MICRO-EPSILON

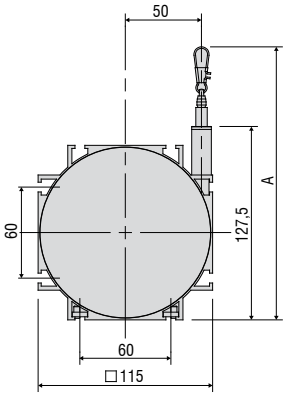
More Precision

wireSENSOR // Draw-wire displacement sensors

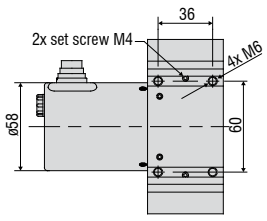
wireSENSOR P115 analogue

- *Robust aluminium profile housing*
- *Customised versions for OEM*
- *Potentiometer, current and voltage output*

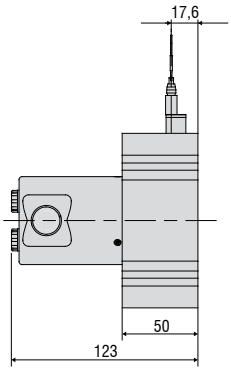
Model P115 (Measuring range 3000/4000/5000mm)



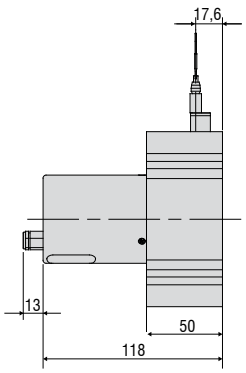
MR (mm)	A (mm)
3000	186
4000 / 5000	180



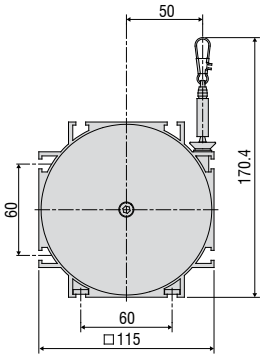
Output U/I

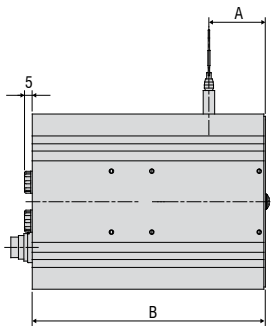


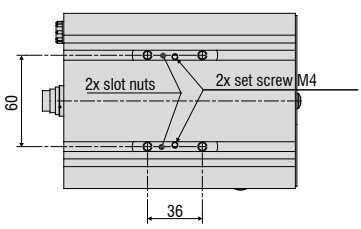
Output P



Model P115 (Measuring range 7500/10000/15000mm)







MR (mm)	A (mm)	B (mm)
7500	37	153
10000	44.5	198
15000	60.5	228

Model		WDS-3000-P115	WDS-4000-P115	WDS-5000-P115	WDS-7500-P115	WDS-10000-P115	WDS-15000-P115
Measuring range		3000mm	4000mm	5000mm	7500mm	10000mm	15000mm
Output		P, U, I					
Linearity	±0.1% FSO	±3mm	-	-	-	-	-
	±0.15% FSO	-	±6mm	±7.5mm	±11.3mm	±15mm	±22.5mm
Resolution		quasi infinite					
Sensor element		hybrid potentiometer					
Temperature range		-20 ... +80 °C					
Material	housing	aluminium					
	draw wire	coated polamide stainless steel (ø 0.45mm)			coated polamide stainless steel (ø 1.0mm)		
Sensor mounting		slot nut					
Wire mounting		wire clip					
Wire acceleration		appr. 6g					
Wire retraction force (min)		4.5N	4N	4N	8N	8N	8N
Wire extension force (max)		8N	8.5N	9N	24N	21N	25N
Protection class		IP 65 (only if connected)					
Vibration		20g, 20Hz - 2kHz					
Mechanical shock		50g, 20ms					
Electrical connection	P	integrated cable, axial, 1m					
	U, I	flange connector, radial, 8-pin, DIN45326					
Weight		appr. 1.1kg			2.2kg	3.2kg	3.5kg

FSO = Full Scale Output
Specifications for analogue outputs on page 47.

