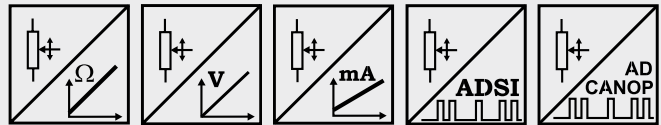


# POSIWIRE® WS10 Analog, SSI or CANopen Output



## Very compact sensor for industrial applications

- 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	Aluminum and stainless steel; cable: stainless steel
	Protection class	IP65 (with mating connector only)
	Connection	Male 8 pin socket M12 (ADCANOP: 5 pin socket)
	Weight	800 g approx.
	EMC, temperature	Refer to output specification

## Order code WS10

### 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 (only for ADCANOP)



Order code connector cable: see page 82/83

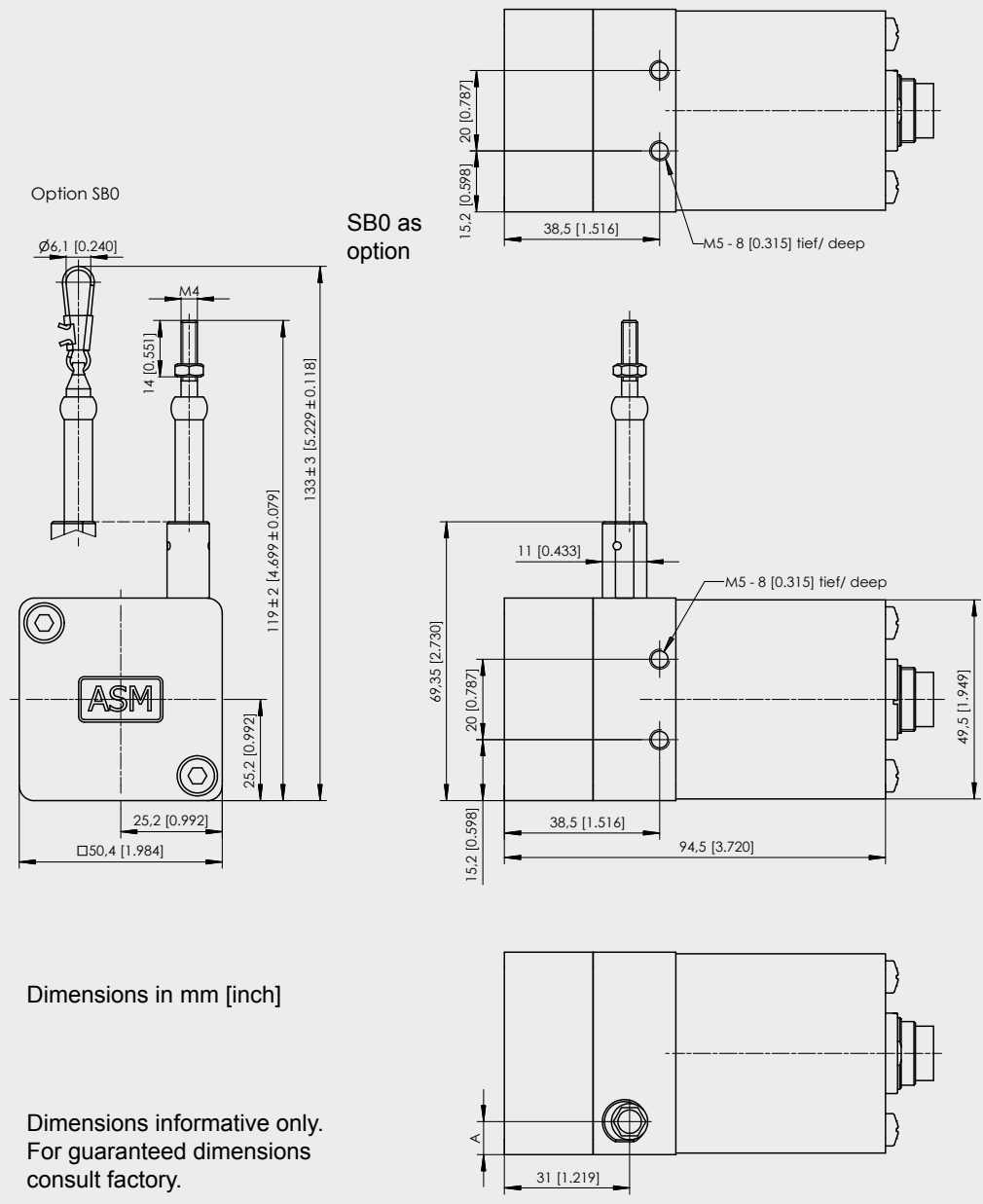
Order example: **WS10 - 1250 - 10V - L10 - M4 - M12**

