



Smart Proximity System

PSP-121, PSE-100, DPT-100 or PSD-200

The SPS is a modular non-contact eddy-current system for vibration and position monitoring, featuring a digital transmitter for condition monitoring or direct connexion to PLC, DCS or SCADA systems or an analog driver for machinery protection systems API 670 compliant.

KEY FEATURES

- Linear measurement ranges: 2 and 4 mm
- (+/-) 8mV/ μm or (+/-) 4mV/ μm sensitivity output
- Optional 4–20 mA output with Modbus (DPT-100)
- Temperature range (sensor & cable): -35 to $+180$ °C
- 5m or 10m total length systems
- API 670 5th ed. compliant
- Self-diagnostic with status led



MONITORING SOLUTIONS



Axial thrust position



Shaft & bearing vibration



Phase reference & speed

TYPICAL APPLICATIONS



Hydrogenerators



Gas & steam turbines



Pumps, fan, cooling towers...



DESCRIPTION

MC-monitoring's Smart Proximity System provides precise, non-contact measurements of relative vibration and axial position on rotating shafts, identifying issues such as imbalance, misalignment, looseness, and thrust bearing wear in turbines, pumps, and electric motors. The system includes the Proximity System

Probe (PSP-121), a Proximity System Extension Cable (PSE-100), and a Digital Proximity Transmitter (DPT-100) or a Proximity System Driver (PSD-200).

Both configurations operate on the same eddy-current measurement principle. The system measures the distance between the probe and a conductive target. This non-contact method allows for precise measurements of distance and position, even in harsh industrial environments where factors like dirt, oil, or electromagnetic interference may be present. It offers excellent linearity and temperature compensation, supporting measurement ranges of 2 and 4 mm. The frequency response extends from DC to 10 kHz with the DPT-100 and up to 20 kHz with the PSD-200, enabling accurate detection of a broad spectrum of vibrations and positional changes. It can also be used as a phase reference sensor, detecting the presence of a once-per-turn target mounted on the shaft. A pulse is generated each time the target crosses the sensor tip, allowing the system to provide rotational speed and serve as a phase reference for synchronous measurements that require correlation with the rotor's position.

The interchangeable components ensure flexibility and ease of maintenance, supporting system lengths of 5 or 10 meters for various installation needs.

PROXIMITY SYSTEM PROBE PSP-121 AND EXTENSION CABLE PSE-100

The PSP-121 proximity system probe is designed for standard mounting applications. It consists of a thermally compensated coil housed in a superior corrosion-resistant AISI316L probe case, sealed with a high-performance thermoplastic PPS cap. The PSE-100 proximity system extension cable features a durable coaxial cable with an FEP sheath, offering outstanding chemical resistance, and is terminated with miniature self-locking coaxial connectors.

Both the probe and the extension cable are designed for long life cycles and are suitable for use in harsh environments. They are interchangeable, easily replaceable, and available in various configurations to meet diverse installation requirements.

DIGITAL PROXIMITY TRANSMITTER DPT-100 AND PROXIMITY SYSTEM DRIVER PSD-200

The Digital Proximity Transmitter DPT-100 is recommended for condition monitoring or direct connexion to PLC, DCS or SCADA systems and the Proximity System Driver PSD-200 is intended for use for machinery protection systems API 670 compliant. They are sophisticated signal conditioners designed to work seamlessly with the PSP-121 and PSE-100. They provide a high frequency signal to the probe to create an electromagnetic field at the probe tip that induces eddy currents in the metallic target. Movements of the target generate changes in the magnetic field that are proportional to the distance between the probe and the target. The DPT-100 or the PSD-200 then processes these variations, converting them into a signal that accurately reflects the distance to the target. They provide a selectable dynamic signal of (+/-) 8 mV/ μ m for 2mm measurement range or (+/-) 4 mV/ μ m for 4mm measurement range for commissioning or for raw signal analysis.

The DPT-100 also provides a 4 to 20 mA processed signal in option. Different thrust and radial position or vibration ranges are available. A built-in Modbus interface provides time-based calculated values such as pk-pk, min, max, mean (gap). Several target materials and different sampling rates are selectable when ordering to accommodate all application needs.

The PSD-200 is designed as analog electronics Type A according to IEC 61508 and Category 2 according to EN ISO 13849. Certifications are ongoing to achieve SIL 2 for safety-related applications, as well as Ex ia and Ex ec approval for use in potentially explosive atmospheres.

