

GENERAL INFORMATION

HOHNER AUTOMATION, S.L *The ideal collaborator for your project*

The central headquarters of Hohner Automation SL is situated in Breda, province of Girona, in the northwest of Spain, only a few kilometres away from the French border and very close to Barcelona, in one of the most deeply-rooted industrial networks of the country and with big firms, whose common impulse is investment in I+D+I.

Hohner Automation SL was founded in 1983. One of the founding partners, Juan Liarte, is still the major shareholder of the firm, thus guaranteeing the continuity and the compliance of the strategic plan that has taken the firm to the present level of development, on the basis of some fundamental, permanent and absolute values, such as **integrity, respect for the individual person** and the **environmental responsibility** and also on the basis of some of the firm's values: **client orientation**, investment in investigation and development and all those tools that help us become better as a firm at service of a client and of a very demanding market.

■ Our Quality Policy

We are a **client orientated** organisation. We are supported by a solid quality system that consolidates us as an **EFFICIENT, FLEXIBLE** and **EFFECTIVE** firm.

We foment the communication among all levels of our organisation. We believe that training is a fundamental tool for the personal development of our team. **Motivation** and participation of the personnel are fundamental points in our firm's policies.

Continuous improvement is a permanent objective for each person within the organisation. We work so that the continuous product, process and system improvement becomes reality, and we do this on the basis of data and information analysis.

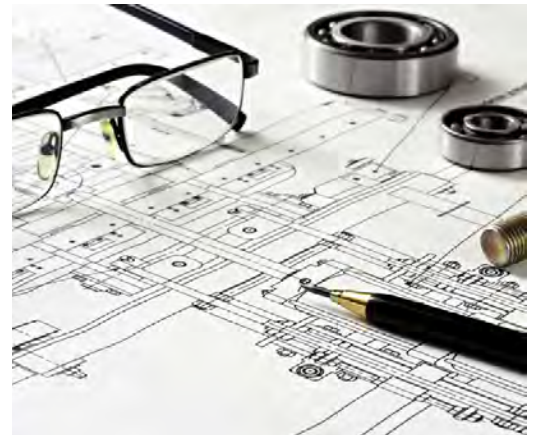
Hohner Automaticos S.L. invests in investigation, development and innovation, thus assuring the long time success of the Firm.



Collaboration



Environmental responsibility



Design

Training

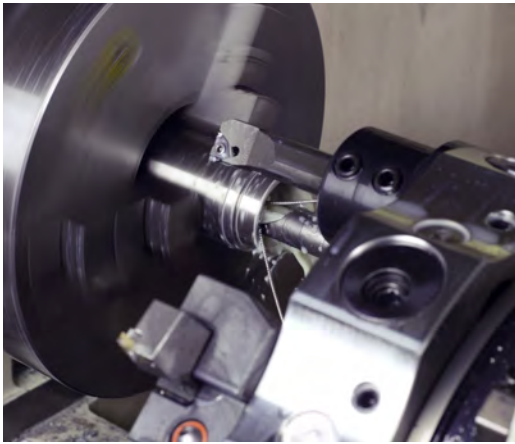


Communication

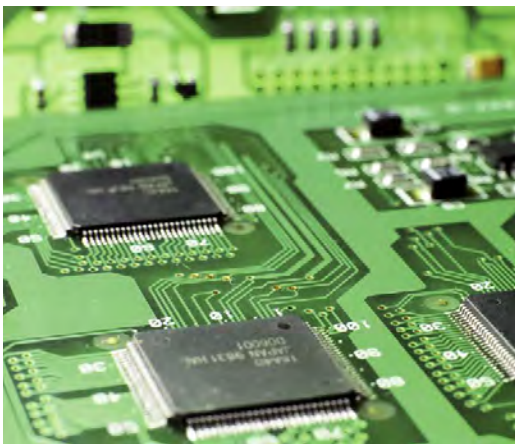




Optical manufacturing



Mechanical manufacturing



Electronic manufacturing

■ Our installations

One of the strong points of our firm is client service, and one of the tools that makes us flexible is the combination of our own engineering department that is available to the client for all types of application assessments, combined with our own departments of optical, mechanical and electronic manufacturing, which allows us to cover all the necessities of our clients with maximum efficacy.

■ Hohner Global

Our worldwide distributors are a team of very well trained persons who are familiar with the applications in the different sectors where our sensors can be applied.

You have a Hohner distributor very close to you



QUALITY CERTIFICATION

BUREAU VERITAS
Certification



Certificación Certification

Concedida a / Awarded to

HOHNER AUTOMÁTICOS, S.L.

PROLONGACIÓ SANT FRANCESC, S/N
17400 BREDÀ
SPAIN

Bureau Veritas Certification certifica que el Sistema de Gestión ha sido auditado y encontrado conforme con los requisitos de la norma:

Bureau Veritas certify that the Management System has been audited and found to be in accordance with the requirements of standard:

NORMA / STANDARD

ISO 9001:2008

El Sistema de Gestión se aplica a:

Scope of certification:

DISEÑO, FABRICACIÓN Y COMERCIALIZACIÓN DE ENCODERS INCREMENTALES Y ABSOLUTOS.

DESIGN, MANUFACTURE AND SALES OF INCREMENTAL AND ABSOLUTE ENCODERS.

Número del Certificado
Certificate Number

ES068317-1

Directora de Certificación / Certification
Manager

Aprobación original :
Original approval date :

16/04/2004

Certificado en vigor:
Effective date:

24/01/2016

Caducidad del certificado:
Certificate expiration date:

14/09/2018

Este certificado está sujeto a los términos y condiciones generales y particulares de los servicios de certificación
This certificate is valid, subject to the general and specific terms and conditions of certification services

Entidad de Certificación / Certification Body: Bureau Veritas Iberia S.L.
C/ Valportillo Primera 22-24, Edificio Caoba, Pol. Ind. La granja, 28108 Alcobendas - Madrid, Spain



ENAC
CERTIFICACIÓN
Nº 04/C-SC004

TECHNICAL CONSIDERATIONS

ELECTRICAL INSTALLATION INSTRUCTIONS

An incremental pulse generator in combination with an electronic counter or microprocessor is a precise method of measuring angular and linear displacements, but in any case, in order to guarantee this precision (not degraded by electrical interference), certain codes have to be taken into account.

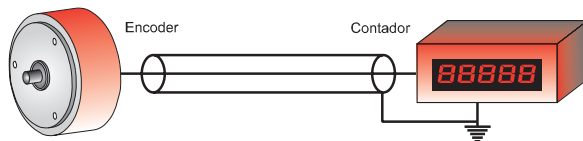
A- Reduce interference by employing screened cable that is correctly connected to earth, a suitable choice of counter position, cable output, adequate voltage and the possibility of using a differential level output (complementary).

B- Attenuate interference due to high frequency by means of an RC filter.

The various problems that may be encountered when installing a generator system-control system are listed below, together with some solutions for them.

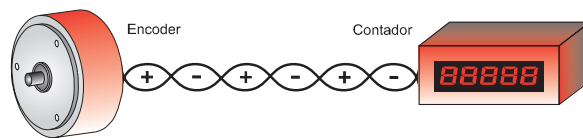
Electrostatic coupling or interference

Electric interference can be reduced by taking the corresponding precautions. The signals produced by the generator must be carried over suitable screened cables that are connected to earth at only one end. Unscreened wiring is only suitable for short runs and interference-free locations.



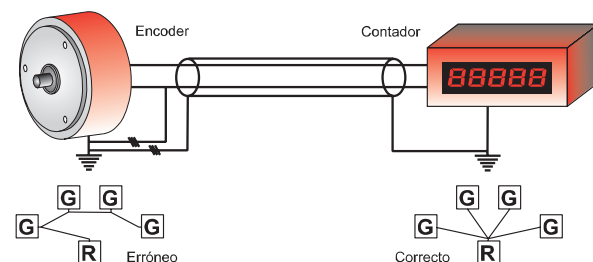
Electromagnetic coupling or interference

This type of effects with wide radii of action are more difficult to combat, one type of protection that can be employed is twisted pair wiring, which is normally sufficient as the voltages induced in the two conductors cancel each other out.



Earth point selection

The following rule should be followed when selecting an earth point: the earth connection must be made at only one point of the electric circuit, all other system points that require an earth connection must be made to this one single point.



Cable run

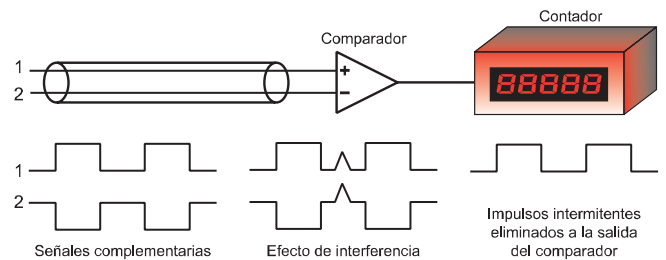
The cable between the generator and the counter must be separate from the high-voltage wiring and follow the shortest, most direct path between them.

Differential receiver

One effective form of interference rejection is to use a differential receiver. The signal and its complement are fed to the two inputs of the comparator. The comparator amplifies the difference between the two inputs and any interference pulses are ignored.

Signal loss over long distances.

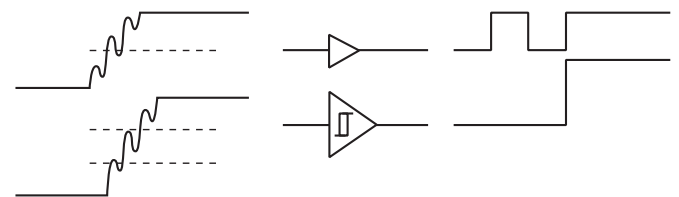
Voltage drops over long wiring runs can lead to problems. It is not only the current fed to the generator that is reduced, but that the high signal is reduced and the low signal is greater, therefore the resulting signal is outside the required limits. This is especially important in 5v systems, but 12v systems are also vulnerable to these effects.



Deformed pulses

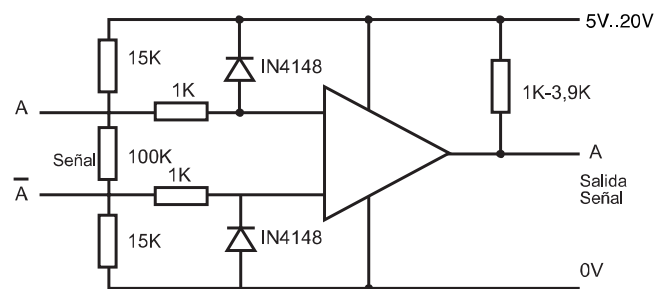
The presence of noise in slow signal changes can cause interference and give false measurement readings. This effect can be eliminated by using a Schmitt Trigger circuit at the input to the counter.

This circuit will ignore any changes in voltage that are less than the hysteresis.



Recommended input circuit

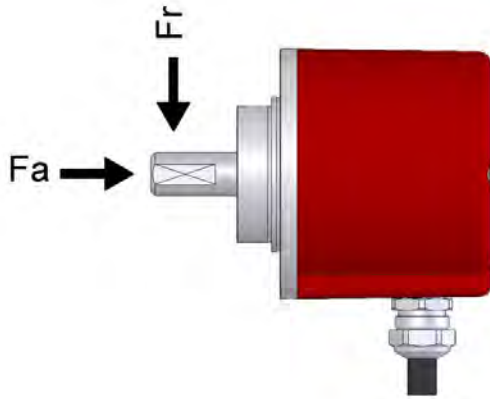
The following circuit provides high noise immunity and can be employed at 50 kHz



TECHNICAL CONSIDERATIONS

MECHANICAL INSTALLATION INSTRUCTIONS

All our pulse generators are fitted with preloaded ball bearings. The lifetime of these bearings largely depends on the load supported by the encoder shaft. Minimising this load is very important in order to guarantee a reasonable encoder lifetime. Under no circumstances should the axial (F_a) and radial (F_r) components at the end of the shaft must not exceed, even briefly, the established limits for each of the series.



There are several solutions for protecting the shaft from excessive loads depending on the encoder types and its applications:

■ Solid shaft encoders: connection with machine shaft

If the connection between the encoder shaft and that of the machine is rigid, any misalignment between the two can lead to very high loads on the bearings. In order to prevent this, the shafts must be connected by means of flexible couplings that are able to absorb the expected misalignment, vibration and any possible axial shaft movement.

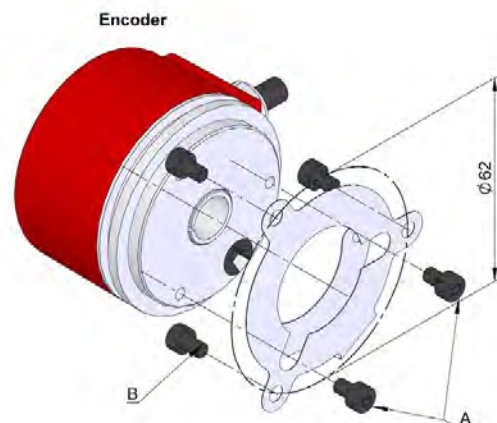
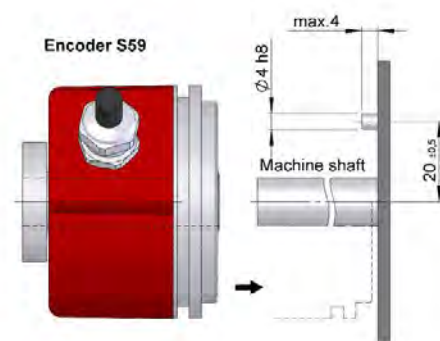
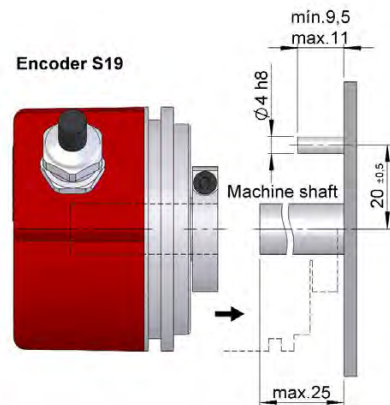
■ Solid shaft encoders: connections to measuring wheels, pulleys and pinions

These components can be fixed directly to the encoder shaft provided there are no radial loads produced in excess of the acceptable limits. Otherwise, an auxiliary shaft must be installed to support these components.

If measuring wheels are employed or rack and pinion measuring systems, it is possible that constant free-play cannot be guaranteed, which would make it necessary to use a flexible angle to secure the encoder to the machine chassis, making it possible to move it.

■ Hollow shaft encoders

In most cases these are fixed to a rigid shaft. In these cases, the encoder body must never be rigidly fixed to the machine chassis; instead, it must be simply prevented from rotating with the shaft. This may be achieved with an elastic flange or retaining pin.



■ PROTECTION AGAINST CONTACT


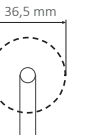
In order to comply with the CE Machine Directive, after installing the encoder, all rotating parts, such as shafts, couplings, wheels and clamps etc, must be protected against accidental contact during machine use.

OVERVIEW





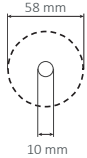
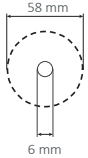
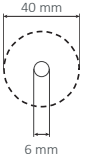
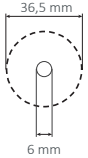
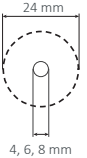








INCREMENTAL ENCODERS










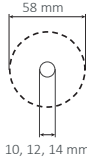
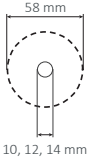
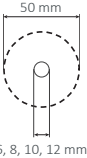
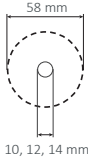
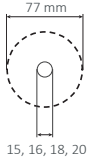
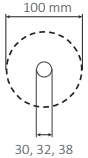
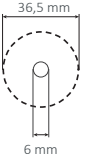














SOLID SHAFT

<p>S10</p>  <p>58 mm</p>  <p>6, 8, 10, 12 6.35, 9.52 mm</p> <p>≤ 50.000 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP65 / IP67 -40...80°C N Cable / Connector</p>  <p>HIGH RESOLUTION</p>	<p>S10I</p>  <p>58 mm</p>  <p>10 mm</p> <p>≤ 50.000 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP67 -40...80°C N Cable</p>  <p>HIGH RESOLUTION</p>	<p>S58</p>  <p>58 mm</p>  <p>6 mm</p> <p>≤ 50.000 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP65 -40...80°C N Cable / Connector</p>  <p>HIGH RESOLUTION</p>	<p>S58S</p>  <p>58 mm</p>  <p>6 mm</p> <p>2.048 ppr</p>  <p>5 VDC 6000 rpm IP65 -20...80°C N Cable / Connector</p>  <p>SIN/COS</p>	<p>S50</p>  <p>50 mm</p>  <p>6, 8, 10 mm</p> <p>≤ 5.000 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP65 -40...80°C Cable / Connector</p>  <p>COMPACT</p>	<p>SPR90</p>  <p>58 mm</p>  <p>6, 10 mm</p> <p>≤ 65.536 ppr</p>  <p>5..30 VDC 6000 rpm IP65 -20...80°C Cable / Connector</p>  <p>PROGRAMMABLE</p>	<p>S64</p>  <p>58 mm</p>  <p>Conic 1:10</p> <p>≤ 10.000 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP54 -40...80°C Cable</p>  <p>HIGH RESOLUTION</p>
<p>S64S</p>  <p>58 mm</p>  <p>Conic 1:10</p> <p>2.048 ppr</p>  <p>5 VDC 6000 rpm IP54 -40...80°C N Cable</p>  <p>SIN/COS</p>	<p>S66</p>  <p>58 mm</p>  <p>Thread M8</p> <p>≤ 10.000 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP64 -40...80°C N Cable / Connector</p>  <p>HIGH RESOLUTION</p>	<p>S30</p>  <p>90 mm</p>  <p>12 mm</p> <p>≤ 50.000 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP65 / IP67 -40...80°C N Cable / Connector</p>  <p>HIGH RESOLUTION</p>	<p>S30I</p>  <p>90 mm</p>  <p>12 mm</p> <p>≤ 50.000 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP67 -40...80°C N Cable</p>  <p>HIGH RESOLUTION</p>	<p>S36</p>  <p>36,5 mm</p>  <p>6 mm</p> <p>≤ 3.600 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP65 -40...80°C N Cable / Connector</p>  <p>MINIATURE</p>	<p>S26</p>  <p>24 mm</p>  <p>4, 6 mm</p> <p>≤ 1.024 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP64 -40...80°C N Cable</p>  <p>MINIATURE</p>	<p>S27</p>  <p>24 mm</p>  <p>4, 6 mm</p> <p>≤ 1.024 ppr</p>  <p>5 VDC / 11..30 VDC 6000 rpm IP64 -40...80°C N Cable</p>  <p>MINIATURE</p>

SOLID SHAFT COST-EFFICIENT

S11	S20	S21	S19	S22	S28
					
					
≤ 5.000 ppr	≤ 1.024 ppr	≤ 500 ppr	≤ 50.000 ppr	≤ 3.600 ppr	≤ 1.024 ppr
					
5 VDC / 11..30 VDC 6000 rpm IP65 -40...80°C Cable	5 VDC / 11..30 VDC 6000 rpm IP67 -20...60°C Cable	5 VDC / 11..30 VDC 5000 rpm IP41 -20...60°C Cable	5 VDC / 11..30 VDC 6000 rpm IP65 -40...80°C Cable / Connector	5 VDC / 11..30 VDC 6000 rpm IP64 -40...80°C Cable / Connector	5 VDC / 11..30 VDC 6000 rpm IP64 -40...80°C Cable
 COST-EFFICIENT	 COST-EFFICIENT	 COST-EFFICIENT	 HIGH RESOLUTION	 MINIATURE	 MINIATURE

HOLLOW SHAFT

S59	S59S	S50H	SPR90H	S77	S80	S22H
						
						
≤ 50.000 ppr	2.048 ppr	≤ 5.000 ppr	≤ 65.536 ppr	≤ 5.000 ppr	≤ 5.000 ppr	≤ 3.600 ppr
						
5 VDC / 11..30 VDC 6000 rpm IP65 -40...80°C Cable / Connector	5 VDC 6000 rpm IP65 -20...80°C Cable / Connector	5 VDC / 11..30 VDC 6000 rpm IP65 -40...80°C Cable / Connector	5...30 VDC 6000 rpm IP65 -20...80°C Cable / Connector	5 VDC / 11..30 VDC 6000 rpm IP65 -40...80°C Cable / Connector	5 VDC / 11..30 VDC 3500 rpm IP65 -40...80°C Cable / Connector	5 VDC / 11..30 VDC 6000 rpm IP64 -40...80°C Cable / Connector
 HIGH RESOLUTION	 SIN/COS	 COMPACT	 PROGRAMMABLE	 HIGH SHAFT LOAD CAPACITY	 HIGH SHAFT LOAD CAPACITY	 MINIATURE

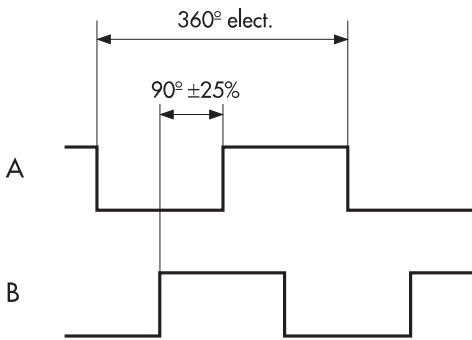
INCREMENTAL ENCODERS

Incremental encoders are probably the most common type of encoder employed in industry because of the wide variety of applications in which they can be used.

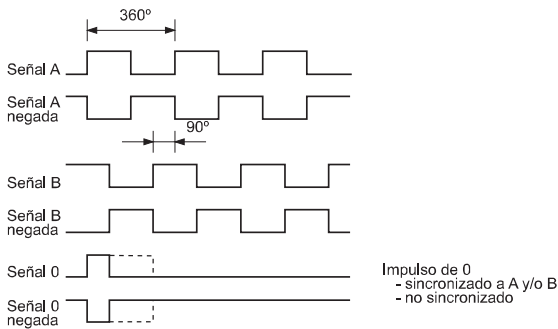
Incremental encoders generate pulses when the shaft is rotated, where the number of pulses per turn can determine a measurement of speed, length or position.

They can be classified, according to function, into unidirectional (a single output channel A), employed whenever it is not necessary to detect the direction of rotation, such as addition and subtraction in counters or tachometers, and bi-directional (with two output channels A and B), which allows the detection of rotation direction, with channel B being 90° out of phase with channel A.

DIGITAL SIGNALS



A third reference or zero signal (0 output channel) can be made available, which provides a pulse for each full turn of the shaft that, for example, permits a position reference to be determined and this signal can be synchronised with respect to channel A or B, or to both, and it can also be non-synchronised. All these signals are also available in inverted form, usually employed in environments where there is noise and/or long wiring runs.



Maximum frequency response

This is the maximum frequency at which the encoder can electrically respond, it refers to the number of output pulses the encoder can produce per second. This frequency is related to the encoder shaft rotation speed and the number of pulses, so that:

$$\text{Frequency (Hz)} = \frac{\text{No of shaft turns per minute}}{60} \times \text{No of encoder pulses}$$

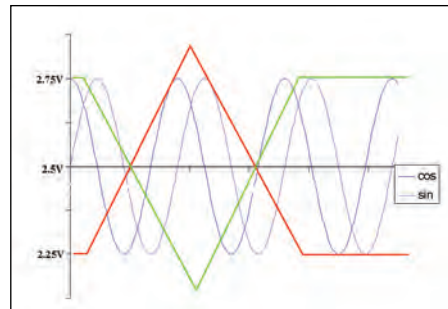
Precision

The unit of measure that defines the encoder precision is the "electrical degree". This is:

$$360^\circ \text{ electrical} = \frac{360^\circ \text{ mechanical}}{\text{No of encoder pulses}}$$

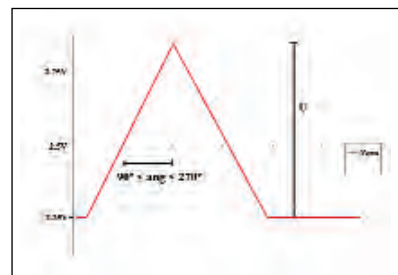
The error of a rotating encoder is not accumulative, it does not increment when the shaft rotates more than a full turn.

SIN COS signals



Rotation direction

The rotation direction criterion of the sine encoder is that shown in the figure. Therefore A goes before B if the shaft turns clockwise when observed from its own shaft.



Signals A AinV, B BinV and Z Zinv

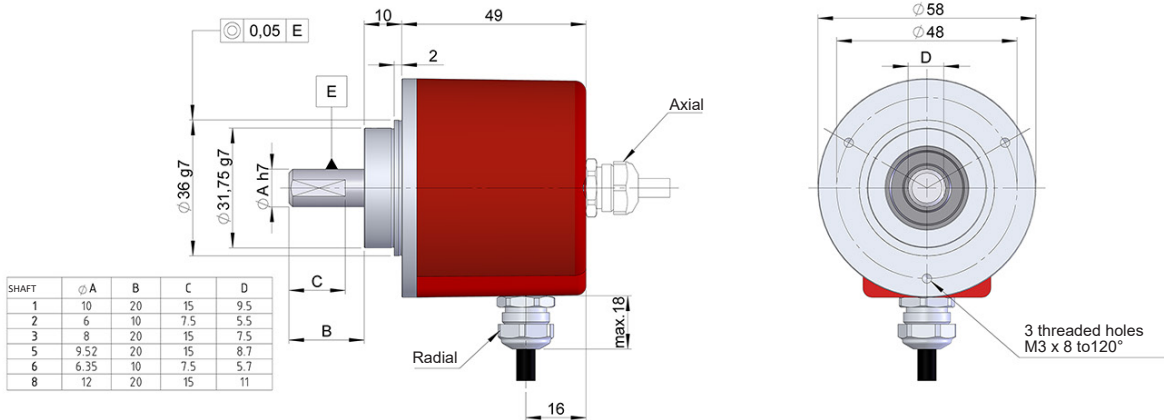
Signal A (cos) goes before B (sen) 90 degrees. The median value of signals A and B is 2,5V DC. Both signals can be obtained in their negative form AinV and BinV as well as Zinv (Fig 1). The reference signal is Z (zero). The distance from zero mode to the peak value of Z is within a 90 to 270° electronics interval, as shown in figure 2. The tool component U is maintained between 0,2 < U < 1 V.



SERIE 10

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 50.000 pulses per turn
- External diameter 58 mm
- Shaft from \varnothing 6 to 12 mm
- Protection class IP67 according to DIN EN 60529
- Highly flexible flanges and different configurations
- Executions mechanical, electronic and special optics forms available on request
- Connection by cable (other cable length available) or industrial connector



Drawing shaft type 1, connection type 3/8, without flange

REFERENCE

Reference example: 10-11639-1024

Serie	Shaft	Flange	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
10/10A -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
10. IP 65	1. \varnothing 10x20 mm	1. None	1. A	1. Radial 4p	0. 11...30 VDC / NPN Open collector 11..30 VDC	(*)	AT00. -40°C
10A. IP 67 (**)	2. \varnothing 6x10 mm	2. 90.1002	2. A+B	3. Radial cable	6. 11...30 VDC / RS422 5 VDC (compatible TTL)		
	3. \varnothing 8x20 mm	3. 90.1003	3. A+B+ $\tilde{0}$	4. Radial Mil 7p	7. 5 VDC / RS422 5 VDC (compatible TTL)		
	5. \varnothing 9.52x20 mm	4. 90.1004	5. A \tilde{A} +B \tilde{B}	5. Radial M23 12p	9. 11...30 VDC / Line driver differential Push-Pull 11..30 VDC		
	6. \varnothing 6.35x10 mm	5. 90.1005	6. A \tilde{A} +B \tilde{B} +0 $\tilde{0}$	6. Axial 4p			
	8. \varnothing 12x20 mm	7. 90.1006 (***)	9. A+B+0	8. Axial cable			
				9. Axial Mil 7p			
				0. Axial M23 12p			
				M. Radial Mil 10p			
				N. Axial Mil 10p			
				L. Radial M12 8p			
				K. Axial M12 8p			

Order your reference
Step file 3D

info@encoderhohner.com
service available in 24 h

(*) 10.000 to 50.000 pulses with interpolation. Available 10.000 direct optical pulses without interpolating upon request.

(**) The option 10A is only available with shaft type 1, and cable connection output (3/8) or connection type (L/K).

(***) Flange mounting included in delivery of the encoder.



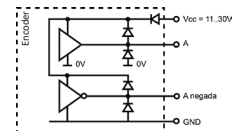
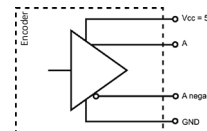
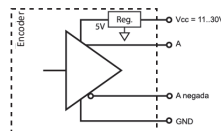
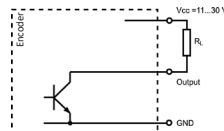
SERIE 10

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Shaft diameter	6, 6.35, 8, 9.52, 10 or 12 mm
Maximum number of revolutions permitted mechanically	≤ 6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65 - Standard IP67 - Option 10A
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm - Standard ≤ 0,03 Nm - Option 10A
Maximum load permitted on axial shaft	≤ 40 N
Maximum load permitted on radial shaft	≤ 80 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer AT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	≤ 50.000
Axial or radial connection	2 meters cable or industrial connector (different models available, other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



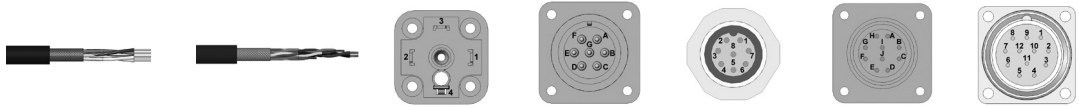
OUTPUT CIRCUIT	NPN Open Collector	RS422 (TTL compatible)	RS422 (TTL compatible)	Push-Pull Differential
Reference code	0	6	7	9
Power supply	11...30 VDC	11...30 VDC	5 VDC ±10%	11...30 VDC
Output voltage	11...30 VDC	5 VDC	5 VDC	11...30 VDC
Consumption	40 mA	Typical: 80 mA Max: 160 mA	Typical: 70 mA Max: 150 mA	Typical: 45 mA Max: 150 mA
Max. load capability / channel	40 mA	±20 mA	±20 mA	±30 mA
Length of cable allowed	50 m (24 VDC)	1200 m	1200 m	100 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 0.5 VDC	VOL < 0.5 VDC	VOL < 2.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > 2.5 VDC	VOH > 2.5 VDC	VOH > VCC – 3 VDC
Frequency	100 kHz	300 kHz	300 kHz	200 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	Not permanent	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 10

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

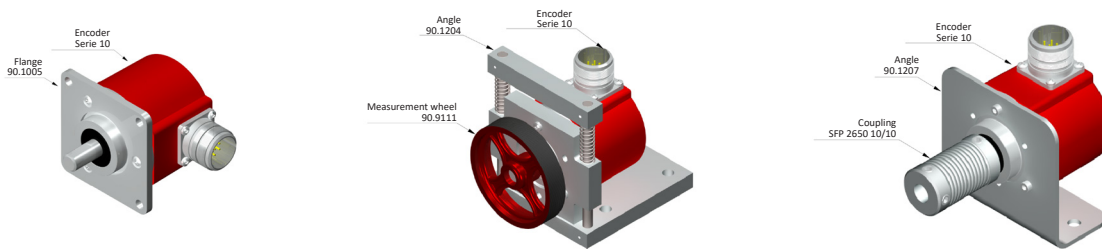
CONNECTION



	Cable 2x2x0,14+1x0,14 95.0008002	Cable 3x2x0,14+2x0,34 95.0008003 (*)	Connector DIN 43650 4p	Connector Mil 7p CW	Connector M12 8p CCW	Connector Mil 10p CW	Connector M23 12p CW
GND	Yellow	Black	1	A	1	A	1
VCC	White	Red	2	B	2	B	2
A	Brown	Yellow	3	C	3	C	3
B	Green	Green	4	D	4	D	4
\tilde{A}		Brown		E	5	E	5
\tilde{B}		Blue		F	6	F	6
0 (reference)	Grey	Grey		G	7	G	7
$\tilde{0}$	Grey	Orange		G	8	H	8

(*) Cable 3x2x0,14+2x0,34 only for encoders with inverted signals.

ACCESSORIES EXAMPLES

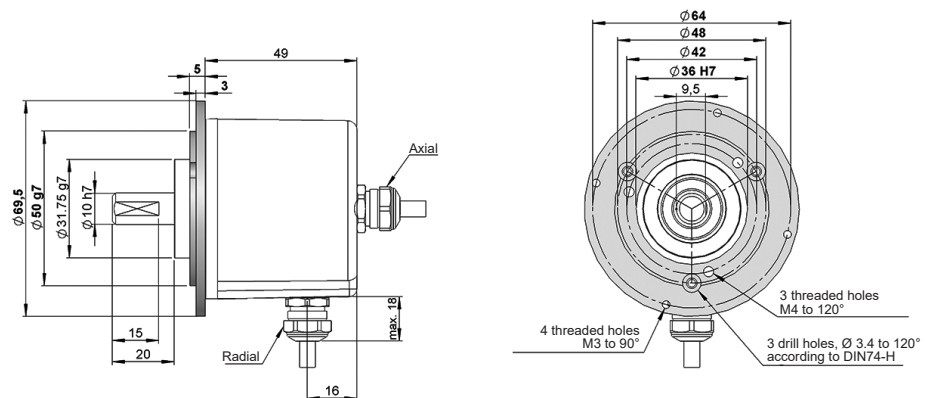


All the accessories available in the section "MOUNTING ACCESSORIES".

FLANGE DIMENSIONS

Flange mounting included

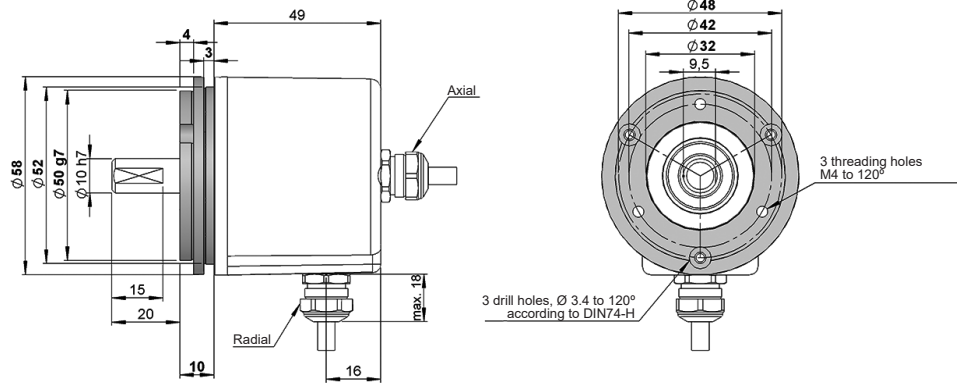
Flange 2
90.1002



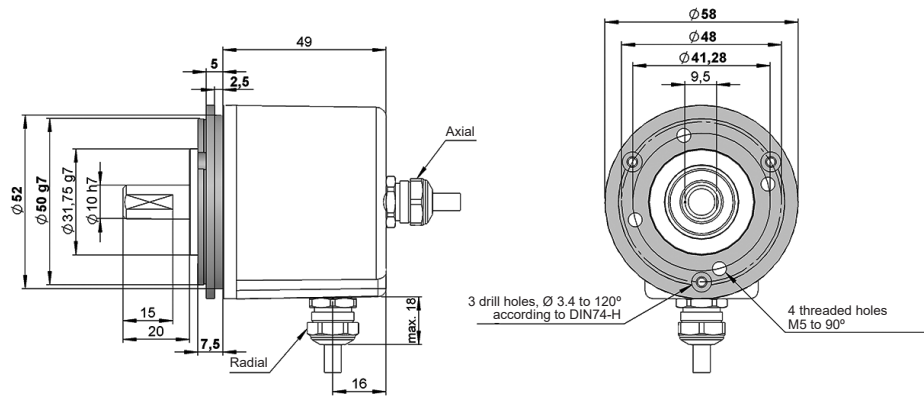
SERIE 10

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

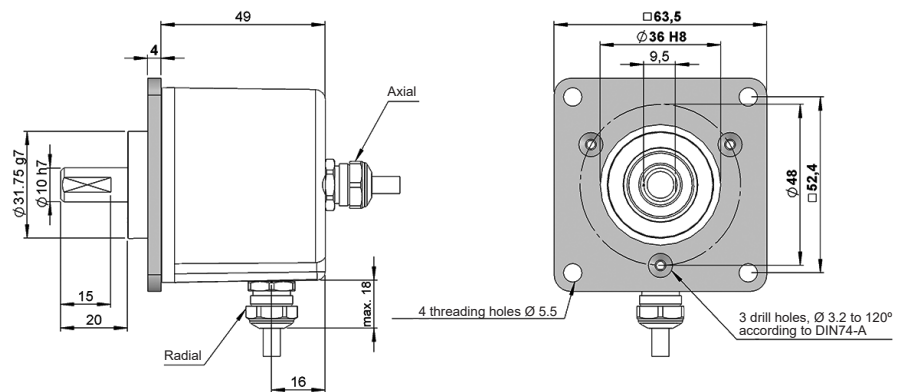
Flange 3
90.1003



Flange 4
90.1004



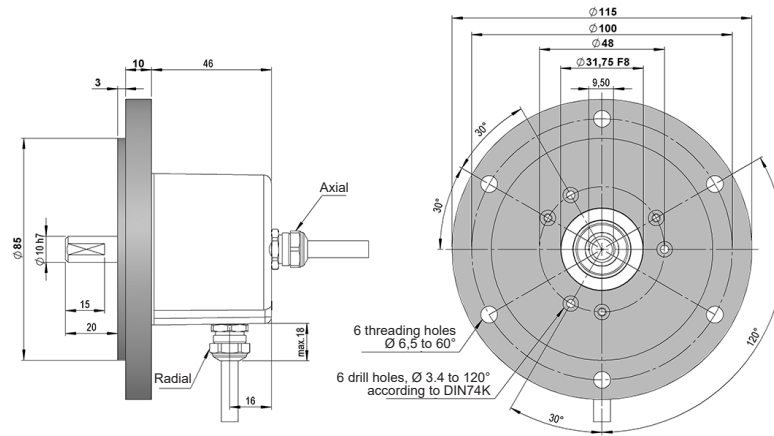
Flange 5
90.1005



SERIE 10

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

Flange 7
90.1006

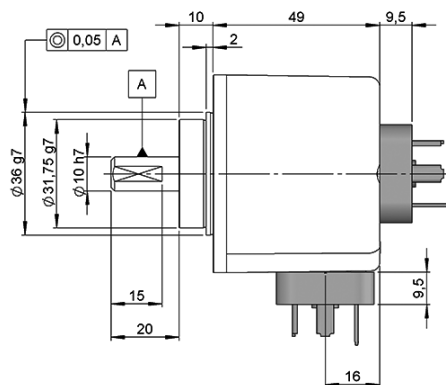


CONNECTION DIMENSIONS

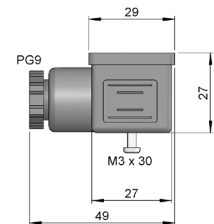
Female connector not included

Connection 1

Radial
DIN 43650 4p
male panel

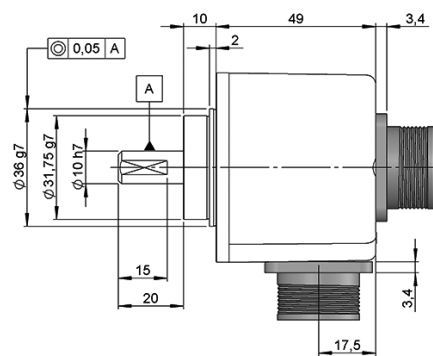


Female connector
95.0007011

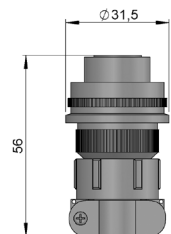


Connection 6

Axial
DIN 43650 4p
male panel



Female connector
90.9507H



Connection 4

Radial
Mil 7p
male panel
clockwise

Connection 9

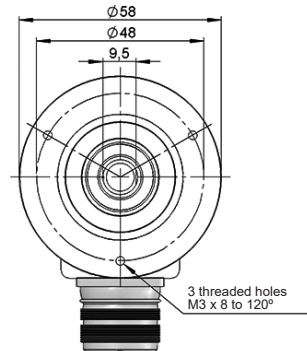
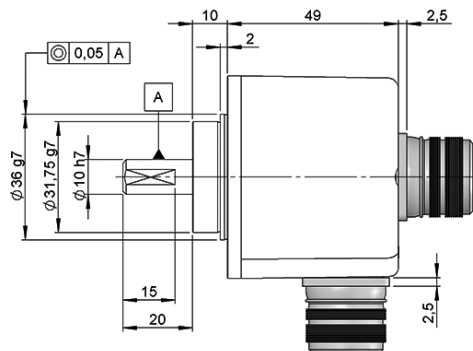
Axial
Mil 7p
male panel
clockwise

SERIE 10

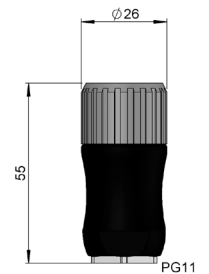
HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

Connection 5

Radial
M23 12p
male panel
clockwise

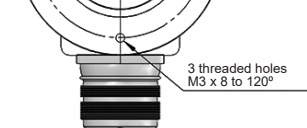
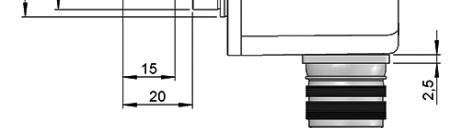


Female connector
95.0007131

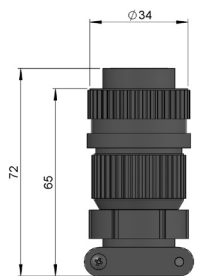


Connection 0

Axial
M23 12p
male panel
clockwise

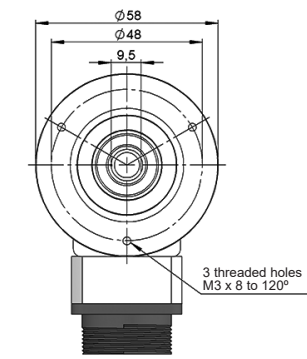
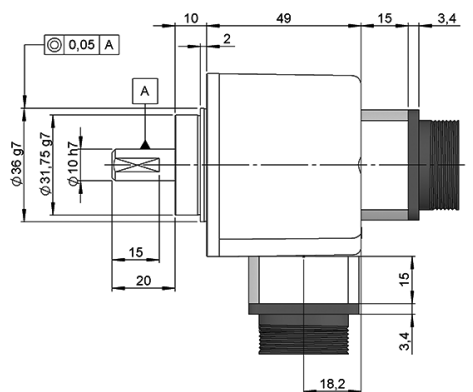


Female connector
90.9510H

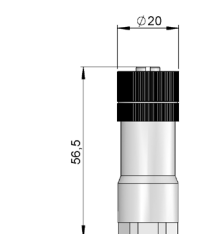


Connection M

Radial
Mil 10p
male panel
clockwise

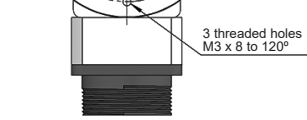
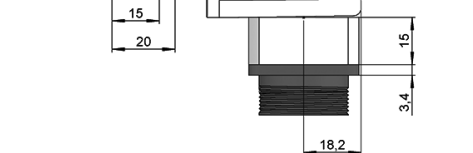


Female connector
95.0007152



Connection N

Axial
Mil 10p
male panel
clockwise

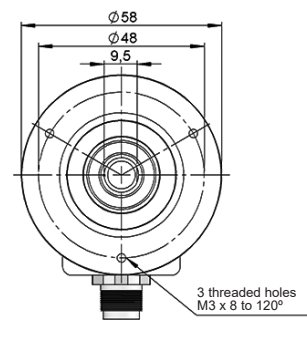
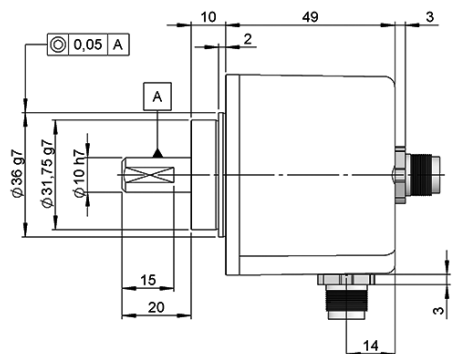


Female connector
95.0007152

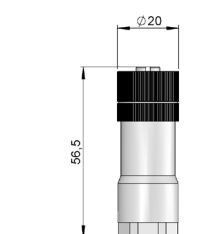


Connection L

Radial
M12 8p
male panel
counter clockwise

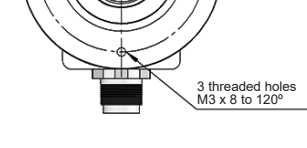


Female connector
95.0007152



Connection K

Axial
M12 8p
male panel
counter clockwise



Female connector
95.0007152

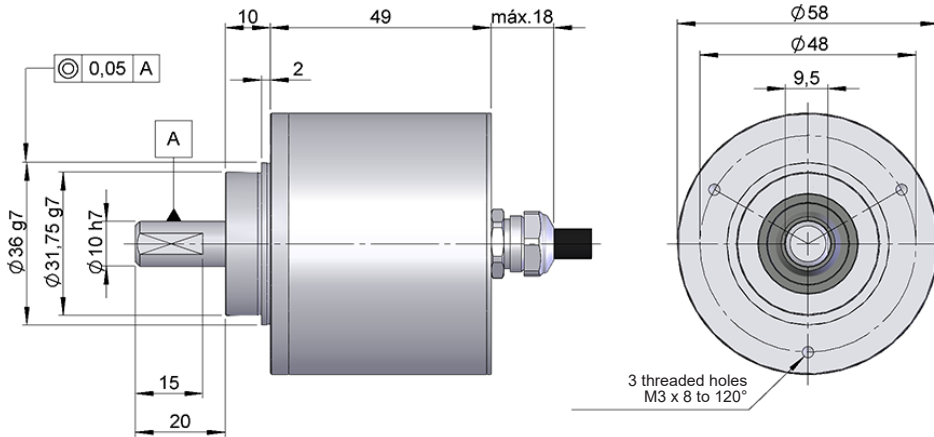




SERIE 10I INOX

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Resolution up to 50.000 pulses per turn
- External diameter 58 mm
- Shaft \varnothing 10 mm
- Protection class IP67 according to DIN EN 60529
- Executions mechanical, electronic and special optics forms available on request
- Connection by cable (other cable length available)



Drawing shaft type 1, connection type 8, without flange

REFERENCE

Reference example: 10I-11689-1024

Serie	Shaft	Flange	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
10I -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
10. Stainless Steel	1. \varnothing 10x20 mm	1. None	1. A 2. A+B 3. A+B+ $\tilde{0}$ 5. A \tilde{A} +B \tilde{B} 6. A \tilde{A} +B \tilde{B} +0 $\tilde{0}$ 9. A+B+0	8. Axial cable	0. 11...30 VDC / NPN Open collector 11...30 VDC 6. 11...30 VDC / RS422 5 VDC (compatible TTL) 7. 5 VDC / RS422 5 VDC (compatible TTL) 9. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC	(*)	AT00. -40°C

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service available in 24 h

(*) 10.000 to 50.000 pulses with interpolation. Available 10.000 direct optical pulses without interpolating upon request.



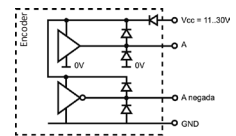
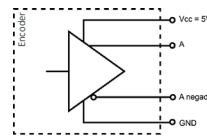
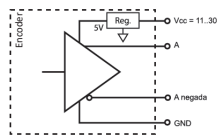
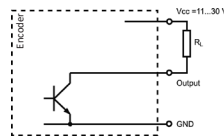
SERIE 10I INOX

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Stainless Steel AISI304 Housing: Stainless Steel AISI304 Shaft: Stainless Steel AISI304
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP67
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	80 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer AT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	50.000
Axial connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	RS422 (TTL compatible)	RS422 (TTL compatible)	Push-Pull Differential
Reference code	0	6	7	9
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%	11...30 VDC
Output voltage	11...30 VDC	5 VDC	5 VDC	11...30 VDC
Consumption	40 mA	Typical: 80 mA Max: 160 mA	Typical: 70 mA Max: 150 mA	Typical: 45 mA Max: 150 mA
Max. load capability / channel	40 mA	±20 mA	±20 mA	±30 mA
Length of cable allowed	50 m (24 VDC)	1200 m	1200 m	100 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 0.5 VDC	VOL < 0.5 VDC	VOL < 2.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > 2.5 VDC	VOH > 2.5 VDC	VOH > VCC – 3 VDC
Frequency	100 kHz	300 kHz	300 kHz	200 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 10I INOX

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

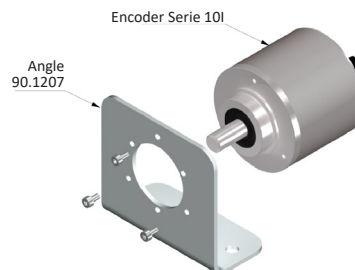
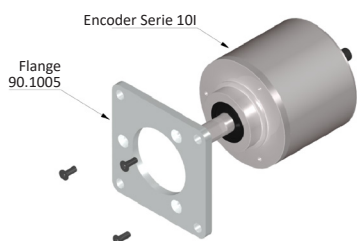
CONNECTION



	Cable 2x2x0,14+1x0,14 95.0008002	Cable 3x2x0,14+2x0,34 95.0008003 (*)
GND	Yellow	Black
VCC	White	Red
A	Brown	Yellow
B	Green	Green
\tilde{A}		Brown
\tilde{B}		Blue
0 (reference)	Grey	Grey
$\tilde{0}$	Grey	Orange

(*) Cable 3x2x0,14+2x0,34 only for encoders with inverted signals.

ACCESSORIES EXAMPLES



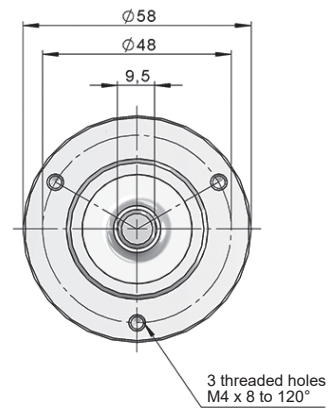
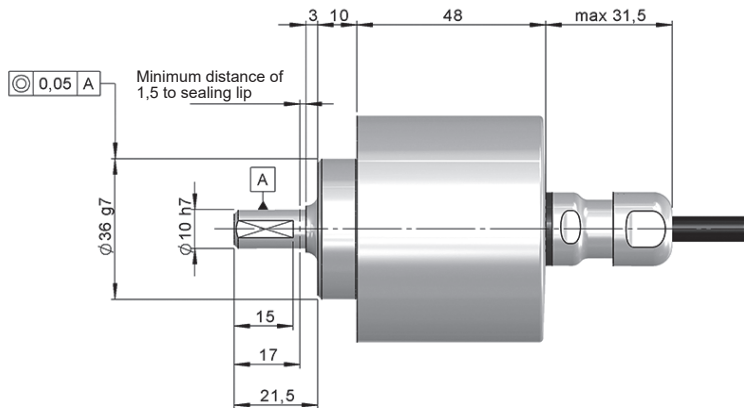
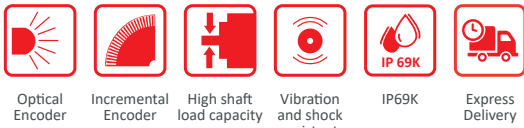
All the accessories available in the section "MOUNTING ACCESSORIES".

SERIE 10K INOX

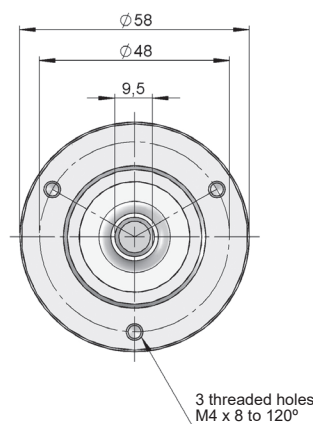
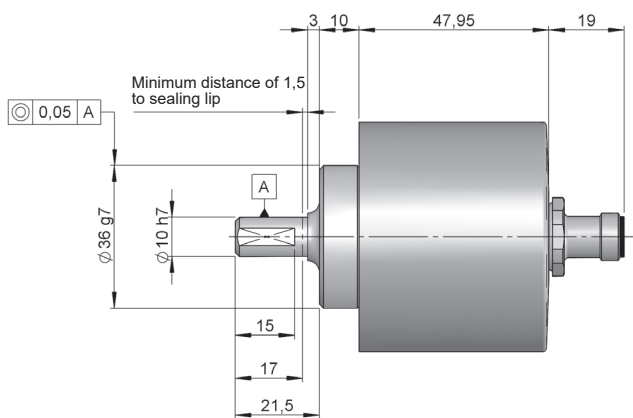
HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS



- Resolution up to 50.000 pulses per turn
- External diameter 58 mm
- Shaft \varnothing 10 mm
- Specially designed for the food and pharmaceutical industry
- Protection class IP69K according to DIN EN 60529
- Connection by cable (other cable length available) or M12 connector appropriate for the food and pharmaceutical industry
- ECOLAB certification
- Designed according to EHEDG criteria



Drawing Shaft \varnothing 10x20 mm, Connection Axial cable, without flange



Drawing Shaft \varnothing 10x20 mm, Connection Axial cable M12 8p CCW, without flange



SERIE 10K INOX

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

IP69K

REFERENCE								Reference example: 10K-11289-1024
Serie	Shaft	Flange	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer	
10K -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
10K. Stainless Steel	1. Ø 10x20 mm (*)	1. None	1. A \tilde{A} +B \tilde{B} +0 \tilde{O} 2. A \tilde{A} +B \tilde{B}	8. Axial cable (**) K. Axial M12 8p CCW (***)	0. 11...30 VDC / NPN Open collector 11...30 VDC 6. 11...30 VDC / RS422 5 VDC (compatible TTL) 7. 5 VDC / RS422 5 VDC (compatible TTL) 9. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC	(****)		

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service available in 24 h

(*) Useful shaft surface, max. 17 mm.

(**) Standard cable length 2m, other length available on order.

(***) Female connector not included. Code to order in accessories.

(****) 10.000 to 50.000 pulses with interpolation. Available 10.000 direct optical pulses without interpolating upon request.

MECHANICAL SPECIFICATIONS

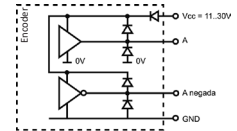
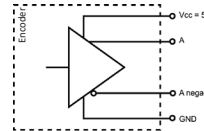
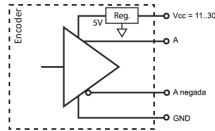
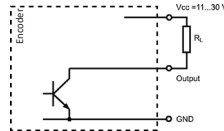
Materials	Cover: Stainless Steel AISI316 Housing: Stainless Steel AISI316 Shaft: Stainless Steel AISI316 Cable: TPE
Bearings	Ballraces
Bearings lifetime	1x10 ⁹ rev.
Maximum number of revolutions permitted mechanically	3600 rpm
Protection against dust and splashes according to DIN EN 60529	IP69K
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm aprox.
Maximum load permitted on axial shaft	100 N
Maximum load permitted on radial shaft	100 N
Weight aprox.	0,7 Kg
Operating temperature range	-20°C to +80°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	50.000
Axial connection	2 meters cable (other cable lengths available on order) or Industrial connector M12 8p CCW. Female connector not included.

SERIE 10K INOX

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

IP69K

OUTPUT SIGNALS

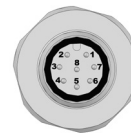


OUTPUT CIRCUIT	NPN Open Collector	RS422 (TTL compatible)	RS422 (TTL compatible)	Push-Pull Differential
Reference code	0	6	7	9
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%	11...30 VDC
Output voltage	11...30 VDC	5 VDC	5 VDC	11...30 VDC
Consumption	40 mA	Typical: 80 mA Max: 160 mA	Typical: 70 mA Max: 150 mA	Typical: 45 mA Max: 150 mA
Max. load capability / channel	40 mA	±20 mA	±20 mA	±30 mA
Length of cable allowed	50 m (24 VDC)	1200 m	1200 m	100 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 0.5 VDC	VOL < 0.5 VDC	VOL < 2.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > 2.5 VDC	VOH > 2.5 VDC	VOH > VCC – 3 VDC
Frequency	100 kHz	300 kHz	300 kHz	200 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

CONNECTION

Female connector not included



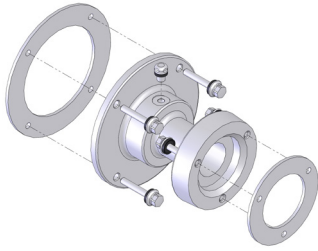
	Cable TPE 4x2x0,14 95.0008069	Connector M12 8p CCW
GND	Brown-White	1
VCC	Brown	2
A	Green	3
B	Blue	4
~A	Green-White	5
~B	Blue-White	6
0 (reference)	Orange	7
~0	Orange-White	8

SERIE 10K INOX

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

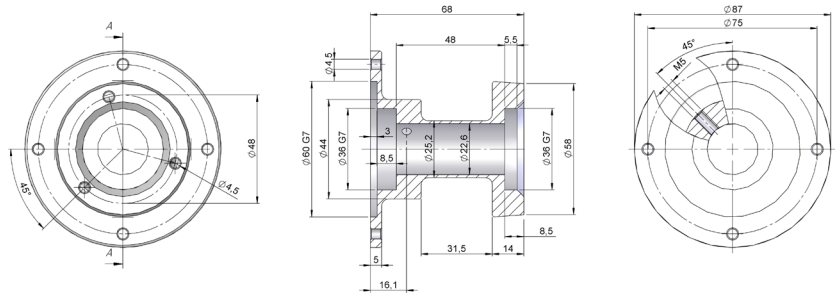
ACCESSORIES

not included



Coupling bell 90.1610

Hygienically designed to be in compliance with EHEDG criteria.



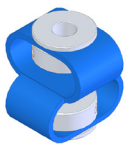
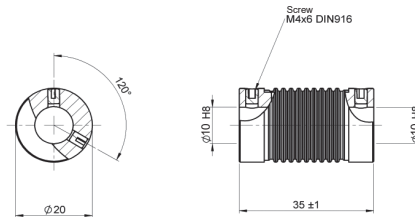
Mounting kit included: Flat seal D8 (1u) Cap M5 (1u), Flat seal Ø87 (1u), Flat seal Ø58 (1u), Sealing washer M4 EHEDG (7u), Screw EHEDG (7u).

* Send us your 3D and we will design the bell for your application.



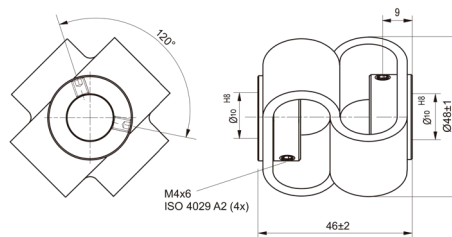
Coupling BFP-2035 10/10

Recommended coupling for 90.1610 coupling bell.



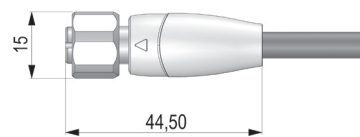
Coupling GFPI 20 10/10

Double loop stainless steel coupling, not compatible with coupling bell 90.1610.



Female connector 95.0007571

For M12 8p CCW connector
1,5 m cable.



* other length available on order



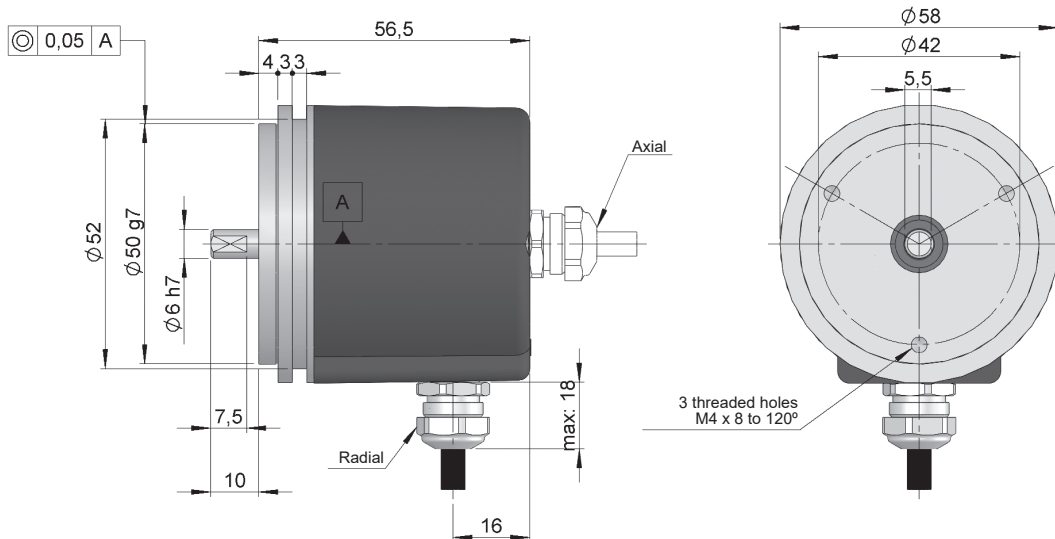
SERIE 58

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 50.000 pulses per turn
- External diameter 58 mm
- Shaft \varnothing 6 mm
- Fixation through synchro flange
- Protection class IP67 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector M12 or M23



Optical Encoder Incremental Encoder High shaft load capacity Vibration and shock resistant IP67 Temperature range Express Delivery



Drawing shaft type 1, connection type 1/2, without flange

REFERENCE

Reference example: 58-11111-1024

Serie	Shaft	Flange	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
58/58A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
58. IP65 58A. IP67 (**)	1. \varnothing 6x10 mm	1. None	1. A \tilde +B \tilde +0 \tilde 2. A \tilde +B \tilde 3. A+B	1. Axial cable 2. Radial cable 3. Axial M23 12p CW 4. Radial M23 12p CW 5. Axial M12 8p CCW 6. Radial M12 8p CCW	0. 11...30 VDC / NPN Open collector 11...30 VDC 1. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL) 6. 11...30 VDC / RS422 5 VDC (compatible TTL)	(*)	BT00. -40°C

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Step file 3D

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service available in 24 h

(*) 10.000 to 50.000 pulses with interpolation. Available 10.000 direct optical pulses without interpolating upon request.

(**) The option 58A is only available with cable connection output (1/2) or connection type (5/6).



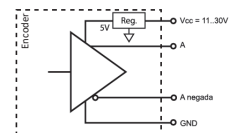
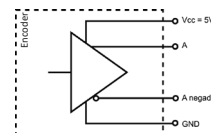
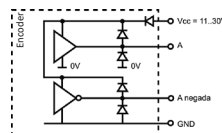
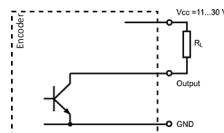
SERIE 58

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65 - Standard IP67 - Option 58A
Rotor inertia moment	30 gcm ² (58) 40 gcm ² (58A)
Starting torque at 20°C (68°F)	≤ 0,02 Nm (58) ≤ 0,04 Nm (58A)
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer BT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	50.000
Axial or radial connection	2 meters cable or industrial connector M12 or M23 (other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)	RS422 (TTL compatible)
Reference code	0	1	2	6
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%	11...30 VDC
Output voltage	11...30 VDC	11...30 VDC	5 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA	Typical: 80 mA Max: 160 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC - 3 VDC	VOH > 2.5 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 58

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

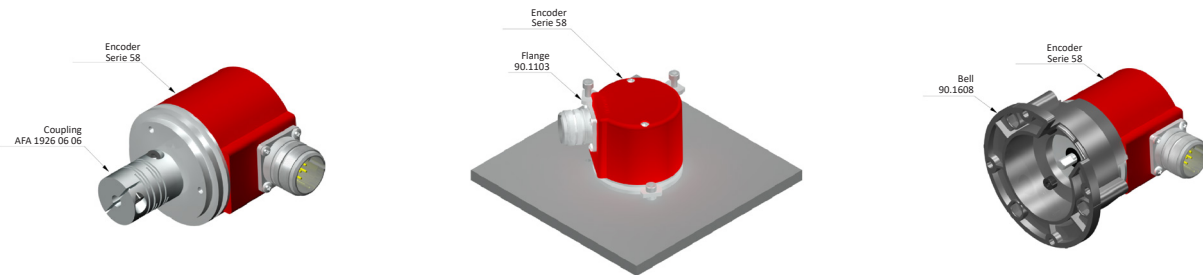
CONNECTION



	Cable 2x2x0,14+1x0,14 95.0008002	Cable (*) 3x2x0,14+2x0,34 95.0008003	Connector M12 8p CCW	Connector M23 12p CW
GND	Yellow	Black	1	1
VCC	White	Red	2	2
A	Brown	Yellow	3	3
B	Green	Green	4	4
\tilde{A}		Brown	5	5
\tilde{B}		Blue	6	6
0 (reference)	Grey	Grey	7	7
$\tilde{0}$	Grey	Orange	8	8

(*) Cable 3x2x0,14+2x0,34 only for encoders with inverted signals.

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".

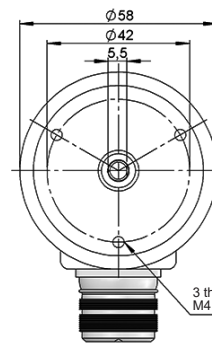
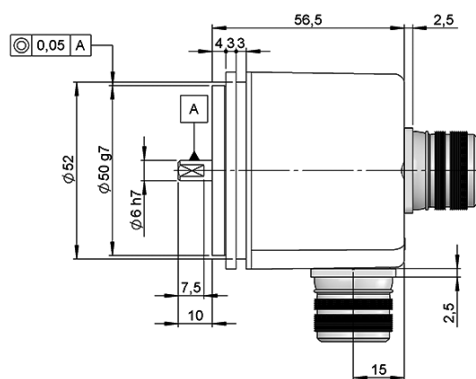
CONNECTION DIMENSIONS

Female connector not included

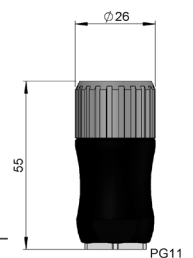
Connection 3
Axial

Connection 4
Radial

M23 12p
male panel
clockwise



Female connector
95.0007131



SERIE 58

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

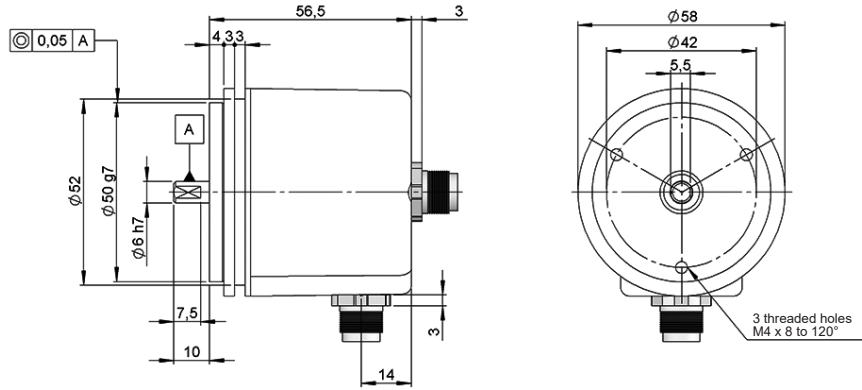
Connection 5

Axial

Connection 6

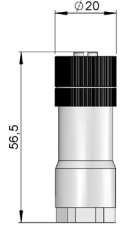
Radial

M12 8p
male panel
counter clockwise



Female connector

95.0007152



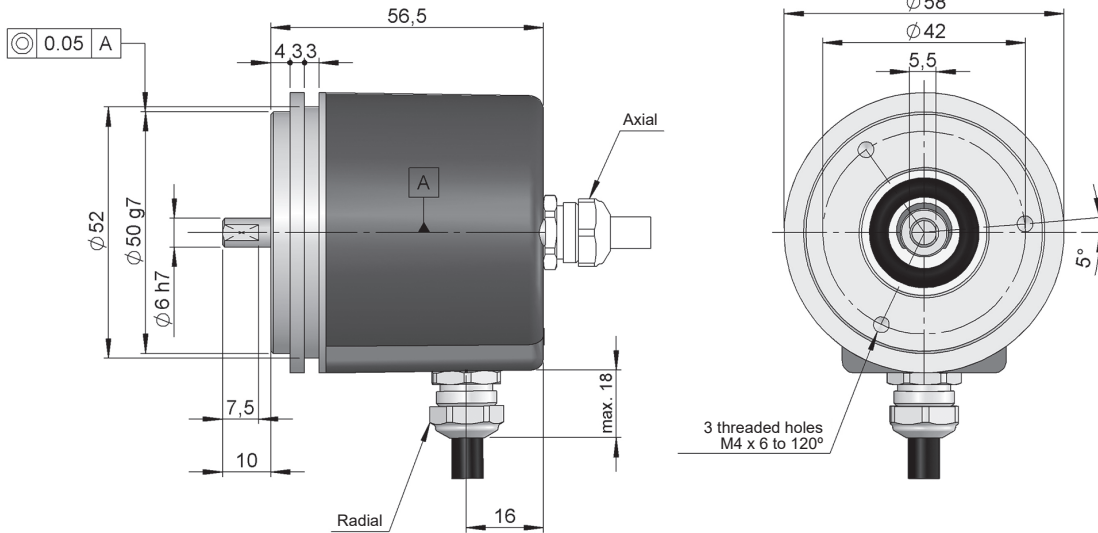


SERIE 58S

INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

 SIN/COS

- Resolution 2.048 pulses per turn
- External diameter 58 mm
- Shaft \varnothing 6 mm
- Fixation through synchro flange
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector M12 or M23



Drawing shaft type 1, connection type 1/2, without flange

REFERENCE

Reference example: 58S-11127-2048

Serie	Shaft	Flange	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
58S -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="text" value="2048"/>	<input type="text" value=""/>
	1. \varnothing 6x10 mm	1. None	1. A \tilde{A} +B \tilde{B} +0 $\tilde{0}$ 2. A \tilde{A} +B \tilde{B}	1. Axial cable 2. Radial cable 3. Axial M23 12p CW 4. Radial M23 12p CCW 5. Axial M12 8p CCW 6. Radial M12 8p CCW	7. 5 VDC / SIN-COS 1Vpp 5 VDC		

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SERIE 58S

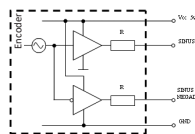
INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight approx.	0,5 Kg
Operating temperature range	-20°C to +80°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Number of pulses per turn	2.048
Axial or radial connection	2 meters cable or industrial connector M12 or M23 (other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



OUTPUT CIRCUIT	Sine-wave
Reference code	7
Power supply	5 VDC ±10%
Output voltage	5 VDC
Consumption	Typical: 40 mA Max: 90 mA
Length of cable allowed	50 m
Signal type	SIN/COS, 1Vpp
Output signal level	0.6 to 1.2 Vpp
Signal offset	2.5 VDC
Reference	0.2 to 1 VDC
Frequency	200 kHz
Protection polarity inversion	Not permanent

Cosine leads (90° electric) Sine, view from the shaft, shaft rotating clockwise

SERIE 58S

INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

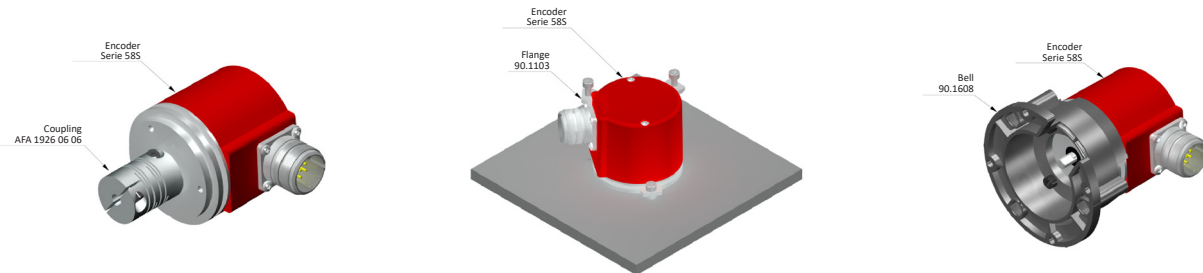
SIN/COS

CONNECTION



	Cable 3x2x0,14+2x0,34 95.0008003	Connector M12 8p CCW	Connector M23 12p CW
GND	Black	1	1
VCC	Red	2	2
COS	Yellow	3	3
SIN	Green	4	4
$\overline{\text{COS}}$	Brown	5	5
$\overline{\text{SIN}}$	Blue	6	6
0 (reference)	Grey	7	7
$\tilde{0}$	Orange	8	8

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".

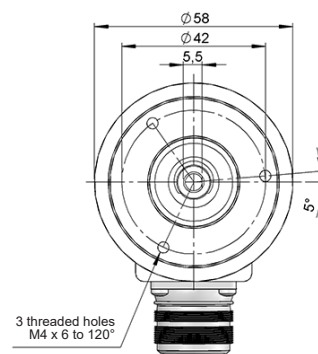
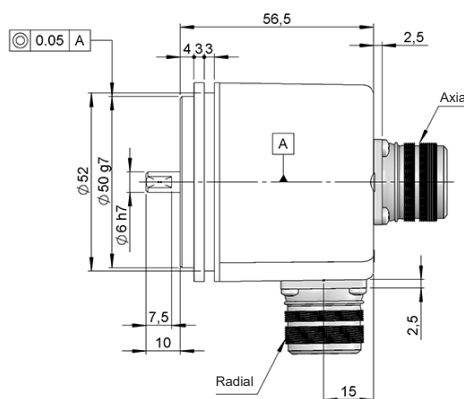
CONNECTION DIMENSIONS

Female connector not included

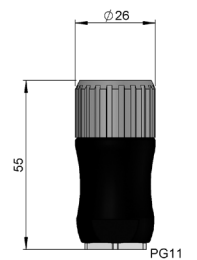
Connection 3
Axial

Connection 4
Radial

M23 12p
male panel
clockwise



Female connector
95.0007131



SERIE 58S

INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

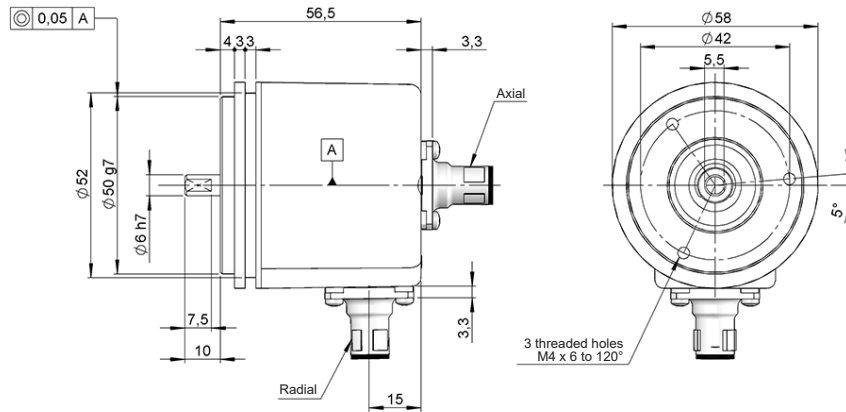
Connection 5

Axial

Connection 6

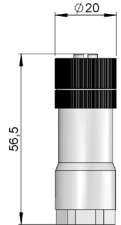
Radial

M12 8p
male panel
counter clockwise



Female connector

95.0007152

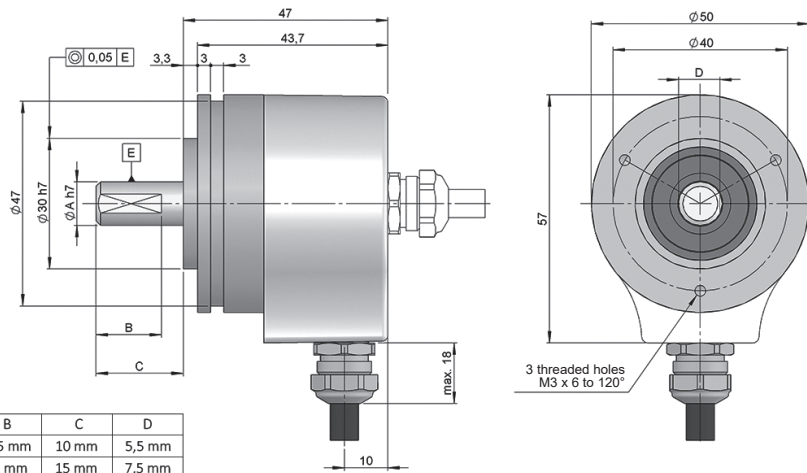
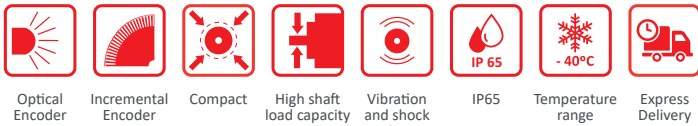


SERIE 50

COMPACT INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS



- Resolution up to 5.000 pulses per turn
- External diameter 50 mm
- Shaft \varnothing 6, 8 or 10 mm
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector M12 or M23



SHAFT	$\varnothing A$	B	C	D
1	6 mm	7,5 mm	10 mm	5,5 mm
2	8 mm	15 mm	15 mm	7,5 mm
3	10 mm	15 mm	20 mm	9,5 mm

Drawing shaft type 3, connection type 1/4, without flange

REFERENCE

Reference example: 50-13641-1024

Serie	Shaft	Flange	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
50 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. \varnothing 6x10 mm 2. \varnothing 8x15 mm 3. \varnothing 10x20 mm	1. None	1. A 2. A+B 3. A+B+ $\tilde{0}$ 5. $\tilde{A}\tilde{A}+\tilde{B}\tilde{B}$ 6. $\tilde{A}\tilde{A}+\tilde{B}\tilde{B}+\tilde{0}\tilde{0}$ 9. A+B+0	1. Axial cable 2. Axial M12 8p CCW 3. Axial M23 12p CW 4. Radial cable 5. Radial M12 8p CCW 6. Radial M23 12p CW	0. 11...30 VDC / NPN Open collector 11...30 VDC 1. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL)		ET00. -40°C

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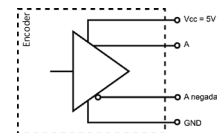
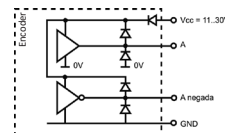
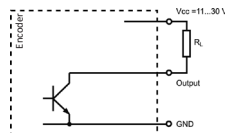
SERIE 50

COMPACT INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	80 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer ET00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	2500 m/s ² (6ms) [≤ 1.024 ppr] 1000 m/s ² (6ms) [> 1.024 ppr]
Maximum pulses per turn	5.000
Axial or radial connection	2 meters cable or industrial connector M12 or M23 (other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)
Reference code	0	1	2
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%
Output voltage	11...30 VDC	11...30 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 2.2 VDC (24 VDC)	VOH > VCC - 3 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes
Protection polarity inversion	Yes	Yes	No

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 50

COMPACT INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

CONNECTION



(B adelanta A)	Cable (*) 5x0,14 95.0008051	Cable (*) 8x0,14 95.0008052	Connector M12 8p CCW	Connector M23 12p CW
GND	White	White	1	1
VCC	Brown	Brown	2	2
A	Green	Green	3	3
B	Yellow	Grey	4	4
\tilde{A}		Yellow	5	5
\tilde{B}		Pink	6	6
0 (reference)	Grey	Blue	7	7
$\tilde{0}$	Grey	Red	8	8

(*) For lengths over 2 meters standard cable, we recommend the use of twisted pair cable 2x2x0,14+1x0,14 (95.0008002) or 3x2x0,14+2x0,34 (95.0008003). Request the final cable length required to avoid junctions.

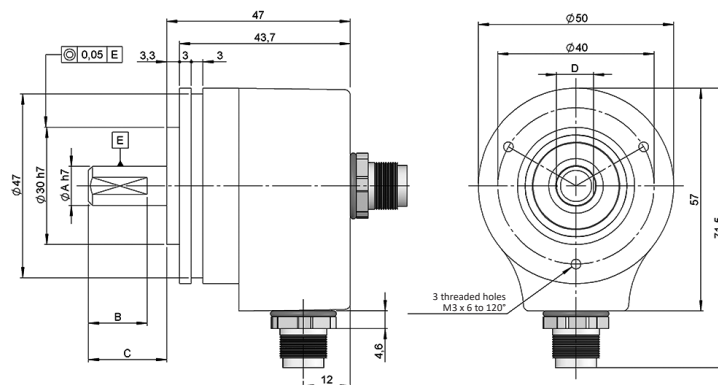
CONNECTION DIMENSIONS

Female connector not included

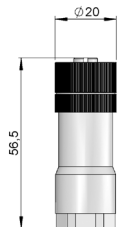
Connection 2
Axial

Connection 5
Radial

M12 8p
male panel
counter clockwise



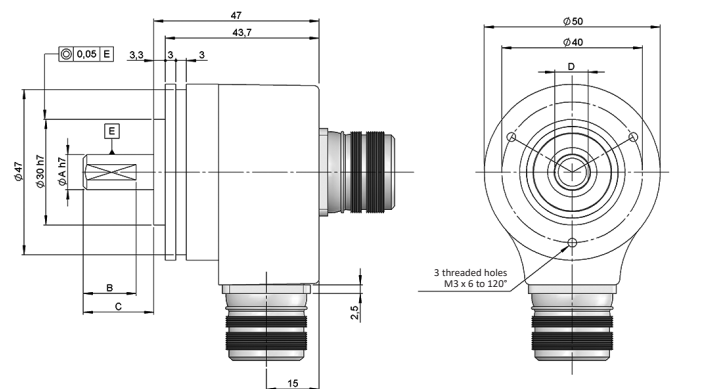
Female connector
95.0007152



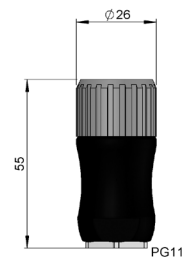
Connection 3
Axial

Connection 6
Radial

M23 12p
male panel
clockwise



Female connector
95.0007131





SERIE PR90

PROGRAMMABLE INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS



Programmable incremental optical encoder from 1 to 65.536 pulses per rotation



Programmable via USB, without an additional programming box



Programmable without powering up the encoder



Multi-voltage 5...30 VDC Automatic power voltage recognition



0° to 360° reference signal position



Optical Encoder



Incremental Encoder



Programmable Encoder



High shaft load capacity



Vibration and shock resistant

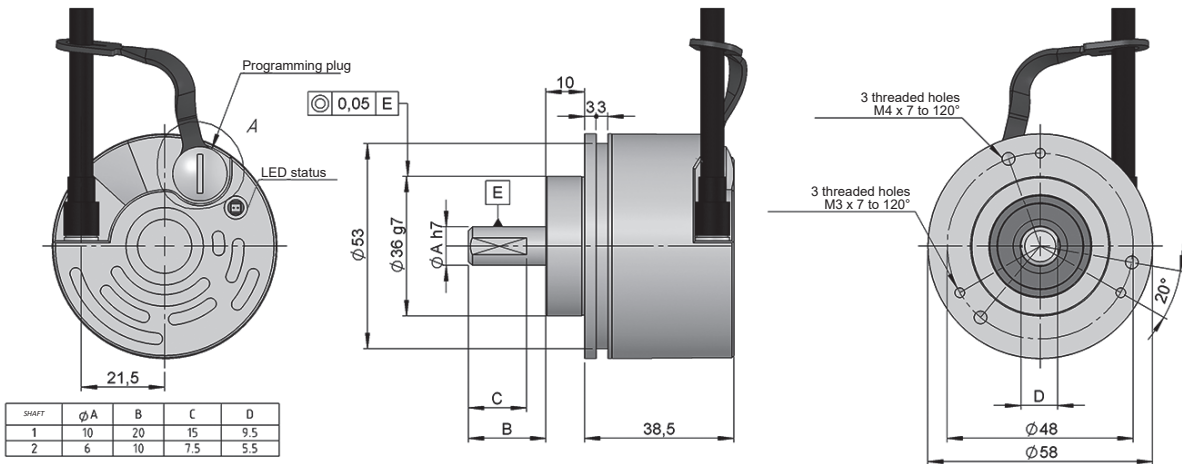
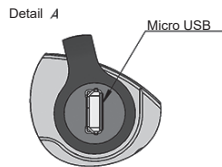


IP65



Express Delivery

- External diameter 58 mm
- Shaft \varnothing 6 or 10 mm
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector M12 or M23



Drawing shaft type 1, connection type 1, without flange

REFERENCE

Reference example: PR90-11C1C-C

Serie	Shaft	Flange	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
PR90 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. \varnothing 10x20 mm 2. \varnothing 6x10 mm	1. None 3. 90.1102 5. 90.1005 (*)	C. A \ddot{A} +B \ddot{B} +0 $\ddot{0}$ CONFIGURABLE • CW / CCW • Z 90° and 180° • Z position of 0...360°	1. Helicoidal cable 2. Radial M12 8p CCW 3. Radial M23 12p CCW	C. 5...30 VDC / HTL - TTL CONFIGURABLE • Electronic output HTL / TTL	C. 1...65536 CONFIGURABLE	

Order your reference
Step file 3D

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service available in 24 h

(*) Flange mounting included in delivery of the encoder.

Female connector is not included in the reference. All options available in the sections "CONNECTION DIMENSIONS", upon request.



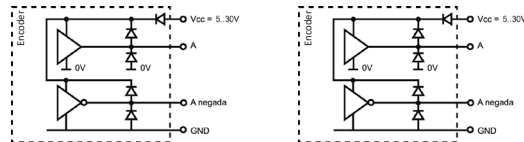
SERIE PR90

PROGRAMMABLE INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	80 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	65.536
Connection	2 meters cable or industrial connector M12 or M23 (other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



OUTPUT CIRCUIT	TTL	HTL
Reference code	C	C
Power supply	5...30 VDC	5...30 VDC
Consumption*	Typical: 45 mA Max: 150 mA	Typical: 45 mA Max: 150 mA
Max. load capability / channel	±20 mA	±20 mA
Length of cable allowed	1200 m	1200 m
"Low" signal level	VOL < 0.5 VDC	VOL < 2.5 VDC
"High" signal level	VOH > 2.5 VDC	VOH > VCC - 1.5 VDC
Frequency	900 kHz	900 kHz
Short circuit protection	Yes	Yes
Protection polarity inversion	Yes	Yes

Configurable CW - Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise
Configurable CCW - Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

(*) Peak current of 400mA (1ms) at start-up of the encoder.

SERIE PR90

PROGRAMMABLE INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

CONNECTION



	Cable 4x2x0,14 95.0008011	Connector M12 8p CCW	Connector M23 12p CCW
GND	Black	7	10
VCC	Red	8	12
A	Yellow	2	5
B	Green	4	8
\tilde{A}	Brown	1	6
\tilde{B}	Blue	3	1
0 (reference)	Grey	6	3
$\tilde{0}$	Orange	5	4

Shield connected to the housing

CONNECTION PC



Cable
uUSB/USB

(*) The connection cable uUSB / USB is not included in the reference.

Available in the section "ACCESSORIES".

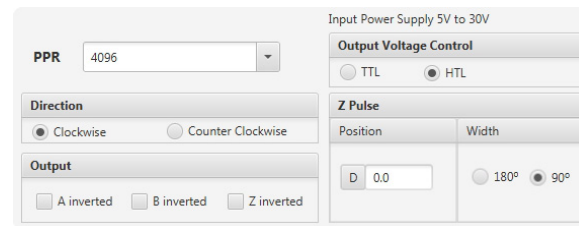
PROGRAMMING DETAILS

LED status:

● *green intermittent indicator:*
Communication between devices

● *red indicator:*
Error detection (overload, low power, optical failure, communications failure, humidity...)
See type of error in the programming software

Configuration options:



Factory configuration:

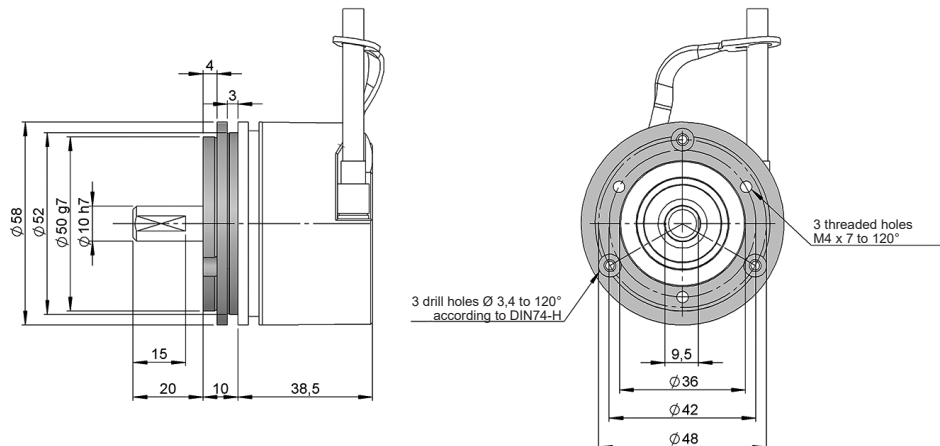
- Pulses: 4096 ppr
- Output: HTL
- Direction: Clockwise (CW)
- Position (Z pulse): 0°
- Width (Index, Z, 0): 90°

Download the **software** and programming manual from: www.encoderhohner.com/pr90/

FLANGE DIMENSIONS

Flange mounting included

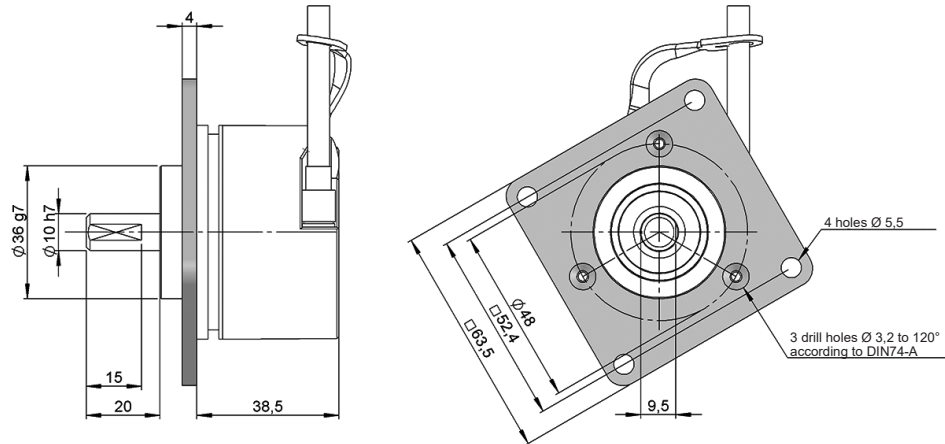
Flange 2
90.1102



SERIE PR90

PROGRAMMABLE INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

Flange 3
90.1005

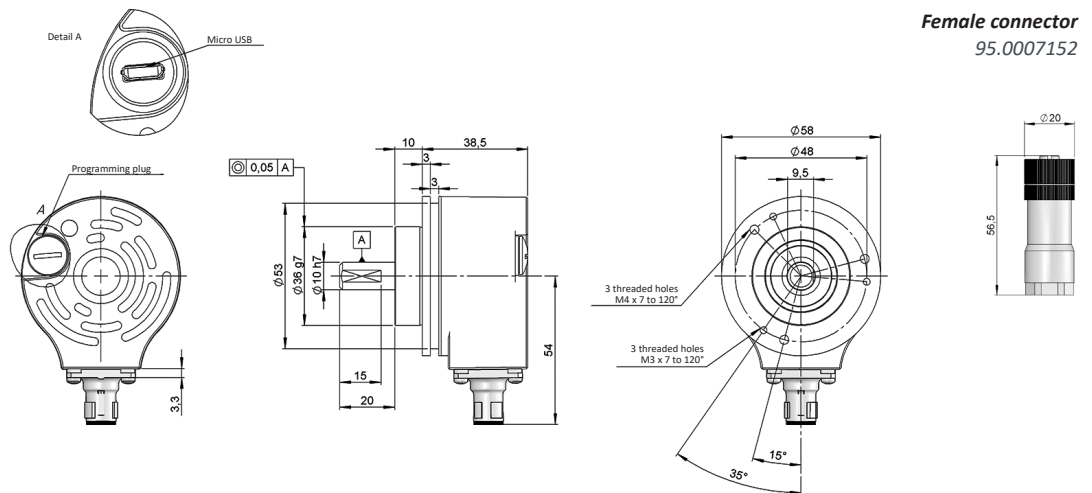


CONNECTION DIMENSIONS

Female connector not included

Connection 2

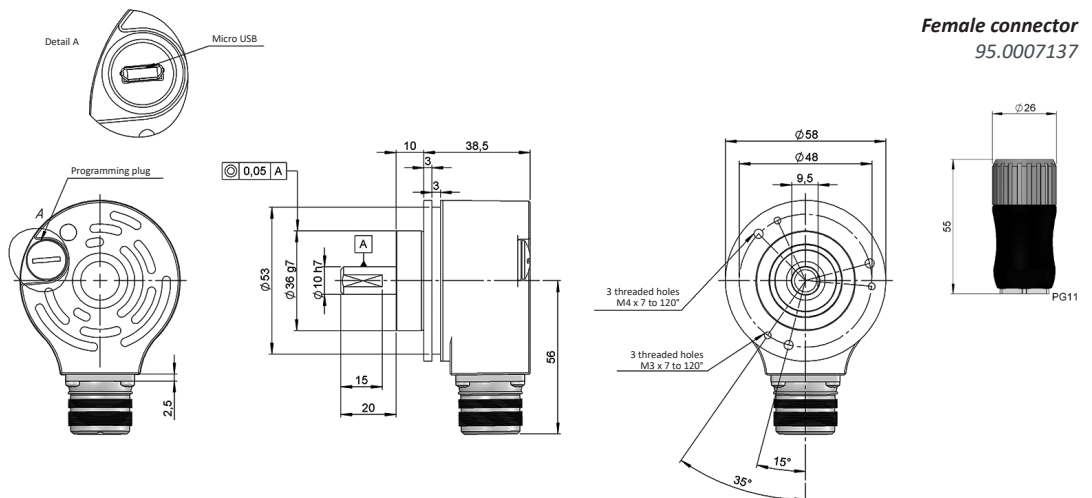
Radial
M12 8p
male panel
counter clockwise



Female connector
95.0007152

Connection 3

Radial
M23 12p
male panel
counter clockwise



Female connector
95.0007137

SERIE PR90

PROGRAMMABLE INCREMENTAL SOLID SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

PRE-ASSEMBLED CABLES

89.003.02.047.xx

length

Cable 3x2x0,14+2x0,34

Female connector

M12 8p CW



89.010.02.015.xx

length

Cable 3x2x0,14+2x0,34

Female connector

M23 12p CW



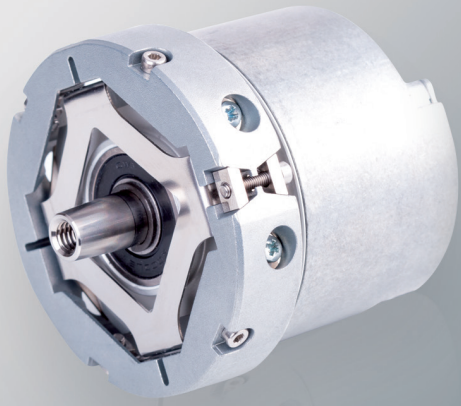


Image with Expanding coupling 90.1101



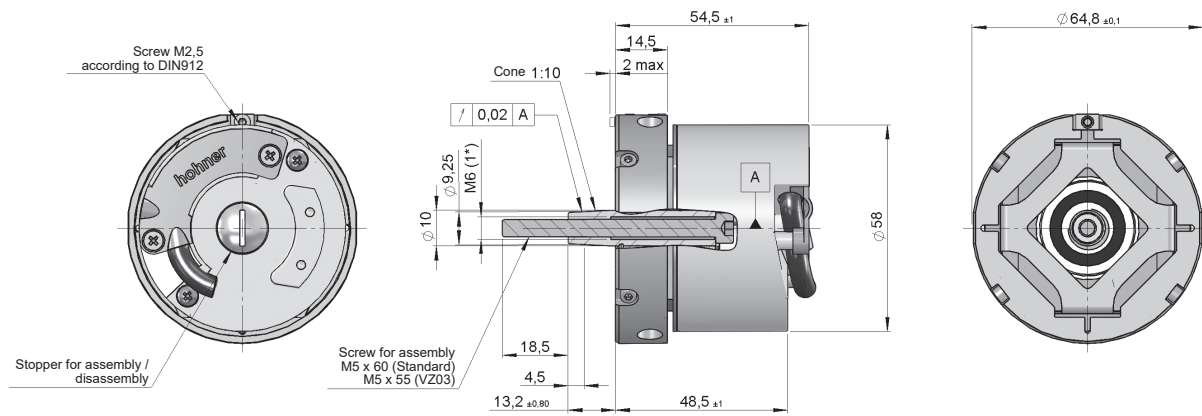
SERIE 64

CONIC SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 10.000 pulses per turn
- External diameter 58 mm
- Conic shaft 1:10
- Protection class IP54 according to DIN EN 60529
- Anti-rotation system through flexible flange, pin torque support or expanding coupling
- Connection by cable (other cable length available)



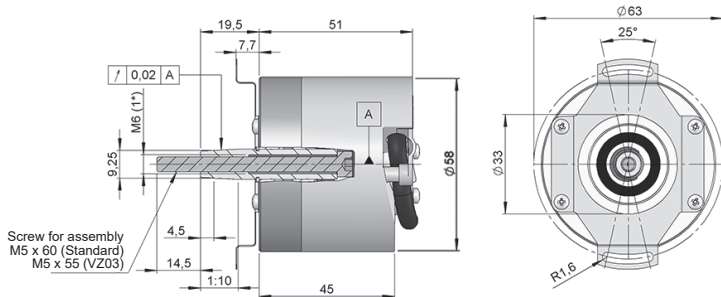
Expanding coupling (90.1101)



(1*) Thread M6 for disassembly

Drawing conic shaft 1:10, anti-rotation system type 0, connection type 1

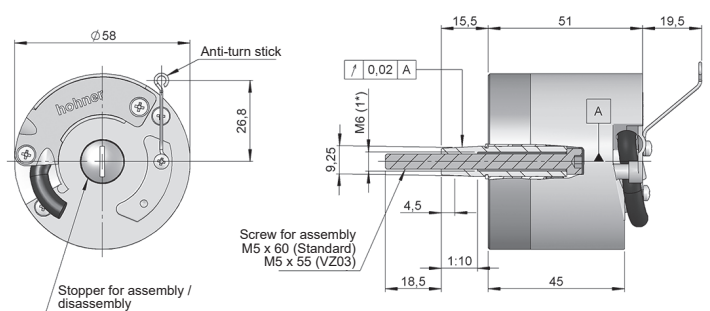
Flexible flange (90.1027)



(1*) Thread M6 for disassembly

Drawing conic shaft 1:10, anti-rotation system type 1, connection type 1

Anti-turn stick (90.1041)



(1*) Thread M6 for disassembly

Drawing conic shaft 1:10, anti-rotation system type 2, connection type 1



SERIE 64

CONIC SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

REFERENCE							Reference example: 64-11111-1024	
Serie	Shaft	Anti-rotation system	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer	
64 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
	1. Conic 1:10	0. Expanding coupling 90.1101 1. Flexible flange 90.1027 2. Anti-turn stick 90.1041 3. None (*)	1. A \tilde{A} +B \tilde{B} +0 $\tilde{0}$ 2. A \tilde{A} +B \tilde{B}	1. Helicoidal cable	0. 11...30 VDC / NPN Open collector 11..30 VDC 1. 11..30 VDC / Line driver differential Push-Pull 11..30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL) 6. 11..30 VDC / RS422 5 VDC (<<compatible TTL>>)		VT00. -40°C VZ03. Screw for assembly M5x55 95.0004099	

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(*) Anti-rotation system type 0 (Expanding coupling 90.1101) and 1 (Flexible flange 90.1027) supplied assembled.
 Anti-rotation systems type2 (Anti-turn stick 90.1041) supplied disassembled and includes the screws required for assembly.
 Other required anti-rotation systems are not supplied assembled. All systems available in the sections "MOUNTING ACCESSORIES".

 Assembly and disassembly instruction manual available in:
www.encoderhohner.com/product/serie-64/

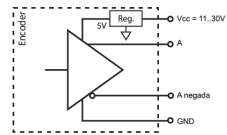
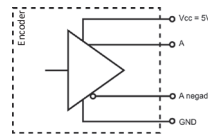
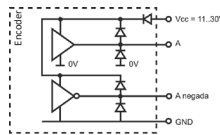
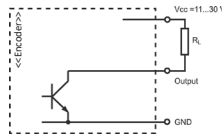
MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Expanding coupling 90.1101 (assembled) Flexible flange 90.1027 (assembled) Anti-turn stick 90.1041 (self-assembly kit included)
Permitted misalignment	±0.5 mm axial (90.1101) ±0.5 mm axial, ±0.3 mm radial (90.1027, 90.1041)
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP54
Rotor inertia moment	≤ 3x10 ⁻⁶ Kg·m ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer VT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	10.000
Helicoidal cable	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)

SERIE 64

CONIC SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)	RS422 (TTL compatible)
Reference code	0	1	2	6
Power supply	11...30 VDC	11...30 VDC	5 VDC ±10%	11...30 VDC
Output voltage	11...30 VDC	11...30 VDC	5 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA	Typical: 80 mA Max: 160 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC - 3 VDC	VOH > 2.5 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	Not permanent	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

CONNECTION



	Cable 3x2x0,14+2x0,34 95.0008003
GND	Black
VCC	Red
A	Yellow
B	Green
~A	Brown
~B	Blue
0 (reference)	Grey
~0	Orange
Shield*	Shield

(*) Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected.

SERIE 64

CONIC SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

ACCESSORIES

Screw for disassembly (included)



95.0004105
M5x60
(Standard)



95.0004099
M5 x 55
(Special Customer VZ03)

Screw for disassembly (not included)



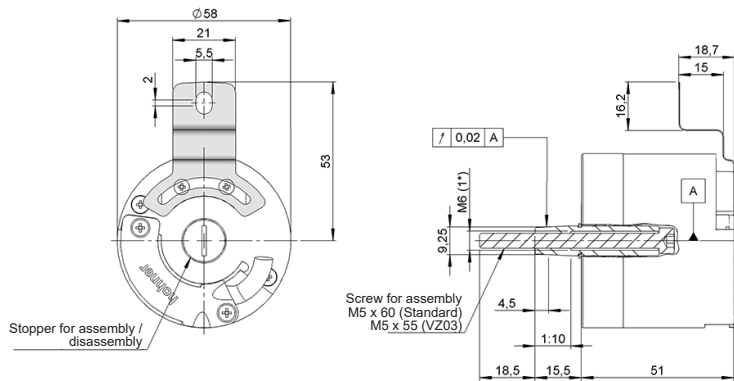
95.0004106
M6x55



95.0004420
Grub screw M5 x 20
45H DIN913

ANTI-ROTATION SYSTEMS DIMENSIONS

Flexible flange 90.1046

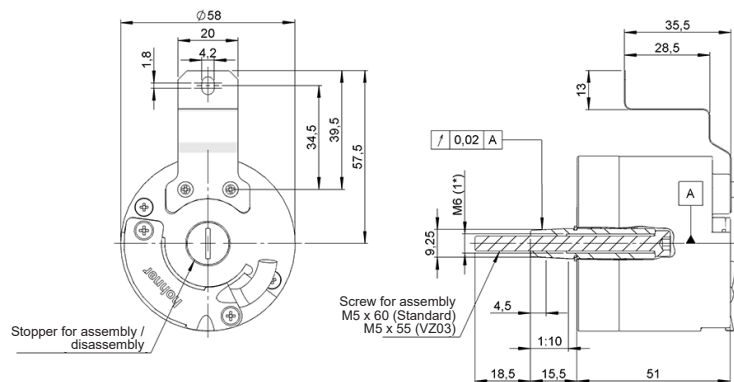


90.1046

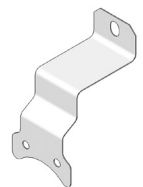


(1*) Thread M6 for disassembly

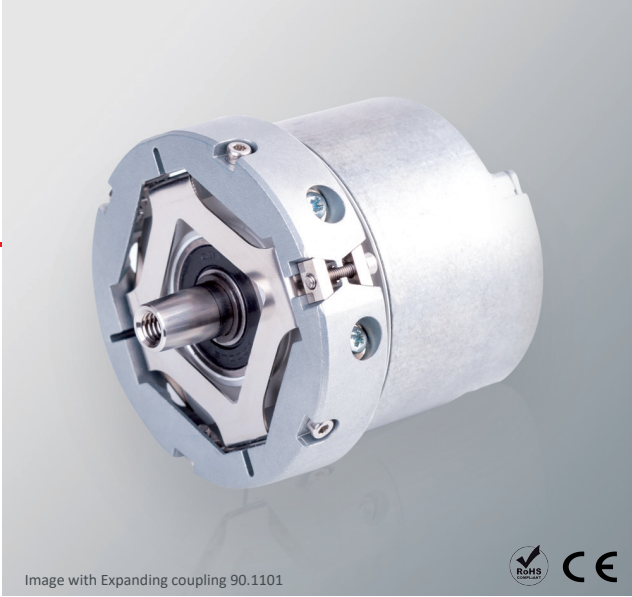
Flexible flange 90.1082



90.1082



(1*) Thread M6 for disassembly



SERIE 64S

CONIC SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

 SIN/COS

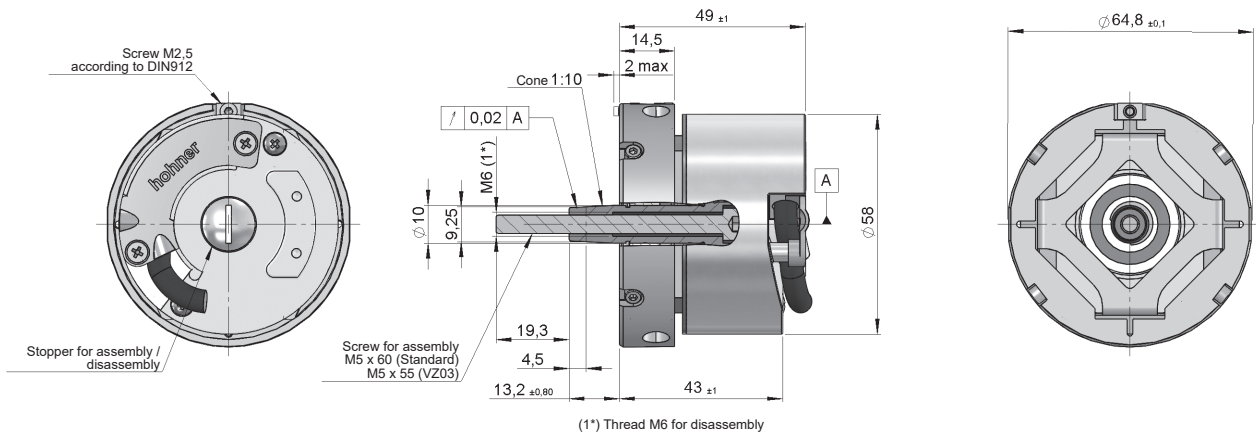
- Resolution 2.048 SIN/COS per turn
- External diameter 58 mm
- Conic shaft 1:10
- Protection class IP54 according to DIN EN 60529
- Anti-rotation system through flexible flange, pin torque support or expanding coupling
- Connection by cable (other cable length available)



Image with Expanding coupling 90.1101



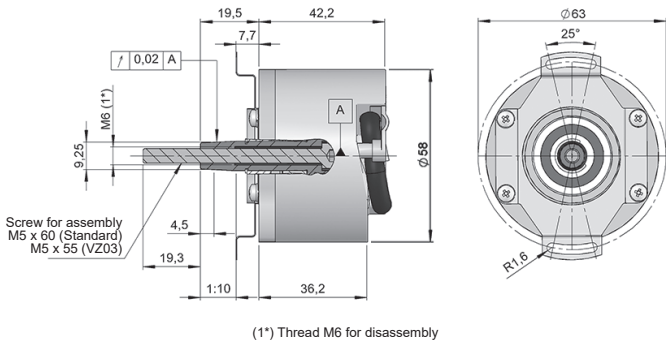
Expanding coupling (90.1101)



(1*) Thread M6 for disassembly

Drawing conic shaft 1:10, anti-rotation system type 0, connection type 1

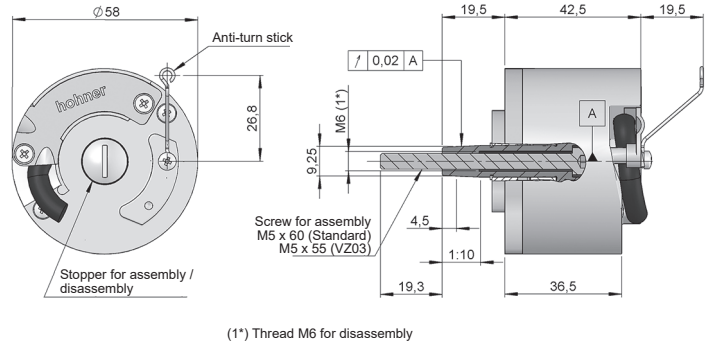
Flexible flange (90.1027)



(1*) Thread M6 for disassembly

Drawing conic shaft 1:10, anti-rotation system type 1, connection type 1

Anti-turn stick (90.1041)



(1*) Thread M6 for disassembly

Drawing conic shaft 1:10, anti-rotation system type 2, connection type 1



SERIE 64S


CONIC SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

REFERENCE							Reference example: 64S-10117-2048	
Serie	Shaft	Anti-rotation system	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer	
64S -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	2 0 4 8	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
	1. Conic 1:10	0. Expanding coupling 90.1101 1. Flexible flange 90.1027 2. Anti-turn stick 90.1041 3. None (*)	1. $\tilde{A}\tilde{A}+\tilde{B}\tilde{B}+0\tilde{0}$ 2. $\tilde{A}\tilde{A}+\tilde{B}\tilde{B}$	1. Helicoidal cable	7. 5 VDC / SIN-COS 1 Vpp 5 VDC		VZ03. Screw for assembly M5x55 95.0004099	

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(*) Anti-rotation system type 0 (Expanding coupling 90.1101) and 1 (Flexible flange 90.1027) supplied assembled.
Anti-rotation system type 2 (Anti-turn stick 90.1041) supplied disassembled and includes the screws required for assembly.
Other required anti-rotation systems are not supplied assembled. All systems available in the sections "MOUNTING ACCESSORIES".

 Assembly and disassembly instruction manual available in:
www.encoderhohner.com/product/serie-64-sincos/

MECHANICAL SPECIFICATIONS

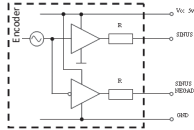
Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Expanding coupling 90.1101 (assembled) Flexible flange 90.1027 (assembled) Anti-turn stick 90.1041 (self-assembly kit included)
Permitted misalignment	±0.5 mm axial (90.1101) ±0.5 mm axial, ±0.3 mm radial (90.1027, 90.1041)
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP54
Rotor inertia moment	≤ 3x10 ⁻⁶ Kg·m ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Number of pulses per turn	2.048
Helicoidal cable	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)

SERIE 64S

CONIC SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

OUTPUT SIGNALS



OUTPUT CIRCUIT	Sine-wave
Reference code	7
Power supply	5 VDC ±10%
Output voltage	5 VDC
Consumption	Typical: 40 mA Max: 90 mA
Length of cable allowed	10 m
Signal type	SIN/COS, 1 Vpp
Output signal level	0.6 to 1.2 Vpp
Signal offset	2.5 VDC
Reference	0.2 to 1 VDC
Frequency (-3 dB)	≤ 200 kHz
Protection polarity inversion	Not permanent

Cosine leads (90° electric) Sine, view from the shaft, shaft rotating clockwise

CONNECTION



	Cable (**) 3x2x0,14+2x0,34 95.0008003
GND	Black
VCC	Red
COS	Yellow
SIN	Green
$\overline{\text{COS}}$	Brown
$\overline{\text{SIN}}$	Blue
0 (reference)	Grey
$\tilde{0}$	Orange
Shield*	Shield

(*) Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected. \perp
 (**) For lengths over 10 meters, we recommend the use of shielded cable 3x(2x0,14)+2x(2x0,14)+2x0,34.

SERIE 64S

CONIC SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

ACCESSORIES

Screw for assembly (included)



95.0004105
M5x60
(Standard)



95.0004099
M5 x 55
(Special Customer VZ03)

Screw for disassembly (not included)



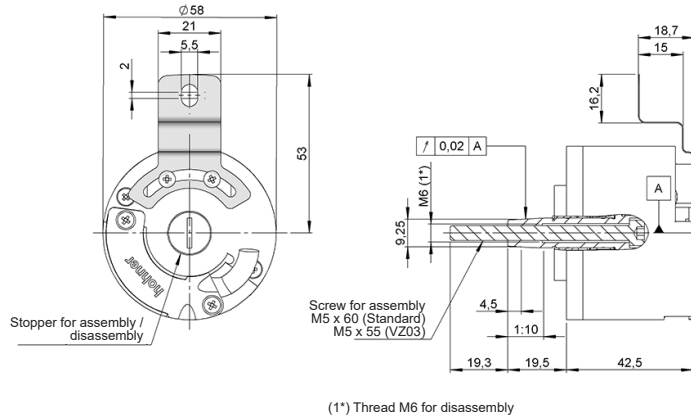
95.0004106
M6x55



95.0004420
Grub screw M5 x 20
45H DIN913

ANTI-ROTATION SYSTEMS DIMENSIONS

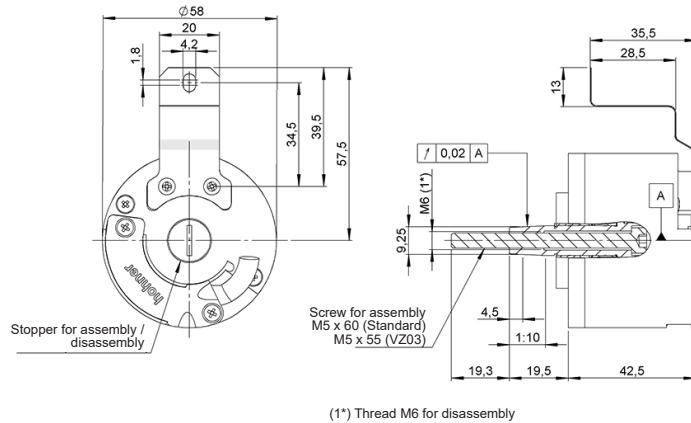
Flexible flange
90.1046



90.1046



Flexible flange
90.1082



90.1082

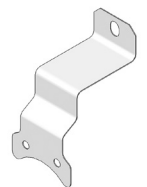




Image with flexible flange 90.1045

SERIE 66

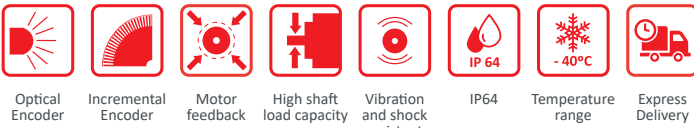
THREAD SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

Equivalent for SIEMENS 1XP8001-1 / 1XP8001-2

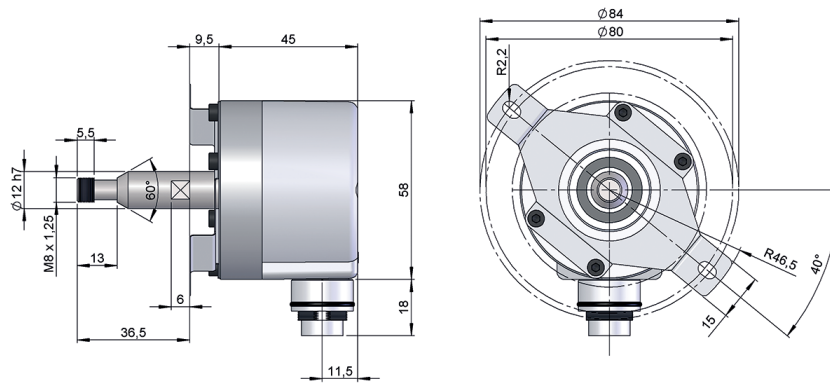
100% interchangeable (mechanically - electronically - pin out)

✓ 66-14121-1024.UC00 / 66-14122-1024.UC00

- Resolution up to 10.000 pulses per turn
- External diameter 58 mm
- Thread shaft M8
- Protection class IP64 according to DIN EN 60529
- Anti-rotation system through flexible flange or anti-turn stick
- Connection by cable (other cable length available) or industrial connector M16

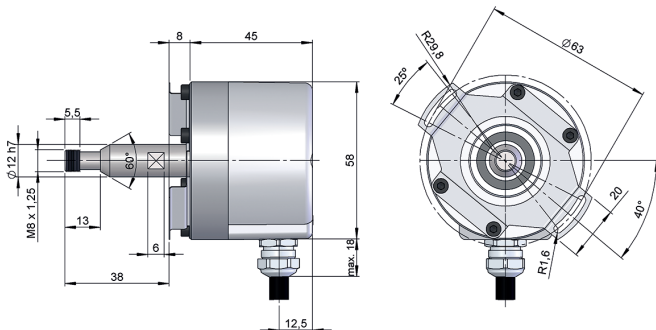


✓ Flexible flange (90.1045)



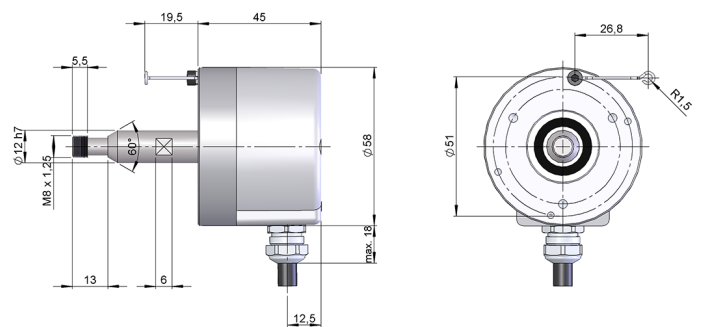
Drawing shaft type 1, anti-rotation system type 4, connection type 2

Flexible flange (90.1027)



Drawing shaft type 1, anti-rotation system type 1, connection type 1

Anti-turn stick (90.1041)



Drawing shaft type 1, anti-rotation system type 2, connection type 1



SERIE 66

THREAD SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

REFERENCE								Reference example: 66-14121-1024			
Serie	Shaft	Anti-rotation system	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer				
66 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>				
	<input checked="" type="checkbox"/> 1. Thread M8	1. Option A Flexible flange 90.1027 2. Option B Anti-turn stick 90.1041 <input checked="" type="checkbox"/> 4. Option C Flexible flange 90.1045 3. None (*)	<input checked="" type="checkbox"/> 1. A \tilde{A} +B \tilde{B} +0 $\tilde{0}$ 2. A \tilde{A} +B \tilde{B}	<input checked="" type="checkbox"/> 1. Radial cable 12p CW <input checked="" type="checkbox"/> 2. Radial M16	0. 11...30 VDC / NPN Open collector 11...30 VDC <input checked="" type="checkbox"/> 1. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC <input checked="" type="checkbox"/> 2. 5 VDC / RS422 5 VDC (compatible TTL) 6. 11...30 VDC / RS422 5 VDC (compatible TTL)		UT00. -40°C <input checked="" type="checkbox"/> UC00				

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service available in 24 h

(*) Anti-rotation system type 1 (Flexible flange 90.1027) and 4 (Flexible flange 90.1045) supplied assembled.

