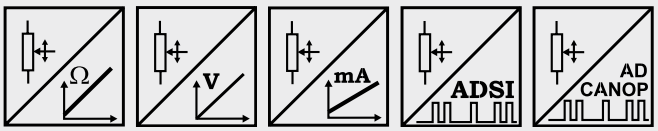
POSIWIRE®
WS10ZG
Analog, SSI or CANopen Output

WS10 in a zinc diecast housing

- **Protection class IP65**
- **Measurement range 0 ... 100 mm to 0 ... 1250 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	Zinc diecast, aluminium and stainless steel; cable: stainless steel
	Protection class	IP65 (with mating connector only)
	Connection	Male 8 pin socket M12 (ADCANOP: 5 pin socket)
	Weight	1.1 kg approx.
	EMC, temperature	Refer to output specification

Order code WS10ZG

WS10ZG – □ – □ – □ – □ – □

Model name

Measurement range (in mm)
100 / 125 / 375 / 500 / 750 / 1000 / 1250

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

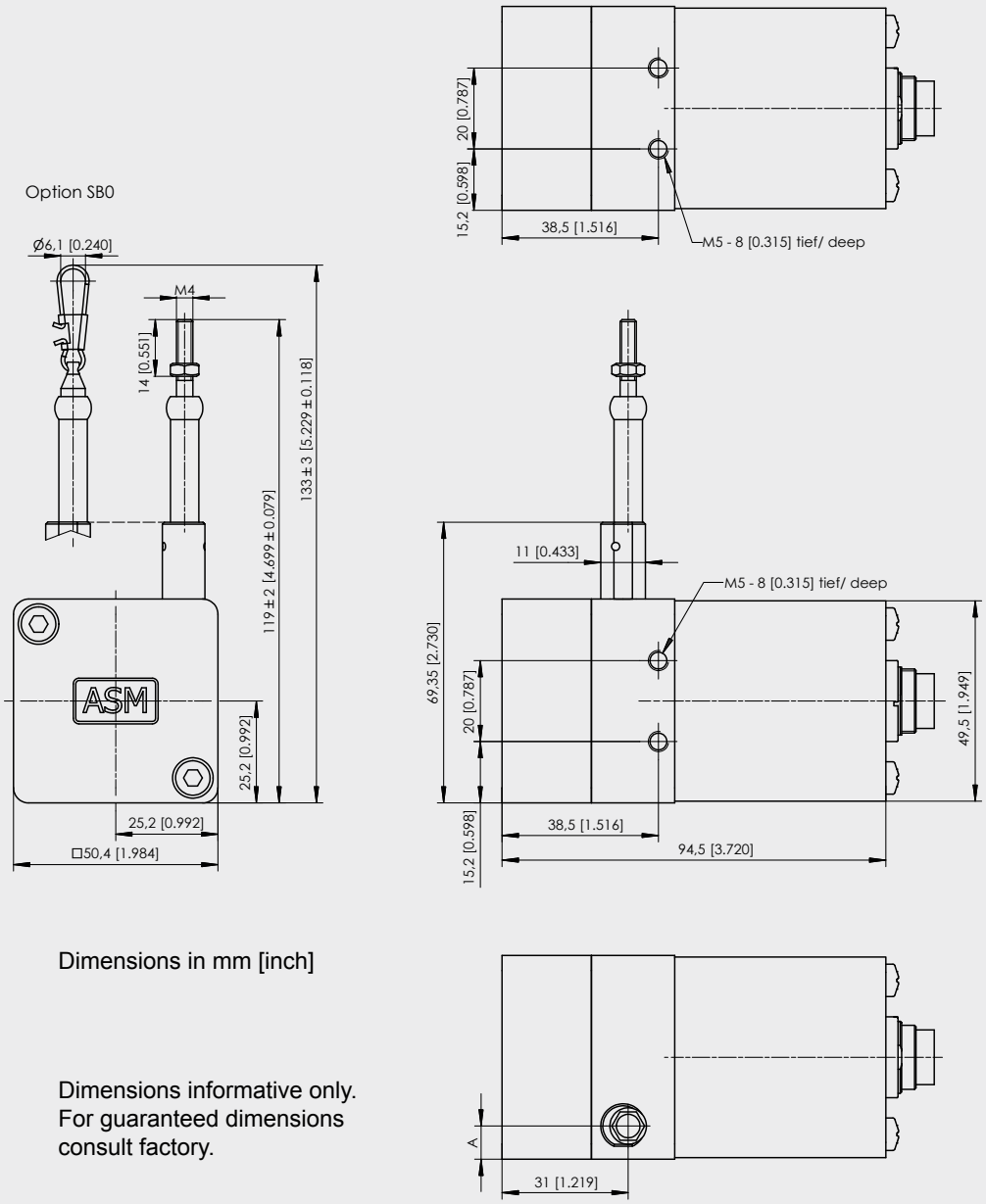
M12	= 8 pin socket M12 (not for ADCANOP)
M12/CAN	= 5 pin socket M12 (for ADCANOP)

