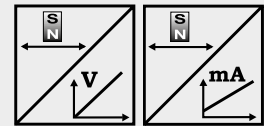




**POSICHRON® position sensor in round profile**

- Protection class IP64
- Measurement range 0 ... 100 to 0 ... 5750 mm
- Absolute position measurement
- Contactless
- Absolutely wearless and maintenance-free for the positioning magnet
- Analog output



Specifications	Output	Voltage Current
	Resolution	Refer to output specification
Sampling rate	Up to 1 kHz, depending on the measurement range	
Linearity	Ranges >500 mm: L10 = ±0.10 % f.s. L02 = ±0.02 % f.s. Ranges ≤500 mm: L10 = ±0.5 mm L02MM = ±0.2 mm	
Repeatability	±3 µm	
Housing material	AlMgSi1 / Zn / V4A	
Protection class	IP64 (with mating connector only)	
Shock	EN 60068-2-27:2010, 50 g 11 ms, 100 shocks	
Vibration	EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles	
Connection	Connector M12, 8 pin / cable 2 m	
EMC, temperature	Refer to output specification	

**Order code PCR21  
1 channel**



**Model name**

**Measurement range (in mm)**

100 ... 5750 (in 10 mm increments)  
other lengths upon request

**Output**

- U1 = 0 ... 10 V signal conditioner
- U1/H = U1 with Alarm\_HOLD (see page 10)
- U2 = 0.5 ... 10 V signal conditioner
- U2/U; U2/H = U2 with Alarm\_LOW; U2 with Alarm\_HOLD (see page 10)
- U8 = 0.5 ... 4.5 V signal conditioner
- U8/U; U8/H = U8 with Alarm\_LOW; U8 with Alarm\_HOLD (see page 10)
- I1 = 4 ... 20 mA signal conditioner (3 wire)
- I1/U; I1/H = I1 with Alarm\_LOW; I1 with Alarm\_HOLD (see page 10)

**Function and characteristics output**

- P1A = Position Magnet 1, increasing
- P1D = Position Magnet 1, decreasing
- PMU = Start value, direction & end value adjustable by the customer

**Linearity**

L02 / L02MM / L10 (for definition see "Specifications" above)

**Connection**

- M12 = Connector M12, 8 pin
- KAB2M = Cable, standard length 2 m, other lengths upon request

Order code mounting set (see page 7)

**PCRP21-BFS4**

**Order Code PCRP21**  
**2 channel, configurable**

PCRP21 - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

**Model name**

**Measurement range (in mm)**  
 100 ... 5750 (in 10 mm increments)  
 other lengths upon request

**Output**

U1 = 0 ... 10 V signal conditioner  
 U1/H = U1 with Alarm\_HOLD (see page 10)  
 U2 = 0.5 ... 10 V signal conditioner  
 U2/U; U2/H = U2 with Alarm\_LOW; U2 with Alarm\_HOLD (see page 10)  
 U8 = 0.5 ... 4.5 V signal conditioner  
 U8/U; U8/H = U8 with Alarm\_LOW; U8 with Alarm\_HOLD (see page 10)  
 I1 = 4 ... 20 mA signal conditioner (3 wire)  
 I1/U; I1/H = I1 with Alarm\_LOW; I1 with Alarm\_HOLD (see page 10)

**Function and characteristics output 1**

P1A = Position magnet 1, increasing  
 P1D = Position magnet 1, decreasing  
 DA = Difference magnet 1/2, increasing (2 magnets required)  
 DD = Difference magnet 1/2, decreasing (2 magnets required)

**Function and characteristics output 2**

P2A = Position magnet 2, increasing  
 P2D = Position magnet 2, decreasing  
 DA = Difference magnet 1/2, increasing  
 DD = Difference magnet 1/2, decreasing } 2 magnets required

VZx.x = Velocity with direction detection (with 1 magnet only)

VZx.x = Velocity in steps of 0.1 m/s			
<u>Example: VZ1.5</u>	towards start position		towards end position
	-1.5 m/s	0	+1.5 m/s
Output U2:	0.5 V	5.25 V	10 V
Output I1:	4 mA	12 mA	20 mA

VAx.x = Velocity without direction detection (with 1 magnet only)

VAx.x = Velocity in steps of 0.1 m/s			
<u>Example: VA1.5</u>	towards start position		towards end position
	-1.5 m/s	0	+1.5 m/s
Output U2:	10 V	0.5 V	10 V
Output I1:	20 mA	4 mA	20 mA

**Linearity**  
 L02 / L02MM / L10 (for definition see "Specifications" above)

**Connection**

M12 = Connector M12, 8 pin  
 KAB2M = Cable, standard length 2 m, other lengths upon request

**1. Order example: PCRP21 - 1000 - U2 - P1D - L10 - M12**  
 Round profile, measurement range 1000 mm, 1 voltage output 0.5 ... 10 V (U2)  
 Output 1: Position magnet 1, decreasing signal (P1D)  
 Output 2: Not used

**2. Order example: PCRP21 - 1000 - I1 - P1A - P2D - L10 - M12**  
 Round Profile, measurement range 1000 mm, 2 current outputs 4 ... 20 mA (I1)  
 Output 1: Position magnet 1, increasing signal (P1A)  
 Output 2: Position magnet 2, decreasing signal (P2D)