Anti-rotation system type 2 (Anti-turn stick 90.1041) supplied disassembled and includes the screws required for assembly.

Other required anti-rotation systems are not supplied assembled. All systems available in the sections "MOUNTING ACCESSORIES".

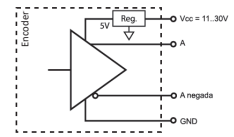
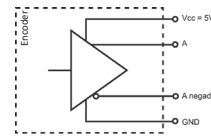
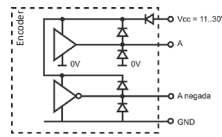
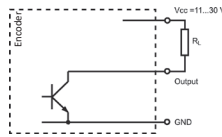
MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange 90.1027 (assembled) Flexible flange 90.1045 (assembled) Anti-turn stick 90.1041 (self-assembly kit included)
Permitted misalignment	±0.5 mm axial, ±0.3 mm radial (90.1027, 90.1045, 90.1041)
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight approx.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer UT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	10.000
Radial cable	2 meters cable or industrial connector M16 (other cable lengths available on order) Female connector not included

SERIE 66

THREAD SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)	RS422 (TTL compatible)
Reference code	0	1	2	6
Power supply	11...30 VDC	11...30 VDC	5 VDC ±10%	11...30 VDC
Output voltage	11...30 VDC	11...30 VDC	5 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA	Typical: 80 mA Max: 160 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC - 3 VDC	VOH > 2.5 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	Not permanent	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

CONNECTION

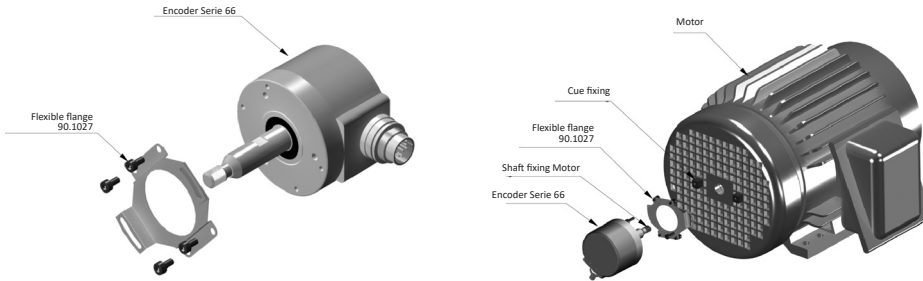


	Cable 3x2x0,14+2x0,34 95.0008003	Connector <input checked="" type="checkbox"/> M16 12p CW
GND	Black	K - L
VCC	Red	B - M
A	Yellow	E
B	Green	H
~A	Brown	F
~B	Blue	A
0 (reference)	Grey	C
~0	Orange	D

SERIE 66

THREAD SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

ACCESSORIES EXAMPLES



Pre-assembled cable with female connector
89.036.010.051.XX

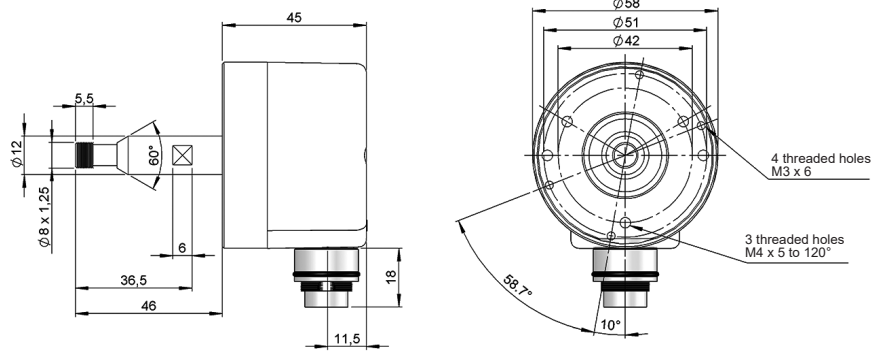
All the accessories available in the section "MOUNTING ACCESSORIES".

CONNECTION DIMENSIONS

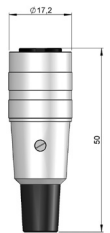
Female connector not included

Connection 2

Radial
M16 12p
male panel
clockwise



Female connector
95.0007149



PRE-ASSEMBLED CABLES

89.036.010.051.xx

length

Cable 6x2x0,14
Female connector
M16 12p CCW





Image with flange 90.1008

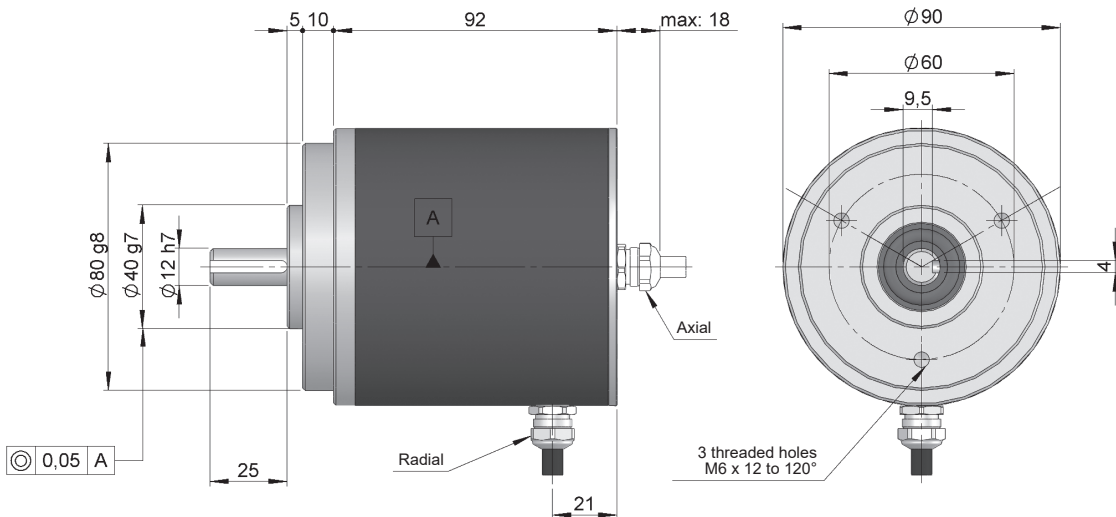


SERIE 30

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Resolution up to 50.000 pulses per turn
- External diameter 90 mm
- Shaft \varnothing 12 mm
- Protection class IP67 according to DIN EN 60529
- Executions mechanical, electronic and special optics forms available on request
- Connection by cable (other cable length available) or industrial connector

Optical Encoder	Incremental Encoder	High shaft load capacity	Vibration and shock resistant	IP 67	Temperature range	Express Delivery



Drawing Encoder Serie 30, connection type 0/5

REFERENCE

Reference example: 30-4251-1024

Serie	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
30/30A -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
30. IP 65	30. A	0. Axial cable	0. 11...30 VDC / NPN Open collector 11...30 VDC	(*)	FT00. -40°C
30A. IP 67	40. A+B	1. Axial DIN 43650 4p	6. 11...30 VDC / RS422 5 VDC (compatible TTL)		
(**)	42. A+B+0	3. Axial Mil 7p CW	7. 5 VDC / RS422 5 VDC (compatible TTL)		
	43. A+B+0̄	4. Axial M23 12p CW	9. 11...30 VDC / Line driver differential Push-Pull		
	35. ĀA+B̄B	5. Radial cable	11...30 VDC		
	36. ĀA+B̄B+0̄	9. Radial M23 12p CW			
		M. Axial Mil 10p CW			

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service available in 24 h

(*) 10.000 to 50.000 pulses with interpolation. Available 10.000 direct optical pulses without interpolating upon request.

(**) The option 30A is only available with cable connection output (0/5).



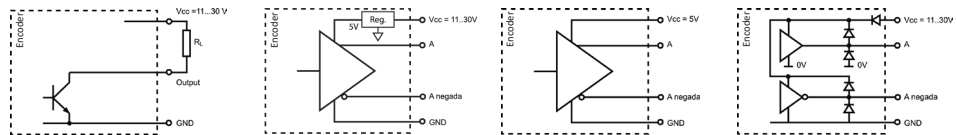
SERIE 30

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65 - Standard IP67 - Option 30A
Rotor inertia moment	270 gcm ²
Starting torque at 20°C (68°F)	≤ 0,05 Nm
Maximum load permitted on axial shaft	80 N
Maximum load permitted on radial shaft	100 N
Weight aprox.	1,2 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer FT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	50.000
Axial or radial connection	2 meters cable or industrial connector (other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



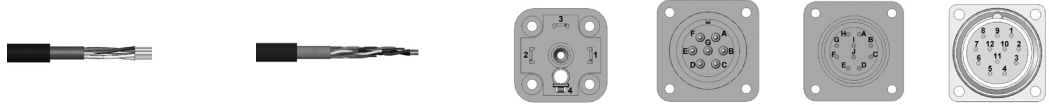
OUTPUT CIRCUIT	NPN Open Collector	RS422 (TTL compatible)	RS422 (TTL compatible)	Push-Pull Differential
Reference code	0	6	7	9
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%	11...30 VDC
Output voltage	11...30 VDC	5 VDC	5 VDC	11...30 VDC
Consumption	40 mA	Typical: 80 mA Max: 160 mA	Typical: 70 mA Max: 150 mA	Typical: 45 mA Max: 150 mA
Max. load capability / channel	40 mA	±20 mA	±20 mA	±30 mA
Length of cable allowed	50 m (24 VDC)	1200 m	1200 m	100 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 0.5 VDC	VOL < 0.5 VDC	VOL < 2.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > 2.5 VDC	VOH > 2.5 VDC	VOH > VCC – 3 VDC
Frequency	100 kHz	300 kHz	300 kHz	200 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 30

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

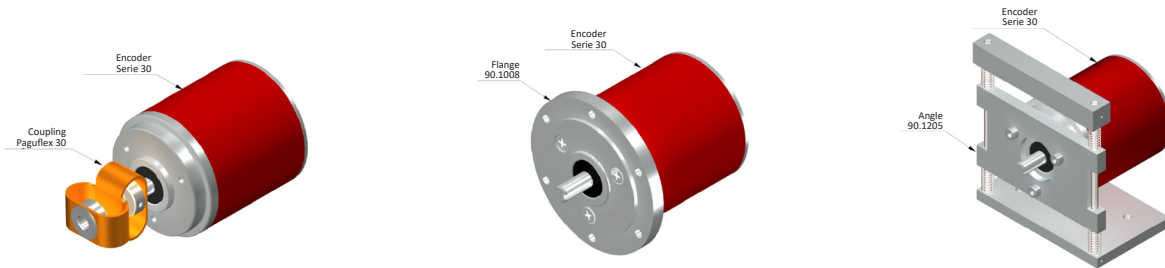
CONNECTION



	Cable 2x2x0,14+1x0,14 95.0008002	Cable 3x2x0,14+2x0,34 95.0008003(*)	Connector DIN 43650 4p	Connector Mil 7p CW	Connector Mil 10p CW	Connector M23 12p CW
GND	Yellow	Black	1	A	A	1
VCC	White	Red	2	B	B	2
A	Brown	Yellow	3	C	C	3
B	Green	Green	4	D	D	4
\tilde{A}		Brown		E	E	5
\tilde{B}		Blue		F	F	6
0 (reference)	Grey	Grey		G	G	7
$\tilde{0}$	Grey	Orange		G	H	8

(*) Cable 3x2x0,14+2x0,34 only for encoders with inverted signals.

ACCESSORIES EXAMPLES



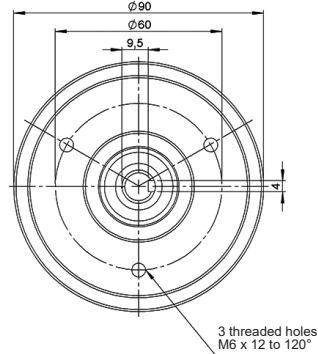
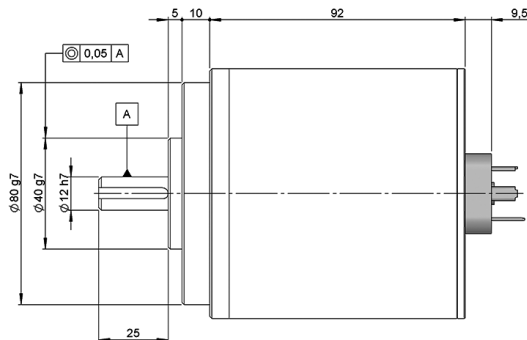
All the accessories available in the section "MOUNTING ACCESSORIES".

CONNECTION DIMENSIONS

Female connector not included

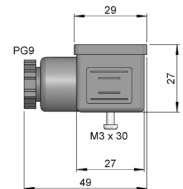
Connection 1

Axial
DIN 43650 4p
male panel



Female connector

95.0007011

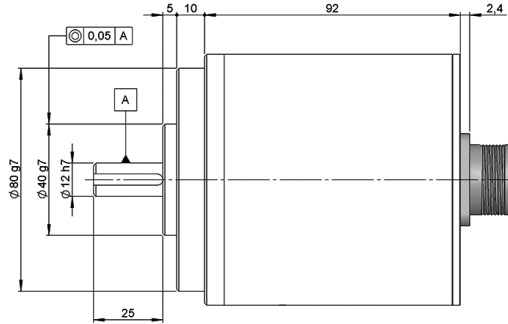


SERIE 30

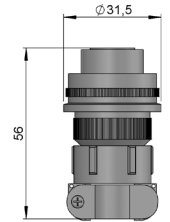
HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

Connection 3

Axial
Mil 7p
male panel
clockwise

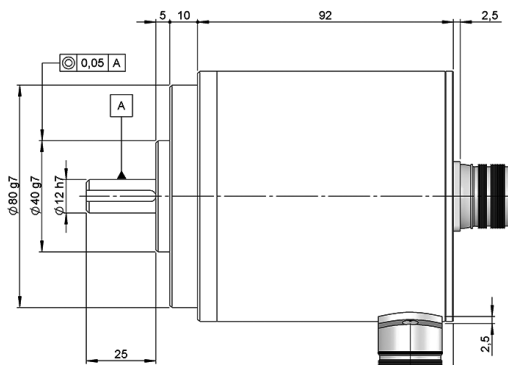


Female connector 90.9507H

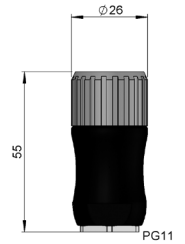


Connection 4

Axial
M23 12p
male panel
clockwise

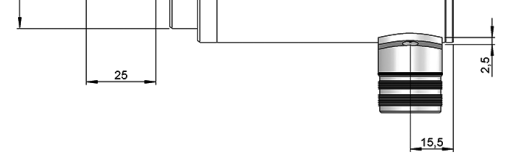


Female connector 95.0007131



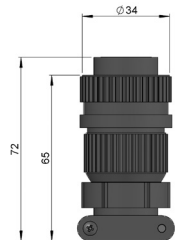
Connection 9

Radial
M23 12p
male panel
clockwise



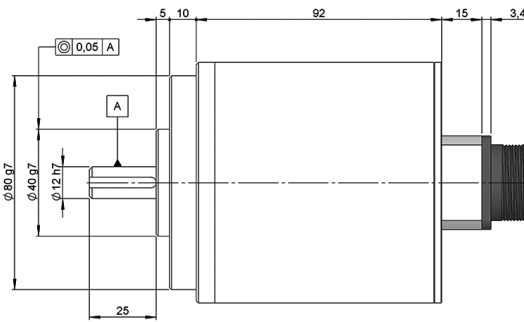
3 threaded holes
M6 x 12 to 120°

Female connector 90.9510H



Connection M

Axial
Mil 10p
male panel
clockwise



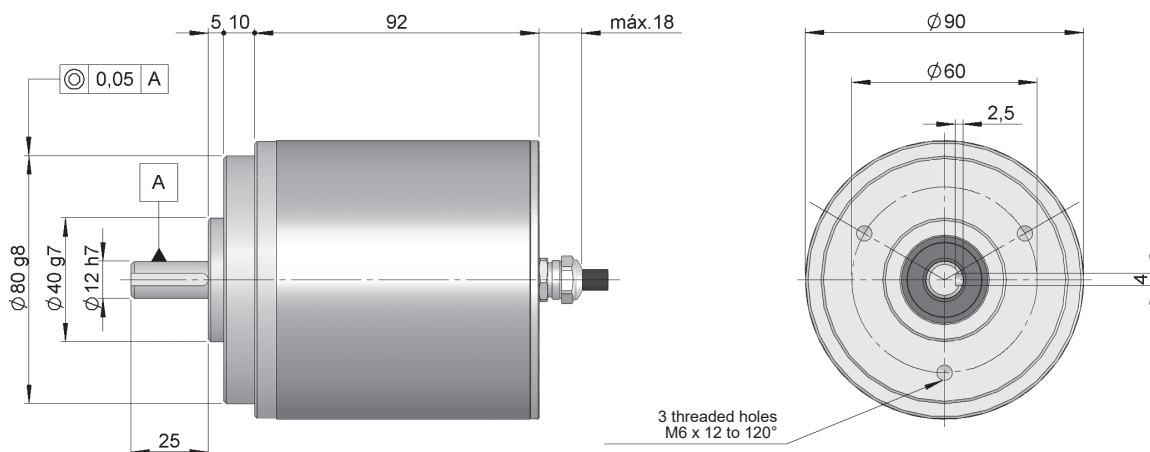
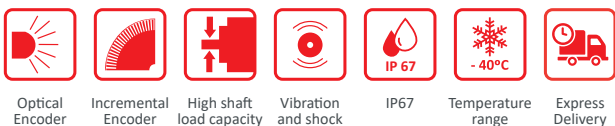
3 threaded holes
M6 x 12 to 120°



SERIE 30I INOX

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Resolution up to 50.000 pulses per turn
- External diameter 90 mm
- Shaft Ø 12 mm
- Protection class IP67 according to DIN EN 60529
- Executions mechanical, electronic and special optics forms available on request
- Connection by cable (other cable length available)



Drawing Encoder S30 IP67, connection type 0

REFERENCE

Reference example: 30I-4200-1024

Serie	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
30I -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
30I. Stainless Steel	30. A 40. A+B 42. A+B+0 43. A+B+0̃ 35. Ã+BB̃ 36. Ã+BB̃+0̃	0. Axial cable	0. 11...30 VDC / NPN Open collector 11..30 VDC 6. 11...30 VDC / RS422 5 VDC (compatible TTL) 7. 5 VDC / RS422 5 VDC (compatible TTL) 9. 11..30 VDC / Line driver differential Push-Pull 11...30 VDC	(*)	FT00. -40°C

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service available in 24 h

(*) 10.000 to 50.000 pulses with interpolation. Available 10.000 direct optical pulses without interpolating upon request.



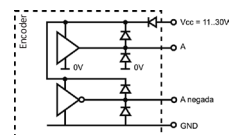
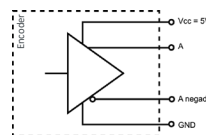
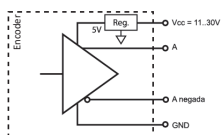
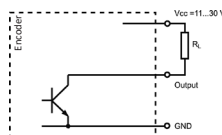
SERIE 30I INOX

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Stainless Steel AISI304 Housing: Stainless Steel AISI304 Shaft: Stainless Steel AISI304
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP67
Rotor inertia moment	270 gcm ²
Starting torque at 20°C (68°F)	≤ 0,05 Nm
Maximum load permitted on axial shaft	80 N
Maximum load permitted on radial shaft	100 N
Weight aprox.	1,2 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer FT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	50.000
Axial connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	RS422 (TTL compatible)	RS422 (TTL compatible)	Push-Pull Differential
Reference code	0	6	7	9
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%	11...30 VDC
Output voltage	11...30 VDC	5 VDC	5 VDC	11...30 VDC
Consumption	40 mA	Typical: 80 mA Max: 160 mA	Typical: 70 mA Max: 150 mA	Typical: 45 mA Max: 150 mA
Max. load capability / channel	40 mA	±20 mA	±20 mA	±30 mA
Length of cable allowed	50 m (24 VDC)	1200 m	1200 m	100 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 0.5 VDC	VOL < 0.5 VDC	VOL < 2.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > 2.5 VDC	VOH > 2.5 VDC	VOH > VCC – 3 VDC
Frequency	100 kHz	300 kHz	300 kHz	200 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 30I INOX

HIGH RESOLUTION INCREMENTAL SOLID SHAFT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

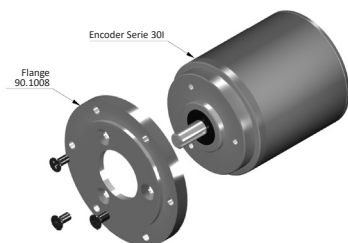
CONNECTION



	Cable 2x2x0,14+1x0,14 95.0008002	Cable 3x2x0,14+2x0,34 95.0008003 (*)
GND	Yellow	Black
VCC	White	Red
A	Brown	Yellow
B	Green	Green
\tilde{A}		Brown
\tilde{B}		Blue
0 (reference)	Grey	Grey
$\tilde{0}$	Grey	Orange

(*) Cable 3x2x0,14+2x0,34 only for encoders with inverted signals.

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".



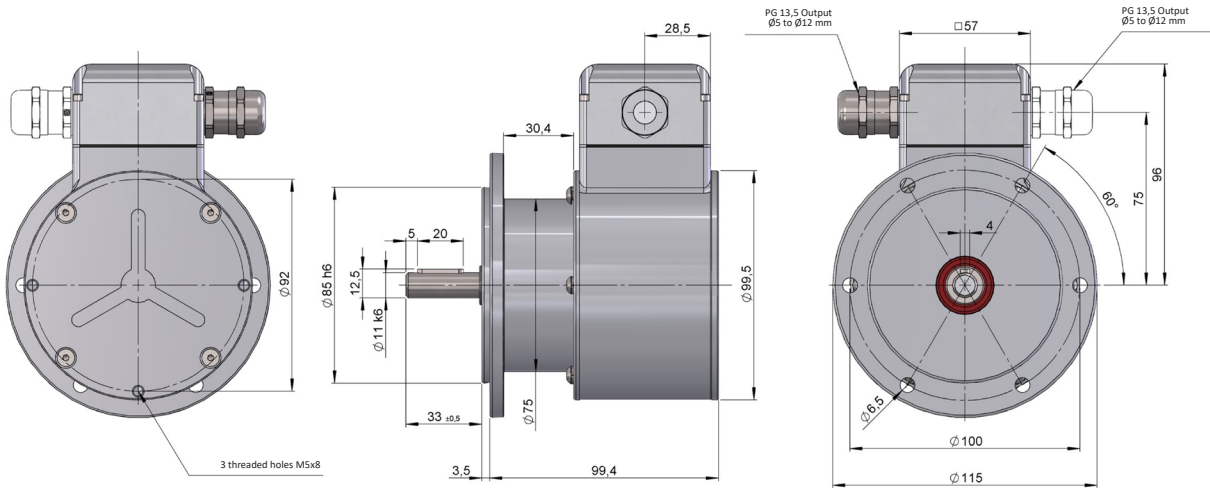
SERIE 100 / DUO

INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Resolution up to 5.000 pulses per turn
- External diameter 100 mm
- Shaft \varnothing 11 mm
- Hybrid bearings for extended lifetime
- Shaft insulation up to 2,5 kV
- Protection class IP66 according to DIN EN 60529
- Connection by terminal box with plug-in spring terminal connectors, rotatable through 360°
- Dual output available



Heavy Duty Encoder Incremental Encoder High shaft load capacity Vibration and shock resistant IP66 2,5 kV bearing isolation Express Delivery



Drawing shaft type 11, connection type 1

REFERENCE

Reference example: 100-11211-5000

Serie	Shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
100/100DUO -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
100. Single output 100DUO. Dual output (*)	11. Solid shaft \varnothing 11 mm	1. $\tilde{A}\tilde{A}+\tilde{B}\tilde{B}+\tilde{O}\tilde{O}$ 2. $\tilde{A}\tilde{A}+\tilde{B}\tilde{B}$	1. Radial terminal box 2. Radial cable 2 m 3. Radial M23 12p CW 4. Radial M12 8p CW 5. Double-shielded radial cable 2 m 6. Double-shielded halogen-free radial cable 2 m	1. 9..30 VDC / Push-Pull differential line driver 9..30 VDC 2. 5 VDC / Differential line driver 5 VDC (RS422 compatible) 6. 9..30 VDC / Differential line driver 5 VDC (RS422 compatible)		YT00. -40°C YT01. +100°C

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(*) Redundant encoder, with 2 galvanically isolated electronics.



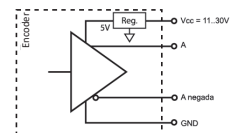
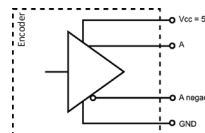
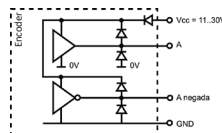
SERIE 100 / DUO

INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Housing: Anodized aluminium Shaft: Stainless Steel
Bearings	Dual set of hybrid bearings with ceramic balls
Bearings lifetime	1x10 ¹⁰ rev.
Flange	Euro flange B10
Shaft diameter	11 mm
Shaft insulation	2,5 kV
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP66
Rotor inertia moment	≈ 250 gcm ²
Starting torque at 20°C (68°F)	≈ 0,07 Nm
Maximum load permitted on axial shaft	350 N
Maximum load permitted on radial shaft	450 N
Weight aprox.	1,8 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer YT00 -20°C to +100°C - Special Customer YT01
Vibration according to DIN EN 60068-2-6	300 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	2500 m/s ² (6ms)
Maximum pulses per turn	5.000
Radial connection	Terminal box, cable or M12/M23 connector

OUTPUT SIGNALS



OUTPUT CIRCUIT	Push-Pull differential line driver	Differential line driver (RS422 compatible)	Differential line driver (RS422 compatible)
Reference code	1	2	6
Power supply	9...30 VDC	5 VDC ±5%	9...30 VDC
Output voltage	9...30 VDC	5 VDC	5 VDC
Consumption	Typical: 45 mA Max: 200 mA	Typical: 70 mA Max: 200 mA	Typical: 80 mA Max: 200 mA
Max. load capability / channel	±30 mA	±20 mA	±20 mA
Length of cable allowed	100 m	1200 m	1200 m
"Low" signal level	VOL < 2.5 VDC	VOL < 0.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > VCC - 3 VDC	VOH > 2.5 VDC	VOH > 2.5 VDC
Frequency	200 kHz	300 kHz	300 kHz
Short circuit protection	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	Yes

Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise.

100DUO: Optionally, different output signal level for each encoder (factory configuration).

SERIE 100 / DUO

INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

CONNECTION



	Cable	Cable	Cable	Cable	Connector	Connector	Terminal
	3x2x0,14+2x0,34 standard 95.0008003	5x2x0,14+2x0,34 double-shielded 95.0008070	5x2x0,14+2x0,34 double-shielded halogen-free 95.0008082	6x2x0,14 up to 100°C 95.0008072	M12 8p CCW	M23 12p CW	
GND	Black	White (tp1)	White (tp1)	White	1	1	GND
VCC	Red	Brown (tp1)	Brown (tp1)	Brown	2	2	+UB
A	Yellow	Red (tp2)	Red (tp2)	Green	3	3	A+
B	Green	Black (tp3)	Black (tp3)	Blue	4	4	B+
\tilde{A}	Brown	Light blue (tp2)	Light blue (tp2)	Yellow	5	5	A-
\tilde{B}	Blue	Violet (tp3)	Violet (tp3)	Red	6	6	B-
0	Grey	Grey (tp4)	Grey (tp4)	Grey-Pink	7	7	Z+
$\tilde{0}$	Orange	Pink (tp4)	Pink (tp4)	Red-Blue	8	8	Z-
Shield	Shield	Shield	Shield	Shield	Housing	Housing	Shield

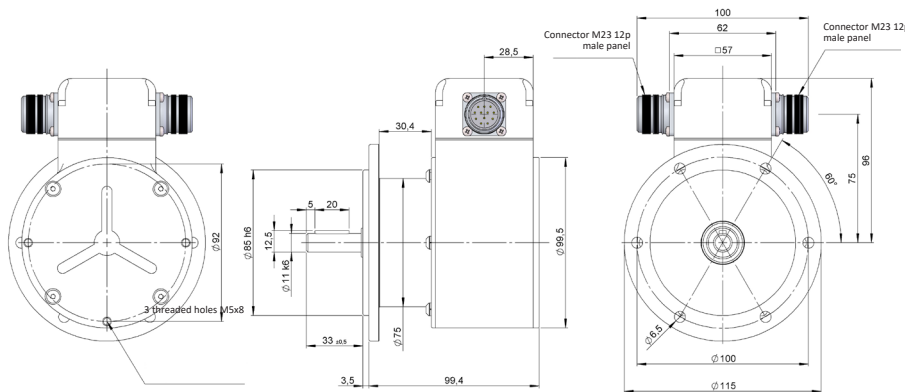
(tp1), (tp2), (tp3), (tp4) Twisted pair cables.

CONNECTION DIMENSIONS

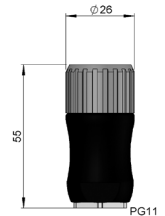
Female connector not included

Connection 3

Radial
M23 12p
male panel
clockwise

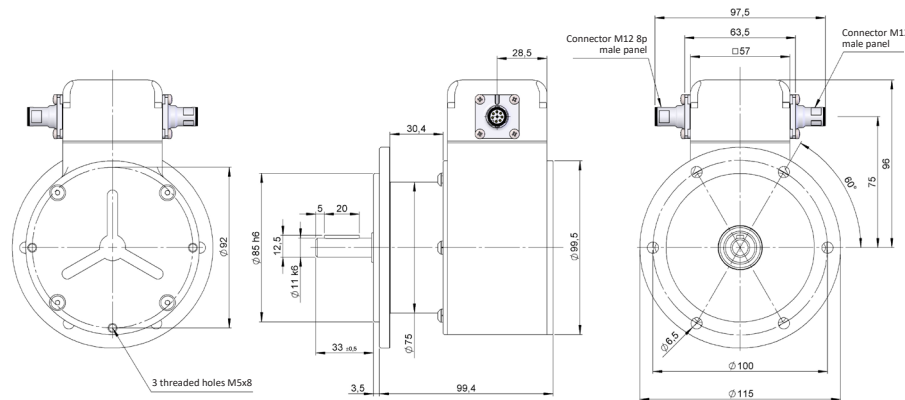


Female connector
95.0007131

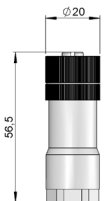


Connection 4

Radial
M12 8p
male panel
counter clockwise



Female connector
95.0007142



SERIE 100 / DUO

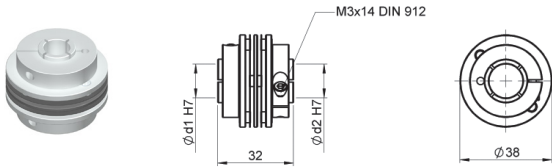
INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

ACCESSORIES EXAMPLES

(not included)

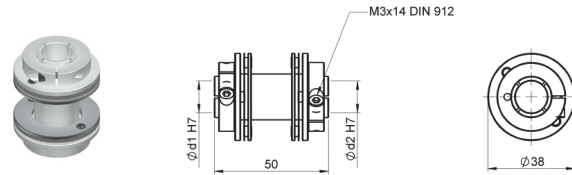
Coupling LFA 3832

LFA 3832 11/d2
d2: Ø 06...14



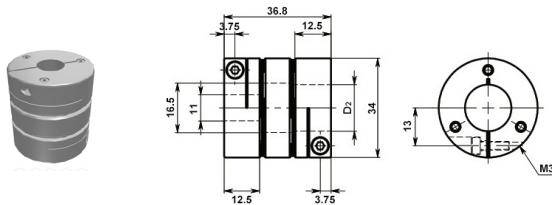
Coupling LFA 3850

LFA 3850 11/d2
d2: Ø 06...14



Coupling LFA 3437

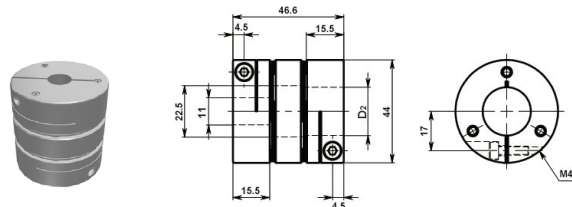
LFA 3437 11/d2
d2: Ø 05...16



Additional keyway available, upon request.

Coupling LFA 4447

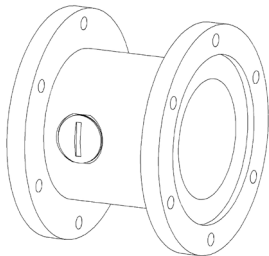
LFA 4447 11/d2
d2: Ø 08...22



Additional keyway available, upon request.

Coupling bell

Customized



* Send us your 3D and we will design the bell for your application.



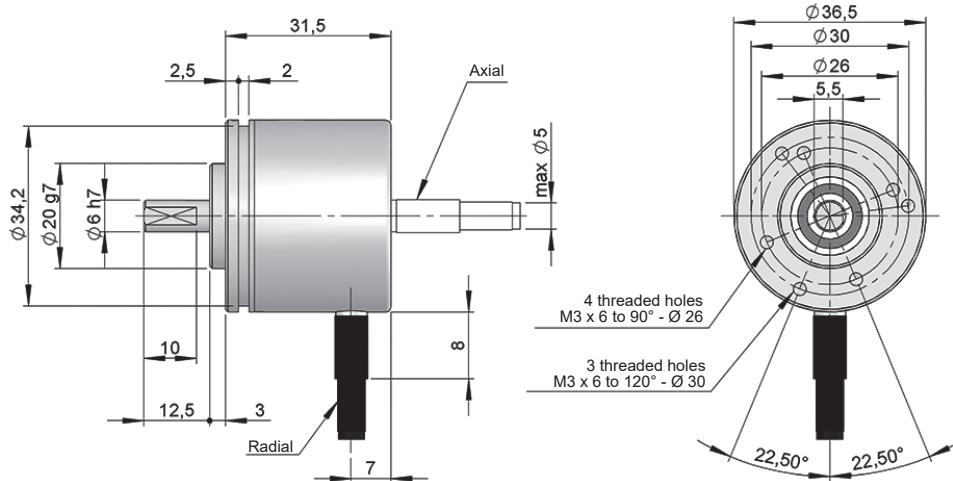
SERIE 36

MINIATURE SOLID SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

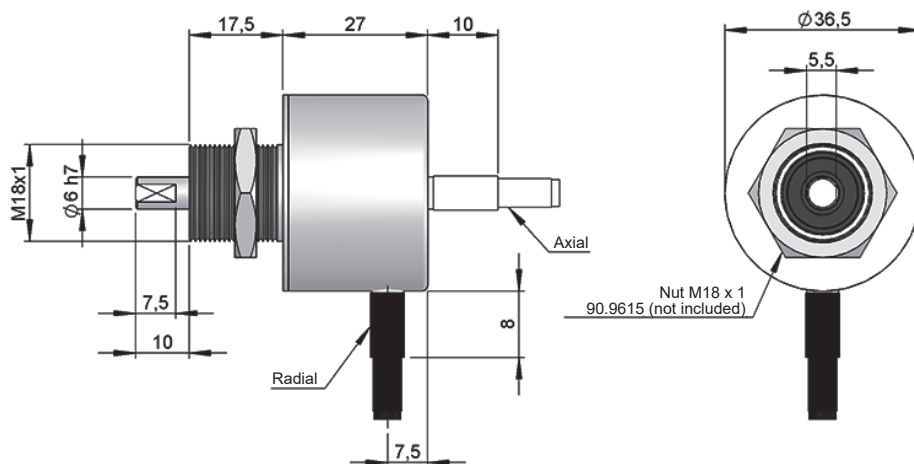
- Resolution up to 10.000 pulses per turn
- External diameter 36,5 mm
- Shaft \varnothing 6 mm
- Protection class IP65 according to DIN EN 60529
- Executions mechanical, electronic and special optics forms available on request
- Connection by cable (other cable length available) or industrial connector M12



Optical Encoder	Incremental Encoder	Miniature Encoder	Vibration and shock resistant	IP65	Temperature range -40°C	Express Delivery



Drawing clamping, connection type 1/2



Drawing M18, connection type 1/2



SERIE 36

MINIATURE SOLID SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

REFERENCE							Reference example: 36-1311-3600
Serie	Mechanical option	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer	
36 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
	1. Clamping 2. M18	2. A+B 3. A+B+0 7. A \tilde{A} +B \tilde{B} +0 $\tilde{0}$ 8. A \tilde{A} +B \tilde{B}	1. Axial cable 2. Radial cable 3. Radial M12 8p CCW	0. 11...30 VDC / NPN Open collector 11..30 VDC 1. 11..30 VDC / Line driver differential Push-Pull 11..30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL)		RT00. -40°C	
						<p>Order your reference Step file 3D</p> <p>info@encoderhohner.com service available in 24 h</p>	

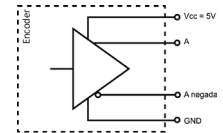
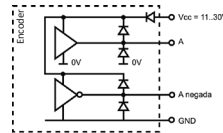
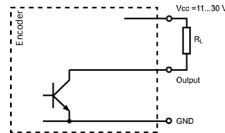
MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP 64 - Standard cable IP 65 - Radial industrial connector M12 IP 65 - Radial cable output option with PG upon request
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight aprox.	0,08 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer RT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	10.000
Axial or radial connection	2 meters cable or industrial connector M12 (other cable lengths available on order) Female connector not included

SERIE 36

MINIATURE SOLID SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)
Reference code	0	1	2
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%
Output voltage	11...30 VDC	11...30 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC – 3 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes
Protection polarity inversion	Yes	Yes	No

Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise

CONNECTION



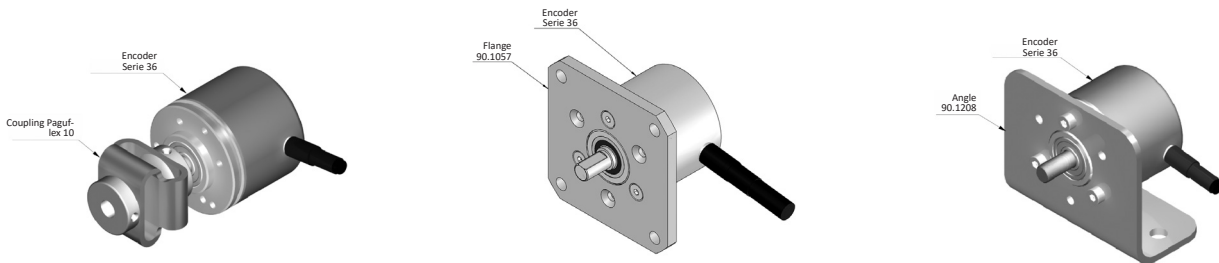
	Cable (*) 5x0,14 95.0008051	Connector (*) Cable 8x0,14	Connector M12 8p CCW
GND	White	White	1
VCC	Brown	Brown	2
A	Green	Green	3
B	Yellow	Grey	4
~A		Yellow	5
~B		Pink	6
0 (reference)	Grey	Blue	7
~0	Grey	Red	8

(*) For lengths over 2 meters standard cable, we recommend the use of twisted pair cable 2x2x0,14+1x0,14 (95.0008002) or 3x2x0,14+2x0,34 (95.0008003). Request the final cable length required to avoid junctions.

SERIE 36

MINIATURE SOLID SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

ACCESSORIES EXAMPLES

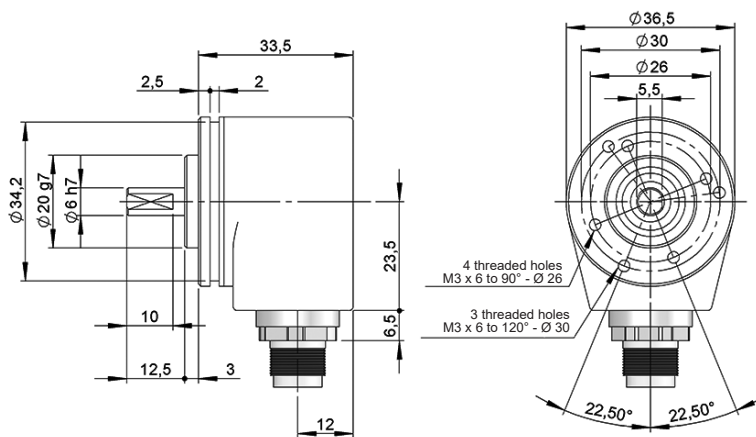


All the accessories available in the section "MOUNTING ACCESSORIES".

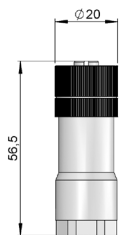
CONNECTION DIMENSIONS

Female connector not included

Connection 3
Radial
M12 8p
male panel
counter clockwise



Female connector
95.0007152

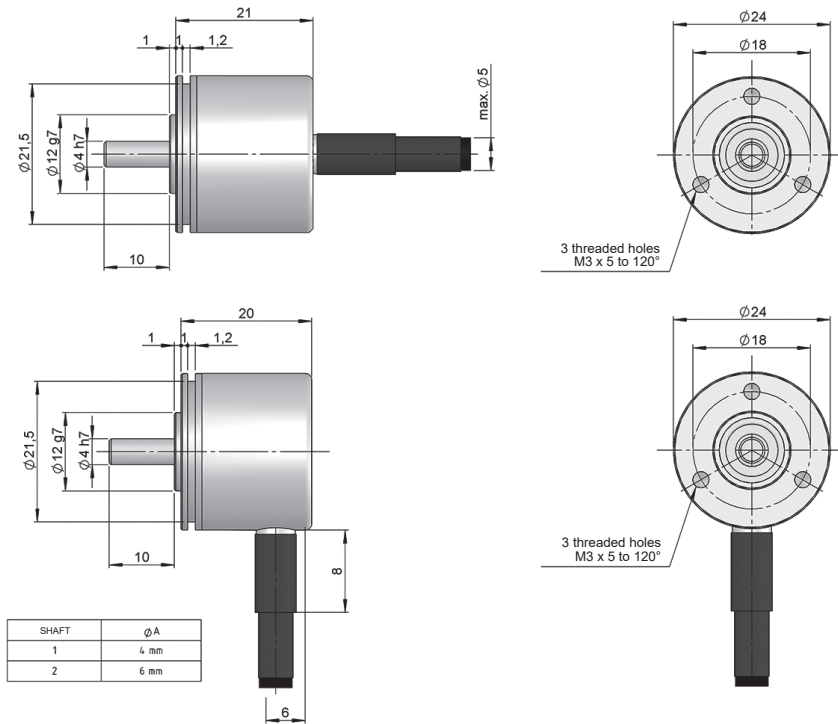




SERIE 26

MINIATURE SOLID SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 4.096 pulses per turn
- External diameter 24 mm
- Shaft \varnothing 4 or 6 mm
- Protection class IP64 according to DIN EN 60529
- Connection by cable (other cable length available)



Drawing shaft type 1, connection type 1/2

REFERENCE

Reference example: 26-1721-500

Serie	Shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
26 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. \varnothing 4 mm 2. \varnothing 6 mm	2. A+B 3. A+B+O 7. $\tilde{A}\tilde{A}+\tilde{B}\tilde{B}+O\tilde{O}$ 8. $\tilde{A}\tilde{A}+\tilde{B}\tilde{B}$	1. Axial cable 2. Radial cable	0. 11...30 VDC / NPN Open collector 11...30 VDC 1. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL)		ZT00. -40°C

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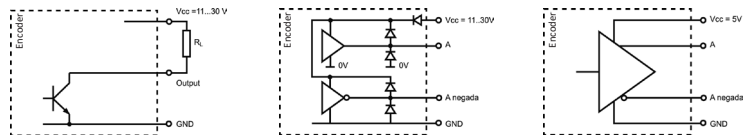
SERIE 26

MINIATURE SOLID SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	10 N
Weight approx.	0,06 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer TT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	4.096
Axial or radial connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)
Reference code	0	1	2
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%
Output voltage	11...30 VDC	11...30 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC - 3 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes
Protection polarity inversion	Yes	Yes	No

Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise

SERIE 26

MINIATURE SOLID SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

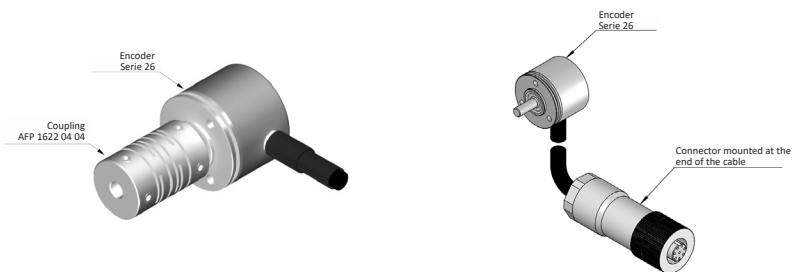
CONNECTION



	Cable 5x0,14 95.0008051 (*)	Cable 8x0,14 95.0008052 (*)
GND	White	White
VCC	Brown	Brown
A	Green	Green
B	Yellow	Grey
\tilde{A}		Yellow
\tilde{B}		Pink
0 (reference)	Grey	Blue
$\tilde{0}$	Grey	Red

(*) For lengths over 2 meters standard cable, we recommend the use of twisted pair cable 2x2x0,14+1x0,14 (95.0008002) or 3x2x0,14+2x0,34 (95.0008003). Request the final cable length required to avoid junctions.

ACCESSORIES EXAMPLES



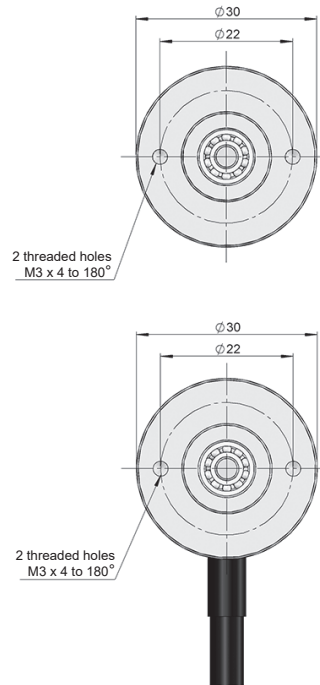
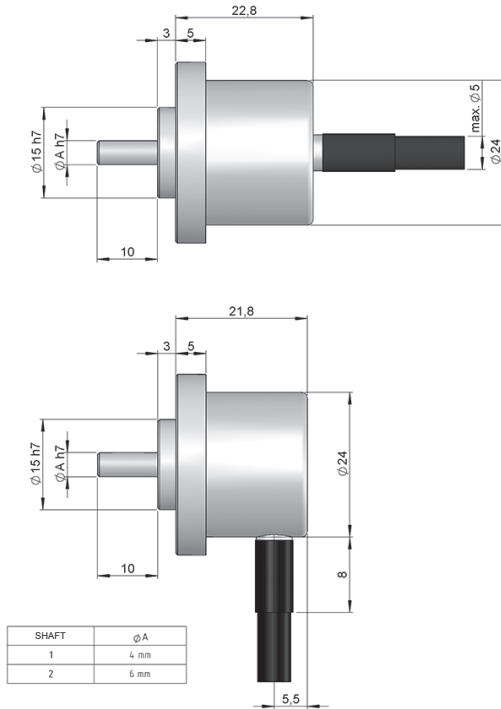
All the accessories available in the section "MOUNTING ACCESSORIES".



SERIE 27

MINIATURE SOLID SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 4.096 pulses per turn
- External diameter 24 mm, mounting flange 30 mm
- Shaft \varnothing 4 or 6 mm
- Protection class IP64 according to DIN EN 60529
- Connection by cable (other cable length available)



Drawing shaft type 1, connection type 1/2

REFERENCE

Reference example: 27-1721-500

Serie	Shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
27 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. \varnothing 4 mm 2. \varnothing 6 mm	2. A+B 3. A+B+0 7. A $\tilde{\sim}$ +B $\tilde{\sim}$ +0 $\tilde{\sim}$ 8. A $\tilde{\sim}$ +B $\tilde{\sim}$	1. Axial cable 2. Radial cable	0. 11...30 VDC / NPN Open collector 11..30 VDC 1. 11..30 VDC / Line driver differential Push-Pull 11..30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL)		TT00. -40°C

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Step file 3D

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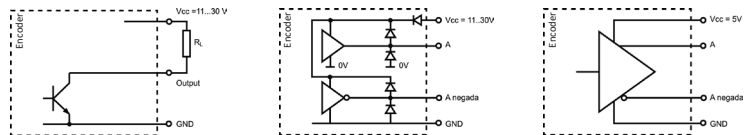
SERIE 27

MINIATURE SOLID SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	10 N
Weight aprox.	0,06 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer TT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	4.096
Axial or radial connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)
Reference code	0	1	2
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%
Output voltage	11...30 VDC	11...30 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC - 3 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes
Protection polarity inversion	Yes	Yes	No

Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise

SERIE 27

MINIATURE SOLID SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

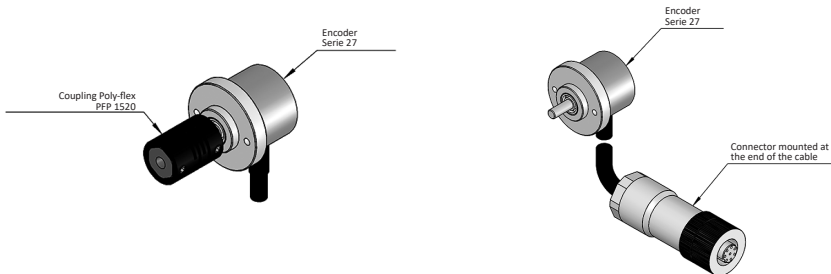
CONNECTION



	Cable 5x0,14 95.0008051 (*)	Cable 8x0,14 95.0008052 (*)
GND	White	White
VCC	Brown	Brown
A	Green	Green
B	Yellow	Grey
\tilde{A}		Yellow
\tilde{B}		Pink
0 (reference)	Grey	Blue
$\tilde{0}$	Grey	Red

(*) For lengths over 2 meters standard cable, we recommend the use of twisted pair cable 2x2x0,14+1x0,14 (95.0008002) or 3x2x0,14+2x0,34 (95.0008003). Request the final cable length required to avoid junctions.

ACCESSORIES EXAMPLES



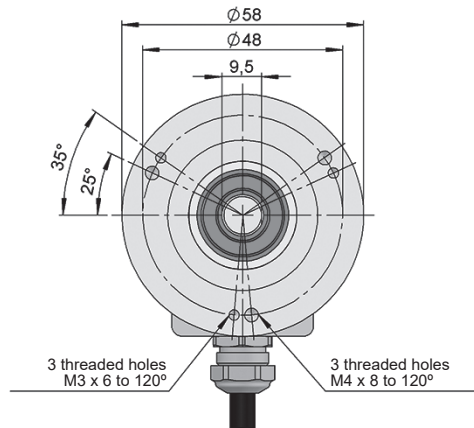
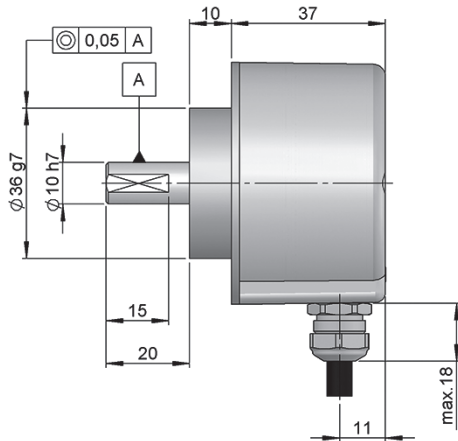
All the accessories available in the section "MOUNTING ACCESSORIES".



SERIE 11

INCREMENTAL SOLID SHAFT ENCODER COST OPTIMIZED FOR INDUSTRIAL APPLICATIONS

- Resolution up to 5.000 pulses per turn
- External diameter 58 mm
- Shaft \varnothing 10 mm
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available)



Drawing shaft type 1, connection type 3, without flange

REFERENCE

Reference example: 11-11639-1024

Serie	Shaft	Flange	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
11 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. \varnothing 10x20 mm	1. None (*)	1. A 2. A+B 3. A+B+ $\tilde{0}$ 5. A \tilde{A} +B \tilde{B} 6. A \tilde{A} +B \tilde{B} + $\tilde{0}$ 9. A+B+ $\tilde{0}$	3. Radial cable	0. 11...30 VDC / NPN Open collector 11...30 VDC 7. 5 VDC / RS422 5 VDC (compatible TTL) 9. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC		ST00. -40°C

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Step file 3D

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service available in 24 h

(*) Flange mounting available, upon request (90.1002 and 90.1005).



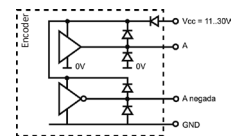
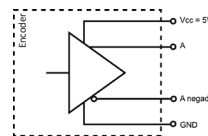
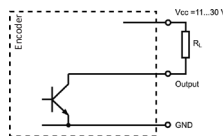
SERIE 11

INCREMENTAL SOLID SHAFT ENCODER COST OPTIMIZED FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	80 N
Weight approx.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer ST00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	5.000
Radial connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	RS422 (TTL compatible)	Push-Pull Differential
Reference code	0	7	9
Power supply	11...30 VDC	5 VDC ±5%	11...30 VDC
Output voltage	11...30 VDC	5 VDC	11...30 VDC
Consumption	40 mA	Typical: 70 mA Max: 150 mA	Typical: 45 mA Max: 150 mA
Max. load capability / channel	40 mA	±20 mA	±30 mA
Length of cable allowed	50 m (24 VDC)	1200 m	100 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 0.5 VDC	VOL < 2.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > 2.5 VDC	VOH > VCC – 3 VDC
Frequency	100 kHz	300 kHz	200 kHz
Short circuit protection	Not permanent	Yes	Yes
Protection polarity inversion	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 11

INCREMENTAL SOLID SHAFT ENCODER COST OPTIMIZED FOR INDUSTRIAL APPLICATIONS

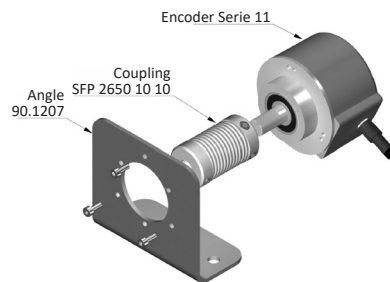
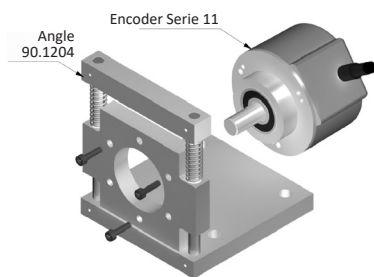
CONNECTION



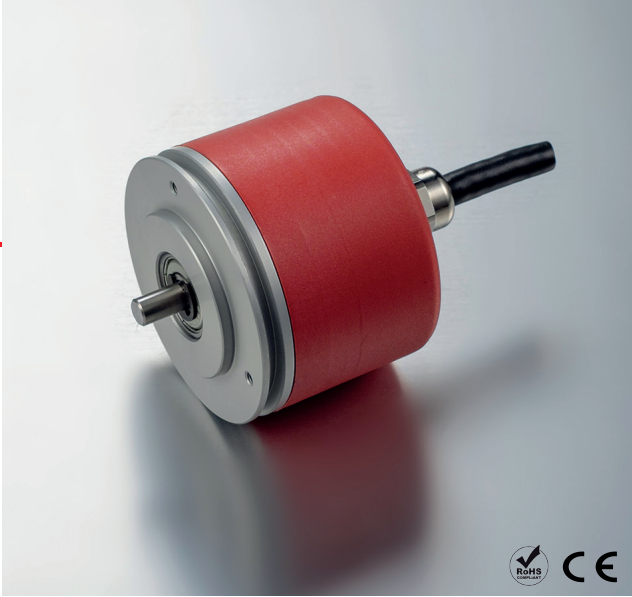
	Cable 2x2x0,14+1x0,14 mm ² 95.0008002	Cable 3x2x0,14+2x0,34 mm ² 95.0008003 (*)
GND	Yellow	Black
VCC	White	Red
A	Brown	Yellow
B	Green	Green
\tilde{A}		Brown
\tilde{B}		Blue
0 (reference)	Grey	Grey
$\tilde{0}$	Grey	Orange

(*) Cable 3x2x0,14+2x0,34 only for encoders with inverted signals.

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".



SERIE 20

INCREMENTAL SOLID SHAFT ENCODER COST OPTIMIZED FOR INDUSTRIAL APPLICATIONS

- Resolution up to 1.024 pulses per turn
- External diameter 58 mm
- Shaft \varnothing 6 mm
- Protection class IP54 according to DIN EN 60529
- Different flanges available
- Connection by cable (other cable length available) or industrial connector



Optical Encoder



Incremental Encoder



Vibration and shock resistant

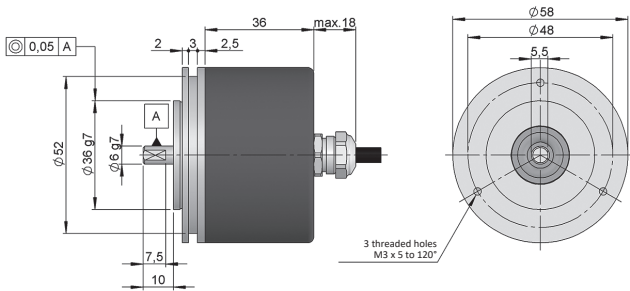


IP54



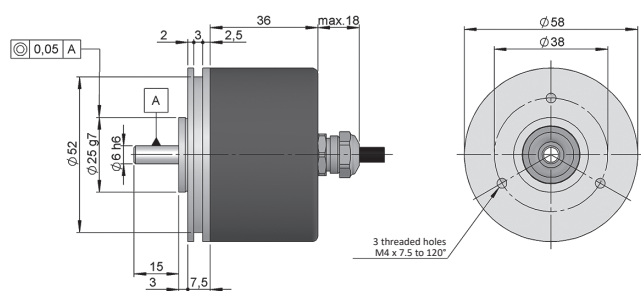
Express Delivery

Option A



Drawing mechanical option type 1, connection type 2, without flange

Option B



Drawing mechanical option type 2, connection type 2, without flange

REFERENCE

Reference example: 20-11621-1024

Serie	Mechanical option	Flange	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
20 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. Option A \varnothing 6x10 mm 2. Option B \varnothing 6x15 mm	1. None 2. 90.1002 3. 90.1004 4. 90.1005 (*)	1. A 2. A+B 3. A+B+ $\tilde{0}$ 4. A \tilde{A} +B \tilde{B} 5. A \tilde{A} +B \tilde{B} + $\tilde{0}$ 6. A \tilde{A} +B \tilde{B} + $\tilde{0}$ 9. A+B+0	1. Axial DIN 43650 4p 2. Axial cable	0. 11...30 VDC / NPN Open collector 11...30 VDC 1. 11...30 VDC / Push-Pull 11...30 VDC 2. 5 VDC / Line driver differential (compatible TTL) 5 VDC (**)		

Order your reference
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service available in 24 h

(*) Flange options 90.1002, 90.1004, 90.1005 (2/3/4) only available for the mechanical option A \varnothing 6x10 mm (1).
Flange mounting included.

(**) Electronic output NPN Open Collector (0) only available for output signals options without inverted signals (1/2/9).



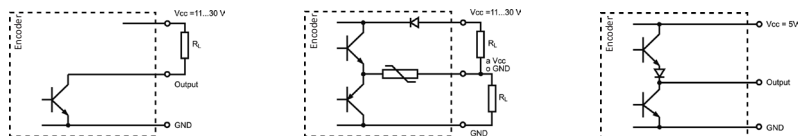
SERIE 20

INCREMENTAL SOLID SHAFT ENCODER COST OPTIMIZED FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Plastic Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP54
Rotor inertia moment	10 gcm ²
Starting torque at 20°C (68°F)	≤ 0,005 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	30 N
Weight approx.	0,3 Kg
Operating temperature range	-20°C to +60°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	1.024
Axial connection	2 meters cable or industrial connector (other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull	Line Driver (TTL compatible)
Reference code	0	1	2
Power supply	11...30 VDC	11...30 VDC	5 VDC ±10%
Output voltage	11...30 VDC	11...30 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 120 mA Max: 150 mA
Max. load capability / channel	40 mA	±30 mA	±40 mA
Length of cable allowed	50 m (24 VDC)	50 m	100 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.2 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC - 3 VDC	VOH > 2.4 VDC
Frequency	100 kHz	200 kHz	100 kHz
Short circuit protection	Not permanent	Yes	Yes
Protection polarity inversion	Yes	Yes	No

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 20

INCREMENTAL SOLID SHAFT ENCODER COST OPTIMIZED FOR INDUSTRIAL APPLICATIONS

CONNECTION



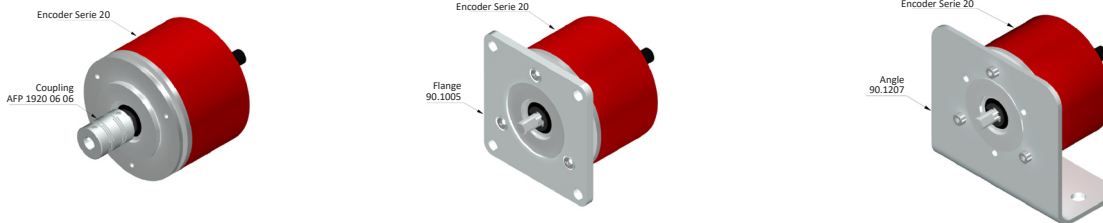
	Cable 2x2x0,14+1x0,14 95.0008002	Cable 3x2x0,14+2x0,34 95.0008003 (*)	Connector DIN 43650 4p
GND	Yellow	Black	1
VCC	White	Red	2
A	Brown	Yellow	3
B	Green	Green	4
\tilde{A}		Brown	
\tilde{B}		Blue	
0 (reference)	Grey (**)	Grey	
$\tilde{0}$	Grey (***)	Orange	

(*) Cable 3x2x0,14+2x0,34 only for encoders with inverted signals.

(**) Only available for Output signals option 9 (A+B+0).

(***) Only available for Output signals option 3 (A+B+0).

ACCESSORIES EXAMPLES

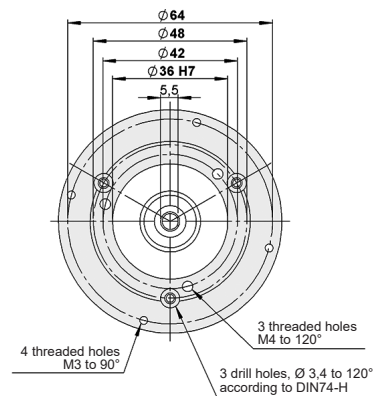
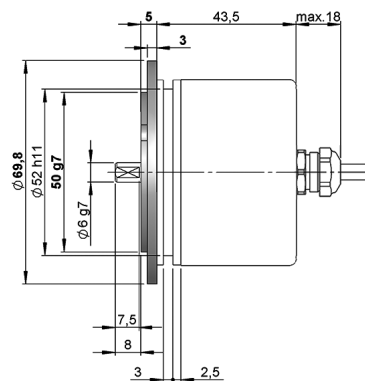


All the accessories available in the section "MOUNTING ACCESSORIES".

FLANGE DIMENSIONS

Flange mounting included

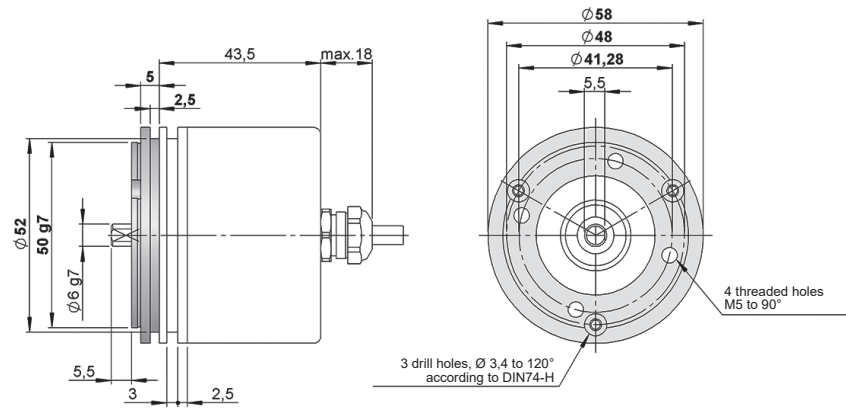
Flange 2
90.1002



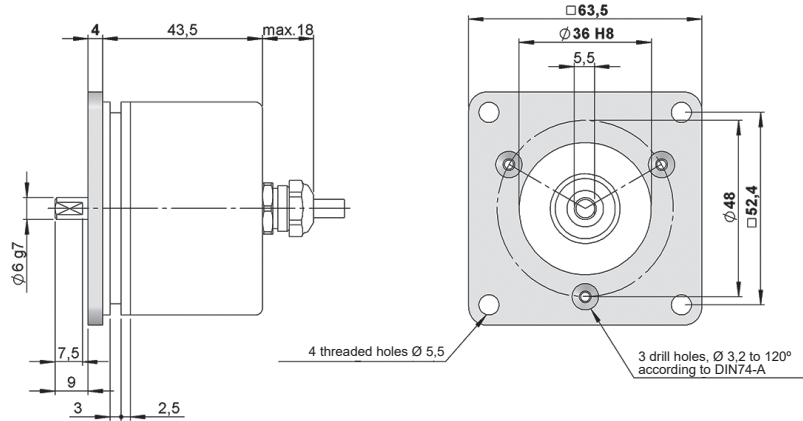
SERIE 20

INCREMENTAL SOLID SHAFT ENCODER COST OPTIMIZED FOR INDUSTRIAL APPLICATIONS

Flange 3
90.1004



Flange 4
90.1005

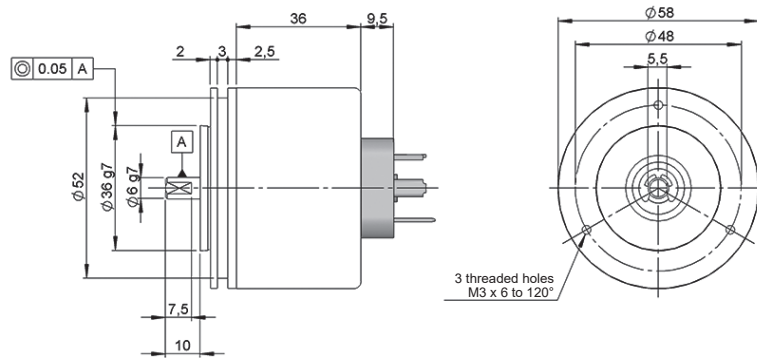


CONNECTION DIMENSIONS

Female connector not included

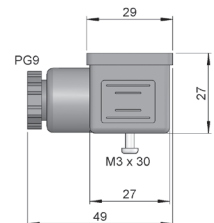
Connection 1

Axial
DIN 43650 4p
male panel



Female connector

95.0007011





SERIE 21

INCREMENTAL SOLID SHAFT ENCODER COST OPTIMIZED FOR INDUSTRIAL APPLICATIONS

- Resolution up to 500 pulses per turn
- External diameter 40 mm
- Shaft \varnothing 6 mm
- Protection class IP41 according to DIN EN 60529
- Connection by cable (other cable length available)



Optical Encoder



Incremental Encoder



Vibration and shock resistant

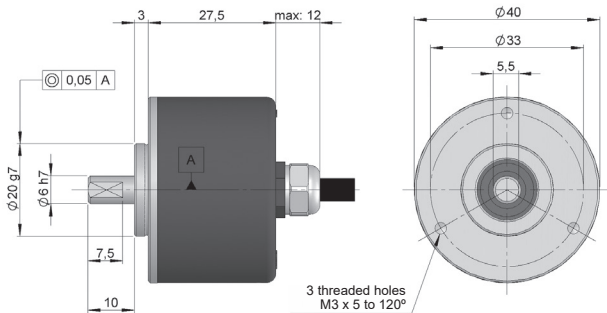


IP41

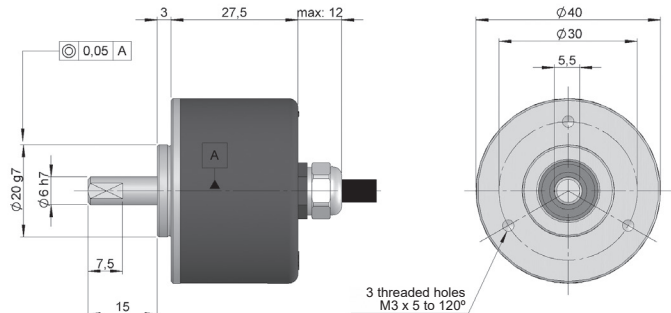


Express Delivery

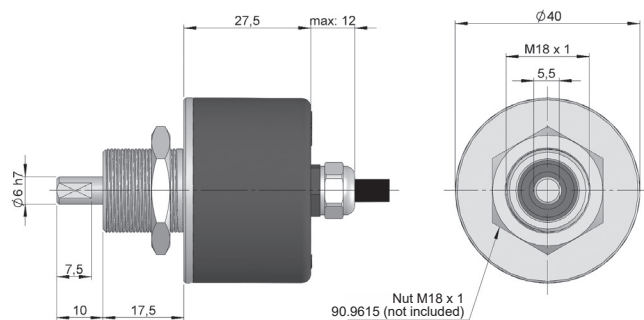
Option A



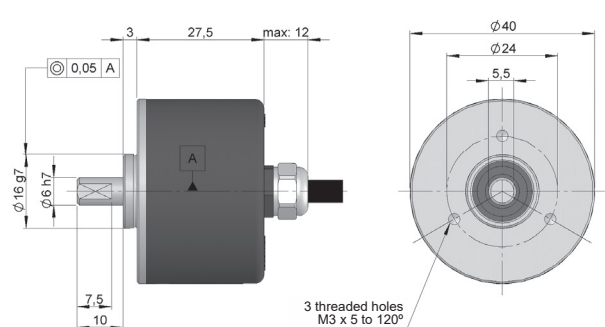
Option B



Option C



Option D



REFERENCE

Reference example: 21-111-500

Serie	Mechanical option	Output signals	Power Supply / Electronic output	Pulses number	Special customer
21 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. Option A 2. Option B 3. Option C 4. Option D	1. A 2. A+B 3. A+B+0 4. A+B+0̃ 7. ÃA+B̃B+0̃0̃ 8. ÃA+B̃B	0. 11...30 VDC / NPN Open collector 11...30 VDC 1. 11...30 VDC / Push-Pull 11...30 VDC 7. 5 VDC / RS422 5 VDC (compatible TTL) 9. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC		

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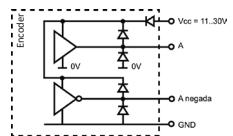
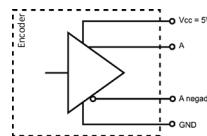
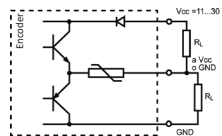
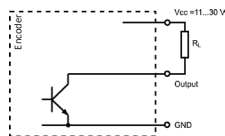
SERIE 21

INCREMENTAL SOLID SHAFT ENCODER COST OPTIMIZED FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Plastic Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	5000 rpm
Protection against dust and splashes according to DIN EN 60529	IP41
Rotor inertia moment	10 gcm ²
Starting torque at 20°C (68°F)	≤ 0,004 Nm
Maximum load permitted on axial shaft	5 N
Maximum load permitted on radial shaft	5 N
Weight aprox.	0,2 Kg
Operating temperature range	-20°C to +60°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	500
Axial connection	1 meter cable (other cable lengths available or connector mounted at the end of the cable, upon request)

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull	RS422 (TTL compatible)	Push-Pull Differential
Reference code	0	1	7	9
Power supply	11...30 VDC	11...30 VDC	5 VDC ±10%	11...30 VDC
Output voltage	11...30 VDC	11...30 VDC	5 VDC	11...30 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA	Typical: 45 mA Max: 150 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA	±30 mA
Length of cable allowed	50 m (24 VDC)	50 m	1200 m	100 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC	VOL < 2.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > Vcc – 3 VDC	VOH > 2.5 VDC	VOH > VCC – 3 VDC
Frequency	100 kHz	200 kHz	300 kHz	200 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 21

INCREMENTAL SOLID SHAFT ENCODER COST OPTIMIZED FOR INDUSTRIAL APPLICATIONS

CONNECTION



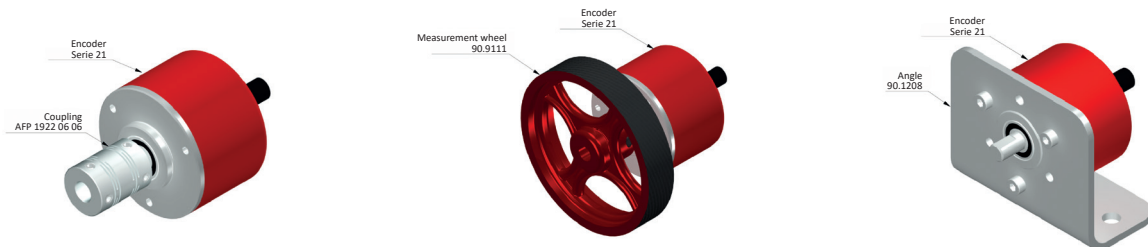
	Cable 2x2x0,14+1x0,14 95.0008002	Cable 3x2x0,14+2x0,34 95.0008003(*)
GND	Yellow	Black
VCC	White	Red
A	Brown	Yellow
B	Green	Green
\tilde{A}		Brown
\tilde{B}		Blue
0 (reference)	Grey (**)	Grey
$\tilde{0}$	Grey (***)	Orange

(*) Cable 3x2x0,14+2x0,34 only for encoders with inverted signals.

(**) Only available for Output signals option 9 (A+B+0).

(***) Only available for Output signals option 3 (A+B+/0).

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".

SERIE 19

HIGH RESOLUTION BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS



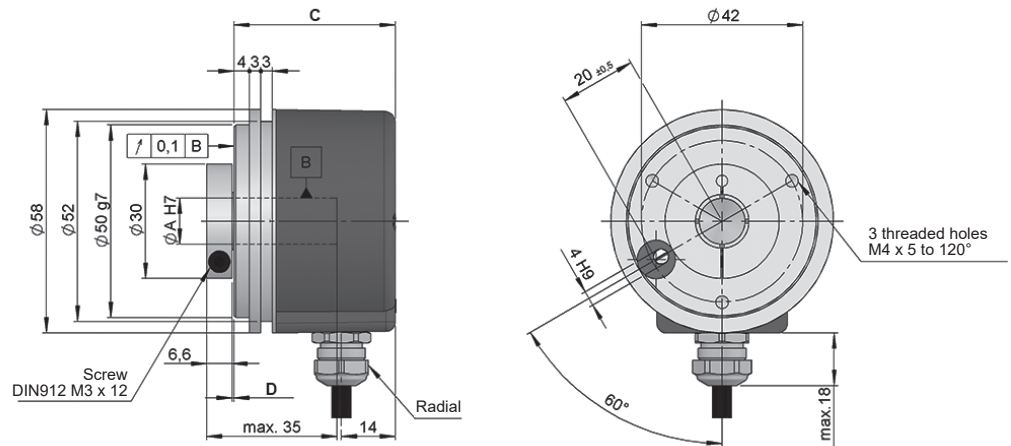
- Resolution up to 50.000 pulses per turn
- External diameter 58 mm
- Blind hollow shaft \varnothing 6, 8, 10, 12, 14 or 15 mm
- Protection class IP67 according to DIN EN 60529
- Shaft fixing through clamp or setscrew
- Anti-rotation system through flexible flange or pin torque support
- Connection by cable (other cable length available) or industrial connector M12, M23



Clamp

HOLLOW SHAFT	\varnothing A
1	6 mm
3	8 mm
4	10 mm
5	12 mm
7	14 mm
8	15 mm

SERIE	C	D
19	42 mm	0,5 mm
19A	51,8 mm	1 mm

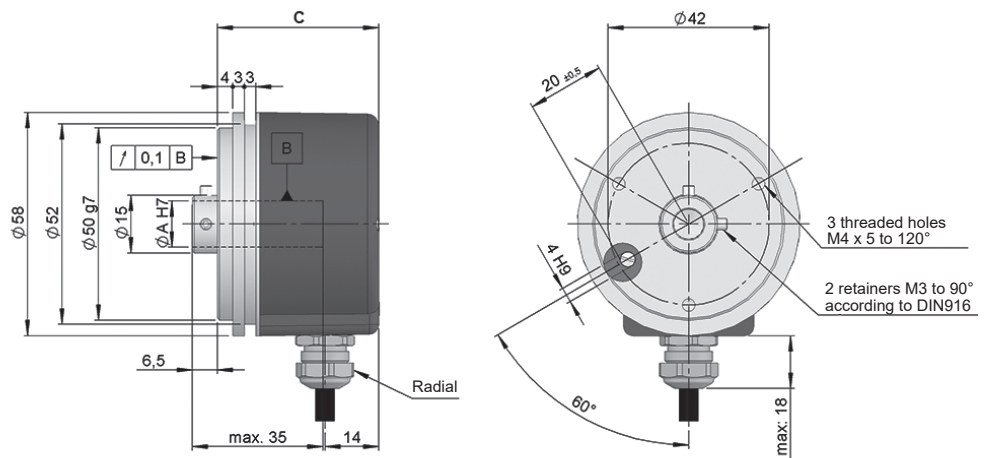


Drawing S19 mechanical option type 1, blind hollow shaft type 5, connection type 3

Setscrew

HOLLOW SHAFT	\varnothing A
1	6 mm
3	8 mm
4	10 mm
5	12 mm
7	14 mm
8	15 mm

SERIE	C
19	42 mm
19A	51,8 mm



Drawing S19 mechanical option type 2, blind hollow shaft type 5, connection type 3



SERIE 19

HIGH RESOLUTION BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

REFERENCE								Reference example: 19-15639-1024
Serie	Mechanical option	Blind-Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer	
19/19A -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
19. IP65	1. Clamp	1. Ø 6x26 mm	1. A	3. Radial cable	0. 11...30 VDC / NPN Open collector 11...30 VDC	(*)	HT00. -40°C	
19A. IP67	2. Setscrew	3. Ø 8x26 mm	2. A+B	5. Radial	6. 11...30 VDC / RS422 5 VDC (compatible TTL)			
		4. Ø 10x26 mm	3. A+B+ $\tilde{0}$	M23 12p	7. 5 VDC / RS422 5 VDC (compatible TTL)			
		5. Ø 12x26 mm	5. A \tilde{A} +B \tilde{B}	CW	9. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC			
		7. Ø 14x26 mm	6. A \tilde{A} +B \tilde{B} +0 $\tilde{0}$	L. Radial				
		8. Ø 15x26 mm	9. A+B+0	M12 8p				
				CCW				
				(**)				

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(*) 10.000 to 50.000 pulses with interpolation. Available 10.000 direct optical pulses without interpolating upon request.

(**) Special customer for connection options with axial outputs, upon request.

The required anti-rotation system is not included in the reference (order separately). Anti-rotation system is supplied disassembled and includes the screws required for assembly to the encoder. All systems available in the sections "MOUNTING ACCESSORIES".

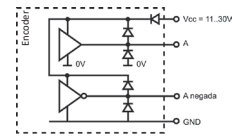
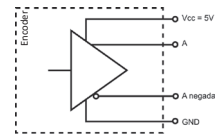
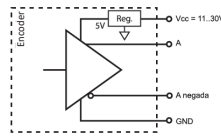
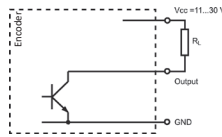
MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Anti-rotation pin or flexible flange
Permitted misalignment	±0.5 mm axial, ±0.3 mm radial (90.1014, 90.1024)
Shaft fixing	Clamp or setscrew
Blind hollow shaft diameter	6, 8, 10, 12, 14 or 15 mm
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65 - Standard IP67 - Option 19A
Rotor inertia moment	30 gcm ² (19) 50 gcm ² (19A)
Starting torque at 20°C (68°F)	≤ 0,02 Nm (19) ≤ 0,04 Nm (19A)
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	80 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer HT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	50.000
Radial connection	2 meters cable or industrial connector M12, M23 (other cable lengths available on order) Female connector not included

SERIE 19

HIGH RESOLUTION BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	RS422 (TTL compatible)	RS422 (TTL compatible)	Push-Pull Differential
Reference code	0	6	7	9
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%	11...30 VDC
Output voltage	11...30 VDC	5 VDC	5 VDC	11...30 VDC
Consumption	40 mA	Typical: 80 mA Max: 160 mA	Typical: 70 mA Max: 150 mA	Typical: 45 mA Max: 150 mA
Max. load capability / channel	40 mA	±20 mA	±20 mA	±30 mA
Length of cable allowed	50 m (24 VDC)	1200 m	1200 m	100 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 0.5 VDC	VOL < 0.5 VDC	VOL < 2.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > 2.5 VDC	VOH > 2.5 VDC	VOH > VCC – 3 VDC
Frequency	100 kHz	300 kHz	300 kHz	200 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

CONNECTION



	Cable 2x2x0,14+1x0,14 95.0008002	Cable 3x2x0,14+2x0,34 95.0008003 (*)	Connector M12 8p CCW	Connector M23 12p CW
GND	Yellow	Black	1	1
VCC	White	Red	2	2
A	Brown	Yellow	3	3
B	Green	Green	4	4
~A		Brown	5	5
~B		Blue	6	6
0 (reference)	Grey	Grey	7	7
~0	Grey	Orange	8	8
Shield**	Shield	Shield	Housing	Housing

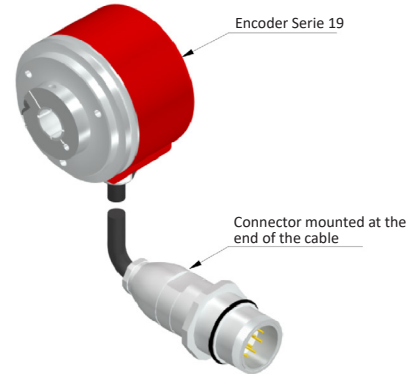
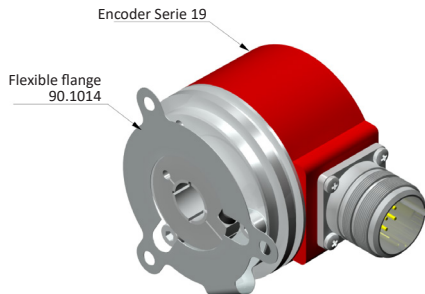
(*) Cable 3x2x0,14+2x0,34 only for encoders with inverted signals.

(**) Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected. ⚡

SERIE 19

HIGH RESOLUTION BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

ACCESSORIES EXAMPLES



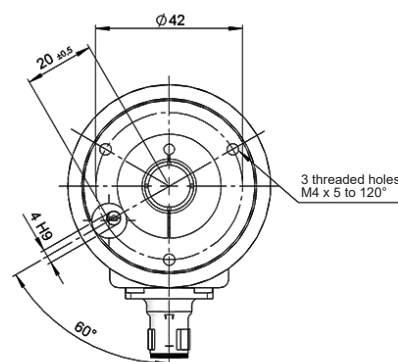
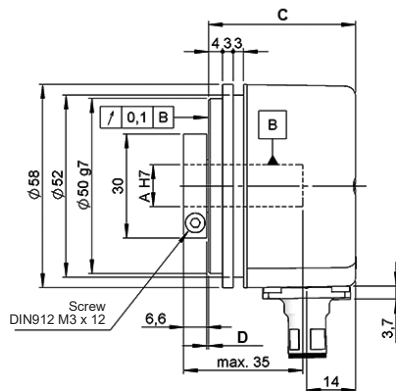
All the accessories available in the section "MOUNTING ACCESSORIES".

CONNECTION DIMENSIONS

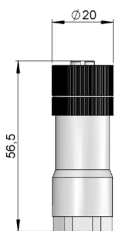
Female connector not included

Connection L

Radial
M12 8p
male panel
counter clockwise

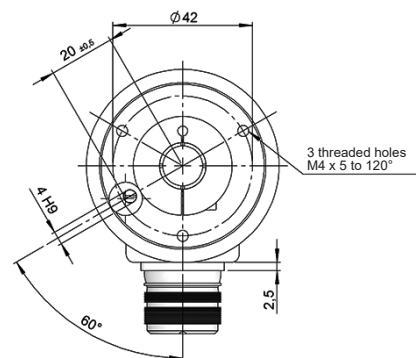
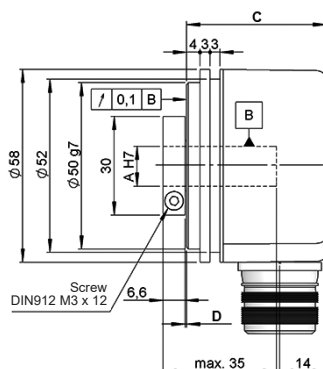


Female connector
95.0007152

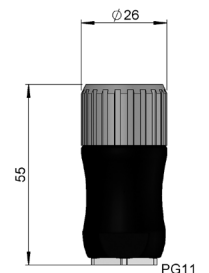


Connection 5

Radial
M23 12p
male panel
clockwise



Female connector
95.0007131

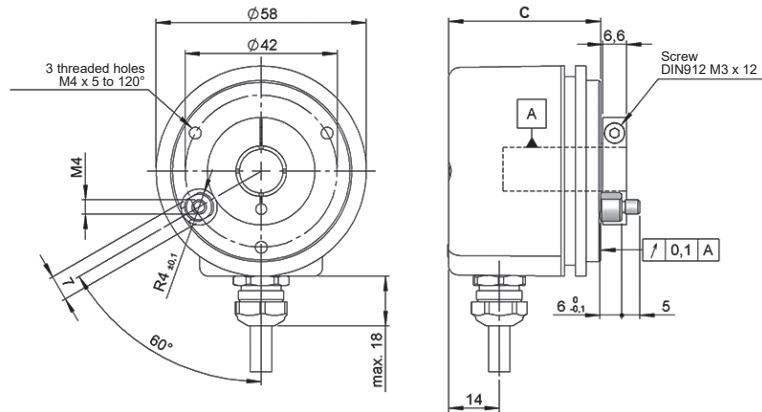


SERIE 19

HIGH RESOLUTION BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

ANTI-ROTATION SYSTEMS DIMENSIONS

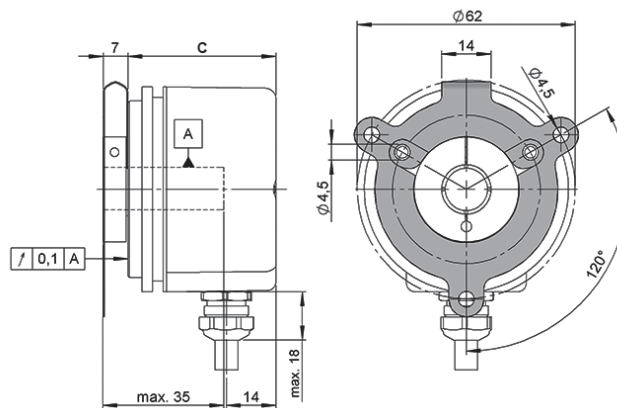
Anti-rotation pin
90.1040



90.1040



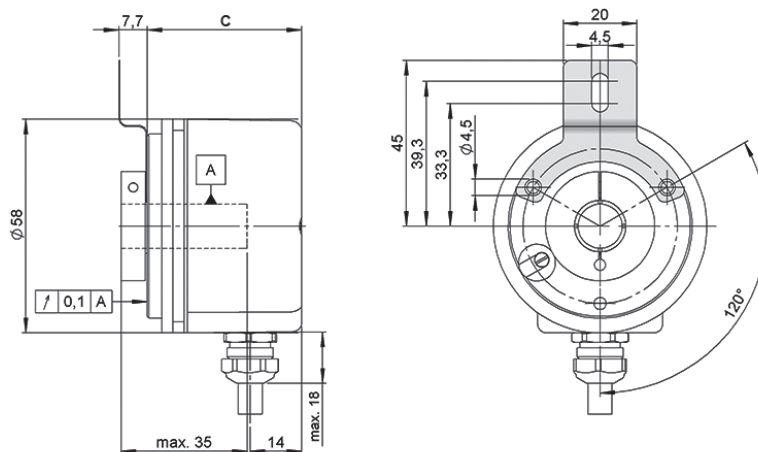
Flexible flange
90.1014



90.1014



Flexible flange
90.1018



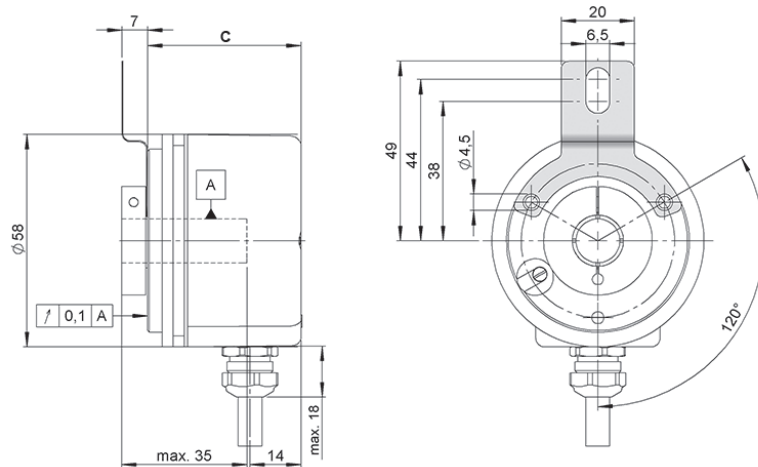
90.1018



SERIE 19

HIGH RESOLUTION BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

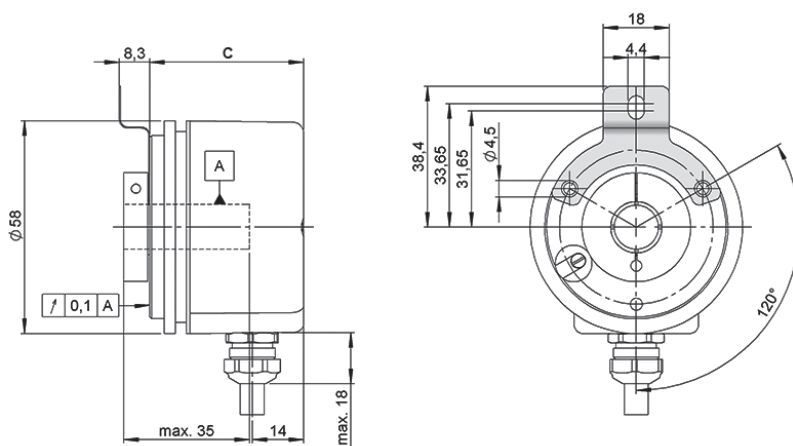
Flexible flange
90.1020



90.1020



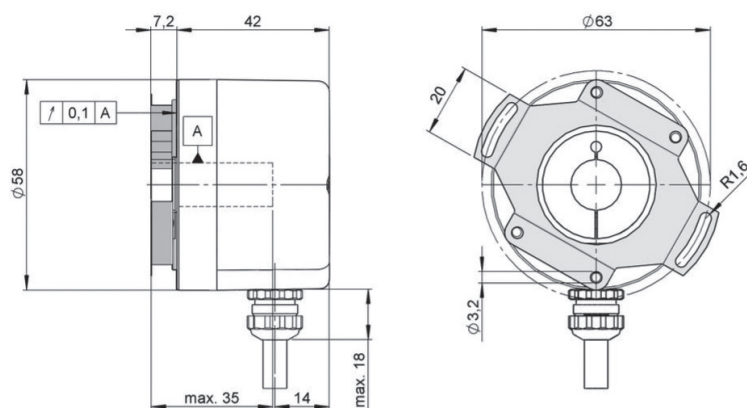
Flexible flange
90.1024



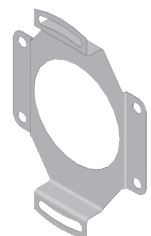
90.1024



Flexible flange
90.1027



90.1027

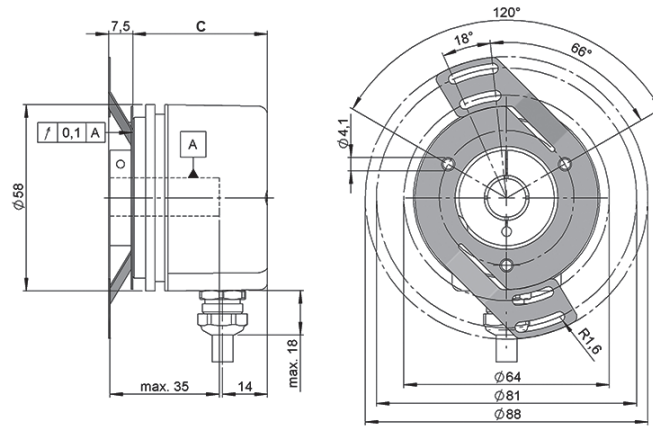


This flexible flange requires a special customer code in the reference:
19-XXXXX-XXXXX.HG01

SERIE 19

HIGH RESOLUTION BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

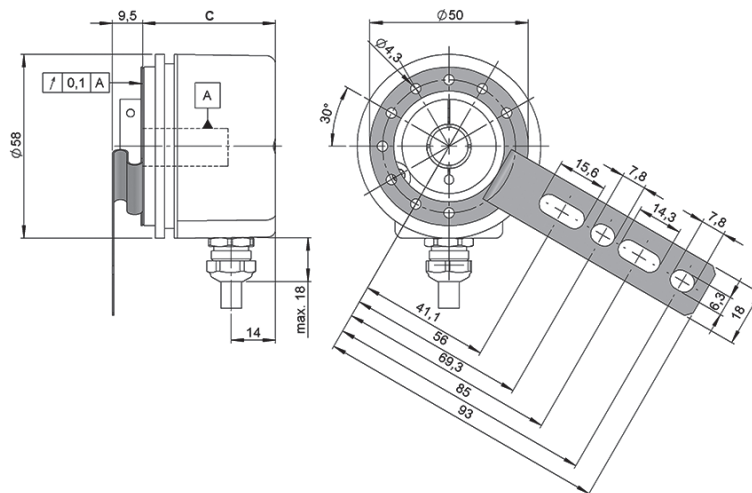
Flexible flange
90.1075



90.1075



Flexible flange
90.1095



90.1095





SERIE 22

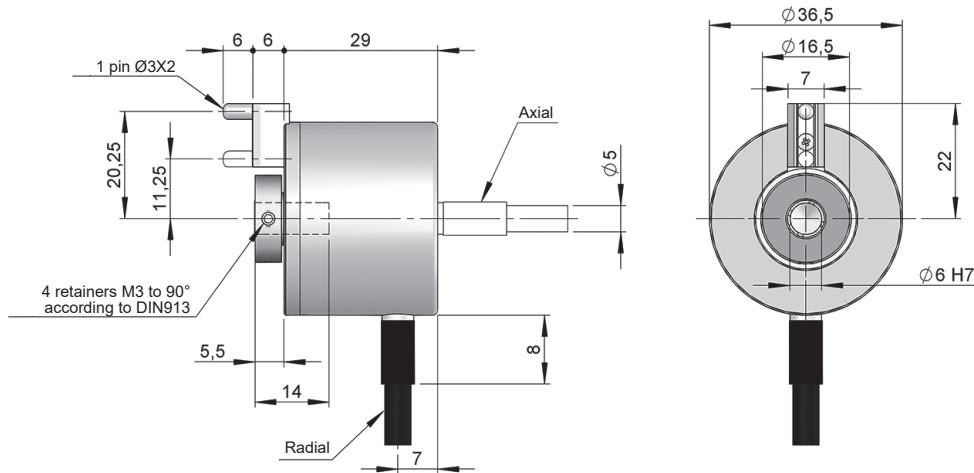
MINIATURE BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 10.000 pulses per turn
- External diameter 36,5 mm
- Blind hollow shaft \varnothing 6 mm
- Shaft fixing through setscrew
- Protection class IP64 according to DIN EN 60529
- Anti-rotation system through flexible flange or pin torque support
- Connection by cable (other cable length available) or industrial connector M12



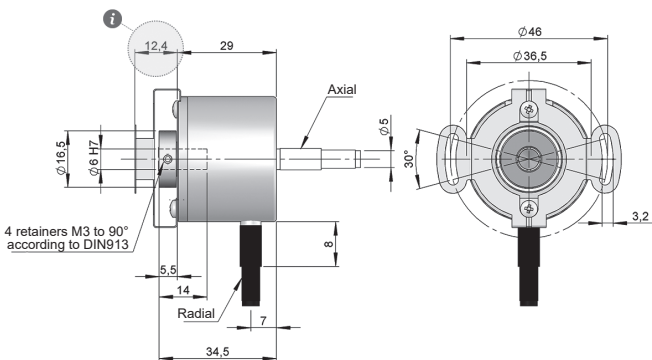
Optical Encoder Incremental Encoder Miniature Encoder Vibration and shock resistant IP64 Temperature range -40°C Express Delivery

Setscrew / Anti-rotation pin (93.0108204)



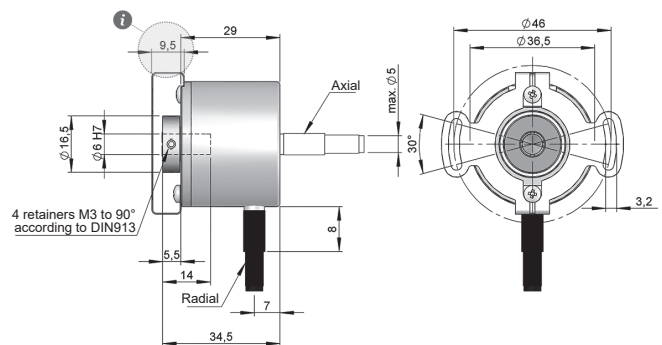
Drawing connection type 1/2, anti-rotation system type 2 (pin included)

Setscrew / Flexible flange (90.1037)



Drawing connection type 1/2, anti-rotation system type 1

Setscrew / Flexible flange (90.1111)



Drawing connection type 1/2, anti-rotation system type 3



SERIE 22

MINIATURE BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

REFERENCE							Reference example: 22-1721-500
Serie	Anti-rotation system	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer	
22 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
	1. Flexible flange (90.1037) 2. Anti-rotation pin (93.0108204) 3. Flexible flange (90.1111) (*)	2. A+B 3. A+B+0 7. A \tilde{A} +B \tilde{B} +0 $\tilde{0}$ 8. A \tilde{A} +B \tilde{B}	1. Axial cable 2. Radial cable 3. Radial M12 8p CCW	0. 11...30 VDC / NPN Open collector 11...30 VDC 1. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL)		PT00. -40°C Order your reference Step file 3D info@encoderhohner.com <i>service available in 24 h</i>	

(*) Anti-rotation system type 1 (Flexible flange 90.1037), 2 (Anti-rotation pin 93.0108204) and 3 (Flexible flange 90.1111) supplied assembled.

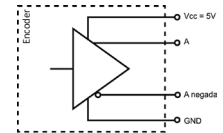
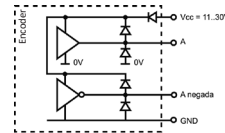
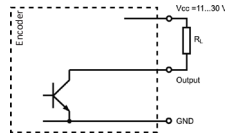
MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Brass
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Anti-rotation pin or flexible flange (included)
Permitted misalignment	±0.3 mm axial, ±0.1 mm radial (93.0108204) ±0.3 mm axial, ±0.2 mm radial (90.1037) ±0.2 mm axial, ±0.1 mm radial (90.1111)
Shaft fixing	Setscrew
Blind hollow shaft diameter	6 mm
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	10 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight aprox.	0,1 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer PT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	10.000
Axial or radial connection	2 meters cable or industrial connector M12 (other cable lengths available on order) Female connector not included

SERIE 22

MINIATURE BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)
Reference code	0	1	2
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%
Output voltage	11...30 VDC	11...30 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC – 3 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes
Protection polarity inversion	Yes	Yes	No

Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise

CONNECTION



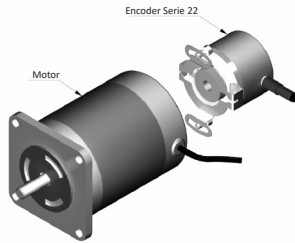
	Cable 5x0,14 95.0008051 (*)	Cable 8x0,14 95.0008052 (*)	Connector M12 8p CCW
GND	White	White	1
VCC	Brown	Brown	2
A	Green	Green	3
B	Yellow	Grey	4
~A		Yellow	5
~B		Pink	6
0 (reference)	Grey	Blue	7
~0	Grey	Red	8

(*) For lengths over 2 meters standard cable, we recommend the use of twisted pair cable 2x2x0,14+1x0,14 (95.0008002) or 3x2x0,14+2x0,34 (95.0008003). Request the final cable length required to avoid junctions.

SERIE 22

MINIATURE BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

ACCESSORIES EXAMPLES



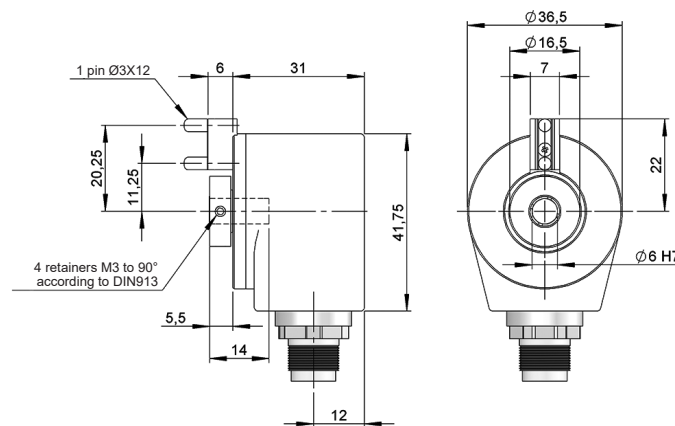
All the accessories available in the section "MOUNTING ACCESSORIES".

CONNECTION DIMENSIONS

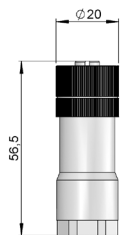
Female connector not included

Connection 3

Radial M12 8p
male panel
counter clockwise



Female connector 95.0007152





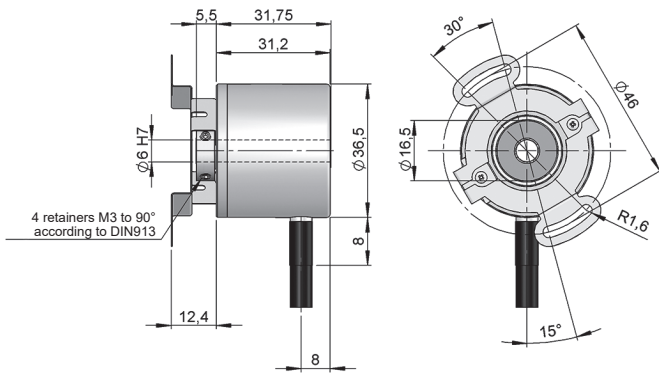
SERIE 22H

MINIATURE HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 10.000 pulses per turn
- External diameter 36,5 mm
- Hollow shaft \varnothing 6 or 8 mm
- Protection class IP50 according to DIN EN 60529
- Shaft fixing through setscrew
- Anti-rotation system through flexible flange or pin torque support
- Connection by cable (other cable length available) or industrial connector M12

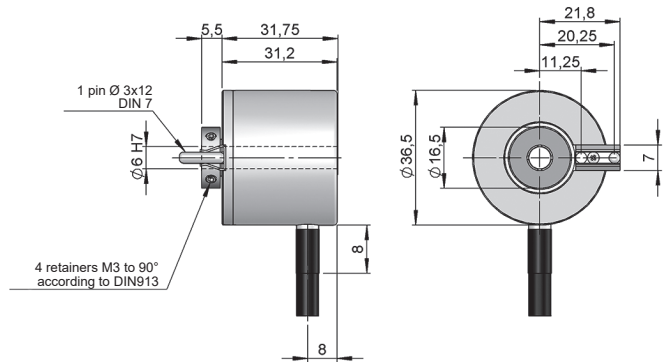


Flexible flange (90.1037)



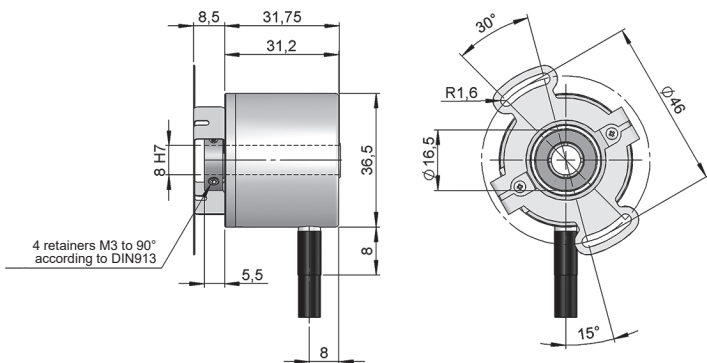
Drawing connection type 2, hollow shaft type 1, anti-rotation system type 1

Anti-rotation pin (93.0108204)



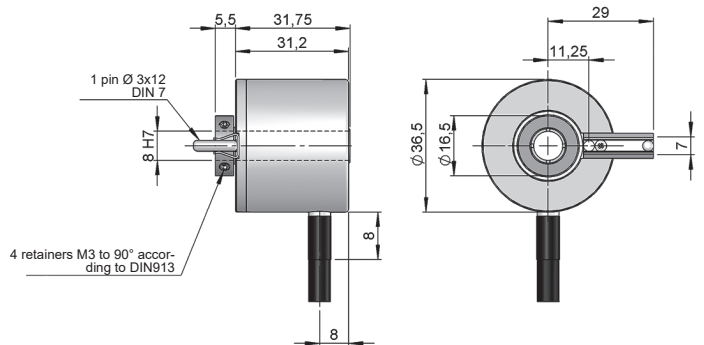
Drawing connection type 2, hollow shaft type 1, anti-rotation system type 2

Flexible flange (90.1111)



Drawing connection type 2, hollow shaft type 2, anti-rotation system type 3

Anti-rotation pin (93.0108208)



Drawing connection type 2, hollow shaft type 2, anti-rotation system type 4



SERIE 22H

MINIATURE HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

REFERENCE							Reference example: 22H-11721-500
Serie	Anti-rotation system	Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
22H -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. Flexible flange (90.1037) 2. Anti-rotation pin (93.0108204) 3. Flexible flange (90.1111) 4. Anti-rotation pin (93.0108208)	1. \varnothing 6 mm 2. \varnothing 8 mm	2. A+B 3. A+B+0 7. $\tilde{A}\tilde{A}+\tilde{B}\tilde{B}+0\tilde{0}$ 8. $\tilde{A}\tilde{A}+\tilde{B}\tilde{B}$	2. Radial cable 3. Radial M12 8p CCW	0. 11...30 VDC / NPN Open collector 11..30 VDC 1. 11..30 VDC / Line driver differential Push-Pull 11..30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL)		PT00. -40°C Order your reference Step file 3D info@encoderhohner.com <i>service available in 24 h</i>

(*) Anti-rotation system type 1 (Flexible flange 90.1037), 2 (Anti-rotation pin 93.0108204), 3 (Flexible flange 90.1111) and 4 (Anti-rotation pin 93.0108208) supplied assembled.

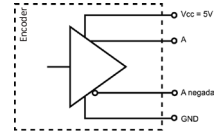
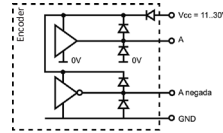
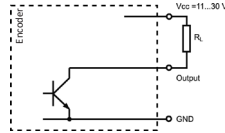
MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Brass
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Anti-rotation pin or flexible flange (included)
Permitted misalignment	±0.3 mm axial, ±0.1 mm radial (93.0108204, 93.0108208) ±0.3 mm axial, ±0.2 mm radial (90.1037) ±0.2 mm axial, ±0.1 mm radial (90.1111)
Shaft fixing	Setscrew
Hollow shaft diameter	6 or 8 mm
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP50
Rotor inertia moment	12 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight aprox.	0,1 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer PT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	10.000
Radial connection	2 meters cable or industrial connector M12 (other cable lengths available on order) Female connector not included

SERIE 22H

MINIATURE HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)
Reference code	0	1	2
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%
Output voltage	11...30 VDC	11...30 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 2.2 VDC (24 VDC)	VOH > VCC – 3 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes
Protection polarity inversion	Yes	Yes	No

Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise

CONNECTION



	Cable 5x0,14 95.0008051 (*)	Cable 8x0,14 95.0008052 (*)	Connector M12 8p CCW
GND	White	White	1
VCC	Brown	Brown	2
A	Green	Green	3
B	Yellow	Grey	4
~A		Yellow	5
~B		Pink	6
0 (reference)	Grey	Blue	7
~0	Grey	Red	8

(*) For lengths over 2 meters standard cable, we recommend the use of twisted pair cable 2x2x0,14+1x0,14 (95.0008002) or 3x2x0,14+2x0,34 (95.0008003). Request the final cable length required to avoid junctions.

SERIE 22H

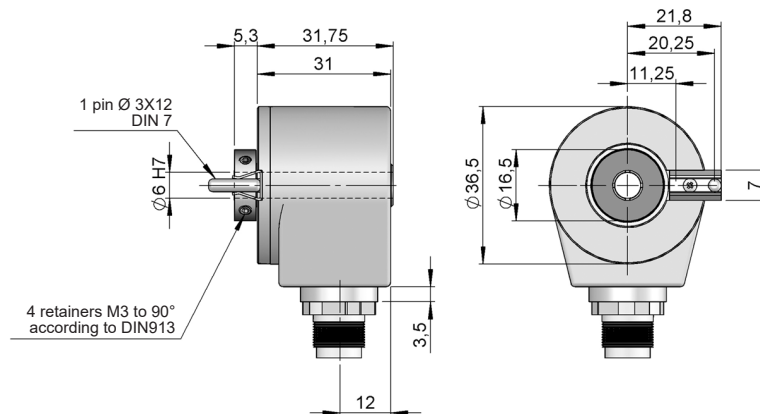
MINIATURE HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

CONNECTION DIMENSIONS

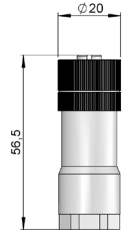
Female connector not included

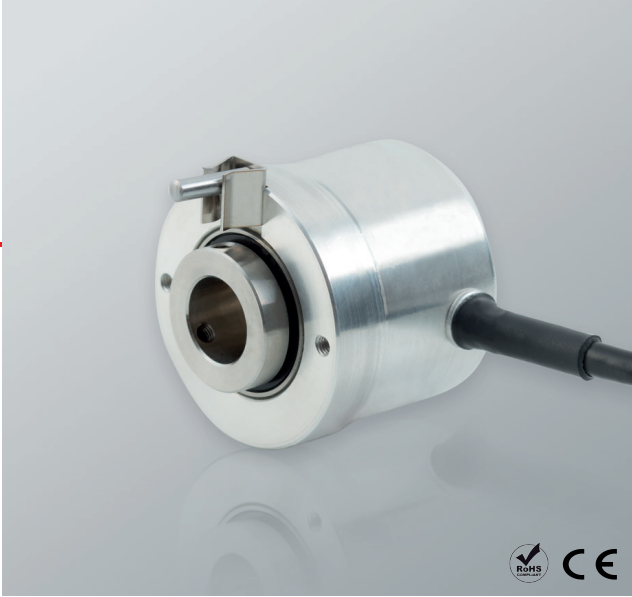
Connection 3

Radial
M12 8p
male panel
counter clockwise



Female connector 95.0007152





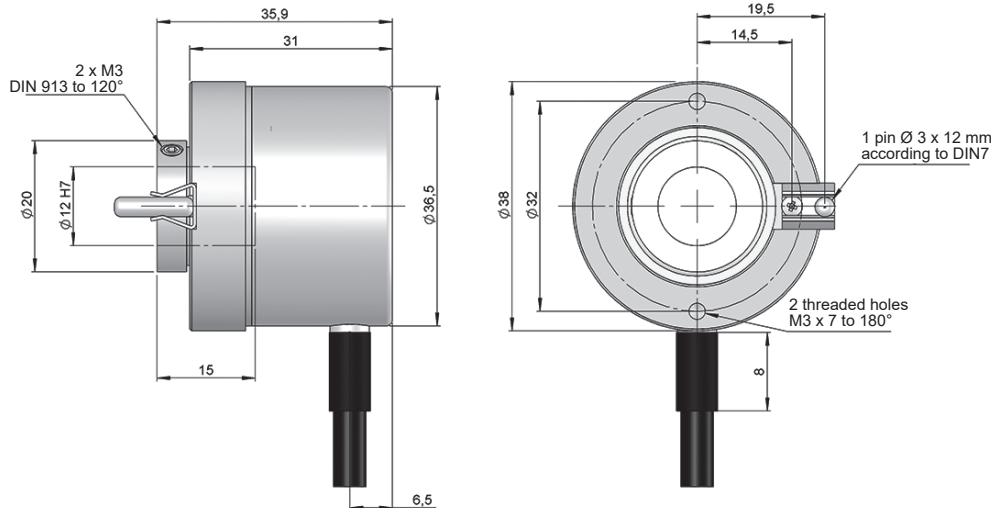
SERIE 22M

BLIND HOLLOW SHAFT MAGNETIC INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 512 pulses per turn
- External diameter 36,5 mm
- Blind hollow shaft \varnothing 10 or 12 mm
- Protection IP65 according to DIN EN 60529
- Anti-rotation system through pin torque support
- Connection by cable (other cable length available)



Magnetic Encoder	Incremental Encoder	Miniature Encoder	Vibration and shock resistant	IP 65	Express Delivery



Drawing blind hollow shaft type 2, connection type 2, anti-rotation system type 2 (pin included)

REFERENCE

Reference example: 22M-24321-512

Serie	Anti-rotation system	Blind-Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
22M -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	2. Anti-rotation pin (93.0108204)	3. \varnothing 10 mm 4. \varnothing 12 mm	2. A+B 3. A+B+0 7. AA+BB+00	1. Axial cable 2. Radial cable	1. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL)	32, 64, 128, 256, 512	

(*) Anti-rotation system type 2 (Anti-rotation pin 93.0108204) supplied assembled.

Order your reference
Step file 3D

info@encoderhohner.com
service available in 24 h



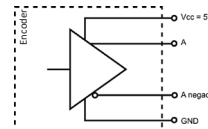
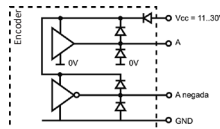
SERIE 22M

BLIND HOLLOW SHAFT MAGNETIC INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Anti-rotation pin (included)
Blind hollow shaft diameter	10 or 12 mm
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	20 gcm ²
Starting torque at 20°C (68°F)	Max. 2 Ncm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight aprox.	0,1 Kg
Operating temperature range	-20°C to +85°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Number of pulses per turn	32, 64, 128, 256, 512
Axial or radial connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)

OUTPUT SIGNALS



OUTPUT CIRCUIT	Push-Pull Differential	RS422 (TTL compatible)
Reference code	1	2
Power supply	11...30 VDC	5 VDC ±5%
Output voltage	11...30 VDC	5 VDC
Consumption	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA
Max. load capability / channel	±30 mA	±20 mA
Length of cable allowed	100 m	1200 m
"Low" signal level	VOL < 2.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > Vcc - 3 VDC	VOH > 2.5 VDC
Frequency	200 KHz	300 KHz
Short circuit protection	Yes	Yes
Protection polarity inversion	Yes	No

Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise

SERIE 22M

BLIND HOLLOW SHAFT MAGNETIC INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

CONNECTION



	Cable 5x0,14 95.0008051 (*)	Cable 8x0,14 95.0008052 (*)
GND	White	White
VCC	Brown	Brown
A	Green	Green
B	Yellow	Grey
~ A		Yellow
~ B		Pink
0 (reference)	Grey	Blue
~ 0	Grey	Red

(*) For lengths over 2 meters standard cable, we recommend the use of twisted pair cable 2x2x0,14+1x0,14 (95.0008002) or 3x2x0,14+2x0,34 (95.0008003). Request the final cable length required to avoid junctions.



