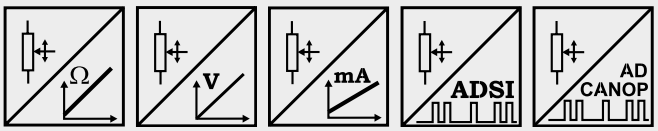
POSIWIRE®
WS7.5
Analog, SSI or CANopen Output

Compact industrial sensor for long ranges

- **Protection class IP52**
- **Measurement ranges 0 ... 10000 mm to 0 ... 40000 mm**
- **Analog output or**
  A/D converted synchronous serial output (SSI) or
  A/D converted CANopen output



Specifications		
	Outputs	Potentiometer 1 kΩ Voltage 0 ... 10 V Current 4 ... 20 mA, 2 or 3 wire Voltage or current output, programmable (PMUV/PMUI) A/D converted synchronous serial interface (SSI) A/D converted CANopen bus
	Resolution	Analog: essentially infinite ADSI16: max. 16 bit f.s. ADCANOP: 16 bit f.s.
	Linearity	Up to ±0.05% f.s.
	Sensing device	Precision potentiometer
	Material	Aluminum and stainless steel; cable: stainless steel
	Protection class	IP52
	Connection	Male 8 pin socket M12 (ADCANOP: 5 pin socket)
	Weight	Approx. 10 kg maximum
	EMC, temperature	Refer to output specification

Order code WS7.5

WS7.5 – ☐ – ☐ – ☐ – ☐ – ☐

Model name

Measurement range (in mm)
10000 / 20000 / 30000 / 40000

Output

R1K	= Potentiometer 1 kΩ
10V	= 0 ... 10 V signal conditioner
420A	= 4 ... 20 mA signal conditioner
420T	= 4 ... 20 mA signal conditioner
PMUV/PMUI	= Programmable 0... 10 V or 4 ... 20 mA signal conditioner
ADSI16	= A/D converted synchronous serial interface 16 bit (12 or 14 bit opt.)
ADCANOP	= A/D converted CANopen bus

Linearity

L10 = ±0.10 % option: L05 = ±0.05 % L25 = ±0.25 %

Cable fixing

M4	= M4 cable fixing
SB0	= Cable clip

Connection

M12	= 8 pin socket M12 (not for ADCANOP)
M12/CAN	= 5 pin socket M12 (for ADCANOP)

Order code connector cable: see page 82/83

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

POSIWIRE®
WS7.5
Absolute or Incremental Encoder Output

Compact industrial sensor for long ranges

- **Protection class IP52**
- **Measurement range 0 ... 10000 mm to 0 ... 40000 mm**
- **Absolute or incremental encoder**

Specifications	Outputs	See order code
	Resolution for 12 bit per revolution (4096 steps/revolution)	Up to 30000: 0.073 mm; 40000: 0.088 mm
	Linearity	±0.05% f.s.; ±0.01% f.s. as option
	Sensing device	Absolute encoder / incremental encoder
	Material	Aluminum and stainless steel; cable: stainless steel
	Protection class	IP52, encoder IP64
	Connection	Depend on the encoder type: connector or bus cover
	Weight	Approx. 10 kg maximum
	EMC, temperature	Refer to output specification

Order code WS7.5

WS7.5 – ☐ – ☐ – ☐ – ☐

Model name

Measurement range (in mm)
10000 / 15000 / 20000 / 25000 / 30000 / 40000

Outputs

ME	= Mechanism only for installation of suitable multiturn encoders
BK	= Customer sources encoder for fitting by ASM
LD5VC	= Incremental encoder TTL compatible, inverted
PP24VC	= Incremental encoder HTL compatible, inverted
HSSI	= Absolute encoder with synchronous serial output (SSI)
HINT	= Absolute encoder with Interbus interface
HPROF	= Absolute encoder with Profibus interface
HDEV	= Absolute encoder with DeviceNet interface
HCAN	= Absolute encoder with CAN interface
HCANOP	= Absolute encoder with CANopen interface

Linearity (option)

L01	= ±0.01% f.s.

