	≤13 bit	≤29 bit	≤13 bit
Steps per turn	≤8192/13 bit							
Number of turn	≤65536/16 bit	–	≤65536/16 bit	–	≤65536/16 bit	–	≤65536/16 bit	–
Absolute accuracy	±0.025°							
Protection	IP 54, IP 65						IP 54	
Operating speed	≤6000 rpm							
Operating temperature	-25...+85 °C							
Max. shaft load	≤20 N axial, ≤40 N radial				–		–	
Options	Incremental outputs Stainless steel variant Operating temperature -40...+85 °C						Protection IP 69K Stainless steel variant Operating temperature -40...+85 °C	

Absolute encoders
Size 58 mm

Precise optical sensing.
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	■		■		■		■	
- SAE J1939	■		■		■		–	
- EtherCAT	■		■		■		–	
- EtherNet/IP	■		■		■		■	
- Powerlink	■		■		■		–	
Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical							
Size (housing)	ø58 mm							
Voltage supply	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)							
Total 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°							
Protection	IP 54, IP 65						IP 54	
Operating speed	≤6000 rpm							
Operating temperature	-25...+85 °C							
Max. shaft load	≤20 N axial, ≤40 N radial				–		–	
Options	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

SSI

Features	■ Through hollow shaft up to ø25.4 mm ■ Integrated interface SSI	■ Through hollow shaft up to ø50.8 mm ■ Integrated interface SSI	■ Through hollow shaft up to ø27 mm ■ Integrated interface SSI and optional incremental signals
Product family	G1M2H	G2M2H	ATD 4S A4
Interface			
- SSI / SSI/incremental	■ / –	■ / –	■ / ■
Function principle	Multiturn		Singleturn / Multiturn
Sensing method	Optical		
Size (housing)	ø90 mm	ø116 mm	ø80 mm
Voltage supply	10...30 VDC		
Shaft type			
- Through hollow shaft	ø25.4 mm	ø50.8 mm	ø20...27 mm
Connection			
- Flange connector M23	Radial		
- Cable	–	–	Radial
Total resolution	≤25 bit		
Steps per turn	≤8192/13 bit		
Number of turn	≤4096/12 bit		
Absolute accuracy	±0.025°		±0.02°
Operating temperature	-25...+85 °C		-20...+85 °C
Protection	IP 54		IP 65
Operating speed	≤3800 rpm	≤2000 rpm	≤5000 rpm
Options	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 up to ø25.4 mm ■ Modular bus cover	■ Through hollow shaft up to ø50.8 mm ■ Modular bus cover	■ Through hollow shaft up to ø27 mm ■ Integrated interface EtherCAT
Product family	G1MMH	G2MMH	ATD 4B A4 Y11
Interface			
- CANopen®	■	■	–
- DeviceNet	■	■	–
- Profibus-DP	■	■	–
- EtherCAT	–	–	■
Function principle	Multiturn		
Sensing method	Optical		
Size (housing)	ø90 mm	ø116 mm	ø80 mm
Voltage supply	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)		
Total resolution	≤29 bit		
Steps per turn	≤8192/13 bit		≤131072/17 bit
Number of turn	≤65536/16 bit		
Absolute accuracy	±0.025°		±0.02°
Operating temperature	-25...+85 °C		-20...+85 °C
Protection	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 Operating modes
Options	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
- Synchro or 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 <70 mm	■ Solid shaft with EURO flange B10 ■ Corrosion protection C4 ■ Housing uncoated (POG 86E)		■ Solid shaft with EURO flange B10 ■ Pulses per revolution up to 5000
Product family	OG 71	OG 9	POG 86E	POG 86	POG 9

Sensing method	Optical				
Size (housing)	ø58 mm	ø115 mm			
Voltage supply	5 VDC ±5 %, 9...26 VDC	5 VDC ±5 %, 9...30 VDC			
Output stage					
- TTL/RS422	■	■	■	■	■
- HTL/push-pull	■	–	–	–	–
- HTL-P (Power Linedriver)	–	■	■	■	■
- LWL (fiber-optic interface)	With fiber-optic transducer (Outdoor-Box)				
Output signals	K1, K2, K0 + inverted				
Shaft type					
- Solid shaft	ø6 mm	ø11 mm			
Flange	Synchro flange	EURO flange B10			
Connection	Terminals	Terminal box			
Pulses per revolution	100...1024	1...1250	512...2500	500...5000	300...5000
Operating temperature	-20...+85 °C	-30...+100 °C	-40...+100 °C		-30...+100 °C
Protection	IP 66	IP 55	IP 56		
Operating speed	≤10 000 rpm	≤12 000 rpm			
Max. shaft load	≤30 N axial, ≤40 N radial	≤250 N axial, ≤450 N radial			
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)				
Options	–	–	Function monitoring EMS Dual shaft Centrifugal switch (FSL)		Function monitoring EMS Dual shaft Speed switches (FSL, ESL) Twin encoder POG 9 G

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. This allows for direct TTL signal supply in extended transmission length of more than 500 m and yet extremely compact housings. 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 ■ Pulses per revolution up to 5000 ■ High protection IP 66	■ Solid shaft with EURO flange B10 ■ Corrosion protection C5-M	■ Solid shaft with EURO flange B10 ■ Pulses per revolution up to 10000	■ Solid shaft with EURO flange B10 ■ IECEx certification
Product family	POG 10	POG 11	POG 90	EEx OG 9
Sensing method	Optical			
Size (housing)	ø115 mm			ø120 mm
Voltage supply	5 VDC ±5 %, 9...30 VDC			
Output stage				
- TTL/RS422	■	■	■	■
- HTL-P (Power Linedriver)	■	■	■	■
- LWL (fiber-optic interface)	With fiber-optic transducer (Outdoor-Box)			
Output signals	K1, K2, K0 + inverted			
Shaft type				
- Solid shaft	ø11 mm			
Flange	EURO flange B10			
Connection	Terminal box, rotatable			
Pulses per revolution	300...5000		1024...10000	25...5000
Operating temperature	-40...+100 °C -50...+100 °C (option)		-20...+85 °C	-40...+55 °C (<500 pulses) -50...+55 °C (<500-2500 pul.) -25...+55 °C (>3072 pulses)
Protection	IP 66	IP 67	IP 66	IP 56
Operating speed	≤12 000 rpm			
Max. shaft load	≤300 N axial, ≤450 N radial			≤200 N axial, ≤350 N radial
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)			Ex II 2G IIC (ATEX/IECEx)
Options	Function monitoring EMS Redundant (POG 10M) Housing foot B3	Function monitoring EMS Redundant (POG 11M) Housing foot B3	Dual shaft Centrifugal switch (FSL) Speed switch (ESL) Housing foot B3	–

EURO flange B10

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

HeavyDuty
Incremental encoders

Size 60...105 mm.
Hollow shaft ø8...26 mm or cone shaft ø17 mm.

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

HÜBNER BERLIN
A Baumer Brand

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 ■ Concentrated on the essential – pure functionality	■ Cone shaft or blind hollow shaft ■ Rotatable terminal box
Product family	**HOG 71**	**HOG 75**	**HOG 86E**	**HOG 86**
Sensing method	Optical			
Size (housing)	ø60 mm	ø75 mm	ø99 mm	ø99 mm
Voltage supply	5 VDC ±5 %, 9...26 VDC			
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	–	–	–
- HTL-P (Power Linedriver)	–	■	■	■
- LWL (fiber-optic interface)	With fiber-optic transducer (Outdoor-Box)			
Output signals	K1, K2, K0 + inverted			
Shaft type				
- Cone shaft 1:10	–	ø17 mm		
- Blind hollow shaft	ø8...12 mm	–	ø12...16 mm	
- Through hollow shaft	–	ø12...26 mm	–	–
Connection	Terminals		Terminal box, rotatable, flange connector M23	Terminal box, rotatable, flange connector M23 or cable
Pulses per revolution	64...2048	250...2500	512...2500	500...5000
Operating temperature	-20...+85 °C	-30...+85 °C	-40...+100 °C	
Protection	IP 66	IP 65	IP 66	
Operating speed	≤10 000 rpm	≤12 000 rpm		
Max. shaft load	≤30 N axial, ≤40 N radial	≤30 N axial, ≤40 N radial	≤350 N axial, ≤450 N radial	≤30 N axial, ≤40 N radial
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)			
Options	–	Hybrid bearings	–	Function monitoring EMS Hybrid bearings Redundant (HOG 86M)

Redundant sensing

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

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 ■ Pulses per revolution up to 5000	■ Cone shaft or blind hollow shaft ■ Pulses per revolution up to 5000 ■ Hybrid bearings as standard	■ Cone shaft or blind hollow shaft ■ Corrosion protection C5-M ■ Hybrid bearings as standard ■ Protection class IP 67	■ Cone shaft or blind hollow shaft ■ Pulses per revolution up to 10 000 ■ Hybrid bearings as standard
Product family	HOG 9	HOG 10	HOG 11	HOG 100

Sensing method	Optical			
Size (housing)	ø97 mm	ø105 mm		
Voltage supply	5 VDC ±5 %, 9...30 VDC			5 VDC ±5 %, 9...26 VDC, 9...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	–	–	–	–
- HTL-P (Power Linedriver)	■	■	■	■
- LWL (fiber-optic interface)	With fiber-optic transducer (Outdoor-Box)			
Output signals	K1, K2, K0 + inverted			
Shaft type				
- Cone shaft 1:10	ø17 mm			
- Through hollow shaft	ø12...16 mm	ø12...20 mm		
Connection	Flange connector M23	Terminal box axial, radial		
Pulses per revolution	300...5000			1024...10 000
Operating temperature	-30...+100 °C	-40...+100 °C (-50...+100 °C option)		-30...+85 °C
Protection	IP 56	IP 66	IP 67	IP 66
Operating speed	≤10 000 rpm	≤12 000 rpm		
Max. shaft load	≤400 N axial, ≤500 N radial	≤450 N axial, ≤600 N radial		
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)			
Options	–	Function monitoring EMS Redundant (HOG 10M)	Function monitoring EMS Redundant (HOG 11M) DNV certification	Centrifugal switch (FSL) Speed switch (ESL) Redundant (HOG 100M)

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...165 mm.
Hollow shaft ø16...75 mm.