SERIE 28

MINIATURE BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

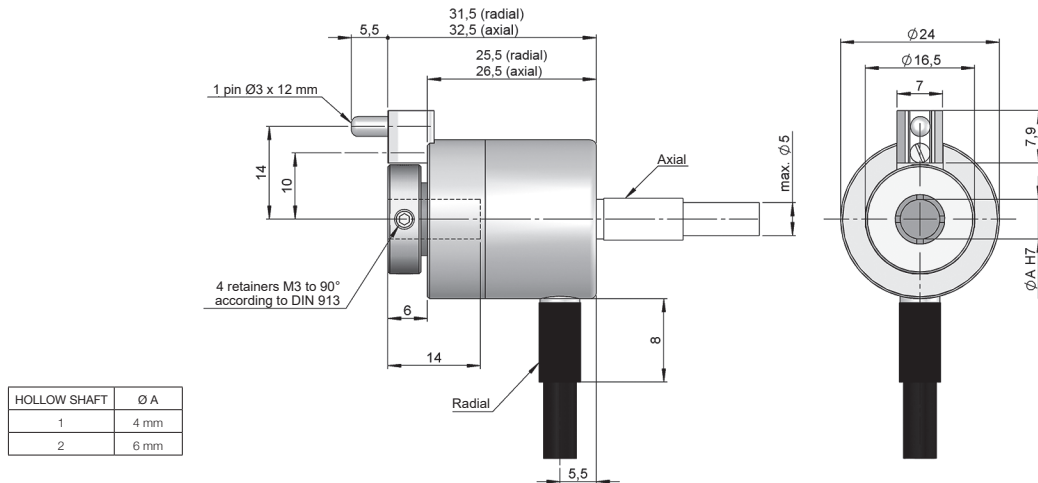
- Resolution up to 4.096 pulses per turn
- External diameter 24 mm
- Blind hollow shaft \varnothing 4, 6 or 8 mm
- Protection class IP64 according to DIN EN 60529
- Shaft fixing through setscrew or clamp
- Anti-rotation system through flexible flange or pin torque support
- Connection by cable (other cable length available)



Optical Encoder	Incremental Encoder	Miniature Encoder	Vibration and shock resistant	IP 64	Temperature range	Express Delivery

Option A:

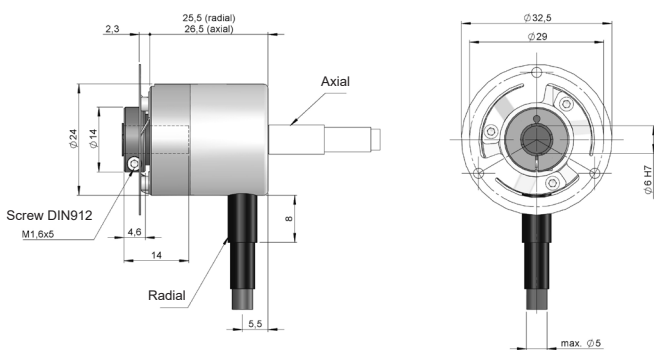
Setscrew / Anti-rotation pin (93.0108204)



Drawing blind hollow shaft mechanical option type 2 (Anti-rotation pin 93.0108204, pin included), connection type 1/2

Option B:

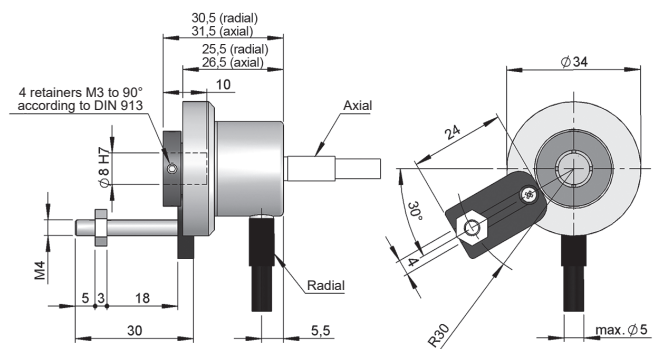
Clamp / Flexible flange (93.0102057)



Drawing blind hollow shaft mechanical option type 3, connection type 1/2

Option C:

Setscrew / Anti-rotation pin (93.0108201 + 93.0108202)



Drawing blind hollow shaft mechanical option type 4, connection type 1/2



SERIE 28

MINIATURE BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

REFERENCE							Reference example: 28-1721-500
Serie	Mechanical option	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer	
28 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
	<ol style="list-style-type: none"> Option A - Ø 4 mm Setscrew Anti-rotation pin (93.0108204) Option A - Ø 6 mm Setscrew Anti-rotation pin (93.0108204) Option B - Ø 6 mm Clamp Flexible flange (93.0102057) Option C - Ø 8 mm Setscrew Anti-rotation pin (93.0108201 + 93.0108202) 	<ol style="list-style-type: none"> A+B A+B+0 A$\tilde{\sim}$+B$\tilde{\sim}$+0$\tilde{\sim}$ A$\tilde{\sim}$+B$\tilde{\sim}$ 	<ol style="list-style-type: none"> Axial cable Radial cable 	<ol style="list-style-type: none"> 11...30 VDC / NPN Open collector 11...30 VDC 11...30 VDC / Line driver differential Push-Pull 11...30 VDC 5 VDC / RS422 5 VDC (compatible TTL) 		WT00. -40°C Order your reference Step file 3D info@encoderhohner.com <i>service available in 24 h</i>	

(* Anti-rotation system type 1/2 (Anti-rotation pin 93.0108204), 3 (Flexible flange 93.0102057) and 4 (Anti-rotation pin 93.0108201 + 93.0108202) supplied assembled.

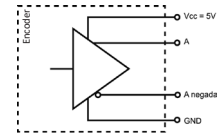
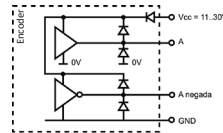
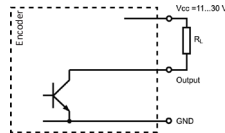
MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Brass
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Anti-rotation pin or flexible flange (included)
Permitted misalignment	±0,1 mm axial, ±0,3 mm radial (93.0108204) ±0,1 mm axial, ±0,1 mm radial (93.0102057) ±0,1 mm axial, ±0,3 mm radial (93.0108201 + 93.0108202)
Shaft fixing	Setscrew or Clamp
Blind hollow shaft diameter	4, 6 or 8 mm
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	5 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	10 N
Maximum load permitted on radial shaft	10 N
Weight aprox.	0,06 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer WT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	4.096
Axial or radial connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)

SERIE 28

MINIATURE BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)
Reference code	0	1	2
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%
Output voltage	11...30 VDC	11...30 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC – 3 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes
Protection polarity inversion	Yes	Yes	No

Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise

CONNECTION



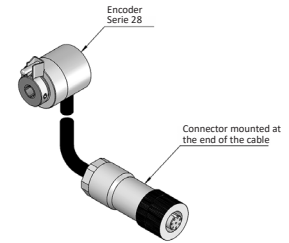
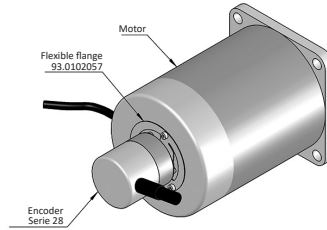
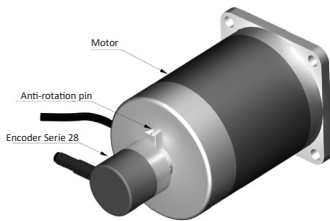
	Cable 5x0,14 95.0008051 (*)	Cable 8x0,14 95.0008052 (*)
GND	White	White
VCC	Brown	Brown
A	Green	Green
B	Yellow	Grey
~A		Yellow
~B		Pink
0 (reference)	Grey	Blue
~0	Grey	Red

(*) For lengths over 2 meters standard cable, we recommend the use of twisted pair cable 2x2x0,14+1x0,14 (95.0008002) or 3x2x0,14+2x0,34 (95.0008003). Request the final cable length required to avoid junctions.

SERIE 28

MINIATURE BLIND HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".



SERIE 59

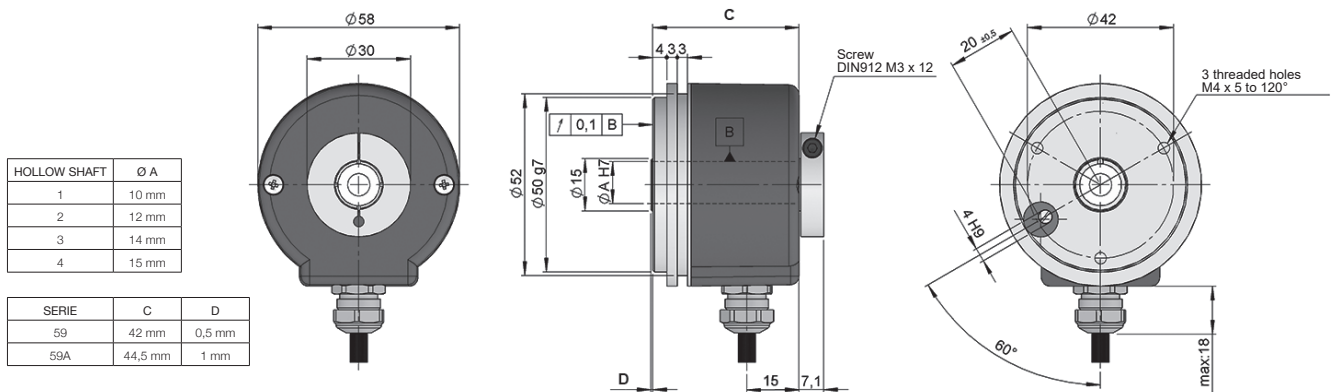
HIGH RESOLUTION HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 50.000 pulses per turn
- External diameter 58 mm
- Hollow shaft up to $\varnothing 15$ mm
- Protection class IP67 according to DIN EN 60529
- Shaft fixing through front or rear clamp
- Anti-rotation system through flexible flange, pin torque support or anti-turn stick
- Connection by cable (other cable length available) or industrial connector M12 or M23



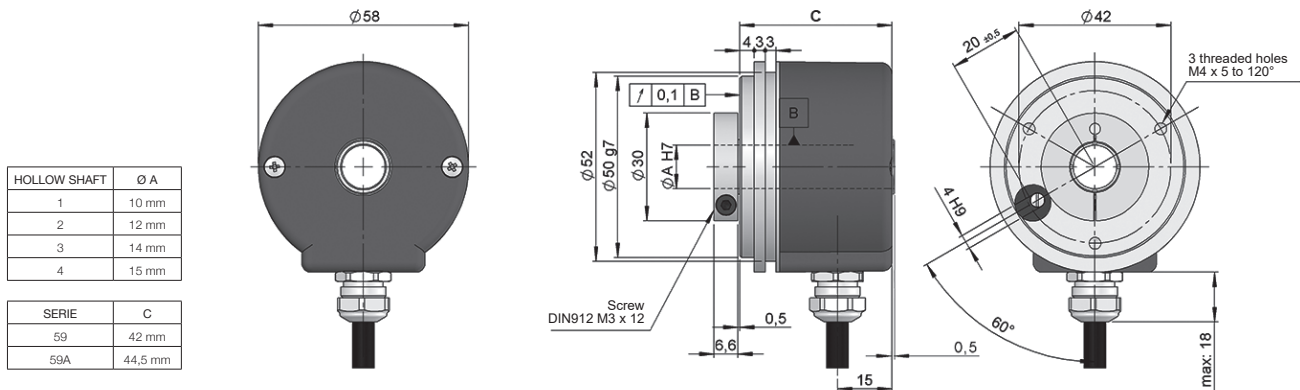
Optical Encoder	Incremental Encoder	High shaft load capacity	Vibration and shock resistant	IP67	Temperature range	Express Delivery

Rear clamp



Drawing mechanical option type 1, hollow shaft type 2, connection type 1

Frontal clamp



Drawing mechanical option type 2, hollow shaft type 2, connection type 1



SERIE 59

HIGH RESOLUTION HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

REFERENCE								Reference example: 59-21111-1024
Serie	Mechanical option	Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer	
59/59A -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
59. IP65	1. Rear clamp	1. Ø 10 mm	1. A \tilde{A} +B \tilde{B} +0 \tilde{O}	1. Radial cable	0. 11...30 VDC / NPN Open collector 11..30 VDC	(*)	GT00. -40°C	
59A. IP67	2. Frontal clamp	2. Ø 12 mm 3. Ø 14 mm 4. Ø 15 mm	2. A \tilde{A} +B \tilde{B}	2. Radial M23 12p CW 3. Radial M12 8p CCW	1. 11..30 VDC / Line driver differential Push-Pull 11..30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL) 6. 11...30 VDC / RS422 5 VDC (compatible TTL)			

Order your reference
Step file 3D

info@encoderhohner.com
service available in 24 h

(*) 10.000 to 50.000 pulses with interpolation. Available 10.000 direct optical pulses without interpolating upon request.

The required anti-rotation system is not included in the reference (order separately). Anti-rotation system is supplied disassembled and includes the screws required for assembly to the encoder. All systems available in the sections "MOUNTING ACCESSORIES".

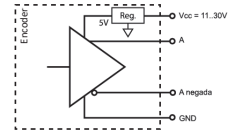
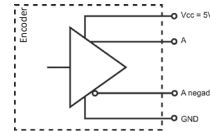
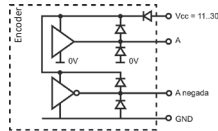
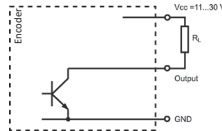
MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Anti-rotation pin, Flexible flange or Anti-turn stick
Permitted misalignment	±0.5 mm axial, ±0.3 mm radial (90.1014, 90.1024)
Shaft fixing	Front or Rear clamp
Hollow shaft diameter	10, 12, 14 or 15 mm
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65 - Standard IP67 - Option 59A
Rotor inertia moment	30 gcm ² (59) 40 gcm ² (59A)
Starting torque at 20°C (68°F)	≤ 0,02 Nm (59) ≤ 0,04 Nm (59A)
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	80 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer GT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	50.000
Radial connection	2 meters cable or industrial connector M12 or M23 (other cable lengths available on order) Female connector not included

SERIE 59

HIGH RESOLUTION HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)	RS422 (TTL compatible)
Reference code	0	1	2	6
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%	11...30 VDC
Output voltage	11...30 VDC	11...30 VDC	5 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA	Typical: 80 mA Max: 160 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC - 3 VDC	VOH > 2.5 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

CONNECTION



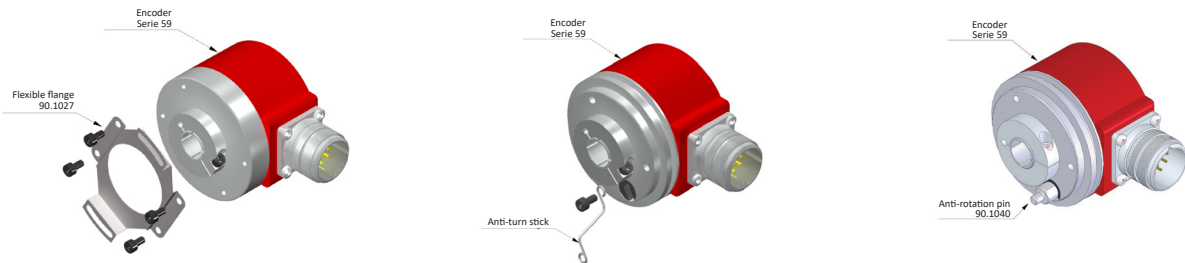
	Cable 3x2x0,14+2x0,34 95.0008003	Connector M12 8p CCW	Connector M23 12p CW
GND	Black	1	1
VCC	Red	2	2
A	Yellow	3	3
B	Green	4	4
~A	Brown	5	5
~B	Blue	6	6
0 (reference)	Grey	7	7
~0	Orange	8	8
Shield*	Shield	Housing	Housing

(*) Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected. ⚡

SERIE 59

HIGH RESOLUTION HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".

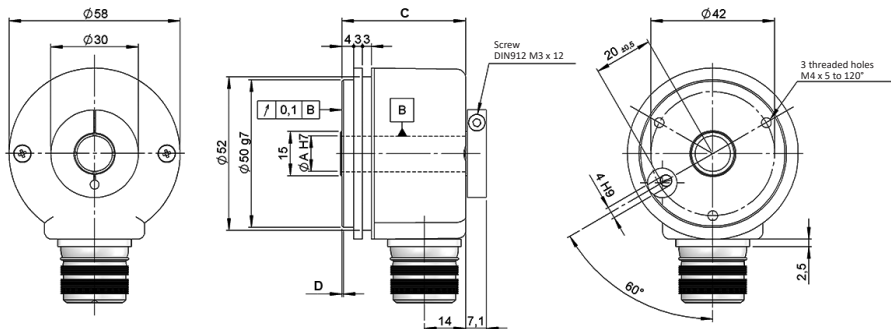
CONNECTION DIMENSIONS

Female connector not included

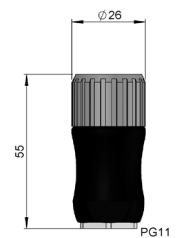
Connection 2
Radial

Fixation 1
Rear clamp

M23 12p
male panel
clockwise



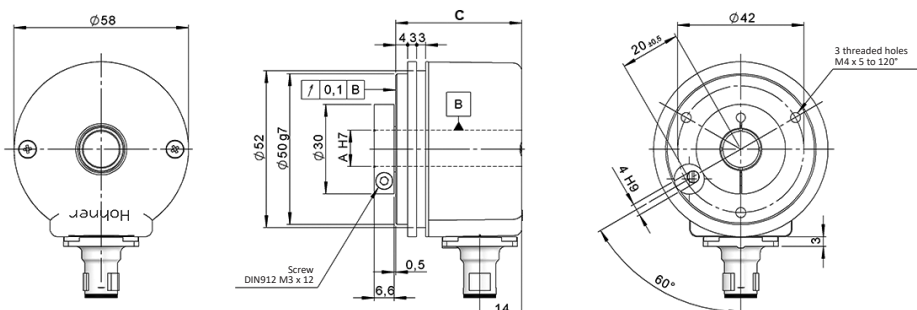
Female connector
95.0007131



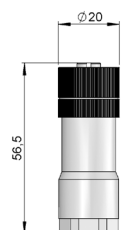
Connection 3
Radial

Fixation 2
Frontal clamp

M12 8p
male panel
counter clockwise



Female connector
95.0007152

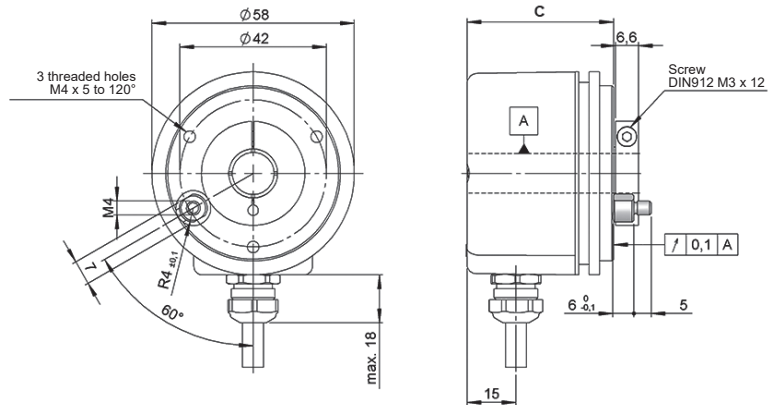


SERIE 59

HIGH RESOLUTION HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

ANTI-ROTATION SYSTEMS DIMENSIONS

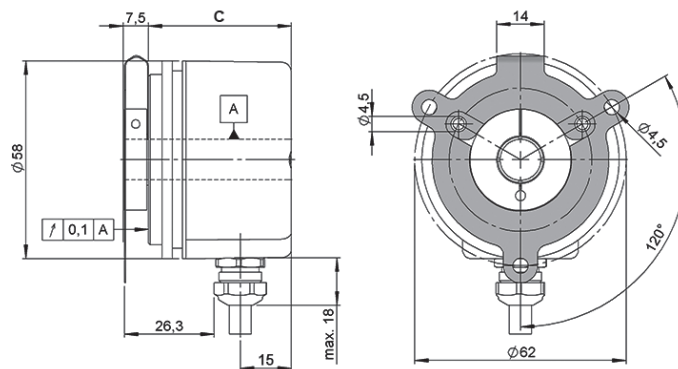
Anti-rotation pin
90.1040



90.1040



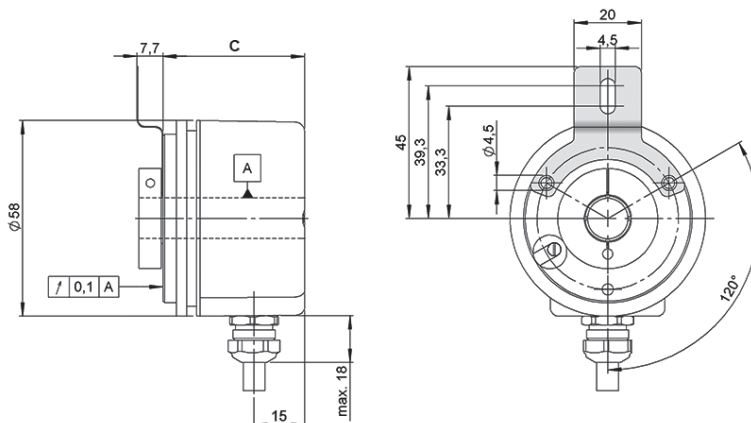
Flexible flange
90.1014



90.1014



Flexible flange
90.1018



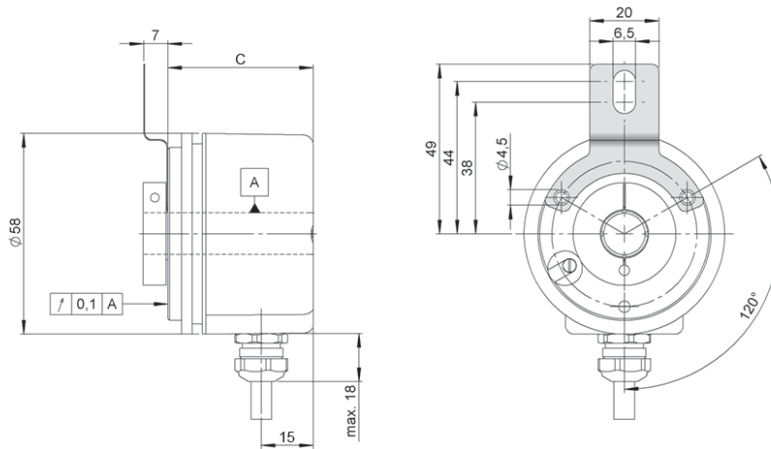
90.1018



SERIE 59

HIGH RESOLUTION HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

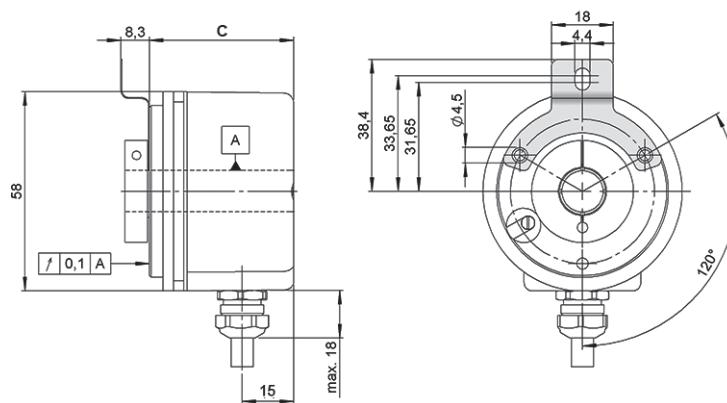
Flexible flange
90.1020



90.1020



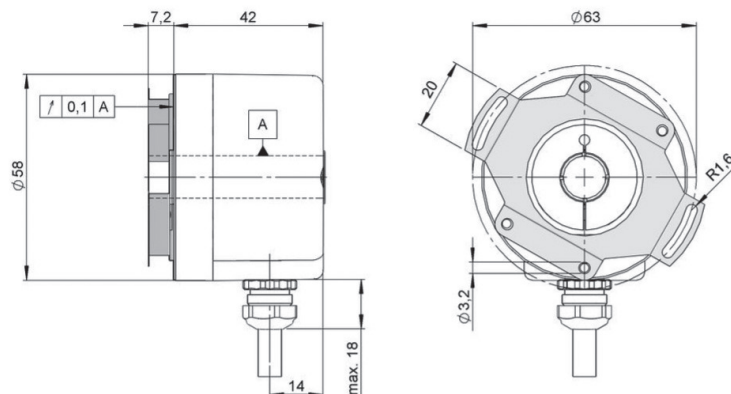
Flexible flange
90.1024



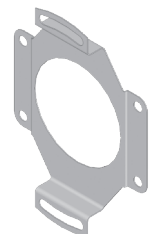
90.1024



Flexible flange
90.1027



90.1027

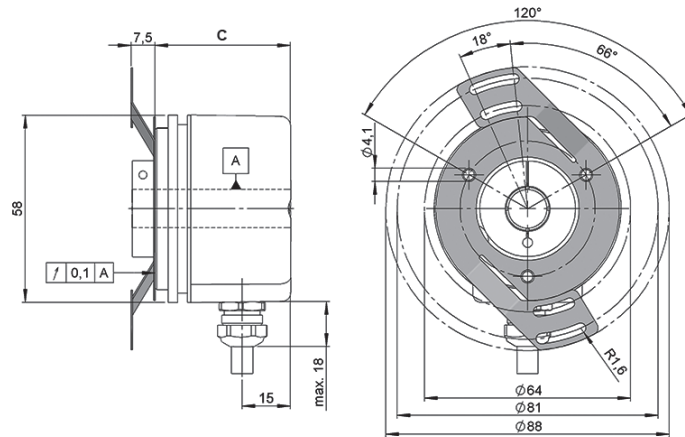


This flexible flange requires a special customer code in the reference: 59-XXXX-XXXX.GG02

SERIE 59

HIGH RESOLUTION HOLLOW SHAFT INCREMENTAL ENCODER FOR INDUSTRIAL APPLICATIONS

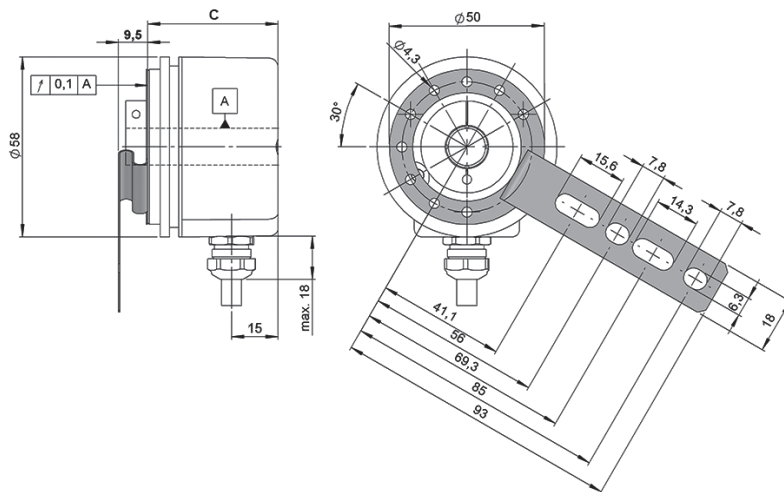
Flexible flange
90.1075



90.1075



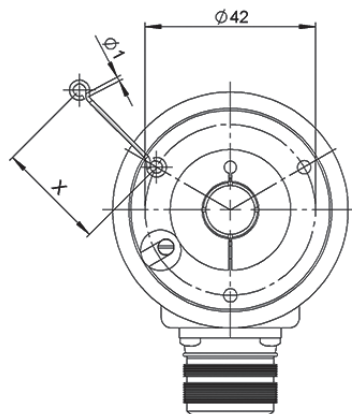
Flexible flange
90.1095



90.1095

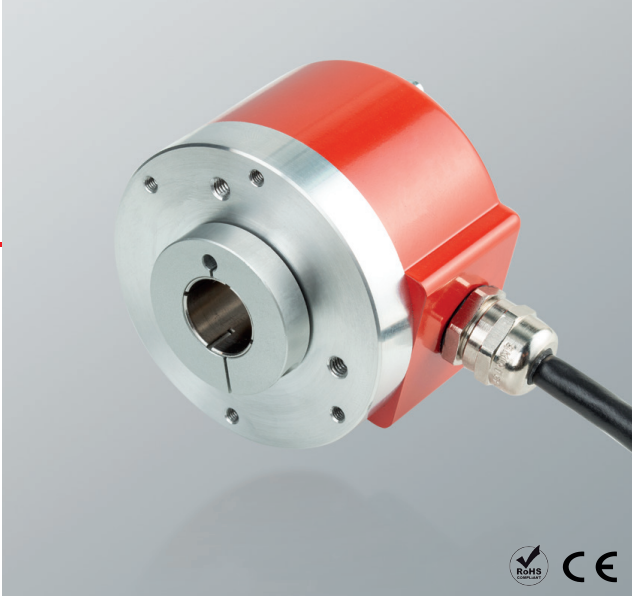


Anti-turn stick



90.1033	X= 33 mm
90.1044	X= 83 mm
90.1043	X= 132 mm

(*) other length available on order



SERIE 59S

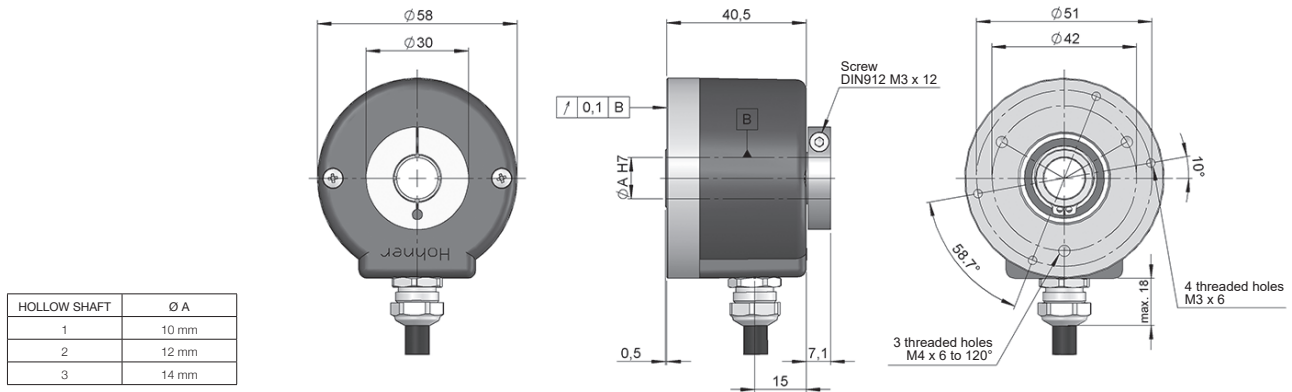
INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

 SIN/COS

- Resolution 2.048 pulses per turn
- Shaft fixing through front or rear clamp
- External diameter 58 mm
- Hollow shaft \varnothing 10, 12 or 14 mm
- Protection class IP65 according to DIN EN 60529
- Anti-rotation system through flexible flange or anti-turn stick
- Connection by cable (other cable length available) or industrial connector M12 or M23

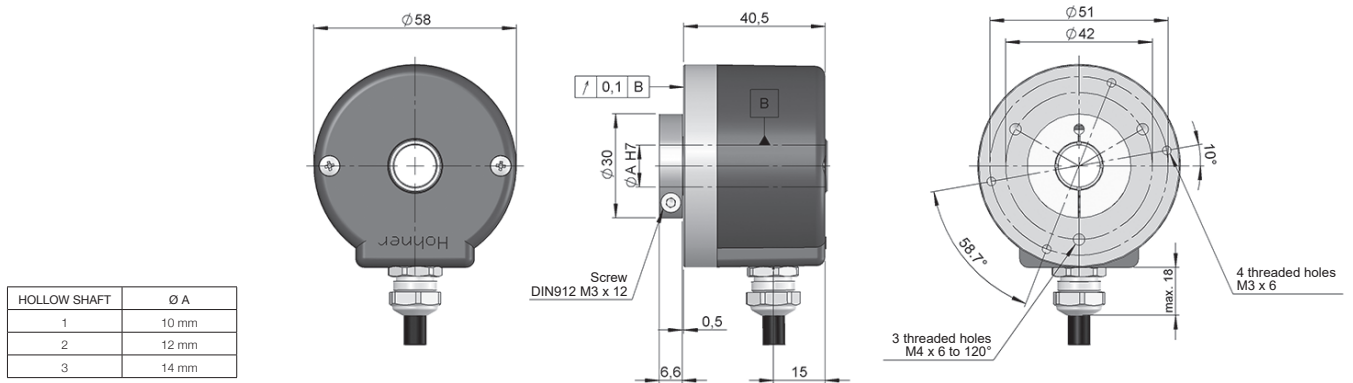


Rear clamp



Drawing mechanical option type 1, hollow shaft type 2, connection type 1

Frontal clamp



Drawing mechanical option type 2, hollow shaft type 2, connection type 1



SERIE 59S

INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

REFERENCE								Reference example: 59S-21117-2048
Serie	Mechanical option	Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer	
59S -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	2 0 4 8	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
	1. Rear clamp 2. Frontal clamp	1. Ø 10 mm 2. Ø 12 mm 3. Ø 14 mm	1. A \tilde{A} +B \tilde{B} +0 \tilde{O} 2. A \tilde{A} +B \tilde{B}	1. Radial cable 2. Radial M23 12p CW 3. Radial M12 8p CCW	7.5 VDC / SIN-COS 1Vpp 5 VDC			

Order your reference
Step file 3D

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service available in 24 h

The required anti-rotation system is not included in the reference (order separately). Anti-rotation system is supplied disassembled and includes the screws required for assembly to the encoder. All systems available in the sections "MOUNTING ACCESSORIES".

MECHANICAL SPECIFICATIONS

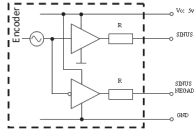
Materials	Housing: Aluminium Flange: Aluminium Shaft: Treated aluminium / Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange or Anti-turn stick (not included)
Permitted misalignment	±0.5 mm axial, ±0.3 mm radial (90.1014, 90.1024)
Shaft fixing	Front or Rear clamp
Hollow shaft diameter	10, 12 or 14 mm
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	80 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Number of pulses per turn	2.048
Axial or radial connection	2 meters cable or industrial connector M12 or M23 (other cable lengths available on order) Female connector not included

SERIE 59S

INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

OUTPUT SIGNALS



OUTPUT CIRCUIT	Sine-wave
Reference code	7
Power supply	5 VDC ±10%
Output voltage	5 VDC
Consumption	Typical: 40 mA Max: 90 mA
Length of cable allowed	50 m
Signal type	SIN/COS, 1Vpp
Output signal level	0.6 to 1.2 Vpp
Signal offset	2.5 VDC
Reference	0.2 to 1 VDC
Frequency	200 kHz
Protection polarity inversion	Not permanent

Cosine leads (90° electric) Sine, view from the shaft, shaft rotating clockwise

CONNECTION



	Cable 3x2x0,14+2x0,34 95.0008003	Connector M12 8p CCW	Connector M23 12p CW
GND	Black	1	1
VCC	Red	2	2
COS	Yellow	3	3
SIN	Green	4	4
$\overline{\text{COS}}$	Brown	5	5
$\overline{\text{SIN}}$	Blue	6	6
0 (reference)	Grey	7	7
$\tilde{0}$	Orange	8	8
Shield*	Shield	Housing	Housing

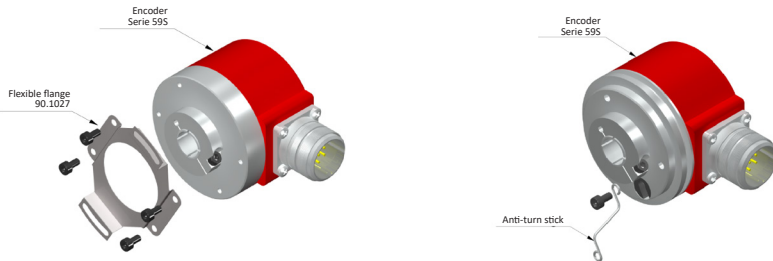
(*) Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected. \perp

SERIE 59S

INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".

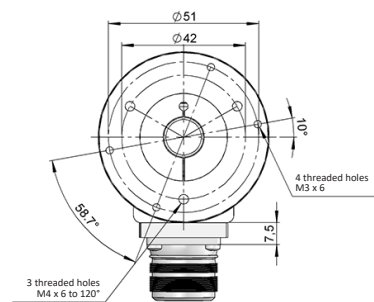
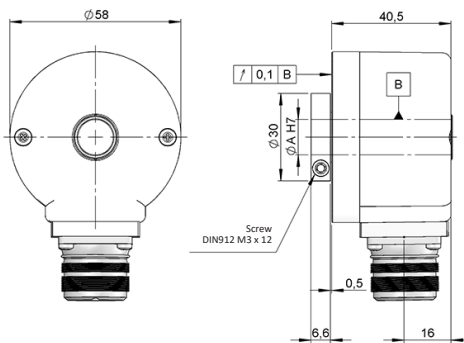
CONNECTION DIMENSIONS

Female connector not included

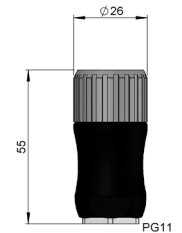
Connection 2
Radial

Fixation 2
Frontal clamp

*M23 12p
male panel
clockwise*



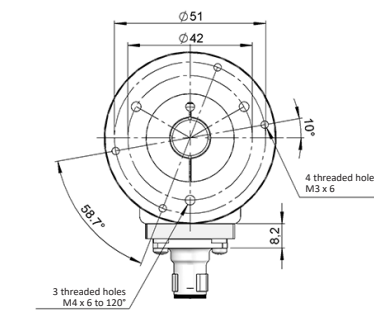
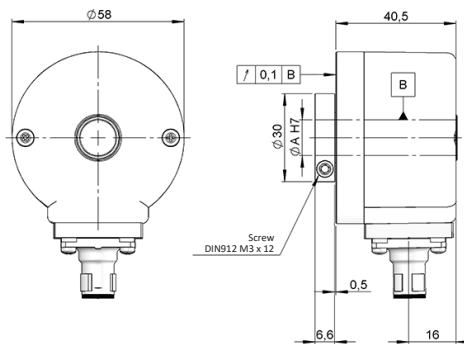
Female connector
95.0007131



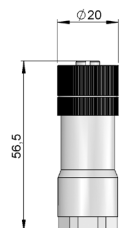
Connection 3
Radial

Fixation 2
Frontal clamp

*M12 8p
male panel
counter clockwise*



Female connector
95.0007152



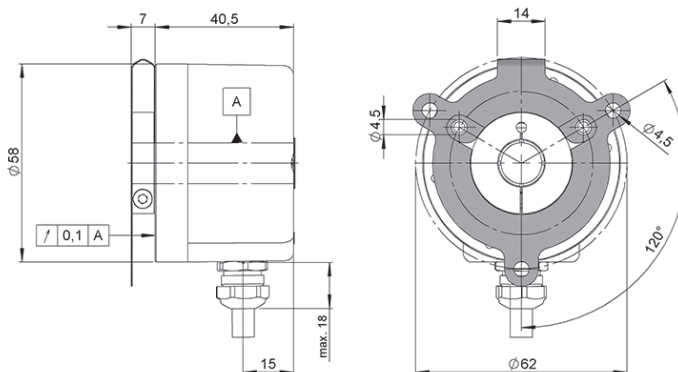
SERIE 59S

INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

ANTI-ROTATION SYSTEMS DIMENSIONS

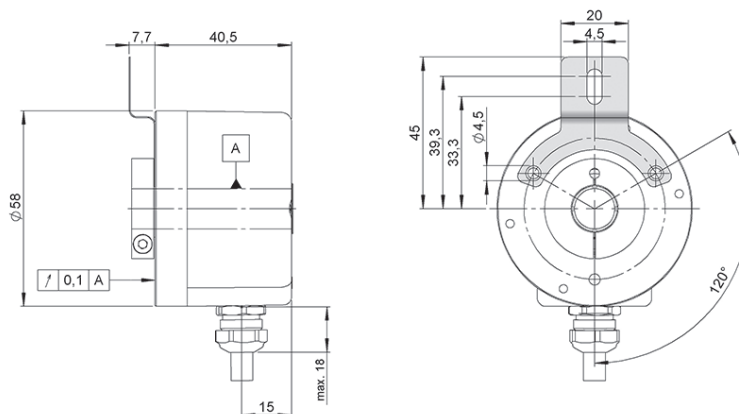
Flexible flange
90.1014



90.1014



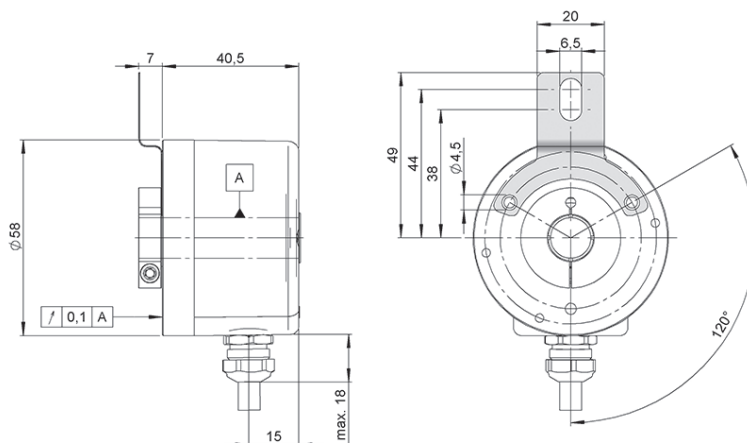
Flexible flange
90.1018



90.1018



Flexible flange
90.1020



90.1020

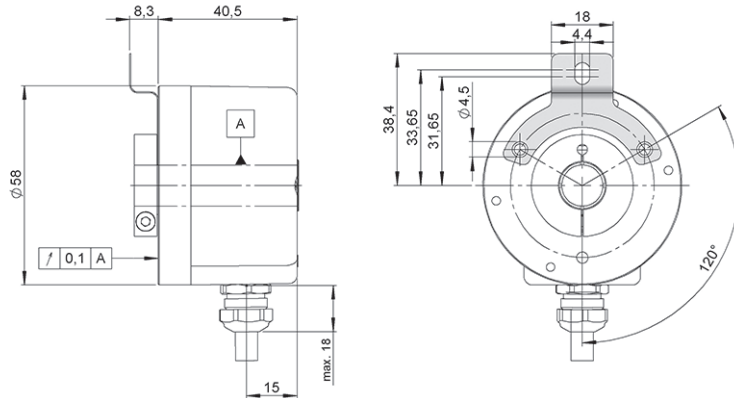


SERIE 59S

INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

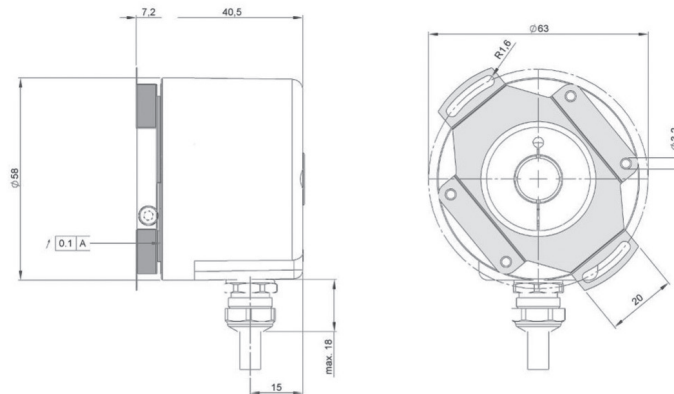
Flexible flange
90.1024



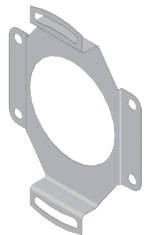
90.1024



Flexible flange
90.1027

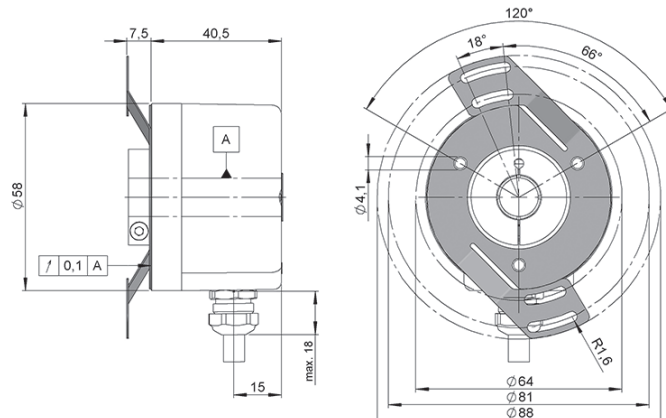


90.1027



*This flexible flange
requires a special
customer code in the
reference
59S-XXXXX-XXXX.GG02*

Flexible flange
90.1075



90.1075

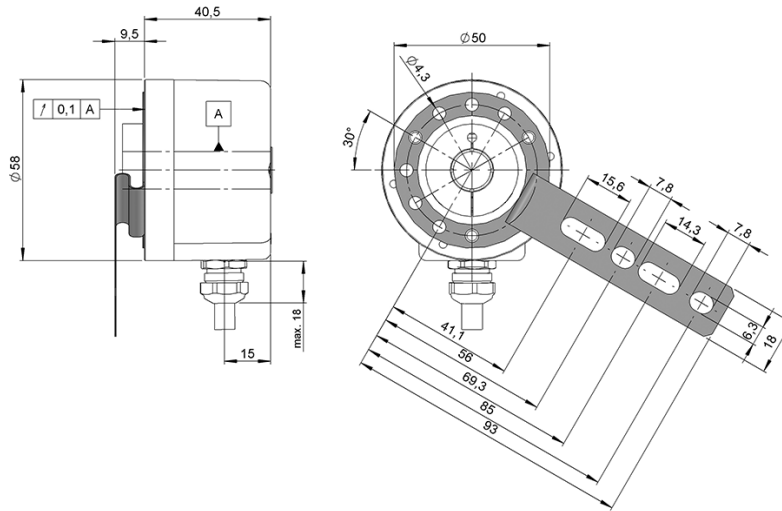


SERIE 59S

INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

SIN/COS

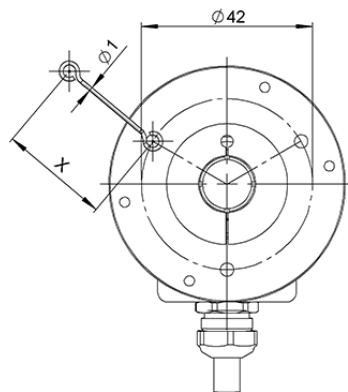
Flexible flange
90.1095



90.1095



Anti-turn stick



90.1033	X= 33 mm
90.1044	X= 83 mm
90.1043	X= 132 mm

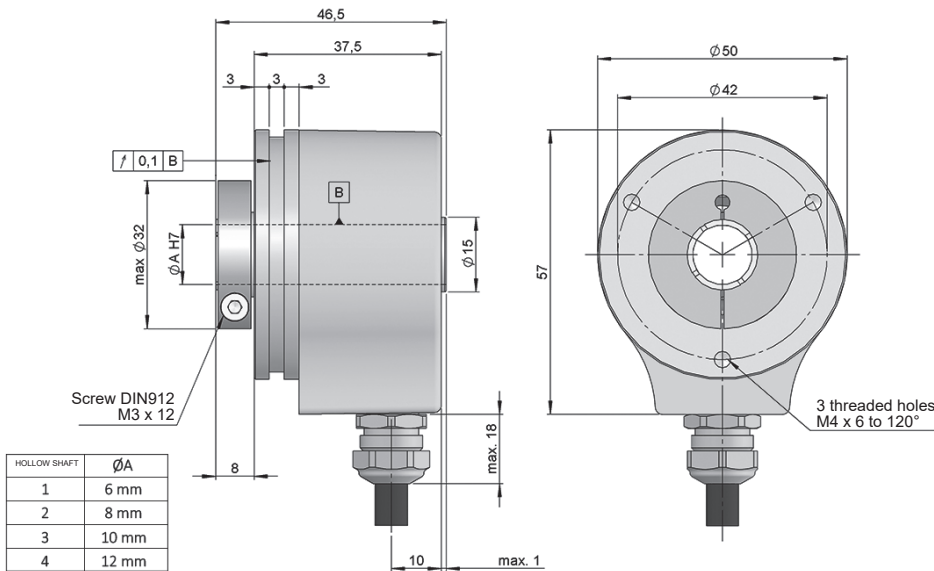
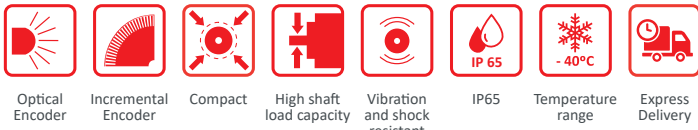
(*) other length available on order



SERIE 50H

COMPACT INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 5.000 pulses per turn
- External diameter 50 mm
- Hollow shaft \varnothing 6, 8, 10 or 12 mm
- Protection class IP65 according to DIN EN 60529
- Anti-rotation system through flexible flange
- Connection by cable (other cable length available) or industrial connector M12 or M23



Drawing mechanical option type 1, hollow shaft type 4, connection type 1

REFERENCE

Reference example: 50H-14111-1024

Serie	Mechanical option	Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
50H -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	ET00. -40°C
	1. Frontal clamp for hollow shaft	1. \varnothing 6 mm 2. \varnothing 8 mm 3. \varnothing 10 mm 4. \varnothing 12 mm	1. A \tilde{A} +B \tilde{B} +0 \tilde{O} 2. A \tilde{A} +B \tilde{B}	1. Radial cable 2. Radial M12 8p CCW 3. Radial M23 12p CW	0. 11...30 VDC / NPN Open collector 11...30 VDC 1. 11...30 VDC / Line driver differential Push-Pull 11...30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL)		

Order your reference
Step file 3D

info@encoderhohner.com
service available in 24 h

The required anti-rotation system is not included in the reference. All systems available in the sections "MOUNTING ACCESSORIES".



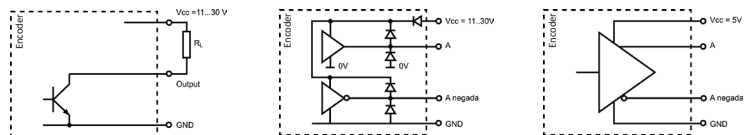
SERIE 50H

COMPACT INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange
Shaft fixing	Clamp
Hollow shaft diameter	6, 8, 10 or 12 mm
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	80 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer ET00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	2500 m/s ² (6ms) [≤ 1.024 ppr] 1000 m/s ² (6ms) [> 1.024 ppr]
Maximum pulses per turn	5.000
Radial connection	2 meters cable or industrial connector M12 or M23 (other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)
Reference code	0	1	2
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%
Output voltage	11...30 VDC	11...30 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC – 3 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes
Protection polarity inversion	Yes	Yes	No

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 50H

COMPACT INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

CONNECTION



	Cable (*) 5x0,14 95.0008051	Cable (*) 8x0,14 95.0008052	Connector M12 8p CCW	Connector M23 12p CW
GND	White	White	1	1
VCC	Brown	Brown	2	2
A	Green	Green	3	3
B	Yellow	Grey	4	4
\tilde{A}		Yellow	5	5
\tilde{B}		Pink	6	6
0 (reference)	Grey	Blue	7	7
$\tilde{0}$	Grey	Red	8	8

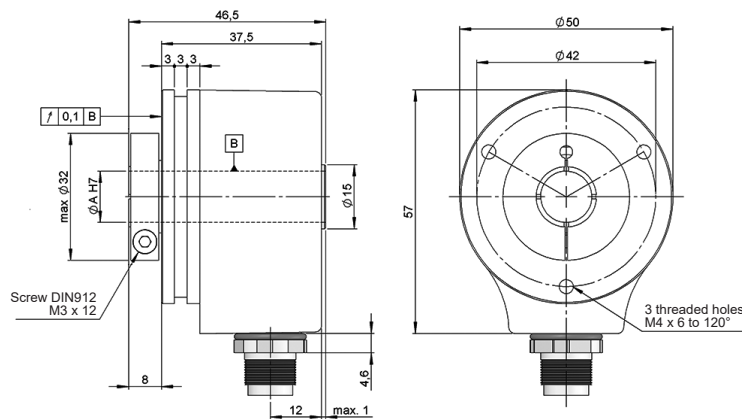
(*) For lengths over 2 meters standard cable, we recommend the use of twisted pair cable 2x2x0,14+1x0,14 (95.0008002) or 3x2x0,14+2x0,34 (95.0008003). Request the final cable length required to avoid junctions.

CONNECTION DIMENSIONS

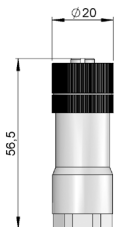
Female connector not included

Connection 2 Radial

M12 8p
male panel
counter clockwise

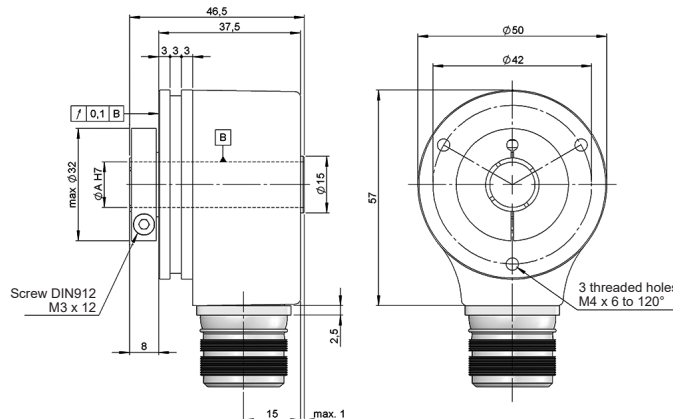


Female connector 95.0007152

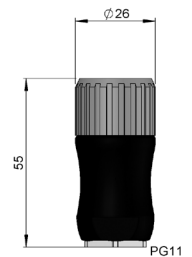


Connection 3 Radial

M23 12p
male panel
clockwise



Female connector 95.0007131

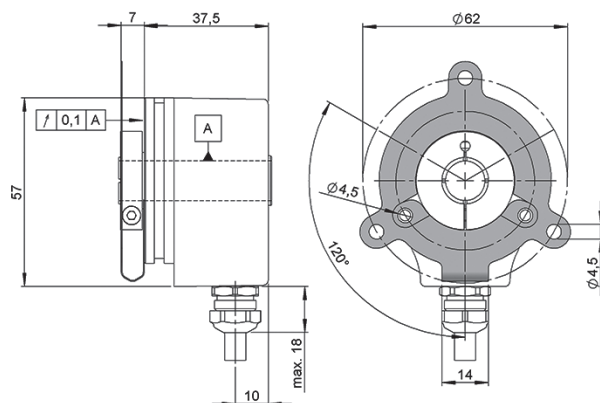


SERIE 50H

COMPACT INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

ANTI-ROTATION SYSTEMS DIMENSIONS

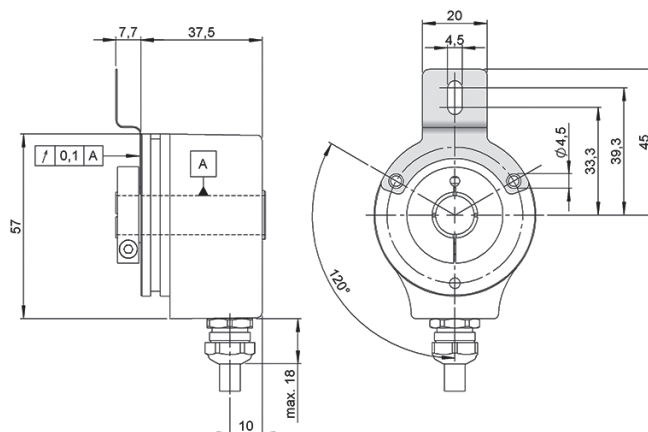
Flexible flange
90.1014



90.1014



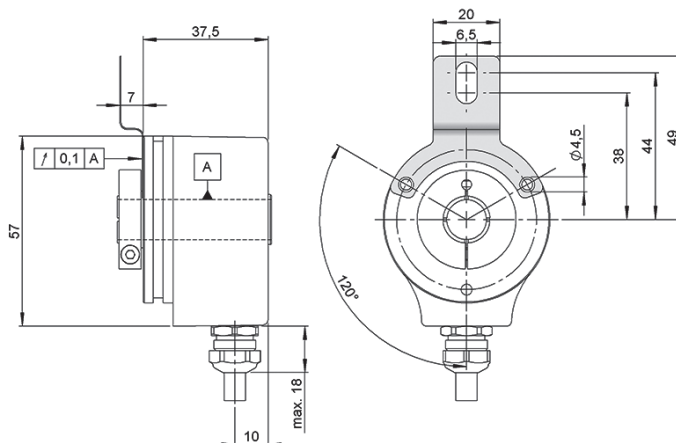
Flexible flange
90.1018



90.1018



Flexible flange
90.1020



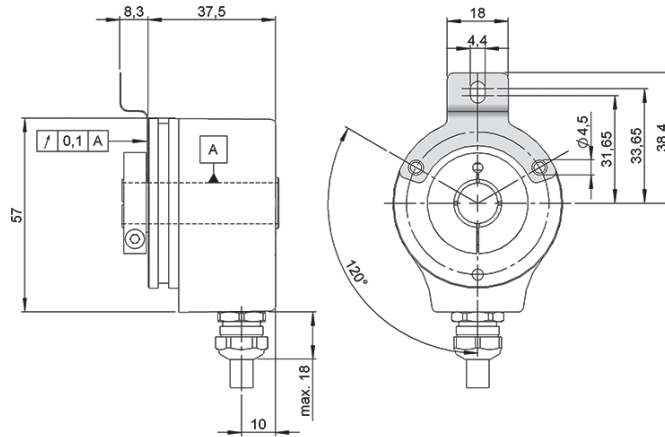
90.1020



SERIE 50H

COMPACT INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

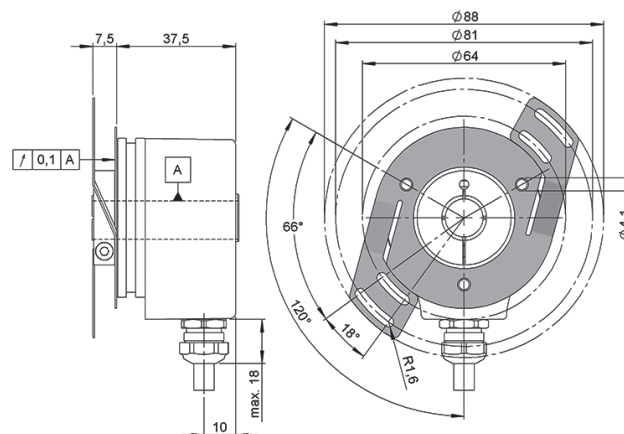
Flexible flange
90.1024



90.1024



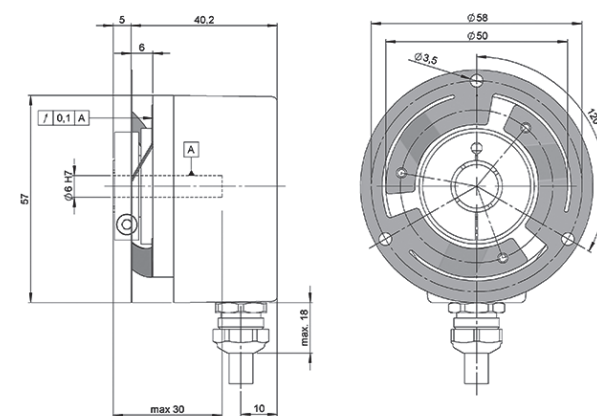
Flexible flange
90.1075



90.1075



Flexible flange
90.1110



90.1110



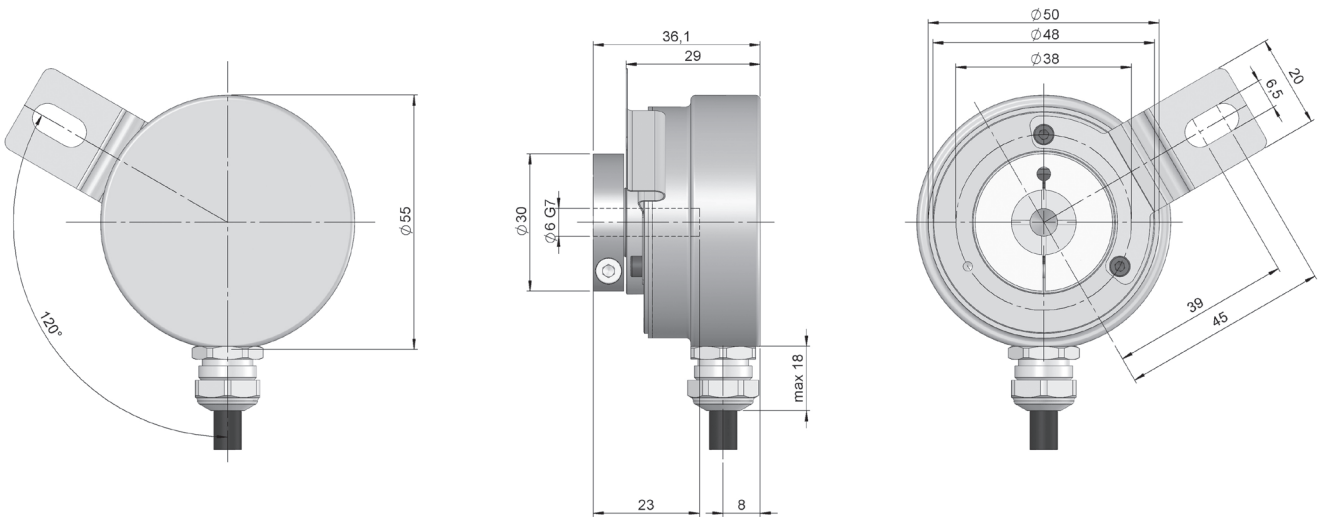
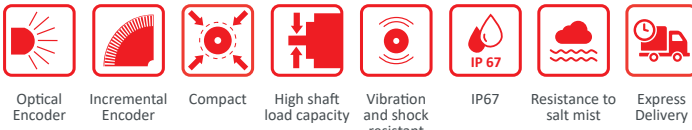
SERIE 50HI INOX

COMPACT INCREMENTAL BLIND HOLLOW SHAFT ENCODER FOR DEMANDING INDUSTRIAL APPLICATIONS



Image with flexible flange 93.0102086

- Resolution up to 5.000 pulses per turn
- Compact dimensions $\varnothing 55 \times 36 \text{ mm}$
- Blind hollow shaft $\varnothing 6 \text{ mm}$
- Resistance to salt mist according to ISO 9227:2006-10
- Protection class IP67 according to DIN EN 60529
- Rugged encoder made of stainless steel for extreme environmental conditions
- Anti-rotation system through flexible flange
- Connection by cable (other cable length available)



Drawing mechanical option type 1, connection type 1, blind hollow shaft type 1 with anti-rotation system through flexible flange 93.0102086 (not included)

REFERENCE

Reference example: 50HI-11113-2048

Serie	Mechanical option	Blind-Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
50HI -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. Frontal clamp	1. $\varnothing 6 \text{ mm}$ (*)	1. A $\tilde{\text{A}}$ +B $\tilde{\text{B}}$ +0 $\tilde{\text{O}}$	1. Radial cable	3. 5...30 VDC / Push-pull		

Order your reference
Step file 3D

info@encoderhohner.com
service available in 24 h

(*) Other shaft diameter available, upon request.

The required anti-rotation system is not included in the reference (order separately). Anti-rotation system is supplied disassembled and includes the screws required for assembly to the encoder. All systems available in the sections "MOUNTING ACCESSORIES".



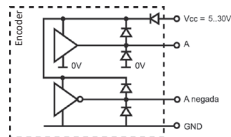
SERIE 50HI INOX

COMPACT INCREMENTAL BLIND HOLLOW SHAFT ENCODER FOR DEMANDING INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Housing: Stainless Steel AISI304L (1.4307) Flange: Stainless Steel AISI304L (1.4307) Shaft: Stainless Steel AISI304L (1.4307)
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange
Permitted misalignment	±0.5 mm axial, ±0.3 mm radial
Shaft fixing	Clamp (Anodized aluminium 20 µm)
Blind hollow shaft diameter	6 mm (other shaft diameter available, upon request)
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP67
Rotor inertia moment	30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +85°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Resistance to salt mist (NSS)	according to ISO 9227:2006-10 (274 h)
Radial connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)

OUTPUT SIGNALS



OUTPUT CIRCUIT	Push-Pull Differential
<i>Reference code</i>	1
Power supply	5...30 VDC
Output voltage	5...30 VDC
Consumption	Typical: 30 mA Max: 85 mA
Max. load capability / channel	±70 mA
"Low" signal level	VOL < 0.5 VDC
"High" signal level	VOH > 2.5 VDC
Frequency	≤ 300 kHz
Short circuit protection	Yes
Protection polarity inversion	Yes
Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise	

CONNECTION



	Cable 4x2x0,14 95.0008076
GND	Blue
VCC	Red
A	Pink
B	Green
Ã	Grey
Ã	Yellow
0 (reference)	White
Õ	Brown
Shield*	Shield

(*): Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected. ⚡

SERIE PR90H

PROGRAMMABLE INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS



Programmable incremental optical encoder from 1 to 65.536 pulses per rotation



Programmable via USB, without an additional programming box



Programmable without powering up the encoder



Multi-voltage 5...30 VDC Automatic power voltage recognition



0° to 360° reference signal position



Optical Encoder



Incremental Encoder



Programmable Encoder



High shaft load capacity



Vibration and shock resistant



IP65

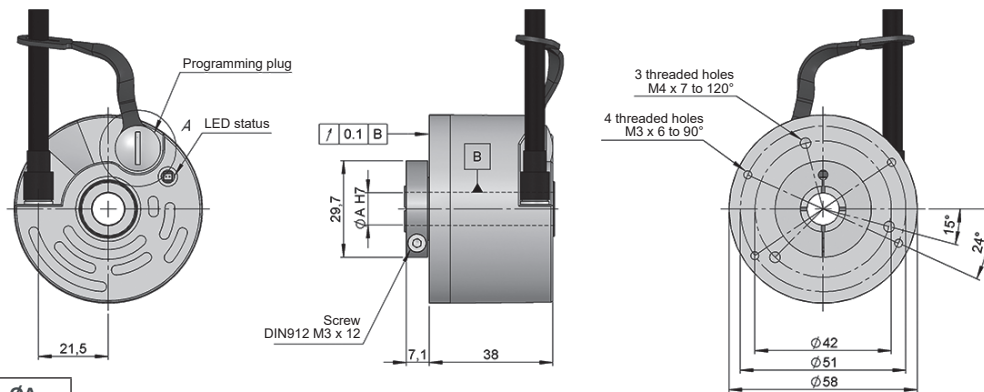


Express Delivery

- External diameter 58 mm
- Hollow shaft \varnothing 10, 12, 14 or 15 mm
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector M12 or M23

Detail A

Micro USB



HOLLOW SHAFT	$\varnothing A$
1	10 mm
2	12 mm
3	14 mm
4	15 mm

Drawing hollow shaft type 1, mechanical option type 2, connection type 1

REFERENCE

Reference example: PR90H-21C1C-C

Serie	Mechanical option	Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
PR90H -	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	2. Frontal clamp	1. \varnothing 10 mm 2. \varnothing 12 mm 3. \varnothing 14 mm 4. \varnothing 15 mm	C. A \tilde{A} +B \tilde{B} +O \tilde{O} CONFIGURABLE • CW / CCW • Z 90° and 180° • Z position of 0...360°	1. Helicoidal cable 2. Radial M12 8p CCW 3. Radial M23 12p CCW	C. 5...30 VDC / HTL - TTL CONFIGURABLE • Electronic output HTL / TTL	C. 1...65536 CONFIGURABLE	

Order your reference
Step file 3D

info@encoderhohner.com
service available in 24 h

Female connector and the required anti-rotation system are not included in the reference. All options available in the sections "CONNECTION DIMENSIONS" and "ANTI-ROTATION SYSTEMS DIMENSIONS", upon request.



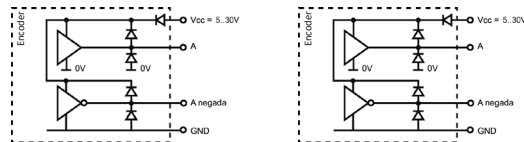
SERIE PR90H

PROGRAMMABLE INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible anti-rotation system (different models available)
Permitted misalignment (Flexible flange)	±0.05 mm axial, ±0.1 mm radial
Shaft fixing	Front clamp
Hollow shaft diameter	10, 12, 14 or 15 mm
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	60 gcm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	80 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	65.536
Connection	2 meters cable or industrial connector M12 or M23 (other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



OUTPUT CIRCUIT	TTL	HTL
Reference code	C	C
Power supply	5...30 VDC	5...30 VDC
Consumption*	Typical: 45 mA Max: 150 mA	Typical: 45 mA Max: 150 mA
Max. load capability / channel	±20 mA	±20 mA
Length of cable allowed	1200 m	1200 m
“Low” signal level	VOL < 0.5 VDC	VOL < 2.5 VDC
“High” signal level	VOH > 2.5 VDC	VOH > VCC – 1.5 VDC
Frequency	900 kHz	900 kHz
Short circuit protection	Yes	Yes
Protection polarity inversion	Yes	Yes

Configurable CW - Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise
Configurable CCW - Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

(*) Peak current of 400mA (1ms) at start-up of the encoder.

SERIE PR90H

PROGRAMMABLE INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

CONNECTION



	Cable 4x2x0,14 95.0008011	Connector M12 8p CCW	Connector M23 12p CCW
GND	Black	7	10
VCC	Red	8	12
A	Yellow	2	5
B	Green	4	8
\tilde{A}	Brown	1	6
\tilde{B}	Blue	3	1
0 (reference)	Grey	6	3
$\tilde{0}$	Orange	5	4

Shield connected to the housing

CONNECTION PC



Cable
uUSB/USB

(*) The connection cable uUSB / USB is not included in the reference.

Available in the section "ACCESSORIES".

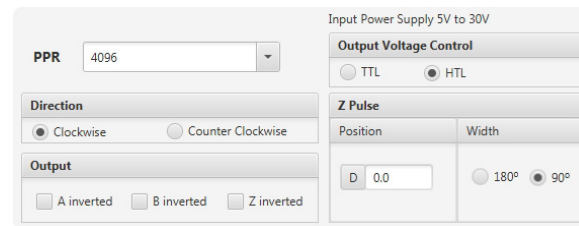
PROGRAMMING DETAILS

LED status:

● *green intermittent indicator:*
Communication between devices

● *red indicator:*
Error detection (overload, low power, optical failure, communications failure, humidity...)
See type of error in the programming software

Configuration options:



Factory configuration:

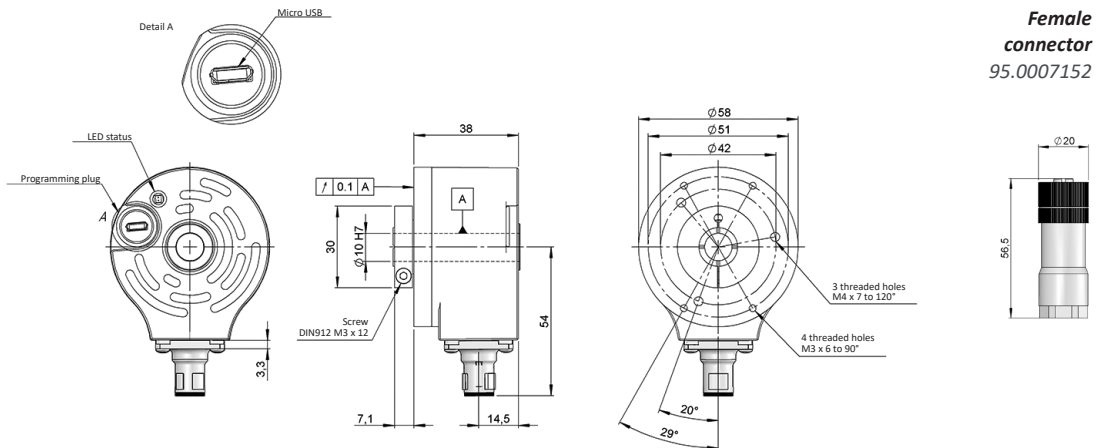
- Pulses: 4096 ppr
- Output: HTL
- Direction: Clockwise (CW)
- Position (Z pulse): 0°
- Width (Index, Z, 0): 90°

Download the software and programming manual from: www.encoderhohner.com/pr90/

CONNECTION DIMENSIONS

Female connector not included

Connection 2
Radial
M12 8p
male panel
counter clockwise



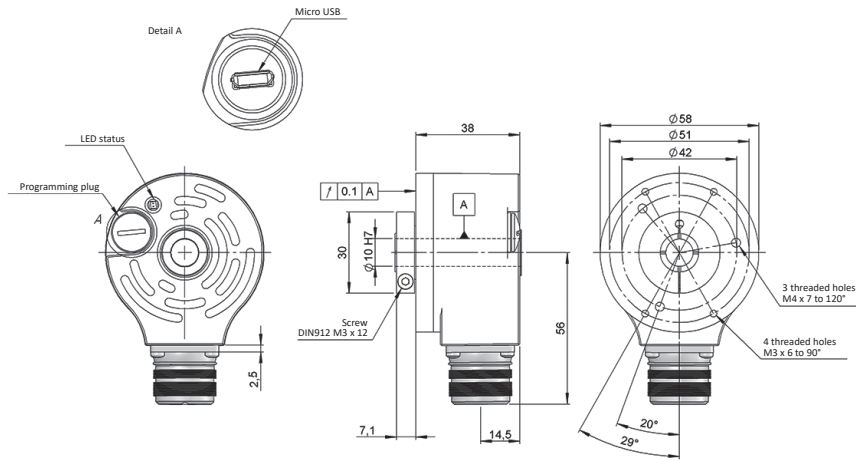
Female connector
95.0007152

SERIE PR90H

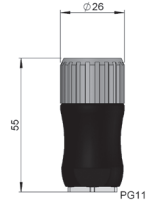
PROGRAMMABLE INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

Connection 3

Radial
M23 12p
male panel
counter clockwise

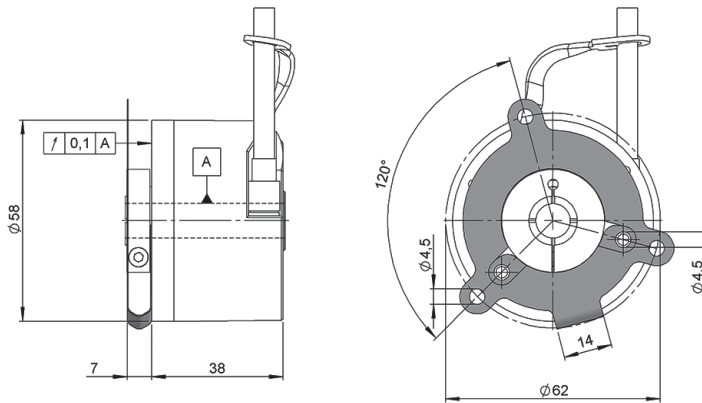


Female connector
95.0007137



ANTI-ROTATION SYSTEMS DIMENSIONS

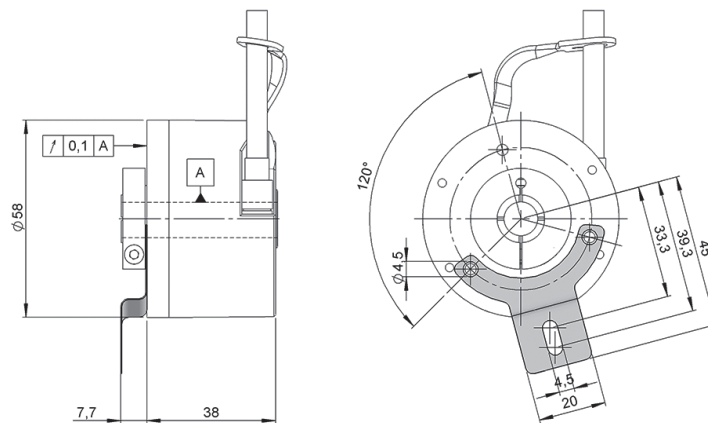
Flexible flange
90.1014



90.1014



Flexible flange
90.1018



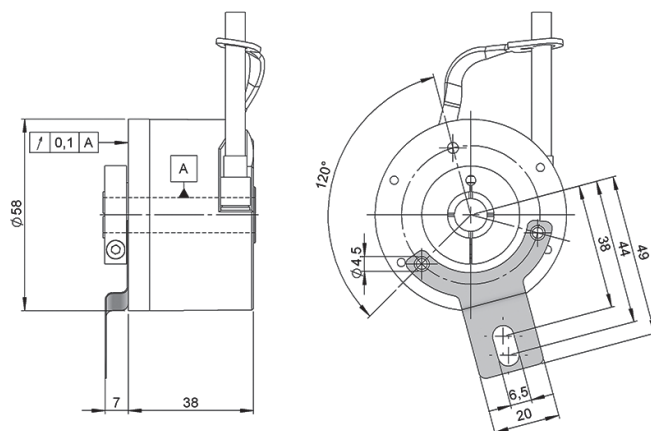
90.1018



SERIE PR90H

PROGRAMMABLE INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

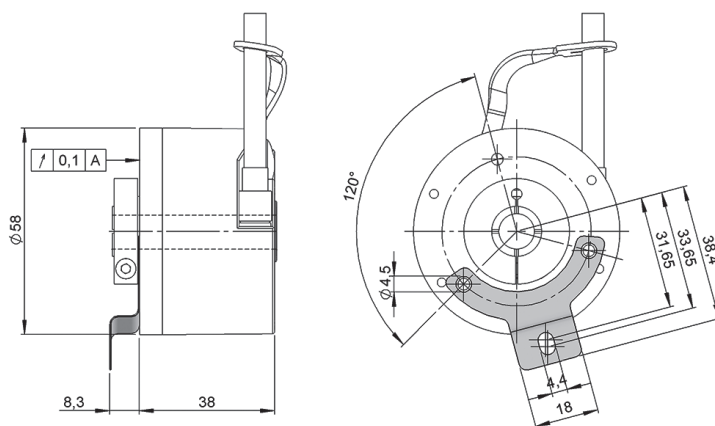
Flexible flange
90.1020



90.1020



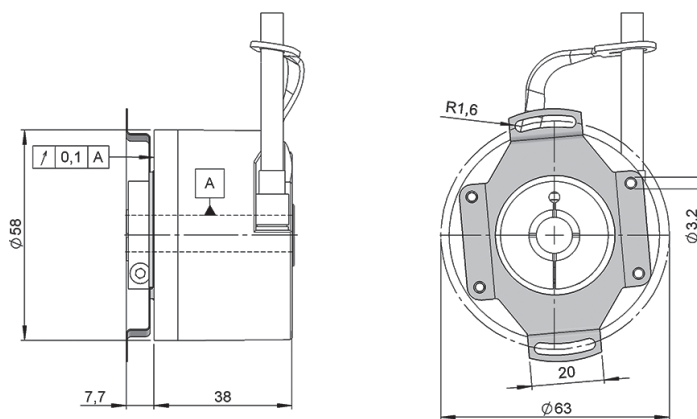
Flexible flange
90.1024



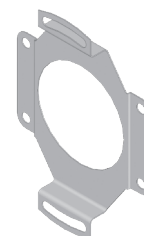
90.1024



Flexible flange
90.1027



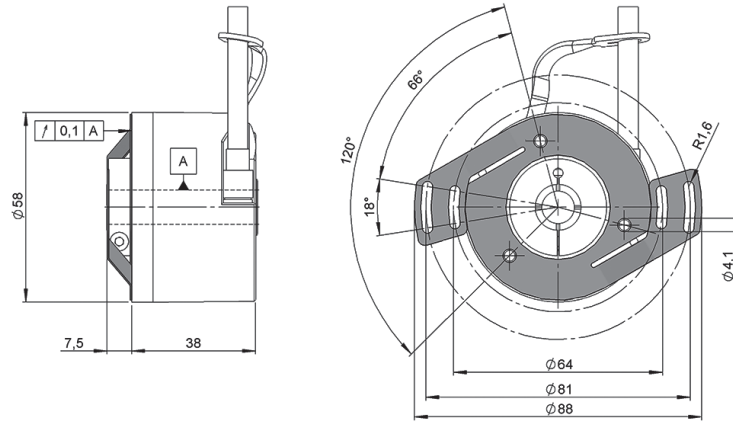
90.1027



SERIE PR90H

PROGRAMMABLE INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

Flexible flange
90.1075



90.1075



PRE-ASSEMBLED CABLES

89.003.02.047.xx

length

Cable 3x2x0,14+2x0,34

Female connector

M12 8p CW



89.010.02.015.xx

length

Cable 3x2x0,14+2x0,34

Female connector

M23 12p CW



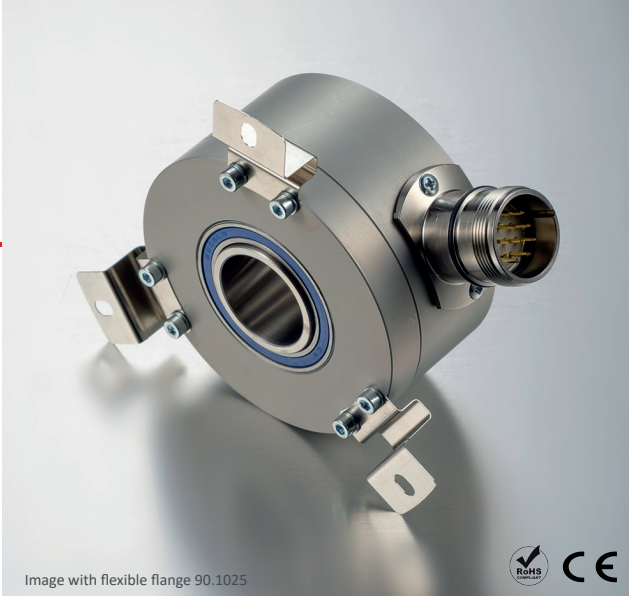


Image with flexible flange 90.1025



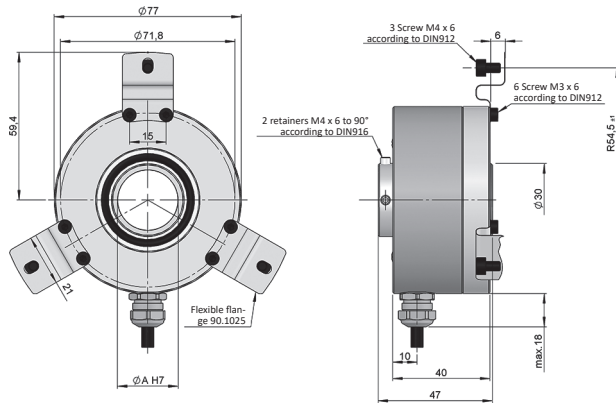
SERIE 77

INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

- Resolution up to 5.000 pulses per turn
- External diameter 77 mm
- Hollow shaft up to $\varnothing 25$ mm
- Protection class IP65 according to DIN EN 60529
- Shaft fixing through front or rear setscrews
- Anti-rotation system through flexible flange
- Connection by cable (other cable length available) or industrial connector M23

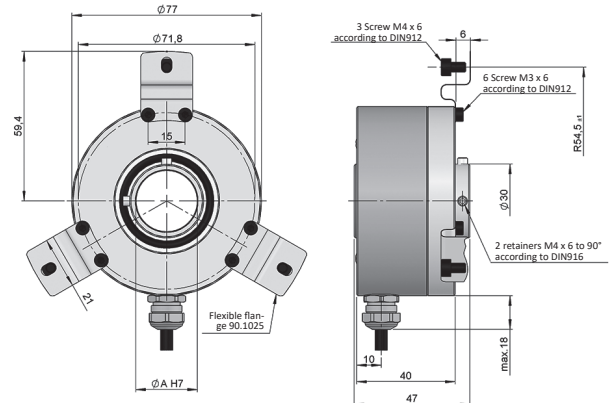
Optical Encoder	Incremental Encoder	High shaft load capacity	Vibration and shock resistant	IP65	Temperature range	Express Delivery

Rear setscrews



Drawing hollow shaft type 25, mechanical option type 1 with anti-rotation system through flexible flange 90.1025, connection type 1

Frontal setscrews



Drawing hollow shaft type 25, mechanical option type 2 with anti-rotation system through flexible flange 90.1025, connection type 1

REFERENCE

Reference example: 77-125111-5000

Serie	Mechanical option	Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
77 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. Rear setscrews 2. Frontal setscrews	15. $\varnothing 15$ mm 16. $\varnothing 16$ mm 17. $\varnothing 17$ mm 18. $\varnothing 18$ mm 19. $\varnothing 19$ mm 20. $\varnothing 20$ mm 24. $\varnothing 24$ mm 25. $\varnothing 25$ mm	1. A \tilde{A} +B \tilde{B} +0 $\tilde{0}$ 2. A \tilde{A} +B \tilde{B}	1. Radial cable 2. Radial M23 12p CW	0. 11...30 VDC / NPN Open collector 11..30 VDC 1. 11..30 VDC / Line driver differential Push-Pull 11..30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL) 6. 11...30 VDC / RS422 5 VDC (compatible TTL)		NT00. -40°C

Order your reference
Step file 3D

info@encoderhohner.com
service available in 24 h

The required anti-rotation system is not included in the reference (order separately). Anti-rotation system is supplied disassembled and includes the screws required for assembly to the encoder. All systems available in the sections "MOUNTING ACCESSORIES".



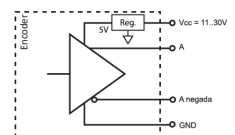
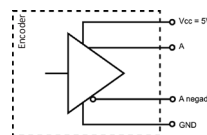
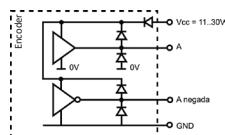
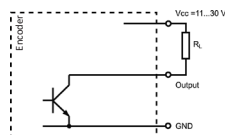
SERIE 77

INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange
Permitted misalignment	±0.5 mm axial, ±0.3 mm radial (90.1025 - one) ±0.4 mm axial, ±0.2 mm radial (90.1025 - three)
Shaft fixing	Front or Rear setscrews
Hollow shaft diameter	15, 16, 17, 18, 19, 20, 24 or 25 mm
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	≤ 1 Kg cm ²
Starting torque at 20°C (68°F)	≤ 0,04 Nm
Maximum load permitted on axial shaft	≤ 100 N
Maximum load permitted on radial shaft	≤ 200 N
Weight aprox.	0,5 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer NT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	5.000
Radial connection	2 meters cable or industrial connector M23 (other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



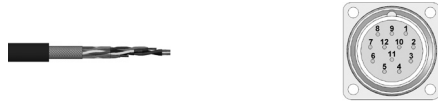
OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)	RS422 (TTL compatible)
Reference code	0	1	2	6
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%	11...30 VDC
Output voltage	11...30 VDC	11...30 VDC	5 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA	Typical: 80 mA Max: 160 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC - 3 VDC	VOH > 2.5 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 77

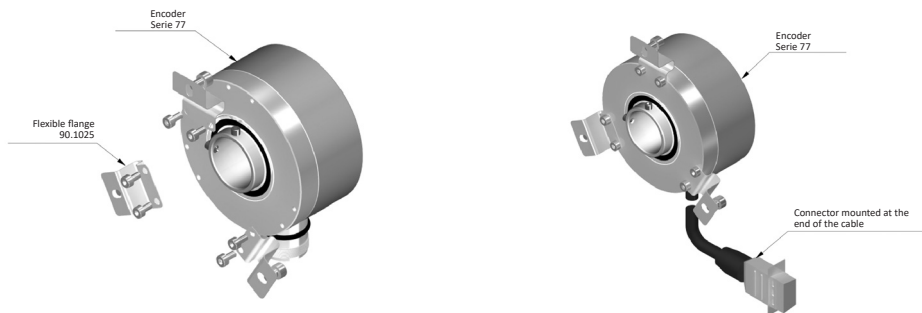
INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

CONNECTION



	Cable	Connector
	3x2x0,14+2x0,34 95.0008003	M23 12p CW
GND	Black	1
VCC	Red	2
A	Yellow	3
B	Green	4
\tilde{A}	Brown	5
\tilde{B}	Blue	6
0 (reference)	Grey	7
$\tilde{0}$	Orange	8

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".

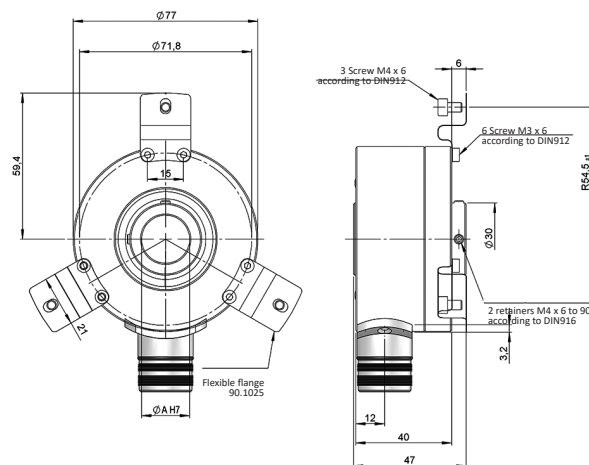
CONNECTION DIMENSIONS

Female connector not included

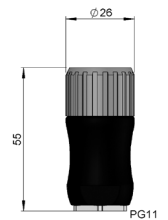
Connection 2
Radial

Fixation 2
Frontal setscrews

M23 12p
male panel
clockwise

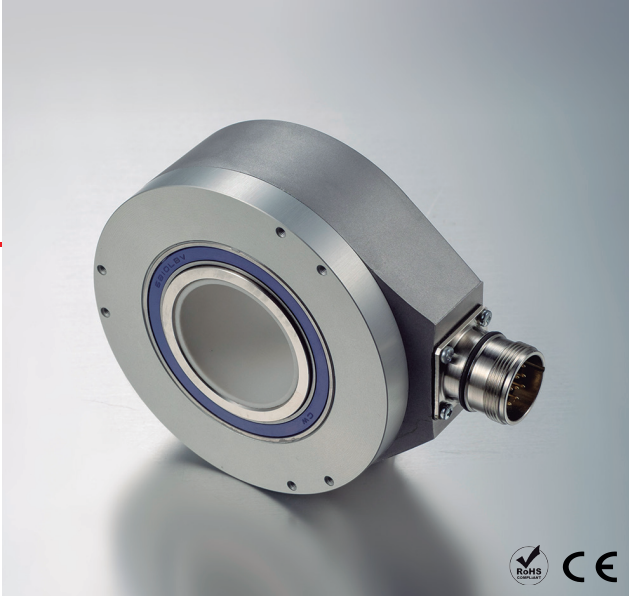


Female connector
95.0007131



SERIE 80

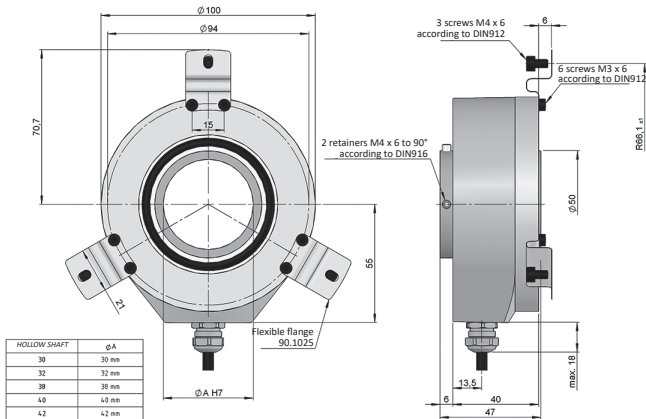
INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS



- Resolution up to 5.000 pulses per turn
- External diameter 100 mm
- Hollow shaft from \varnothing 30 to 42 mm
- Protection class IP65 according to DIN EN 60529
- Shaft fixing through front or rear setscrews
- Anti-rotation system through flexible flange
- Connection by cable (other cable length available) or industrial connector M12, M23

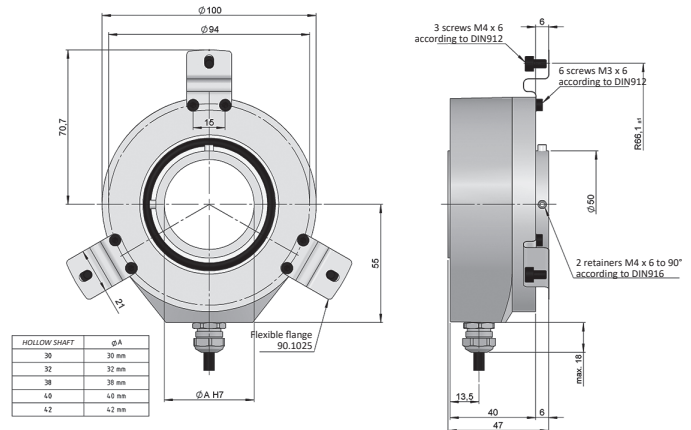


Rear setscrews



Drawing hollow shaft type 42, mechanical option type 1 with anti-rotation system through flexible flange 90.1025, connection type 1

Frontal setscrews



Drawing hollow shaft type 42, mechanical option type 2 with anti-rotation system through flexible flange 90.1025, connection type 1

REFERENCE

Reference example: 80-130111-3600

Serie	Mechanical option	Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
80 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1. Rear setscrews 2. Frontal setscrews	30. \varnothing 30 mm 32. \varnothing 32 mm 38. \varnothing 38 mm 40. \varnothing 40 mm 42. \varnothing 42 mm	1. A \tilde{A} +B \tilde{B} +0 \tilde{O} 2. A \tilde{A} +B \tilde{B}	1. Radial cable 2. Radial M23 12p CW 3. Radial M12 8p CCW	0. 11...30 VDC / NPN Open collector 11..30 VDC 1. 11..30 VDC / Line driver differential Push-Pull 11..30 VDC 2. 5 VDC / RS422 5 VDC (compatible TTL) 6. 11...30 VDC / RS422 5 VDC (compatible TTL)		MT00. -40°C

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The required anti-rotation system is not included in the reference (order separately). Anti-rotation system is supplied disassembled and includes the screws required for assembly to the encoder. All systems available in the sections "MOUNTING ACCESSORIES".



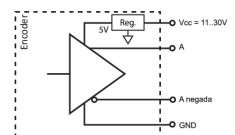
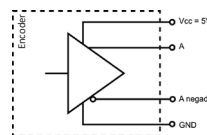
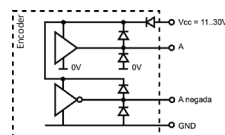
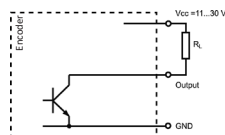
SERIE 80

INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Cover: Aluminium Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange
Permitted misalignment	±0.5 mm axial, ±0.3 mm radial (90.1025 - one) ±0.4 mm axial, ±0.2 mm radial (90.1025 - three)
Shaft fixing	Front or Rear setscrews
Hollow shaft diameter	30, 32, 38, 40 or 42 mm
Maximum number of revolutions permitted mechanically	3600 rpm
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	≤ 1 - 1.8 Kg cm ²
Starting torque at 20°C (68°F)	≤ 0,04 Nm
Maximum load permitted on axial shaft	≤ 100 N
Maximum load permitted on radial shaft	≤ 200 N
Weight aprox.	0,7 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer MT00
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Maximum pulses per turn	5.000
Radial connection	2 meters cable or industrial connector M12, M23 (other cable lengths available on order) Female connector not included

OUTPUT SIGNALS



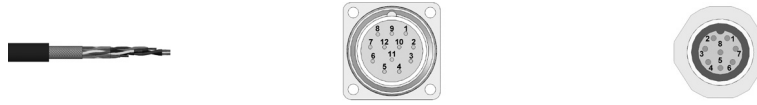
OUTPUT CIRCUIT	NPN Open Collector	Push-Pull Differential	RS422 (TTL compatible)	RS422 (TTL compatible)
Reference code	0	1	2	6
Power supply	11...30 VDC	11...30 VDC	5 VDC ±5%	11...30 VDC
Output voltage	11...30 VDC	11...30 VDC	5 VDC	5 VDC
Consumption	40 mA	Typical: 45 mA Max: 150 mA	Typical: 70 mA Max: 150 mA	Typical: 80 mA Max: 160 mA
Max. load capability / channel	40 mA	±30 mA	±20 mA	±20 mA
Length of cable allowed	50 m (24 VDC)	100 m	1200 m	1200 m
"Low" signal level	VOL < 0.4 VDC (24 VDC)	VOL < 2.5 VDC	VOL < 0.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > 22 VDC (24 VDC)	VOH > VCC - 3 VDC	VOH > 2.5 VDC	VOH > 2.5 VDC
Frequency	100 kHz	200 kHz	300 kHz	300 kHz
Short circuit protection	Not permanent	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	No	Yes

Channel B leads (90° electric) channel A, view from the shaft, shaft rotating clockwise

SERIE 80

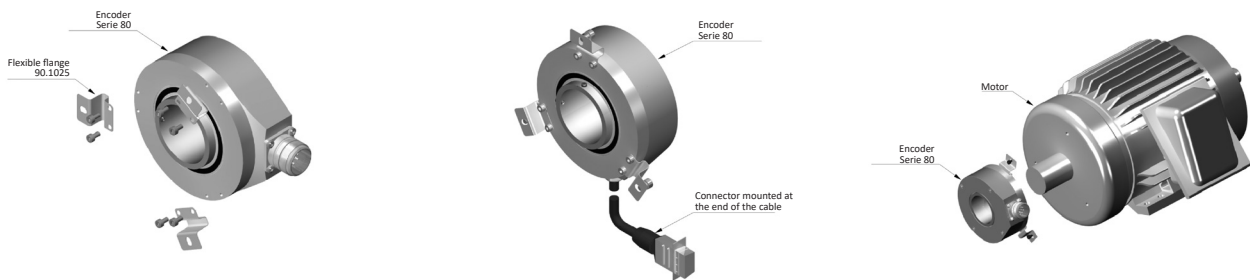
INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

CONNECTION



	Cable 3x2x0,14+2x0,34 95.0008003	Connector M23 12p CW	Connector M12 8p CCW
GND	Black	1	1
VCC	Red	2	2
A	Yellow	3	3
B	Green	4	4
\tilde{A}	Brown	5	5
\tilde{B}	Blue	6	6
0 (reference)	Grey	7	7
$\tilde{0}$	Orange	8	8

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".

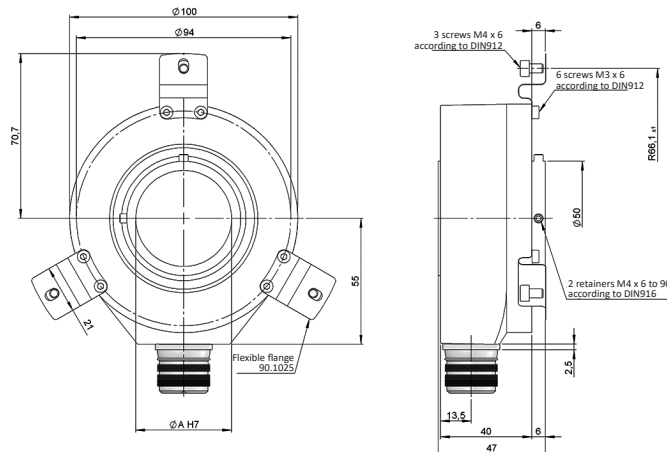
CONNECTION DIMENSIONS

Female connector not included

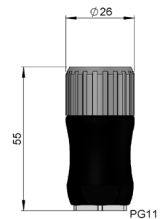
Connection 2
Radial

Fixation 2
Frontal setscrews

M23 12p
male panel
clockwise



Female connector
95.0007131



SERIE 80

INCREMENTAL HOLLOW SHAFT ENCODER FOR INDUSTRIAL APPLICATIONS

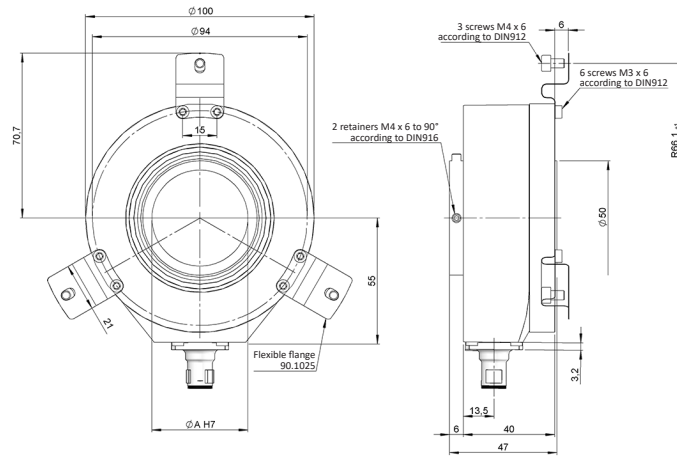
Connection 3

Radial

Fixation 1

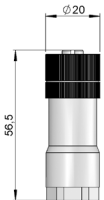
Rear setscrews

*M12 8p
male panel
counter clockwise*



Female connector

95.0007152





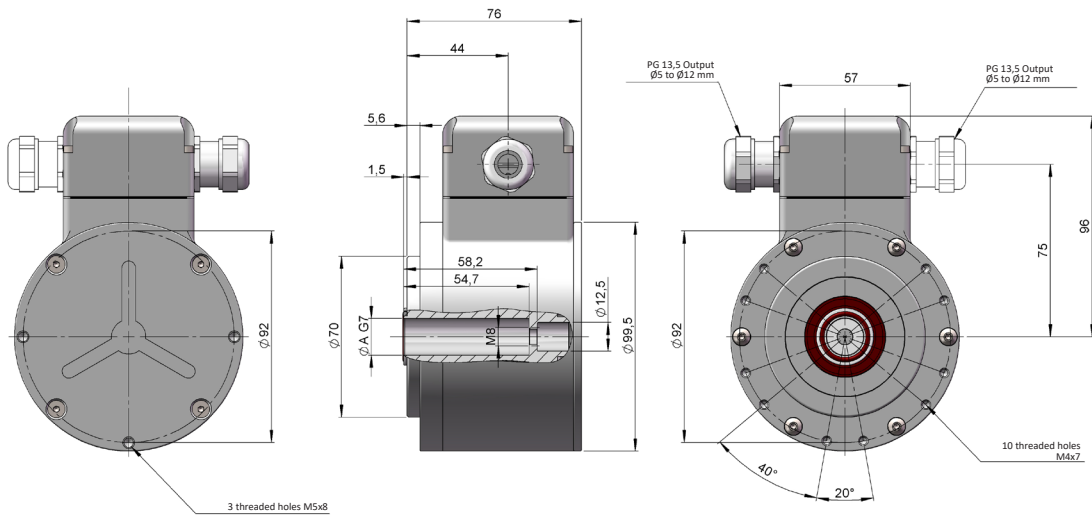
SERIE 100 H / DUO

INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Resolution up to 5.000 pulses per turn
- External diameter 100 mm
- Blind hollow shaft from \varnothing 12 to 16 mm
- Hybrid bearings for extended lifetime
- Shaft insulation up to 2,5 kV
- Protection class IP66 according to DIN EN 60529
- Connection by terminal box with plug-in spring terminal connectors, rotatable through 360°
- Dual output available



Heavy Duty Encoder Incremental Encoder High shaft load capacity Vibration and shock resistant IP66 2,5 kV bearing isolation Express Delivery



Drawing blind hollow shaft type 12, connection type 1

REFERENCE

Reference example: 100H-12111-5000

Serie	Shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
100H/100H DUO -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
100H. Single output 100H DUO. Dual output (*)	12. Blind-Hollow shaft \varnothing 12 mm 16. Blind-Hollow shaft \varnothing 16 mm	1. A \tilde{A} +B \tilde{B} +0 \tilde{O} 2. A \tilde{A} +B \tilde{B}	1. Radial terminal box 2. Radial cable 2 m 3. Radial M23 12p CW 4. Radial M12 8p CW 5. Double-shielded radial cable 2 m 6. Double-shielded halogen-free radial cable 2 m	1. 9...30 VDC / Push-Pull differential line driver 9...30 VDC 2. 5 VDC / Differential line driver 5 VDC (RS422 compatible) 6. 9...30 VDC / Differential line driver 5 VDC (RS422 compatible)		YT00. -40°C YT01. +100°C

Order your reference
Step file 3D

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service available in 24 h

The required anti-rotation system is not included in the reference (order separately). Anti-rotation system is supplied disassembled and includes the screws required for assembly to the encoder. Available in the section "ACCESSORIES".

(*) Redundant encoder, with 2 galvanically isolated electronics.

Assembly and disassembly instruction manual available in: www.encoderhohner.com/product/serie-100h/



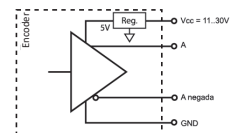
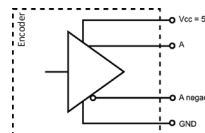
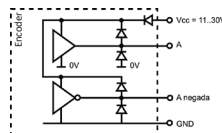
SERIE 100H / DUO

INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Housing: Anodized aluminium Shaft: Stainless Steel AISI316
Bearings	Dual set of hybrid bearings with ceramic balls
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Torque arm M6
Permitted misalignment	±0,05 mm radial
Shaft fixing	Screw M5 or M6
Hollow shaft diameter	12, 16 mm
Shaft insulation	2,5 kV
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP66
Rotor inertia moment	≈ 500 gcm ²
Starting torque at 20°C (68°F)	≈ 0,07 Nm
Maximum load permitted on axial shaft	400 N
Maximum load permitted on radial shaft	500 N
Weight approx.	1,7 Kg
Operating temperature range	-20°C to +80°C - Standard -40°C to +80°C - Special Customer Option YT00 -20°C to +100°C - Special Customer Option YT01
Vibration according to DIN EN 60068-2-6	300 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	2500 m/s ² (6ms)
Maximum pulses per turn	5.000 points par tour
Radial connection	Terminal box, cable or M12/M23 connector

OUTPUT SIGNALS



OUTPUT CIRCUIT	Push-Pull differential line driver	Differential line driver (RS422 compatible)	Differential line driver (RS422 compatible)
Reference code	1	2	6
Power supply	9...30 VDC	5 VDC ±5%	9...30 VDC
Output voltage	9...30 VDC	5 VDC	5 VDC
Consumption	Typical: 45 mA Max: 200 mA	Typical: 70 mA Max: 200 mA	Typical: 80 mA Max: 200 mA
Max. load capability / channel	±30 mA	±20 mA	±20 mA
Length of cable allowed	100 m	1200 m	1200 m
"Low" signal level	VOL < 2.5 VDC	VOL < 0.5 VDC	VOL < 0.5 VDC
"High" signal level	VOH > VCC - 3 VDC	VOH > 2.5 VDC	VOH > 2.5 VDC
Frequency	200 kHz	300 kHz	300 kHz
Short circuit protection	Yes	Yes	Yes
Protection polarity inversion	Yes	Yes	Yes

Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise.

100H DUO: Optionally, different output signal level for each encoder (factory configuration).

SERIE 100H / DUO

INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

CONNECTION



	Cable 3x2x0,14+2x0,34 standard 95.0008003	Cable 5x2x0,14+2x0,34 double-shielded 95.0008070	Cable 5x2x0,14+2x0,34 double-shielded halogen-free 95.0008082	Cable 6x2x0,14 up to 100°C 95.0008072	Connector M12 8p CCW	Connector M23 12p CW	Terminal
GND	Black	White (tp1)	White (tp1)	White	1	1	GND
VCC	Red	Brown (tp1)	Brown (tp1)	Brown	2	2	+UB
A	Yellow	Red (tp2)	Red (tp2)	Green	3	3	A+
B	Green	Black (tp3)	Black (tp3)	Blue	4	4	B+
\tilde{A}	Brown	Light blue (tp2)	Light blue (tp2)	Yellow	5	5	A-
\tilde{B}	Blue	Violet (tp3)	Violet (tp3)	Red	6	6	B-
0	Grey	Grey (tp4)	Grey (tp4)	Grey-Pink	7	7	Z+
$\tilde{0}$	Orange	Pink (tp4)	Pink (tp4)	Red-Blue	8	8	Z-
Shield	Shield	Shield	Shield	Shield	Housing	Housing	Shield

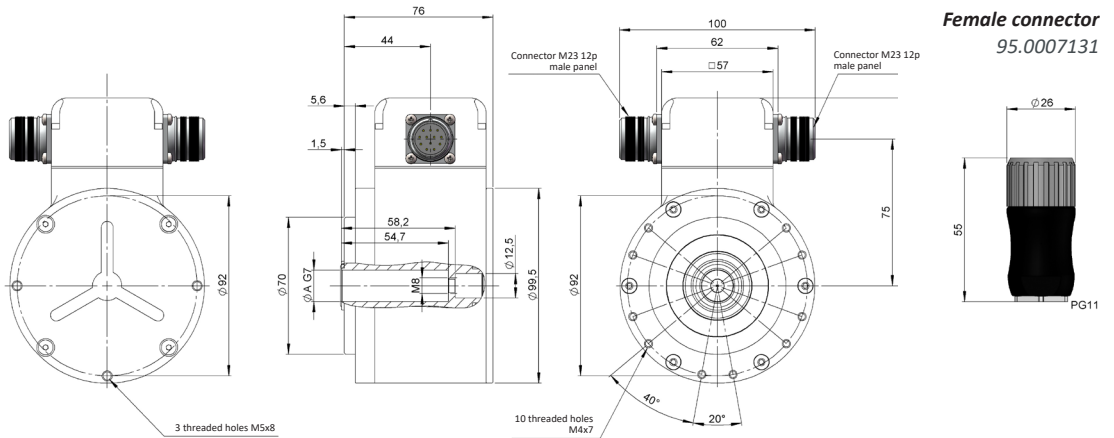
(tp1), (tp2), (tp3), (tp4) Twisted pair cables.

CONNECTION DIMENSIONS

Female connector not included

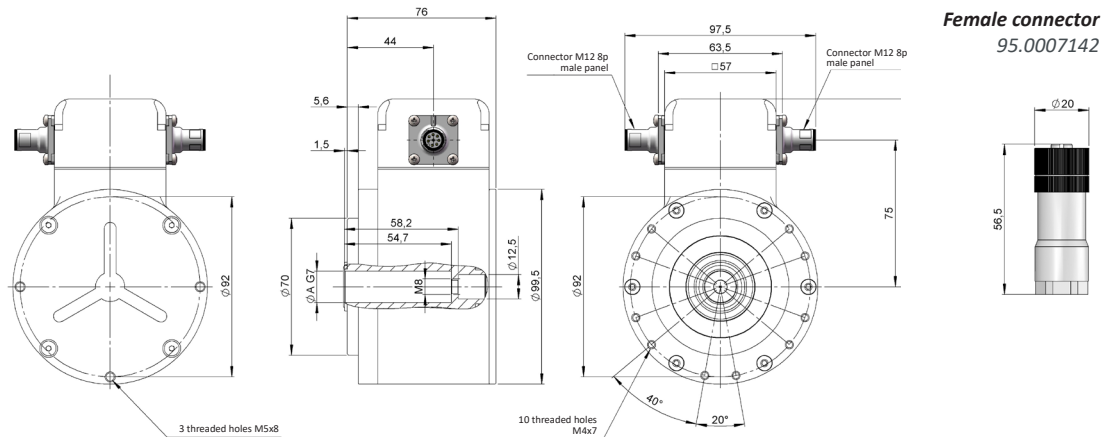
Connection 3

Radial
M23 12p
male panel
clockwise



Connection 4

Radial
M12 8p
male panel
counter clockwise



SERIE 100H / DUO

INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

ACCESSORIES

(not included)

Torque arm M6

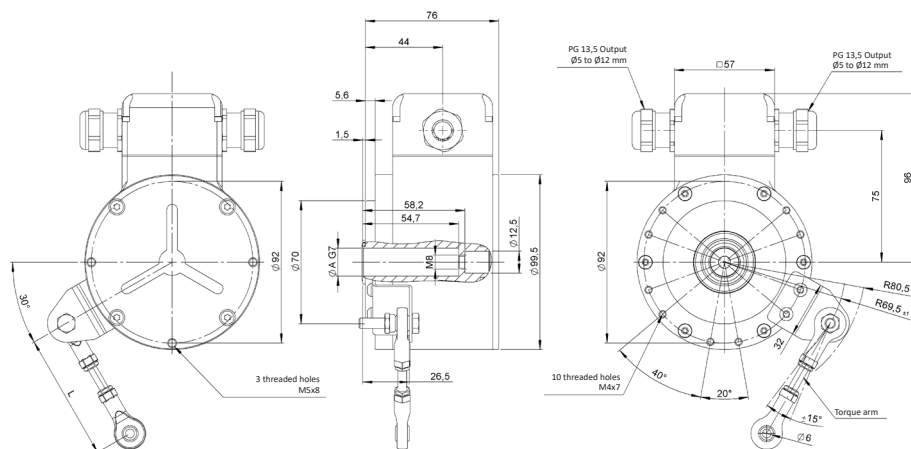
90.1130.70
L= 70 mm

90.1130.100
L= 100 mm

other length
available on order

Mounting kit
00.0003008

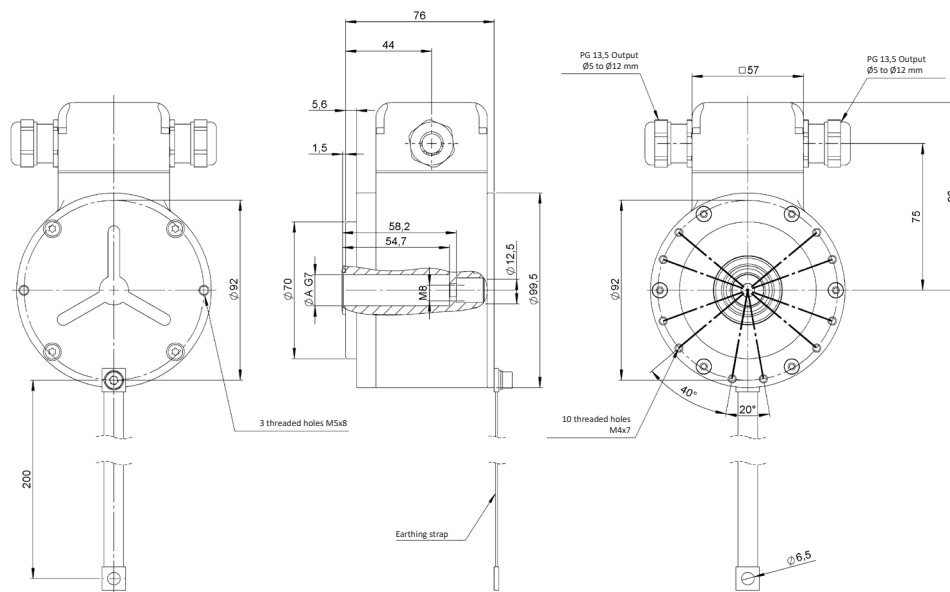
Support plate
00.0003007



To ensure proper use and assembly of the accessory, refer to the manual.

Earthing strap

00.0003006
200 mm



Mounting &
dismounting kit
00.0003009

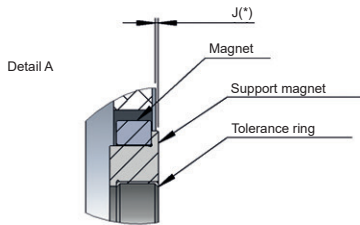




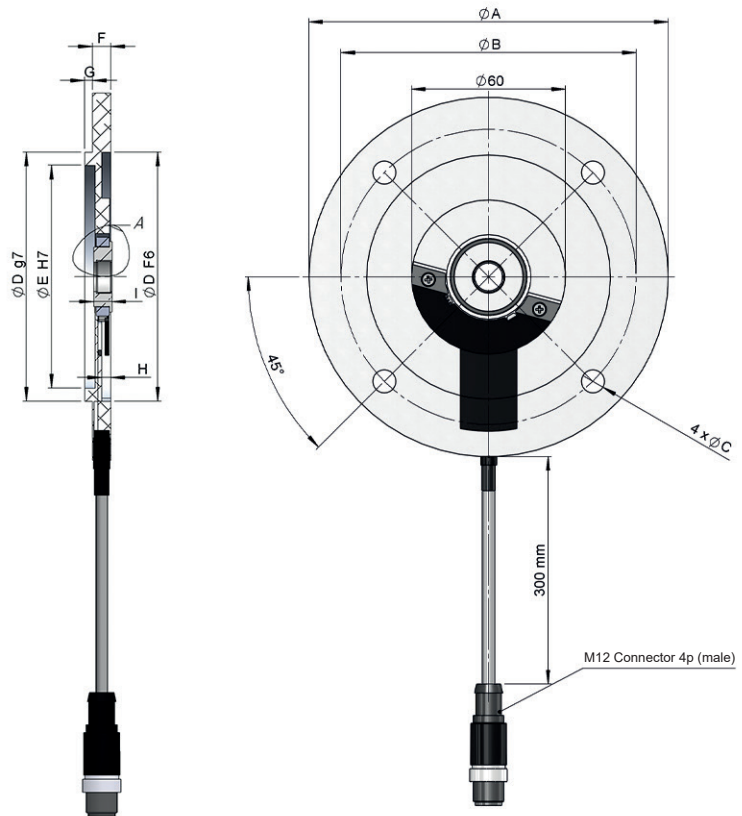
SERIE MR

MAGNETIC INCREMENTAL ENCODER

- Non-contacting measuring system
- Easy assembly
- 5...30 VDC Push-Pull not differential
- High protection class IP67
- Compact dimensions
- For applications under possible adverse ambient conditions (vibrations, humidity, dust, etc.)



