

# POSIWIRE®

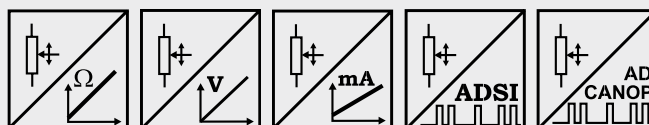
## WS10

### 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	WS10	-	-	-	-	-
<b>Measurement range (in mm)</b>	100 / 125 / 375 / 500 / 750 / 1000 / 1250					
<b>Output</b>	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					
<b>Linearity</b>	L10 = ±0.10 % option: L05 = ±0.05 % L25 = ±0.25 %					
<b>Cable fixing</b>	M4 = M4 cable fixing SB0 = Cable clip					
<b>Connection</b>	M12 = 8 pin socket M12 (ADCANOP: 5 pin)					

Order code connector cable: see page 82/83

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

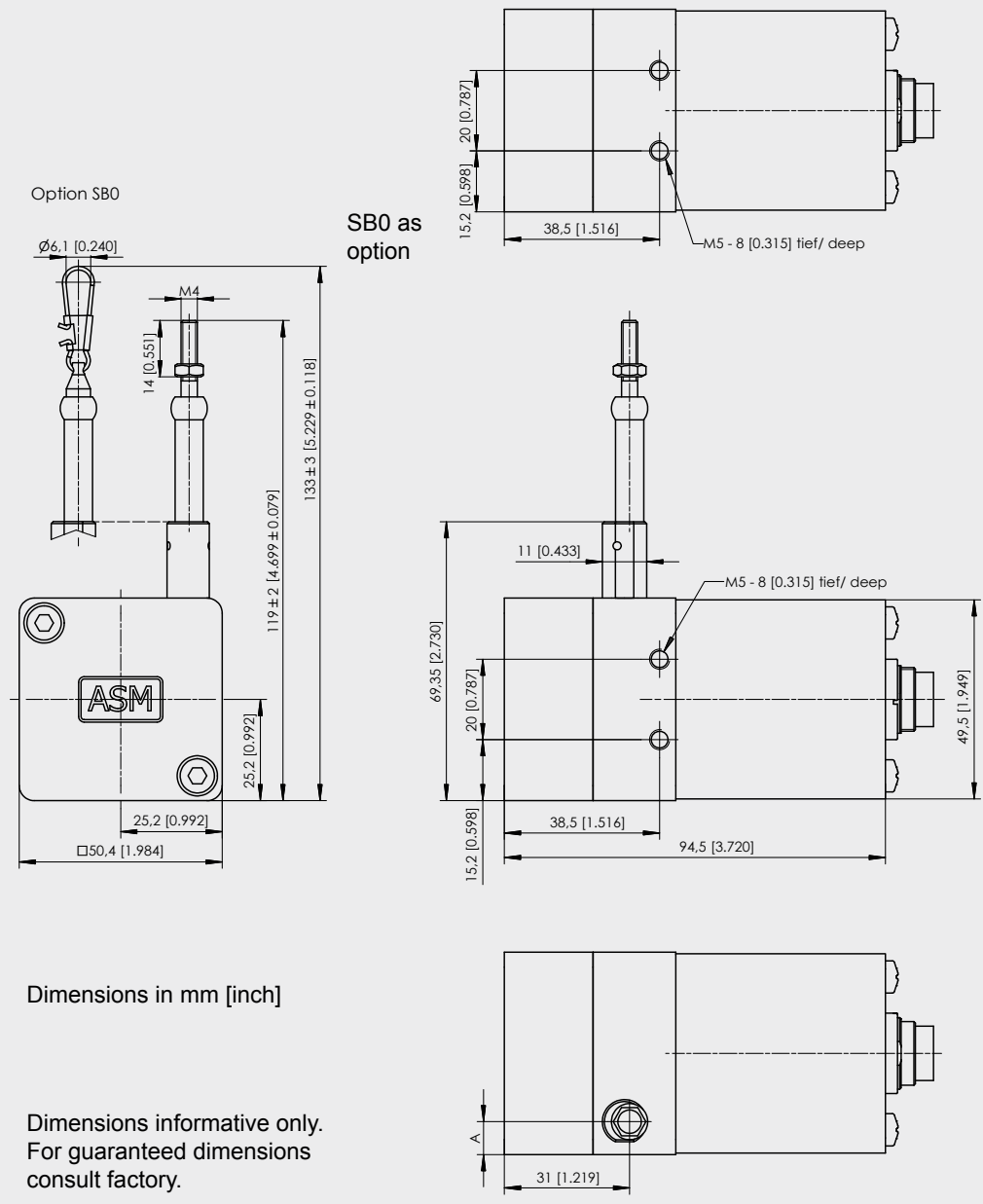
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## WS10