Order code position magnets (see page 7)

**PCMAG ...**

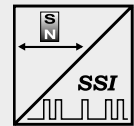
Order code mating connecting cable (see page 14)

**KAB-...M-M12/8F/G-LITZE**



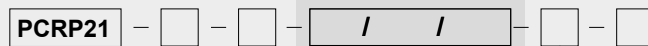
**POSICHRON® position sensor in round profile**

- Protection class IP64
- Measurement range 0 ... 100 to 0 ... 5750 mm
- Absolute position measurement
- Wear- and maintenance-free
- Superior shock and vibration resistance
- Absolutely wear free and maintenance-free
- Synchronous serial interface (SSI)



<b>Specifications</b>	Output	Synchronous serial interface (SSI)
	Resolution	5, 10, 20, 50, 100 µm
	Sampling rate	Up to 1 kHz, depending on the measurement range
	Linearity	Ranges >500 mm: L10 = ±0.10 % f.s. L02 = ±0.02 % f.s. Ranges ≤500 mm: L10 = ±0.5 mm L02MM = ±0.2 mm
	Repeatability	±3 µm
	Housing material	AlMgSi1 / Zn / V4A
	Protection class	IP64 (with mating connector only)
	Shock	EN 60068-2-27:2010, 50 g 11 ms, 100 shocks
	Vibration	EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles
	Connection	Connector M12, 8 pin / cable 2m
EMC, temperature	Refer to output specification	

**Order Code PCR21**



**Model name**

**Measurement range (in mm)**

100 ... 5750 (in 10 mm increments)  
other lengths upon request

**Resolution (in µm)**

5 / 10 / 20 / 50 / 100

**Output**

SSI = Synchronous serial interface

**Code**

G / D = Gray / Dual

**Number of data bits**

24 / 25

**Linearity**

L02 / L02MM / L10 (for definition see "Specifications" above)

**Connection**

M12 = Connector M12, 8 pin

KAB2M = Cable, standard length 2 m, other lengths upon request

Order code mounting set (see page 7)

**PCRP21-BFS4**

Order code position magnets (see page 7)

**PCMAG ...**

Order code mating connecting cable (see page 14)

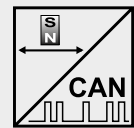
**KAB-...M-M12/8F/G-LITZE**

**Order example: PCR21 - 1000 - 5 - SSI/G/24 - L10 - M12**



**POSICHRON® position sensor in round profile**

- Protection class IP64
- Measurement range 0 ... 100 to 0 ... 5750 mm
- Absolute position measurement
- Contactless
- Absolutely wear free and maintenance-free
- CANopen bus



<b>Specifications</b>	Output	CANopen bus; CAN SAE J1939
	Resolution	50 µm
	Sampling rate	Up to 1 kHz, depending on the measurement range
	Linearity	Ranges >500 mm: L10 = ±0.10 % f.s. L02 = ±0.02 % f.s. Ranges ≤500 mm: L10 = ±0.5 mm L02MM = ±0.2 mm
	Repeatability	±3 µm
	Housing material	AlMgSi1 / Zn / V4A
	Protection class	IP64 (with mating connector only)
	Shock	EN 60068-2-27:2010, 50 g 11 ms, 100 shocks
	Vibration	EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles
	Connection	5 pin socket M12
EMC, temperature	Refer to output specification	

**Order Code PCR21**

**Model name** PCR21 -   -   -   -  

**Measurement range (in mm)**  
100 ... 5750 (in 10 mm increments)  
other lengths upon request

**Output**  
CANOP = CANopen bus  
CANOP/R = CANopen-Bus with integrated terminating resistance  
CANJ1939 = CAN SAE J1939

**Linearity**  
L02 / L02MM / L10 (for definition see "Specifications" above)

**Connection**  
M12/CAN = Connector M12, 5 pin

Order code mounting set (see page 7)