J(*) Distance to mounting between support of magnet and surface to fix the sensor.
Mounting tolerance: ± 0.7 mm



Ø A	Ø B	Ø C	Ø D	Ø E	F	G	H	I	J
Ø 105	85	7	70	62	7	2,5	3	7	0
Ø 120	100	7	80	72	7	3	3,5	7	0
Ø 140	115	9	95	85	7	3	3,5	7	0,5
Ø 160	130	9	110	100	7	3,5	4	7	0,5

REFERENCE

Reference example: MR-105-14-001

Serie	External diameter / Shaft diameter	Resolution	Special Customer
MR -	<input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> -	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

105-14. Ø 105 mm / Shaft Ø 14 mm
 120-19. Ø 120 mm / Shaft Ø 19 mm
 140-11. Ø 140 mm / Shaft Ø 11 mm
 160-14. Ø 160 mm / Shaft Ø 14 mm

Order your reference
Step file 3D

info@encoderhohner.com
service available in 24 h



SERIE MR

MAGNETIC INCREMENTAL ENCODER

MECHANICAL SPECIFICATIONS

Materials	Flange: Aluminium Support magnet: Stainless Steel Magnet: Ferrite
Maximum number of revolutions permitted mechanically	6000 rpm
Shaft diameter	11, 14, 19 mm
Housing fixing	4 holes (see dimensions table $\varnothing B - \varnothing C$)
Permitted misalignment	± 0.7 mm axial, ± 1 mm radial
Protection against dust and splashes according to DIN EN 60529	IP67
Weight aprox.	0,4 Kg
Operating temperature range	-20 to +85°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	30 cm cable ended with M12 4p industrial male connector Female connector not included

ELECTRICAL SPECIFICATIONS

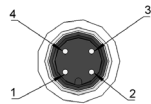
Measuring range	0...360°
Resolution	1 ppr
Power supply	5...30 VDC
Consumption	< 20 mA (without load)
Reverse polarity protection of power supply	Yes (max. 2s)
Insulation test	1 KV
Insulation resistance	200 M Ω
Impulse sequence	A 90° B Tolerance $\pm 25^\circ$ el.
Motor shaft tolerance	According to IEC Dimensions

OUTPUT SIGNALS

Electronic Output voltage	Push-Pull not differential
"High" signal level	> VCC -3 VDC
"Low" signal level	< 2.5 VDC
Frequency	≤ 20 kHz
Duty cycle signal	180° \pm 18° el.
Length of cable allowed	50 m
Max. load capability / channel	30 mA
Output channels	Square wave-Impulse, (2-channel) A+B
Short circuit protection	No

CONNECTION

Female connector not included

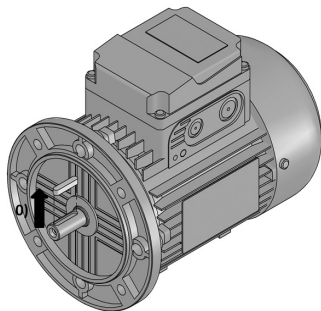


	Connector M12 4p
GND	3
VCC	1
A	4
B	2

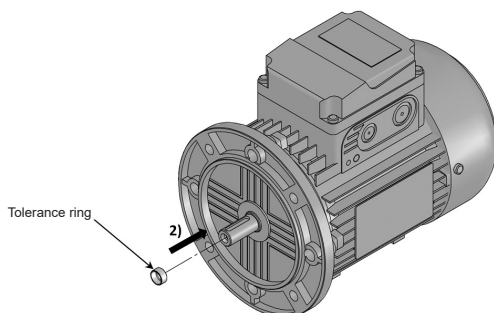
SERIE MR

MAGNETIC INCREMENTAL ENCODER

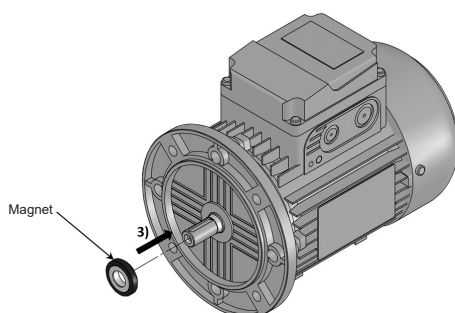
ASSEMBLY INSTRUCTIONS



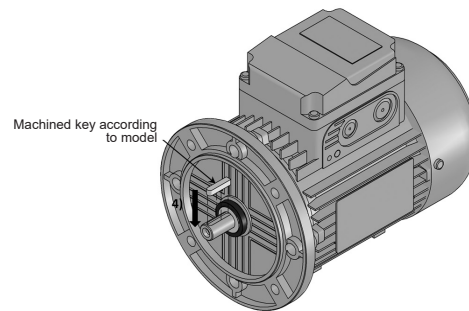
1) Dismount the key.



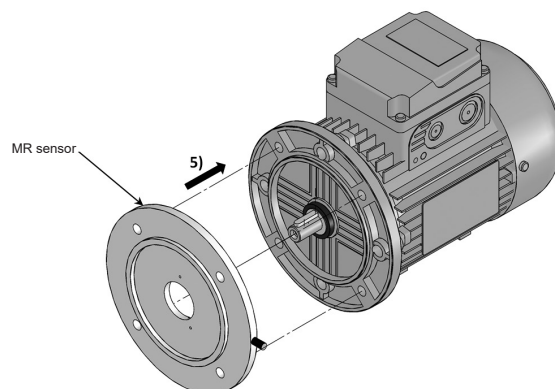
2) Push tolerance ring up to the shoulder of the shaft.



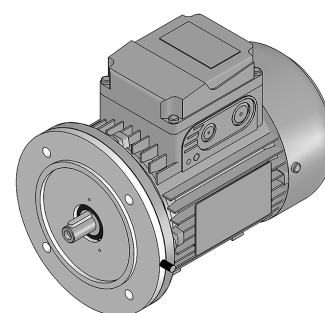
3) Mount magnet embedded with tolerance ring.



4) Push machined key according to MR model.



5) Mount MR sensor.





SERIE MIE

MAGNETIC INCREMENTAL ENCODER

- Non-contacting measuring system
- Easy assembly
- 5...30 VDC Push-Pull not differential
- High protection class IP67
- Compact dimensions
- For applications under possible adverse ambient conditions (vibrations, humidity, dust, etc.)



Magnetic Encoder



Incremental Encoder



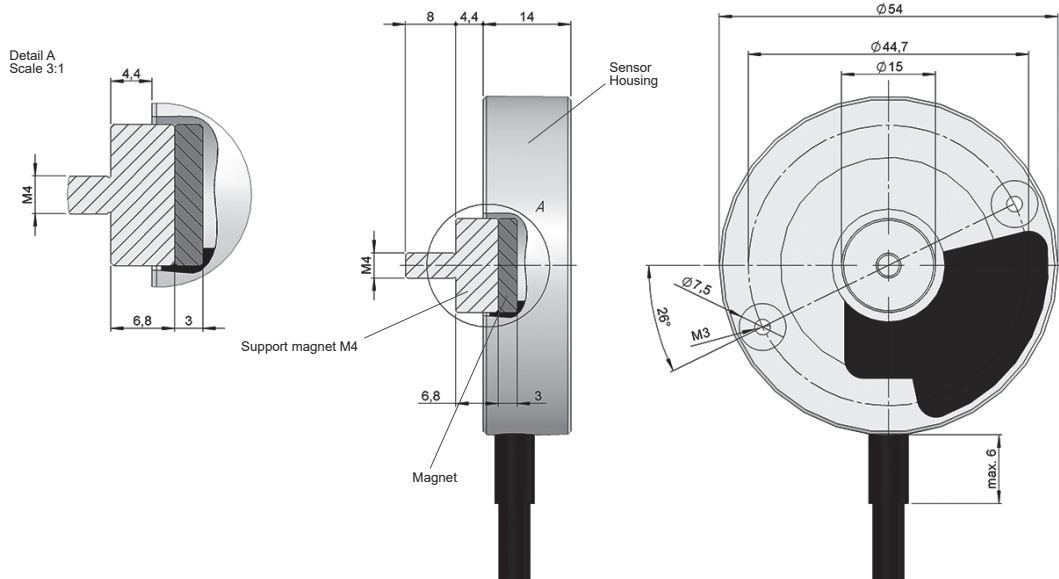
Vibration and shock resistant



IP 67



Express Delivery



Drawing mechanical option type 01, connection type 01

REFERENCE

Reference example: MIE-0102-001

Serie	Mechanical option	Connection	Resolution	Special Customer
MIE -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	01. \varnothing 15 x 6.8 mm	01. Radial cable (2 meters) 02. 150 cm cable + connector M8 3p		

Order your reference
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service available in 24 h



SERIE MIE

MAGNETIC INCREMENTAL ENCODER

MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Shaft: PET (Polyethylene Terephthalate)
Maximum number of revolutions permitted mechanically	12000 rpm
Shaft diameter (support of magnet)	15 mm
Shaft fixing	M4
Housing fixing	2 screws M3
Permitted misalignment	±0.5 mm axial, ±1 mm radial
Protection against dust and splashes according to DIN EN 60529	IP67
Weight approx.	0,3 Kg
Operating temperature range	-20°C to +85°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request) Female connector not included

ELECTRICAL SPECIFICATIONS

Measuring range	0...360°
Resolution	1 ppr
Power supply	5...30 VDC
Consumption	< 20 mA (without load)
Reverse polarity protection of power supply	Yes
Magnet	Ferrite
Sensor	Hall

OUTPUT SIGNALS

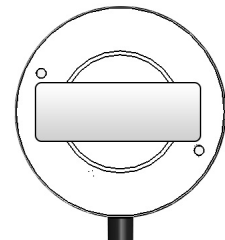
Electronic Output voltage	Push-Pull not differential
"High" signal level (VOH)	> VCC -3 VDC
"Low" signal level	< 2.5 VDC
Frequency	≤ 20 kHz
Duty cycle signal	180° ± 18°
Length of cable allowed	50 m
Max. load capability / channel	30 mA
Output channels	A
Short circuit protection	No

CONNECTION



	Cable	Connector
	5x0,14 95.0008051	M8 3p
GND	White	3
VCC	Brown	1
A	Green	4

LABEL

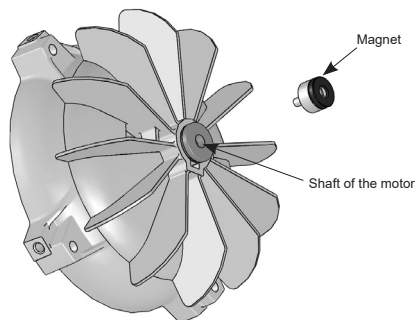


Label dimensions: 45 x 15 mm

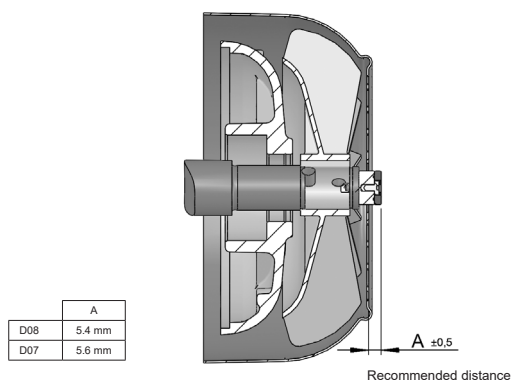
SERIE MIE

MAGNETIC INCREMENTAL ENCODER

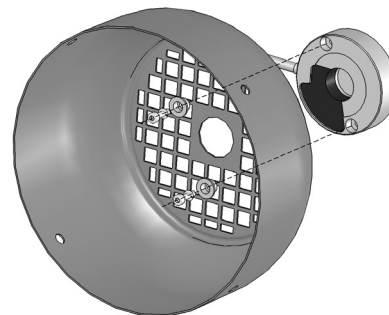
ASSEMBLY INSTRUCTIONS



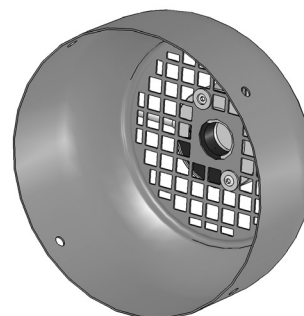
- 1) Required hole at the center of the shaft
- 2) Assembly the magnet on the shaft or (max. 0,3 Nm). Use a screwdriver according to ISO 2380 (M3 Screw).



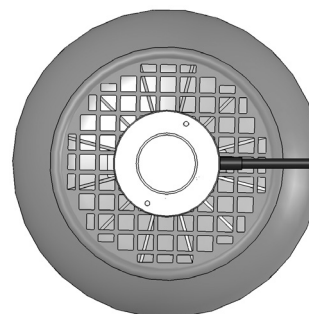
- 3) Put the cover on the motor and check the distance between magnet and end of the cover.



- 4) Extract cover of the motor.
- 5) Assembly the screws + washer and ferrule for the inner side of the cover.



- 6) Thread screws to the sensor (max. 0,9 Nm).



- 7) Check that the turn is free of contact between parts.

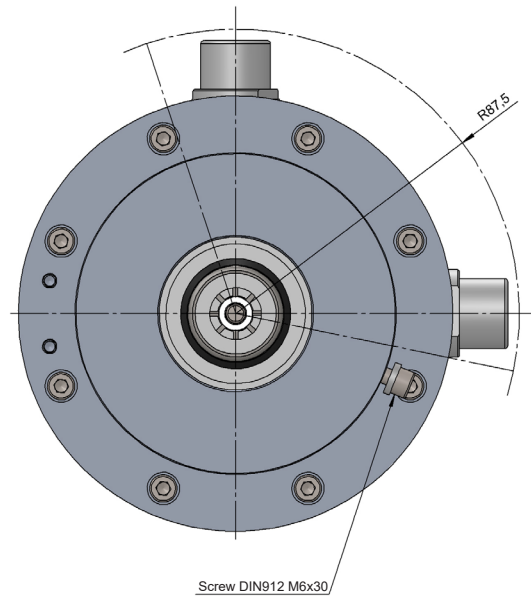
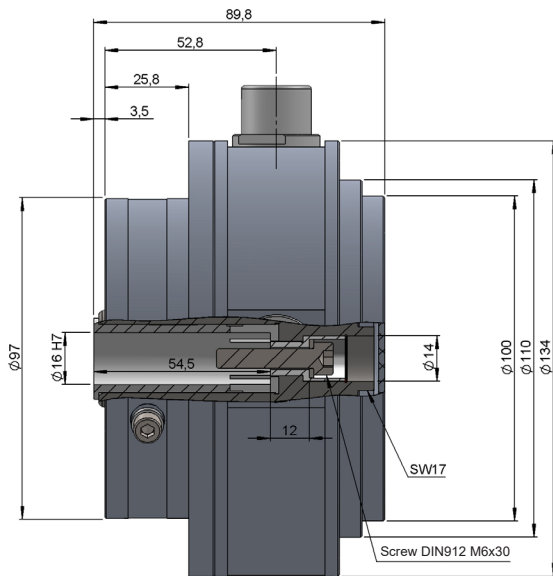


SERIE 130M

INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Resolution up to 2.048 pulses per turn
- External diameter 134 mm
- Hollow shaft from Ø 16 to 36 mm
- Isolated shaft
- Protection class IP68 according to DIN EN 60529
- Oil-immersion operation up to 90°C / 10 bar
- HTL and TTL output signals available
- Redundant magnetic sensing
- Solid aluminium housing for high vibration and shock resistance

Magnetic Encoder	Incremental Encoder	Subsea Encoder	High shaft load capacity	Vibration and shock resistant	IP68	Express Delivery



Drawing hollow shaft type 16, connection type 1

REFERENCE

Reference example: 130M-1-016211-2048

Serie	Immersion type	Anti-rotation system	Hollow shaft	Output signals	Connection	Power Supply / Electronic output	Pulses number	Special customer
130M -	<input type="checkbox"/> -	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	1. Hydraulic oil	0. None (***)	16. Ø 16 mm Isolated (**)	1. AÃ+BB+00 2. Redundant AÃ+BB+00	1. Connector 8p IP68 Hermetic sealing	1. 9...30 VDC / HTL 2. 5 VDC ±5% / TTL RS422	(*)	

Order your reference
Step file 3D

info@encoderhohner.com
service available in 24 h

(*) 128, 256, 512, 1024, 2048

(**) Hollow shaft diameter up to 36 mm available, upon request (≤ 31 mm with shaft isolation).

(***) Our engineering department adapts to the specific needs of assembly and anti-rotation systems.

Assembly and disassembly instruction manual available in:
www.encoderhohner.com/product/serie-130m/



SERIE 130M

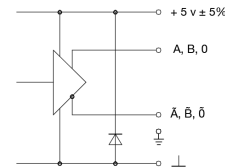
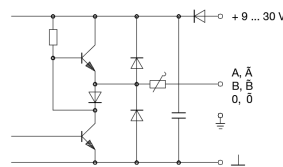
INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

Materials	Housing: Anodized aluminium 20 µm Shaft: Stainless Steel AISI316
Bearings	Dual set of hybrid bearings with ceramic balls
Immersion type	Hydraulic oil*
Shaft fixing	Screw M6x30
Hollow shaft diameter	16 to 36 mm (≤ 31 mm with shaft isolation)
Maximum number of revolutions permitted mechanically	2800 rpm
Protection against dust and splashes according to DIN EN 60529	IP68
Rotor inertia moment	4,7 Kgcm ²
Starting torque at 20°C (68°F)	≈ 0,5 Nm
Maximum load permitted on axial shaft	150 N
Maximum load permitted on radial shaft	200 N
Weight	≈ 2,4 Kg
Operating temperature range	-20°C to +90°C
Vibration according to DIN EN 60068-2-6	150 m/s ² (15g) (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	2000 m/s ² (12ms)
Maximum pulses per turn	128, 256, 512, 1024, 2048
Connection	Industrial connector 8p (Female contacts) IP68; Hermetic sealing Mating connectors not included

(*) Shell Tellus S2 V 46

OUTPUT SIGNALS



OUTPUT CIRCUIT	HTL	TTL RS422
Reference code	1	2
Power supply	9...30 VDC	5 VDC ± 5%
Consumption (without load)	≤ 90 mA (each system)	≤ 90 mA (each system)
Frequency	100 kHz	100 kHz
Channel A leads (90° electric) channel B, view from the shaft, shaft rotating clockwise		

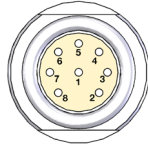
The encoder complies with the Electromagnetic Compatibility standards (EMC):

- > Emission in residential, commercial and light industry environments (UNE-EN 61000-6-3:2007 + A1: 2012).
- > Immunity in industrial environments (UNE-EN 61000-6-2:2006 + ERR:2009).

SERIE 130M

INCREMENTAL ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

CONNECTION



	Connector
	Industrial connector 8p (Female contacts) IP68 Herme
GND	2
VCC	1
A	7
B	3
~A	5
~B	6
0 (reference)	4
~0	8

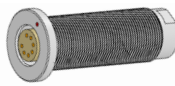
ACCESSORIES

(not included)



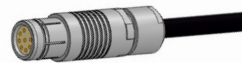
A1

89.060.022.080.00.5
Pre-assembled cable with male connectors (0,5 m)



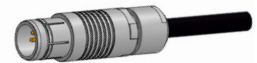
A2

95.0007370
Bulkhead feedthrough connector (Female-Male)



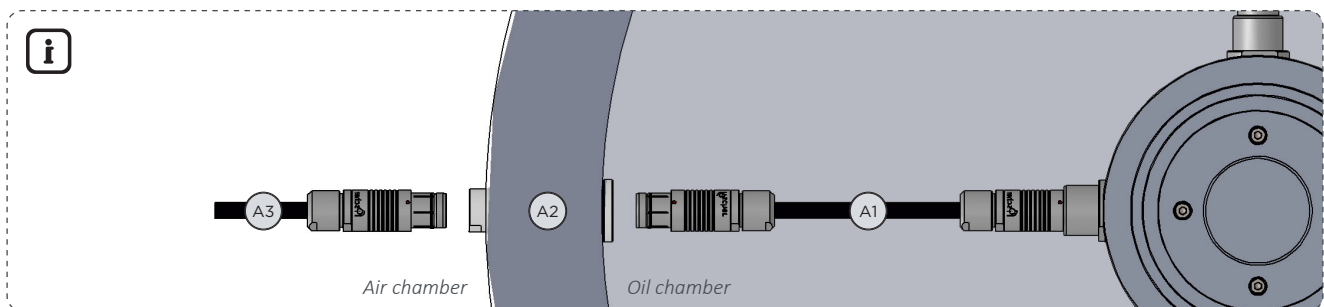
A3

89.061.022.080.00.5
Pre-assembled cable with female connector (0,5 m)



A4

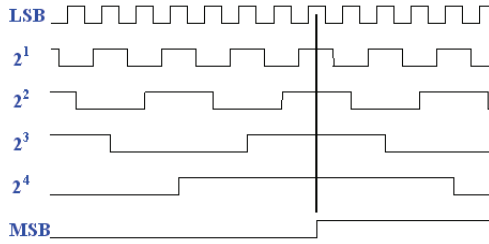
89.062.022.080.XX.X
Pre-assembled cable with male connector



A4

Pre-assembled cable with male connector available, according to

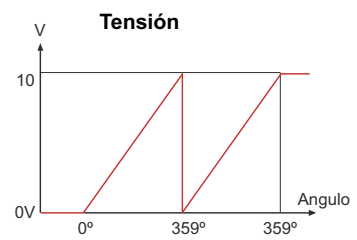
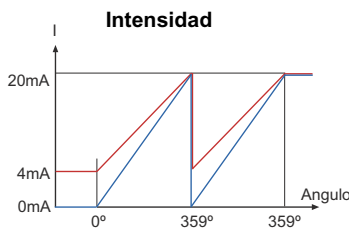
Parallel



SSI



Analog



Fieldbus



SmarSens



GENERAL INFORMATION **PARALLEL**

PARALLEL AND PARALLEL PROGRAMMABLE ABSOLUT ENCODERS

The absolut encoders are widely employed throughout industry. Unlike incremental measurement systems, absolut encoders always provide the true positional value. If the system is mechanically moved while power is off, when it is restored, the actual position will be immediately read.

Hohner offers a wide variety of absolut encoders, singleturn and multiturn, serial, parallel or analogue outputs, together with a wide range of output codes. It also provides the possibility of programmable encoders that allow the user to program the encoder's most important parameters.

All this enables us to offer our customers solutions to assign a specific and unique value to each shaft position.

Absolut encoders are classified into two groups: singleturn and multiturn.

Singleturn absolut encoders code the 360° of a revolution into "n" point per turn and the code is repeated for each turn.

If a measurement is required for more than one turn of the shaft, a multiturn encoder is required, which is used to provide a precise position in longer paths.

Programmable optical absolut encoders

All essential encoder parameters are user-programmable in our programmable absolut encoders.

Available for singleturn and multiturn encoders in various mechanical options.

The programming enables the user to select the zero of reference, the number of positions per turn, up to 8192 points per turn (13 bits), the number of turns in the multiturn case, up to 4096 turns, rotation direction and output code: Binary, Gray, Excess Gra and BCD.

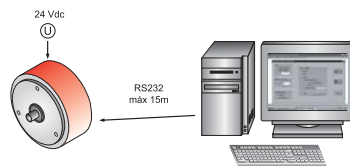
There are advantages, such as the possibility of electronic misadjustment and optimisation in mechanical systems that are subject to tolerances etc.

Since the same encoder can be installed in different applications and their specific programming assigned during the actual installation, this translates into savings in both stock and maintenance.

Programming the encoder

In order to program a hohner encoder, a PC is required, together with the programming software and the connection cable between the encoder and PC (the last two are supplied with the encoder).

The encoder is connected to a power supply (24vdc) and the communications cable is connected to



the PC serial port.

By following the simple instruction in the manual, the user will be able to program the most important encoder parameters in a simple manner.

Output codes

In singleturn encoders, hohner can offer any resolution per turn, up to a maximum of 21 bits per turn (2.097.152 points per turn). Any number of turns 2n, can be provided up to 4096 turns, in other words 2, 4, 8, 16, 32 etc up to 4096. Codes are available in both clockwise and counter clockwise directions. In the clockwise direction, the code increases when the shaft rotates in a clockwise direction looking at the shaft. In the counter clockwise direction, the code increases when the shaft rotates in a counter clockwise direction looking at the shaft.

Binary code

The binary code is based on 2, in other words, the information is coded using only "0" and "1".

Gray code

The Gray code is a special form of binary code where only one bit changes from one combination to another, this permits higher transmission speeds and greater security, because in the case of natural binary codes, for example, "n" bits are changed and there is a series of intermediate steps that can be interpreted as other positions, and depending on the data read speed of the control system, one of these intermediate positions could constitute incorrect data if one bit changes faster than the others.

The Gray code is therefore, a very reliable code for data transmission because in all cases of on position to another, only one bit varies and there are no doubtful intermediate positions between one and the next.

In the resolutions that are not "2n", the Excess Gray code allows the last combination to the first to also change by only one bit. For example 360, 72 etc, this would be for an encoder with 360 positions: (512-360)/2 = Excess 76. the code would go from 76 to 435, so that position 76 to 435 would only change one bit.

BCD code

In certain cases, the information processed by the system must be converted to decimal so that it may be more easily interpreted, this is the main reason why Binary Coded Decimal (BCD) exists. In BCD, each decimal number is directly coded in binary in order to represent the ten digits from zero to nine, which requires four bits, meaning that each decade needs four bits

Dec	Binary Code					Gray Code					BCD Code							
											2nd decade				1st decade			
	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	2 ³	2 ²	2 ¹	2 ⁰	2 ³	2 ²	2 ¹	2 ⁰
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1
2	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0
3	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1
4	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0
5	0	0	1	0	1	0	0	1	1	1	0	0	0	0	1	0	0	1
6	0	0	1	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0
7	0	0	1	1	1	0	0	1	0	0	0	0	0	0	1	1	1	1
8	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0
9	0	1	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	1
10	0	1	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0
11	0	1	0	1	1	0	1	1	1	0	0	0	0	1	0	0	0	1
12	0	1	1	0	0	0	1	0	1	0	0	0	0	1	0	0	1	0
13	0	1	1	0	1	0	1	0	1	1	0	0	0	1	0	0	1	1
14	0	1	1	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0
15	0	1	1	1	1	0	1	0	0	0	0	0	0	1	0	1	0	1
16	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	1	0













Correspondence table from Decimal to Binary, to Gray and to BCD.

ABSOLUT ENCODERS **PARALLEL**

- Resolution up to 24 bits
- Solid (CS) and hollow shaft (HS)
- Protection class IP65 or IP67 according to DIN 40050
- Available any positions number per turn
- Direction, code, enable, store and reset selection
- Output codes: Binary, Gray, Gray excess or BCD
- Radial or axial connection, cable or connector output



OVERVIEW

	Diameter 58 mm		Diameter 90 mm
	Solid shaft	Hollow shaft	Solid shaft
Singleturn	CS10 CS10 IP67 	HS10 	CS30 CS30 IP67 
Programmable singleturn	CSP10 	HSP10 	CSP30 
Multiturn	CM10 CM10 IP67 	HM10 	CM30 CM30 IP67 
Programmable multiturn	CMP10 	HMP10 	CMP30 

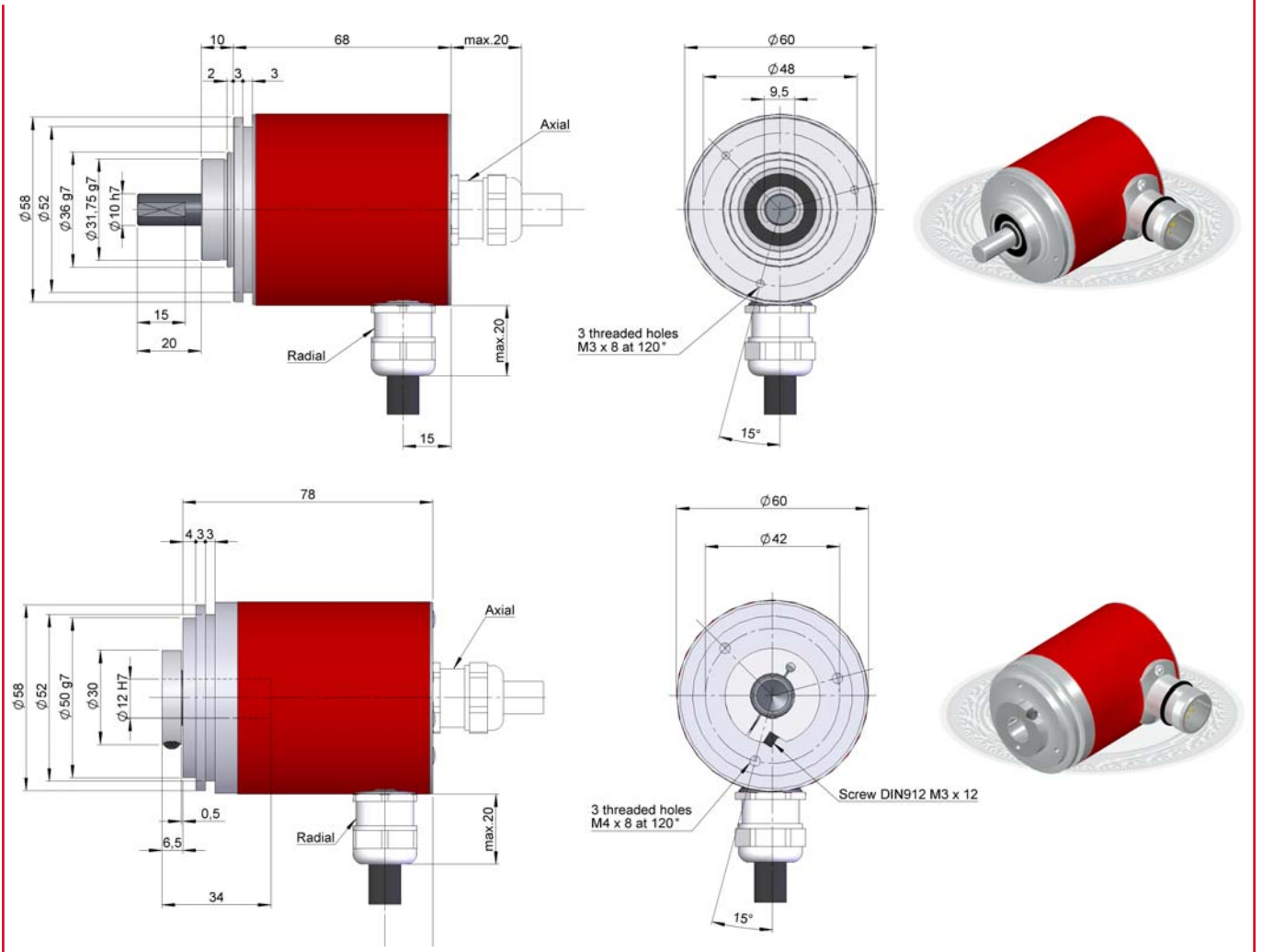
TECHNICAL SPECIFICATIONS

	Diameter 58 mm	Diameter 90 mm
Housing	Aluminium/Stainless steel	
Shaft	Stainless steel	
Bearings	Ballraces	
Bearings lifetime	1x10 ¹⁰ rev.	
Maximum number of revolutions permitted mechanically	6000 rpm.	
Protection against dust and splashes according to DIN 40050	IP65 / IP67.	
Rotor inertia moment	30 gcm ²	270 gcm ²
Starting torque 20°C (68°F)	Max. 2,0 Ncm	Max. 5,0 Ncm
Maximum load permitted on axial shaft	40 N	80 N
Maximum load permitted on radial shaft	60 N	100 N
Misalignment permitted axial (blind hollow shaft)	±0.5 mm	-
Misalignment permitted radial (blind hollow shaft)	±0.3 mm	-
Weight aprox.	400 g ST, 500 g MT	1,2 kg ST, 1,3 kg MT
Operating temperature range	-10°C a +70°C	
Vibration	100 m/s ² (10Hz...2000Hz)	
Shock	1000 m/s ² (6ms)	
Consumption max.	100 mA (CS/HS), 150 mA (CM/HM)	
Power supply	10..30Vdc	
Interface	Parallel	
Electrical output	Push-pull, NPN, NPN Open Collector	
Configurable parameters (programmable series)	Direction, code, store, enable, reset, preset1, preset2	
Configurable parameters	Direction and reset	
Inputs	Opto-coupled	
Available codes	Binary, gray and BCD	
Max. points per turn	8192 positions (13 bits)	
Max. turns	4096 turns (12 bits)	
Linearity	±1/2 LSB	
Radial and axial connection	2 metres cable or industrial connector	

ST: Singleturn MT: Multiturn

SINGLETURN ABSOLUT ENCODER

- Singleturn resolution up to 13 bits
- Protection class IP65 according to DIN 40050
- External diameter 58 mm
- Solid shaft (CS) and blind hollow shaft (HS)



Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

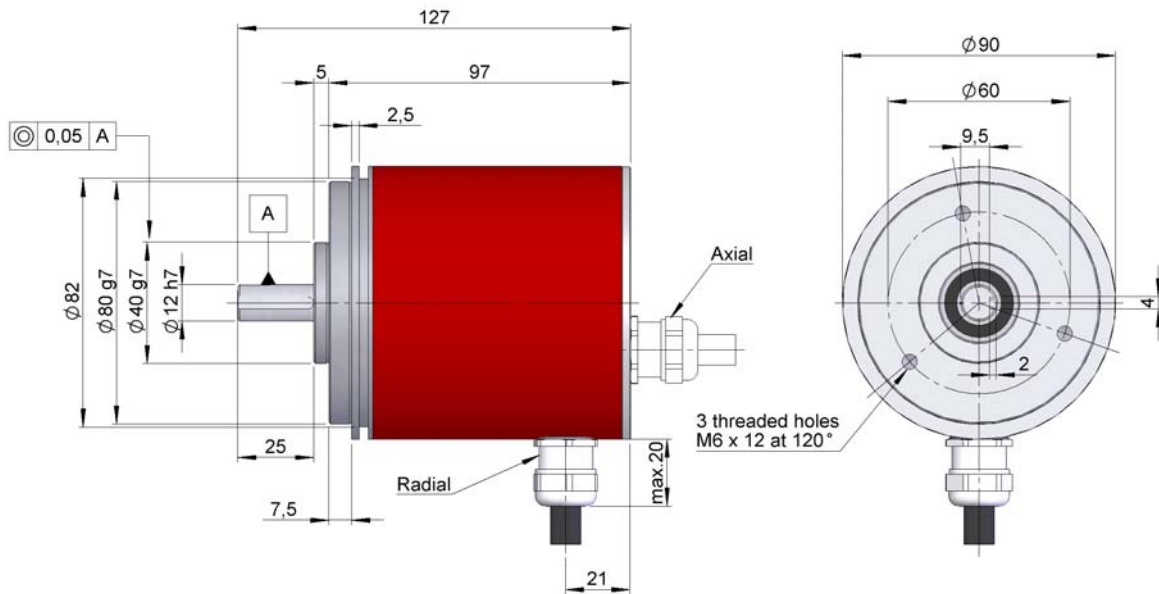
ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNEC-TION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	CONFIG. PARAMETERS	RESOLUTION	SPECIAL CUSTOMER
● ●	10	●	●	●	●	●	●	●	●	● ● ● ● ●	● ● ● ● ●	● ●
CS- Singleturn Solid shaft			1- None 2- 90.1002 3- 90.1003 4- 90.1004 5- 90.1005 6- 90.1006		1- Axial 2- Radial	0- Parallel		1- IP65		S- Direction*		
HS- Singleturn Blind hollow shaft							1- Binary CW 2- Binary CCW 3- Gray CW 4- Gray CCW 5- Gray excess CW 6- Gray excess CCW 7- BCD CW 8- BCD CCW		2- 10...30 Vdc NPN 3- 10...30 Vdc Push-Pull 4- 10...30 Vdc NPN OC			
		1- Solid Ø6x10 mm 2- Solid Ø10x20 mm 3- Blind hollow Ø12 mm 4- Blind hollow Ø10 mm		1- Cable 3- 95.0007131 4- 95.0007006 5- 95.0007062								

(* Only available with resolution 2ⁿ.

ABSOLUT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Singleturn resolution (CS) up to 13 bits or multiturn (CM) up to 24 bits
- Protection class IP65 according to DIN 40050
- External diameter 90 mm
- Solid shaft



Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

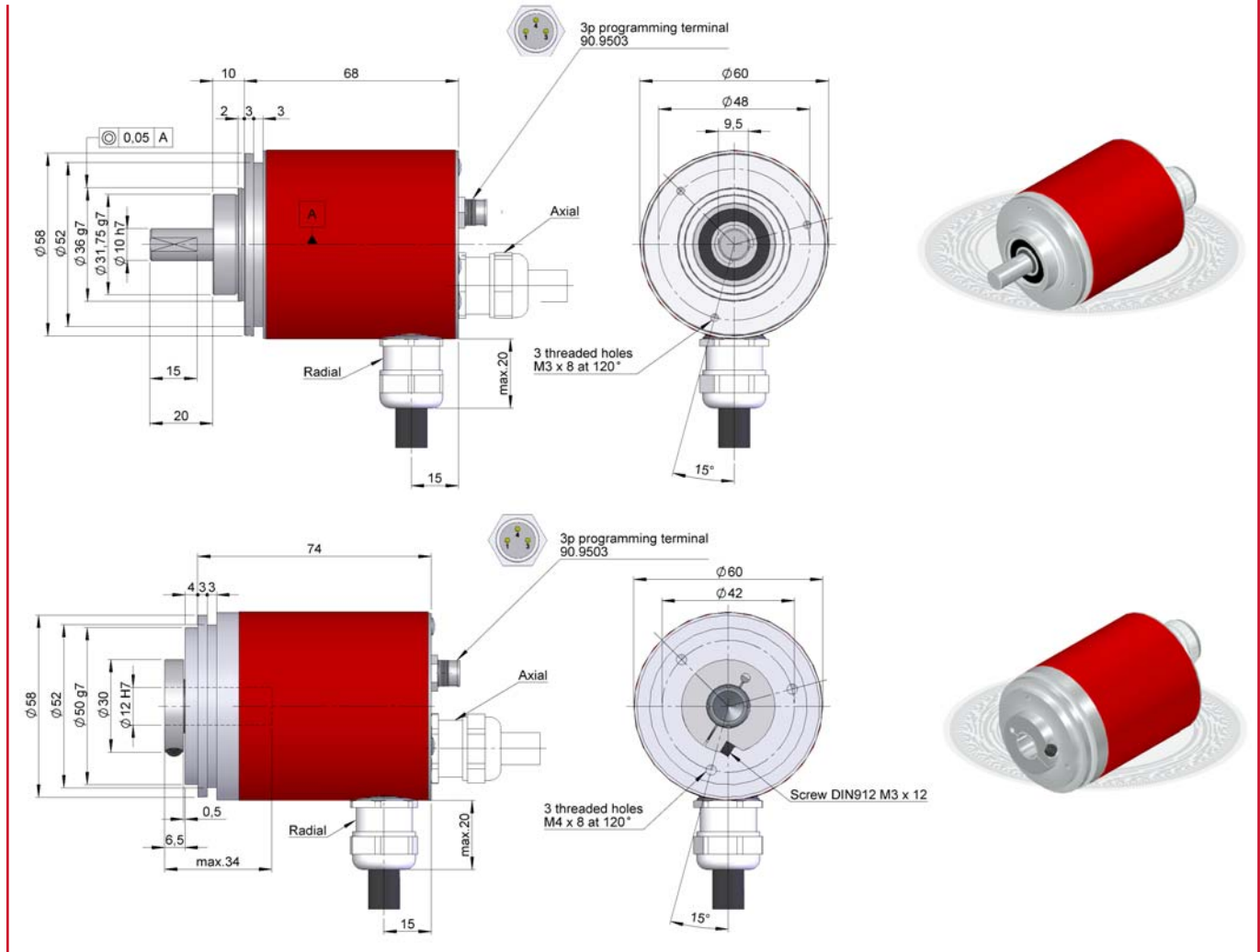
TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	CONFIG. PARAMETERS	SINGLE-TURN RESOLUTION	MULTITURN RESOLUTION	SPECIAL CUSTOMER
CS- Singleturn CM- Multiturn	30	2- Ø12 x 25 mm	1- None 3- 90.1008	1- Cable 3- 95.0007131 4- 95.0007006 5- 95.0007062 6- 95.0007063	1- Axial 2- Radial	0- Parallel	1- Binary CW 2- Binary CCW 3- Gray CW 4- Gray CCW 5- Gray excess CW 6- Gray excess CCW 7- BCD CW* 8- BCD CCW*	1- IP65	2- 10...30 Vdc NPN 3- 10...30 Vdc Push-Pull 4- 10...30 Vdc NPN OC	S- Direction**			

(*) BCD code option is only available with Singleturn (CS) type.
 (**) Only available with resolution 2¹.

PARALLEL PROGRAMMABLE SERIES CSP10 / HSP10

SINGLETURN ABSOLUT ENCODERS

- Programming by PC up to 13 bits
- Protection class IP65 according to DIN 40050
- External diameter 58 mm
- Solid shaft (CSP) and blind hollow shaft (HSP)



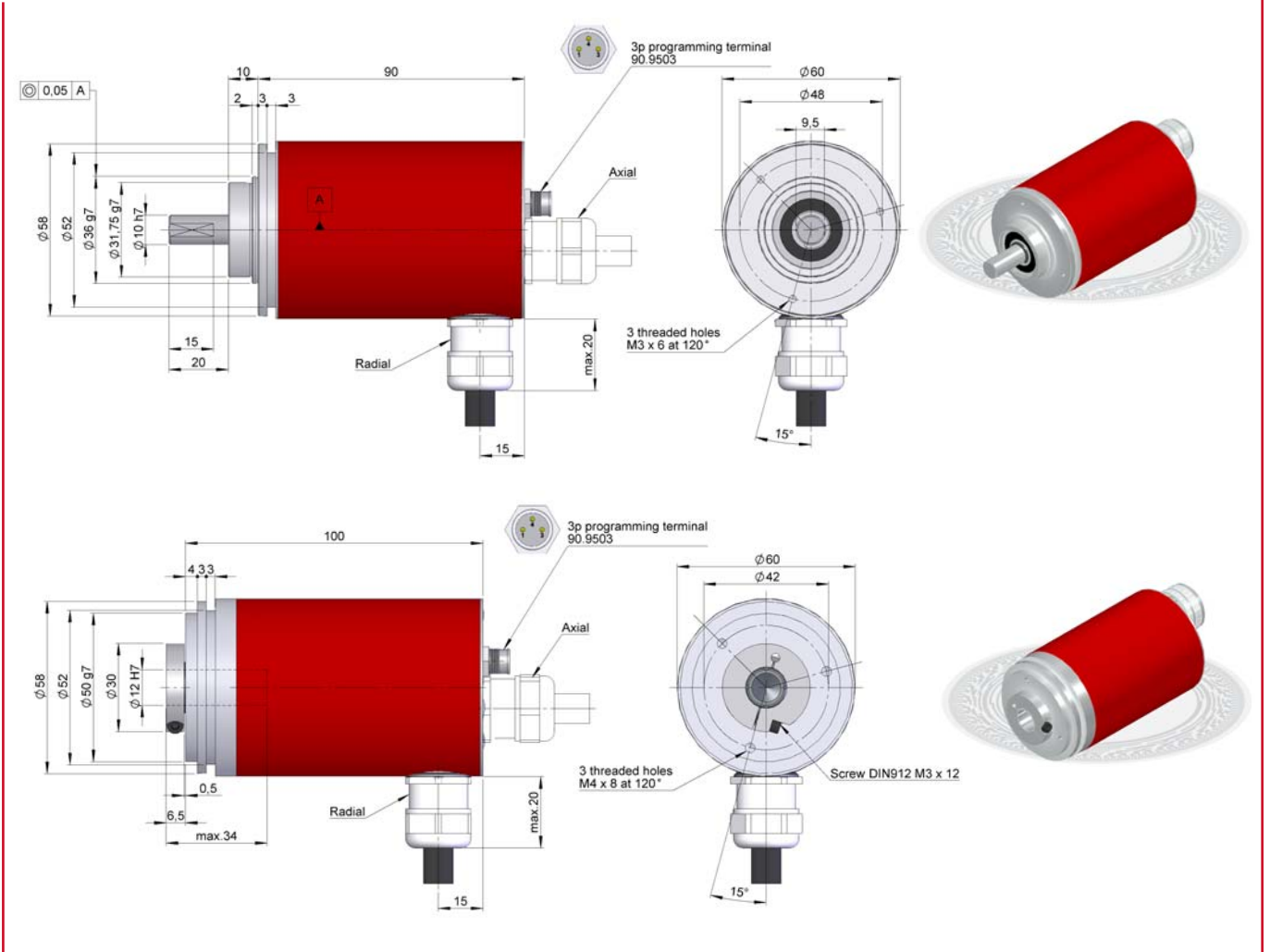
Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	RESOLUTION	SPECIAL CUSTOMER
● ●	10	●	●	●	●	●	●	●	●	8192	● ●
CSP-Solid shaft HSP-Blind hollow shaft			1- None 2- 90.1002 3- 90.1003 4- 90.1004 5- 90.1005 6- 90.1006		1- Axial 2- Radial	0- Parallel		1- IP65			
							9- Prog by PC		3- 10...30 Vdc Push-Pull		
		1- Solid Ø6x10 mm 2- Solid Ø10x20 mm 3- Blind hollow Ø12 mm 4- Blind hollow Ø10 mm		1- Cable 5- 95.0007062							

MULTITURN ABSOLUT ENCODER

- Programming by PC up to 24 bits
- Protection class IP65 according to DIN 40050
- External diameter 58 mm
- Solid shaft (CMP) and blind hollow shaft (HMP)



Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

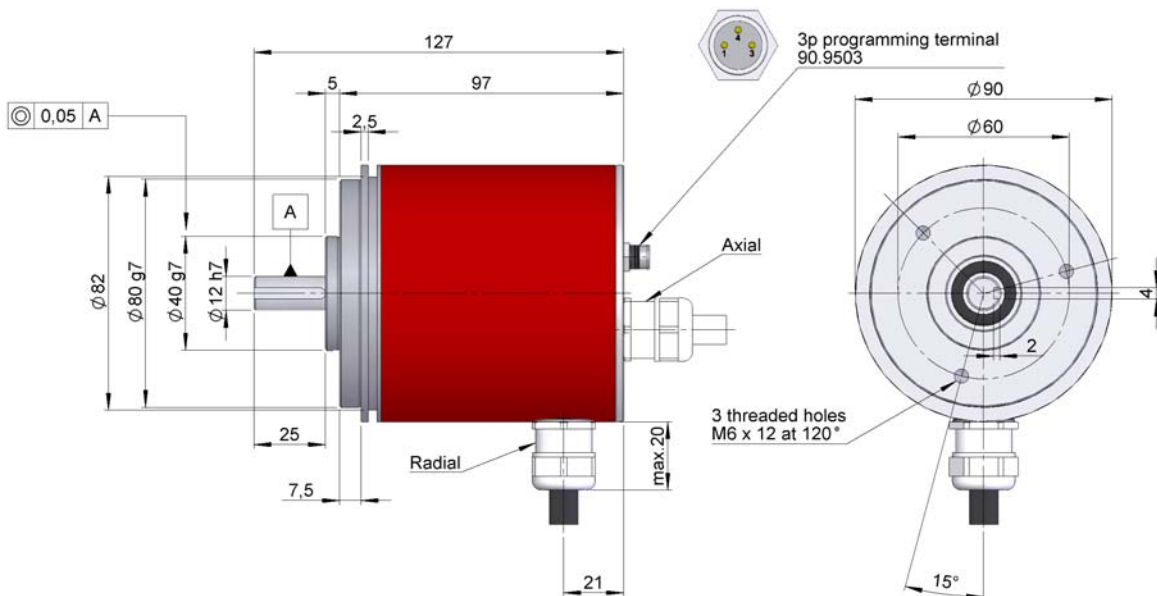
ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	SINGLETURN RESOLUTION	MULTITURN RESOLUTION	SPECIAL CUSTOMER
● ● ●	10	●	●	●	●	●	●	●	●	8192 / 2048	● ●	
CMP- Solid shaft HMP- Blind hollow shaft		1- Solid Ø10 mm 2- Solid Ø6 mm 3- Blind hollow Ø12 mm 4- Blind hollow Ø10 mm	1- None 2- 90.1002 3- 90.1003 4- 90.1004 5- 90.1005 6- 90.1006	1- Cable 6- 95.0007063	1- Axial 2- Radial	0- Parallel 9- Prog by PC		1- IP65	3- 10...30 Vdc Push-Pull			

PARALLEL PROGRAMMABLE SERIES CSP30 / CMP30

PROGRAMMABLE ABSOLUT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Programming by PC singleturn (CSP) up to 13 bits or multiturn (CMP) programming by PC up to 24 bits
- Protection class IP65 according to DIN 40050
- External diameter 90 mm
- Solid shaft



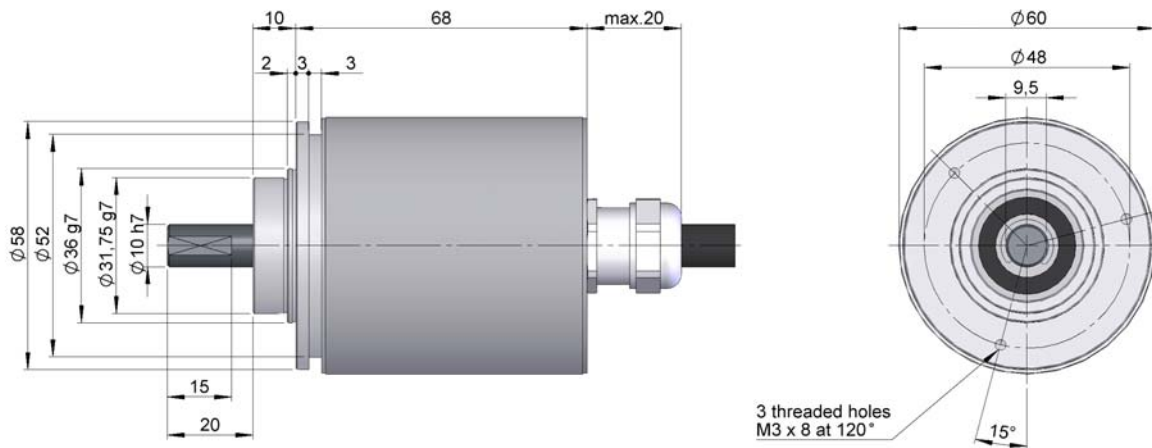
Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	SINGLETURN RESOLUTION	MULTITURN RESOLUTION	SPECIAL CUSTOMER
● ● ●	30	●	●	●	●	●	●	●	●	8192 / 2048		● ●
CSP- Singleturn CMP- Multiturn		↓	1- None 3- 90.1008	↓	1- Axial 2- Radial	0- Parallel	↓	1- IP65	↓			
		2- Ø12 x 25 mm		1- Cable 5- 95.0007062 6- 95.0007063			9- Prog by PC		3- 10...30 Vdc Push-Pull			

SINGLETURN ABSOLUT ENCODER FOR SEVERE APPLICATIONS

- Singleturn resolution up to 13 bits
- Protection class IP67 according to DIN 40050
- External diameter 58 mm
- Solid shaft



Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

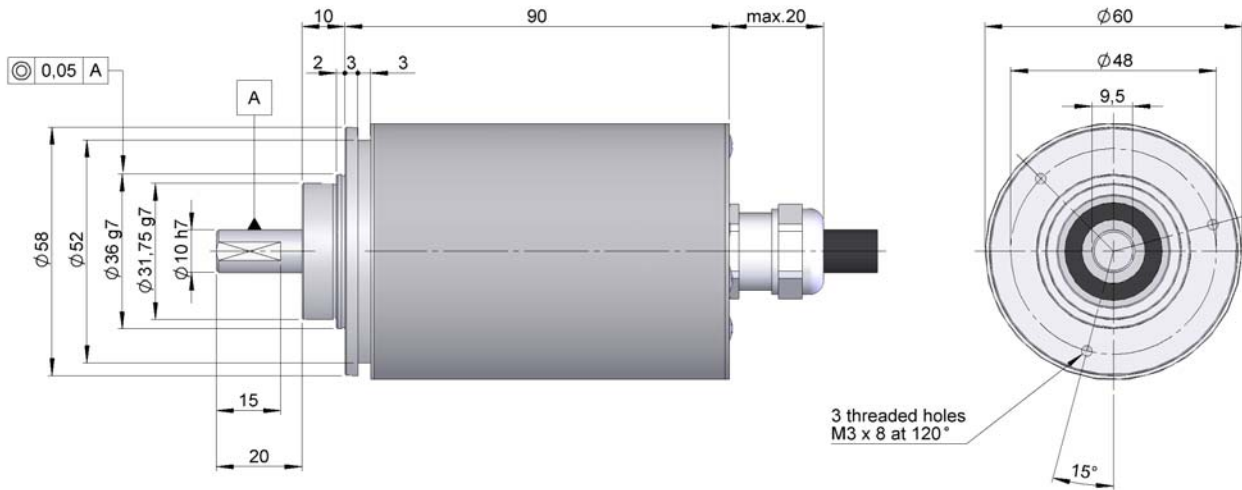
ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	CONFIG. PARAMETERS	RESOLUTION	SPECIAL CUSTOMER
● ●	10	●	●	●	●	●	●	●	●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●
CS- Singleturn		1- $\phi 6$ x 10 mm 2- $\phi 10$ x 20 mm	1- None 2- 90.1002 3- 90.1003 4- 90.1004 5- 90.1005 6- 90.1006	1- Cable	1- Axial	0- Parallel	1- Binary CW 2- Binary CCW 3- Gray CW 4- Gray CCW 5- Gray excess CW 6- Gray excess CCW 7- BCD CW 8- BCD CCW	2- Stainless steel IP67 3- IP67	2- 10...30 Vdc NPN 3- 10...30 Vdc Push-Pull 4- 10...30 Vdc NPN OC	S- Direction*		

(*) Only available with resolution 2ⁿ.

MULTITURN ABSOLUT ENCODER FOR SEVERE APPLICATIONS

- Multiturn resolution up to 24 bits
- Protection class IP67 according to DIN 40050
- External diameter 58 mm
- Solid shaft



Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

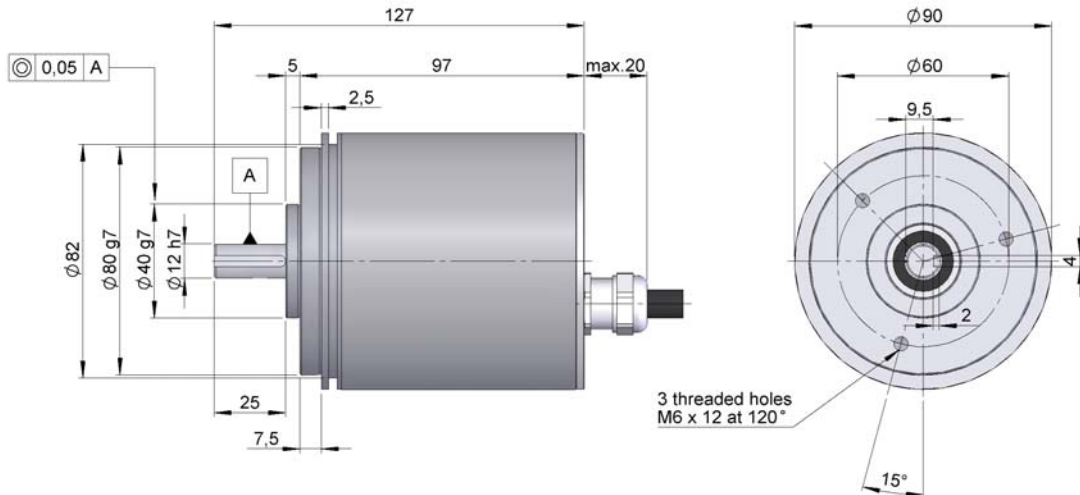
ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	CONFIG. PARAMETERS	SINGLETURN RESOLUTION	MULTITURN RESOLUTION	SPECIAL CUSTOMER
••	10	•	•	•	•	•	•	•	•	•	•••••	•••••	•••••
CM- Multiturn			1- None 2- 90.1002 3- 90.1003 4- 90.1004 5- 90.1005 6- 90.1006		1- Axial	0- Parallel		2- Stainless steel IP67 3- IP67		S- Direction*			
		1- Ø10 x 20 mm		1- Cable			1- Binary CW 2- Binary CCW 3- Gray CW 4- Gray CCW 5- Gray excess CW 6- Gray excess CCW		2- 10...30 Vdc NPN 3- 10...30 Vdc Push-Pull 4- 10...30 Vdc NPN O.C.				

(*) Only available with resolution 2ⁿ.

ABSOLUT ENCODER FOR SEVERE AND HEAVY DUTY INDUSTRIAL APPLICATIONS

- Singleturn resolution (CS) up to 13 bits or multiturn (CM) up to 24 bits
- Protection class IP67 according to DIN 40050
- External diameter 90 mm
- Solid shaft



Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	CONFIG. PARAMETERS	SINGLETURN RESOLUTION	MULTITURN RESOLUTION	EJECUCION ESPECIAL
• • CS- Singleturn • CM- Multiturn	• • 30	•	• 1- None • 3- 90.1008	•	• 1- Axial	• 0- Parallel	•	• 2-Stainless steel IP67 • 3- IP67	•	• S- Direction**	• • • • • • • • • • • • • •	• • • • • • • • • • • • • •	• •
		↓ 2- Ø12 x 25 mm	↓	↓ 1- Cable			↓	↓	↓				
							1- Binary CW 2- Binary CCW 3- Gray CW 4- Gray CCW 5- Gray excess CW 6- Gray excess CCW 7- BCD CW* 8- BCD CCW*		2- 10...30 Vdc NPN 3- 10...30 Vdc Push-Pull 4- 10...30 Vdc NPN OC				

(*) BCD code option is only available with Singleturn (CS) type.
(**) Only available with resolution 2ⁿ.

CONNECTION AND CONNECTORS

CONNECTION CS / CSP / HS / HSP PARALLEL OUTPUT



	Cable 15 x 0.14	Cable 25 x 0.14	95.0007131 M23 12p	95.0007006 M23 16p	95.0007062 21p	95.0007063 26p
GND	Black	Black	1	1	1	1
Vcc	Red	Red	2	2	2	2
Bit 0	Brown	Brown	3	3	3	3
Bit 1	White	White	4	4	4	4
Bit 2	Yellow	Yellow	5	5	5	5
Bit 3	Green	Green	6	6	6	6
Bit 4	Orange	Pink	7	7	7	7
Bit 5	Violet	Orange	8	8	8	8
Bit 6	Grey	Grey	9	9	9	9
Bit 7	Blue	Blue	10	10	10	10
Bit 8	White - Black	Yellow - Black	11	11	11	11
Bit 9	White - Red	Yellow - Red	12	12	12	12
Bit 10	White - Brown	Yellow - Brown		13	13	13
Bit 11	White - Yellow	Yellow - Green		14	14	14
Bit 12	White - Blue	Yellow - Grey		15	15	15
Bit 13		Yellow - Blue		16	16	16
Bit 14		White - Black			17	17
Bit 15		White - Red			18	18
DIR	White - Yellow	White - Pink	11	15	20	25
RES	White - Blue	White - Blue	12	16	21	26

CONNECTION CM / CMP / HM / HMP PARALLEL OUTPUT



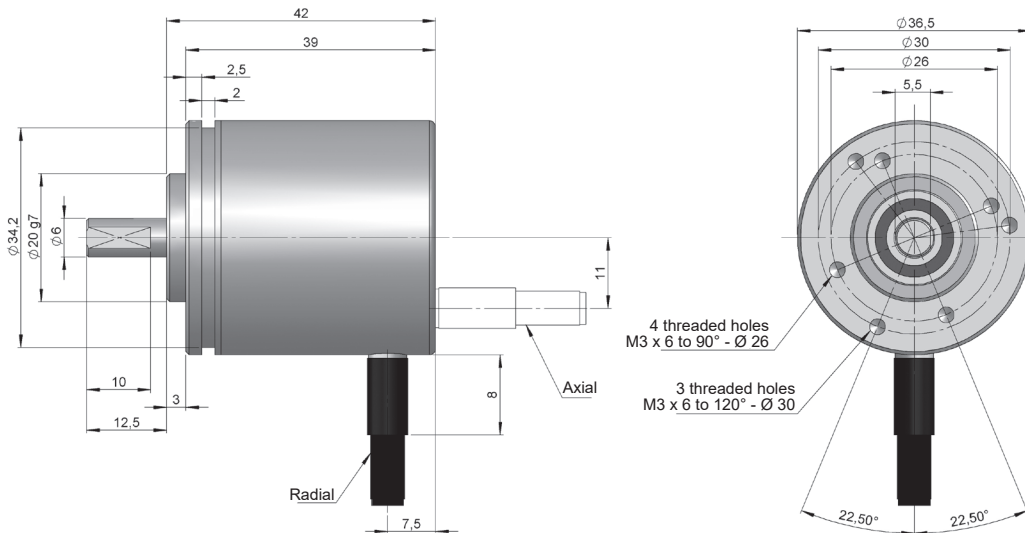
	Cable 15 x 0.14	Cable 25 x 0.14	Cable 36 x 0.14	95.0007131 M23 12p	95.0007006 M23 16p	95.0007062 21p	95.0007063 26p	90.9537H SUBD 37p
GND	Black	Black	Black	1	1	1	1	1
Vcc	Red	Red	Red	2	2	2	2	2
Bit 0	Brown	Brown	Brown	3	3	3	3	3
Bit 1	White	White	White	4	4	4	4	4
Bit 2	Yellow	Yellow	Yellow	5	5	5	5	5
Bit 3	Green	Green	Green	6	6	6	6	6
Bit 4	Orange	Pink	Pink	7	7	7	7	7
Bit 5	Violet	Orange	Orange	8	8	8	8	8
Bit 6	Grey	Grey	Grey	9	9	9	9	9
Bit 7	Blue	Blue	Blue	10	10	10	10	10
Bit 8	White - Black	Yellow - Black	Yellow - Black	11	11	11	11	11
Bit 9	White - Red	Yellow - Red	Yellow - Red	12	12	12	12	12
Bit 10	White - Brown	Yellow - Brown	Yellow - Brown		13	13	13	13
Bit 11	White - Yellow	Yellow - Green	Yellow - Green		14	14	14	14
Bit 12	White - Blue	Yellow - Grey	Yellow - Pink		15	15	15	15
Bit 13		Yellow - Azul	Yellow - Grey		16	16	16	16
Bit 14		White - Black	Yellow - Blue			17	17	17
Bit 15		White - Red	White - Black			18	18	18
Bit 16		White - Brown	White - Red			19	19	19
Bit 17		White - Green	White - Brown			20	20	20
Bit 18		White - Pink	White - Green			21	21	21
Bit 19		White - Orange	White - Pink				22	22
Bit 20		White - Grey	White - Orange				23	23
Bit 21		White - Blue	White - Grey				24	24
Bit 22			White - Blue				25	25
Bit 23			Green - Black				26	26
DIR	White - Yellow	Yellow - Pink	Grey - Brown	11	15	20	25	36
RES	White - Blue	White - Blue	Grey - Blue	12	16	21	26	37

SERIE E36 CM

MINIATURE SOLID SHAFT ABSOLUTE MULTITURN ENCODER



- Singleturn resolution up to 13 bits
- Multiturn resolution up to 24 bits
- Magnetic technology
- External diameter 36,5 mm
- Shaft \varnothing 6 mm
- Protection class IP64 according to DIN EN 60529
- Connection by cable (other cable length available)



REFERENCE

Reference example: E36CM-SSI-1231-1212

Serie	Interface	Solid shaft	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Multiturn resolution	Special customer
E36CM -	SSI -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	SSI, SSI	1. \varnothing 6 mm	1. Axial cable 2. Radial cable	1. Binary CW 2. Binary CCW 3. Gray CW 4. Gray CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	12. 12 bits 16. 16 bits 20. 20 bits 24. 24 bits	LN. +105°C

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SERIE E36 CM


MINIATURE SOLID SHAFT ABSOLUTE MULTITURN ENCODER




MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight approx.	0,08 Kg
Operating temperature range	-40°C to +85°C - Standard -40°C to +105°C - Special Customer LN
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable (other cable lengths available on order)

ELECTRICAL SPECIFICATIONS

Interface	
Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary Gray
Protocol	SSI
Singleturn resolution	up to 13 bits
Multiturn resolution	up to 24 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
“Low” signal level	< 0,8 VDC
“High” signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION

	
	Cable 8x0,14 mm ² 95.0008052
GND	White
VCC	Brown
DATA+	Yellow
DATA-	Pink
CLK+	Green
CLK-	Grey
PRESET*	Red
DIR**	Blue

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.



SERIE E36 HM

MINIATURE BLIND HOLLOW SHAFT ABSOLUTE MULTITURN ENCODER

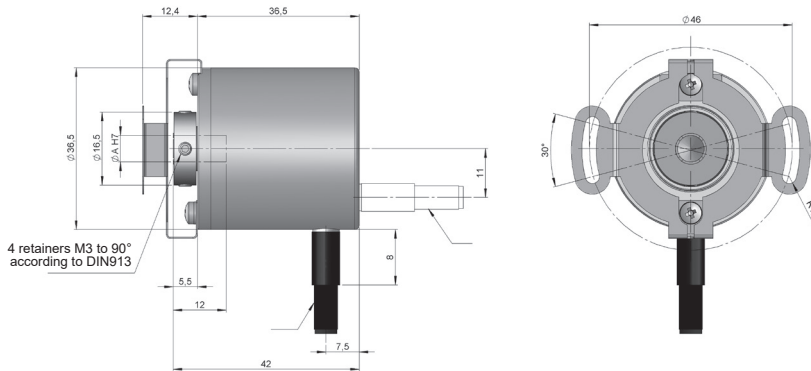


- Singleturn resolution up to 13 bits
- Multiturn resolution up to 24 bits
- Magnetic technology
- External diameter 36,5 mm
- Blind hollow shaft \varnothing 6 mm or 8 mm
- Protection class IP64 according to DIN EN 60529
- Connection by cable (other cable length available)



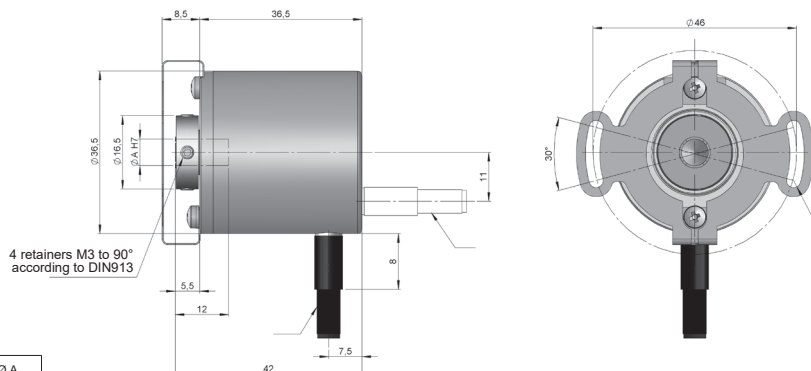
Magnetic Encoder	Absolute Encoder	Miniature Encoder	Vibration and shock resistant	IP64	Temperature range	Express Delivery

Setscrew / Flexible flange (90.1037)



BLIND HOLLOW SHAFT	\varnothing A
1	6 mm
2	8 mm

Setscrew / Flexible flange (90.1111)



BLIND HOLLOW SHAFT	\varnothing A
1	6 mm
2	8 mm



SERIE E36 HM

MINIATURE BLIND HOLLOW SHAFT ABSOLUTE MULTITURN ENCODER



REFERENCE

Reference example: E36HM-SSI-11231-1212

Serie	Interface	Anti-rotation system	Blind-Hollow shaft	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Multiturn resolution	Special customer
E36HM -	SSI -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	SSI. SSI	1. Flexible flange (90.1037) 2. Flexible flange (90.1111) (*)	1. Ø 6 mm 2. Ø 8 mm	1. Axial cable 2. Radial cable	1. Binary CW 2. Binary CCW 3. Gray CW 4. Gray CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	12. 12 bits 16. 16 bits 20. 20 bits 24. 24 bits	LN. +105°C

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(*) Anti-rotation system type 1 (Flexible flange 90.1037) and 2 (Flexible flange 90.1111) supplied assembled.

MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange (included)
Permitted misalignment	±0.3 mm axial, ±0.2 mm radial (90.1037) ±0.2 mm axial, ±0.1 mm radial (90.1111)
Shaft fixing	Setscrew
Blind hollow shaft diameter	6 mm or 8 mm
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	10 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight approx.	0,08 Kg
Operating temperature range	-40°C to +85°C - Standard -40°C to +105°C - Special Customer LN
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable (other cable lengths available on order)

SERIE E36 HM

MINIATURE BLIND HOLLOW SHAFT ABSOLUTE MULTITURN ENCODER



ELECTRICAL SPECIFICATIONS

Interface



Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary Gray
Protocol	SSI
Singleturn resolution	up to 13 bits
Multiturn resolution	up to 24 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
“Low” signal level	< 0,8 VDC
“High” signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION



	Cable 8x0,14 mm ² 95.0008052
GND	White
VCC	Brown
DATA+	Yellow
DATA-	Pink
CLK+	Green
CLK-	Grey
PRESET*	Red
DIR**	Blue

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.



SERIE E36 CS

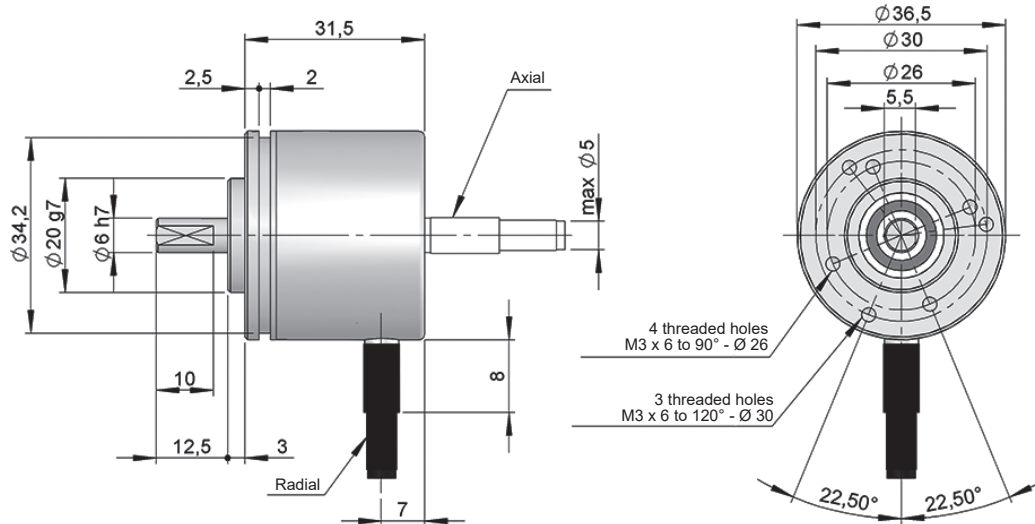
MINIATURE SOLID SHAFT ABSOLUTE SINGLETURN ENCODER



- Singleturn resolution up to 13 bits
- Magnetic technology
- External diameter 36,5 mm
- Shaft \varnothing 6 mm
- Protection class IP64 according to DIN EN 60529
- Connection by cable (other cable length available)



Magnetic Encoder Absolute Encoder Miniature Encoder Vibration and shock resistant IP64 Temperature range Express Delivery



Drawing shaft type 1, connection type 1/2

REFERENCE

Reference example: E36CS-SSI-1231-12

Serie	Interface	Solid shaft	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Special customer
E36CS -	SSI -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	SSI. SSI	1. \varnothing 6 mm	1. Axial cable 2. Radial cable	1. Binary CW 2. Binary CCW 3. Gray CW 4. Gray CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	<input type="checkbox"/> <input type="checkbox"/>

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SERIE E36 CS


MINIATURE SOLID SHAFT ABSOLUTE SINGLETURN ENCODER




MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight approx.	0,08 Kg
Operating temperature range	-40°C to +105°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable (other cable lengths available on order)

ELECTRICAL SPECIFICATIONS

Interface	
Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary Gray
Protocol	SSI
Singleturn resolution	up to 13 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
"Low" signal level	< 0,8 VDC
"High" signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION

	
	Cable 8x0,14 mm ² 95.0008052
GND	White
VCC	Brown
DATA+	Yellow
DATA-	Pink
CLK+	Green
CLK-	Grey
PRESET*	Red
DIR**	Blue

(* Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.



SERIE E36 HS

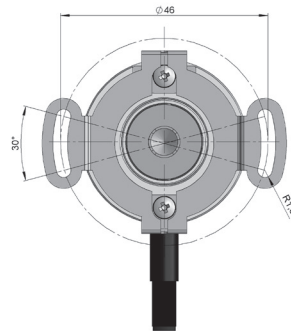
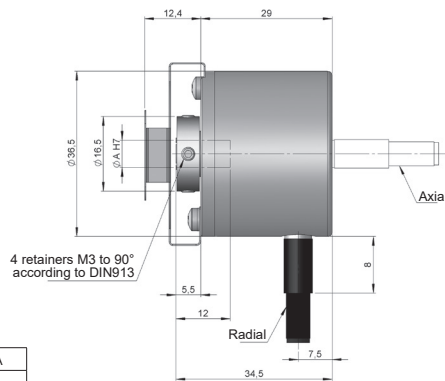
MINIATURE BLIND HOLLOW SHAFT ABSOLUTE SINGLETURN ENCODER



- Singleturn resolution up to 13 bits
- Magnetic technology
- External diameter 36,5 mm
- Blind hollow shaft \varnothing 6 mm or 8 mm
- Protection class IP64 according to DIN EN 60529
- Connection by cable (other cable length available)

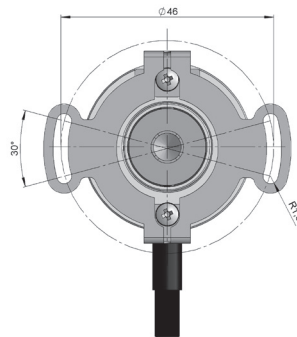
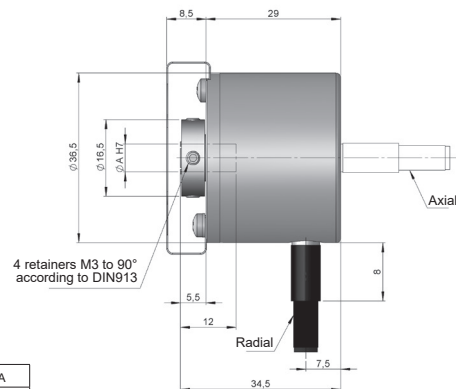
Magnetic Encoder	Absolute Encoder	Miniature Encoder	Vibration and shock resistant	IP64	Temperature range	Express Delivery

Setscrew / Flexible flange (90.1037)



BLIND HOLLOW SHAFT	\varnothing A
1	6 mm
2	8 mm

Setscrew / Flexible flange (90.1111)



BLIND HOLLOW SHAFT	\varnothing A
1	6 mm
2	8 mm



SERIE E36 HS

MINIATURE BLIND HOLLOW SHAFT ABSOLUTE SINGLETURN ENCODER



REFERENCE

Reference example: E36HS-SSI-11231-12

Serie	Interface	Anti-rotation system	Blind-Hollow shaft	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Special customer
E36HS -	SSI -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	SSI. SSI	1. Flexible flange (90.1037) 2. Flexible flange (90.1111) (*)	1. Ø 6 mm 2. Ø 8 mm	1. Axial cable 2. Radial cable	1. Binary CW 2. Binary CCW 3. Gray CW 4. Gray CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	

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(*) Anti-rotation system type 1 (Flexible flange 90.1037) and 2 (Flexible flange 90.1111) supplied assembled.

MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange (included)
Permitted misalignment	±0.3 mm axial, ±0.2 mm radial (90.1037) ±0.2 mm axial, ±0.1 mm radial (90.1111)
Shaft fixing	Setscrew
Blind hollow shaft diameter	6 mm or 8 mm
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	10 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight aprox.	0,08 Kg
Operating temperature range	-40°C to +105°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable (other cable lengths available on order)

SERIE E36 HS

MINIATURE BLIND HOLLOW SHAFT ABSOLUTE SINGLETURN ENCODER



ELECTRICAL SPECIFICATIONS

Interface



Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary Gray
Protocol	SSI
Singleturn resolution	up to 13 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
“Low” signal level	< 0,8 VDC
“High” signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

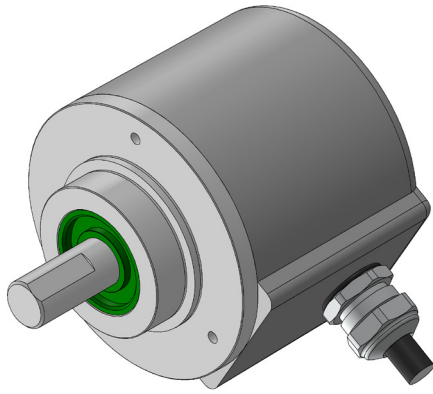
CONNECTION



	Cable 8x0,14 mm ² 95.0008052
GND	White
VCC	Brown
DATA+	Yellow
DATA-	Pink
CLK+	Green
CLK-	Grey
PRESET*	Red
DIR**	Blue

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.



SERIE E58 CM

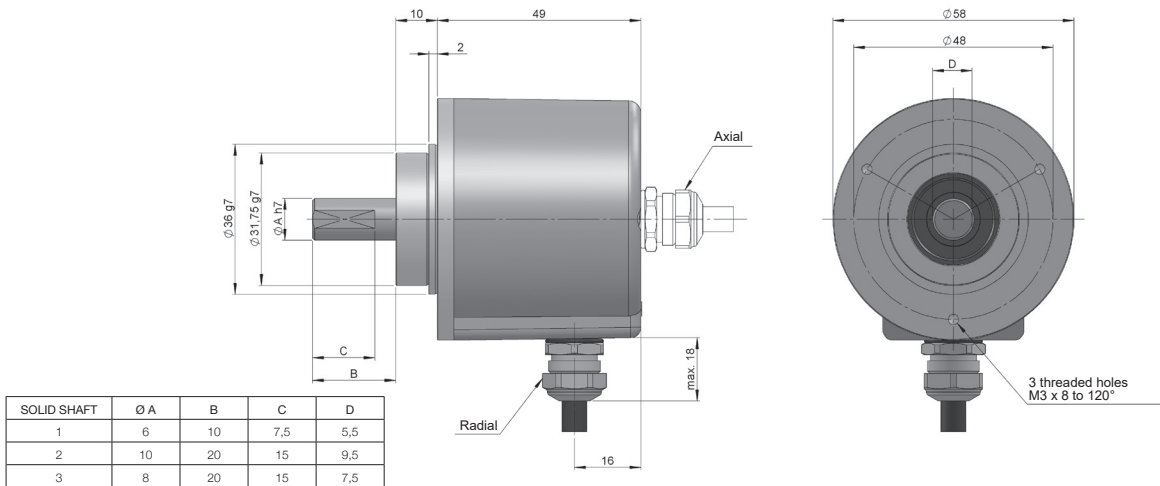
SOLID SHAFT ABSOLUTE MULTITURN ENCODER



- Singleturn resolution up to 13 bits
- Multiturn resolution up to 24 bits
- Magnetic technology
- External diameter 58 mm
- Solid shaft \varnothing 6, 8 and 10 mm
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector M23



Magnetic Encoder	Absolute Encoder	Vibration and shock resistant	IP65	Temperature range -40°C	Express Delivery



Drawing connection type 1/2, without flange

REFERENCE

Reference example: E58CM-SSI-12321-1212

Serie	Interface	Solid shaft	Flange	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Multiturn resolution	Special customer
E58CM -	SSI -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	SSI, SSI	1. \varnothing 6 mm 2. \varnothing 10 mm 3. \varnothing 8 mm	1. None 2. 90.1002 3. 90.1003 4. 90.1004 5. 90.1005 6. 90.1006	1. Axial cable 2. Radial cable 3. Radial M23 12p 5. Axial M23 12p	1. Binary CW 2. Binary CCW 3. Gray CW 4. Gray CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	12. 12 bits 16. 16 bits 20. 20 bits 24. 24 bits	LN. +105°C

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SERIE E58 CM


SOLID SHAFT ABSOLUTE MULTITURN ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Zamac Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight approx.	0,08 Kg
Operating temperature range	-40°C to +85°C - Standard -40°C to +105°C - Special Customer LN
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable or industrial connector M23 (other cable lengths available on order) Female connector not included

ELECTRICAL SPECIFICATIONS

Interface	
Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary Gray
Protocol	SSI
Singleturn resolution	up to 13 bits
Multiturn resolution	up to 24 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
"Low" signal level	< 0,8 VDC
"High" signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION



	Cable 8x0,14 mm ² 95.0008052	Connector M23 12p CW
GND	White	1
VCC	Brown	2
DATA+	Yellow	3
DATA-	Pink	4
CLK+	Green	5
CLK-	Grey	6
PRESET*	Red	7
DIR**	Blue	8

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.

SERIE E58 CM

SOLID SHAFT ABSOLUTE MULTITURN ENCODER



CONNECTION DIMENSIONS

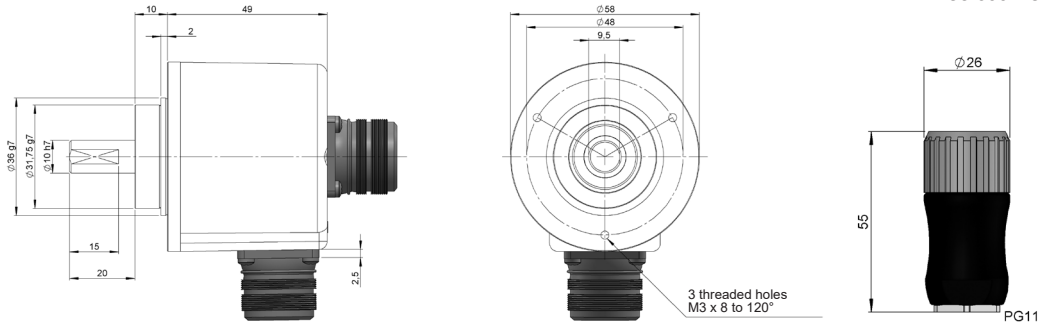
Female connector not included

Connection 3

Radial
M23 12p
male panel
clockwise

Connection 5

Axial
M23 12p
male panel
clockwise



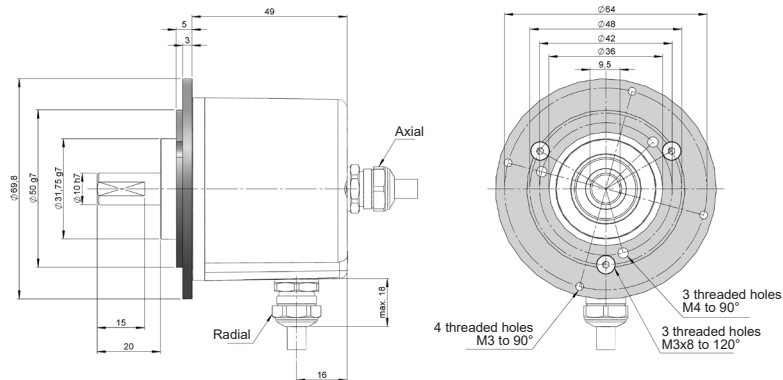
Female connector
95.0007131

FLANGE DIMENSIONS

Flange mounting included

Flange 2

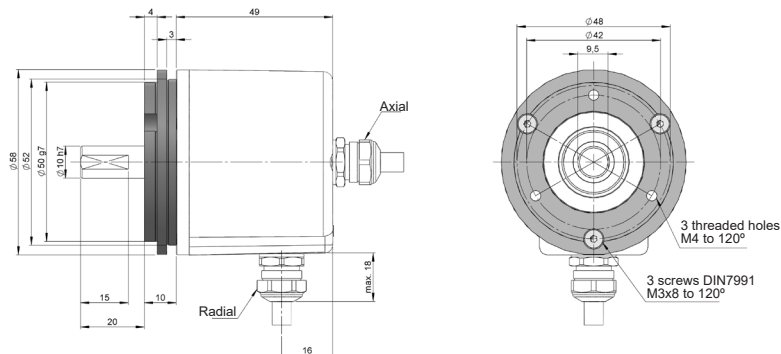
90.1002



Flange 3

90.1003

Synchro

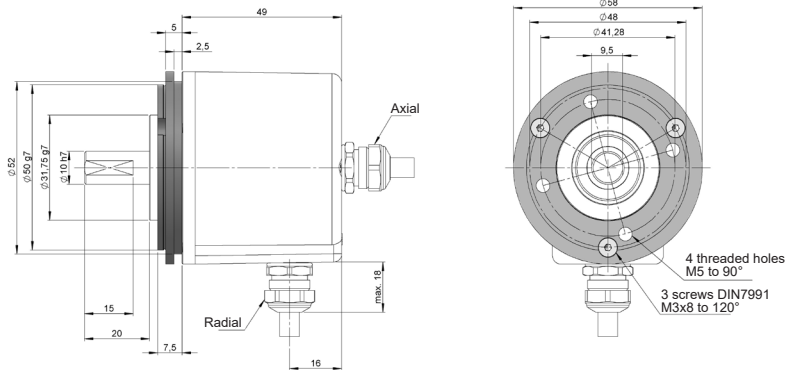


SERIE E58 CM

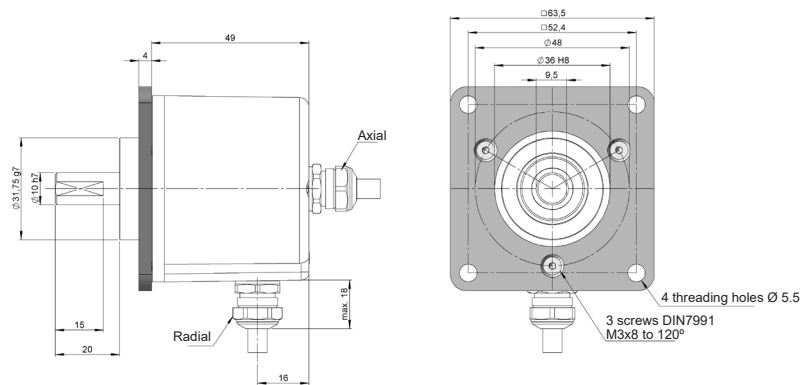
SOLID SHAFT ABSOLUTE MULTITURN ENCODER



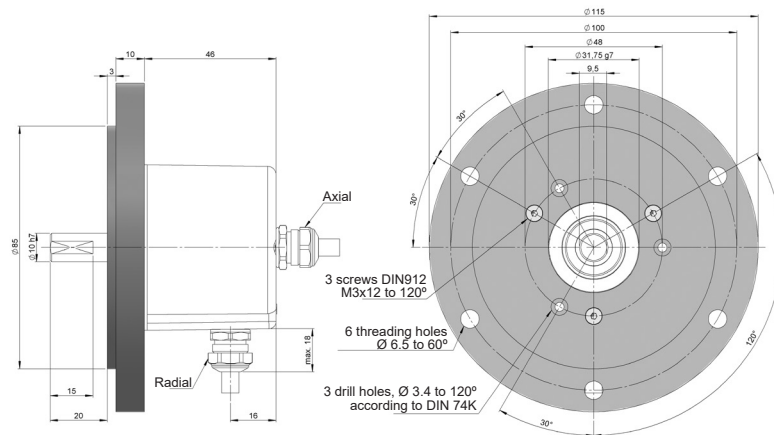
Flange 4
90.1004

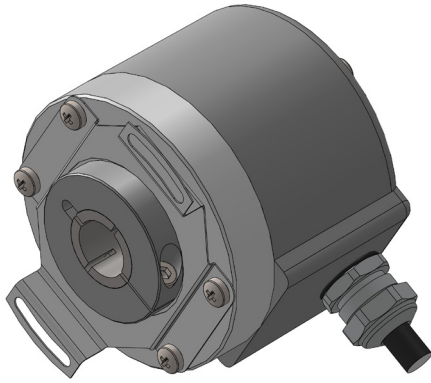


Flange 5
90.1005



Flange 6
90.1006



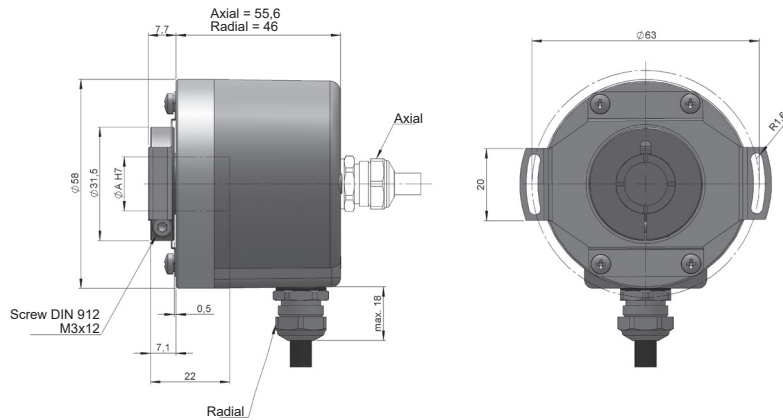
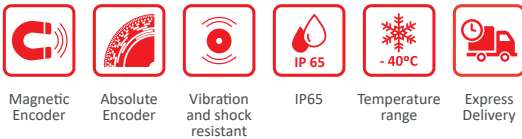


SERIE E58 HM

BLIND HOLLOW SHAFT ABSOLUTE MULTITURN ENCODER



- Singleturn resolution up to 13 bits
- Multiturn resolution up to 24 bits
- Magnetic technology
- External diameter 58 mm
- Blind hollow shaft \varnothing 8, 10, 12, 14 and 15 mm
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector M23



HOLLOW SHAFT	\varnothing A
3	8
4	10
5	12
7	14
8	15

Drawing connection type 1/2, anti-rotation system type 3 (flexible flange 90.1027)

REFERENCE

Reference example: E58HM-SSI-31221-1212

Serie	Interface	Hollow shaft	Anti-rotation system	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Multiturn resolution	Special customer
E58HM -	SSI -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	SSI. SSI	3. \varnothing 8 mm 4. \varnothing 10 mm 5. \varnothing 12 mm 7. \varnothing 14 mm 8. \varnothing 15 mm	1. None 2. Flexible flange (90.1018) 3. Flexible flange (90.1027) 4. Flexible flange (90.1075) (*)	1. Axial cable 2. Radial cable 3. Radial 5. Axial M23 12p	1. Binary CW 2. Binary CCW 3. Gray CW 4. Gray CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	12. 12 bits 16. 16 bits 20. 20 bits 24. 24 bits	LN. +105°C

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(*) Anti-rotation system type 3 (flexible flange 90.1027) and 4 (flexible flange 90.1075) supplied assembled.
Anti-rotation system type 2 (flexible flange 90.1018) supplied disassembled and includes the screws required for assembly.



SERIE E58 HM


BLIND HOLLOW SHAFT ABSOLUTE MULTITURN ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Zamac Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange (included)
Permitted misalignment	±0.5 mm axial, ±0.3 mm radial (90.1018) ±0.5 mm axial, ±0.3 mm radial (90.1027) ±0.5 mm axial, ±0.2 mm radial (90.1075)
Shaft fixing	Clamp
Blind hollow shaft diameter	8, 10, 12, 14 and 15 mm
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight aprox.	0,08 Kg
Operating temperature range	-40°C to +85°C - Standard -40°C to +105°C - Special Customer LN
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable or industrial connector M23 (other cable lengths available on order) Female connector not included

ELECTRICAL SPECIFICATIONS

Interface	
Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary Gray
Protocol	SSI
Singleturn resolution	up to 13 bits
Multiturn resolution	up to 24 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
"Low" signal level	< 0,8 VDC
"High" signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION



	Cable 8x0,14 mm ² 95.0008052	Connector M23 12p CW
GND	White	1
VCC	Brown	2
DATA+	Yellow	3
DATA-	Pink	4
CLK+	Green	5
CLK-	Grey	6
PRESET*	Red	7
DIR**	Blue	8

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.

SERIE E58 HM

BLIND HOLLOW SHAFT ABSOLUTE MULTITURN ENCODER



CONNECTION DIMENSIONS

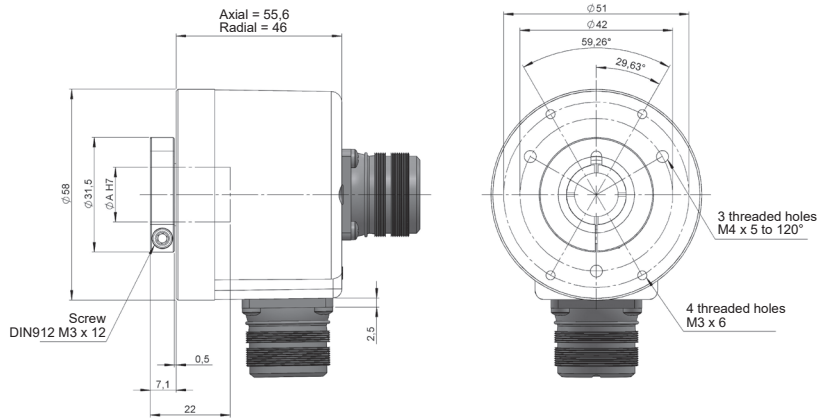
Female connector not included

Connection 3

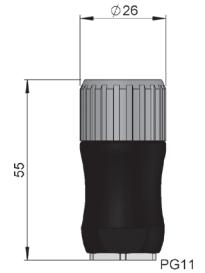
Radial
M23 12p
male panel
clockwise

Connection 5

Axial
M23 12p
male panel
clockwise



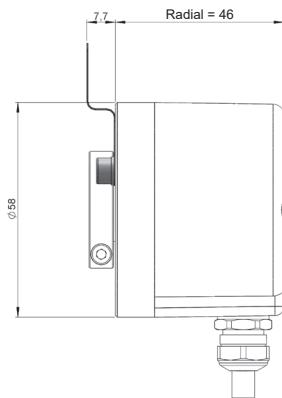
Female connector
95.0007131



ANTI-ROTATION SYSTEMS DIMENSIONS

Anti-rotation system 2

Flexible flange
90.1018

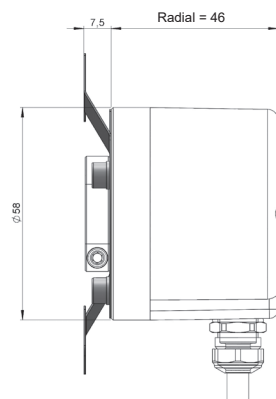


90.1018



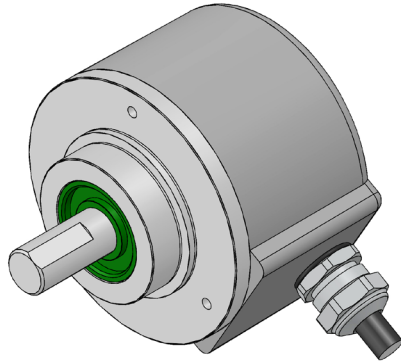
Anti-rotation system 3

Flexible flange
90.1075



90.1075



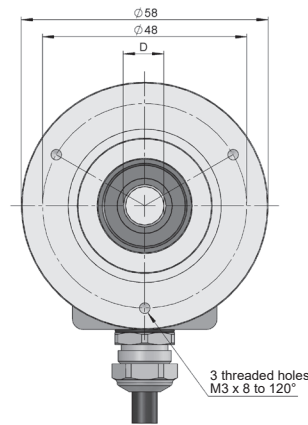
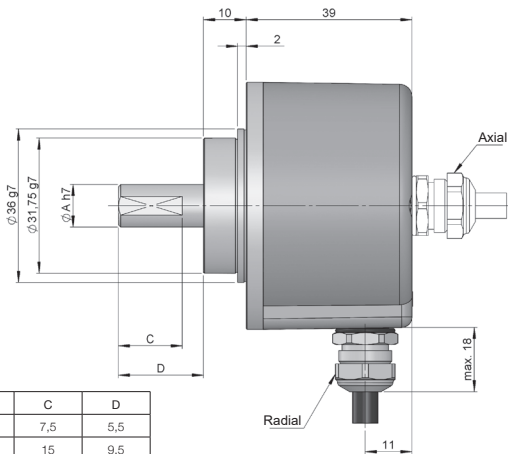


SERIE E58 CS

SOLID SHAFT ABSOLUTE SINGLETURN ENCODER



- Singleturn resolution up to 13 bits
- Magnetic technology
- External diameter 58 mm
- Solid shaft \varnothing 6, 8 and 10 mm
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector M23



SOLID SHAFT	\varnothing A	B	C	D
1	6	10	7,5	5,5
2	10	20	15	9,5
3	8	20	15	7,5

Drawing connection type 1/2, without flange

REFERENCE

Reference example: E58CS-SSI-12231-12

Serie	Interface	Solid shaft	Flange	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Special customer
E58CS -	SSI -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	SSI, SSI	1. \varnothing 6 mm 2. \varnothing 10 mm 3. \varnothing 8 mm	1. None 2. 90.1002 3. 90.1003 4. 90.1004 5. 90.1005 6. 90.1006	1. Axial cable 2. Radial cable 3. Radial M23 12p 5. Axial M23 12p	1. Binary CW 2. Binary CCW 3. Gray CW 4. Gray CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	<input type="checkbox"/> <input type="checkbox"/>

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SERIE E58 CS


SOLID SHAFT ABSOLUTE SINGLETURN ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Zamac Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight aprox.	0,08 Kg
Operating temperature range	-40°C to +105°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable or industrial connector M23 (other cable lengths available on order) Female connector not included

ELECTRICAL SPECIFICATIONS

Interface	
Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary Gray
Protocol	SSI
Singleturn resolution	up to 13 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
"Low" signal level	< 0,8 VDC
"High" signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION



	Cable 8x0,14 mm ² 95.0008052	Connector M23 12p CW
GND	White	1
VCC	Brown	2
DATA+	Yellow	3
DATA-	Pink	4
CLK+	Green	5
CLK-	Grey	6
PRESET*	Red	7
DIR**	Blue	8

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.

SERIE E58 CS

SOLID SHAFT ABSOLUTE SINGLETURN ENCODER



CONNECTION DIMENSIONS

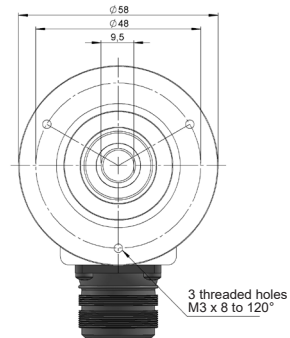
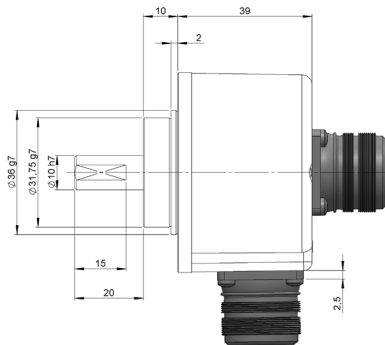
Female connector not included

Connection 3

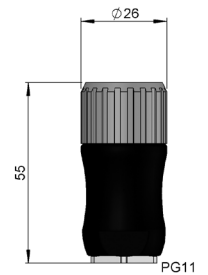
Radial
M23 12p
male panel
clockwise

Connection 5

Axial
M23 12p
male panel
clockwise



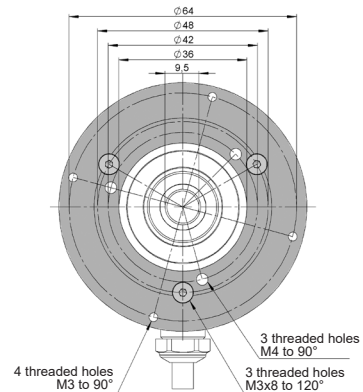
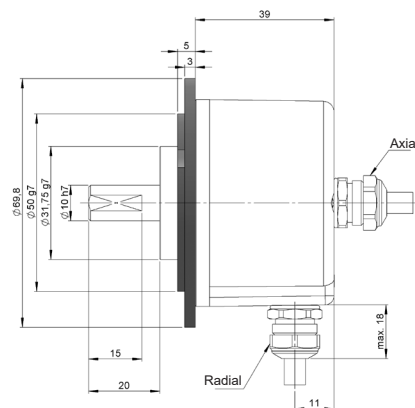
Female connector
95.0007131



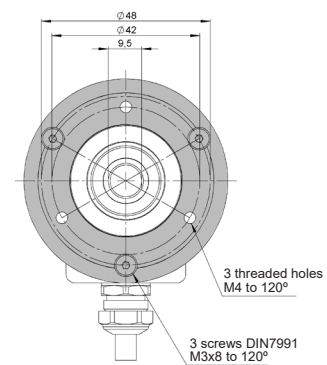
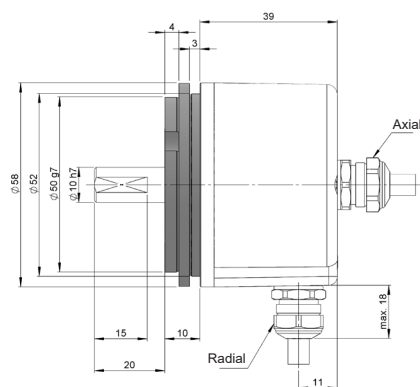
FLANGE DIMENSIONS

Flange mounting included

Flange 2 90.1002



Flange 3 90.1003 Synchro

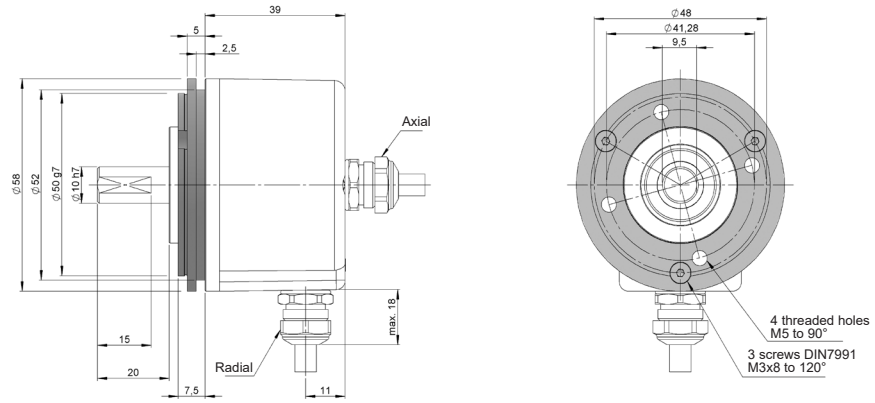


SERIE E58 CS

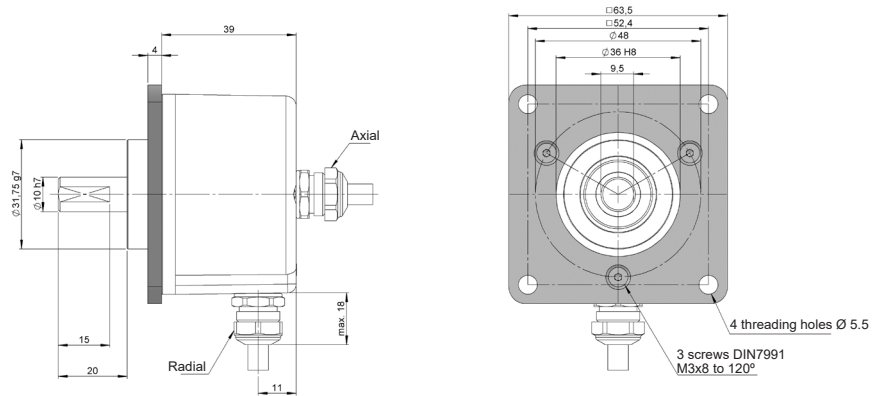
SOLID SHAFT ABSOLUTE SINGLETURN ENCODER



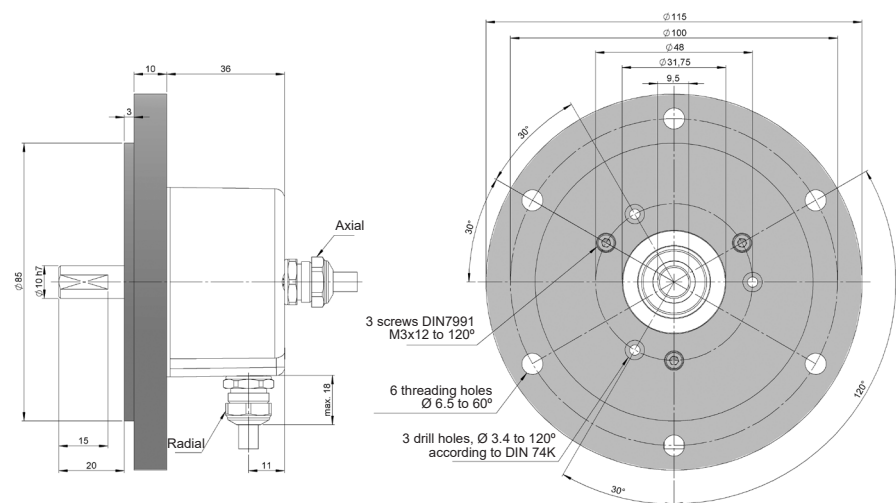
Flange 4
90.1004

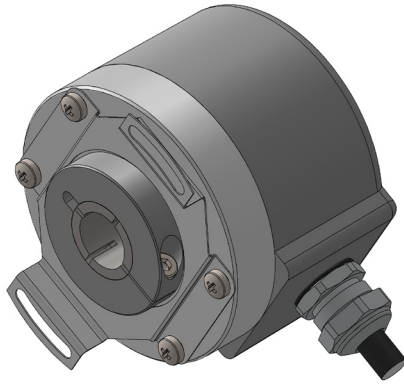


Flange 5
90.1005



Flange 6
90.1006



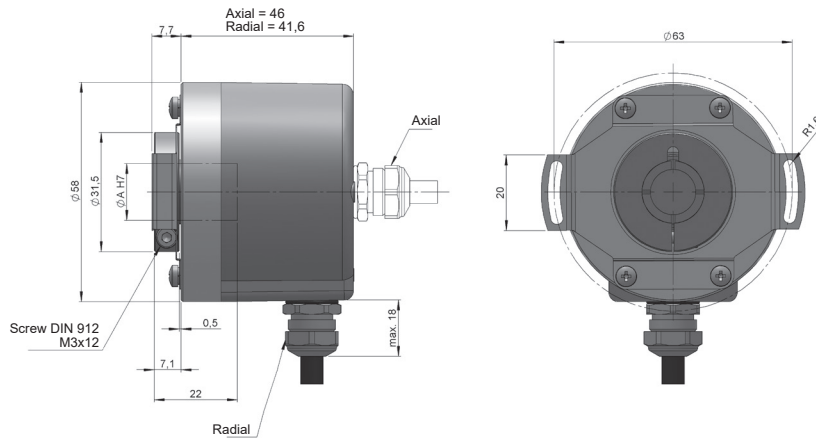


SERIE E58 HS

BLIND HOLLOW SHAFT ABSOLUTE SINGLETURN ENCODER



- Singleturn resolution up to 13 bits
- Magnetic technology
- External diameter 58 mm
- Blind hollow shaft \varnothing 8, 10, 12, 14 and 15 mm
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector M23



HOLLOW SHAFT	\varnothing A
3	8
4	10
5	12
7	14
8	15

Drawing connection type 1/2, anti-rotation system type 3 (flexible flange 90.1027)

REFERENCE

Reference example: E58HS-SSI-31231-12

Serie	Interface	Hollow shaft	Anti-rotation system	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Special customer
E58HS -	SSI -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	SSI. SSI	3. \varnothing 8 mm 4. \varnothing 10 mm 5. \varnothing 12 mm 7. \varnothing 14 mm 8. \varnothing 15 mm	1. None 2. Flexible flange (90.1018) 3. Flexible flange (90.1027) 4. Flexible flange (90.1075) (*)	1. Axial cable 2. Radial cable 3. Radial M23 12p 5. Axial M23 12p	1. Binary CW 2. Binary CCW 3. Gray CW 4. Gray CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	<input type="checkbox"/> <input type="checkbox"/>

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Step file 3D

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service available in 24 h

(*) Anti-rotation system type 3 (Flexible flange 90.1027) and 4 (Flexible flange 90.1075) supplied assembled.
Anti-rotation system type 2 (Flexible flange 90.1018) supplied disassembled and includes the screws required for assembly.



SERIE E58 HS


BLIND HOLLOW SHAFT ABSOLUTE SINGLETURN ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Zamac Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange (included)
Permitted misalignment	±0.5 mm axial, ±0.3 mm radial (90.1018) ±0.5 mm axial, ±0.3 mm radial (90.1027) ±0.5 mm axial, ±0.2 mm radial (90.1075)
Shaft fixing	Clamp
Blind hollow shaft diameter	8, 10, 12, 14 and 15 mm
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP65
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight aprox.	0,08 Kg
Operating temperature range	-40°C to +105°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable or industrial connector M23 (other cable lengths available on order) Female connector not included

ELECTRICAL SPECIFICATIONS

Interface	
Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary Gray
Protocol	SSI
Singleturn resolution	up to 13 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
"Low" signal level	< 0,8 VDC
"High" signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION



	Cable 8x0,14 mm ² 95.0008052	Connector M23 12p CW
GND	White	1
VCC	Brown	2
DATA+	Yellow	3
DATA-	Pink	4
CLK+	Green	5
CLK-	Grey	6
PRESET*	Red	7
DIR**	Blue	8

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.

SERIE E58 HS

BLIND HOLLOW SHAFT ABSOLUTE SINGLETURN ENCODER



CONNECTION DIMENSIONS

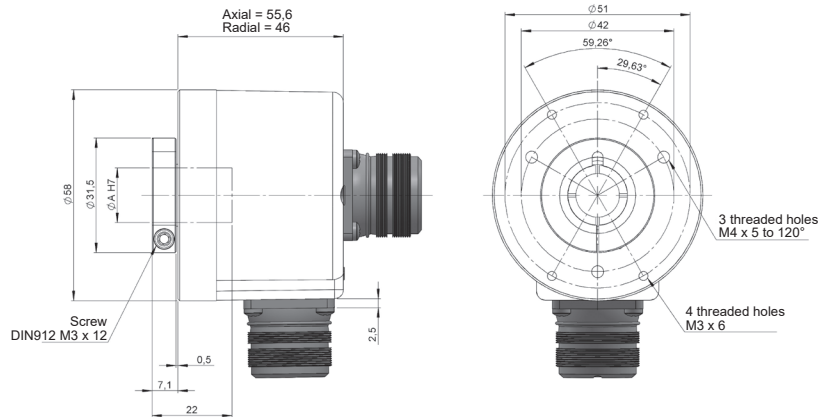
Female connector not included

Connection 3

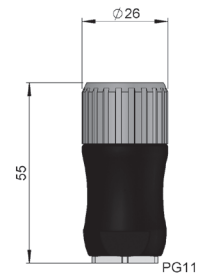
Radial
M23 12p
male panel
clockwise

Connection 5

Axial
M23 12p
male panel
clockwise



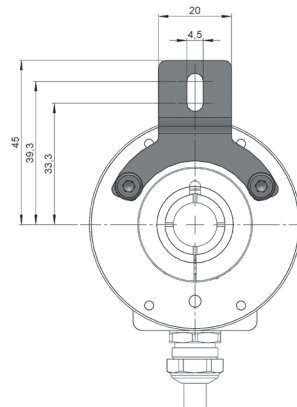
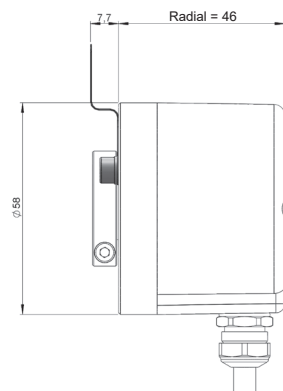
Female connector 95.0007131



ANTI-ROTATION SYSTEMS DIMENSIONS

Anti-rotation system 2

Flexible flange
90.1018

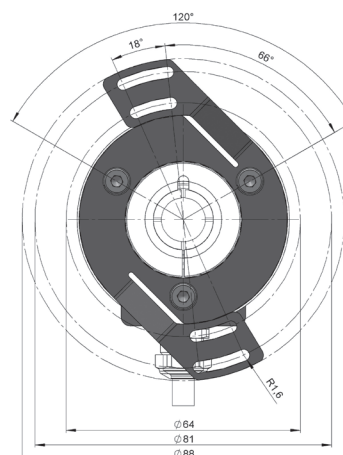
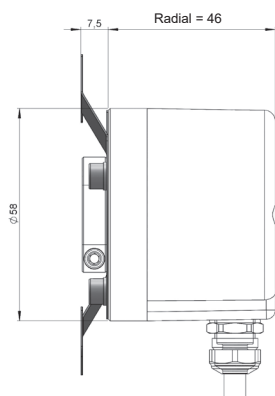


90.1018



Anti-rotation system 3

Flexible flange
90.1075



90.1075





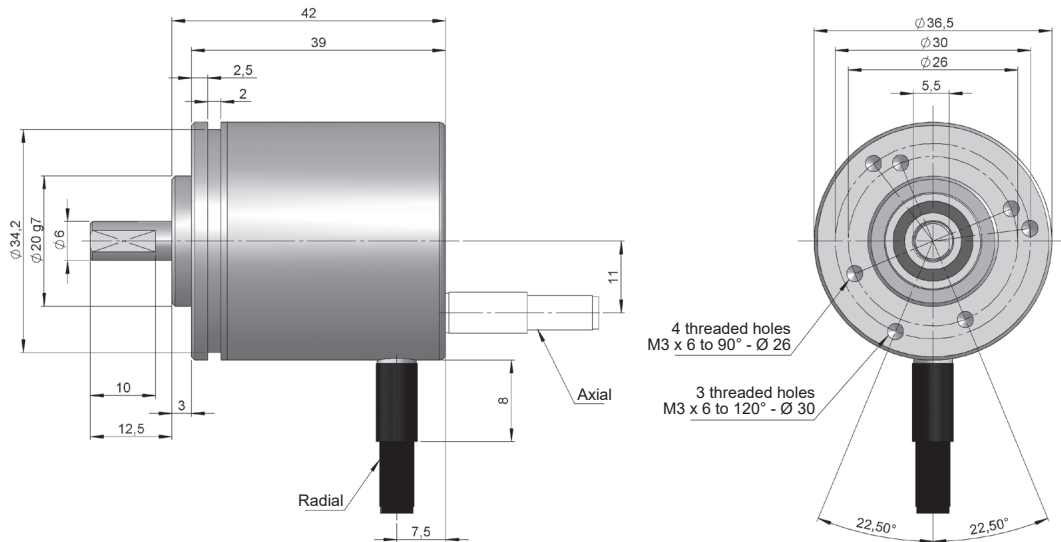
SERIE E36 CM

MINIATURE SOLID SHAFT ABSOLUTE MULTITURN ENCODER



- Singleturn resolution up to 13 bits
- Multiturn resolution up to 24 bits
- Magnetic technology
- External diameter 36,5 mm
- Shaft \varnothing 6 mm
- Protection class IP64 according to DIN EN 60529
- Connection by cable (other cable length available)

Magnetic Encoder	Absolute Encoder	Miniature Encoder	Vibration and shock resistant	IP64	Temperature range	Express Delivery



REFERENCE

Reference example: E36CM-BIS-1211-1212

Serie	Interface	Solid shaft	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Multiturn resolution	Special customer
E36CM -	BIS -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	BIS, BISS-C	1. \varnothing 6 mm	1. Axial cable 2. Radial cable	1. Binary CW 2. Binary CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	12. 12 bits 16. 16 bits 20. 20 bits 24. 24 bits	LN. +105°C

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SERIE E36 CM

MINIATURE SOLID SHAFT ABSOLUTE MULTITURN ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight approx.	0,08 Kg
Operating temperature range	-40°C to +85°C - Standard -40°C to +105°C - Special Customer LN
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable (other cable lengths available on order)

ELECTRICAL SPECIFICATIONS

Interface	
Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary
Protocol	BISS-C
Singleturn resolution	up to 13 bits
Multiturn resolution	up to 24 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
“Low” signal level	< 0,8 VDC
“High” signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION

	Cable 8x0,14 mm ² 95.0008052
GND	White
VCC	Brown
DATA+	Yellow
DATA-	Pink
CLK+	Green
CLK-	Grey
PRESET*	Red
DIR**	Blue

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.



SERIE E36 HM

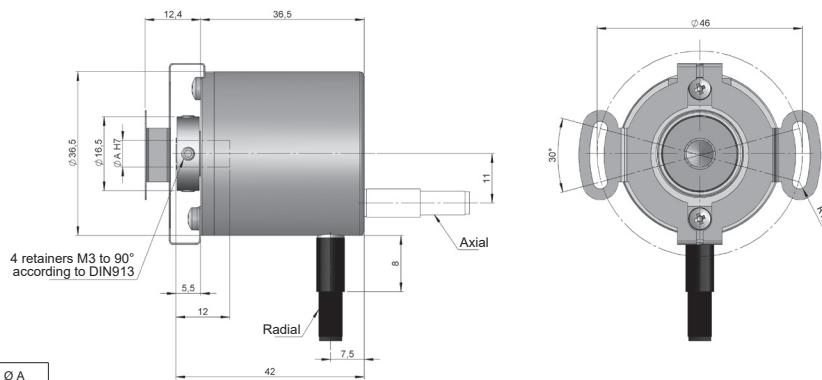


MINIATURE BLIND HOLLOW SHAFT ABSOLUTE MULTITURN ENCODER

- Singleturn resolution up to 13 bits
- Multiturn resolution up to 24 bits
- Magnetic technology
- External diameter 36,5 mm
- Blind hollow shaft \varnothing 6 mm or 8 mm
- Protection class IP64 according to DIN EN 60529
- Connection by cable (other cable length available)

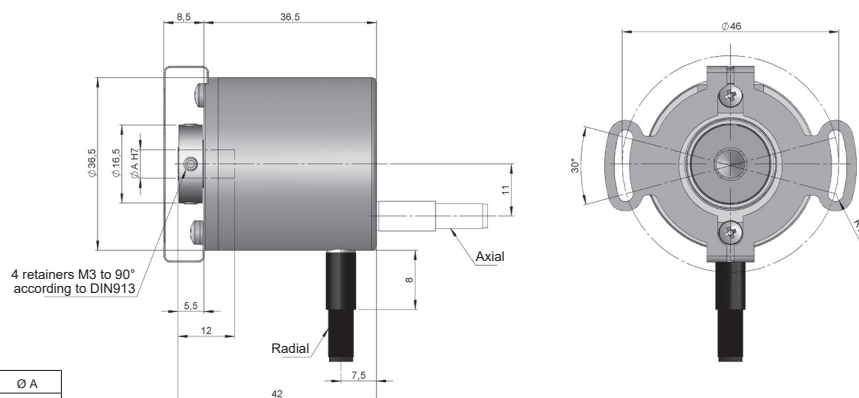
Magnetic Encoder	Absolute Encoder	Miniature Encoder	Vibration and shock resistant	IP64	Temperature range	Express Delivery

Setscrew / Flexible flange (90.1037)



BLIND HOLLOW SHAFT	\varnothing A
1	6 mm
2	8 mm

Setscrew / Flexible flange (90.1111)



BLIND HOLLOW SHAFT	\varnothing A
1	6 mm
2	8 mm



SERIE E36 HM

MINIATURE BLIND HOLLOW SHAFT ABSOLUTE MULTITURN ENCODER



REFERENCE										Reference example: E36HM-BIS-11211-1212
Serie	Interface	Anti-rotation system	Blind-Hollow shaft	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Multiturn resolution	Special customer	
E36HM -	BIS -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	BIS. BISS-C	1. Flexible flange (90.1037) 2. Flexible flange (90.1111) (*)	1. Ø 6 mm 2. Ø 8 mm	1. Axial cable 2. Radial cable	1. Binary CW 2. Binary CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	12. 12 bits 16. 16 bits 20. 20 bits 24. 24 bits	LN. +105°C	

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(*) Anti-rotation system type 1 (Flexible flange 90.1037) and 2 (Flexible flange 90.1111) supplied assembled.

MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange (included)
Permitted misalignment	±0.3 mm axial, ±0.2 mm radial (90.1037) ±0.2 mm axial, ±0.1 mm radial (90.1111)
Shaft fixing	Setscrew
Blind hollow shaft diameter	6 mm or 8 mm
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	10 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight aprox.	0,08 Kg
Operating temperature range	-40°C to +85°C - Standard -40°C to +105°C - Special Customer LN
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable (other cable lengths available on order)

SERIE E36 HM

MINIATURE BLIND HOLLOW SHAFT ABSOLUTE MULTITURN ENCODER



ELECTRICAL SPECIFICATIONS

Interface



Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary
Protocol	BISS-C
Singleturn resolution	up to 13 bits
Multiturn resolution	up to 24 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
“Low” signal level	< 0,8 VDC
“High” signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION



	Cable 8x0,14 mm ² 95.0008052
GND	White
VCC	Brown
DATA+	Yellow
DATA-	Pink
CLK+	Green
CLK-	Grey
PRESET*	Red
DIR**	Blue

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.



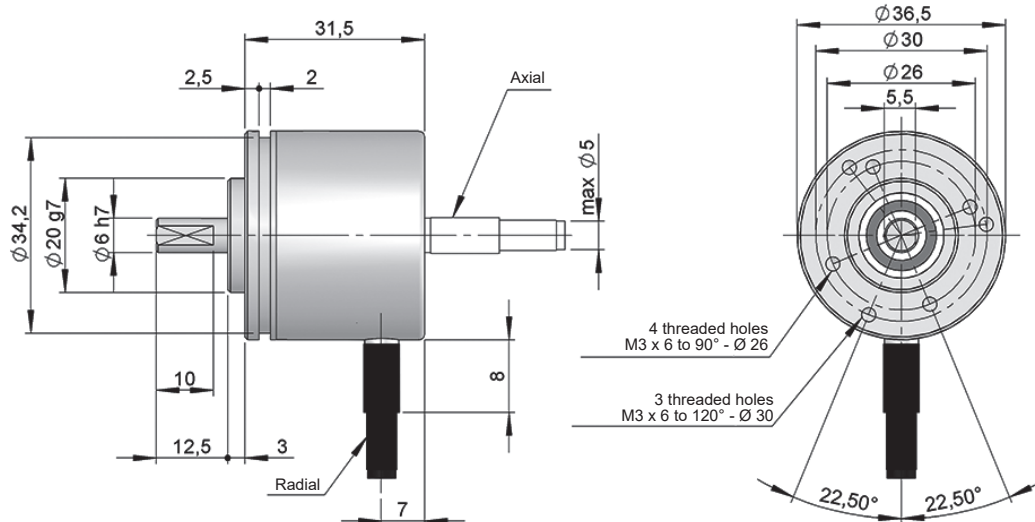
SERIE E36 CS



MINIATURE SOLID SHAFT ABSOLUTE SINGLETURN ENCODER

- Singleturn resolution up to 13 bits
- Magnetic technology
- External diameter 36,5 mm
- Shaft \varnothing 6 mm
- Protection class IP64 according to DIN EN 60529
- Connection by cable (other cable length available)

Magnetic Encoder	Absolute Encoder	Miniature Encoder	Vibration and shock resistant	IP64	Temperature range	Express Delivery



Drawing shaft type 1, connection type 1/2

REFERENCE

Reference example: E36CS-BIS-1211-12

Serie	Interface	Solid shaft	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Special customer
E36CS -	BIS -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	BIS. BISS	1. \varnothing 6 mm	1. Axial cable 2. Radial cable	1. Binary CW 2. Binary CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	<input type="checkbox"/> <input type="checkbox"/>

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SERIE E36 CS

MINIATURE SOLID SHAFT ABSOLUTE SINGLETURN ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	2 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight approx.	0,08 Kg
Operating temperature range	-40°C to +105°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable (other cable lengths available on order)

ELECTRICAL SPECIFICATIONS

Interface	
Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary
Protocol	BISS-C
Singleturn resolution	up to 13 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
"Low" signal level	< 0,8 VDC
"High" signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION

	Cable 8x0,14 mm ² 95.0008052
GND	White
VCC	Brown
DATA+	Yellow
DATA-	Pink
CLK+	Green
CLK-	Grey
PRESET*	Red
DIR**	Blue

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.



SERIE E36 HS

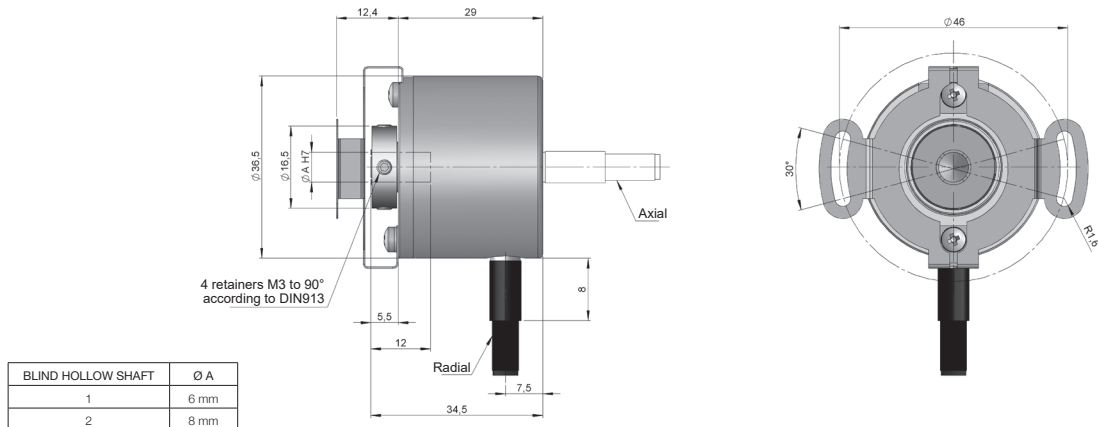


MINIATURE BLIND HOLLOW SHAFT ABSOLUTE SINGLETURN ENCODER

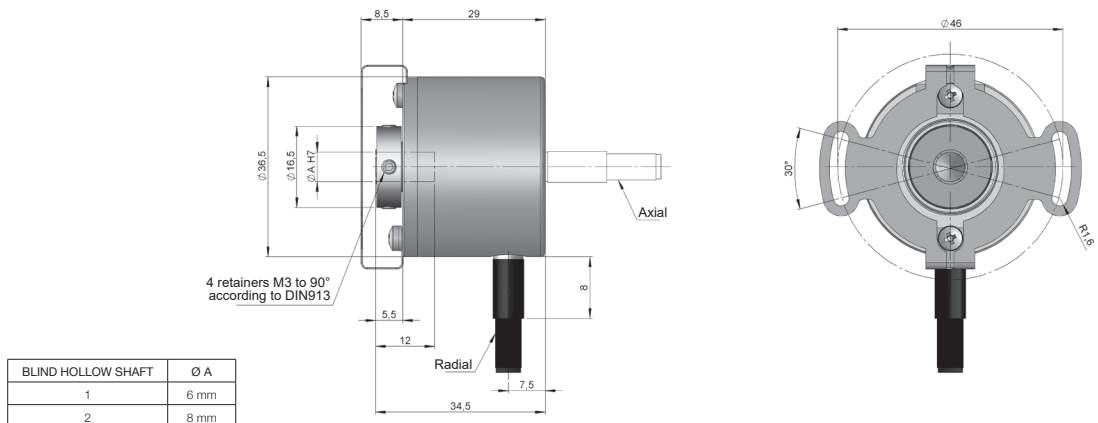
- Singleturn resolution up to 13 bits
- Magnetic technology
- External diameter 36,5 mm
- Blind hollow shaft \varnothing 6 mm or 8 mm
- Protection class IP64 according to DIN EN 60529
- Connection by cable (other cable length available)

Magnetic Encoder	Absolute Encoder	Miniature Encoder	Vibration and shock resistant	IP64	Temperature range - 40°C	Express Delivery

Setscrew / Flexible flange (90.1037)



Setscrew / Flexible flange (90.1111)



SERIE E36 HS

MINIATURE BLIND HOLLOW SHAFT ABSOLUTE SINGLETURN ENCODER



REFERENCE

Reference example: E36HS-BIS-11211-12

Serie	Interface	Anti-rotation system	Blind-Hollow shaft	Connection	Code	Power Supply / Electronic output	Singleturn resolution	Special customer
E36HS -	BIS -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	BIS. BISS-C	1. Flexible flange (90.1037) 2. Flexible flange (90.1111) (*)	1. Ø 6 mm 2. Ø 8 mm	1. Axial cable 2. Radial cable	1. Binary CW 2. Binary CCW	1. 4,75...30 VDC / RS422	09. 9 bits 10. 10 bits 11. 11 bits 12. 12 bits 13. 13 bits	

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(*) Anti-rotation system type 1 (Flexible flange 90.1037) and 2 (Flexible flange 90.1111) supplied assembled.

MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Flexible flange (included)
Permitted misalignment	±0.3 mm axial, ±0.2 mm radial (90.1037) ±0.2 mm axial, ±0.1 mm radial (90.1111)
Shaft fixing	Setscrew
Blind hollow shaft diameter	6 mm or 8 mm
Maximum number of revolutions permitted mechanically	6000 rpm - Standard 10000 rpm - Upon request 12000 rpm (≤ 12 bits) - Upon request
Protection against dust and splashes according to DIN EN 60529	IP64
Rotor inertia moment	10 gcm ²
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Maximum load permitted on axial shaft	20 N
Maximum load permitted on radial shaft	40 N
Weight approx.	0,08 Kg
Operating temperature range	-40°C to +105°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Axial or radial connection	2 meters cable (other cable lengths available on order)

SERIE E36 HS

MINIATURE BLIND HOLLOW SHAFT ABSOLUTE SINGLETURN ENCODER



ELECTRICAL SPECIFICATIONS

Interface



Electronic output	RS422
Power supply (VCC)	4,75...30 VDC
Consumption	≤ 100 mA
Code	Binary
Protocol	BISS-C
Singleturn resolution	up to 13 bits
Absolute accuracy	±0,35°
Relative accuracy	±1,5 LSB
Max. load capability / channel	±20 mA
“Low” signal level	< 0,8 VDC
“High” signal level	2 ... 5,5 VDC
Frequency	50 kHz...2 MHz
Short circuit protection	Yes
Protection polarity inversion	Yes

CONNECTION



	Cable 8x0,14 mm ² 95.0008052
GND	White
VCC	Brown
DATA+	Yellow
DATA-	Pink
CLK+	Green
CLK-	Grey
PRESET*	Red
DIR**	Blue

(*) Apply a 4,75...30 VDC pulse (more than 1 ms) to set the encoder to Zero and reboot the encoder (turn off and then turn on the power supply).

(**) Connect to 4,75...30 VDC to change direction from default. If this input is not used, it should be connected to GND in order to avoid interferences. The encoder must be always rebooted (turn off and then turn on the power supply) after switching.



SERIE CM26M

ABSOLUTE MULTITURN MAGNETIC ENCODER

- System contactless Hall Effect which guarantees over 100 million turns of life
- Programmable up to 72000° (200 turns)
- Resolution 12 bits
- External diameter 25 mm
- Shaft Ø 6 mm
- Analog output 0...10V
- Mechanically 100% interchangeable with available potentiometers in the market



Magnetic Encoder



Absolute Encoder



Analog output



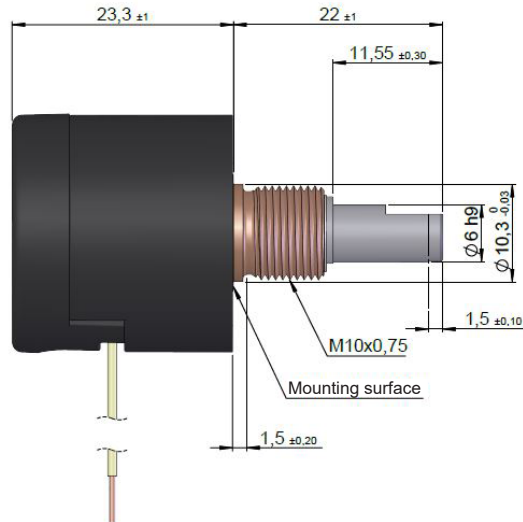
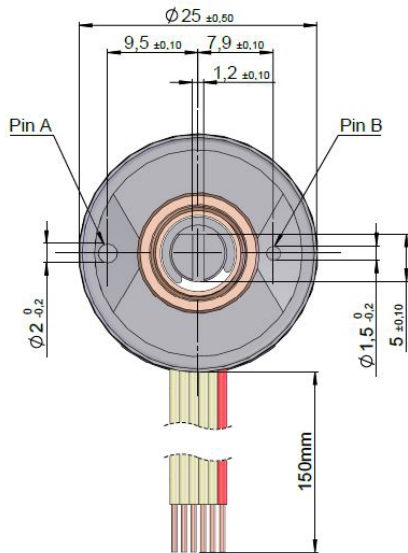
IP 40



Temperature range
-40°C



Express Delivery



REFERENCE Reference example: CM26M-22-3600

Serie	Mechanical option	Output signal	Measurement range (in degrees)	Special Customer
CM26M -	□	□ -	3 6 0 0	. □ □

2. Thread 10x0,75 mm / Shaft Ø 6 mm Pin A - Pin B

2. Analog output 0...10V

3600. Standard (3600° - 10 turns) (*)

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(*) Programmable up to 72000° (200 turns).
The CM26M series enables easy, flexible and perfect adjustment of start and end points of the analog output signal and the sense of rotation direction by the user.

 Previous assembly and installation reading "Programming Manual CM26M" is recommended:
www.encoderhohner.com/product/cm26m/



SERIE CM26M

ABSOLUTE MULTITURN MAGNETIC ENCODER

MECHANICAL SPECIFICATIONS

Materials	Housing: Plastic / Bronze Shaft: Stainless Steel
Bearings	Sleeve bearing
Mechanical angle	Endless
Lifetime	> 100x10 ⁶ shaft rotating movements
Maximum number of revolutions permitted mechanically	100 rpm
Protection against dust and splashes according to DIN EN 60529	IP 40
Operational torque	0,1 ≤ M ≤ 0,6 Ncm
Maximum load permitted on radial shaft	1 N
Mounting parts (included)	Hexagonal nut, 14 mm + tooth washer
Torque nut assembly	≤ 3 Nm
Weight aprox.	0,3 Kg
Operating temperature range	-40°C to +85°C
Vibration according to DIN EN 60068-2-6	±1,5 mm / 20 g / 10...2000 Hz / 16 frequency cycles (3x4 h)
Shock according to DIN EN 60068-2-27	50 g / 11 ms / halfsine (3x6 shocks)
Radial connection	Flat ribbon cable (0,15 m)

ELECTRICAL SPECIFICATIONS

Measuring range	0...72000° (200 turns)
Independent linearity	±0.05 % (3600°)
Absolute linearity	±0.1 % (3600°)
Resolution	12 bits
Update rate	3 ms
Max. number of programming cycles	10.000
Output signal	0...10 V
Power supply	9...30 VDC 15...30 VDC
Power consumption (without load)	< 10 mA
Output load	≥ 5KΩ
Insulation voltage	1000 VAC (50 Hz, 1 min)
Insulation resistance	2 MΩ (500 VDC, 1 min)

(*) For detecting absolute position (> 360°) the sensor should not be turned more than 179° without supply voltage.

CONNECTION



	Flat ribbon cable AWG28 RM / 1.27
DIR	1 (red)
END (programming cable)	2
START (programming cable)	3
VCC	4
OUT	5
GND	6

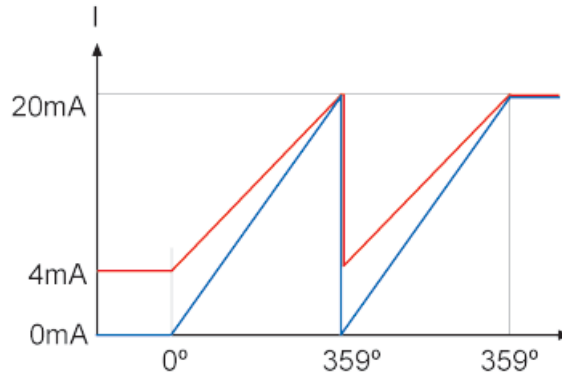
GENERAL INFORMATION **ANALOG**

ABSOLUT AND PROGRAMMABLE ABSOLUT ANALOG ENCODERS

■ Analog interface

The analog interface has two outputs: one provides the absolute position measurement as a voltage (0/10V), and the other as a current (0/20mA or 4/20mA). Both outputs come from a singleturn absolute encoder with a 12bit resolution, with the 0 absolute position (0 degrees) having a value of 0V at the V+ output and 4 or 0 mA at the I+ output.

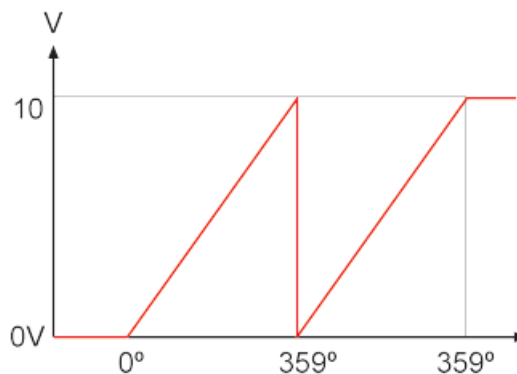
When the absolute position is 4095 (359 degrees) the V+ output will be 10V and the I+ output will be 20mA. These outputs consist of four wires (two per output): I+, I- and V+, V-, being I- and V- referenced internally to negative (GND), and thus forming two measurement loops. Depending on the measurement system implemented by the customer, one or the other output will be used (current or voltage).



■ Current output

Electrical specifications

Output form	0/20mA o 4/20mA
Resolution	Up to 12 bits (4096 positions) for 360°
Thermal stability	±20 ppm/°C
Update frequency	100KHz
Linearity error	0.07% of the active angle
R _{LOAD} máx.	(V _{IN} - 2 V)/20mA)
R _{LOAD} min.	150Ω



■ Voltage output

Electrical specifications









Output form	0/10V (V _{CC} min.=12V)
Resolution	Up to 12 bits (4096 positions) for 360°
Slew Rate	0.7V/us
Update frequency	100KHz
Linearity error	0.05% of the active angle
Load resistance	>5kΩ
Protection against shortcircuit	Yes

ABSOLUT ENCODERS ANALOG

- Interface analog current loop output 4..20mA, 0..20mA and 0..10 V voltage output
- Resolution 10 or 12 bits
- Solid or blind hollow shaft
- Protection class IP65 or IP67 according to DIN 40050
- Direction and range selectable
- Radial or axial connection, cable or connector output



OVERVIEW

	Diameter 58 mm		Diameter 90 mm
	Solid shaft	Hollow shaft	Solid shaft
Singleturn	CS10 CS10 IP67 	HS10 	CS30 CS30 IP67 
Multiturn	CM10 CM10 IP67 	HM10 	CM30 CM30 IP67 
Multiturn programmable	CMP10 	HMP10 	

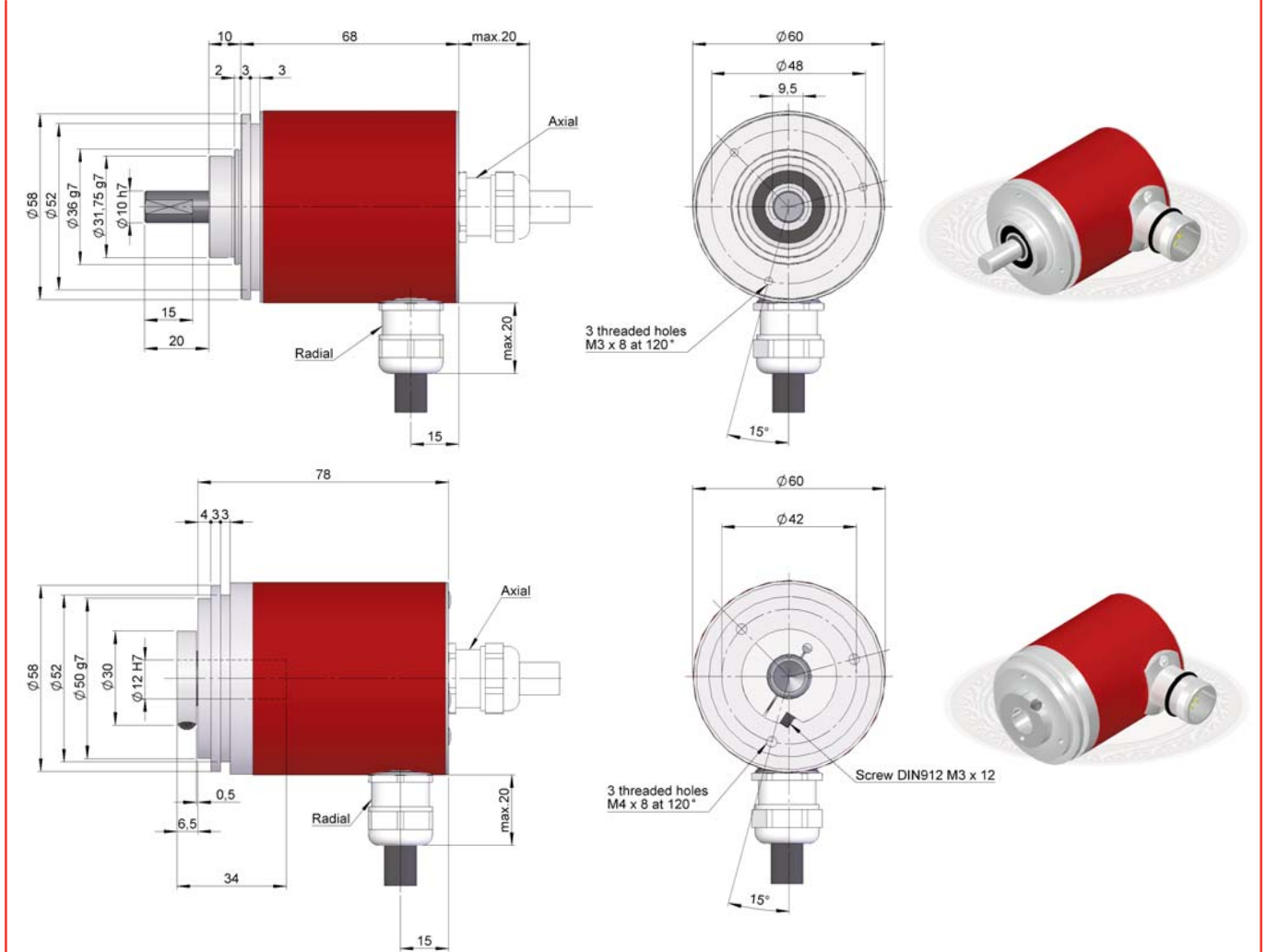
TECHNICAL SPECIFICATIONS

	Diameter 58 mm	Diameter 90 mm
Housing	Aluminium/Stainless steel	
Shaft	Stainless steel	
Bearings	Ballraces	
Bearings lifetime	1x10 ¹⁰ rev.	
Maximum number of revolutions permitted mechanically	6000 rpm.	
Protection against dust and splashes according to DIN 40050	IP65 / IP67.	
Rotor inertia moment	30 gcm ²	270 gcm ²
Starting torque 20°C (68°F)	Máx. 2,0 Ncm	Máx. 5,0 Ncm
Maximum load permitted on axial shaft	40 N	80 N
Maximum load permitted on radial shaft	60 N	100 N
Misalignment permitted axial (blind hollow shaft)	±0.5 mm	-
Misalignment permitted radial (blind hollow shaft)	±0.3 mm	-
Weight aprox.	400 g ST, 500 g MT	1,2 kg ST, 1,3 kg MT
Operating temperature range	-10°C a +70°C	
Vibration	100 m/s ² (10Hz..2000Hz)	
Shock	1000 m/s ² (6ms)	
Consumption max.	100 mA (CS/HS), 150 mA (CM/HM)	
Power supply	10..30Vdc	
Interface	Analogue	
Electrical output	0..20mA, 0..10v, 4..20mA	
Configurable parameter (programmable series)	Range	
Configurable parameters	Direction	
Resolution	10 or 12 bits	
Maximum range	4096 turns	
Radial and axial connection	2 metres cable or industrial connector	

ST: Singleturn MT: Multiturn

SINGLETURN ABSOLUT ENCODER

- Singleturn resolution up to 12 bits
- Protection class IP65 according to DIN 40050
- External diameter 58 mm
- Solid shaft (CS) and blind hollow shaft (HS)



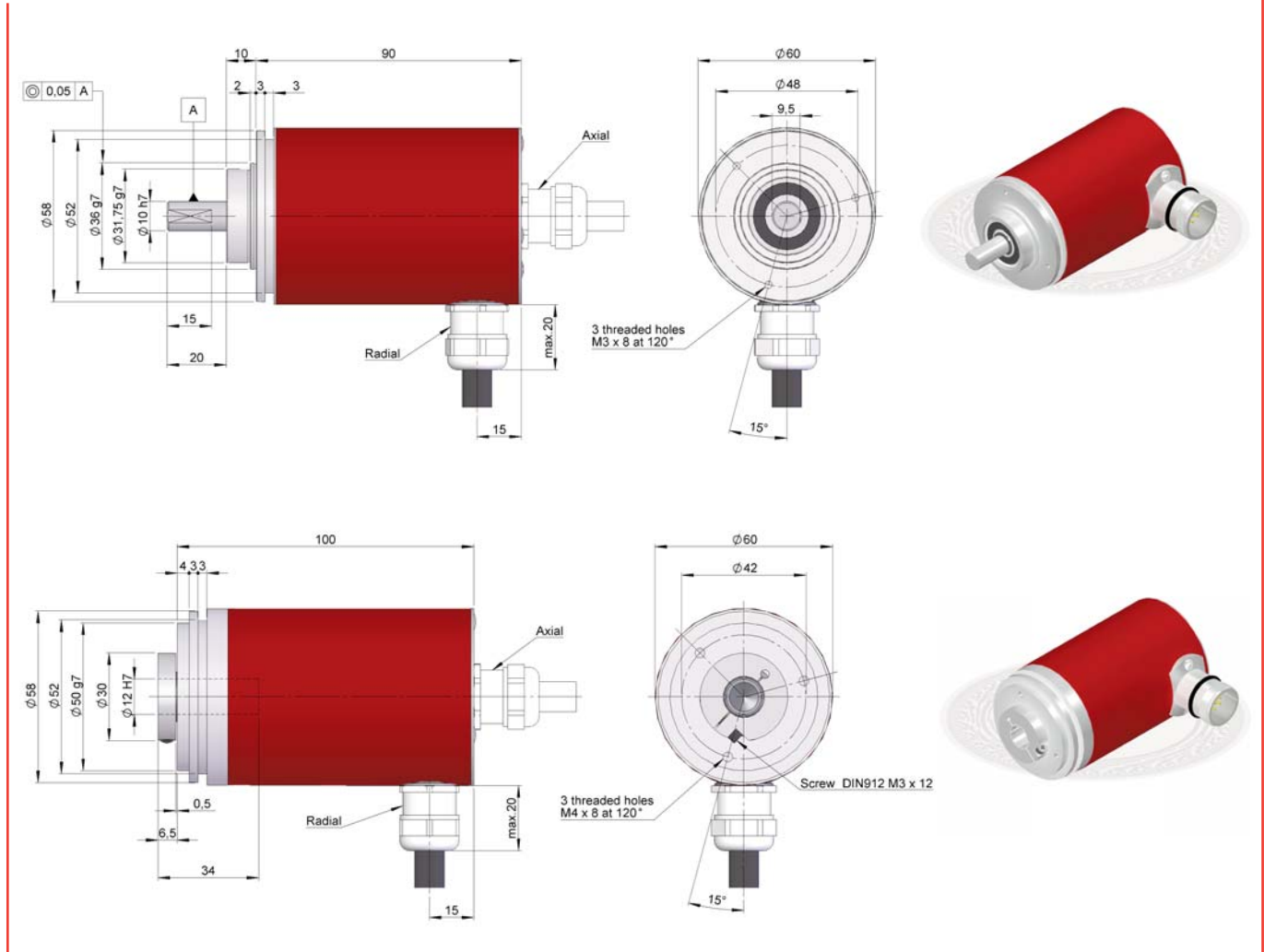
Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	CONFIG PARAMETERS	RESOLUTION	RANGE	SPECIAL CUSTOMER
● ● 10		●	●	●	●	●	●	●	●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
CS- Singleturn Solid shaft		1- Solid Ø6x10 mm 2- Solid Ø10x20 mm 3- Blind hollow Ø12 mm 4- Blind hollow Ø10 mm	1- None 2- 90.1002 3- 90.1003 4- 90.1004 5- 90.1005 6- 90.1006	1- Cable 3- 95.0007131	1- Axial 2- Radial	2- Analog	1- Clockwise 2- Counter clockwise	1- IP65	5- 0...20mA, 15-30V 6- 4...20mA, 15-30V 7- 0...10V, 15-30V	S- Direction	1024- 10 bits 4096- 12 bits	Blank-360 degrees 180- 180 degrees 90- 90 degrees 45- 45 degrees	

MULTITURN ABSOLUT ENCODER

- Resolution up to 12 bits
- Protection class IP65 according to DIN 40050
- External diameter 58 mm
- Solid shaft (CM) and blind hollow shaft (HM)



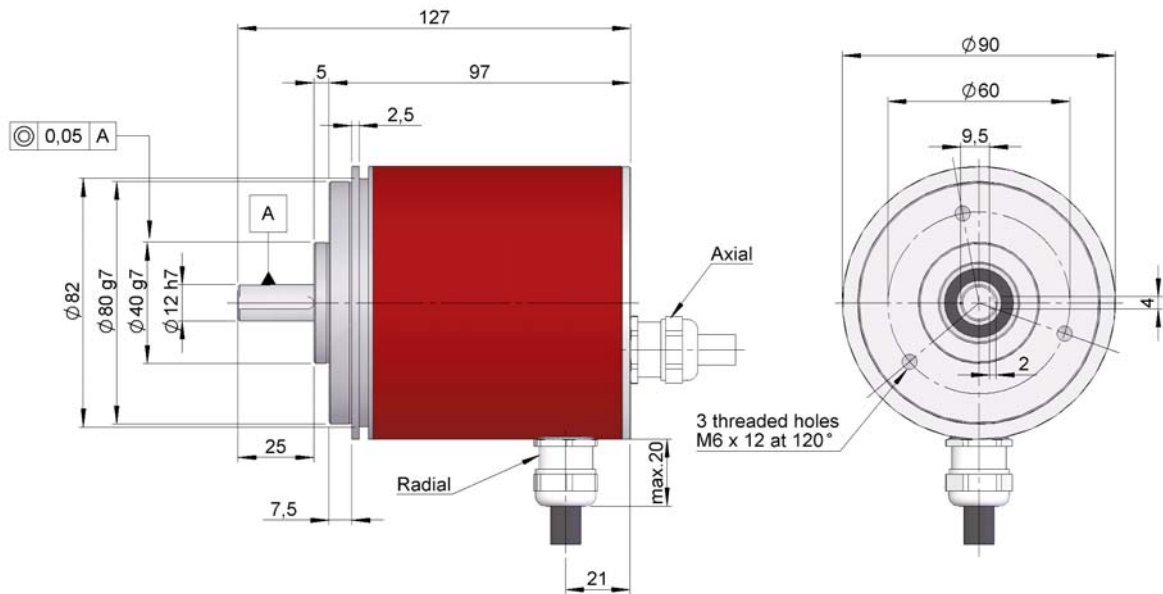
Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	RESOLUTION	RANGE	SPECIAL CUSTOMER
● ●	10	●	●	●	●	●	●	●	●	● ● ● ●	● ● ● ●	● ● ● ●
CM- Multiturn Solid shaft		1- Solid Ø10x20 mm 2- Solid Ø6x10 mm 3- Blind hollow Ø12 mm 4- Blind hollow Ø10 mm	1- None 2- 90.1002 3- 90.1003 4- 90.1004 5- 90.1005 6- 90.1006	1- Cable 3- 95.0007131	1- Axial 2- Radial	2- Analog	1- Clockwise 2- Counter clockwise	1- IP65	5- 0...20mA, 15-30V 6- 4...20mA, 15-30V 7- 0...10V, 15-30V	1024- 10 bits 4096- 12 bits	2- 2 turns 4- 4 turns 8- 8 turns 16- 16 turns 32- 32 turns 64- 64 turns 128- 128 turns 256- 256 turns 512- 512 turns 1024- 1024 turns 2048- 2048 turns 4096- 4096 turns	

ABSOLUT ENCODER FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Singleturn resolution (CS) or multiturn (CM) up to 12 bits
- Protection class IP65 according to DIN 40050
- External diameter 90 mm
- Solid shaft



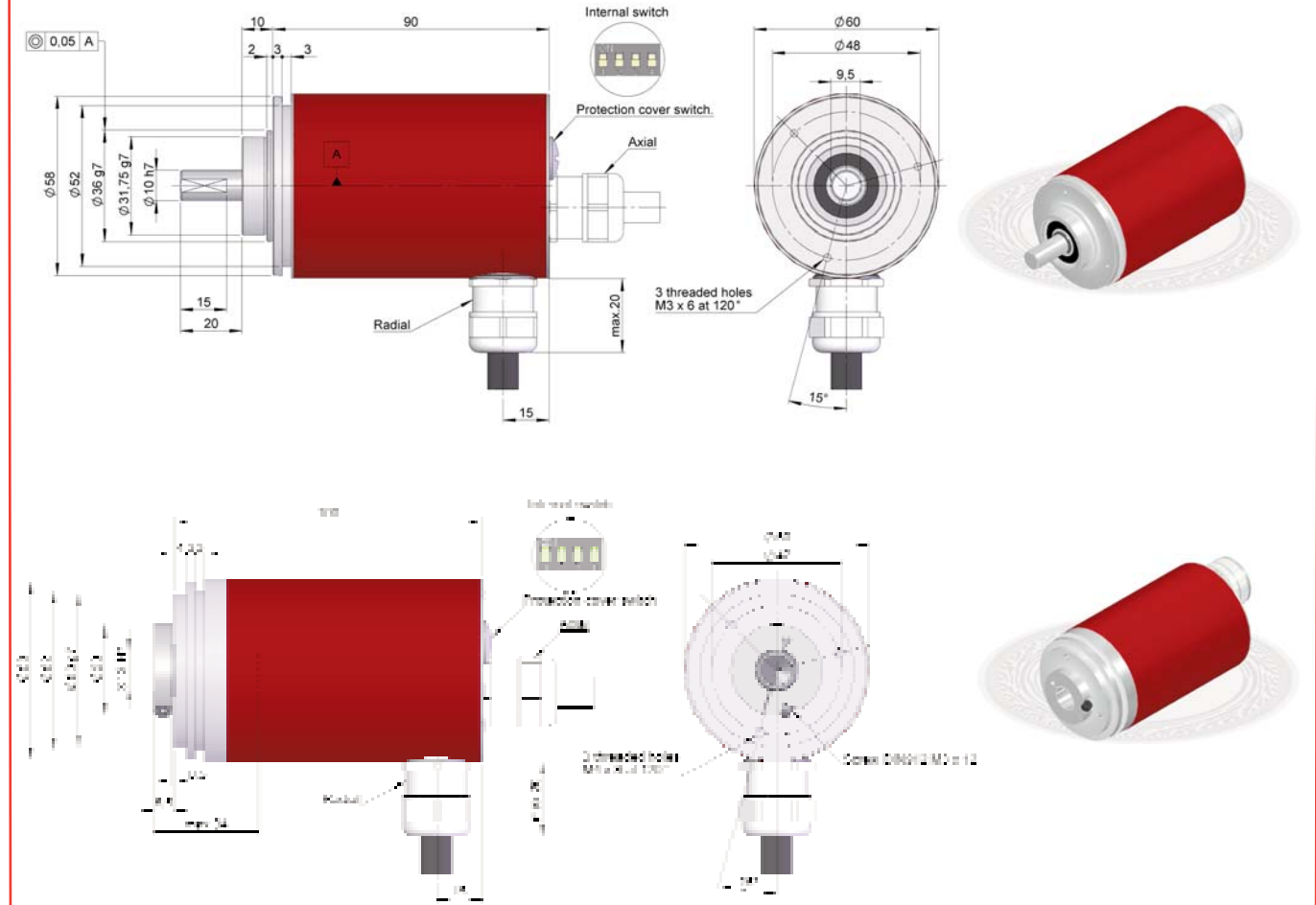
Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	CONFIG. PARAMETERS	RESOLUTION	RANGE	SPECIAL CUSTOMER
● ● CS- Singleturn ● CM- Multiturn	● 30	● 2- Ø12 x 25 mm	● 1- None ● 3- 90.1008	● 1- Cable ● 3- 95.0007131	● 1- Axial ● 2- Radial	● 2- Analog ● 1- Clockwise ● 2- Counter clockwise	● 1- IP65	● 5- 0...20mA, 15-30V ● 6- 4...20mA, 15-30V ● 7- 0...10V, 15-30V	● S- Direction (only singleturn)	● 1024- 10 bits ● 4096- 12 bits	● 45- 1/8 turn ● 90- 1/4 turn ● 180- 1/2 turn ● Blank- 1 turn	● 2- 2 turns ● 4- 4 turns ● 8- 8 turns ● 16- 16 turns ● 32- 32 turns ● 64- 64 turns ● 128- 128 turns ● 256- 256 turns ● 512- 512 turns ● 1024- 1024 turns ● 2048- 2048 turns ● 4096- 4096 turns	● CS-singleturn ● CM-multiturn

CONFIGURABLE ABSOLUT MULTITURN ENCODER

- Resolution up to 12 bits
- Configurable range by switch up to 4096 turns
- Protection class IP65 according to DIN 40050
- External diameter 58 mm
- Solid shaft (CMP) and blind hollow shaft (HMP)



Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

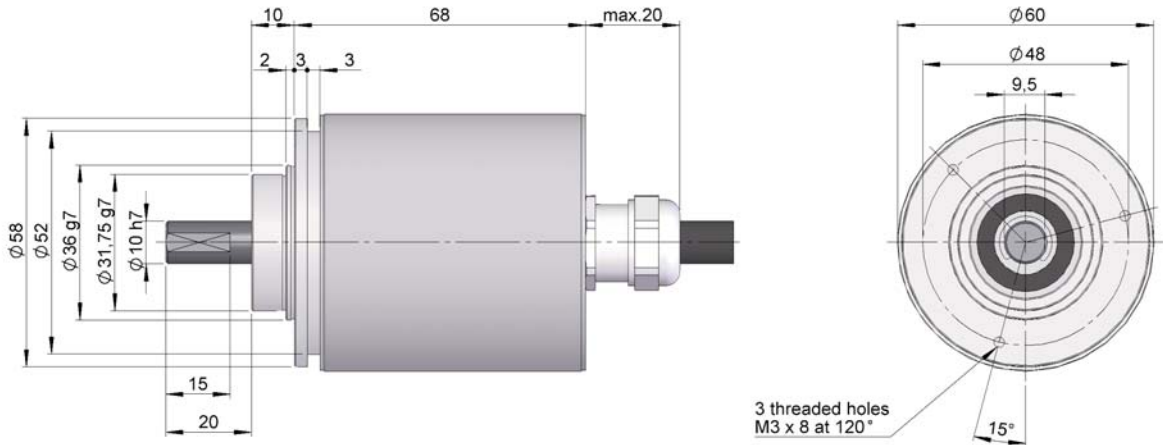
TYPE	SERIE	SHAFT	FLANGE	CONNEX-TION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	RESOLUTION	SPECIAL CUSTOMER
● ●	10	●	●	●	●	●	●	●	●	● ● ● ● ● ● ● ●	● ●
CMP- Solid shaft HMP- Blind hollow shaft		1- Solid Ø10x20 mm 2- Solid Ø6x10 mm 3- Blind hollow Ø12 mm 4- Blind hollow Ø10 mm	1- None 2- 90.1002 3- 90.1003 4- 90.1004 5- 90.1005 6- 90.1006	1- Cable 3- 95.0007131	1- Axial 2- Radial	2- Analog	1- Clockwise 2- Counter clockwise	1- IP65	5- 0...20mA, 15-30V 6- 4...20mA, 15-30V 7- 0...10V, 15-30V	1024- 10 bits 4096- 12 bits	

CONFIGURABLE RANGE

Switch 1	Switch 2	Switch 3	Switch 4	Analog output range
ON	ON	ON	ON	1/8 turn
OFF	ON	ON	ON	1/4 turn
ON	OFF	ON	ON	1/2 turn
OFF	OFF	ON	ON	1 turn
ON	ON	OFF	ON	2 turns
OFF	ON	OFF	ON	4 turns
ON	ON	OFF	ON	8 turns
OFF	OFF	OFF	ON	16 turns
ON	ON	OFF	OFF	32 turns
OFF	ON	OFF	OFF	64 turns
ON	OFF	ON	OFF	128 turns
OFF	OFF	ON	OFF	256 turns
ON	ON	OFF	OFF	512 turns
OFF	ON	OFF	OFF	1024 turns
ON	OFF	OFF	OFF	2048 turns
OFF	OFF	OFF	OFF	4096 turns

SINGLETURN ABSOLUT ENCODER FOR SEVERE INDUSTRIAL APPLICATIONS

- Singleturn resolution up to 12 bits
- Protection class IP67 according to DIN 40050
- External diameter 58 mm
- Solid shaft



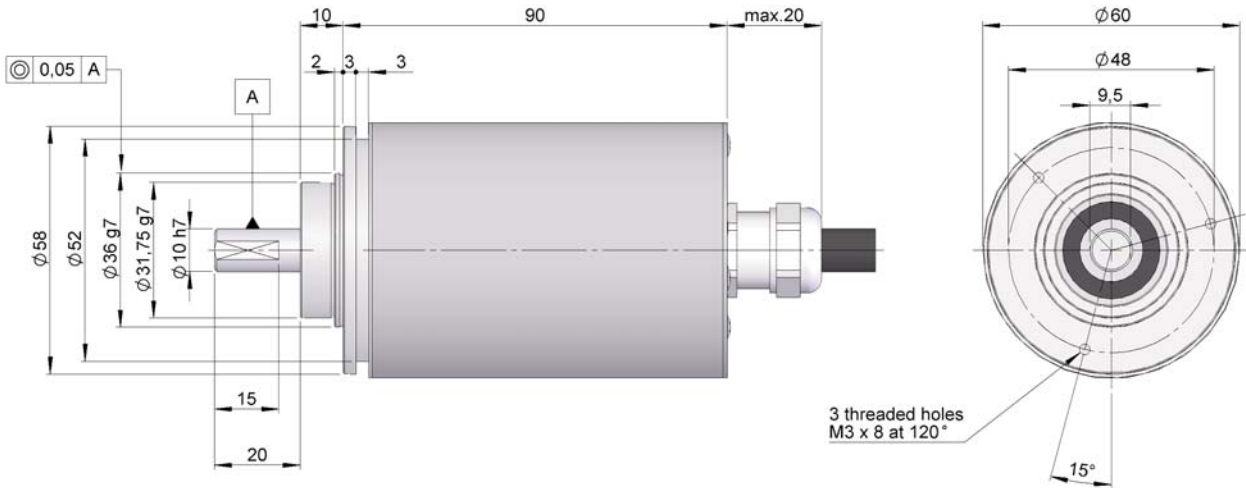
Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNEC-TION	AXIAL RADIAL	INTERFACE	DIRECTIO	IP	POWER SUPPLY OUTPUT	CONFIG PARAMETERS	RESOLUTION	RANGE	SPECIAL CUSTOMER
● ● ● CS- Singleturn	10	●	●	●	●	●	●	●	●	●	● ● ● ●	● ● ● ●	● ● ●
		1- Ø6 x 10 mm 2- Ø10 x 20 mm	1- None 2- 90.1002 3- 90.1003 4- 90.1004 5- 90.1005 6- 90.1006	1- Cable	1- Axial	2- Analog	1- Clockwise 2- Counter clockwise	2- Stainless steel IP67 3- IP67	5- 0...20mA, 15-30V 6- 4...20mA, 15-30V 7- 0...10V, 15-30V	S- Direction	1024- 10 bits 4096- 12 bits	Blank- 360 degrees 180- 180 degrees 90- 90 degrees 45- 45 degrees	

MULTITURN ABSOLUT ENCODER FOR SEVERE INDUSTRIAL APPLICATIONS

- Multiturn resolution up to 12 bits
- Protection class IP67 according to DIN 40050
- External diameter 58 mm
- Solid shaft



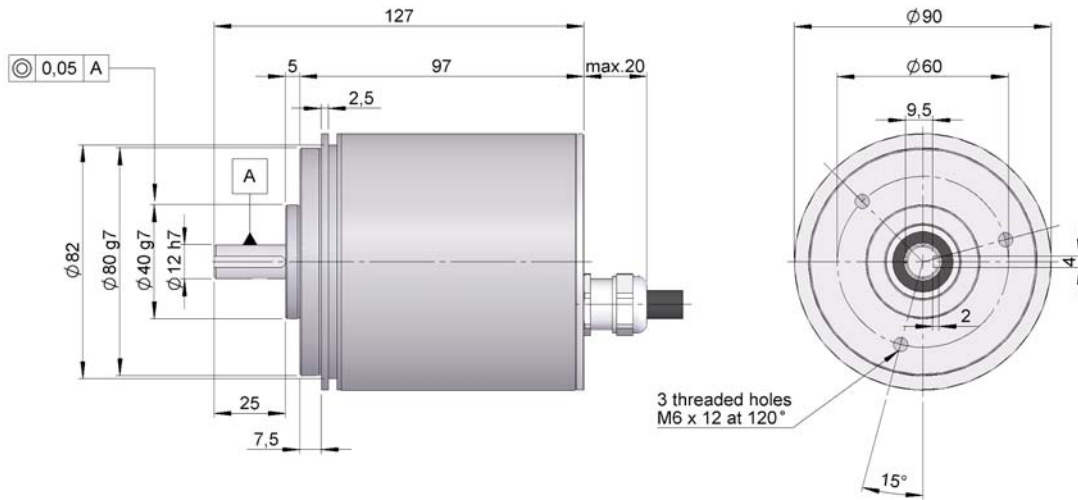
Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CODE	IP	POWER SUPPLY OUTPUT	RESOLUTION	RANGE	SPECIAL CUSTOMER
● ● CM- Multiturn	10	●	●	●	●	●	●	●	●	● ● ● ●	● ● ● ●	● ● ● ●
		1- Ø10 x 20 mm	1- None 2- 90.1002 3- 90.1003 4- 90.1004 5- 90.1005 6- 90.1006	1- Cable	1- Axial	2- Analog	1- Clockwise 2- Counter clockwise	2- Stainless steel IP67 3- IP67	5- 0...20mA, 15-30v 6- 4...20mA, 15-30v 7- 0...10v, 15-30v	1024- 10 bits 4096- 12 bits	2- 2 turns 4- 4 turns 8- 8 turns 16- 16 turns 32- 32 turns 64- 64 turns 128- 128 turns 256- 256 turns 512- 512 turns 1024- 1024 turns 2048- 2048 turns 4096- 4096 turns	

ABSOLUT ENCODER FOR EXTREME AND SEVERE INDUSTRIAL APPLICATIONS

- Singleturn resolution (CS) or multiturn (CM) up to 12 bits
- Protection class IP67 according to DIN 40050
- External diameter 90 mm
- Solid shaft



Previous mounting and installation of the encoder is recommended to read the section "TECHNICAL CONSIDERATIONS".

ORDERING CODE

TYPE	SERIE	SHAFT	FLANGE	CONNECTION	AXIAL RADIAL	INTERFACE	CÓDIGO	IP	POWER SUPPLY OUTPUT	CONFIG. PARAMETERS	RESOLUTION	RANGE	SPECIAL CUSTOMER
● ● CS- Singleturn ● CM- Multiturn	● ● 30	● 2- Ø12 x 25 mm	● 1- None 3- 90.1008	● 1- Cable	● 1- Axial	● 2- Analog	● 1- Clockwise 2- Counter clockwise	● 2- Stainless steel IP67 3- IP67	● 5- 0...20mA, 15-30V 6- 4...20mA, 15-30V 7- 0...10V, 15-30V	● S- Direction (only singleturn) ● ● ● ● ● 1024- 10 bits 4096- 12 bits	● ● ● ● ● 45- 1/8 turn 90- 1/4 turn 180- 1/2 turn Blank- 1 turn 2- 2 turns 4- 4 turns 8- 8 turns 16- 16 turns 32- 32 turns 64- 64 turns 128- 128 turns 256- 256 turns 512- 512 turns 1024- 1024 turns 2048- 2048 turns 4096- 4096 turns	CS-singleturn CM-multiturn	

CONNECTION AND CONNECTORS

ANALOG OUTPUT CONNECTIONS



	Cable 5 x 0.14 Output current	Cable 5 x 0.14 Output voltage	95.0007131 M23 12p
GND	Yellow	Yellow	1
Vcc	White	White	2
I +	Brown	-	3
I -	Green	-	4
V +	-	Brown	5
V -	-	Green	6
DIR	Grey	Grey	7
Screen	Screen	Screen	12

FIELD BUS ABSOLUT ENCODERS

■ PROFIBUS

Profibus DP is a digital communications network that connects and is useful as a communication network between industrial controllers and Input/Output devices. Each device is a node in the network and should be identified unmistakably. Profibus DO is a network in the form of "master-server" with a token bus that is compatible with multiple hierarchies and message prioritizations.

We can connect up to 32 elements (master or slave) in one sole network segment. If you wish to install more than 32 elements, repeaters should be used in order to interconnect the different segments. The network should be finished at the beginning and the end of each segment with an active bus termination.

The encoder presents a bus termination in the inside of it or an external one can be installed.

The following functionalities are integrated in the encoders Profibus Hohner:

- Galvanic isolation of the bus with DC/DC
- Line Driver according to RS-485. max. 12MB

- Diagnosis led: Indication led of functioning state and the power supply led.
- Direction programmable by micro switches. The allowed value range is from 1...126. Each node number should be used one sole time in one network. During the initialization of the encoder, the micro switches are read by the firmware.
- The communication velocity is adjusted by the software. Normally the master of the system adjusts it. All of the modules in the same segment of the Profibus network should be adjusted to the same communication velocity.
- They can be programmed in accordance with the profile of the Profibus encoder in Class 1 and Class 2.

Configurable parameters:

- Rotation direction
- Scaling factor
- Number of positions per turn and total resolution
- Preset value.
- Diagnosis mode.

■ DEVICENET

DeviceNet is a digital communications network that connects and is useful as a communication network between industrial controllers and Input/Output devices. Each device is a node in the network and should be identified unmistakably. DeviceNet is a network in the form of "producer-consumer" with a token bus that is compatible with multiple hierarchies and message prioritizations. DeviceNet can be configured to operate in the "master-slave" mode using "point to point" messages. Device Net supports the capacity of having a power supply integrated in its bus, which allows reducing the connection points

The following functionalities are integrated in the Devicenet Hohner encoders:

- We can have up to 64 nodes (0...63). Each Node Number should be used one sole time in one network. During the initialization of the devices the Node Number micro switches are read by the firmware.
- Galvanic isolation with DC/DC

- A Bus termination resistance is available and can be selected by the micro switch
- Communication modes: polled, cyclic and cos.
- Communication velocity selectable through micro switches: 125 kBits/sec, 250 kBits/sec or 500 kBits/sec.

Configurable parameters:

- Rotation direction.
- Scaling factor
- Number of positions per turn and total resolution
- Preset.
- Diagnosis mode.

■ CANOPEN

CANOpen is a digital communications network that connects and is useful as a communication network between industrial controllers and Input/Output devices. Each device is a node in the network and should be identified unmistakably.

CANOpen is a network in the form of "producer-consumer" with a token bus that is compatible with multiple hierarchies and message prioritizations.

CANOpen can be configured to operate in the "master-slave" mode using "point to point" messages.

CANOpen supports the capacity of having a power supply integrated in its bus, which allows reducing the connection points

The following functionalities are integrated in the CANOpen encoders:

- We can have up to 64 nodes (0...63). Each Node Number should be used one sole time in one network.

During the initialization of the devices the Node Number micro switches are read by the firmware.

- A Bus termination resistance is available and can be selected by the micro switch
- Communication modes: polled, cyclic and cos.
- Communication velocity selectable through micro switches: 10...1000 kBits/sec

Configurable parameters:

- Rotation direction.
- Scaling.
- Number of pulses per turn and number of turns
- Total resolution
- Preset.
- Offset



SERIE CS10/CM10

SINGLETURN AND MULTITURN
ABSOLUTE SOLID SHAFT ENCODER

DeviceNet

- DeviceNet
- Programmable up to 30 bits (65.536 points per turn, 16.384 turns)
- External diameter 58 mm
- Shaft \varnothing 6 or 10 mm
- Protection class IP65 according to DIN EN 60529
- Connection by industrial connector 2 x M12



Optical Encoder



Absolute Encoder



High shaft load capacity



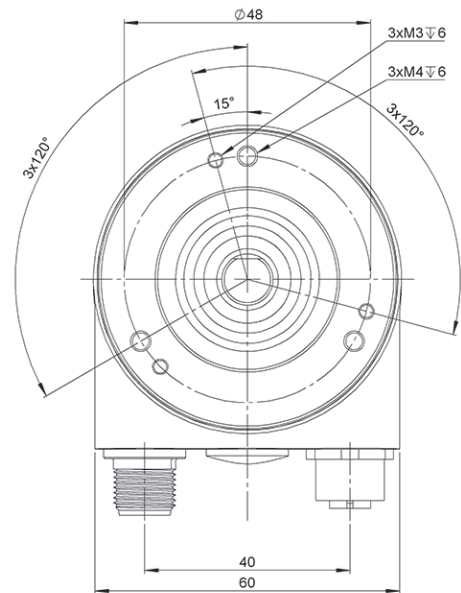
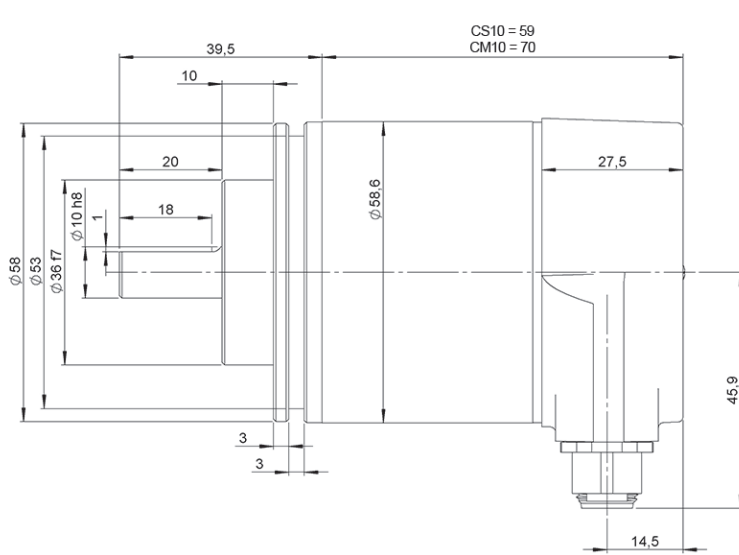
Vibration and shock resistant



IP65



Temperature range



Drawing shaft type 2, connection type 1, clamping

REFERENCE

Reference example: CS10-1212-13 | CM10-2112-1312

Serie	Flange	Shaft	Interface	Connection	Singleturn resolution	Multiturn resolution	Special customer
CS10/CM10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	. <input type="checkbox"/> <input type="checkbox"/>
CS10. Singleturn CM10. Multiturn	1. Clamping 2. Synchro	1. \varnothing 6x10 mm 2. \varnothing 10x20 mm	1. DeviceNet	2. 2 x M12 Connector	up to 16 bits (Standard: 13 bits)	up to 14 bits (Standard: 12 bits)	

Order your reference
Step file 3D

info@encoderhohner.com

service available in 24 h



SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER

DeviceNet

MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	55x10 ⁸ rev. (Clamping) [40 N / 110 N] 150x10 ⁸ rev. (Clamping) [40 N / 60 N] 85x10 ⁸ rev. (Synchro) [40 N / 110 N] 195x10 ⁸ rev. (Synchro) [40 N / 60 N]
Shaft diameter	6 or 10 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	110 N
Weight aprox.	470 g
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	2 x M12 Connector Mating connectors not included

INTERFACE

DeviceNet

Profile	CIP
Programming functions	Resolution, preset, complement, transmission mode (polled mode, cyclic mode, sync mode)
Manual functions	Address selector switch 0-99 and terminal resistor (with connection cap)
Transmission rate	150, 250, 500 kBaud
Interface cycle time	≥ 10 ms

ELECTRICAL SPECIFICATIONS

Output Driver	Transceiver (ISO 11898), Galvanically Isolated by Opto-Couplers
Power supply	10...30 VDC
Consumption	≤ 230 mA (10 VDC) ≤ 100 mA (24 VDC)
Power Consumption	≤ 2.5 W
Start time	< 250 ms
Singleturn resolution	up to 16 bits
Multiturn resolution	up to 14 bits
Accuracy (INL)	±0.0220° (14 – 16 bits) ±0.0439° (≤13 bits)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	13,5 years

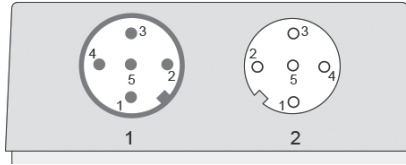
SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER

DeviceNet

CONNECTION

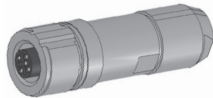
Mating connectors not included



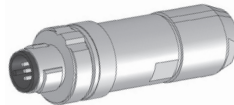
	M12 5p Male a coded	M12 5p Female a coded	
VCC	2	2	
GND	3	3	
CAN High	4	4	
CAN Low	5	5	
CAN GND	1	1	

ACCESSORIES

90.9550
M12 5p
Female

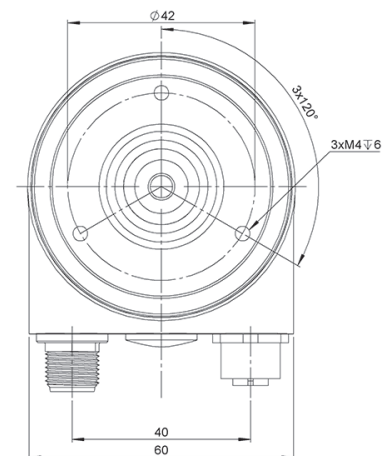
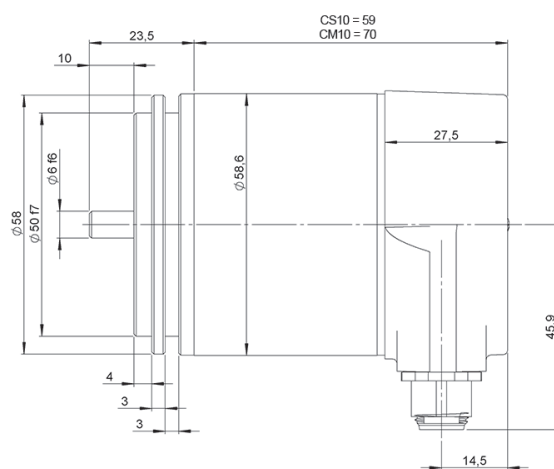


90.9551
M12 5p
Male



FLANGE DIMENSIONS

Flange 2
Synchro



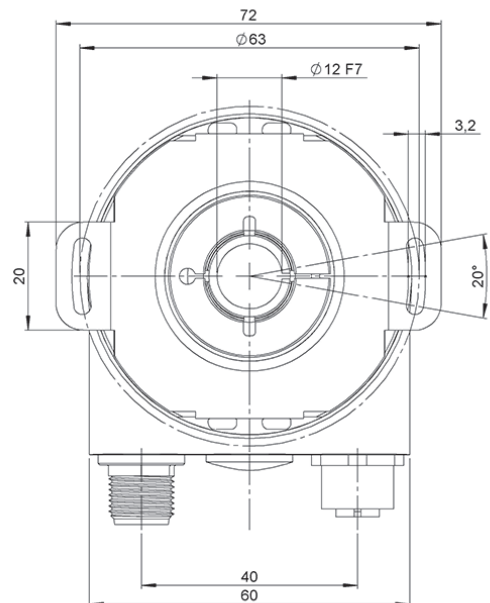
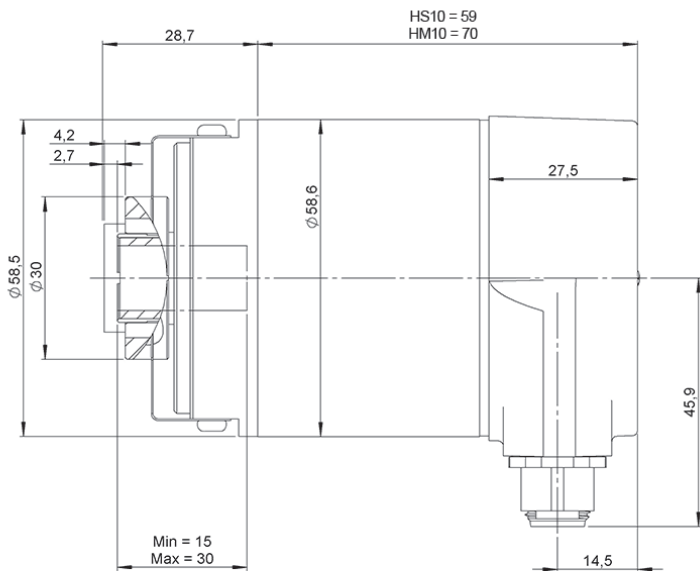
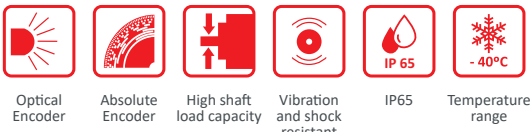


SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER

DeviceNet

- DeviceNet
- Programmable up to 30 bits (65.536 points per turn, 16.384 turns)
- External diameter 58 mm
- Blind hollow shaft \varnothing 10 or 12 mm
- Protection class IP65 according to DIN EN 60529
- Connection by industrial connector 2 x M12



Drawing blind hollow shaft type 4, connection type 2

REFERENCE

Reference example: HS10-4312-13 | HM10-4412-1312

Serie	Flange	Blind-Hollow shaft	Interface	Connection	Singleturn resolution	Multiturn resolution	Special customer
HS10/HM10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
HS10. Singleturn HM10. Multiturn	4. Blind-Hollow shaft	3. \varnothing 10 mm 4. \varnothing 12 mm	1. DeviceNet	2. 2 x M12 Connector	up to 16 bits (Standard: 13 bits)	up to 14 bits (Standard: 12 bits)	

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SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER

DeviceNet

MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Blind hollow shaft diameter	10 or 12 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Weight aprox.	475 g
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	2 x M12 Connector Mating connectors not included

INTERFACE

DeviceNet

Profile	CIP
Programming functions	Resolution, preset, complement, transmission mode (polled mode, cyclic mode, sync mode)
Manual functions	Address selector switch 0-99 and terminal resistor (with connection cap)
Transmission rate	150, 250, 500 kBaud
Interface cycle time	≥ 10 ms

ELECTRICAL SPECIFICATIONS

Output Driver	Transceiver (ISO 11898), Galvanically Isolated by Opto-Couplers
Power supply	10...30 VDC
Consumption	≤ 230 mA (10 VDC) ≤ 100 mA (24 VDC)
Power Consumption	≤ 2.5 W
Start time	< 250 ms
Singleturn resolution	up to 16 bits
Multiturn resolution	up to 14 bits
Accuracy (INL)	±0.0220° (14 – 16 bits) ±0.0439° (≤13 bits)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	13,5 years

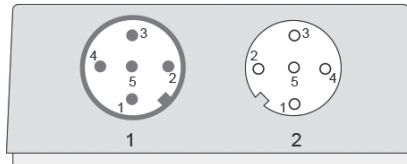
SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER

DeviceNet

CONNECTION

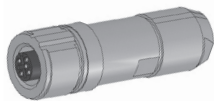
Mating connectors not included



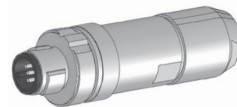
	M12 5p Male a coded	M12 5p Female a coded	
VCC	2	2	
GND	3	3	
CAN High	4	4	
CAN Low	5	5	
CAN GND	1	1	

ACCESSORIES

90.9550
M12 5p
Female



90.9551
M12 5p
Male





SERIE CS10/CM10

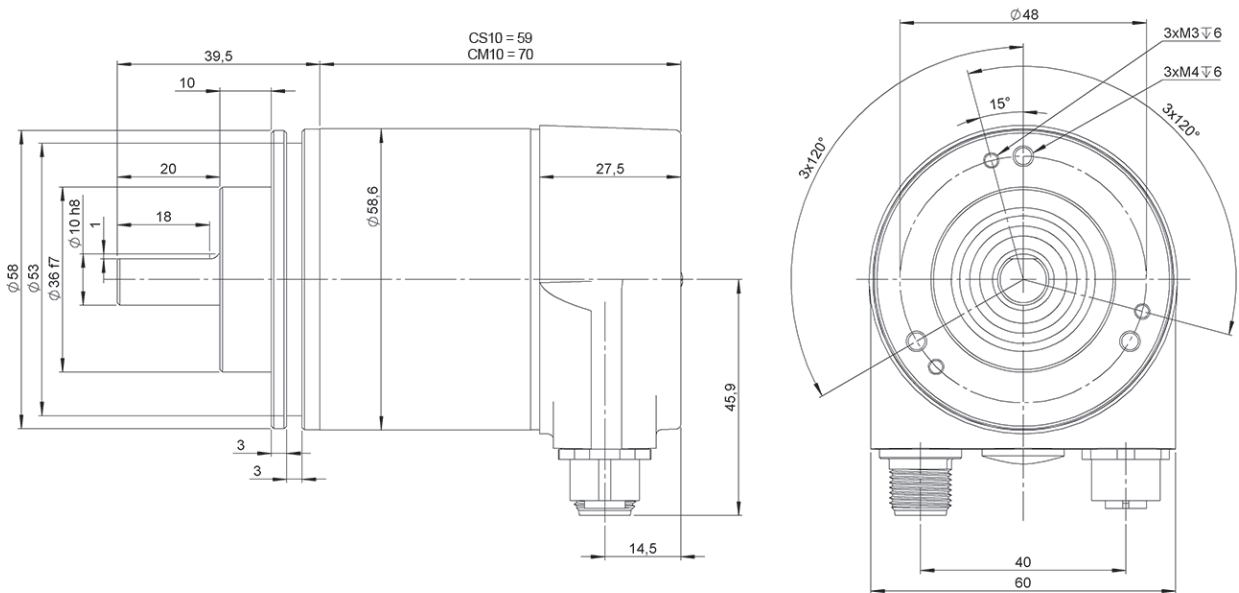
SINGLETURN AND MULTITURN
ABSOLUTE SOLID SHAFT ENCODER



- CANOpen
- Programmable up to 30 bits (65.536 points per turn, 16.384 turns)
- External diameter 58 mm
- Shaft \varnothing 6 or 10 mm
- Protection class IP65 according to DIN EN 60529
- Connection by industrial connector 2 x M12



Optical Encoder	Absolute Encoder	High shaft load capacity	Vibration and shock resistant	IP65	Temperature range



Drawing shaft type 2, connection type 2, clamping

REFERENCE

Reference example: CS10-1222-13 | CM10-2122-1312

Serie	Flange	Shaft	Interface	Connection	Singleturn resolution	Multiturn resolution	Special customer
CS10/CM10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	. <input type="checkbox"/> <input type="checkbox"/>
CS10. Singleturn CM10. Multiturn	1. Clamping 2. Synchro	1. \varnothing 6x10 mm 2. \varnothing 10x20 mm	2. CANOpen	2. 2 x M12 Connector	up to 16 bits (Standard: 13 bits)	up to 14 bits (Standard: 12 bits)	

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SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	55x10 ⁸ rev. (Clamping) [40 N / 110 N] 150x10 ⁸ rev. (Clamping) [40 N / 60 N] 85x10 ⁸ rev. (Synchro) [40 N / 110 N] 195x10 ⁸ rev. (Synchro) [40 N / 60 N]
Shaft diameter	6 or 10 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	110 N
Weight aprox.	470 g
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	2 x M12 Connector Mating connectors not included

INTERFACE



Profile	DS-406
Programming functions	Resolution, preset, 2 limit switches, 8 CAMS, baud rate, CAN-Identifier, bootloader, transmission modes (polled, cyclic, sync)
Manual functions	Address selector switch 0-99 and terminal resistor (with connection cap)
Features	Round axis
Transmission rate	min. 20 kBaud max. 1 MBaud
Interface cycle time	≥ 1 ms

ELECTRICAL SPECIFICATIONS

Output Driver	Transceiver (ISO 11898), Galvanically Isolated by Opto-Couplers
Power supply	10...30 VDC
Consumption	≤ 230 mA (10 VDC) ≤ 100 mA (24 VDC)
Power Consumption	≤ 2.5 W
Start time	< 250 ms
Singleturn resolution	up to 16 bits
Multiturn resolution	up to 14 bits
Accuracy (INL)	±0.0220° (14 – 16 bits) ±0.0439° (≤13 bits)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	13,5 years

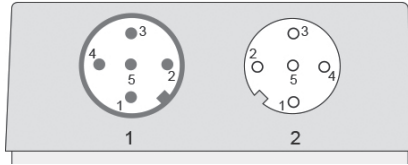
SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER



CONNECTION

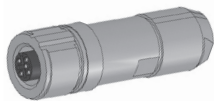
Mating connectors not included



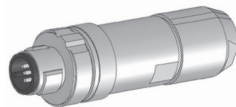
	M12 5p Male a coded	M12 5p Female a coded	
VCC	2	2	
GND	3	3	
CAN High	4	4	
CAN Low	5	5	
CAN GND	1	1	

ACCESSORIES

90.9550
M12 5p
Female

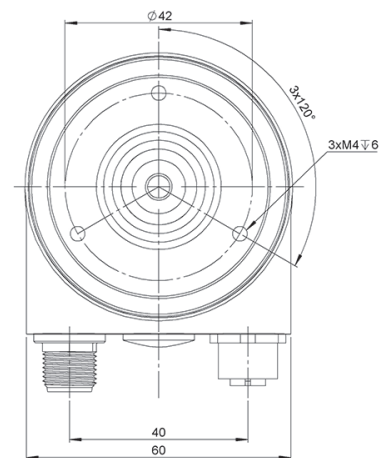
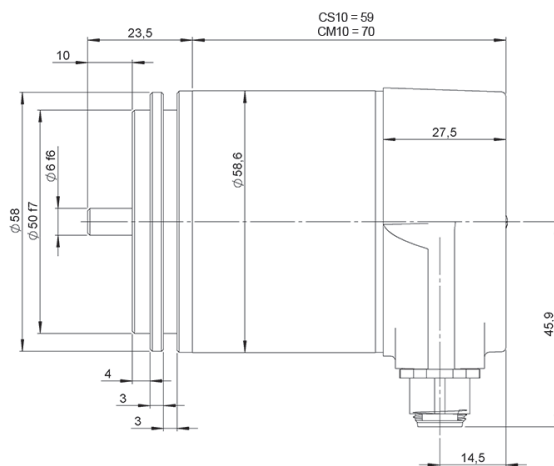


90.9551
M12 5p
Male



FLANGE DIMENSIONS

Flange 2
Synchro



SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER

CANopen®



- CANOpen
- Programmable up to 30 bits (65.536 points per turn, 16.384 turns)
- External diameter 58 mm
- Blind hollow shaft \varnothing 10 or 12 mm
- Protection class IP65 according to DIN EN 60529
- Connection by industrial connector 2 x M12



Optical Encoder



Absolute Encoder



High shaft load capacity



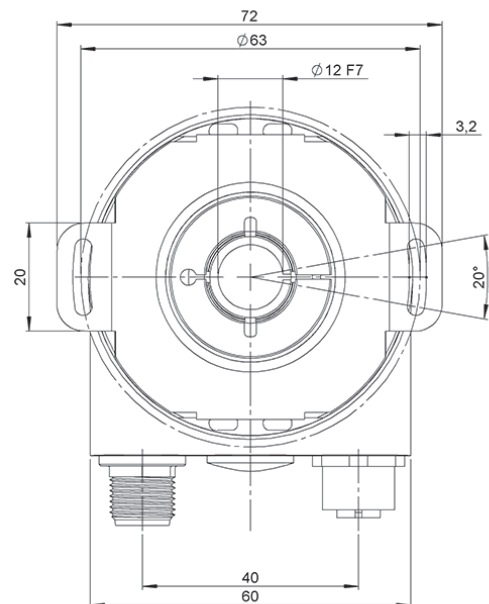
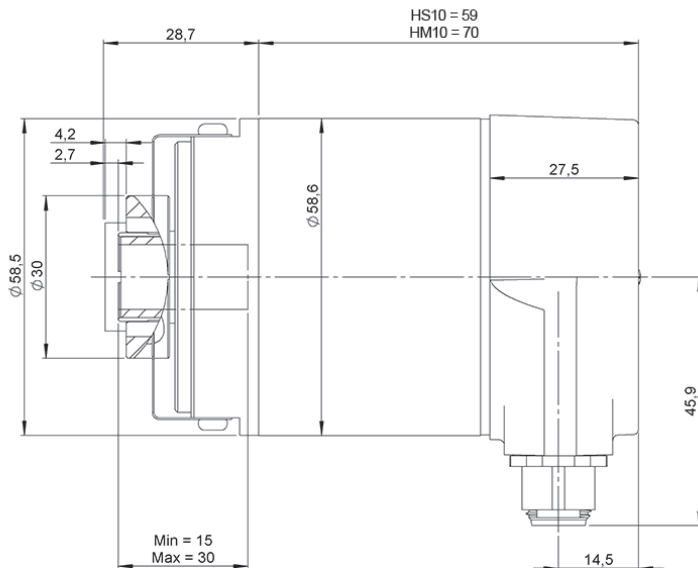
Vibration and shock resistant



IP65



Temperature range



Drawing blind hollow shaft type 4, connection type 2

REFERENCE

Reference example: HS10-4322-13 | HM10-4422-1312

Serie	Flange	Blind-Hollow shaft	Interface	Connection	Singleturn resolution	Multiturn resolution	Special customer
HS10/HM10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
HS10. Singleturn HM10. Multiturn	4. Blind-Hollow shaft	3. \varnothing 10 mm 4. \varnothing 12 mm	2. CANOpen	2. 2 x M12 Connector	up to 16 bits (Standard: 13 bits)	up to 14 bits (Standard: 12 bits)	

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SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Blind hollow shaft diameter	10 or 12 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Weight aprox.	475 g
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	2 x M12 Connector Mating connectors not included

INTERFACE



Profile	DS-406
Programming functions	Resolution, preset, 2 limit switches, 8 CAMS, baud rate, CAN-Identifier, bootloader, transmission modes (polled, cyclic, sync)
Manual functions	Address selector switch 0-99 and terminal resistor (with connection cap)
Features	Round axis
Transmission rate	min. 20 kBaud max. 1 MBaud
Interface cycle time	≥ 1 ms

ELECTRICAL SPECIFICATIONS

Output Driver	Transceiver (ISO 11898), Galvanically Isolated by Opto-Couplers
Power supply	10...30 VDC
Consumption	≤ 230 mA (10 VDC) ≤ 100 mA (24 VDC)
Power Consumption	≤ 2.5 W
Start time	< 250 ms
Singleturn resolution	up to 16 bits
Multiturn resolution	up to 14 bits
Accuracy (INL)	±0.0220° (14 – 16 bits) ±0.0439° (≤13 bits)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	13,5 years

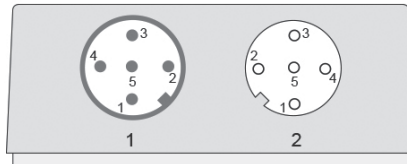
SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER



CONNECTION

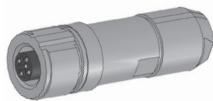
Mating connectors not included



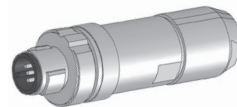
	M12 5p Male a coded	M12 5p Female a coded	
VCC	2	2	
GND	3	3	
CAN High	4	4	
CAN Low	5	5	
CAN GND	1	1	

ACCESSORIES

90.9550
M12 5p
Female



90.9551
M12 5p
Male





SERIE CS10/CM10

SINGLETURN AND MULTITURN
ABSOLUTE SOLID SHAFT ENCODER



- Profibus DP
- Programmable up to 30 bits (65.536 points per turn, 16.384 turns)
- External diameter 58 mm
- Shaft \varnothing 6 or 10 mm
- Protection class IP65 according to DIN EN 60529
- Connection by cable or industrial connector 3 x M12



Optical Encoder



Absolute Encoder



High shaft load capacity



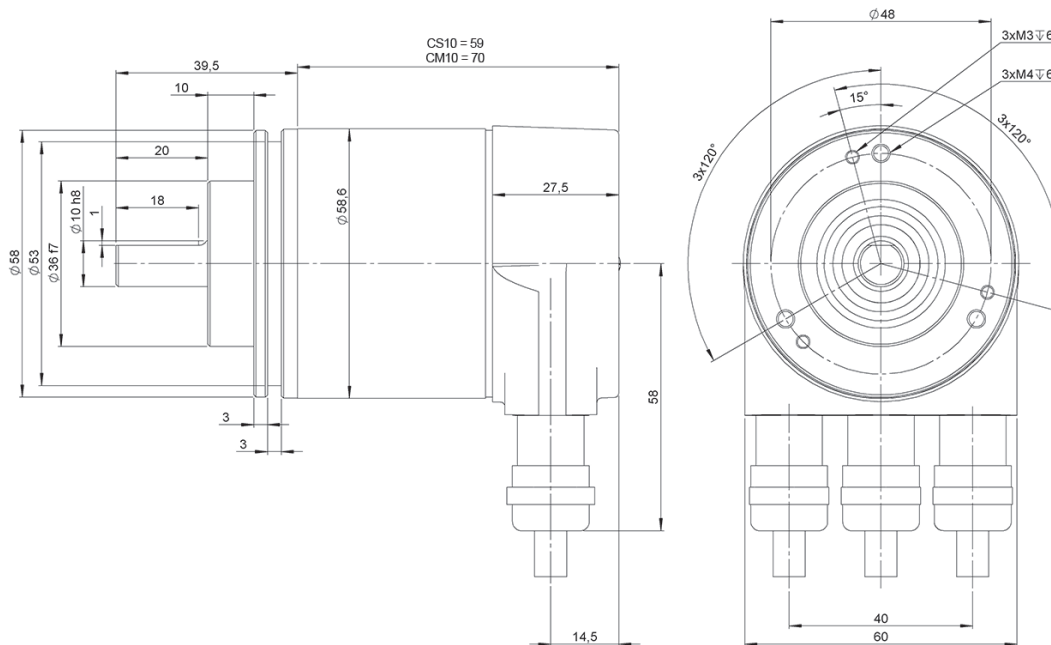
Vibration and shock resistant



IP65



Temperature range



Drawing shaft type 2, connection type 1, clamping

REFERENCE

Reference example: CS10-1232-13 | CM10-2131-1312

Serie	Flange	Shaft	Interface	Connection	Singleturn resolution	Multiturn resolution	Special customer
CS10/CM10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	. <input type="checkbox"/> <input type="checkbox"/>
CS10. Singleturn CM10. Multiturn	1. Clamping 2. Synchro	1. \varnothing 6x10 mm 2. \varnothing 10x20 mm	3. Profibus DP	1. 3 x Cable Gland Terminal Box 2. 3 x M12 Connector	up to 16 bits (Standard: 13 bits)	up to 14 bits (Standard: 12 bits)	

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SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	55x10 ⁸ rev. (Clamping) [40 N / 110 N] 150x10 ⁸ rev. (Clamping) [40 N / 60 N] 85x10 ⁸ rev. (Synchro) [40 N / 110 N] 195x10 ⁸ rev. (Synchro) [40 N / 60 N]
Shaft diameter	6 or 10 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	110 N
Weight aprox.	475 g
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	3 x Cable Gland (Terminal Box) 3 x M12 Connector Mating connectors not included

INTERFACE



Profile	DPV0, DPV1 and DPV2 Class 2 (EN50170 + EN50254)
Diagnostics	Memory
Programming functions	Resolution, gearing factor (physical resolution), velocity scaling + filter, preset (zero point), counting direction, limit switches, node number, teach-in, diagnosis
Manual functions	Address selector switch 0-99 and terminal resistor (with connection cap)
Features	Round axis
Transmission rate	≤ 12 Mbaud
Interface cycle time	≥ 1 ms

ELECTRICAL SPECIFICATIONS

Output Driver	Profibus Data Interface, galvanically isolated via opto-couplers
Power supply	10...30 VDC
Consumption	≤ 115 mA (10 VDC) ≤ 50 mA (30 VDC)
Power Consumption	≤ 1.5 W
Start time	< 1 s
Singleturn resolution	up to 16 bits
Multiturn resolution	up to 14 bits
Accuracy (INL)	±0.0220° (14 – 16 bits) ±0.0439° (≤13 bits)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	13,5 years

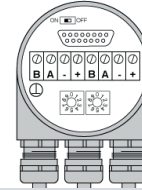
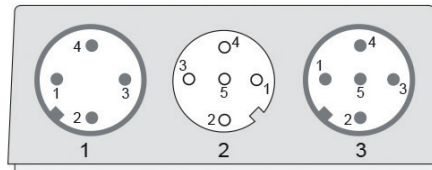
SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER



CONNECTION

Mating connectors not included



	M12 4p Male a coded	M12 5p Female b coded	M12 5p Male b coded
VCC	1	-	-
GND	3	-	-
BUS Line A (Bus out)	-	2	-
BUS Line B (Bus out)	-	4	-
BUS Line A (Bus in)	-	-	2
BUS Line B (Bus in)	-	-	4
Not connected	2, 4	1, 3, 5	1, 3, 5

3 x Cable Gland Terminal Box*
(+)
(-)
A (right)
B (right)
A (left)
B (left)

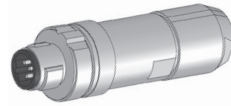
(*) The power supply has to be connected once (no matter which clamps). If the terminating resistor is switched on, the outgoing bus lines are disconnected.

ACCESSORIES

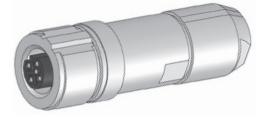
90.9554
M12 4p
Female



90.9553
M12 5p
Male



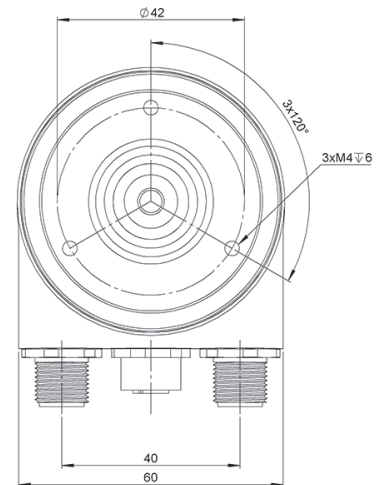
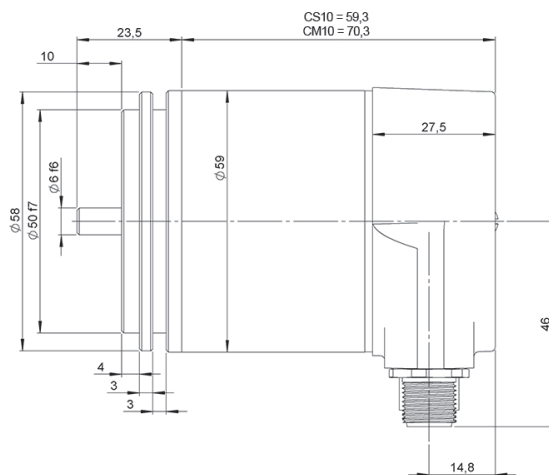
90.9552
M12 5p
Female



FLANGE DIMENSIONS

Flange 2
Synchro

Connection 2
3 x M12



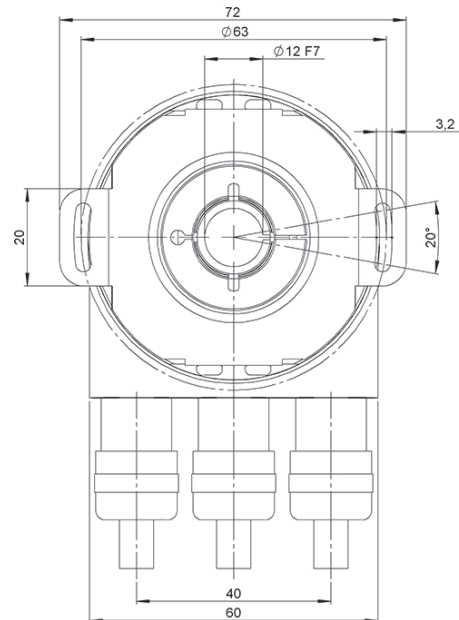
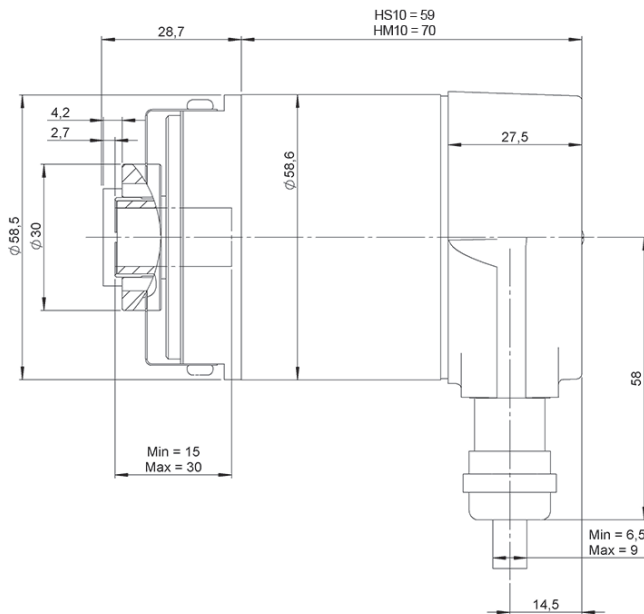
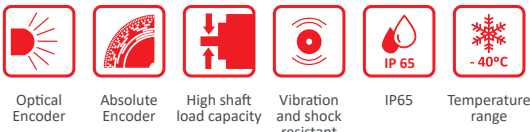


SERIE HS10/HM10

SINGLETURN AND MULTITURN
ABSOLUTE BLIND HOLLOW SHAFT
ENCODER



- Profibus DP
- Programmable up to 30 bits (65.536 points per turn, 16.384 turns)
- External diameter 58 mm
- Blind hollow shaft \varnothing 10 or 12 mm
- Protection class IP65 according to DIN EN 60529
- Connection by cable or industrial connector 3 x M12



Drawing blind hollow shaft type 3, connection type 1

REFERENCE

Reference example: HS10-4432-13 | HM10-4331-1312

Serie	Flange	Blind-Hollow shaft	Interface	Connection	Singleturn resolution	Multiturn resolution	Special customer
HS10/HM10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
HS10. Singleturn HM10. Multiturn	4. Blind-Hollow shaft	3. \varnothing 10 mm 4. \varnothing 12 mm	3. Profibus DP	1. 3 x Cable Gland Terminal Box 2. 3 x M12 Connector	up to 16 bits (Standard: 13 bits)	up to 14 bits (Standard: 12 bits)	

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SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Blind hollow shaft diameter	10 or 12 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Weight aprox.	480 g
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	3 x Cable Gland (Terminal Box) 3 x M12 Connector Mating connectors not included

INTERFACE



Profile	DPV0, DPV1 and DPV2 Class 2 (EN50170 + EN50254)
Diagnostics	Memory
Programming functions	Resolution, gearing factor (physical resolution), velocity scaling + filter, preset (zero point), counting direction, limit switches, node number, teach-in, diagnosis
Manual functions	Address selector switch 0-99 and terminal resistor (with connection cap)
Features	Round axis
Transmission rate	≤ 12 Mbaud
Interface cycle time	≥ 1 ms

ELECTRICAL SPECIFICATIONS

Output Driver	Profibus Data Interface, galvanically isolated via opto-couplers
Power supply	10...30 VDC
Consumption	≤ 115 mA (10 VDC) ≤ 50 mA (30 VDC)
Power Consumption	≤ 1.5 W
Start time	< 1 s
Singleturn resolution	up to 16 bits
Multiturn resolution	up to 14 bits
Accuracy (INL)	±0.0220° (14 – 16 bits) ±0.0439° (≤13 bits)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	13,5 years

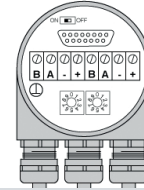
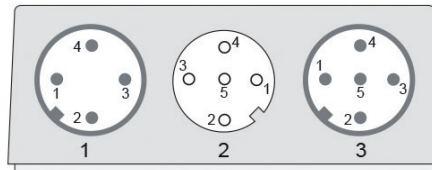
SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER



CONNECTION

Mating connectors not included



	M12 4p Male a coded	M12 5p Female b coded	M12 5p Male b coded
VCC	1	-	-
GND	3	-	-
BUS Line A (Bus out)	-	2	-
BUS Line B (Bus out)	-	4	-
BUS Line A (Bus in)	-	-	2
BUS Line B (Bus in)	-	-	4
Not connected	2, 4	1, 3, 5	1, 3, 5

3 x Cable Gland Terminal Box*
(+)
(-)
A (right)
B (right)
A (left)
B (left)

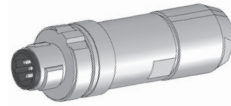
(*) The power supply has to be connected once (no matter which clamps). If the terminating resistor is switched on, the outgoing bus lines are disconnected.

ACCESSORIES

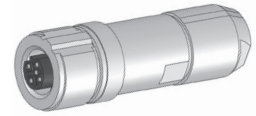
90.9554
M12 4p
Female



90.9553
M12 5p
Male

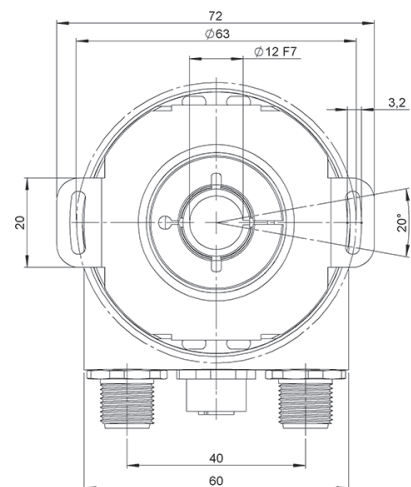
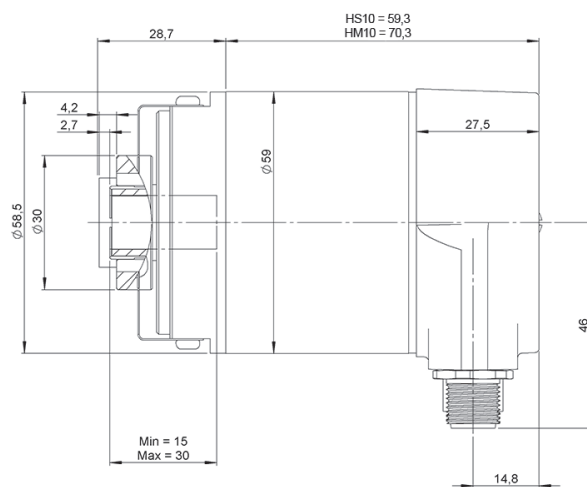


90.9552
M12 5p
Female



CONNECTION DIMENSIONS

Connection 2
3 x M12



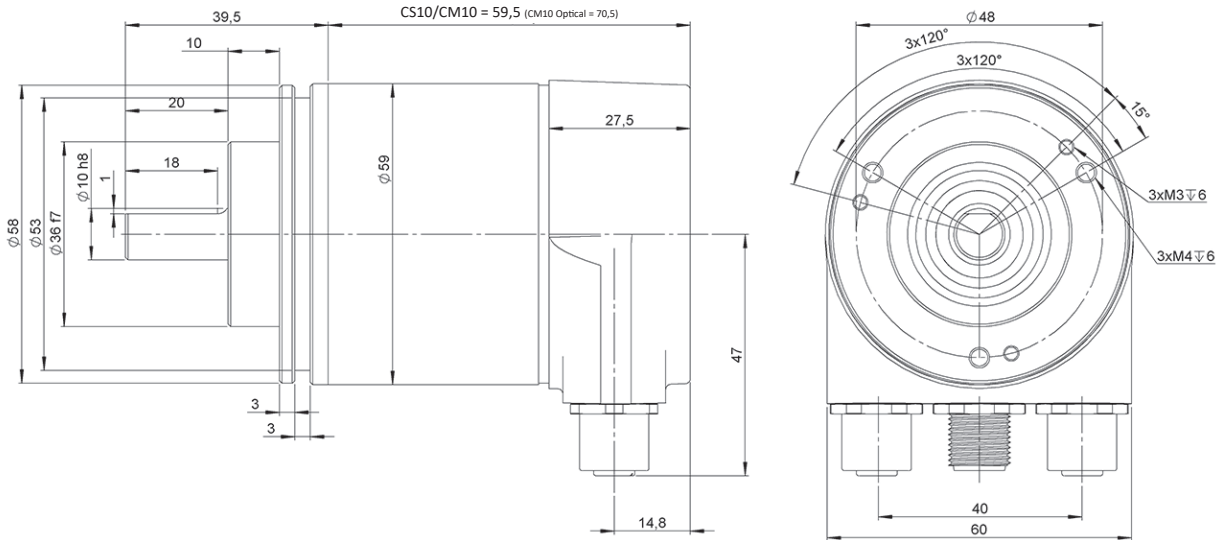
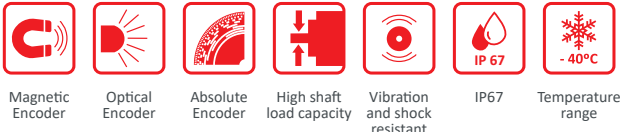


SERIE CS10/CM10

SINGLETURN AND MULTITURN
ABSOLUTE SOLID SHAFT ENCODER



- Profinet
- Singleturn resolution up to 16 bits
- Multiturn resolution up to 30 bits
- External diameter 58 mm
- Shaft \varnothing 6, 10 or 12 mm
- Protection class IP67 according to DIN EN 60529
- Connection by industrial connector 3 x M12



Drawing shaft type 2, Connection 2 (Radial), Clamping

REFERENCE

Reference example: CM10-PFN-12112-1312

Serie	Interface	Flange	Shaft	IP	Technology	Connection	Singleturn resolution	Multiturn resolution	Special customer
CS10/CM10 -	PFN -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	. <input type="checkbox"/> <input type="checkbox"/>
CS10. Singleturn		1. Clamping	1. \varnothing 6x10 mm	1. IP65	1. Magnetic	2. Radial 3 x M12	13. 13 bits	12. 12 bits (**)	13. INOX 303
CM10. Multiturn		2. Synchro	2. \varnothing 10x20 mm 8. \varnothing 12x20 mm	2. IP67	2. Optical	3. Axial 3 x M12 (*)	16. 16 bits	14. 14 bits	

(*) Only available for magnetic technology.

(**) Only available for singleturn resolution 13 bits.

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SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Steel Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	55x10 ⁸ rev. (Clamping) [40 N / 110 N] 150x10 ⁸ rev. (Clamping) [40 N / 60 N] 85x10 ⁸ rev. (Synchro) [40 N / 110 N] 195x10 ⁸ rev. (Synchro) [40 N / 60 N]
Shaft diameter	6, 10 or 12 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65, IP67
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	110 N
Weight aprox.	350 g (connection type 2) 415 g (connection type 3)
Operating temperature range	-40°C to +85°C (connection type 2) -40°C to +70°C (connection type 3)
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Connection	3 x M12 Connector Mating connectors not included

INTERFACE



Profile	Profidrive Profile 4.x Encoder Profile 4.x
Diagnostics	Memory
Programming functions	Resolution, time base and filter for velocity, preset, counting direction, IP-Address
Features	Boot-Loader, Round Axis, Flashing LEDs
Transmission rate	10 / 100 Mbit
Interface cycle time	≥ 1 ms

ELECTRICAL SPECIFICATIONS

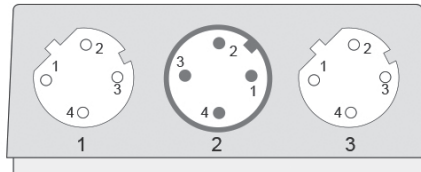
Output Driver	Ethernet
Power supply	10...30 VDC
Consumption	≤ 230 mA (10 VDC) ≤ 100 mA (24 VDC)
Power Consumption	≤ 2.5 W
Start time	< 250 ms
Singleturn resolution	13 bits - 16 bits
Multiturn resolution	12 bits - 14 bits
Accuracy (INL)	±0.0878° (Magnetic) ±0.0439° (Optical)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	65 years

SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER



CONNECTION



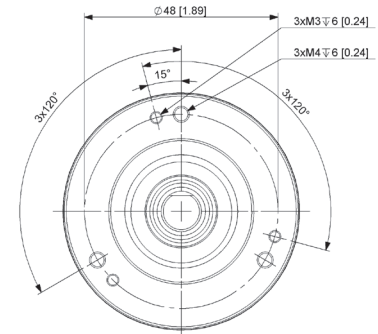
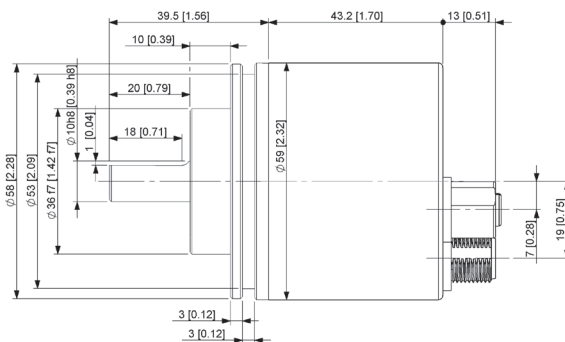
	M12 4p Female d coded	M12 4p Male a coded	M12 4p Female d coded
VCC	-	1	-
GND	-	3	-
Tx+	1	-	1
Rx+	2	-	2
Tx-	3	-	3
Rx-	4	-	4
Not connected	-	2, 4	-

CONNECTION DIMENSIONS

Mating connectors not included

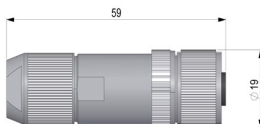
Connection 3

Axial
3 x M12

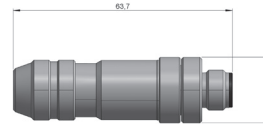


ACCESSORIES

95.000706
M12 4p
Female



95.000707
M12 4p
Male



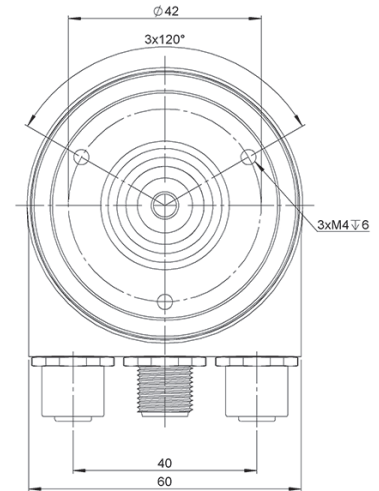
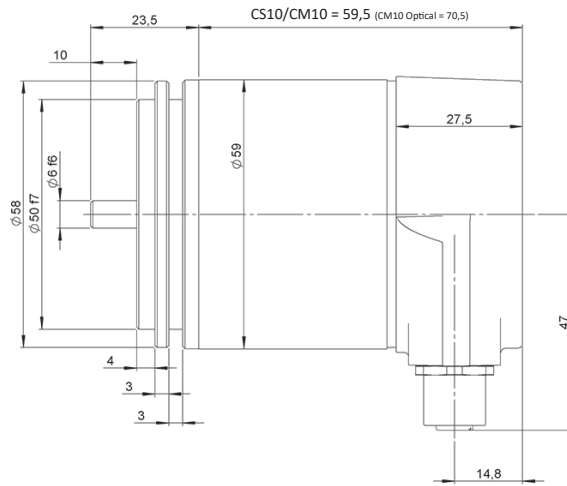
SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER



FLANGE DIMENSIONS

Flange 2
Synchro

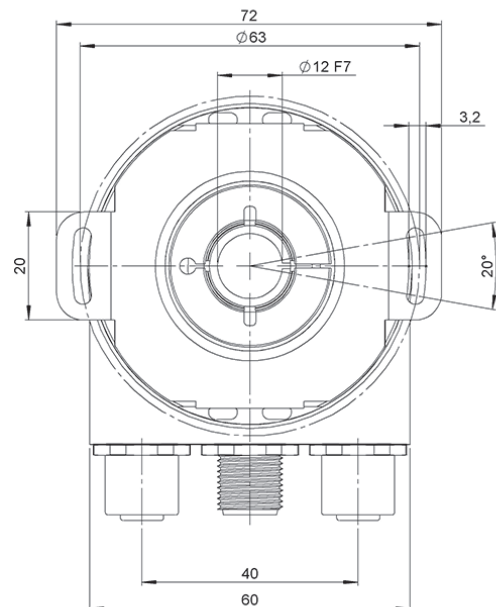
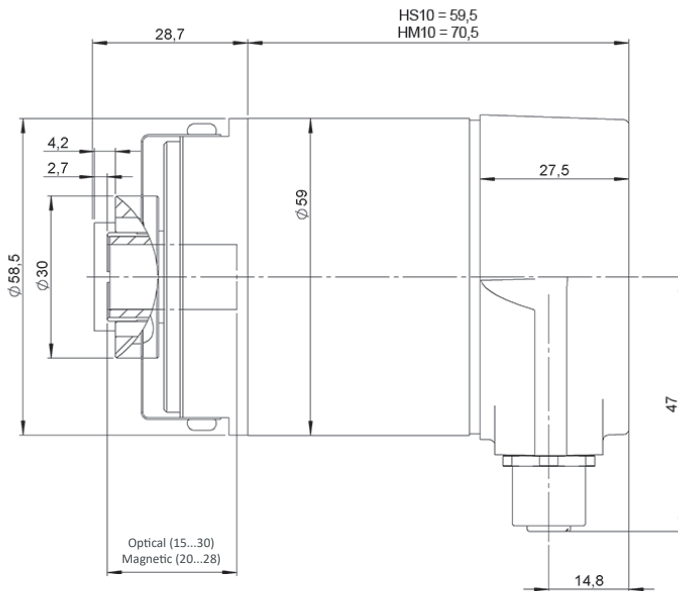
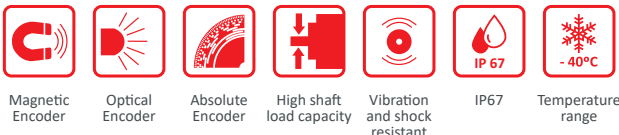


SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER



- Profinet
- Singleturn resolution up to 16 bits
- Multiturn resolution up to 30 bits
- External diameter 58 mm
- Blind hollow shaft \varnothing 6, 8, 10, 12, 14 or 15 mm
- Protection class IP67 according to DIN EN 60529
- Connection by industrial connector 3 x M12



Drawing shaft type 4, Connection 2 (Radial)

REFERENCE

Reference example: HM10-PFN-34112-1312

Serie	Interface	Flange	Shaft	IP	Technology	Connection	Singleturn resolution	Multiturn resolution	Special customer
HS10/HM10 -	PFN -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
HS10. Singleturn		3. Flexible flange	1. \varnothing 6 mm 2. \varnothing 8 mm 3. \varnothing 10 mm 4. \varnothing 12 mm 5. \varnothing 14 mm 6. \varnothing 15 mm	1. IP65 2. IP67	1. Magnetic 2. Optical	2. Radial 3 x M12 3. Axial 3 x M12 (*)	13. 13 bits 16. 16 bits	12. 12 bits (**) 14. 14 bits	13. INOX 303

(*) Only available for magnetic technology.

(**) Only available for singleturn resolution 13 bits.