- Precise optical encoders for large drive shafts
- Through hollow shaft
- Outstanding high mechanical reserve capacity
- For use in permanently oily-wet environments
- Hybrid bearings as standard

HÜBNER BERLIN
A Baumer Brand

HTL TTL




Features	■ Through hollow shaft ■ Corrosion protection C5-M ■ Integrated lightning protection ■ Axial torque plate	■ Through hollow shaft up to ø38 mm	■ Through hollow shaft ■ Rotatable terminal box ■ Operating speed max. 6000 rpm ■ Pulses per revolution up to 5000	■ Through hollow shaft with keyway ■ Corrosion protection C5-M ■ Protection IP 67 ■ Pulses per revolution up to 8192
Product family	HOG 131	HOG 16	HOG 163	HOG 165
Sensing method	Optical			
Size (housing)	ø130 mm	ø158 mm	ø158 mm	ø165 mm
Voltage supply	5 VDC ±5 %, 9...30 VDC			
Output stage				
- TTL/RS422	■	■	■	■
- HTL-P (Power Linedriver)	■	■	■	■
- LWL (fiber-optic interface)	With fiber-optic transducer (Outdoor-Box)			
Output signals	K1, K2, K0 + inverted			
Shaft type				
- Through hollow shaft	ø16...36 mm	ø20...38 mm	ø38...75 mm	ø20...38 mm
Connection	Terminal box	Terminal box, rotatable		
Pulses per revolution	2048...3072	250...2500	250...5000	1024...8192
Operating temperature	-40...+100 °C	-20...+85 °C	-30...+85 °C	-30...+100 °C
Protection	IP 56	IP 66	IP 56	IP 67
Operating speed	≤6000 rpm			
Max. shaft load	≤300 N axial, ≤500 N radial	≤450 N axial, ≤600 N radial	≤300 N axial, ≤500 N radial	≤500 N axial, ≤650 N radial
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)			
Options	Redundant (HOG 131M)	Redundant (HOG 16M)	Redundant (HOG 163M)	Redundant (HOG 165M) Long torque arm Surface protection in harsh environments

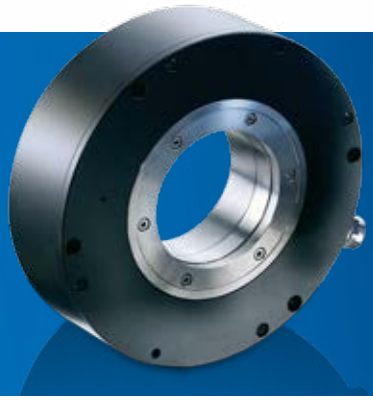
Hybrid bearings

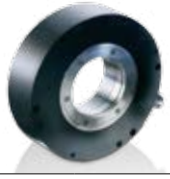
Hybrid bearings consist of a steel race hosting high-strength ceramic balls. Hybrid bearings enable 5 times the service life of conventional steel bearings. In parallel, hybrid bearings provide high-voltage proof isolation of the encoder shaft.

Incremental encoders

Size 227...287 mm.
Hollow shaft ø80...150 mm.

- Precise optical encoders for large drive shafts
- Through hollow shaft
- Outstanding high mechanical reserve capacity
- Insulated shaft





Features	■ Through hollow shaft up to ø115 mm ■ Rotatable terminal box ■ Robust light-metal housing ■ Pulses per revolution up to 2048	■ Through hollow shaft up to ø115 mm ■ Rotatable terminal box ■ Robust light-metal housing ■ Pulses per revolution up to 4000	■ Through hollow shaft up to ø150 mm ■ Plug-in electronics for quick exchange, no need to uninstall ■ With crane eye for easy handling
Product family	HOG 220	HOG 22	HOG 28

Sensing method	Optical		
Size (housing)	ø227 mm		ø287 mm
Voltage supply	5 VDC ±5 %, 9...30 VDC		5 VDC ±5 %, 9...26 VDC
Output stage			
- TTL/RS422	■	■	■
- HTL-P (Power Linedriver)	■	■	■
- LWL (fiber-optic)	With fiber-optic transducer (Outdoor-Box)		
Output signals	K1, K2, K0 + inverted		
Shaft type			
- Through hollow shaft	ø80...115 mm		ø120...150 mm
Connection	Terminal box radial, rotatable		Terminal box radial, rotatable, mating connector M23
Pulses per revolution	1024, 2048	720...4000	1024...2048
Operating temperature	-30...+85 °C		
Protection	IP 56	IP 54	IP 56
Operating speed	≤3800 rpm		≤3600 rpm
Max. shaft load	≤450 N axial, ≤700 N radial		≤550 N axial, ≤800 N radial
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)		
Options	Redundant (HOG 220M) Isolated hollow shaft	Redundant (HOG 22M) Protection IP 56	Redundant (HOG 28M)

Corrosion protection

For onshore or offshore applications in a high-corrosive environment, Baumer provides sensors with long-term protection by durable coating compliant to categories C4 or C5M according to EN ISO 12944. External salt spray tests proved these products corrosion-proof and standard compliant. Non-coated products of the HeavyDuty class fulfil C4 requirements even in their standard variant, whereas stainless steel designs or nickel-plated sensors provide C5M protection.

HeavyDuty
Incremental encoders – Sine/Cosine

Size 58...115 mm.
Solid shaft ø6...11 mm, hollow shaft ø12...26 mm or cone shaft ø17 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 ■ Sine waves per revolution up to 5000	■ Blind hollow shaft up to ø14 mm ■ High resistance against shocks and vibrations ■ Patented expansion anchor for fan guard assembly	■ Cone shaft or through hollow shaft up to ø26 mm ■ Hybrid bearings as standard
Product family	OGS 71	POGS 90	HOGS 71	HOGS 75
Sensing method	Optical			
Size (housing)	ø58 mm	ø115 mm	ø60 mm	ø75 mm
Voltage supply	5 VDC ±10 %, 9...30 VDC			
Output stage				
- SinCos 1 Vpp	■	■	■	■
Output signals	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	Connecting terminal in the housing	Terminal box, rotatable	Connecting terminal in the housing	
Sine waves per revolution	1024...5000	720...5000	1024...5000	1024...2048
Operating temperature	-20...+85 °C			-20...+70 °C
Protection	IP 66			IP 56
Operating speed	≤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 IIC / 3D IIIC (ATEX)			
Options	–	Dual shaft	–	Cable outlet

Incremental encoders – Sine/Cosine

Size 105...168 mm.
Solid shaft ø12...75 mm or cone shaft ø17 mm.

- Precise optical sensing
- Extremely high signal quality

Features	■ Cone shaft or blind hollow shaft up to ø20 mm	■ Through hollow shaft up to ø75 mm	■ Through hollow shaft up to ø70 mm ■ Axial torque plate ■ Clamping set
Product family	HOGS 100	HOGS 14	HOGS 151
Sensing method	Optical		
Size (housing)	ø105 mm	ø158 mm	ø168 mm
Voltage supply	5 VDC ±10 %, 9...30 VDC		
Output stage			
- SinCos 1 Vpp	■	■	■
Output signals	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		Round connector, cable
Sine waves per revolution	720...5000	1024...5000	
Operating temperature	-20...+85 °C		
Protection	IP 66	IP 55	IP 54
Operating speed	≤10 000 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 IIC / 3D IIIC (ATEX)		
Options	Dual shaft Centrifugal switch (FSL) Speed switch (ESL) Redundant (HOGS 100M)	–	–

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, hollow shaft or cone shaft.

- EURO flange B10
- Operating temperature bis +100 °C
- Power-autonomous *MicroGen* revolution counter
- Extremely robust thanks to bearings at both shaft ends
- Additional incremental signals with zero pulse

HÜBNER BERLIN
A Baumer Brand

absolute

New

New

Features	■ Solid shaft with synchro flange	■ Solid shaft with EURO flange B10 ■ Axial bus cover	■ Solid shaft with EURO flange B10 ■ Corrosion & seawater proof ■ Double-sided mounting	■ Cone shaft, blind or through hollow shaft ■ Corrosion & seawater proof ■ Double-sided mounting
Product family	AMG 71	AMG 81	PMG 10	HMG 10
Interface				
- SSI	■	■	■	■
- CANopen®	–	■	■	■
- Profibus-DP	–	■	■	■
- Profinet	–	–	■	■
- EtherCAT	–	–	■	■
Function principle	Singleturn / Multiturn			
Sensing method	Optical		Magnetic	
Size (housing)	ø60 mm	ø115 mm	ø115 mm	ø105 mm
Voltage supply	7...30 VDC	9...30 VDC		
Shaft type				
- Solid shaft	ø6 mm	ø11 mm	ø11 mm	–
- Cone shaft 1:10	–	–	–	ø17 mm
- Blind hollow shaft	–	–	–	ø12...20 mm
- Through hollow shaft	–	–	–	ø12...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 Mating connector M12 or M23	
Total resolution	≤29 bit		≤40 Bit	
Steps per turn	≤8192/13 bit		≤1 048 576/20 bit	
Number of turn	≤4096/12 Bit ≤65 536/16 Bit		≤1 048 576/20 bit	
Protection	IP 66	IP 55	IP 66, IP 67	
Operating temperature	-20...+85 °C		-40...+100 °C	
Operating speed	≤5000 rpm	≤3500 rpm	≤12000 rpm	
Max. shaft load	≤50 N axial, ≤120 N radial	≤50 N axial, ≤60 N radial	≤450 N axial, ≤650 N radial	
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)			
Options	SinCos signal Additional incremental signals	Additional incremental signals	Integrated speed switch (programmed ex works) Additional incremental signals with zero pulse	

HeavyDuty
Absolute encoders

Robust mechanics and innovative technology – our absolute HeavyDuty encoders are ultra-reliable and durable 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 ■ Axial torque plate
Product family	HMG 161

Interface	
- SSI	■
- CANopen®	■
- DeviceNet	■
- Profibus-DP	■
Sensing method	Optical
Size (housing)	ø160 mm
Voltage supply	9...30 VDC
Shaft type	
- Through hollow shaft	ø38...70 mm
Connection	Bus cover Terminal box
Total resolution	≤29 bit
Steps per turn	≤8192/13 bit
Number of turn	≤65 536/16 bit
Protection	IP 66
Operating temperature	-20...+85 °C
Operating speed	≤5000 rpm
Max. shaft load	≤350 N axial, ≤500 N radial
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)
Options	Additional incremental signals

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 energy 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 switch, energy-autonomous by tacho principle
- Electronic speed switches, up to three outputs
- Solid shaft
- EURO flange B10

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A Baumer Brand

SAFETY




Features	■ Mechanical centrifugal switch ■ Operating temperature max. +130 °C	■ Electronic speed switch ■ Speed up to 6000 rpm	■ Electronic speed switch ■ 3 outputs	■ Electronic speed switch
Product family	FS 90	ES 90	ES 93	ES 100
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)	ø115 mm			
Shaft type				
- Solid shaft	ø11 mm			
Flange	EURO flange B10			
Connection	Terminal box			
Operating temperature	-30...+130 °C	-20...+85 °C		
Protection	IP 55			
Operating speed (n)	≤1.25 x ns	≤6000 rpm	≤5000 rpm	≤500 rpm
Switching speed range (ns)[1]	850...4900 rpm	650...6000 rpm	200...5000 rpm	110...500 rpm
Max. shaft load	≤150 N axial, ≤250 N radial			
Options	Product combination with encoder or tachogenerator			

1) Any selected switching speed as a permanent factory setting

Digital speed switch as stand-alone product.

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

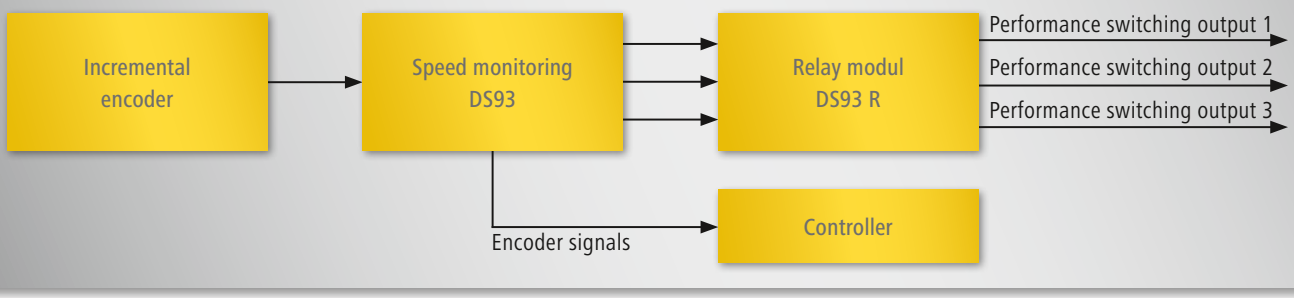
New



Features	■ Configurable speed monitoring ■ Outdoor housing ■ With speed display	■ Relay modul for DS 93 and encoder with DSL-R ■ High switching performance ■ DIN rail mount	■ Speed monitor with SIL3 and PLe certification ■ Inputs for incremental encoder and proximity switch (SinCos, TTL, HTL, PNP)
Product family	DS 93	DS 93 R	GMM230S, GMM236S GMM240S, GMM246S
Voltage supply	15...26 VDC	–	18...30 VDC
Switching outputs	3 outputs, speed-controlled	3 floating relay change-over contacts	1 relay-, 1 analog- and 4 control outputs HTL
Output switching capacity	High: 12 V, Low: 0 V ≤40 mA	≤6 A at 250 VAC or ≤1 A at 48 VC each output	Relay 5...36 V (5 mA...5 A) Analog 4...20 mA (≤270 Ω) HTL (≤30 mA each output)
Size (housing)	122 x 122 x 80 mm	50 x 75 x 55 mm	50 x 100 x 65 mm
Connection	Terminals with cable gland		Screw terminal and connector D-SUB
Operating temperature	-20...+70 °C	-20...+50 °C	-20...+55 °C
Protection	IP 65	IP 20	IP 20
Switching speed range (ns)	≤20 000 rpm	≤20 000 rpm	–
Options	Relay module with three floating relay contacts	–	Programming unit

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
Encoders with speed switch

Incremental encoders with digital speed switch.