GLOBAL SPECIFICATIONS

Conditioners	DPT-100	PSD-200
Power supply	+20V _{DC} to +28V _{DC}	-20V _{DC} to -28V _{DC}
Current consumption	30mA typ. (4-20mA output not included)	10mA typ.
Linear output range	+2V to +18V	-2V to -18V
Output impedance		
• Voltage output	100Ω	100Ω
• Current loop output	>1MΩ	—
Output protection	Short-circuit	Short-circuit
Output voltage swing	0V to 20V	-1.5V to -18.5V
Frequency response	0 to 10 kHz (-3dB)	0 to 20 kHz (-3dB)
4 to 20 mA processed output		
• Vibration (pk-pk)	full, 1/2, 1/4, 1/8 range	—
• Position (average)	full range	—
Recommended processing window size per machine speed (4-20mA & Modbus)		
• Above 200 rpm	0.6s	—
• From 50 to 200 rpm	1.2s	—
• Below 50 rpm	2.4s	—
Relay output (closed when Sensor is OK)		
• Type	—	Normally-open solid state relay
• Switching capacity	—	60V/100mA
• Isolation	—	1000V
RAW output		
• Range	—	+0.5V to +4.5V (output range /-4)
• Output impedance	—	>5kΩ
Target material		
• By default	AISI 4140	AISI 4140
• Other materials	see ordering information	—

System length

• 5m	PSP-121 with 1m integral cable and PSE of 4m PSP-121 with 5m integral cable without PSE
• 10m	PSP-121 with 1m integral cable and PSE of 9m PSP-121 with 10m integral cable without PSE
Interchangeability of components	All components are interchangeable
Interchangeability tolerance	<5%

RANGE SPECIFIC

Nominal range	2mm		4mm	
Sensitivity	(+/-) 8mV/ μ m		(+/-) 4mV/ μ m	
Linear measuring range	0.2 to 2.2mm		0.2 to 4.2mm	
System length	5m	10m	5m	10m
Deviation from Straight Line (DSL)				
• All systems at 25 °C $\pm$ 5 °C	25 μ m	25 μ m	50 μ m	50 μ m
• All systems at -35 °C to 85 °C	150 μ m	200 μ m	300 μ m	400 μ m
• PSP and PSE at -35°C to 180°C and DPT/PSD at -35°C to 85°C	200 μ m	300 μ m	400 μ m	600 μ m
Sensitivity error or Incremental Scale Factor (ISF)				
• All systems at 25 °C $\pm$ 5 °C	$\pm$ 5%	$\pm$ 5%	$\pm$ 10%	$\pm$ 10%
• All systems at -35 °C to 85 °C	$\pm$ 7%	$\pm$ 10%	$\pm$ 12%	$\pm$ 15%
• PSP and PSE at -35°C to 180°C and DPT/PSD at -35°C to 85°C	$\pm$ 10%	$\pm$ 15%	$\pm$ 15%	$\pm$ 20%

SELF-DIAGNOSTIC

Detection

• DPT-100	Sensor cable open or broken
• PSD-200	Sensor cable open or short circuit Power supply undervoltage Internal failure

Means of reporting

• DPT-100	Output current fixed to 2.0mA Output voltage fixed to +1V Status LED blinking
• PSD-200	Output voltage fixed to -1V (RAW output not affected) Status LED off Relay sensor OK open

MODBUS RTU - ONLY DPT-100

Communication protocol

• Type	RS-485
• Baudrate	115200 bauds
• Parity	none
• Stop bits	1
• Flow control	none
• Default slave ID	1

Input register table

• Address 0	Min gap in μm
• Address 1	Max gap in μm
• Address 2	Mean gap in μm
• Address 3	Pk-pk in μm

Holding register table

• Address 0	Slave ID
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ENVIRONMENTAL

Temperature

• PSP-121 & PSE-100	-35°C to 180°C operating and 200°C short term survival
• DPT-100 & PSD-200	-35°C to 85°C

Humidity

• PSP-121 & PSE-100	0 to 100%
• DPT-100 & PSD-200	0 to 95%, non-condensing

Pressure between probe tip and body	6 bars differential without leakage
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Protection rating

• PSP-121 & PSE-100	IP68
• DPT-100 & PSD-200	IP40

COMPLIANCE AND CERTIFICATIONS

EU declaration of conformity	CE marking
Electromagnetic compatibility EMC	Directive 2014/30/EU EN 61636-1
Environmental management	RoHS directive (2011/65/EU)
Hazardous areas approvals	ATEX / IECEx : Ex ia and Ex ec certification pending
Functional safety	SIL 2 certification pending

