

WS7.5

Displacement sensor with
measurement length up to
40,000 mm



- Protection class IP52
- Aluminum/stainless steel/EPDM housing
- Optional with magnetic absolute encoder
- Redundant version available

Product versions

			Analog output, SSI output
	Analog output with magnetic encoder		
		Analog output with magnetic encoder, programmable	
		Analog output with magnetic encoder, redundant	
	Digital output SSI with magnetic encoder		
	Digital output CAN Bus with magnetic encoder		
		Absolute encoder output	
			
	Incremental encoder output		



WS7.5 - Cable Extension Position Sensor Version with analog output, SSI output

Specifications

		Order options	
Measurement range	10000 / 20000 / 30000 / 40000 mm	1	10000 / 20000 / 30000 / 40000
Resolution	Analog: quasi infinite		
Output	Potentiometer 1 kΩ Voltage 0 ... 10 V Current 4 ... 20 mA, 2 wire Current 4 ... 20 mA, 3 wire Current output, programmable Voltage output, programmable Signal conditioner SSI 12 bit Signal conditioner SSI 14 bit Signal conditioner SSI 16 bit	2	R1K 10V 420A 420T PMUI PMUV ADSI ADSI14 ADSI16
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	3	L10 L05
Sensing device	Precision potentiometer		
Material	Aluminum, stainless steel and EPDM measuring cable: stainless steel		
Protection class	IP52		
Cable fixing	M4 cable fixing Cable clip	4	M4 SB0
Connection	Connector M12, 8 pin	5	M12
Temperature range	-20 ... +85 °C		
Weight	Approx. 10 kg		
EMC	DIN EN 61326-1:2013		

Order code

WS7.5 – **1** – **2** – **3** – **4** – **5**

Order example: WS7.5 – 30000 – 420T – L10 – M4 – M12

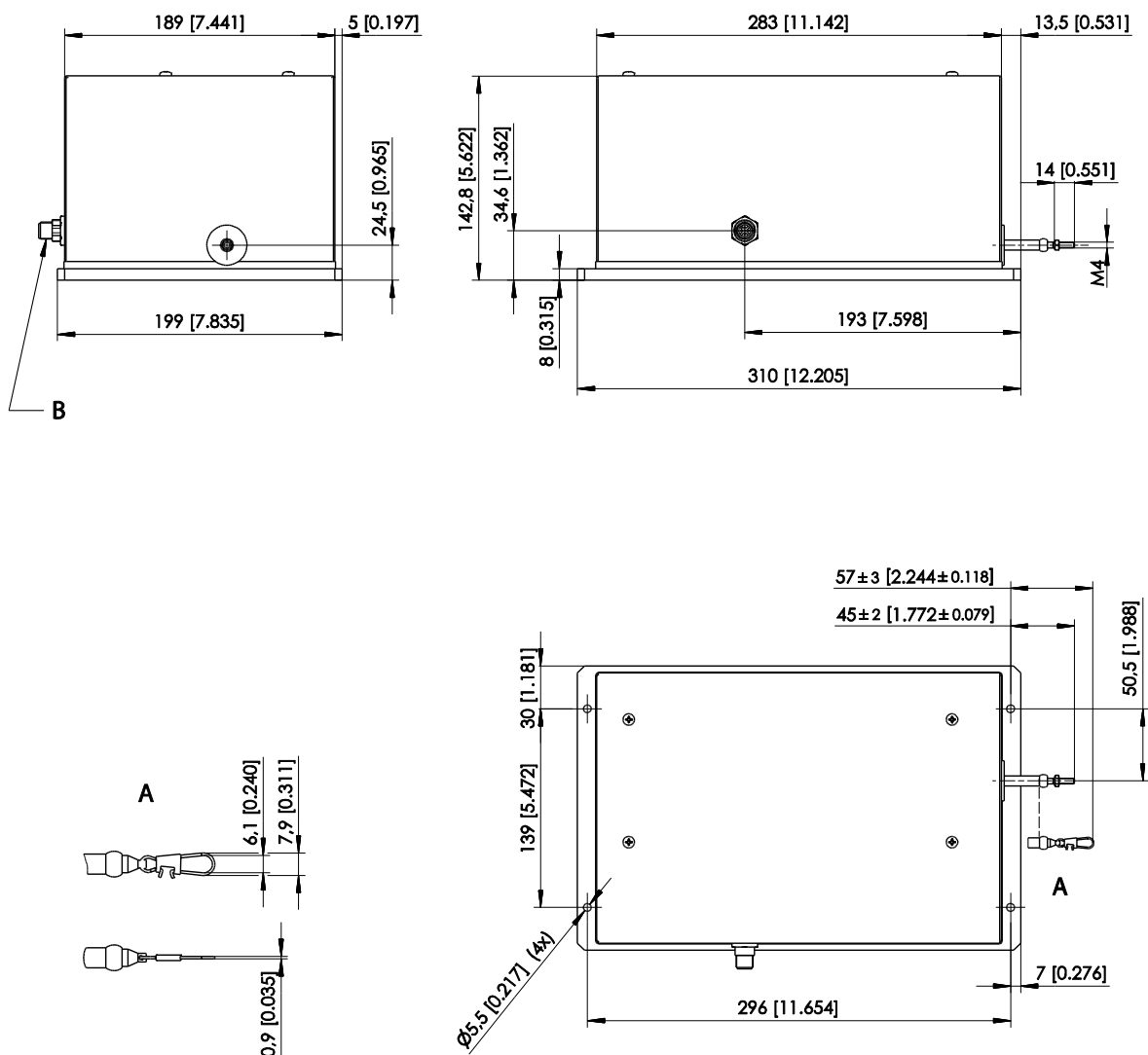
Accessories:

Connector cable (see page 39)

Cable forces typical at 20 °C	Measurement range	Maximum pull-out force	Minimum pull-in force
	[mm]	[N]	[N]
	10000 – 30000	8.0	4.2
	40000	7.0	3.4

Dimensions

Measurement range 10000 ... 40000 mm, analog output, SSI output



A – Option SB0
B – Connector M12

Dimensions in mm [inch]
Dimensions informative only.
For guaranteed dimensions consult factory.