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

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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			
Size (housing)	ø105 mm		ø165 mm	
Voltage supply	9...30 VDC	15...30 VDC	9...30 VDC	15...30 VDC
Output stage				
- TTL/RS422	■	■	■	■
- HTL-P (Power Linedriver)	■	■	■	■
Output signals	K1, K2, K0 + inverted			
Shaft type				
- Blind hollow shaft	ø16 mm		–	–
- Through hollow shaft	–	–	ø25 mm	
Connection	Terminal box			
Pulses per revolution	512...2500		512...4096	
Operating temperature	-30...+85 °C			
Protection	IP 66		IP 67	
Operating speed (n)	≤6000 rpm			
Switching speed range (ns)	3...6000 rpm			
Max. shaft load	≤250 N axial, ≤450 N radial		≤150 N axial, ≤200 N radial	
Switching outputs	2 relay outputs, each with its individual attack value, 1 relay output as control output	3 transistor outputs, each with its individual attack value	2 relay outputs, each with its individual attack value, 1 relay output as control output	3 transistor outputs, each with its individual attack value
Output switching capacity	≤0.25 A at 230 VAC/VDC at each output	High: 12 V, Low: 0 V ≤20 mA	≤0.25 A at 230 VAC/VDC at each output	High: 12 V, Low: 0 V ≤20 mA
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)			
Options	–	Relay module DS 93 R with three floating relay contacts	–	Relay module DS 93 R with three floating relay contacts

Encoders with speed switch

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	
Size (housing)	ø120 mm	
Voltage supply	15...26 VDC	
Output stage		
- TTL/RS422	■	■
- HTL-P (Power Linedriver)	■	■
Output signals	K1, K2, K0 + inverted	
Shaft type		
- Solid shaft	ø11 mm	
Flange	EURO flange B10	
Connection	Terminal box	
Pulses per revolution	512...2500	
Operating temperature	-30...+85 °C	
Protection	IP 66	
Operating speed (n)	≤6000 rpm	
Switching speed range (ns)	3...6000 rpm	
Max. shaft load	≤300 N axial, ≤450 N radial	
Switching outputs	2 relay outputs, each with its individual attack value, 1 relay output as control output	3 transistor outputs, each with its individual attack value
Output switching capacity	≤0.25 A at 230 VAC/VDC at each output	High: 12 V, Low: 0 V ≤40 mA
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)	
Options	–	Relay module DS 93 R with three floating relay contacts

HeavyDuty
Encoder with speed switches

Incremental encoders with digital speed switch.

- Encoder-integrated for a space-saving solution
- Fully configurable switch on/off speed
- Operating temperature -40...+100 °C
- Additional incremental signals with zero pulse
- Corrosion & seawater proof

CANopen · PROFIBUS · EtherCAT · PROFINET · DeviceNet · SSI

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SAFETY

Features	■ Solid shaft with EURO flange B10 ■ 1 transistor output	■ Solid shaft with EURO flange B10 ■ 1 relay output	■ Cone shaft or blind hollow shaft ■ 1 transistor output	■ Cone shaft or blind hollow shaft ■ 1 relay output
Product family	PMG 10D	PMG 10D	HMG 10D	HMG 10D
Interface				
- SSI	■	■	■	■
- CANopen®	■	■	■	■
- DeviceNet	■	■	■	■
- Profibus-DP	■	■	■	■
- EtherCAT	■	■	■	■
- ProfiNet	■	■	■	■
Function principle	Singleturn / Multiturn			
Sensing method	Magnetic			
Size (housing)	ø115 mm		ø105 mm	
Voltage supply	9...30 VDC			
Shaft type				
- Solid shaft	ø11 mm		–	–
- Cone shaft 1:10	–	–	ø17 mm	
- Blind hollow shaft	–	–	ø12...20 mm	
Flange	EURO flange B10		–	–
Connection	Bus cover, terminal box, mating connector M12 or mating connector M23			
Total resolution	≤40 bit			
Steps per turn	≤1 048 576/20 bit			
Number of turn	≤1 048 576/20 bit			
Protection	IP 66, IP 67			
Operating temperature	-40...+100 °C			
Operating speed (n)	≤12000 rpm			
Switching speed range (ns)	2...12000 rpm			
Max. shaft load	≤450 N axial, ≤650 N radial		–	–
Switching outputs	1 transistor output, each with its individual attack value	1 relay output, each with its individual attack value	1 transistor output, each with its individual attack value	1 relay output, each with its individual attack value
Output switching capacity	≤50 mA at 30 VDC	≤100 mA at 60 VDC	High: 12 V, Low: 0 V ≤20 mA	≤0.25 A at 230 VAC/VDC at each output
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)			
Options	Relay module DS 93 R with three floating relay contacts Additional incremental signals with zero pulse	Additional incremental signals with zero pulse	Relay module DS 93 R with three floating relay contacts Additional incremental signals with zero pulse	Additional incremental signals with zero pulse

HeavyDuty
Encoder with speed switches

HeavyDuty
Tachogenerators

Solid shaft with EURO flange B10 or 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

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A Baumer Brand

LongLife




Features	■ Solid shaft with EURO flange B10		■ Solid shaft with flange B10, ø85 mm ■ 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							
Size (housing)	ø115 mm		ø85 mm		ø115 mm		ø120...175 mm	
Shaft type								
- Solid shaft	ø11 mm		ø6 mm		ø7...14 mm		ø14...18 mm	
Flange	EURO flange B10		Flange B10		EURO flange B10		Flange B10	
Idle voltage	10...60 mV per rpm		10...60 mV per rpm		10...150 mV per rpm	20...100 mV per rpm	10...200 mV per 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					
Operating temperature	-30...+130 °C							
Protection	IP 56				IP 55			
Operating speed	≤9000 rpm		≤10 000 rpm		≤10 000 rpm		≤6000 rpm	
Max. shaft load	≤150 N axial, ≤250 N radial		≤40 N axial, ≤60 N radial		≤60 N axial, ≤80 N radial		≤80 N axial, ≤100 N radial	
Options	–		–		Sea/tropical climate protection Dual shaft Protection IP 56		–	

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 flange B10 ■ Redundant output (TDPZ)
Product family	EEx GP 0.2	TG74

Voltage supply	No	
Size (housing)	ø126 mm	
Shaft type		
- Solid shaft	ø11 mm	ø14 mm
Flange	EURO flange B10	Flange B10
Idle voltage	20...150 mV per rpm	
Performance		
- Speed ≥5000 rpm	12 W	
Rotor moment of inertia	1.15 kgcm²	
Connection	Screw terminals	
Operating temperature	-20...+55 °C	
Protection	IP 54	
Operating speed	2800...8000 rpm	
Max. shaft load	≤60 N axial, ≤80 N radial	
Explosion protection	ATEX II 2G Ex de IIC T6 Gb	–

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 or cone shaft designs.
Idle voltage up to 60 mV per rpm.

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

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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						
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 per rpm	10...60 mV per rpm		10...20 mV per rpm	10...20 mV per rpm	16...60 mV per 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						
Protection	IP 20	IP 55		IP 20	IP 68		
Operating speed	≤10 000 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 up to +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 3	KTD 4	RTD 1 B14 Y1	RTD 4 A4 Y2
Voltage supply/frequency	No			7 Vms / 10 kHz	7 Vms / 10 kHz
Size (housing)	ø95 mm	ø100 mm	ø86 mm	ø58 mm	ø80 mm
Shaft type					
- Solid shaft	–	–		ø6 mm	–
- Blind hollow shaft	ø16 mm	ø14 mm	ø10...16 mm	–	ø10...16 mm
Idle voltage	20...60 mV per rpm	20...60 mV per rpm	10...60 mV per rpm	–	–
Performance					
- Speed ≥5000 rpm	0.9 W	–		–	–
Rotor moment of inertia	1.95 kgcm²	600-900 kgcm²	600 kgcm²	≤0.01 Nm (+20 °C)	≤0.015 Nm (+20 °C)
Connection	Connector	Screw terminals	Cable, radial	Connector M23	Connector M23
Operating temperature	-30...+130 °C	-25...+100 °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	–	–	Operating temperature -30 °C	–	–

HeavyDuty
Combinations

Incremental twin encoders.
Solid, blind hollow or cone shaft.

- Two encoders on a common shaft
- Every encoder with optional redundant sensing
- Integrated function monitoring EMS

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Features	■ Solid shaft with EURO flange B10 ■ Speed up to 12 000 rpm	■ Solid shaft with EURO flange B10 ■ Corrosion protection C5-M	■ Cone shaft or blind hollow shaft ■ Speed up to 10 000 rpm	■ Cone shaft or blind hollow shaft ■ Corrosion protection C5-M
Product family	**POG 86 G** | **POG 9 G**	**POG 10 G** | **POG 11 G**	**HOG 9 G**	**HOG 10 G** | **HOG 11 G**
Sensing method	Optical			
Size (housing)	ø115 mm	ø115 mm	ø97 mm	ø105 mm
Voltage supply	5 VDC ±5 %, 9...30 VDC			
Output stage				
- TTL/RS422	■	■	■	■
- HTL-P (Power Linedriver)	■	■	■	■
Shaft type				
- Solid shaft	ø11 mm	ø11 mm	–	–
- Cone shaft	–	–	ø17 mm	ø17 mm
- Blind hollow shaft	–	–	ø16 mm	ø16...20 mm
Flange	EURO flange B10	EURO flange B10	–	–
Connection	Terminal box		Flange connector M23	Terminal box
Pulses per revolution	300...5000	300...5000	300...5000	300...5000
Operating temperature	-40...+100 °C -25...+100 °C (>3072 ppr)			
Protection	IP 56	IP 66 | IP 67	IP 56	IP 66 | IP 67
Operating speed	≤12 000 rpm	≤6000 rpm	≤10 000 rpm	≤6000 rpm
Max. shaft load	≤250 N axial, ≤350 N radial	≤300 N axial, ≤450 N radial	≤400 N axial, ≤500 N radial	≤450 N axial, ≤600 N radial
Explosion protection	Ex II 3G IIC / 3D IIIC (ATEX)			
Options	Function monitoring EMS	Function monitoring EMS Redundant sensing system, two terminal boxes each encoder	Function monitoring EMS	Function monitoring EMS Redundant sensing system, two terminal boxes each encoder

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.

Tachogenerator.
With speed switch or incremental encoder.