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SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Steel Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Shaft diameter	6, 8, 10, 12, 14 or 15 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65, IP67
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Weight aprox.	380 g (connection type 2) 465 g (connection type 3)
Operating temperature range	-40°C to +85°C (connection type 2) -40°C to +70°C (connection type 3)
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Connection	3 x M12 Connector Mating connectors not included

INTERFACE



Profile	Profidrive Profile 4.x Encoder Profile 4.x
Diagnostics	Memory
Programming functions	Resolution, time base and filter for velocity, preset, counting direction, IP-Address
Features	Boot-Loader, Round Axis, Flashing LEDs
Transmission rate	10 / 100 Mbit
Interface cycle time	≥ 1 ms

ELECTRICAL SPECIFICATIONS

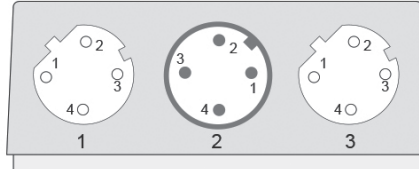
Output Driver	Ethernet
Power supply	10...30 VDC
Consumption	≤ 230 mA (10 VDC) ≤ 100 mA (24 VDC)
Power Consumption	≤ 2.5 W
Start time	< 250 ms
Singleturn resolution	13 bits - 16 bits
Multiturn resolution	12 bits - 14 bits
Accuracy (INL)	±0.0878° (Magnetic) ±0.0439° (Optical)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	65 years

SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER



CONNECTION



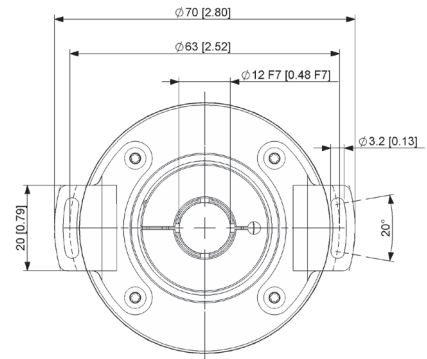
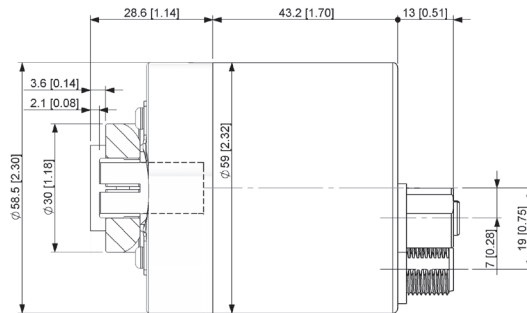
	M12 4p Female d coded	M12 4p Male a coded	M12 4p Female d coded
VCC	-	1	-
GND	-	3	-
Tx+	1	-	1
Rx+	2	-	2
Tx-	3	-	3
Rx-	4	-	4
Not connected	-	2, 4	-

CONNECTION DIMENSIONS

Mating connectors not included

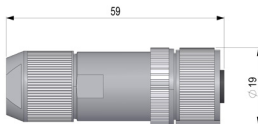
Connection 3

Axial
3 x M12

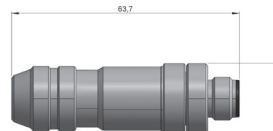


ACCESSORIES

95.0007076
M12 4p
Female



95.0007077
M12 4p
Male





SERIE CS10/CM10

SINGLETURN AND MULTITURN
ABSOLUTE SOLID SHAFT ENCODER

EtherNet/IP™

- EtherNet/IP
- Programmable up to 30 bits (65.536 points per turn, 16.384 turns)
- External diameter 58 mm
- Shaft \varnothing 6 or 10 mm
- Protection class IP65 according to DIN EN 60529
- Connection by industrial connector 3 x M12



Optical Encoder



Absolute Encoder



High shaft load capacity



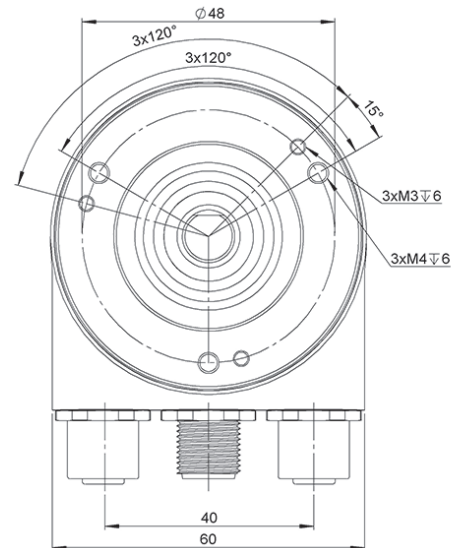
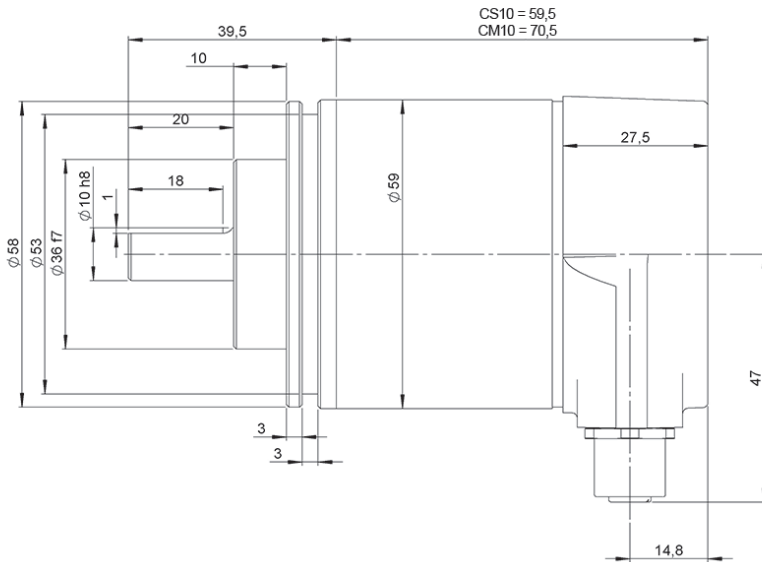
Vibration and shock resistant



IP65



Temperature range



Drawing shaft type 2, connection type 2, clamping

REFERENCE

Reference example: CS10-1252-16 | CM10-2152-1614

Serie	Flange	Shaft	Interface	Connection	Singleturn resolution	Multiturn resolution	Special customer
CS10/CM10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
CS10. Singleturn CM10. Multiturn	1. Clamping 2. Synchro	1. \varnothing 6x10 mm 2. \varnothing 10x20 mm	5. EtherNet/IP	2. 3 x M12 Connector	up to 16 bits (Standard: 13 bits)	up to 14 bits (Standard: 12 bits)	

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SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER

EtherNet/IP™

MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	55x10 ⁸ rev. (Clamping) [40 N / 110 N] 150x10 ⁸ rev. (Clamping) [40 N / 60 N] 85x10 ⁸ rev. (Synchro) [40 N / 110 N] 195x10 ⁸ rev. (Synchro) [40 N / 60 N]
Shaft diameter	6 or 10 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	110 N
Weight aprox.	370 g
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	3 x M12 Connector Mating connectors not included

INTERFACE

EtherNet/IP™

Profile	CIP
Diagnostics	Memory
Programming functions	Resolution, time base and filter for velocity, preset, counting direction, IP-Address
Features	Boot-Loader, Round Axis
Transmission rate	10 / 100 Mbit
Interface cycle time	≥ 1 ms

ELECTRICAL SPECIFICATIONS

Output Driver	Ethernet
Power supply	10...30 VDC
Consumption	≤ 230 mA (10 VDC) ≤ 100 mA (24 VDC)
Power Consumption	≤ 2.5 W
Start time	< 250 ms
Singleturn resolution	up to 16 bits
Multiturn resolution	up to 14 bits
Accuracy (INL)	±0.0220° (14 – 16 bits) ±0.0439° (≤13 bits)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	65 years

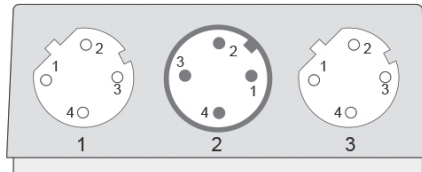
SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER

EtherNet/IP™

CONNECTION

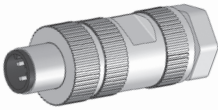
Mating connectors not included



	M12 4p Female d coded	M12 4p Male a coded	M12 4p Female d coded
VCC	-	1	-
GND	-	3	-
Tx+	1	-	1
Rx+	2	-	2
Tx-	3	-	3
Rx-	4	-	4
Not connected	-	2, 4	-

ACCESSORIES

90.9556
M12 4p
Male

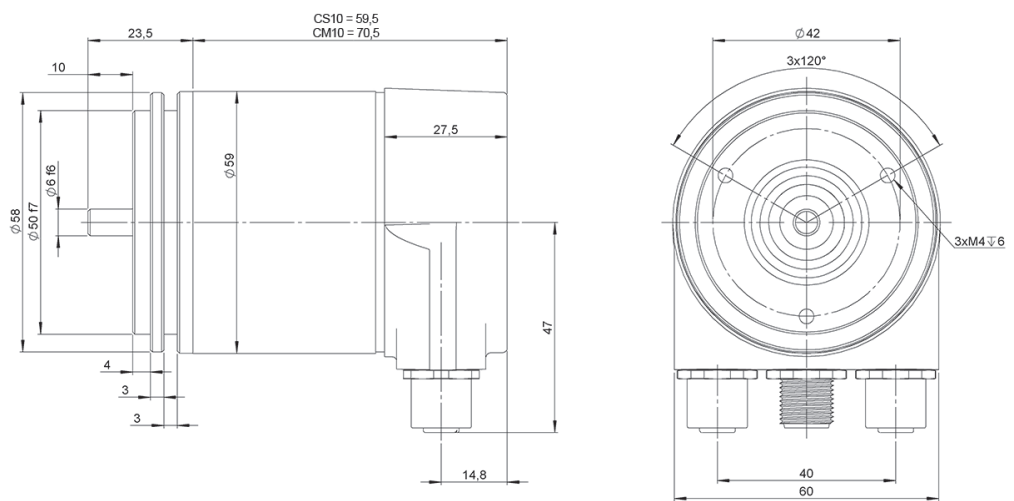


90.9555
M12 4p
Female



FLANGE DIMENSIONS

Flange 2
Synchro



SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER

EtherNet/IP™



- EtherNet/IP
- Programmable up to 30 bits (65.536 points per turn, 16.384 turns)
- External diameter 58 mm
- Blind hollow shaft \varnothing 10 or 12 mm
- Protection class IP65 according to DIN EN 60529
- Connection by industrial connector 3 x M12



Optical Encoder



Absolute Encoder



High shaft load capacity



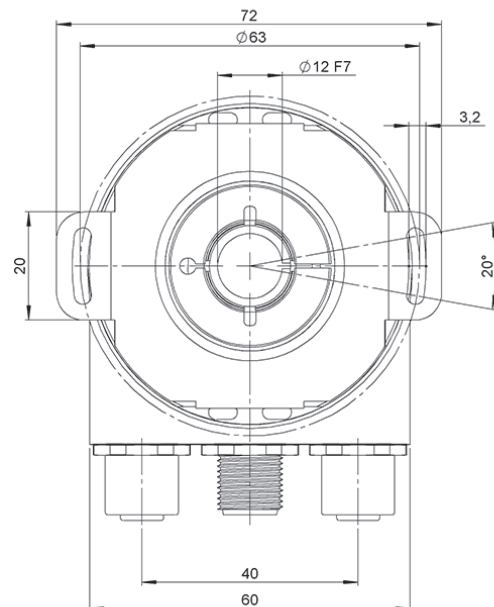
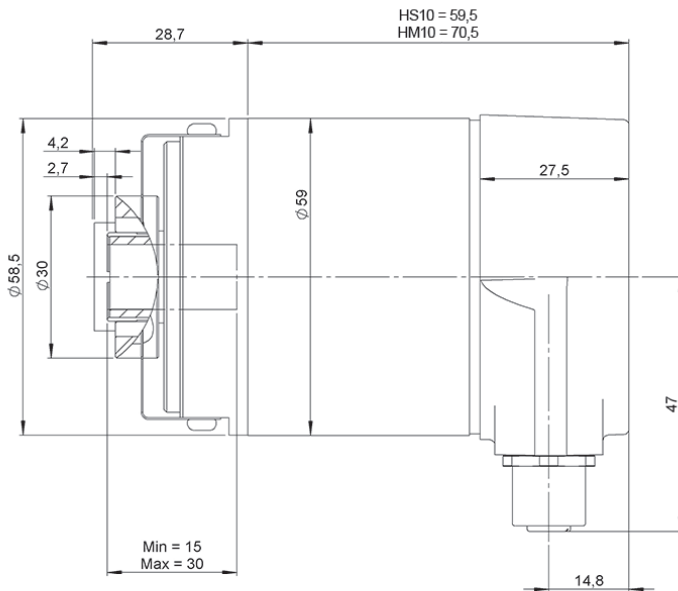
Vibration and shock resistant



IP65



Temperature range



Drawing blind hollow shaft type 4, connection type 2

REFERENCE

Reference example: HS10-4352-16 | HM10-4452-1614

Serie	Flange	Blind-Hollow shaft	Interface	Connection	Singleturn resolution	Multiturn resolution	Special customer
HS10/HM10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
HS10. Singleturn HM10. Multiturn	4. Blind-Hollow shaft	3. \varnothing 10 mm 4. \varnothing 12 mm	5. EtherNet/IP	2. 3 x M12 Connector	up to 16 bits (Standard: 13 bits)	up to 14 bits (Standard: 12 bits)	

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SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER

EtherNet/IP™

MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Shaft diameter	10 or 12 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Weight aprox.	380 g
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	3 x M12 Connector Mating connectors not included

INTERFACE

EtherNet/IP™

Profile	CIP
Diagnostics	Memory
Programming functions	Resolution, time base and filter for velocity, preset, counting direction, IP-Address
Features	Boot-Loader, Round Axis
Transmission rate	10 / 100 Mbit
Interface cycle time	≥ 1 ms

ELECTRICAL SPECIFICATIONS

Output Driver	Ethernet
Power supply	10...30 VDC
Consumption	≤ 230 mA (10 VDC) ≤ 100 mA (24 VDC)
Power Consumption	≤ 2.5 W
Start time	< 250 ms
Singleturn resolution	up to 16 bits
Multiturn resolution	up to 14 bits
Accuracy (INL)	±0.0220° (14 – 16 bits) ±0.0439° (≤13 bits)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	65 years

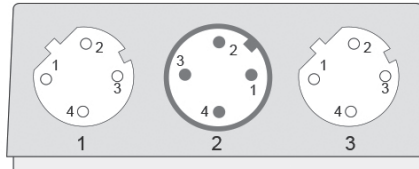
SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER

EtherNet/IP™

CONNECTION

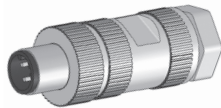
Mating connectors not included



	M12 4p Female d coded	M12 4p Male a coded	M12 4p Female d coded
VCC	-	1	-
GND	-	3	-
Tx+	1	-	1
Rx+	2	-	2
Tx-	3	-	3
Rx-	4	-	4
Not connected	-	2, 4	-

ACCESSORIES

90.9556
M12 4p
Male



90.9555
M12 4p
Female





SERIE CS10/CM10

SINGLETURN AND MULTITURN
ABSOLUTE SOLID SHAFT ENCODER

EtherCAT

- EtherCAT
- Programmable up to 30 bits (65.536 points per turn, 16.384 turns)
- External diameter 58 mm
- Shaft \varnothing 6 or 10 mm
- Protection class IP65 according to DIN EN 60529
- Connection by industrial connector 3 x M12



Optical Encoder



Absolute Encoder



High shaft load capacity



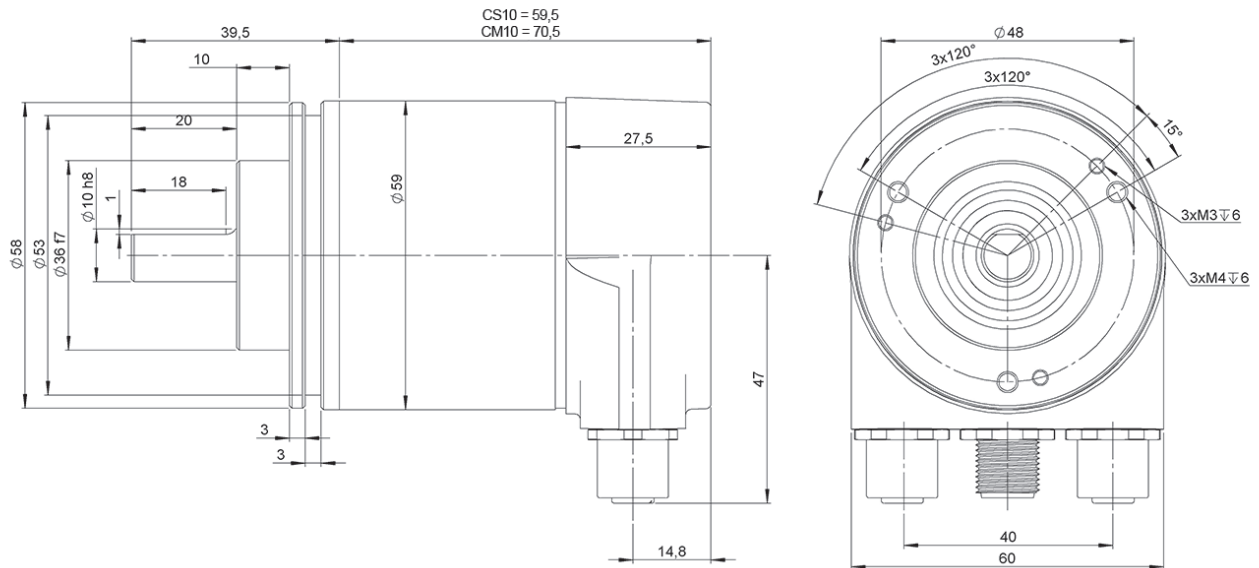
Vibration and shock resistant



IP65



Temperature range



Drawing shaft type 2, connection type 2, clamping

REFERENCE

Reference example: CS10-1262-16 | CM10-2162-1614

Serie	Flange	Shaft	Interface	Connection	Singleturn resolution	Multiturn resolution	Special customer
CS10/CM10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	. <input type="checkbox"/> <input type="checkbox"/>
CS10. Singleturn CM10. Multiturn	1. Clamping 2. Synchro	1. \varnothing 6x10 mm 2. \varnothing 10x20 mm	6. EtherCAT	2. 3 x M12 Connector	up to 16 bits (Standard: 13 bits)	up to 14 bits (Standard: 12 bits)	

Order your reference
Step file 3D

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SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	55x10 ⁸ rev. (Clamping) [40 N / 110 N] 150x10 ⁸ rev. (Clamping) [40 N / 60 N] 85x10 ⁸ rev. (Synchro) [40 N / 110 N] 195x10 ⁸ rev. (Synchro) [40 N / 60 N]
Shaft diameter	6 or 10 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	110 N
Weight aprox.	370 g
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	3 x M12 Connector Mating connectors not included

INTERFACE



Profile	CoE (CANopen over EtherCAT, DS-301+DS-406)
Diagnostics	OptoAsic, Memory, LED
Programming functions	Resolution, preset, counting direction
Features	Boot-Loader, Round Axis
Transmission rate	10 / 100 Mbit
Interface cycle time	≥ 62,5 µs

ELECTRICAL SPECIFICATIONS

Output Driver	Ethernet
Power supply	10...30 VDC
Consumption	≤ 230 mA (10 VDC) ≤ 100 mA (24 VDC)
Power Consumption	≤ 2.5 W
Start time	< 250 ms
Singleturn resolution	up to 16 bits
Multiturn resolution	up to 14 bits
Accuracy (INL)	±0.0220° (14 – 16 bits) ±0.0439° (≤13 bits)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	65 years

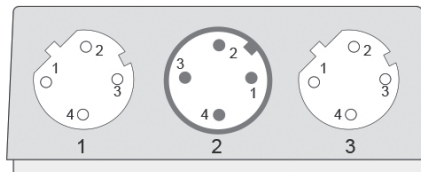
SERIE CS10/CM10

SINGLETURN AND MULTITURN ABSOLUTE SOLID SHAFT ENCODER

EtherCAT®

CONNECTION

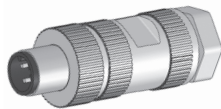
Mating connectors not included



	M12 4p Female d coded	M12 4p Male a coded	M12 4p Female d coded
VCC	-	1	-
GND	-	3	-
Tx+	1	-	1
Rx+	2	-	2
Tx-	3	-	3
Rx-	4	-	4
Not connected	-	2, 4	-

ACCESSORIES

90.9556
M12 4p
Male

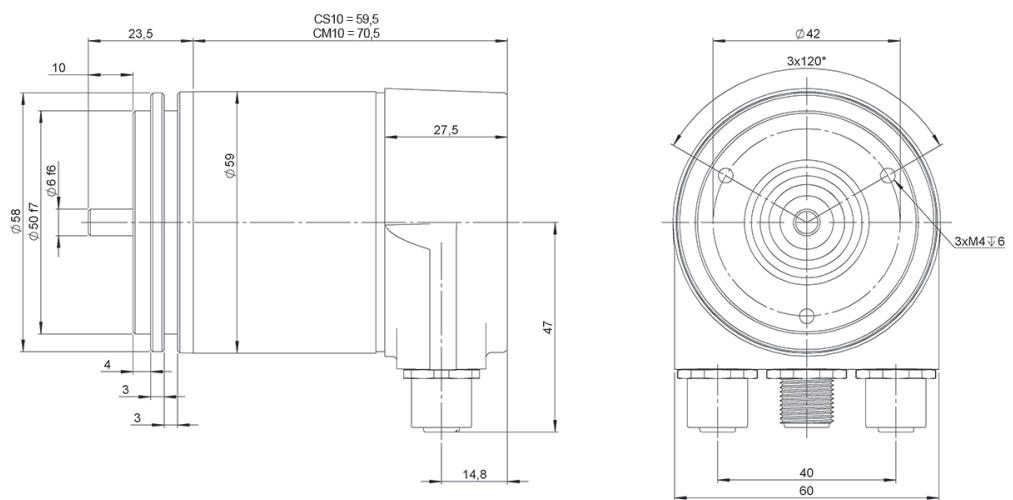


90.9555
M12 4p
Female



FLANGE DIMENSIONS

Flange 2
Synchro



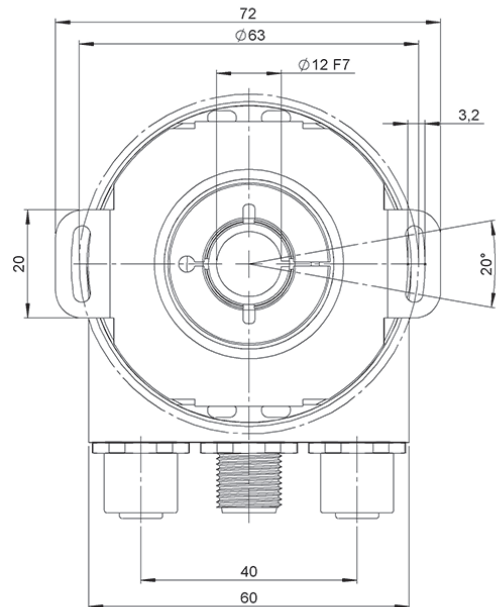
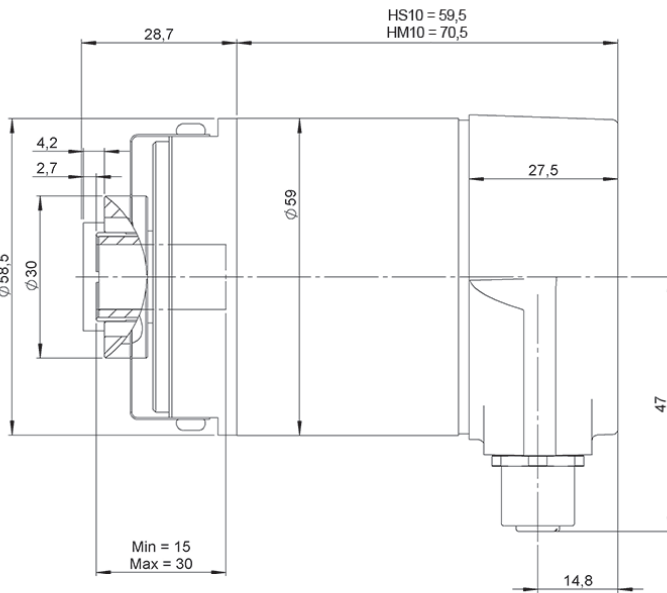
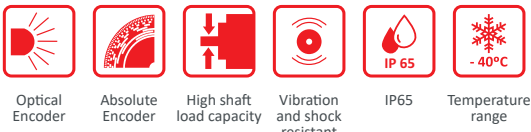
SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER

EtherCAT



- EtherCAT
- Programmable up to 30 bits (65.536 points per turn, 16.384 turns)
- External diameter 58 mm
- Blind hollow shaft \varnothing 10 or 12 mm
- Protection class IP65 according to DIN EN 60529
- Connection by industrial connector 3 x M12



Drawing blind hollow shaft type 4, connection type 2

REFERENCE

Reference example: HS10-4362-16 | HM10-4462-1614

Serie	Flange	Blind-Hollow shaft	Interface	Connection	Singleturn resolution	Multiturn resolution	Special customer
HS10/HM10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
HS10. Singleturn HM10. Multiturn	4. Blind-Hollow shaft	3. \varnothing 10 mm 4. \varnothing 12 mm	6. EtherCAT	2. 3 x M12 Connector	up to 16 bits (Standard: 13 bits)	up to 14 bits (Standard: 12 bits)	

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Step file 3D

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SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER



MECHANICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Shaft diameter	10 or 12 mm
Maximum number of revolutions permitted mechanically	≤ 12000 rpm
Protection according to DIN EN 60529	IP65
Rotor inertia moment	≤ 30 gcm ²
Starting torque at 20°C (68°F)	≤ 0,03 Nm
Weight aprox.	375 g
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
Humidity	98% RH, not condensed
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...1000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Radial connection	3 x M12 Connector Mating connectors not included

INTERFACE



Profile	CoE (CANopen over EtherCAT, DS-301+DS-406)
Diagnostics	OptoAsic, Memory, LED
Programming functions	Resolution, preset, counting direction
Features	Boot-Loader, Round Axis
Transmission rate	10 / 100 Mbit
Interface cycle time	≥ 62,5 µs

ELECTRICAL SPECIFICATIONS

Output Driver	Ethernet
Power supply	10...30 VDC
Consumption	≤ 230 mA (10 VDC) ≤ 100 mA (24 VDC)
Power Consumption	≤ 2.5 W
Start time	< 250 ms
Singleturn resolution	up to 16 bits
Multiturn resolution	up to 14 bits
Accuracy (INL)	±0.0220° (14 – 16 bits) ±0.0439° (≤13 bits)
Code	Binary
Short circuit protection	Yes
Protection polarity inversion	Yes
EMC: Emitted interference	DIN EN 61000-6-4
EMC: Noise immunity	DIN EN 61000-6-2
MTTF	65 years

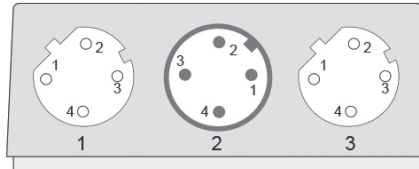
SERIE HS10/HM10

SINGLETURN AND MULTITURN ABSOLUTE BLIND HOLLOW SHAFT ENCODER

EtherCAT®

CONNECTION

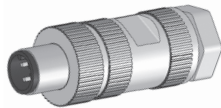
Mating connectors not included



	M12 4p Female d coded	M12 4p Male a coded	M12 4p Female d coded
VCC	-	1	-
GND	-	3	-
Tx+	1	-	1
Rx+	2	-	2
Tx-	3	-	3
Rx-	4	-	4
Not connected	-	2, 4	-

ACCESSORIES

90.9556
M12 4p
Male



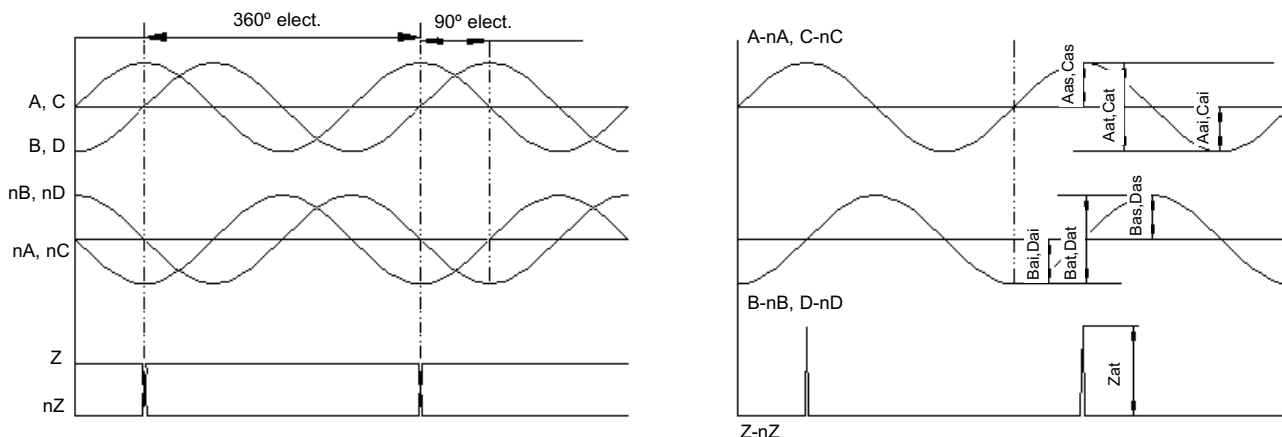
90.9555
M12 4p
Female



INTRODUCTION

SmarSens is a range of Hohner encoders that give a single encoder the possibility of absolute and incremental signals. Its compact and robust design with numerous communication interfaces available make SmarSens a product that adapts to the real needs of the client. The implementation through an OptoASIC provides a high degree of optoelectronic integration. The range of SmarSens encoders is applicable to a great variety of applications such as wind turbines, elevators, etc.

INCREMENTAL SIGNALS / ABSOLUT SIGNALS 1Vpp



	Amplitude Vpp	Offset / Asymmetry	Amplitude ratio A/B	Phase A to B
A, nA, B, nB C, nC, D, nD	0,5±20%	2,5±10%	-	-
A - nA	1±20%	$ A_{as}-A_{ai} /(2*(A_{as} + A_{ai}))\leq 0.065$	0.8 to 1.25	90°±10°
B - nB	1±20%	$ B_{as}-B_{ai} /(2*(B_{as} + B_{ai}))\leq 0.065$		
C - nC	1±20%	$ C_{as}-C_{ai} /(2*(C_{as} + C_{ai}))\leq 0.065$		
D - nD	1±20%	$ D_{as}-D_{ai} /(2*(D_{as} + D_{ai}))\leq 0.065$		
Z, nZ	0,5±20%	2,5±10%		
Z - nZ	1±20%			

A: Incremental cosine signal
 B: Incremental sine signal
 C: Absolute cosine signal
 D: Absolute sine signal
 Z: Index signal

Aas, Bas, Cas, Das: Channel A, B, C and D, upper peak voltage amplitude
 Aai, Bai, Cai, Dai: Channel A, B, C and D, lower peak voltage amplitude
 Aat, Bat, Cat, Dat: Channel A, B, C and D, peak to peak voltage amplitude

Sinusoidal outputs are a very useful system to make interpolations that give high resolution to the single turn part. There are incremental signals, A and B, the signal A (cosine) moves in front of B (sine) 90° degrees, and there are absolute signals, C and D, the signal C (cosine) moves in front of D (sine) 90° degrees. The median value of signals A, B, C, D, nA, nB, nC and nD, is 2.5 Vdc. The nA/nCOS_inc signal is 180 degrees from A/COS_inc, just nB/nSIN_inc is to B/SIN_inc, like nC/COS_abs is to C/COS_abs and D/SIN_abs is to D/SIN_abs. The peak to peak of the sinusoids is from 0.4 to 0.6 Vpp. These sine and cosine signals, in the control input, adapt the interpolate signals to 1 Vpp in the A-nA, B-nB, C-nC and D-nD.

SSI INTERFACE

In many cases, the data transmitted from one system to another are exposed to magnetic fields and noise. When using a standard interface like the RS-422, the effects produced by these disruptions are reduced. The SSI "Synchronous Serial Interface" is an industrial output standard that only needs 4 lines to carry out data transmission. This transmission system for absolute encoders provides diverse advantages in comparison to the traditional parallel transmission and asynchronous serial methods:

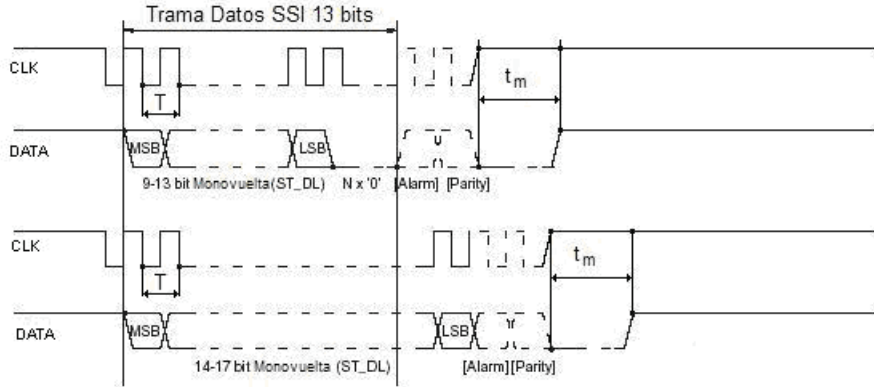
- Inferior number of components.
- Easy wiring system.
- Data transmission between the encoder and the receiver are controlled by the receivers clock signal.
- High transmission speeds based on distance and data block to be transmitted.

The SSI interface requires a Master (for example, a SSI data acquisition card) and a Slave (the encoder) for communication. The Master generates the CLK and their inverted signals, while the slave generates the DATA and their inverted signals. The communication is one-way. When in idle mode, CLK and DATA have the value "1" (high value). In the data acquisition mode, the Master generates a burst of pulses of the same period T and the Slave will respond with an information bit for each pulse also with a T duration. The CLK and DATA signals are synchronized. To start the transmission, the Master will set the CLK signal to "0" (low value) and then send the pulses. To end the block, the master will maintain during tm seconds the CLK signal at "1" and then the SLO signal will also become "1". At this point, the Master can interrogate the Slave again. The bits sent during a burst of pulses by the Master are called a block. In the SSI, the standard size of the blocks is 13 or 25 bits, although other sizes are possible.

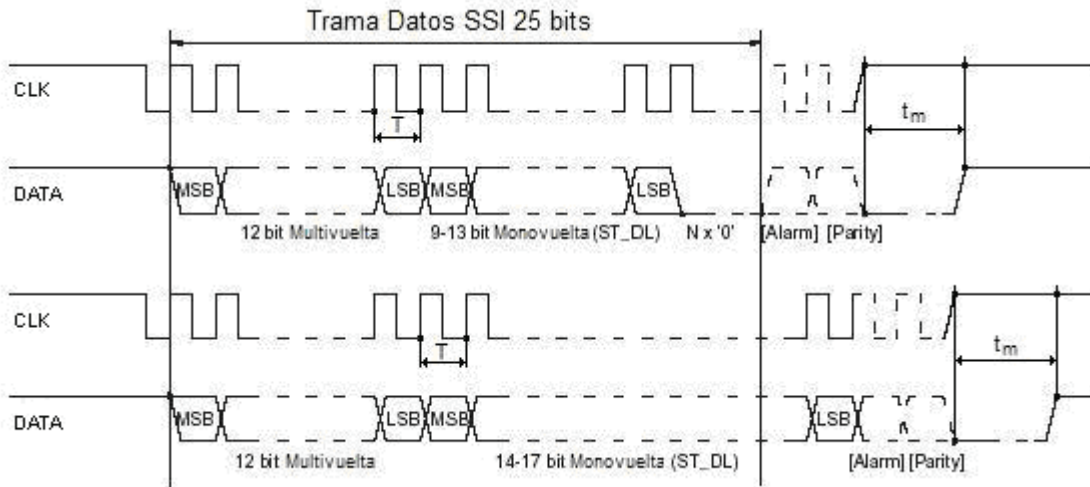
GENERAL INFORMATION **SmarSens**

In the single-turn mode, the information is transmitted in SSI blocks of at least 13 standard bits. If the single-turn resolution is higher than 13 bits, the block will last n bits, with n being the number of single-turn resolution bits. In the serial delivery, the first bit of data transmitted deals with the most significant bit (MSB) of the block and the last one with the least significant bit (LSB). If the resolution is less than 13 bits, the remaining space up to the 13 bits is filled with zeros. In the SSI1 Figure, you can see the block sent when the resolution is lower than 13 bits and also when it is higher.

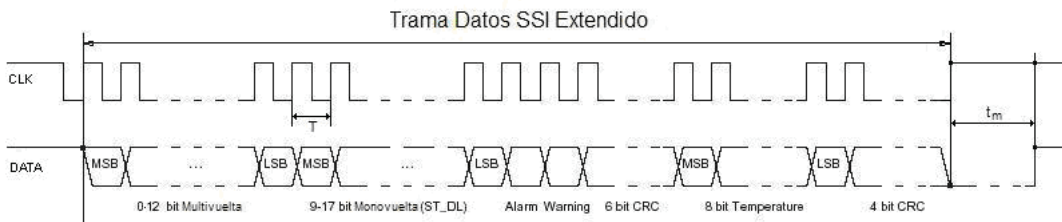
In all the SSI blocks, in single-turn, multi-turn, or extended modes, you can add the Alarm and Parity bits activating the relevant configuration bits. By default, these bits are not sent in the block.



In the multiturn mode, the information is transmitted in standard SSI blocks of 25 bits for singleturn resolutions of less than 14 bits. The 12 bits of the multiturn part are transmitted at the beginning, starting from the most significant bit to the least. Next, the singleturn part bits are transmitted, starting from the most significant bit of the block. If the resolution singleturn is inferior to 13 bits, the bits left over from the block will become zeros. If the singleturn resolution is higher than 13 bits, the size of the block will be $25+(n-13)$ bits, where n is the number of singleturn resolution bits. In the SSI2 figure, you can see the case for a single-turn resolution equal to or less than 13 bits and the case for resolutions higher than 13 singleturn bits.



In the SSI extended mode, the length of block is variable, depending on the information sent. First, it transmits the data of the multiturn part, with a variable length of 0 (only single-turn) or 12 bits, from the most significant to the least significant bit. Next, the single-turn part also transmits from the most to the least significant bit. The length can vary depending on the resolution of the part single-turn, from 10 bits to 14 bits. Once transmitted, the least significant bit will send the Alarm and Warning bits. As a method to detect errors in the transmission, a 6 bit CRC will be generated, with the 43h polynomial, of the information processed up to that point (multiturn+singleturn+Alarm+Warning) that will be transmitted after the Warning bit. Next, it will send the information on the sensor temperature encapsulated in 8 bits, and lastly, it will calculate a CRC, with the 4 bits 13h polynomial, that will close the block to transmit, for the 8 bits of sensor temperature data. In the SSI3 figure, you can see the format of the extended SSI block.

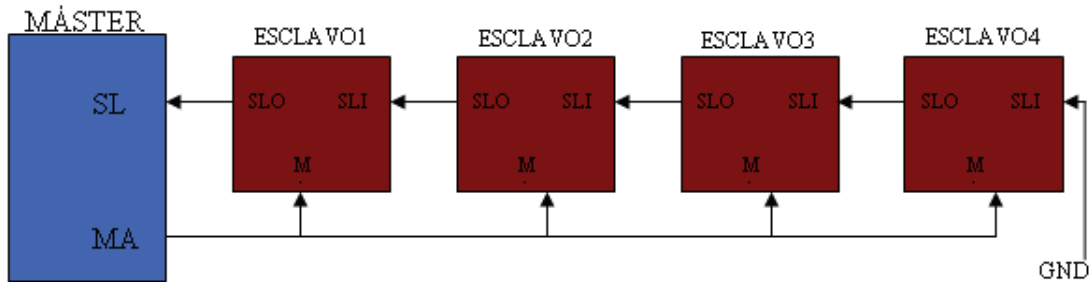


In all cases, the value of T should be from $1\mu s$ to $10\mu s$, and t_m should be higher than $40\mu s$. To correctly operate, you should set up the encoder configuration record to allow SSI-BISS compatibility.

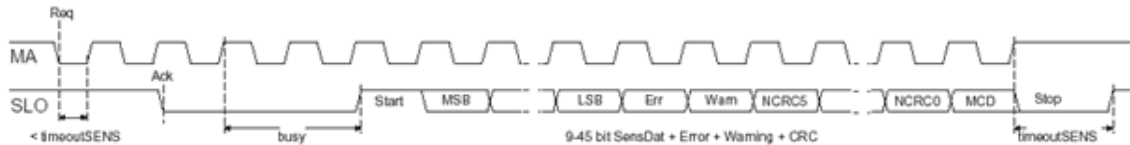
GENERAL INFORMATION **SmarSens**

BISS INTERFACE

This multipoint serial communication standard is open and simple to use. It is similar to the SSI but the control (or master) interacts with the sensors programming the different parameters for each sensor, as well as reading its different status record. For this reason, the BiSS "Bidirectional interface Serial Synchronous", unlike the SSI, is bidirectional. The communication can be from 17KHz to 4MHz frequencies under ideal conditions. For longer sensor-control distances, this frequency gradually diminishes. The maximum number of slaves for each master, like this encoder, that can be connected to a control is four. The BISS1 figure graphically shows the connection of four slaves with the master. The last slave of the chain has to have the SLI to GND input. Physically, this means that SLI+ should connect to GND and SLI- to 5V. When the encoders interact with other slaves that are not encoders, they must be located on the chain with the lowest identifiers, starting from one. The use of more than one slave with the master implies that the maximum work frequency of the encoder is divided by the number of slaves connected, due to the time that they take in transmitting data to other slaves.



The encoder data reading by the Master (MA) is always one-way, using PWM codification and following the BISS2 figure format. The Master starts the communication with start bit (start, lowering the signal from "1" to "0"), next, it waits for the encoder's answer, also called slave (SLO) that, before the synchronism signal or clock sent by the master, begins to send data after a start signal. The encoder starts to send data from the most to the least significant bit, and then sends the Error, Alarm and CRC bits of 6 0x43h polynomial generator bits. Lastly, it sends a data bit called a multi-block (MCD). The size of the block depends on the encoder's resolution. After each block, the encoder's position is given



The multi-cycle or multi-block bit does not have any purpose in a single block, but it does when in various blocks, and provides the information on the encoder's temperature.

This temperature is encoded into 8 bits and each bit is transmitted in a different data reading block of the encoder. Also, the entire multi-block cycle includes a start bit to indicate the MCD start, next the 8 bits, the 4 bit CRC with a 0x13h polynomial generator and lastly, a stop bit. Overall, the encoder's temperature reading takes up 16 blocks of data reading. In the BISS3 figure, you can see the details of this type of transmission.

EXTERNALLY CONFIGURABLE PARAMETERS AND DIAGNOSIS LED (OPTIONAL)

Unscrewing the top of the rear cover, you will find the reset/preset button to position the absolute value of the encoder to a known value.

In the case of a SSI encoder, pushing the button will update the position to 0 (Reset). In the case of a BiSS encoder, when we push the button, we can update the position to any previously programmed value (Preset).

You can also change the direction using the external nDIR input, that when we connected to the GND inverts the encoder's default rotation direction.

The diagnosis LED can also be reached by unscrewing the top. When the encoder and the communication with the master are working correctly, the LED is green. The led is red (in SSI mode) when the communication fails with the master, when the lamps stop working, when the communication fails with the multi-turn part or when the encoder exceeds the recommended work temperature values.

In the BiSS communication mode, the diagnosis LED is configurable with the 0x30h record (error mask) where we can choose what are/is the error/s that we are interested in detecting.

When there is an error in the encoder (diagnosis LED is red), the 8 bit record with direction 0x68h specifies the reason for the error, according to the active bit. The table of errors is :

Bit7	Operation temperate exceeded
Bit6	Error external system sent to NERRR
Bit5	Error in the serial interface
Bit4	Invalid position or data conversion is not ready
Bit3	Configuration error EEPROM interface
Bit2	Error in the pitch codification
Bit1	Error in the multi-turn part
Bit0	Failure in the LED power control

The "Error in the pitch codification" usually causes problems with the disc (breakage, condensation or dirt) or mechanical overload (excess in the rotation speed).

The "Failure in the LED power control" originates when there are problems with heat, dirt, condensation or fatigue.



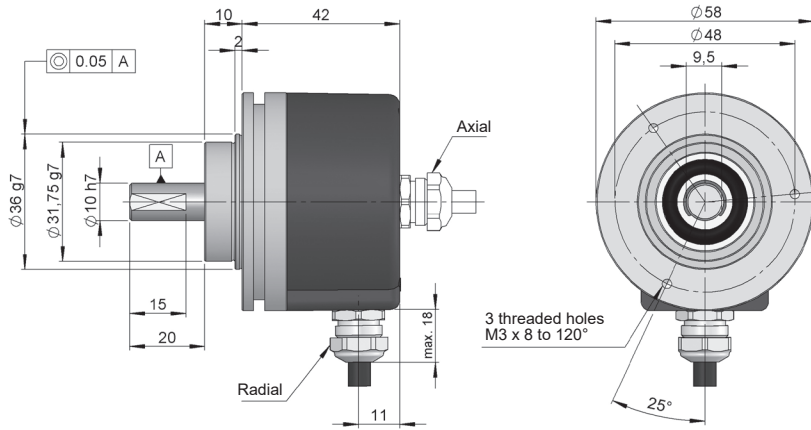
SERIE SMRS 10

SINGLETURN ABSOLUTE AND INCREMENTAL SOLID SHAFT ENCODER

SSI SSI
SSI + SinCos

BiSS INTERFACE BiSS-C
BiSS-C + SinCos

- Singleturn resolution up to 19 bits
- Incremental resolution 2048 SIN/COS
- External diameter 58 mm
- Solid shaft \varnothing 6, 8 or 10 mm
- Operating temperature range up to 100°C
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector



Drawing shaft type 2, connection type 11/12, cable 95.0008003, without flange

REFERENCE

Reference example: SMRS10-21121311S-17

Serie	Solid shaft	Flange	Connection	Interface	IP	Power supply	Parameters config.	Absolute resolution	Special customer
SMRS10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1. \varnothing 6 mm	1. None	10. Helicoidal cable	11. SSI Binary CW	1. IP65	1. 4..30 VDC	S. Direction	10. 10 bits	KD. Halogen-free cable	
2. \varnothing 10 mm	2. 90.1002	11. Axial cable	12. SSI Binary CCW	(*)	2. 5 VDC	R. Reset	12. 12 bits	MB. -40°C	
3. \varnothing 8 mm	3. 90.1003	12. Radial cable	13. SSI Gray CW				13. 13 bits		
4. 90.1004	4. 90.1004	21. 30 cm axial cable + connector D-Sub 15p	14. SSI Gray CCW				14. 14 bits		
5. 90.1005	5. 90.1005	22. 30 cm radial cable + connector D-Sub 15p	21. SSI + 2048 SIN/COS Binary CW				17. 17 bits		
6. 90.1006	6. 90.1006	31. Axial M23 12p	22. SSI + 2048 SIN/COS Binary CCW				19. 19 bits (**)		
		32. Radial M23 12p	23. SSI + 2048 SIN/COS Gray CW						
		41. Axial M12 8p	24. SSI + 2048 SIN/COS Gray CCW						
		42. Radial M12 8p	35. BiSS-C						
		71. Axial M23 17p	45. BiSS-C + 2048 SIN/COS						
		72. Radial M23 17p							

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(*) For helicoidal cable IP54.

(**) 21 bits - Upon request.

Other extension cable options available with specific connectors mounted at the end of the cable for different market drives, on request.



SERIE SMRS 10

SINGLETURN ABSOLUTE AND INCREMENTAL SOLID SHAFT ENCODER

SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

TECHNICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65 - Standard IP54 - Helicoidal connection
Rotor inertia moment	≤ 3x10 ⁻⁶ Kg·m ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight aprox.	0,4 Kg
Operating temperature range	-10°C to +100°C - Standard -40°C to +100°C - Special Customer MB
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Consumption	≤ 90 mA
Power supply	5 VDC ±10% / 10...30 VDC
Linearity	± ½ LSB
Helicoidal connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)
Axial or radial connection	2 meters cable or industrial connector M23 or M12 (other cable lengths available on order) or 30 cm cable + connector D-Sub 15p Female connector not included

SSI / BiSS INTERFACE



(*)

Electronic output	RS485	RS485
Max. load capability / channel	±20 mA	±20 mA
Resolution	10...19 bits 21 bits - Upon request	10...19 bits 21 bits - Upon request
Code	Binary Gray	Binary
Clock frequency	50 kHz ... 2 MHz	50 kHz ... 10 MHz
Protocol	SSI	BiSS-C

(*) BiSS protocol allows to configure CRC, Alarm messages, Warnings, Sense, Reset and Absolute resolution by BUS. Default configuration: Binary CW.

INCREMENTAL OUTPUT

SIN/COS



Electronic output	Differential 1 Vpp
Signal offset	2,5 VDC
Resolution	2048 ppr
Cutoff frequency (-3 db)	>500 kHz

SERIE SMRS 10

SINGLETURN ABSOLUTE AND INCREMENTAL SOLID SHAFT ENCODER

SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

CONNECTION



	Cable (**) 3x2x0,14+2x0,34 95.0008003	Cable (**) 6x2x0,14 mm ² 95.0008072	Cable (**) 6x2x0,14mm ² Halogen-free cable up to 90°C 95.0008073	Connector BiSS M23 12p CW	Connector SSI M23 12p CW	Connector BiSS / SSI M23 17p CW	Connector M12 8p CCW	Connector D-Sub 15p High density
GND	Black	White	White	1	1	10	1	13
VCC	Red	Brown	Brown	8	2	7	2	12
DATA+	Yellow	Pink	Pink	2	3	14	3	7
DATA-	Green	Grey	Grey	7	4	17	4	2
CLOCK+	Brown	Yellow	Yellow	3	5	8	5	6
CLOCK-	Blue	Green	Green	6	6	9	6	1
SLI+	-	-	-	-	-	1		
SLI-	-	-	-	-	-	4		
DIR or RESET	Grey	Red-Blue	Red-Blue	9	9	2	7	11
A+(cos)	-	Red	Red	10	10	15		8
B+(sin)	-	Black	Black	4	7	12		9
A-(cos)	-	Blue	Blue	12	12	16		3
B-(sin)	-	Violet	Violet	5	8	13		4
Shield (*)	Shield	Shield	Shield	11	11	11	8	Housing

(*) Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected. ⊥

(**) The recommended maximum cable length is 10 meters. The 95.0008003 cable for interfaces types 11, 12, 13, 14 and 35 and the 95.0008072 cable for interface types 21, 22, 23, 24 and 45. The 95.0008073 cable for special customer KD.



Cable length	< 25 m	< 50 m	< 100 m	< 200 m	< 400 m
Transmission speed	< 1 MHz	< 400 kHz	< 300 kHz	< 200 kHz	< 100 kHz



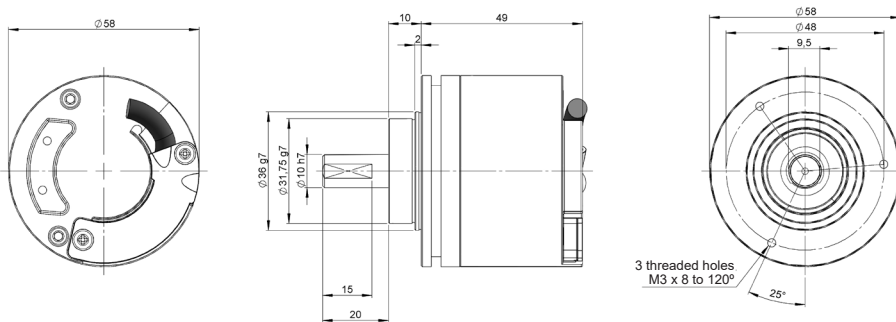
Cable length	< 10 m	< 25 m	< 60 m	< 100 m
Transmission speed	< 10 MHz	< 5 MHz	< 2 MHz	< 1 MHz

CONNECTION DIMENSIONS

Female connector not included

Connection 10

Helicoidal cable



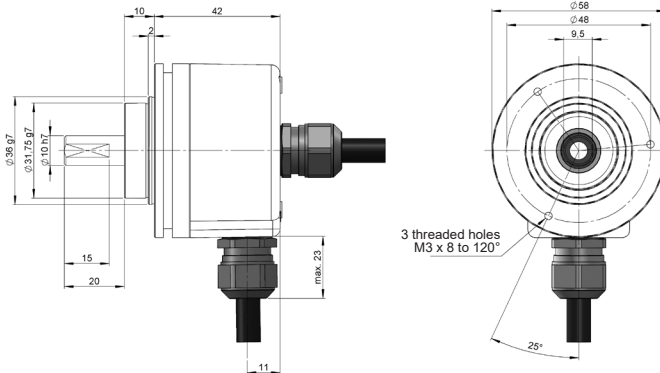
SERIE SMRS 10

SINGLETURN ABSOLUTE AND INCREMENTAL SOLID SHAFT ENCODER

SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

Connection 11

Axial cable
95.0008072
95.0008073

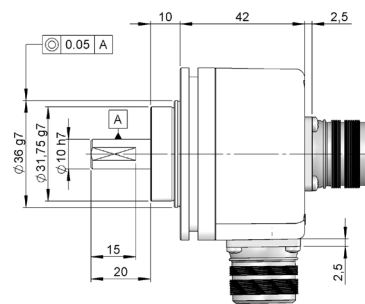


Connection 12

Radial cable
95.0008072
95.0008073

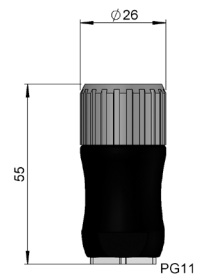
Connection 31

Axial
M23 12p
male panel
clockwise



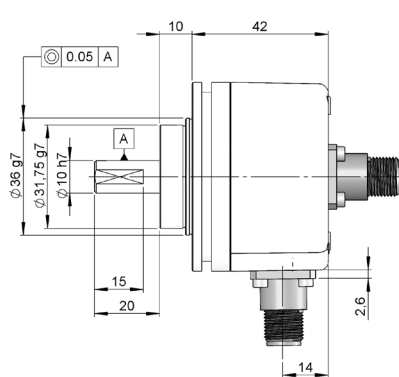
Female connector

95.0007131



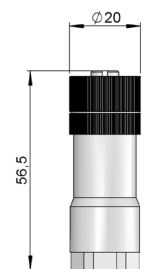
Connection 32

Radial
M23 12p
male panel
clockwise



Female connector

95.0007152



Connection 41

Axial
M12 8p
male panel
clockwise

Connection 42

Radial
M12 8p
male panel
clockwise

SERIE SMRS 10

SINGLETURN ABSOLUTE AND INCREMENTAL SOLID SHAFT ENCODER

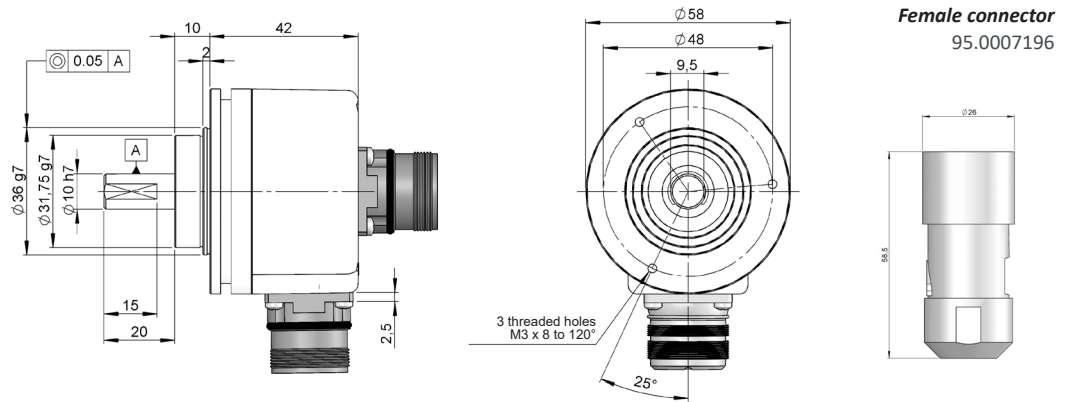
SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

Connection 71

Axial
M23 17p
male panel
clockwise

Connection 72

Radial
M23 17p
male panel
clockwise

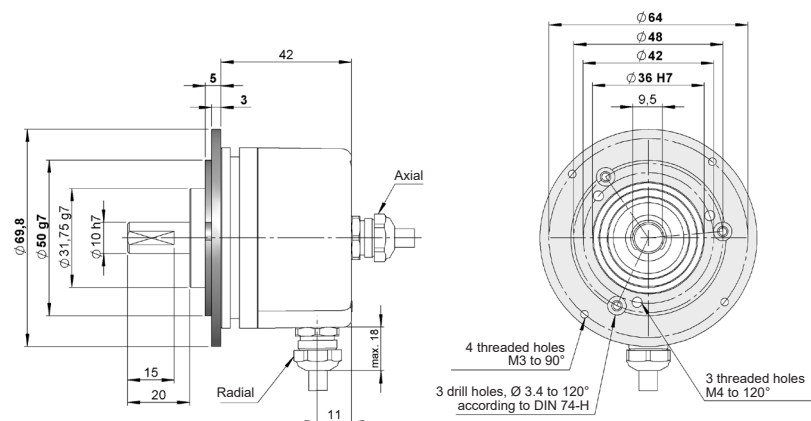


FLANGE DIMENSIONS

Flange mounting included

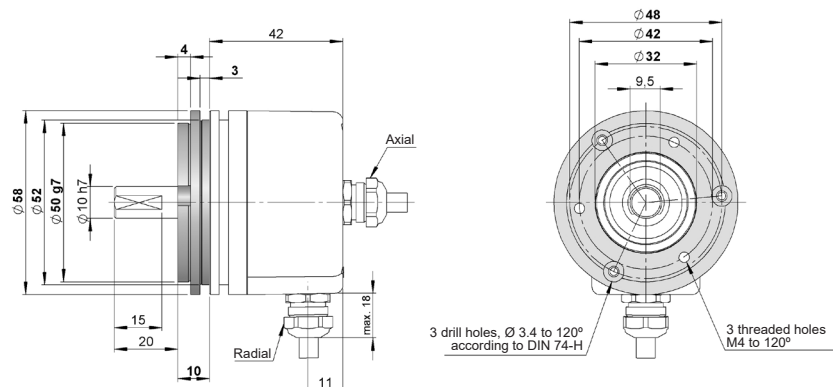
Flange 2

90.1002



Flange 3

90.1003

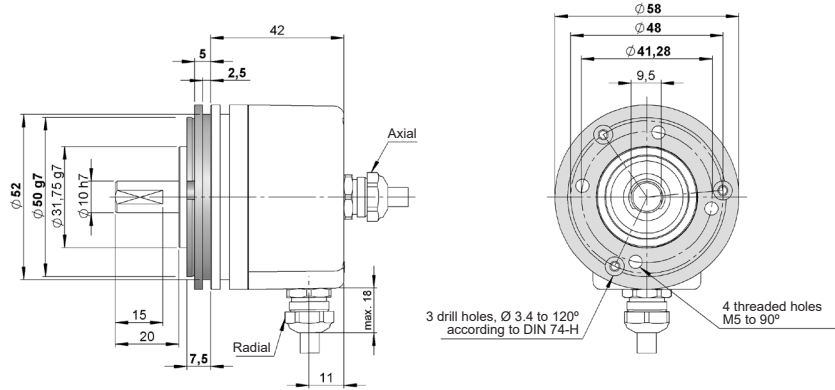


SERIE SMRS 10

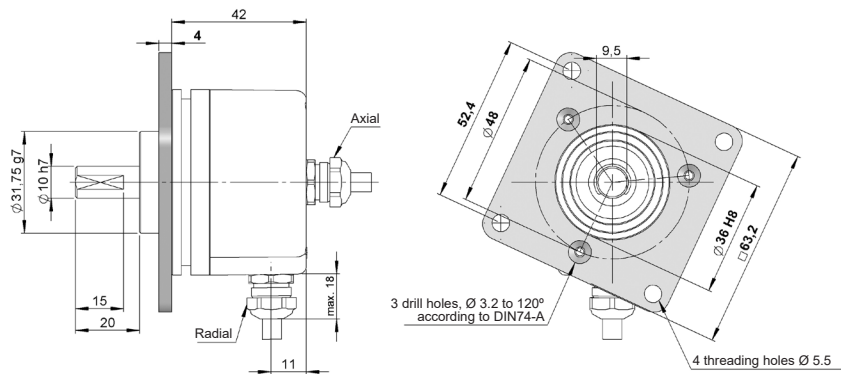
SINGLETURN ABSOLUTE AND INCREMENTAL SOLID SHAFT ENCODER

SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

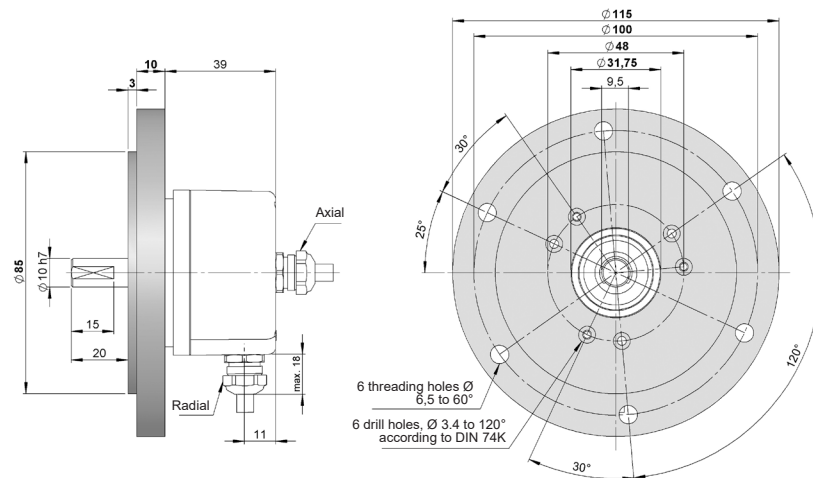
Flange 4
90.1004



Flange 5
90.1005



Flange 6
90.1006



SERIE SMRS 19

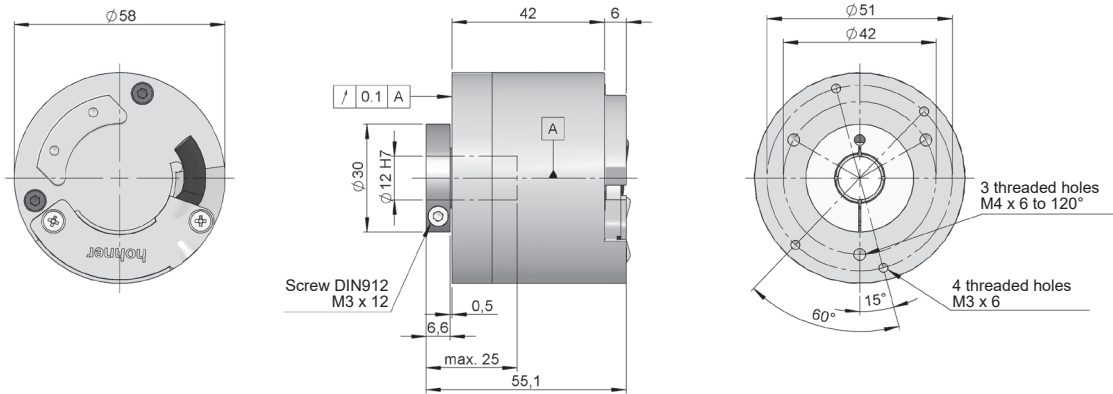
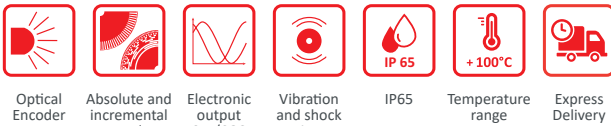
SINGLETURN ABSOLUTE AND INCREMENTAL BLIND HOLLOW SHAFT ENCODER



SSI SSI
SSI + SinCos

BISS BiSS-C
BiSS-C + SinCos

- Singleturn resolution up to 19 bits
- Incremental resolution 2048 SIN/COS
- External diameter 58 mm
- Blind hollow shaft \varnothing 8, 10, 12, 14 or 15 mm
- Operating temperature range up to 100°C
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector



Drawing blind hollow shaft type 3, connection type 10, without flange

REFERENCE

Reference example: SMRS19-31121311S-17

Serie	Blind-Hollow shaft	Anti-rotation system	Connection	Interface	IP	Power supply	Parameters config.	Absolute resolution	Special customer
SMRS19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. \varnothing 12 mm	1. None	10. Helicoidal cable	11. SSI Binary CW	1. IP65	1. 4..30 VDC	S. Direction	10. 10 bits	KD. Halogen-free cable
	4. \varnothing 10 mm	2. Flexible flange	12. Radial cable	12. SSI Binary CCW	(**)	2. 5 VDC	R. Reset	12. 12 bits	MB. -40°C
	5. \varnothing 8 mm	(90.1018)	20. 30 cm helicoidal cable	13. SSI Gray CW				13. 13 bits	
	6. \varnothing 14 mm	3. Flexible flange	+ connector	14. SSI Gray CCW				14. 14 bits	
	7. \varnothing 15 mm	(90.1027)	D-Sub 15p	21. SSI + 2048 SIN/COS Binary CW				17. 17 bits	
		4. Flexible flange	22. 30 cm radial cable + connector	22. SSI + 2048 SIN/COS Binary CCW				19. 19 bits (***)	
		(90.1075)	D-Sub 15p	23. SSI + 2048 SIN/COS Gray CW					
		(*)	32. Radial M23 12p	24. SSI + 2048 SIN/COS Gray CCW					
			42. Radial M12 8p	35. BiSS-C					
			72. Radial M23 17p	45. BiSS-C + 2048 SIN/COS					

Order your reference
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service available in 24 h

(*) Anti-rotation system type 3 (Flexible flange 90.1027) and 4 (Flexible flange 90.1075) supplied assembled. Anti-rotation system type 2 (flexible flange 90.1018) supplied disassembled and includes the screws required for assembly.

(**) For helicoidal cable IP54.

(***) 21 bits - Upon request.

Other extension cable options available with specific connectors mounted at the end of the cable for different market drives, on request.



SERIE SMRS 19



SINGLETURN ABSOLUTE AND INCREMENTAL BLIND HOLLOW SHAFT ENCODER

SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

TECHNICAL SPECIFICATIONS


Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65 - Standard IP54 - Helicoidal connection
Rotor inertia moment	≤ 3x10 ⁻⁶ Kg·m ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight aprox.	0,4 Kg
Operating temperature range	-10°C to +100°C - Standard -40°C to +100°C - Special Customer MB
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Consumption	≤ 90 mA
Power supply	5 VDC ±10% / 4...30 VDC
Linearity	± ½ LSB
Helicoidal connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)
Axial or radial connection	2 meters cable or industrial connector M23 or M12 (other cable lengths available on order) or 30 cm cable + connector D-Sub 15p Female connector not included

SSI / BiSS INTERFACE

		 (*)
Electronic output	RS485	RS485
Max. load capability / channel	±20 mA	±20 mA
Resolution	10...19 bits 21 bits - Upon request	10...19 bits 21 bits - Upon request
Code	Binary Gray	Binary
Clock frequency	50 kHz ... 2 MHz	50 kHz ... 10 MHz
Protocol	SSI	BiSS-C

(*) BiSS protocol allows to configure CRC, Alarm messages, Warnings, Sense, Reset and Absolute resolution by BUS. Default configuration: Binary CW.

INCREMENTAL OUTPUT

	
Electronic output	Differential 1 Vpp
Signal offset	2,5 VDC
Resolution	2048 ppr
Cutoff frequency (-3 db)	>500 kHz

SERIE SMRS 19

SINGLETURN ABSOLUTE AND INCREMENTAL BLIND HOLLOW SHAFT ENCODER

SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

CONNECTION



	Cable (**) 3x2x0,14+2x0,34 95.0008003	Cable (**) 6x2x0,14 mm ² 95.0008072	Cable (**) 6x2x0,14mm ² Halogen-free cable up to 90°C 95.0008073	Connector BiSS M23 12p CW	Connector SSI M23 12p CW	Connector BiSS / SSI M23 17p CW	Connector M12 8p CCW	Connector D-Sub 15p High density
GND	Black	White	White	1	1	10	1	13
VCC	Red	Brown	Brown	8	2	7	2	12
DATA+	Yellow	Pink	Pink	2	3	14	3	7
DATA-	Green	Grey	Grey	7	4	17	4	2
CLOCK+	Brown	Yellow	Yellow	3	5	8	5	6
CLOCK-	Blue	Green	Green	6	6	9	6	1
SLI+	-	-	-	-	-	1		
SLI-	-	-	-	-	-	4		
DIR or RESET	Grey	Red-Blue	Red-Blue	9	9	2	7	11
A+(cos)	-	Red	Red	10	10	15		8
B+(sin)	-	Black	Black	4	7	12		9
A-(cos)	-	Blue	Blue	12	12	16		3
B-(sin)	-	Violet	Violet	5	8	13		4
Shield (*)	Shield	Shield	Shield	11	11	11	8	Housing

(*) Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected. \perp
(**) The recommended maximum cable length is 10 meters. The 95.0008003 cable for Interfaces types 11, 12, 13, 14 and 35 and the 95.0008072 cable for Interface types 21, 22, 23, 24 and 45. The 95.0008073 cable for special customer KD.



Cable length:	< 25 m	< 50 m	< 100 m	< 200 m	< 400 m
Transmission speed	< 1 MHz	< 400 kHz	< 300 kHz	< 200 kHz	< 100 kHz



Cable length	< 10 m	< 25 m	< 60 m	< 100 m
Transmission speed	< 10 MHz	< 5 MHz	< 2 MHz	< 1 MHz

SERIE SMRS 19

SINGLETURN ABSOLUTE AND INCREMENTAL BLIND HOLLOW SHAFT ENCODER

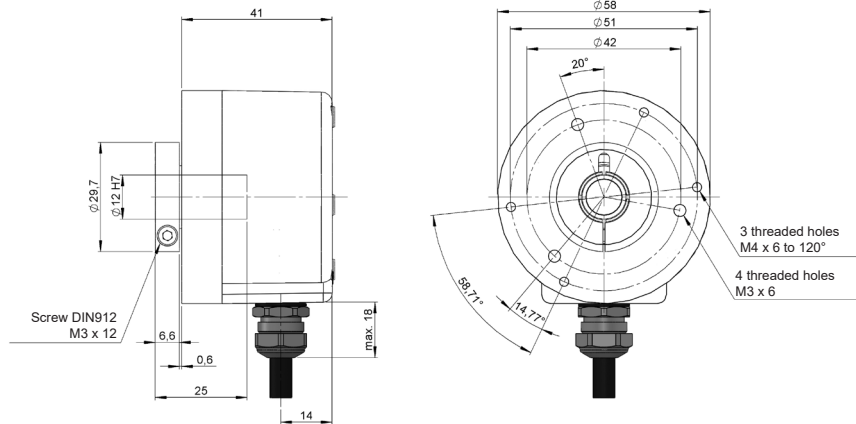
SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

CONNECTION DIMENSIONS

Female connector not included

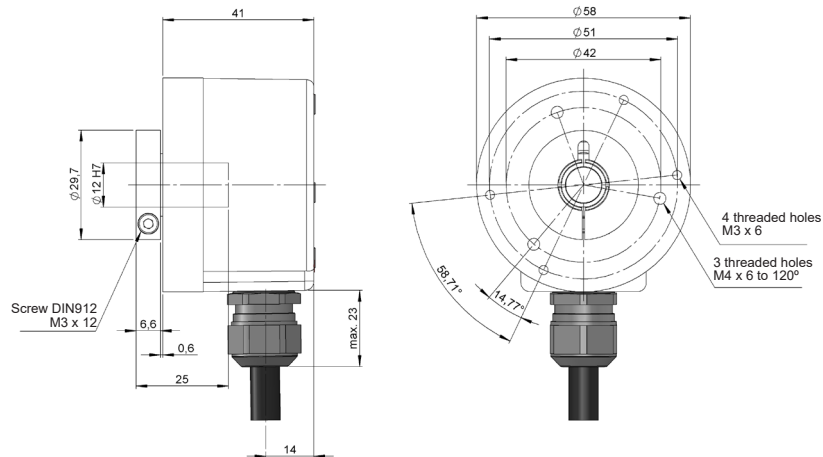
Connection 12

Radial cable
95.0008003



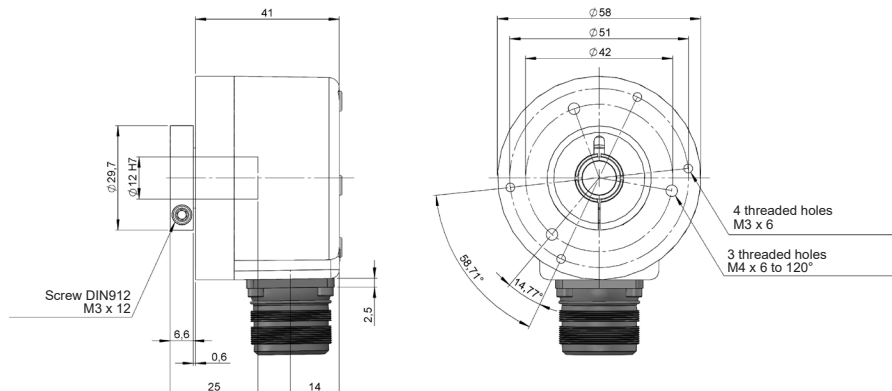
Connection 12

Radial cable
95.0008072
95.0008073

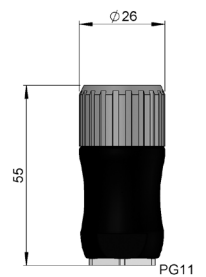


Connection 32

Radial
M23 12p
male panel



Female connector
95.0007131



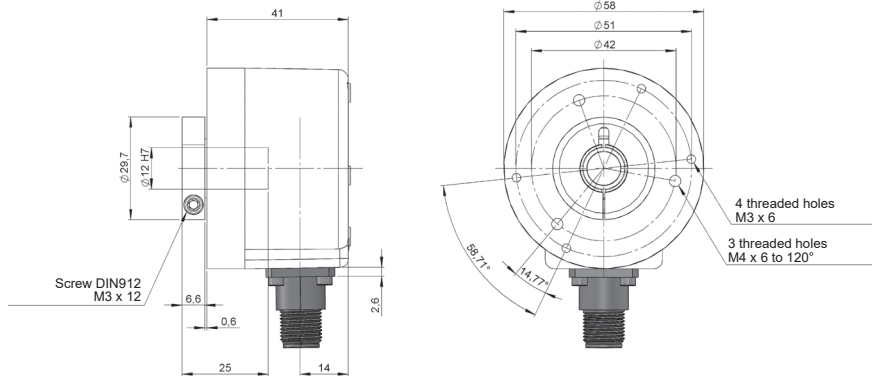
SERIE SMRS 19

SINGLETURN ABSOLUTE AND INCREMENTAL BLIND HOLLOW SHAFT ENCODER

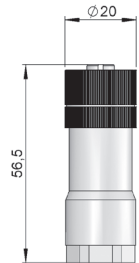
SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

Connection 42

Radial
M12 8p
male panel

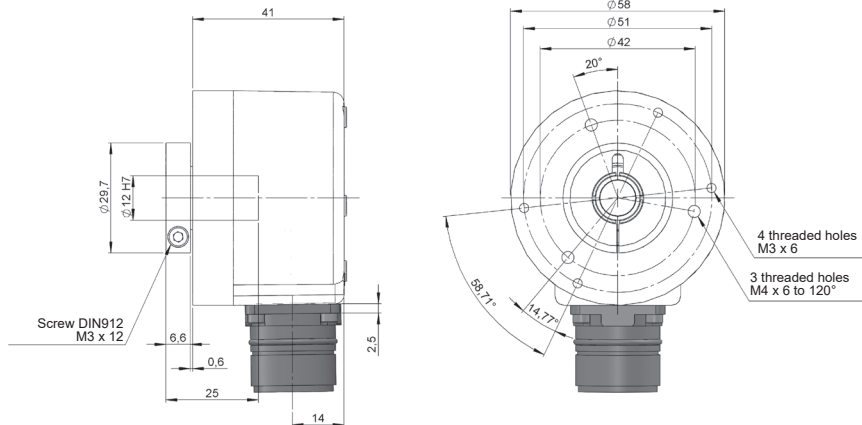


Female connector
95.0007152

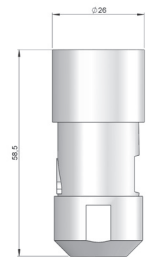


Connection 72

Radial
M23 17p
male panel



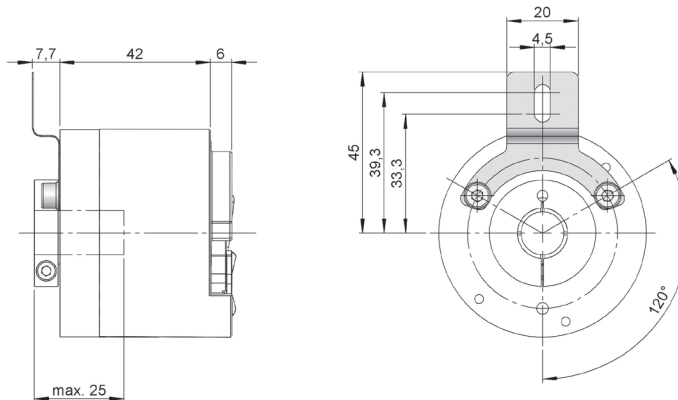
Female connector
95.0007196



ANTI-ROTATION SYSTEMS DIMENSIONS

Anti-rotation system 2

Flexible flange 90.1018



90.1018



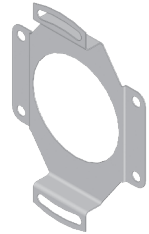
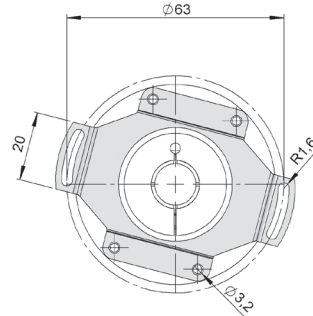
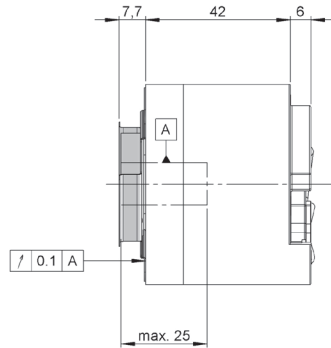
SERIE SMRS 19

SINGLETURN ABSOLUTE AND INCREMENTAL BLIND HOLLOW SHAFT ENCODER

SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

Anti-rotation system 3

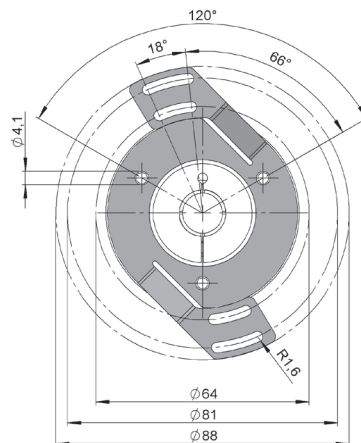
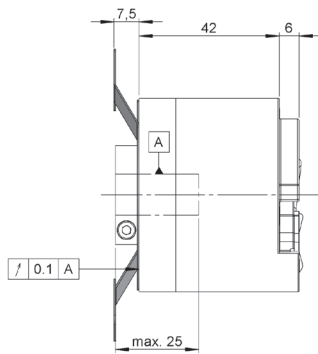
Flexible flange 90.1027



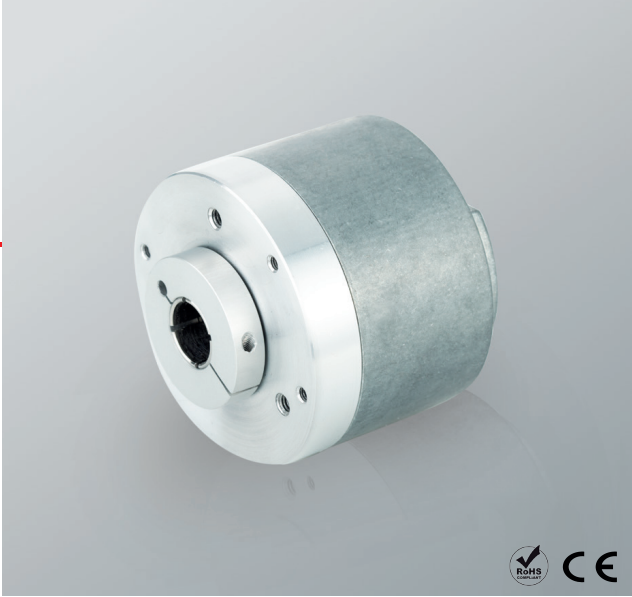
90.1027

Anti-rotation system 4

Flexible flange 90.1075



90.1075



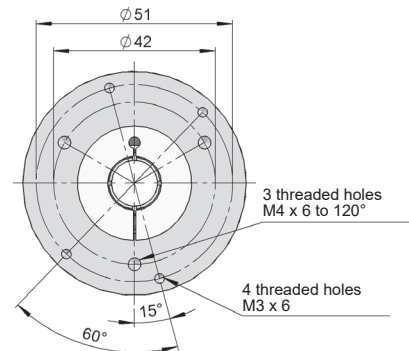
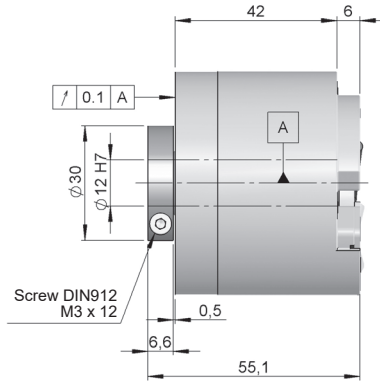
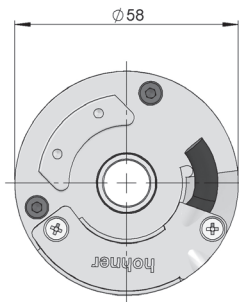
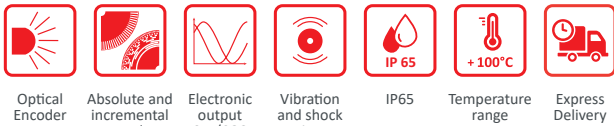
SERIE SMRS 59

SINGLETURN ABSOLUTE AND INCREMENTAL HOLLOW SHAFT ENCODER

SSI SSI
SSI + SinCos

BiSS INTERFACE BiSS-C
BiSS-C + SinCos

- Singleturn resolution up to 19 bits
- Incremental resolution 2048 SIN/COS
- External diameter 58 mm
- Hollow shaft \varnothing 8, 10, 12, 14 or 15 mm
- Operating temperature range up to 100°C
- Protection class IP65 according to DIN EN 60529
- Connection by cable (other cable length available) or industrial connector



Drawing hollow shaft type 3, connection type 10, without flange

REFERENCE

Reference example: SMRS59-31121311S-17

Serie	Hollow shaft	Anti-rotation system	Connection	Interface	IP	Power supply	Parameters config.	Absolute resolution	Special customer
SMRS59 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. \varnothing 12 mm 4. \varnothing 10 mm 5. \varnothing 8 mm 6. \varnothing 14 mm 7. \varnothing 15 mm	1. None 2. Flexible flange (90.1018) 3. Flexible flange (90.1027) 4. Flexible flange (90.1075) (*)	10. Helicoidal cable 12. Radial cable 20. 30 cm helicoidal cable + connector 21. D-Sub 15p 22. 30 cm radial cable + connector 23. D-Sub 15p 32. Radial M23 12p 42. Radial M12 8p 72. Radial M23 17p	11. SSI Binary CW 12. SSI Binary CCW 13. SSI Gray CW 14. SSI Gray CCW 21. SSI + 2048 SIN/COS Binary CW 22. SSI + 2048 SIN/COS Binary CCW 23. SSI + 2048 SIN/COS Gray CW 24. SSI + 2048 SIN/COS Gray CCW 35. BiSS-C 45. BiSS-C + 2048 SIN/COS	1. IP65 (**)	1. 4..30 VDC 2. 5 VDC	S. Direction R. Reset	10. 10 bits 12. 12 bits 13. 13 bits 14. 14 bits 17. 17 bits 19. 19 bits (***)	KD. Halogen-free cable MB. -40°C

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service available in 24 h

(*) Anti-rotation system type 3 (Flexible flange 90.1027) and 4 (Flexible flange 90.1075) supplied assembled. Anti-rotation system type 2 (flexible flange 90.1018) supplied disassembled and includes the screws required for assembly.

(**) For helicoidal cable IP54.

(***) 21 bits - Upon request.

Other extension cable options available with specific connectors mounted at the end of the cable for different market drives, on request.



SERIE SMRS 59

SINGLETURN ABSOLUTE AND INCREMENTAL HOLLOW SHAFT ENCODER

SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

TECHNICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP65 - Standard IP54 - Helicoidal connection
Rotor inertia moment	≤ 3x10 ⁻⁶ Kgm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight aprox.	0,4 Kg
Operating temperature range	-10°C to +100°C - Standard -40°C to +100°C - Special Customer MB
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Consumption	≤ 90 mA
Power supply	5 VDC ±10% / 4...30 VDC
Linearity	± ½ LSB
Helicoidal connection	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request)
Axial or radial connection	2 meters cable or industrial connector M23 or M12 (other cable lengths available on order) or 30 cm cable + connector D-Sub 15p Female connector not included

SSI / BiSS INTERFACE



(*)

Electronic output	RS485	RS485
Max. load capability / channel	±20 mA	±20 mA
Resolution	10...19 bits 21 bits - Upon request	10...19 bits 21 bits - Upon request
Code	Binary Gray	Binary
Clock frequency	50 kHz ... 2 MHz	50 kHz ... 10 MHz
Protocol	SSI	BiSS-C

(*) BiSS protocol allows to configure CRC, Alarm messages, Warnings, Sense, Reset and Absolute resolution by BUS. Default configuration: Binary CW.

INCREMENTAL OUTPUT

SIN/COS



Electronic output	Differential 1 Vpp
Signal offset	2,5 VDC
Resolution	2048 ppr
Cutoff frequency (-3 db)	>500 kHz

SERIE SMRS 59

SINGLETURN ABSOLUTE AND INCREMENTAL HOLLOW SHAFT ENCODER

SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

CONNECTION



	Cable (**) 3x2x0,14+2x0,34 95.0008003	Cable (**) 6x2x0,14 mm ² 95.0008072	Cable (**) 6x2x0,14mm ² Halogen-free cable up to 90°C 95.0008073	Connector BiSS M23 12p CW	Connector SSI M23 12p CW	Connector BiSS / SSI M23 17p CW	Connector M12 8p CCW	Connector D-Sub 15p High density
GND	Black	White	White	1	1	10	1	13
VCC	Red	Brown	Brown	8	2	7	2	12
DATA+	Yellow	Pink	Pink	2	3	14	3	7
DATA-	Green	Grey	Grey	7	4	17	4	2
CLOCK+	Brown	Yellow	Yellow	3	5	8	5	6
CLOCK-	Blue	Green	Green	6	6	9	6	1
SLI+	-	-	-	-	-	1		
SLI-	-	-	-	-	-	4		
DIR or RESET	Grey	Red-Blue	Red-Blue	9	9	2	7	11
A+(cos)	-	Red	Red	10	10	15		8
B+(sin)	-	Black	Black	4	7	12		9
A-(cos)	-	Blue	Blue	12	12	16		3
B-(sin)	-	Violet	Violet	5	8	13		4
Shield (*)	Shield	Shield	Shield	11	11	11	8	Housing

(*) Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected. \perp

(**) The recommended maximum cable length is 10 meters. The 95.0008003 cable for Interfaces types 11, 12, 13, 14 and 35 and the 95.0008072 cable for Interface types 21, 22, 23, 24 and 45. The 95.0008073 cable for special customer KD.



Cable length	< 25 m	< 50 m	< 100 m	< 200 m	< 400 m
Transmission speed	< 1 MHz	< 400 kHz	< 300 kHz	< 200 kHz	< 100 kHz



Cable length	< 10 m	< 25 m	< 60 m	< 100 m
Transmission speed	< 10 MHz	< 5 MHz	< 2 MHz	< 1 MHz

SERIE SMRS 59

SINGLETURN ABSOLUTE AND INCREMENTAL HOLLOW SHAFT ENCODER

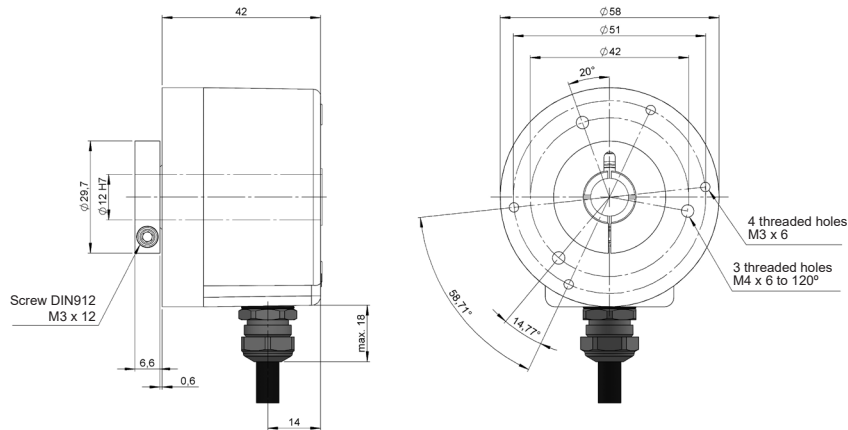
SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

CONNECTION DIMENSIONS

Female connector not included

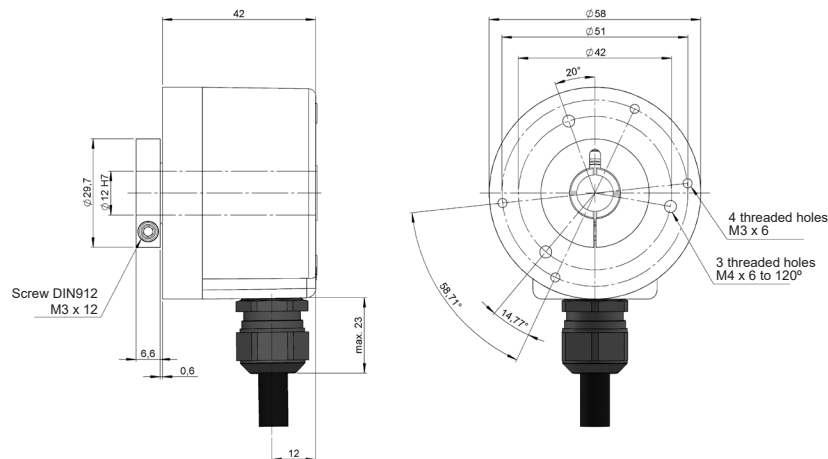
Connection 12

Radial cable
95.0008003



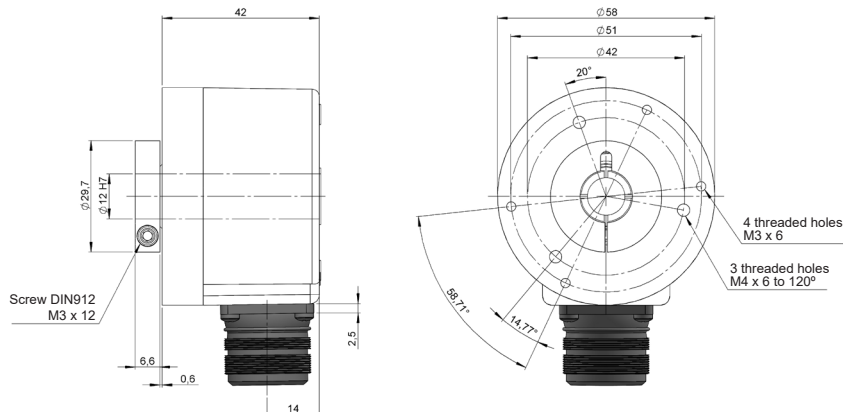
Connection 12

Radial cable
95.0008072
95.0008073

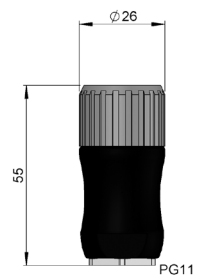


Connection 32

Radial
M23 12p
male panel



Female connector
95.0007131



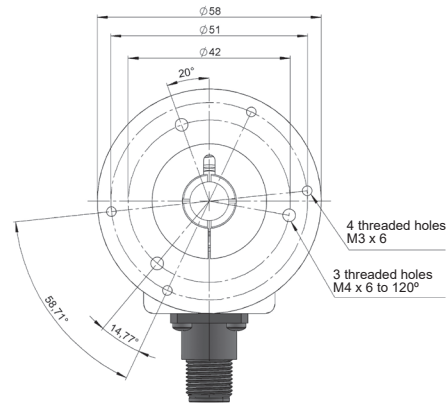
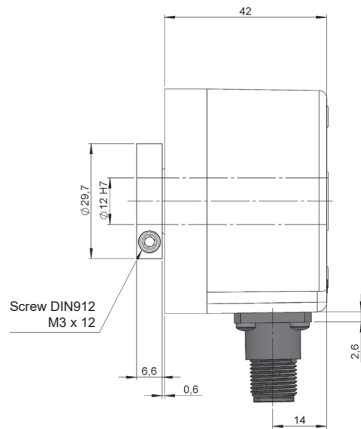
SERIE SMRS 59

SINGLETURN ABSOLUTE AND INCREMENTAL HOLLOW SHAFT ENCODER

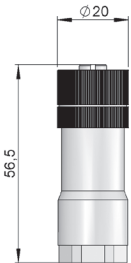
SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

Connection 42

Radial
M12 8p
male panel

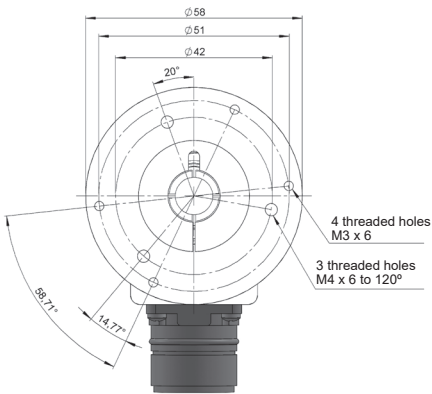
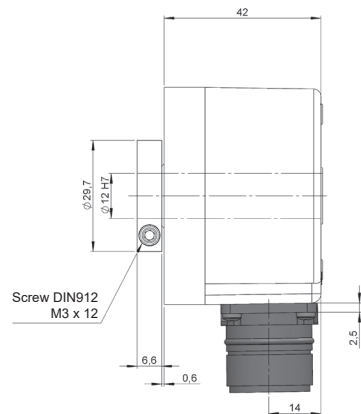


Female connector 95.0007152

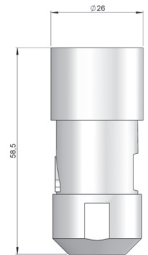


Connection 72

Radial
M23 17p
male panel



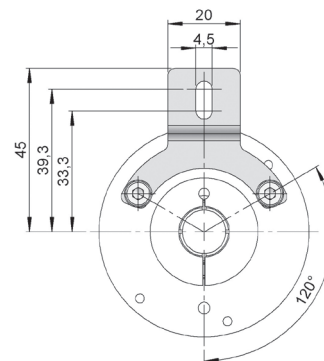
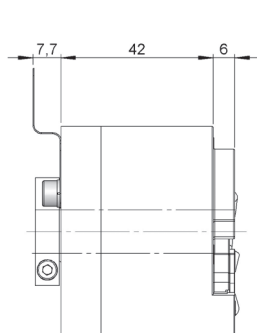
Female connector 95.0007196



ANTI-ROTATION SYSTEMS DIMENSIONS

Anti-rotation system 2

Flexible flange 90.1018



90.1018

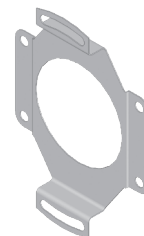
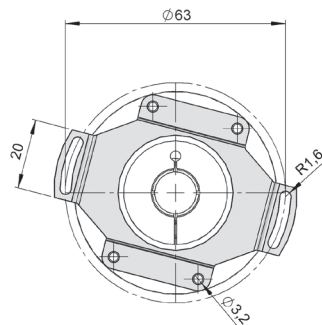
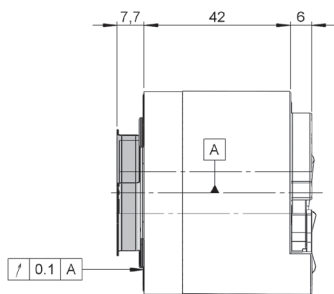
SERIE SMRS 59

SINGLETURN ABSOLUTE AND INCREMENTAL HOLLOW SHAFT ENCODER

SSI / SSI + SinCos
BiSS-C / BiSS-C + SinCos

Anti-rotation system 3

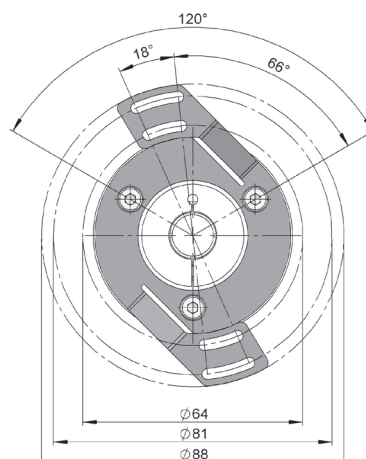
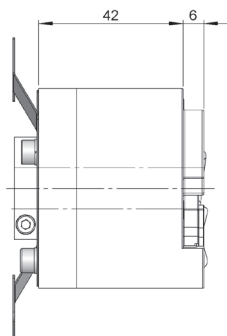
Flexible flange 90.1027



90.1027

Anti-rotation system 4

Flexible flange 90.1075



90.1075

SERIE SMRS 64

SINGLETURN ABSOLUTE AND INCREMENTAL CONIC SHAFT ENCODER

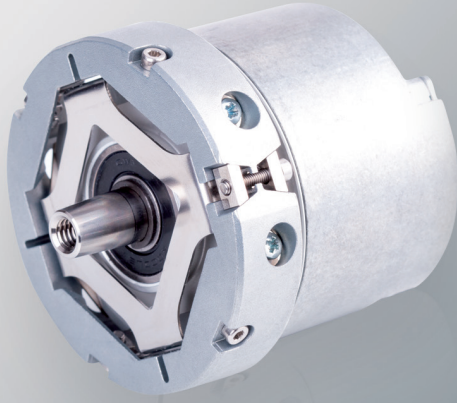


Image with Expanding coupling 90.1101



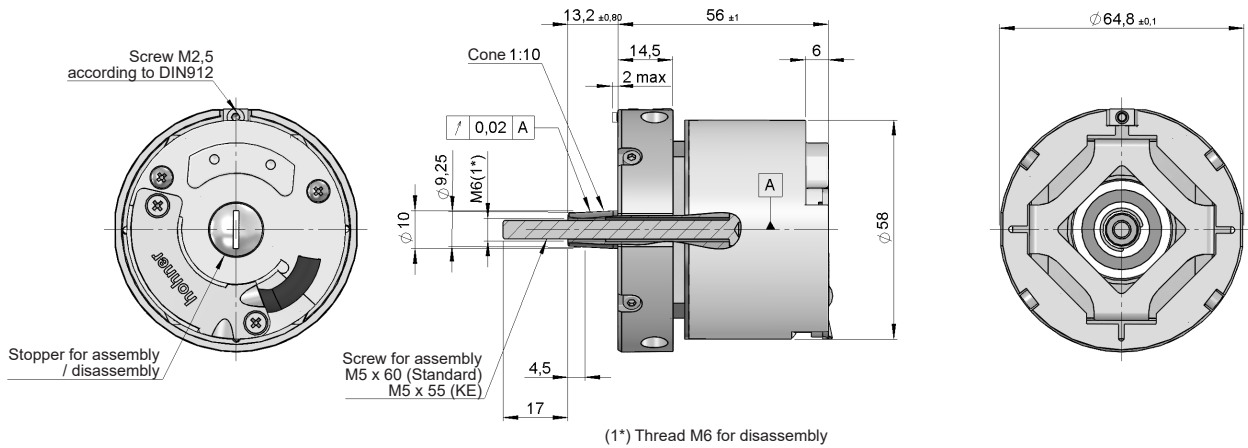
SSI SSI
SSI + SinCos

BISS INTERFACE BiSS-C
BiSS-C + SinCos

- Singleturn resolution up to 19 bits
- Incremental resolution 2048 SIN/COS per turn
- External diameter 58 mm
- Conic shaft 1:10
- Operating temperature range up to +100°C
- Protection class IP54 according to DIN EN 60529
- Anti-rotation system through flexible flange or expanding coupling
- Connection by cable (other cable length available)

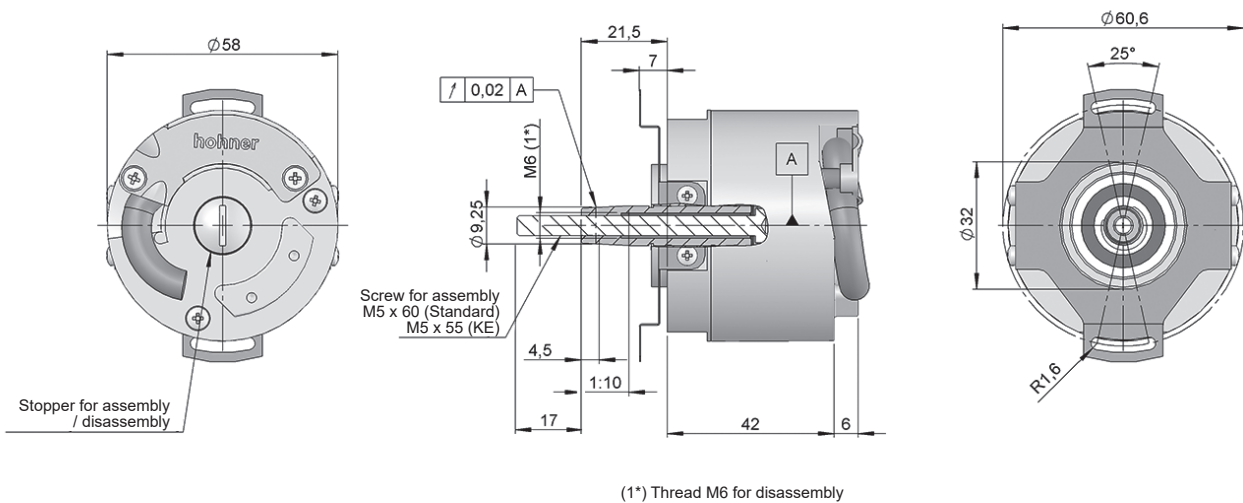


Expanding coupling (90.1101)



Drawing mechanical option type 2, conic shaft 1:10, connection type 10

Flexible flange (90.1038)



Drawing mechanical option type 1, conic shaft 1:10, connection type 10

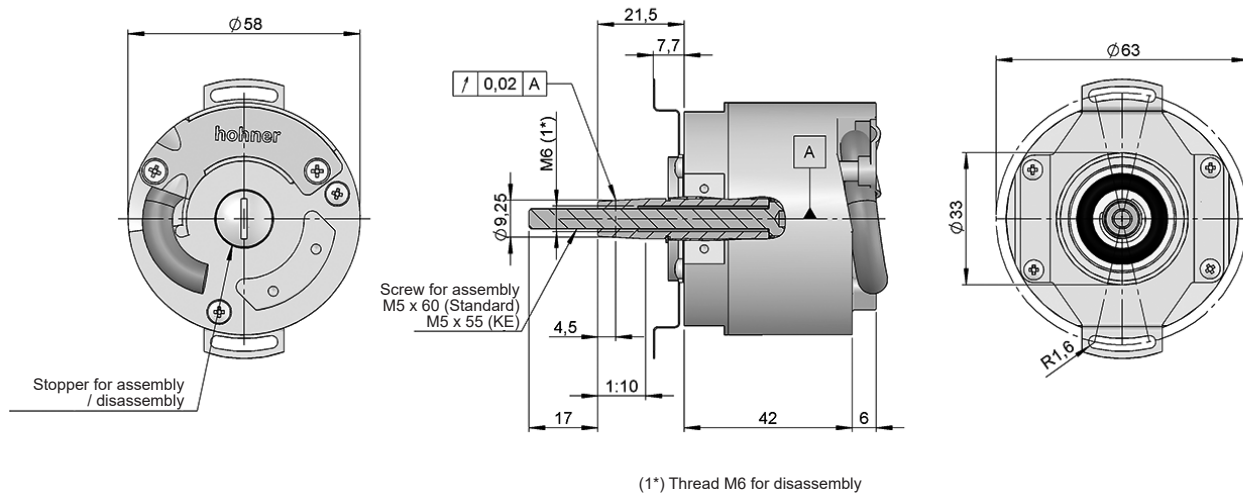


SERIE SMRS 64

SINGLETURN ABSOLUTE AND INCREMENTAL CONIC SHAFT ENCODER

SSI
SSI + SinCos
BiSS-C
BiSS-C + SinCos

Flexible flange (90.1027)



Drawing mechanical option type 3, conic shaft 1:10, connection type 10

REFERENCE

Reference example: SMRS64-131013115-17

Serie	Conic shaft	Mechanical option	Connection	Interface	IP	Power supply	Parameters config.	Absolute resolution	Special customer
SMRS64 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	1. Conic 1:10	1. Flexible flange 90.1038 2. Expanding coupling 90.1101 3. Flexible flange 90.1027 (*)	10. Helicoidal cable 20. 30 cm cable + connector D-Sub 15p	11. SSI Binary CW 12. SSI Binary CCW 13. SSI Gray CW 14. SSI Gray CCW 21. SSI + 2048 SIN/COS Binary CW 22. SSI + 2048 SIN/COS Binary CCW 23. SSI + 2048 SIN/COS Gray CW 24. SSI + 2048 SIN/COS Gray CCW 35. BiSS-C 45. BiSS-C + 2048 SIN/COS	1. IP54	1. 4..30 VDC 2. 5 VDC	S. Direction R. Reset	10. 10 bits 12. 12 bits 13. 13 bits 14. 14 bits 17. 17 bits 19. 19 bits (**)	KD. Halogen-free cable KE. Screw for assembly M5x55 95.0004099


Order your reference
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(*) Anti-rotation system type 1 (Flexible flange 90.1038), 2 (Expanding coupling 90.1101) and 3 (Flexible flange 90.1027) supplied assembled.

(**) 21 bits - Upon request.

Other extension cable options available with specific connectors mounted at the end of the cable for different market drives, on request.
All systems and required assembly and disassembly screws available in the section "ACCESSORIES".

 Assembly and disassembly instruction manual available in:
www.encoderhohner.com/product/serie-smrs64/

SERIE SMRS 64

SINGLETURN ABSOLUTE AND INCREMENTAL CONIC SHAFT ENCODER

SSI
SSI + SinCos
BiSS-C
BiSS-C + SinCos

TECHNICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Expanding coupling 90.1101 (assembled) Flexible flange 90.1038 (assembled) Flexible flange 90.1027 (assembled)
Permitted misalignment	±0.5 mm axial (90.1101) ±0.5 mm axial, ±0.3 mm radial (90.1038, 90.1027)
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP54
Rotor inertia moment	≤ 3x10 ⁻⁶ Kgm ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight aprox.	0,4 Kg
Operating temperature range	-20°C to +100°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Consumption	≤ 90 mA
Power supply	5 VDC ±10% / 4...30 VDC
Linearity	± ½ LSB
Helicoidal cable	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request) or 30 cm cable + connector D-Sub 15p

SSI / BiSS INTERFACE



(*)

Electronic output	RS485	RS485
Max. load capability / channel	±20 mA	±20 mA
Resolution	10...19 bits 21 bits - Upon request	10...19 bits 21 bits - Upon request
Code	Binary Gray	Binary
Clock frequency	50 kHz ... 2 MHz	50 kHz ... 10 MHz
Protocol	SSI	BiSS-C

(*) BiSS protocol allows to configure CRC, Alarm messages, Warnings, Sense, Reset and Absolute resolution by BUS. Default configuration: Binary CW.

INCREMENTAL OUTPUT

SIN/COS



Electronic output	Differential 1 Vpp
Signal offset	2,5 VDC
Resolution	2048 PPR
Cutoff frequency (-3 db)	>500 kHz

SERIE SMRS 64

SINGLETURN ABSOLUTE AND INCREMENTAL CONIC SHAFT ENCODER

SSI
SSI + SinCos
BiSS-C
BiSS-C + SinCos

CONNECTION



	Cable 3x2x0,14+2x0,34 (**) 95.0008003	Cable 6x2x0,14 mm ² (**) up to 100°C 95.0008072	Cable 6x2x0,14 mm ² (**) Halogen-free cable up to 90°C 95.0008073	D-Sub 15p HD
GND	Black	White	White	13
VCC	Red	Brown	Brown	12
DATA+	Yellow	Pink	Pink	7
DATA-	Green	Grey	Grey	2
CLOCK+	Brown	Yellow	Yellow	6
CLOCK-	Blue	Green	Green	1
DIR or RESET	Grey	Red-Blue	Red-Blue	11
A+(cos)	-	Red	Red	8
B+(sin)	-	Black	Black	9
A-(cos)	-	Blue	Blue	3
B-(sin)	-	Violet	Violet	4
Shield*	Shield	Shield	Shield	Housing

(*) Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected.

(**) The recommended maximum cable length is 10 meters. The 95.0008003 cable for Interfaces types 11, 12, 13, 14 and 35 and the 95.0008072 cable for Interface types 21, 22, 23, 24 and 45. The 95.0008073 cable for special customer KD.

For longer lengths use connection option type 20 connection with extension accessories.



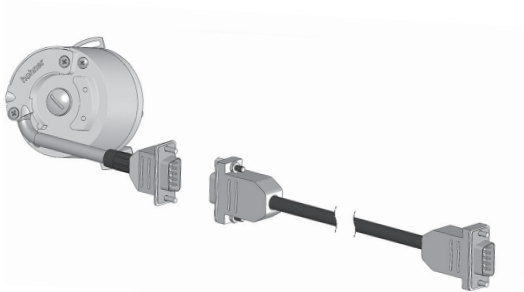
Cable length:	< 25 m	< 50 m	< 100 m	< 200 m	< 400 m
Transmission speed	< 1 MHz	< 400 kHz	< 300 kHz	< 200 kHz	< 100 kHz



Cable length	< 10 m	< 25 m	< 60 m	< 100 m
Transmission speed	< 10 MHz	< 5 MHz	< 2 MHz	< 1 MHz

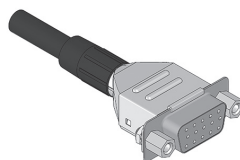
ACCESSORIES

Extension cable connection



Other extension cable options available with specific connectors mounted at the end of the cable for different market drives, on request.

Female connector (not included)



D-Sub 15p

The female connector is supplied disassembled, with the assembly instruction manual.

Screw for assembly (included)



95.0004105
M5x60
(Standard)

95.0004099
M5 x 55
(Special Customer KE)

Screw for disassembly (not included)



95.0004106
M6x55

95.0004420
Grub screw M5 x 20
45H DIN913



Image with Expanding coupling 90.1101



SERIE SMRS 64S

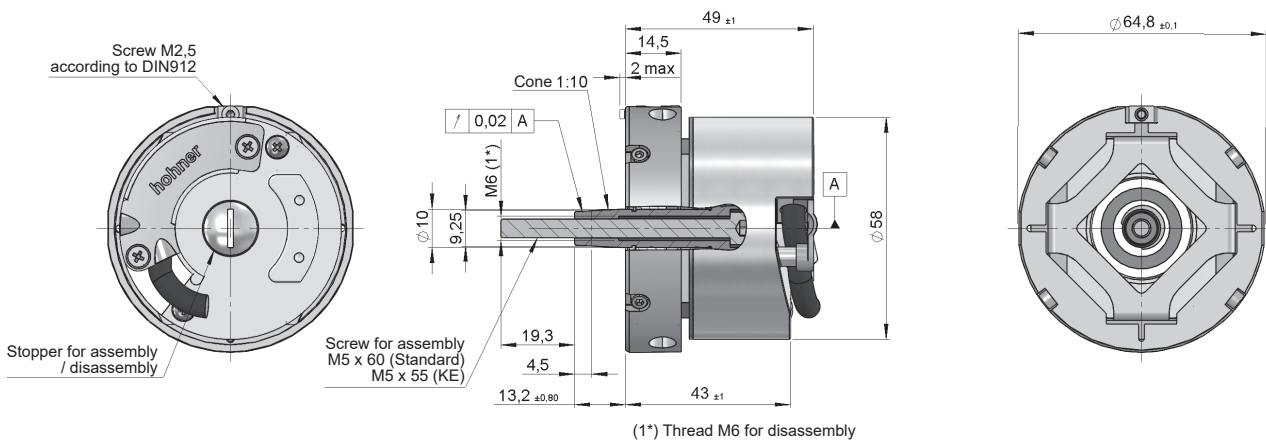
SINGLETURN ABSOLUTE AND INCREMENTAL CONIC SHAFT ENCODER

SIN/COS + SIN/COS

- Absolute resolution 1 SIN/COS per turn
- Incremental resolution 2048 SIN/COS per turn
- External diameter 58 mm
- Conic shaft 1:10
- Protection class IP54 according to DIN EN 60529
- Anti-rotation system through flexible flange or expanding coupling
- Connection by cable (other cable length available)

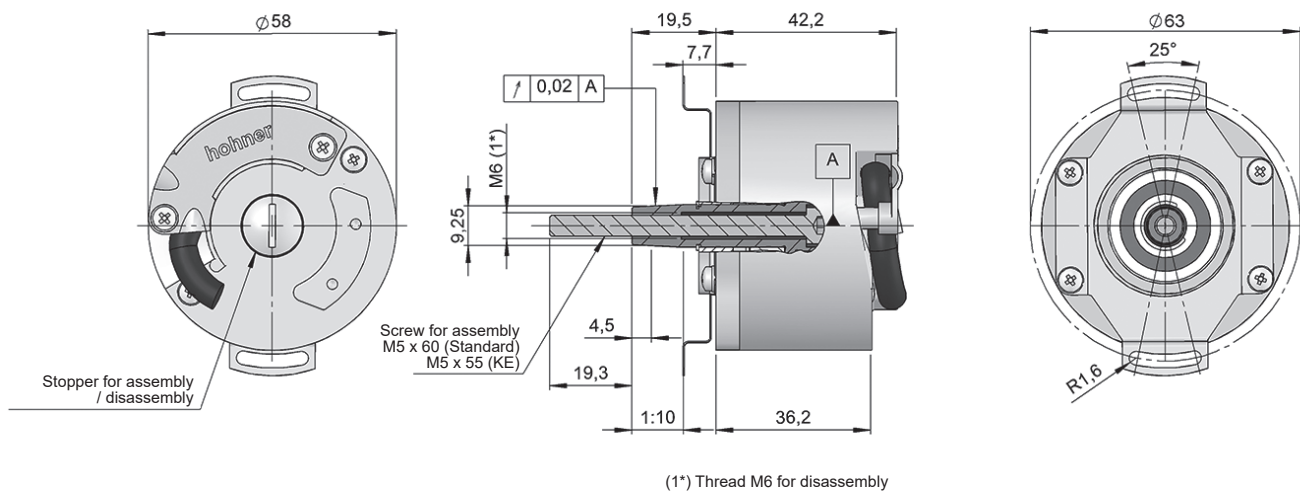
Optical Encoder	Absolute and incremental encoder	SIN/COS	Vibration and shock resistant	IP54	Express Delivery

Expanding coupling (90.1101)



Drawing mechanical option type 2, conic shaft 1:10, connection type 10

Flexible flange (90.1027)



Drawing mechanical option type 1, conic shaft 1:10, connection type 10



SERIE SMRS 64S

SINGLETURN ABSOLUTE AND INCREMENTAL CONIC SHAFT ENCODER

SIN/COS + SIN/COS

REFERENCE


Reference example: SMRS64S-12106012-2048

Serie	Conic shaft	Mechanical option	Connection	Interface	IP	Power supply	Pulses number	Special customer
SMRS64S -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	1. Conic 1:10	1. Flexible flange 90.1027 2. Expanding coupling 90.11001 (*)	10. Helicoidal cable 20. 30 cm cable + connector D-Sub 15p	60. Absolute 1 SIN/COS in 360° and incremental 2048 SIN/COS	1. IP54	2. 5 VDC		KD. Halogen-free cable KE. Screw for assembly M5x55 95.0004099

(*) Anti-rotation system type 1 (Flexible flange 90.1027) and 2 (Expanding coupling 90.1101) supplied assembled.

Other extension cable options available with specific connectors mounted at the end of the cable for different market drives, on request.

All systems and required assembly and disassembly screws available in the section "ACCESSORIES".

 Assembly and disassembly instruction manual available in: www.encoderhohner.com/product/serie-smrs64s/

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TECHNICAL SPECIFICATIONS

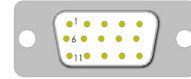
Materials	Housing: Aluminium Flange: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Housing fixing	Expanding coupling 90.1101 (assembled) Flexible flange 90.1027 (assembled)
Permitted misalignment	±0.5 mm axial (90.1101) ±0.5 mm axial, ±0.3 mm radial (90.1027)
Maximum number of revolutions permitted mechanically	6000 rpm
Protection against dust and splashes according to DIN EN 60529	IP54
Rotor inertia moment	≤ 3x10 ⁻⁶ Kg·m ²
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Weight aprox.	0,4 Kg
Operating temperature range	-20°C to +80°C
Vibration according to DIN EN 60068-2-6	100 m/s ² (10Hz...2000Hz)
Shock according to DIN EN 60068-2-27	1000 m/s ² (6ms)
Consumption	≤ 90 mA
Power supply	5 VDC ±10%
Electronic incremental output	SIN/COS, 1 V _{pp} ±20%
Incremental resolution	2048 SIN/COS
Electronic absolute output	SIN/COS, 1 V _{pp} ±20%
Absolute resolution	1 SIN/COS in 360°
Frequency (-3 dB)	≤ 200 kHz
Signal offset	2,5 VDC
Helicoidal cable	2 meters cable (other cable lengths available or connector mounted at the end of the cable, upon request) or 30 cm cable + connector D-Sub 15p

SERIE SMRS 64S

SINGLETURN ABSOLUTE AND INCREMENTAL CONIC SHAFT ENCODER

SIN/COS + SIN/COS

CONNECTION



	Cable 6x2x0,14 mm ² (**) up to 100°C 95.0008072	Cable 6x2x0,14 mm ² (**) Halogen-free cable up to 90°C 95.0008073	D-Sub 15p HD
POWER SUPPLY			
GND	White	White	7
VCC	Brown	Brown	9
INCREMENTAL SIGNALS			
A+	Green	Green	5
A-	Yellow	Yellow	6
B+	Blue	Blue	8
B-	Red	Red	1
Z+	Grey-Pink	Grey-Pink	3
Z-	Red-Blue	Red-Blue	4
ABSOLUTE SIGNALS			
C+	Grey	Grey	11
C-	Pink	Pink	10
D+	Black	Black	12
D-	Violet	Violet	13
Shield*	Shield	Shield	Housing

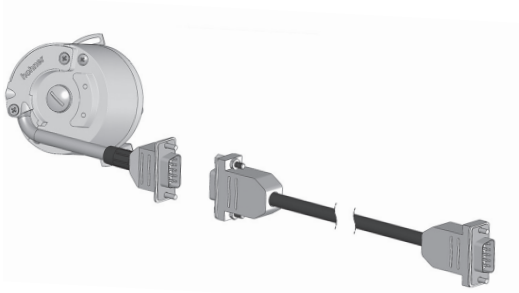
(* Shield connected to the encoder housing. It is recommended to connect the end of the wire shield to the ground of the equipment where the encoder is connected.

(**) The recommended maximum cable length is 10 meters.

For longer lengths use connection option type 20 connection with extension accessories.

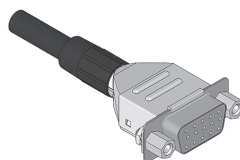
ACCESSORIES

Extension cable connection



Other extension cable options available with specific connectors mounted at the end of the cable for different market drives, on request.

Female connector (not included)



(D-Sub 15p)

The female connector is supplied disassembled, with the assembly instruction manual.

Screw for assembly (included)



95.0004105
M5x60
(Standard)

95.0004099
M5 x 55
(Special Customer KE)

Screw for disassembly (not included)



95.0004106
M6x55

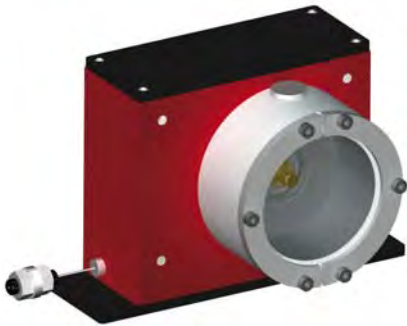
95.0004420
Grub screw M5 x 20
45H DIN913

■ Magnetic linear measuring



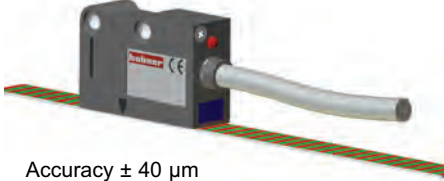
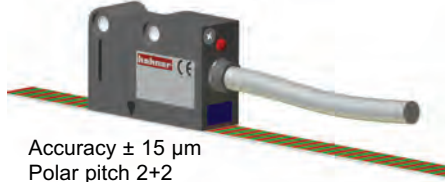
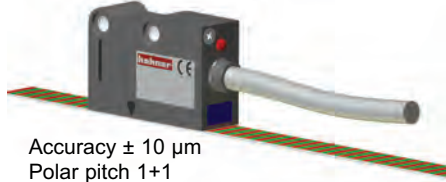
High accuracy
contactless

■ Draw wire (enco-meter)



Easy mounting
Good for telescope
system

OVERVIEW **MAGNETIC SENSOR**

MSL	MSM	MSH
 <p>Accuracy $\pm 40 \mu\text{m}$ Polar pitch 5+5 Resolution up to $5 \mu\text{m}$ IP67</p>	 <p>Accuracy $\pm 15 \mu\text{m}$ Polar pitch 2+2 Resolution up to $1 \mu\text{m}$ IP67</p>	 <p>Accuracy $\pm 10 \mu\text{m}$ Polar pitch 1+1 Resolution up to $0,5 \mu\text{m}$ IP67</p>

General Information

Incremental magnetic sensors for linear measurement of the MS series allow non-contact, highly precise and real-time measurements. The measuring group is made up of two parts: a sensor that incorporates the electronic capture/an output driver and a polarized magnetic strip in a constant period.

Use is very simple. It consists in moving the sensor without making contact along the strip allowing lengths over 50 metres.

Series of MS magnetic sensors is made up of 3 models, depending on the precision required, with the possibility to incorporate reference signals externally or to the magnetic strip.

Sensor's high IP allows installation in most industrial applications and is ideal for outdoor use.

Range of MS sensors offers an economic and robust alternative to other lineal measurement systems.

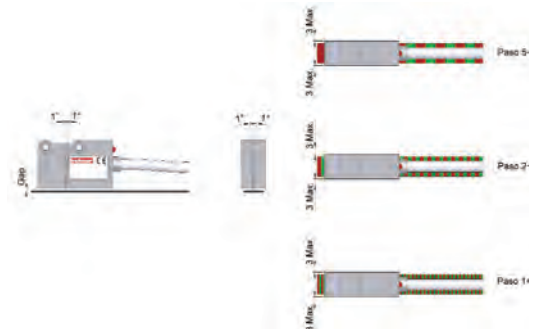
Sensor assembly

The sensor can be mounted in any position, keeping the active side, marked by arrows, toward the surface of magnetic strip. Once mounting is carried, place cables and move manually the sensor in the entire run, in order to ensure it can freely slide without any obstacle.

Check that aligning tolerances between sensor and magnetic strip are respected along the whole run. Each positioning error must be corrected.

Dimension of any brackets or supporting arms have to be conveniently calculated; it must be avoided any kind of their bending.

- Proceed to fix magnetic sensor using the M4 threaded holes.
- As an alternative you can use them as passing holes for TCEI M3x18 screws.



Fixing of magnetic band

Magnetic band can be fixed on any kind of non-magnetic surface.

For a better protection of magnetic band from shavings, liquid sprinklings, powder, etc. we suggest to always use the metal sheet cover PS, already equipped with a double-sided adhesive tape or the aluminium support AP.

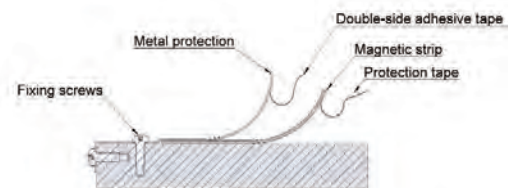
The best gluing temperature is between 20 and 30 °C; avoid making it when temperature is below 10°C.

In case of stocking magnetic strip MP200 at a lower temperature than the machine, it is advisable to wait for some hours before gluing. The adhesion of glued parts is completed after at least 48 hours.

Make the gluing of magnetic strip as follows:

- Clean carefully the fixing surface from oil, fat or any kind of dirt, using trace-free solvents.
- Raise up few centimetre of adhesive protection and place magnetic strip, lightly pushing on the initial adhesive zone.
- Proceed with the placing of the strip, removing progressively the adhesive protection and making a uniform pressure. If possible, use a small manual roller.
- Proceed as above to glue the stainless steel cover tape on the magnetic strip, after an accurate cleaning of the surface.
- Use the exceeding part of cover tape for mechanical fixing and "earth" connection of the structure by means of screws TC M3x8.

In order for the system to be more precise, the magnetic strip should be 80 mm (40 mm on each side) longer than the maximum travel of the machine: $L = \text{effective travel} + 80 \text{ mm}$. The tape should be centred along the limit switch.



LINEAR MEASURING MAGNETIC SYSTEM

Electrical connections

Sensor is set up with a Line-Driver output. If the reading device cannot read complementary signals, it is necessary to isolate the unused wires one by one. It is important to note that the connection of the unused wires can damage the sensor and it does not guarantee its immunity from interferences.

Make connection when power supply is switched off, and also batteries (when present) are excluded.

Avoid allocating the cable next to any devices which may cause electromagnetic interferences (motors, solenoid valves, inverters).

If some interferences are detected, act on the source of disturb using EMC filters.

If cable extensions are needed, it is necessary to use shielded cables with a section at least 0.35 mm² for power supply and 0.14 mm² for signals.

Verify the correct connection and the continuity of the shield which has to be connected to an earthing node with very low impedance.

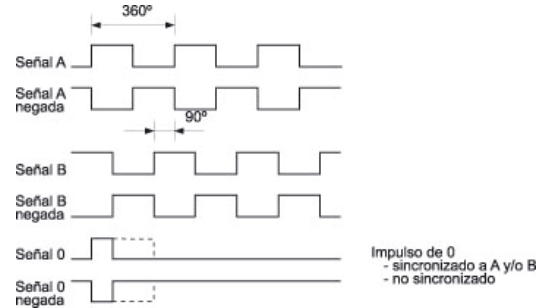
Sensor is supplied with a standard cable 2m long. longer lengths can be required.

To balance Line-Driver output, you have to use the following resistance:

- 5V RL=120Ω
- 12V RL=350Ω
- 24V RL=1000Ω

Respect the minimum cable's winding radius of 60mm.

For applications where the max speed reaches more than 1m/sec, the use of a "special cable", suitable to continuous movements, is indispensable.



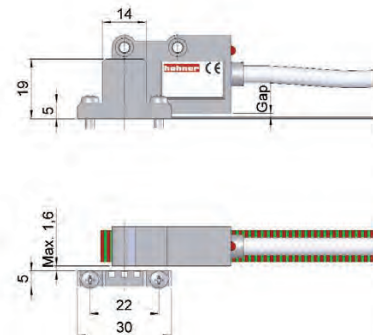
Mounting external zero

The sensor allows the detection of external reference points as well as those included on the magnetic strip (special order). This gives the measurement system the position references necessary for most applications.

The external reference signal is received by installing a magnet (EC) or magnetizing the strip at the desired position(s).

For the installation of the external zero reference (magnet) proceed as follows:

- Both sensor and magnetic strip have to be previously fixed to the machine, in their final position.
- Place the magnet where you need the zero position and move it around 4 mm, until the index red led turns on.
- Place the base of the magnet parallelly to the magnetic strip, at a distance of about 1mm from the sensor. Make the notch, located on the upper part of the magnet, roughly correspond with the vertical one on the body of the sensor.
- Mark on the machine the position of M3 fixing holes of magnet.
- Drill the fixing holes and tighten the magnet by 2 TC M3x12 screws, keeping the active part (magnets) toward the sensor. The slots permit a displacement, parallelly to the magnetic strip, in order to get an accurate positioning of magnet.
- Make a working test in both ways of moving.



Resistance to chemical agents and maintenance

LOW-IMPACT AGENTS

Formic acid, lactic acid, formaldehyde 40%, glycerine 93°C, hexane, iso-octane, linseed oil, cotton oil, soybean oil, mineral oil.

MEDIUM-IMPACT AGENTS

Acetylene, acetone, acetic acid, oleic acid, stearic acid 70°C, seawater, ammonia, gasoline, ether isopropilic, petroleum, vapor.

STRONG-IMPACT AGENTS

Nitric acid, benzene, dimethylbenzene, tetraethyl furan, nitrobenzene, solvent, toluene, carbon tetrachloride, turpentine, trichlorethylene.

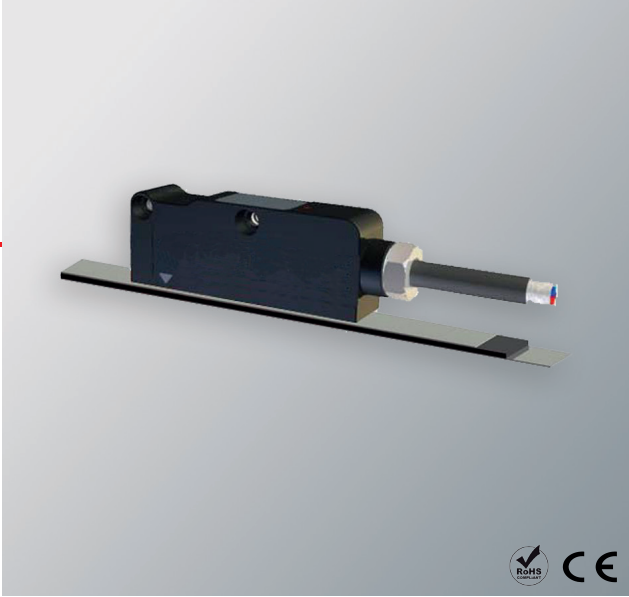
The band and sensor do not need any particular maintenance. An accurate installation, conforming to mounting instructions, and a correct use are sufficient to get a qualitative stability.