**POSIWIRE®**  
**WS10**  
**Analog, SSI or CANopen Output**



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**



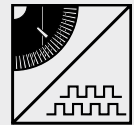
Dimensions in mm	Measurement range	A
	375; 750	12.4
100; 125; 500; 1000; 1250	8	

**POSIWIRE®**  
**WS10**  
**Incremental Encoder Output**



**Very compact sensor for industrial applications**

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



<b>Specifications</b>	Outputs	Incremental encoder output 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	Aluminum and stainless steel; cable: stainless steel
	Protection class	IP65 (with mating connector only)
	Connection	Male 8 pin socket M12
	Weight	Approx. 800 g
EMC, temperature	Refer to output specification	

**Order code WS10**



**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

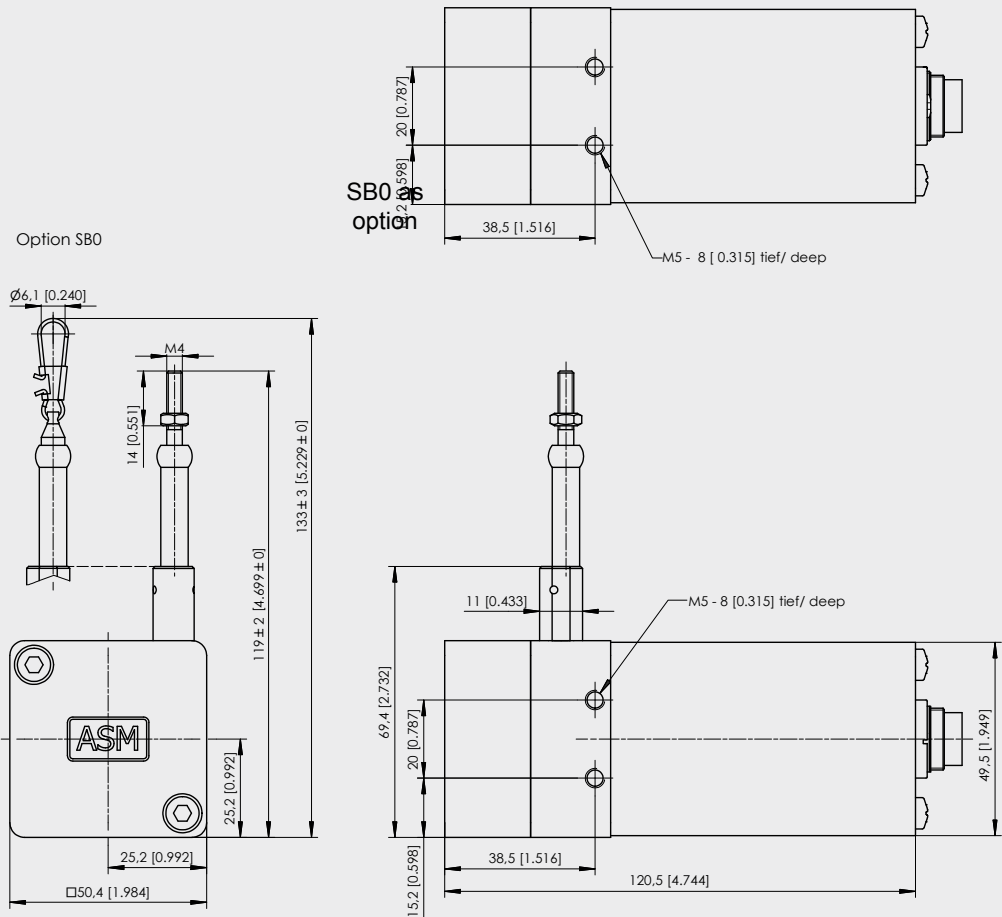
**Order example: WS10 - 1250 - 10 - PP530 - M4 - M12**