- Energy-autonomous speed switch
- Electronic speed switch ESL with 1 or 3 switching outputs
- Mechanical centrifugal switch FSL with one switching output




Features	■ Tachogenerator with integrated mechanical centrifugal switch ■ Solid shaft with flange B10	■ Tachogenerator with integrated mechanical centrifugal switch ■ Solid shaft with EURO flange B10	■ Tachogenerator with electronic speed switch ■ Solid shaft with EURO flange B10	■ Tachogenerator with encoder ■ Solid shaft with EURO flange B10
Product family	TDP 0.09+FSL	TDP 0,2+FSL | TDPZ 0,2+FSL	TDP 0,2+ESL | TDPZ 0,2+ESL	TDP 0,2+OG9

Sensing method	Optical			
Size (housing)	ø85 mm	ø115 mm		
With centrifugal switch	■	■	–	–
With speed switch	–	–	■	–
Voltage supply	No	No	12 VDC ±10 % (only TDP 0.2 +ESL 93)	5 VDC ±5 % 8...30 VDC
Idle voltage	10...60 mV per rpm	10...150 mV per rpm | 0...100 mV per rpm	10...150 mV per rpm | 20...100 mV per rpm	10...150 mV per rpm
Performance (Speed >3000 rpm)	1.2 W	12 W | 2 x 3 W	12 W | 2 x 3 W	12 W
Shaft type				
- Solid shaft	ø6 mm	ø7...14 mm	ø7...14 mm	ø11 mm
Flange	Flange B10	EURO flange B10		
Connection	Terminal box			
Operating temperature	-30...+130 °C	-30...+130 °C	-25...+85 °C	-30...+100 °C -25...+100 °C (>3072 ppr)
Protection	IP 56	IP 55	IP 55	IP 56
Operating speed (n)	≤1.25 x ns	≤1.25 x ns	≤6000 rpm	≤10 000 rpm
Switching speed range (ns)[1]	850...4900 rpm	850...4900 rpm	200...600 rpm	–
Max. shaft load	≤40 N axial, ≤60 N radial	≤60 N axial, ≤80 N radial		
Switching outputs (speed-controlled)	1 output	1 output	1 or 3 outputs	–
Output circuit	Normally open / Normally closed	Normally open / Normally closed	Transistor outputs: High: 12 V, Low: 0 V ≤40 mA	–
Options	–	Redundant output (TDPZ)	Redundant output (TDPZ)	–

1) Any selected switching speed as a permanent factory setting

HeavyDuty
Combinations

Incremental encoders with speed switch.
Solid shaft ø11 mm.

- Energy-autonomous speed switch
- Electronic speed switch ESL with one or three switching outputs
- Mechanical centrifugal switch FSL with one switching output

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Features	■ Solid shaft with EURO flange B10 ■ Pulses per revolution 500...5000		■ Solid shaft with EURO flange B10 ■ Pulses per revolution 300...5000		■ Solid shaft with EURO flange B10 ■ Special sealing against ingress of solids		■ Solid shaft with EURO flange B10 ■ Corrosion protection C5-M ■ For use in salty, oily-wet environments	
Product family	POG 86+FSL		POG 9+FSL	POG 9+ESL	POG 10+FSL	POG 10+ESL	POG 11+FSL	POG 11+ESL
Sensing method	Optical							
Size (housing)	ø115 mm							
With centrifugal switch	■		■	–	■	–	■	–
With speed switch	–		–	■	–	■	–	■
Voltage supply	5 VDC ±5 %, 9...30 VDC							
Output stage								
- TTL/RS422	■		■		■		■	
- HTL-P (Power Linedriver)	■		■		■		■	
Output signals	K1, K2, K0 + inverted							
Shaft type								
- Solid shaft	ø11 mm							
Flange	EURO flange B10							
Connection	Terminal box							
Pulses per revolution	500...5000		300...5000					
Operating temperature	-30...+100 °C		-30...+100 °C	-20...+85 °C	-40...+100 °C	-25...+85 °C	-40...+100 °C	-25...+85 °C
Protection	IP 56		IP 56		IP 66		IP 67	
Operating speed	≤6000 rpm							
Switching speed range (ns)[1)]	850...4900 rpm (FSL), 200...6000 rpm (ESL)							
Max. shaft load	≤300 N axial, ≤450 N radial							
Switching outputs (speed-controlled)	1 output		1 output	1 or 3 outputs	1 output	1 or 3 outputs	1 output	1 or 3 outputs
Output circuit	Norm. open/ Norm. closed		Norm. open/ Norm. closed	Transistor outputs	Norm. open/ Norm. closed	Transistor outputs	Norm. open/ Norm. closed	Transistor outputs
Options	Function monitoring EMS				Function monitoring EMS Redundant sensing			

1) Any selected switching speed as a permanent factory setting

Incremental encoders with speed switch. Hollow shaft or cone shaft.

- Energy-autonomous speed switch
- Electronic speed switch ESL with one or three switching outputs
- Mechanical centrifugal switch FSL with one switching output



Features	■ Cone shaft or blind hollow shaft	■ Cone shaft or blind hollow shaft ■ Special sealing against ingress of solids		■ Cone shaft or blind hollow shaft ■ Corrosion protection C5-M ■ For use in salty, oily-wet environments	
Product family	HOG 86+FSL	HOG 10+FSL	HOG 10+ESL	HOG 11+FSL	HOG 11+ESL
Sensing method	Optical				
Size (housing)	ø99 mm	ø105 mm			
With centrifugal switch	■	■	–	■	–
With speed switch	–	–	■	–	■
Voltage supply	5 VDC ±5 %, 9...30 VDC				
Output stage					
- TTL/RS422	■	■		■	
- HTL-P (Power Linedriver)	■	■		■	
Output signals	K1, K2, K0 + inverted				
Shaft type					
- Cone shaft 1:10	ø17 mm				
- Blind hollow shaft	ø16 mm	ø16...20 mm			
Connection	Terminal box				
Pulses per revolution	500...5000	300...5000			
Operating temperature	-40...+100 °C	-40...+100 °C	-20...+85 °C	-40...+100 °C	-20...+85 °C
Protection	IP 56	IP 66		IP 67	
Operating speed	≤6000 rpm				
Switching speed range (ns)[1)]	850...4900 rpm	850...4900 rpm (FSL) 200...6000 rpm (ESL)		850...4900 rpm (FSL) 200...6000 rpm (ESL)	
Max. shaft load	≤350 N axial, ≤450 N radial	≤450 N axial, ≤600 N radial			
Switching outputs (speed-controlled)	1 output	1 output	1 or 3 outputs	1 output	1 or 3 outputs
Output circuit	Norm. open/ Norm. closed	Norm. open/ Norm. closed	Transistor outputs	Norm. open/ Norm. closed	Transistor outputs
Options	Function monitoring EMS Redundant sensing				

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 envirment 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 up to ø150 mm.
Up to 8192 pulses per revolution.
- Square wave and sine signals
- High protection on to IP 67
- Compact designs




Features	■ Through hollow shaft up to ø43.5 mm ■ Up to 1024 pulses per revolution	■ Through hollow shaft up to ø43.5 mm ■ Up to 4096 pulses per revolution ■ Sensor housing made of zinc die cast	■ Through hollow shaft up to ø45 mm ■ Up to 50 pulses per revolution	■ Through hollow shaft up to ø28 mm ■ Up to 2048 pulses per revolution	
Product family	MDFK 08	MIR 10	ITD 67	ITD49H00	ITD49H00 Sine
Sensing method	Magnetic				
Magnetic wheel diameter	ø30.5...56 mm	ø30.5...56 mm	ø72 mm	ø40 mm	
Dimensions (sensing head)	15 x 8.5 x 45.5 mm	10 x 15 x 45.5 mm	20 x 11 x 75 mm	12 x 16 x 48 mm	
Voltage supply	8...30 VDC 5 VDC ±5 %	10...30 VDC 5 VDC ±5 %	8...26 VDC	5 VDC ±5 % 8...26 VDC	5 VDC ±10 %
Output stage					
- TTL/RS422	■	■	–	■	–
- HTL/push-pull	■	■	■	■	–
- SinCos 1 Vpp	–	–	–	–	■
Output signals	A 90° B, N + inverted	A 90° B, N + inverted	A, B	A 90° B, N / A 90° B, N + inv.	
Output frequency	≤250 kHz	≤350 kHz	≤160 kHz	≤300 kHz (TTL) ≤160 kHz (HTL)	≤180 kHz
Shaft type					
- Through hollow shaft	ø6...43.5 mm	ø6...43.5 mm	ø10...45 mm	ø9...28 mm	
Connection					
- Cable	Radial				
Pulses per revolution	256...1024	320...4096	20, 50	64...2048	–
Sine waves per revolution	–	–	–	–	64
Operating temperature	-25...+85 °C	-40...+85 °C	-20...+85 °C	-40...+100 °C	
Protection	IP 67	IP 66, IP 67	IP 67	IP 67	
Operating speed	≤20 000 rpm	≤20 000 rpm	≤10 000 rpm	≤30 000 rpm	
Options	–	–	Redundant variant	Cable with connector Several installation 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	■ Through hollow shaft up to ø65 mm ■ Up to 4095 pulses per revolution		■ Through hollow shaft up to ø150 mm ■ Up to 8192 pulses per revolution	
Product family	ITD69H00	ITD69H00 Sine	ITD89H00	ITD89H00 Sine
Sensing method	Magnetic			
Magnetic wheel diameter	ø81 mm		ø162 mm	
Dimensions (sensing head)	12 x 16 x 48 mm			
Voltage supply	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 90° B, N / A 90° B, N + inverted			
Output frequency	≤300 kHz (TTL) ≤160 kHz (HTL)	≤180 kHz	≤300 kHz (TTL) ≤160 kHz (HTL)	≤180 kHz
Shaft type				
- Through hollow shaft	ø40...65 mm		ø70...ø150 mm	
Connection				
- Cable	Radial			
Pulses per revolution	128...4096	–	256...8192	–
Sine waves per revolution	–	128	–	246
Operating temperature	-40...+100 °C			
Protection	IP 67			
Operating speed	≤15 000 rpm		≤7500 rpm	
Options	Cable with connector Several installation options			

Bearingless encoders
Incremental

Hollow shaft up to ø740 mm.
Up to 32 768 pulses per revolution.

- Square wave and SinCos signals
- Optional with DNV certification
- Wear-free
- Wide axial backlash ±3 mm
- For any shaft the matching installation principle

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HDmag




Features	■ Through hollow shaft ø16...80 mm ■ Installation depth ≤30 mm ■ Stainless steel wheel	■ Through hollow shaft ø50...180 mm ■ Installation depth ≤30 mm ■ Stainless steel wheel	■ Through hollow shaft ø70...340 mm ■ Installation depth ≤30 mm ■ Stainless steel wheel	■ Through hollow shaft ø650...740 mm ■ Installation depth ≤30 mm
Product family	MHGE 100	MHGE 200	MHGE 400	MHGE 800
Sensing method	Magnetic			
Magnetic wheel diameter	ø99.9 mm	ø201.7 mm	ø405.4 mm	ø813 mm
Dimensions (sensing head)	100 x 40 x 65 mm			
Voltage supply	Rectangular: 4.75...30 VDC, Sine: 5 VDC			
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
- SinCos 1 Vpp	■	■	■	■
Output signals	A+, B+, R+ , A-, B-, R-			
Output frequency	≤300 kHz			
Shaft type				
- Through hollow shaft	ø16...80 mm	ø50...180 mm	ø70...340 mm	ø650...740 mm
Connection				
- Flange connector M23	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			
Protection	IP 66, IP 67			
Operating speed	≤8000 rpm	≤4000 rpm	≤2000 rpm	≤100 rpm
Options	DNV certification			DNV certification Stainless steel wheel

Bearingless encoders
Incremental

Hollow shaft up to ø340 mm.
Up to 524 288 pulses per revolution.