WS7.5 - Cable Extension Position Sensor Version with analog output with magnetic encoder

Specifications

		Order options	
Measurement range	10000 / 15000 / 20000 / 25000 / 30000 / 40000 mm	1	10000 / 15000 / 20000 / 25000 / 30000 / 40000
Resolution	<0.002% f.s.		
Output	Voltage 0.5 ... 10 V Voltage 0.5 ... 4.5 V Current 4 ... 20 mA, 3 wire	2	U2 U8 I1
Signal characteristics	Increasing signal (e.g. 4 ... 20 mA) Decreasing signal (e.g. 20 ... 4 mA)	3	A D
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	4	L10 L05
Sensing device	Magnetic absolute encoder		
Material	Aluminum, stainless steel and EPDM measuring cable: stainless steel		
Protection class	IP52		
Cable fixing	M4 cable fixing Cable clip	5	M4 SB0
Connection	Connector M12, 5 pin (standard) Connector M12, 8 pin (DBs_optional)	6	M12A5 M12A8
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	-20 ... +85 °C		
Weight	Approx. 10 kg		
EMC	DIN EN 61326-1:2013		

Order code

WS7.5	–	1	–	2	–	3	–	4	–	5	–	6
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Order example: WS7.5 – 30000 – U2 – A – L10 – M4 – M12A5

Accessories:

Connector cable (see page 37)



WS7.5 - Cable Extension Position Sensor

Version with analog output with magnetic encoder, programmable

Specifications

		Order options	
Measurement range	10000 / 15000 / 20000 / 25000 / 30000 / 40000 mm	1	10000 / 15000 / 20000 / 25000 / 30000 / 40000
Resolution	<0.002% f.s.		
Output	Voltage 0.5 ... 10 V, programmable Voltage 0.5 ... 4.5 V, programmable Current 4 ... 20 mA, 3 wire, programmable	2	U2/PMU U8/PMU I1/PMU
Signal characteristics	Increasing signal (e.g. 4 ... 20 mA) Decreasing signal (e.g. 20 ... 4 mA)	3	A D
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	4	L10 L05
Sensing device	Magnetic absolute encoder		
Material	Aluminum, stainless steel and EPDM measuring cable: stainless steel		
Protection class	IP52		
Cable fixing	M4 cable fixing Cable clip	5	M4 SB0
Connection	Connector M12, 5 pin	6	M12A5
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	-20 ... +85 °C		
Weight	Approx. 10 kg		
EMC	DIN EN 61326-1:2013		

Order code

WS7.5	–	1	–	2	–	3	–	4	–	5	–	6
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Order example: WS7.5 – 30000 – U2/PMU – A – L10 – M4 – M12A5

Accessories:

Connector cable (see page 38)



WS7.5 - Cable Extension Position Sensor

Version with analog output with magnetic encoder, redundant

Specifications

		Order options	
Measurement range	10000 / 15000 / 20000 / 25000 / 30000 / 40000 mm	1	10000 / 15000 / 20000 / 25000 / 30000 / 40000
Resolution	<0.002% f.s.		
Output	Voltage 0.5 ... 10 V, redundant Voltage 0.5 ... 4.5 V, redundant Current 4 ... 20 mA, 3 wire, redundant	2	U2R U8R I1R
Signal characteristics	Output 1 increasing, output 2 increasing Output 1 increasing, output 2 decreasing Output 1 decreasing, output 2 decreasing	3	A/A A/D D/D
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	4	L10 L05
Sensing device	Magnetic absolute encoder		
Material	Aluminum, stainless steel and EPDM measuring cable: stainless steel		
Protection class	IP52		
Cable fixing	M4 cable fixing Cable clip	5	M4 SB0
Connection	Connector M12, 8 pin	6	M12A8
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	-20 ... +85 °C		
Weight	Approx. 10 kg		
EMC	DIN EN 61326-1:2013		

Order code

WS7.5	–	1	–	2	–	3	–	4	–	5	–	6
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Order example: WS7.5 – 30000 – I1R – A – L10 – M4 – M12A8

Accessories:

Connector cable (see page 39)



WS7.5 - Cable Extension Position Sensor Version with digital output SSI with magnetic encoder

Specifications

			Order options
Measurement range	10000 / 15000 / 20000 / 25000 / 30000 / 40000 mm	1	10000 / 15000 / 20000 / 25000 / 30000 / 40000
Resolution	100 µm	2	100
Output	SSI synchronous serial interface	3	MSSI
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	4	L10 L05
Sensing device	Magnetic absolute encoder		
Material	Aluminum, stainless steel and EPDM measuring cable: stainless steel		
Protection class	IP52		
Cable fixing	M4 cable fixing Cable clip	5	M4 SB0
Connection	Connector M12, 8 pin	6	M12A8
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	-20 ... +85 °C		
Weight	Approx. 10 kg		
EMC	DIN EN 61326-1:2013		

Order code

WS7.5	–	1	–	2	–	3	–	4	–	5	–	6
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Order example: WS7.5 – 30000 – 100 – MSSI – L10 – M4 – M12A8

Accessories:

Connector cable (see page 39)



WS7.5 - Cable Extension Position Sensor Version with digital output CAN Bus with magnetic encoder

Specifications

		Order options	
Measurement range	10000 / 20000 / 30000 / 40000 mm	1	10000 / 20000 / 30000 / 40000
Resolution	setting via CAN Bus		
Output	CANopen CAN SAE J1939 CANopen redundant CAN SAE J1939 redundant	2	MCANOP MCANJ1939 MCANOPR MCANJ1939R
Linearity	±0.10% f.s. (standard) ±0.05% f.s. (optional)	3	L10 L05
Sensing device	Magnetic absolute encoder		
Material	Aluminum, stainless steel and EPDM measuring cable: stainless steel		
Protection class	IP52		
Cable fixing	M4 cable fixing Cable clip	4	M4 SB0
Connection	Connector M12, 5 pin	5	M12/CAN
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	-20 ... +85 °C		
Weight	Approx. 10 kg		
EMC	DIN EN 61326-1:2013		