### 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	

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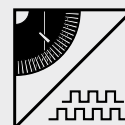
## WS10

### Incremental Encoder Output



#### Very compact sensor for industrial applications

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



Specifications	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

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

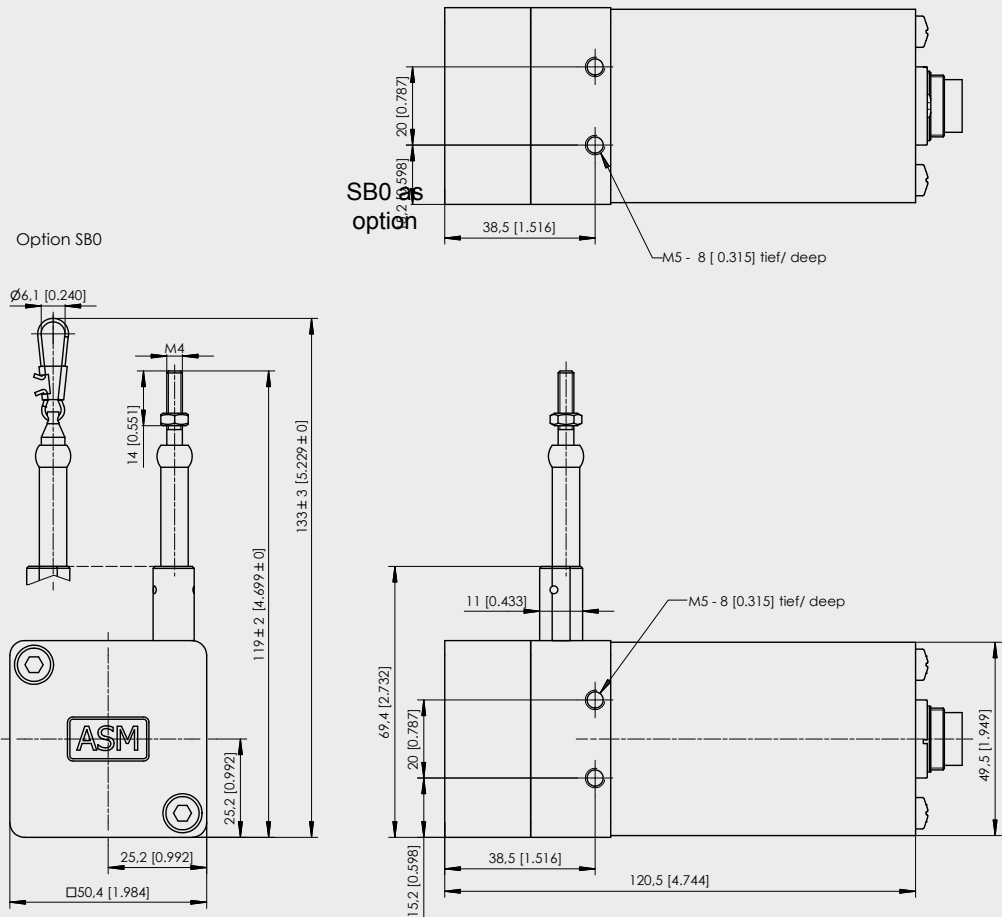
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## WS10