- Square wave and SinCos signals
- Particularly high resolution
- Wear-free
- Wide axial backlash ±3 mm
- For any shaft the matching installation principle
- Outstanding signal quality thanks to FPGA signal processing

Features	■ Through hollow shaft ø16...80 mm ■ Installation depth ≤35 mm ■ Stainless steel wheel	■ Through hollow shaft ø50...180 mm ■ Installation depth ≤35 mm ■ Stainless steel wheel	■ Through hollow shaft ø70...340 mm ■ Installation depth ≤35 mm ■ Stainless steel wheel
Product family	MHGP 100	MHGP 200	MHGP 400
Sensing method	Magnetic		
Magnetic wheel diameter	ø99.9 mm	ø201.7 mm	ø405.4 mm
Dimensions (sensing head)	120 x 30 x 90 mm		
Voltage supply	4.5...30 VDC		
Output stage			
- TTL/RS422	■	■	■
- HTL/push-pull	■	■	■
- SinCos 1 Vpp	■	■	■
Output signals	A+, B+, R+ , A-, B-, R-		
Output frequency	≤2 MHz		
Shaft type			
- Through hollow shaft	ø16...80 mm	ø50...180 mm	ø70...340 mm
Connection			
- Flange connector M23	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		
Protection	IP 66, IP 67		
Operating speed	≤8000 rpm	≤4000 rpm	≤2000 rpm

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 & quasi-absolute

Hollow shaft ø3183 mm.
Up to 131 072 pulses per revolution.

- Square wave, sine and SSI interface
- Position and speed signals via SSI
- Any shaft diameter as standard
- Wear-free
- Wide axial backlash ±5 mm
- Radial air gap up to 3 mm

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HDmag flex

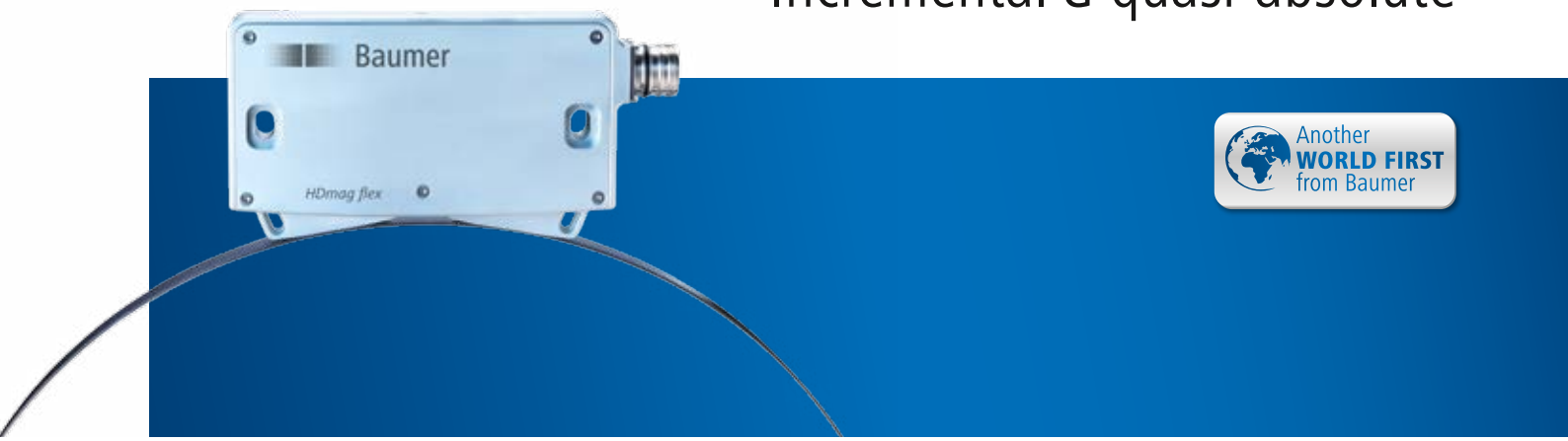
Features	■ Magnetic belt encoder ■ Incremental ■ Pulses per revolution up to 131 072	■ Magnetic belt encoder ■ Quasi-absolute ■ Resolution up to 24 bit singleturn
Product family	MIR 3000F	MQR 3000F

Sensing method	Magnetic	
Dimensions (sensing head)	165 x 25 x 93 mm	
Voltage supply	4.75...30 VDC	
Output stage		
- TTL/RS422	■	■
- HTL/push-pull	■	■
- SinCos 1 Vpp	■	■
- SSI	–	Linedriver RS485
Output signals	A+, B+, R+, A-, B-, R-	0...24 bit singleturn 0...24 bit speedsignal
Shaft type		
- Magnetic belt	ø300...3183 mm	
Connection	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	
Protection sensing head	IP 66, IP 67	
Operating speed	≤1850 rpm	
Options	–	Additional incremental signals

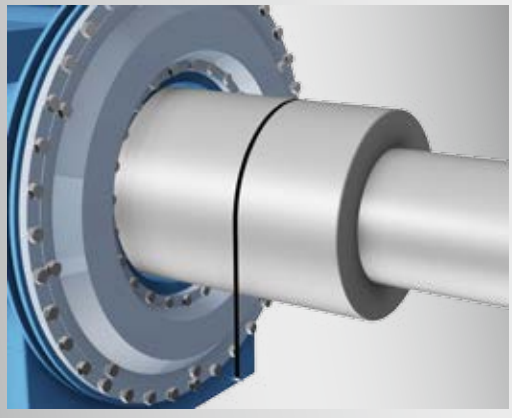
HDmag flex

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
Incremental & quasi-absolute

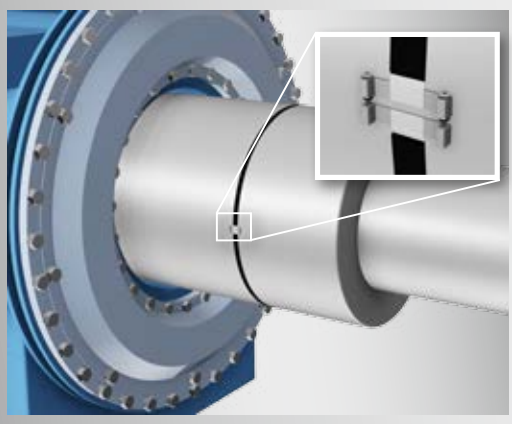


Another **WORLD FIRST** from Baumer



Installed in no time at all.

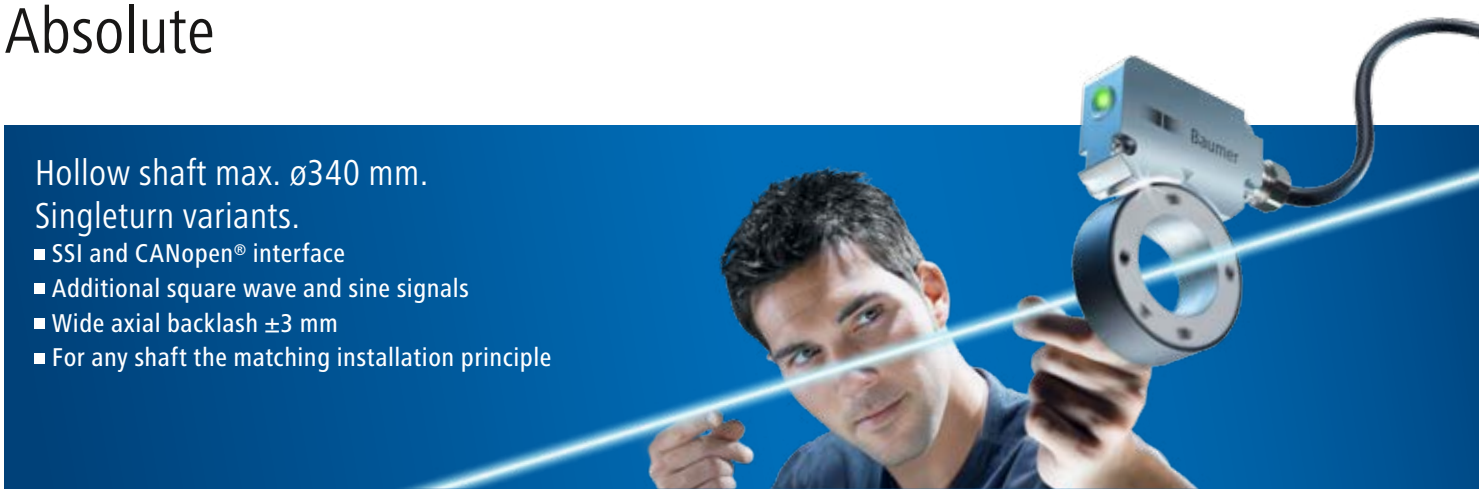
The adjustable magnetic strap is buckled like a belt on the drive or generator shaft and thus allows to work with even the largest diameters.



The lock is welded securely to the magnetic belt for maximum tractive force, holding the belt securely on the shaft.

The sensing head allows for very high resolutions and large mechanical backlash.

Bearingless encoders
Absolute



Hollow shaft max. ø340 mm.
Singleturn variants.

- SSI and CANopen® interface
- Additional square wave and sine signals
- Wide axial backlash ±3 mm
- For any shaft the matching installation principle

HDmag

Features	■ Wearfree encoder ■ Through hollow shaft ø30 mm	■ Wearfree encoder ■ Through hollow shaft ø16...80 mm ■ Stainless steel wheel	■ Wearfree encoder ■ Through hollow shaft ø50...180 mm ■ Stainless steel wheel	■ Wearfree encoder ■ Through hollow shaft ø70...340 mm ■ Stainless steel wheel
Product family	MHAD 50	MHAP 100	MHAP 200	MHAP 400
Interface				
- SSI	■	■	■	■
- CANopen®	■	–	–	–
Function principle	Singleturn			
Sensing method	Magnetic			
Magnetic wheel diameter	ø50 mm	ø101.3 mm	ø203.1 mm	ø406.8 mm
Dimensions (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			
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
- SinCos 1 Vpp	–	■	■	■
Output signals	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		
- Cable	Radial	–	–	–
Total resolution	≤65 536 / 16 bit	≤131 072 / 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		
Protection	IP 67	IP 66, IP 67		
Operating speed	≤6000 rpm	≤8000 rpm	≤4000 rpm	≤2000 rpm

Compact kit design ø30 and ø58 mm. Singleturn and multiturn variants.

