



PRDS1

Angle sensor for standard industrial applications



- **Measurement range 0°... 360°**
- **Protection class IP67/IP69**
- **Stainless steel round housing**
- **Diameter 12 mm**
- **Contactless with external position magnet, wear-free**

Product versions



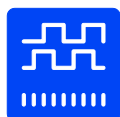
Incremental output



Digital output SSI



Digital output CANopen



PRDS1 - Magnetic Angle Sensor Version with Incremental output

Specifications

		Order options	
Measurement range	0 ... 360°		
Resolution	1, 2, 3 ... 1024 pulses per revolution	1	1, 2, 3 ... 1024
Linearity	±1% (typical)		
Output	Incremental encoder output RS422 compatible, excitation 5 V DC Incremental encoder output RS422 compatible, excitation 8 ... 36 V DC Incremental encoder output HTL compatible, excitation 8 ... 36 V DC DC	2	RS5VF RS24VF HT24VF
Rated distance sensor / magnet	Depending on the position magnet		
Connection	8-pin connector M12	3	M12A8
Housing material	Stainless steel		
Mounting	M12 x 1		
Protection class	IP67/IP69		
Shock	DIN EN 60068-2-27:2010, 100 g/11 ms, 100 shocks		
Vibration	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles		
Temperature range	-40 ... +85°C		
Weight	35 g approx.		
EMC	DIN EN 61326-1:2013		

Order code

PRDS1 – **1** – **2** – **3**

Order example: PRDS1 – 1024 – RSV5F – M12A8

Accessories:

Connector cable (see page 15)

Position magnets (see from page 6)



PRDS1 - Magnetic Angle Sensor Version with Digital output SSI

Specifications

		Order options	
Measurement range	0 ... 360°		
Output	Synchronous serial output with excitation 5 V DC Synchronous serial output with excitation 10 ... 36 V	1	RSSI5V/D/14 RSSI24V/D/14
Code characteristics	Signal increasing CW, clockwise Signal increasing CCW, counterclockwise	2	CW CCW
Resolution	14 Bit (16384 steps) per revolution		
Linearity	±1% (typical)		
Rated distance sensor / magnet	Depending on the position magnet		
Connection	8-pin connector M12	3	M12A8
Housing material	Stainless steel		
Mounting	M12 x 1		
Protection class	IP67/IP69		
Shock	DIN EN 60068-2-27:2010, 100 g/11 ms, 100 shocks		
Vibration	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles		
Temperature range	-40 ... +85°C		
Weight	35 g approx.		
EMC	DIN EN 61326-1:2013		

Order code

PRDS1 – **1** – **2** – **3**

Order example: PRDS1 – RSSI5V/D/14 – CW – M12A8

Accessories:

Connector cable (see page 15)

Position magnets (see from page 6)



PRDS1 - Magnetic Angle Sensor Version with Digital output CANopen

Specifications

		Order options	
Measurement range	0 ... 360°		
Output	CANopen CANopen with integrated terminating resistance	1	CANOP CANOP/RT
Resolution	0,05° max.		
Linearity	±1° (typical)		
Rated distance sensor / magnet	Depending on the position magnet		
Connection	5-pin connector M12	2	M12A5/CAN
Housing material	Stainless steel		
Mounting	M12 x 1		
Protection class	IP67/IP69		
Shock	DIN EN 60068-2-27:2010, 100 g/11 ms, 100 shocks		
Vibration	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles		
Temperature range	-40 ... +85°C		
Weight	35 g approx.		
EMC	DIN EN 61326-1:2013		