### Incremental Encoder Output

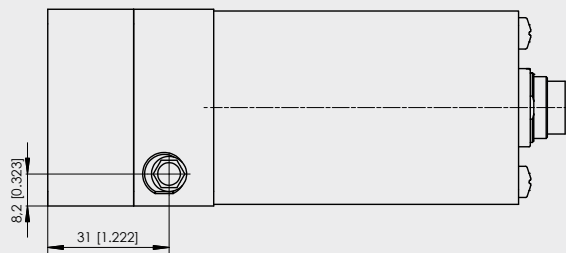
Cable forces, typical at 20 °C	Resolution	Max. pull-out force	Min. pull-in force
	[pulses per mm]	[N]	[N]
	10 / 25	5.8	3.0

#### Outline drawing



Dimensions in mm [inch]

Dimensions informative only.  
For guaranteed dimensions  
consult factory.



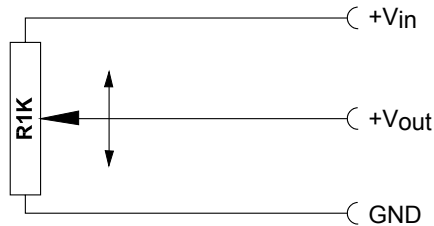
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## R1K and 10V

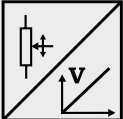
### Analog Output

<b>Voltage divider R1K</b> Potentiometer 	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</b> <b>10V and 10V5</b> Voltage output 	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

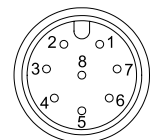
#### Output signals



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

#### Connection

View to sensor  
connector



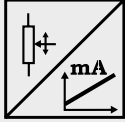
CONN-M12-8F

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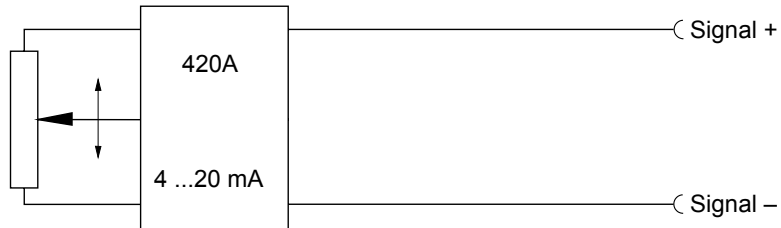
## 420A and 420T

### Analog Output

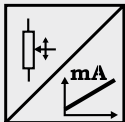
<b>Signal conditioner</b> <b>420A</b> Current output (2 wire)	Excitation voltage	12 ... 27 V DC non stabilized, measured at the sensor terminals
	Excitation current	35 mA max.
	Output current	4 ... 20 mA equivalent for 0 ... 100 % range
	Stability (temperature)	$\pm 100 \times 10^{-6} / ^\circ\text{C}$ 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</b> <b>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



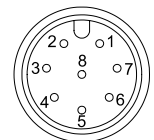
#### Output signals



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



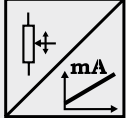
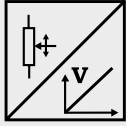
CONN-M12-8F