**PCRP21-BFS4**

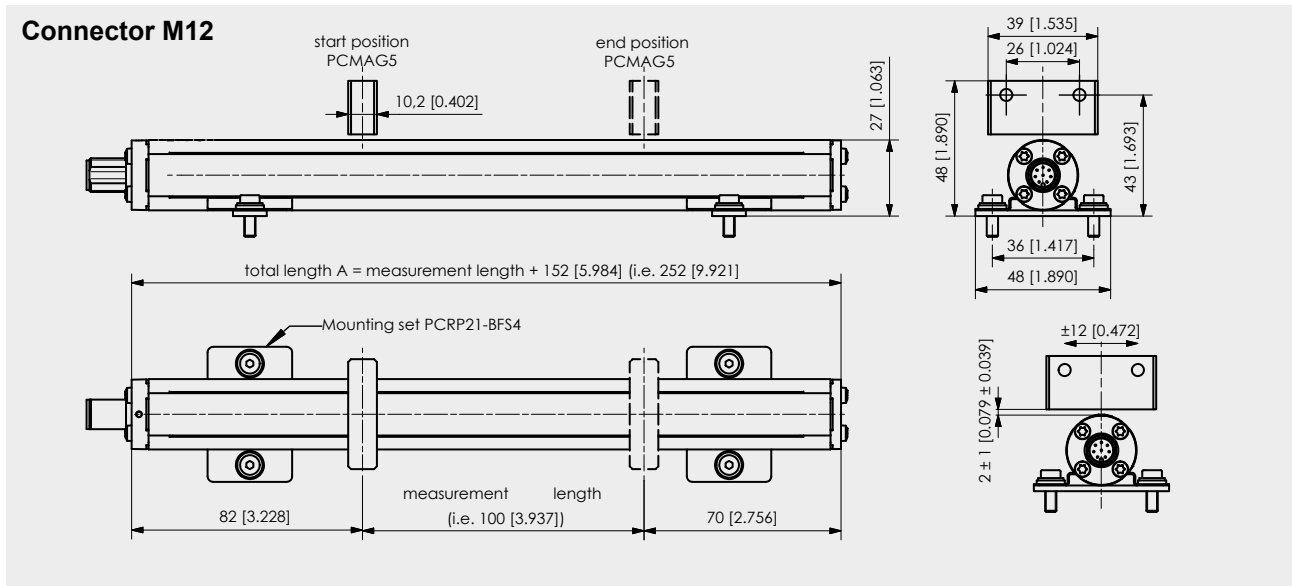
Order code position magnet (see page 7)

**PCMAG ...**

Order code bus cable (see page 15)