Order code

WS7.5 – **1** – **2** – **3** – **4** – **5**

Order example: WS7.5 – 30000 – MCANOP – L10 – M4 – M12/CAN

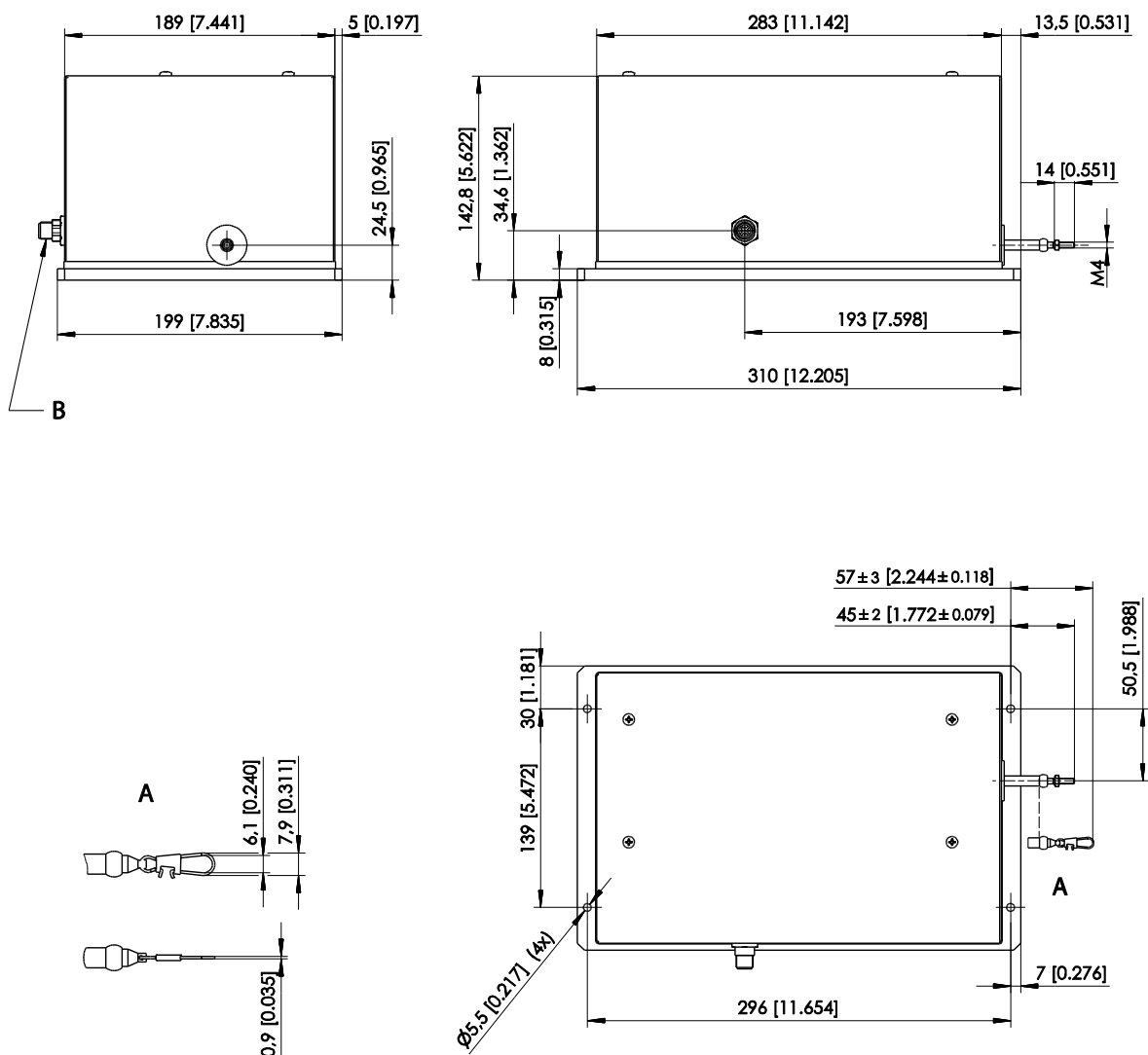
Accessories:

Connector cable (see page 40)

Cable forces typical at 20 °C	Measurement range	Maximum pull-out force	Minimum pull-in force
	[mm]	[N]	[N]
	10000 – 30000	8.0	4.2
	40000	7.0	3.4

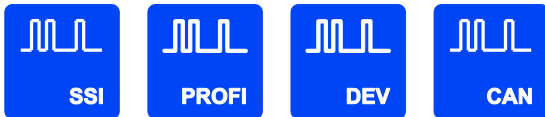
Dimensions

Measurement range 10000 ... 40000 mm, magnetic encoder output



A – Option SB0
B – Connector M12

Dimensions in mm [inch]
Dimensions informative only.
For guaranteed dimensions consult factory.



WS7.5 - Cable Extension Position Sensor Version with absolute encoder output

Specifications

		Order options	
Measurement range	10000 / 15000 / 20000 / 25000 / 30000 / 40000 mm	1	10000 / 15000 / 20000 / 25000 / 30000 / 40000
Output for 12 bit per revolution (4096 steps / revolution)	Up to 30000 mm: 0.073 mm 40000 mm: 0.088 mm		
Output	Absolute encoder with synchronous serial output (SSI) Absolute encoder with Profibus interface Absolute encoder with Interbus interface Absolute encoder with DeviceNet interface Absolute encoder with CAN-interface Absolute encoder with CANopen interface Mechanism only for suitable multiturn encoders	2	HSSI HPROF HINT HDEV HCAN HCANOP ME
Linearity	±0.05% f.s. (standard) ±0.01% f.s. (optional)	3	L01
Sensing device	Absolute encoder		
Material	Aluminum, stainless steel and EPDM measuring cable: stainless steel		
Protection class	IP52, encoder IP64		
Cable fixing	M4 cable fixing Cable clip	4	M4 SB0
Connection	Depending on the type of encoder: connector or Bus cover		
Temperature range	-20 ... +85 °C		
Weight	Approx. 10 kg		
EMC	DIN EN 61326-1:2013		

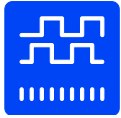
Order code

WS7.5 – **1** – **2** – **3** – **4**

Order example: WS7.5 – 30000 – HSSI – M4

Accessories:

Mating connector CONN-CONIN-12F-G (see page 41)



WS7.5 - Cable Extension Position Sensor Version with incremental encoder output

Specifications

		Order options	
Measurement range	10000 / 20000 / 30000 / 40000 mm	1	10000 / 20000 / 30000 / 40000
Resolution	Up to 30000 mm: 13,69 pulses / mm 40000mm: 11,36 pulses / mm		
Output	Incremental encoder TTL compatible Incremental encoder HTL compatible	2	LD5VC PP24VC
Linearity	±0.05% f.s. (standard) ±0.01% f.s. (optional)	3	L01
Sensing device	Incremental encoder		
Material	Aluminum, stainless steel and EPDM measuring cable: stainless steel		
Protection class	IP52, encoder IP64		
Cable fixing	M4 cable fixing Cable clip	4	M4 SB0
Connection	Connector 12 pin		
Temperature range	-20 ... +85 °C		
Weight	Approx. 10 kg		
EMC	DIN EN 61326-1:2013		