# POSIWIRE®

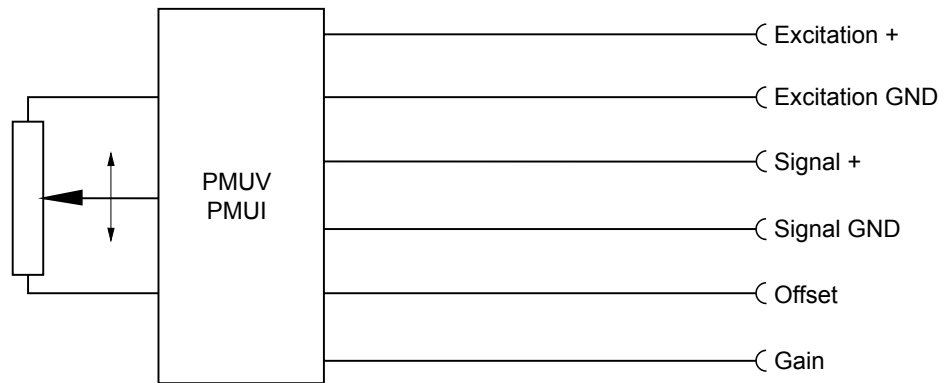
## PMUV / PMUI

### 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	



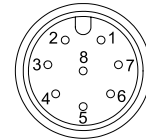
#### Output signals



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



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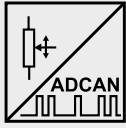
Signal name	Connector pin no.
Excitation +	1
Excitation GND	2
Not used	3
Not used	4
Signal +	5
Signal GND	6
Offset	7
Gain	8

# POSIWIRE®

## ADCANOP

### A/D Converted CANopen Bus

#### Interface ADCANOP

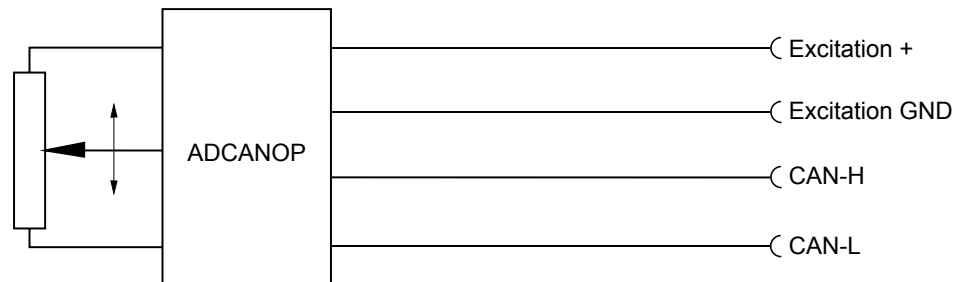


Communication profile	CANopen CiA 301 V 4.02, Slave
Encoder profile	Encoder CiA 406 V 3.2
Error Control	Node Guarding, Heartbeat, Emergency Message
Node ID	Adjustable via LSS
PDO	3 TxPDO, 0 RxPDO, no linking, static mapping
PDO Modes	Event-/Time triggered, Remote-request, Sync cyclic/acyclic
SDO	1 server, 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