Article description

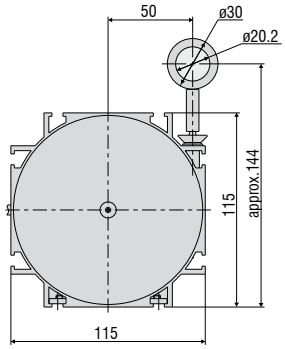
WDS - 3000 - P115 - CA - P

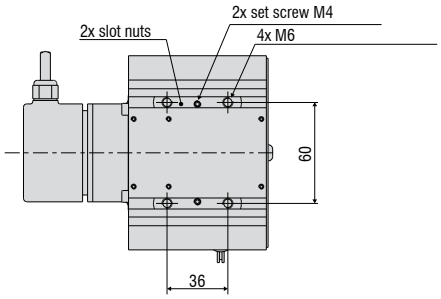
- **P**
  - P: potentiometer — connection CA: P115-3000/4000/5000; connection SA: P115-7500/10000/15000
  - U: voltage — connection SR: P115-3000/4000/5000; connection SA: P115-7500/10000/15000
  - I: current — connection SR: P115-3000/4000/5000; connection SA: P115-7500/10000/15000
- **CA** — Connection:
  SR: radial plug
  SA: axial plug
  CA: integrated cable, axial, 1m
- **P115** — Model P115
- **3000** — Measuring range in mm

wireSENSOR P115 digital

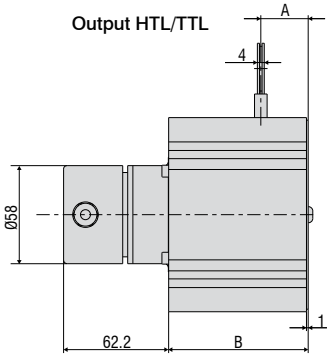
- *Robust aluminium profile housing*
- *Customised versions for OEM*
- *Incremental / absolute encoder*