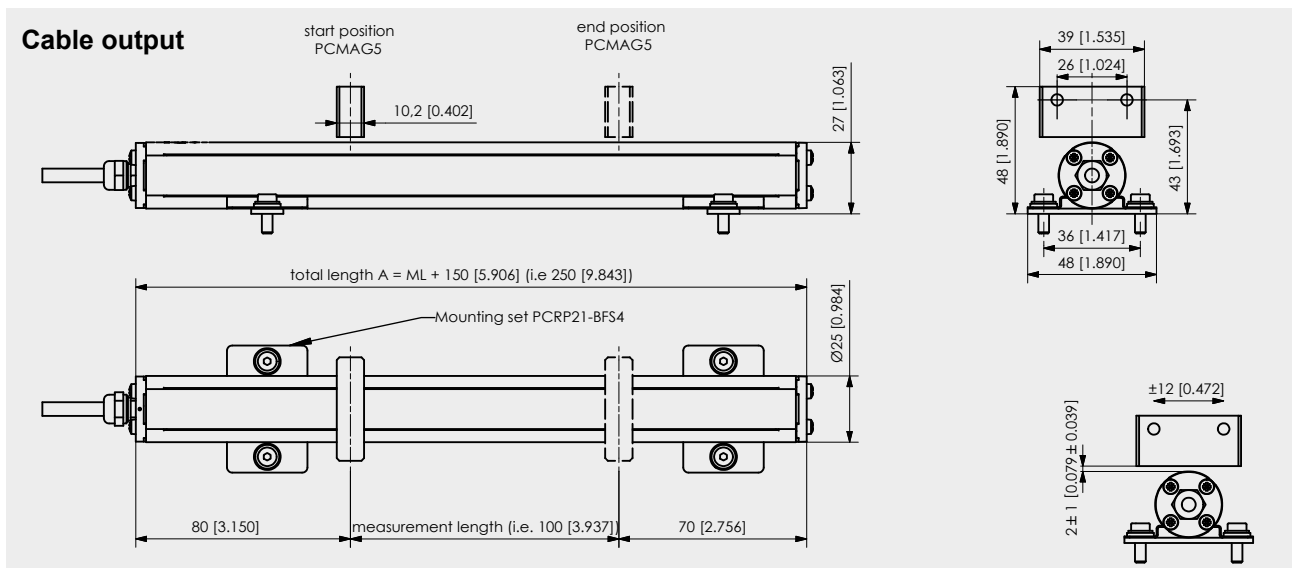
**KAB-...M-M12/5F/G-M12/5M/G - CAN**

**Order example: PCR21 - 1000 - CANOP - L10 - M12/CAN**



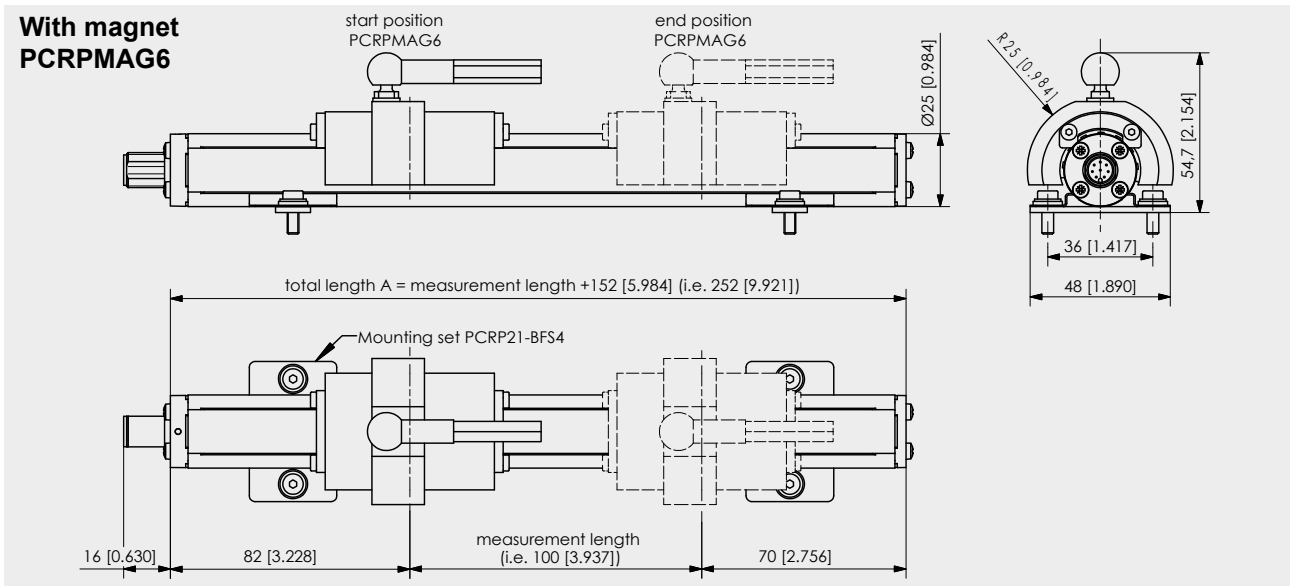
Dimensions in mm [inch]

Dimensions informative only. For guaranteed dimensions consult factory.



Dimensions in mm [inch]

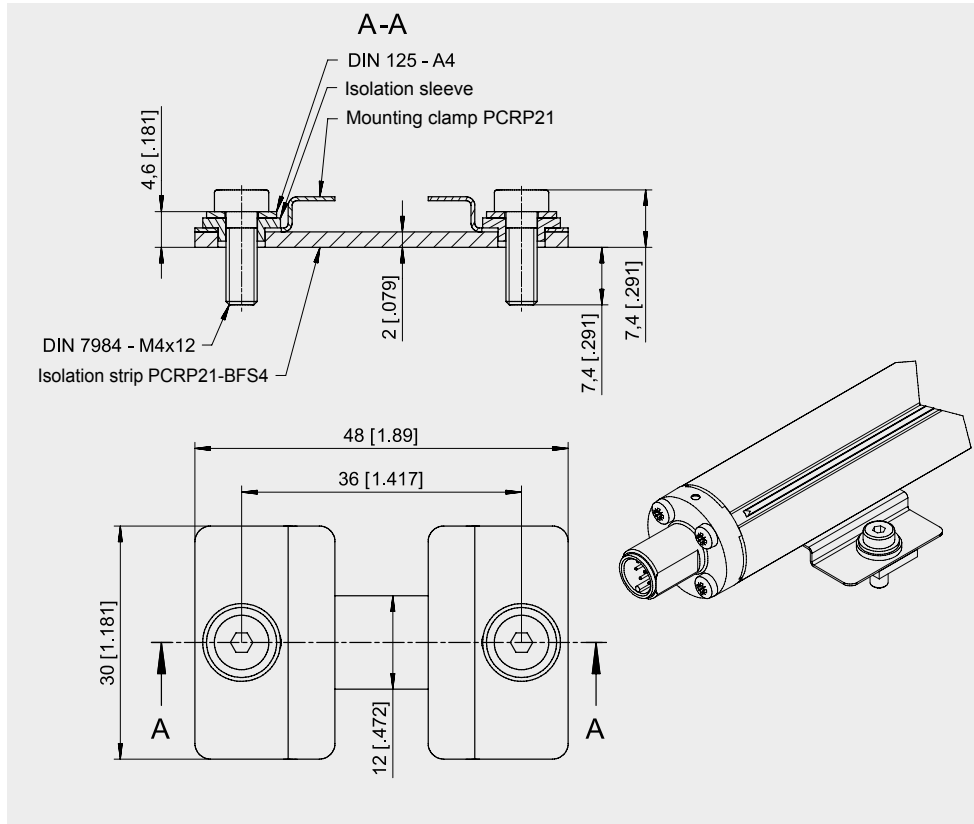
Dimensions informative only. For guaranteed dimensions consult factory.



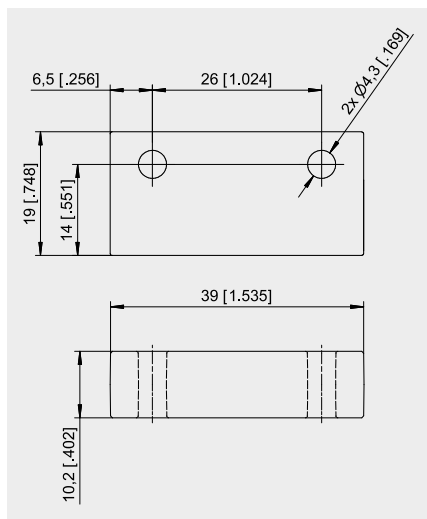
Dimensions in mm [inch]

Dimensions informative only. For guaranteed dimensions consult factory.