Cable fixing

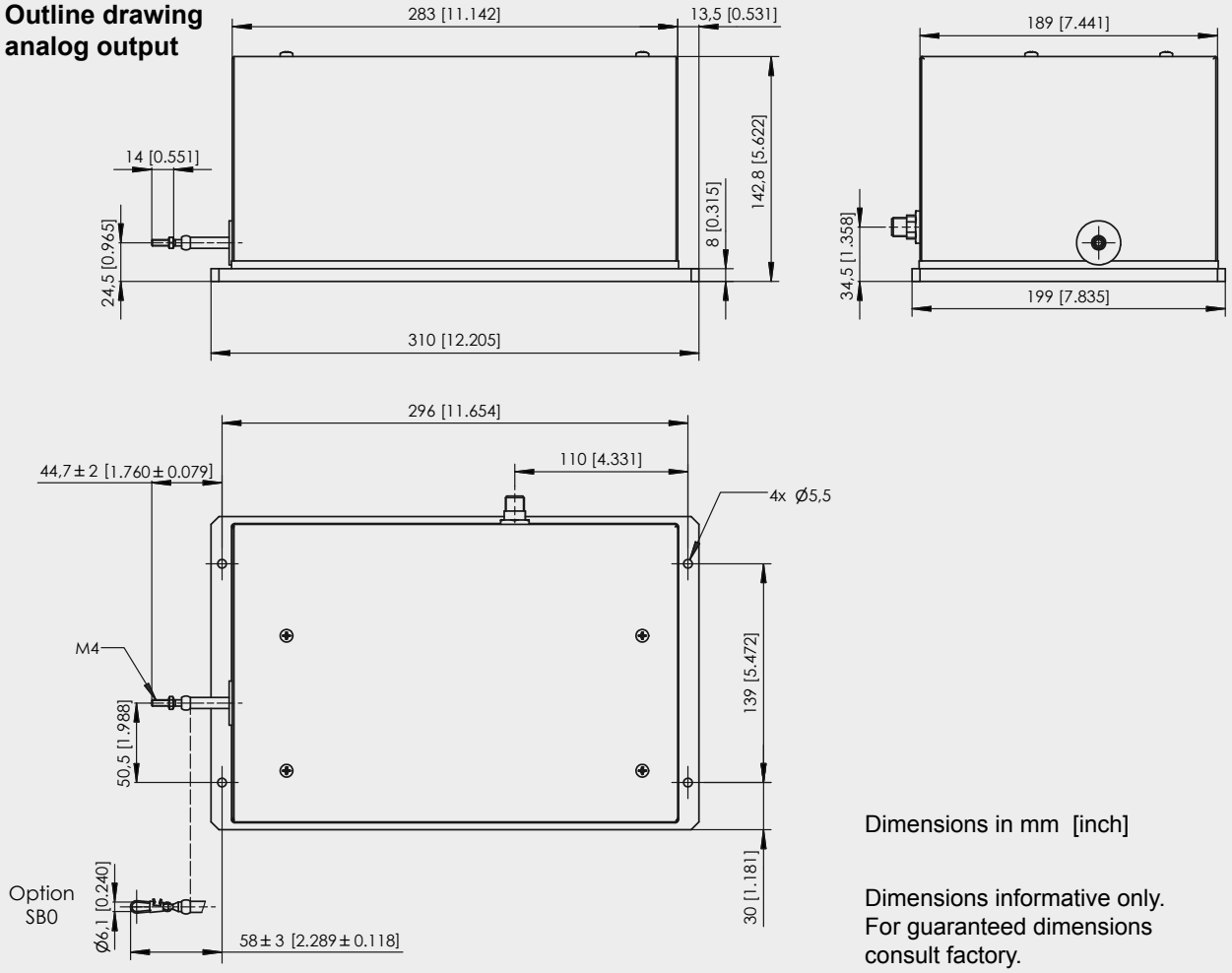
M4	= M4 cable fixing
SB0	= Cable clip

Order code mating connector **incremental, HSSI:** **CONN-CONIN-12F-G**

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

Cable forces, typical at 20 °C	Range	Max. pull-out force	Min- pull-in force
	[mm]	[N]	[N]
	10000 - 30000	8.0	4.2
	40000	7.0	3.4

