Kübler

- Incremental encoders
- Absolute encoders
- Inclinometers
- Connection Technology
- Accessories – Encoders
- Counters and Process Indicators

pulses for automation

New for 2011

Safety first

further information about Safety Solutions on page 11

www.kuebler.com/safety

Encoders for Functional Safety

- Safe Incremental Encoder Function
- Safe Absolute Encoder Function
- Safe mechanical connection

pulses for automation

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New for 2011

Our pulses are our assets

The core business of the Kübler Group is the development, manufacture and marketing of leading-edge position and motion sensors, innovative display and counting technology as well as connection and transmission technology.

Founded in the year 1960, the family business is now led by the next generation of the family, Gebhard and Lothar Kübler. It is active worldwide with an export share of its turnover of about 70 percent. 8 group members and 50 strong sales partners offer product know-how, service and advice globally on-site.

We see the opportunities for our business in the field of application oriented innovations and in the provision of outstanding all-round service – always with the success of our customers in mind. With over 350 employees and 3 production sites, we reliably ensure the high level of flexibility of our products, superior quality management as well as exceptional delivery dependability.

Our Product Portfolio

Position and Motion Sensors
- Incremental Encoders
- Absolute Encoders
- Linear Measuring Technology
- Inclinometers
- Connection Technology
- Accessories

Connector and Signal Transmission Technology
- Slip Rings
- Optical fibre signal transmission
- Cables, Connectors and Cordsets

Counters and Process Indicators
- Display and Preset Counters
- Timers and Preset Hour Meters
- Frequency Meters and Tachometers
- Combination Time and Energy Meters
- Position Displays
- Process Displays and Controllers

OEM Products and Systems (OPS)
- Customised Display, Measurement and Control Components
- Complete System Solutions: Sensor Technology, Electronics, Mechanics

Presales

Kübler – the service specialists for every industrial sector and application – supplying complete integrated solutions – globally on your doorstep

Sample Service – Fast delivery of customised versions

Selection tool
Kübler website: Product Finder

Delivery Service: 10 by 10,
48 h Express and Repair Service

Kübler Service for planning dependability

Fast, reliable service and professional advice have top priority at Kübler. We are globally on your doorstep in 6 service and application centres and offer our customers planning dependability.

We deliver from stock within one day. We can manufacture your special orders within 48 hours. Moreover, 10 by 10 is our delivery offensive, which ensures that – for quantities of up to 10 pieces – you will receive all catalogue products so marked within 10 days.
Our processes and services are certified and are constantly being improved.

10 by 10

With our 10 by 10 Service we will manufacture 10 encoders within 10 working days.

The benefits to you: easier to order, the delivery can be calculated, flexibility for small production batches.

10 by 10

Technical Hotline

Our Hotline will answer your technical questions Mon-Fri within normal working hours:

Kübler GmbH, Germany	+49 7720 3903-35
Kübler France	+33 3 89 53 45 45
Kübler Italy	+39 0 26 42 33 45
Kübler China	+86 10 5134 8680
Kübler India	+91 9819 457 872
Kübler Poland	+48 6 18 49 99 02

Sample and Repair Service

The Kübler Service Centre can quickly manufacture special, customised versions within a short space of time. We are happy to help you with the practicalities of using our products – at your location if desired. We can carry out repairs within a maximum of 5 working days.

48 h Express Service

Short delivery times, a high level of on-time delivery, guaranteed quality and enthusiastic, service-oriented employees – these are what our customers can depend on.

We can process your order within 48 hours; we can ship stock items the same day.

48h

Kübler plus

Service Excellence provided by Kübler application specialists for target sectors

Product security – replacement models at the end of the product life-cycle

Aftersales

Service Centres, globally on your doorstep:
Advice, analysis, support during installation in over 50 countries

« We were able to considerably reduce our average delivery time and I can confirm that delivery schedules were always adhered to. Technical support is very professional, efficient and not at all bureaucratic. »

Purchasing Manager, German Producer of Geared Motors

Tailor-made solutions – Kübler Design System

« With the KDS method our customers receive a lasting solution to lowering costs, reducing the number of models available or eliminating quality deficiencies. With KDS we develop product and engineering solutions together. The method stands out because of its structured process; this delivers innovation through experience and cooperation with the customer. »

Gebhard and Lothar Kübler, Managing Directors Kübler GmbH

The Kübler Design System – satisfying customer demands

Customer demands

- Long service life
- High-performance product
- Simple installation and maintenance
- System and process quality
- Optimised investment costs

fulfilled via

Technology

- Optimal sensor technology
- Optimal product adaptation
- Optimal integration

Methodology and experience

- Kübler competency in methodology and project management
- Reduction in customer R&D costs
- Combination of Customer and Kübler Expertise
- Speeding up of the development process

Service

- Complete systems
- Engineering Service
- Logistics

The 4 phases of the Kübler Design System

Analysis, Demands

- Definition of the requirements
- Product requirements
- Timetable
- Target costs

Design

- Technology
- Functions
- Performance characteristics

Prototype, Test

- Quickly realized prototype and/or specific customer drawing
- Testing of the prototype in the application
- Support by Kuebler application team during test phase
- Customer approval

Industrialisation, Production

- Implementation of production and quality processes
- Logistics/ packaging
- Ongoing quality controls
- Continuous improvement (Kaizen)

Sendix Heavy Duty H100 – Incremental Encoder with optional mechanical speed switch or double encoder

Data sheet page 20

The Sendix Heavy Duty H100 are an extremely rugged family of incremental encoders available in 3 versions: encoders with or without speed switch and double encoders.
Thanks to the special HD-Safety-Lock™ construction they are ideally suited for applications in heavy industry, such as steel works and cranes. Resistant materials, wide temperature ranges and a high protection level ensure they remain unaffected by the harshest environmental conditions. Their innovative connection technology enables simple quick installation.

Suitable for your Heavy Duty application

- Thanks to the special HD-Safety-Lock™ bearing construction, an extremely high bearing load capacity of up to 300 N axial and 400 N radial is achieved.
- With a temperature range from -40°C up to +100°C, IP66 protection and seawater-resistant materials, the encoder is resistant to harsh environmental conditions.
- Feather key shaft slot ensures positive fitting to the application
- Safe overspeed protection by means of mechanical speed switch

Simple quick installation

- Innovative plug-in spring terminal connectors in the terminal box greatly simplify the cable connection and offer a very high level of safety.
- Various connection possibilities thanks to terminal box being rotatable through 180°
- Large number of resolution and switching speed options available as standard

Safety-Lock becomes HD-Safety- Lock

Safety-Lock™

- Mechanically interlocked bearings
- Large, extra-strong outer bearings
- Larger bearing span

Benefits:

Avoids premature damage or even encoder failure in the field.

HD-Safety-Lock™ = Safety-Lock™ + additional engineering:

+ Floating bearing on the cover-side eliminates internal stress
+ Mechanically decoupled sensor unit ensures constant signal quality with large temperature fluctuations and other adverse environmental influences
+ Dual seals on the shaft-side – friction seal against humidity, labyrinth seal against dust and water jet ingress
+ Very large, highly-robust flange bearings
+ Even greater bearing clearance

Benefits:

The resistance against adverse environmental conditions is greatly increased – especially against high bearing loads and high temperatures.

	Safety-Lock™	HD-Safety-Lock™
Stability with vibration	+	++
Robustness against installation errors	++	++
Radial load	80 N	400 N
Axial load	40 N	300 N
Elimination of internal stresses	0	++
Constant signal quality with extended temperatures	+	++
Mechanical protection of the seal	0	++

Innovative Connection Technology

Plug-in cage-clamp connectors in the 180° rotatable connection cover

	Sendix Heavy Duty with new terminal box connection technology	standard terminal box connection technology
Simple, safe and fast installation	++	0
Quick connection of the cable to the spring terminal without the need for tools	++	not possible
Mounting of the encoder and electrical installation can be carried out separately	++	0
Preparation of the connection cable can be done in the workshop –> facilitates installation in the field	++	not possible
Simplified installation where access is tight or difficult (no kinks in the cable)	++	+

Real-time encoders – Sendix Singleturn and Multiturn with PROFINET interface

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In the devices Sendix 5858/5878 (Singleturn) and Sendix 5868/ 5888 (Multiturn) with PROFINET interface the complete encoder profile according to "Profile Encoder Version 4.1" as well as the „Identification & Maintenance Functionality in Version 1.16" (IM blocks 0, 1, 2, 3 and 4) has been implemented.
The encoders support the Isochronous Real-Time-Mode – also called the IRT-Mode – and are therefore ideal for real-time applications. The IRT-Mode offers, via a decoupling of the real-time communication from the standard communication (TCP/IP), a real-time solution for all high-performance application such as synchronous applications.

- Short cycle time of ≥ 1msec
- Plug and Play start-up thanks to the "Ezturn for Profinet" software supplied with the encoder.
- Possibility to easily expand the characteristics of the encoder without having to disassemble the encoder.
- Scaling and preset values, as well as many additional parameters, can be programmed via the PROFINET-Bus.
- The Ezturn software allows the display of the main parameters for monitoring purposes.
- Position, speed and many other states of the encoder can be transmitted as output values.

Visual warning and alarm signals advise of sensor faults, under-voltage or over-temperature.
The standard Ethernet equipment ensures a direct link, for example from a laptop to the encoder.
Fault diagnosis is therefore much simpler, allowing the measures necessary to correct the problem to be taken without delay, so avoiding long machine downtimes.
The resolution for the singleturn devices is up to 16 bits and for multiturn devices up to 28 bits total resolution.

Incremental and absolute encoders for Functional Safety

Safety is – not least since the EU Machinery Directive 2006/42/EG – an “integral part of the construction of drives”. When choosing the right encoder for functional safety the principle applies that safety is achieved through the intelligent combination of encoder, controller and actuator.
Sendix SSI absolute encoders, with an additional Sin/Cos incremental output, and Sin/Cos versions of incremental encoders are available with certification. But safety goes further than this: safe components are characterised by a robust reliable interface and by the ability to cope with high mechanical and electronic loads.

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Safe Incremental Encoder Function

In order to achieve safe incremental information with the encoder, the controller must monitor the validity of the analogue, 90° phase-shifted sine/cosine signals with the help of the function:
$\sin^2 + \cos^2 = 1$

Safe Absolute Encoder Function

In order to obtain safe information with the encoder regarding the absolute position, the controller counts the incremental pulses and compares the result with the absolute positions also provided by the encoder.

Safe mechanical connection

A 100% reliable mechanical connection is required for a safe function in the applications. Suitably sturdy fixing elements can help eliminate the risk of faults.

Compliance with Safety Standards

According to DIN EN 13849-1 and DIN EN 61800-5-2 up to SIL3/PLe/ Cat.4 the following safety functions can be implemented with the encoder::

SS1:	Safe Stop 1	controlled braking, STO after time or standstill
SS2:	Safe Stop 2	controlled braking until SOS
SOS:	Safe Operating Stop	safe operating stop in position control
SLS:	Safe Limited Speed	
SLI:	Limited Increment of Position	
SLP:	Safe Limited Position	
SSR:	Safe Speed Range	
SDI:	Safe Direction	
SSM:	Safe Speed Monitoring	

Sendix 3651 / 3671 Singleturn encoder with e1 approval

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Sendix with e1 approval from the German Federal Motor Transport Authority (KBA)

The magnetic singleturn encoders are particularly compact and robust. Their e1 certification permits them to be used in utility vehicles without affecting the type approval of the complete vehicle.

The benefits at a glance:

- Compact 36 mm construction
- Protection max. IP69k
- Analogue outputs (0...10 V, 4...20 mA, 0...5 V)
- Wide temperature range from -40°C up to +85°C

IS60 – Inclinometer with CANopen interface

IS60 – Inclinometer

The inclinometer IS60 permits 2-dimensional inclinations to be measured. Versions are available for the measuring ranges ± 10°, ± 45° or ± 60°.

The sensor has a standardised CANopen interface, which enables easy configuration and start-up. All the parameters are stored in the internal permanent memory.

The benefits at a glance:

- Protection rating IP68
- Robust plastic housing
- High shock resistance
- High resolution and accuracy
- Programmable vibration suppression
- High sampling rate and bandwidth

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ATEX encoders Sendix 7058/7068
with Profibus and CANopen interface

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The “flameproof-enclosure” versions of these singleturn and multiturn encoders are approved for zones 1, 2, 21 and 22 and come with the latest Fieldbus profiles from Profibus and CANopen.

These shock- and vibration-resistant encoders operate flexibly with a high resolution of up to 29 bits. With a protection level of IP67, a wide temperature range of -40°C up to +60°C and a sea-water-resistant aluminium housing/flange, they are ideally suited for use outdoors in offshore or coastal applications. The compact design with an installation depth of only 145 mm, a diameter of 70 mm and a space-saving cable outlet rounds off the wide-ranging flexible application possibilities in hazardous areas.

The Idea behind our Connection Technology System

Connection Technology from Kübler = Guaranteed System Safety!

All the products in the Connection Technology section have been tested and approved with the relevant compatible Kübler sensors. We give you our guarantee on this supported by professional levels of service.

Your benefit:

- Elimination of connection errors
  – no laborious fault finding
- Optimal shielding
  – avoids EMC problems
- Shorter installation times
  – saves time, cuts costs
- No time-consuming search for the right connector or cable
  – saves time, eliminates errors

M12 – pre-assembled cordsets

New: For simple error-free connection of our analogue series of encoders, inclinometers and draw-wire mechanics.

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M23 connector for Ex-Zone 2/22

This coupling is mandatory for use with relevant encoders that have Ex2/22 approval and M23 connectors.
It ensures that the connector cannot be unfastened by hand.

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Connector and Signal Transmission Technology

Flexible Shaft Coupling

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M12 – Securing clip in EX-Zones 2/22

Using the Securing clip, encoders with the appropriate Ex2/22 approval and M12 connector can be deployed in areas with combustible dust acc. to EN 50281-1-1 (EX-zones 2/22).

M12 – T-coupler for CANopen / DeviceNet

The T-coupler with coupling-coupling connector – the practical error-free solution for cabling problems in CANopen and DeviceNet Fieldbus networks.

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Optical fibre modules – now also for SSI encoders

The proven optical fibre transmission modules for incremental encoders have been extended with a variant for absolute encoders with the standard interface SSI.

- Connection of standard encoders over very long distances, up to 1500 m
- Reliable connections, even in case of very strong EMC interference

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Paguflex – flexible shaft coupling

This flexible shaft coupling for connecting motor and encoder is a safe, uncomplicated and economical solution, especially where a large misalignment of the drive shaft has to be compensated for. The coupling can compensate for axial misalignments up to 15 mm, radial misalignments up to 3.2 mm and angular misalignments up to 15°.

Position Display / Codix Preset Counter

Codix 560 – now available also with RS232/RS485 interface – supports MODBUS (RTU) or CR/LF protocol

For pulses, time, frequency, position. The new large preset counter Codix 560 covers a wide range of functions and counting modes: from preset counting up to simple control tasks.

- DIN dimensions 96 x 48 mm
- Very bright and large 14-segment LEDs
- Simple operation and programming structure with running help texts
- Total counter or batch counter
- Preset status display
- 3 predefined settings
- 4-level RESET Modes
- User-friendly screw terminals
- Minimal mounting depth
- Suitable for integration in mosaic systems
- Tracking preset
- Teach mode
- RS 232/485 interface for reading and configuring the counter with the MODBUS and CR/LF protocols

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570-SSI Position Display

The fast SSI display Type 570 is designed for absolute SSI encoders with a resolution up to 32 bits. It can be used as either a Master or a Slave display.
Thanks to simple bit assignment and bit blanking the display, which can be scaled and linearized, can also be cascaded, in order to extend the display range as desired. Output options include 2 limit values, analogue output or interface.

- SSI-clock frequency from 100 Hz up to 1 MHz
- Gray or binary code
- Display may be adjusted using scaling- and offset-features
- Linearization with Teach option
- Version with scaleable analogue output, resolution 14 bits, 0 ... 10 V, -10 ... +10 V, 0 ... 20 mA or 4 ... 20 mA
- NEW: Version with 2 relay outputs as limit values or presets; can also be programmed as tracking preset and with RS232/485 interface

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Codix Process Controller:

The fastest way to get started ... without manual

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Codix 56X

A new generation of Process Controllers for analogue, temperature and strain gauge input signals

These very fast powerful displays set new standards when it comes to user friendliness.

Their easy-to-read 14-segment LED display, easy-to-understand running help texts and practical Quick-start Guide eliminate the need to wade through time-consuming full instruction manuals.

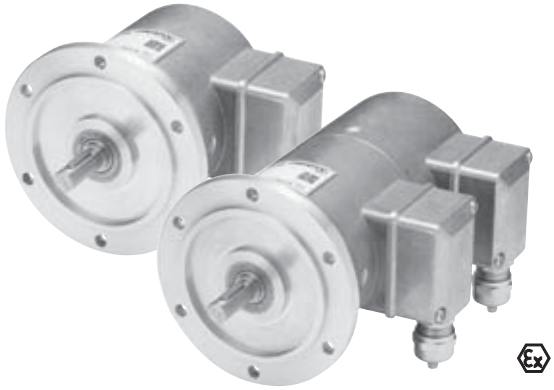
User-friendly:

- Help text as running text
- Easy-to-read 14-segment LED 6-digit display
- Simple programming via 4 keys on the front
- One front key as well as 2 additional inputs can be programmed for specific applications.
- Characteristic curves for thermocouples and RTD permanently stored
- Practical Quick-start Guide for setting the parameters and operating the device.
  The guide is affixed directly to the front of the unit and can be removed and re-applied as required.

Powerful:

- Sampling rate of 10 readings per second
- Application-specific characteristic curves via 12 measurement points
- 2 relay outputs (changeover contacts) for limit monitoring with hysteresis and ON/OFF delay function
- MIN/MAX memory function, individually resettable
- Inputs and outputs galvanically isolated
- Time-controlled Totaliser function for totalising the measured values. Can be reset separately.
- Auxiliary sensor power supply 15 VDC / 25 mA, also for 2-wire transmitters

Heavy Duty, optical | Sendix H100 (Shaft) | Push-Pull / RS422 / Speed switch



The Heavy Duty encoder H100 is an extremely rugged incremental encoder available in 3 versions: encoder with or without speed switch and double encoder.

Thanks to the special HD-Safety-Lock™ construction it is ideally suited for applications in heavy industry, such as steel works and cranes. Resistant materials, wide temperature ranges and a high protection level ensure it remains unaffected by the harshest environmental conditions. Its innovative connection technology enables simple quick installation.

HD Safety-Lock™ | High rotational speed | Temperature -40°+100° | High IP value IP 66 | High shaft load capacity | Magnetic field proof | Plug-in cage-clamp connectors | Spring terminal connectors | Reverse polarity protection | Optical sensor | Seawater-resistant

Suitable for your Heavy Duty application

- HD-Safety-Lock™ bearing construction for an extremely high bearing load capacity of up to 300 N axial and 400 N radial
- With a temperature range from -40°C up to +100°C, IP66 protection and seawater-resistant material the encoder is resistant to harsh environmental conditions.
- Feather key shaft slot ensures positive fitting to the application
- Safe overspeed protection by means of mechanical speed switch

Simple quick installation

- Innovative plug-in [1] spring terminal connectors in the terminal box greatly simplify the cable connection and offer a very high level of safety.
- Various connection possibilities thanks to terminal box being rotatable through 180°
- Large number of resolution and switching speed options available as standard

Order code without speed switch

8.H100	.	1	1	1	X	.	XXXX
Type		a	b	c	d		e

a *Flange*
1 = Euro RE0444

b *Shaft (ø x L), with feather key shaft slot*
1 = ø 11 x 30 mm

c *Version*
1 = incremental encoder

d *Output circuit / Power supply*
1 = RS422 (with inverted signal) / 5 ... 30 V DC
2 = Push-pull (with inverted signal) / 10 ... 30 V DC

e *Pulse rate*
360, 512, 1000, 1024, 2048, 2500, 3600
(e.g. 360 pulses => 0360)
Other pulse rates on request

Order code with speed switch

8.H100	.	1	1	2	X	.	XXXX	.	XXXX	.	1
Type		a	b	c	d		e		f		g

a *Flange*
1 = Euro RE0444

b *Shaft (ø x L), with feather key shaft slot*
1 = ø 11 x 30 mm

c *Version*
2 = increm. encoder with mech. speed switch

d *Output circuit / Power supply*
1 = RS422 (with inverted signal) / 5 ... 30 V DC
2 = Push-pull (with inverted signal) / 10 ... 30 V DC

e *Pulse rate*
360, 512, 1000, 1024, 2048, 2500, 3600
(e.g. 360 pulses => 0360)
Other pulse rates on request

f *Switching speed*
750, 1000, 2000, 3000, 4000
Other switching speeds on request

g *Switching accuracy*
1 = Standard (± 4% at 100 rad/s²)
Other switching accuracies on request

Order code double encoder

8.H100	.	1	1	3	X	.	XXXX	.	XXXX
Type		a	b	c	d		e		f

a *Flange*
1 = Euro RE0444

b *Shaft (ø x L), with feather key shaft slot*
1 = ø 11 x 30 mm

c *Version*
3 = 2 x incremental encoder

d *Output circuit / Power supply*
1 = RS422 (with inverted signal) / 5 ... 30 V DC
2 = Push-pull (with inverted signal) / 10 ... 30 V DC

e *Pulse rate encoder 1*
360, 512, 1000, 1024, 2048, 2500, 3600

f *Pulse rate encoder 2*
360, 512, 1000, 1024, 2048, 2500, 3600

Other pulse rates on request

1) Plug-in version from 2nd quarter 2011 - until then non plug-in spring terminal connector

Incremental Encoders

Heavy Duty, optical | Sendix H100 (Shaft) | Push-Pull / RS422 / Speed switch

Accessories

Encoder cable	PUR-trailing cable, shielded, halogen free, orange (4 x 2 x 0,25 mm² + 2 x 1 mm², twisted pair)	**8.0000.6400.XXXX** [1]
Speed switch cable	TPE-trailing cable, shielded, halogen free, black (5 x 0,75 mm²)	**8.0000.6600.XXXX** [1]

Mechanical characteristics

Speed		max. 6000 min^{-1}
Starting torque with seal		~ 2 Ncm
Load capacity of shaft	radial	400 N
	axial	300 N
Weight	H100	~ 1,8 kg
	H100 + speed switch	~ 2,7 kg
Protection acc. to EN 60 529		IP66
EX approval for hazardous areas		II 3G 3D Eex nA T4
Working temperature range (surface of housing)		-40°C … +100°C
Materials	shaft	stainless steel
	housing	die-cast aluminium (EN AC-44300), seawater-resistant coating
	flange	seawater resistant aluminium, Type Al Si Mg Mn (EN AW-6082)
Shock resistance acc. EN 60068-2-27		< 300 g ~ 3000 m/s² (1 ms)
Vibration resistance acc. EN 60068-2-27		< 10 g ~ 100 m/s²
for switching speed 750 or 1000		< 5 g ~ 50 m/s²

Speed switch

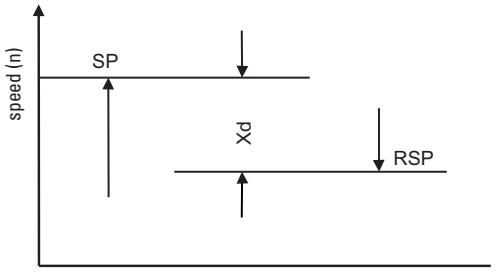
Switching speed (ns)	750 … 4000 min^{-1}
max. rotational speed (mechanical)	1,25 x ns
Switching accuracy with acceleration α = 100 rad/s² (corresponds Δn = 955 min^{-1}/s)	+/- 4% of ns
Switching difference CW/CCW rotation	~ 3 %
Switching hysteresis (Xd)	~ 40% up to 65% of ns
Switching capacity	3 A / 230 V AC 1 A / 125 V DC

(more details see manual)

Electrical characteristics

Output circuit		**RS 422** (TTL compatible)	**Push-Pull** (HTL) up to 150m cable length
Power supply		5 … 30 V DC	10 … 30 V DC
Power consumption (no load)			
with inverted signal		typ. 40 mA / max. 90 mA	typ. 50 mA / max. 100 mA
Permissible load / channel		max. ±20 mA	max. ±30 mA
Pulse frequency		max. 300 kHz	max. 300 kHz
Signal level	high	min. 2,5 V	min. U_B - 2,5 V
	low	max. 0,5 V	max. 0,5 V
Rising edge time t_r		max. 200 ns	max. 1 µs
Falling edge time t_f		max. 200 ns	max. 1 µs
Short circuit proof outputs [2]		yes [3]	yes
Reverse connection of the supply voltage		yes	yes
CE-compliant acc. to		EN 61000-6-1, EN 61000-6-4 and EN 61000-6-3	

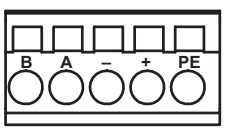
Definition Switching hysteresis (Xd)



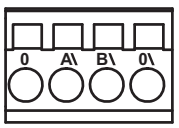
SP = Switching point (for switching speed ns)
RSP = Reset point
Xd = Switching difference (Hysteresis)

Terminal assignment terminal connections

Incremental encoders

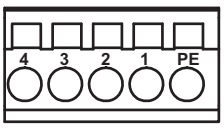


B	incremental track B
A	incremental track A
-	0 V
+	+U_B
PE	shield



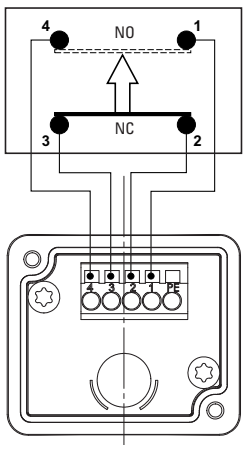
0	incremental track 0
A\	incremental track A inv.
B\	incremental track B inv.
0\	incremental track 0 inv.

Speed switch



4, 1	normally open (NO)
3, 2	normally closed (NC)
PE	shield

Jumper

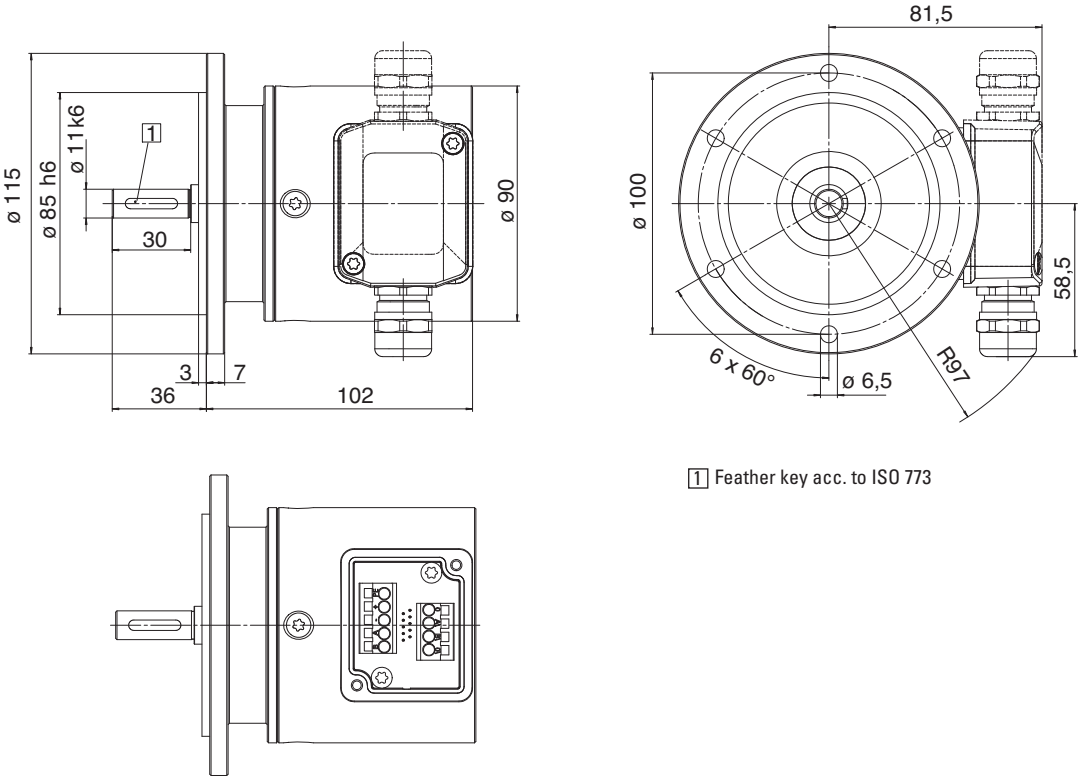


1) XXXX = cable length in meters
2) If supply voltage U_B correctly applied
3) Only one channel allowed to be shorted-out:
at U_B = 5 V short circuit to channel, 0 V, or +U_B is permitted.
at U_B = 5 ... 30 V short circuit to channel or 0 V is permitted.

Heavy Duty, optical | **Sendix H100 (Shaft)** | **Push-Pull / RS422 / Speed switch**

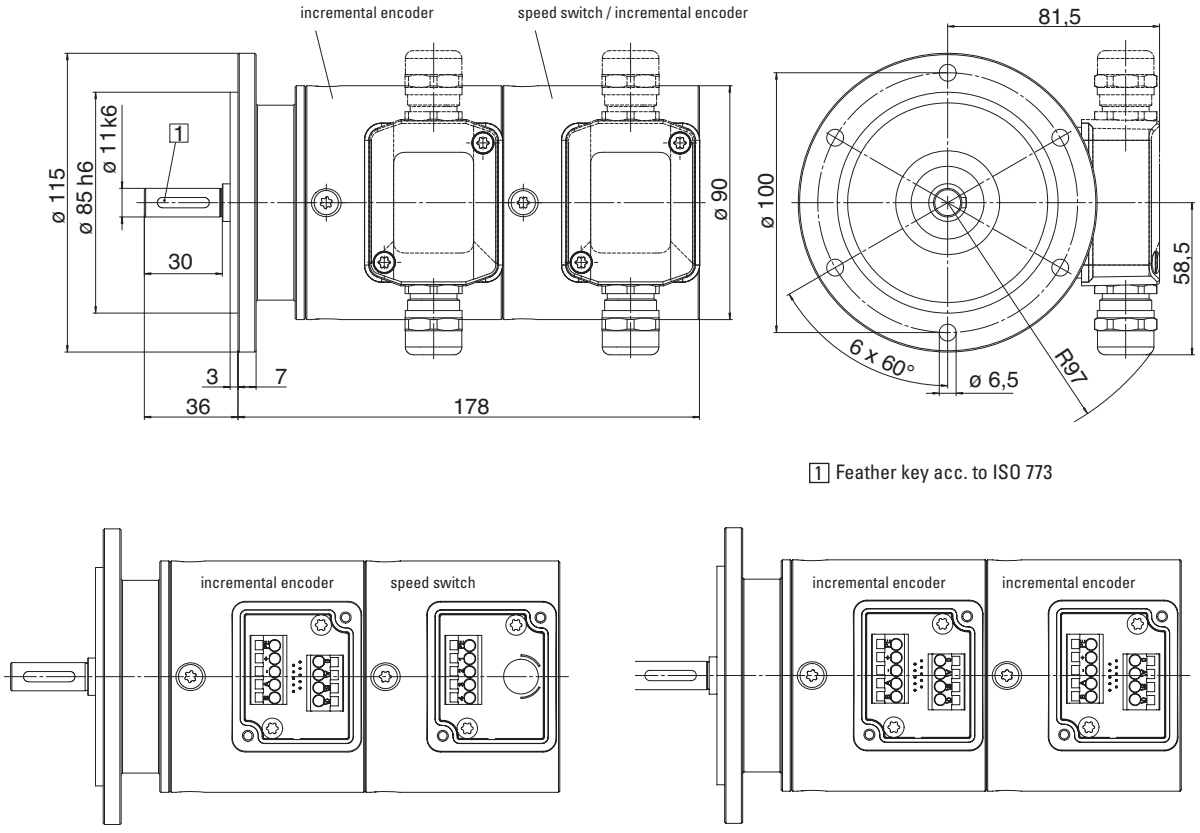
Dimensions

Incremental encoder



1 Feather key acc. to ISO 773

Incremental encoder with mechanical speed switch or 2 x incremental encoder (double encoder)



1 Feather key acc. to ISO 773

Standard, optical | Sendix 5858 / 5878 (Shaft / Hollow shaft) | PROFINET

The singleturn encoders 5858 and 5878 with PROFINET interface and optical sensor technology are ideal for use in all applications with a PROFINET interface.

The encoder supports the IRT mode and is therefore ideal for real-time applications.

Easy start-up thanks to the "Ezturn for Profinet" software supplied with the encoder.