**PCRP21-BFS4**  
Mounting set for  
PCRP21



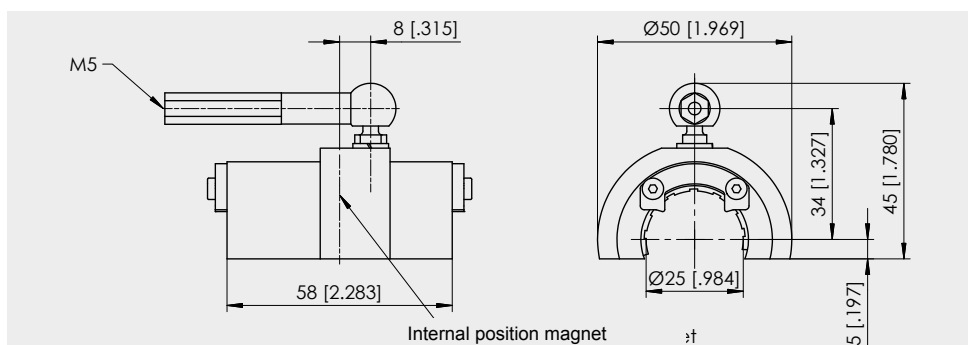
**PCMAG5**  
Standard magnet



Dimensions in mm [inch]

Dimensions informative only.  
For guaranteed dimensions consult factory.

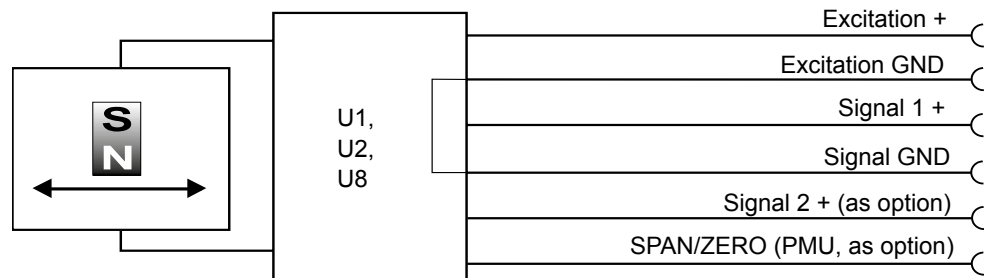
**PCRPMAG6**  
Guided magnet slider  
for PCR21 with internal  
position magnet



Not to be used for a large number of operation cycles!

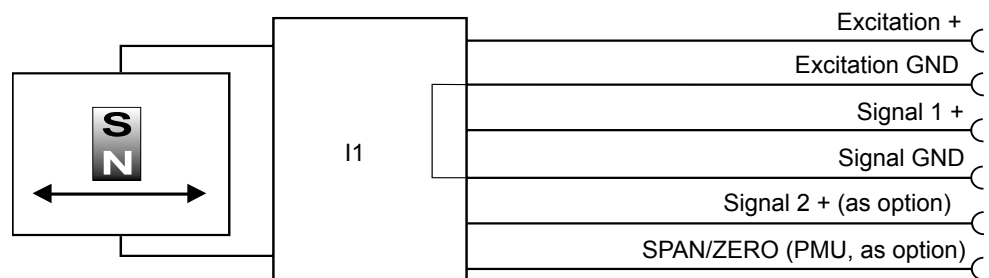
<b>U1, U2, U8</b> Voltage output  	Excitation voltage	<b>U1:</b> 18 ... 36 V DC; <b>U2:</b> 18 ... 36 V DC; <b>U8:</b> 10 ... 36 V
	Excitation current	Typ. 35 mA, 80 mA max.
	Output voltage	<b>U1:</b> 0 ... 10 V DC; <b>U2:</b> 0.5 ... 10 V DC; <b>U8:</b> 0.5 ... 4.5 V DC
	Output current	2 mA max.
	Output load	> 5 kΩ
	Resolution	16 bit f.s., min. 10 μm
	Stability (temperature)	±50 x 10 <sup>-6</sup> / °C f.s.
	Protection	Reverse polarity, short circuit
	Output noise	0.5 mV <sub>RMS</sub>
	Operating temperature	-40 ... +85 °C
EMC	EN 61326-1:2013	

Signal diagram



<b>I1</b> Current output (3 wire)  	Excitation voltage	18 ... 36 V DC (10 ... 36 V for R <sub>L</sub> ≤ 250Ω)
	Excitation current	Typ. 60 mA, 80 mA max.
	Load resistor	350 Ω max.
	Output current	4 ... 20 mA, 30 mA max (at failure)
	Resolution	16 bit f.s., min. 10 μm
	Stability (temperature)	±50 x 10 <sup>-6</sup> / °C f.s.
	Protection	Reverse polarity, short circuit
	Output noise	0.5 mV <sub>RMS</sub>
	Operating temperature	-40 ... +85 °C
	EMC	EN 61326-1:2013

Signal diagram



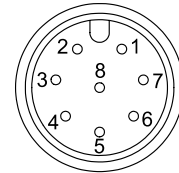


**Connector M12, 8-pin**

Signal wiring

Signal	Plug connection	Cable connection
Excitation +	1	white
Excitation GND	2	brown
Signal 1 +	3	green
Signal GND	4	yellow
Signal 2 + (optional*)	5	grey
SPAN/ZERO (PMU** only, optional)	6	pink