Order code

WS7.5 – **1** – **2** – **3** – **4**

Order example: WS7.5 – 30000 – LD5VC – L01 – M4

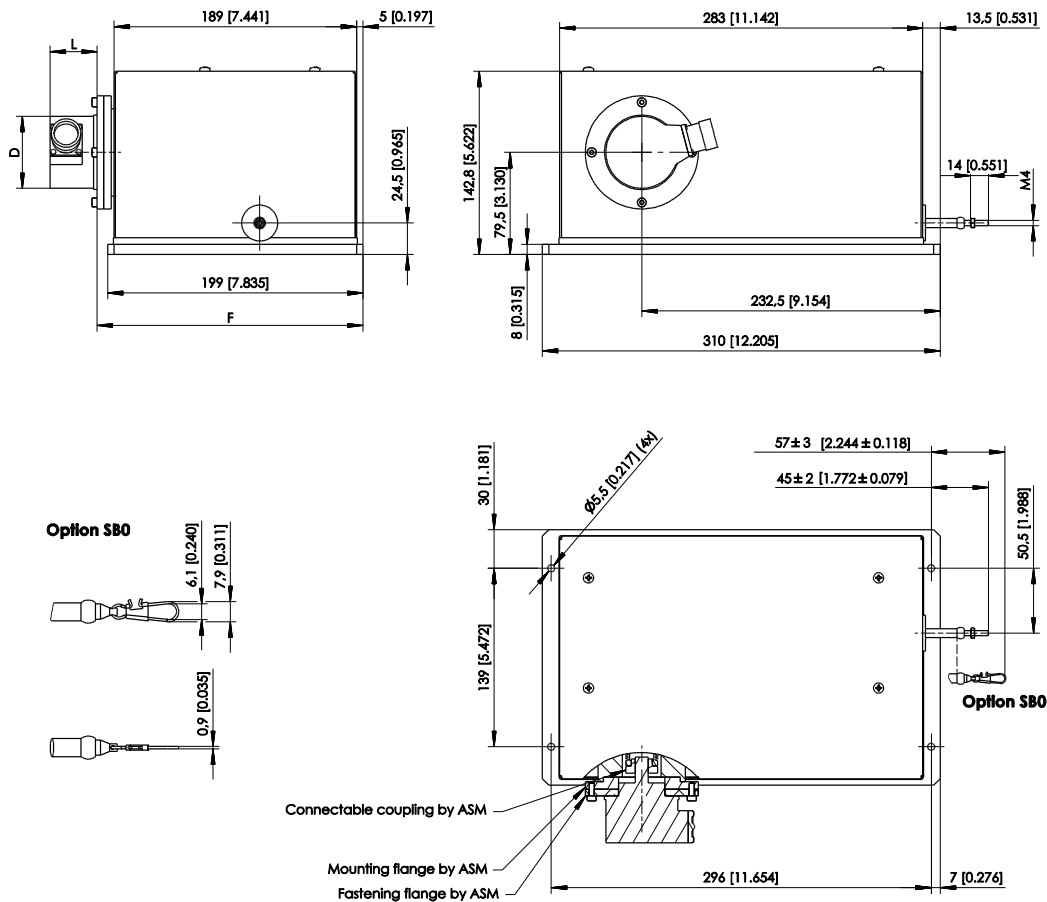
Accessories:

Mating connector CONN-CONIN-12F-G (see page 41)

Cable forces typical at 20 °C	Measurement range [mm]	Maximum pull-out force [N]	Minimum pull-in force [N]
	10000 – 30000	8.0	4.2
	40000	7.0	3.4

Dimensions

Measurement range 10000 ... 40000 mm; output: absolute and incremental encoder

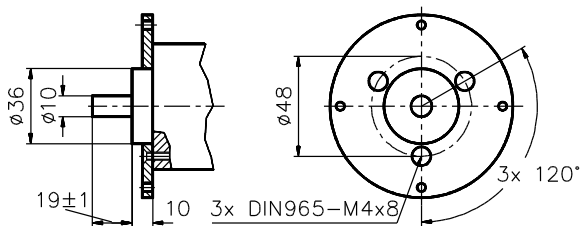


Dimensions in mm [inch]

Dimensions D, F and L depend on the encoder type and sensor fixing.

Dimensions informative only. For guaranteed dimensions consult factory.

Output ME



Connectable coupling in two parts

The outer part of the coupling should be fitted to the encoder shaft. Adjust a 0.5 mm clearance between the fastening and the mounting flanges to give an initial tension on the coupling when the mounting bolts are tightened.

Dimensions for encoder mounting

Output specification

Analog outputs

Voltage divider

R1K Potentiometer 	Excitation voltage	32 V DC max. at 1 kΩ (max. power 1 W)
	Potentiometer impedance	1 kΩ ±10 %
	Thermal coefficient	±25 x 10 ⁻⁶ / °C f.s.
	Sensitivity	Depends on the measuring range, individual sensitivity of the sensor is specified on the label
	Voltage divider utilization range	approx. 3 % ... approx. 97 %
	Operating temperature	Refer to output specification
	EMC	DIN EN 61326-1:2013

NOTICE

The potentiometer must be connected as a voltage divider!

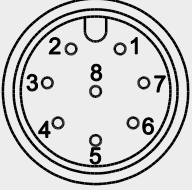
The following processing circuit has to be implemented according to the circuit scheme in the Appendix (see „Output information“)!

Electrical current flow impact on the wiper causes linearity errors and shortens the lifetime of the potentiometer

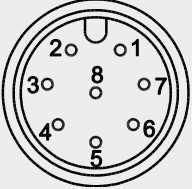
- The metal wiper of the potentiometer must be protected against current load

Additional information:

https://www.asm-sensor.com/en/downloads.html?file=files/asmTheme/pdf/ws_poti_technote_en.pdf

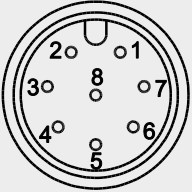
Signal wiring Connector M12, 8 pin	Signal	Connector pin no.	Cable color
 View to the sensor connector	Poti +	1	white
	Poti GND	2	brown
	Poti slider	3	green
	-	4	yellow
	-	5	grey
	-	6	pink
	-	7	blue
	-	8	red

10V and 10V5 Voltage output 	Excitation voltage	18 ... 27 V DC non stabilized
	Excitation current	20 mA max.
	Output voltage	10V : 0 ... 10 V DC; 10V5 : 0.5 ... 10 V DC
	Output current	2 mA max.
	Output load	> 5 kΩ
	Stability (temperature)	±50 x 10 ⁻⁶ / °C f.s.
	Protection	Reverse polarity, short circuit
	Output noise	0.5 mV _{RMS}
	Operating temperature	Refer to output specification
	EMC	DIN EN 61326-1:2013

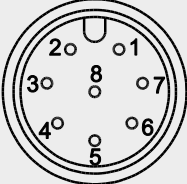
Signal wiring Connector M12, 8 pin	Output signals	Connector pin no.	Cable color
 View to the soldering side of mating connector	Excitation +	1	white
	Excitation GND*	2	brown
	Signal +	3	green
	Signal GND*	4	yellow
	Not connected	5	grey
	Not connected	6	pink
	Not connected	7	blue
	Not connected	8	red

*: internally connected

420A Current output (2 wire) 	Excitation voltage	12 ... 27 V DC non stabilized, measured at the sensor terminals
	Excitation current	35 mA max.
	Output current	4 ... 20 mA equivalent for 0 ... 100 % range
	Stability (temperature)	$\pm 100 \times 10^{-6}$ / °C f.s.
	Protection	Reversed polarity, short circuit
	Output noise	0.5 mV _{eff}
	Operating temperature	Refer to output specification
	EMC	DIN EN 61326-1:2013

Signal wiring Connector M12, 8 pin	Output signals	Connector pin no.	Cable color
 View to the sensor connector	Signal +	1	white
	Signal -	2	brown
	Not connected	3	green
	Not connected	4	yellow
	Not connected	5	grey
	Not connected	6	pink
	Not connected	7	blue
	Not connected	8	red

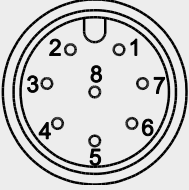
420T Current output (3 wire) 	Excitation voltage	18 ... 27 V DC non stabilized
	Excitation current	40 mA max.
	Load resistor	350 Ω max.
	Output current	4 ... 20 mA equivalent for 0 ... 100 % range
	Stability (temperature)	±50 x 10 ⁻⁶ / °C f.s.
	Protection	Reverse polarity, short circuit
	Output noise	0.5 mV _{RMS}
	Operating temperature	Refer to output specification
	EMC	DIN EN 61326-1:2013