Order code

PRDS1 – **1** – **2**

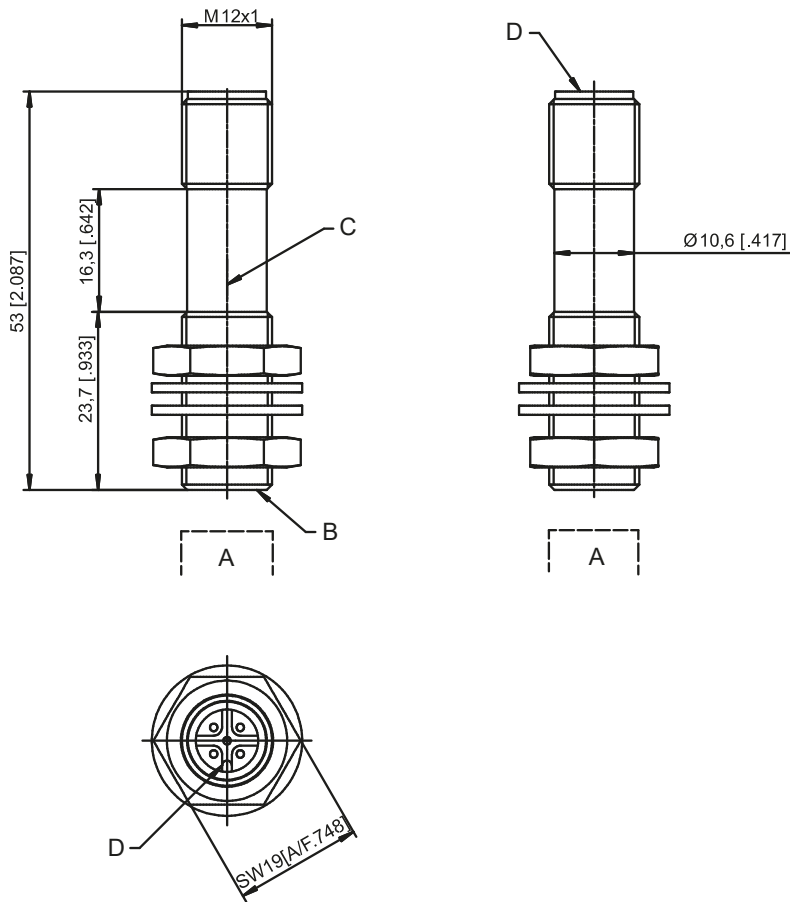
Order example: PRDS1 – CANOP – M12A5/CAN

Accessories:

Connector cable (see page 16)

Position magnets (see from page 6)

Dimensions

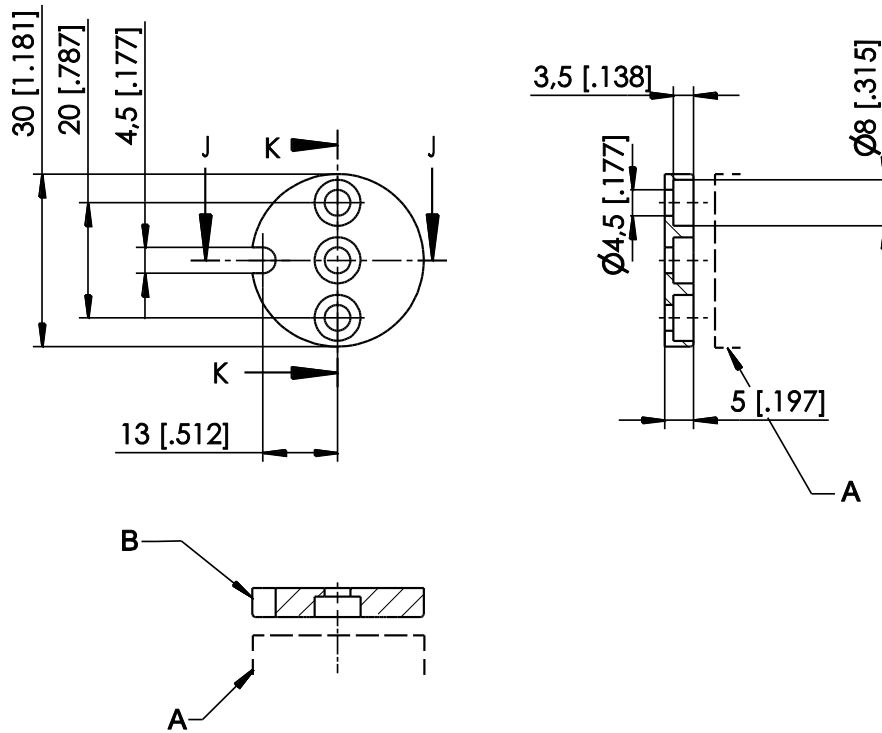


- A – Position magnet
- B – Measuring area
- C – Marking
- D – Connector M12

Dimensions in mm [inch]. Weight approx. 35 g.
Dimensions informative only.
For guaranteed dimensions consult factory.