Model P115

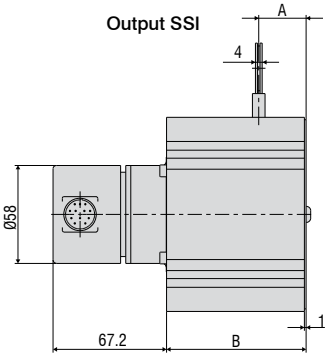




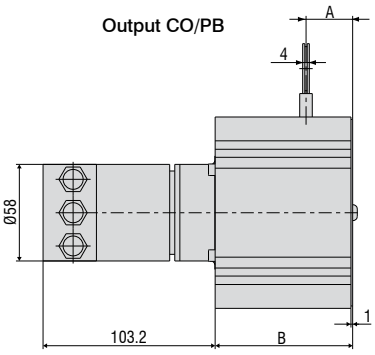
Output HTL/TTL



Output SSI



Output CO/PB



MR (mm)	A (mm)	B (mm)
5000	28	82.5
7500	37	105.5
10000	44.5	148.5
15000	61	180.5

Model		WDS-5000-P115	WDS-7500-P115	WDS-10000-P115	WDS-15000-P115
Measuring range		5000mm	7500mm	10000mm	15000mm
Output		HTL, TTL, SSI, PB, CO			
Linearity	±0.01% FSO	-	-	±1mm	±1.5mm
	±0.02% FSO	±1mm	±1.5mm	-	-
Resolution	HTL, TTL	0.105mm (9.52 pulses/mm)			
	SSI, PB, CO	0.038mm			
Sensor element		incremental/absolute encoder			
Temperature range		-20 ... +80°C			
Material	housing	aluminium			
	draw wire	coated polamide stainless steel (ø 1.0mm)			
Sensor mounting		slot nuts			
Wire mounting		eyelet			
Wire acceleration		5g	6g	3g	3g
Wire retraction force (min)		4N	8N	8N	8N
Wire extension force (max)		16N	24N	21N	25N
Protection class		IP 65 (only if connected)			
Vibration		20g, 20Hz - 2kHz			
Mechanical shock		50g, 10ms			
Electrical connection	HTL, TTL	integrated cable, radial, 1m			
	SSI	flange connector, radial,12-pin			
	PB, CO	bus cover			
Weight		appr. 2kg	appr. 2.5kg	appr. 3.5kg	appr. 4.5kg

FSO = Full Scale Output
Specifications for digital outputs on page 48.

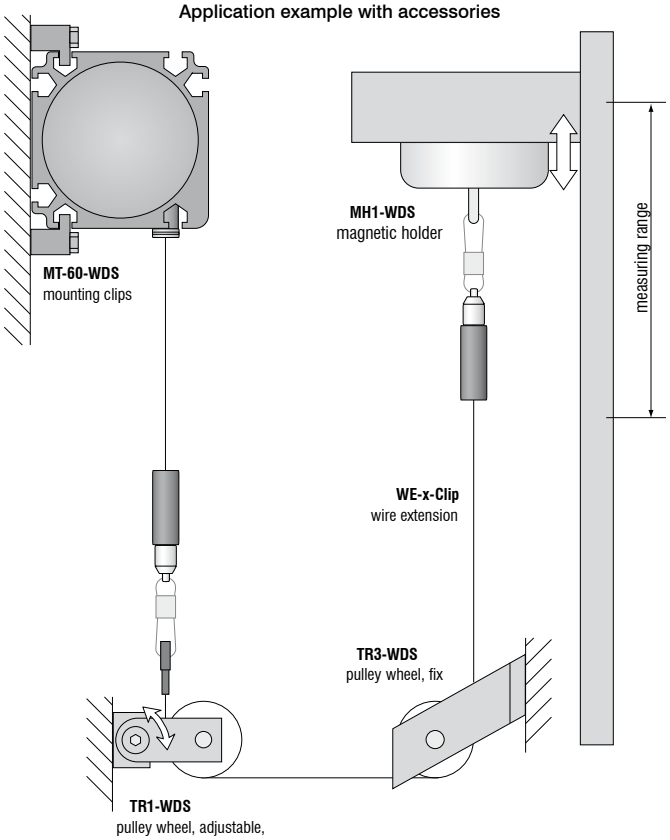
Article description

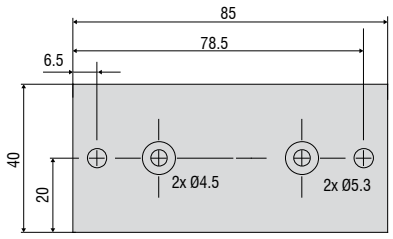
WDS - 5000 - P115 - CR - TTL

- **TTL** – Output option:
  HTL
  TTL
  CO: CANopen
  PB: Profibus DP
  SSI
- **CR** – Connection:
  SR (Output SSI): radial plug
  CR (Output HTL, TTL): integrated cable, radial, 1m
  BH (Output CO, PB): bus cover
- **P115** – Model P115
- **5000** – Measuring range in mm

Accessories:	
WE-xxxx-M4	Wire extension with M4-wire connection, x=length
WE-xxxx-Clip	Wire extension with eyelet, x=length
TR1-WDS	Pulley wheel, adjustable
TR3-WDS	Pulley wheel, fixed
GK1-WDS	Attachment head for M4
MH1-WDS	Magnetic holder for wire mounting
MH2-WDS	Magnetic holder for sensor mounting
MT-60-WDS	Mounting clamp for WDS-P60
FC8	Female connector for WDS, 8-pin
FC8/90	Female connector 90° for WDS
PC 3/8-WDS	Sensor cable, length 3m
PS 2020	(Power Supply 24 V / 2,5 A, Input 100 - 240 VAC, output 24 VDC / 2.5 A, for snap in mounting on DIN 50022 rail)
WDS-MP60	Mounting plate for P60 sensors