# POSIWIRE® WS10 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]

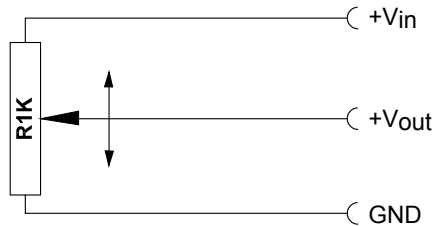
Dimensions informative only.  
For guaranteed dimensions  
consult factory.

# POSIWIRE® R1K and 10V Analog Output

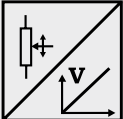


<b>Voltage divider R1K Potentiometer</b> 	Excitation voltage	32 V DC max. at 1 kΩ (max. power 1 W)
	Potentiometer impedance	1 kΩ ±10 %
	Thermal coefficient	±25 x 10 <sup>-6</sup> / °C f.s.
	Sensitivity	Depends on the measuring range, individual sensitivity of the sensor is specified on the label
	Voltage 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.

<b>Signal conditioner 10V and 10V5 Voltage output</b> 	Excitation voltage	18 ... 27 V DC non stabilized
	Excitation current	20 mA max.
	Output voltage	<b>10V:</b> 0 ... 10 V DC; <b>10V5:</b> 0.5 ... 10 V DC
	Output current	2 mA max.
	Output load	> 5 kΩ
	Stability (temperature)	±50 x 10 <sup>-6</sup> / °C f.s.
	Protection	Reverse polarity, short circuit
	Output noise	0.5 mV <sub>RMS</sub>
	Operating temperature	-20 ... +85 °C
	EMC	According EN 61326:2006

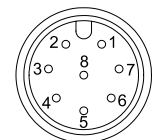
## Output signals



Signal wiring	Signal name R1K	10V	Cable color	Connector pin no.
	+Vin	Excitation +	White	1
	GND	Excitation GND	Brown	2
	+Vout	Signal +	Green	3
		Signal GND	Yellow	4

## Connection

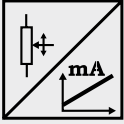
View to sensor connector



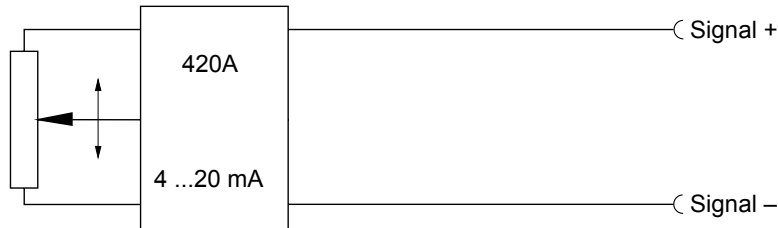
CONN-M12-8F

# POSIWIRE® 420A and 420T Analog Output



<b>Signal conditioner 420A</b> 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)	$\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s.
	Protection	Reversed polarity, short circuit
	Output noise	0.5 mV <sub>RMS</sub>
	Operating temperature	-20 ... +85 °C
	EMC	According to EN 61326:2006

## Output signals



<b>Signal conditioner 420T</b> 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)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s.
	Protection	Reverse polarity, short circuit
	Output noise	0.5 mV <sub>RMS</sub>
	Operating temperature	-20 ... +85 °C
	EMC	According to EN 61326:2006