Order code connector cable: see page 82/83

Order example: WS10ZG - 1250 - 10V - L10 - M4 - M12

Cable forces, typical at 20 °C	Measurement range	Max. pull-out force	Min. pull-in force
	[mm]	[N]	[N]
	100	4.7	3.0
	125	4.6	2.4
	375	7.4	3.9
	500	5.5	2.8
	750	7.6	3.8
	1000	5.3	2.9
	1250	4.6	2.4

Outline drawing



Dimensions in mm [inch]

Dimensions informative only.
For guaranteed dimensions
consult factory.

Dimensions in mm	Measurement range	A
	375; 750	12.4
	100; 125; 500; 1000; 1250	8

POSIWIRE®
WS10ZG
Incremental Encoder Output

WS10 in a zinc diecast housing

- **Protection class IP65**
- **Measurement range 0 ... 1250 mm**
- **Incremental encoder output**

Specifications		
	Outputs	Incremental encoder output for reliable data transmission. The output is compatible with TTL and HTL.
	Resolution	10 or 25 pulses per mm (1/40 mm or 1/100 mm with external edge counting mode)
	Linearity	±0.05% f.s.
	Sensing device	Incremental encoder
	Material	Zinc diecast, aluminum and stainless steel; measuring cable: stainless steel
	Protection class	IP65 (with mating connector only)
	Connection	Male 8 pin socket M12
	Weight	Approx. 1.1 kg
	EMC, temperature	Refer to output specification

Order code WS10ZG

WS10ZG – □ – □ – □ – □ – □

Model name

Measurement range (in mm)
1250

Pulses per mm
10 = 10 pulses per mm
25 = 25 pulses per mm
Other numbers of pulses on request

Output
PP530 = Incremental output 5 ... 30 V
IE41LI = Incremental encoder TTL compatible
IE41HI = Incremental encoder HTL compatible