Position magnets

PRMAG20



A – Sensor
B – Marking

Order code	Weight	Material	Moment of inertia
PRMAG20	approx. 12 g	zinc coated steel, plastic	1.3 kgmm ²

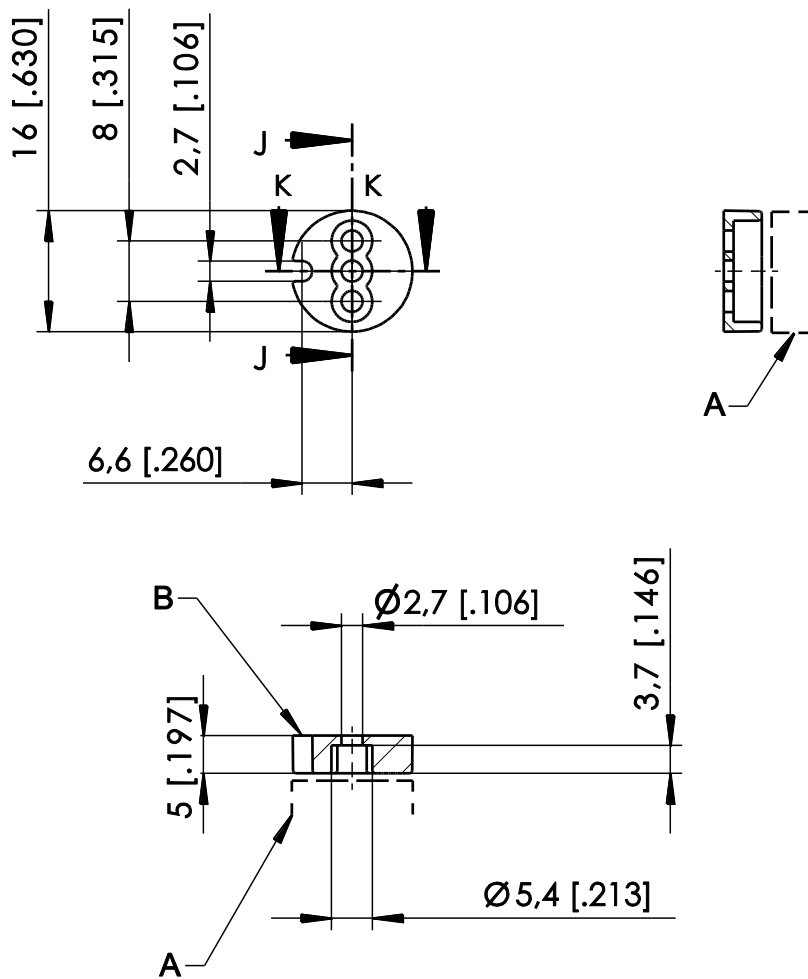
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch].

Dimensions informative only.

For guaranteed dimensions please consult factory.

PRMAG21



A – Sensor
B – Marking

Order code	Weight	Material	Moment of inertia
PRMAG21	approx. 3 g	zinc coated steel; plastic	0.1 kgmm ²

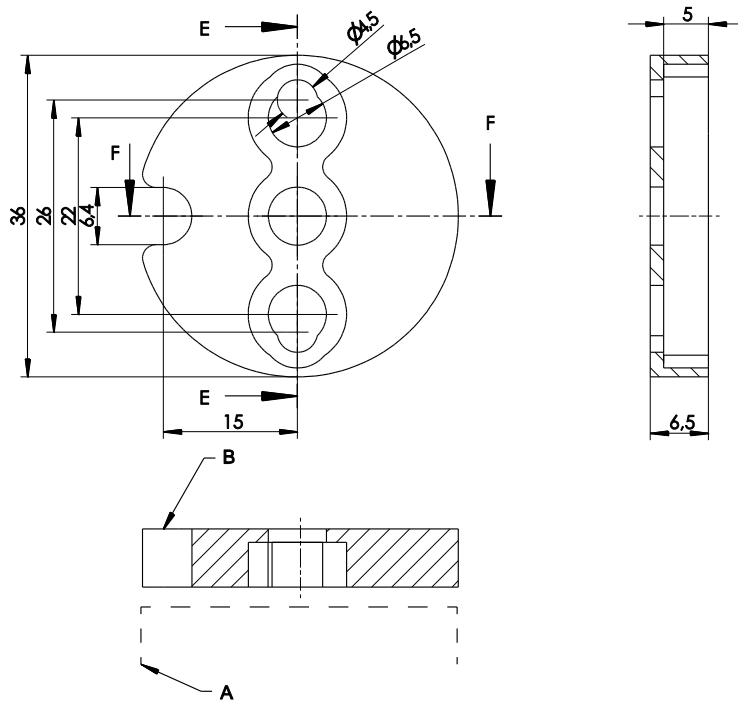
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch]

Dimensions informative only.