Application example with accessories





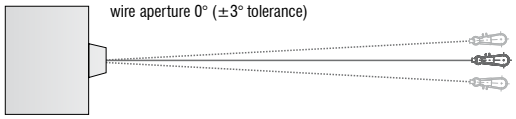
Mounting plate WDS-MP60

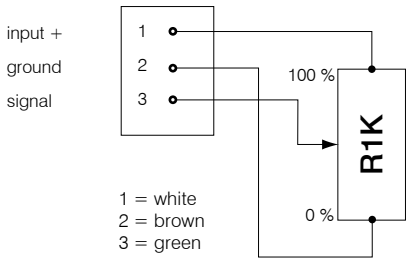
Installation information:

Wire attachment: The free return of the measurement wire is not permissible and it is essential that this is avoided during installation.

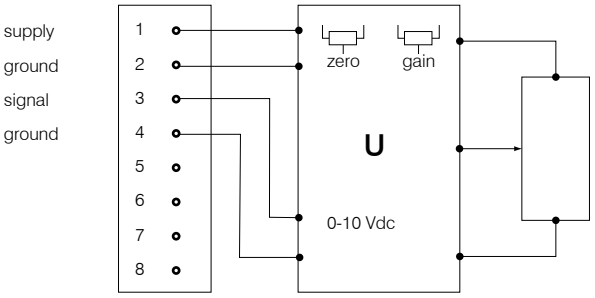
Wire exit angle:

When mounting a draw-wire displacement sensor, a straight wire exit (±3° tolerance) must be taken into account. If this tolerance is exceeded, increased material wear on the wire and at the wire aperture must be expected.

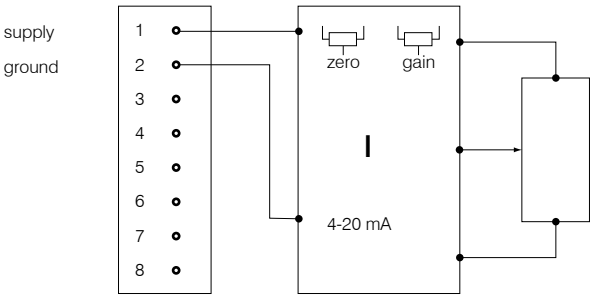




Potentiometric output (P)	
Supply voltage	max. 32VDC at 1kOhm / 1 Wmax
Resistance	1kOhm ±10% (potentiometer
Temperature coefficient	±0.0025% FSO/°C
Sensitivity	depends on measuring range individually shown on test report



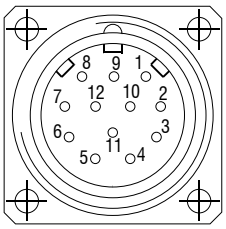
Voltage output (U)	
Supply voltage	14 ... 27VDC (non stabilised)
Current consumption	max. 30mA
Output voltage	0 ... 10VDC
	Option 0 ... 5 / ±5V
Load impedance	>5kOhm
Signal noise	0.5mV$_{eff}$
Temperature coefficient	±0.005% FSO/°C
Electromagnetic compatibility (EMC)	EN 50081-2
	EN 50082-2
Adjustment ranges	
Zero	±20% FSO
Sensitivity	±20%



Current Output (I)	
Supply voltage	14 ... 27VDC (non stabilised)
Current consumption	max. 35mA
Output current	4 ... 20mA
Load	<600Ohm
Signal noise	<1.6µAeff
Temperature coefficient	±0.01% FSO/°C
Electromagnetic compatibility (EMC)	EN 50081-2
	EN 50082-2
Adjustment range	
Zero	±18% FSO
Sensitivity	±15%