Safety-Lock™ | High rotational speed | Temperature - 40° + 85° | High IP value | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Short-circuit proof | Reverse polarity protection | Optical sensor | Seawater-resistant version on request

Reliable

- Ideally suited for all PROFINET applications thanks to the use of encoder profile 4.1
- Perfect for use in harsh outdoor environments, as a result of IP67 protection and rugged housing construction

Flexible

- IRT-Mode
- Cycle time ≤ 1 ms
- Firmware updater allows for easy expansion of characteristics without having to disassemble the encoder.
- M12 connector ensures fast, simple, error-free connection

Order code Shaft version

8.5858 . X X C 2 . C1 12
Type — a b c d — e

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days. 10 by 10

a *Flange*
1 = clamping flange, ø 58 mm, IP65
2 = synchro flange, ø 58 mm, IP65
3 = clamping flange, ø 58 mm, IP67
4 = synchro flange, ø 58 mm, IP67
5 = square flange, 63.5 mm (2.5"), IP65
7 = square flange, 63.5 mm (2.5"), IP67

b *Shaft (ø x L), with flat*
1 = 6 x 10 mm [1]
2 = 10 x 20 mm [2]
3 = 6,35 x 22,2 mm (1/4" x 7/8")
4 = 9,5 x 22,2 mm (3/8" x 7/8")

c *Interface / Power supply*
C = PROFINET / 10 ... 30 V DC

e *Fieldbus profile*
C1= PROFINET

d *Type of connection*
removable bus terminal cover
2 = 3 x M12 connector

optional on request
- Ex 2/22
- seawater-resistant

Order code Hollow shaft

8.5878 . X X C 2 . C1 12
Type — a b c d — e

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days. 10 by 10

a *Flange*
1 = with torque stop set, IP65
2 = with torque stop set, IP67
3 = with stator coupling, ø 65, IP65
4 = with stator coupling, ø 65, IP67
5 = with stator coupling, ø 63, IP65
6 = with stator coupling, ø 63, IP67

b *Blind hollow shaft*
3 = ø 10 mm
4 = ø 12 mm
5 = ø 14 mm
6 = ø 15 mm
8 = ø 9.5 mm (3/8")
9 = ø 12.7 mm (1/2")

c *Interface / Power supply*
C = PROFINET / 10 ... 30 V DC

e *Fieldbus profile*
C1= PROFINET

d *Type of connection*
removable bus terminal cover
2 = 3 x M12 connector

optional on request
- Ex 2/22
- seawater-resistant

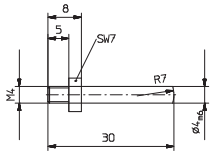
1) Preferred type only in conjunction with Flange type 2
2) Preferred type only in conjunction with Flange type 1

Standard, optical | **Sendix 5858 / 5878 (Shaft / Hollow shaft)** | **PROFINET**

Mounting accessory for shaft encoders

Coupling	Bellows coupling ø 19 mm for shaft 6 mm	**8.0000.1101.0606**
	Bellows coupling ø 19 mm for shaft 10 mm	**8.0000.1101.1010**

Mounting accessory for hollow shaft encoders

Cylindrical pin, long for torque stops	 With fixing thread	**8.0010.4700.0000**

Connection Technology

Connector, self-assembly (straight))	Coupling M12 for Port A and Port B	**05.WASCSY4S**
	Connector M12 for supply voltage	**05.B8141-0**
Cordset, pre-assembled with 2 m PUR cable	M12 for Port A and Port B	**05.00.6031.4411.002M**
	M12 for power supply	**05.00.6061.6211.002M**

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

Mechanical characteristics

Max. speed		
without shaft seal (IP65) up to 70°C		9 000 min^{-1}, 7 000 min^{-1} (continuous)
without shaft seal (IP65) up to T_{max}		7 000 min^{-1}, 4 000 min^{-1} (continuous)
with shaft seal (IP67) up to 70°C		8 000 min^{-1}, 6 000 min^{-1} (continuous)
with shaft seal (IP67) up to T_{max}		6 000 min^{-1}, 3 000 min^{-1} (continuous)
Starting torque without shaft seal (IP65)		< 0.01 Nm
Starting torque with shaft seal (IP67)		
	shaft version	< 0.05 Nm
	hollow shaft version	< 0.03 Nm
Moment of inertia		
	shaft version	3.0 x 10^{-6} kgm^2
	hollow shaft version	6.0 x 10^{-6} kgm^2
Load capacity of shaft	radial	80 N
	axial	40 N
Weight		approx. 0.50 kg
Protection EN 60 529	housing side	IP67
	shaft side	IP65, opt. IP67
EX approval for hazardous areas		optional Zone 2 and 22
Working temperature range		-40°C ... +85°C
Materials	shaft / hollow shaft	stainless steel
	flange	aluminium
	housing	zinc die-cast housing
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

General electrical characteristics

Power supply	10 ... 30 V DC
Power consumption (no load)	max. 200 mA
Reverse connection of the supply voltage (U_B)	yes
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4, EN 61000-6-3
RoHS compliant acc. to	EU guideline 2002/95/EG

Device characteristics

Singleturn resolution	1 ... 65535 (16 bit), (scaleable: 1 ... 65535)
Default value	8192 (13 bit)
Total resolution	scaleable from 1 up to 65535 (13 bit)
Code	binary
Protocol	PROFINET

Link 1 and 2, LED (green / yellow)

two coloured	green	active Link
	yellow	data transfer

Error LED (red) / PWR LED (green)

Functionality see manual

Ezturn software for Profinet (supplied with the encoder)

- Monitoring of cyclic data (e.g. position, speed)
- Monitoring of acyclic data (e.g. IMO, electronic name plate, encoder parameters, warnings and error messages, preset)
- Setting of preset values
- Firmware updates via the bus

Standard, optical | **Sendix 5858 / 5878 (Shaft / Hollow shaft)** | **PROFINET**

General information about PROFINET

The PROFINET encoder implements the Encoder Profile 4.1. (according to the specification Encoder Version 4.1 Dec 2008")

It permits scaling and preset values, as well as many other additional parameters to be programmed via the PROFINET-Bus.

When switching on, all parameters are loaded from an EEPROM, where they were saved previously to protect them against power-failure, or taken over by the controller in the start-up phase.

Position, speed and many other states of the encoder can be transmitted.

PROFINET

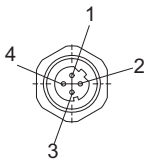
The complete encoder profile according to Profile Encoder Version 4.1 as well as the Identification & Maintenance functionality Version 1.16 has been implemented. IM blocks 0, 1, 2, 3 and 4 are supported.

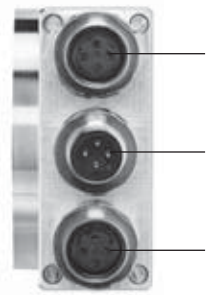
Terminal assignment bus

Type of connection 2, D-coded

Direction	Port A1				Port 2			
Signal	Transmit data+	Receive data+	Transmit data -	Receive data -	Transmit data+	Receive data+	Transmit data-	Receive data-
Abbreviation	TxD+	RxD+	TxD-	RxD-	TxD+	RxD+	TxD-	RxD-
M12 PIN assignment	1	2	3	4	1	2	3	4

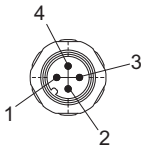
Port A and B





Terminal assignment power supply

Signal	$+U_B$ power supply	n.c.	0 V	n.c.
Abbreviation	$+U_B$	-	0 V	-
M12 PIN assignment	1	2	3	4



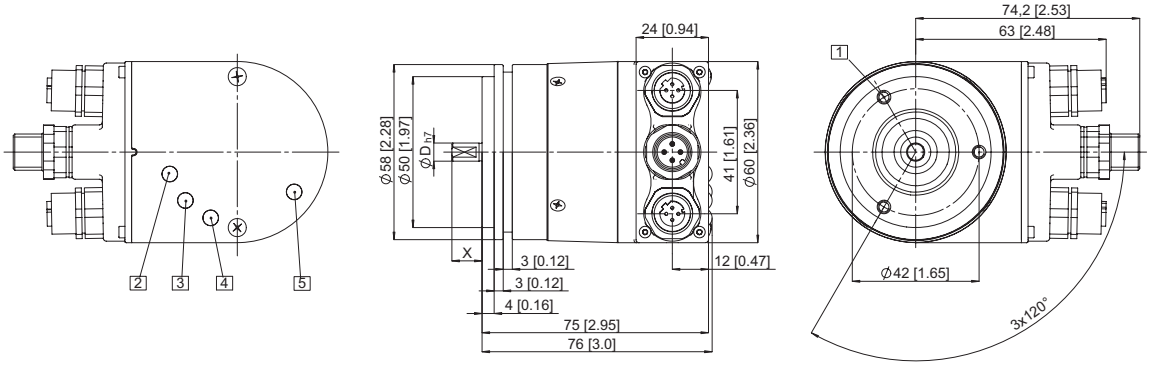
Standard, optical | **Sendix 5858 / 5878 (Shaft / Hollow shaft)** | **PROFINET**

Dimensions shaft version, with removable bus terminal cover

Synchro flange, ø 58 mm

Flange type 2 and 4

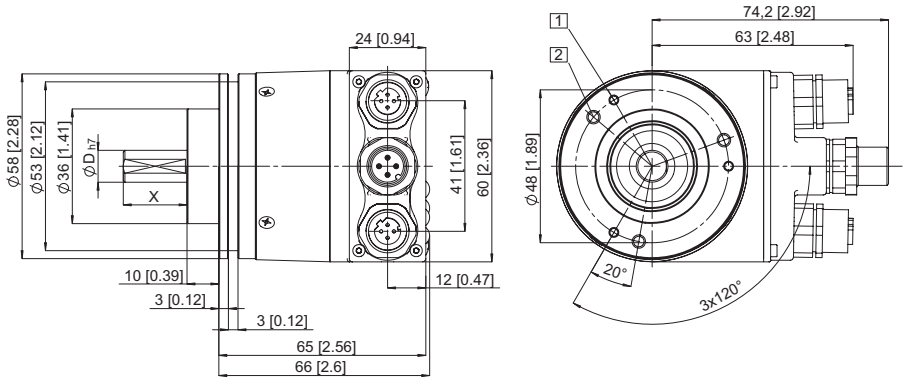
1 LINK 1, yellow/green LED
2 LINK 2, yellow/green LED
3 PWR, green LED
4 ERR, red LED
5 3 x M4, 6.0 [0.24] deep



Clamping flange, ø 58 mm

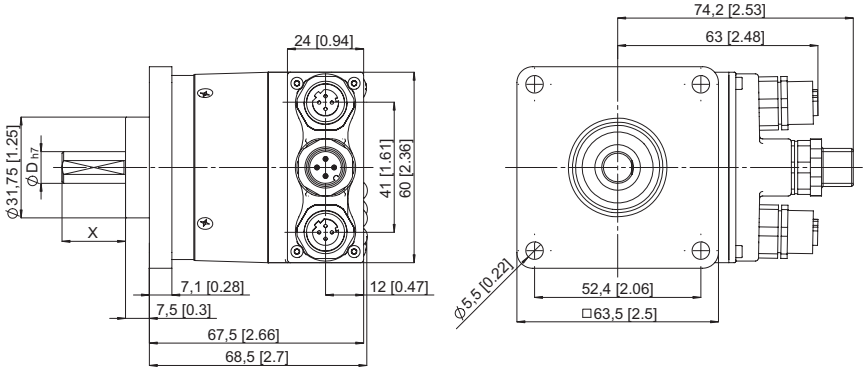
Flange type 1 and 3

1 3 x M3, 6.0 [0.24] deep
2 3 x M4, 8.0 [0.31] deep



Square flange, □ 63.5 mm

Flange type 5 and 7



Standard, optical | **Sendix 5858 / 5878 (Shaft / Hollow shaft)** | **PROFINET**

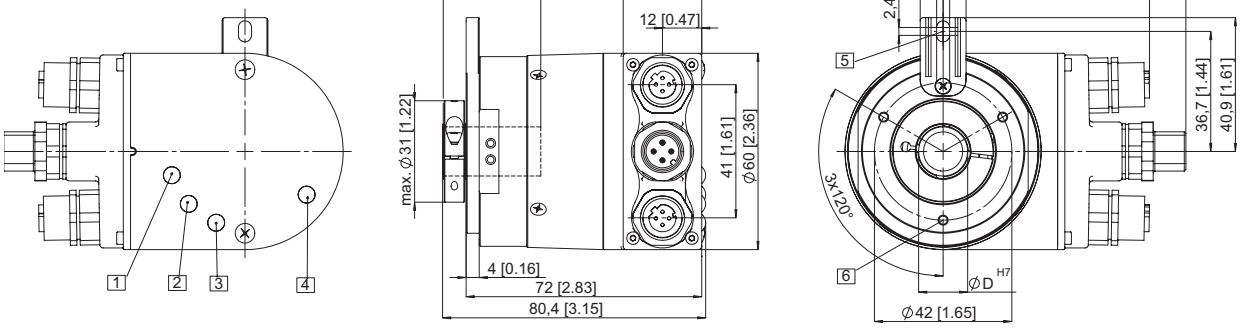
Dimensions hollow shaft version (blind hollow shaft), with removable bus terminal cover

Flange with torque stop set, ø 58 mm

Flange type 1 and 2

1 LINK 1, yellow/green LED
2 LINK 2, yellow/green LED
3 RUN, green LED
4 ERR, red LED

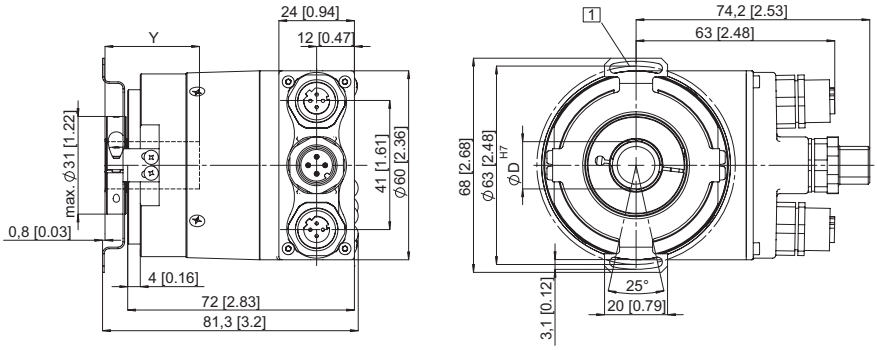
5 Torque stop slot,
Recommendation: Cylindrical pin DIN7, ø 4 mm
6 3 x M3, 5.5 [0.21] deep



Flange with stator coupling, ø 58 mm

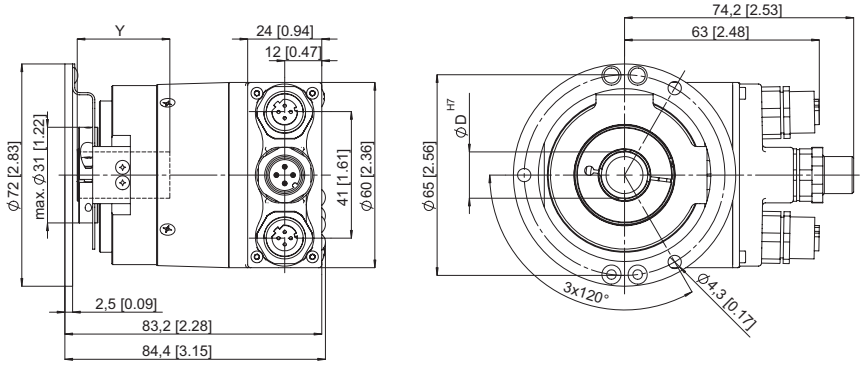
Flange type 5 and 6

1 Fixing screws DIN 912 M3 x 8
(Washer included in delivery)



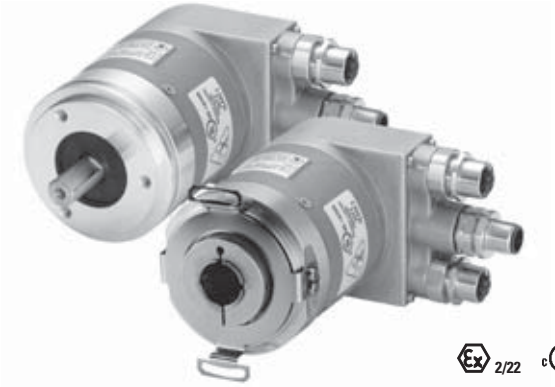
Flange with stator coupling, ø 58 mm

Flange type 3 and 4



Y: Insertion depth for blind hollow shaft: 30 mm

Standard, optical | **Sendix 5868 / 5888 (Shaft / Hollow shaft)** | **PROFINET**



The multiturn encoders 5868 and 5888 with PROFINET interface and optical sensor technology are ideal for use in all applications with a PROFINET interface.

The encoder supports the isochronous mode and is therefore ideal for real-time applications.

Easy start-up thanks to the "Ezturn for Profinet" software supplied with the encoder.

Mechanical drive | Safety-Lock™ | High rotational speed | Temperature | High IP value | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Reverse polarity protection | Optical sensor | Seawater-resistant version on request

Reliable

- Ideally suited for all PROFINET applications thanks to the use of encoder profile 4.1
- Perfect for use in harsh outdoor environments, as a result of IP67 protection and rugged housing construction

Flexible

- IRT-Mode
- Cycle time ≤ 1 ms
- Faster, easier error-free connection thanks to M12 connectors
- Firmware updater allows for easy expansion of characteristics without having to disassemble the encoder.

Order code Shaft version

8.5868	.	X	X	C	2	.	C1	12
Type		a	b	c	d		e	

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

10 by 10

a *Flange*
1 = clamping flange, ø 58 mm, IP65
2 = synchro flange, ø 58 mm, IP67
3 = clamping flange, ø 58 mm, IP67
4 = synchro flange, ø 58 mm, IP67
5 = square flange, 63,5 mm (2,5"), IP65
7 = square flange, 63,5 mm (2,5"), IP67

b *Shaft (ø x L), with flat*
1 = 6 mm x 10 mm [1]
2 = 10 mm x 20 mm [2]
3 = 6,35 x 22,2 mm (1/4" x 7/8")
4 = 9,5 x 22,2 mm (3/8" x 7/8")

c *Interface / Power supply*
C = PROFINET / 10 ... 30 V DC

d *Type of connection*
removable bus terminal cover
2 = 3 x M12 connector

e *Fieldbus profile*
C1 = PROFINET

optional on request
- Ex 2/22
- seawater-resistant

Order code Hollow shaft

8.5888	.	X	X	C	2	.	C1	12
Type		a	b	c	d		e	

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

10 by 10

a *Flange*
1 = with torque stop set, IP65
2 = with torque stop set, IP67
3 = with stator coupling, ø 65, IP65
4 = with stator coupling, ø 65, IP67
5 = with stator coupling, ø 63, IP65
6 = with stator coupling, ø 63, IP67

b *Blind hollow shaft*
3 = ø 10 mm
4 = ø 12 mm
5 = ø 14 mm
6 = ø 15 mm
8 = ø 9.5 mm [3/8"]
9 = ø 12.7 mm [1/2"]

c *Interface / Power supply*
C = PROFINET / 10 ... 30 V DC

d *Type of connection*
removable bus terminal cover
2 = 3 x M12 connector

e *Fieldbus profile*
C1 = PROFINET

optional on request
- Ex 2/22
- seawater-resistant

1) Preferred type only in conjunction with Flange type 2
2) Preferred type only in conjunction with Flange type 1

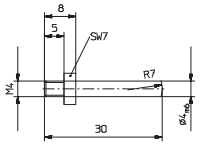
Absolute Encoders – Multiturn

Standard, optical | **Sendix 5868 / 5888 (Shaft / Hollow shaft)** | **PROFINET**

Mounting accessory for shaft encoders

Coupling	Bellows coupling ø 19 mm for shaft 6 mm	**8.0000.1101.0606**
	Bellows coupling ø 19 mm for shaft 10 mm	**8.0000.1101.1010**

Mounting accessory for hollow shaft encoders

Cylindrical pin, long for torque stops		With fixing thread **8.0010.4700.0000**

Connection Technology

Connector, self-assembly (straight))	Coupling M12 for Port A and Port B	**05.WASCSY4S**
	Connector M12 for supply voltage	**05.B8141-0**
Cordset, pre-assembled with 2 m PUR cable	M12 for Port A and Port B	**05.00.6031.4411.002M**
	M12 for power supply	**05.00.6061.6211.002M**

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

Mechanical characteristics

Max. speed		
without shaft seal (IP65) up to 70°C		9 000 min^{-1}, 7 000 min^{-1} (continuous)
without shaft seal (IP65) up to T_{max}		7 000 min^{-1}, 4 000 min^{-1} (continuous)
with shaft seal (IP67) up to 70°C		8 000 min^{-1}, 6 000 min^{-1} (continuous)
with shaft seal (IP67) up to T_{max}		6 000 min^{-1}, 3 000 min^{-1} (continuous)
Starting torque without shaft seal (IP65)		< 0.01 Nm
Starting torque with shaft seal (IP67)		
	shaft version	< 0.05 Nm
	hollow shaft version	< 0.03 Nm
Rotor moment of inertia		
	shaft version	3.0 x 10^{-6} kgm^2
	hollow shaft version	7.5 x 10^{-6} kgm^2
Load capacity of shaft	radial	80 N
	axial	40 N
Weight		approx. 0.54 kg
Protection EN 60 529	housing side	IP67
	shaft side	IP65, opt. IP67
EX approval for hazardous areas		optional Zone 2 and 22
Working temperature range		-40°C ... +85°C
Materials	shaft / hollow shaft	stainless steel
	flange	aluminium
	housing	zinc die-cast housing
Shock resistance acc. EN 60068-2-27		2000 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

General electrical characteristics

Power supply	10 ... 30 V DC
Power consumption (no load)	max. 200 mA
Reverse connection of the supply voltage (U_B)	yes
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4, EN 61000-6-3
RoHS compliant acc. to	EU-guideline 2002/95/EG

Device characteristics

Singleturn resolution	1 ... 65535 (16 bit), (scaleable: 1 ... 65535)
Default value	8192 (13 bit)
Total resolution	scaleable from 1 up to 268435456 (28 bit) 12 bit multiturn
Code	binary
Protocol	PROFINET

Link 1 and 2, LED (green / yellow)

two coloured	green	active Link
	yellow	data transfer

Error LED (red) / PWR LED (green)

Functionality see manual

Ezturn software for Profinet (supplied with the encoder)

- Monitoring of cyclic data (e.g. position, speed)
- Monitoring of acyclic data (e.g. IMO, electronic name plate, encoder parameters, warnings and error messages, preset)
- Setting of preset values
- Firmware updates via the bus

Standard, optical | **Sendix 5868 / 5888 (Shaft / Hollow shaft)** | **PROFINET**

General information about PROFINET

The PROFINET encoder implements the Encoder Profile 4.1. (according to the specification Encoder Version 4.1 Dec 2008")

It permits scaling and preset values, as well as many other additional parameters to be programmed via the PROFINET-Bus.

When switching on, all parameters are loaded from an EEPROM, where they were saved previously to protect them against power-failure, or taken over by the controller in the start-up phase.

Position, speed and many other states of the encoder can be transmitted.

PROFINET

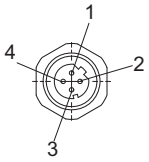
The complete encoder profile according to Profile Encoder Version 4.1 as well as the Identification & Maintenance functionality Version 1.16 has been implemented. IM blocks 0, 1, 2, 3 and 4 are supported.

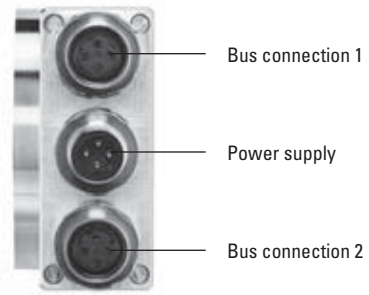
Terminal assignment bus

Type of connection 2, D-coded

Direction	Port 1				Port 2			
Signal	Transmit data+	Receive data+	Transmit data -	Receive data -	Transmit data+	Receive data+	Transmit data-	Receive data-
Abbreviation	TxD+	RxD+	TxD-	RxD-	TxD+	RxD+	TxD-	RxD-
M12 PIN assignment	1	2	3	4	1	2	3	4

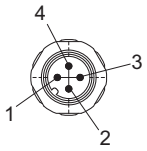
Port A and B





Terminal assignment power supply

Signal	$+U_B$ power supply	n.c.	0 V	n.c.
Abbreviation	$+U_B$	-	0 V	-
M12 PIN assignment	1	2	3	4

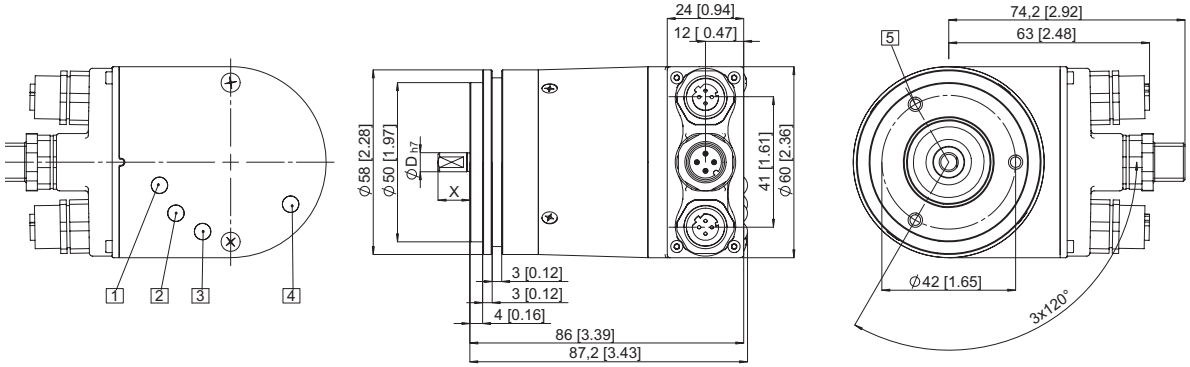


Standard, optical | **Sendix 5868 / 5888 (Shaft / Hollow shaft)** | **PROFINET**

Dimensions shaft version, with removable bus terminal cover

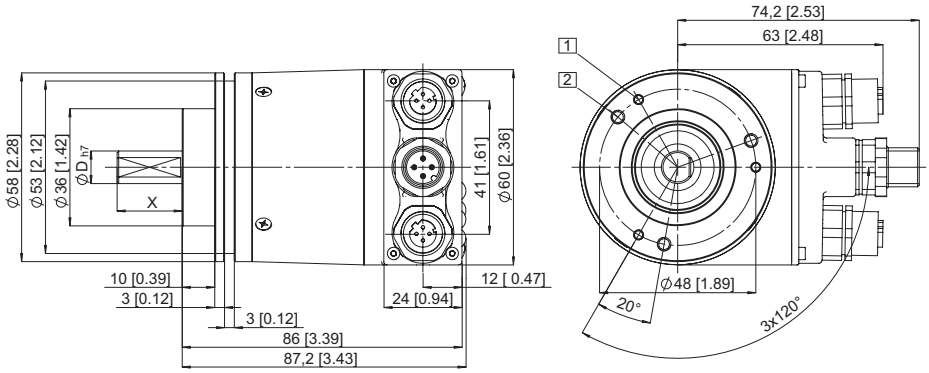
Synchro flange, ø 58 mm
Flange type 2 and 4

1 LINK 1, yellow/green LED
2 LINK 2, yellow/green LED
3 PWR, green LED
4 ERR, red LED
5 3 x M4, 6.0 [0.24] deep

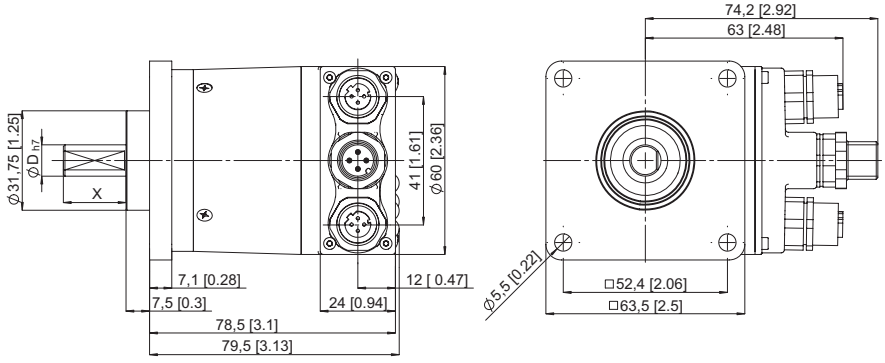


Clamping flange, ø 58 mm
Flange type 1 and 3

1 3 x M3, 6.0 [0.24] deep
2 3 x M4, 8.0 [0.31] deep



Square flange, □ 63.5 mm
Flange type 5 and 7



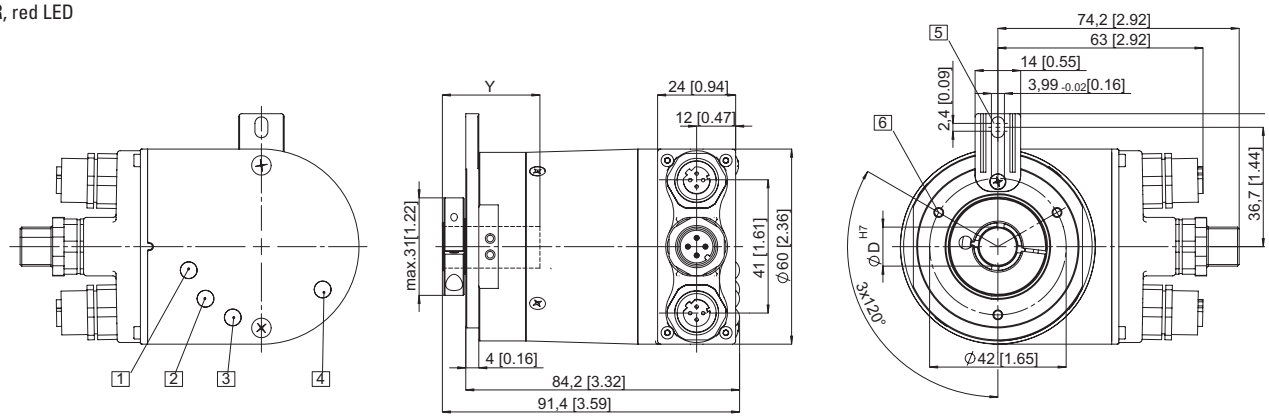
Standard, optical | **Sendix 5868 / 5888 (Shaft / Hollow shaft)** | **PROFINET**

Dimensions hollow shaft version (blind hollow shaft), with removable bus terminal cover

Flange with torque stop set, long, ø 58 mm
Flange type 1 and 2

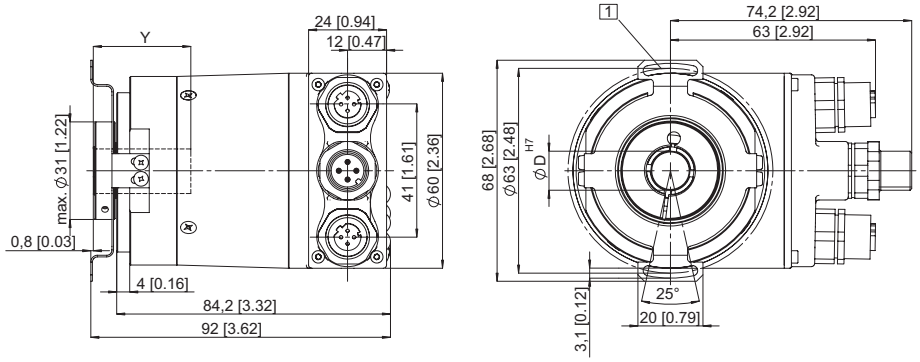
1 LINK 1, yellow/green LED
2 LINK 2, yellow/green LED
3 RUN, green LED
4 ERR, red LED

5 Torque stop slot,
Recommendation: Cylindrical pin DIN7, ø 4 mm
6 3 x M3, 5.5 [0.21] deep

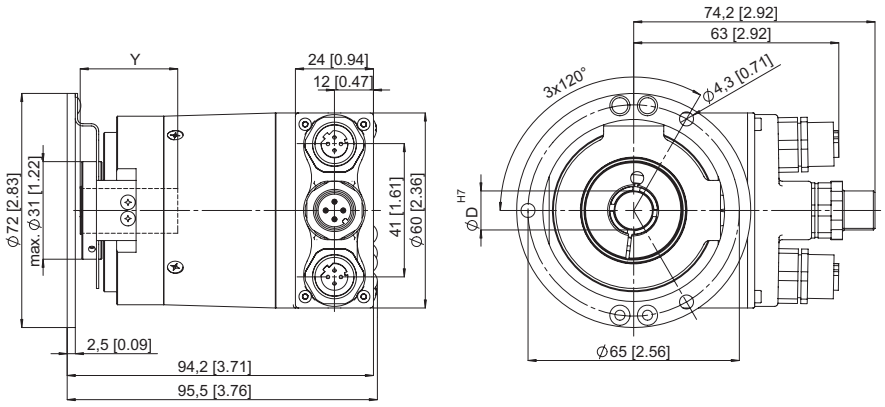


Flange with stator coupling, ø 58 mm
Flange type 5 and 6

1 Fixing screws DIN 912 M3 x 8
(Washer included in delivery)



Flange with stator coupling, ø 58 mm
Flange type 3 and 4

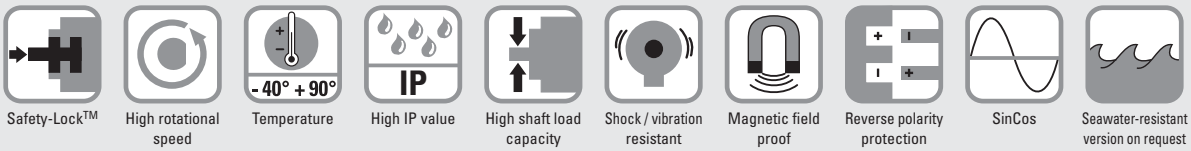


Y: Insertion depth for blind hollow shaft: 30 mm

Functional Safety, optical | Sendix 5814 SIL / 5834 SIL (Shaft / Hollow shaft) | SinCos

The incremental encoders Sendix 5814 SIL and 5834 SIL are perfectly suited for use in safety-related applications up to SIL3 according to DIN EN ISO 61800-5-2 or PLe to DIN EN ISO 13849.