For guaranteed dimensions please consult factory.

PRMAG22



A – Sensor

B – Marking

Order code	Weight	Material	Moment of inertia
PRMAG22	approx. 19 g	zinc coated steel, plastic	3 kgmm ²

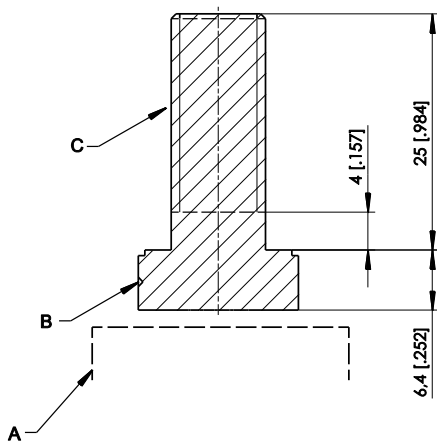
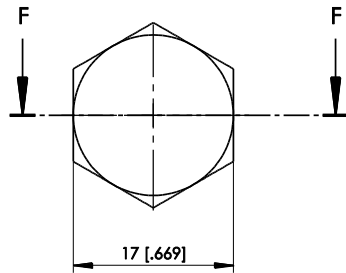
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch].

Dimensions informative only

For guaranteed dimensions please consult factory.

PRMAG-M10



A – Sensor
B – Marking
C – Thread M10

Order code	Weight	Material	Moment of inertia
PRMAG-M10	approx. 30 g	stainless steel A2	1.3 kgmm ²

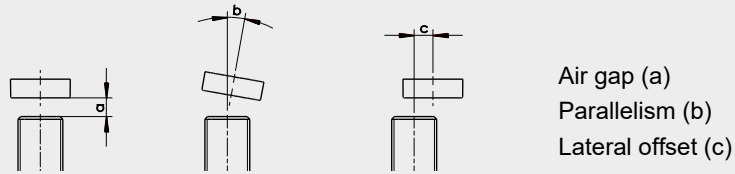
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch].

Dimensions informative only.

For guaranteed dimensions please consult factory.

Measuring error by misalignment of the position magnet



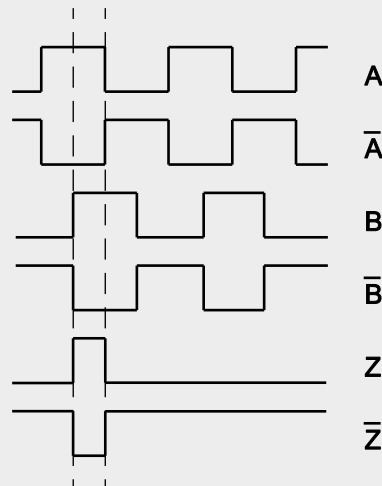
Sensor	Position magnet	Air gap [mm]	Parallelism [°]	Error by lateral offset [°]					
				0.2 mm	0.5 mm	1 mm	2 mm	3 mm	4 mm
PRAS1 PRDS1	PRMAG20	0 ... 6.5	0 ... 5	0.15	0.4	0.8	2.2	5.0	–
	PRMAG21	0 ... 4	0 ... 5	0.2	0.4	1	3.8	10	–
	PRMAG22	0 ... 9.5	0 ... 5	0.1	0.4	1	2.2	4.5	8
	PRMAG-M10	0 ... 5	0 ... 5	0.1	0.1	0.5	2.0	7	–

Output specification

Incremental output

RS5VF /RS24VF Incremental 	Interface	EIA RS-422
	Excitation voltage	RS5VF: 5 V DC $\pm 10\%$ RS24VF: 8 ... 36 V DC
	Excitation current	100 mA max., depending on the load
	Max. pulse frequency	500 kHz
	Output signals	A, $\bar{A}$, B, $\bar{B}$, Z, $\bar{Z}$ Push-Pull
	Output current	10 mA max.
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Operating temperature	-40 ... +85 °C
	Protection	Short circuit
	EMC	DIN EN 61326-1:2013

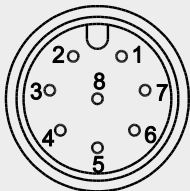
Output signals



Pulse sequence for clockwise rotation CW in view of shaft or active front of sensor.