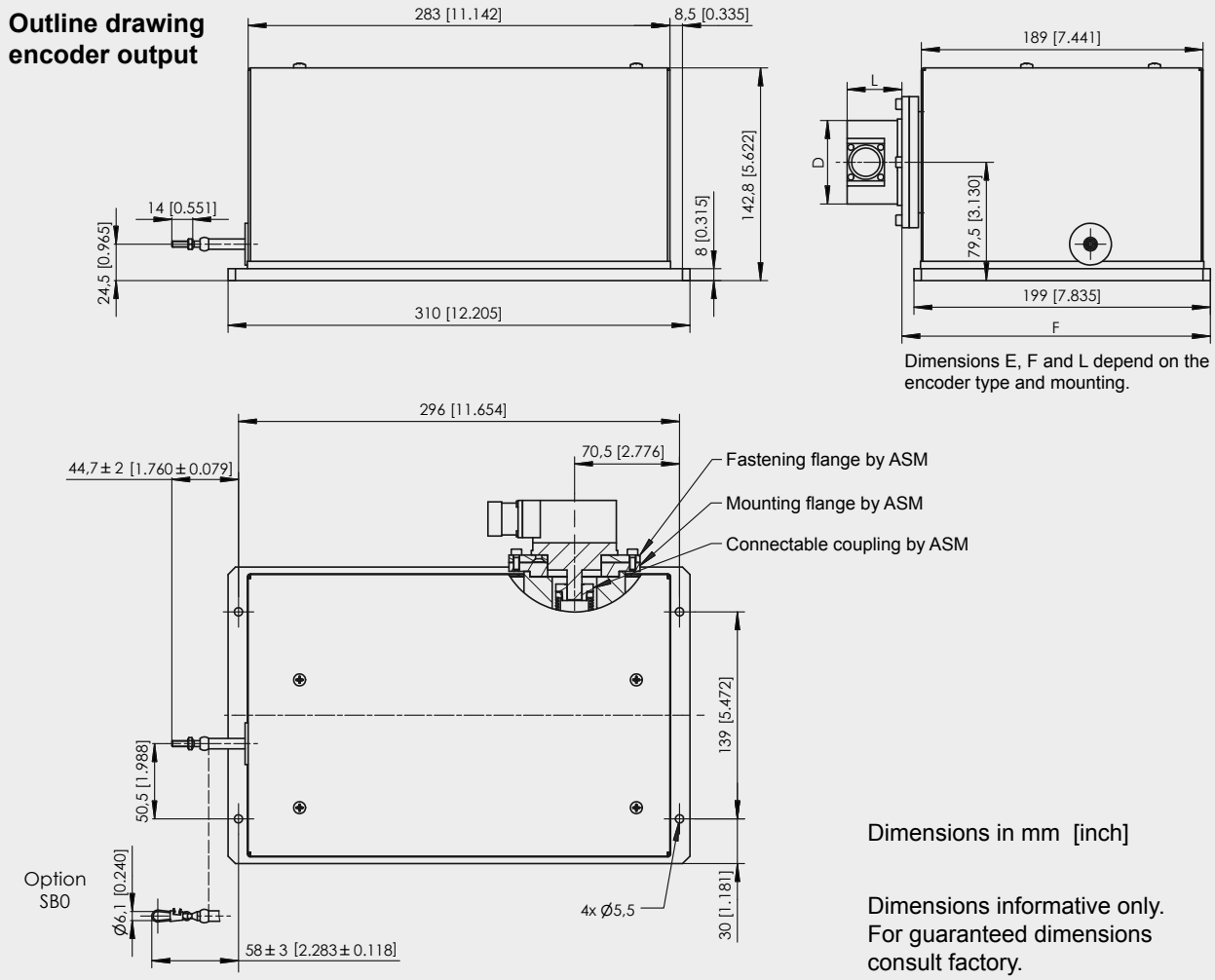
Outline drawing analog output



Dimensions in mm [inch]

Dimensions informative only. For guaranteed dimensions consult factory.

Outline drawing encoder output

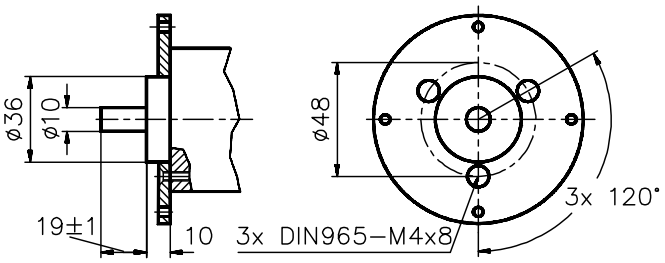


Dimensions E, F and L depend on the encoder type and mounting.

Dimensions in mm [inch]

Dimensions informative only. For guaranteed dimensions consult factory.

Output ME



Dimensions for encoder mounting

Connectable coupling in two parts (output ME)

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.

POSIWIRE®
R1K and 10V
Analog Output

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 % ... 97 %
	Operating temperature	-20 ... +85 °C

Output signals

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

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

More information:
http://www.asm-sensor.com/asm/pdf/pro/ws_poti_technote_en.pdf

Signal conditioner 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	-20 ... +85 °C
	EMC	According EN 61326:2006

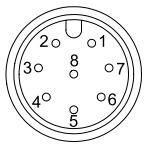
Output signals

Signal wiring

Signal name R1K	10V	Cable color	Connector pin no.
$+V_{in}$	Excitation +	White	1
GND	Excitation GND	Brown	2
$+V_{out}$	Signal +	Green	3
	Signal GND	Yellow	4