These encoders are particularly suited for applications in the field of safe drive engineering.



Safety-Lock™ | High rotational speed | Temperature | High IP value | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Reverse polarity protection | SinCos | Seawater-resistant version on request

Certified Safety

- Certified by the BGIA - Institute for Occupational Safety and Health
- Suitable for SIL3 applications acc. to DIN EN ISO 61800-5-2
- Suitable for PLe applications acc. to DIN EN ISO 13849
- With incremental SinCos tracks

Flexible

- Shaft and Hollow shaft versions
- Cable and connector variants
- Various mounting options available

Order code Shaft version

8.5814SIL . 1 X X X . XXXX
Type — a b c d — e

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

a *Flange*
1 = clamping flange, ø 58 mm, IP65

b *Shaft (ø x L)*
2 = 10 x 20 mm, with flat
A = 10 x 20 mm, with feather key shaft slot

c *Interface / Power supply*
1 = SinCos / 5 V DC
2 = SinCos / 10 ... 30 V DC

d *Type of connection*
1 = axial cable (1 m PVC)
2 = radial cable (1 m PVC)
3 = M23 connector, 12 pin, axial
4 = M23 connector, 12 pin, radial
5 = M12 connector, 8 pin, axial
6 = M12 connector, 8 pin, radial

e *Pulse rate*
1024, **2048**

optional on request
- seawater-resistant
- special cable length

Order code hollow shaft

8.5834SIL . X X X X . XXXX
Type — a b c d — e

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

a *Flange*
A = with torque stop set, IP65
B = with stator coupling, IP65

b *Hollow shaft*
3 = ø 10 mm
4 = ø 12 mm
5 = ø 14 mm
K = ø 10 mm, tapered shaft

c *Interface / Power supply*
1 = SinCos / 5 V DC
2 = SinCos / 10 ... 30 V DC

d *Type of connection*
2 = radial cable (1 m PVC)
4 = M23 connector, 12 pin, radial
6 = M12 connector, 8 pin, radial
E = tangential cable outlet cable length 1 m (PVC cable)

e *Pulse rate*
1024, **2048**

optional on request
- seawater-resistant
- special cable length

Connection Technology

Connector, self-assembly (straight)	M12	**05.CMB-8181-0**
	M23	**8.0000.5012.0000**
Cordset, pre-assembled with 2 m PVC cable	M12	**05.WAKS8-2/P00**
	M23	**8.0000.6901.0002**

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

Functional Safety, optical | Sendix 5814 SIL / 5834 SIL (Shaft / Hollow shaft) | SinCos

Notes regarding "Functional Safety"

These encoders are suitable for use in safety-related systems up to SIL3 to DIN EN ISO 61800-5-2 and PLe to DIN EN ISO 13849 in conjunction with controllers or evaluation units, which possess the necessary functionality. Additional functions can be found in the operating manual.

Mechanical characteristics

Max. speed, shaft version		
without shaft seal (IP65) up to 70°C		12 000 min^{-1}, 10 000 min^{-1} (continuous)
without shaft seal (IP65) up to T_{max}		8 000 min^{-1}, 5 000 min^{-1} (continuous)
with shaft seal (IP67) up to 70°C		11 000 min^{-1}, 9 000 min^{-1} (continuous)
with shaft seal (IP67) up to T_{max}		8 000 min^{-1}, 5 000 min^{-1} (continuous)
Max. speed, hollow shaft version		
without shaft seal (IP65) up to 70°C		9 000 min^{-1}, 6 000 min^{-1} (continuous)
without shaft seal (IP65) up to T_{max}		6 000 min^{-1}, 3 000 min^{-1} (continuous)
with shaft seal (IP67) up to 70°C		8 000 min^{-1}, 4 000 min^{-1} (continuous)
with shaft seal (IP67) up to T_{max}		4 000 min^{-1}, 2 000 min^{-1} (continuous)
Starting torque, shaft version		
without shaft seal (IP65)		< 0.01 Nm
with shaft seal (IP67)		< 0.05 Nm
Starting torque, hollow shaft version		
without shaft seal (IP65)		< 0.03 Nm
Moment of inertia		
Shaft version		4.0 x 10^{-6} kgm^2
Hollow shaft version		7.0 x 10^{-6} kgm^2
Load capacity of shaft	radial / axial	80 N / 40 N
Weight		approx. 0.45 kg
Protection EN 60 529	housing side	IP67
	shaft side	IP65, opt. IP67
Working temperature range		-40°C ... +90°C [1]
Materials	shaft / hollow shaft	stainless steel
	flange	aluminium
	housing	zinc die-cast housing
	cable	PVC
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

Electrical characteristics

Supply voltage	5 V DC ± 5%	10 ... 30 V DC
Current consumption (no load)	max. 70 mA	max. 45 mA
Reverse polarity protection of the power supply (U_B)	yes	
UL certified	File 224618	
Conforms to CE requirements acc. to	EN 61000-6-2, EN 61000-6-4, EN 61000-6-3	
RoHS compliant acc. to	EU guideline 2002/95/EG	

Output SinCos (A / B)

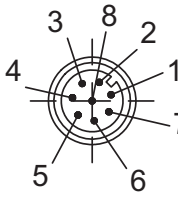
Max. frequency -3dB	400 kHz
Signal level	1 Vpp (± 20%)
Short circuit proof	yes [2]

Terminal assignment

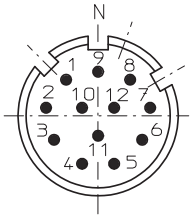
Signal:	GND	+V	A	A inv	B	Binv	shield
Cable colour:	WH	BN	GN	YE	GY	PK	shield
M23 connector:	10	12	5	6	8	1	PH [3]
M12	1	2	3	4	5	6	PH [3]

+V: Encoder Power Supply +V DC
GND: Encoder Power Supply Ground (0V)
PE: Protective earth
PH: Plug connector housing (Shield)
A, Ainv: Sine output
B, Binv: Cosine output

Top view of mating side, male contact base



M12 connector, 8-pin



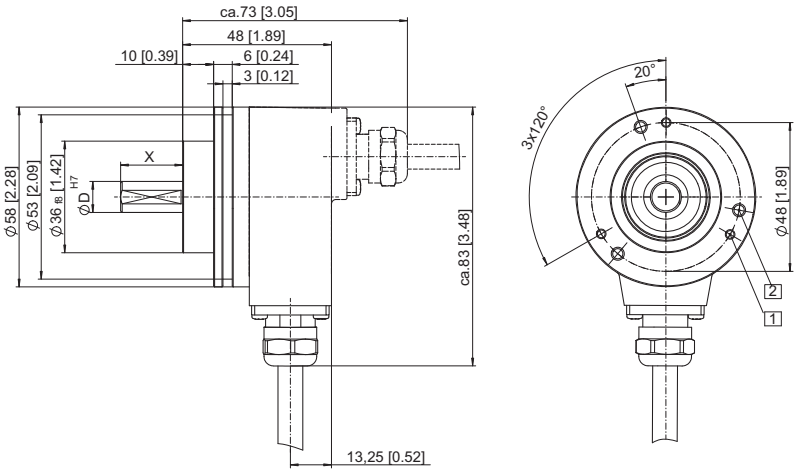
M23 connector, 12-pin

1) Cable version: -30°C ... + 90°C fixed installation
2) Short circuit to 0V or to output, one channel at a time, supply voltage correctly applied
3) PH = Shield is attached to connector housing

Functional Safety, optical | **Sendix 5814 SIL / 5834 SIL (Shaft / Hollow shaft)** | **SinCos**

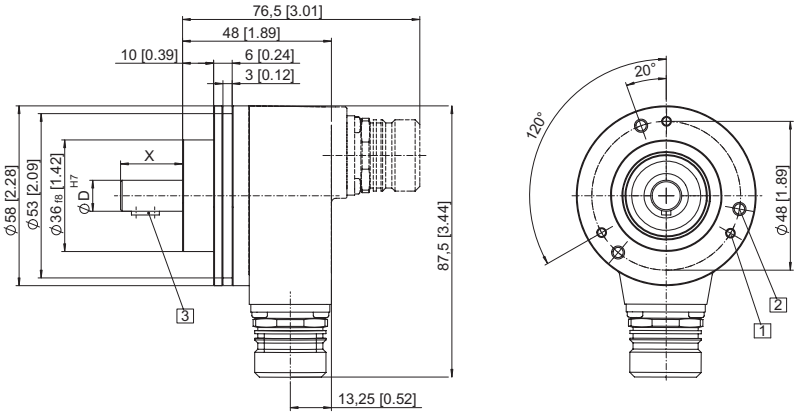
Dimensions shaft version

Clamping flange
Flange type 1 with shaft type 2
(Drawing with cable)



1 3 x M3, 6 [0.24] deep
2 3 x M4, 8 [0.32] deep

Flange type 1 with shaft type A
(Drawing with M23 connector)



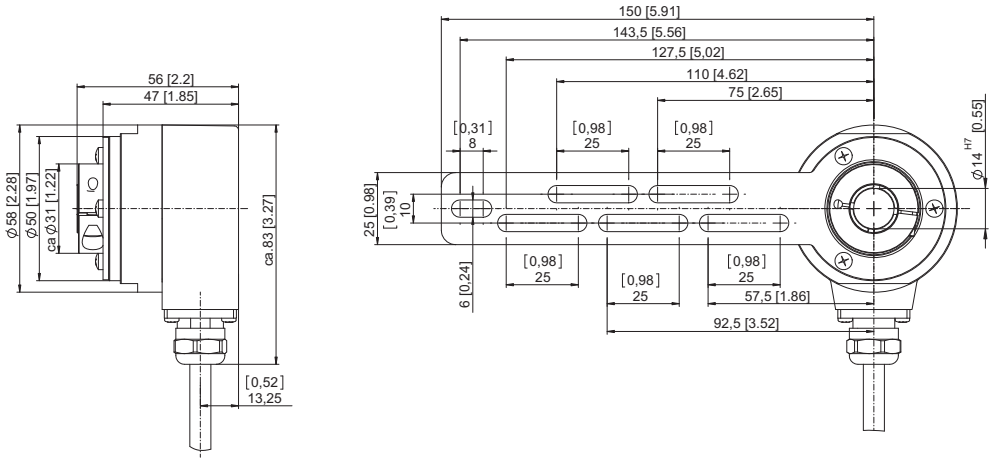
1 3 x M3, 6 [0.24] deep
2 3 x M4, 8 [0.32] deep
3 Feather key DIN 6885 - A - 3x3x6
optional: Feather key DIN 6885 - A - 4x4x8

Functional Safety, optical | **Sendix 5814 SIL / 5834 SIL (Shaft / Hollow shaft)** | **SinCos**

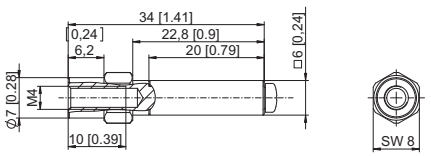
Dimensions hollow shaft version

With torque stop set
flange type A

(Drawing with cable)



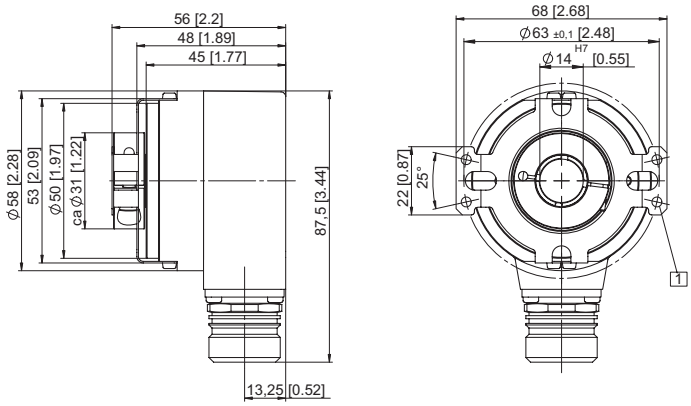
Torque pin with rectangular sleeve
with M4 thread, 10 deep



Flange with stator coupling and hollow shaft
Flange type B

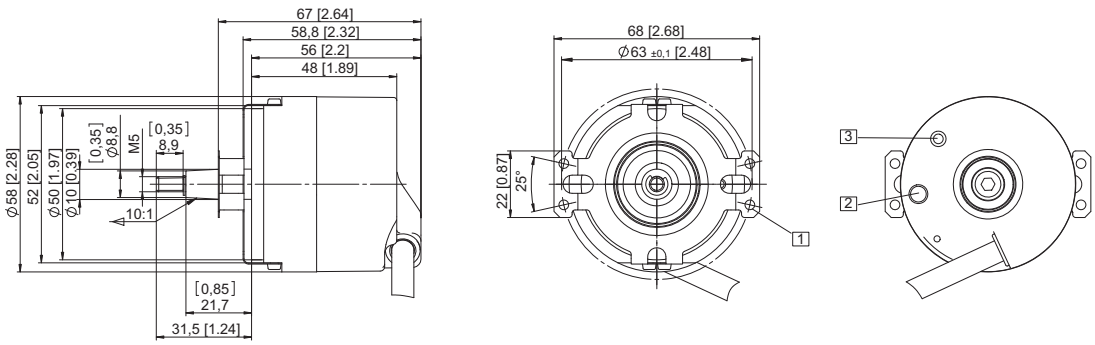
(Drawing with M23 connector)

1 for (4x) M3 screw



Flange with stator coupling and tapered shaft
Flange type B

(Drawing with tangential cable outlet)



1 for (4x) M3 screw
2 Status LED
3 SET button

Functional Safety, optical | **Sendix 5853 SIL / 5873 SIL (Shaft / Hollow shaft)** | **SSI / BiSS + SinCos**

The absolute singleturn encoders Sendix 5853 SIL and 5873 SIL are perfectly suited for use in safety-related applications up to SIL3 according to DIN EN ISO 61800-5-2 or PLe to DIN EN ISO 13849.

The extra strong Safety-Lock™ Design interlocked bearings, the high integration density of the components based on OptoASIC technology and the rugged die-cast housing make these devices ideal also for demanding applications outdoors.

Safety-Lock™ | High rotational speed | Temperature | High IP value | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Reverse polarity protection | SinCos | Optical sensor | Seawater-resistant version on request

Certified Safety

- Certified by the BGIA - Institute for Occupational Safety and Health
- Suitable for SIL3 applications acc. to DIN EN ISO 61800-5-2
- Suitable for PLe applications acc. to DIN EN ISO 13849
- SSI or BiSS interface with incremental SinCos tracks

Flexible

- Shaft and Hollow shaft versions
- Cable and connector variants
- Various mounting options available

Order code Shaft version

8.5853SIL	.	1	X	X	X	.	X	X	2	X
Type		a	b	c	d		e	f	g	h

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

10 by 10

a *Flange*
1 = Clamping flange, ø 58 mm, IP65

b *Shaft (ø x L)*
2 = 10 x 20 mm, with flat
A = 10 x 20 mm, with feather key shaft slot

c *Output circuit / Power supply*
3 = SSI/BiSS + 2048 ppr SinCos track / 5 V DC
4 = SSI/BiSS + 2048 ppr SinCos track / 10 ... 30 V DC

d *Type of connection*
1 = axial cable (1 m PVC)
2 = radial cable (1 m PVC)
3 = M23 connector, 12-pin, axial
4 = M23 connector, 12-pin, radial

e *Code*
B = SSI, Binary
C = BiSS, Binary
G = SSI, Gray

f *Resolution* [1]
A = 10 bit ST
1 = 11 bit ST
2 = 12 bit ST
3 = 13 bit ST
4 = 14 bit ST
7 = 17 bit ST

g *Input / output* [1]
2 = SET, DIR inputs
additional status output

h *Options (Service)*
1 = No Option
2 = Status LED
3 = SET button and Status LED

optional on request
- seawater-resistant
- special cable length

Order code Hollow shaft

8.5873SIL	.	X	X	X	X	.	X	X	2	X
Type		a	b	c	d		e	f	g	h

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

a *Flange*
A = with torque stop set, IP65
B = with stator coupling, IP65

b *Hollow shaft*
3 = ø 10 mm
4 = ø 12 mm
5 = ø 14 mm
K = ø 10 mm, tapered shaft

c *Output circuit / Power supply*
3 = SSI/BiSS + 2048 ppr SinCos track / 5 V DC
4 = SSI/BiSS + 2048 ppr SinCos track / 10 ... 30 V DC

d *Type of connection*
2 = radial cable (1 m PVC)
4 = M23 connector, 12-pin, radial
E = tangential cable outlet cable length 1 m (PVC cable)

e *Code*
B = SSI, Binary
C = BiSS, Binary
G = SSI, Gray

f *Resolution* [1]
A = 10 bit ST
1 = 11 bit ST
2 = 12 bit ST
3 = 13 bit ST
4 = 14 bit ST
7 = 17 bit ST

g *Input / output* [1]
2 = SET, DIR inputs
additional status output

h *Options (Service)*
1 = No Option
2 = Status LED
3 = SET button and Status LED

optional on request
- seawater-resistant
- special cable length

1) Resolution, preset value and count direction are factory-programmable

Functional Safety, optical | **Sendix 5853 SIL / 5873 SIL (Shaft / Hollow shaft)** | **SSI / BiSS + SinCos**

Connection Technology

Connector, self-assembly (straight)	M23	**8.0000.5012.0000**
Cordset, pre-assembled with 2 m PVC cable	M23	**8.0000.6901.0002.0031**

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

Notes regarding "Functional Safety"

These encoders are suitable for use in safety-related systems up to SIL3 to DIN EN ISO 61800-5-2 and PLe to DIN EN ISO 13849 in conjunction with controllers or evaluation units, which possess the necessary functionality. Additional functions can be found in the operating manual.

Mechanical characteristics

Max. speed, shaft version		
without shaft seal (IP65) up to 70°C		12 000 min^{-1}, 10 000 min^{-1} (continuous)
without shaft seal (IP65) up to T_{max}		8 000 min^{-1}, 5 000 min^{-1} (continuous)
with shaft seal (IP67) up to 70°C		11 000 min^{-1}, 9 000 min^{-1} (continuous)
with shaft seal (IP67) up to T_{max}		8 000 min^{-1}, 5 000 min^{-1} (continuous)
Max. speed, hollow shaft version		
without shaft seal (IP65) up to 70°C		9 000 min^{-1}, 6 000 min^{-1} (continuous)
without shaft seal (IP65) up to T_{max}		6 000 min^{-1}, 3 000 min^{-1} (continuous)
with shaft seal (IP67) up to 70°C		8 000 min^{-1}, 4 000 min^{-1} (continuous)
with shaft seal (IP67) up to T_{max}		4 000 min^{-1}, 2 000 min^{-1} (continuous)
Starting torque, shaft version		
without shaft seal (IP65)		< 0.01 Nm
with shaft seal (IP67)		< 0.05 Nm
Starting torque, hollow shaft version		
without shaft seal (IP65)		< 0.03 Nm
Moment of inertia		
Shaft version		4.0 x 10^{-6} kgm^2
Hollow shaft version		7.0 x 10^{-6} kgm^2
Load capacity of shaft	radial / axial	80 N / 40 N
Weight		approx. 0.45 kg
Protection EN 60 529	housing side	IP67
	shaft side	IP65, opt. IP67
Working temperature range		-40°C ... +90°C [1]
Materials	shaft / hollow shaft	stainless steel
	flange	aluminium
	housing	zinc die-cast housing
	cable	PVC
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

Electrical characteristics

Supply voltage		5 V DC ± 5% or 10 ... 30 V DC
Current consumption	5 V DC	max. 70 mA
(w/o output load)	10 ... 30 V DC	max. 45 mA
Reverse polarity protection of the power supply (U_B)		yes
UL certified		File 224618
Conforms to CE requirements acc. to		EN 61000-6-2, EN 61000-6-4, EN 61000-6-3
RoHS compliant acc. to		EU guideline 2002/95/EG

General Interface characteristics

Output driver		RS485 transceiver type
Permissible load / channel		max. 20 mA
Signal level	high	typ 3.8 V
	low at I_{Load} = 20 mA	typ 1.3 V
Short circuit proof outputs		yes [2]

SSI Interface

Singleturn resolution		10…14 bit and 17 bit [3]
Code		Binary or Gray
SSI clock rate	≤ 14 bit	50 kHz ... 2 MHz
	≥ 15 bit	50 kHz ... 125 kHz
Monoflop time		≤ 15 µs

Note: If the clock starts cycling within the monoflop time, a second data transfer starts with the same data. If the clock starts cycling after the monoflop time, the data transfer starts with the new values. The update rate is dependent on the clock speed, data length and monoflop-time.

Data refresh rate	≤ 14 bit	< 1 µs
	15 ... 17 bit	4 µs
Status and Parity bit		optional on request

Output SinCos (A / B) 2048 ppr (Optional incremental track)

Max. frequency -3dB	400 kHz
Signal level	1 Vpp (± 20%)
Short circuit proof	yes

SET input or SET button

Input		active high
Input type:		comparator
Signal level	high	min: 60 % of +V, max: +V
	low	max: 25 % of +V (Supply voltage)
Input current		< 0.5 mA
Min. pulse duration (SET)		10 ms
Timeout after SET signal		14 ms
Reaction Time (DIR input)		1 ms

The encoder can be set to zero at any position by means of a HIGH signal on the SET input or by pressing the optional SET button (with a pencil, ball-point pen or similar). Other preset values can be factory-programmed.
The SET input has a signal delay time of approx. 1 ms. Once the SET function has been triggered, the encoder requires an internal processing time of approx. 15 ms before the new position data can be read. During this time the LED is ON.

DIR input

A HIGH signal switches the direction of rotation from the default CW to CCW. This function can also be factory-programmed to be inverted. If DIR is changed when the device is already switched on, then this will be interpreted as an error. The LED will come ON and the status output will switch to LOW.

1) Cable version: -30°C ... +90°C
2) Short circuit to 0V or to output, one channel at a time, supply voltage correctly applied
3) Other options upon request

Functional Safety, optical | **Sendix 5853 SIL / 5873 SIL (Shaft / Hollow shaft)** | **SSI / BiSS + SinCos**

Power-ON delay

After Power-ON the encoder requires a time of approx. 150 ms before valid data can be read.

LED

The optional LED (red) serves to display various alarm or error messages.
In normal operation the LED is OFF.

If the LED is ON this indicates:
- Sensor error, singleturn or multiturn (soiling, glass breakage etc.)
- LED error, failure or ageing
- Over- or under-temperature

In the SSI mode, the fault indication can only be reset by switching off the power-supply to the device.

Terminal assignment

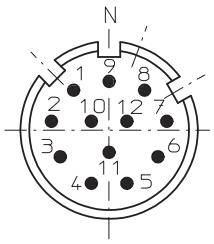
For output circuit 3 or 4 (2 control inputs, SinCos)

Signal:	GND	+V	+C	-C	+D	-D	SET	DIR	A	A inv	B	Binv	PE
Cable colour:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY-PK	RD-BU	Shield
M23 connector:	1	2	3	4	5	6	7	8	9	10	11	12	PH

+V: Encoder Power Supply +V DC
GND: Encoder Power Supply Ground (0V)
+C, -C: Clock signal
+D, -D: Data signal
SET: Set input. The current position is set to zero
DIR: Direction input: If this input is active, the output values are counted backwards (decrease) when the shaft is turning clockwise.

Stat: Status output
PE: Protective earth
PH: Plug connector housing (shield)
A, Ainv: Sine output (incremental)
B, Binv: Cosine output (incremental)

Top view of mating side, male contact base



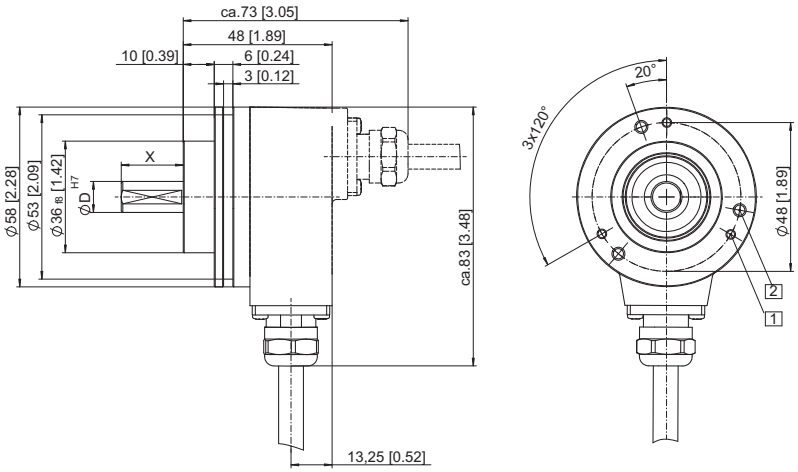
M23 connector, 12-pin

Functional Safety, optical | **Sendix 5853 SIL / 5873 SIL (Shaft / Hollow shaft)** | **SSI / BiSS + SinCos**

Dimensions shaft version

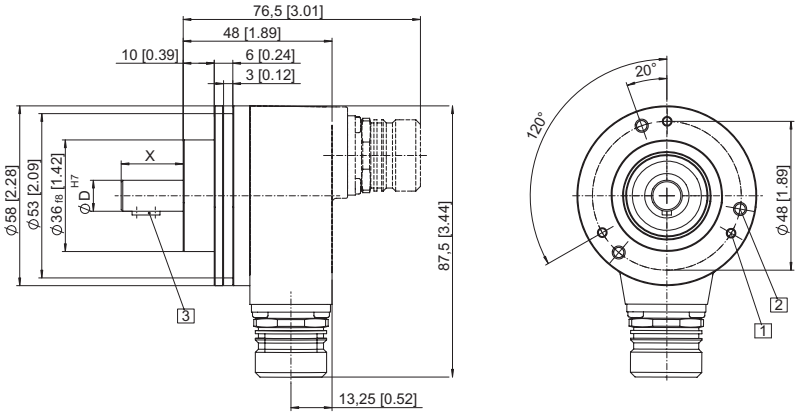
Clamping flange
Flange type 1 with shaft type 2
(Drawing with cable)

1 3 x M3, 6 [0.24] deep
2 3 x M4, 8 [0.32] deep



Flange type 1 with shaft type A
(Drawing with M23 connector)

1 3 x M3, 6 [0.24] deep
2 3 x M4. 8 [0.32] deep
3 Feather key DIN 6885 - A - 3x3x6
optional: Feather key DIN 6885 - A - 4x4x8



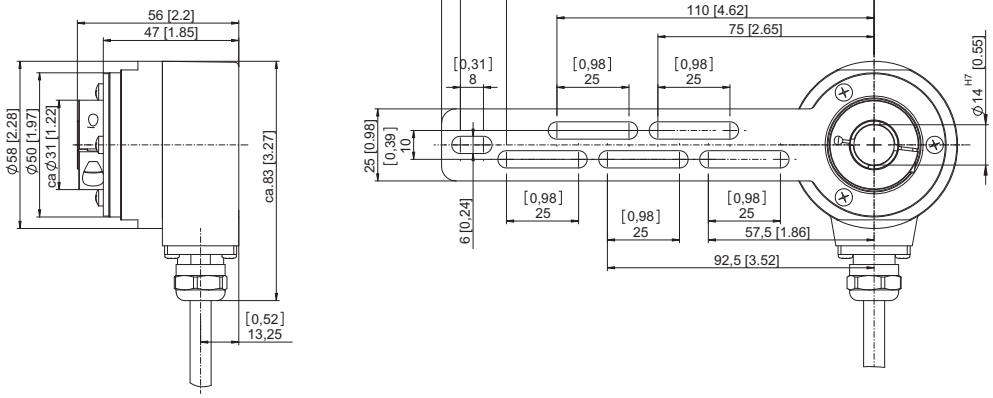
Functional Safety, optical | **Sendix 5853 SIL / 5873 SIL (Shaft / Hollow shaft)** | **SSI / BiSS + SinCos**

Dimensions hollow shaft version

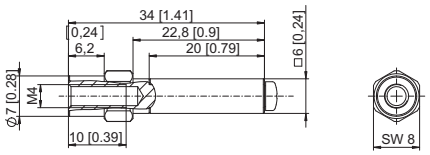
With torque stop set

Flange type A

(Drawing with cable)



Torque pin with rectangular sleeve
with M4 thread, 10 mm deep

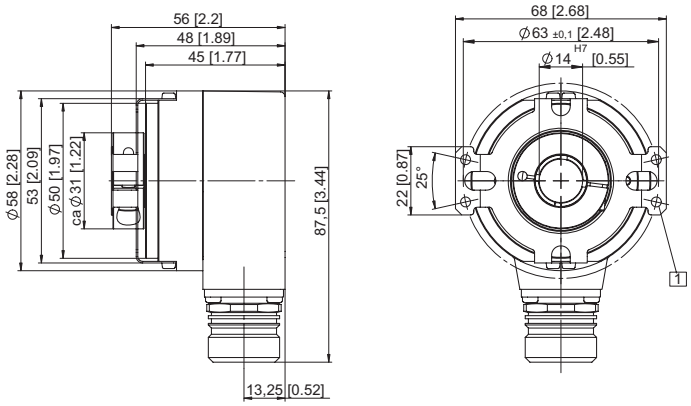


Flange with stator coupling and hollow shaft

Flange type B

(Drawing with M23 connector)

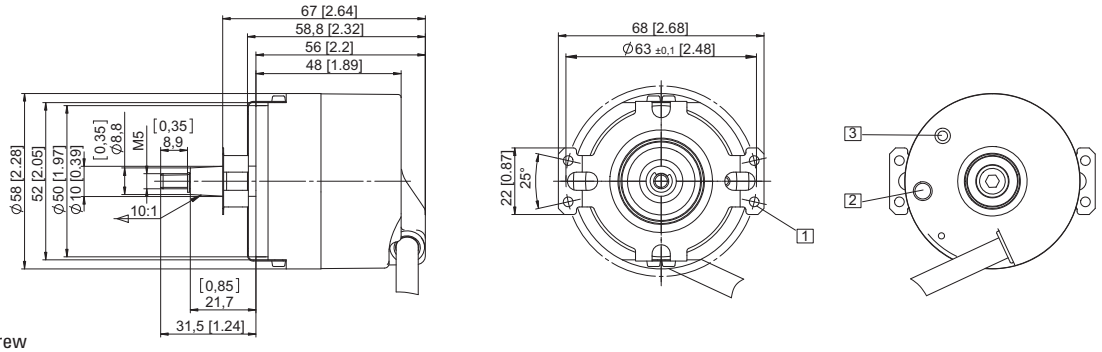
1 for (4x) M3 screw



Flange with stator coupling and tapered shaft

Flange type B

(Drawing with tangential cable outlet)



1 for (4x) M3 screw

2 Status LED

3 SET button

Functional Safety, optical | **Sendix 5863 SIL / 5883 SIL (Shaft / Hollow shaft)** | **SSI / BiSS + SinCos**

The absolute multiturn encoders Sendix 5863 SIL and 5883 SIL are perfectly suited for use in safety-related applications up to SIL3 according to DIN EN ISO 61800-5-2 or PLe to DIN EN ISO 13849.

The extra strong Safety-Lock™ Design interlocked bearings, the high integration density of the components based on OptoASIC technology and the rugged die-cast housing make these devices ideal also for demanding applications outdoors.