Cable fixing
M4 = M4 cable fixing
SB0 = Cable clip

Connection
M12 = 8 pin socket M12

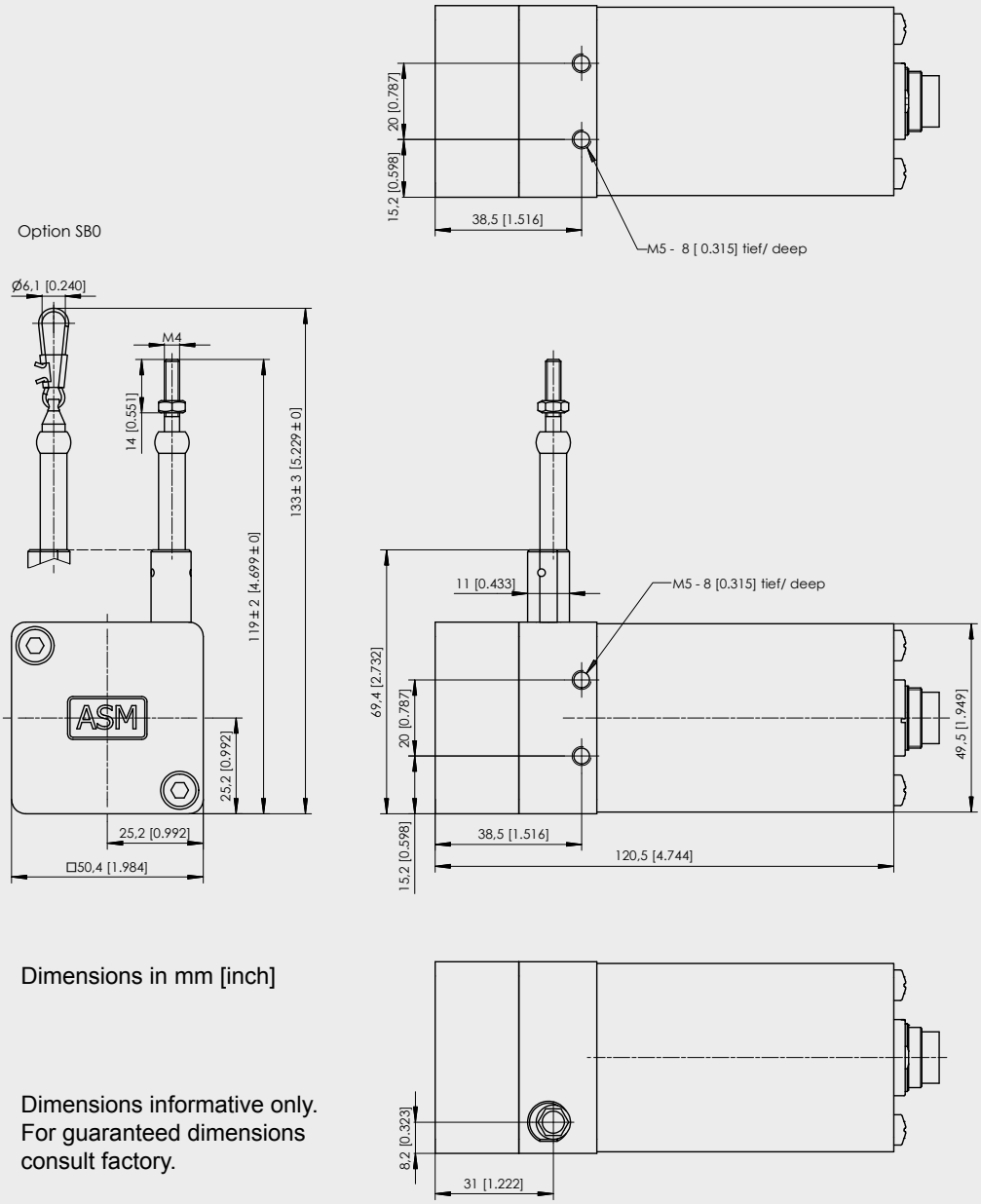
Order code connector cable: see page 82

Order example: WS10ZG - 1250 - 10 - PP530 - M4 - M12

POSIWIRE®
WS10ZG
Incremental Encoder Output

Cable forces, typical at 20 °C	Resolution	Max. pull-out force	Min. pull-in force
	[pulses per mm]	[N]	[N]
	10 / 25	5.8	3.0

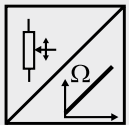
Outline drawing



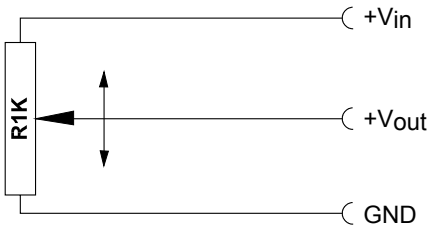
Dimensions in mm [inch]

Dimensions informative only.
For guaranteed dimensions
consult factory.

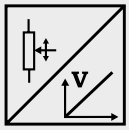
POSIWIRE®
R1K and 10V
Analog Output

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



Note: The Potentiometer must be connected as a voltage divider. The input impedance of the following processing circuit should be 10 MΩ min.