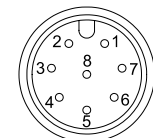
## Output signals



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

## Connection

View to sensor  
connector

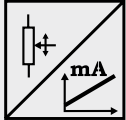
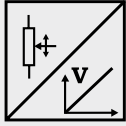


CONN-M12-8F

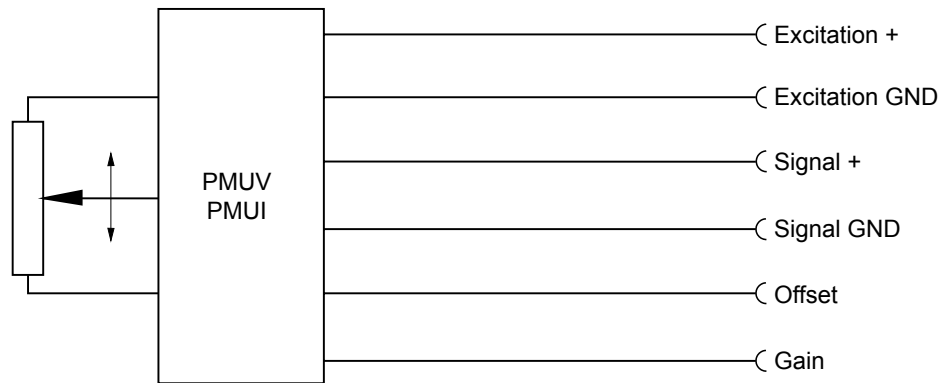
# POSIWIRE® PMUV / PMUI Programmable Analog Output



<b>Signal conditioner PMUV / PMUI</b> Voltage or current output (3 wire)	Excitation voltage	18 ... 27 V DC
	Excitation current	50 mA max.
	Voltage output <b>PMUV</b>	0 ... 10 V
	Output current	10 mA max.
	Output load	1 kΩ min.
	Current output <b>PMUI</b>	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)	±50 x 10 <sup>-6</sup> / °C f.s.	
Operating temperature	-20 ... +85 °C	
Protection	Reversed polarity, short circuit	
EMC	According to EN 61326:2006	



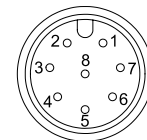
## Output signals



Signal name	Connector pin no.
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

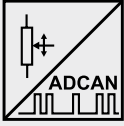


CONN-M12-8F

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

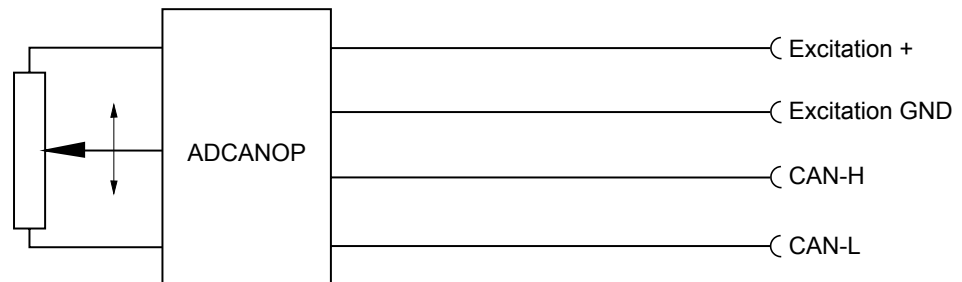
# POSIWIRE® ADCANOP A/D Converted CANopen Bus



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

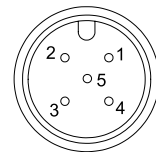
Specifications	Excitation voltage	8 ... 36 V DC
	Excitation current	Typ. 15/30 mA for 24/12 V, max. 100 mA
	Resolution	16 bit f.s.
	Measuring rate	1 kHz (asynchronous)
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s.
	Repeatability	1 LSB
	Operating temperature	-20 ... +85 °C
	Protection	Reverse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