PHYSICAL CHARACTERISTICS

DPT-100 & PSD-200

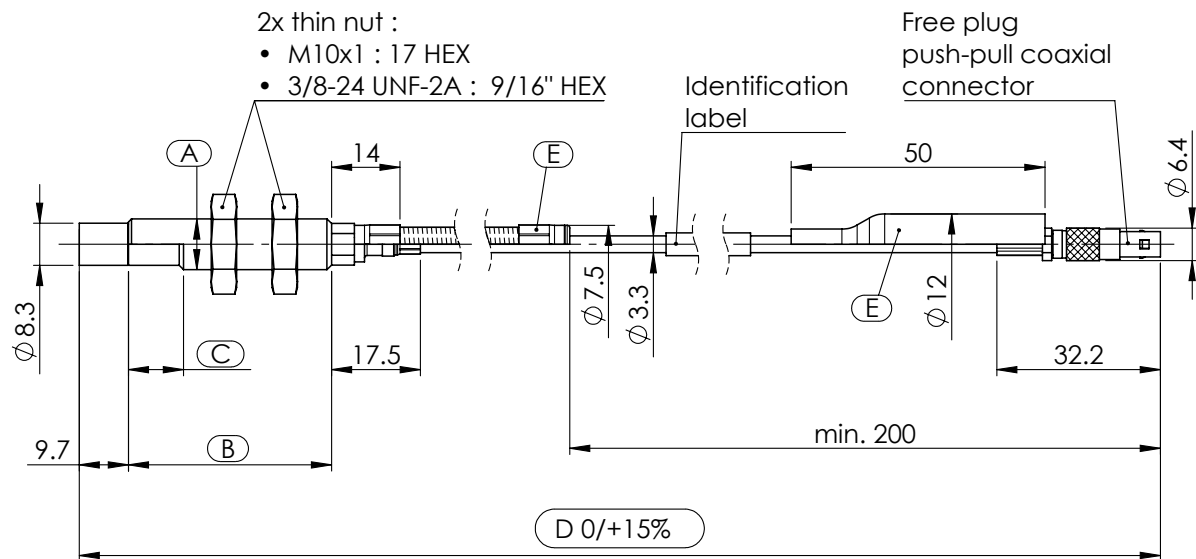
Housing material	Aluminum powder coated
Coaxial connector	Elbow socket miniature coaxial LEMO connector Type 00
I/O connectors type	FMC 1,5/4-ST-3,81 BK
Wires section range	0.2 to 1.5mm ²

PSE-100 & PSP-121

Coaxial connector	Straight Plug and Free Socket miniature coaxial LEMO connector Type 00 with Push-Pull with latching system
Coaxial cable	75 Ω triaxial cable with FEP outer sheath, $\varnothing$ 3,3 mm
PSP-121 tip	PPS polyphenylene sulfide high performance thermoplastic tip
PSP-121 housing	AISI 316L stainless steel body
Optional cable protection	Flexible stainless steel armor with FEP sheath
Optional connector insulating sleeve	Push-fit silicone sleeve resistant to chemicals, fuels and solvents
Maximum tensile load	
• Between probe and integral cable	330 N without damage
• Between cable and connector	270 N without damage

PSP-121 STANDARD MOUNT ORDERING INFORMATION

Part type PSP-121 Standard mount
 Ordering Number 051.121.011 – **AXX.BXXX.CXXX.DXXX.EXX.FXX**