Connection

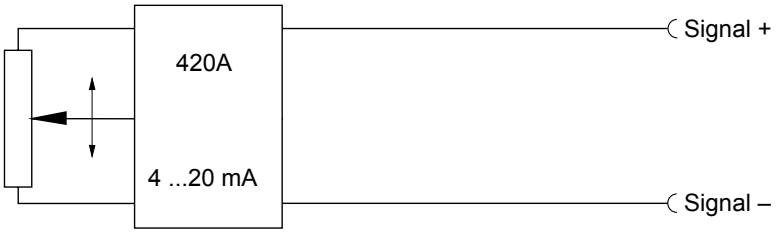
View to sensor connector



CONN-M12-8F

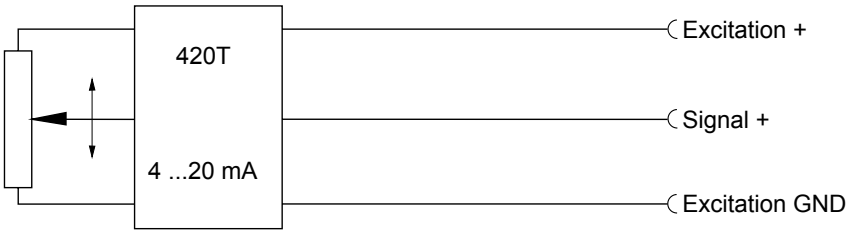
Signal conditioner 420A Current output (2 wire)	Excitation voltage	12 ... 27 V DC non stabilized, measured at the sensor terminals
	Excitation current	35 mA max.
	Output current	4 ... 20 mA equivalent for 0 ... 100 % range
	Stability (temperature)	±100 x 10^{-6} / °C f.s.
	Protection	Reversed polarity, short circuit
	Output noise	0.5 mV_{RMS}
	Operating temperature	-20 ... +85 °C
	EMC	According to EN 61326:2006

Output signals



Signal conditioner 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	-20 ... +85 °C
	EMC	According to EN 61326:2006

Output signals

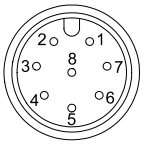


Signal wiring

Signal name 420A	420T	Cable color	Connector pin no.
Signal +	Excitation +	White	1
Signal –	Excitation GND	Brown	2
	Signal +	Green	3

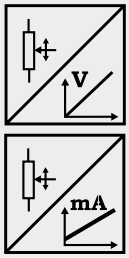
Connection

View to sensor connector

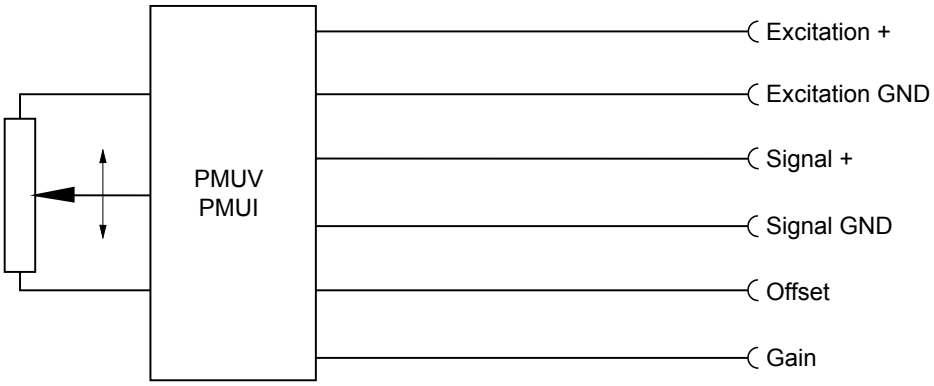


CONN-M12-8F

POSIWIRE®
PMUV / PMUI
Programmable Analog Output

Signal conditioner PMUV / PMUI Voltage or current output (3 wire) 	Excitation voltage	18 ... 27 V DC
	Excitation current	50 mA max.
	Voltage output **PMUV** Output current Output load	0 ... 10 V 10 mA max. 1 kΩ min.
	Current output **PMUI** Working resistance	4 ... 20 mA (3 wire) 500 Ω max.
	Scaling Activation of offset and gain adjust Scalable range	 Connect with excitation GND (0 V) 90% max. f.s.
	Stability (temperature)	±50 x 10^{-6} / °C f.s.
	Operating temperature	-20 ... +85 °C
	Protection	Reversed polarity, short circuit
	EMC	According to EN 61326:2006

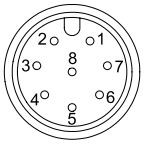
Output signals



	Signal name	Connector pin no.
Signal wiring PMUV / PMUI	Excitation +	1
	Excitation GND	2
	Signal +	3
	Signal GND	4
	Not used	5
	Not used	6
	Offset	7
	Gain	8