- Bearingless design without mechanical wear-free
- Integrated interface
- Hollow shaft ø6...12 mm

MAGRES

Features	■ Encoder kit – size ø36 mm	■ Encoder kit – size ø36 mm ■ E1 compliant design ■ Corrosion protection C5-M	■ Encoder kit – size ø58 mm	■ Encoder kit – size ø58 mm ■ E1 compliant design ■ Corrosion protection C5-M
Product family	**EAM360 Kit** - *MAGRES*	**EAM360R Kit** - *MAGRES*	**EAM580 Kit** - *MAGRES*	**EAM580R Kit** - *MAGRES*
Interface				
- SSI	■	–	■	–
- Analog	–	■	–	■
- CANopen®	■	■	■	■
- SAE J1939	–	■	–	■
- Profinet	–	–	■	–
Function principle	Singleturn/Multiturn			
Sensing method	Magnetic			
Size (housing)	ø36 mm		ø58 mm	
Voltage supply	4.5 ... 30 VDC (CANopen, SAE J1939, SSI) 8 ... 30 VDC / 14 ... 30 VDC (Analog - depending on type) 10 ... 30 VDC (Ethernet)			
Shaft type				
- Ring magnet bore	ø6 mm, ø8 mm, ø12 mm			
Connection				
- Flange connector M12	Radial			
- Flange connector M12	–	–	Radial	–
- Cable	Radial (0.14 mm²)	Radial (0.5 mm²)	Radial (0.14 mm²)	Radial (0.5 mm²)
Total resolution	≤16 384/14 bit			
Steps per turn	≤16 384/14 bit			
Number of turn	≤262 144/18 bit			
Operating temperature	-40...+85 °C			
Protection	IP 67			
Operating speed	≤6000 rpm			
Options	Additional incremental signals (SSI, CANopen®)	Additional incremental signals (SSI, CANopen®) Cable with Deutsch connector	Additional incremental signals (SSI, CANopen®)	Additional incremental signals (SSI, CANopen®) Cable with Deutsch connector

Bearingless encoders
Absolute

Compact kit design ø50 and ø55 mm.
Singleturn variants.

- Bearingless design without mechanical wear-free
- Integrated interface
- Hollow shaft ø5...8 mm

New

New

Features	■ Encoder kit – size ø50 mm ■ Integrated interfaces ■ Singleturn	■ Encoder kit – size ø55 mm ■ Integrated interfaces ■ Singleturn
Product family	EAM500	BMSK 55 - *MAGRES*

Interface		
- Analog	■	–
- CANopen® redundant	■	–
- SSI	–	■
Function principle	Singleturn	
Sensing method	Magnetic	
Size (housing)	ø50 mm	ø55 mm
Voltage supply	10...30 VDC (CANopen®) 12...30 VDC (Analog) 5 VDC ±5 % (Analog)	10...30 VDC (on request) 5 VDC ±10 %
Shaft type		
- Ring magnet bore	ø5...8 mm	
Connection		
- Cable	Radial	
Total resolution	≤12 bit (Analog) ≤14 bit (CANopen®)	12 bit
Steps per turn	4096/12 bit (Analog) 16384/14 bit (CANopen®)	4096/12 bit
Number of turn	–	–
Absolute accuracy	±1.8°	±1°
Operating temperature	-40...+85 °C	-20...+85 °C
Protection	IP 67	IP 67
Operating speed	≤800 rpm	≤6000 rpm

Compact kit design ø58 mm. Singleturn and multiturn variants.

- All common fieldbus & EtherNet interfaces
- Modular bus covers
- Hollow shaft ø12 mm

MAGRES

Features	■ Encoder kit – size ø58 mm ■ Modular bus cover ■ Multiturn	■ Encoder kit – size ø58 mm ■ Modular bus cover ■ Singleturn
Product family	**BMMK 58 flexible**	**BMSK 58 flexible**

Interface		
- CANopen®	■	■
- DeviceNet	■	■
- Profibus-DP	■	■
- SAE J1939	■	■
- EtherCAT	■	■
- EtherNet/IP	■	■
- Powerlink	■	■
- Profinet	■	■
Function principle	Multiturn	Singleturn
Sensing method	Magnetic	
Size (housing)	ø58 mm	
Voltage supply	10...30 VDC	
Shaft type		
- Ring magnet bore	ø12 mm	
Connection		
- Bus cover	Radial	
Total resolution	≤30 bit	≤12 bit
Steps per turn	≤4096/12 bit	
Number of turn	≤262144/18 bit	–
Absolute accuracy	±1°	
Operating temperature	-20...+85 °C	
Protection	IP 67	
Operating speed	≤6000 rpm	

Magnetic rotary encoders
Magnetic angle sensors

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

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

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-Type270°)	MDRM 18 (U-Type360°)	MDFM 20 (I-Type270°)	MDFM 20 (U-Type360°)

Sensor housing	Cylindrical threaded		Rectangular	
Dimensions (sensing head)	18 mm		20 x 30 x 8 mm	
Sensing distance	5 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
Total resolution	1.41°		0.09°	
Response time	<2 ms		<4 ms	
Connection	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			
Protection	IP 67			

Linear bearingless encoders
Incremental

Size 10 mm.
Unlimited measuring range.

- Square wave output signals
- Max. resolution 0.02 mm
- With magnetic belt

Features	■ Linear measuring system ■ Output signals A 90° B with index pulse ■ Output circuit push-pull or RS422
Product family	MIL10

Size (sensing head)	Rectangular
Dimensions (sensing head)	10 x 15 x 45.5 mm
Sensing distance	0.1...0.6 mm
Interpolation	Factor 20, 50, 100
Movement speed	<5 m/s (resolution 5 µm) <10 m/s (resolution 10 µm) <25 m/s (resolution 25 µm)
Output circuit	HTL/Push-pull TTL/RS422
Output signal	A 90° B
Total resolution	5 µm (factor 4 evaluation) 10 µm (factor 4 evaluation) 25 µm (factor 4 evaluation)
System-Accuracy	±(0.02 mm +0.04 mm x magnetic belt length)
Connection	Cable 2 m Cable 0.3 m with connector M12
Voltage supply	10...30 VDC, 5 VDC ±5 %
Operating temperature	-40...+85 °C
Protection	IP 66, IP 67

Linear measurement made easy.

Absolute cable transducer BMMS K50
with max. 5 m measuring length.

Cable transducers

Easy attachment – reliable results.

Baumer cable transducers 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 transducers
Absolute

Size up to 120 mm.
Measuring length up to 12 m.

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

New




Features	■ Measuring length up to 5 m ■ Non-contact magnetic sensing		■ Measuring length up to 7.5 m ■ Non-contact magnetic sensing	■ Measuring length up to 4.7 m ■ Non-contact magnetic sensing ■ Dirt skimmer ■ Three-chamber structure	■ Measuring length up to 12 m ■ Absolute potentiometer sensing ■ Dirt skimmer ■ Three-chamber structure	
Product family	BMMS K34	BMMS K50	BMMS M75	GCA5	GCA8	GCA12
Interface						
- SSI	■		■	–	–	
- Analog / redundant	■ / ■		■ / ■	■ / ■	■ / ■	
- CANopen® / redundant	■ / ■		■ / ■	– / ■	– / ■	
Sensing method	Magnetic				Potentiometric	
Size	88 x 88 x 66 mm		120 x 120 x 70 mm	104 x 104 x 65 mm	104 x 110 x 80 mm	126 x 124 x 92 mm
Voltage supply	8...30 VDC			8...30 VDC (Analog) 10...30 VDC (CANopen®)	10...30 VDC	
Connection						
- Flange connector M12	Radial					
- Cable	Radial					
Measuring length	3400 mm	5000 mm	7500 mm	4700 mm	8000 mm	12 000 mm
Resolution						
- SSI, CANopen®	0.1 mm/step					
- Analog	12 bit					
Linearity	±0.6 %	±0.5 %	±0.2 %	±1 %	±1 %	
Operating temperature	-40...+85 °C					
Protection	IP 65 (encoder, except cable outlet)			IP 67 (housing) IP 54 (cable outlet)	IP 67 (housing) IP 54 (cable outlet)	
Materials	Cable-pull housing: plastic Encoder: Aluminium Cable: Stainless steel with coating			Housing: plastic Cable: Stainless steel with coating	Housing: plastic Cable: Stainless steel with coating	

Cable transducers
Absolute & incremental

Size up to 200 mm.
Measuring length up to 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	**GCI2**	**GCA2**	**GCI4**	**GCA4**	**GCI15**	**GCA15**	**GCI50**	**GCA50**
Interface								
- SSI	–	■	–	■	–	■	–	■
- BiSS-C	–	■	–	■	–	■	–	■
- CANopen® / SAE J1939	–	■ / ■	–	■ / ■	–	■ / ■	–	■ / ■
- DeviceNet	–	■	–	■	–	■	–	■
- Profibus-DP	–	■	–	■	–	■	–	■
- EtherCAT	–	■	–	■	–	■	–	■
- EtherNet/IP	–	■	–	■	–	■	–	■
- Powerlink	–	■	–	■	–	■	–	■
- Profinet	–	■	–	■	–	■	–	■
Function principle	Incremental	Absolute	Incremental	Absolute	Incremental	Absolute	Incremental	Absolute
Sensing method	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							
- Cable	Radial, axial							
- Bus cover	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	–
Total resolution	–	≤36 bit	–	≤36 bit	–	≤36 bit	–	≤36 bit
Linearity	±0.01 %		±0.02 % (3...7.5 m), ±0.01 % (10...50 m)					
Operating temperature	-20...+85 °C							
Protection (encoder)	IP 65							
Materials	Cable-pull housing: plastic Encoder: Aluminium Cable: Stainless steel with coating		Cable-pull housing: Aluminium Encoder: Aluminium Cable: Stainless steel with coating					
Options	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, motor feedback 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
Motor feedback encoder

Size 36 mm or 58 mm.
Precise optical sensing.

- Add-on and built-in variations
- Resolution up to 21 bit per turn
- All-digital acquisition of the rotor position
- SSI and BiSS C interface

New

New

New

New

Features	■ Built-in encoder ■ For small and medium servo motors ■ Multiturn	■ Built-in encoder ■ For small and medium servo motors ■ Singleturn	■ Add-on encoder ■ For large servo motors ■ Singleturn ■ With stator coupling	■ Add-on encoder ■ For large servo motors ■ Singleturn ■ With expanding ring coupling
Product family	**EFL360-MT**	**EFL360-ST**	**EFL580**	**EFL580**
Interface				
- SSI	–	–	■	■
- BiSS C	■	■	■	■
Function principle	Multiturn	Singleturn	Singleturn	Singleturn
Sensing method	Optical / magnetic	Optical	Optical	Optical
Size (housing)	ø36 mm		ø58 mm	
Voltage supply	5 VDC ±10%		5 VDC ±10%	
Shaft type				
- Cone shaft	–		ø9.25 mm	
- Blind hollow shaft	ø6 mm		–	
Connection	PCB connector		Cable with connector	
Total resolution	37 bit	21 bit	13 bit (SSI) 21 bit (BiSS C)	13 bit (SSI) 21 bit (BiSS C)
Steps per turn	2 097 152/21 bit	2 097 152/21 bit	8192/13 bit (SSI) 2 097 152/21 bit (BiSS C)	8192/13 bit (SSI) 2 097 152/21 bit (BiSS C)
Number of turn	65 536/16 bit	–	–	–
Protection	IP 00		IP 64	
Operating temperature	-20...+115 °C		-25...+105 °C	
Operating speed	≤8000 rpm		≤6000 rpm	
Options	Cone shaft Temperature sensor Elektronic lable		Sin/Cos 2048 sine waves Temperature sensor	

For very special applications
Motor feedback encoder

Size 36 mm or 58 mm.
Precise optical sensing.

- Add-on and built-in variations
- Resolution up to 21 bit per turn
- All-digital acquisition of the rotor position
- SSI and BiSS C interface

BiSS C – the open standard

Highspeed protocol BiSS C is ideal for demanding applications with fast isochrone data transmission and high demands on safety.

Benefits of the BiSS C interface:

- All-digital position acquisition without sine signals
- Bi-directional communication for acquisition and preset of the absolute rotor position
- Fast transmission rates at clock frequencies up to 10 MHz
- Protected transmission by CRC sum
- Open, nonproprietary standard
- Fast, flexible interfacing

For very special applications
Encoders for hazardous environments

Zone 0, 1, 2 | Zone 20, 21, 22 | Class I Division 1, Class 2 Division 1.
ATEX, IECEx, IEC (UL).