Signal wiring Connector M12, 8 pin	Output signals	Connector pin no.	Cable color
 View to soldering side of mating connector	Excitation +	1	white
	Excitation GND*	2	brown
	Signal +	3	green
	Signal GND*	4	yellow
	Not connected	5	grey
	Not connected	6	pink
	Not connected	7	blue
	Not connected	8	red

*: internally connected

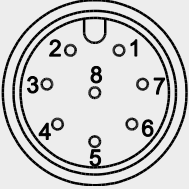
PMUV Voltage output programmable PMUI Current output programmable 	Excitation voltage	18 ... 27 V DC
	Excitation current	50 mA max.
	Voltage output PMUV	0 ... 10 V
	Output current	10 mA max.
	Output load	1 kΩ min.
	Current output PMUI	4 ... 20 mA (3 wire)
	Working resistance	500 Ω max.
	Scaling	
	Activation of offset and gain adjust	Connect with excitation GND (0 V)
	Scalable range	90 % max. f.s.
Stability (temperature)		$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s.
Operating temperature		Refer to output specification
Protection		Reversed polarity, short circuit
EMC		DIN EN 61326-1:2013

PMUV / PMUI

Signal wiring Connector M12, 8 pin	Output signals	Connector pin no.	Cable color
 View to soldering side of mating connector	Excitation +	1	white
	Excitation GND*	2	brown
	Signal +	3	green
	Signal GND*	4	yellow
	Not connected	5	grey
	Not connected	6	pink
	ZERO	7	blue
	END	8	red

*: internally connected

PMUI2

Signal wiring Connector M12, 8 pin	Output signals	Connector pin no.	Cable color
 View to soldering side of mating connector	Excitation +	1	white
	Excitation GND*	2	brown
	Not connected	3	green
	Not connected	4	yellow
	Signal +	5	grey
	Signal GND*	6	pink
	ZERO	7	blue
	END	8	red

*: internally connected

Outputs .../PMUV, PMUI, PMUI2

Programming of the start and end value by the customer

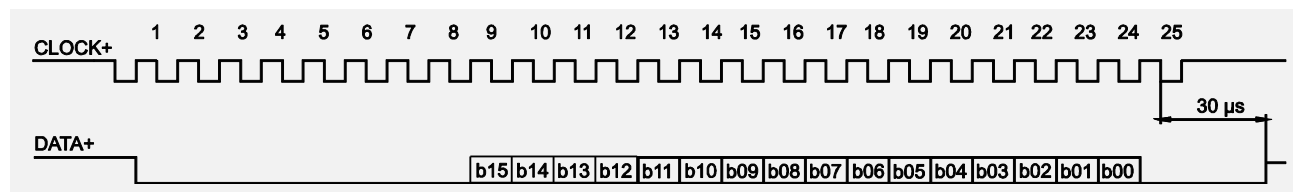
Teach-In of start and end value for the outputs PMUV, PMUV and PMUI2 is provided by two binary signals ZERO and END. At the start position connect signal ZERO for a short period to GND via push button. At the end position connect signal END for a short period to GND. The scaling range will be stored non-volatile. To reset the sensor to factory default both signals ZERO and END must be connected to ground while powering up the sensor.

Digital Interfaces

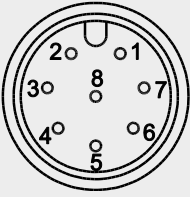
ADSI A/D converted synchronous serial 	Excitation voltage	11 ... 27 V DC
	Excitation current	200 mA max.
	Interface	EIA RS422, RS485, short-circuit proof
	Clock frequency	70 ... 500 kHz
	Code	Gray-Code, continuous progression
	Delay between pulse trains	30 µs min.
	Resolution	ADSI16: 16 bit (65536 counts) f.s. ADSI14: 14 bit (16384 counts) f.s. ADSI: 12 bit (4096 counts) f.s.
	Stability (temperature)	±50 x 10 ⁻⁶ / °C f.s.
	Operating temperature	-20 ... +85 °C
	EMC	DIN EN 61326-1:2013

Data format

(train of 26 pulses)

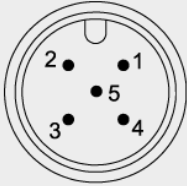


Transmission rate	Cable length	Baud rate	Note: Extension of the cable length will reduce the maximum transmission rate.
	< 50 m	< 300 kHz	
	< 100 m	< 100 kHz	

Signal wiring Connector M12, 8 pin	Output signals	Connector pin no.	Cable color
 View to soldering side of mating connector	Excitation +	1	white
	Excitation GND (0 V)	2	brown
	CLOCK	3	green
	$\overline{\text{CLOCK}}$	4	yellow
	DATA	5	grey
	$\overline{\text{DATA}}$	6	pink
	Not connected	7	blue
	Not connected	8	red

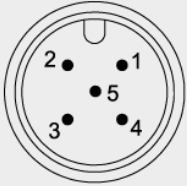
Magnetic encoder, analog output

U2 Voltage output 0.5 ... 10 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	20 mA typical at 24 V DC 38 mA typical at 12 V DC max. 50 mA
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013
U8 Voltage output 0.5 ... 4.5 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	17 mA typical at 24 V DC 32 mA typical at 12 V DC 50 mA max.
	Output voltage	0.5 ... 4.5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013
I1 Current output 4 ... 20 mA, 3 wires 	Excitation voltage	8 ... 36 V DC
	Excitation current	typical 36 mA at 24 V DC typical 70 mA at 12 V DC 120 mA max.
	Load R_L	500 Ω max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013

Signal wiring	Output signals	Connector pin no.	Cable color
Connector M12, 5 pin  View to the sensor connector	Excitation +	1	brown
	Signal	2	white
	GND	3	blue
	Do not connect!	4	black
	Do not connect!	5	(grey)

Magnetic encoder, analog output, programmable

U2/PMU Voltage output 0.5 ... 10 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	20 mA typical at 24 V DC 38 mA typical at 12 V DC max. 50 mA
	Output voltage	0,5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	EN 61326-1:2013
U8/PMU Voltage output 0.5 ... 4.5 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	17 mA typical at 24 V DC 32 mA typical at 12 V DC max. 50 mA
	Output voltage	0.5 ... 4.5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stabilität (Temperatur)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013
I1/PMU Current output 4 ... 20 mA, 3 wires 	Excitation voltage	8 ... 36 V DC
	Excitation current	typical 36 mA at 24 V DC typical 70 mA at 12 V DC max. 120 mA
	Load R_L	500 Ω max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013

Signal wiring Connector M12, 5 pin	Output signals	Connector pin no.	Cable color
 View to the sensor connector	Excitation +	1	brown
	Signal	2	white
	GND	3	blue
	Do not connect!	4	black
	SPAN/ZERO	5	grey

Output .../PMU

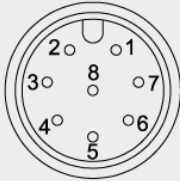
Programming of the start and end value by the customer (programmable)

Teach-In of start and end value for the analog outputs U2/PMU, U8/PMU, I1/PMU is provided by a binary signal SPAN/ZERO. At the start position connect signal SPAN/ZERO for a period of 2 ... 3 seconds to GND via push button. At the end position connect signal SPAN/ZERO for a period of 5 ... 6 seconds to GND via a push button. The scaling range will be stored non-volatile.