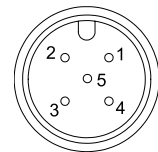
#### Signal diagram



View to sensor connector

#### Signal wiring / connection

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





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## PP530

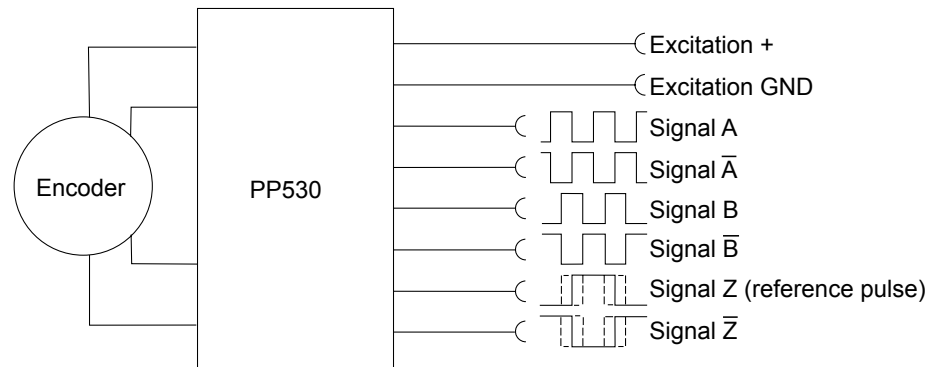
### Incremental Output

#### Signal conditioner PP530 Incremental

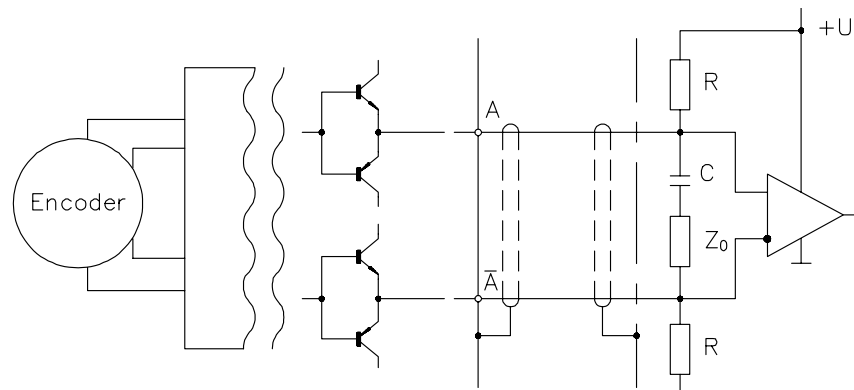


Excitation voltage	5 ... 30 V DC
Excitation current	25 mA typ. (w/o load), 200 mA max.
Output frequency	200 kHz max.
Output	Linedriver, Push-Pull, CMOS, TTL- and HTL-compatible
Output current	30 mA max.
Output voltage	Depends on the excitation voltage (e.g. to obtain TTL signals the excitation voltage 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	$< 200 \text{ ns}$
Transition time negative edge	$< 200 \text{ ns}$
Protection	Reverse polarity, short circuit
EMC	According to EN 61326:2006

#### Signal diagram



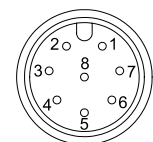
#### Recommended processing circuit



#### Signal wiring / connection

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

#### View to sensor connector



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## IE41LI and IE41HI

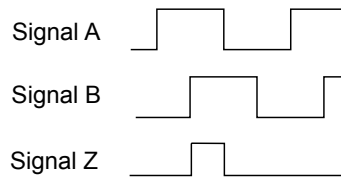
### Incremental Output

#### Signal conditioner IE41LI and IE41HI Incremental

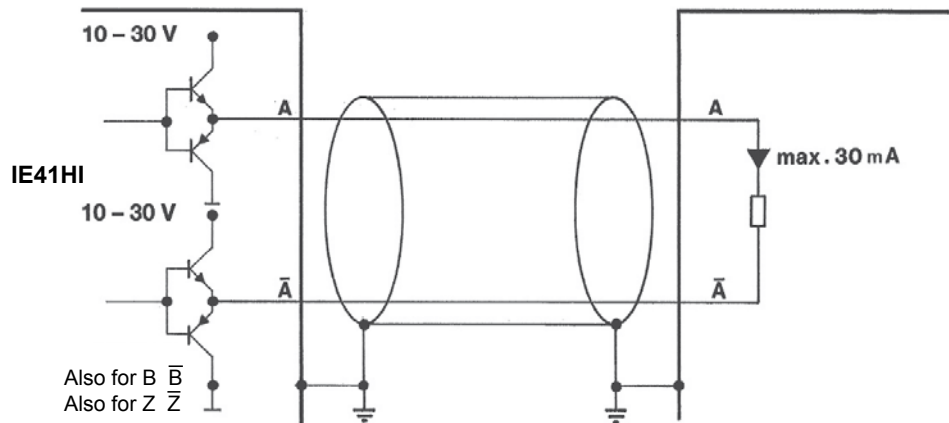
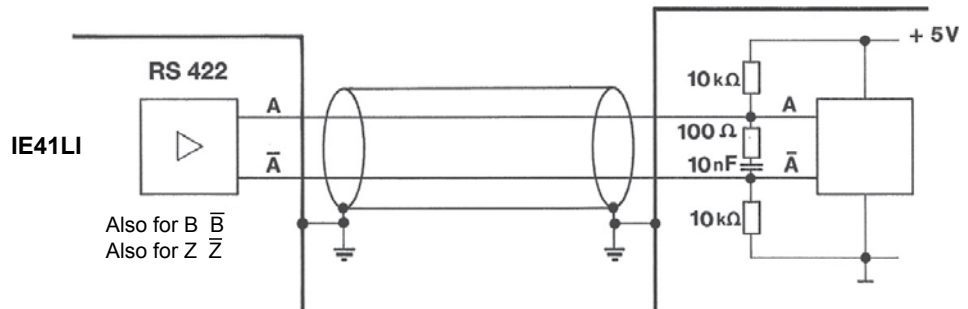