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

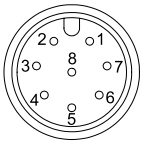
Output signals

Signal wiring

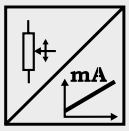
Signal name R1K	10V	Cable color	Connector pin no.
+V_{in}	Excitation +	White	1
GND	Excitation GND	Brown	2
+V_{out}	Signal +	Green	3
	Signal GND	Yellow	4

Connection

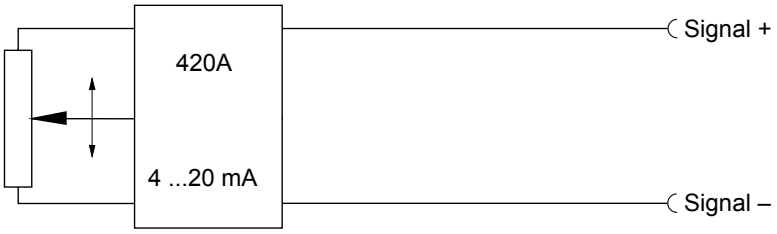
View to sensor connector

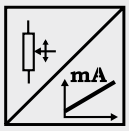


CONN-M12-8F

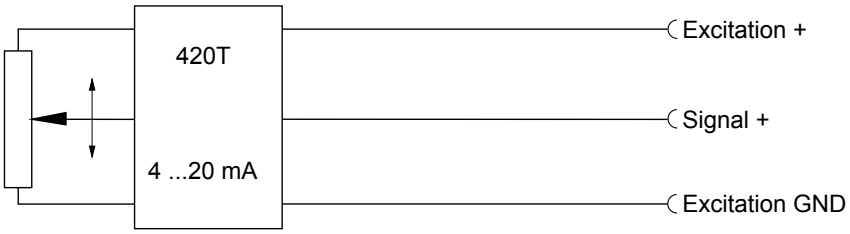
Signal conditioner 420A Current output (2 wire) 	Excitation voltage	12 ... 27 V DC non stabilized, measured at the sensor terminals
	Excitation current	35 mA max.
	Output current	4 ... 20 mA equivalent for 0 ... 100 % range
	Stability (temperature)	±100 x 10^{-6} / °C f.s.
	Protection	Reversed polarity, 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

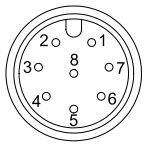


Signal wiring

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

Connection

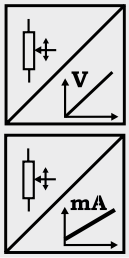
View to sensor connector



CONN-M12-8F

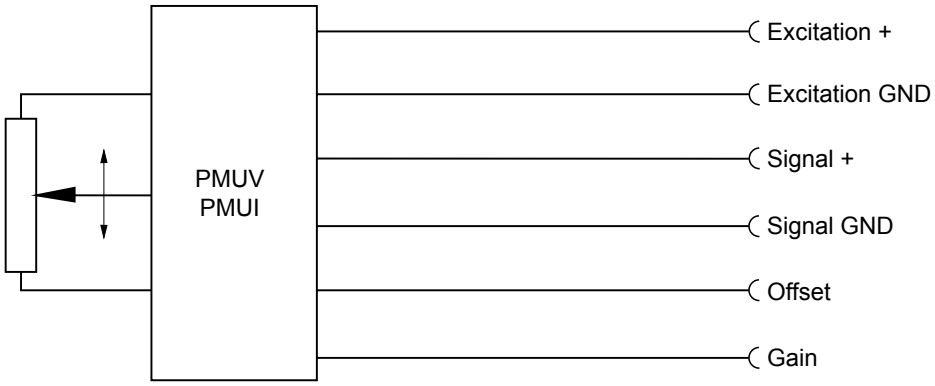
POSIWIRE®
PMUV / PMUI
Programmable Analog Output

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

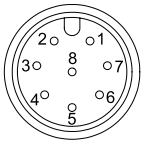


Signal wiring PMUV / PMUI

Signal name	Connector pin no.
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