Contact description	
1 UB	Encoder power supply connection
2 GND	Encoder ground connection. The voltage drawn to GND is UB.
3 Pulses +	Positive SSI pulse input. Pulse + forms a current loop with pulse -. A current of approx. 7 mA in direction of pulse + input generates a logical 1 in positive logic.
4 Data +	Positive, serial data output of the differential line driver. A High level at the output corresponds to logical 1 in positive logic.
5 ZERO	Zero setting input for setting a zero point at any desired point within the entire resolution. The zeroing process is triggered by a High pulse (pulse duration ≥100 ms) and must take place after the rotating direction selection (UP/ DOWN). For maximum interference immunity, the input must be connected to GND after zeroing.
6 Data -	Negative, serial data output of the differential line driver. A High level at the output corresponds to logical 0 in positive logic.
7 Pulses -	Negative SSI pulse input. Pulse - forms a current loop with pulse +. A current of approx. 7 mA in direction of pulse - input generates a logical 0 in positive logic.
8 / 10 $\overline{\text{DATAVALID}}$ $\overline{\text{DATAVALID}}$ MT	Diagnosis outputs $\overline{\text{DV}}$ and $\overline{\text{DV MT}}$ Jumps in data word, e.g. due to defective LED or photoreceiver, are displayed via the DV output. In addition, the power supply of the multiturn sensor unit is monitored and the $\overline{\text{DV MT}}$ output is set when a specified voltage level is dropped below. Both outputs are Low-active, i.e. are switched through to GND in the case of an error.
9 UP/DOWN	UP/DOWN counting direction input. When not connected, this input is on High. UP/ $\overline{\text{DOWN}}$-High means increasing output data with a clockwise shaft rotating direction when looking at the flange. UP/ $\overline{\text{DOWN}}$-Low means increasing values with a counter-clockwise shaft rotating direction when looking at the flange.
11 / 12	Not in use

Pin assignment		
Pin	Cable colour	Assignment
1	brown	UB
2	black	GND
3	blue	Pulses +
4	beige	Data +
5	green	ZERO
6	yellow	Data -
7	violet	Pulses -
8	brown/yellow	$\overline{\text{DATAVALID}}$
9	pink	UP/ DOWN
10	black/yellow	$\overline{\text{DATAVALID}}$ $\overline{\text{MT}}$
11	-	-
12	-	-

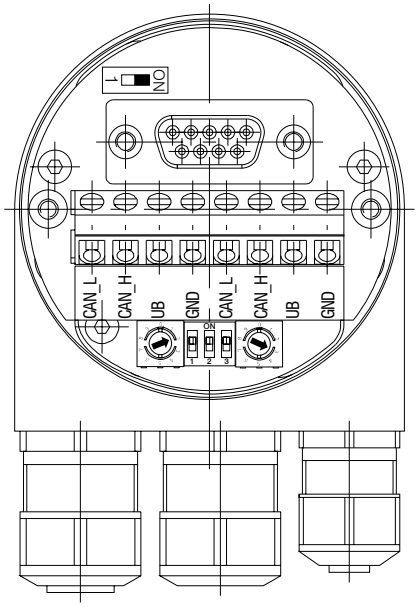


Please use leads twisted in pairs for extension cables.