## Signal diagram



View to sensor connector

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





# POSIWIRE® PP530 Incremental Output

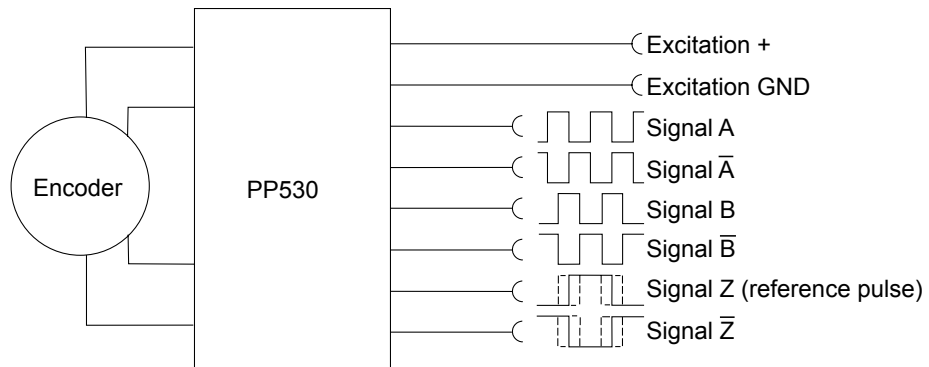


## Signal conditioner PP530 Incremental

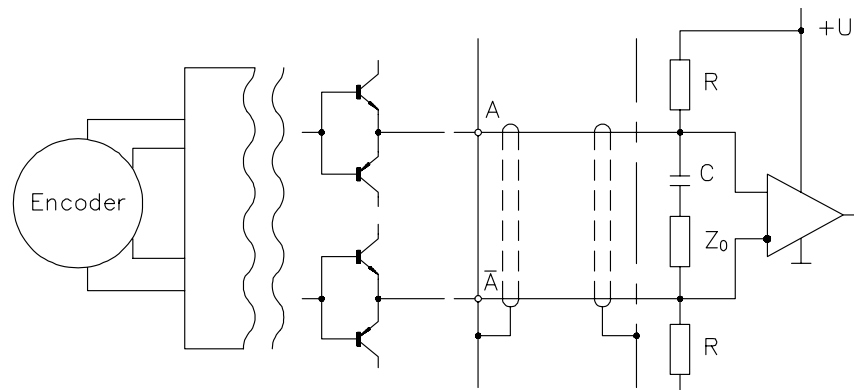


Excitation voltage	5 ... 30 V DC
Excitation current	25 mA typ. (w/o load), 200 mA max.
Output frequency	200 kHz max.
Output	Linedriver, Push-Pull, CMOS, TTL- and HTL-compatible
Output current	30 mA max.
Output voltage	Depends on the excitation voltage (e.g. to obtain TTL signals the excitation voltage must be 5 V). Compatible to EIA RS422/RS485
Saturation voltage high/low	$I_a < 10 \text{ mA}, U_B 5 \text{ V}/24 \text{ V}: < 0.5 \text{ V}$ $I_a < 30 \text{ mA}, U_B 5 \text{ V}/24 \text{ V}: < 1 \text{ V}$
Stability (temperature)	$\pm 20 \times 10^{-6} / ^\circ\text{C}$ 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