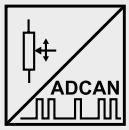


CONN-M12-8F

Signal wiring PMUI2

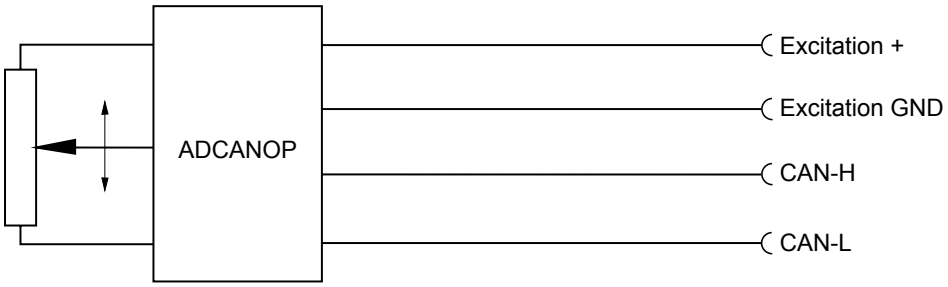
Signal name	Connector pin no.
Excitation +	1
Excitation GND	2
Not used	3
Not used	4
Signal +	5
Signal GND	6
Offset	7
Gain	8

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

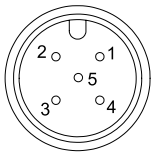
Signal diagram



Signal wiring / connection

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

View to sensor connector

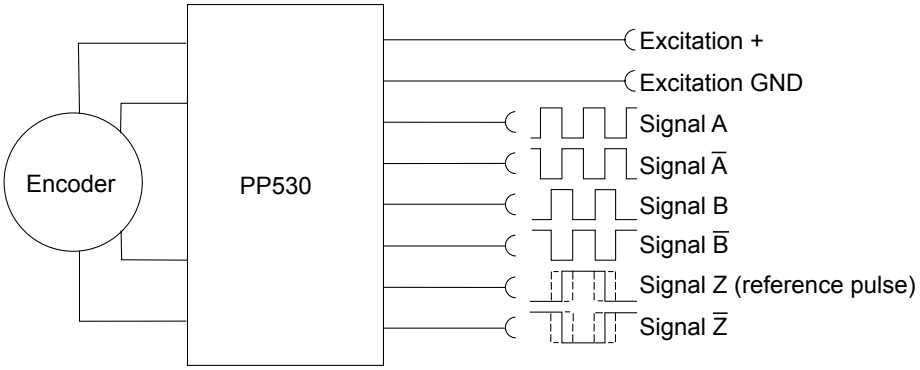


POSIWIRE®
PP530
Incremental Output

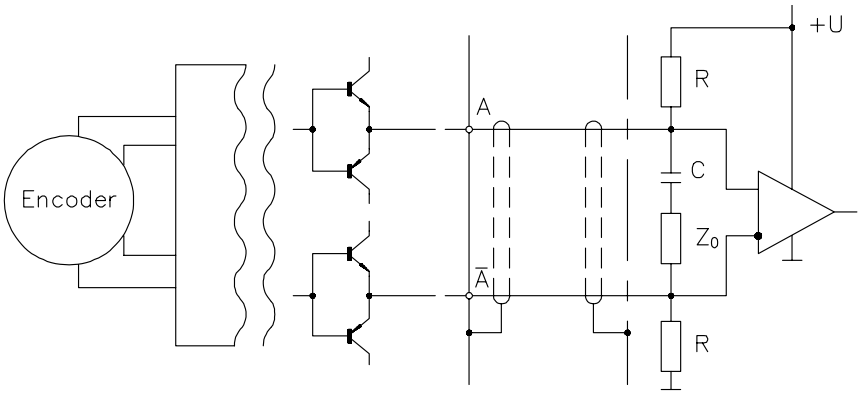
Signal conditioner PP530
Incremental

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



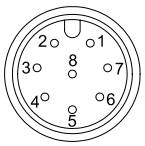
Recommended processing circuit



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



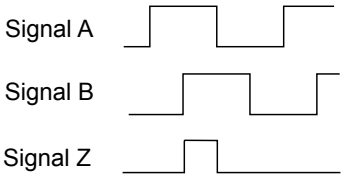
CONN-M12-8F

POSIWIRE®
IE41LI and IE41HI
Incremental Output

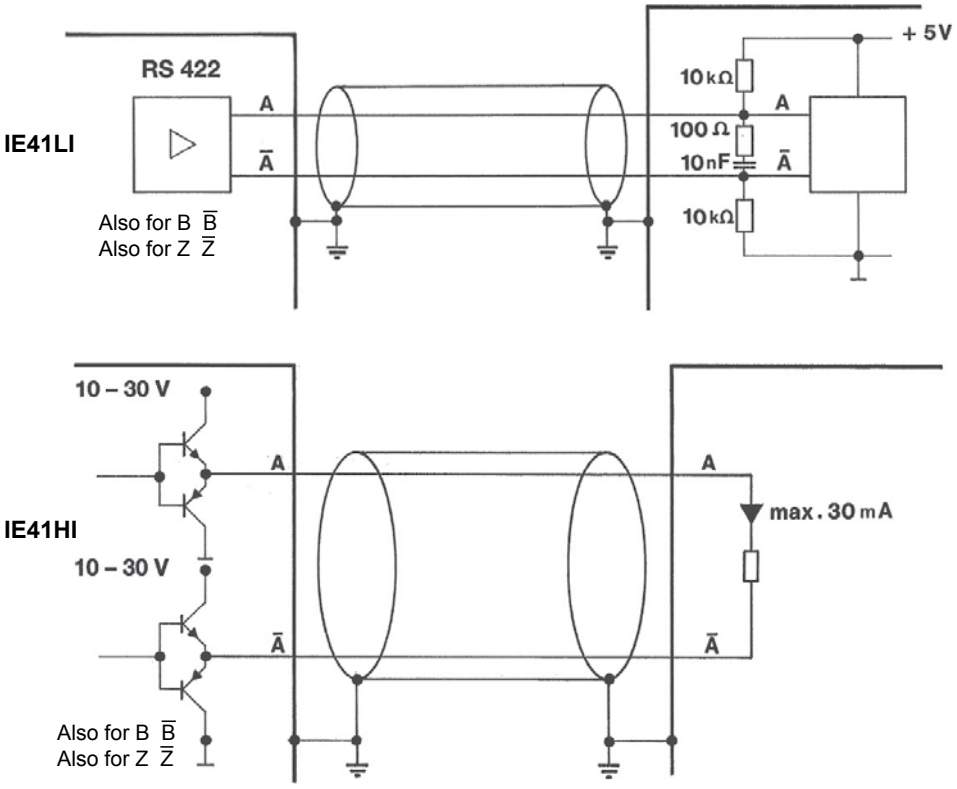