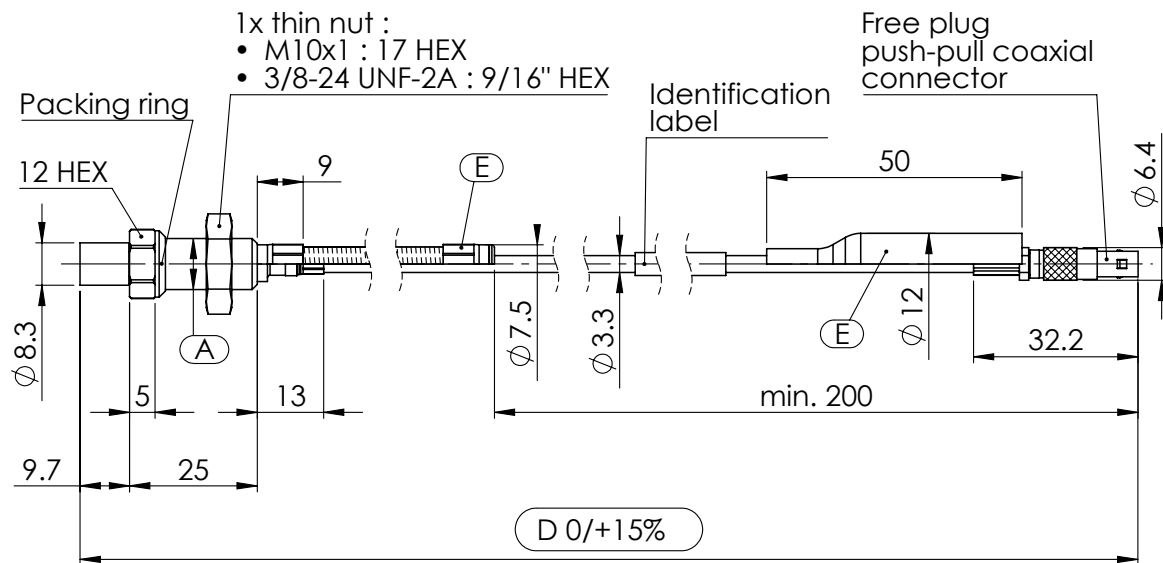
A	Case thread	01	M10x1
		02	3/8-24 UNF-2A
B	Thread length	020 to 250	Requested length in mm (per 10mm) Preferred options*: 070, 100 Ex. 070 = 70 mm case length
C	Unthreaded length	000 to 230	Requested length in mm (per 10mm) Preferred options*: 000 Ex. 040 = 40 mm unthreaded length
D	Sensor total length	010	1m
		050	5m
		100	10m
E	Cable and connector protections	00	Standard cable
		01	Standard cable with insulating sleeve on connector
		02	Armored cable
		03	Armored cable with insulating sleeve on connector
F	Certification	00	CE

* Preferred options offer the best lead times.

Example: 051.121.011 – **A01.B100.C050.D010.E03.F00**: PSP-121 – M10x1 Case thread, 100 mm Thread length, 50 mm Unthreaded length, 1 m total length, Armored cable with insulating sleeve on connector, CE certified.

PSP-121 REVERSE MOUNT ORDERING INFORMATION

Part type PSP-121 Reverse mount
 Ordering Number 051.121.111 – **AXX.DXXX.EXX.FXX**



A	Case thread	01	M10x1
		02	3/8-24 UNF-2A
D	Sensor total length	010	1m
		050	5m
		100	10m
E	Cable and connector protections	00	Standard cable
		01	Standard cable with insulating sleeve on connector
		02	Armored cable
		03	Armored cable with insulating sleeve on connector
F	Certification	00	CE

Example: 051.121.111 – **A01.D010.E03.F00**: PSP-121 – M10x1 Case thread, 1 m total length, Armored cable with insulating sleeve on connector, CE certified.