Connection

View to sensor connector



CONN-M12-8F

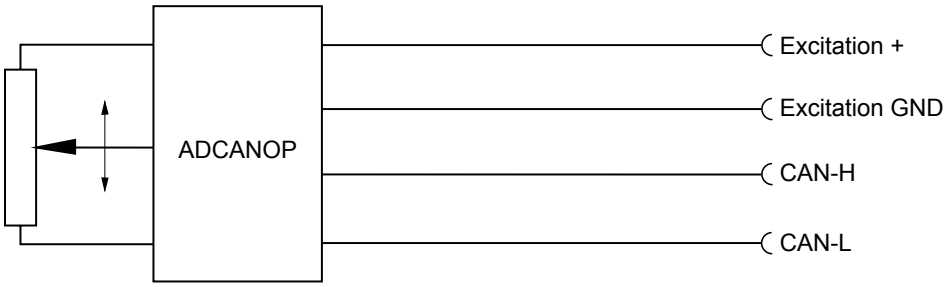
	Signal name	Connector pin no.
Signal wiring PMUI2	Excitation +	1
	Excitation GND	2
	Not used	3
	Not used	4
	Signal +	5
	Signal GND	6
	Offset	7
	Gain	8

POSIWIRE®
ADCANOP
A/D Converted CANopen Bus

Interface ADCANOP	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
	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	2 cams
	Certified	Yes
	Transmission rates	50 kBaud to 1 MBaud, adjustable via LSS
	Nodes	127 max.
	Bus connection	M12 connector, 5 pins
	Integrated bus terminating resistor	No
	Bus, galvanic isolated	No

Specifications	Excitation voltage	8 ... 36 V DC
	Excitation current	Typ. 15/30 mA for 24/12 V, max. 100 mA
	Resolution	16 bit f.s.
	Measuring rate	1 kHz (asynchronous)
	Stability (temperature)	±50 x 10^{-6} / °C f.s.
	Repeatability	1 LSB
	Operating temperature	-20 ... +85 °C
	Protection	Reverse polarity, short circuit
	Dielectric strength	1 kV (V AC, 50 Hz, 1 min.)
	Environment - EMC Automation	EN 61326:2006

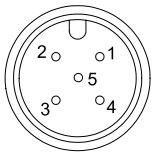
Signal diagram



Signal wiring / connection

Signal name	Connector pin no.
Shield	1
Excitation +	2
GND	3
CAN-H	4
CAN-L	5

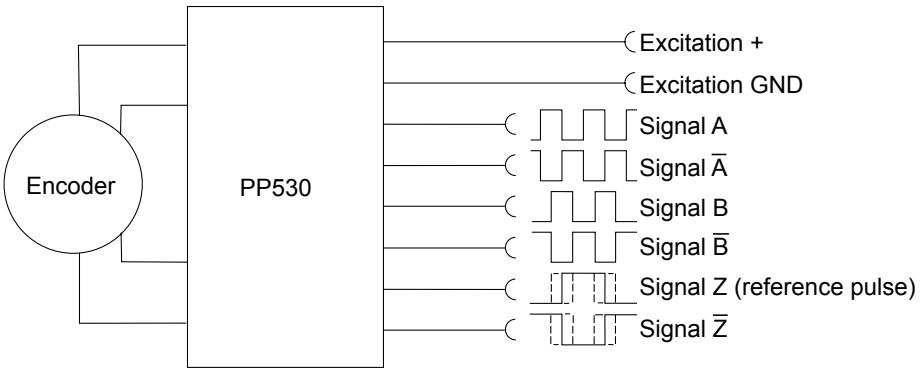
View to sensor connector



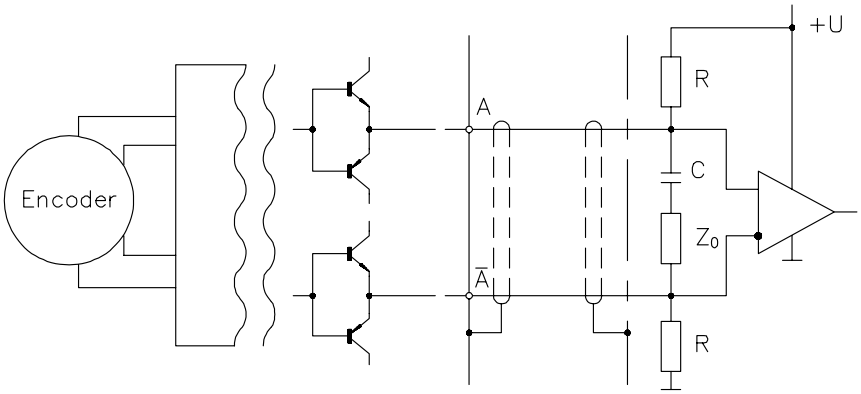
POSIWIRE®
PP530
Incremental Output

Signal conditioner PP530 Incremental	Excitation voltage	5 ... 30 V DC
	Excitation current	25 mA typ. (w/o load), 200 mA max.
	Output frequency	200 kHz max.
	Output	Linedriver, Push-Pull, CMOS, TTL- and HTL-compatible
	Output current	30 mA max.
	Output voltage	Depends on the excitation voltage (e.g. to obtain TTL signals the excitation voltage must be 5 V). Compatible to EIA RS422/RS485
	Saturation voltage high/low	Ia <10 mA, U_B 5 V/24 V: <0.5 V Ia <30 mA, U_B 5 V/24 V: <1 V
	Stability (temperature)	±20 x 10^{-6} / °C f.s. (sensor mechanism)
	Operation temperature	-10 ... +70 °C
	Storage temperature	-30 ... +80 °C
	Transition time positive edge	<200 ns
	Transition time negative edge	<200 ns
	Protection	Reverse polarity, short circuit
	EMC	According to EN 61326:2006