- Size 58...160 mm
- Square wave and sine signals
- SSI, CANopen®, RS485, Profibus-DP

Features	■ Incremental encoder ■ Solid shaft with EURO flange B10 ■ ATEX-/IECEx certification ■ SinCos signal with *LowHarmonics*		■ Incremental encoder ■ Through hollow shaft ■ ATEX-/IECEx certification	■ Incremental encoder ■ Solid shaft with clamping or synchro flange ■ Blind or through hollow shaft ■ ATEX certification	■ Incremental encoder ■ Solid shaft with clamping flange ■ Stainless steel housing ■ ATEX certification
Product family	**EEx OG 9**	**EEx OG 9 S**	**EEx HOG 161**	**ExEIL580 - *OptoPulse*®**	**X 700 - incremental**
Sensing method	Optical				
Size (housing)	ø120 mm	ø120 mm	ø160 mm	ø58 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	5 VDC ±5 % 8...30 VDC 4.75...30 VDC	4.75...30 VDC
Output stage					
- TTL/RS422	■	–	■	■	■
- HTL/push-pull	■	–	■	■	■
- SinCos 1 Vpp	–	■	–	–	–
Output signals	K1, K2, K0 + inverted			A 90° B, N + inverted	
Shaft type					
- Solid shaft	ø11 mm		–	ø6 mm, ø10 mm	ø10 mm
- Blind hollow shaft	–		–	ø8...15 mm	–
- Through hollow shaft	–		ø30...70 mm	ø8...15 mm	–
Flange	EURO flange B10		–	Clamping/synchro flange	Clamping flange
Connection					
- Terminal box	Radial			–	–
- Flange connector M12, M23	–			Radial / axial	–
- Cable	–		–	Radial / axial / tangential	Axial
Pulses per revolution	1...5000	–	250...2500	100...5000	5...5000
Sine waves per revolution	–	1024...2048	–	–	–
Operating temperature	-50...+55°C -40...+55°C -25...+55°C	-20...+55 °C	-20...+58 °C (IP 56) -20...+66 °C (IP 54)	-40...+85 °C	-25...+70 °C
Protection	IP 56		IP 54, IP 56	IP 65, IP 67	IP 67
Operating speed	≤5600 rpm		≤5600 rpm	≤12 000 rpm (IP 65) ≤6000 rpm (IP 67)	≤6000 rpm
Max. shaft load	≤200 N axial, ≤350 N radial		≤450 N axial, ≤650 N radial	≤40 N axial, ≤80 N radial	≤60 N axial, ≤50 N radial
Explosion protection	Ex II 2G (ATEX/IECEx)		Ex II 2G (ATEX/IECEx)	Ex II 3D (ATEX)	Ex II 2D/2G (ATEX)
Options	Cable gland M16, M20, M25x1,5	–	Cable gland M20x1.5	–	–

For very special applications
Encoders for hazardous environments

Zone 0, 1, 2 | Zone 20, 21, 22 | Class I Division 1, Class 2 Division 1. ATEX, IECEx, IEC (UL).

- Size 58...160 mm
- Square wave and sine signals
- SSI, CANopen®, RS485, Profibus-DP




Features	■ Incremental encoder ■ Solid shaft with square flange ■ ATEX-/IECEx, NEC (UL) certification ■ Safety barrier mandatory	■ Incremental encoder ■ Through hollow shaft ■ ATEX-/IECEx, NEC (UL) certification ■ Safety barrier mandatory	■ Absolute encoder ■ Solid shaft with clamping flange ■ Stainless steel housing ■ ATEX certification	■ Absolute encoder ■ Solid shaft with clamping flange ■ Stainless steel housing ■ ATEX certification
Product family	**ExG25**	**ExHS35**	**X 700 - RS485** **X 700 - SSI**	**X 700 - CANopen®** **X 700 - Profibus-DP**

Interface						
- SSI / RS485	–	–	■ / ■		–	
- CANopen® / Profibus-DP	–	–	–		■ / ■	
Function principle	–	–	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical		Optical			
Size (housing)	ø58 mm	ø80 mm	ø70 mm			
Voltage supply	8.9 VDC		10...30 VDC			
Output signals	A, B, Z + invertiert		–		–	
Shaft type						
- Solid shaft	ø9.52 mm	–	ø10 mm			
- Through hollow shaft	–	ø9.525...25.4 mm	–			
Flange	Square flange	–	Clamping flange			
Connection						
- Cable gland	Radial	Radial	Axial		Bus cover, radial	
- MIL connector	Radial	Radial	–		–	
- Flange connector M23	Radial	–	–		–	
Total resolution	–	–	≤25 bit	≤14 bit	≤25 bit	≤14 bit
Steps per turn	–	–	≤8192/13 bit	≤16384/14 bit	≤8192/13 bit	≤16384/14 bit
Number of turn	–	–	≤4096/12 bit	–	≤4096/12 bit	–
Pulses per revolution	5...6000	1024...5000	–		–	
Absolute accuracy	–		±0.025°			
Operating temperature	-25...+60 °C	-30...+70 °C	-25...+60 °C			
Protection	IP 65		IP 67			
Operating speed	≤6000 rpm	≤3000 rpm	≤6000 rpm			
Max. shaft load	≤450 N axial, ≤670 N radial	–	≤60 N axial, ≤50 N radial			
Explosion protection	Ex II 1G/1D (ATEX/IECEx) Class I Div. 1 / Class II Div. 1 (NEC 505)		Ex II 2D/2G (ATEX)			
Options	Safety barrier		–			

For very special applications
Redundant absolute encoders

Two sensing systems.
For maximum application availability.
- Size 28...58 mm
- SSI, CANopen®, analog




Features	■ Absolute encoders ■ Solid shaft with flat mounting flange	■ Absolute encoders ■ Solid shaft with clamping or synchro flange ■ Blind hollow shaft	■ Absolute encoders ■ Solid shaft with clamping flange ■ SSI / integrated resolver	■ Bearingless encoders with two sensor heads ■ Through hollow shaft ø30 mm
Product family	**EAM280**	**BMMV 58** | **BMMH 58** **BMSV 58** | **BMSH 58**	**ATD 2S B14 Y24**	**MHAD 50** - *HDmag*

Interface				
- Analog redundant	■	■	–	–
- SSI redundant	–	–	–	■
- SSI + Resolver	–	–	■	–
- CANopen® redundant	■	■	–	■
Function principle	Singleturn	Multiturn or Singleturn	Multiturn or Singleturn	Singleturn
Sensing method	Magnetic			
Size (housing)	ø28.6 mm	ø58 mm	ø58 mm	ø55 x 36 x 20 mm
Voltage supply	10...30 VDC, 12...30 VDC 5 VDC ±5 %	8...30 VDC	10...30 VDC	4.5...30 VDC
Shaft type				
- Solid shaft	ø6 mm	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
Total resolution	≤12 or 14 bit	≤30 bit	≤24 bit	≤16 bit
Steps per turn	4096/12 bit (Analog) 16 384/14 bit (CANopen®)	≤4096/12bit	4096/12 bit	≤65 536/16 bit
Number of turn	–	≤262 144/18 bit	4096/12 bit	–
Absolute accuracy	±1.8°	±1°	–	±0.3° (-40...+85 °C) ±0.25° (+20 °C)
Operating temperature	-40...+85 °C	-20...+65 °C	-30...+85 °C	-40...+85 °C
Protection	IP 65			IP 67
Operating speed	≤800 rpm	≤6000 rpm	≤5000 rpm	≤6000 rpm
Max. shaft load	≤25 N axial, ≤25 N radial	≤40 N axial, ≤60 N radial | –	≤40 N axial, ≤60 N radial	–

For very special applications
SIL encoders incremental and absolute

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

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

PL SIL Functional Safety



Features	■ Sine encoders ■ Through hollow shaft ■ SIL2/SIL3 approval	■ Incremental encoders ■ Solid shaft with clamping or synchro flange ■ SIL2 approval	■ Sine encoders ■ Cone shaft ■ Blind hollow shaft ■ PLd/SIL2 approval
Product family	**ITD22H00 SIL**	**GI357**	**HOGS 100S**
Sensing method	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
- Flange connector 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	≤10 000 rpm	≤10 000 rpm
Max. shaft load	–	≤20 N axial, ≤40 N radial	≤250 N axial, ≤400 N radial
Approval	SIL2 or SIL3 compliant in redundant use	SIL2 compliant to IEC 61508	Pld/SIL2 approval
Other	Suitable to safety speed switches GMM2xxS		

For very special applications
Stainless steel incremental encoders




Features	■ Through hollow shaft ■ Max. 6000 pulses per revolution	■ Solid shaft with clamping flange ■ Max. 6000 pulses per revolution		■ Blind hollow shaft ■ Max. 6000 pulses per revolution	■ Blind hollow shaft ■ Max. 10 000 pulses per revolution ■ Sine waves per revolution 1024...2048
Product family	GE333	GE355	GF355	ITD21 A4 Y65	ITD 40 A4 / ITD 42 A4 Y141
Sensing method	Optical				
Size (housing)	ø58 mm				ø89 mm
Voltage supply	5 VDC ±10 %, 4.75...30 VDC, 10...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, B, N + inv. / A, B, N
Shaft type					
- Solid shaft	–	ø10 mm		–	– / –
- Blind hollow shaft	–	–		–	ø20...27 mm / –
- Through hollow shaft	ø12 mm	–		ø10...14 mm	– / ø20...27 mm
Connection					
- Cable	Radial	Radial / axial		Radial	Radial
Pulses per revolution	5...6000	5...6000		200...6000	2000...10 000 / –
Sine waves per revolution	–	–		–	– / 1024...2048
Operating temperature	-25...+100 °C (5 VDC) -25...+85 °C (24 VDC)	-25...+85 °C		-20...+85 °C	-20...+70 °C / -20...+85 °C
Protection	IP 65	IP 67		IP 66	IP 67
Operating speed	≤6000 rpm	≤10 000 rpm		≤3000 rpm	≤2500 rpm
Max. shaft load	–	≤20 N axial, ≤40 N radial			–
Material	Stainless steel: 1.4305	Stainless steel: 1.4305	Stainless steel: 1.4404	Stainless steel: 1.4305	Stainless steel: 1.4305 / Stainless steel
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

EtherCAT · EtherNet/IP · PROFIBUS · CANopen · DeviceNet · PROFINET · ETHERNET POWERLINK · SSI · 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	–		■		■	■
- SAE J1939	–		■ 1)		–	■
- EtherCAT	–		■ 1)		–	■ 1)
- EtherNet/IP	–		■ 1)		–	■
- Powerlink	–		■ 1)		–	■ 1)
- Profinet	–		■ 1)		–	■
Function principle	Singleturn	Multiturn	Multiturn		Multiturn	Multiturn
Sensing method	Optical				Magnetic	
Size (housing)	ø58 mm					
Voltage supply	10...30 VDC					
Shaft type						
- Solid shaft	ø10 mm		ø6, ø10 mm	–	ø10 mm	
- Through hollow shaft	–		–	ø12...14 mm	–	–
Connection	M23 radial		Bus cover cable gland		Bus cover M12	
Total 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°				±1°	
Operating temperature	-25...85 °C				-40...+85 °C	
Protection	IP 67				IP 68, IP 69 K	
Operating speed	≤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)	
Material	Stainless steel: 1.4305 / 1.4404		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 ■ Max. 32 768 pulses per revolution
Product family	**GI355-C** | **GI356-C**	**HOG 11**	**HOG 131**	**MHGE 100 -** *HDmag* | **MHGE 800 -** *HDmag*

Sensing method	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 IIC / 3D IIIC (ATEX)	Ex II 3G IIC / 3D IIIC (ATEX)	–
Corrosion protection	Corrosion protection C5-M	Corrosion and seawater proof		
Options	With SIL2 certification: GI357	DNV certification	–	DNV certification

For very special applications
Offshore absolute encoders

For use in C5-M environments.