Inputs	
Control signals UP/DOWN and Zero	
Level High	> 0.7 UB
Level Low	< 0.3 UB
Connection:	UP/DOWN input with 10kohms to UB, zeroing input with 10kohms to GND.
SSI pulse	
Optocoupler inputs for electrical isolation	

Outputs		
SSI data	RS485 driver	
Diagnostic outputs		
Push-pull outputs are short-circuit-proof		
Level High	> UB -3.5V	(with I = -20mA)
Level Low	≤ 0.5V	(with I = 20mA)

CANopen features	
Bus protocol	CANopen
Device profile	CANopen - CiA DSP 406, V 3.0
CANopen Features	Device Class 2, CAN 2.0B
Operating modes (with SDO progr.)	Polling Mode (asynch, via SDO) Cyclic Mode (asynch-cyclic) The encoder cyclically sends the current process actual value without a request by a master. The cycle time can be parameterised for values between 1 and 65535 ms. Synch Mode (synch-cyclic) The encoder sends the current actual process value after receiving a synch telegram sent by a master. The synch counter in the encoder can be parameterised so that the position value is not sent until after a defined number of synch telegrams. Acyclic Mode (synch-acyclic)
Preset value	With the “Preset“ parameter the encoder can be set to a desired actual process value that corresponds to the defined axis position of the system. The offset value between the encoder zero point and the mechanical zero point of the system is saved in the encoder.
Rotating direction	With the operating parameter the rotating direction in which the output code is to increase or decrease can be parameterised. Scaling The steps per revolution and the total revolution can be parameterised.
Scaling	The steps per revolution and the total revolution can be parameterised.
Diagnose	The encoder supports the following error messages: - Position and parameter error - Lithium cell voltage at lower limit (Multiturn)
Default setting	50kbit/s, node number 1



Setting of terminating Resistor for CANopen

ON = Last user

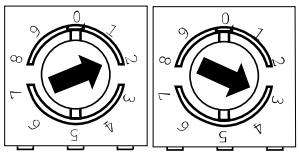
OFF = User X

Setting CANopen baud rate			
Baud rate	Setting Dip Switch		
	1	2	3
10kBit/s	OFF	OFF	OFF
20kBit/s	OFF	OFF	ON
50kBit/s	OFF	ON	OFF
125kBit/s	OFF	ON	ON
250kBit/s	ON	OFF	OFF
500kBit/s	ON	OFF	ON
800kBit/s	ON	ON	OFF
1MBit/s	ON	ON	ON

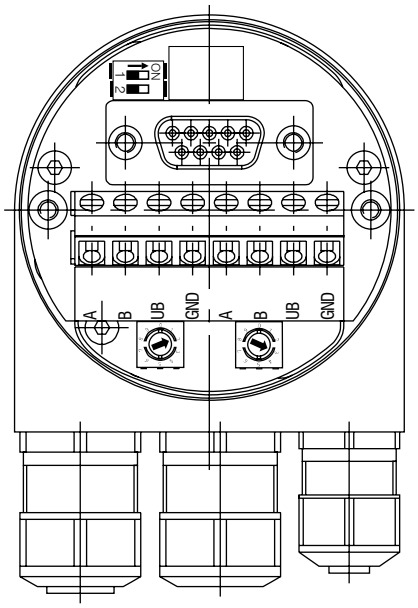
Contact description CANopen	
CAN_L	CAN Bus Signal (dominant Low)
CAN_H	CAN Bus Signal (dominant High)
UB	Supply voltage 10...30VDC
GND	Ground contact for UB
	(Terminals with the same designation are internally interconnected)

Settings of user address for CANopen

Address can be set with rotary switch. Example: User address 23



Profibus-DP features	
Bus protocol	Profibus-DP
Profibus features	Device Class 1 and 2
Data exch. functions	Input: Position value Additional parameterised speed signal (readout of the current rotary speed) Output: Preset value
Preset value	With the “Preset“ parameter the encoder can be set to a desired actual value that corresponds to the defined axis position of the system.
Parameter functions	Rotating direction: With the operating parameter the rotating direction for which the output code is to increase or decrease can be parameterised.
Diagnose	The encoder supports the following error messages: - Position error - Lithium cell voltage at lower limit (Multiturn)
Default setting	User address 00