Signal conditioner IE41LI and IE41HI
Incremental

	IE41LI	IE41HI
Excitation voltage	5 V DC ±10 %	10 ... 30 V DC
Excitation current	150 mA max. w/o load	
Output frequency	300 kHz max.	200 kHz max.
Output	RS422	Push-pull antivalent
Output current	±30 mA max.	30 mA
Output voltage	Depending on the excitation voltage	
Stability (temperature)	±20 x 10^{-6} / °C f.s. (sensor mechanism)	
Operating temperature	-10 ... +70 °C	
Protection against short circuit	One channel for 1 s	Yes
EMC	According to EN 61326:2006	

Output signals



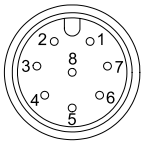
Recommended processing circuit



Signal wiring / connection

Signal name	Connector pin no. WS10	Connector pin no. WS12
Excitation +	1	1
Excitation GND (0 V)	2	2
Signal A	4	3
Signal Ā	6	5
Signal B (A + 90°)	3	4
Signal B̄	5	6
Signal Z (reference pulse)	7	7
Signal Z̄	8	8

View to sensor connector



CONN-M12-8F

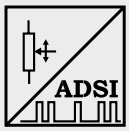
POSIWIRE®
ADSI16
A/D Converted SSI Output