Signal diagram



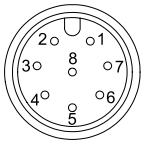
Recommended processing circuit



Signal wiring / connection

Output signal name	Connector pin no.
Excitation +	1
Excitation GND (0 V)	2
Signal A	4
Signal Ā	6
Signal B (A + 90°)	3
Signal B̄	5
Signal Z (reference pulse)	7
Signal Z̄	8

View to sensor connector



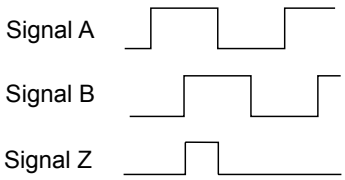
CONN-M12-8F

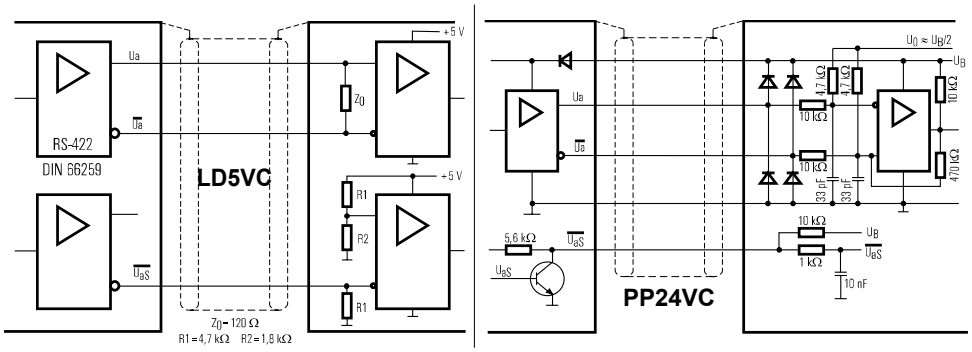
POSIWIRE®
LD5VC and PP24VC
Incremental Output

Signal conditioner LD5VC Incremental	Interface	Line driver RS422
	Excitation voltage	5 V DC ±10 %
	Excitation current	150 mA max. w/o load
	Output frequency	300 kHz max.
	Output current	20 mA per channel
	Signal level	
	Ud High at Id=20 mA	≥2.5V
	Ud Low at Id=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	According to EN 61326:2006

Signal conditioner PP24VC Incremental	Interface	Push-pull line driver (24 V-HTL)
	Excitation voltage	10 ... 30 V DC
	Excitation current	150 mA max. w/o load
	Output frequency	300 kHz max.
	Output current	100 mA per channel
	Signal level	
	Ud High at Id=20 mA, Ub=24 V	≥21V
	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	-20 ... +85 °C
	Protection	Reverse polarity, short circuit, overvoltage
	EMC	According to EN 61326:2006

Output signals

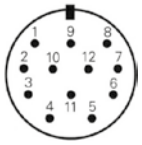




Signal wiring / connection

Signal name	CONN-CONIN-12F, connector pin no.
Excitation +	12
Excitation GND (0 V)	10
Signal A	5
Signal $\overline{A}$	6
Signal B (A + 90°)	8
Signal $\overline{B}$	1
Signal Z (reference pulse)	3
Signal $\overline{Z}$	4
Fault detection signal $\overline{Uas}$	7
Shield	Housing

View to sensor connector



CONN-CONIN-12F

POSIWIRE®
ADSI16
A/D Converted SSI Output

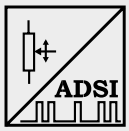
- **Resolution 16 bit, synchronous serial data transmission/SSI**
- **Optional available with 12 bit (ADSI) or 14 bit (ADSI14) resolution**
- **No loss of data at power down**
- **Easy to connect to PLC´s with SSI input circuitry**

Description

The sensing device of the ADSI is a precision potentiometer. The position information is given by an analog/digital converter output serialized as a data word. Data transmission takes place by means of the signals CLOCK and DATA. The processing unit (PLC, Micro- computer) sends pulse sequences which clock the data transmission with the required transfer rate. With the first falling edge of a pulse sequence the position of the sensor is recorded and stored. The following rising edges control the bit-by-bit A/D conversion, encoding and output of the data word. After a delay time the next new position information will be transmitted.