Mechanical drive | Safety-Lock™ | High rotational speed | Temperature | High IP value | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Reverse polarity protection | SinCos | Seawater-resistant version on request

Certified Safety

- Certified by the BGIA - Institute for Occupational Safety and Health
- Suitable for SIL3 applications acc. to DIN EN ISO 61800-5-2
- Suitable for PLe applications acc. to DIN EN ISO 13849
- SSI or BiSS interface with incremental SinCos tracks

Flexible

- Shaft and Hollow shaft versions
- Cable and connector variants
- Various mounting options available

Order code Shaft version

8.5863SIL . 1 X X X . X X 2 X
Type — a b c d — e f g h

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

10 by 10

a *Flange*
1 = clamping flange, ø 58 mm, IP65

b *Shaft (ø x L)*
2 = 10 x 20 mm, with flat
A = 10 x 20 mm, with feather key shaft slot

c *Output circuit / Power supply*
3 = SSI/BiSS + 2048 ppr SinCos track / 5 V DC
4 = SSI/BiSS + 2048 ppr SinCos track / 10 ... 30 V DC

d *Type of connection*
1 = axial cable (1 m PVC)
2 = radial cable (1 m PVC)
3 = M23 connector, 12-pin, axial
4 = M23 connector, 12-pin, radial

e *Code*
B = SSI, Binary
C = BiSS, Binary
G = SSI, Gray

f *Resolution* [1)]
A = 10 bit ST + 12 bit MT
1 = 11 bit ST + 12 bit MT
2 = 12 bit ST + 12 bit MT
3 = 13 bit ST + 12 bit MT
4 = 14 bit ST + 12 bit MT
7 = 17 bit ST + 12 bit MT

g *Input / output* [1)]
2 = SET, DIR inputs
additional status output

h *Options (Service)*
1 = no Option
2 = status-LED
3 = SET button and status LED

optional on request
- seawater-resistant
- special cable length

Order code Hollow shaft

8.5883SIL . X X X X . X X 2 X
Type — a b c d — e f g h

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

10 by 10

a *Flange*
A = with torque stop set, IP65
B = with stator coupling, IP65

b *Hollow shaft*
3 = ø 10 mm
4 = ø 12 mm
5 = ø 14 mm
K = ø 10 mm, tapered shaft

c *Output circuit / Power supply*
3 = SSI/BiSS + 2048 ppr SinCos track / 5 V DC
4 = SSI/BiSS + 2048 ppr SinCos track / 10 ... 30 V DC

d *Type of connection*
2 = radial cable (1 m PVC)
4 = M23 connector, 12-pin, radial
E = tangential cable outlet cable length 1 m (PVC cable)

e *Code*
B = SSI, Binary
C = BiSS, Binary
G = SSI, Gray

f *Resolution* [1)]
A = 10 bit ST + 12 bit MT
1 = 11 bit ST + 12 bit MT
2 = 12 bit ST + 12 bit MT
3 = 13 bit ST + 12 bit MT
4 = 14 bit ST + 12 bit MT
7 = 17 bit ST + 12 bit MT

g *Input / output* [1)]
2 = SET, DIR inputs
additional status output

h *Options (Service)*
1 = no Option
2 = status-LED
3 = SET button and status LED

optional on request
- seawater-resistant
- special cable length

1) Resolution, preset value and count direction are factory-programmable

Functional Safety, optical | Sendix 5863 SIL / 5883 SIL (Shaft / Hollow shaft) | SSI / BiSS + SinCos

Connection Technology

Connector, self-assembly (straight)	M23	**8.0000.5012.0000**
Cordset, pre-assembled with 2 m PVC cable	M23	**8.0000.6901.0002.0031**

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

Notes regarding "Functional Safety"

These encoders are suitable for use in safety-related systems up to SIL3 to DIN EN ISO 61800-5-2 and PLe to DIN EN ISO 13849 in conjunction with controllers or evaluation units, which possess the necessary functionality. Additional functions can be found in the operating manual.

Mechanical characteristics

Max. speed, shaft version	
without shaft seal (IP65) up to 70°C	12 000 min^{-1}, 10 000 min^{-1} (continuous)
without shaft seal (IP65) up to T_{max}	8 000 min^{-1}, 5 000 min^{-1} (continuous)
with shaft seal (IP67) up to 70°C	11 000 min^{-1}, 9 000 min^{-1} (continuous)
with shaft seal (IP67) up to T_{max}	8 000 min^{-1}, 5 000 min^{-1} (continuous)
Max. speed, hollow shaft version	
without shaft seal (IP65) up to 70°C	9 000 min^{-1}, 6 000 min^{-1} (continuous)
without shaft seal (IP65) up to T_{max}	6 000 min^{-1}, 3 000 min^{-1} (continuous)
with shaft seal (IP67) up to 70°C	8 000 min^{-1}, 4 000 min^{-1} (continuous)
with shaft seal (IP67) up to T_{max}	4 000 min^{-1}, 2 000 min^{-1} (continuous)
Starting torque, shaft version	
without shaft seal (IP65)	< 0.01 Nm
with shaft seal (IP67)	< 0.05 Nm
Starting torque, hollow shaft version	
without shaft seal (IP65)	< 0.03 Nm
Moment of inertia	
Shaft version	4.0 x 10^{-6} kgm^2
Hollow shaft version	7.0 x 10^{-6} kgm^2
Load capacity of shaft radial / axial	80 N / 40 N
Weight	approx. 0.45 kg
Protection EN 60 529 housing side	IP67
shaft side	IP65, opt. IP67
Working temperature range	-40°C ... +90°C [1]
Materials shaft/hollow shaft	stainless steel
flange	aluminium
housing	zinc die-cast housing
cable	PVC
Shock resistance acc. EN 60068-2-27	2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6	100 m/s^2, 55 ... 2000 Hz

Electrical characteristics

Supply voltage		5 V DC ± 5% or 10 ... 30 V DC
Current consumption (w/o output load)	5 V DC	max. 80 mA
	10 ... 30 V DC	max. 50 mA
Reverse polarity protection of the power supply (U_B)		yes
UL certified		File 224618
Conforms to CE requirements acc. to		EN 61000-6-2, EN 61000-6-4, EN 61000-6-3
RoHS compliant acc. to		EU-guideline 2002/95/EG

General Interface characteristics

Output driver		RS485 transceiver type
Permissible load / channel		max. 20 mA
Signal level	high	typ 3.8 V
	low at I_{Load} = 20 mA	typ 1.3 V
Short circuit proof outputs		yes [2]

SSI Interface

Singleturn resolution		10 ... 14 bits and 17 bit [3]
Number of revolutions		4096 (12 bit)
Code		Binary or Gray
SSI clock rate	≤ 14 bit	50 kHz ... 2 MHz
	≥ 15 bit	50 kHz ... 125 kHz
Monoflop time		≤ 15 µs

Note: If the clock starts cycling within the monoflop time, a second data transfer starts with the same data. If the clock starts cycling after the monoflop time, the data transfer starts with the new values. The update rate is dependent on the clock speed, data length and monoflop-time.

Data refresh rate	≤ 14 bit	< 1 µs
	15 ... 17 bit	4 µs
Status and Parity bit		optional on request

Output SinCos (A / B) 2048 ppr (Optional incremental track)

Max. frequency -3dB	400 kHz
Signal level	1 Vpp (± 20%)
Short circuit proof	yes

SET input or SET button

Input		active high
Input type:		comparator
Signal level	high	min: 60 % of +V, max: +V
	low	max: 25 % of +V (Supply voltage)
Input current		< 0.5 mA
Min. pulse duration (SET)		10 ms
Timeout after SET signal		14 ms
Reaction Time (DIR input)		1 ms

The encoder can be set to zero at any position by means of a HIGH signal on the SET input or by pressing the optional SET button (with a pencil, ball-point pen or similar). Other preset values can be factory-programmed.
The SET input has a signal delay time of approx. 1 ms. Once the SET function has been triggered, the encoder requires an internal processing time of approx. 15 ms before the new position data can be read. During this time the LED is ON.

DIR input

A HIGH signal switches the direction of rotation from the default CW to CCW. This function can also be factory-programmed to be inverted. If DIR is changed when the device is already switched on, then this will be interpreted as an error. The LED will come ON and the status output will switch to LOW.

1) Cable version: -30°C ... +90°C
2) Short circuit to 0V or to output, one channel at a time, supply voltage correctly applied
3) Other options upon request

Functional Safety, optical | **Sendix 5863 SIL / 5883 SIL (Shaft / Hollow shaft)** | **SSI / BiSS + SinCos**

Power-ON delay

After Power-ON the encoder requires a time of approx. 150 ms before valid data can be read.

LED

The optional LED (red) serves to display various alarm or error messages.
In normal operation the LED is OFF.

If the LED is ON this indicates:
- Sensor error, singleturn or multiturn (soiling, glass breakage etc.)
- LED error, failure or ageing
- Over- or under-temperature

In the SSI mode, the fault indication can only be reset by switching off the power-supply to the device.

Terminal assignment

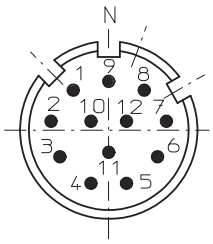
For output circuit 3 or 4 (2 control inputs, SinCos)

Signal:	GND	+V	+C	-C	+D	-D	SET	DIR	A	A inv	B	Binv	PE
Cable colour:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY-PK	RD-BU	Shield
M23 connector:	1	2	3	4	5	6	7	8	9	10	11	12	PH

+V: Encoder Power Supply +V DC
GND: Encoder Power Supply Ground (0V)
+C, -C: Clock signal
+D, -D: Data signal
SET: Set input. The current position is set to zero
DIR: Direction input: If this input is active, the output values are counted backwards (decrease) when the shaft is turning clockwise.

Stat: Status output
PE: Protective earth
PH: Plug connector housing (shield)
A, Ainv: Sin output (incremental)
B, Binv: Cos output (incremental)

Top view of mating side, male contact base

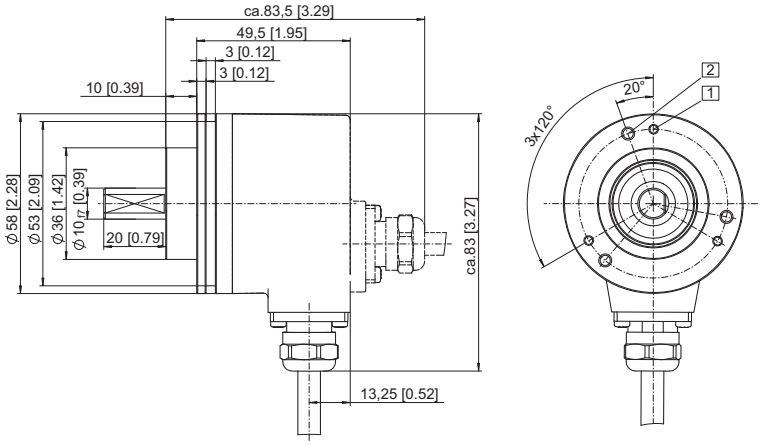


M23 connector, 12-pin

Functional Safety, optical | **Sendix 5863 SIL / 5883 SIL (Shaft / Hollow shaft)** | **SSI / BiSS + SinCos**

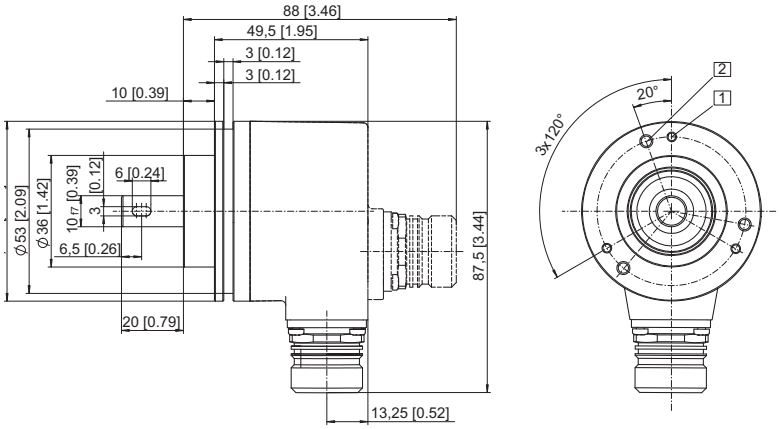
Dimensions shaft version

Clamping flange
Flange type 1 with shaft type 2
(Drawing with cable)



Flange type 1 with shaft type A
(Drawing with M23 connector)

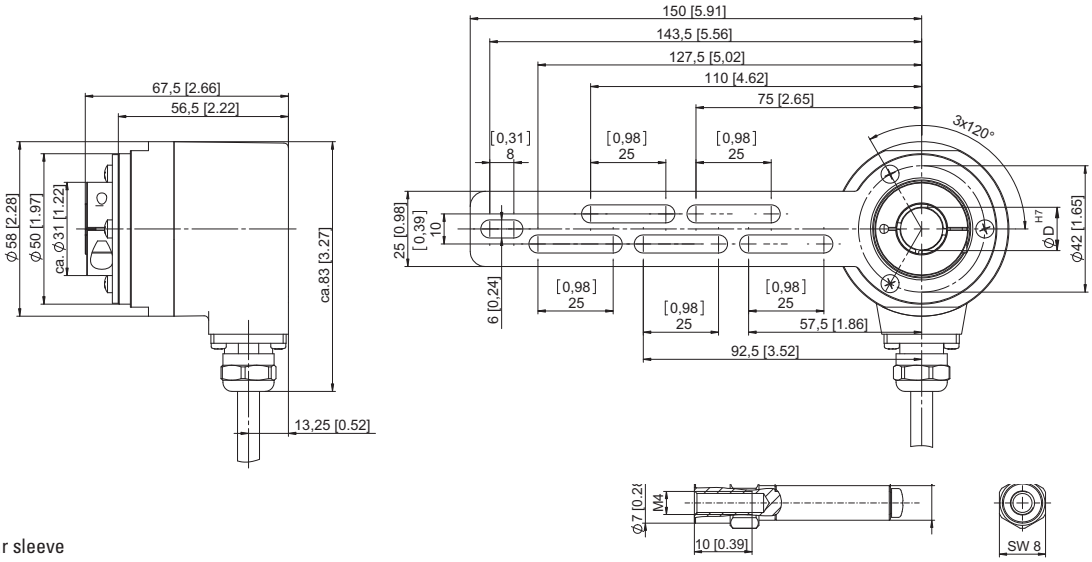
1 3 x M3, 6 [0.24] deep
2 3 x M4, 8 [0.32] deep



Functional Safety, optical | **Sendix 5863 SIL / 5883 SIL (Shaft / Hollow shaft)** | **SSI / BiSS + SinCos**

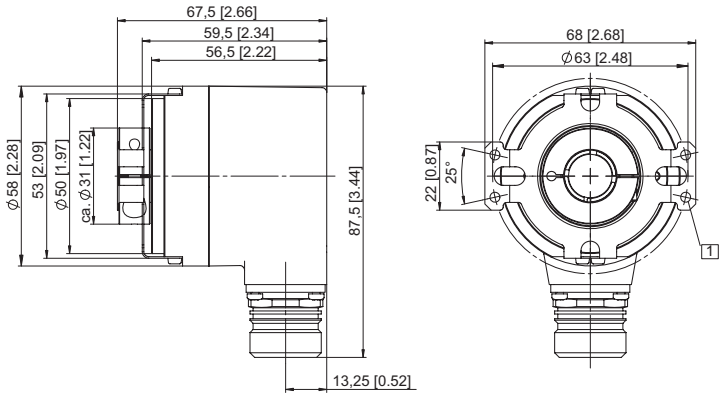
Dimensions hollow shaft version

With torque stop set
Flange type A
(Drawing with cable)



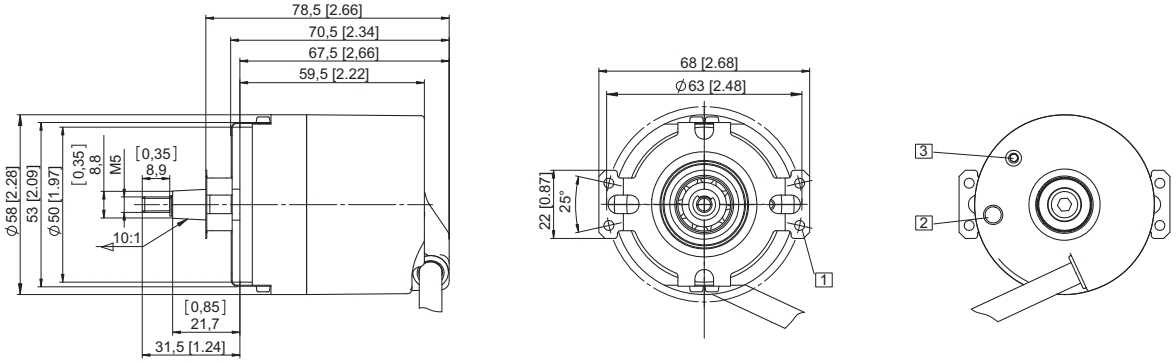
Torque pin with rectangular sleeve
with M4 thread, 10 deep

Flange with stator coupling and hollow shaft
Flange type B
(Drawing with M23 connector)



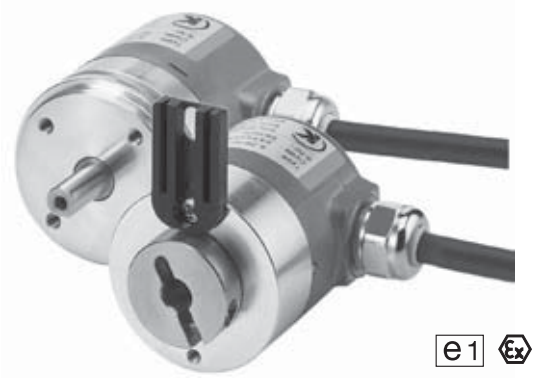
1 for (4x) M3 screw

Flange with stator coupling and tapered shaft
Flange type B
(Drawing with tangential cable outlet)



1 for (4x) M3 screw
2 Status LED
3 SET button

Compact, magnetic | **Sendix 3651 / 3671 (Shaft / Hollow shaft)** | **Analogue**



Thanks to their different interfaces and measurement ranges, the Sendix 3651 and Sendix 3671 singleturn encoders with analogue interface, in shaft and hollow shaft versions, are particularly flexible in use.

A green and a red LED, acting as reference point and fault indicators, ensure easy installation and troubleshooting.

These encoders have an e1-approval from the German Federal Motor Transport Authority.

Safety-Lock™ | High rotational speed | Temperature - 40° + 85° | High IP value | High shaft load capacity | Shock / vibration resistant | Short-circuit proof | Reverse polarity protection | Magnetic sensor | Seawater-resistant version on request

Safe operation

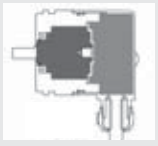
- Non-contact measuring system for long-life non-wear applications
- Rugged die cast housing and IP protection up to 69K for an exceptional tightness
- High shock and vibration resistance for an exceptional robustness

Compact and effective

- Outer diameter of only 36 mm
- The hollow shaft version is fitted with a blind hole with a diameter of up to 10 mm. It can be mounted as required with either a torque stop pin or a stator coupling.
- 360° with 12 bit resolution (4096 positions)
- For use in 12 V or 24 V vehicle electrical systems

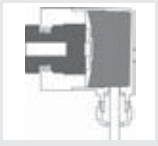
Safety-Lockplus™

IP69k protection on the flange side, robust bearing assemblies with interlocking bearings, mechanically protected shaft seal



Sensor-Protect™

Fully encapsulated electronics, separate mechanical bearing assembly



Order code Shaft version

8.3651 . 2 X X X . X X X X (Type: a b c d . e f g h)

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days. 10 by 10

a *Flange*
2 = synchro flange

b *Shaft (ø x L), with flat*
3 = ø 6 x 12.5 mm
5 = ø 6.35 (1/4") x 12.5 mm
6 = ø 8 x 12.5 mm

c *Output circuit [2]*
3 = current output
4 = voltage output

d *Type of connection*
1 = axial cable (1 m PUR)
2 = radial cable (1 m PUR)
3 = M12 connector, axial
4 = M12 connector, radial

e *Measuring range*
1 = 1 x 360°
2 = 1 x 180°
3 = 1 x 90°
4 = 1 x 45°

f *Output / Power supply*
3 = 4 ... 20 mA / 10 ... 30 V DC
4 = 0 ... 10 V / 15 ... 30 V DC
5 = 0 ... 5 V / 10 ... 30 V DC

g *Option 1*
1 = count direction cw [1]
2 = count direction ccw [1]

h *Option 2*
1 = IP67
2 = IP69K

optional on request
- Ex 2/22
- seawater-resistant
- special cable length

Order code Hollow shaft

8.3671 . X X X X . X X X X (Type: a b c d . e f g h)

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days. 10 by 10

a *Flange*
2 = with torque stop set
5 = with stator coupling

b *Hollow shaft*
2 = ø 6 mm
3 = ø 6.35 mm (1/4")
4 = ø 8 mm
6 = ø 10 mm

c *Output circuit [2]*
3 = current output
4 = voltage output

d *Type of connection*
1 = axial cable (1 m PUR)
2 = radial cable (1 m PUR)
3 = M12 connector, axial
4 = M12 connector, radial

e *Measuring range*
1 = 1 x 360°
2 = 1 x 180°
3 = 1 x 90°
4 = 1 x 45°

f *Output / Power supply*
3 = 4 ... 20 mA / 10 ... 30 V DC
4 = 0 ... 10 V / 15 ... 30 V DC
5 = 0 ... 5 V / 10 ... 30 V DC

g *Option 1*
1 = count direction cw [1]
2 = count direction ccw [1]

h *Option 2*
1 = IP67
2 = IP69K

optional on request
- Ex 2/22
- seawater-resistant
- special cable length

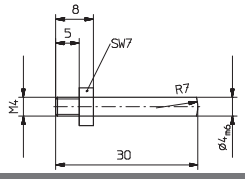
1) cw = Increasing code values when shaft turning clockwise (cw). Top view on shaft
2) Output circuit "3" only in conjunction with output "3", Output circuit "4" only in conjunction with output "4" or "5".

Compact, magnetic | Sendix 3651 / 3671 (Shaft / Hollow shaft) | Analogue

Mounting accessory for shaft encoders

Coupling	Bellows coupling ø 19 mm for shaft 6 mm	**8.0000.1101.0606**

Mounting accessory for hollow shaft encoders

Cylindrical pin, long for torque stops	 With fixing thread	**8.0010.4700.0000**

Connection Technology

Connector, self-assembly	M12	**8.0000.5116.0000**
Cordset, pre-assembled with 2 m PVC cable	M12	**05.WAKS4.5-2/P00**

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

Mechanical characteristics

Max. speed		6000 min^{-1}
Starting torque		< 0.06 Nm
Load capacity of shaft	radial axial	40 N 20 N
Weight		approx. 0.2 kg
Protection EN 60 529/DIN 40050-9		IP67 / IP69k
EX approval for hazardous areas		optional Zone 2 and 22
Working temperature range		-40°C ... +85°C
Materials	shaft / hollow shaft flange housing cable	stainless steel aluminium zinc die-cast housing PUR
Shock resistance acc. EN 60068-2-27		5000 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		300 m/s^2, 10 ... 2000 Hz
Permanent shock resistance acc. EN 60068-2-29		1000 m/s^2, 2 ms
Vibration (broad-band random) EN 60068-2-64		5 ... 2500 Hz, 100 m/s^2 - rms

General electrical characteristics

RoHS compliant acc. to	EU guideline 2002/95/EG
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4, EN 61000-6-3 and EN 61000-4-8 (behaviour under magnetic influence)
e1 compliant acc. to	EU guideline 2009/19/EG (acc. to EN 55025, ISO 11452 and ISO 7637)

Electrical characteristics current interface 4 ... 20 mA

Sensor

Power supply		10 ... 30 V DC
Current consumption (no load)		max. 38 mA
Reverse connection of the supply voltage		yes
Measuring range		45°, 90°, 180° or 360°
Resolution		12 bit
Linearity		< 1° (360° measuring range)
Repeat accuracy (25°C)		< 0.1° (360° measuring range)
Status LED	Red Green	break in current loop, input load too high. reference point display turns ON at cw: betw. 0° and 1° at ccw: betw. 0° and -1°

Current loop

Output load	max. 200 Ohm at 10 V DC max. 900 Ohm at 24 V DC
Setting time	< 1 ms (R_{load} = 400 Ohm, 25°C)

Short-circuit proof outputs
When the supply voltage is correctly applied. But not output to 0 V or to $+U_B$.
Supply voltage and sensor output signal are not galvanically isolated.

Electrical characteristics voltage interface

Sensor

Power supply	output 0 ... 5 V output 0 ... 10 V	10 ... 30 V DC 15 ... 30 V DC
Current consumption (no load)		max. 35 mA
Reverse connection of the supply voltage		yes
Measuring range		45°, 90°, 180° or 360°
Resolution		12 bit
Linearity		< 1° (360° measuring range)
Repeat accuracy (25°C)		< 0.1° (360° measuring range)

Voltage output

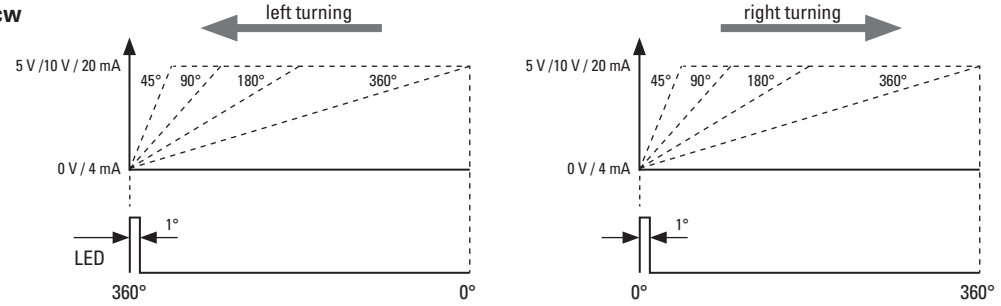
Current output		max. 10 mA
Setting time		< 1 ms (R_{load} ≥ 1 KOhm, 25°C)
Short-circuit proof outputs When the supply voltage is correctly applied. But not output to 0 V or to $+U_B$. Supply voltage and sensor output signal are not galvanically isolated.		
Status LED	Green	reference point display turns ON at cw: betw. 0° and 1° at ccw: betw. 0° and -1°

Compact, magnetic | **Sendix 3651 / 3671 (Shaft / Hollow shaft)** | **analogue**

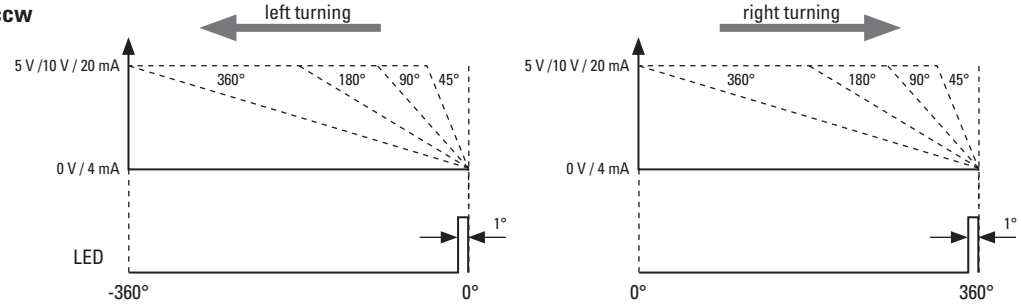
Example (output signal profile)

Measurement range 45° / 90° / 180° / 360°

Version cw

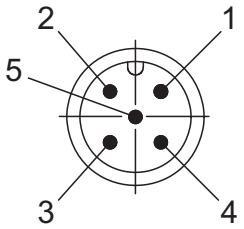


Version ccw



Terminal assignment

Signal	0V	$+U_B$	+I	-I
Cable colour	WH	BN	GN	YE
M12 / Pin	3	2	4	5

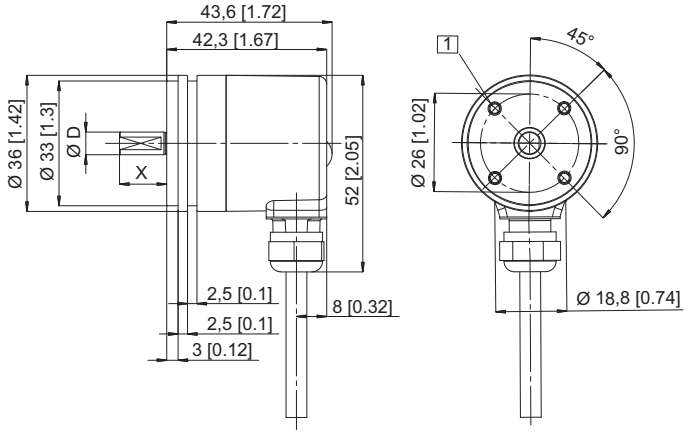


Compact, magnetic | **Sendix 3651 / 3671 (Shaft / Hollow shaft)** | **analogue**

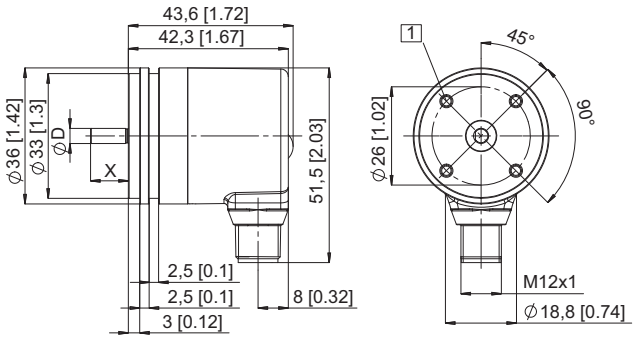
Dimensions shaft version

Synchro flange, ø 36 mm

1 M3, 6 [0.24] deep



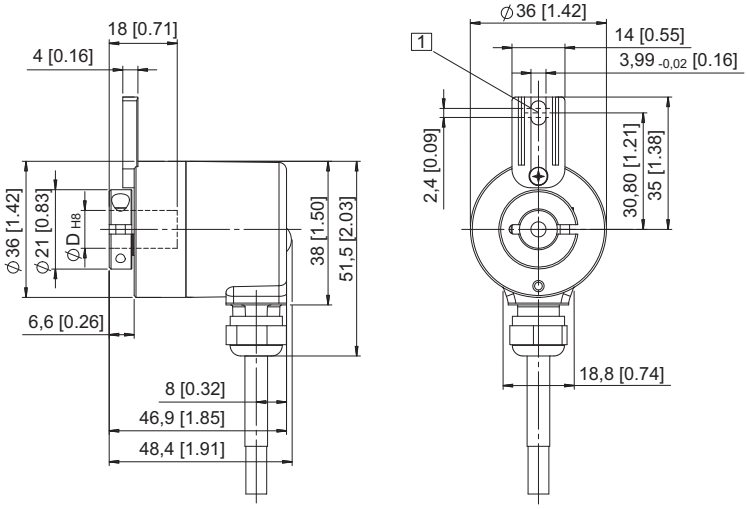
1 M3, 6 [0.24] deep



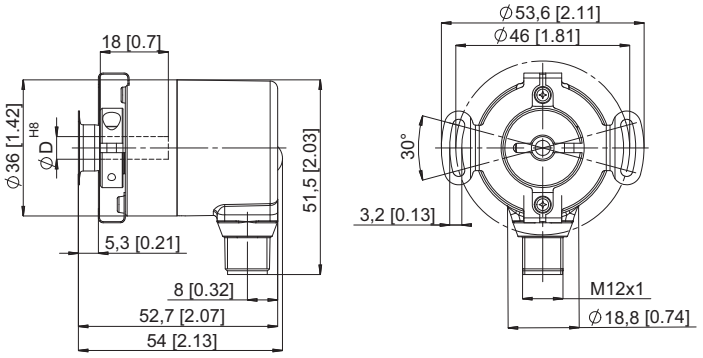
Dimensions hollow shaft version

With torque stop set, ø 36 mm

1 Torque stop slot,
Recommendation: Cylindrical pin DIN7, ø 4 mm



With stator coupling, ø 36 mm



ATEX, optical | **Sendix 7053 (Shaft)** | **SSI**

The Sendix 7053 Absolute Encoders – Singleturn offer Ex protection in a compact 70 mm seawater resistant housing, with an SSI interface and optical sensor technology.

These shock and vibration-resistant encoders operate flexibly with a resolution of up to 17 bits; they are also available with axial and radial cable outlets.

Ex approval | Safety-Lock™ | High rotational speedv | High IP value | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Short-circuit proof | Reverse polarity protection | Optical sensor | Seawater-resistant

Safe

- "Flameproof-enclosure" version: approved for zone 1, 2 and 21, 22
- Zone 1, 2 and 21, 22: Ex II 2G Ex d IIC T6 and Ex II 2D Ex tD A21 IP6X T85°C
- Can be operated in marine environments – housing and flange manufactured from seawater-resistant aluminium
- Remains sealed even in harsh everyday use and ensures highest safety against field breakdowns. IP67 protection

Compact

- Can be used even when space is tight
- Minimal installation depth, diameter 70 mm
- Compact cable outlet axial or radial

Order code Shaft version

8.7053	.	1	X	2	X	.	X	X	2	1	.	XXXX
Type		a	b	c	d		e	f	g	h		i 1)

a *Flange*
1 = clamping-synchronous flange ø 70 mm, IP67

b *Shaft (ø x L)*
1 = 12 x 25 mm, with keyway for 4 x 4 mm key
2 = 10 x 20 mm, with flat

c *Interface / Power supply*
2 = SSI or BiSS/ 10 … 30 V DC

d *Type of connection*
1 = axial cable (2 m PUR)
2 = radial cable (2 m PUR)
A = axial cable (length > 2 m)
B = radial cable (length > 2 m)
(preferred lengths, see **i**, e.g.: 0100 = 10 m)

e *Code*
B = SSI, Binary
G = SSI, Gray

f *Resolution* 2)
A = 10 bit ST
1 = 11 bit ST
2 = 12 bit ST
3 = 13 bit ST
4 = 14 bit ST
7 = 17 bit ST

g *Inputs / Outputs* 2)
2 = SET, DIR input
additional status output

h *Options*
1 = no option

i *Cable length in dm* 1)
0050 = 5 m
0100 = 10 m
0150 = 15 m

optional on request
- special cable length

Mounting accessory for shaft encoders

Coupling	Bellows coupling ø19 mm for shaft 10 mm	**8.0000.1101.1010**

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

2) Not applicable with connection types 1 and 2
1) Resolution, preset value and counting direction factory-programmable

ATEX, optical | **Sendix 7053 (Shaft)** | **SSI**

Explosion protection

EC type-examination certificate	PTB09 ATEX 1106 X
Category (gas)	Ex II 2G Ex d IIC T6
Category (dust)	Ex II 2D Ex tD A21 IP6X T85°C
Directive 94/9 EC	EN 60079-0; DIN EN 60079-1 EN 61241-0; DIN EN 61241-1

Mechanical characteristics

Max. speed		continuous 6 000 min^{-1}
Starting torque		< 0.05 Nm
Moment of inertia		4.0 x 10^{-6} kgm^2
Load capacity of shaft	radial axial	80 N 40 N
Weight		approx. 0.6 kg
Protection EN 60 529		IP67
Working temperature range		-40°C ... +60°C
Materials	shaft flange / housing cable	stainless steel seawater-resistant Al, type AlSiMgMn (EN AW-6082) or stainless steel PUR
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

General electrical characteristics

Power supply	10 ... 30 V DC
Current consumption (w/o output load)	max. 45 mA
Reverse polarity protection for power supply (U_B)	yes
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3
RoHS compliant acc. to	EU guideline 2002/95/EG

SSI interface

Output driver		RS485 Transceiver type
Permissible load/channel		max. 20 mA
Signal level	high low at I_{Load} = 20 mA	typ 3.8 V typ 1.3 V
Short-circuit proof outputs		yes[1]
Singleturn resolution		10…14 bit and 17 bit [2]
Number of revolutions		4096 (12 bit)
Code		Binary or Gray
SSI clock rate		< 14 bit: 50 kHz ... 2 MHz
Monoflop time		< 15 µs [2]

Note: if clock starts cycling within monoflop time a second data transfer starts with the same data. If clock starts cycling after monoflop time, the data transfer starts with updated values. The update rate depends on clock speed, data length and monoflop time.