To reset the sensor to factory default ZERO/END must be connected to ground while powering up the sensor for 2 ... 3 seconds.

Magnetic encoder, analog output, redundant

U2R Voltage output 0.5 ... 10 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	20 mA typical at 24 V DC 38 mA typical at 12 V DC max. 50 mA per channel
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013
U8R Voltage output 0.5 ... 4.5 V 	Excitation voltage	8 ... 36 V DC
	Excitation current	17 mA typical at 24 V DC 32 mA typical at 12 V DC max. 50 mA per channel
	Output voltage	0.5 ... 4.5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013
I1R Current output 4 ... 20 mA, 3 wires 	Excitation voltage	8 ... 36 V DC
	Excitation current	36 mA typical at 24 V DC 76 mA typical at 12 V DC max. 120 mA per channel
	Load R_L	500 Ω max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	See specification of the respective sensor
	EMC	DIN EN 61326-1:2013

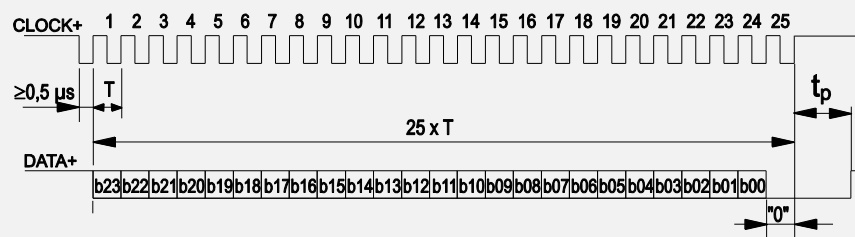
Signal wiring	Channel	Output signals	Connector pin no.	Cable color
Connector M12, 8 pin  View to the sensor connector	1	Excitation +	1	white
		Signal	2	brown
		GND	3	green
		Do not connect!	4	yellow
	2	Excitation +	5	grey
		Signal	6	pink
		GND	7	blue
		Do not connect!	8	red

Digital output

MSSI Synchronous serial SSI 	Interface	EIA RS-422
	Excitation voltage	8 ... 36 V DC
	Excitation current	19 mA typical at 24 V DC 35 mA typical at 12 V DC max. 80 mA
	Clock frequency	100 kHz ... 500 kHz
	Code	Gray-Code, continuous progression
	Delay between pulse trains (t_p)	30 μ s min.
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical)
	Operating temperature	See specification of the respective sensor
	Protection	Reverse polarity, short circuit
	EMC	DIN EN 61326-1:2013

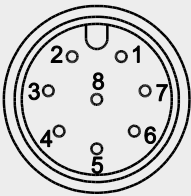
Data format

(Train of 26 pulses)



Transmission rate	Cable length	Baud rate	Note:
	50 m	100-400 kHz	Extension of the cable length will reduce the maximum transmission rate.
	100 m	100-300 kHz	

Signal wiring Connector M12, 8 pin

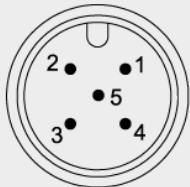


View to the sensor
connector

Output signals	Connector pin no.	Cable color
Excitation +	1	white
Excitation GND	2	brown
CLOCK	3	green
$\overline{\text{CLOCK}}$	4	yellow
DATA	5	grey
$\overline{\text{DATA}}$	6	pink
-	7	blue
-	8	red

MCANOP, CANOPR CANopen 	CAN specification	ISO 11898, Basic and Full CAN 2.0 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 SDO, default: 127
	PDO	3 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 rate	50 kBit bis 1 Mbit, adjustable via LSS or SDO, default: 125 kBit
	Bus connection	M12 connector, 5 pin
	Integrated bus terminating resistor	120Ω adjustable by the customer
	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.
	Measuring rate	1 kHz (asynchronous)
	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	EN 61326-1:2013

Signal wiring	Output signals	Connector pin no.	Cable color
Connector M12, 5 pin 	Shield	1	brown
	Excitation +	2	white
	GND	3	blue
	CAN-H	4	black
	CAN-L	5	grey

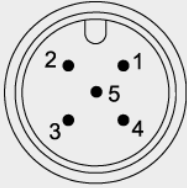
View to the sensor connector

MCANJ1939, MCANJ1939R SAE J1939 	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 adjustable by the customer
	Address	Default 247d, configurable

NAME Fields	Arbitrary address capable	1	Yes
	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

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

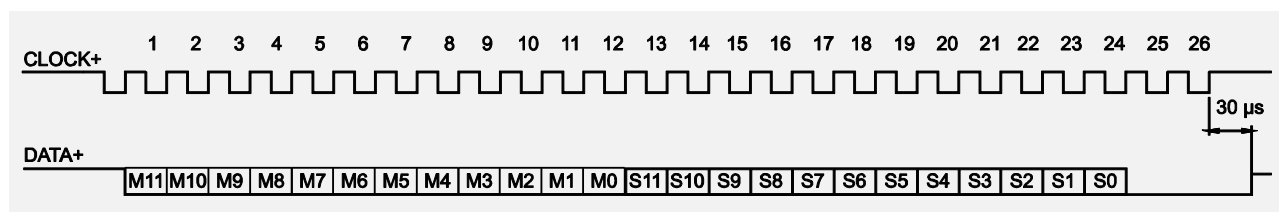
Specifications	Excitation voltage	8 ... 36 V DC
	Excitation current	20 mA typical at 24 V DC 40 mA typical at 12 V DC max. 80 mA
	Measuring rate	1 kHz (asynchronous)
	Stability (temperature)	±50 x 10 ⁻⁶ /°C f.s. (typical)
	Repeatability	1 LSB
	Operating temperature	See specification of the respective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

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

Absolute encoder output

HSSI synchronous serial 	Excitation voltage	10 ... 30 V DC
	Excitation current	100 mA
	Interface	Standard-SSI
	Lines / drivers	Clock and data / RS422
	Code	Gray
	Resolution	12 + 12 bit
	3 dB cutoff frequency	500 kHz
	Control input	$\overline{\text{DIRECTION}}$
	Preset key	Zero adjustment with optical response
	Alarm output	Alarm bit (SSI option), warning bit
	Status LED	Green = OK, red = alarm
	Connection	12 pin male socket

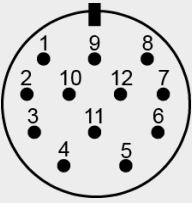
Data format



(Mx = Multiturn bits, Sx = Singleturn bits)

Transmission rate

Cable length	Baud rate	Note:
< 50 m	< 400 kHz	Extension of the cable length will reduce the maximum transmission rate.
< 100 m	< 300 kHz	
< 200 m	< 200 kHz	
< 400 m	< 100 kHz	