Signal conditioner ADSI16

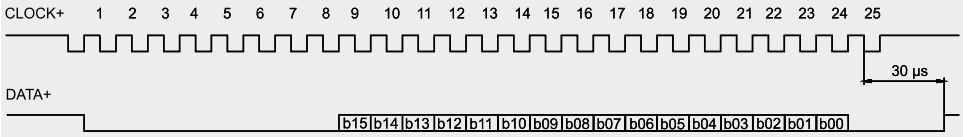
A/D converted synchronous serial



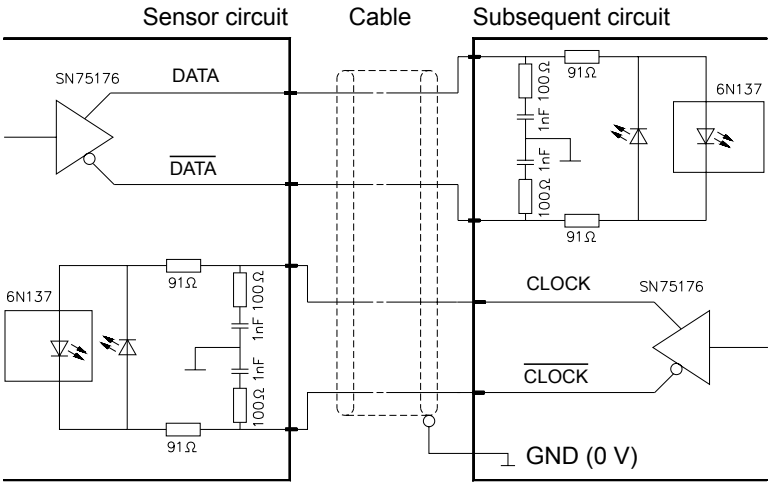
Interface	EIA RS422, RS485, short-circuit proof
Excitation voltage	11 ... 27 V DC
Excitation current	200 mA max.
Clock frequency	70 ... 500 kHz
Code	Gray code, continuous progression
Delay between pulse trains	30 µs min.
Resolution	16 bit (65536 counts) f.s.; optional 12 (ADSI) bit resp. 14 bit (ADSI14)
Stability (temperature)	±50 x 10^{-6} / °C f.s.
Operating temperature	-20 ... +85 °C
EMC	According to EN 61326:2006

Data format

(train of 26 pulses)



Recommended processing circuit



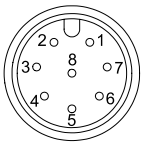
Transmission rate

Cable length	Baud rate
< 50 m	< 300 kHz
< 100 m	< 100 kHz

Note:
Extension of the cable length will reduce the maximum transmission rate.

Signal wiring

Signal name	Connector pin no.
Excitation +	1
Excitation GND (0 V)	2
CLOCK	3
$\overline{\text{CLOCK}}$	4
DATA	5
$\overline{\text{DATA}}$	6
Shield	not connected



CONN-M12-8F

View to sensor connector

POSIWIRE®
HSSI
Absolute SSI Encoder

Signal conditioner HSSI Absolute encoder 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	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

Resolution	Clock												
	T1	T2	T3	...	T12	T13	...	T21	T22	T23	T24	T25	T26
	Data bits												
24 bit	M11	M10	M9	...	M0	S11	...	S3	S2	S1	S0	0	

Mx = multiturn bits, Sx = singleturn bits

Transmission rate

Cable length	Baud rate
< 50 m	< 400 kHz
< 100 m	< 300 kHz
< 200 m	< 200 kHz
< 400 m	< 100 kHz

Note:
Extension of the cable length will reduce the maximum transmission rate.

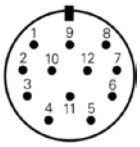
Signal wiring

Signal name	Color	Connector pin no.
Excitation +	White	8
Excitation GND (0 V)	Brown	1
CLOCK	Yellow	3
$\overline{\text{CLOCK}}$	Green	11
DATA	Pink	2
$\overline{\text{DATA}}$	Gray	10
$\overline{\text{Direction}}$ *	Blue	5
0 V Signal output	Black	12

* Excitation + = cw increasing code, 0 V = cw decreasing code

Connection

View to sensor connector



CONN-CONIN-12F

Interface HPROF Absolute encoder Profibus	Excitation voltage	10 ... 30 V DC
	Excitation current	250 mA
	Interface	RS485
	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	EN 61326: class A

	Signal name	Cable terminal no. (bus cover)
Signal wiring	U_B in	1
	0V in	2
	U_B out	3
	0V out	4
	B in	5
	A in	6
	B out	7
	A out	8

Interface HINT Absolute encoder Interbus	Excitation voltage	10 ... 30 V DC
	Excitation current	250 mA
	Interface	Interbus, ENCOM profile K3 (configurable), K2
	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	EN 50081-2, EN 50082-2

Data format Interbus K2/K3		Differential signals (RS485) ENCOM profile K3, K2, 32 Bit, binary process data
	DT-Format	Sµpi address 0 1 2 3
	(according to the Phoenix company)	Byte No. 3 2 1 0
	ID code K2	36 H (= 54 dec.)
	ID code K3	37 H (= 55 dec.)