Data refresh rate	up to 14 bit for 15 ... 17 bit	< 1 µ < 4 µs
Status and Parity bit		on request

SET input

Input		high active
Input type		Comparator
Signal level	high low	min. 60 % of +V max. +V max. 25 % of +V (+V = Power supply)
Input current		< 0.5 mA
Min. pulse duration (SET)		10 ms
Timeout after SET signal		14 ms
Response time (DIR input)		1 ms

The encoder can be set to zero at any position by means of a High signal on the SET input. Other preset values can be factory-programmed.
The SET input has a signal delay time of approximately 1 ms. Once the SET function has been triggered, the encoder requires an internal processing time of approximately 15 ms before the new position data can be read.

DIR input

A High signal switches the direction of rotation from the default CW to CCW. The reverse function can also be factory-programmed.

If DIR is reversed when the device is already switched on, this will be interpreted as an error. The status output switches to Low.

Status output

Output driver		Open Collector, internal pull-up resistor 22 kOhm
Permissible load		max. 20 mA
Signal level	high low	+V < 1 V
Active at		low

The status output serves to display various alarm or error messages.
The status output is high (Open Collector with internal pull-up 22k) in normal operation.

Power-ON delay

After Power-ON, the device requires a time of approximately 150 ms before valid data can be read.

1) Short-circuit with 0V or output, only one channel at a time, supply voltage correctly applied
2) Other options on request

ATEX, optical | **Sendix 7053 (Shaft)** | **SSI**

Terminal assignment

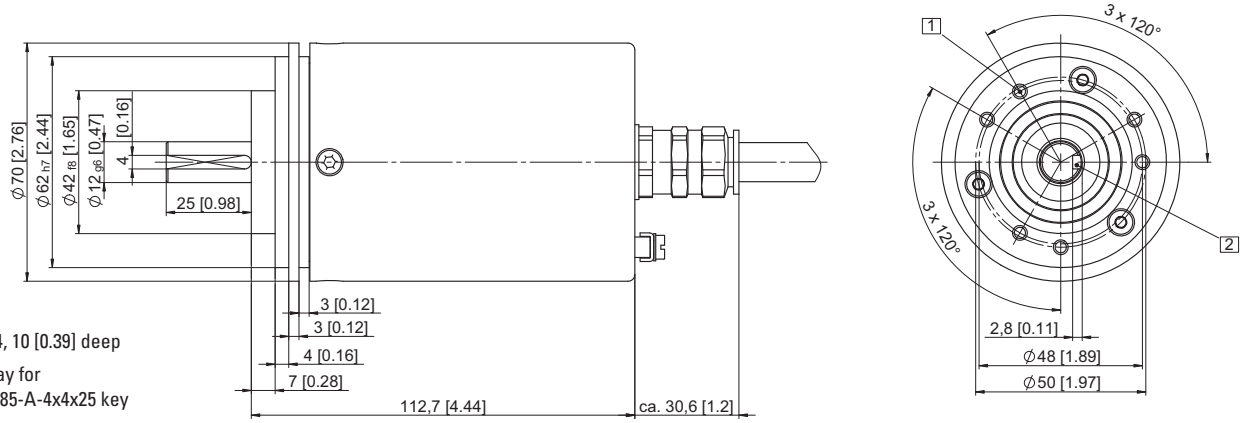
For output circuit 1 or 2

Signal	GND	+V	+C	-C	+D	-D	SET	DIR	Stat	PE	PE
Cable marking	1	2	3	4	5	6	7	8	9	yellow/green	shield

+V: Encoder power supply +V DC
GND: Encoder Ground GND (0V)
+C, -C: Clock signal
+D, -D: Data signal
SET: Set input. The current position becomes defined as position zero.
DIR: Direction input. If this input is active, output values are decreasing when shaft is turned clockwise
Stat: Status output
PE: Protective earth

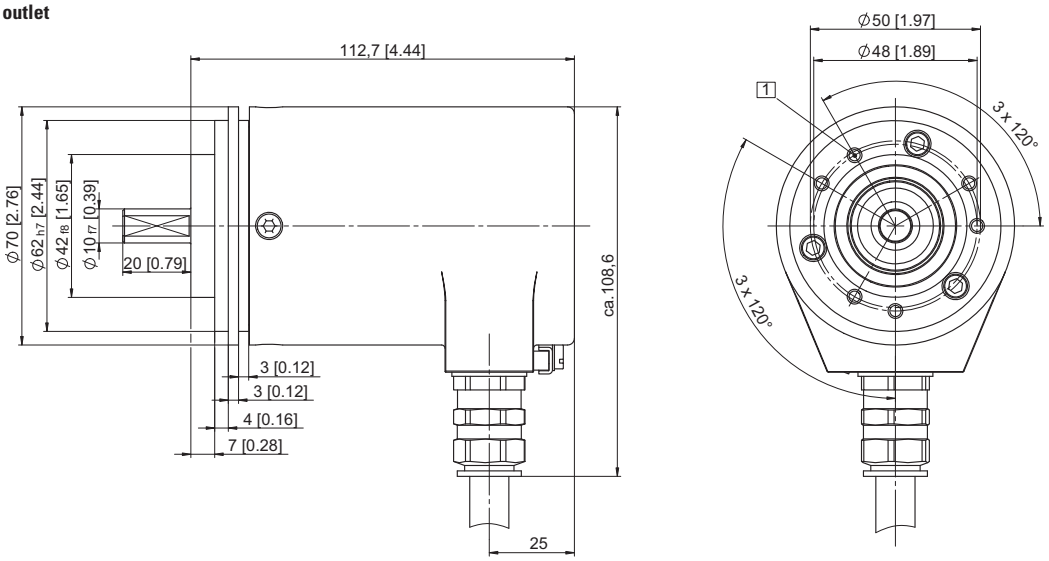
Dimensions

Shaft type 1 with axial cable outlet



1 6 x M4, 10 [0.39] deep
2 Keyway for DIN6885-A-4x4x25 key

Shaft type 2 with radial cable outlet



1 6 x M4, 10 [0.39] deep

ATEX, optical | **Sendix 7058 (Shaft)** | **Profibus-DP**

The Sendix 7058 absolute singleturn encoders offer Ex protection in a compact 70 mm seawater resistant housing, with a Profibus interface and optical sensor technology.

These shock and vibration-resistant encoders operate flexibly with a resolution of up to 16 bits; they are also available with axial and radial cable outlets.

Ex approval | Safety-Lock™ | High rotational speed | High IP value | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Short-circuit proof | Reverse polarity protection | Optical sensor | Seawater-resistant

Safe

- "Flameproof-enclosure" version: approved for zone 1, 2 and 21, 22
- Zone 1, 2 and 21, 22: Ex II 2G Ex d IIC T6 and Ex II 2D Ex tD A21 IP6X T85°C
- Can be operated in marine environments – housing and flange manufactured from seawater-resistant aluminium
- Remains sealed even in harsh everyday use and ensures highest safety against field breakdowns. IP67 protection

Compact

- Can be used even when space is tight
- Minimal installation depth, diameter 70 mm
- Compact cable outlet axial or radial

Order code Shaft version

8.7058	.	1	X	3	X	.	31	11	.	XXXX
Type		a	b	c	d		e			f 1)

a *Flange*
1 = clamping-synchronous flange ø 70 mm, IP67

b *Shaft (ø x L)*
1 = 12 x 25 mm, with keyway for 4 x 4 mm key
2 = 10 x 20 mm, with flat

c *Interface / Power supply*
3 = Profibus-DP V0 / 10 ... 30 V DC

d *Type of connection*
1 = axial cable (2 m PUR)
2 = radial cable (2 m PUR)
A = axial cable (length > 2 m)
B = radial cable (length > 2 m)
(preferred lengths, see **f**, e.g.: 0100 = 10 m)

e *Fieldbus profile*
31 = Profibus-DP V0 Encoder profile Class 2

f *Cable length in dm* 1)
0050 = 5 m
0100 = 10 m
0150 = 15 m

optional on request
- special cable length

Mounting accessory for shaft encoders

Coupling	Bellows coupling ø19 mm for shaft 10 mm	**8.0000.1101.1010**

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

1) Not applicable with connection types 1 and 2

ATEX, optical | Sendix 7058 (Shaft) | Profibus-DP

Explosion protection	
EC type-examination certificate	PTB09 ATEX 1106 X
Category (gas)	Ex II 2G Ex d IIC T6
Category (dust)	Ex II 2D Ex tD A21 IP6X T85°C
Directive 94/9 EC	EN 60079-0; DIN EN 60079-1 EN 61241-0; DIN EN 61241-1

Mechanical characteristics		
Max. speed		6 000 min^{-1} continuous
Starting torque		< 0.05 Nm
Moment of inertia		4.0 x 10^{-6} kgm^2
Load capacity of shaft	radial axial	80 N 40 N
Weight		approx. 0.6 kg
Protection EN 60 529		IP67
Working temperature range		-40°C ... +60°C
Materials	shaft flange / housing cable	stainless steel seawater-resistant Al, type AlSiMgMn (EN AW-6082) or stainless steel PUR
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

General electrical characteristics	
Power supply	10 ... 30 V DC
Current consumption (w/o output load)	max. 110 mA
Reverse polarity protection for power supply (U_B)	yes
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3
RoHS compliant acc. to	EU guideline 2002/95/EG

Interface characteristics Profibus-DP	
Resolution Singleturn	1 ... 65536 (16 bit), scaleable
Default value	8192 (13 bit)
Code	Binary
Interface	Specification according to Profibus-DP 2.0 / Standard (DIN 19245 Part 3) / RS485 galvanically isolated
Protocol	Profibus Encoder Profile V1.1 Class1 and Class 2 with manufacturer-specific add-ons
Baud rate	maximum 12 Mbit/s
Device address	software controlled setting of the device address via the SSA-service with a CLASS 2-Master. Default address: 125
Termination	active termination can only be switched on externally

Profibus Encoder-Profile V1.1

The PROFIBUS-DP device profile describes the functionality of the communication and the manufacturer-specific component within the PROFIBUS Fieldbus system. The Encoder Profile applies to encoders and defines the individual objects independently of the manufacturer. In addition, the profile makes provision for additional extended functions specific to the manufacturer. The use of PROFIBUS compatible devices ensures that the systems of today are ready to meet the demands of the future.

The following parameters can be programmed

- Direction of rotation
- Scaling – number of steps per revolution
- Preset value
- Diagnostics mode

The following functionality is integrated

- Galvanic isolation of the Bus stage with DC/DC converter
- Line Driver acc. to RS485 max. 12 MB
- Full Class 1 and Class 2 functionality
- Speed value

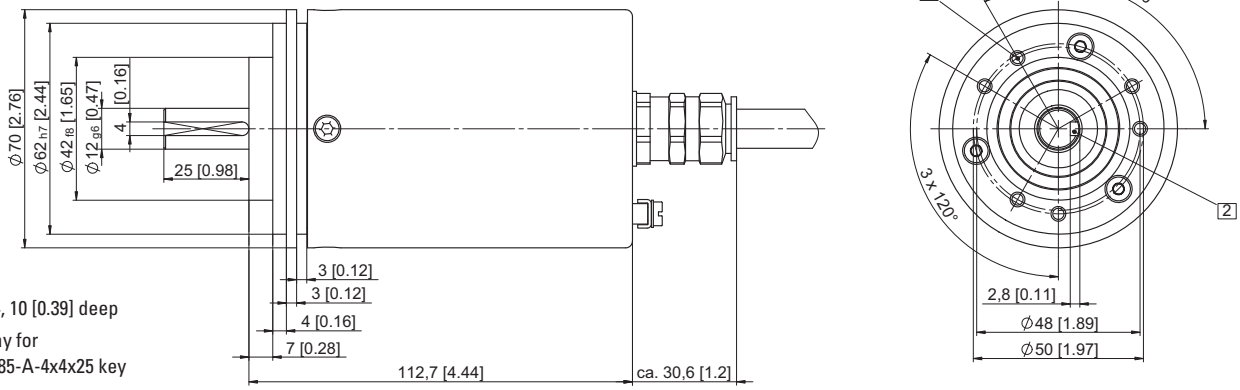
Terminal assignment

Signal	0 V	+V	BUS A IN	BUS B IN	BUS GND	BUS V DC	BUS A OUT	BUS B OUT
Cable marking	1	2	4	5	6	7	8	9

ATEX, optical | **Sendix 7058 (Shaft)** | **Profibus-DP**

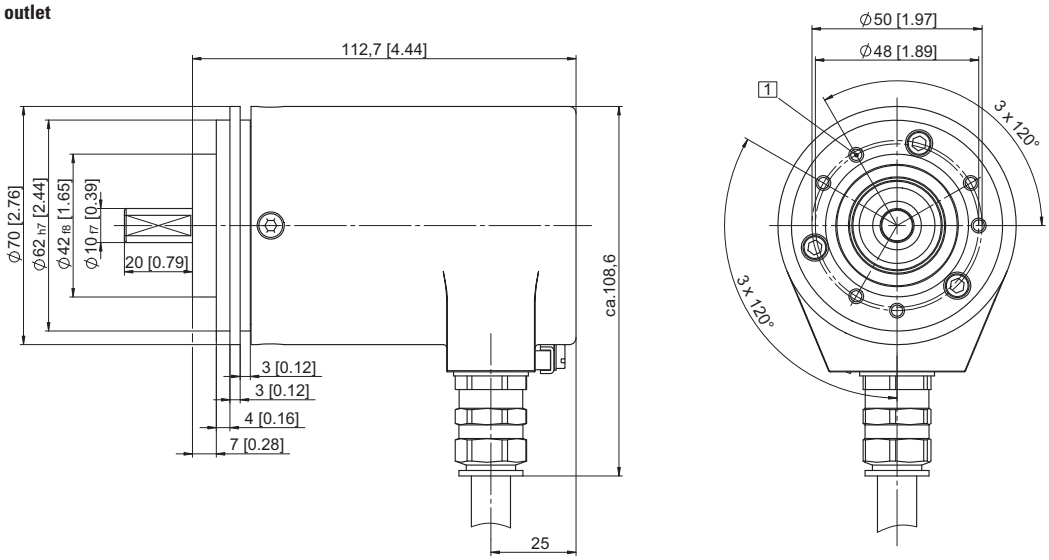
Dimensions

Shaft type 1 with axial cable outlet



1 6 x M4, 10 [0.39] deep
2 Keyway for DIN6885-A-4x4x25 key

Shaft type 2 with radial cable outlet



1 6 x M4, 10 [0.39] deep

ATEX, optical | **Sendix 7058 (Shaft)** | **CANopen**

The Sendix 7058 absolute singleturn encoders offer Ex protection in a compact 70 mm seawater resistant housing, with a CANopen interface and optical sensor technology.

These shock and vibration-resistant encoders operate flexibly with a resolution of up to 16 bits; they are also available with axial and radial cable outlets

Ex approval | Safety-Lock™ | High rotational speed | High IP value | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Short-circuit proof | Reverse polarity protection | Optical sensor | Seawater-resistant

Safe

- "Flameproof-enclosure" version: approved for zone 1, 2 and 21, 22
- Zone 1, 2 and 21, 22: Ex II 2G Ex d IIC T6 and Ex II 2D Ex tD A21 IP6X T85°C
- Can be operated in marine environments – housing and flange manufactured from seawater-resistant aluminium
- Remains sealed even in harsh everyday use and ensures highest safety against field breakdowns – IP67 protection.

Compact

- Can be used even when space is tight
- Minimal installation depth, diameter 70 mm
- Compact cable outlet axial or radial

Order code Shaft version

8.7058	.	1	X	2	X	.	21	11	.	XXXX
Type		a	b	c	d		e			f [1]

a *Flange*
1 = clamping-synchronous flange ø 70 mm, IP67

b *Shaft (ø x L)*
1 = 12 x 25 mm, with keyway for 4 x 4 mm key
2 = 10 x 20 mm, with flat

c *Interface / Power supply*
2 = CANopen DS301 V4.02 / 10 ... 30 V DC

d *Type of connection*
1 = axial cable (2 m PUR)
2 = radial cable (2 m PUR)
A = axial cable (length > 2 m)
B = radial cable (length > 2 m)
(preferred lengths, see **f**, e.g.: 0100 = 10 m)

e *Fieldbus profile*
21 = CANopen encoder profile DS406 V3.2

f *Cable length in dm* [1]
0050 = 5 m
0100 = 10 m
0150 = 15 m

optional on request
- special cable length

Mounting accessory for shaft encoders

Coupling	Bellows coupling ø19 mm for shaft 10 mm	**8.0000.1101.1010**

Programming set

including:	- Interface converter USB-CAN - Connection cable from interface converter to encoder - Power supply 90 ... 250 V AC - DVD with Ezturn® software	**8.0010.9000.0015**

Minimum System Requirements:
Operating system: WinXP SP3 or higher, Win7 in preparation
Processor: 1 GHz
RAM : 512 MB
Required disk space: 500 MB

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

1) Not applicable with connection types 1 and 2

ATEX, optical | Sendix 7058 (Shaft) | CANopen

Explosion protection

EC type-examination certificate	PTB09 ATEX 1106 X
Category (gas)	Ex II 2G Ex d IIC T6
Category (dust)	Ex II 2D Ex tD A21 IP6X T85°C
Directive 94/9 EC	EN 60079-0; DIN EN 60079-1 EN 61241-0; DIN EN 61241-1

Mechanical characteristics

Max. speed		6 000 min^{-1} continuous
Starting torque		< 0.05 Nm
Moment of inertia		4.0 x 10^{-6} kgm^2
Load capacity of shaft	radial axial	80 N 40 N
Weight		approx. 0.6 kg
Protection EN 60 529		IP67
Working temperature range		-40°C ... +60°C
Materials	shaft flange / housing cable	stainless steel seawater-resistant Al, type AlSiMgMn (EN AW-6082) or stainless steel PUR
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

General electrical characteristics

Power supply	10 ... 30 V DC
Current consumption (w/o output load)	max. 90 mA
Reverse polarity protection for power supply (U_B)	yes
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3
RoHS compliant acc. to	EU guideline 2002/95/EG

Interface characteristics CANopen

Resolution	1 ... 65536 (16 bit), (scalable: 1 ... 65536)
Default value	8192 (13 bit)
Code	Binary
Interface	CAN High-Speed according to ISO 11898, Basic- and Full-CAN, CAN Specification 2.0 B
Protocol	CANopen Profile DS406 V3.2 with manufacturer-specific add-ons
Baud rate	10 ... 1000 kbit/s (Software configurable)
Node address	1 ... 127 (Software configurable)
Switchable termination	Software configurable

General information about CANopen

The CANopen encoders support the latest CANopen communication profile according to DS301 V4.02 .

In addition, device-specific profiles like the encoder profile DS406 V3.2 are available.

The following operating modes may be selected: Polled Mode, Cyclic Mode, Sync Mode and a High Resolution Sync Protocol. Moreover, scale factors, preset values, limit switch values and many other additional parameters can be programmed via the CANbus. When switching the device on, all parameters are loaded from an EEPROM, where they were saved previously to protect them against power-failure.

As output values **position**, **speed**, **acceleration** as well as the **working area status** may be combined freely as PDO (PDO mapping)

CANopen Communication Profile DS301 V4.02

Among others, the following functionality is integrated:

Class C2 functionality
- NMT Slave
- Heartbeat Protocol
- High Resolution Sync Protocol
- Identity Object
- Error Behaviour Object
- Variable PDO Mapping self-start programmable (Power on to operational), 3 Sending PDO's
- Node address, baud rate and CANbus Programmable termination

CANopen Encoder Profile DS406 V3.2

The following parameters can be programmed:

- Event mode
- Units for speed selectable (Steps/Sec or RPM)
- Factor for speed calculation (e.g. measuring wheel circumference) Integration time for speed value of 1...32
- 2 work areas with 2 upper and lower limits and the corresponding output states
- Variable PDO mapping of position, speed, acceleration, working area status
- Extended failure management for position sensing with integrated temperature control
- User interface with visual display of bus and failure status - 3 LED's
- Optional - 32 CAMs programmable
- Customer-specific memory - 16 Bytes

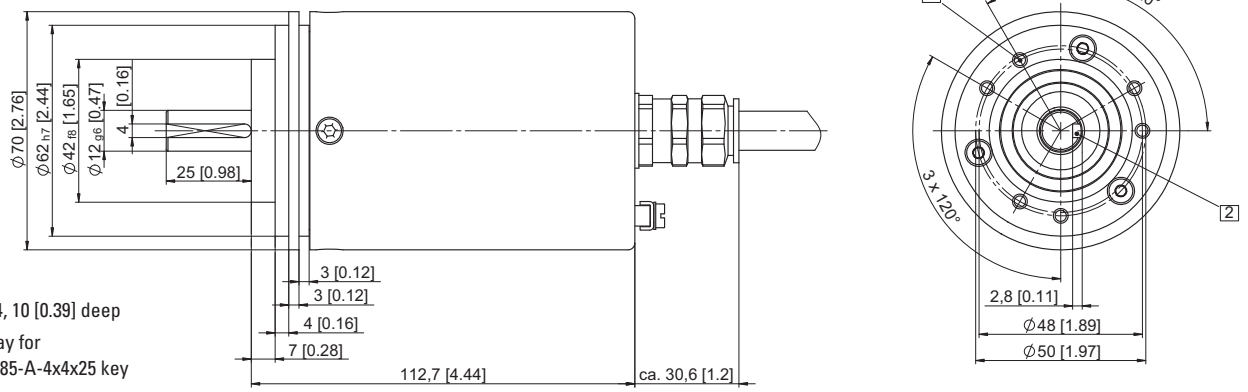
Terminal assignment

Signal	0 V	+V	CAN High	CAN Low	CAN GND	CAN High	CAN Low	CAN GND
Cable marking	1	2	4	5	6	7	8	9

ATEX, optical | **Sendix 7058 (Shaft)** | **CANopen**

Dimensions

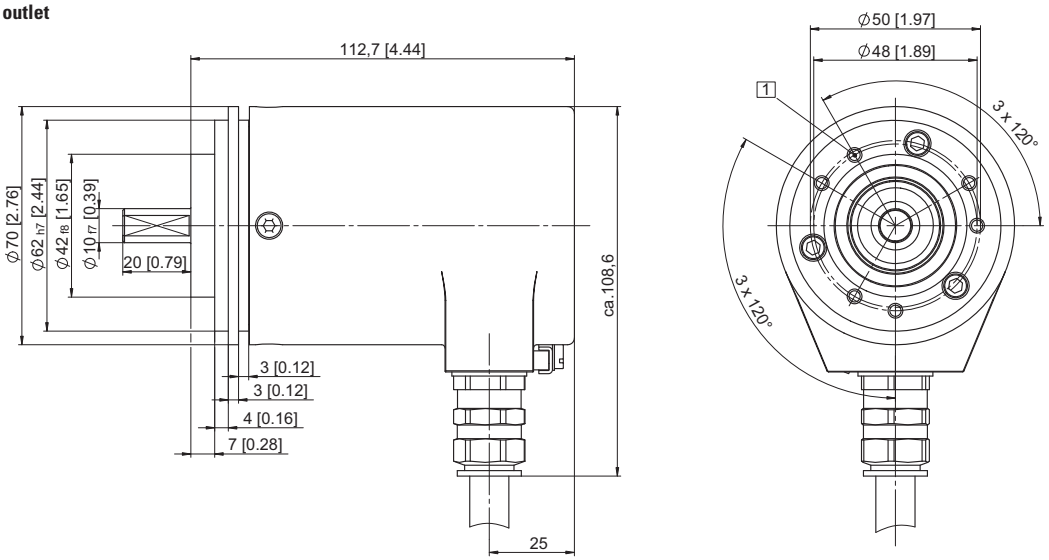
Shaft type 1 with axial cable outlet



1 6 x M4, 10 [0.39] deep

2 Keyway for DIN6885-A-4x4x25 key

Shaft type 2 with radial cable outlet



1 6 x M4, 10 [0.39] deep

ATEX, optical | **Sendix 7063 (Shaft)** | **SSI**

The Sendix 7063 absolute singleturn encoders offer Ex protection in a compact 70 mm seawater resistant housing, with an SSI interface and optical sensor technology.

These shock and vibration-resistant encoders operate flexibly with a resolution of up to 29 bits; they are also available with axial and radial cable outlets.

Ex approval | Mechanical drive | Safety-Lock™ | High rotational speed | High IP value | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Reverse polarity protection | Optical sensor | Seawater-resistant

Safe

- "Flameproof-enclosure" version: approved for zone 1, 2 and 21, 22
- Zone 1, 2 and 21, 22: Ex II 2G Ex d IIC T6 and Ex II 2D Ex tD A21 IP6X T85°C
- Can be operated in marine environments – housing and flange manufactured from seawater-resistant aluminium
- Remains sealed even in harsh everyday use and ensures highest safety against field breakdowns. IP67 protection

Compact

- Can be used even when space is tight
- Minimal installation depth, diameter 70 mm
- Compact cable outlet axial or radial

Order code Shaft version

8.7063 . 1 X 2 X . X X 2 1 . XXXX

Type | a b c d | e f g h | i [1]

a *Flange*
1 = clamping-synchronous flange ø 70 mm, IP67

b *Shaft (ø x L)*
1 = 12 x 25 mm, with keyway for 4 x 4 mm key
2 = 10 x 20 mm, with flat

c *Interface / Power supply*
2 = SSI or BiSS / 10 ... 30 V DC

d *Type of connection*
1 = axial cable (2 m PUR)
2 = radial cable (2 m PUR)
A = axial cable (length > 2 m)
B = radial cable (length > 2 m)
(preferred lengths, see **i**, e.g.: 0100 = 10 m)

e *Code*
B = SSI, Binary
G = SSI, Gray

f *Resolution* [2]
A = 10 bit ST
1 = 11 bit ST
2 = 12 bit ST
3 = 13 bit ST
4 = 14 bit ST
7 = 17 bit ST

g *Inputs / Outputs* [2]
2 = SET, DIR input
additional status output

h *Options*
1 = no option

i *Cable length in dm* [1]
0050 = 5 m
0100 = 10 m
0150 = 15 m

optional on request
- special cable length

Mounting accessory for shaft encoders

Coupling	Bellows coupling ø 19 mm for shaft 10 mm	**8.0000.1101.1010**

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

1) Not applicable with connection types 1 and 2
2) Resolution, preset value and counting direction factory-programmable

ATEX, optical | **Sendix 7063 (Shaft)** | **SSI**

Explosion protection

EC type-examination certificate	PTB09 ATEX 1106 X
Category (gas)	Ex II 2G Ex d IIC T6
Category (dust)	Ex II 2D Ex tD A21 IP6X T85°C
Directive 94/9 EC	EN 60079-0; DIN EN 60079-1 EN 61241-0; DIN EN 61241-1

Mechanical characteristics

Max. speed		continuous 6 000 min^{-1}
Starting torque		< 0.05 Nm
Rotor moment of inertia		4.0 x 10^{-6} kgm^2
Load capacity of shaft	radial axial	80 N 40 N
Weight		approx. 0.6 kg
Protection EN 60 529		IP67
Working temperature range		-40°C ... +60°C
Materials	shaft flange / housing cable	stainless steel seawater-resistant Al, type AlSiMgMn (EN AW-6082) or stainless steel PUR
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

General electrical characteristics

Power supply	10 ... 30 V DC
Current consumption (w/o output load)	max. 50 mA
Reverse polarity protection for power supply (U_B)	yes
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3
RoHS compliant acc. to	EU guideline 2002/95/EG

SSI Interface

Output driver		RS485 Transceiver type
Permissible load/channel		max. 20 mA
Signal level	high low at I_{Load} = 20 mA	typ 3.8 V typ 1.3 V
Short-circuit proof outputs		yes [1]
Singleturn resolution		10 ... 14 bit and 17 bit [2]
Number of revolutions		4096 (12 bit)
Code		Binary or Gray
SSI clock rate		< 14 bit: 50 kHz ... 2 MHz
Monoflop time		< 15 µs [2]

Note: if clock starts cycling within monoflop time a second data transfer starts with the same data. If clock starts cycling after monoflop time, the data transfer starts with updated values. The update rate depends on clock speed, data length and monoflop time.

Data refresh rate	up to 14 bit for 15 ... 17 bit	< 1 µ < 4 µs
Status and Parity bit		upon request

SET Input

Input		high active
Input type		Comparator
Signal level	high low	min. 60 % of +V max. +V max. 25 % of +V (+V = Power supply)
Input current		< 0.5 mA
Min. pulse duration (SET)		10 ms
Timeout after SET signal		14 ms
Response time (DIR input)		1 ms

The encoder can be set to zero at any position by means of a High signal on the SET input. Other preset values can be factory-programmed.
The SET input has a signal delay time of approximately 1 ms. Once the SET function has been triggered, the encoder requires an internal processing time of approximately 15 ms before the new position data can be read.

DIR Input

A High signal switches the direction of rotation from the default cw to ccw. The reverse function can also be factory-programmed.

If DIR is reversed when the device is already switched on, this will be interpreted as an error. The status output switches to Low.

Status output

Output driver		Open Collector, internal pull-up resistor 22 kOhm
Permissible load		max. 20 mA
Signal level	high low	+V < 1 V
Active at		low

The status output serves to display various alarm or error messages.
The status output is high (Open Collector with internal pull-up 22k) in normal operation.

Power-ON delay

After Power-On, the device requires a time of approximately 150 ms before valid data can be read.