In case of malfunctioning please contact the manufacturer for repairing or changing of faulty components. Verify again all mounting tolerances whenever it happens something which can modify the correct alignment of the system.

In order not to compromise the precision of the strip, do not stress it mechanically. Strip has to be rolled always in the same way (active part toward outside), with a diameter not less than 260 mm.

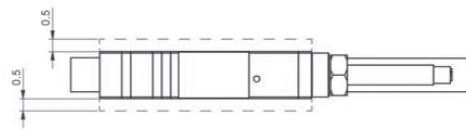
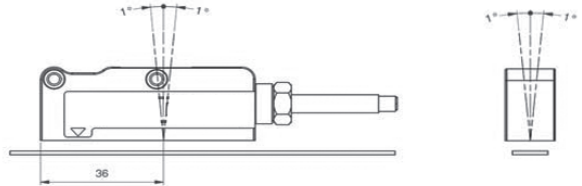
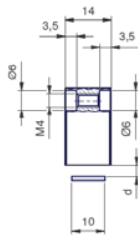
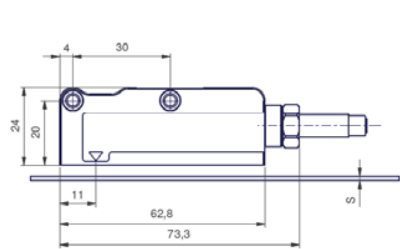
SERIE MSA

ABSOLUTE LINEAR MEASURING MAGNETIC SENSOR



- Linear magnetic sensor, with direct reading of the absolute position
- Magnetic detection without contact
- High speed serial interface
- Easy assembly; Wide alignment tolerances
- Resolution 10 μm
- Accuracy ±15 μm
- Pole pitch 2+2
- Protection class IP67
- Warning indication through LED
- Connection by cable (other cable length available)

Linear measurement system	Magnetic	Absolute	Vibration and shock resistant	IP67



Magnetic band CSMA

	CSMA	CSM + PS*	CSM + AP*
S (mm)	1.3	1.6	2.1
d (mm)	0.3 ÷ 1	0.7 MAX	0.2 MAX

(* PS and AP see accessories section)

Drawing MSA sensor dimensions

Sensor alignment tolerances

SENSOR REFERENCE

Reference example: MSA-M10528S7M02

Serie	Pole pitch	Resolution	Power supply	Interface	Connection	Special Customer
MSA -	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	M. 2+2 mm	10. 10 μm (*)	528. 5...28 VDC	S7. SSI Gray	M02. 2 meters cable	

(* Resolution between edges (1 Pulse = 4 edges). Other resolutions available, upon request (1, 100 μm).

BAND REFERENCE

Serie

CSMA

Band length: mm

For a better protection of magnetic band from shavings, liquid sprinklings, powder, etc. we suggest to always use the stainless steel cover PS, already equipped with a double-sided adhesive tape, or the aluminium support AP (see accessories).



SERIE MSA

ABSOLUTE LINEAR MEASURING MAGNETIC SENSOR



SENSOR SPECIFICATIONS

Absolute resolution	10 μm
Accuracy	$\pm 15 \mu\text{m}$
Repeatability	± 1 increment
Signal period	2 mm
GAP, distance sensor/band (d) see previous table	0,3 to 1 mm
Measuring length	up to 30 m
Max. traversing speed	300 m/min
Protection class (EN 60529)	IP67
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +70°C
Humidity	100% not condensed
Vibration (EN 60068-2-6)	200 m/s ² (55...2000 Hz)
Weight	80g
Axial connection	2 meters cable (other cable length or radial output available, upon request)

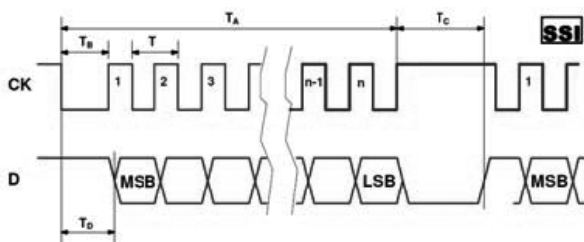
OUTPUT SIGNALS



Interface	SSI Gray
Clock frequency	0,1...1,2 MHz
n	Position bit* = 24 bit
T _c	12...45 μs
Power supply	5...28 VDC $\pm 5\%$
Current consumption	150 mA max (Z=120 Ω)
Length of cable allowed	20 m
Short circuit protection	Yes
Protection polarity inversion	Yes

Reading through positioning sensor based on magneto resistance, with AMR effect (Magnetic Anisotropy).

(*) The number of bit transmitted is different for other resolutions. See values table in MSA reference manual, section 8.



CONNECTION



	Cable 2x2x0,25+2x0,25 mm ²
GND	White
VCC	Brown
D+	Pink
D-	Grey
CK+	Green
CK-	Yellow
Shield	Shield

The cable is suitable for continuous movements.
The cable's bending radius should not be lower than 70 mm.



- In case of cable extension, it is necessary to guarantee
- > The electrical connection between the body of the connectors and the cables shield.
 - > Ensuring a minimum power supply of 5 V to the sensor, the maximum cable length can be extended to 50 m.

SERIE MSA

ABSOLUTE LINEAR MEASURING MAGNETIC SENSOR

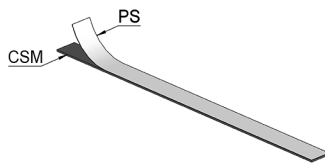


BAND SPECIFICATIONS

Pole pitch	Incremental track 2+2 mm + absolute track
Accuracy at 20°C	±20 µm/m (high accuracy) ±80 µm/m (low accuracy)
Width band	10 mm
Thickness band "S" (see previous table)	1,3 mm
Maximum length	30 m
Thermal expansion	$10,5 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ Tref: 20°C ± 0,1°C
Bending radius	≥ 130 mm
Operating temperature range	0°C to +70°C
Storage temperature range	-20°C to +80°C

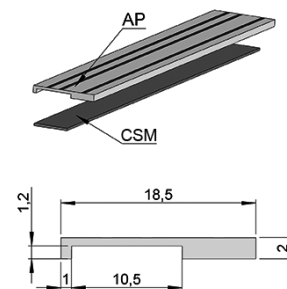
ACCESSORIES

PS: Cover for band protection



Stainless steel cover for protection.
To be placed in the magnetic band. (10 mm width - 0.3 mm thickness).

AP: Aluminium support



It is not possible to use the support AP if the magnetic band is already covered by PS band protection.

INSTALLATION AND HANDLING

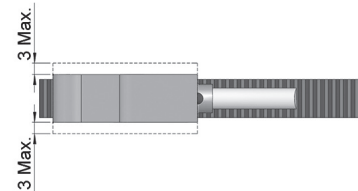
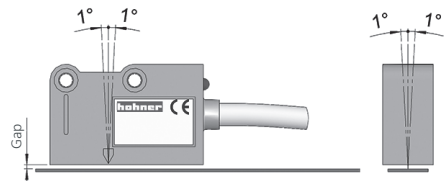
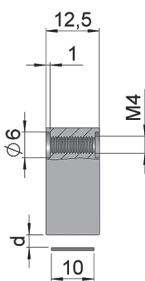
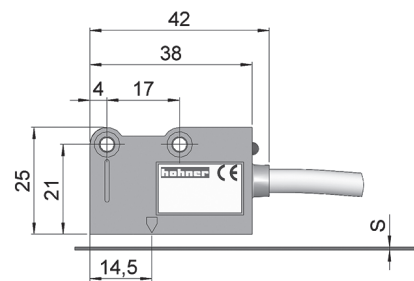
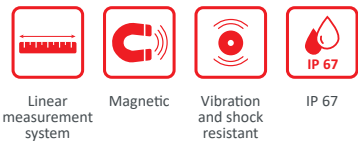
1. Degrease the surface you want to place the magnetic band by using alcohol and dry it carefully.
2. Place the band and keep it aligned with the reader head ensuring the magnetic part is just next to the sensor.
3. Place the cover PS or the support AP, if provided.
4. The max. adhesion will be achieved after 48 hours from sticking.
5. Keep other magnetic parts clear from the tape.
6. Store and roll up the tape keeping the magnetic strip on the outside, in order to avoid tensions.



SERIE MSH

LINEAR MEASURING MAGNETIC SENSOR

- Magnetic detection without contact
- Easy assembly
- Resolution 5 μm
- Accuracy $\pm 6 \mu\text{m}$
- Pole pitch 1+1
- Protection class IP67
- Metallic cover
- Connection by cable (other cable length available)



Magnetic band CSH

	CSH	CSH + PS*	CSH + AP*
S (mm)	1.3	1.6	2.1
d (mm)	0.1 \div 0.4	-	-

Drawing MSH sensor dimensions

Sensor alignment tolerances

SENSOR REFERENCE

Reference example: MSH-5528

Serie	Resolution	Power supply	Special Customer
MSH -	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
Pole pitch 1+1	5.5 μm (*)	528. 5...28 VDC	

(*) Resolution between edges (1 Pulse = 4 edges). Other resolutions available, upon request (0.5, 1, 10 μm).

BAND REFERENCE

Serie

CSH

Band length: mm



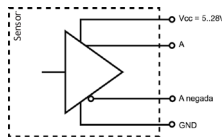
SERIE MSH

LINEAR MEASURING MAGNETIC SENSOR

SENSOR SPECIFICATIONS

Resolution	5 μm
Accuracy	$\pm 6 \mu\text{m}$
Repeatability	± 1 increment
GAP, distance sensor/band (d) see previous table	0,1 to 0,4 mm
Speed	6 m/s (10 μm)
Housing	Metallic
Protection class (EN 60529)	IP67
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +80°C
Humidity	100% not condensed
Vibration (EN 60068-2-6)	300 m/s ² (55...2000 Hz)
Shock (EN 60068-2-27)	1000 m/s ² (11ms)
Weight	40g
Connection	2 meters cable

OUTPUT SIGNALS



OUTPUT CIRCUIT	Line Driver
Power supply	5...28 VDC $\pm 5\%$
Load without charge	Max: 60 mA
Load with charge	140 mA max (VDC=5V and Z= 120 Ω) 90 mA max (VDC=28V and Z= 1,2k Ω)
Frequency	300 kHz
Short circuit protection	Yes
Protection polarity inversion	Yes

Channel A leads 90° electrics channel B

CONNECTION



	Cable
	3x2x0,14+2x0,35 mm ²
GND	Blue
VCC	Red
A	Green
B	White
\tilde{A}	Orange
\tilde{B}	Sky blue
0 (reference)	Brown
$\tilde{0}$	Yellow

The cable's bending radius should not be lower than 60 mm.

BAND SPECIFICATIONS

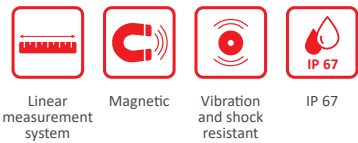
Pole pitch	1+1 mm
Accuracy at 20°C	$\pm 30 \mu\text{m}/\text{meter}$
Width band	10 mm
Thickness band "S" (see previous table)	1,3 mm
Maximum length	50 m
Thermal expansion	$10,5 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ Tref: 20°C $\pm 0,1^\circ\text{C}$
Bending radius	$\geq 130 \text{ mm}$
Operating temperature range	0°C to +70°C
Storage temperature range	-20°C to +80°C



SERIE MSM

LINEAR MEASURING MAGNETIC SENSOR

- Magnetic detection without contact
- Easy assembly
- Resolution 10 µm
- Accuracy ±8 µm
- Pole pitch 2+2
- Protection class IP67
- Metallic cover
- External or integrated reference signal
- Connection by cable (other cable length available)



Linear measurement system

Magnetic

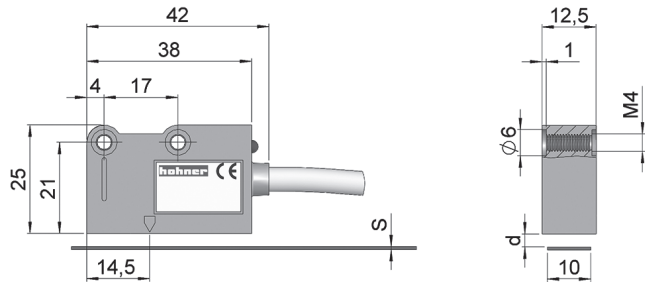
Vibration and shock resistant

IP 67

Magnetic band CSM

	CSM	CSM + PS*	CSM + AP*
S (mm)	1.3	1.6	2.1
d (mm)	0.2 ÷ 1.4	1.1 MAX	0.6 MAX

(* PS and AP see accessories section)



SENSOR REFERENCE

Reference example: MSM-10E528

Serie	Resolution	Zero	Power supply	Special Customer
MSM -	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
Pole pitch 2+2	10. 10 µm (*)	E. External (**)	528. 5...28 VDC	

(*) Resolution between edges (1 Pulse = 4 edges). Other resolutions available, upon request (1, 5, 25, 50, 100, 500, 1000 µm).

(**) Integrated zero available, upon request.

BAND REFERENCE

Serie

CSM

Band length: mm

For a better protection of magnetic band from shavings, liquid sprinklings, powder, etc. we suggest to always use the stainless steel cover PS, already equipped with a double-sided adhesive tape, or the aluminium support AP (see accessories).

Integrated zero available, upon request.



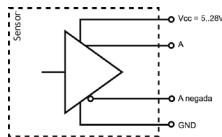
SERIE MSM

LINEAR MEASURING MAGNETIC SENSOR

SENSOR SPECIFICATIONS

Resolution	10 µm
Accuracy	±8 µm
Repeatability	±1 increment
GAP, distance sensor/band (d) see previous table	0,2 to 1,4 mm
Speed	12 m/s (10 µm)
Housing	Metallic
Protection class (EN 60529)	IP67
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +80°C
Humidity	100% not condensed
Vibration (EN 60068-2-6)	300 m/s ² (55...2000 Hz)
Shock (EN 60068-2-27)	1000 m/s ² (11ms)
Weight	40g
Connection	2 meters cable

OUTPUT SIGNALS



OUTPUT CIRCUIT	Line Driver
Power supply	5...28 VDC ±5%
Load without charge	Max: 60 mA
Load with charge	140 mA max (VDC=5V and Z= 120Ω) 90 mA max (VDC=28V and Z= 1,2kΩ)
Frequency	300 kHz
Short circuit protection	Yes
Protection polarity inversion	Yes

Channel A leads 90° electric channel B

CONNECTION



	Cable
	3x2x0,14+2x0,35 mm ²
GND	Blue
VCC	Red
A	Green
B	White
~A	Orange
~B	Sky blue
0 (reference)	Brown
~0	Yellow

The cable's bending radius should not be lower than 60 mm.

BAND SPECIFICATIONS

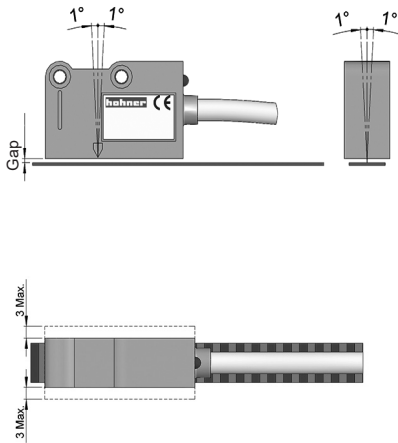
Pole pitch	2+2 mm
Accuracy at 20°C	±30 µm/meter
Width band	10 mm
Thickness band "S" (see previous table)	1,3 mm
Maximum length	50 m
Thermal expansion	10,5 x 10 ⁻⁶ °C ⁻¹ Tref: 20°C ± 0,1°C
Bending radius	≥ 130 mm
Operating temperature range	0°C to +70°C
Storage temperature range	-20°C to +80°C

SERIE MSM

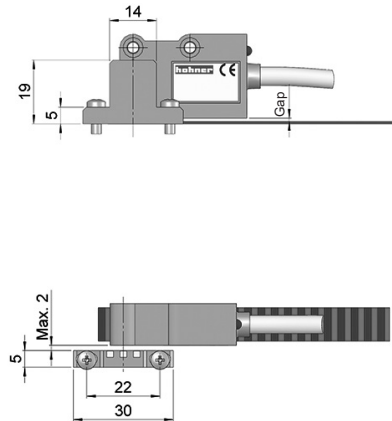
LINEAR MEASURING MAGNETIC SENSOR

ALIGNMENT AND SENSOR MOUNTING

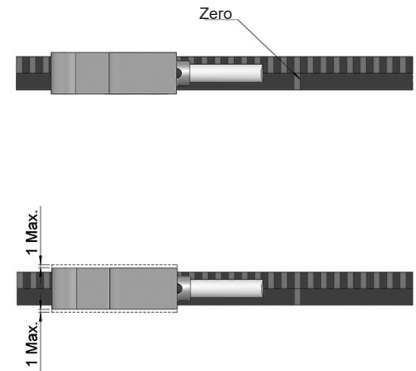
Sensor - Band



Sensor with external zero - Band

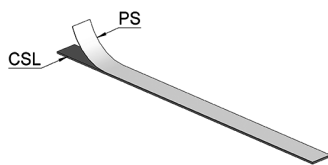


Sensor with integrated zero



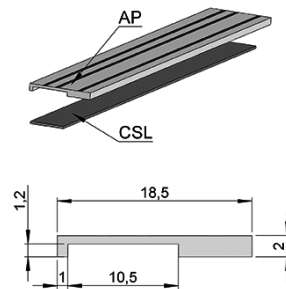
ACCESSORIES

PS: Cover for band protection



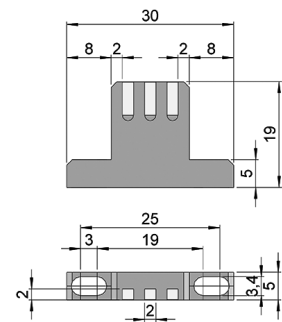
Stainless steel cover for protection. To be placed in the magnetic band. (10 mm width - 0.3 mm thickness).

AP: Aluminium support



It is not possible to use the support AP if the magnetic band is already covered by PS band protection.

EC: External zero



INSTALLATION AND HANDLING

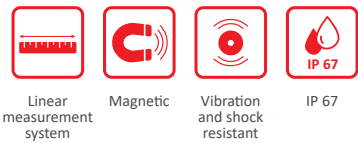
1. Degrease the surface you want to place the magnetic band by using alcohol and dry it carefully.
2. Place the band and keep it aligned with the reader head ensuring the magnetic part is just next to the sensor.
3. Place the cover PS or the support AP, if provided.
4. The max. adhesion will be achieved after 48 hours from sticking.
5. Keep other magnetic parts clear from the tape.
6. Store and roll up the tape keeping the magnetic strip on the outside, in order to avoid tensions.



SERIE MSL

LINEAR MEASURING MAGNETIC SENSOR

- Magnetic detection without contact
- Easy assembly
- Resolution 100 µm
- Accuracy ±50 µm
- Pole pitch 5+5
- Protection class IP67
- Metallic cover
- External or integrated reference signal
- Connection by cable (other cable length available)



Linear measurement system

Magnetic

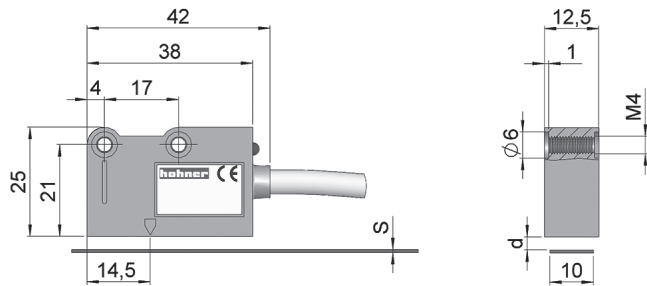
Vibration and shock resistant

IP 67

Magnetic band CSL

	CSL	CSL + PS*	CSL + AP*
S (mm)	1.3	1.6	2.1
d (mm)	0.3 + 4	3.7 MAX	3.2 MAX

(*) PS and AP see accessories section



SENSOR REFERENCE

Reference example: MSL-100E528

Serie	Resolution	Zero	Power supply	Special Customer
MSL -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
Pole pitch 5+5	100. 100 µm (*)	E. External (**)	528. 5...28 VDC	

(*) Resolution between edges (1 Pulse = 4 edges). Other resolutions available, upon request (5, 10, 25, 50 µm).

(**) Integrated zero available, upon request.

BAND REFERENCE

Serie

CSL

Band length: mm

For a better protection of magnetic band from shavings, liquid sprinklings, powder, etc. we suggest to always use the stainless steel cover PS, already equipped with a double-sided adhesive tape, or the aluminium support AP (see accessories).

Integrated zero available, upon request.



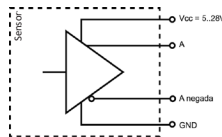
SERIE MSL

LINEAR MEASURING MAGNETIC SENSOR

SENSOR SPECIFICATIONS

Resolution	100 µm
Accuracy	±50 µm
Repeatability	±1 increment
GAP, distance sensor/band (d) see previous table	0,3 to 4 mm
Speed	30 m/s (25 µm)
Housing	Metallic
Protection class (EN 60529)	IP67
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +80°C
Humidity	100% not condensed
Vibration (EN 60068-2-6)	300 m/s ² (55...2000 Hz)
Shock (EN 60068-2-27)	1000 m/s ² (11ms)
Weight	40g
Connection	2 meters cable

OUTPUT SIGNALS



OUTPUT CIRCUIT	Line Driver
Power supply	5..28 VDC ±5%
Load without charge	Max: 60 mA
Load with charge	140 mA max (Vdc=5v and Z= 120Ω) 90 mA max (Vdc=28v and Z= 1,2kΩ)
Frequency	300kHz
Short circuit protection	Yes
Protection polarity inversion	Yes

Channel A leads 90° electric channel B

CONNECTION



	Cable
	3x2x0,14+2x0,35 mm ²
GND	Blue
VCC	Red
A	Green
B	White
~A	Orange
~B	Sky blue
0 (reference)	Brown
~0	Yellow

The cable's bending radius should not be lower than 60 mm.

BAND SPECIFICATIONS

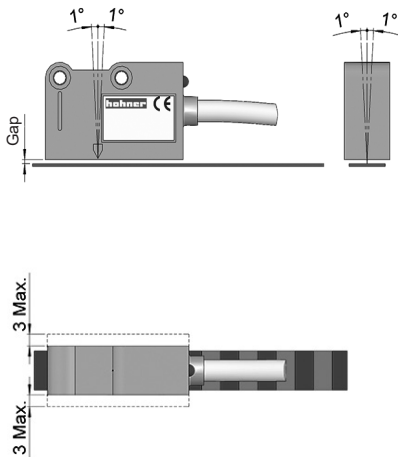
Pole pitch	5+5 mm
Accuracy at 20°C	±30 µm/meter
Width band	10 mm
Thickness band "S" (see previous table)	1,3 mm
Maximum length	25 m
Thermal expansion	10,5 x 10 ⁻⁶ °C ⁻¹ Tref: 20°C ± 0,1°C
Bending radius	≥ 130 mm
Operating temperature range	0°C to +70°C
Storage temperature range	-20°C to +80°C

SERIE MSL

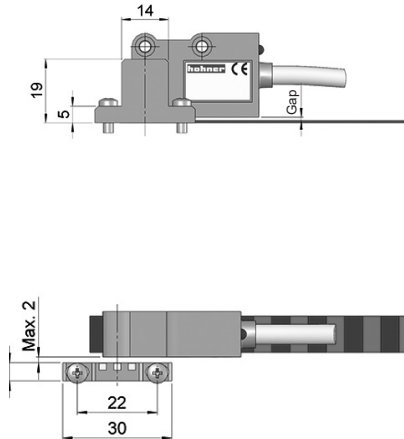
LINEAR MEASURING MAGNETIC SENSOR

ALIGNMENT AND SENSOR MOUNTING

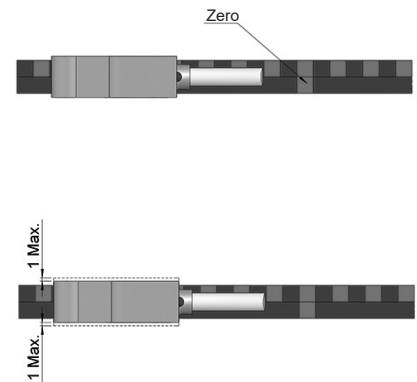
Sensor - Band



Sensor with external zero - Band

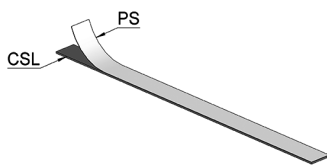


Sensor with integrated zero

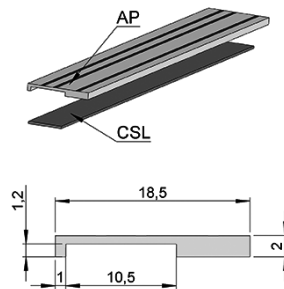


ACCESSORIES

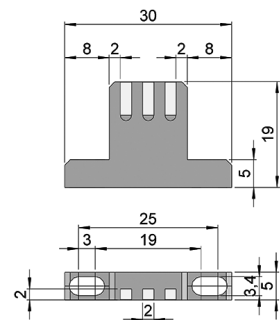
PS: Cover for band protection



AP: Aluminium support



EC: External zero



Stainless steel cover for protection. To be placed in the magnetic band. (10 mm width - 0.3 mm thickness).



It is not possible to use the support AP if the magnetic band is already covered by PS band protection.

INSTALLATION AND HANDLING


1. Degrease the surface you want to place the magnetic band by using alcohol and dry it carefully.
2. Place the band and keep it aligned with the reader head ensuring the magnetic part is just next to the sensor.
3. Place the cover PS or the support AP, if provided.
4. The max. adhesion will be achieved after 48 hours from sticking.
5. Keep other magnetic parts clear from the tape.
6. Store and roll up the tape keeping the magnetic strip on the outside, in order to avoid tensions.




SERIE VIMS

DIGITAL READOUT WITH MAGNETIC SENSOR


- Magnetic detection without contact
- Easy assembly
- One axis Digital Readout with 6 ½ digit LCD and negative sign
- Programmable resolution
- Accuracy $\pm 20 \mu\text{m}$
- Pole pitch 2+2
- Wide alignment tolerances
- Magnetic Sensor of small overall dimensions
- Connection by cable (other cable length available)




Linear measurement system




Magnetic




Vibration and shock resistant



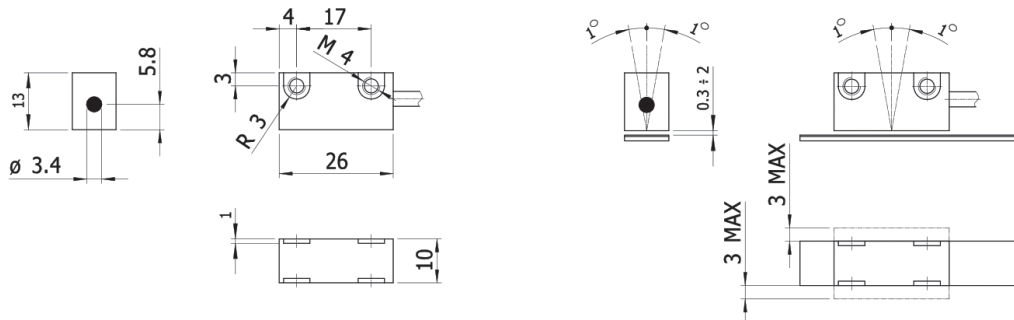
Sensor IP 67



Digital Readout IP 43



Express Delivery



Drawing VIMS sensor dimensions

REFERENCE

Reference example: VIMS-2BM02

Serie	Pole pitch	Power supply	Connection	Special Customer
VIMS -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	2. 2+2 mm	B. Batteries E. External power supply (1,5...5 V)	M02. 2 meters cable	

Configurable settings instructions in VIMS reference manual, section 9.

BAND REFERENCE

Serie

CSM

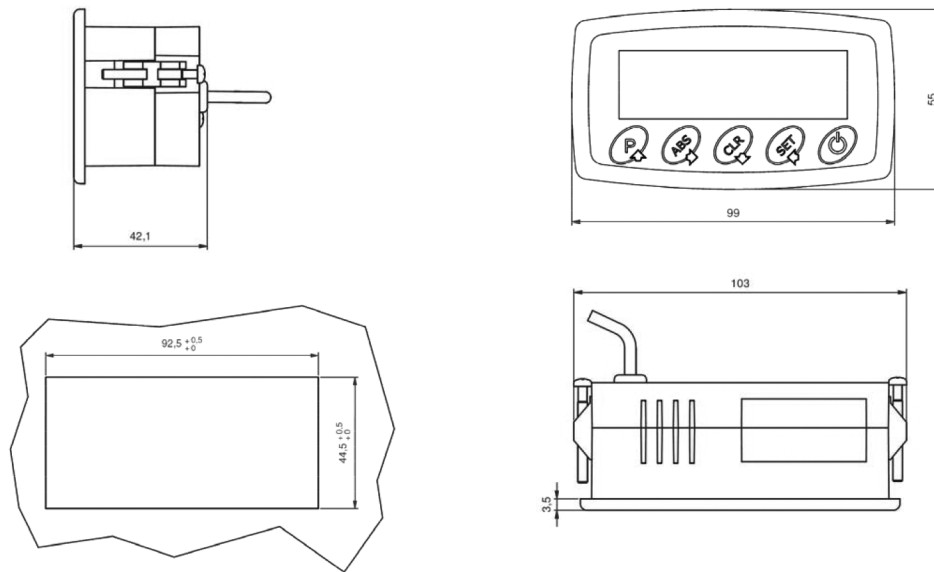
Band length: mm

For a better protection of magnetic band from shavings, liquid sprinklings, powder, etc. we suggest to always use the stainless steel cover PS, already equipped with a double-sided adhesive tape, or the aluminium support AP (see accessories).



SERIE VIMS

DIGITAL READOUT WITH MAGNETIC SENSOR



Drawing VIMS digital readout dimensions

MECHANICAL AND ELECTRICAL SPECIFICATIONS

Display	6 ½ digits LCD h = 13 mm and negative sign
Programmable resolution	1.0 - 0.1 - 0.05 - 0.01 mm 0.01 - 0.001 - 1/16 - 1/32 - 1/64 inch 1° - 0.1° - 0.01° - 0.001° angular
Repeatability	± 1/2 digit
Power supply	Batteries x2 LR6 AA External (1,5...5 V)
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +70°C
Humidity	95% (not condensed)

READOUT

Weight	100 g
Vibration (EN 60068-2-6)	25 m/s ² (55Hz...2000Hz)
Protection class (EN 60529)	IP 43

CABLE - 6 cores Ø 3,4 mm

Minimum bending radius	25 mm
Length	2 m

SENSOR SPECIFICATIONS

Maximum speed	4 m/s
Sensor - magnetic band gap	0,3...2 mm
Accuracy	± 20 µm
Magnetic band to be used with – pole pitch	CSM (2+2mm)
Vibration (EN 60068-2-6)	300 m/s ² (55Hz...2000Hz)
Shock (EN 60068-2-27)	1000 m/s ² (11 ms)
Protection class (EN 60529)	IP 67

SERIE VIMS

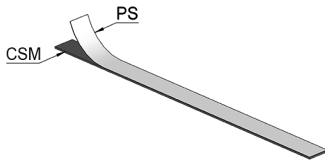
DIGITAL READOUT WITH MAGNETIC SENSOR

BAND SPECIFICATIONS

Pole pitch	2+2 mm
Accuracy at 20°C	±30 µm/m
Width band	10 mm
Thickness band	1,3 mm
Maximum length	50 m
Thermal expansion	$10,5 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ T ref = 20°C ± 0,1°C
Bending radius	≥ 130 mm
Operating temperature range	0°C to 70°C
Storage temperature range	-20°C to 80°C

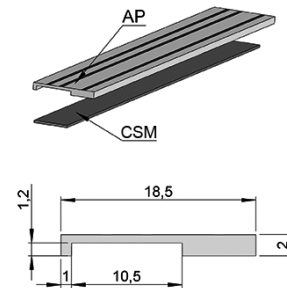
ACCESSORIES

PS: Cover for band protection



Stainless steel cover for protection.
To be placed in the magnetic band. (10 mm width - 0.3 mm thickness).

AP: Aluminium support



It is not possible to use the support AP if the magnetic band is already covered by PS band protection.

INSTALLATION AND HANDLING

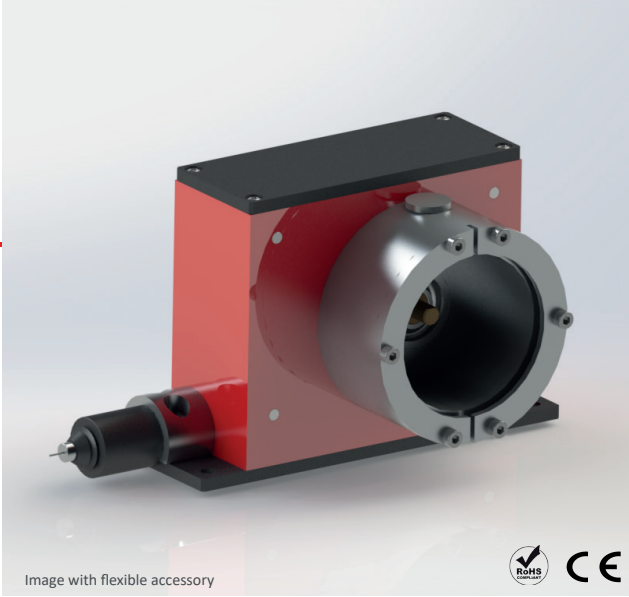
1. Degrease the surface you want to place the magnetic band by using alcohol and dry it carefully.
2. Place the band and keep it aligned with the reader head ensuring the magnetic part is just next to the sensor.
3. Place the cover PS or the support AP, if provided.
4. The max. adhesion will be achieved after 48 hours from sticking.
5. Keep other magnetic parts clear from the tape.
6. Store and roll up the tape keeping the magnetic strip on the outside, in order to avoid tensions.

WARNING

WHAT TO AVOID

1. All mechanical reworks (Cutting, drilling, face milling a.s.o.).
2. All mishandling.
3. Impacts and external stress.
4. Avoid other magnetic fields.





ENCO-METER EM4

EXTENDIBLE CABLE MEASUREMENT SYSTEM

- Measuring linear distances up to 4 meters
- Any mounting position possible
- Protection class IP51 according to DIN EN 60529
- Anodised and pressurized options available
- The drum shaft can drive any kind of rotary encoder (encoder, potentiometer, ...)
- Stainless steel extendible cable $\varnothing 0,61$ AISI316

Image with flexible accessory



Linear measurement system



Extendible cable



45°



Pressurized

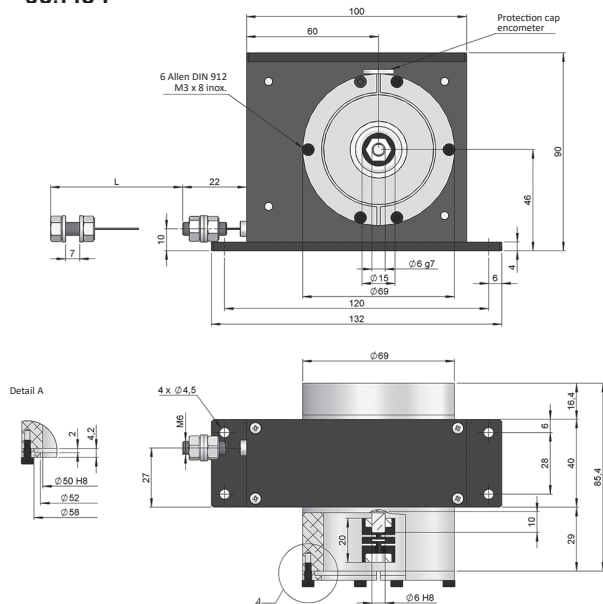


IP 51



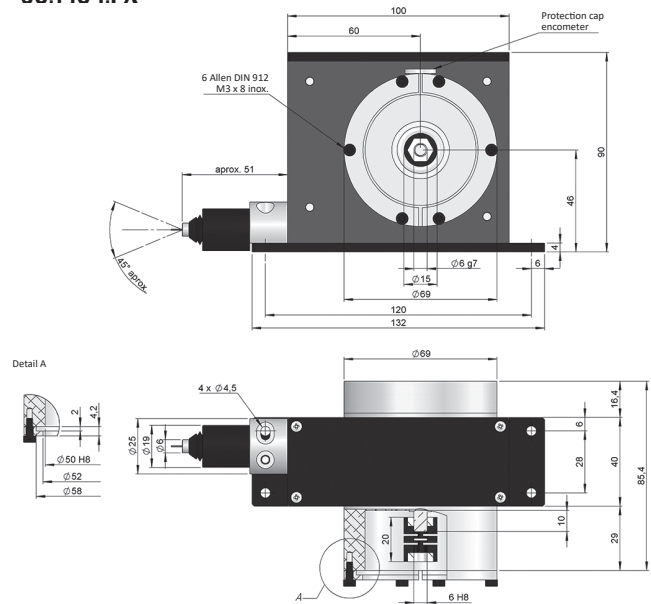
Express Delivery

90.1404



Drawing 90.1404 with standard bell synchro and coupling type 1

90.1404.FX



Drawing 90.1404.FX with flexible accessory, standard bell synchro and coupling type 1

REFERENCE

Reference example: 90.1404.SY1

Serie	Fixing system to sensor	Coupling	Special Customer
90.1404 / 90.1404.FX	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
90.1404. Standard	SY. Standard bell synchro	1. PFP 1520 06/06	AW. Inverted caps
90.1404.FX. Flexible accessory	CL. Clamping bell	2. PFP 1520 06/6.35	AV. Double restoring force
		3. PFP 2224 06/10	BF. Outdoor (Anodised 5µm)
			BL. Saline environment (Anodised 20µm)
			BD. Pressurized

Request the ENCO-METER already coupled to an electronic output device that could be an Incremental Optical Encoder, Multiturn Absolute Optical Encoder, Potentiometer or Multiturn Absolute Magnetic Encoder.



ENCO-METER EM4

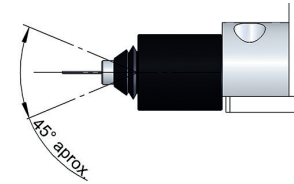
EXTENDIBLE CABLE MEASUREMENT SYSTEM

TECHNICAL SPECIFICATIONS

MODEL	EM4
Reference	90.1404 / 90.1404.FX
Travel	200 mm ±0,06 / per turn
Cable	Ø 0,61 stainless steel AISI316 (structure 19 x 7 + 0)
Measurement range, up to (mm)	4000
Maximum cable extension (mm)	4010
Minimum cable static tension	3 N - Standard 6 N - Special customer AV
Maximum cable static tension	8,9 N - Standard 18 N - Special customer AV
Maximum extension acceleration	35 m/s ² - Standard 30 m/s ² - Special customer AV
Maximum recovery acceleration	10 m/s ² - Standard 20 m/s ² - Special customer AV
Maximum speed	1 m/s
Protection against dust and splashes according to DIN EN 60529	IP51

(*) Other types of cables are possible on special order.

FLEXIBLE ACCESSORY (FX)

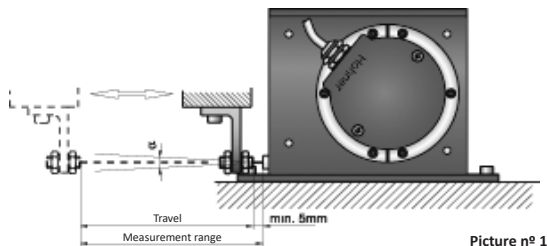


ENCO-METERS with flexible accessory FX (90.1404.FX, 90.1808.FX, 90.1810.FX) allow a misalignment of the extendable cable up to 45°.

ANODISED OPTIONS

- + **Special Customer BF:** 5 microns anodised housing for using in outdoor environments.
- + **Special Customer BD:** 20 microns anodised housing protected against the aggressive effect of the saltwater air.

INSTALLATION



ENCO-METER units are secured to a flat machine surface by means of three or four M4 screws. The cable must be correctly aligned and under no circumstances must it exceed the measurement range.

Special customer AW for inverted caps.

EM 90.1404: $\alpha < 2^\circ$ | EM 90.1404.FX: $\alpha < 45^\circ$

OUTPUT DEVICES

We can also supply the draw wire system already coupled to an electronic output device that could be an incremental encoder, absolute encoder or potentiometer.

+ ABSOLUTE OR INCREMENTAL ENCODER

If it is required to obtain a determined resolution "r" (mm per pulse) in the case of using an absolute or incremental encoder, the number of encoder pulses (n) will be:

$$n = \frac{D}{r} \quad (D \text{ is ENCO-METER travel in mm})$$

+ POTENTIOMETER

Using a potentiometer, an output "r" ratio (in Ω per mm) is obtained in accordance with:

$$r = \frac{R}{D \cdot n} \quad (R \text{ is the rated resistance and } n \text{ is the maximum number of turns})$$

As standard, we have potentiometers of $R = 10K\Omega$ and $n = 10$ turns. It must be taken into consideration that the mechanical travel of the potentiometer may limit the ENCO-METER measurement range.

i Electronic output devices that are delivered coupled to an ENCO-METER have an orientation of 45°. See Installation picture n° 1.

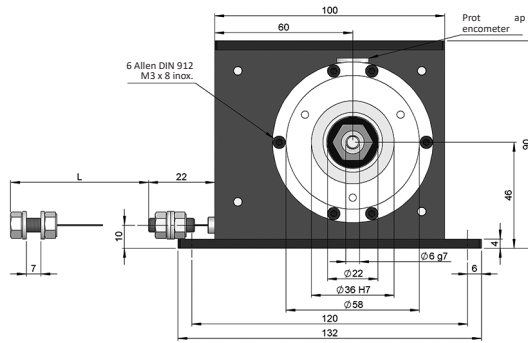
i If devices are not supplied assembled, we recommend mounting the sensor on the ENCO-METER without the seal.

ENCO-METER EM4

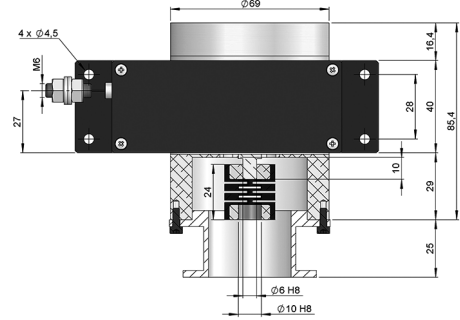
EXTENDIBLE CABLE MEASUREMENT SYSTEM

FIXING SENSOR SYSTEM DIMENSIONS

Fixing system to
sensor type CL
Clamping bell

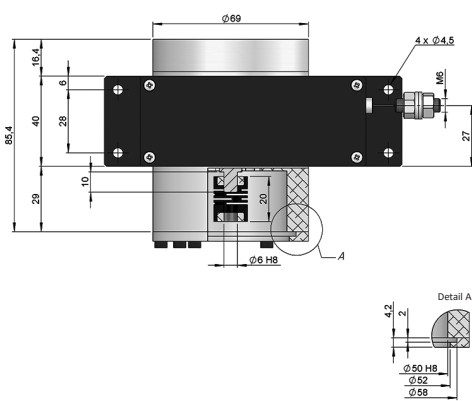
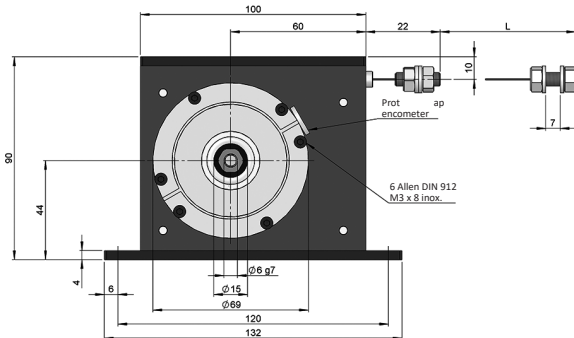


Coupling type 3
PFP 2224 06/10



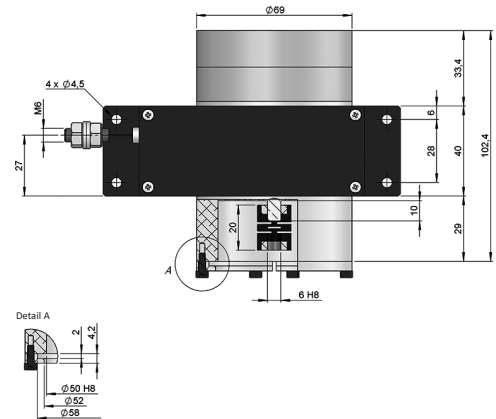
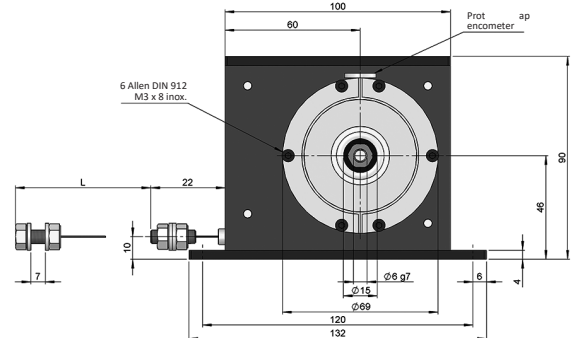
SPECIAL CUSTOMER OPTIONS

AW - Inverted caps



Drawing 90.1404, Special Customer AW

AV - Double restoring force

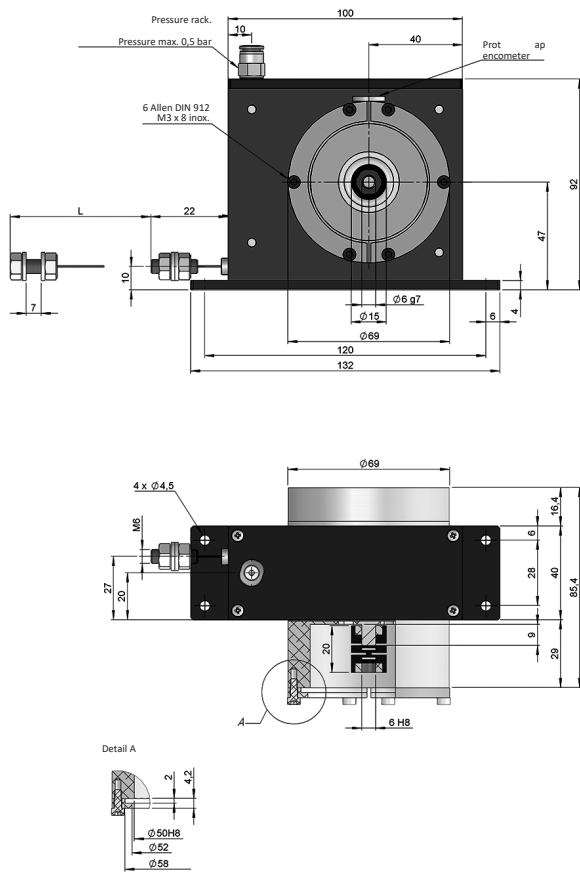


Drawing 90.1404, Special Customer AV

ENCO-METER EM4

EXTENDIBLE CABLE MEASUREMENT SYSTEM

BD - Pressurized option



Drawing 90.1404, Special Customer BD

ENCO-METER EM8

EXTENDIBLE CABLE MEASUREMENT SYSTEM

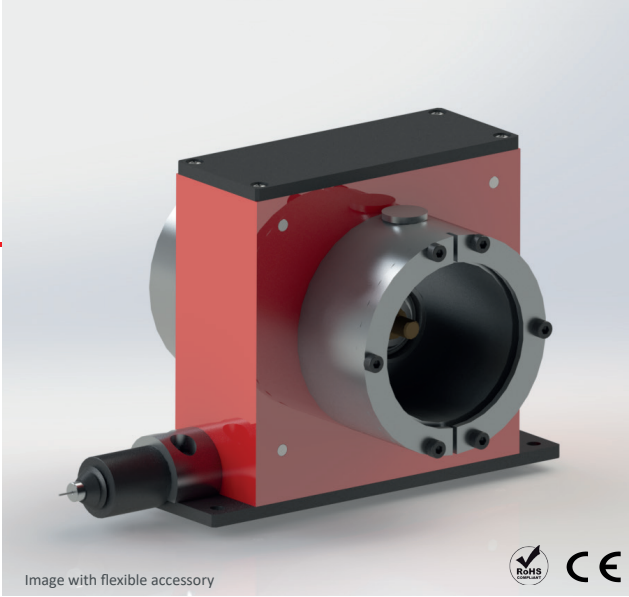


Image with flexible accessory



- Measuring linear distances up to 8 meters
- Any mounting position possible
- Protection class IP51 according to DIN EN 60529
- Anodised and pressurized options available
- The drum shaft can drive any kind of rotary encoder (encoder, potentiometer, ...)
- Stainless steel extendible cable $\varnothing 0,61$ AISI316



Linear measurement system



Extendible cable



45°



Pressurized

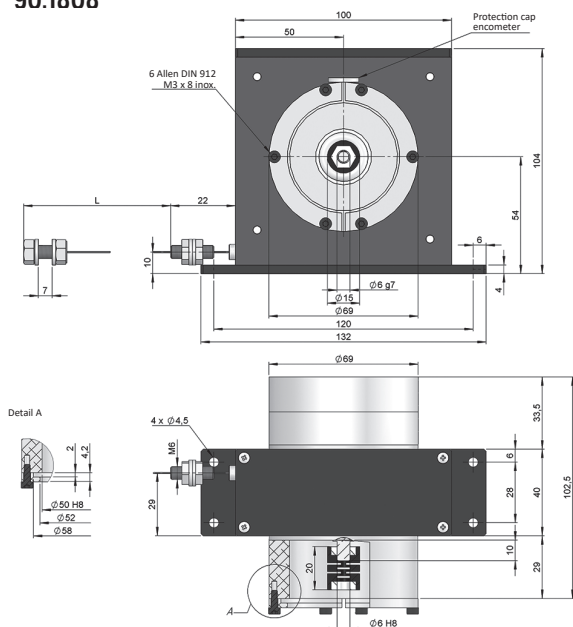


IP 51



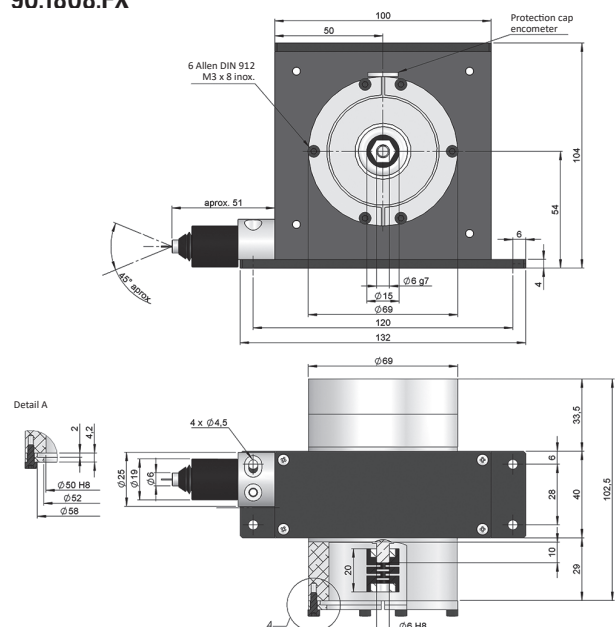
Express Delivery

90.1808



Drawing 90.1808 with standard bell synchro and coupling type 1

90.1808.FX



Drawing 90.1808.FX with flexible accessory, standard bell synchro and coupling type 1

REFERENCE

Reference example: 90.1808.SY1

Serie	Fixing system to sensor	Coupling	Special Customer
90.1808 / 90.1808.FX	. <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	. <input type="checkbox"/> <input type="checkbox"/>
90.1808. Standard	SY. Standard bell synchro	1. PFP 1520 06/06	AW. Inverted caps
90.1808.FX. Flexible accessory	CL. Clamping bell	2. PFP 1520 06/6.35	BF. Outdoor (Anodised 5µm)
		3. PFP 2224 06/10	BL. Saline environment (Anodised 20µm)
			BD. Pressurized

Request the ENCO-METER already coupled to an electronic output device that could be an Incremental Optical Encoder, Multiturn Absolute Optical Encoder, Potentiometer or Multiturn Absolute Magnetic Encoder.



ENCO-METER EM8

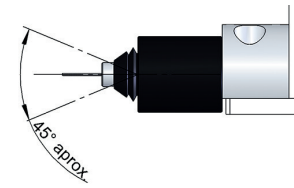
EXTENDIBLE CABLE MEASUREMENT SYSTEM

TECHNICAL SPECIFICATIONS

MODEL	EM8
Reference	90.1808 / 90.1808.FX
Travel	250 mm ±0,06 / per turn
Cable	Ø 0,61 stainless steel AISI316 (structure 19 x 7 + 0)
Measurement range, up to (mm)	8000
Maximum cable extension (mm)	8010
Minimum cable static tension	6 N - Standard
Maximum cable static tension	13 N - Standard
Maximum extension acceleration	30 m/s ² - Standard
Maximum recovery acceleration	12 m/s ² - Standard
Maximum speed	0,75 m/s
Protection against dust and splashes according to DIN EN 60529	IP51

(*) Other types of cables are possible on special order.

FLEXIBLE ACCESSORY (FX)



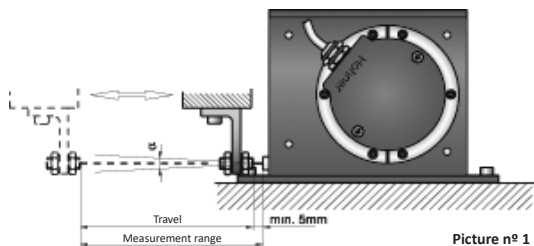
ENCO-METERS with flexible accessory FX (90.1404.FX, 90.1808.FX, 90.1810.FX) allow a misalignment of the extendable cable up to 45°.

ANODISED OPTIONS

+ **Special Customer BF:** 5 microns anodised housing for using in outdoor environments.

+ **Special Customer BD:** 20 microns anodised housing protected against the aggressive effect of the saltwater air.

INSTALLATION



Picture n° 1

ENCO-METER units are secured to a flat machine surface by means of three or four M4 screws. The cable must be correctly aligned and under no circumstances must it exceed the measurement range.

Special customer AW for inverted caps.

EM 90.1808: $\alpha < 2^\circ$ | EM 90.1808.FX: $\alpha < 45^\circ$

OUTPUT DEVICES

We can also supply the draw wire system already coupled to an electronic output device that could be an incremental encoder, absolute encoder or potentiometer.

+ ABSOLUTE OR INCREMENTAL ENCODER

If it is required to obtain a determined resolution "r" (mm per pulse) in the case of using an absolute or incremental encoder, the number of encoder pulses (n) will be:

$$n = \frac{D}{r} \quad (D \text{ is ENCO-METER travel in mm})$$

+ POTENTIOMETER

Using a potentiometer, an output "r" ratio (in Ω per mm) is obtained in accordance with:

$$r = \frac{R}{D \cdot n} \quad (R \text{ is the rated resistance and } n \text{ is the maximum number of turns})$$

As standard, we have potentiometers of $R = 10K\Omega$ and $n = 10$ turns. It must be taken into consideration that the mechanical travel of the potentiometer may limit the ENCO-METER measurement range.

i Electronic output devices that are delivered coupled to an ENCO-METER have an orientation of 45°. See Installation picture n° 1.

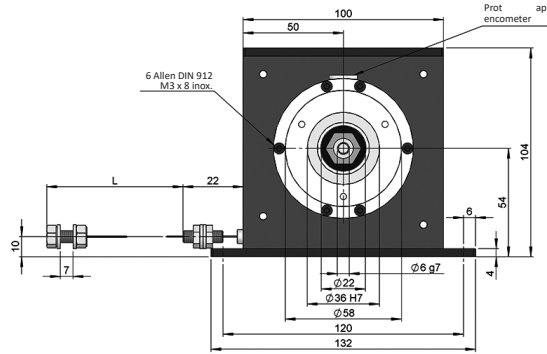
i If devices are not supplied assembled, we recommend mounting the sensor on the ENCO-METER without the seal.

ENCO-METER EM8

EXTENDIBLE CABLE MEASUREMENT SYSTEM

FIXING SENSOR SYSTEM DIMENSIONS

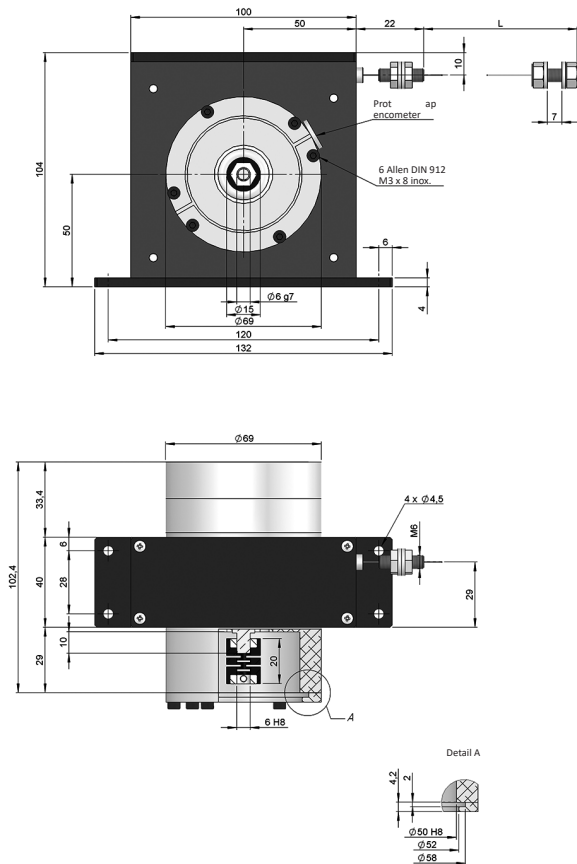
Fixing system to
sensor type CL
Clamping bell



Coupling type 3
PFP 2224 06/10

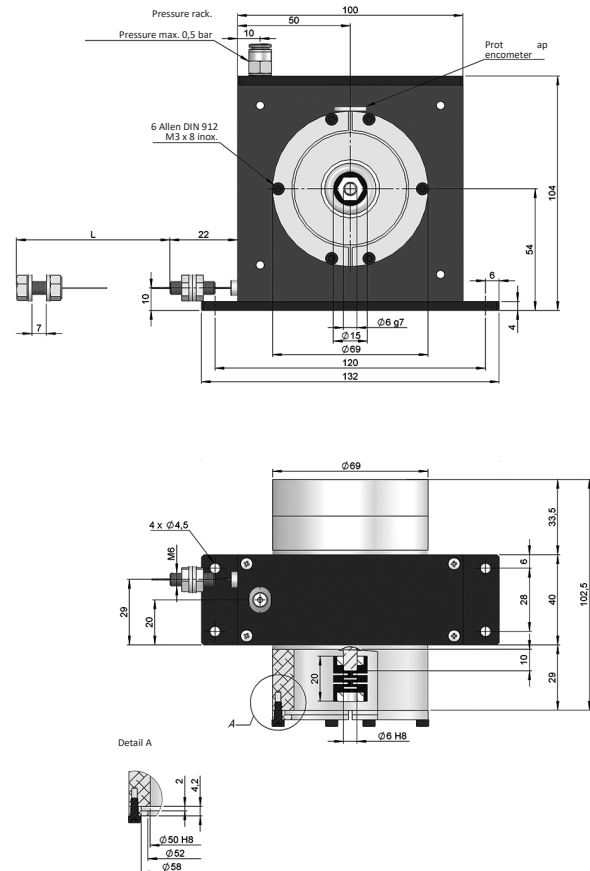
SPECIAL CUSTOMER OPTIONS

AW - Inverted caps



Drawing 90.1808, Special Customer AW

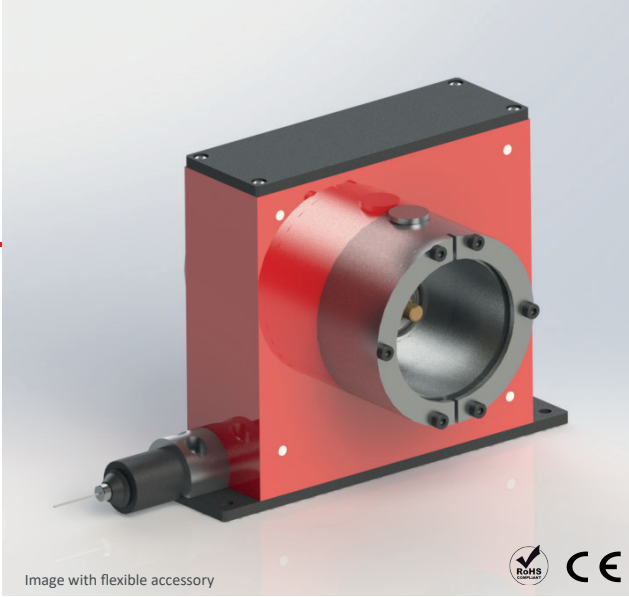
BD - Pressurized option



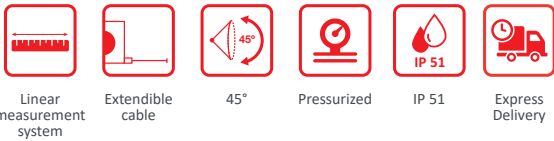
Drawing 90.1808, Special Customer BD

ENCO-METER EM10

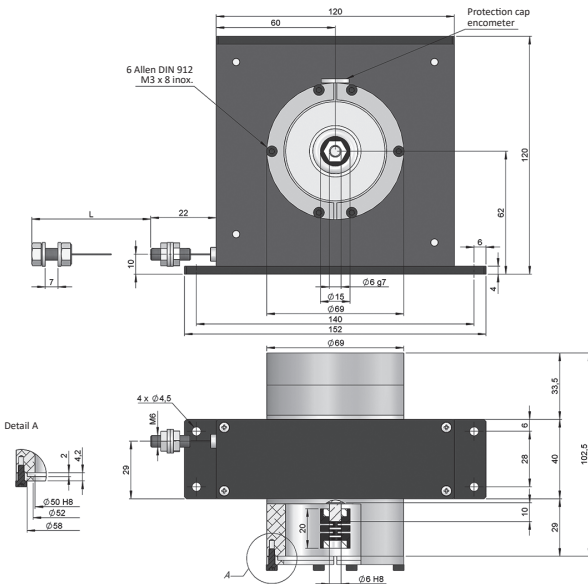
EXTENDIBLE CABLE MEASUREMENT SYSTEM



- Measuring linear distances up to 10 meters
- Any mounting position possible
- Protection class IP51 according to DIN EN 60529
- Anodised and pressurized options available
- The drum shaft can drive any kind of rotary encoder (encoder, potentiometer, ...)
- Stainless steel extendible cable $\varnothing 0,61$ AISI316

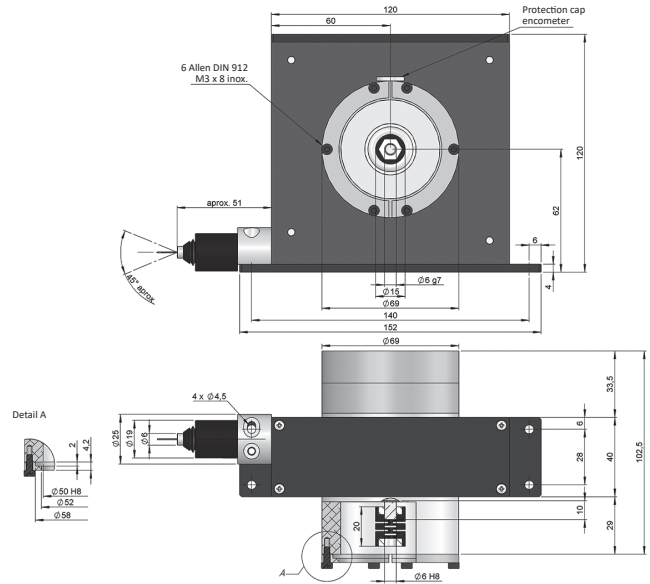


90.1810



Drawing 90.1810 with standard bell synchro and coupling type 1

90.1810.FX



Drawing 90.1810.FX with flexible accessory, standard bell synchro and coupling type 1

REFERENCE

Reference example: 90.1810.SY1

Serie	Fixing system to sensor	Coupling	Special Customer
90.1810 / 90.1810.FX	. <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	. <input type="checkbox"/> <input type="checkbox"/>
90.1810. Standard	SY. Standard bell synchro	1. PFP 1520 06/06	AW. Inverted caps
90.1810.FX. Flexible accessory	CL. Clamping bell	2. PFP 1520 06/6.35 3. PFP 2224 06/10	BF. Outdoor (Anodised 5µm) BL. Saline environment (Anodised 20µm) BD. Pressurized

Request the ENCO-METER already coupled to an electronic output device that could be an Incremental Optical Encoder, Multiturn Absolute Optical Encoder, Potentiometer or Multiturn Absolute Magnetic Encoder.



ENCO-METER EM10

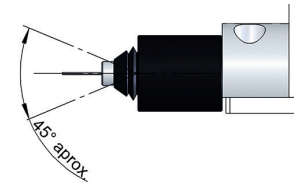
EXTENDIBLE CABLE MEASUREMENT SYSTEM

TECHNICAL SPECIFICATIONS

MODEL	EM10
Reference	90.1810 / 90.1810.FX
Travel	300 mm ±0,06 / per turn
Cable	Ø 0,61 stainless steel AISI316 (structure 19 x 7 + 0)
Measurement range, up to (mm)	10000
Maximum cable extension (mm)	10010
Minimum cable static tension	6 N - Standard
Maximum cable static tension	13 N - Standard
Maximum extension acceleration	25 m/s ² - Standard
Maximum recovery acceleration	12 m/s ² - Standard
Maximum speed	0,75 m/s
Protection against dust and splashes according to DIN EN 60529	IP51

(*) Other types of cables are possible on special order.

FLEXIBLE ACCESSORY (FX)



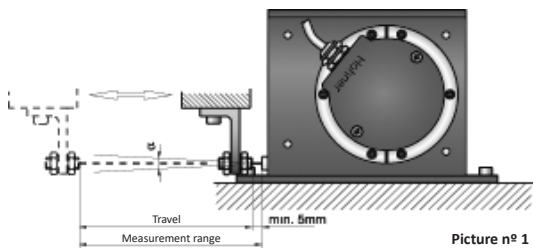
ENCO-METERS with flexible accessory FX (90.1404.FX, 90.1808.FX, 90.1810.FX) allow a misalignment of the extendable cable up to 45°.

ANODISED OPTIONS

+ **Special Customer BF:** 5 microns anodised housing for using in outdoor environments.

+ **Special Customer BD:** 20 microns anodised housing protected against the aggressive effect of the saltwater air.

INSTALLATION



Picture n° 1

ENCO-METER units are secured to a flat machine surface by means of three or four M4 screws. The cable must be correctly aligned and under no circumstances must it exceed the measurement range.

Special customer AW for inverted caps.

EM 90.1810: $\alpha < 2^\circ$ | EM 90.1810.FX: $\alpha < 45^\circ$

OUTPUT DEVICES

We can also supply the draw wire system already coupled to an electronic output device that could be an incremental encoder, absolute encoder or potentiometer.

+ ABSOLUTE OR INCREMENTAL ENCODER

If it is required to obtain a determined resolution "r" (mm per pulse) in the case of using an absolute or incremental encoder, the number of encoder pulses (n) will be:

$$n = \frac{D}{r} \quad (D \text{ is ENCO-METER travel in mm})$$

+ POTENTIOMETER

Using a potentiometer, an output "r" ratio (in Ω per mm) is obtained in accordance with:

$$r = \frac{R}{D \cdot n} \quad (R \text{ is the rated resistance and } n \text{ is the maximum number of turns})$$

As standard, we have potentiometers of $R = 10K\Omega$ and $n = 10$ turns. It must be taken into consideration that the mechanical travel of the potentiometer may limit the ENCO-METER measurement range.

i Electronic output devices that are delivered coupled to an ENCO-METER have an orientation of 45°. See Installation picture n° 1.

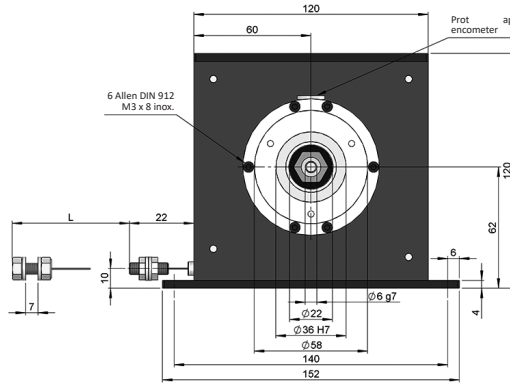
i If devices are not supplied assembled, we recommend mounting the sensor on the ENCO-METER without the seal.

ENCO-METER EM10

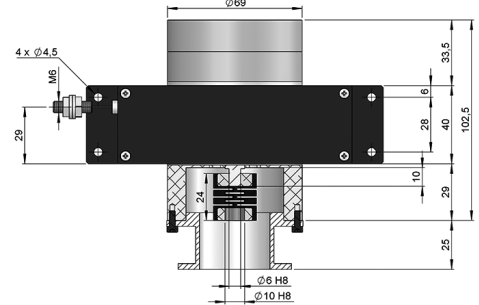
EXTENDIBLE CABLE MEASUREMENT SYSTEM

FIXING SENSOR SYSTEM DIMENSIONS

Fixing system to
sensor type CL
Clamping bell

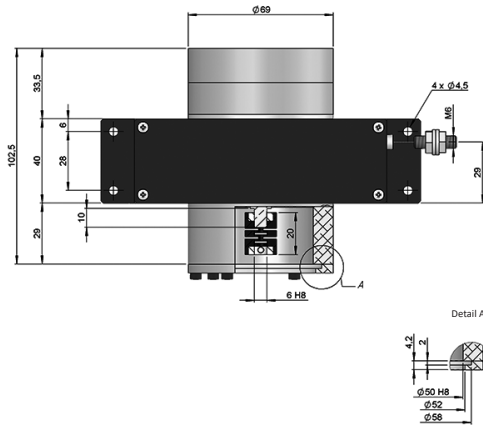
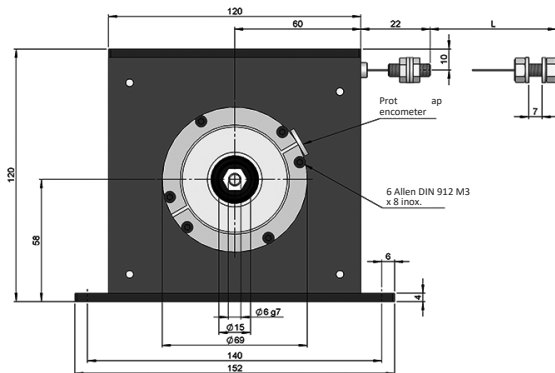


Coupling type 3
PFP 2224 06/10



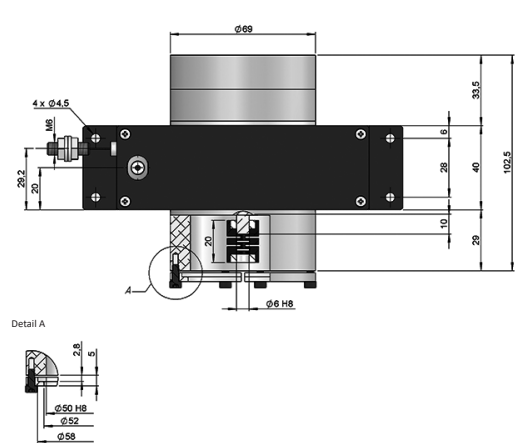
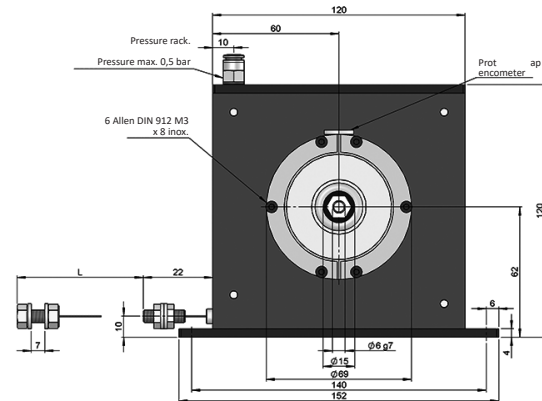
SPECIAL CUSTOMER OPTIONS

AW - Inverted caps



Drawing 90.1810, Special Customer AW

BD - Pressurized option



Drawing 90.1810, Special Customer BD

SERIE XT12

ROBUST DRAW WIRE SYSTEM FOR HEAVY DUTY INDUSTRIAL APPLICATIONS



Image XT12-15000



- Measuring linear distances up to 15 meters
- Any mounting position possible
- High speed up to 10 m/s
- The drum shaft can drive any kind of rotary encoder or potentiometer
- Stainless steel measuring cable $\varnothing 0,90$ mm
- Different wire types and wire attachment options



Linear measurement system



Extendible cable



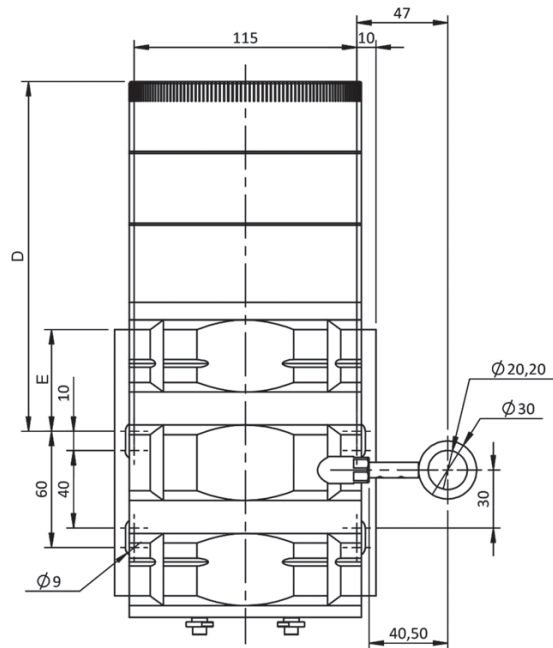
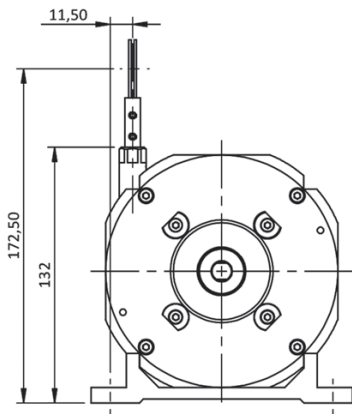
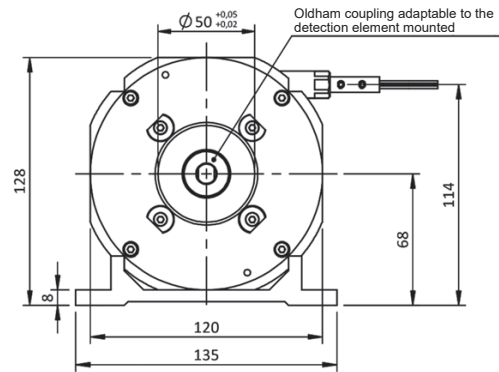
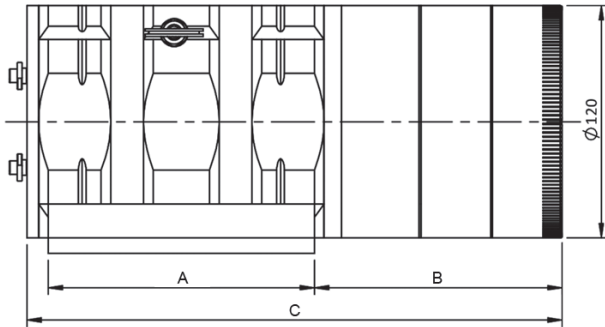
High speed



Temperature range
- 30°C



Express Delivery



SERIE	A	B	C	D	E
90.XT1210	102 mm	66 mm	181 mm	84,50 mm	18,50 mm
90.XT1215	137,50 mm	128 mm	276,50 mm	180,50 mm	52,50 mm

Drawing with a measuring cable attachment through eyelet



SERIE XT12

ROBUST DRAW WIRE SYSTEM FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

REFERENCE

Reference example: 90.XT1215

Serie	Measurement range	Special Customer
90.XT12	□ □	. □ □
	10. up to 10000 mm 15. up to 15000 mm	BK. -30°C BL. Anodised BM. M6 threaded rod BN. Cleaning brush for the cable

The standard draw wire system includes a $\varnothing 10$ coupling brace with adaptation flange.
Other coupling options and flanges available, upon request.

We can also supply the draw wire system already coupled to an electronic output device that could be an incremental encoder, absolute encoder or potentiometer.

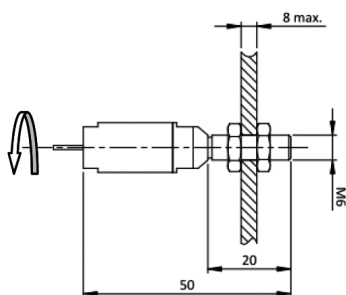
TECHNICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Measuring cable*: $\varnothing 0,90$ mm Stainless Steel
Travel	300 mm / per turn
Measurement range, up to (mm)	15000
Minimum cable static tension	10,5 N
Maximum cable static tension	15 N
Max. Acceleration	4 m/s ²
Max. Speed	10 m/s
Linearity	$\pm 0,05\%$ f.s.
Weight aprox.	8 Kg
Operating temperature range	-20°C to +80°C - Standard -30°C to +80°C - Special Customer BK
Storage temperature range	-30°C to +80°C

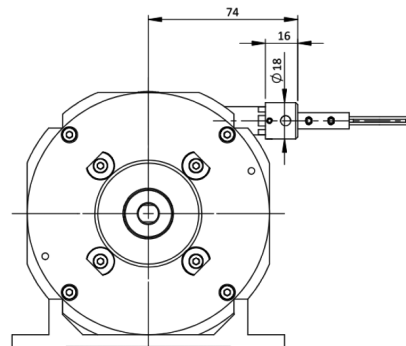
(*) Other types of cables are possible on special order.

SPECIAL CUSTOMER OPTIONS

BM - M6 threaded rod



BN - Cleaning brush for the cable



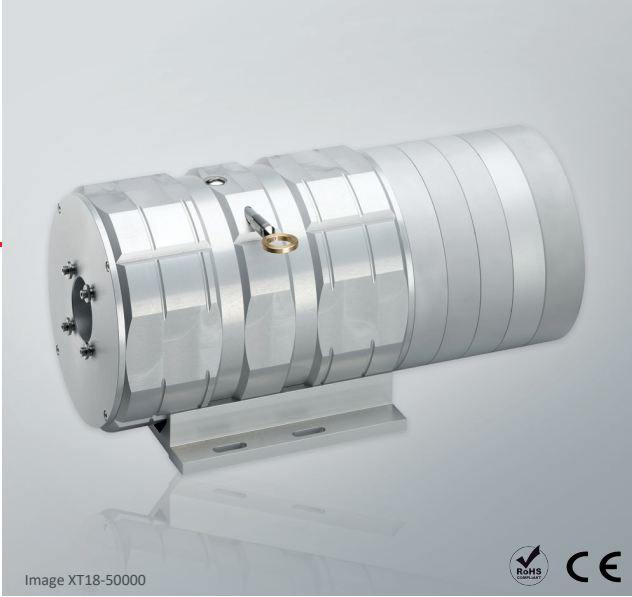


Image XT18-50000



SERIE XT18

ROBUST DRAW WIRE SYSTEM FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

- Measuring linear distances up to 50 meters
- Any mounting position possible
- High speed up to 10 m/s
- The drum shaft can drive any kind of rotary encoder or potentiometer
- Stainless steel measuring cable $\varnothing 0,90$ mm
- Different wire types and wire attachment options



Linear measurement system



Extendible cable



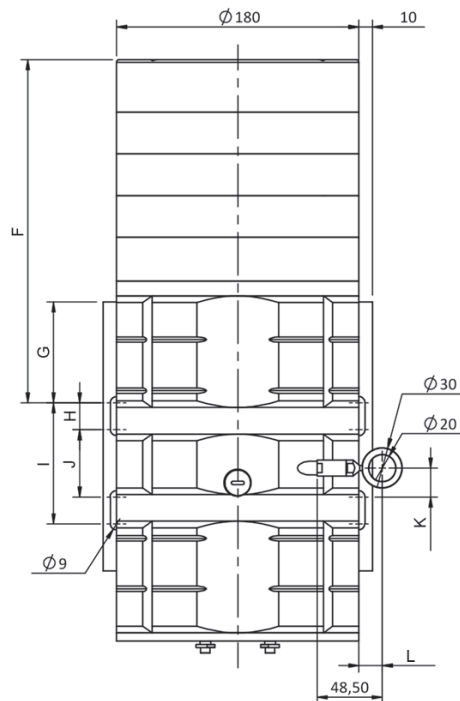
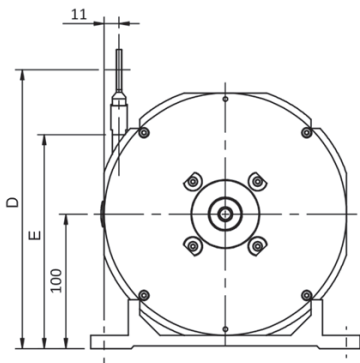
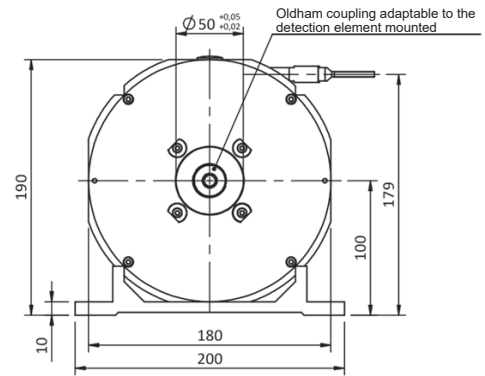
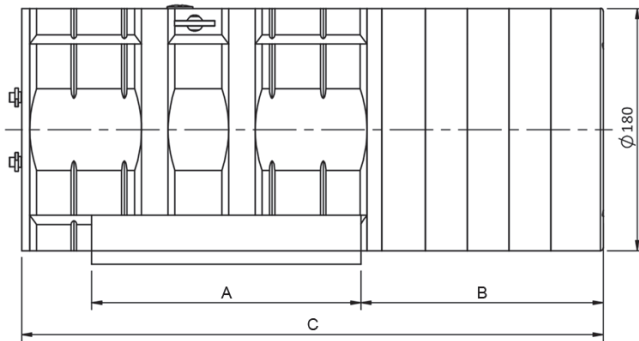
High speed



Temperature range
-30°C



Express Delivery



SERIE	90.XT1820	90.XT1830	90.XT1840	90.XT1850
A	110 mm	160 mm	180 mm	200 mm
B	154,50 mm	148 mm	180 mm	180 mm
C	282,50 mm	319 mm	392 mm	432 mm
D	218,50mm	218,50 mm	218,50 mm	207,37 mm
E	170 mm	170 mm	170 mm	159 mm
F	174,50 mm	183 mm	235 mm	255 mm
G	20 mm	35 mm	55 mm	75 mm
H	10 mm	20 mm	20 mm	20 mm
I	80 mm	90 mm	90 mm	90 mm
J	60 mm	50 mm	50 mm	50 mm
K	38 mm	21,50 mm	21,50 mm	21,50 mm
L	17,50 mm	28,50 mm	28,50 mm	17,50 mm

Drawing with a measuring cable attachment through eyelet



SERIE XT18

ROBUST DRAW WIRE SYSTEM FOR HEAVY DUTY INDUSTRIAL APPLICATIONS

REFERENCE

Reference example: 90.XT1850

Serie	Measurement range	Special Customer
90.XT18	□ □	□ □
	20. up to 20000 mm 30. up to 30000 mm 40. up to 40000 mm 50. up to 50000 mm	BK. -30°C BL. Anodised BM. M6 threaded rod BN. Cleaning brush for the cable

The standard draw wire system includes a $\varnothing 10$ coupling brace with adaptation flange.
Other coupling options and flanges available, upon request.

We can also supply the draw wire system already coupled to an electronic output device that could be an incremental encoder, absolute encoder or potentiometer.

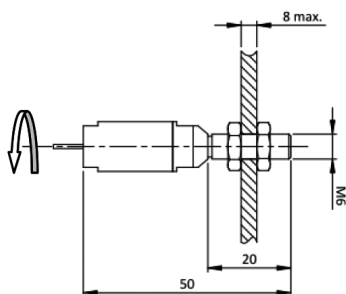
TECHNICAL SPECIFICATIONS

Materials	Housing: Aluminium Flange: Aluminium Measuring cable*: $\varnothing 0,90$ mm Stainless Steel
Travel	500 mm / per turn
Measurement range, up to (mm)	50000
Minimum cable static tension	15 N
Maximum cable static tension	30 N
Max. Acceleration	2 m/s ² (90.XT1820, 90.XT1830) 1 m/s ² (90.XT1840, 90.XT1850)
Max. Speed	10 m/s
Linearity	$\pm 0,05\%$ f.s.
Weight aprox.	12 Kg (90.XT1820), 15 Kg (90.XT1830) 20 Kg (90.XT1840), 23 Kg (90.XT1850)
Operating temperature range	-20°C to +80°C - Standard -30°C to +80°C - Special Customer BK
Storage temperature range	-30°C to +80°C

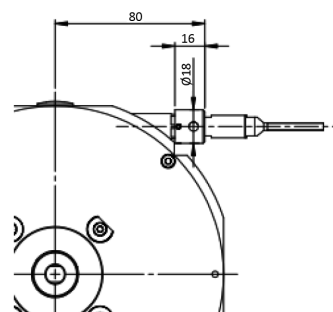
(*) Other types of cables are possible on special order.

SPECIAL CUSTOMER OPTIONS

BM - M6 threaded rod



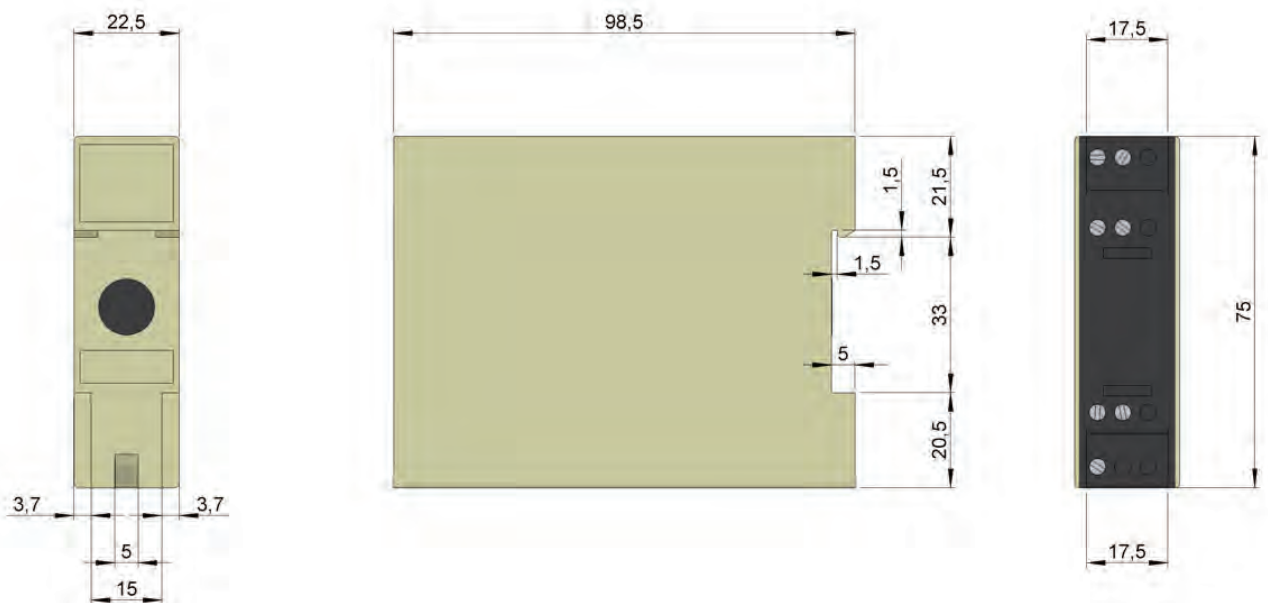
BN - Cleaning brush for the cable



ELECTRONIC DISCRIMINATOR 90.8600

ELECTRONIC DISCRIMINATOR FOR ENCODERS

- A/B signal discriminator
- Opto-isolated Push-Pull (HTL) Inputs
- Outputs Push-pull (HTL)
- Low consumption 70mA (without load)
- Power supply 10..24v
- Protection class IP 20
- Rapid assembly on a DIN rail



MECHANICAL SPECIFICATIONS

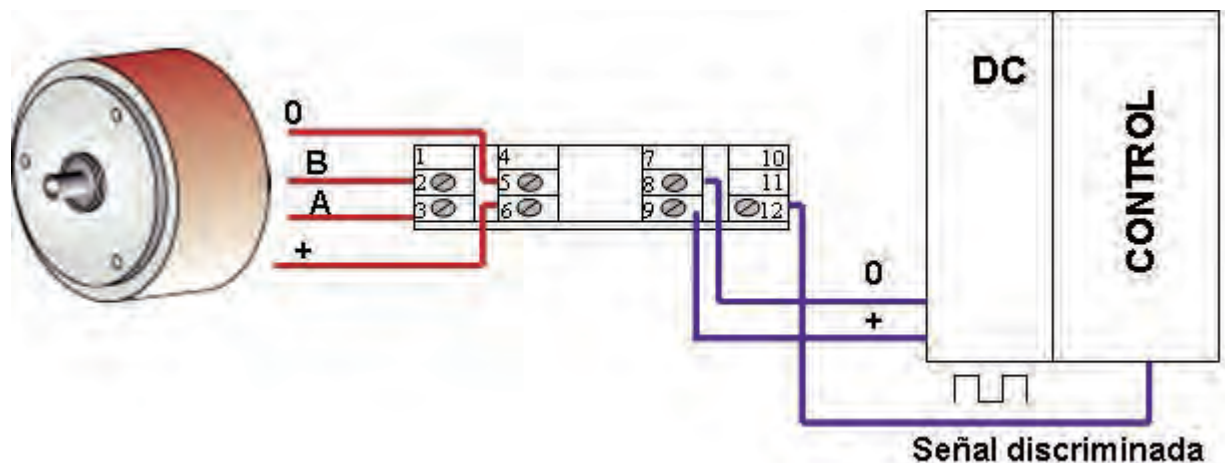
Input channels	A/B
Input signal type	Push-Pull
Input signal level	10..24v
Frecuency	200 Khz
Passive filter	250 Khz
Phase displacement of input signal	90° ±25%
Output channels	A/B/direction
Output signal type	Push-pull
Output signal level	10..24v
Intensity of the outgoing load	30 mA per channel
Power supply	10..24v
Intern consumption	70 mA without load
Power supply encoder output	10..24v
Connection type	Pitch of the connection strip screw 5,08
Max.conductor sections	Max 2,5 mm ²
Protection against dust and splashes according to DIN 40050	IP 20
Relative humidity	85%
Operating temperature range	-10°..+70°C
Assembly	DIN Rail in 50022
Weigth	100 gr
Housing	Grey polycarbonate UL94

MODULE DESCRIPTION

This digital discriminator takes advantage of the two encoder A and B channels, in order to refuse the possible noise or rebounds of the encoder. According to the direction in which the encoder turns, the discriminator captures one of the two signals (A or B), which will be the main signal and the other one will be the validation

signal. In this manner, there will always be a margin of 90 degrees in order to absorb and eliminate all of the rebounds and noises that may appear on the main signal. In this manner, if the encoder turns in one direction, the output signal will be A, and if it turns in the other direction, the output signal will be B.

CONNECTION DIAGRAM



PIN 1: NC

PIN 2: Input channel B encoder

PIN 3: Input channel A encoder

PIN 4: NC

PIN 5: 0 V Encoder

PIN 6: Power supply encoder +V

PIN 7: NC

PIN 8: 0 V

PIN 9: Power supply encoder +V

PIN 10: NC

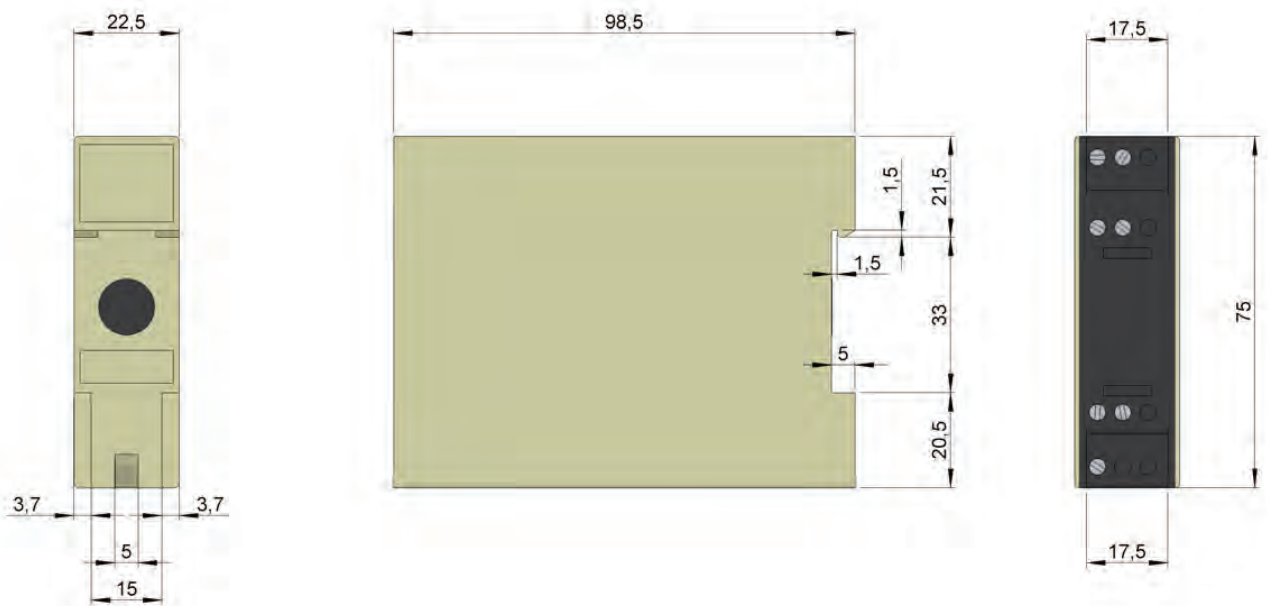
PIN 11: NCr

PIN 12: Anti-dither output signal

DIRECTION DETECTOR MODULE 90.8601

DIRECTION DETECTOR MODULE FOR ENCONDERS

- Rotational direction discriminator
- Input A and B Push-pull (HTL) opto-isolated
- Output A, B and direction Push-pull (HTL)
- Low consumption 70mA (without load)
- Power supply 10..24v
- Protection class IP 20
- Rapid assembly on a DIN rail



MECHANICAL SPECIFICATIONS

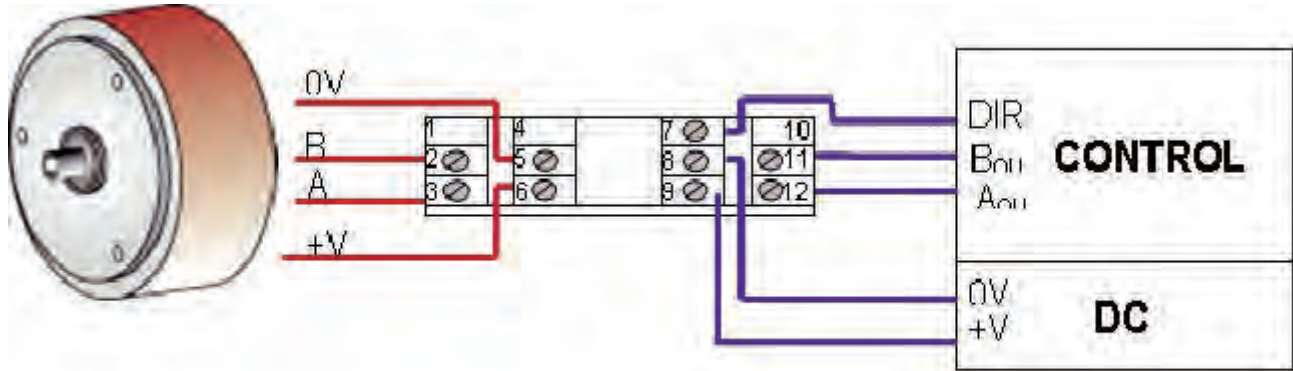
Input channels	A/B
Input signal type	Push-Pull
Input signal level	10..24v
Frecuency	200 Khz
Passive filter	250 Khz
Phase displacement of input signal	90° ±25%
Output channels	A/B/direction
Output signal type	Push-pull
Output signal level	10..24v
Output load intensity	30 mA per channel
Power supply	10..24v
Intern consumption	70 mA without load
Encoder power supply output	10..24v
Connection type	Pitch of the connection strip screw 5,08
Max.conductor sections	Max 2,5 mm ²
Protection against dust and splashes	IP 20
Relative humidity	85%
Operating temperature range	-10°..+70°C
Assembly	DIN Rail in 50022
Weight	100 gr
Housing	Grey polycarbonate UL94

MODULE DESCRIPTION

Especially designed module for applications where automatic up/down inputs are lacking. The digital direction detector takes advantage of the two channels of encoder A and B for generating a DIR output signal. According to the direction in which the encoder turns, channel A will advance by 90° to B or vice versa. In the first case, the DIR output will be a 0. In the second case,

where channel B advances on channel A, the DIR output will be a 1. Apart from the DIR output, the A and B input signals are digitalised and regenerated at the Aout and Bout respectively. The output driver for the three signals (Aout, Bout and DIR) is a 10-24V Push-Pull.

CONNECTION DIAGRAM



PIN 1: NC
PIN 2: Input channel B encoder
PIN 3: Input channel A encoder
PIN 4: NC
PIN 5: 0 V Encoder
PIN 6: Power supply encoder +V

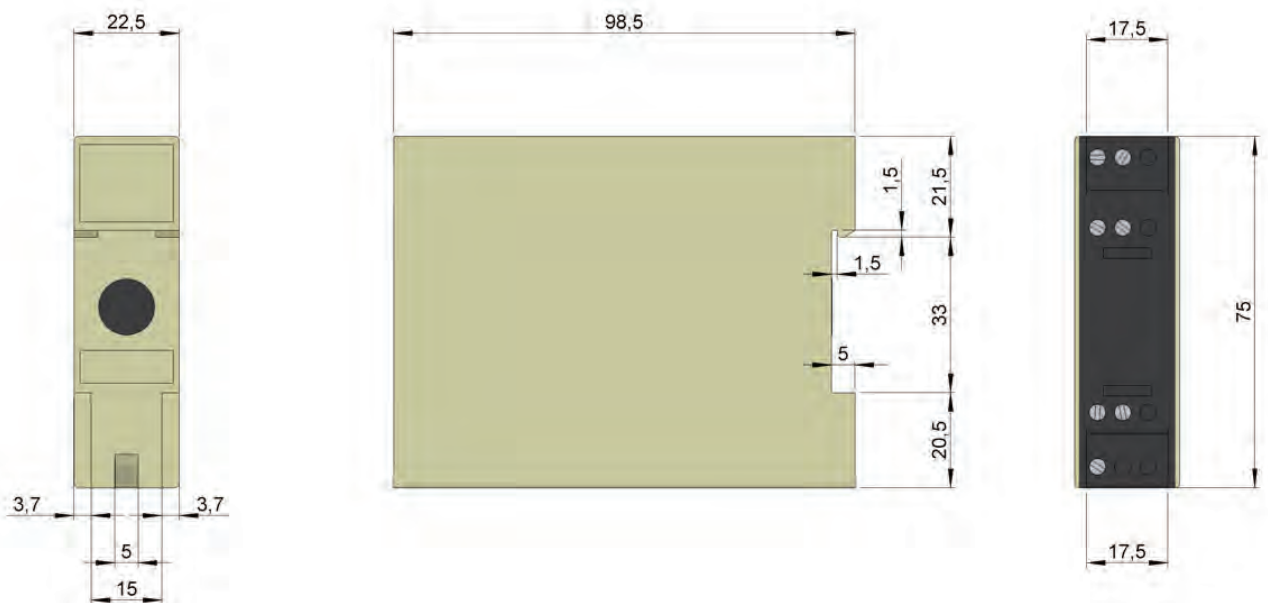
PIN 7: Output DIR
PIN 8: 0 V
PIN 9: Power supply encoder +V
PIN 10: NC
PIN 11: Output Bout
PIN 12: Output Aout

DIFFERENTIAL SIGNALS CONVERTOR

90.8602

DIFFERENTIAL SIGNALS CONVERTOR FOR ENCODERS

- A/B Differential signals convertor
- A/A and B/B differential Push-Pull Input
- A/B Push-Pull Output
- Low consumption 70mA (without load)
- Power supply 10..24v
- Protection class IP 20
- Rapid assembly on a DIN Rail



MECHANICAL SPECIFICATIONS

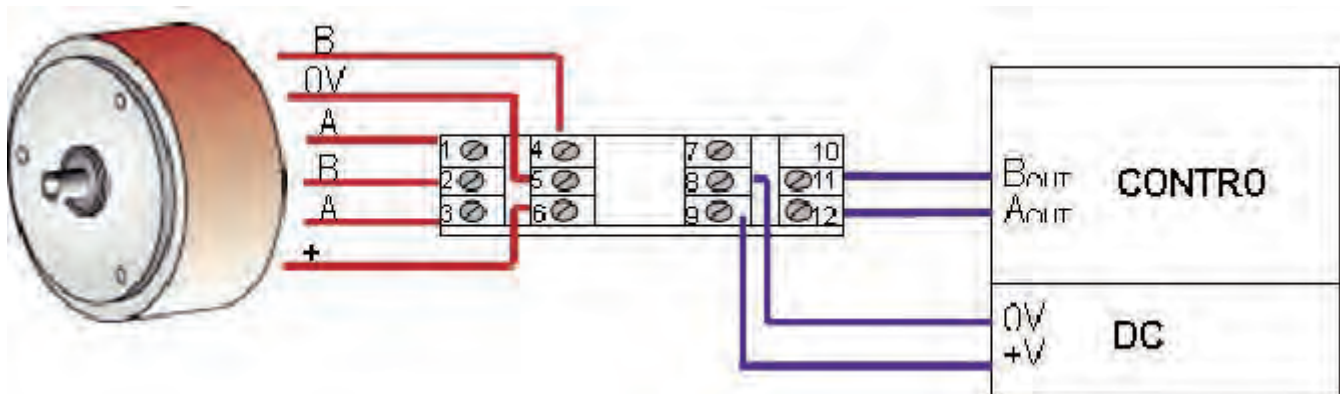
Input channels	Differential A/B
Input signal type	Differential Push-Pull
Input signal level	10..24v
Frecuency	200 Khz
Passive filter	250 Khz
Input signal phase displacement	90° ±25%
Output channels	A/B/direction
Output signal type	Push-pull
Output signal level	10..24v
Output load intensity	30 mA per channel
Power supply	10..24v
Intern consumption	70 mA sin cargo
Encoder power supply output	10..24v
Connection type	Pitch of the connection strip screw 5,08
Max.conductor sections	Max 2,5 mm ²
Protection against dust and splashes	IP 20
Relative humidity	85%
Operating temperature range	-10°..+70°C
Assembly	DIN Rail in 50022
Weight	100 gr
Housing	Grey polycarbonate UL94

MODULE DESCRIPTION

This converter takes advantage of the differential signals referring to each channel (A/An yB/Bn) of the encoder for generating two outputs, A and B. Each one of these outputs will be the result of the A-An and B-Bn operation respectively, modifying the negative levels to 0 volts. Furthermore, the inputs have a 259 KHz filter for high fre-

quencies in order to absorb noise. The output driver for the two signals (Aout, Bout) is a 10-24V Push-Pull. This system is very useful when you want to have quality signals (A,B) in environments with high electromagnetic interference and wiring distances, but at the same time you want to save on control inputs.

CONNECTION DIAGRAM



PIN 1: Input channel An encoder
PIN 2: Input channel B encoder
PIN 3: Input channel A encoder
PIN 4: Input channel An encoder
PIN 5: 0 V Encoder
PIN 6: Power supply encoder +V

PIN 7: NC
PIN 8: 0 V
PIN 9: Power supply encoder +V(10/24 Vdc)
PIN 10: NC
PIN 11: Output signal Bout
PIN 12: Output signal Aout

OVERVIEW ACCESSORIES

Flexible couplings



Flanges



Support angles



Measuring wheels



Mounting bells



Antirotation systems



Pre-assembled cables



Connectors



FLEXIBLE COUPLINGS

■ Coupling importance

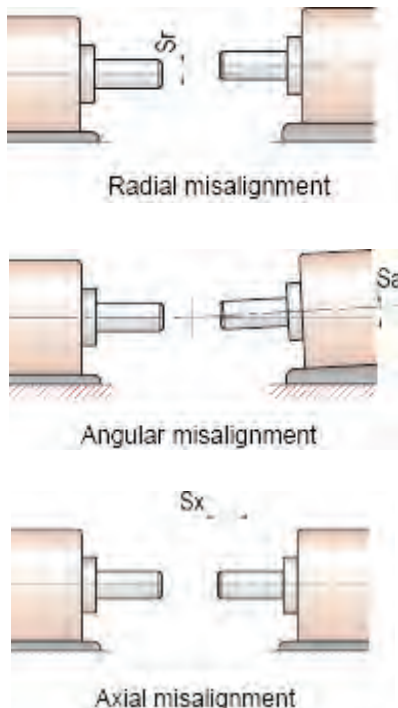
A large number of mechanical installations involve the problem of transmitting movement between the machine shafts. The coupling is the simplest manner of achieving this transmission since it works by joining the two ends of these shafts, thus transmitting rotation from one to the other. Not only does correct equipment operation depend on good resolution of the transmission problem, but also the useful lifetime of the encoders or coupled machines.

■ Selection

Coupling selection must be a compromise between factors, such as cost, available installation space, the required duration and transmission performance, which must satisfy requirements, such as:

■ Absorption of shaft misalignment and loads

Due to dimensional errors inherent in all mechanical installations, the shafts to be installed will maintain certain positional differences or "misalignment" between the two and this will hinder the transmission of movement. This misalignment may be axial, radial or angular.



In all cases, the employed coupling system must be able to absorb such misalignment and prevent any negative effects of loads on shafts, bearings, supports and frames. Misalignment can also cause fatigue or wear in the coupling and therefore, during selection, the rotation speed must be taken into account, reducing as much as possible the maximum acceptable misalignment figures that are given in the tables for each model.



■ For transmission

This is not important for measurement systems. For power drives, it should be verified that the torque to be transmitted is less than the rated torque given in the performance tables, with greater margins in accordance with the expected misalignment.

■ Kinematic precision

In measurement systems and high-precision drives, it is important that the coupling does not cause any positional phase differences between the shafts.

All models in the ENCO-FLEX range are free from torsional play and only the OLDHAM may acquire a certain amount of free play after a time working with significant radial misalignment (and this can be corrected by replacing the disc). If the load torque or inertia in the driven shaft is significant, phase differences may be produced due to the torsional elasticity in the coupling. In such cases, the use of models that are not very rigid, such as the SPRING-FLEX or POLY-FLEX, should be avoided.

■ Rotation speed

The OLDHAM-FLEX and SPRING-FLEX models are not suitable for high-speed shafts, especially if there is significant misalignment. For the rest of the couplings, it must be taken into account that their useful lifetime depends on fatigue and hence the speed at which they operate.

■ Securing to shafts

Couplings can be supplied with fixing setscrews (two at 90°) or with a built-in clamp-flange.

Clamp securing has the advantage of not producing any marks on the shafts, thus they are better able to withstand sharp inversions and vibration. Setscrews are more economic and allow larger diameters to be employed for the same coupling. The inconvenience of setscrews is that they can produce flaw on the shafts. Moreover, they can loosen due to vibration, but this can be avoided by using a semi-permanent adhesive.



ALU-FLEX

ALUMINIUM GROOVED FLEXIBLE COUPLINGS OR STAINLESS STEEL

- Without free-plays. They do not produce any speed variations in the transmission
- High torsional rigidity
- Available with setscrews and built-in clamps
- Resistant to oils and chemical products
- Mechanical protection against excessive torque



ALU-FLEX are single flexible couplings in a single piece, machined from hardened aluminium alloy. They are suitable for transmissions that require moderate torque and when shaft misalignment is not very large. They act as mechanical fuses to excessive torques.

These couplings are suitable for measurement and control systems, together with reduced torque drives. They permit transmission of very precise kinematic movement, without free-

play and with low torsional elasticity. They are recommended for auxiliary machines, tachometric generators potentiometers and encoders etc.

The coupling will absorb errors in alignment and shaft installation.

TECHNICAL SPECIFICATIONS

	Torque	Clamping torque	Max. Speed	Admissible max. misalignment			Torsion spring stiffness	Radial spring stiffness	Weight	Inertia
	Ncm	Ncm		Angular	Axial	Radial				
				degree	mm	mm				
AFP 6508	2	8	8.000	±2	±0,15	±0,1	0,55	24	0,5	0,02
AFP 1015	15	15	8.000	±2	±0,2	±0,15	2,2	22	2,4	0,34
AFP 1218	25	35	8.000	±2,5	±0,25	±0,15	2,8	28	4	0,83
AFP 1622	40	80	8.000	±3	±0,3	±0,2	5	34	9,5	3,2
AFP 1922	60	80	8.000	±3,5	±0,4	±0,25	9	40	13	6,7
AFP 2524	100	120	8.000	±4	±0,5	±0,3	20	60	26	22,2
AFP 2532	100	120	8.000	±4	±0,5	±0,3	18	50	35	30
AFP 3030	150	120	8.000	±4	±0,5	±0,3	21	60	45	57
AFP 3038	150	120	8.000	±4	±0,5	±0,3	21	60	60	76
AFA 1421	50	50	6.000	±3	±0,25	±0,2	4,5	22	6,5	1,9
AFA 1625	60	50	6.000	±3,5	±0,3	±0,2	5,5	30	10	3,8
AFA 1928	80	120	6.000	±4	±0,4	±0,25	8	36	16	8,7
AFA 2532	100	100	6.000	±4	±0,5	±0,35	16	45	34	29
IFA 2532	200	150	6.000	±4	±0,5	±0,35	29	150	88	84
AFA 3038	150	100	6.000	±4	±0,5	±0,35	19	60	58	76



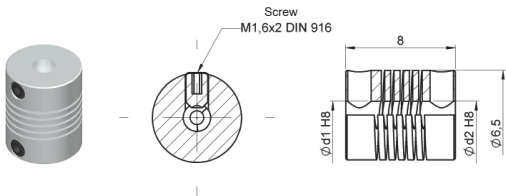
ALU-FLEX

ALUMINIUM GROOVED FLEXIBLE COUPLINGS OR STAINLESS STEEL

AFP 6508 - Aluminium

Ordering code example: AFP 6508 02/02

Ø d1/d2

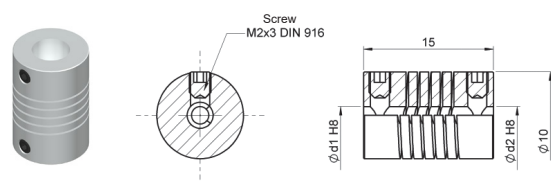


01/01
01/02
02/02

AFP 1015 - Aluminium

Ordering code example: AFP 1015 02/02

Ø d1/d2

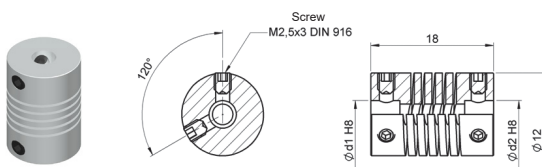


02/02
02/03
02/04
02/05
03/03
03/05

AFP 1218 - Aluminium

Ordering code example: AFP 1218 04/04

Ø d1/d2

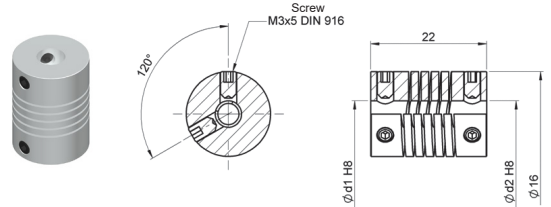


02/04
03/03
03/04
04/04

AFP 1622 - Aluminium

Ordering code example: AFP 1622 06/06

Ø d1/d2

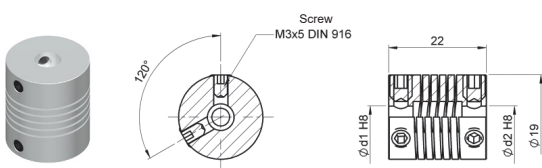


03/03
04/04
04/05
05/05
06/06

AFP 1922 - Aluminium

Ordering code example: AFP 1922 06/06

Ø d1/d2

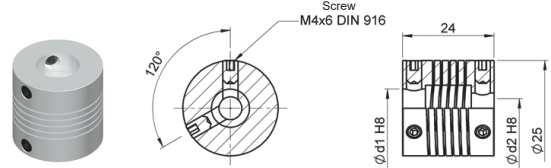


04/06
05/05
06/06

AFP 2524 - Aluminium

Ordering code example: AFP 2524 06/06

Ø d1/d2

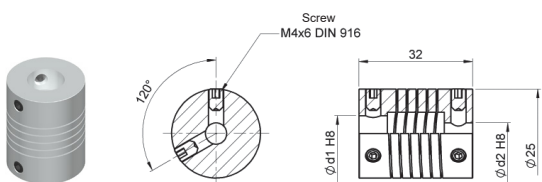


06/06
06/08
06/10
08/08
10/10
12/12

AFP 2532 - Aluminium

Ordering code example: AFP 2532 10/10

Ø d1/d2

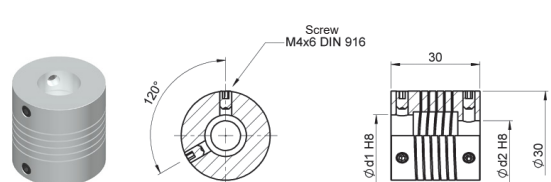


06/06
06/08
08/08
08/10
10/10
10/12

AFP 3030 - Aluminium

Ordering code example: AFP 3030 10/10

Ø d1/d2

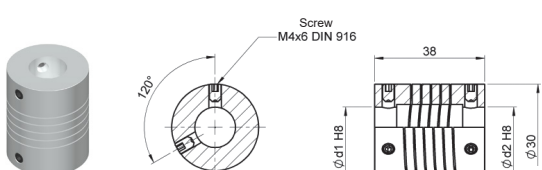


10/10
10/12
10/14

AFP 3038 - Aluminium

Ordering code example: AFP 3038 12/12

Ø d1/d2

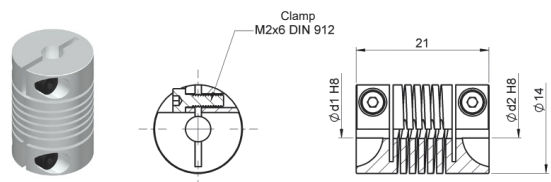


10/10
12/12
14/14

AFA 1421 - Aluminium

Ordering code example: AFA 1421 04/04

Ø d1/d2



02/02
02/03
03/03
03/04
04/04

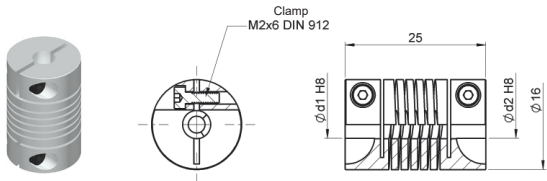
ALU-FLEX

ALUMINIUM GROOVED FLEXIBLE COUPLINGS OR STAINLESS STEEL

AFA 1625 - Aluminium

Ordering code example: AFA 1625 05/05

Ø d1/d2

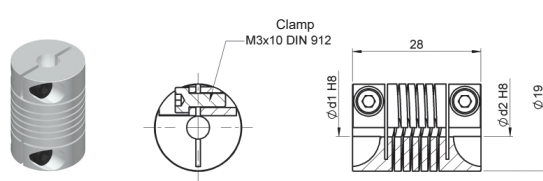


03/03
03/05
04/04
05/05

AFA 1928 - Aluminium

Ordering code example: AFA 1928 06/06

Ø d1/d2

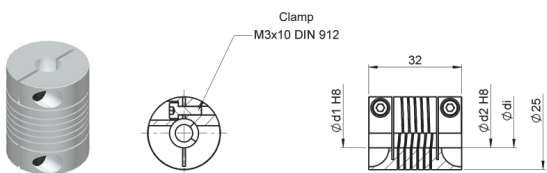


04/04
04/06
05/05
05/06
06/06

AFA 2532 - Aluminium

Ordering code example: AFA 2532 10/10

Ø d1/d2

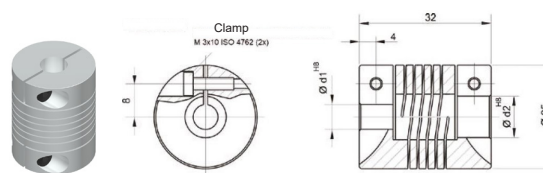


06/06
06/08
06/10
08/08
08/10
10/10
10/12

IFA 2532 - Stainless Steel

Ordering code example: IFA 2532 10/10

Ø d1/d2

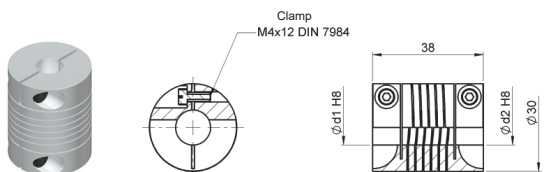


06/06
06/08
06/10
08/08
08/10
10/10

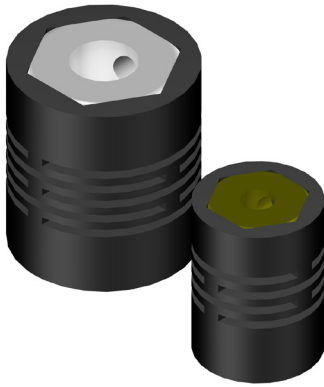
AFA 3038 - Aluminium

Ordering code example: AFA 3038 12/12

Ø d1/d2



10/10
12/12
14/14



POLY-FLEX

ACETAL GROOVED FLEXIBLE COUPLINGS

- Absorption of significant angular and radial deviations
- Low inertia
- Free of speed variations in the transmission
- Torsional vibration attenuation
- Electric and thermal insulation between the shafts
- Mechanical protection against excessive torque



POLY-FLEX are flexible couplings manufactured in polyamide and reinforced with fibreglass. Reduced size for applications that do not require high torque and where there is significant shaft misalignment.