View to the sensor connector



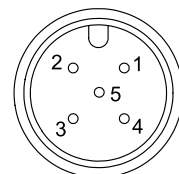
\* When using multiple magnets the distance between two magnets must be min. 70 mm to identify the single magnets definitely.    \*\* Description page 10

**Connector M12, 5-pin**

Signal wiring

Signal	Plug connection
Excitation +	1
Signal 1 +	2
GND	3
Signal 2 + (optional*)	4
PMU** (optional)	5

View to the sensor connector



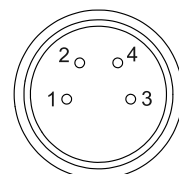
\* When using multiple magnets the distance between two magnets must be min. 70 mm to identify the single magnets definitely.    \*\* Description page 10

**Connector M8, 4-pin**

Signal wiring

Signal	Plug connection
Excitation +	1
Excitation GND	2
Signal +	3
PMU** (optional)	4

View to the sensor connector



\* When using multiple magnets the distance between two magnets must be min. 70 mm to identify the single magnets definitely.    \*\* Description page 10

**Option - PMU for analog output U1, U2, U8 and I1**

Programming of the start and end value by the customer:

The option PMU allows to program the start value and the end value of the output range by a programming signal SPAN/ZERO available at the connector. This Signal SPAN/ZERO must be connected with GND via a push button, then position magnet of the sensor must be moved to the start resp. end position. Pushing the button between 2 and 4 seconds sets the actual position as start position, pushing the button more than 5 seconds sets the actual position as end position. The values will be stored and are available after switching off the sensor.

To reset the sensor to the factory values the button must be pushed for longer than two seconds when the sensor is switched on.

**Diagnostic on analog outputs**

**Behaviour of the analog signal output in case of error**

In case of error (magnet missing or outside the measuring range) the analog output signal will assume a state according to the following options:

**Alarm\_HIGH**

The output voltage resp. the output current is at HIGH level (overrange).

**Alarm\_LOW**

The output voltage resp. the output current is at LOW level (underrange).

**Alarm\_HOLD**

The output voltage resp. the output current will keep the last valid state.

	<b>Alarm_HIGH</b> (standard)	<b>Alarm_LOW</b> (.../U)	<b>Alarm_HOLD</b> (.../H)
<b>U1</b>	$U_{out} \geq 10,5 \text{ V}$	—	keeps last valid state (Order code <b>U1/H</b> )
<b>U2</b>	$U_{out} \geq 10,5 \text{ V}$	$U_{out} < 0,25 \text{ V}$ (Order code <b>U2/U</b> )	keeps last valid state (Order code <b>U2/H</b> )
<b>U8</b>	$U_{out} \geq 10 \text{ V}$	$U_{out} < 0,25 \text{ V}$ (Order code <b>U8/U</b> )	keeps last valid state (Order code <b>U8/H</b> )
<b>I1</b>	$I_{out} \geq 21 \text{ mA}$	1,5 ... 2 mA (Order code <b>I1/U</b> )	keeps last valid state (Order code <b>I1/H</b> )

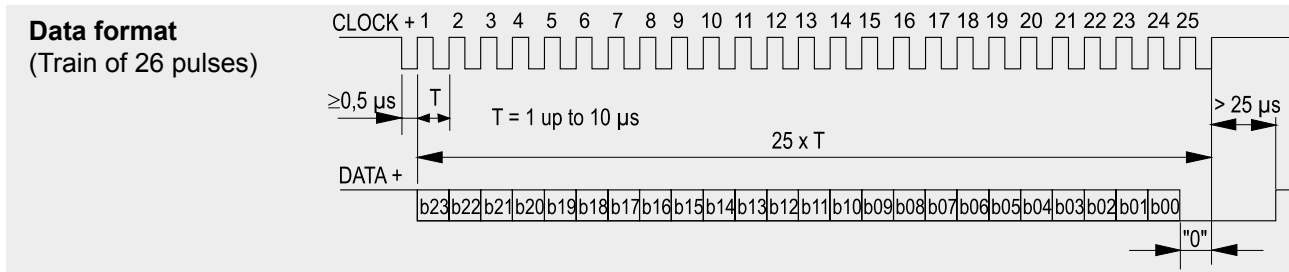
**Error signal for SSI output**

If the sensor cannot detect a magnet the position value will assume the maximum value (0xFFFFF).

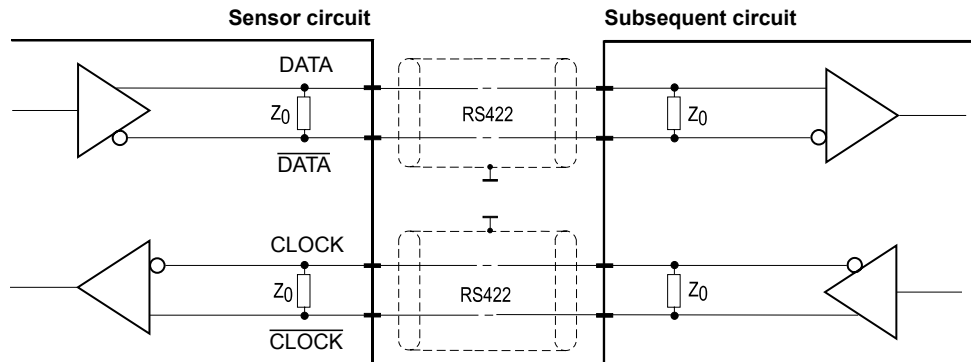
<b>Synchronous serial interface SSI</b> 	Output	RS422
	Excitation voltage	10 ... 36 V DC, residual ripple 10 mV <sub>SS</sub>
	Excitation current	Typ. 80 mA, 150 mA max.
	Clock frequency	100 kHz ... 1 MHz
	Code	Gray code, dual code
	Resolution	≥ 5 μm
	Delay between pulse trains	>25 μs
	Stability (temperature)	±50 x 10 <sup>-6</sup> / °C f.s.
	Operating temperature	-40 ... +85 °C
	EMC	EN 61326-1:2013