1) Short-circuit with 0V or output, only one channel at a time, supply voltage correctly applied
2) Other options upon request

ATEX, optical | **Sendix 7063 (Shaft)** | **SSI**

Terminal assignment

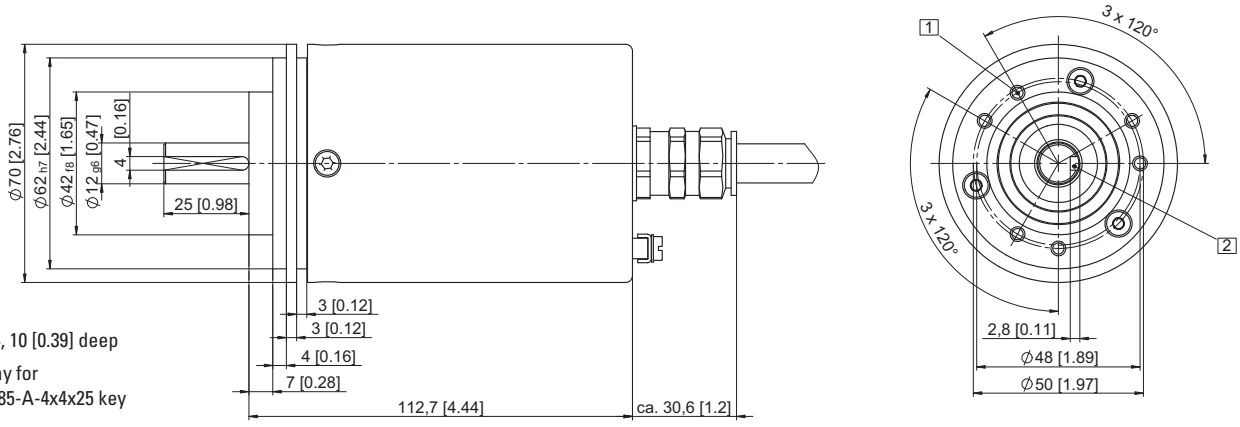
for output circuit 1 or 2

Signal	GND	+V	+C	-C	+D	-D	SET	DIR	Stat	PE	PE
Cable marking	1	2	3	4	5	6	7	8	9	yellow/green	shield

+V: Encoder power supply +V DC
GND: Encoder Ground GND (0V)
+C, -C: Clock signal
+D, -D: Data signal
SET: Set input. The current position becomes defined as position zero.
DIR: Direction input. If this input is active, output values are decreasing when shaft is turned clockwise
Stat: Status output
PE: Protective earth

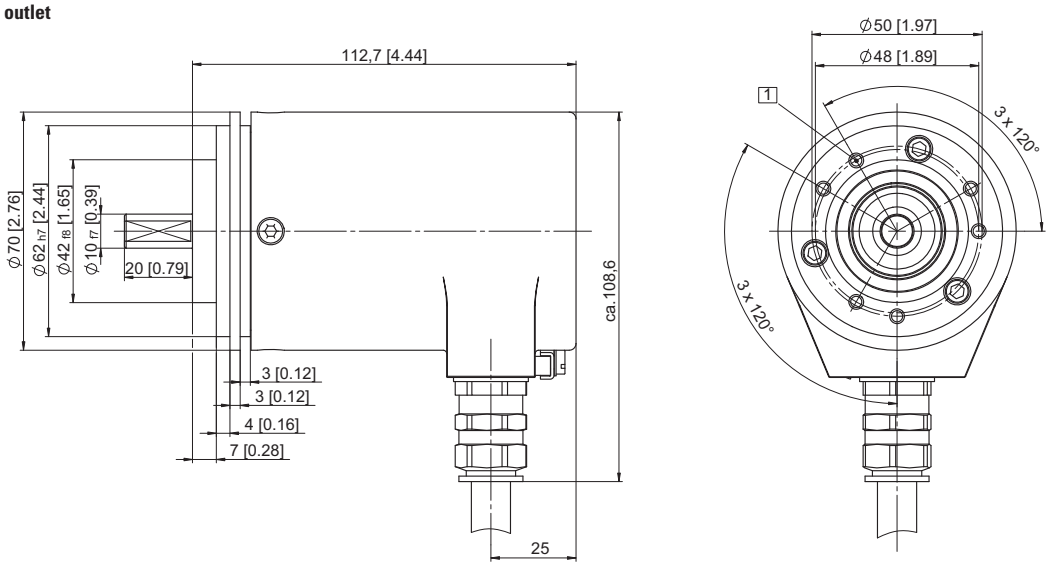
Dimensions

Shaft type 1 with axial cable outlet



1 6 x M4, 10 [0.39] deep
2 Keyway for DIN6885-A-4x4x25 key

Shaft type 2 with radial cable outlet



1 6 x M4, 10 [0.39] deep

ATEX, optical | **Sendix 7068 (Shaft)** | **Profibus-DP**

The Sendix 7068 absolute singleturn encoders offer Ex protection in a compact 70 mm seawater resistant housing, with a Profibus interface and optical sensor technology.

These shock and vibration-resistant encoders operate flexibly with a resolution of up to 28 bits; they are also available with axial and radial cable outlets.

PROFIBUS®

Safe

- "Flameproof-enclosure" version: approved for zone 1, 2 and 21, 22
- Zone 1, 2 and 21, 22: Ex II 2G Ex d IIC T6 and Ex II 2D Ex tD A21 IP6X T85°C
- Can be operated in marine environments – housing and flange manufactured from seawater-resistant aluminium
- Remains sealed even in harsh everyday use and ensures highest safety against field breakdowns. IP67 protection

Compact

- Can be used even when space is tight
- Minimal installation depth, diameter 70 mm
- Compact cable outlet axial or radial

Order code Shaft version

8.7068	.	1	X	3	X	.	31	11	.	XXXX
Type		a	b	c	d		e			f [1]

a *Flange*
1 = clamping-synchronous flange ø 70 mm, IP67

b *Shaft (ø x L)*
1 = 12 x 25 mm, with keyway for 4 x 4 mm key
2 = 10 x 20 mm, with flat

c *Interface / Power supply*
3 = Profibus-DP V0 / 10 ... 30 V DC

d *Type of connection*
1 = axial cable (2 m PUR)
2 = radial cable (2 m PUR)
A = axial cable (length > 2 m)
B = radial cable (length > 2 m)
(preferred lengths, see **f**, e.g.: 0100 = 10 m)

e *Fieldbus profile*
31 = Profibus-DP V0 encoder profile Class 2

f *Cable length in dm* [1]
0050 = 5 m
0100 = 10 m
0150 = 15 m

optional on request
- special cable length

Mounting accessory for shaft encoders

Coupling	Bellows coupling ø 19 mm for shaft 10 mm	**8.0000.1101.1010**

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

1) Not applicable with connection types 1 and 2

ATEX, optical | Sendix 7068 (Shaft) | Profibus-DP

Explosion protection

EC type-examination certificate	PTB09 ATEX 1106 X
Category (gas)	Ex II 2G Ex d IIC T6
Category (dust)	Ex II 2D Ex tD A21 IP6X T85°C
Directive 94/9 EC	EN 60079-0; DIN EN 60079-1 EN 61241-0; DIN EN 61241-1

Mechanical characteristics

Max. speed		6 000 min^{-1} continuous
Starting torque		< 0.05 Nm
Rotor moment of inertia		4.0 x 10^{-6} kgm^2
Load capacity of shaft	radial axial	80 N 40 N
Weight		approx. 0.6 kg
Protection EN 60 529		IP67
Working temperature range		-40°C ... +60°C
Materials	shaft flange / housing cable	stainless steel seawater-resistant Al, type AlSiMgMn (EN AW-6082) or stainless steel PUR
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

General electrical characteristics

Power supply	10 ... 30 V DC
Current consumption (w/o output load)	max. 120 mA
Reverse polarity protection for power supply (U_B)	yes
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3
RoHS compliant acc. to	EU guideline 2002/95/EG

Interface characteristics Profibus-DP

Resolution Singleturn	1 ... 65536 (16 bit), scaleable 1 ... 65536 Default value: 8192 (13 bit)
Total resolution	28 bit (scaleable 1 ... 2^{28} steps), Default: 25 bit
Number of revolutions	4096 (12 bit), scaleable 1 ... 4096
Code	Binary
Interface	Specification according to Profibus-DP 2.0 / Standard (DIN 19245 Part 3) / RS485 galvanically isolated
Protocol	Profibus Encoder Profile V1.1 Class1 and Class 2 with manufacturer-specific add-ons
Baud rate	maximum 12 Mbit/s
Device address	software controlled setting of the device address via the SSA-service with a CLASS 2-Master. Default address: 125
Termination	active termination can only be switched on externally

Profibus Encoder-Profile V1.1

The PROFIBUS-DP device profile describes the functionality of the communication and the manufacturer-specific component within the PROFIBUS Fieldbus system. The Encoder Profile applies to encoders and defines the individual objects independently of the manufacturer. In addition, the profile makes provision for additional extended functions specific to the manufacturer. The use of PROFIBUS compatible devices ensures that the systems of today are ready to meet the demands of the future.

The following parameters can be programmed

- Direction of rotation
- Scaling – number of steps per revolution
- Preset value
- Diagnostics mode

The following functionality is integrated

- Galvanic isolation of the Bus stage with DC/DC converter
- Line Driver acc. to RS485 max. 12 MB
- Full Class 1 and Class 2 functionality
- Speed value

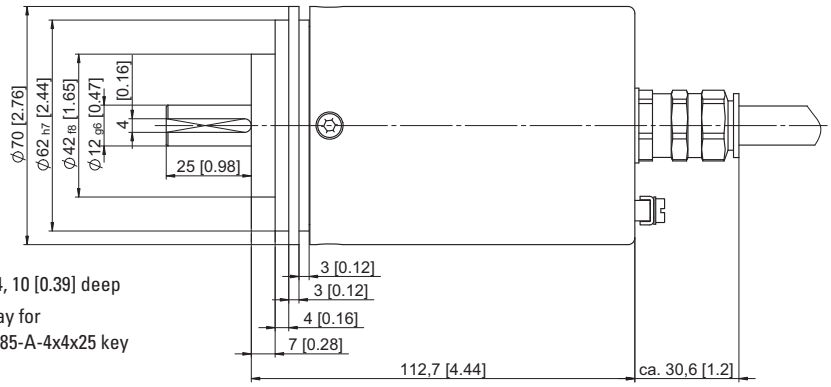
Terminal assignment

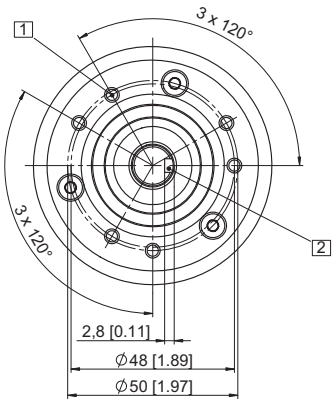
Signal	0 V	+V	BUS A IN	BUS B IN	BUS GND	BUS V DC	BUS A OUT	BUS B OUT
Cable marking	1	2	4	5	6	7	8	9

ATEX, optical | **Sendix 7068 (Shaft)** | **Profibus-DP**

Dimensions

Shaft type 1 with axial cable outlet

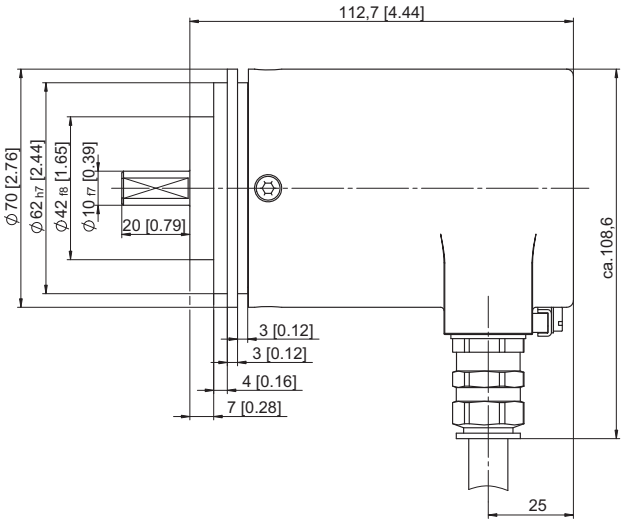


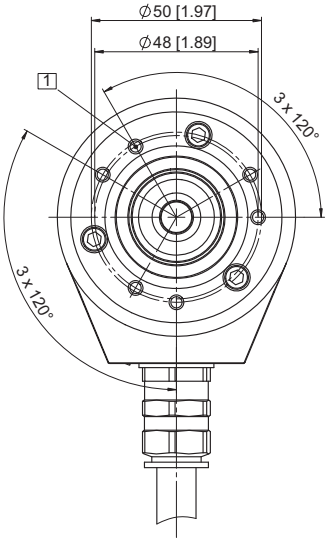


1 6 x M4, 10 [0.39] deep

2 Keyway for DIN6885-A-4x4x25 key

Shaft type 2 with radial cable outlet





1 6 x M4, 10 [0.39] deep

ATEX, optical | **Sendix 7068 (Shaft)** | **CANopen**

The Sendix 7068 absolute singleturn encoders offer Ex protection in a compact 70 mm seawater resistant housing, with a CANopen interface and optical sensor technology.

These shock and vibration-resistant encoders operate flexibly with a resolution of up to 28 bits; they are also available with axial and radial cable outlets

CANopen®

Safe

- "Flameproof-enclosure" version: approved for zone 1, 2 and 21, 22
- Zone 1, 2 and 21, 22: Ex II 2G Ex d IIC T6 and Ex II 2D Ex tD A21 IP6X T85°C
- Can be operated in marine environments – housing and flange manufactured from seawater-resistant aluminium
- Remains sealed even in harsh everyday use and ensures highest safety against field breakdowns. IP67 protection

Compact

- Can be used even when space is tight
- Minimal installation depth, diameter 70 mm
- Compact cable outlet axial or radial

Order code Shaft version

8.7068	.	1	X	2	X	.	21	11	.	XXXX
Type		a	b	c	d		e			f 1)

a *Flange*
1 = clamping-synchronous flange ø 70 mm, IP67

b *Shaft (ø x L)*
1 = 12 x 25 mm, with keyway for 4 x 4 mm key
2 = 10 x 20 mm, with flat

c *Interface / Power supply*
2 = CANopen DS301 V4.02 / 10 ... 30 V DC

d *Type of connection*
1 = axial cable (2 m PUR)
2 = radial cable (2 m PUR)
A = axial cable (length > 2 m)
B = radial cable (length > 2 m)
(preferred lengths, see **f**, e.g.: 0100 = 10 m)

e *Fieldbus profile*
21 = CANopen encoder profile DS406 V3.2

f *Cable length in dm* 1)
0050 = 5 m
0100 = 10 m
0150 = 15 m

optional on request
- special cable length

Mounting accessory for shaft encoders

Coupling	Bellows coupling ø 19 mm for shaft 10 mm	**8.0000.1101.1010**

Programming set

including:	- Interface converter USB-CAN - Connection cable from interface converter to encoder - Power supply 90 ... 250 V AC - DVD with Ezturn® software	**8.0010.9000.0015**

Minimum System Requirements:
Operating system: Windows XP SP3 or higher, Win7 in preparation
Processor: 1 GHz
RAM : 512 MB
Required disk space: 500 MB

Further accessories can be found in the Accessories section or in the Accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

1) Not applicable with connection types 1 and 2

Absolute Encoders – Multiturn

ATEX, optical | Sendix 7068 (Shaft) | CANopen

Explosion protection

EC type-examination certificate	PTB09 ATEX 1106 X
Category (gas)	Ex II 2G Ex d IIC T6
Category (dust)	Ex II 2D Ex tD A21 IP6X T85°C
Directive 94/9 EC	EN 60079-0; DIN EN 60079-1 EN 61241-0; DIN EN 61241-1

Mechanical characteristics

Max. speed		6 000 min^{-1} continuous
Starting torque		< 0.05 Nm
Rotor moment of inertia		4.0 x 10^{-6} kgm^2
Load capacity of shaft	radial axial	80 N 40 N
Weight		approx. 0.6 kg
Protection EN 60 529		IP67
Working temperature range		-40°C ... +60°C
Materials	shaft flange / housing cable	stainless steel seawater-resistant Al, type AlSiMgMn (EN AW-6082) or stainless steel PUR
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

General electrical characteristics

Power supply	10 ... 30 V DC
Current consumption (w/o output load)	max. 100 mA
Reverse polarity protection for power supply (U_B)	yes
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3
RoHS compliant acc. to	EU guideline 2002/95/EG

Interface characteristics CANopen

Resolution Singleturn	1 ... 65536 (16 bit), scalable 1 ... 65536 Default value: 8192 (13 bit)
Total resolution	28 bit (scalable 1 ... 2^{28} steps), Default: 25 bit
Code	Binary
Interface	CAN High-Speed according to ISO 11898, Basic- and Full-CAN, CAN Specification 2.0 B
Protocol	CANopen Profile DS406 V3.2 with manufacturer-specific add-ons
Baud rate	10 ... 1000 kbit/s (Software configurable)
Node address	1 ... 127 (Software configurable)
Switchable termination	Software configurable

General information about CANopen

The CANopen encoders support the latest CANopen communication profile according to DS301 V4.02 .

In addition, device-specific profiles like the encoder profile DS406 V3.2 are available.

The following operating modes may be selected: Polled Mode, Cyclic Mode, Sync Mode and a High Resolution Sync Protocol. Moreover, scale factors, preset values, limit switch values and many other additional parameters can be programmed via the CAN-Bus. When switching the device on, all parameters are loaded from an EEPROM, where they were saved previously to protect them against power-failure.

As output values **position**, **speed**, **acceleration** as well as the **working area status** may be combined freely as PDO (PDO mapping)

CANopen Communication Profile DS301 V4.02

Among others, the following functionality is integrated:

Class C2 functionality
- NMT Slave
- Heartbeat Protocol
- High Resolution Sync Protocol
- Identity Object
- Error Behaviour Object
- Variable PDO Mapping self-start programmable (Power on to operational), 3 Sending PDO's
- Node address, baud rate and CANbus Programmable termination

CANopen Encoder Profile DS406 V3.2

The following parameters can be programmed:

- Event mode
- Units for speed selectable (Steps/Sec or RPM)
- Factor for speed calculation (e.g. measuring wheel circumference) Integration time for speed value of 1...32
- 2 work areas with 2 upper and lower limits and the corresponding output states
- Variable PDO mapping of position, speed, acceleration, working area status
- Extended failure management for position sensing with integrated temperature control
- User interface with visual display of bus and failure status - 3 LED's
- Optional - 32 CAMs programmable
- Customer-specific memory - 16 Bytes

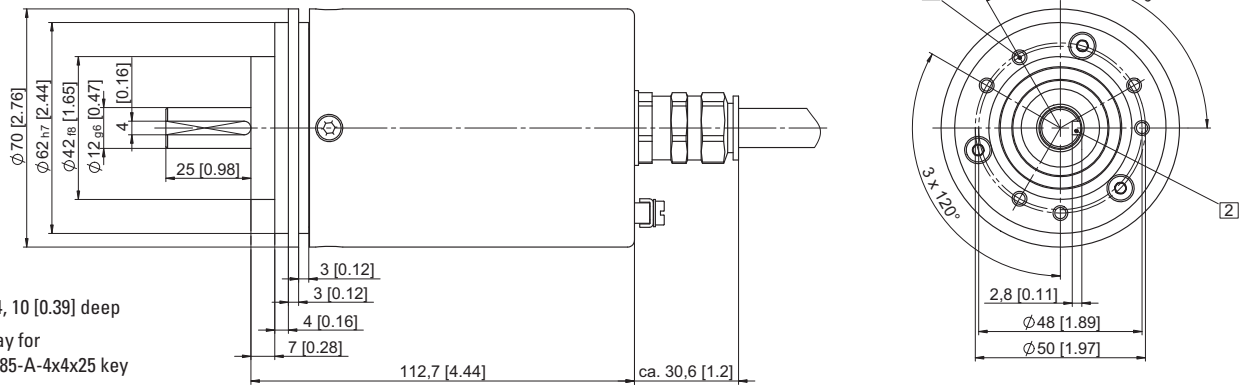
Terminal assignment

Signal	0 V	+V	CAN High	CAN Low	CAN GND	CAN High	CAN Low	CAN GND
Cable marking	1	2	4	5	6	7	8	9

ATEX, optical | **Sendix 7068 (Shaft)** | **CANopen**

Dimensions

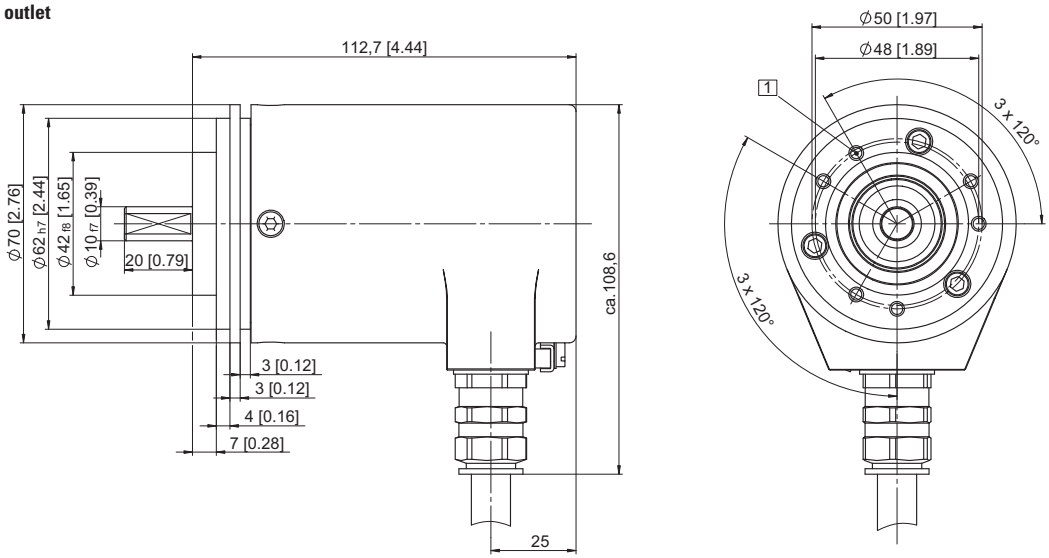
Shaft type 1 with axial cable outlet



1 6 x M4, 10 [0.39] deep

2 Keyway for DIN6885-A-4x4x25 key

Shaft type 2 with radial cable outlet



1 6 x M4, 10 [0.39] deep

Inclinometer | IS60, 2-dimensional | CANopen

The inclinometer IS60 permits 2-dimensional inclinations to be measured. Versions are available for the measuring ranges ± 10°, ± 45° or ± 60°.

The sensor has a standardised CANopen interface, which enables easy configuration and start-up. All the parameters are stored in the internal permanent memory.

RoHS

CANopen

High IP value | Shock / vibration resistant | Reverse polarity protection

Robust and reliable

- Protection rating IP68
- Robust plastic housing
- High shock resistance

User-friendly and accurate

- High resolution and accuracy
- Programmable vibration suppression
- High sampling rate and bandwidth

Order code Inclinometer IS60

8.IS60	.	2	X	5	2	3
Type		a	b	c	d	e

a *Measuring direction*
2 = 2-dimensional X/Y

b *Measuring range*
1 = ± 10°
2 = ± 45°
3 = ± 60°

c *Interface*
5 = CANopen

d *Supply voltage*
2 = 10 ... 30 V DC

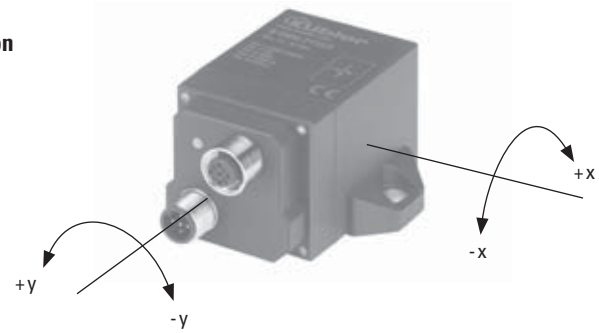
e *Type of connection*
3 = 2 x M12 connector

Connection Technology

Connectors, self-assembly (straight)	Coupling M12 for Bus in	**05.B-8151/9**
	Connector M12 for Bus out	**05.BS-8151-0/9**
Cordset, pre-assembled with 6 m PVC cable	Coupling M12 for Bus in	**05.00.6021.2211.006M**
	Connector M12 for Bus out	**05.00.6021.2411.006M**

Additional connectors can be found in the Connection Technology section or in the Connection Technology area of our website at: www.kuebler.com/connection_technology.

Direction of Inclination



1) In relation to the supply voltage 5 V DC
2) Only in combination with interface 4

Inclinometer | IS60, 2-dimensional | CANopen

Mechanical characteristics

Connection CAN	M12 connector, 5-pin
Weight	approx. 0.2 kg
Protection EN 60 529	IP68
Working temperature range	-40°C ... +80°C
Materials	plastic PBT-GF20-V0
Shock resistance	30 g 11ms
Vibration resistance	55Hz (1mm)
Dimensions	68 x 42.5 x 42.5 mm

Interface characteristics CANopen

Interface	CANopen according to CiA DS-301, Profile to CiA DSP-410
Data rates	10k, 20k, 50k, 125k, 250k, 500k, 800k bit/s, 1 Mbit/s
Functions	TPDO (RTR, cyclic, event-driven, synchronized), parameterization per SDO and object register, digital filter (Butterworth Low pass, 8th order), SYNC Consumer, EMCY Producer, output and control of internal device temperature (±2.0 K accuracy), failure control with the help of Heartbeat or Nodeguarding / Lifeguarding
Note ID	1…127

General electrical characteristics

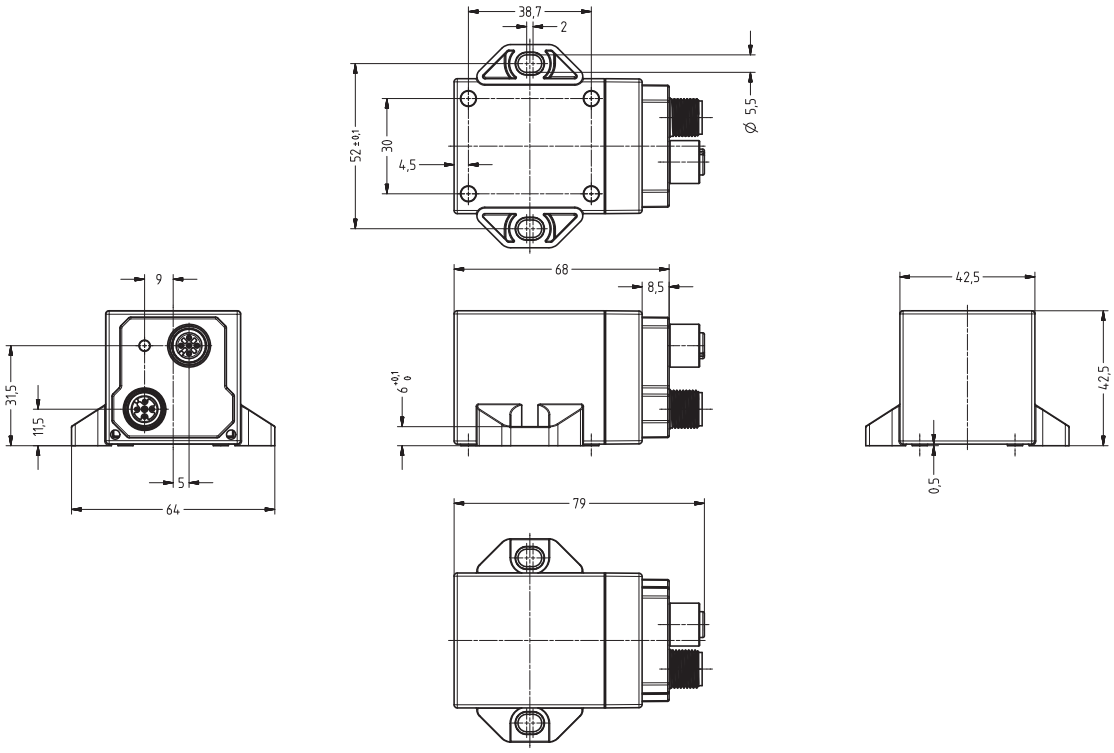
Supply voltage		10 ... 30 V DC
Power consumption (no load)		40 ... 105 mA
Reverse polarity protection (U_B)		yes
Measuring axes		2 (X/Y)
Measuring range		± 10°, ± 45°, ± 60°
Resolution	for version ± 10°	0.05°
	for version ± 45° and ± 60°	0.1°
Absolute accuracy		
	for version ± 10°	0.2°
	for version ± 45°	0.3°
	for version ± 60°	0.4°
Calibration accuracy (at 25°C)		± 0.1° (Zero point and final values)
Temperature drift (Zero point)		typ. ± 0.008°/K
Sampling rate		100 Hz
CE compliant acc. to		EN 61326-2-3 EMC requirements for transducers
RoHS compliant acc. to		EU guideline 2002/95/EG

A full description of the technical data can be found in the relevant product manual at www.kuebler.com.

Terminal assignment

PIN	Signal	Assignment
1	CAN_SHLD	Shield
2	CAN V+	Supply voltage (+24 V DC)
3	CAN_GND	GND
4	CAN_H	CAN_H Bus cable
5	CAN_L	CAN_L-Bus cable

Dimensions



Connection of motor and encoder | Flexible shaft coupling | Paguflex

The safe, uncomplicated and economical solution, if drive shafts with angular, radial and/or axial displacement are to be friction-locked together.

Order-No.	8.0000.1G01.0606

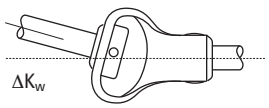
Size 1
Bore diameter both sides 6 mm

Order-No.	8.0000.1H01.1010

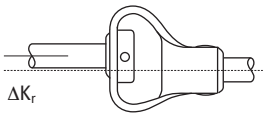
Size 2
Bore diameter both sides 10 mm

Functional principle

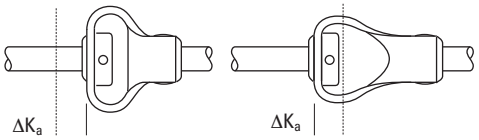
Compensation of an angular misalignment



Compensation of a radial misalignment



Compensation of a axial misalignment

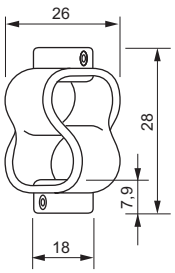


Technical data

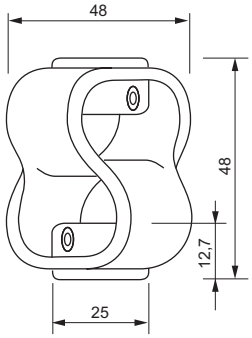
Type		8.0000.1**G**01.0606	8.0000.1**H**01.1010
max. torque with displacement $K_W \leq 1°$, $K_a \leq 2$ mm, $K_r \leq 0.5$ mm	$T_K max_1$ [Nm]	0.8	3.0
max. torque with max. angular and radial displacement	$T_K max_2$ [Nm]	0.5	1.8
Compliance			
Axial misalignment	$2 \cdot \Delta K_a$ [mm]	9.0	15
Radial misalignment	ΔK_r [mm]	2.6	3.2
Angular misalignment	ΔK_W [°]	10	15
Working temperature	[°C]	-40 ... +100	-40 ... +100

Dimensions

Size 1



Size 2



Optical fibre signal transmission | SSI | Optical fibre transmitter and receiver

eco plus

Cost advantage compared to conventional wiring over 150 m length*

Optical fibre transmission system for SSI absolute encoders

The system is made up of an optical fibre transmitter and an optical fibre receiver.

The optical fibre transmitter converts the electrical signals of a normal absolute encoder with Synchronous Serial Interface (SSI) into a light signal for transmission by means of an optical fibre. The receiving module converts the optical signal back into electrical signals. Absolute signals can be transmitted safely through one glass fibre over distances of up to 1500 m.

The resolution of 13 bit for a singleturn encoder or 25 bit for a multiturn encoder can be defined by means of a DIP-switch on the front side of the module.