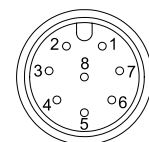
### Recommended processing circuit



### 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

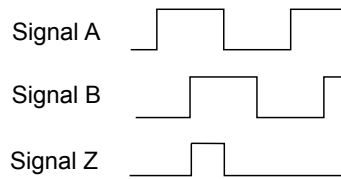


#### Signal conditioner IE41LI and IE41HI Incremental

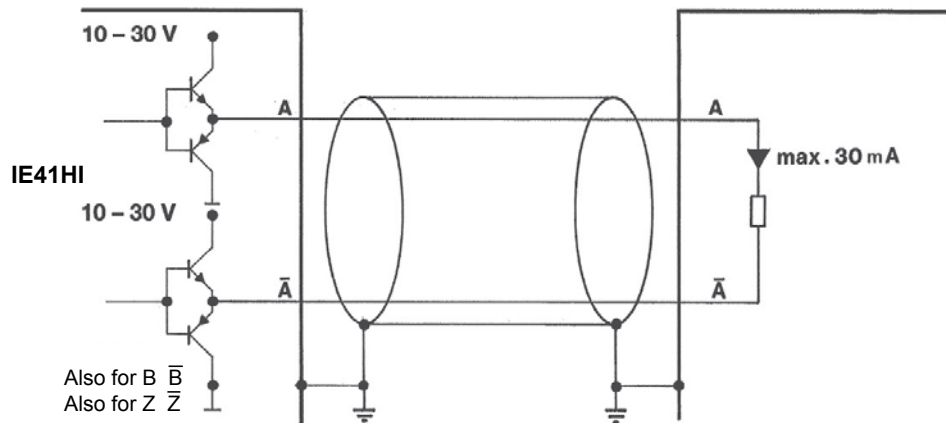
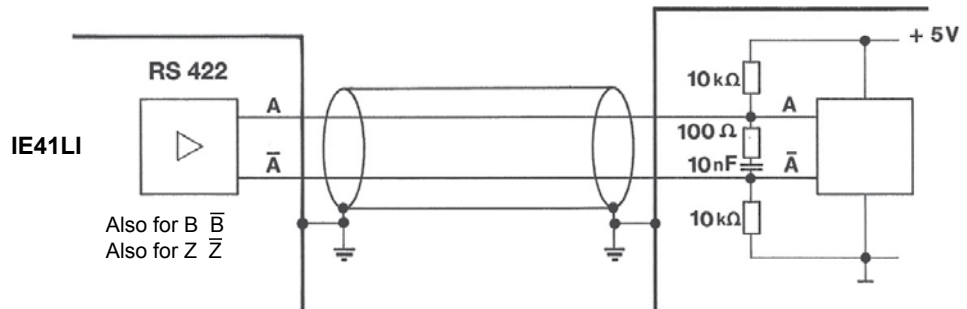


	IE41LI	IE41HI
Excitation voltage	5 V DC $\pm 10\%$	10 ... 30 V DC
Excitation current	150 mA max. w/o load	
Output frequency	300 kHz max.	200 kHz max.
Output	RS422	Push-pull antivalent
Output current	$\pm 30$ mA max.	30 mA
Output voltage	Depending on the excitation voltage	
Stability (temperature)	$\pm 20 \times 10^{-6}$ / °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



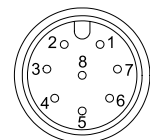
#### Recommended processing circuit



#### 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 $\bar{A}$	6	5
Signal B (A + 90°)	3	4
Signal $\bar{B}$	5	6
Signal Z (reference pulse)	7	7
Signal $\bar{Z}$	8	8

View to sensor  
connector



CONN-M12-8F

# POSIWIRE®

## ADSI16

### A/D Converted SSI Output

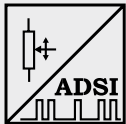


- Resolution 16 bit, synchronous serial data transmission/SSI
- Optional available with 12 bit (ADSI) or 14 bit (ADSI14) resolution
- No loss of data at power down
- Easy to connect to PLC's with SSI input circuitry

#### Description

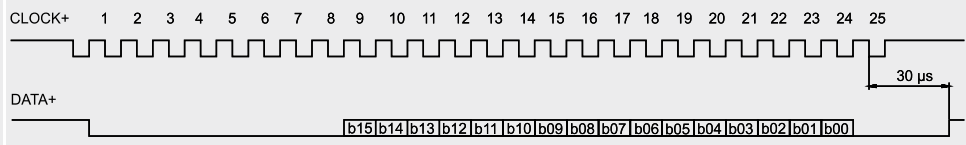
The sensing device of the ADSI is a precision potentiometer. The position information is given by an analog/digital converter output serialized as a data word. Data transmission takes place by means of the signals CLOCK and DATA. The processing unit (PLC, Micro-computer) sends pulse sequences which clock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