The material provides excellent resistance to fatigue, which makes it very suitable for high-speed couplings. It absorbs torsional vibration and insulates the shafts both electrically and thermally, acting, where necessary, as a mechanical fuse.

The tightening of the setscrews has been reinforced by incorporating an aluminium fitting.

These couplings are suitable for measurement systems and machines that do not offer high resistant torque values. They are recommended for tachometric generators potentiometers and encoders, etc. POLY-FLEX couplings can be used in the temperature range of -30° to 85°.

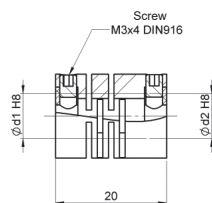
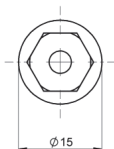
TECHNICAL SPECIFICATIONS

	Torque <i>Ncm</i>	Clamping torque <i>Ncm</i>	Max. Speed <i>rpm</i>	Admissible max. misalignment			Torsion spring stiffness <i>Nm/rad</i>	Radial spring stiffness <i>N/mm</i>	Weight <i>gr</i>	Inertia <i>gcm²</i>
				Angular <i>degree</i>	Axial <i>mm</i>	Radial <i>mm</i>				
PFP 1520	30	70	12000	±2,5	±0,2	±0,3	12	45	6	2
PFP 2224	80	120	10000	±3	±0,2	±0,3	38	115	10	7

PFP 1520

Ordering code example: PFP 1520 06/06

∅ d1/d2

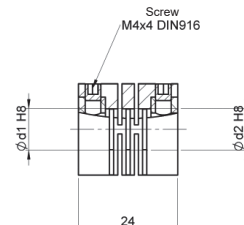
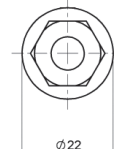


03/03
03/05
03/06
04/04
04/05
04/06
05/05
05/06
06/06
6.35/6.35

PFP 2224

Ordering code example: PFP 2224 08/08

∅ d1/d2



04/04
06/06
06/6.35
06/08
06/10
6.35/6.35
08/08
08/10
10/10
9.52/9.52

Printed in bold = Immediate delivery. Check with us the delivery time for the other options.

Other shaft diameter available, upon request.





SPRING-FLEX

FLEXIBLE COUPLING SPRINGS

- Absorption of significant misalignment
- Elimination of loads on the shafts due to misalignment
- Free of wear and fatigue
- Vibration absorption
- High torsional elasticity
- Protection against sudden acceleration in transmission



SPRING-FLEX couplings are based on the use of a helicoid spring as an elastic transmission element. These springs are constructed from stainless steel with a plane section. Spring ends are designed to prevent its rotation.

The result is a highly elastic coupling that enables very misaligned shafts to be coupled without the reactions on the bearings being excessively high. The coupling maintains its properties in both

directions of rotations.

They are suitable for measurement systems and machines that do not offer a very high load torque and where the alignment of the shafts is not too tight or can cause variations (heat expansion, vibration and movements etc).

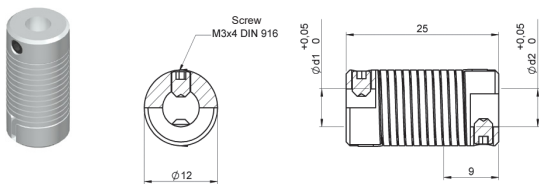
TECHNICAL SPECIFICATIONS

	Torque <i>Ncm</i>	Clamping torque <i>Ncm</i>	Max. Speed <i>rpm</i>	Admissible max. misalignment			Torsion spring stiffness <i>Nm/rad</i>	Radial spring stiffness <i>N/mm</i>	Weight <i>gr</i>	Inertia <i>gcm²</i>
				Angular <i>degree</i>	Axial <i>mm</i>	Radial <i>mm</i>				
SFP 1225	15	70	8000	±5	±0,5	±0,5	40	60	14	2,8
SFP 1635	50	150	3000	±5	±1	±1	50	70	28	10
SFP 2650	150	300	3000	±5	±1	±1,5	40	60	100	95

SFP 1225

Ordering code example: SFP 1225 06/06

∅ d1/d2

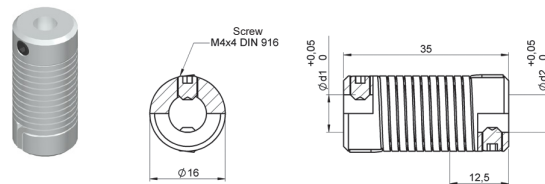


03/03
03/04
03/05
04/04
04/05
04/06
05/05
06/06

SFP 1635

Ordering code example: SFP 1635 08/08

∅ d1/d2

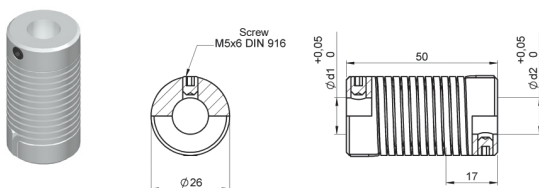


04/04
04/05
04/06
05/05
05/06
06/06
06/08
08/08

SFP 2650

Ordering code example: SFP 2650 10/12

∅ d1/d2



06/06
06/08
06/10
08/08
08/10
10/10
10/12
12/12

Printed in bold = Immediate delivery. Check with us the delivery time for the other options.
Other shaft diameter available, upon request.





BELLOW-FLEX

FLEXIBLE METAL BELLOWS COUPLINGS

- High absorption of misalignments
- Elimination of loads on the shafts due to misalignment
- No wear and tear or fatigue
- No cinematic errors in transmission
- High torsional stiffness



BELLOW-FLEX couplings are based on the use of flexible metal bellows that can transmit the moment of rotation while compensating for errors of alignment without hardly any distortion due to torsional elasticity. The characteristics of the BELLOWS-FLEX produce speed transmission of great precision, including high torque and speeds, which recommend them for servo-actions, precision

machinery, installation of control and measurement, etc.

The number of convolutions in the bellow has been chosen in the search for a compromise between the transmittable torque and the admissible misalignments.

TECHNICAL SPECIFICATIONS

	Torque max.	Clamping torque max.	Max. Speed	Admissible max. misalignment			Torsion spring stiffness	Radial spring stiffness	Weight	Inertia
	<i>Ncm</i>	<i>Ncm</i>		<i>rpm</i>	Angular	Axial				
				<i>degree</i>	<i>mm</i>	<i>mm</i>	<i>Nm/rad</i>	<i>N/mm</i>	<i>gr</i>	<i>gcm²</i>
BFP 1222	15	50	10000	±2,5	±0,4	±0,2	45	30	8	1,8
BFP 1520	40	70	10000	±3	±0,4	±0,2	90	40	6	2
BFP 1525	40	70	10000	±4	±0,5	±0,3	70	15	7	2,3
BFP 2029	120	150	10000	±4	±0,4	±0,25	150	25	15	8
BFP 2035	100	150	10000	±4	±0,5	±0,3	150	10	16	9
BFP 2533	200	80	10000	±8	±2,77	±0,46	210	29	19,5	16,1
BFA 1622	40	50	10000	±3	±0,4	±0,2	90	40	6	2,1
BFA 2129	120	100	10000	±4	±0,4	±0,25	150	25	15	9
BFA 2135	100	100	10000	±4	±0,5	±0,3	140	10	16	9,5
BFA 2435	100	100	10000	±4	±0,5	±0,3	140	10	18	15,2
BFA 2537	200	66	10000	±8	±2,77	±0,46	210	29	28,5	25,4



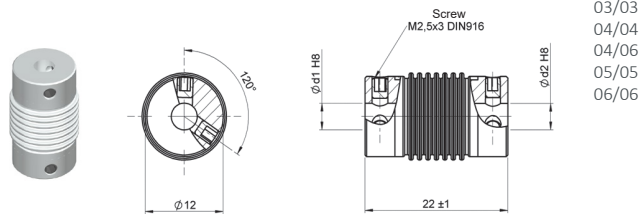
BELLOW-FLEX

FLEXIBLE METAL BELLOWS COUPLINGS

BFP 1222

Ordering code example: BFP 1222 06/06

∅ d1/d2

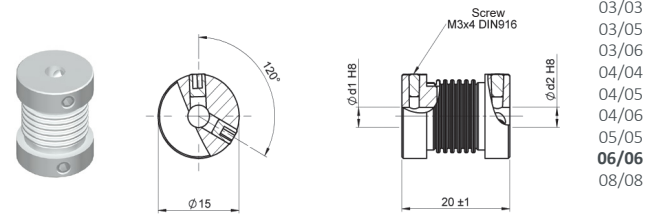


03/03
04/04
04/06
05/05
06/06

BFP 1520

Ordering code example: BFP 1520 06/06

∅ d1/d2

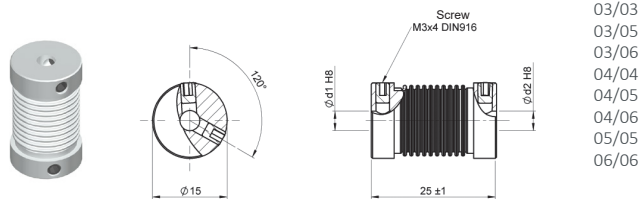


03/03
03/05
03/06
04/04
04/05
04/06
05/05
06/06
08/08

BFP 1525

Ordering code example: BFP 1525 03/03

∅ d1/d2

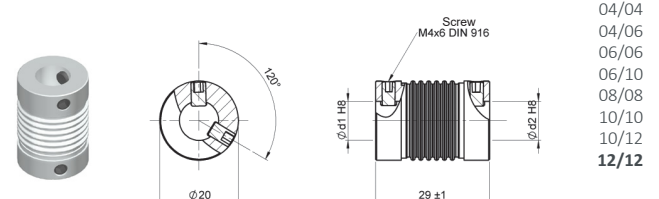


03/03
03/05
03/06
04/04
04/05
04/06
05/05
06/06

BFP 2029

Ordering code example: BFP 2029 12/12

∅ d1/d2

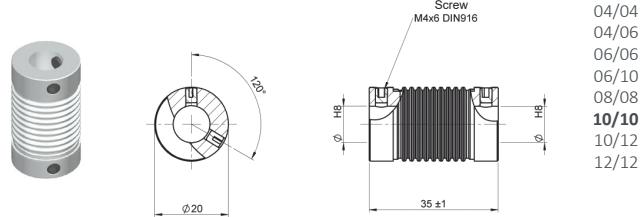


04/04
04/06
06/06
06/10
08/08
10/10
10/12
12/12

BFP 2035

Ordering code example: BFP 2035 10/10

∅ d1/d2

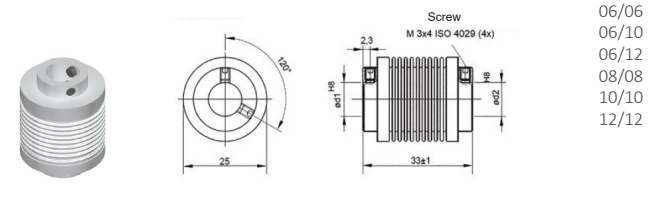


04/04
04/06
06/06
06/10
08/08
10/10
10/12
12/12

BFP 2533

Ordering code example: BFP 2533 10/10

∅ d1/d2

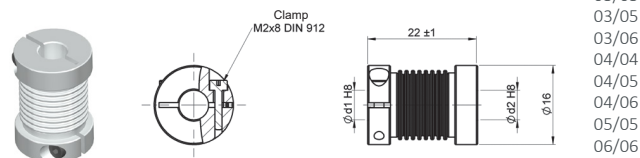


06/06
06/10
06/12
08/08
10/10
12/12

BFA 1622

Ordering code example: BFA 1622 06/06

∅ d1/d2

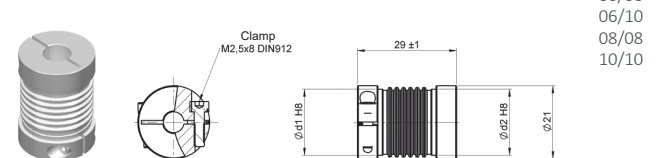


03/03
03/05
03/06
04/04
04/05
04/06
05/05
06/06

BFA 2129

Ordering code example: BFA 2129 10/10

∅ d1/d2

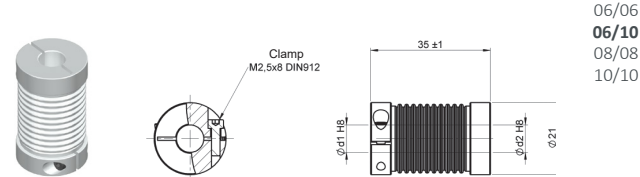


06/06
06/10
08/08
10/10

BFA 2135

Ordering code example: BFA 2135 06/10

∅ d1/d2

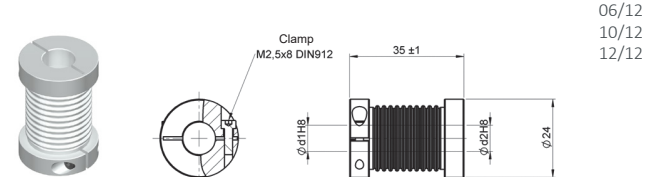


06/06
06/10
08/08
10/10

BFA 2435

Ordering code example: BFA 2435 12/12

∅ d1/d2



06/12
10/12
12/12

Printed in bold = Immediate delivery. Check with us the delivery time for the other options.
Other shaft diameter available, upon request.

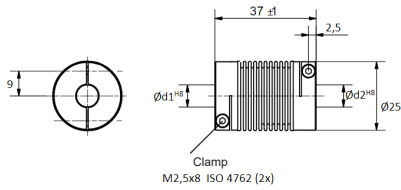
BELLOW-FLEX

FLEXIBLE METAL BELLOWS COUPLINGS

BFA 2537

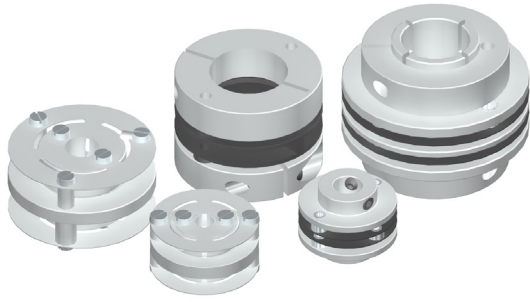
Ordering code example: BFA 2537 08/08

Ø d1/d2



06/06
06/10
08/08
10/10
12/12

Printed in bold = Immediate delivery. Check with us the delivery time for the other options.
Other shaft diameter available, upon request.



LAMI-FLEX

FLEXIBLE SHEET COUPLINGS

- Suitable for high speed
- High flexibility
- No cinematic errors in transmission
- High torsional rigidity



The LAMI-FLEX couplings are based on the use of some flexible steel or plastic membranes that pivot on the coupling, thus proportioning it a very good flexibility. The characteristics of LAMI-FLEX result in a transmission of great precision movement.

They are suitable for high rotation speeds, such as robots, machinetools, turbines, dynamometers ...

TECHNICAL SPECIFICATIONS

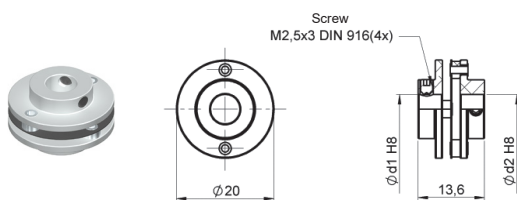
	Torque	Clamping torque	Max. Speed	Admissible max. misalignment			Torsion spring stiffness	Radial spring stiffness	Weight	Inertia	
	Ncm	Ncm		rpm	Angular	Axial					Radial
					degree	mm					mm
LFP 2014	50	60	10000	±2,5	±0,3	-	100	-	5	2,6	
LFP 2016	50	60	10000	±3	±0,4	±0,2	45	125	6	2,8	
LFA 2213	20	20	10000	±2	±0,3	±0,3	14	3	9,5	3,2	
LFA 2519	40	65	12000	±2,5	±0,4	±0,25	22	60	16	13,5	
LFA 2525	40	65	12000	±2,5	±0,4	±0,25	22	60	18	15	
LFA 3019	80	80	12000	±3	±0,4	±0,4	150	6	16	19	
LFA 3022	60	80	12000	±2,5	±0,4	±0,3	30	40	30	35	
LFA 3027	60	80	12000	±2,5	±0,4	±0,3	30	40	32	37	
LFA 3437	6,3	150	18000	2	±0,5	0,2	2500	100	75	130	
LFA 3832	400	60	8000	±2,5	±0,3	±0,3	250	220	53	82	
LFA 3850	400	60	8000	±2,5	±0,8	±0,8	250	12	63	106	
LFA 4447	15	350	14000	2	±0,6	0,25	6400	180	156	470	

LFP 2014

Ordering code example: LFP 2014 04/04

Ø d1/d2

02/02
02/04
04/04
06/06

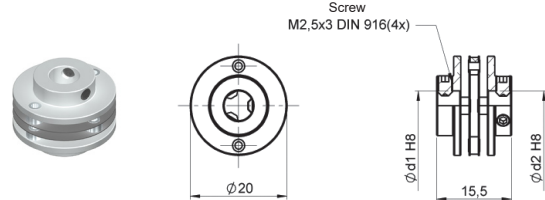


LFP 2016

Ordering code example: LFP 2016 02/04

Ø d1/d2

02/02
02/04
04/04
06/06



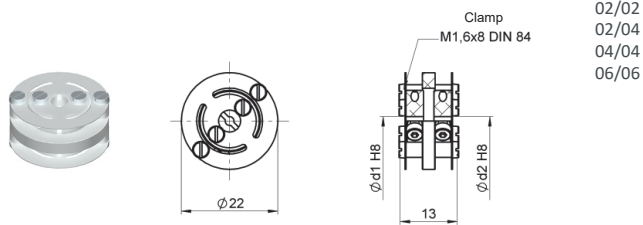
LAMI-FLEX

FLEXIBLE SHEET COUPLINGS

LFA 2213

Ordering code example: LFA 2213 04/04

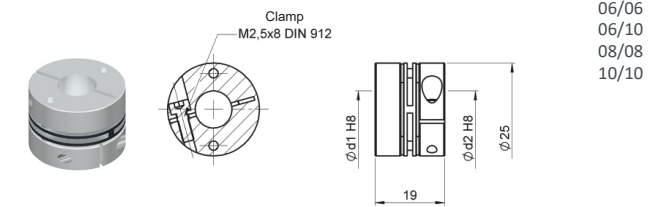
Ø d1/d2



LFA 2519

Ordering code example: LFA 2519 06/06

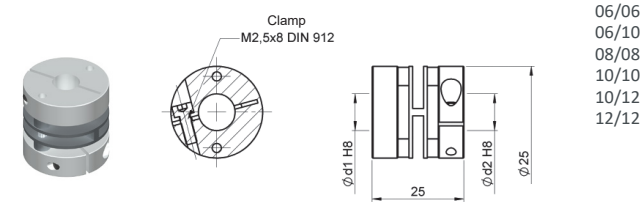
Ø d1/d2



LFA 2525

Ordering code example: LFA 2525 06/06

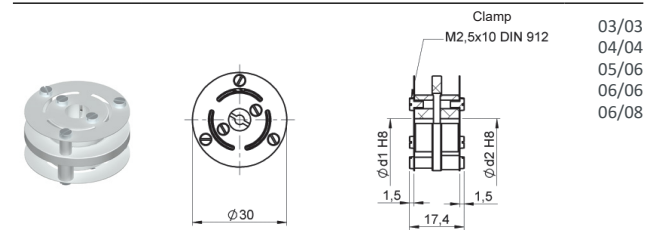
Ø d1/d2



LFA 3019

Ordering code example: LFA 3019 06/08

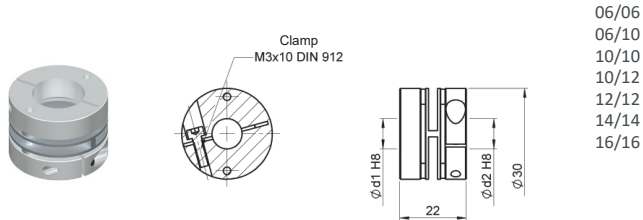
Ø d1/d2



LFA 3022

Ordering code example: LFA 3022 10/10

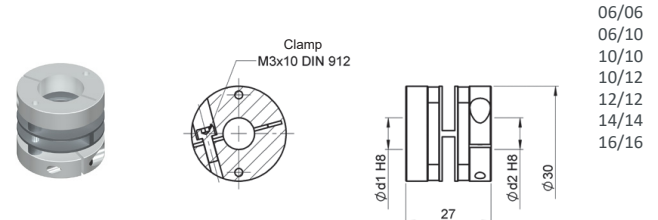
Ø d1/d2



LFA 3027

Ordering code example: LFA 3027 12/12

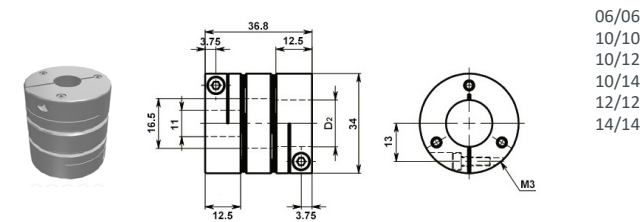
Ø d1/d2



LFA 3437

Ordering code example: LFA 3437 11/11

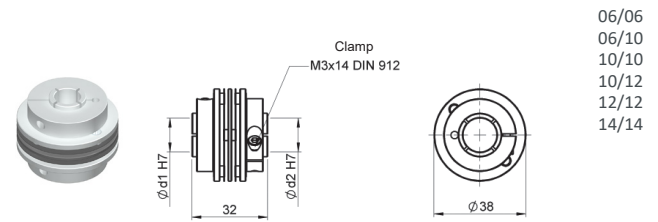
Ø d1/d2



LFA 3832

Ordering code example: LFA 3832 06/06

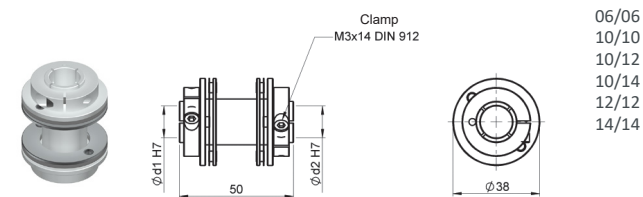
Ø d1/d2



LFA 3850

Ordering code example: LFA 3850 06/06

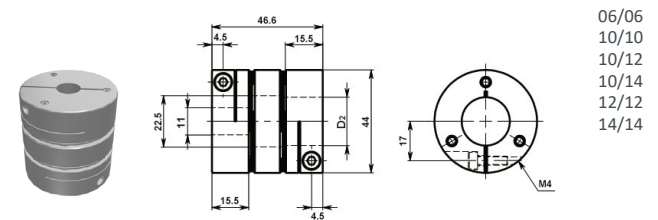
Ø d1/d2

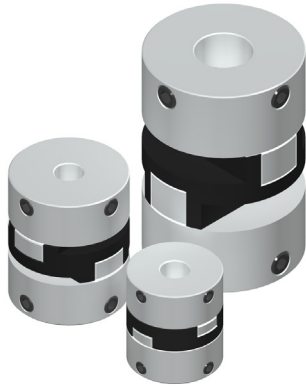


LFA 4447

Ordering code example: LFA 44470 11/11

Ø d1/d2





OLDHAM-FLEX

LATERAL SLIPPAGE COUPLINGS

- High absorption capacity of radial misalignment
- They do not produce kinematic errors in transmission
- Elimination of loads on shaft
- Mechanical protection against excessive torque
- Replaceable disc



OLDHAM-FLEX couplings are based on the use of a disc that can move radially with respect to the two shafts, which permits the compensation of large misalignment errors between them. The drums are machined from hardened aluminium alloy. The discs are manufactured from acetal with excellent mechanical properties and low friction coefficient. Due to wear, the coupling may show free-play above 10^7 revolutions under normal misalignment conditions, which can be corrected by replacing the disc. Because the OLDHAM-FLEX couplings are fitted with securing drums with drilled holes, the discs can be installed and replaced without any need to

disassemble the machines in order to separate the shafts. Radial misalignment does not produce any appreciable kinematic errors in transmission. However, angular misalignment can lead to small errors in a similar fashion to "Cardan" types of universal joints. They are suitable for positioning shaft slow drives, spindles and valves, etc. They must never be employed with cantilever or paired shafts.

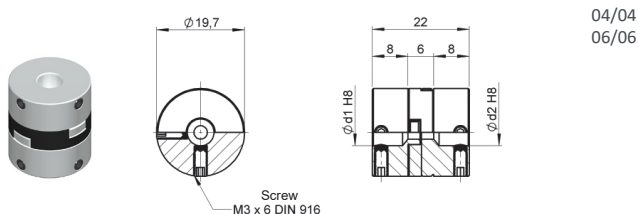
TECHNICAL SPECIFICATIONS

	Torque max. <i>Ncm</i>	Clamping torque max. <i>Ncm</i>	Max. Speed <i>rpm</i>	Admissible max. misalignment			Torsion spring stiffness <i>Nm/rad</i>	Weight <i>gr</i>	Inertia <i>gcm²</i>
				Angular <i>degree</i>	Axial <i>mm</i>	Radial <i>mm</i>			
OFP 1922	170	94	3000	±0,5	±0,1	±0,2	115	12	67
OFP 2530	400	227	3000	±0,5	±0,1	±0,2	205	31	252
OFP 3349	900	227	3000	±0,5	±0,15	±0,2	615	86	1278

OFP 1922

Ordering code example: OFP 1922 06/06

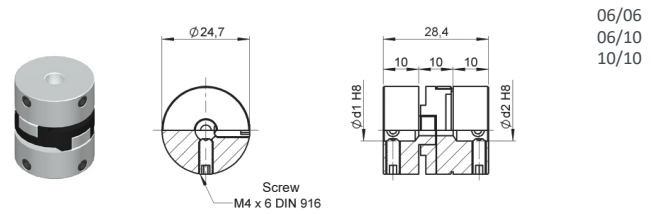
∅ d1/d2



OFP 2530

Ordering code example: OFP 2530 10/10

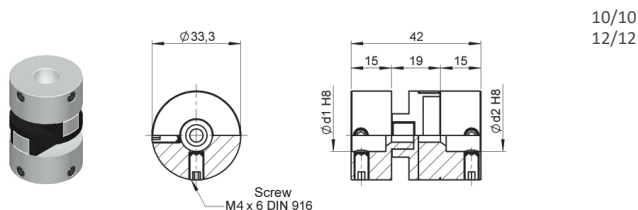
∅ d1/d2



OFP 3349

Ordering code example: OFP 3349 12/12

∅ d1/d2





PAGU-FLEX

FLEXIBLE ISOLATING COUPLING

- High precision for positioning applications
- Without wear or fatigue
- Vibration absorption
- Good torsional elasticity

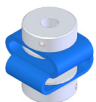


Adjuncts to a great variety of uses, the PAGU-FLEX couplings have been designed flexibly in accordance with the existing agreements for the shaft, as well as with the different requirements of the specific application cases. In the standard versions, each one of the galvanised heads (C15K material) has a cylindrical hole (H7 tolerance) and is fixed to the

shaft through a stay bolt with a hexagonal head DIN 916. The internal heads are very useful in situations with little space or reduced access.

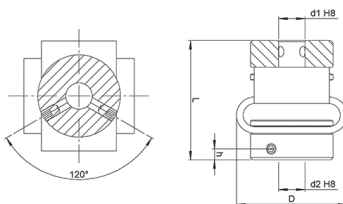
TECHNICAL SPECIFICATIONS

	Torque	Clamping torque	Max. Speed	Admissible max. misalignment			Torsion spring stiffness	Radial spring stiffness	Weight	Inertia	
	<i>Ncm</i>	<i>Ncm</i>		<i>rpm</i>	Angular	Axial					Radial
					<i>degree</i>	<i>mm</i>					<i>mm</i>
GFP 10	0,5	100	3.000	±10	±2	±2	13	13	33	41	
GFP 20	1,5	200	3.000	±10	±3	±2,5	25	15	48	104	
GFP 30	5	300	3.000	±15	±5	±5	43	9	140	220	

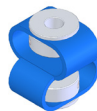


GFP 10

Ø d1/d2
06/06
08/08

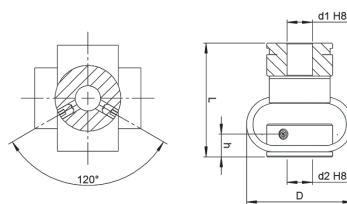


Ordering code example: GFP 10 06/06

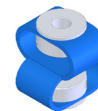


GFP 20

Ø d1/d2
10/10

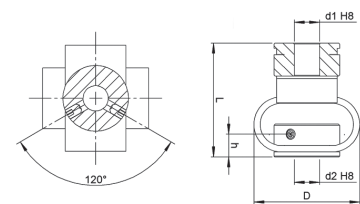


Ordering code example: GFP 20 10/10



GFP 30

Ø d1/d2
12/12
14/14

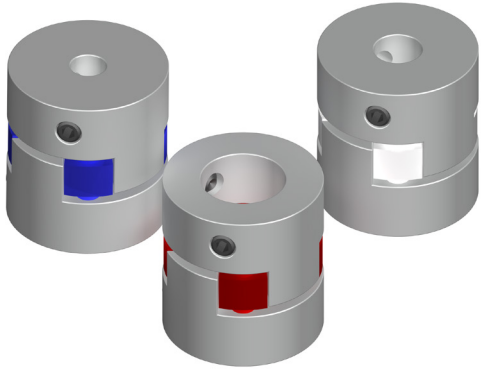


Ordering code example: GFP 30 12/12

	Symbol	10	20	30
Rotation diameter	D	29 ± 1	48 ± 1	58 ± 1
Length in the idle mode	L	29 ± 1,5	46 ± 2	52 ± 2
Height of the thread screw	h	2,5	9	11
Minimum diameter of the drill hole	d1/d2	4	8	10
Maximum permitted diameter of the standard drill hole	d1/d2	10	14	19
Hexagonal screw DIN 916		M3	M4	M5

Dimensions in mm





CROSS-FLEX

SPIDER COUPLING

- Free of cinematic errors in transmission
- Replaceable disc
- Elevated torque transmission
- Admits few misalignments



The CROSS-FLEX couplings are based on the use of a central disc. They are recommended for applications with some of the torque transmissions and with little misalignments.

With the use of the CROSS-FLEX couplings, the angular misalignments may lead to small errors. Radial misalignment does not produce any appreciable kinematic errors in transmission. Wear is minimum.

TECHNICAL SPECIFICATIONS

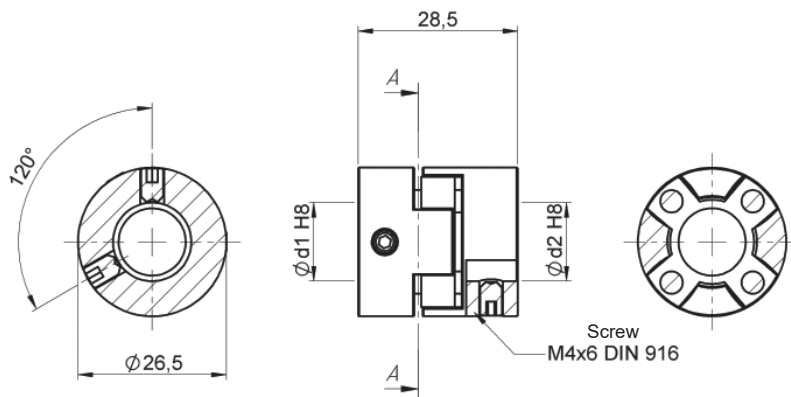
	Torque max.	Clamping torque max.	Max. Speed	Admissible max. misalignment			Hardness	Max. Torsion torque	Weight	Inertia
	<i>Ncm</i>	<i>Ncm</i>		<i>rpm</i>	Angular	Axial				
				<i>degree</i>	<i>mm</i>	<i>mm</i>	<i>shore hardness</i>	<i>degree</i>	<i>gr</i>	<i>gcm²</i>
CFP 80	800	150	19000	±1,3	±1	±0,22	80 (blue)	10	34	30
CFP 92	1500	150	19000	±1,3	±1	±0,22	92 (white)	10	34	30
CFP 98	2500	150	19000	±1,3	±1	±0,22	98 (red)	10	34	30

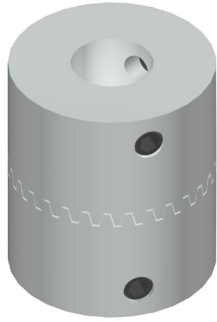
CFP 80 - CFP 92 - CFP 98

Ordering code example: CFP 98 06/06

Ø d1/d2

04/04
06/06
08/08
10/10
12/12
14/14





UNION

RIGID COUPLING

- High rigidity
- Free of cinematic errors in transmission
- Very little misalignment absorption
- Easy assembly, disassembly and adjustment



The UNION couplings are simple rigid couplings of two tooled steel pieces. They are apt for transmissions that require elevated torques and where there are no misalignments between the shafts.

In the case of these couplings, the angular misalignments may lead to small errors. They are suitable for positioning shaft slow drives.

TECHNICAL SPECIFICATIONS

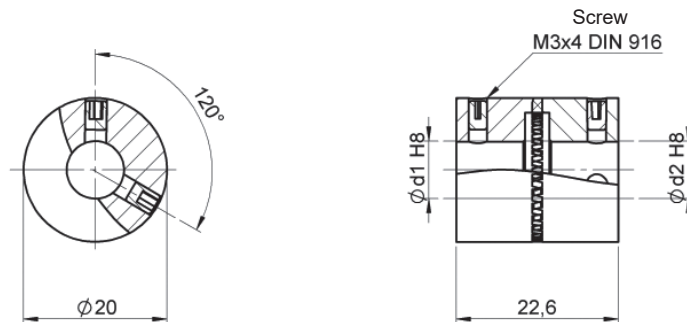
Torque	Clamping torque	Max. Speed	Admissible max. misalignment			Module	Radial spring stiffness	Weight	Inertia	
			Angular	Axial	Radial					
<i>Ncm</i>	<i>Ncm</i>	<i>rpm</i>	<i>degree</i>	<i>mm</i>	<i>mm</i>	<i>mm</i>	<i>N/mm</i>	<i>gr</i>	<i>gcm²</i>	
UFP 2022	200	80	8000	±0,5	-	-	0,7	-	42	26

UFP 2022

Ordering code example: UFP 2022 06/06

Ø d1/d2

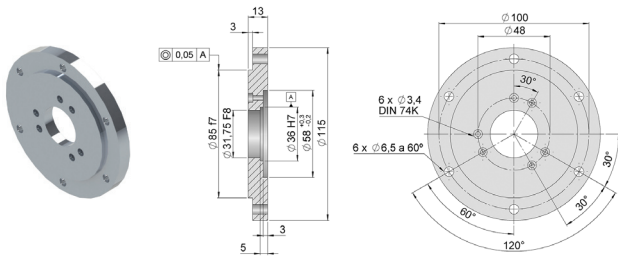
06/06
06/08
06/10
08/08
10/10



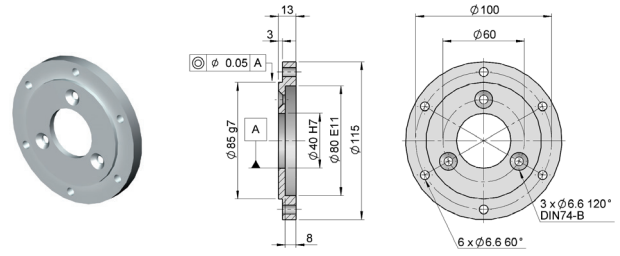
FLANGES

STANDARD FLANGES

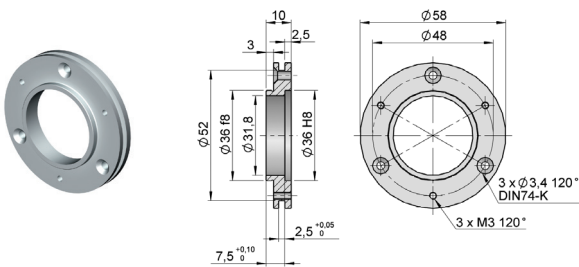
90.1006



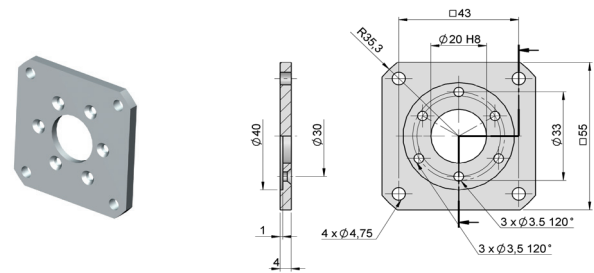
90.1008



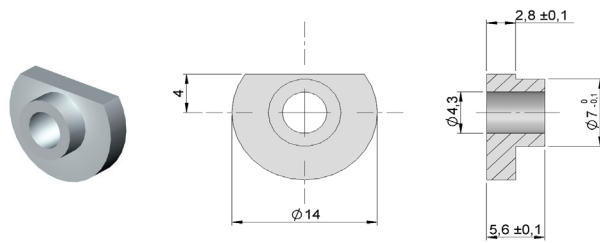
90.1015



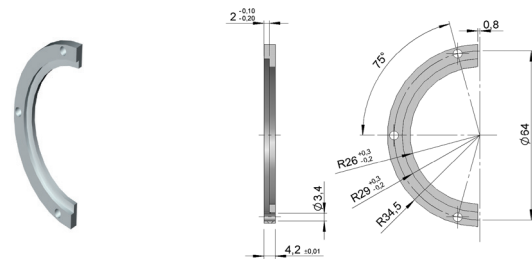
90.1057

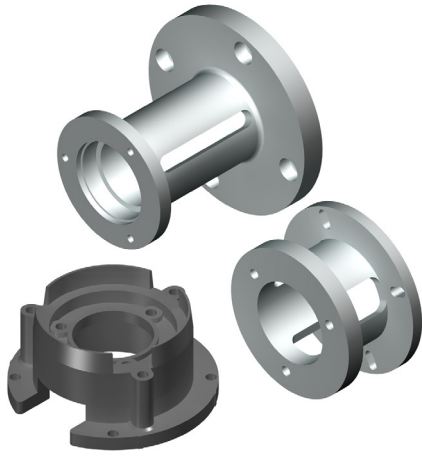


90.1103



90.1105



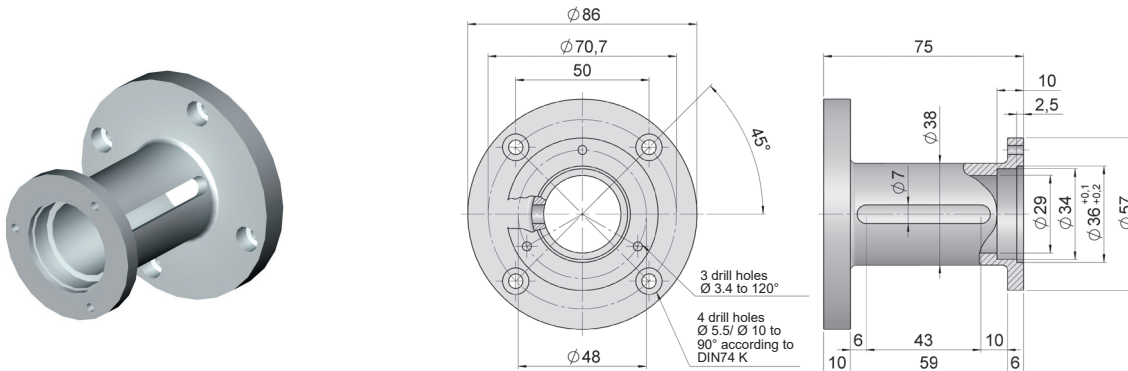


COUPLING BELLS

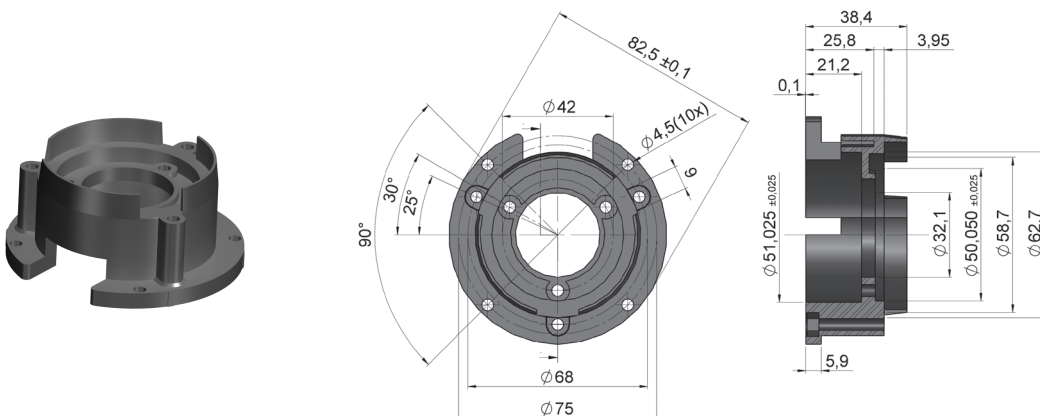


Code	Appropriate series	Suitable securing screws
90.1600	10, 20, 11, CM10, CS10	3 M3 x 6 DIN84, DIN85, DIN7985, DIN7984
90.1608	10, 20, 11, CM10, CS10	3 M3 x 8 DIN84, DIN85, DIN7985, DIN7984
90.1609	10, 20, 11, CM10, CS10	3 M3 x 6 DIN84, DIN85, DIN7985, DIN7984

90.1600

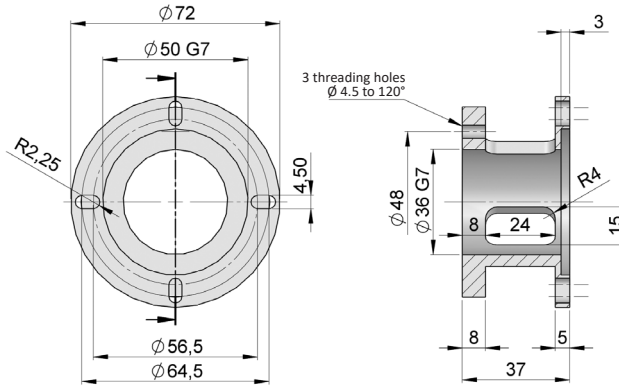
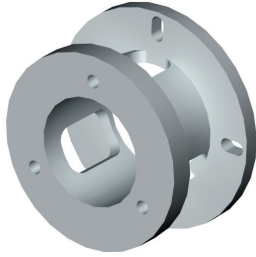


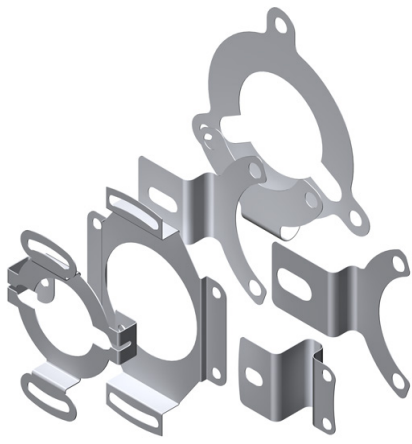
90.1608



COUPLING BELLS

90.1609





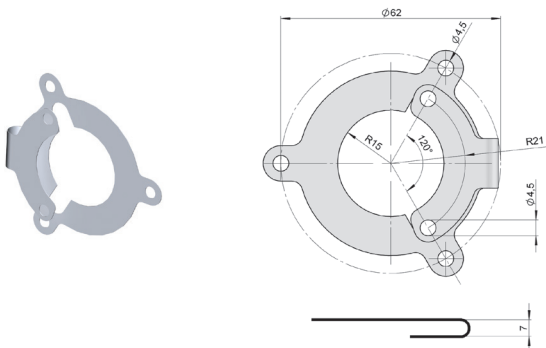
ANTI-ROTATION SYSTEM

FLEXIBLE ANTI-ROTATION SYSTEM

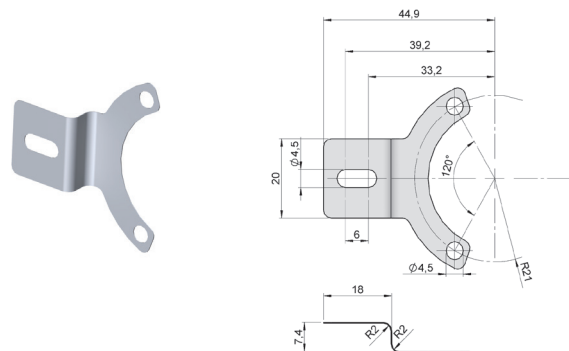


Code	Appropriate series	Fixation screws
90.1014	19, 59	5 M4 x 6 DIN912, DIN84
90.1018	19, 59	3 M4 x 6 DIN912, DIN84
90.1020	19, 59	3 M4 x 6 DIN912, DIN84
90.1024	19, 59	3 M4 x 6 DIN912, DIN84
90.1025	77, 80	5 M4 x 6 DIN912, DIN84
90.1027	19, 59	6 M4 x 6 DIN912, DIN84

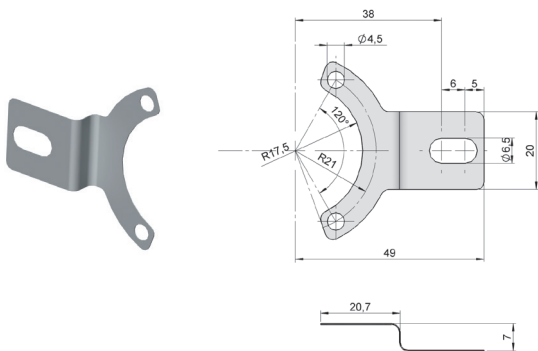
90.1014



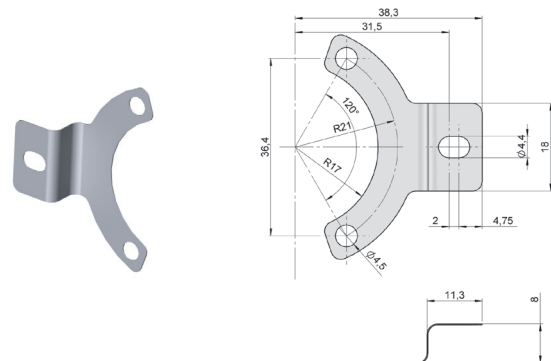
90.1018



90.1020



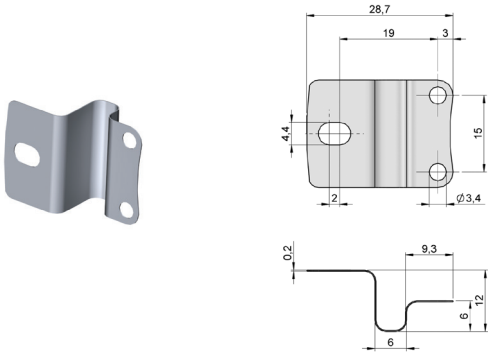
90.1024



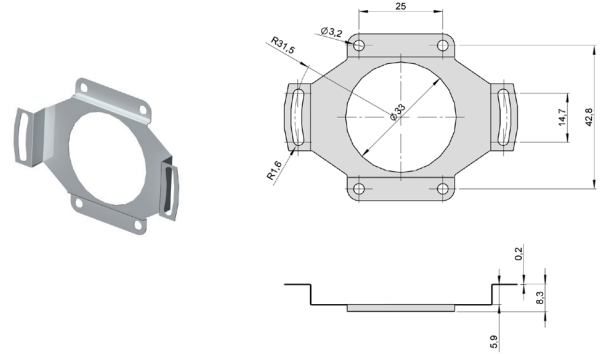
ANTI-ROTATION SYSTEM

FLEXIBLE ANTI-ROTATION SYSTEM

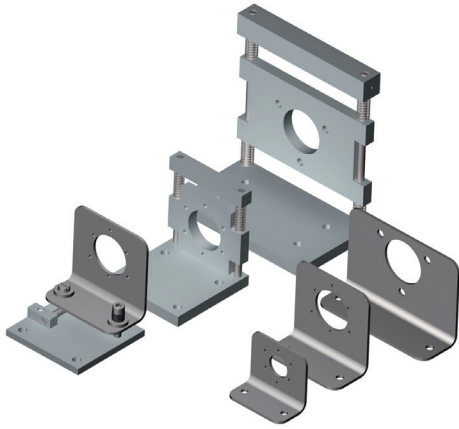
90.1025



90.1027

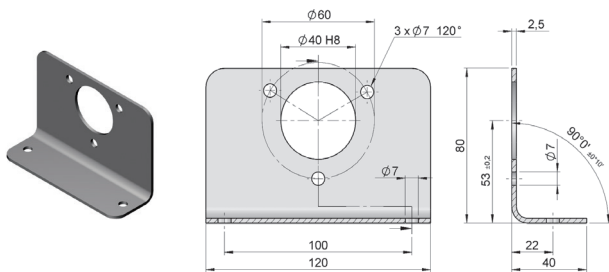


SUPPORT ANGLES

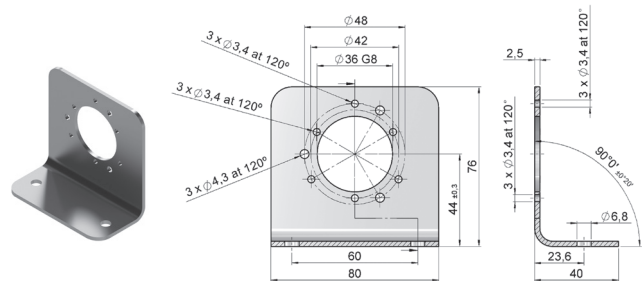


Reference	Series
RIGID ANGLES	
90.1201	30, CS30, CM30
90.1207	10, 10K, 11, 20, 58, PR90, SMRS 10, CS10, CM10
90.1208	21, 36

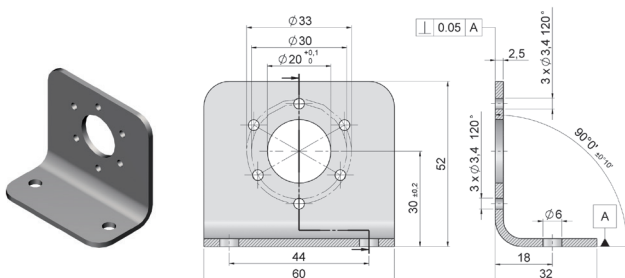
90.1201



90.1207



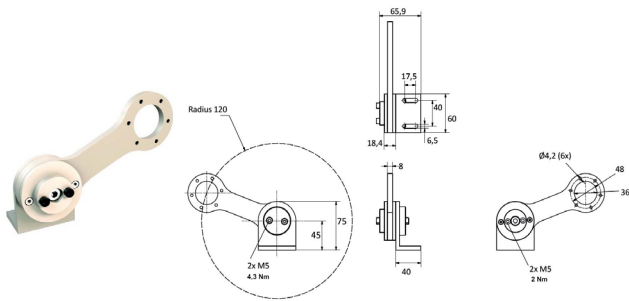
90.1208



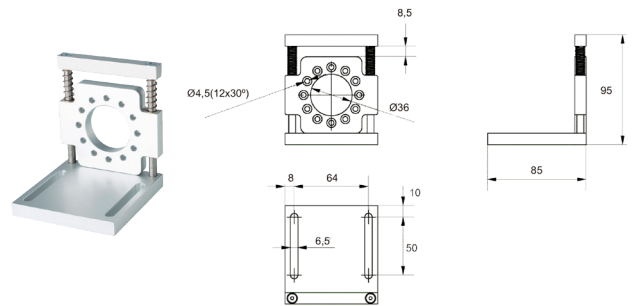
SUPPORT ANGLES

Reference	Series
FLEXIBLE ANGLES	
90.1202	10, 20, 11, PR90, SMRS 10, CS10, CM10
90.1204	10, 20, 11, PR90, SMRS 10, CS10, CM10
90.1205	30, CS30, CM30
90.1206	10, 20, 11, 58, CS10, CM10

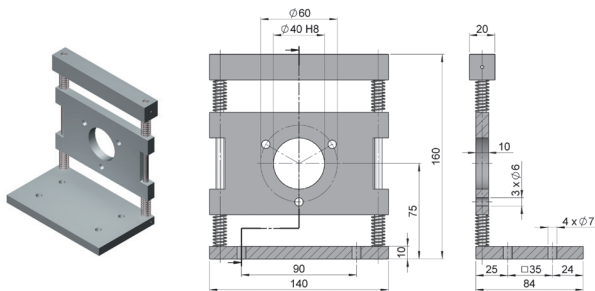
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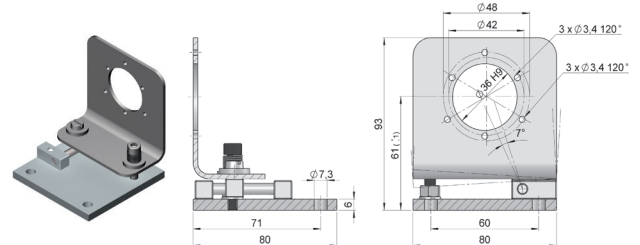
90.1204

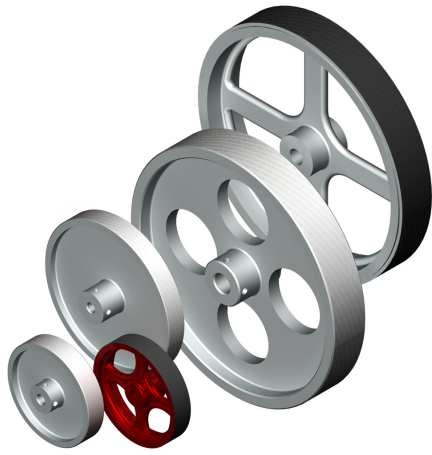


90.1205



90.1206





MEASURING WHEELS



TECHNICAL SPECIFICATIONS

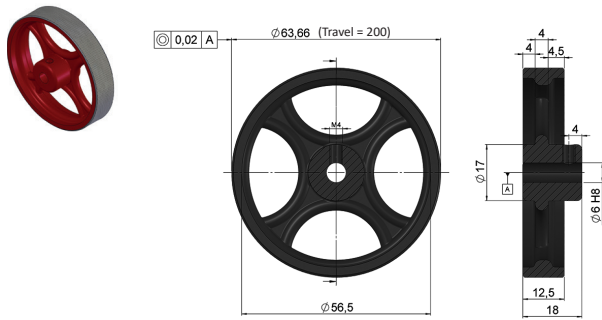
	Type	Travel <i>mm</i>	Diameter Ø D <i>mm</i>	Shaft* Ø d <i>mm</i>	Width B <i>mm</i>	M (DIN 916)
90.9101	Knurled aluminium	200	63,66	6	12	M4 x 6
90.9102	Knurled aluminium	305	97,08	10	12	M5 x 6
90.9103	Knurled aluminium	500	159,15	10	25	M5 x 6
90.9107	Smooth polyurethane	500	159,15	10	25	M5
90.9108	Smooth polyurethane	200	63,66	6	12	M4 x 6
90.9110	Knurled aluminium	200	63,66	6	12	M4 x 6
90.9111	Rubber	200	63,66	6	12	M4 x 6
90.9112	Studded polyurethane	200	63,66	6	12	M4 x 6
90.9113	Rubber	500	159,15	10	25	M5 x 6
90.9114	Corrugated polyurethane	500	159,15	10	25	M5
90.9115	Corrugated polyurethane	200	63,66	6	12	M4 x 6
90.9122	Smooth polyurethane	305	97,08	10	12	M5 x 6
90.9123	Studded polyurethane	305	97,08	10	12	M5 x 6
90.9124	Corrugated polyurethane	305	97,08	10	12	M5 x 6
90.9150	Studded polyurethane	500	159,15	10	25	M5
90.9175	Knurled aluminium	500	159,15	10	25	M5

(*) Other shaft diameter available. For example code for wheel 90.9113 with 6 mm shaft: 90.9113.6

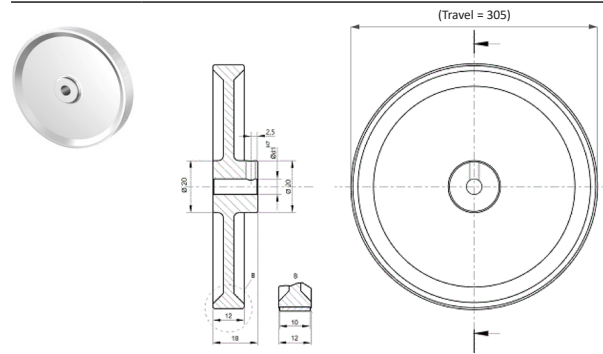


MEASURING WHEELS

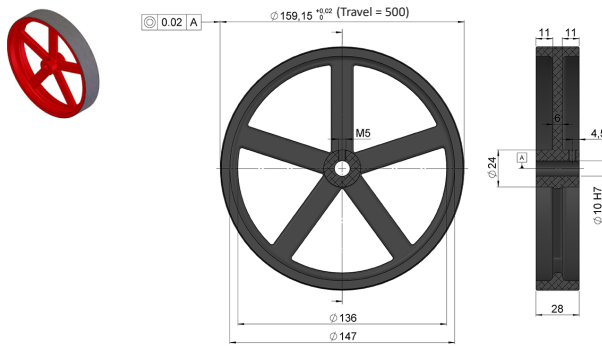
90.9101



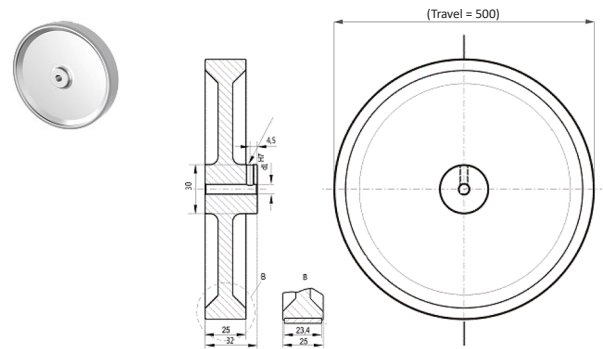
90.9102



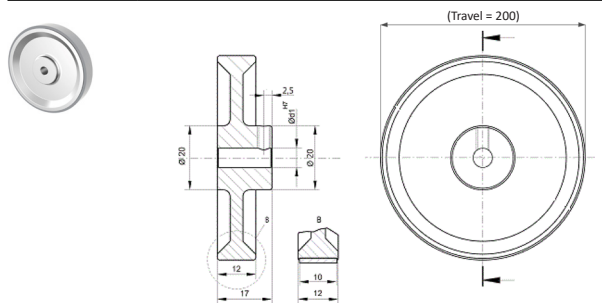
90.9103



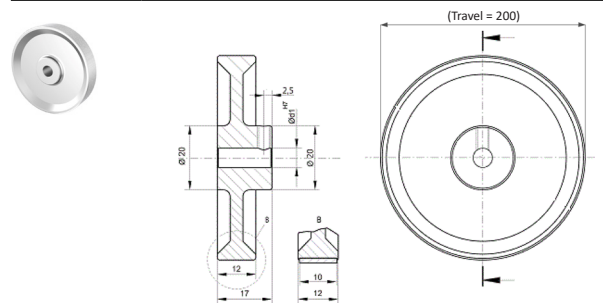
90.9107



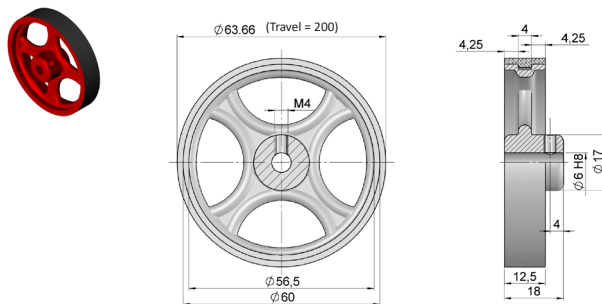
90.9108



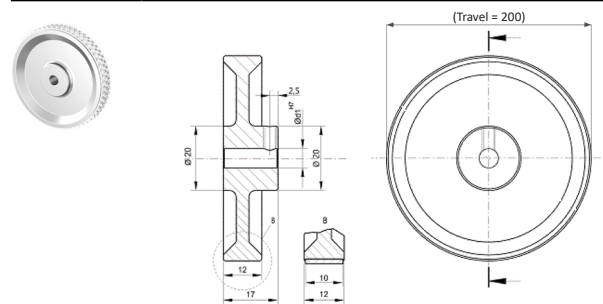
90.9110



90.9111

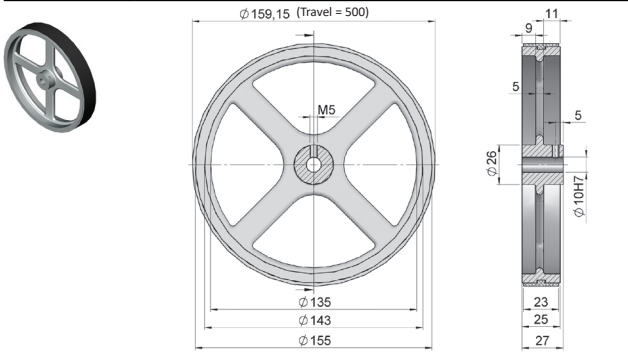


90.9112

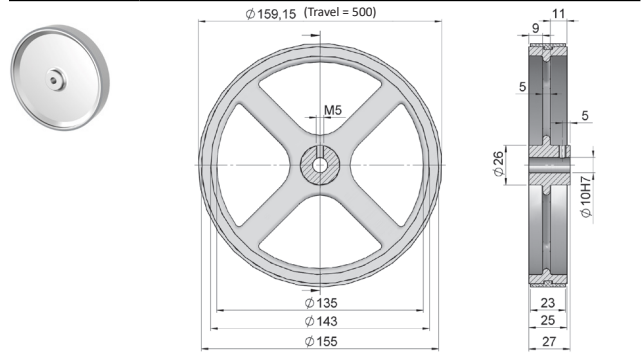


MEASURING WHEELS

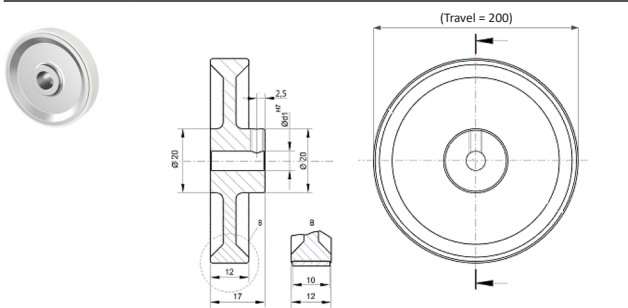
90.9113



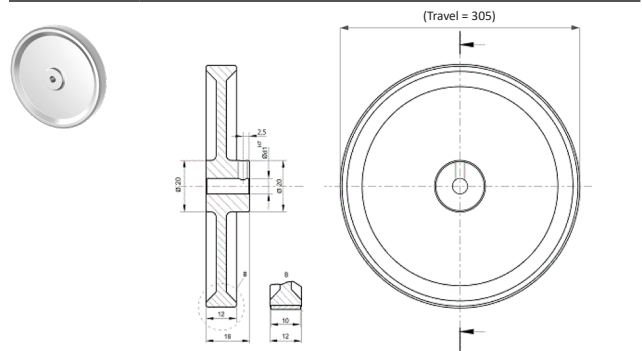
90.9114



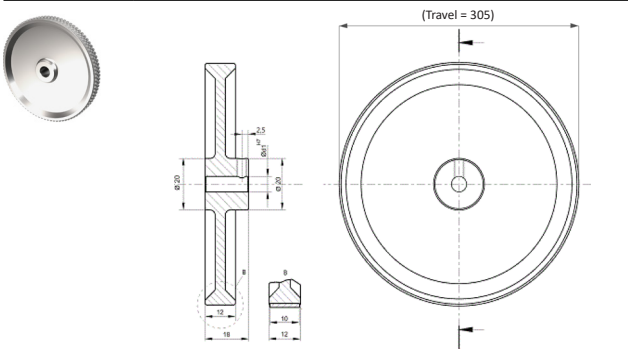
90.9115



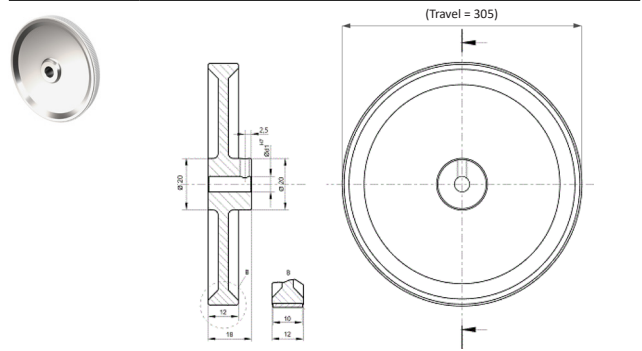
90.9122



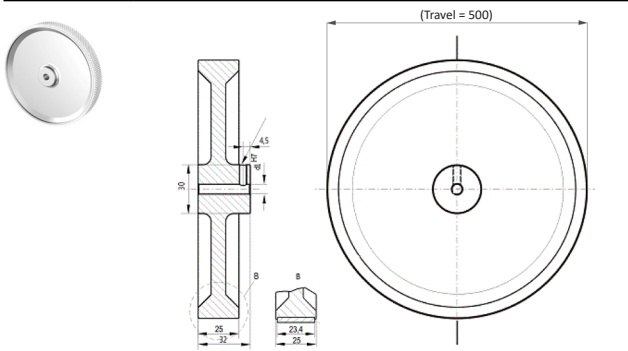
90.9123



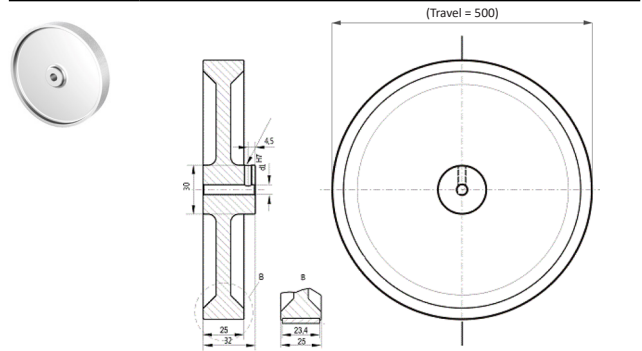
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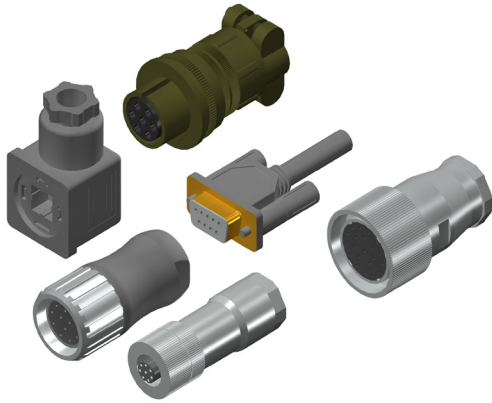
90.9150



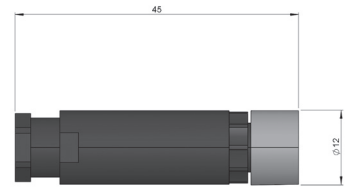
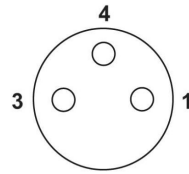
90.9175



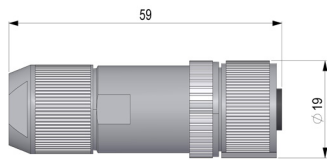
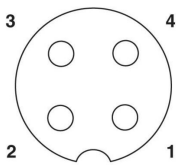
CONNECTORS



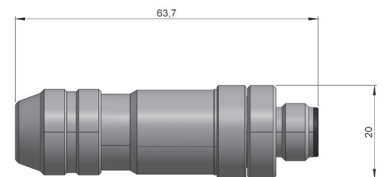
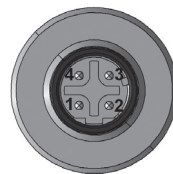
95.0007179
M8 3p



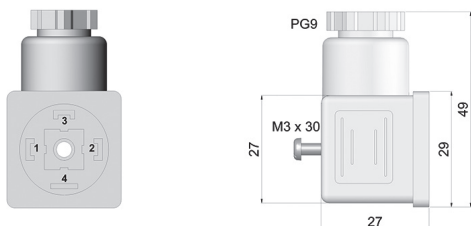
95.0007076
M12 4p CW



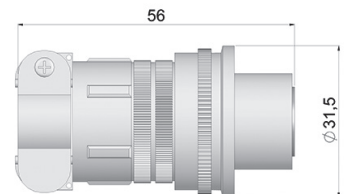
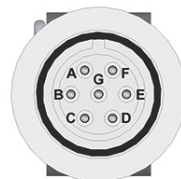
95.0007077
M12 4p CCW



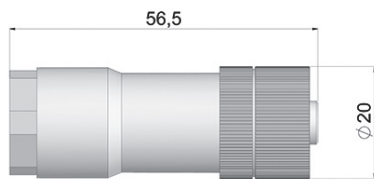
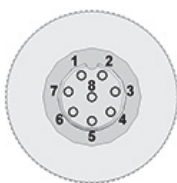
95.0007011
DIN 43650



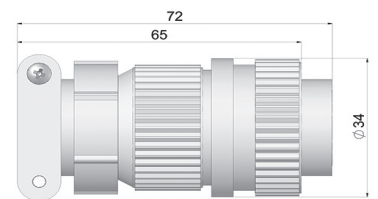
90.9507H
Militar 7p CCW



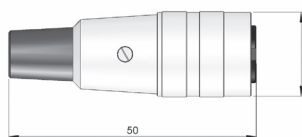
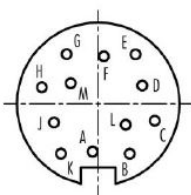
95.0007152
M12 8p CW



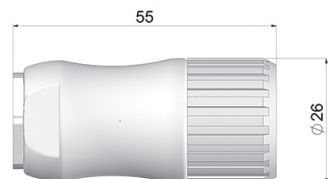
90.9510H
Militar 10p CCW



95.0007149
M16 12p CCW



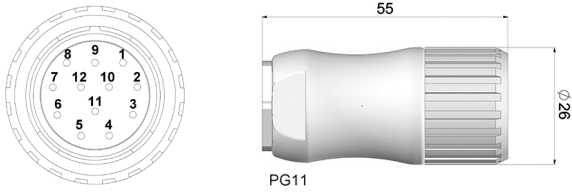
95.0007131
M23 12p CCW



CONNECTORS

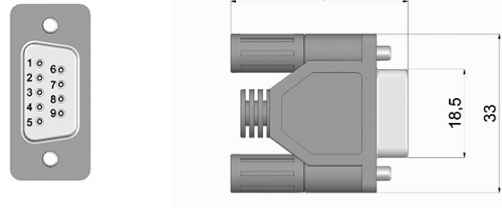
95.0007137

M23 12p CW



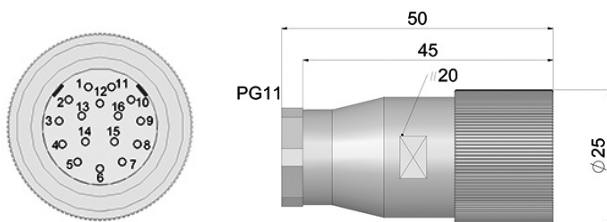
90.9589H

D-Sub 9p



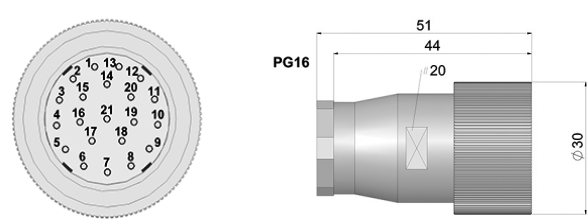
95.0007006

M23 16p CCW



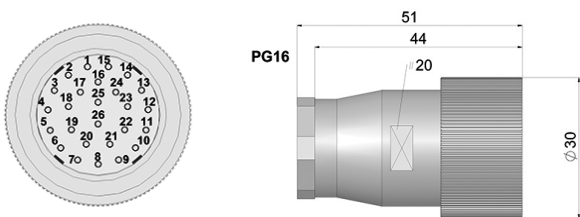
95.0007062

21p CCW



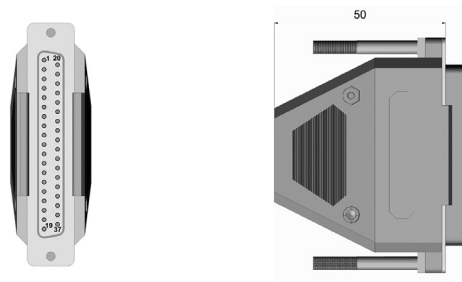
95.0007063

26p CCW



90.9537H

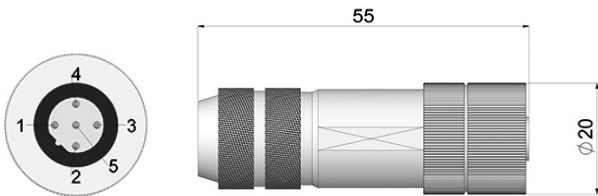
37p



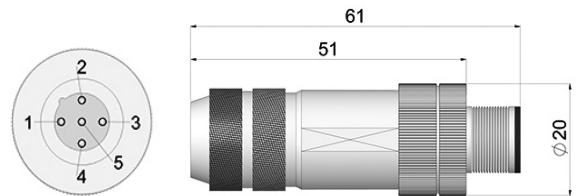
CONNECTORS

PROFIBUS CONNECTORS

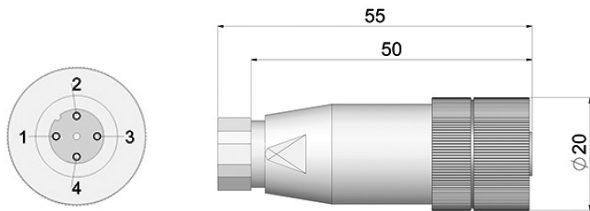
90.9552
M12 5p



90.9553
M12 5p

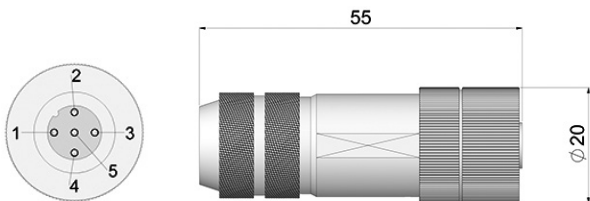


90.9554
M12 4p CW

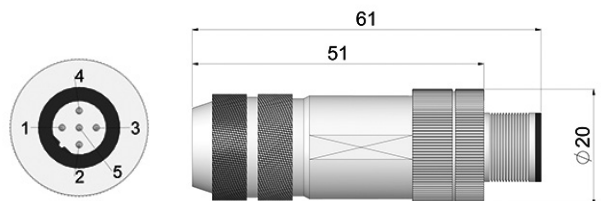


DEVICENET/CANOPEN CONNECTORS

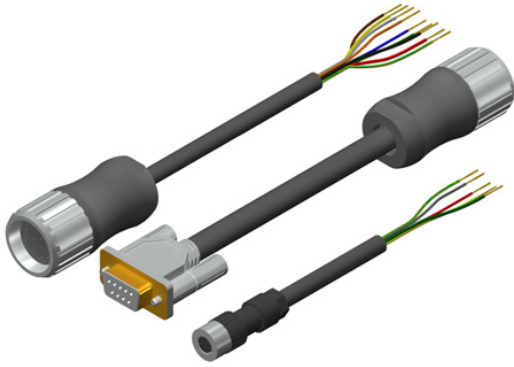
90.9550
M12 5p



90.9551
M12 5p



PRE-ASSEMBLED CABLES



- Compatible with Hohner encoders
- Reduces the possibility of wiring errors
- Eliminates risks of short-circuits
- Saves on installation time



Connector 95.0007011



Composed of:
Cable 5x0,14
Female connector type DIN 43650 4p

REF: 89.001.01.000.XX
length

Connector 95.0007152



Composed of:
Cable 3x2x0,14+2x0,34
Female connector M12 8p CW

REF: 89.003.02.000.XX
length

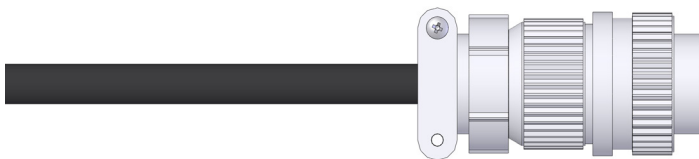
Connector 90.9507H



Composed of:
Cable 5x0,14
Female connector type militar 7p CCW

REF: 89.002.01.000.XX
length

Connector 90.9510H



Composed of:
Cable 3x2x0,14+2x0,34
Female connector type militar 10p
CCW

REF: 89.004.02.000.XX
length

Connector 95.0007131



Composed of:
Cable 3x2x0,14+2x0,34
Female connector M23 12p CCW

REF: 89.005.02.000.XX
length



PRE-ASSEMBLED CABLES

Connector 95.0007137



Composed of:
Cable 3x2x0,14+2x0,34
Female connector M23 12p CW

REF: 89.010.02.015.XX
length

Connector 95.0007149



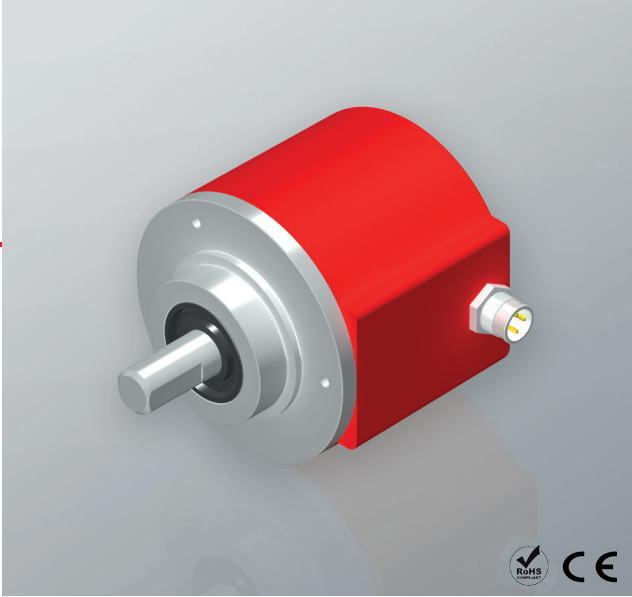
Composed of:
Cable 6x2x0,14
Female connector M16 12p CCW

REF: 89.036.010.051.XX
length

Cable length available: 2, 4, 6, 8, 10, 20 and 30 meters



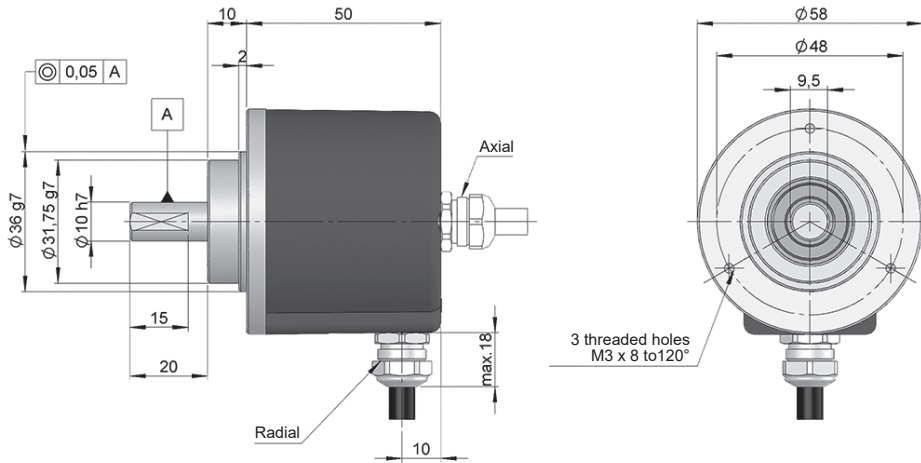
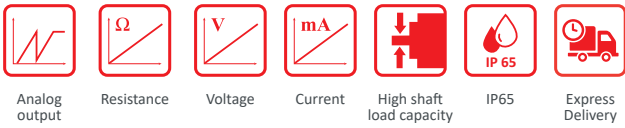
Other pre-assembled cables available.
Special cables available



SERIE POT10

SOLID SHAFT ANGULAR SENSOR FOR INDUSTRIAL APPLICATIONS

- External diameter 58 mm
- Shaft \varnothing 6 or 10 mm
- Protection class IP65 according to DIN EN 60529
- Measuring range 360°/ 3600°/ 7200°
- Current, voltage or resistance output
- Connection by cable (other cable length available) or industrial connector M8
- Measuring system using accuracy potentiometer



Drawing shaft type 1, connection type 1/2, without flange

REFERENCE Reference example: POT10-1134-3600

Serie	Shaft	Flange	Connection	Electronic output	Measuring range	Special customer
POT10 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	1. \varnothing 10x20 mm 2. \varnothing 6x10 mm	1. None	1. Axial cable 2. Radial cable 3. Radial M8 3p	1. 1 k Ω 2. 10 k Ω 3. 0..10 v 4. 4...20 mA	180. 180° (1/2 turn) 360. 360° (1 turn) 1800. 1800° (5 turns) 3600. 3600° (10 turns) 7200. 7200° (20 turns)	

Order your reference
Step file 3D

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service available in 24 h



SERIE POT10

SOLID SHAFT ANGULAR SENSOR FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

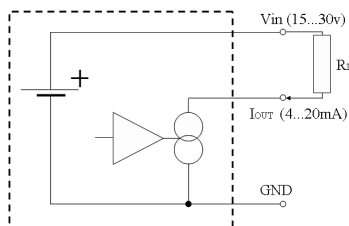
Materials	Cover: Zamak Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	50 rpm (180°, 1800°) 100 rpm (360°, 3600°) 200 rpm (7200°)
Protection against dust and splashes according to DIN EN 60529	IP65
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Output	Potentiometer, Analog output.
Weight aprox.	0,4 Kg
Operating temperature range	-20°C to +85°C
Direction	Clockwise (CW)
Axial or radial connection	2 meters cable or industrial connector M8 (other cable lengths available on order) Female connector not included

ELECTRICAL SPECIFICATIONS

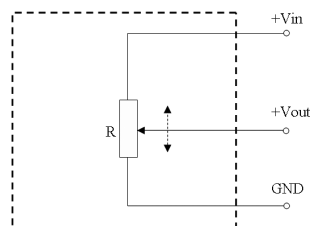
	1 kΩ or 10 kΩ 1turn	1 kΩ or 10 kΩ 10 turns	0..10v	4..20mA
Reference code	1 or 2	1 or 2	3	4
Voltage supply	30 VDC max	30 VDC max	15...30 VDC	15...30 VDC
Accuracy	± 15%	± 5%	± 0,3%	± 0,3%
Linearity	± 2%	± 0,25%	± 0,5%	± 0,5%
Thermal coefficient	± 50ppm/C°	± 50ppm/C°	± 50ppm/C°	± 50ppm/C°
Load	1w max	2w max	5 kΩ min	600 Ω max

OUTPUT SIGNALS

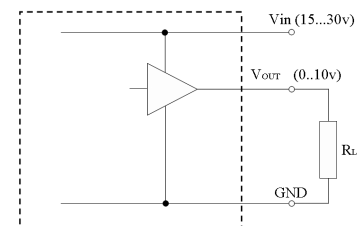
Current



Resistive



Voltage



SERIE POT10

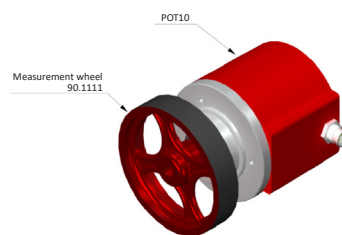
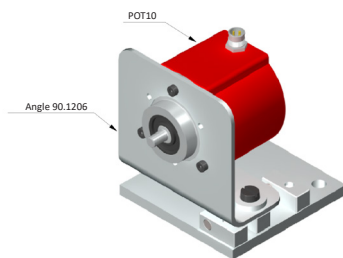
SOLID SHAFT ANGULAR SENSOR FOR INDUSTRIAL APPLICATIONS

CONNECTION

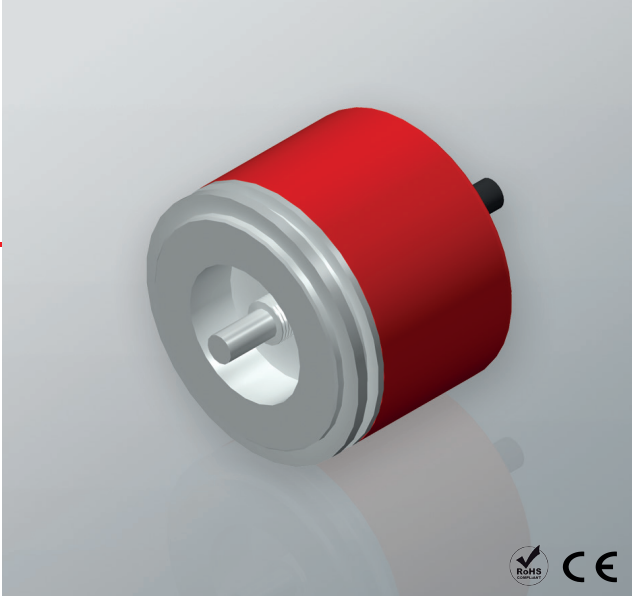


<i>Current</i>	<i>Resistive</i>	<i>Voltage</i>	Cable 5x0,14 95.0008051	Connector M8 3p
GND	GND	GND	Yellow	1
Vin	Vin	Vin	White	2
Iout	Vout	Vout	Brown	3

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".



SERIE POT20

SOLID SHAFT ANGULAR SENSOR FOR INDUSTRIAL APPLICATIONS

- External diameter 58 mm
- Shaft \varnothing 6,35 mm
- Protection class IP54 according to DIN EN 60529
- Measuring range 10 turns
- Output resistance 5k or 10k
- Connection by cable (other cable length available) or industrial connector
- Measuring system using accuracy potentiometer



Analog output



Resistance

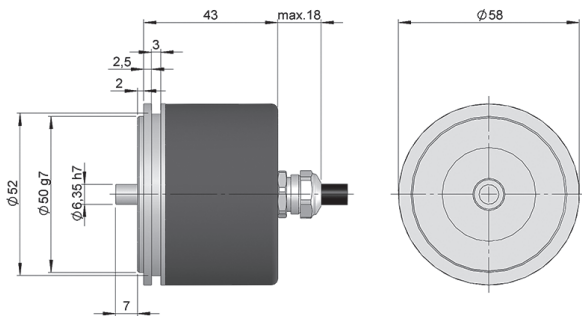


IP54



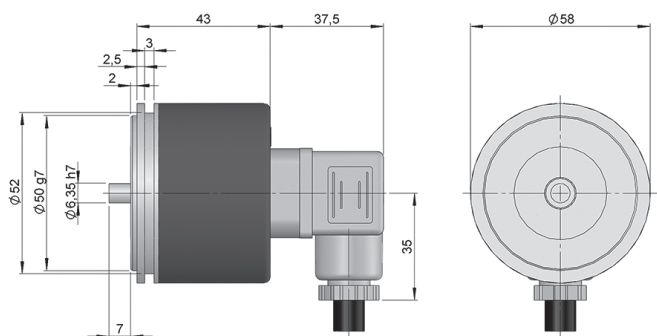
Express Delivery

Axial cable



Drawing shaft type 1, connection type 1, without flange

Connector Axial 4p



Drawing shaft type 1, connection type 2, without flange

REFERENCE

Reference example: POT20-1112-3600

Serie	Shaft	Flange	Connection	Electronic output	Measuring range	Special customer
POT20 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	1. \varnothing 6,35 mm	1. None	1. Axial cable 2. Axial 4p	1. 5 k Ω 2. 10 k Ω	3600. 3600° (10 turns)	

Order your reference
Step file 3D

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service available in 24 h



SERIE POT20

SOLID SHAFT ANGULAR SENSOR FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

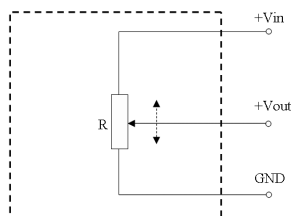
Materials	Cover: PA 6.6 Housing: Aluminium Shaft: Nickel plated brass
Bearings lifetime	1x10 ⁶ rev.
Maximum number of revolutions permitted mechanically	100 rpm
Protection against dust and splashes according to DIN EN 60529	IP54
Starting torque at 20°C (68°F)	≤ 0,01 Nm
Output	Resistive
Weight aprox.	0,4 Kg
Operating temperature range	-20°C to +85°C
Direction	Clockwise (CW)
Axial or radial connection	2 meters cable or industrial connector (other cable lengths available on order) Female connector not included

ELECTRICAL SPECIFICATIONS

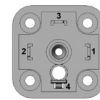
	5 kΩ 10 turns	10 kΩ 10 turns
Reference code	1	2
Voltage supply	30 VDC max	30 VDC max
Output tolerance	± 5%	± 5%
Resolution	± 0,025%	± 0,02%
Thermal coefficient	± 50ppm/C°	± 50ppm/C°
Load	1w max	1w max
Linearity	± 0,25%	± 0,25%

OUTPUT SIGNALS

Resistive



CONNECTION

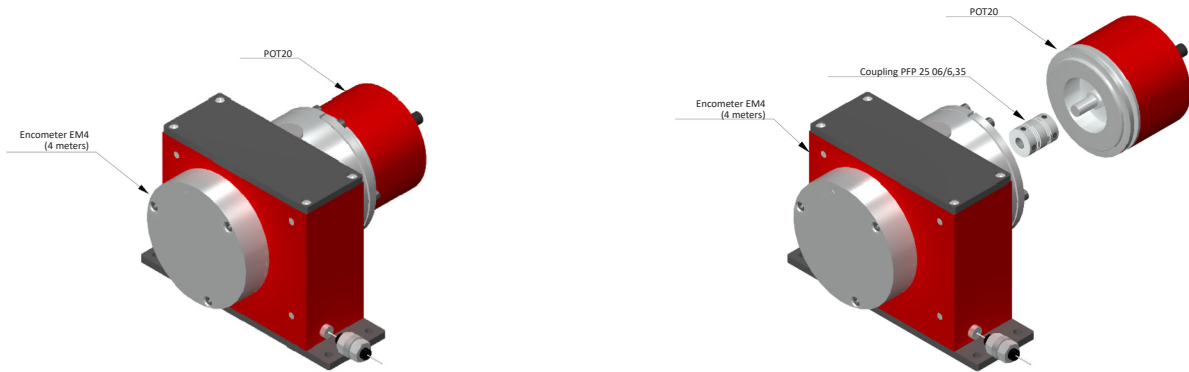


Resistive	Cable 5x0,14 95.0008051	Connector DIN 43650 4p
GND	Yellow	1
Vin	White	2
Vout	Brown	3

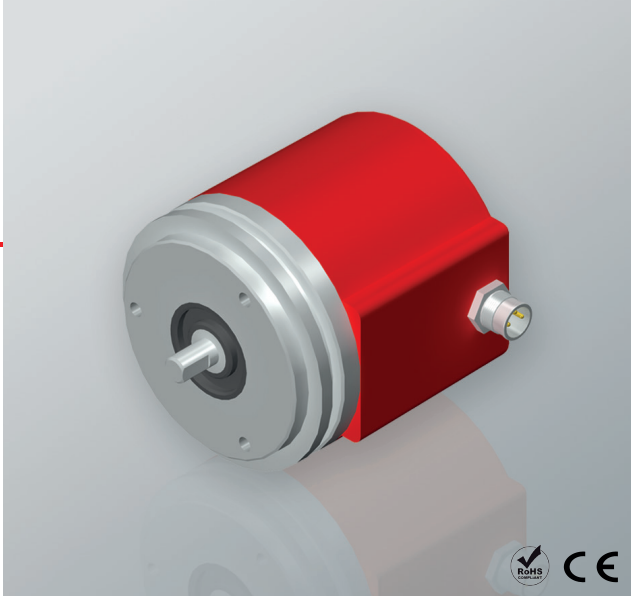
SERIE POT20

SOLID SHAFT ANGULAR SENSOR FOR INDUSTRIAL APPLICATIONS

ACCESSORIES EXAMPLES



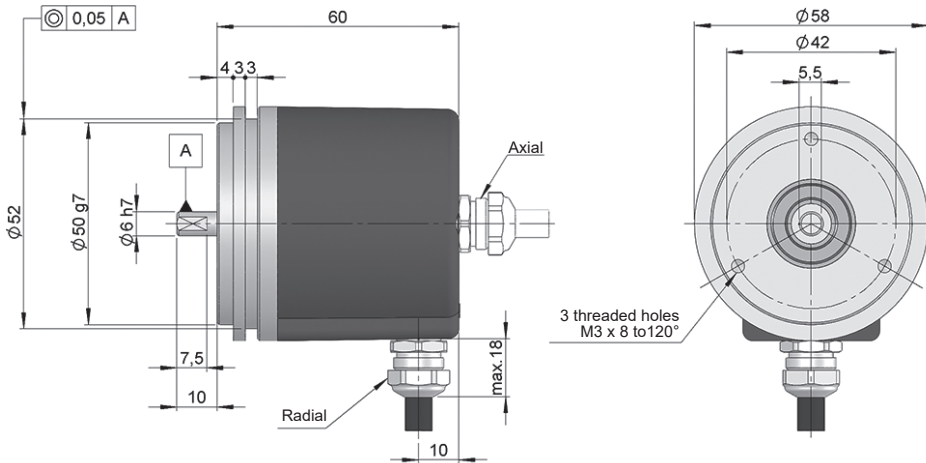
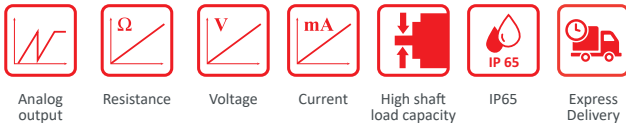
All the accessories available in the section "MOUNTING ACCESSORIES".



SERIE POT58

SOLID SHAFT ANGULAR SENSOR FOR INDUSTRIAL APPLICATIONS

- External diameter 58 mm
- Shaft \varnothing 6 or 10 mm
- Protection class IP65 according to DIN EN 60529
- Measuring range 360°/ 3600°/ 7200°
- Current, voltage or resistance output
- Connection by cable (other cable length available) or industrial connector M8
- Measuring system using accuracy potentiometer



Drawing shaft type 2, connection type 1/2, without flange

REFERENCE

Reference example: POT58-1134-3600

Serie	Shaft	Flange	Connection	Electronic output	Measuring range	Special customer
POT58 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> -	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
	1. \varnothing 10x20 mm 2. \varnothing 6x10 mm	1. None	1. Axial cable 2. Radial cable 3. Radial M8 3p	1. 1 k Ω 2. 10 k Ω 3. 0..10 v 4. 4...20 mA	180. 180° (1/2 turn) 360. 360° (1 turn) 1800. 1800° (5 turns) 3600. 3600° (10 turns) 7200. 7200° (20 turns)	

Order your reference
Step file 3D

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SERIE POT58

SOLID SHAFT ANGULAR SENSOR FOR INDUSTRIAL APPLICATIONS

MECHANICAL SPECIFICATIONS

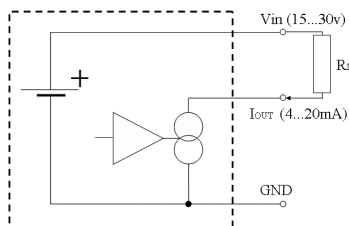
Materials	Cover: Zamak Housing: Aluminium Shaft: Stainless Steel
Bearings	Ballraces
Bearings lifetime	1x10 ¹⁰ rev.
Maximum number of revolutions permitted mechanically	50 rpm (180°, 1800°) 100 rpm (360°, 3600°) 200 rpm (7200°)
Protection against dust and splashes according to DIN EN 60529	IP65
Starting torque at 20°C (68°F)	≤ 0,02 Nm
Maximum load permitted on axial shaft	40 N
Maximum load permitted on radial shaft	60 N
Output	Potentiometer, Analog output
Weight aprox.	0,4 Kg
Operating temperature range	-20°C to +85°C
Direction	Clockwise (CW)
Axial or radial connection	2 meters cable or industrial connector M8 (other cable lengths available on order) Female connector not included

ELECTRICAL SPECIFICATIONS

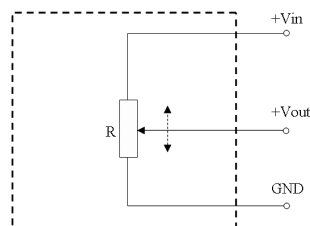
	1 kΩ or 10 kΩ 1turn	1 kΩ or 10 kΩ 10 turns	0..10v	4..20mA
Reference code	1 or 2	1 or 2	3	4
Voltage supply	30 VDC max	30 VDC max	15...30 VDC	15...30 VDC
Accuracy	± 15%	± 5%	± 0,3%	± 0,3%
Linearity	± 2%	± 0,25%	± 0,5%	± 0,5%
Thermal coefficient	± 50ppm/C°	± 50ppm/C°	± 50ppm/C°	± 50ppm/C°
Load	1w max	2w max	5 kΩ min	600 Ω max

OUTPUT SIGNALS

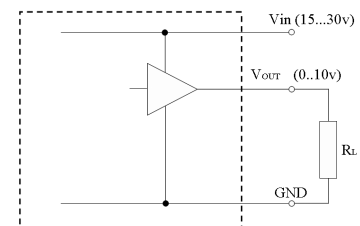
Current



Resistive



Voltage



SERIE POT58

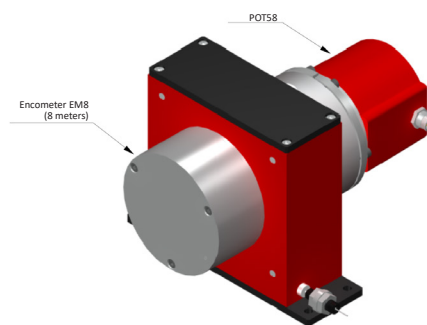
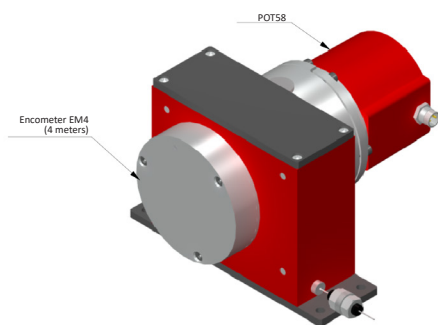
SOLID SHAFT ANGULAR SENSOR FOR INDUSTRIAL APPLICATIONS

CONNECTION



<i>Current</i>	<i>Resistive</i>	<i>Voltage</i>	Cable 5x0,14 95.0008051	Connector M8 3p
GND	GND	GND	Yellow	1
Vin	Vin	Vin	White	2
Iout	Vout	Vout	Brown	3

ACCESSORIES EXAMPLES



All the accessories available in the section "MOUNTING ACCESSORIES".



SERIE IN360C

INCLINOMETER



- High resolution (up to 0.001°)
- High accuracy (up to ±0.05°)
- Internal software diagnostic checks
- 1D and 2D inclination measurement
- Anti-Vibration programmable filter
- CANopen interface (DS301 DSP-410)
- Protection class IP67
- Very easy programming via CAN frames without additional tools


 Inclinometer

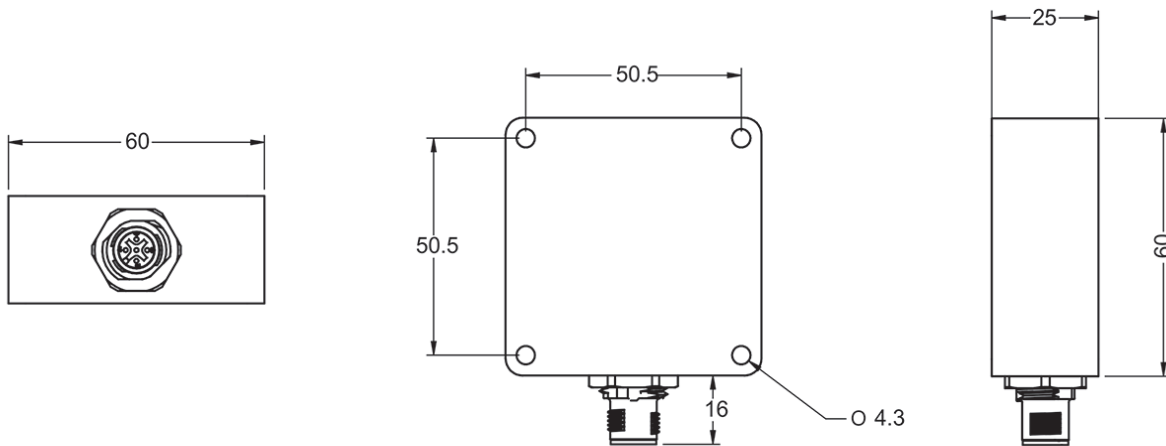

 1 axis


 2 axes


 IP 67


 Temperature range
 -40°C


 Express Delivery



REFERENCE Reference example: IN360C-C2

Serie	Interface	Number of axis / Measuring range	Connection	Special customer
IN360/IN360T	C -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
IN360. Standard IN360T. Temperature compensated	C. CANopen	C. Configurable: 1 axis (0...360°) or 2 axes (± 60°) (*)	2. Male M12 connector	

(*) Programmable settings instructions in IN360C reference manual, section 3.



MECHANICAL SPECIFICATIONS

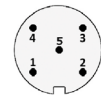
Materials	Housing: Anodized aluminium
Protection according to DIN EN 60529	IP67
Weight	180 g (150...220 g)
Storage temperature range	-40° to +85°C
Operating temperature range	-40° to +85°C
Vibration according to DIN EN 60068-2-6	40 m/s ² (8,2Hz...500Hz), 5 cycles, on 3 axes
Shock according to DIN EN 60068-2-27	3000 m/s ² (11ms)
Connection	5-pole M12 male

ELECTRICAL SPECIFICATIONS

Range of measurement	0 ... 360° or ±180° (1 axis) ±5 ... ±60° (2 axes)
Resolution* (user programmable)	0.01° (1...0.001°)
Supply Voltage range	12/24 V (7...40 V)
Current consumption	30 mA (max. 45 mA)
High accuracy	±0.05 ... ±0.10° (0 ... 360°) ±0.05 ... ±0.15° (±60°)
Sample Rate	550 S/s
Baud Rate (user programmable)	500 Kbit/s (10...1000 Kbit/s)
Temperature drift	±0.008°/°C (IN360C) ±0.002°/°C (IN360TC)

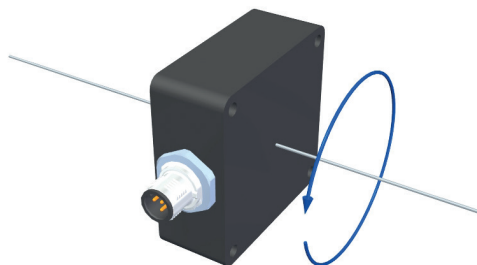
(*) 0.001° only if range is below ±30° in 2-axes mode.

CONNECTION

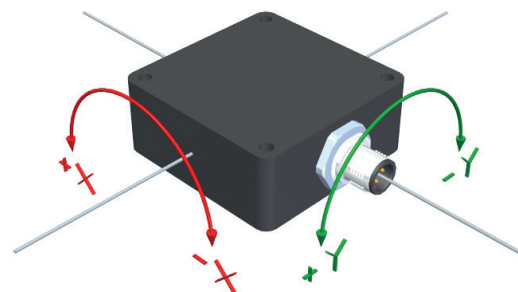


	M12 5p male CCW
SHIELD - Optional CAN shield	1
VCC - Power supply	2
GND - Ground	3
Data AH - CAN_H bus line (dominant high)	4
Data BL - CAN_L bus line (dominant low)	5

1 AXIS



2 AXES



Zero degrees on the single-axis model (vertical operation position) are obtained by keeping the connector to the left.

In order to get the high accuracy performances, we suggest to fix the inclinometer with 4 countersunk screws, placed at the edges of the 4 slot-holes.



SERIE IN360A

INCLINOMETER

- Robust metal case protects from shocks and vibrations
- Filling resin protects against thermal shocks, moisture and harsh environments
- 1D and 2D inclination measurement
- Protection class IP67
- Analog output (4-20 mA or 0.5-4.5 V)
- Protected against reverse bias



Inclinometer



1 axis



2 axes



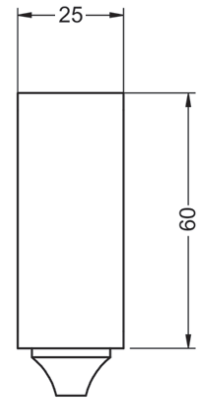
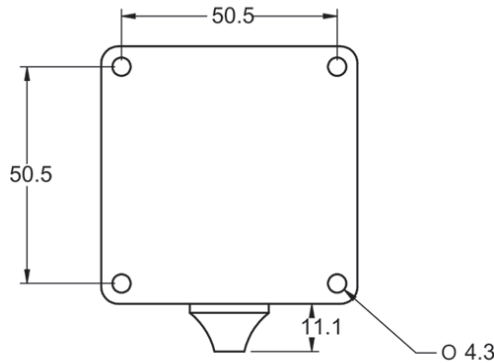
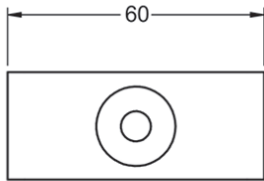
IP 67



Temperature range



Express Delivery



REFERENCE

Reference example: IN360A-114

Serie	Interface	Number of axis / Measuring range	Connection	Output signal	Special Customer
IN360	A -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	A. Analog output	1. 1 axis / 0...360° 2. 2 axes / ± 30°	1. Cable (0,5m)	4. 4...20 mA 5. 0,5...4,5 V	



SERIE IN360A

INCLINOMETER

MECHANICAL SPECIFICATIONS

Materials	Housing: Anodized aluminium
Protection according to DIN EN 60529	IP67
Weight	200 g
Storage temperature range	-40° to +85°C
Operating temperature range	-40° to +85°C
Connection	0,5m open lead cable

ELECTRICAL SPECIFICATIONS

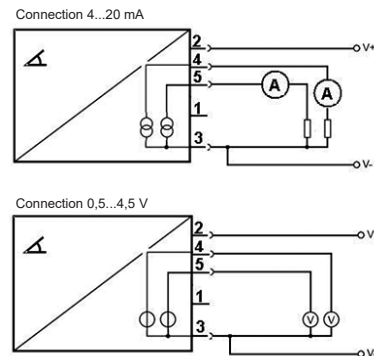
Range of measurement	0...360° (1 axis) ±30° (2 axes)
Resolution	7.33 µA (4...20 mA) 1.67 mV (0,5...4,5 V)
Supply Voltage	12/24 V (7...30 V)
Current consumption*	40 mA
Accuracy	±0.20° (max ±0.50°)
Temperature drift	±0.008°/°C
Load resistor	250 Ω; max 500 Ω (4...20 mA) 10 kΩ (0,5...4,5 V)

(*) Sensor current consumption is 40mA. At X and Y full scale (20mA+20mA), the total current consumption is 80mA.

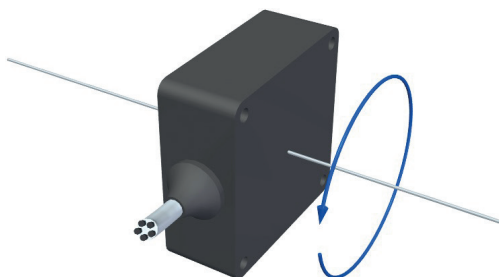
CONNECTION

	Open lead cable
IU - Internal use only (leave it open if present)	1
VCC - Power supply	2
GND - Ground	3
OUTX - Analog output (x-axis in 2-axes mode and 1-axis mode)	4
OUTY* - Analog output (y-axis in 2-axes mode)	5

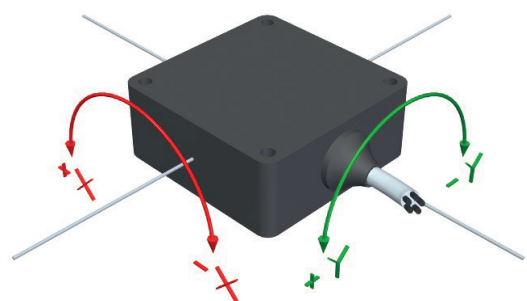
(*) OUTY - Not connected in 1-axis mode



1 AXIS



2 AXES



Zero degrees on the single-axis model (vertical operation position) are obtained by keeping the connector to the left.

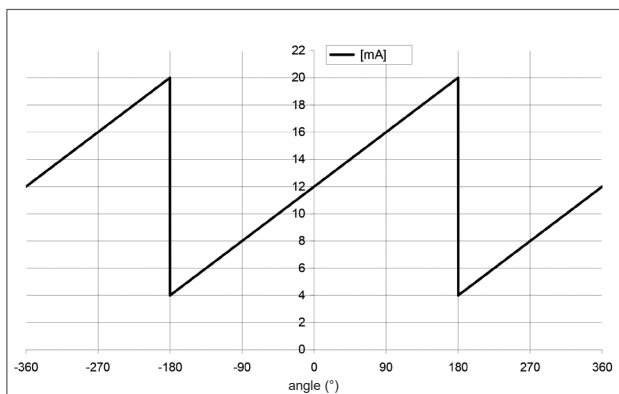
In order to get the high accuracy performances, we suggest to fix the inclinometer with 4 countersunk screws, placed at the edges of the 4 slot-holes.

SERIE IN360A

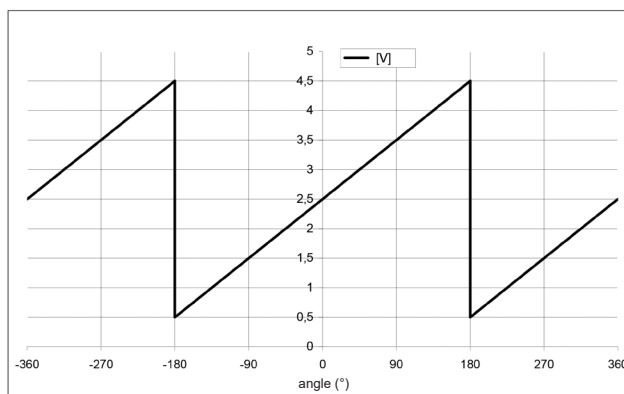
INCLINOMETER

OUTPUT CHARACTERISTICS

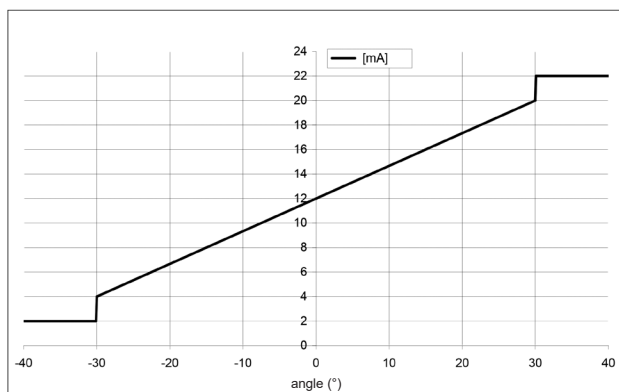
1 AXIS - 4...20 mA



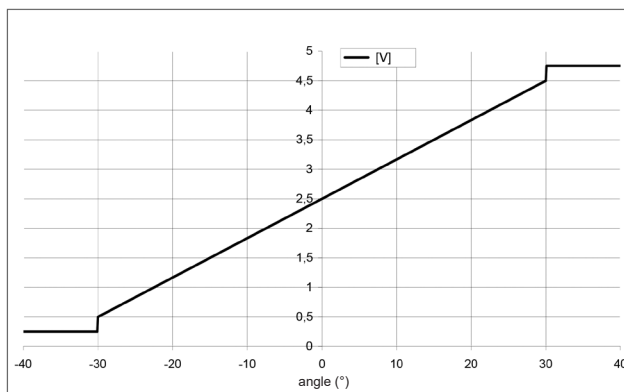
1 AXIS - 0,5...4,5 V



2 AXES - 4...20 mA



2 AXES - 0,5...4,5 V

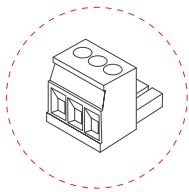
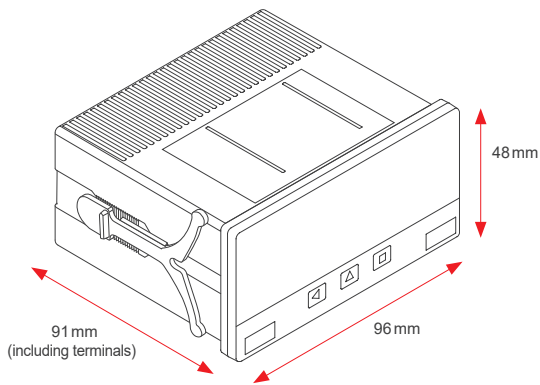


VI96 DISPLAY

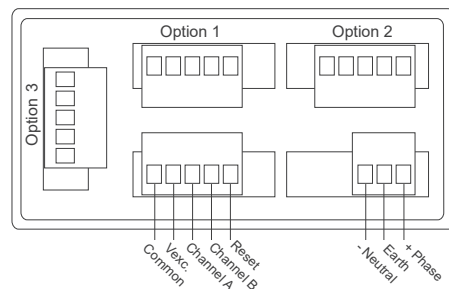
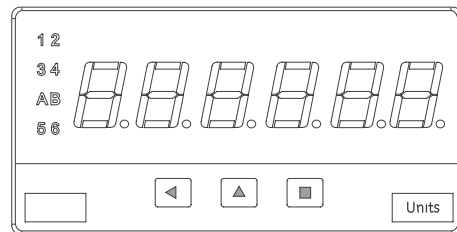
IMPULSE COUNTER, RATEMETER AND PERIODMETER



- Reading at 6 digits with 14 mm digit height
- Standard size of 96 x 48 mm
- Admits all type of impulse signals and encoders
- Provides excitation voltage for the sensor
- Universal high and low AC and DC power options
- Optional output modules



Detail of the plug-in screw terminal. The instrument is provided with all male and female terminals needed.



REFERENCE

Reference example: VI96-2000

Serie	Power supply	Option 1	Option 2	Option 3
VI96 -	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1. 85-265 Vac/dc 2. 11/60 Vdc, 24 Vac, 48 Vac	0. None 1. 1 Relay 2. Analog output 3. Modbus RTU 4. RS-485 5. RS-232 6. 1 Transistor 7. 1 SSR Control	0. None 1. 1 Relay 2. Analog output 3. Modbus RTU 4. RS-485 5. RS-232 6. 1 Transistor 7. 1 SSR Control	0. None 1. 1 Relay 2. Analog output 3. Modbus RTU 4. RS-485 5. RS-232 6. 1 Transistor 7. 1 SSR Control

Order your reference
Step file 3D

info@encoderhohner.com

service available in 24 h



VI96

IMPULSE COUNTER, RATEMETER AND PERIODMETER

TECHNICAL SPECIFICATIONS

Digits	6
Reading	999999 / -199999
Decimal point	Configurable
Led color	Red (standard)
Digital height	14 mm
Signals accepted	NPN, PNP, Namur, pick-up, TTL, inductive, mechanical, quadrature...
Excitation voltage	+5 Vdc, +9 Vdc, +15 Vdc, +18 Vdc (max. 70 mA)
Maximum Vdc at input terminals	±30 Vdc
Quartz accuracy	±0.01 %
Thermal stability	20 ppm/°C
Display refresh	15 refresh / second
Maximum frequencies	Counter up to 250 KHz Ratemeter and periodmeter up to 500 KHz
Minimum frequencies	Ratemeter and periodmeter down to 1 mHz (0.001 Hz)
Power 'H'	85 to 265 Vac/dc (isolated 1500 Veff)
Power 'L'	11 to 60 Vdc and 24/48 Vac (isolated 1500 Veff)
Retransmission and control options	Relays, analog output, serial communications...
Consumption	<1.5 W (meter only) <4.0 W (meter with options)
Front protection	IP65
Connections	Plug-in screw terminal
Weight	<150 grams
Mounting	Panel
Front size	96 x 48 mm
Panel cut-out	92 x 44 mm
Deep	91 mm (including terminals)
Operating temperature range	0 to 50 °C

VI96

IMPULSE COUNTER, RATEMETER AND PERIODMETER

FUNCTIONS INCLUDED

Fast access' menu	A single press on the front keypad gives access to alarm setpoint modification, preset, memories...
Function 'SLOW'	Special mode for low frequency ratemeter applications
Function 'FAST'	Special mode for high frequency counter applications
Scaling factor	Multiplier and divider from 1 to 999999
Configurable reset	Front and rear reset, and reset linked to alarm activation
Preset	Configurable
Trigger level	Configurable
Function 'Trigger Sense'	Help on setting the correct trigger level
Sensor selection	By menu
Cycle counter	Count of cycles defined by the 'on alarm reset' function
Retention memory	Recovers the counting value in case of power loss
On power-up' function	Protects remote systems by delaying the output and control signals at cold start-up
Alarms	With one or two setpoints, independent activation and deactivation delays, hysteresis, optional manual deactivation of the relay
Inverted relay	For security applications
Display filters	Recursive filters for unstable signals
Brightness	5 levels of brightness intensity
Password	Blocks access to configuration menu

ACCESSORIES EXAMPLES



Wall box



DIN Adapter



Benchtop housing



Protector



Adapter

Accessories available upon request