- **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

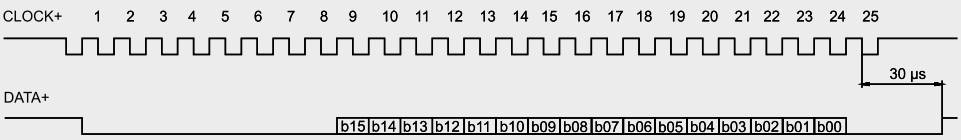
The sensing device of the ADSI is a precision potentiometer. The position information is given by an analog/digital converter output serialized as a data word. Data transmission takes place by means of the signals CLOCK and DATA. The processing unit (PLC, Micro- computer) sends pulse sequences which 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

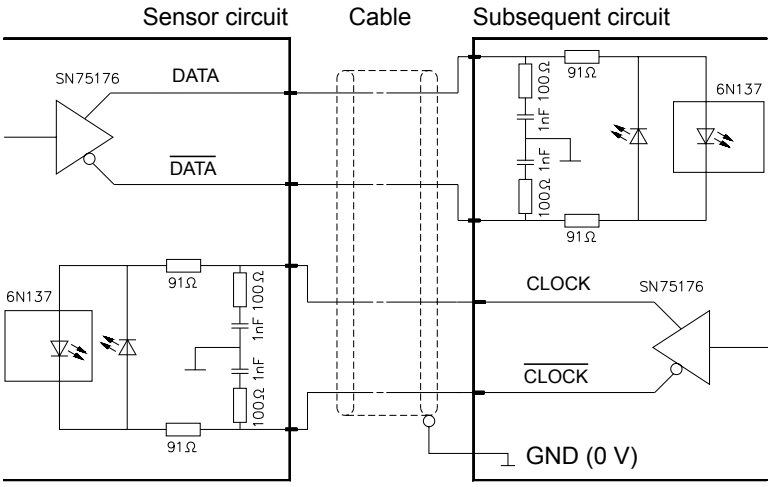


Interface	EIA RS422, RS485, short-circuit proof
Excitation voltage	11 ... 27 V DC
Excitation current	200 mA max.
Clock frequency	70 ... 500 kHz
Code	Gray code, continuous progression
Delay between pulse trains	30 µs min.
Resolution	16 bit (65536 counts) f.s.; optional 12 (ADSI) bit resp. 14 bit (ADSI14)
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



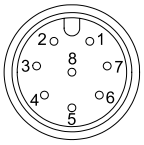
Transmission rate

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

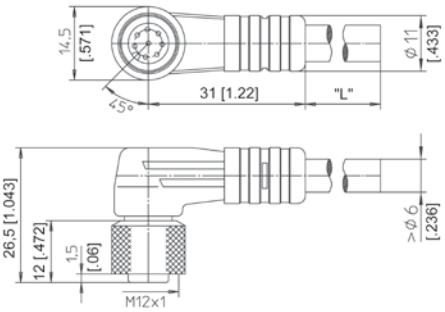
Connector cable for WS® position sensors
8 pin M12

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



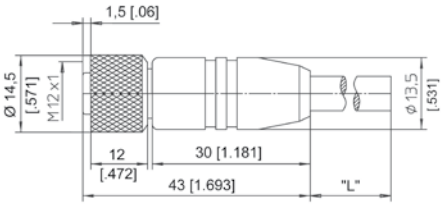
Connector cable for WS® position sensors
8 pin M12

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

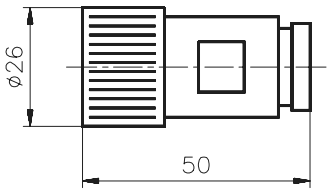
Connector pin / cable color							
1	2	3	4	5	6	7	8
White	Brown	Green	Yellow	Grey	Pink	Blue	Red

Connector for WS® position sensors
12 pin CONIN

Female connector.

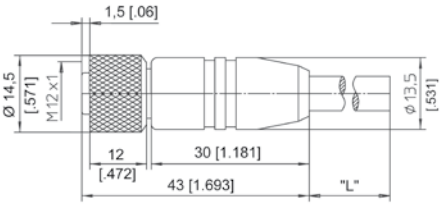
Order code:

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