- Size ø58...122 mm
- SSI, fieldbus, real time EtherNet

New




Features	■ Solid shaft with clamping or synchro flange		■ Through hollow shaft		■ Solid shaft with clamping or synchro flange	■ Cone, solid, blind or through hollow shaft ■ Double-sided mounting	
Product family	**GM400-C**	**GM401-C**	**G0M2H-C**	**G0A2H-C**	**GXMMW[1)]**	**PMG 10**	**HMG 10**
Interface							
- SSI / SSI with incremental	■ / ■		■ / ■		■ / ■	■ / ■	■ / ■
- CANopen®	–		–		■	■	■
- DeviceNet	–		–		■	■	■
- Profibus-DP	–		–		■	■	■
- EtherCAT	–		–		■	■	■
- Profinet	–		–		■	■	■
Function principle	Multiturn		Multiturn	Singleturn	Multiturn	Multiturn / Singleturn	
Sensing method	Optical						
Size (housing)	ø58 mm		ø58 mm		ø58 mm	ø115 mm	ø105 mm
Voltage supply	10...30 VDC		10...30 VDC		10...30 VDC	9...30 VDC	
Shaft type							
- Solid shaft	ø10 mm	ø6 mm	–		ø6 mm, ø10 mm	ø11 mm	–
- Cone shaft 1:10	–		–		–	–	ø17 mm
- Blind hollow shaft	–		–		–	–	ø12...20 mm
- Through hollow shaft	–		ø12-14 mm		–	–	ø12...20 mm
Flange	Clamping flange	Synchro flange	–		Clamping flange, synchro flange	EURO flange B10	–
Connection	Flange connector M23 cable		Flange connector M23 cable		Bus cover with M12 or cable gland	Bus cover, terminal box, connector M12 or M23	
Total resolution	≤30 bit		≤26 bit	≤14 bit	≤28 bit	≤40 bit	
Steps per turn	≤16384/14 bit		≤16384/14 bit	≤16384/14 bit	≤8192/13 bit	≤1 048 576/20 bit	
Number of turn	≤65536/16 bit		≤4096/12 bit	–	≤65 536/16 bit	≤1 048 576/20 bit	
Absolute accuracy	±0.025°		±0.025°		±0.025°	–	
Protection	IP 54, IP 65		IP 54 (IP 65 option)		IP 54, IP 65	IP 66, IP 67	
Operating temperature	-25...+85 °C		-25...+85 °C		-25...+85 °C	-40...+100 °C	
Operating speed	≤6000 rpm		≤6000 rpm		≤6000 rpm	≤12 000 rpm	
Max. shaft load	≤20 N axial, ≤40 N radial		–		≤20 N axial, ≤40 N radial	≤450 N axial, ≤650 N radial	
Corrosion protection	Corrosion protection C5-M				Corrosion and seawater proof		
Options	Additional incremental signals						

1) on request

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 regeneration	■ Conversion HTL to TTL ■ Signal regeneration	■ Conversion TTL to HTL ■ Signal regeneration	■ Conversion HTL to HTL ■ Signal regeneration
Product family	HEAG 151	HEAG 152	HEAG 153	HEAG 154
Size	DIN rail housing 50 x 75 x 55 mm			
Voltage supply	5 VDC ±5%		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			
Output signals	K1, K2, K0 + inverted			
Output circuit	Optocoupler			
Connection	Screw terminals			
Consumption	≤5 mA			
Input frequency	200 kHz	120 kHz	200 kHz	120 kHz
Operating temperature	-20...+50 °C			
Protection	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		
Voltage supply	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-		
Output signals	A+, A-, B+, B-, R+, R-		
Connection	Mating 3-pin connector M23		
Consumption	≤150 mA (15 VDC)	≤500 mA (5 VDC), ≤300 mA (10...30 VDC)	
Input frequency	400 kHz		
Operating temperature	0...+50 °C		
Protection	IP 65		
Options	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		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		LWL 1, 2, 3	
Output signals	LWL 1, 2, 3, 4		K1, K2, K3 + inverted	
Connection				
- Screw terminals	–	–	■	■
- Cable gland M16	■	■	–	–
- Cable gland M20	■	■	–	–
Max. load current	200 mA		60 mA	
Operating temperature	-20...+70 °C		-20...+50 °C	
Protection	IP 65		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	
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	
Output signals	LWL 1, 2, 3	
Connection		
- Screw terminals	■	■
- Cable gland M16	–	–
- Cable gland M20	–	–
Max. load current	75 mA	
Operating temperature	-20...+50 °C	
Protection	IP 20	

A secure hold during tilt and vibration.

Inclination sensor GIM500.

Inclination & acceleration sensors

Absolute precise and robust.

Baumer inclination sensors of the GIM series detect the inclination angle towards the horizontal line at machines and machine equipment. Typical applications are construction or agricultural vehicles in mobile automation. As particular construction benefit, an accessible rotary shaft during installation is not required.
To meet the ever-growing requirements in mobile automation, the Baumer GIM inclination sensors provide versatile interface options such as CANopen®, SAE J1939 or analog current and voltage outputs. Besides the very robust mechanical design, GIM500 excels with outstanding electromagnetic capability and E1 type approval compliant to automotive directive 2006/28/EG.

Baumer acceleration sensors of the GAM900 series supply the master control with precise acceleration information via CANopen® or analog interface. SIL2/PLd-certified acceleration sensor GAM900S acts as a two-in one device replacing conventional sensorics for monitoring shock and vibration, for example in wind turbines: acceleration sensors to detect vibration in three-axis direction and mechanical limit switches with relay contact as link in the safety chain. Thanks to SIL2/PLd-certified limit monitoring, GAM900S will simplify the equipment's safety assessment and implementation of machine directive 2006/42/EG including „vibration monitoring" as safety function requirement.

MEMS technology

Baumer inclination and acceleration sensors are working with sensor elements based on MEMS technology (micro electro mechanical system). Compared with conventional technologies, the MEMS sensor elements excel with their compact design, high cost efficiency and ultimate durability under harsh conditions. The MEMS sensor elements used by Baumer have been specially qualified for the use in harsh industrial environments, and their long-term availability is ensured.

Inclination sensors
Application-specific scaling

One and two-dimensional.
Compact design.
- Analog, CANopen®, Profibus-DP and SAE J1939
- Robust metal or plastic housing
- MEMS technology

New

Features	■ Sensing range: 0...360° (1-dimensional) Up to ±90° (2-dimensional) ■ Corrosion protection C5-M ■ E1 compliant design	■ Sensing range: 0...360° (1-dimensional) Up to ±60° (2-dimensional)
Product family	GIM500	GNAMG
Interface		
- Analog	■	–
- CANopen®	■	■
- SAE J1939	■	–
- Profibus-DP	–	■
Sensing method	MEMS	MEMS
Size (housing)	48 x 24 x 52 mm	99 x 60 x 5 mm
Voltage supply	8...36 VDC	10...30 VDC
Connection	Cable Flange connector M12	Cable gland Flange connector M12
Total resolution	0.025°	0.1°
Accuracy		
- Sensing range 0...360°	±0.1°	±0.2°
- Sensing range ±10°	±0.1°	±0.1°
- Sensing range ±30°, ±60°	±0.1°	±0.2°
- Sensing range ±90°	±0.1°	–
Operating temperature	-40...+85 °C	-25...+85 °C
Protection	IP 69K	IP 66 (flange connector M12) IP 67 (cable gland)
Options	Cable with Deutsch connector	Stainless steel Operating temperature -40...+85 °C

Measuring inclination even in harsh environments

Inclination sensors detect the angle of inclination towards the horizontal line at machines and equipment. Acting as electronic water scale, they are ideal for measuring inclination angles, particularly where rotation shafts are difficult to access. Baumer inclination sensors significantly contribute towards improved safety, for example at cranes. The robust and saltwater-proof, IP 69K-rated aluminium die cast housing makes them ideal for industrial use in a rough ambiance.

Acceleration sensors
Measuring precision and safety

Vibration and shock detection in three-axis direction.

- Redundant diversified sensing
- Offshore capable
- Analog and CANopen®
- Individually configurable filters

Features	■ Up to two relay outputs for limit monitoring ■ 3 axes detection, MEMS based	■ Safe limit monitoring by relay output ■ Redundante 3 axes detection, MEMS based ■ SIL2/PLd approval
Product family	GAM900	GAM900S

Interface		
- Analog	■	■
- CANopen®	■	■
Sensing method	MEMS	2 x MEMS
Size (housing)	55 x 30 x 90 mm	
Voltage supply	10...30 VDC	
Connection	Flange connector 1x or 2x M12	
Frequency bands	6 (configurable)	4 (configurable)
Total resolution	<4 mg	
Accuracy 3σ (with band pass filtering)	=35 mg (range ±1000 mg) =10 mg (range ±250 mg)	=60 mg (range ±1000 mg) =15 mg (range ±250 mg)
Measuring range	±2 g	
Operating temperature	-40...+85 °C	
Protection	IP 67	
Material	Aluminium or glass-fiber reinforced plastic	
Optionen	Filter up to 150 Hz	

TÜVRheinland CERTIFIED
Functional Safety Type Approved
www.tuv.com ID 0600000000

PLd SIL2 Functional Safety

Functional safety with certificate

The EC type-examination of the acceleration sensor GAM900S by the notified body TÜV Rheinland certifies the compliance with the increased requirements of the conformity assessment procedure according to the Machinery Directive. Further SIL2/PLd certified encoders complete the Baumer portfolio and simplify safety certification of the installation.

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
- Adaptor 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 and supreme competence in consulting, sales and service.

Baumer – the strong partner.

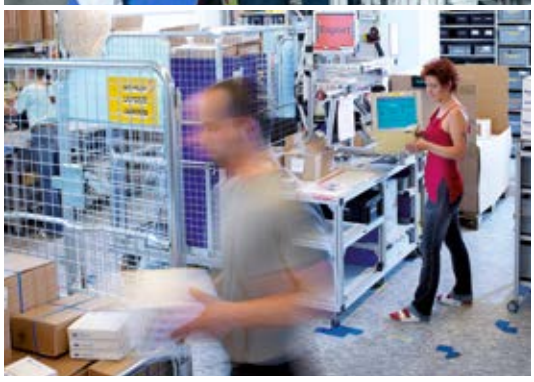
We at Baumer are close to our customers, understand their needs and provide the best solution. Worldwide customer service for Baumer starts with on-the-spot personal discussions and qualified consultation. Our application engineers speak your language and strive from the start, through an interactive problem analysis, to offer comprehensive and user-compatible solutions.

We are close to you across the globe.

The worldwide Baumer sales organizations guarantee short delivery times and readiness to supply. Many of our customers are directly linked via our electronic order system with the JIT logistics process.

A worldwide network coupled with the most modern communication techniques enable us to deliver information quickly and transparently to decision makers in all Baumer locations.

Closeness to the customer for Baumer means being available for your needs anywhere and at any time.



Worldwide presence.

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Côte d'Ivoire
Egypt
Morocco
Reunion
South Africa

America
Brazil
Canada
Colombia
Mexico
United States
Venezuela

Asia
Bahrain
China
India
Indonesia
Israel
Japan
Kuwait
Malaysia
Oman
Philippines
Qatar
Saudi Arabia
Singapore
South Korea
Taiwan
Thailand
UAE

Europe
Austria
Belgium
Bulgaria
Croatia
Czech Republic
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