	IE41LI	IE41HI
Excitation voltage	5 V DC $\pm 10\%$	10 ... 30 V DC
Excitation current	150 mA max. w/o load	
Output frequency	300 kHz max.	200 kHz max.
Output	RS422	Push-pull antivalent
Output current	$\pm 30$ mA max.	30 mA
Output voltage	Depending on the excitation voltage	
Stability (temperature)	$\pm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



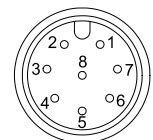
#### Recommended processing circuit



#### 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



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# POSIWIRE®

## ADSI16

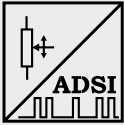
### A/D Converted SSI Output

- 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

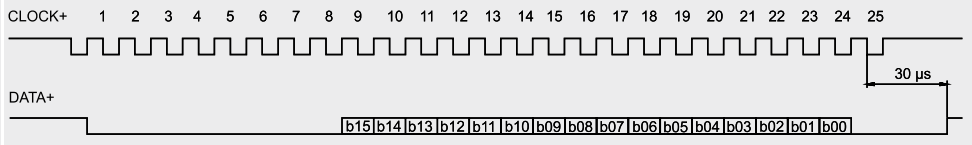
The sensing device of the ADSI is a precision potentiometer. The position information is given by an analog/digital converter output serialized as a data word. Data transmission takes place by means of the signals CLOCK and DATA. The processing unit (PLC, Micro-computer) sends pulse sequences which clock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

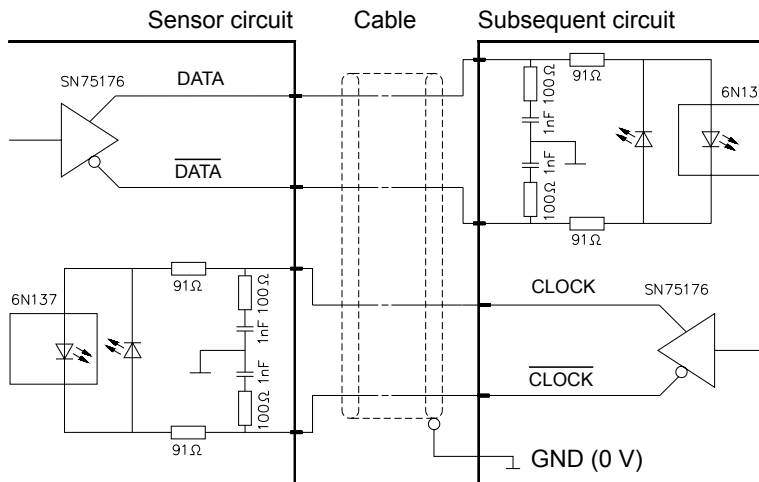


Interface	EIA RS422, RS485, short-circuit proof
Excitation voltage	11 ... 27 V DC
Excitation current	200 mA max.
Clock frequency	70 ... 500 kHz
Code	Gray code, continuous progression
Delay between pulse trains	30 µs min.
Resolution	16 bit (65536 counts) f.s.; optional 12 (ADSI) bit resp. 14 bit (ADSI14)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

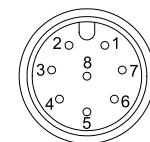
Cable length	Baud rate
< 50 m	< 300 kHz
< 100 m	< 100 kHz

#### 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
$\overline{\text{CLOCK}}$	4
DATA	5
$\overline{\text{DATA}}$	6
Shield	not connected



View to sensor  
connector

CONN-M12-8F



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