	Signal name	Cable terminal no. (bus cover)
Signal wiring	U_B +	1
	GND	2
	DI1	3
	$\overline{DI1}$	4
	DO1	5
	$\overline{DO1}$	6
	DO2	7
	$\overline{DO2}$	8
	DI2	9
	$\overline{DI2}$	10
	RBST	11
	GND	12

Interface HDEV Absolute encoder DeviceNet	Excitation voltage	10 ... 30 V DC
	Excitation current	250 mA
	Interface	CAN highspeed according to ISO/DIS 11898 CAN specification 2.0 A (11 bit identifier)
	Protocol	DeviceNet according rev. 2.0, programmable encoder
	Resolution	12 (10 ... 14) + 12 bit
	Output code	Binary
	MAC-ID	Selectable via DIP switch
	Data 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	EN 50081-2, EN 50082-2

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 mm^2

Transmission rate	**Segment length**	**Kbit/s**
	500 m	125
	250 m	250
	100 m	500

Signal wiring	**Signal name**	**Cable terminal no. (bus cover)**
	U_B in	1
	0V in	2
	CAN-L	3
	CAN-H	4
	Drain	5
	Drain	6
	CAN-H	7
	CAN-L	8

Interface **HCAN/HCANOP** Absolute encoder CANopen/CAN Layer 2	Excitation voltage	10 ... 30 V DC
	Excitation current	250 mA
	Interface	CAN highspeed according to ISO/DIS 11898
	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	EN 50081-2, EN 50082-2

	Signal name	Cable terminal no. (bus cover)
Signal wiring	U_B in	1
	0V 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
	0V out	9
	U_B out	10

Connector cable for WS® position sensors
8 pin M12

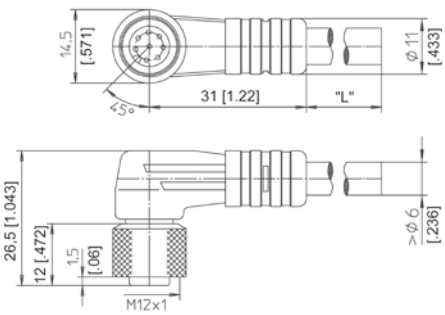
The 8-lead shielded cable is supplied with a mating 8-pin 90° M12 connector at one end and 8 wires at the other end. Available lengths are 2 m, 5 m and 10 m. Wire: cross sectional area 0.25 mm².

Order code:

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

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

Length in m



Connector cable for WS® position sensors
8 pin M12

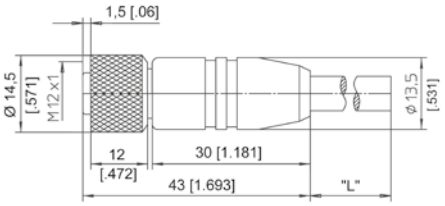
The 8-lead shielded cable is supplied with a mating 8-pin M12 connector at one end and 8 wires at the other end. Available lengths are 2 m, 5 m and 10 m. Wire: cross sectional area 0.25 mm².

Order code:

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

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

Length in m



Connector cable wiring - M12, 8 pin

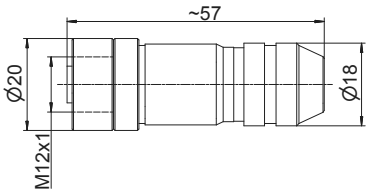
Connector pin / cable color							
1	2	3	4	5	6	7	8
White	Brown	Green	Yellow	Gray	Pink	Blue	Red

Connector for WS® position sensors
8 pin M12

Female connector.

Order code:

CONN - M12 - 8F - G

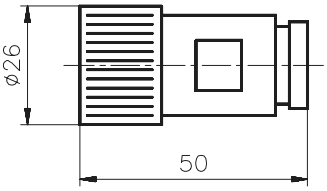


Connector for WS® position sensors
12 pin CONIN

Female connector.

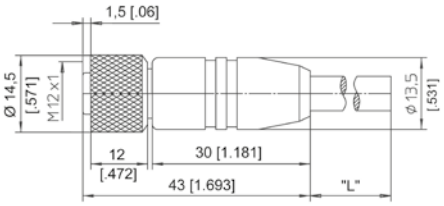
Order code:

CONN - CONIN - 12F - G



Connector/bus cable for WS® position sensors
5 pin M12
CAN bus/DeviceNet

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
5 pin M12
CAN bus/DeviceNet

Order code:

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

Terminating resistance
5 pin M12
CAN bus/DeviceNet

Order code:

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