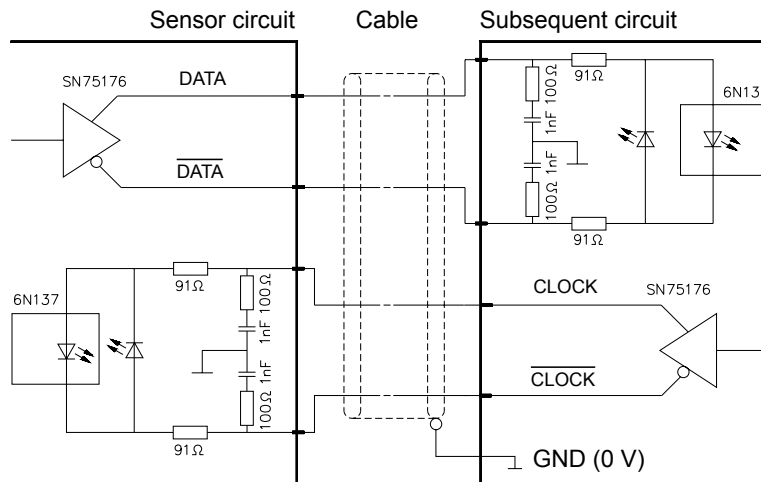


Interface	EIA RS422, RS485, short-circuit proof
Excitation voltage	11 ... 27 V DC
Excitation current	200 mA max.
Clock frequency	70 ... 500 kHz
Code	Gray code, continuous progression
Delay between pulse trains	30 µs min.
Resolution	16 bit (65536 counts) f.s.; optional 12 (ADSI) bit resp. 14 bit (ADSI14)
Stability (temperature)	±50 x 10 <sup>-6</sup> / °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

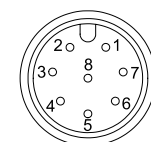
Cable length	Baud rate
< 50 m	< 300 kHz
< 100 m	< 100 kHz

#### 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
CLOCK	4
DATA	5
DATA	6
Shield	not connected



CONN-M12-8F

View to sensor  
connector

# POSIWIRE® Accessories for WS® Position Sensors



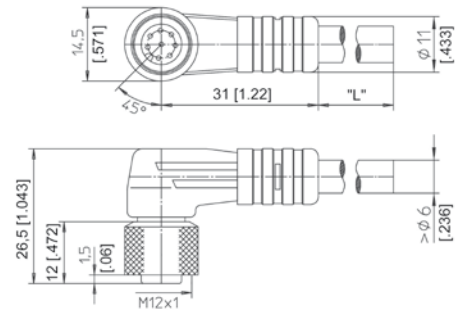
**Connector cable  
for WS® position  
sensors**  
8 pin M12

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



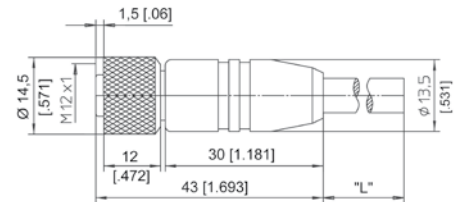
**Connector cable  
for WS® position  
sensors**  
8 pin M12

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



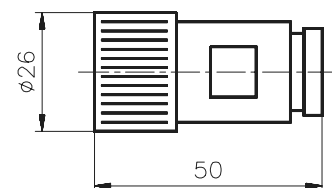
Connector cable wiring - M12, 8 pin	Connector pin / cable color							
	1	2	3	4	5	6	7	8
	White	Brown	Green	Yellow	Grey	Pink	Blue	Red

**Connector for WS®  
position sensors**  
12 pin CONIN

Female connector.

Order code:

**CONN - CONIN - 12F - G**



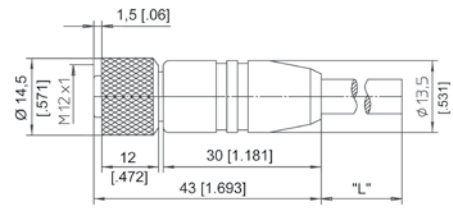
# POSIWIRE® Accessories for WS® Position Sensors



## 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**