Signal wiring CONN-CONIN-12F-G	Signal	Connector pin no.	Cable color
 View to the sensor connector	Excitation +	8	white
	Excitation GND	1	brown
	CLOCK	3	yellow
	$\overline{\text{CLOCK}}$	11	green
	DATA	2	pink
	$\overline{\text{DATA}}$	10	grey
	Direction*	5	blue
	0 V Signal output	12	black
* unconnected or Excitation + = cw increasing code 0 V = cw decreasing code			

HINT Interbus 	Interface	Interbus, ENCOM profile K3 (configurable), K2
	Excitation voltage	10 ... 30 V DC
	Excitation current	250 mA
	Output code	32 Bit binary
	Baud rate	500 kBaud
	Data refresh	Every 600 µs
	Resolution	12 (10 ... 14) + 12 bit
	Programmability	Direction, preset, offset, resolution
	Connection	Bus cover with T manifold
	EMC	DIN EN 61326-1:2013

Data format K2 / K3					
			Differential signals (RS485) ENCOM profile K3, K2, 32 Bit, binary process data		
DÜ-Format	Supi-Adresse	0	1	2	3
(according to the Phoenix company)	Byte no.	3	2	1	0
ID-Code K2	36H (=54 dez.)				
ID-Code K3	37H (=55 dez.)				

Signal wiring	Output signals	Cable terminal no. (bus cover)
	U _b +	1
	GND	2
	DI1	4
	$\overline{DI1}$	6
	D01	3
	$\overline{D01}$	5
	D02	7
	$\overline{D02}$	8
	DI2	9
	$\overline{D02}$	10
	RBST	11
	GND	12

HPROF Profibus 	Interface	RS485
	Excitation voltage	10 ... 30 V DC
	Excitation current	250 mA
	Protocol	Profibus DP with encoder profile C2
	Resolution	12 (10 ... 14) + 12 bit
	Output code	Binary
	Baud rate	Automatically selected between 9,6 kBaud and 12 MBaud
	Programmability	Resolution, preset, direction
	Integrated special functions	Velocity, acceleration, operating time
	Bus terminating resistor	Selectable via DIP switch
	Connection	Bus cover with T manifold
	EMC	Din EN 61326: Class A

Signal wiring	Output signals	Cable terminal no. (bus cover)
	U _b in	1
	0 V in	2
	U _B out	3
	0 V out	4
	B in	5
	A in	6
	B out	7
	A out	8

HDEV DeviceNet 	Interface	CAN highspeed according to ISO/DIS 11898 CAN specification 2.0 A (11 bit identifier)
	Excitation voltage	10 ... 30 V DC
	Excitation current	250 mA
	Protocol	DeviceNet according rev. 2.0, programmable encoder
	Resolution	12 (10 ... 14) + 12 bit
	Output code	Binary
	MAC-ID	Selectable via DIP switch
	Date refresh	Every 5 ms
	Baud rate	Selectable via DIP switch: 125 kBaud, 250 kBaud, 500 kBaud
	Programmability	Resolution, preset, direction
	Bus terminating resistor	Selectable via DIP switch
	Connection	Bus cover with T manifold
	EMC	DIN EN 61326-1:2013

Recommended transmission

Characteristic impedance	135 ... 165 Ω (3 ... 20 MHz)
Operating capacity	< 30 pF
Loop resistance	< 110 Ω/km
Wire diameter	> 0.63 mm
Wire width	> 0.34 mm²

Transmission rate

Segment length	Kbit/s
500 m	125
250 m	250
100 m	500

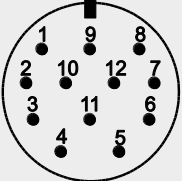
Signal wiring	Output signals	Cable terminal no. (bus cover)
	U _b in	1
	0 V in	2
	CAN-L	3
	CAN-H	4
	Drain	5
	Drain	6
	CAN-H	7
	CAN-L	8
	0 V out	9
	U _b out	10

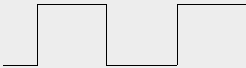
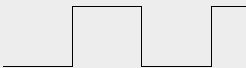
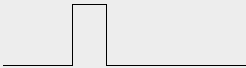
HCAN / HCANOP CANopen / CAN Layer 2 	Interface	CAN highspeed according to ISO/DIS 11898
	Excitation voltage	10 ... 30 V DC
	Excitation current	250 mA
	Protocol	CANopen according DS301 with encoder profile DSP406, programmable encoder according class C2
	Resolution	12 (10 ... 14) + 12 bit
	Output code	Binary
	Data refresh	Every millisecond (selectable), on request
	Baud rate	Selectable 10 up to 1000 kbit/s
	Base identifier	Selectable via DIP switch
	Programmability	CANopen: direction, resolution, preset, offset CAN L2: direction, limit values
	Integrated special functions	CANopen: velocity, acceleration, rotary axis, limit values CAN L2: direction, limit values
	Connection	Bus cover with T manifold
	EMC	DIN EN 61326-1:2013

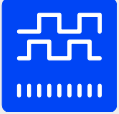
Signal wiring	Output signals	Cable terminal no. (bus cover)
	U _b in	1
	0 V in	2
	CAN in – (dominant L)	3
	CAN in + (dominant H)	4
	CAN GND in	5
	CAN GND out	6
	CAN out + (dominant H)	7
	CAN out – (dominant L)	8
	0 V out	9
	U _b out	10

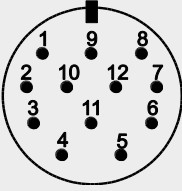
Incremental output

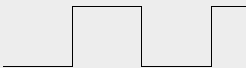
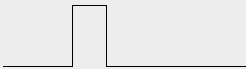
LD5VC Incremental interface 	Excitation voltage	5 V DC ±10 %
	Excitation current	150 mA max. w/o load
	Interface	Line driver RS422
	Output frequency	300 kHz max.
	Output current	20 mA per channel
	Signal level	
	U _d High bei I _d = 20 mA	≥ 2.5 V
	U _d Low bei I _d = 20 mA	≥ 0.5 V
	Transition time positive edge	< 100 ns
	Transition time negative edge	< 100 ns
	Stability (temperature)	±20 x 10 ⁻⁶ / °C f.s. (sensor-mechanism)
	Operation temperature	-20 ... +85 °C
	Protection	Short circuit, overvoltage
	EMC	DIN EN 61326-1:2013

Signal wiring CONN-CONIN-12F-G	Output signals	Connector pin no.	Cable color
 View to soldering side of mating connector	Excitation +	12	white
	Excitation GND	10	brown
	Signal A	5	yellow
	Signal $\bar{A}$	6	pink
	Signal B (A + 90°)	8	green
	Signal $\bar{B}$	1	grey
	Signal Z (reference pulse)	3	blue
	Signal $\bar{Z}$	4	red
	Fault detection signal	7	-
	Shield	housing	-