**Description**

The data transmission takes place by means of the two signals CLOCK and DATA. The processing unit (PLC, microcomputer) sends pulse sequences which clock the data transmission at the required transfer rate. With the first falling edge of the pulse sequence the position of the sensor is recorded and stored. The following rising edges control the bit-by-bit transfer of the data word. After a delay time the next new position information can be transmitted.



**Signal diagram**



<b>Cable length</b>	<b>Baud rate</b>
50 m	100-1000 kHz
100 m	100-300 kHz

**Note:**  
Extension of the cable length will reduce the maximum transmission rate.  
The signals CLOCK/CLOCK and DATA/DATA must be connected in a twisted pair cable, common shielded.

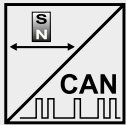
Signal wiring	Signal	Plug connection	Cable connection
	Excitation +	1	white
	Excitation GND	2	brown
	CLOCK	3	green
	CLOCK	4	yellow
	DATA	5	grey
	DATA	6	pink

View to sensor connector



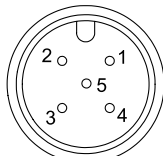
Error indication see page 10.

**Description** CANopen interface with process data for position and cam functions, programmable are preset, resolution, filtering and cam switching points.

<b>Interface CANOP</b> 	Communication profile	CANopen CiA 301 V 4.02, Slave
	Encoder profile	Encoder CiA 406 V 3.2
	Error Control	Node Guarding, Heartbeat, Emergency Message
	Node ID	Adjustable via LSS or via object dictionary
	PDO	4 TxPDO, 0 RxPDO, no linking, static mapping
	PDO Modes	Event-/Time triggered, Remote-request, Sync cyclic/acyclic
	SDO	1 server, 0 client
	CAM	8 cams
	Certified	Yes
	Transmission rates	50 kBaud to 1 MBaud, adjustable via LSS or via object dictionary
	Nodes	127 max.
	Bus connection	M12 connector, 5 pins
	Integrated bus terminating resistor	120 Ω (option)
Bus, galvanic isolated	No	

<b>Specifications</b>	Excitation voltage	18 ... 36 V DC
	Excitation current	Typ. 20 mA for 24 V, max. 80 mA
	Number of position magnets	1 ... 4
	Resolution	50 μm
	Measuring rate	1 kHz (asynchronous)
	Stability (temperature)	±50 x 10 <sup>-6</sup> / °C f.s.
	Repeatability	1 LSB
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	Dielectric strength	500 V (V AC, 50 Hz, 1 min.)
	EMC	EN 61326-1:2013

When using multiple magnets the distance between two magnets must be min. 70 mm to identify the single magnets definitely.

<b>Signal wiring</b>	Signal	Plug connection	View to sensor connector 
	Shield	1	
	Excitation +	2	
	GND	3	
	CAN-H	4	
	CAN-L	5	

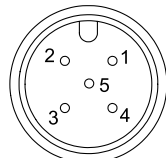
<b>Interface J1939</b> 	CAN specification	ISO 11898, Basic and Full CAN 2.0 B
	Transceiver	24V-compliant, not isolated
	Communication profile	SAE J1939
	Baud rate	250 kbit/s
	Internal termination resistor	120 Ω (option)
	Address	Default 247d, configurable

<b>NAME Fields</b>	Arbitrary address capable	0	No
	Industry group	0	Global
	Vehicle system	7Fh (127d)	Non specific
	Vehicle system instance	0	
	Function	FFh (255d)	Non specific
	Function instance	0	
	ECU instance	0	
	Manufacturer	145h (325d)	Manufacturer ID
	Identity number	0nnn	Serial number 21 bit

<b>Parameter Group Numbers (PGN)</b>	Configuration data	PGN EF00h	Proprietary-A (PDU1 peer-to-peer)
	Process data	PGN FFnnh	Proprietary-B (PDU2 broadcast); nn Group Extension (PS) configurable

<b>Specifications</b>	Excitation voltage	18 ... 36 V DC
	Excitation current	Typ. 20 mA for 24 V, max. 80 mA
	Measuring rate	1 kHz (asynchronous)
	Stability (temperature)	±50 x 10 <sup>-6</sup> / °C f.s.
	Repeatability	1 LSB
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	Dielectric strength	500 V (V AC, 50 Hz, 1 min.)
	EMC	EN 61326-1:2013

When using multiple magnets the distance between two magnets must be min. 70 mm to identify the single magnets definitely.