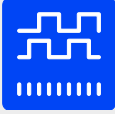
A zero impulse Z, $\bar{Z}$ is generated at the reference position.

Signal wiring Connector M12, 8 pin

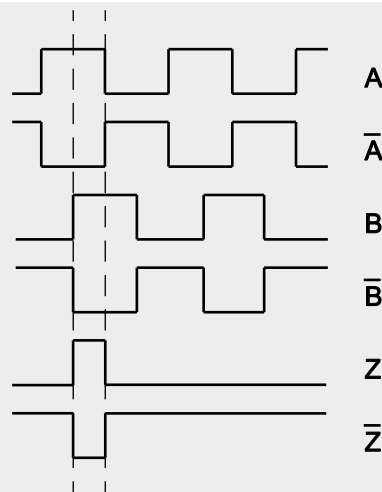


View to the
sensor connector

Output signals	Connector pin no.	Cable color
Excitation +	1	white
Excitation GND	2	brown
A	4	yellow
$\bar{A}$	6	pink
B	3	green
$\bar{B}$	5	grey
Z	7	blue
$\bar{Z}$	8	red

HT24VF Incremental 	Interface	HTL
	Excitation voltage	8 ... 36 V DC
	Excitation current	100 mA max., depending on the load
	Max. pulse frequency	500 kHz
	Output signals	A, $\bar{A}$, B, $\bar{B}$, Z, $\bar{Z}$ Push-Pull
	Output current	10 mA max.
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Operating temperature	-40 ... +85 °C
	Protection	Short circuit
	EMC	DIN EN 61326-1:2013

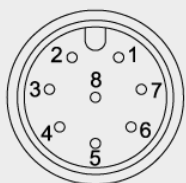
Output signals



Pulse sequence for clockwise rotation CW in view of shaft or active front of sensor.

A zero impulse Z, $\bar{Z}$ is generated at the reference position.

Signal wiring Connector M12, 8 pin



View to the sensor
connector

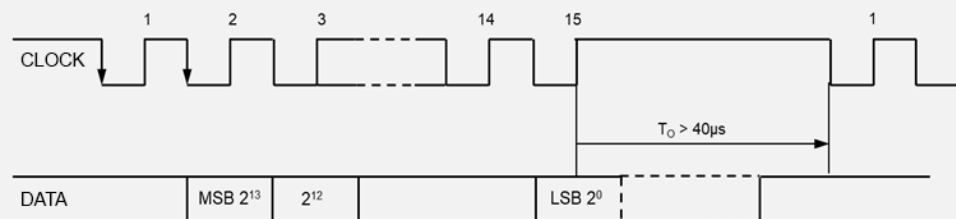
Output signals	Connector pin no.	Cable color
Excitation +	1	white
Excitation GND	2	brown
A	4	yellow
$\bar{A}$	6	pink
B	3	green
$\bar{B}$	5	grey
Z	7	blue
$\bar{Z}$	8	red

SSI output

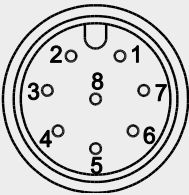
RSSI5V/D/14 RSSI24V/D/14 Synchronous serial SSI 14 Bit 	Interface	EIA RS-422
	Excitation voltage	RSSI5V/D/14: 5 V DC $\pm 10\%$ RSSI24V/D/14: 8 ... 36 V DC
	Excitation current	typ. 50mA@100kHz, depending on the load max. 100mA
	Clock frequency	100 kHz ... 500 kHz
	Code	Dualcode 14 bit (see data format)
	Delay between pulse trains	>40 μ s
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Operating temperature	Refer to sensor specifications
	Protection	Short circuit
	EMC	EN 61326-1:2013

Data format

(Train of 15 pulses)



Transmission rate	Cable length	Baud rate	Note:
	50 m	100 - 500 kHz	Extension of the cable length will reduce the maximum transmission rate. The signals <u>CLOCK</u> / <u>CLOCK</u> and <u>DATA</u> / <u>DATA</u> must be connected in a twisted pair cable, shielded in pairs, the pairs also commonly shielded.
	100 m	100 - 250 kHz	

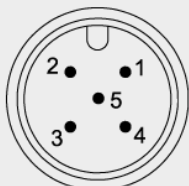
Signal wiring	Output signals	Connector pin no.	Cable color
Connector M12, 8 pin 	Excitation +	1	white
	Excitation GND	2	brown
	CLOCK	3	green
	<u>CLOCK</u>	4	yellow
	DATA	5	grey
	<u>DATA</u>	6	pink
	-	7	blue
	-	8	red