Output signals	
Signal A	
Signal B	
Signal Z	

PP24VC Incremental interface 	Excitation voltage	10 ... 30 V DC
	Excitation current	150 mA max. w/o load
	Interface	Push-pull line driver (24 V-HTL)
	Output frequency	300 kHz max.
	Output current	100 mA per channel
	Signal level	
	Ud High at Id = 20 mA, Ub = 24 V	≥ 21 V
	Ud Low at Id = 20 mA, Ub = 24 V	≥ 2.8 V
	Transition time positive edge	< 200 ns
	Transition time negative edge	< 200 ns
	Stability (temperature)	±20 x 10 ⁻⁶ / °C f.s. (sensor mechanism)
	Operating temperature	Refer to output specification
	Protection	Reverse polarity, short circuit, overvoltage
	EMC	DIN EN 61326-1:2013

Signal wiring CONN-CONIN-12F-G	Output signals	Connector pin no.	Cable color
	Excitation +	12	white
	Excitation GND	10	brown
	Signal A	5	yellow
	Signal $\bar{A}$	6	pink
	Signal B (A + 90°)	8	green
	Signal $\bar{B}$	1	grey
	Signal Z (reference pulse)	3	blue
	Signal $\bar{Z}$	4	red
	Fault detection signal	7	-
	Shield	housing	-
View to soldering side of mating connector			

Output signals	
Signal A	
Signal B	
Signal Z	

Accessories

Connector cable M12, 4 pin

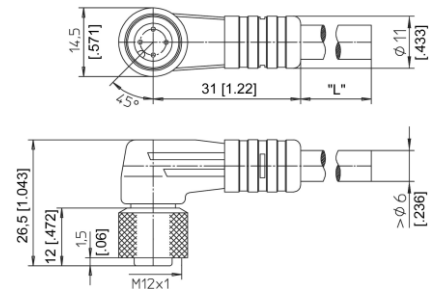
(angular coupling)

shielded connector

Suitable for 5-pin

sensor connectors

The 4-core screened cable is supplied with a mating 4-pin 90° M12 connector at one end and 4 wires at the other end. Available lengths are 2 m, 5 m and 10 m.
Wire: cross sectional area 0.34 mm²
Cable diameter: 5.6 ±0.2 mm



Order code

	KAB - xM - M12/4F/W - LITZE
IP69:	KAB - xM - M12/4F/W/69K - LITZE
xM = length in m	

Connector cable M12, 4 pin

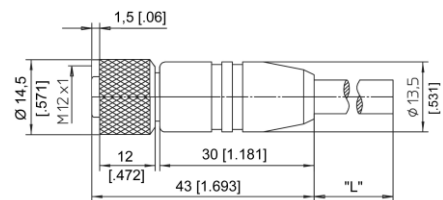
(straight coupling)

shielded connector

Suitable for 5-pin

sensor connectors

The 4-core screened cable is supplied with a mating 4-pin M12 connector at one end and 4 wires at the other end. Available lengths are 2 m, 5 m and 10 m.
Wire: cross sectional area 0.34 mm²
Cable diameter: 5.6 ±0.2 mm



Order code

	KAB - xM - M12/4F/G - LITZE
IP69:	KAB - xM - M12/4F/G/69K - LITZE
xM = length in m	

Signal wiring M12, 4 pin	Plug connection / cable color			
	1	2	3	4
	brown	white	blue	black

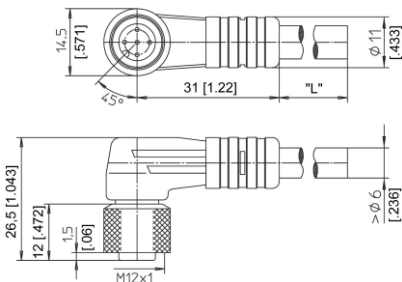
Applicable for cable carriers

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

Connector cable M12, 5 pin
(angular coupling)

shielded connector

The 5-core screened cable is supplied with a mating 5-pin 90° M12 connector at one end and 4 wires at the other end. Available lengths are 2 m, 5 m and 10 m.
Wire: cross sectional area 0.34 mm²
Cable diameter: 5.6 ±0.2 mm



Order code

KAB - xM - M12/5FW - LITZE

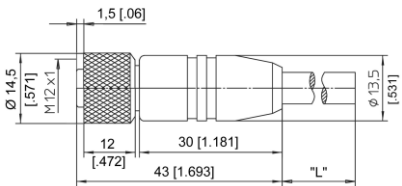
IP69: KAB - xM - M12/5FW/69K - LITZE

xM = length in m

Connector cable M12, 5 pin
(straight coupling)

shielded connector

The 5-core screened cable is supplied with a mating 5-pin M12 connector at one end and 4 wires at the other end. Available lengths are 2 m, 5 m and 10 m.
Wire: cross sectional area 0.34 mm²
Cable diameter: 5.6 ±0.2 mm



Order code

KAB - xM - M12/5F/G - LITZE

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

xM = length in m

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

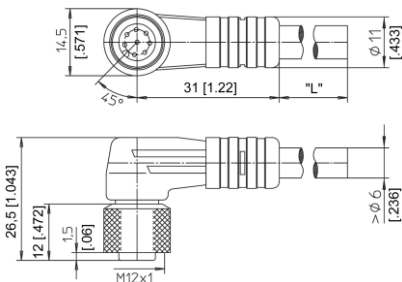
Applicable for cable carriers

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

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

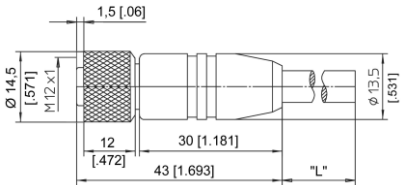
IP69: KAB - xM - M12/8F/W/69K - LITZE

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

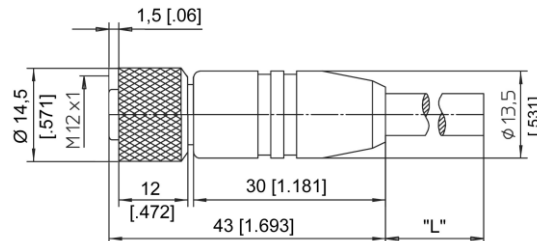
Maximum movement speed	3 m/s
Maximum acceleration	5 m/s²
Minimum bending radius	10 x cable diameter

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

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



Applicable for cable carriers

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

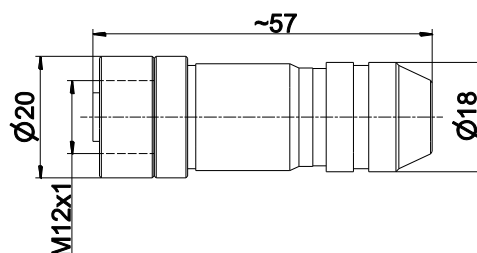
Plug-in connectors

Plug-in connector M12, 8 pin (straight coupling)

Order code:

CONN-M12-8F-G

Cable diameter
max. 6 ... 8 mm



Plug-in connector CONIN, 12 pin (straight coupling)

Order code:

CONN-CONIN-12F-G

Cable diameter
max. 6 ... 8 mm