<b>Signal wiring</b>	Signal	Plug connection	View to sensor connector 
	Shield		
Excitation +		2	
GND		3	
CAN-H		4	
CAN-L		5	

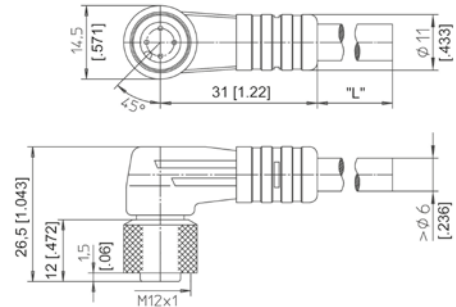
**Connector cable  
M12, 5-pin  
shielded**

The 5-lead shielded cable is supplied with a mating 5-pin 90° M12 connector at one end and 5 wires at the other end. Available lengths are 2 m, 5 m and 10 m. Wire: cross sectional area 0.34 mm<sup>2</sup>.

Order code:

**KAB - XM - M12/5F/W - LITZE**  
**IP69K: KAB - XM - M12/5F/W/69K - LITZE**

Length in m



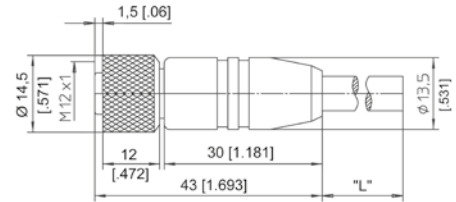
**Connector cable  
M12, 5-pin  
shielded**

The 5-lead shielded cable is supplied with a mating 5-pin M12 connector at one end and 5 wires at the other end. Available lengths are 2 m, 5 m and 10 m. Wire: cross sectional area 0.34 mm<sup>2</sup>.

Order code:

**KAB - XM - M12/5F/G - LITZE**  
**IP69K: KAB - XM - M12/5F/G/69K - LITZE**

Length in m



Signal wiring M12, 5-pin	Plug connection / Cable connection				
	1	2	3	4	5
	brown	white	blue	black	grey

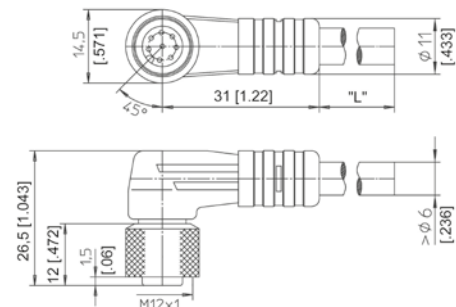
**Connector cable  
M12, 8-pin  
shielded**

The 8-lead shielded cable is supplied with a mating 8-pin 90° M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m. Wire: cross sectional area 0.25 mm<sup>2</sup>.

Order code:

**KAB - XM - M12/8F/W - LITZE**  
**IP69K: KAB - XM - M12/8F/W/69K - LITZE**

Length in m



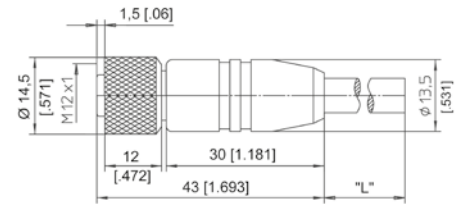
**Connector cable  
M12, 8-pin  
shielded**

The 8-lead shielded cable is supplied with a mating 8-pin M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m. Wire: cross sectional area 0.25 mm<sup>2</sup>.

Order code:

**KAB - XM - M12/8F/G - LITZE**  
**IP69K: KAB - XM - M12/8F/G/69K - LITZE**

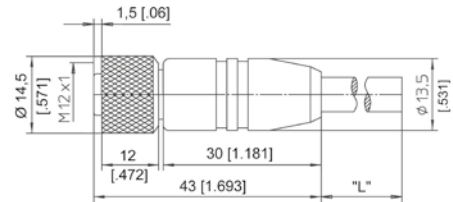
Length in m



Signal wiring M12, 8-pin	Plug connection / Cable connection							
	1	2	3	4	5	6	7	8
	white	brown	green	yellow	grey	pink	blue	red

**Connector/bus cable**  
**M12, 5-pin**  
**CAN bus**  
shielded

The 5-lead shielded cable is supplied with a female 5-pin M12 connector at one end and a male 5-pin M12 connector at the other end. Available lengths are 0.3 m, 2 m, 5 m and 10 m.



Order code:

**KAB - XM - M12/5F/G - M12/5M/G - CAN**

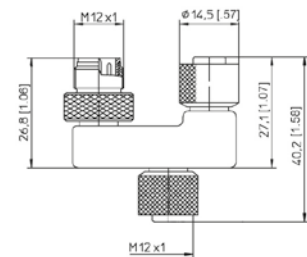
**IP69K: KAB - XM - M12/5F/G/69K - M12/5M/G/69K - CAN**

Length in m ↑

**T-piece for bus cable**  
**M12, 5-pin**  
**CAN bus**

Order code:

**KAB - TCONN - M12/5M - 2M12/5F - CAN**



**Terminating**  
**resistance**  
**M12, 5-pin**  
**CAN bus**

Order code:

**KAB - RTERM - M12/5M/G - CAN**