View to the sensor connector

Digital output CANopen

CANOP CANOP/RT CANopen 	CAN Specification	ISO 11898, Basic and Full CAN 2.0 B
	Communication profile	CANopen CiA 301 V 4.02, Slave
	Device profile	Encoder CiA 406 V 3.2
	Configuration services	Layer Setting Service (LSS), CiA Draft Standard 305 (transmission rate, node id)
	Error Control	Node Guarding, Heartbeat, Emergency Message
	Node ID	Default: 127; programmable via LSS or SDO
	PDO	3 TxPDO, 0 RxPDO, 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, default: 125 kBaud; programmable via LSS or SDO
	Bus connection	M12 connector, 5 pin
	Integrated bus terminating resistor (optional)	120 Ω (version CANOP/RT)
	Bus, galvanic isolated	No

Specifications	Excitation voltage	8 ... 36 V DC
	Excitation current	20 mA typical at 24 V DC 40 mA typical at 12 V DC, 80 mA max.
	Resolution	0.05° max.
	Stability (temperature)	±50 x 10 ⁻⁶ /°C f.s. (typical)
	Repeatability	1 LSB
	Operating temperature	See specification of the respective sensor
	Protection	Reverse polarity, short circuit
	Dielectric strength	1 kV (V AC, 50 Hz, 1 min.)
	EMC	DIN EN 61326-1:2013

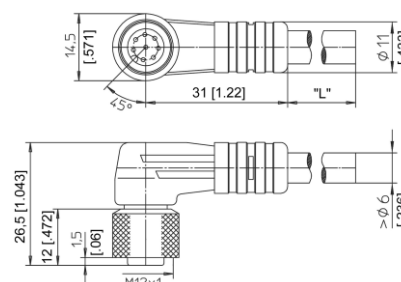
Signal wiring	Output signals	Connector pin no.
Connector M12, 5 pin  View to the sensor connector	Shield	1
	Excitation +	2
	GND	3
	CAN-H	4
	CAN-L	5

Accessories

Connector cable M12, 8 pin (angular coupling)

shielded connector

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 m, 5 m and 10 m.
Wire: cross sectional area 0.25 mm²
Cable diameter: 6.3 ±0.2 mm



Order code

KAB - xM - M12/8F/W - LITZE

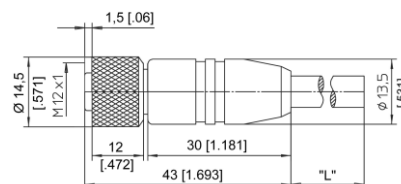
IP69: **KAB - xM - M12/8F/W/69K - LITZE**

xM = length in m

Connector cable M12, 8 pin (straight coupling)

shielded connector

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 m, 5 m and 10 m.
Wire: cross sectional area 0.25 mm²
Cable diameter: 6.3 ±0.2 mm



Order code

KAB - xM - M12/8F/G - LITZE

IP69: **KAB - xM - M12/8F/G/69K - LITZE**

xM = length in m

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

Applicable for cable carriers

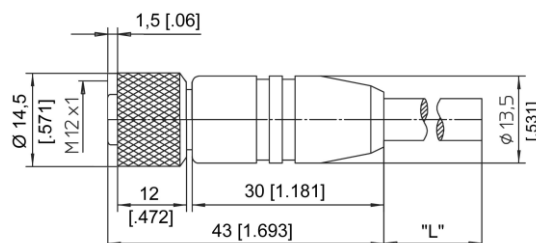
Maximum movement speed	3 m/s
Maximum acceleration	5 m/s²
Minimum bending radius	10 x cable diameter

Connector/bus cable M12, 5 pin CAN-Bus

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 and 10 m.

Cable diameter: 6.7 ± 0.2 mm



Order code

KAB - xM - M12/5F/G - M12/5M/G - CAN

IP69: KAB - xM - M12/5F/G/69K - M12/5M/G/69K - CAN

xM = length in m

Applicable for cable carriers

Maximum movement speed	3 m/s
Maximum acceleration	5 m/s ²
Minimum bending radius	10 x cable diameter

T-connector for bus cable M12, 5 pin CAN-Bus

Order code

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



Terminating resistor M12, 5 pin CAN-Bus

Order code

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