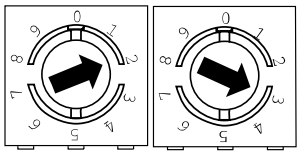


Settings of terminating resistors for Profibus-DP

ON = last user
OFF = user X

Settings of user address for Profibus-DP

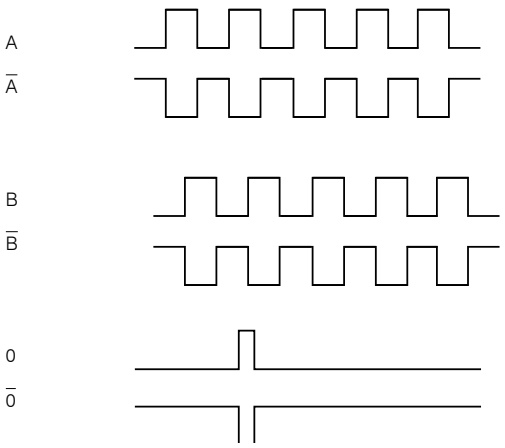
Settings of user address for Profibus-DP



Contact description Profibus-DP
A Negative serial data line
B Positive serial data line
UB Supply voltage 10...30VDC
GND Ground contact for UB

(Terminals with the same designation are internally interconnected)

Signal output



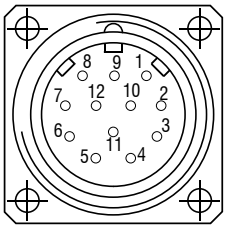
Output TTL	Linedriver (5 VDC)	
Level High	≥ 2.5V	(with I = -20mA)
Level Low	≤ 0.5V	(with I = 20mA)
Load High	≤ 20mA	
Output	A, $\overline{A}$, B, $\overline{B}$, O	

Output HTL	Push-pull (10 ... 30 VDC)	
Level High	≥ UB -3V	(with I = -20mA)
Level Low	≤ 1.5V	(with I = 20mA)
Load High	≤ 40mA	
Output	A, $\overline{A}$, B, $\overline{B}$, O	

Output E	Push-pull (5 VDC)
Level High	UB -2.5V
Level Low	≤ 0.5V
Load High	≤ 50mA
Output	A, B, O

Output E830	Push-pull (8 ... 30 VDC)
Level High	UB -3V
Level Low	≤ 2.5V
Load High	≤ 50mA
Output	A, B, O

Pin assignment TTL, HTL		
Pin	Cable colour	Assignment
Pin 1	pink	B inv.
Pin 2	blue	UB Sense
Pin 3	red	N (zero impulse)
Pin 4	black	N inv. (zero impulse inv.)
Pin 5	brown	A
Pin 6	green	A inv.
Pin 7	-	-
Pin 8	grey	B
Pin 9	-	-
Pin 10	white/green	GND
Pin 11	white	GND Sense
Pin 12	brown/green	UB



Pin 2 and Pin 12 are internally connected as well as Pin 11 and 10.
For cable length >10m twisted pair wires are required.

Connection assignment E, E830		
Pin	Cable colour	Assignment
-	white	0V
-	brown	+UB
-	green	A
-	-	A
-	yellow	B
-	-	B
-	grey	0

High performance sensors made by Micro-Epsilon

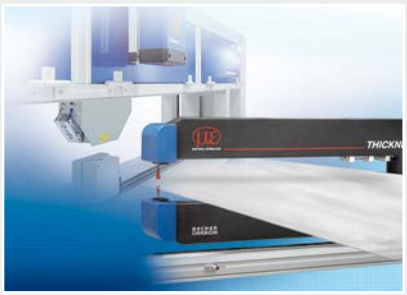
Sensors and systems for displacement and position

Sensors and measurement devices for non-contact temperature measurement

2D/3D profile sensors (laser scanner)

Optical micrometers, fibre optic sensors and fibre optics

Colour recognition sensors, LED analysers and colour inline spectrometer



Measurement and inspection systems

MICRO-EPSILON

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