Reliable transmission

- Safe signal transmission up to 1500 m
- Resists extremely strong electro-magnetic fields

Easy installation

- Signal transmission via a single glass fibre.
- Resolution of 13 bit or 25 bit can be set via DIP-switch
- LED for monitoring of power supply, clock and date
- DIN-rail mounting – requires min. installation space – only 22 mm wide

Application areas

- Process control technology and automation technology
- Applications sensitive to interference
- High voltage plants
- Plants with long transmission distances
- Potential separation
- Explosive areas

Order code Optical fibre transmitter / receiver

LWL X(a) . A X(b)

a
S = Optical fibre transmitter
E = Optical fibre receiver

b *Supply voltage*
1 = 10 ... 30 V DC
4 = 5 V DC

Scope of delivery:
- Optical fibre module
- Operating manual, dual language, German and English

Accessories

Simplex Patch cable
ST-ST - Multimode

Connector:
2 x ST/PC, Optical fibre:
1 x 50/125

05.B09-B09-821-XXXX

XXXX = Length in m
Standard lengths: 2 m, 5 m, 8 m, 10 m, 15 m, 20 m, ... (in 5 m steps)

ST Multimode coupling

Barrel: ceramic, slotted

05.LWLK.001

* Comparison of costs:
Costs per meter standard copper cable compared to costs per meter optical fibre signal cable + costs of transmitter + costs of receiver

Optical fibre signal transmission | SSI | Optical fibre transmitter and receiver

Technical data

Supply voltage	10 ... 30 V DC or 5 V DC ± 5%
Power consumption per module U_B10 ... 30 V DC	max 1.6 W
U_B 5 V DC	max 0.8 W
Operating voltage reverse connection protection	available
Encoder inputs optical fibre transmitter	-T, +T and -D, +D
SSI clock rate	500 kHz fixed setting
Optical wavelength	820 nm (infrared)
Optical transmission rate	120 Mbit/s
Optical fibre connection	ST connector, 13 mm, ø 9 mm, on the bottom side of the housing

Glass fibre	multimode fibre, 50/125 µm, 62.5/125 µm
Max. optical fibre transmission distance	max. 1500 m
Dimensions (W x L x H)	22.5 x 110.8 x 88.4 mm
Protection	IP40, terminals IP20
Terminals max.conductor diameter	protected against contact 2.5 mm²
Temperature range	-10°C ... +60°C
Weight	approx. 100 g
Standards	EN 55 011 Class B1 EN 61 000-6-2: 2006

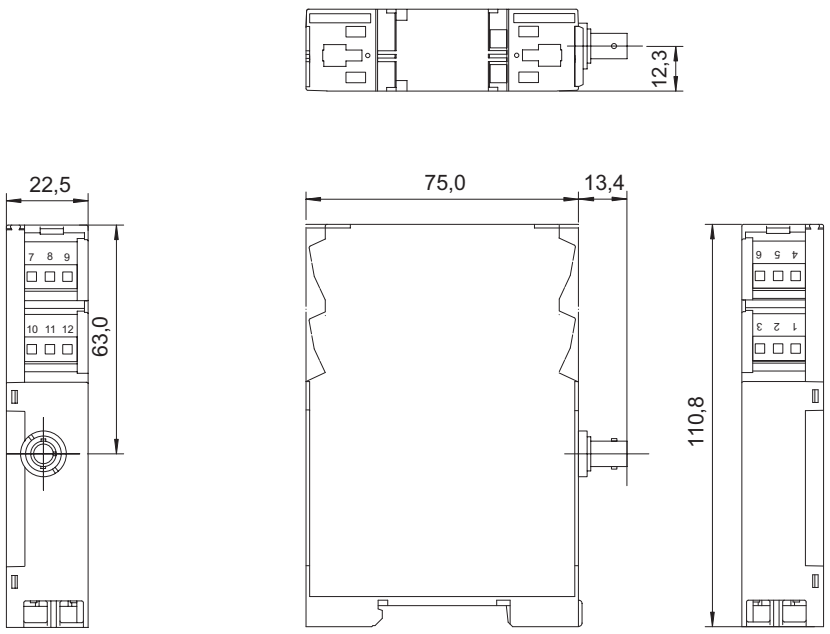
Connection diagram
Optical fibre transmitter

Pin	Signal
1	0 V (GND)
2	+ U_B
3	+ T
4	- T
5	+ D
6	- D
7	0 V (GND)
8	+ U_B

Connection diagram
Optical fibre receiver

Pin	Signal	
1	0 V (GND)	from power supply
2	+ U_B	
3	+ D	to controller
4	- D	
5	+ T	from controller
6	- T	
7	emitter (-)	optocoupler output alarm output
8	collector (+)	

Dimensions



M12, M23 Connection Technology

M12 – Accessories

Securing clip for M12 connectors EX zone 2/22

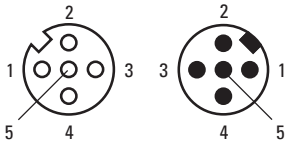
plastic housing

Suitable for use in areas with combustible dust acc. to EN 50281-1-1

Order No.
8.0000.5000.0006

T-junction, coupling – coupling – connector

IP67, metal / plastic housing



suitable for:
M12 connector and coupling

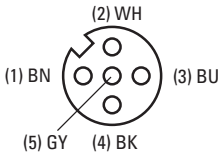
Order No.
05.FKM5-FKM5-FSM5

M12 – Cordsets, pre-assembled (Analogue)

(Working temperature range -30°C ... +80°C)

Coupling, PVC cable, 5-pin

straight, IP67, single-ended plug housing metal / plastic



suitable for our analogue series:

A50	B80
C120	D135
IS40	

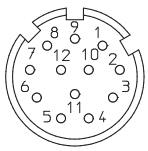
cable length
2 m
5 m
10 m
15 m

Order No.
05.WAKS4.5-2/P00
05.WAKS4.5-5/P00
05.WAKS4.5-10/P00
05.WAKS4.5-15/P00

M23 – Connectors, self-assembly, 12-pin

Coupling, Ex zone 2/22

pin socket assignment cw
IP67, metal housing



Solder connections,
for cable ø 5,5 ... 10,5 mm

suitable for our series:

5000 / 5020	5814 / 5834
580X / 582X	585X / 587X
586X / 588X	9000
908X	A02X

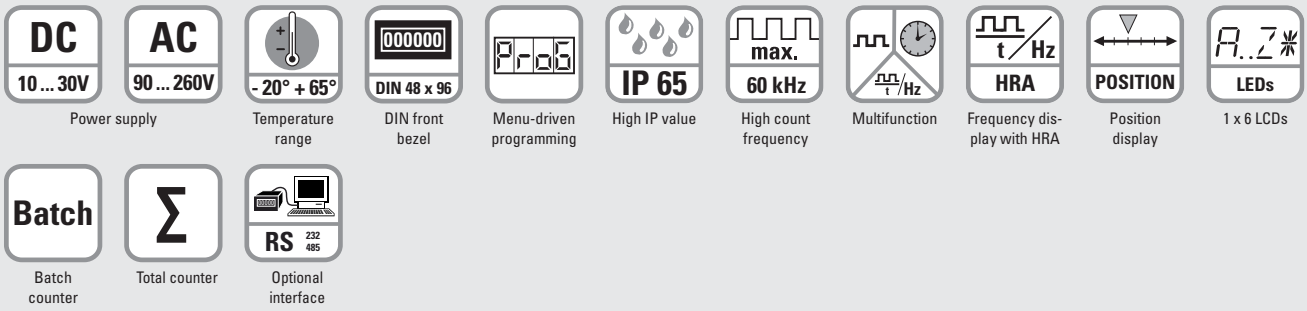
Order No.
8.0000.5012.0000.Ex

LED Preset Counters | 2 Presets | Codix 560

pending

With its automatic help texts, clearly and legibly displayed on 14 LED segments, the Codix 560 preset counter takes the user effortlessly through the programming. The large user-friendly front keys can be operated even when wearing gloves.

New: now available also with RS 232/485 interface and MODUBS and CR-LF protocol



Power supply | Temperature range | DIN front bezel | Menu-driven programming | High IP value | High count frequency | Multifunction | Frequency display with HRA | Position display | 1 x 6 LCDs

Batch counter | Total counter | Optional interface

Multifunction

- Counter, Tachometer, Timer and Position Display in one device
- Can be used as Preset Counter, Batch Counter or Total Counter
- 2 relays (change-over)
- Many different count modes
- Scalable display
- Set value
- Multi-range power supply for AC or DC
- Readable or configurable via RS 232/485 interface
- Allows direct connection of a large display or printer

User-friendly:

- Automatic help texts, displayed in German and English
- 14-segment LED for improved text representation
- Status display of the presets
- 3 predefined parameters
- Tracking presets eliminate the need for reprogramming of the pre-signal
- Minimum installation depth
- 4-stage RESET modes
- 3-stage keypad locking
- Suitable for installation in mosaic systems

Order Code

6.560 . 010 . XXX (a b c)

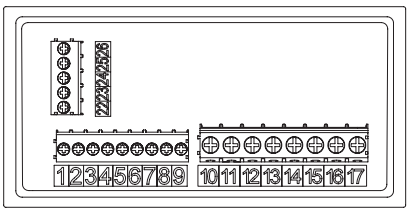
a *Supply voltage*
0 = 90 ... 260 V AC [1)]
3 = 10 ... 30 V DC [1)]

b *Input trigger levels*
0 = Standard level (HTL) [1)]
A = 4...30 V DC level

c *Interface (optional)*
0 = None
5 = RS 232
7 = RS 485

Delivery specification
- Preset counter
- Mounting clip
- Instruction manual

Connections



RS 232 (optional)

22	GND	25	–
23	RXD	26	–
24	TXD		

RS 485 (optional)

22	–	25	–
23	DO	26	–
24	DI		

Signal and Control inputs

1	INP A (Signal input A)
2	INP B (Signal input B)
3	RESET (Reset input)
4	LOCK (Keypad lock)
5	GATE (Gate input)
6	MPI 1 (User input 1)
7	MPI 2 (User input 2)
8	Sensor supply voltage AC: 24 V DC/80 mA DC: U_B connected through
9	Shared connection for signal and control inputs GND (0 VDC)

Version with relay/optocoupler

10	Relay contact C.2	Output 1
11	Relay contact N.O.2	
12	Relay contact N.C.2	
13	Relay contact C.1	Output 2
14	Relay contact N.O.1	
15	Relay contact N.C.1	
16	AC: 90..260 V AC N~ DC: 10..30 V DC	Supply voltage
17	AC: 90..260 V AC L~ DC: GND (0 V DC)	

[1)] *Stock types*

LED Preset Counters | 2 Presets | Codix 560

Generalechnical data

Display		6-digit, 14 segment LED Display, 14 mm [0.551"] high
Operating temperature		-20°C ... +65°C
Storage temperature		-25°C ... +75°C
Relative humidity	at +40°C	r.F. 93%, non-condensing
Altitude		up to 2000 m

Electrical characteristics

Sensor supply voltage	AC	90 ... 260 V AC max. 11 VA, 50/60 HZ
	DC	10 ... 30 V, max. 5,5 W
External fuse protection	230 V AC	T 0,1 A
	10 ... 30 V DC	T 0,25 A
Data retention		> 10 years, EEPROM
Response time of the frequency meter:		100 / 600 ms, for details, see instruction manual
Input modes	Input modes:	Count direction (cnt.dir), Difference (up.dn), Addition A+B (up.up), phase discriminator x1, x2, x4 (quad, quad x2, quad x4), Ratio (A/B), Ratio in % ((A-B)/A x100%)
	Frequency meter:	A, A-B, A+B quad, A/B, (A-B)/A x 100%
	Timer:	4 Start modes: FrErun, Auto, InpA.InpB., InpB.InpB.
Sensor supply voltage	AC supply	24 V DC± 15%, 80 mA
	DC supply	max. 50 mA, external supply voltage is connected through
EMV	Emitted interference	EN55011 Class B
	Immunity to interference	EN 61000-6-2
Device safety	designed to	EN61010 part 1
	Protection Class	2
	Application area	Pollution level 2

Mechanical Data

Protection		IP65 (from the front)
Weight	AC version	approx. 180 g

Inputs

Count inputs			A and B
Polarity of the inputs			programmable for all inputs in common, NPN/PNP
Input resistance			5 kΩ
Count frequency			max. 5 kHz (details see manual) can be damped to 30 Hz (mechanical contacts)
Control / Reset input			MPI 1 and MPI 2, Lock, Gate, Reset
Min pulse duration of the inputs			10 ms /1 ms
Switching levels with DC supply	HTL-level:	low:	0 ... 4 V DC
		high:	12 ... 30 V DC
	4 ... 30 V DC:	low:	0 ... 2 V DC
		high:	3,5 ... 30 V DC
Switching levels with AC supply	HTL-level:	low:	0 ... 0,2 x UB
		high:	0,6 x UB ... 30 V DC
	4 ... 30 V DC:	low:	0 ... 2 V DC
		high:	3,5 ... 30 V DC
Pulse shape			variable, Schmitt-Trigger characteristics

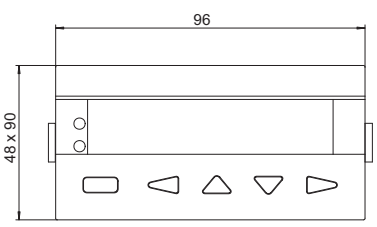
Otputs

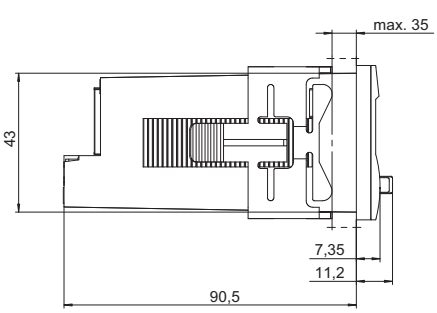
Switching voltage	max. 250 V AC / 150 V DC
Switching current	max. 3 A AC / DC min. 30 mA DC
Switching capacity	max. 750 VA / 90 W
Output 1 + 2	
Mech. service life (switching cycles)	2×10^7
N° of switching cycles at 3 A / 250 V AC	5×10^4
N° of switching cycles at 3 A / 30 V DC	5×10^4
Relay with changeover contact	
Reaction time of the outputs (pulse / time)	13 ms Details s. instruction manual

Optional Interface MODBUS and CR/LF

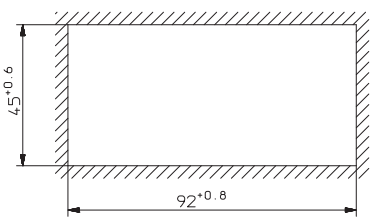
Count frequency	max. 45 kHz Details s. instruction manual
Interface	RS 232, RS 485
Baud rate	9600
Device address	1 ... 99, programmable

Dimensions





Panel cut out



LED Preset Counters | **2 Presets** | **Codix 560**

Pulse counter

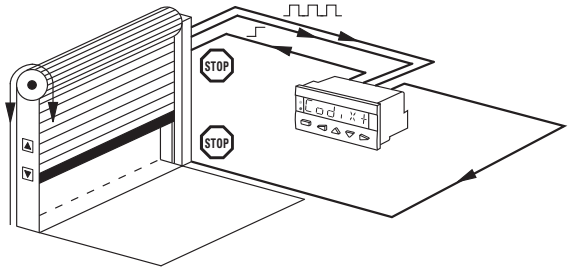
Functions / Count modes

- Count with direction mode
- Difference mode
- Quadrature mode quad / quad2 / quad4
- Add, Sub, automatic reset
- 2-input adding mode A+B
- Ratio measurement A/B
- Multi-range power supply for AC or DC
- Percentage difference measurement (A-B)/A x 100%
- Batch counting
- Totaliser (Overall total)
- Multiplication and division factor (up to 99,9999)
- Set value
- Step or tracking preset

Application examples

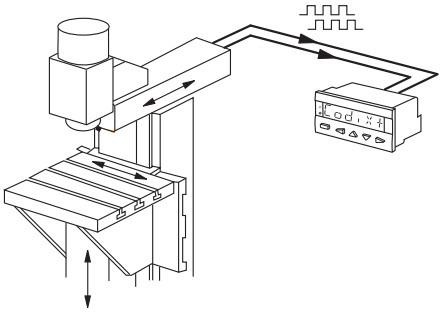
CountDir + Add

Roller shutter door with automatic shut-off



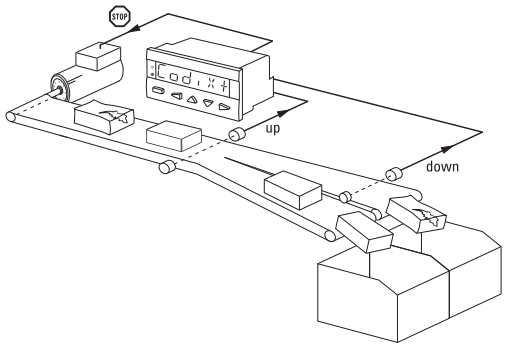
Quad + Add

Running direction and position on milling machines, Limit switch monitoring



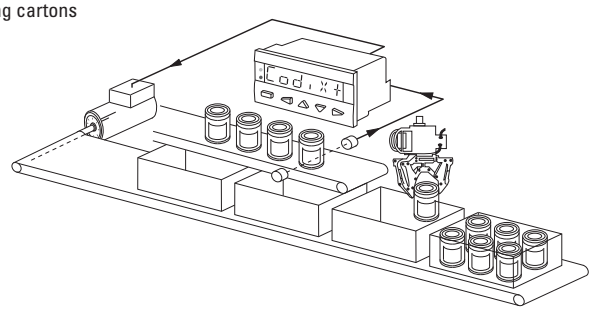
UpDown + Add

Automatic subtraction of faulty or reject parts from the total piece count



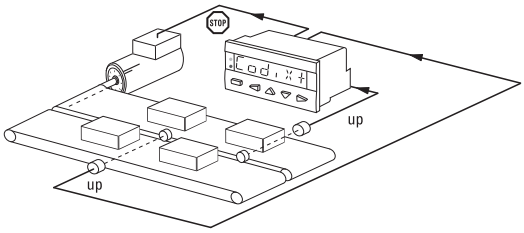
CountDir + Batch

Logging of piece numbers and packing units plus control of replenishment of packing cartons



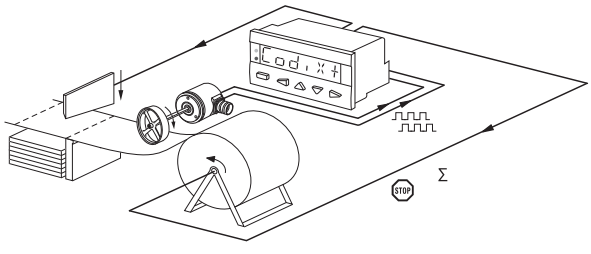
UpUp + Add

Adding up of two parallel or staggered production lines



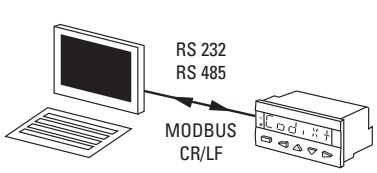
Quad + Add tot

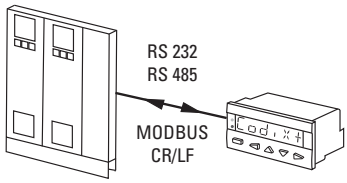
Cut-to-length with overall total count and control of the machine

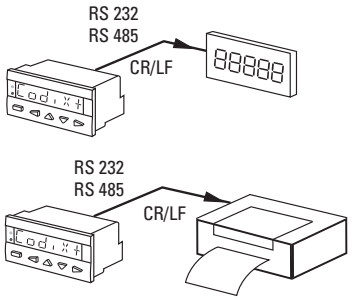


RS 232 / RS 485 interface (optional)

For connecting the counter to a PC, a PLC, a large display or a printer – for reading-out data or configuring the device.







LED Preset Counters | **2 Presets** | **Codix 560**

Frequency meter (Tachometer)

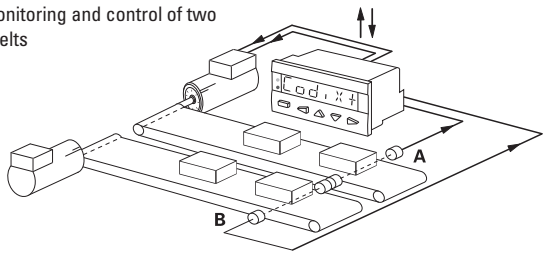
Functions / Count modes

- A
- A – B
- A + B
- A / B
- (A – B) / A x 100 % (percentage display)
- Quad (phase discriminator with recognition of direction)
- Averaging
- Start delay
- 2nd tacho input
- Gate input
- Multiplication and division factor (up to 99,9999)

Application examples

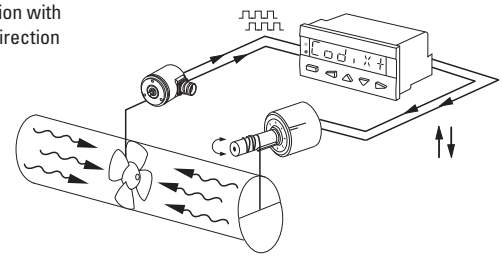
A – B

Synchro monitoring and control of two conveyor belts



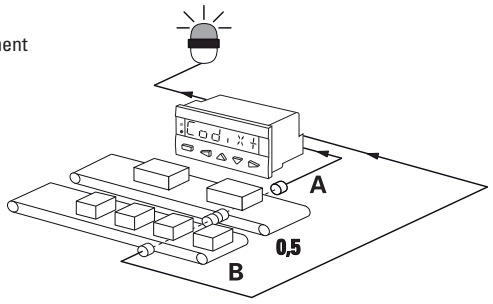
Quad

Speed regulation with indication of direction



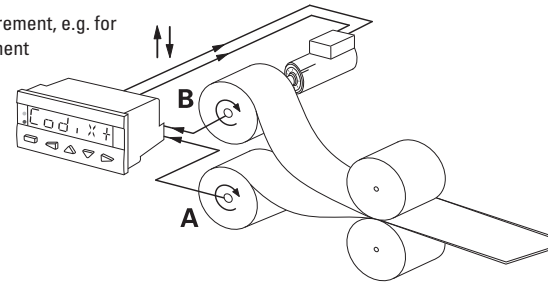
A/B

Ratio measurement



(A-B)/A [%]

Ratio measurement, e.g. for speed alignment



Time and Hours-run meter (Timer)

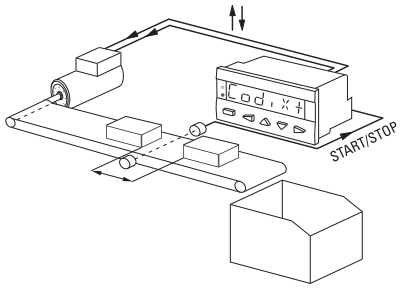
Functions / Count modes

- FrErun (Control via gate input)
- Auto (Start via Reset, Stop at Preset)
- InpB.InpB (Start with first edge at InpB., Stop with second edge InpB.)
- InpA. InpB (Start with InpA., Stop with InpB.)
- Totaliser (Overall total)
- Batch counting
- Set value
- Step or tracking preset

Application examples

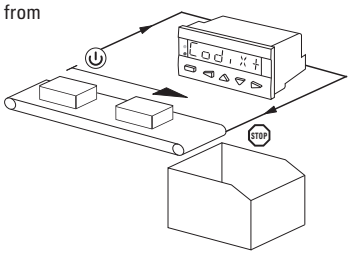
InpB. InpB

Interval measurement



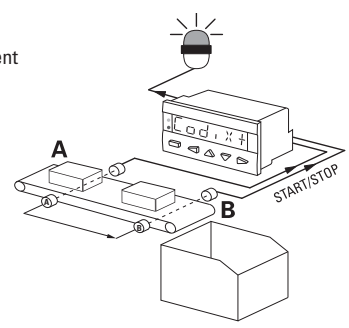
FrErun

Measurement of overall time from switching on the conveyor belt till switching off



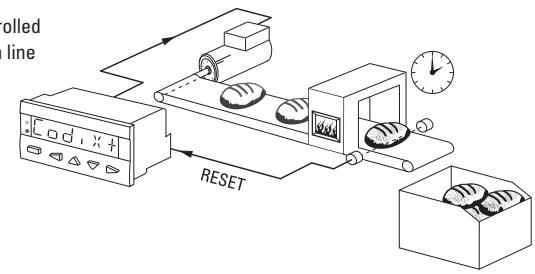
InpA. InpB

Run-time measurement



Auto

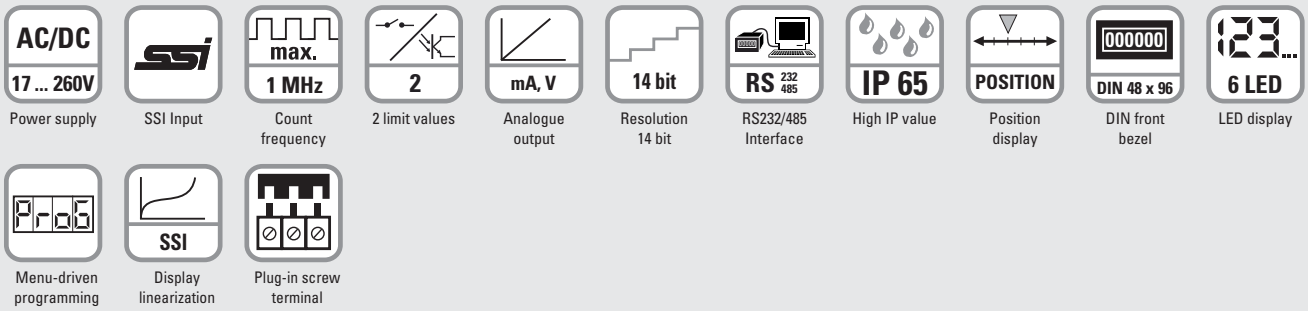
Time-controlled production line



LED, SSI Display | 2 presets, analogue output | Type 570

The fast SSI display Type 570 is designed for absolute SSI encoders with a resolution up to 32 bits. It can be used as either a Master or a Slave display.

Thanks to simple bit assignment and bit blanking the display, which can be scaled and linearized, can also be cascaded, in order to extend the display range as desired. Output options include 2 limit values, analogue output or interface.



Your benefit

- AC and DC supply voltage in one unit
- Master- or slave mode
- Plug-in screw terminals
- SSI-clock frequency from 100 Hz up to 1 MHz
- Display may be adjusted using scaling- and offset-features
- Large 15 mm [0.591“] high LED-display, 6-digit, with adjustable brightness
- Round-loop function
- Linearization with Teach option
- Bit blanking

Product features

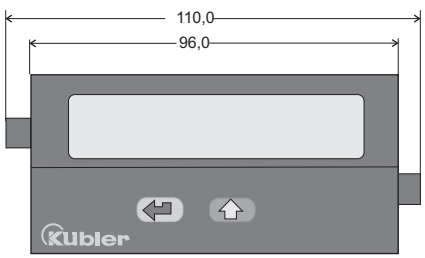
- Suitable for SSI-protocols from 8 up to 32 bits
- Version with 2 optocoupler outputs to work as limit or preset values; also with programmable tracking preset.
- Version with scaleable analogue output, resolution 14 bits, 0 ... 10 V, -10 ... +10 V, 0 ... 20 mA or 4 ... 20 mA
- Version with serial interface for reading data in and out (RS232/RS485)
- NEW: Version with 2 relay outputs as limit values or presets; can also be programmed as tracking preset and with RS232/485 interface
- Gray or binary code
- 48 x 96 mm [1.89 x 3.78“] DIN-housing, IP65

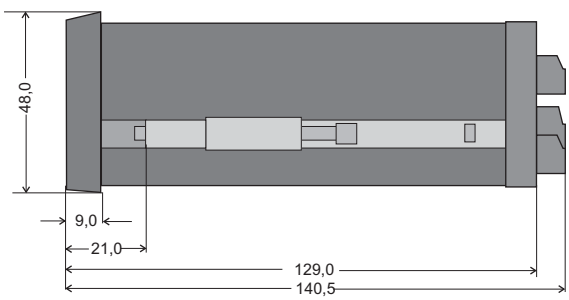
Order code

0.570.011.E00	**Display with 2 optocoupler outputs** [1]	17 - 30 V DC or 115/230 V AC
0.570.012.E90	**Display with analogue output** [1]	17 - 30 V DC or 115/230 V AC
0.570.012.E05	**Display with serial interface RS232/485**	17 - 30 V DC or 115/230 V AC
0.570.010.305	**Display with 2 relay outputs and RS232/485 interface**	17 - 30 V DC

Dimensions

Panel cut-out
97 x 45 mm





[1] *Stock types*

LED, SSI Display | 2 presets, analogue output | Type 570

General technical data

Display	LED display, 15 mm high 6 decades
Operating temperature	0°C ... +45°C
Storage temperature	-25°C ... +70°C
Altitude	up to 2000 m

Electrical characteristics

Power supply	(0.570.01X.EXX)	17 ... 30 V DC and 115/230 V AC, ± 12,5 %
	(0.570.010.305)	17 ... 30 V DC
Current consumption DC	17 V	190 mA
	24 V	150 mA
	30 V	120 mA
Power consumption AC		7,5 VA
Sensor power supply (for encoder)		24 V DC ± 15%, 120 mA
EMV	Immunity to interference	EN 55011 class B
	Emitted interference	EN 61000-6-2
Device safety	designed to	EN61010 part 1
	Protection Class	2
	Application area	Pollution level 2

Mechanical characteristics

Protection	IP65 from front
Weight	approx. 200 g

Inputs

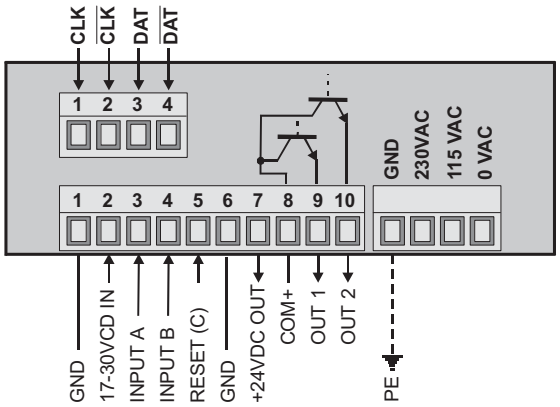
SSI data inputs		Differential RS 422 input
Input frequency range		100 Hz ... 1 MHz
SSI clock output		Differential RS 422 output
Output frequency range		100 Hz ... 1 MHz
Input reset		PNP or NPN, programmable 5,1 mA, 24 V DC R_i = 4,7 kOhm
Input level	Low	0 ... 2 V
	High	9 ... 35 V
Min. reset pulse time		min. 5 ms

Outputs

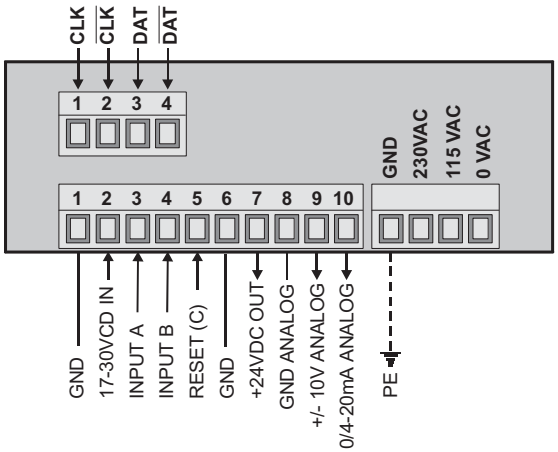
Scaleable analogue output	(0.570.012.E90)	0 ... 10 V, –10 ... + 10 V or 0 ... 20 mA, 4 ... 20 mA
Resolution		14 bit + sign
Accuracy		0,1 %
Optocoupler output	(0.570.011.E00)	5 ... 35 V DC/150 mA reaction time approx. 5 ms
Interface	(0.570.012.E05 + 0.570.010.305)	RS232 and RS485 acc. to ISO 1745 Drivecom Protocol or Printer Protocol
Relay output	(0.570.010.305)	2 changeover contacts max. 250 V AC / 1 A / 250 VA max. 100 V DC / 1 A / 100 W reaction time approx. 10 ms

Terminal assignment

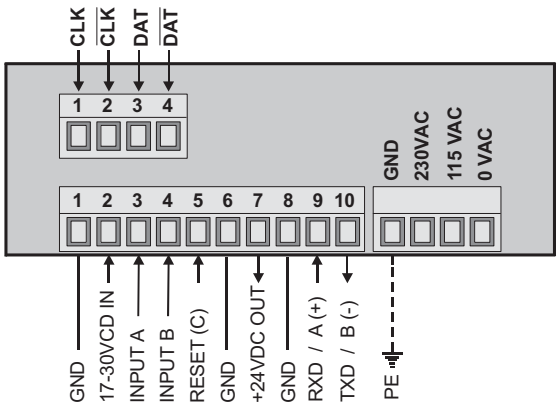
Display with 2 optocoupler outputs (0.570.011.E00)



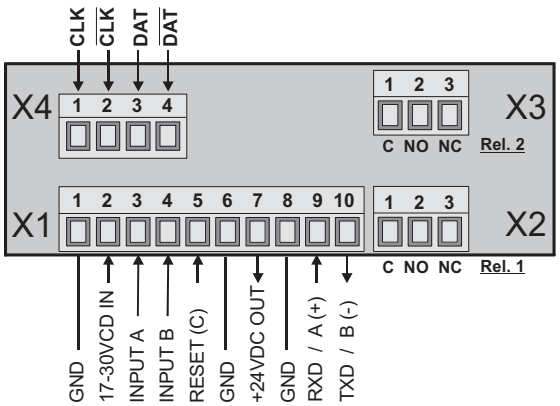
Display with analogue output (0.570.012.E90)



Display with serial interface RS 232/485 (0.570.012.E05)



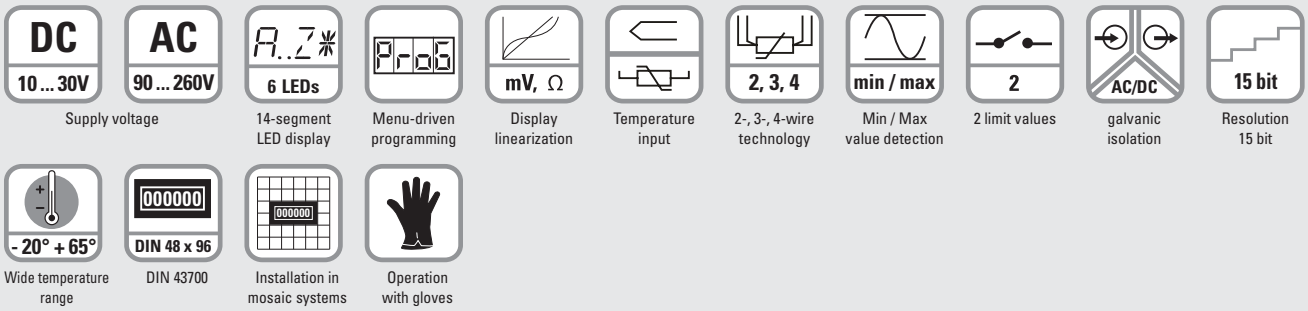
Display with 2 relay outputs, RS 232/485 (0.570.010.305)



Temperature Controllers | for Temperature Sensors | Codix 564

The Codix 564 Temperature Controller displays temperature values in high resolution. In addition it can monitor and control 2 limit values. All current temperature sensors, such as thermocouple types B, E, J, K, N, R, S and T, as well as mV inputs, Pt100 and resistance inputs, can be connected to the device.

These fast displays set new standards when it comes to user friendliness. Their easy-to-read 14-segment LED display, easy-to-understand running Help Texts and a practical Quick-start Guide eliminate the need to wade through time-consuming full instruction manuals.



User-friendly

- Practical Quick-start Guide for setting the parameters and operating the device
- Help text as running text
- Easy-to-read 14-segment LED 6-digit display
- Simple programming via 4 keys on the front
- One front key as well as 2 additional inputs can be programmed for specific applications.
- Characteristic curves for thermocouples and RTD permanently stored

Powerful

- Sampling rate of 10 readings per second
- Customised linearization via 12 control points
- 2 relay outputs (changeover contacts) for limit monitoring with hysteresis and ON/OFF delay function
- MIN/MAX memory function, individually resettable
- Auxiliary sensor power supply with AC version
- Inputs and outputs galvanically isolated
- Digital filter (first-order) for smoothing display fluctuations with unstable input signals

Order code

6.56	4	.	0	1	0	.	X	00
	a				b		c	

a *Input type*
4 = Temperature [1)]

b *Outputs*
0 = relays [1)]

c *Supply voltage*
0 = 90 ... 260 V AC [1)]
3 = 10 ... 30 V DC [1)]

Delivery specification:
- Process device
- Panel mounting clip
- Gasket
- Multilingual operating instructions
- One sheet of self-adhesive symbols
- Quick-start guide

Quick-start Guide for setting the parameters and operating the device.

The guide can be affixed directly to the front of the unit and can be removed and re-applied as required.

[1)] *Stock types*

Temperature Controllers | for Temperature Sensors | Codix 564

General technical data

Display	6-digit, 14 segment LED
Digit height	14 mm
Display range	-199999 … 999999, with leading zero blanking
Data retention	> 10 years, EEPROM
Operation	5 keys
Operating temperature	-20°C ... +65°C
Storage temperature	-25°C ... +75°C
Relative humidity (non-condensing)	R.H. 93 % at 40°C
Altitude	up to 2000 m

Electrical characteristics

Supply voltage	AC supply	90 ... 260 V AC / max. 9 VA 50 / 60 Hz ext. fuse protection: T 0,1 A
	DC supply	10 ... 30 V DC / max. 3,5 W with galvanic isolation and reverse polarity protection ext. fuse protection: T 0,4 A
Mains hum suppression		50 Hz or 60 Hz programmable
Sensor supply voltage	AC supply	24 V DC ±15 %, 30 mA
EMC Noise immunity		EN61000-6-2 with shielded signal and control cables
EMC Noise emission		EN55011 Class B
Device safety	designed to Protection Class Application area	EN61010 part 1 2 Pollution level 2

Mechanical characteristics

Housing		Panel mount housing to DIN 43 700, RAL 7021
Dimensions		96 x 48 x 102 mm
Panel cut-out		92 +0,8 x 45 +0,6 mm
Installation depth		approx. 92 mm incl. terminals
Weight		approx. 180 g
Protection		IP65 from front
Housing material		Polycarbonate UL94 V-2
Vibration resistance	acc. to EN60068-2-6	10 - 55 Hz / 1 mm / XYZ 30 min in each direction
Shock resistance	acc. to EN60068-2-27	100G / XYZ 3 times in each direction
	acc. to EN60068-2-29	10G / 6 ms / XYZ 2000 times in each direction

Connections

Supply voltage and outputs	Plug-in screw terminal, 8-pin, RM5,00, Core cross-section max. 2,5 mm²
Signal and control inputs	Plug-in screw terminal, 9-pin, RM 3,50, Core cross-section max. 1,5 mm²

Control Inputs MPI 1 / MPI 2

Quantity		2 optocouplers
Function		programmable
Switching levels	low	< 2 V
	high	> 4 V (max. 30 V)
Pulse length		> 100 ms

Measuring signal inputs

Sampling rate	10 readings/sec

Input Thermocouple

sensor:	range:	accuracy at 23°C:
type B	+250°C ... 1820°C	typ. 1.0°C, max. 2.0°C
E	-200°C ... 1000°C	typ. 0.2°C, max. 0.5°C
J	-210°C ... 1200°C	typ. 0.2°C, max. 0.5°C
K	-200°C ... 499,9°C	typ. 0.6°C, max. 1.0°C
	-500°C ... 1372°C	typ. 0.3°C, max. 0.5°C
N	-200°C ... 1300°C	typ. 0.3°C, max. 0.7°C
R	-50°C ... 1768°C	typ. 1.0°C, max. 2.0°C
S	-50°C ... 1768°C	typ. 1.0°C, max. 2.0°C
T	-200°C ... 400°C	typ. 0.2°C, max. 0.5°C

Resolution J, K, T, E, N	1 or 0,1°C/°F
Resolution S, R, B	1°C/°F
Temperature drift	< 100 ppm/K
Reference point	internal or external constant
Reference point accuracy	≤ ±1°C

Input mV

Measuring range	± 105 mV
Resolution	±15 bit
Measuring accuracy at 23°C (% of range)	typ. 0,02 / max. ≤ 0,05
Temperature drift	< 100 ppm/K
Input resistance	> 2 MΩ

Input Pt100

Measuring range	-200°C … +850°C
Resolution	1 or 0,1°C/°F
Measuring accuracy at 23°C	typ. 0,3°C, max. ≤ 0,6°C
Temperature drift	< 100 ppm/K
Measuring current	200 µA
Connection	2-, 3-, 4-wire
Lead wire resistance	max. 25 Ω per wire

Input 500 Ω

Measuring range	0 … 525 Ω
Resolution	15 bit
Measuring accuracy at 23°C	typ. 0,1 Ω, max. ≤ 0,2 Ω
Temperature drift	< 100 ppm/K
Measuring current	200 µA
Connection	2-, 3-, 4-wire
Lead wire resistance	max. 25 Ω v

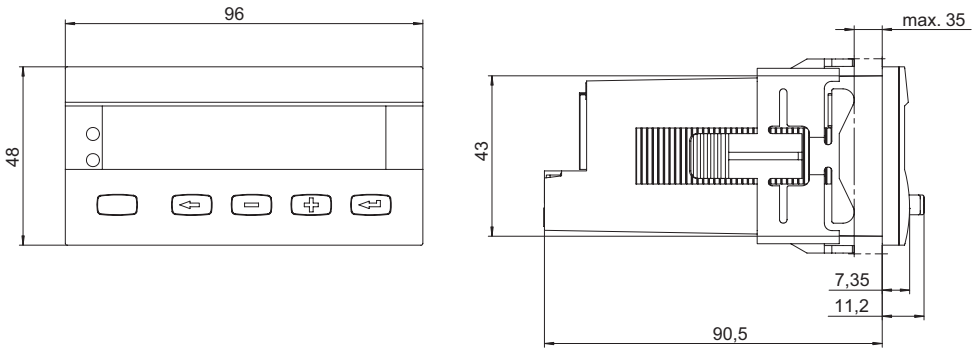
Alarm outputs

Relays		changeover contacts
Switching voltage	max.	250 V AC / 125 V DC
	min.	5 V AC / 5 V DC
Switching current	max.	5 A AC / 5 A DC
	min.	10 mA DC
Switching capacity		max. 1250 VA / 150 W
Pull-in time		approx. 10 ms

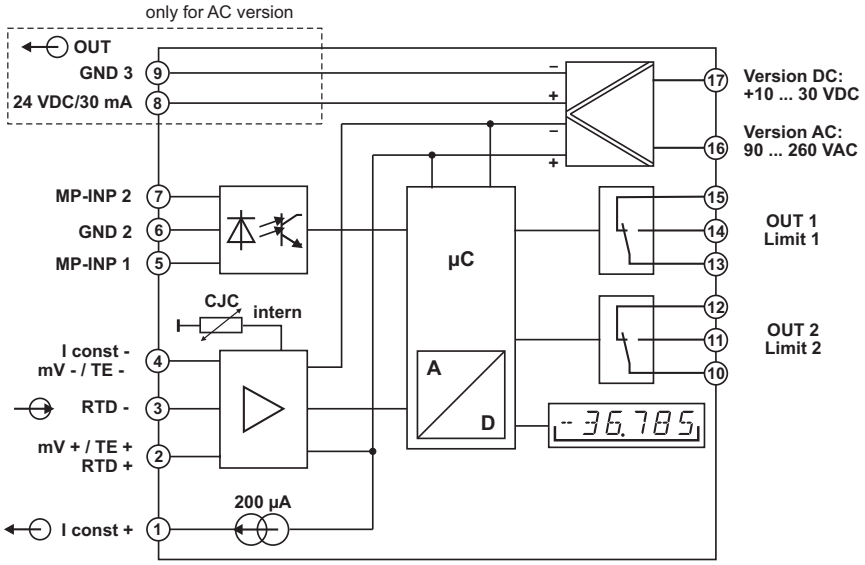
Temperature Controllers | for Temperature Sensors | Codix 564

Dimensions

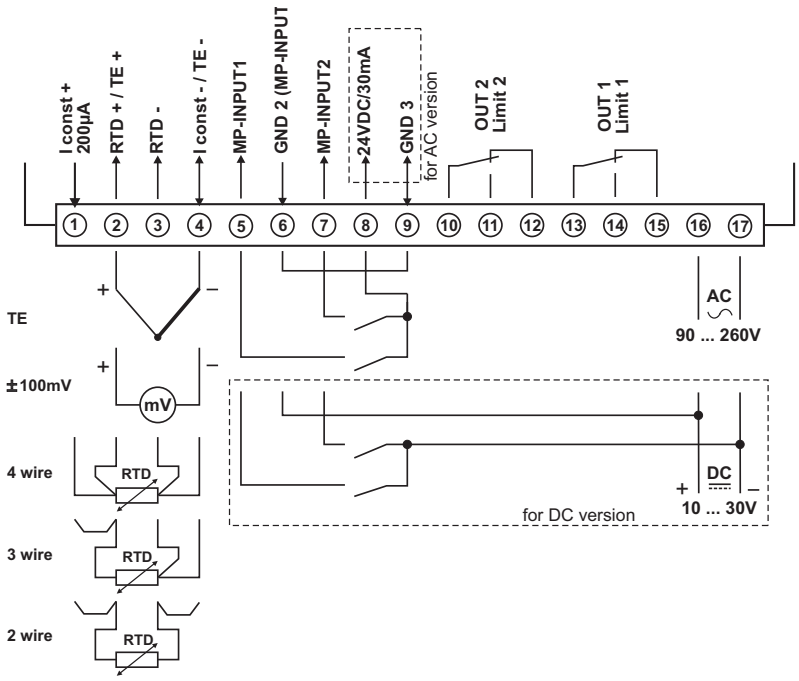
Panel cut-out
92 mm $^{+0,8}$ x 45 mm $^{+0,6}$



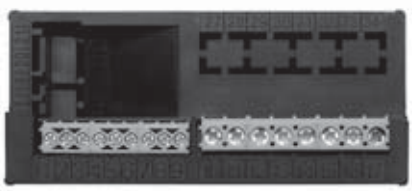
Block diagram



Terminal assignment



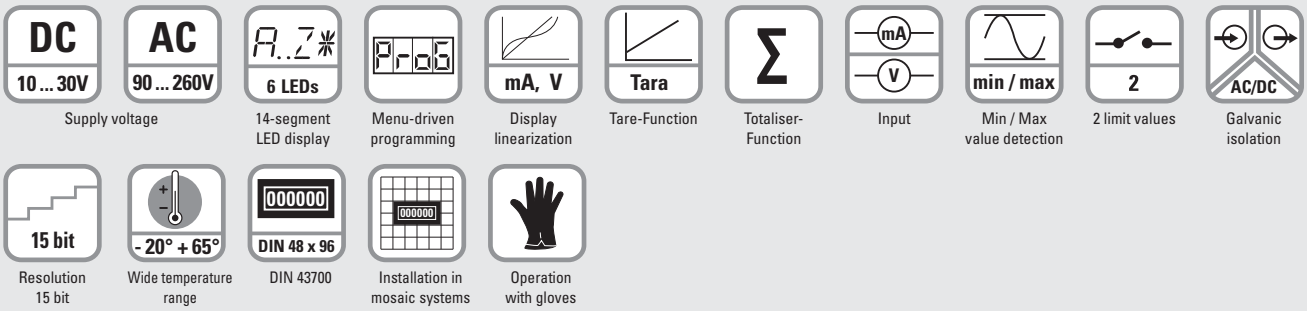
Rear side view



Process Controller | for analogue input signals | Codix 565

The Codix 565 Process Controller with Totaliser function displays V and mA analogue input signals in high resolution. In addition it can monitor and control 2 limit values.

These fast displays set new standards when it comes to user friendliness. Their easy-to-read 14-segment LED display, easy-to-understand running Help Texts and a practical Quick-start Guide eliminate the need to wade through time-consuming full instruction manuals.



Supply voltage | 14-segment LED display | Menu-driven programming | Display linearization | Tare-Function | Totaliser-Function | Input | Min / Max value detection | 2 limit values | Galvanic isolation

Resolution 15 bit | Wide temperature range | DIN 43700 | Installation in mosaic systems | Operation with gloves

User-friendly

- Practical Quick-start Guide for setting the parameters and operating the device
- Help text as running text
- Easy-to-read 14-segment LED 6-digit display
- Simple programming via 4 keys on the front
- One front key as well as 2 additional inputs can be programmed for specific applications.
- Customer-specific characteristic (linearization) curve via 12 control points for all measurement signal inputs

Powerful

- Sampling rate of 10 readings per second
- Time-controlled Totaliser function for totalising the measured values. Can be reset separately.
- 2 relay outputs (changeover contacts) for limit monitoring with hysteresis and ON/OFF delay function for current measured or totaliser values
- MIN/MAX memory function individually resettable
- Auxiliary sensor power supply 15 VDC / 25 mA, also for 2-wire transmitters
- Inputs and outputs galvanically isolated
- Digital filter (first-order) for smoothing display fluctuation with unstable input signals
- Tare function

Order code

6.565.0100.X00 (a = 5, b = 0, c = X)

a *Input type*
5 = Analogue [1)]

b *Outputs*
0 = relays [1)]

c *Supply voltage*
0 = 90 ... 260 V AC [1)]
3 = 10 ... 30 V DC [1)]

Delivery specification:
- Process device
- Panel mounting clip
- Gasket
- Multilingual operating instructions
- One sheet of self-adhesive symbols
- Quick-start guide

Quick-start Guide for setting the parameters and operating the device.

The guide can be affixed directly to the front of the unit and can be removed and re-applied as required.

[1)] *Stock types*

Process Controller | for analogue input signals | Codix 565

General technical data

Display	6-digit, 14 segment LED
Digit height	14 mm
Display range	-199999 … 999999, with leading zero blanking
Data retention	> 10 years, EEPROM
Operation	5 keys
Operating temperature	-20°C ... +65°C
Storage temperature	-25°C ... +75°C
Relative humidity (non-condensing)	R.H. 93 % at 40°C
Altitude	up to 2000 m

Electrical characteristics

Supply voltage	AC supply	90 ... 260 V AC / max. 9 VA 50 / 60 Hz ext. fuse protection: T 0,1 A
	DC supply	10 ... 30 V DC / max. 3,5 W with galvanic isolation and reverse polarity protection ext. fuse protection: T 0,4 A
Mains hum suppression		50 Hz or 60 Hz programmable
Sensor supply voltage	AC supply	24 V DC ±15 %, 30 mA 15 V DC ± 1 %, 25 mA
	DC supply	15 V DC ± 1 %, 25 mA
EMC Noise immunity		EN61000-6-2 with shielded signal and control cables
EMC Noise emission		EN55011 Classe B
Device safety	designed to Protection Class Application area	EN61010 part 1 2 Pollution level 2

Mechanical characteristics

Housing		Panel mount housing to DIN 43 700, RAL 7021
Dimensions		96 x 48 x 102 mm
Panel cut-out		92 +0,8 x 45 +0,6 mm
Installation depth		approx. 92 mm incl. terminals
Weight		approx. 180 g
Protection		IP65 from front
Housing material		Polycarbonate UL94 V-2
Vibration resistance	acc. to EN60068-2-6	10 - 55 Hz / 1 mm / XYZ 30 min in each direction
Shock resistance	acc. to EN60068-2-27	100G / XYZ 3 times in each direction
	acc. to EN60068-2-29	10G / 6 ms / XYZ 2000 times in each direction

Connections

Supply voltage and outputs	Plug-in screw terminal, 8-pin, RM5,00, Core cross- section max. 2,5 mm²
Signal and control inputs	Plug-in screw terminal, 9-pin, RM 3,50, Core cross- section max. 1,5 mm²

Control Inputs MPI 1 / MPI 2

Quantity		2 optocouplers
Function		programmable
Switching levels	low high	< 2 V > 4 V (max. 30 V)
Pulse length		> 100 ms

Measuring signal inputs

Sampling rate	10 readings/sec

Voltage input

Progr. ranges	0 ... 10 V, 2 … 10 V, ± 10 V
Meas. range	-10,5 ... +10,5 V
Resolution	< 0,4 mV (±15 bit)
Measuring accuracy at 23°C (% of range)	typ. 0,02 % / max. ≤ 0,05 %
Temperature drift	< 100 ppm / K
Input resistance	1 MΩ
Max. voltage	± 30 V

Current input

Progr. ranges	0 ... 20 mA, 4 … 20 mA
Meas. range	-0,5 ... 21 mA
Resolution	1 µA (> 14 bit)
Measuring accuracy at 23°C (% of range)	typ. 0,02 % / max. ≤ 0,05 %
Temperature drift	< 100 ppm / K
Input resistance	22 Ω + PTC 25 Ω
Voltage drop	approx. 1,8 V at 20 mA
Max. current	60 mA

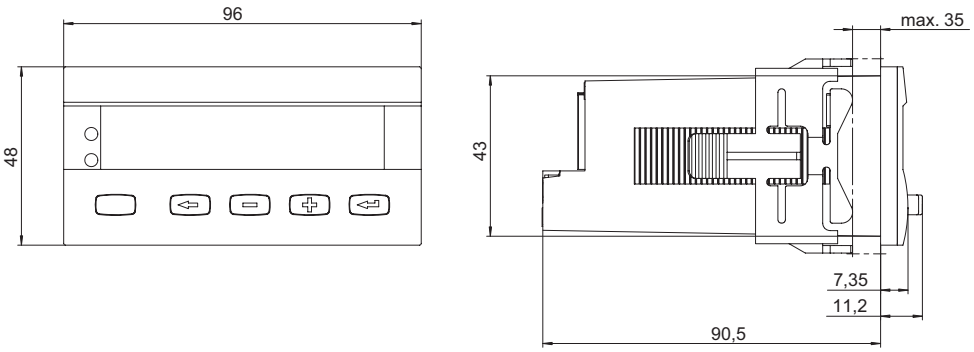
Alarm outputs

Relays		changeover contacts
Switching voltage	max. min.	250 V AC / 125 V DC 5 V AC / 5 V DC
Switching current	max. min.	5 A AC / 5 A DC 10 mA DC
Switching capacity		max. 1250 VA / 150 W

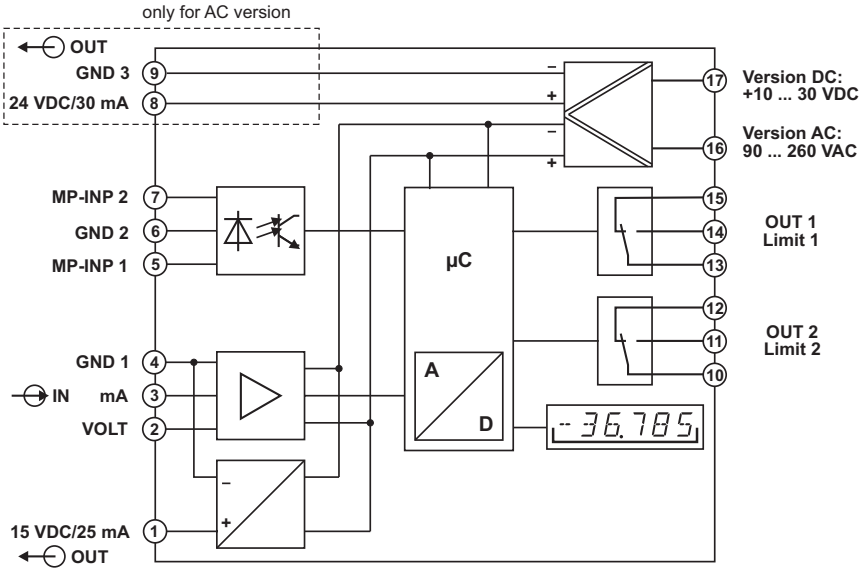
Process Controller | for analogue input signals | Codix 565

Dimensions

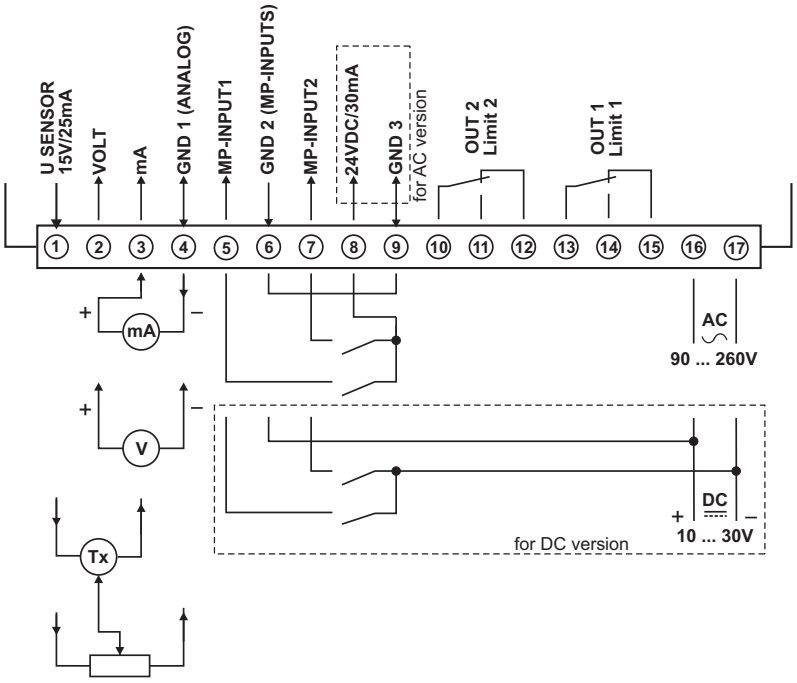
Panel cut-out
92 mm $^{+0,8}$ x 45 mm $^{+0,6}$



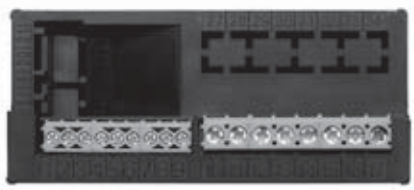
Block diagram



Terminal assignment



Rear side view



Process Controller | for strain-gauge inputs | Codix 566

The Codix 566 Process Controller with Totaliser function displays measured values from all common strain-gauge inputs in high resolution. In addition it can monitor and control 2 limit values.

These fast displays set new standards when it comes to user friendliness. Their easy-to-read 14-segment LED display, easy-to-understand running Help Texts and a practical Quick-start Guide eliminate the need to wade through time-consuming full instruction manuals.

Supply voltage | 14-segment LED display | Menu-driven programming | Display linearization | Tare-Function | Totaliser-Function | DMS input | Min / Max value detection | 2 limit values | Galvanic isolation

Resolution 15 bit | Wide temperature range | DIN 43700 | Installation in mosaic systems | Operation with gloves

User-friendly

- Practical Quick-start Guide for setting the parameters and operating the device.
- Help text as running text
- Easy-to-read 14-segment LED 6-digit display
- Simple programming via 4 keys on the front
- One front key as well as 2 additional inputs can be programmed for specific applications.
- Customer-specific characteristic (linearization) curve via 12 control points for all measurement signal inputs

Powerful

- Sampling rate of 10 readings per second
- Application-specific characteristic curves via 12 measurement points
- Manual Totaliser function for totalising the measured values. Can be reset separately.
- 2 relay outputs (changeover contacts) for limit monitoring with hysteresis and ON/OFF delay function for current measured or totaliser values
- MIN/MAX memory function, individually resettable
- Excitation supply 10 VDC / 30 mA for powering 350 Ω bridges.
- Inputs and outputs galvanically isolated
- Digital filter (first-order) for smoothing display fluctuation with unstable input signals
- Tare function

Order code

6.566 . 010 . X 00
(a) (b) (c)

(a) *Input type*
6 = Strain-gauge [1)]

(b) *Outputs*
0 = relays [1)]

(c) *Supply voltage*
0 = 90 ... 260 V AC [1)]
3 = 10 ... 30 V DC [1)]

Delivery specification:
- Process device
- Panel mounting clip
- Gasket
- Multilingual operating instructions
- One sheet of self-adhesive symbols
- Quick-start guide

Quick-start Guide for setting the parameters and operating the device.

The guide can be affixed directly to the front of the unit and can be removed and re-applied as required.

[1)] *Stock types*

Process Controller | for strain-gauge inputs | Codix 566

General technical data

Display	6-digit, 14 segment LED
Digit height	14 mm
Display range	-199999 … 999999, with leading zero blanking
Data retention	> 10 years, EEPROM
Operation	5 keys
Operating temperature	-20°C ... +65°C
Storage temperature	-25°C ... +75°C
Relative humidity (non-condensing)	R.H. 93 % at 40°C
Altitude	up to 2000 m

Electrical characteristics

Supply voltage	AC supply	90 ... 260 V AC / max. 9 VA 50 / 60 Hz ext. fuse protection: T 0,1 A
	DC supply	10 ... 30 V DC / max. 3,5 W with galvanic isolation and reverse polarity protection ext. fuse protection: T 0,4 A
Mains hum suppression		50 Hz or 60 Hz programmable
Sensor supply voltage	AC supply	24 V DC ±15 %, 30 mA 10 V DC ± 1%, 30 mA
	DC supply	10 V DC ± 1%, 30 mA
EMC Noise immunity		EN61000-6-2 with shielded signal and control cables
EMC Noise emission		EN55011 Classe B
Device safety	designed to Protection Class Application area	EN61010 part 1 2 Pollution level 2

Mechanical characteristics

Housing		Panel mount housing to DIN 43 700, RAL 7021
Dimensions		96 x 48 x 102 mm
Panel cut-out		92 +0,8 x 45 +0,6 mm
Installation depth		approx. 92 mm incl. terminals
Weight		approx. 180 g
Protection		IP65 from front
Housing material		Polycarbonate UL94 V-2
Vibration resistance	acc. to EN60068-2-6	10 - 55 Hz / 1 mm / XYZ 30 min in each direction
Shock resistance	acc. to EN60068-2-27	100G / XYZ 3 times in each direction
	acc. to EN60068-2-29	10G / 6 ms / XYZ 2000 times in each direction

Connections

Supply voltage and outputs	Plug-in screw terminal, 8-pin, RM5,00, Core cross-section max. 2,5 mm²
Signal and control inputs	Plug-in screw terminal, 9-pin, RM 3,50, Core cross-section max. 1,5 mm²

Control Inputs MPI 1 / MPI 2

Quantity		2 optocouplers
Function		programmable
Switching levels	low high	< 2 V > 4 V (max. 30 V)
Pulse length		> 100 ms

Measuring signal inputs

Sampling rate	10 readings/sec
Input resistance	1 MΩ
Max. measuring signal range	approx. ± 35 mV
Max. voltage	± 10 V

Strain gauge signal input

Sensitivity	3,3 mV / V 3,0 mV / V 2,0 mV / V
Resolution	± 15 bit
Measuring accuracy at 23°C (% of range)	typ. 0,05 % / max. ≤ 0,1 %
Temperature drift	< 100 ppm/K

Sensitivity	1,5 mV / V 1,0 mV / V
Resolution	± 14 bit
Measuring accuracy at 23°C (% of range)	typ. 0,1 % / max. ≤ 0,2 %
Temperature drift	< 100 ppm/K

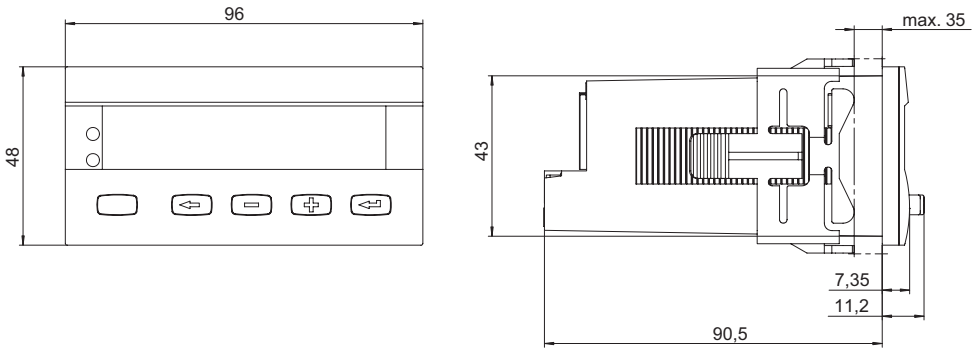
Alarm outputs

Relays		changeover contacts
Switching voltage	max. min.	250 V AC / 125 V DC 5 V AC / 5 V DC
Switching current	max. min.	5 A AC / 5 A DC 10 mA DC
Switching capacity		max. 1250 VA / 150 W
Pull-in time		approx. 10 ms

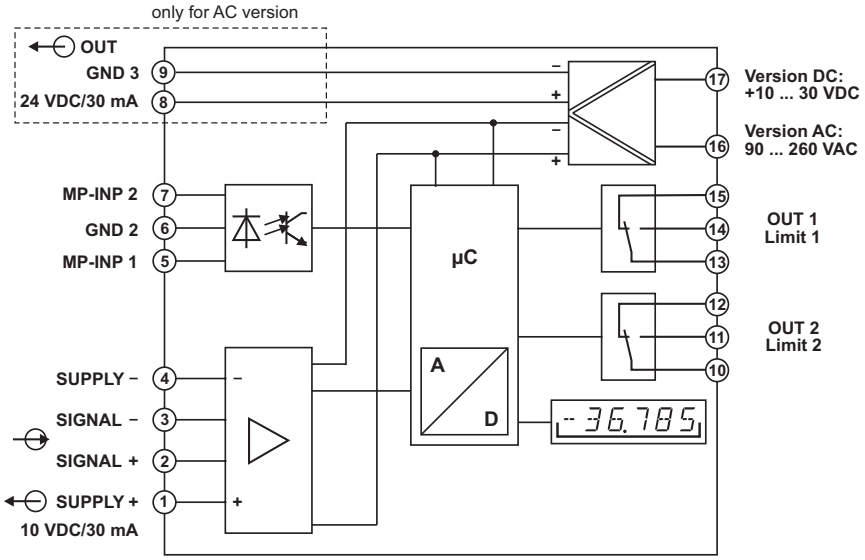
Process Controller | for strain-gauge inputs | Codix 566

Dimensions

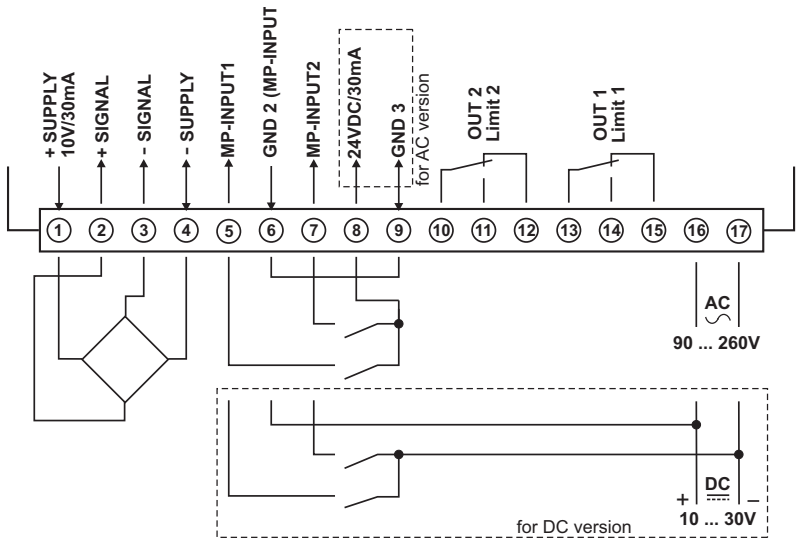
Panel cut-out
92 mm $^{+0,8}$ x 45 mm $^{+0,6}$



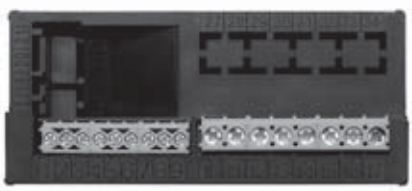
Block diagram



Terminal assignment



Rear side view



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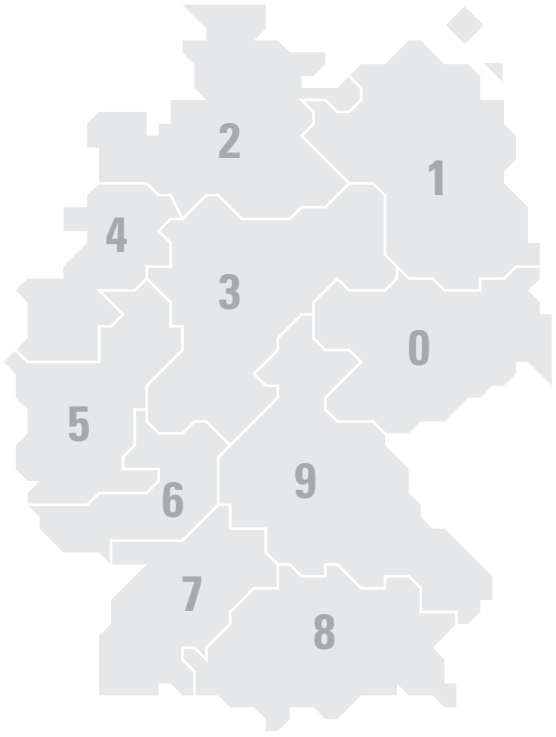

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