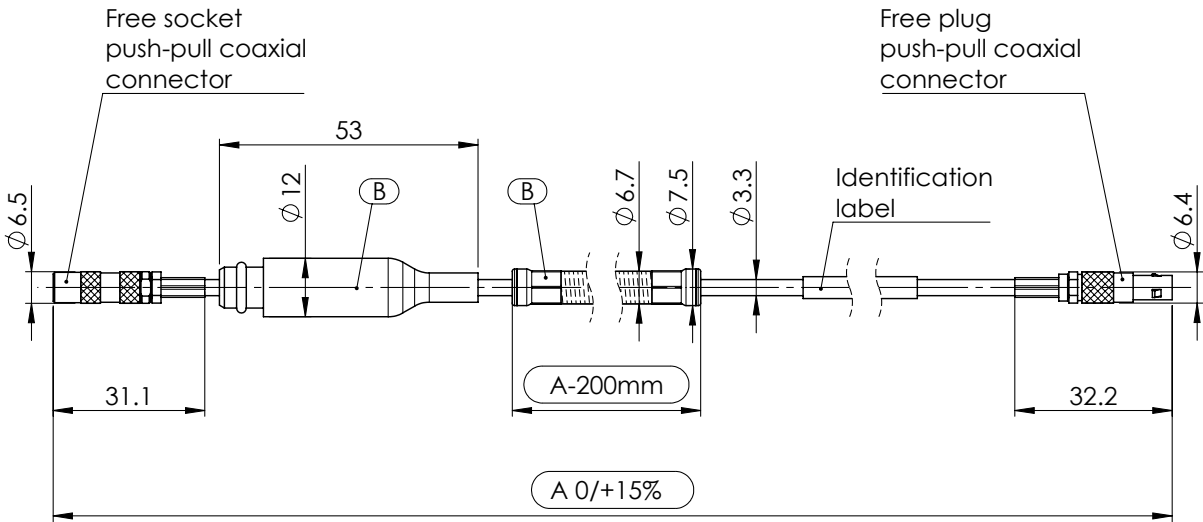
PSE-100 ORDERING INFORMATION

Part type

PSE-100

Ordering Number

056.100.011 – AXXX.BXX.CXX

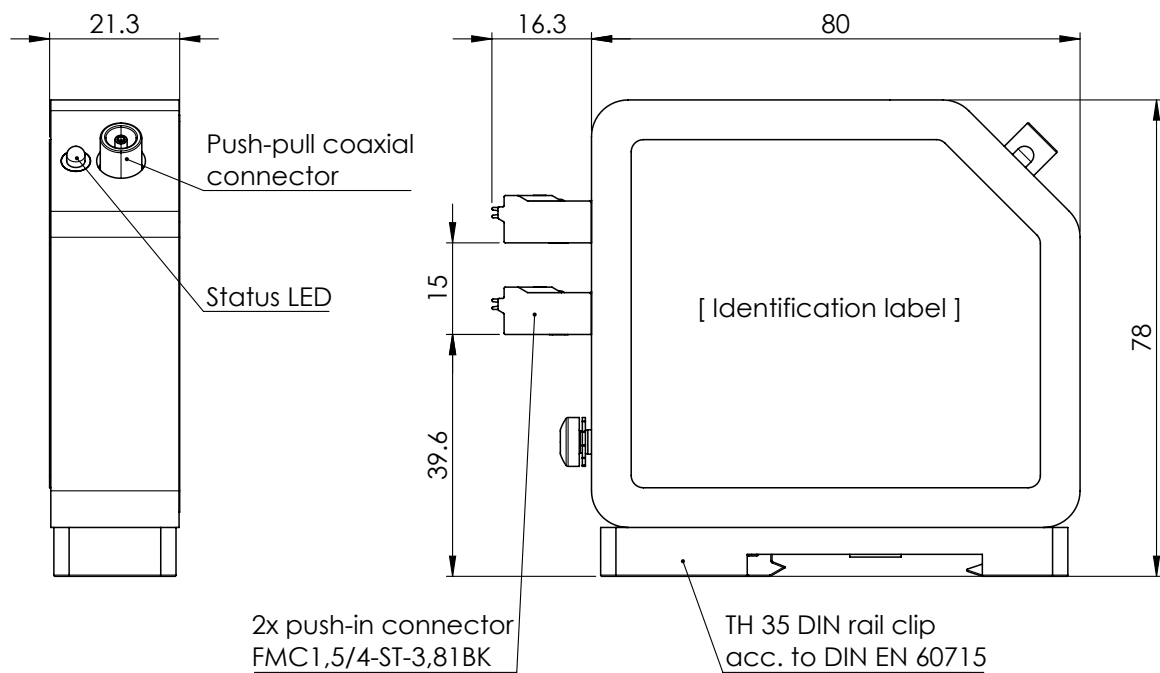


A	Cable length	040	4m
		090	9m
B	Cable and connector protections	00	Standard cable
		01	Standard cable with insulating sleeve on connector
		02	Armored cable
		03	Armored cable with insulating sleeve on connector
C	Certification	00	CE

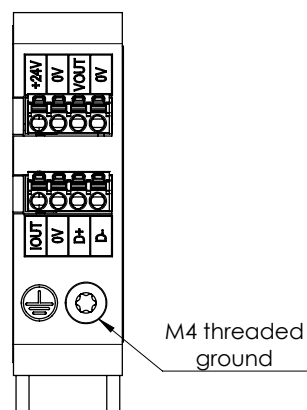
Example: 056.100.011 – A090.B03.C00: PSE-100 — 9 m Cable length, Armored cable with insulating sleeve on connector, CE certified.

DPT-100 ORDERING INFORMATION

Part type	DPT-100
Ordering Number	057.100.011 - AXX.BXX.CXX.DXX.EXX.FXX



DPT-100 PINOUT



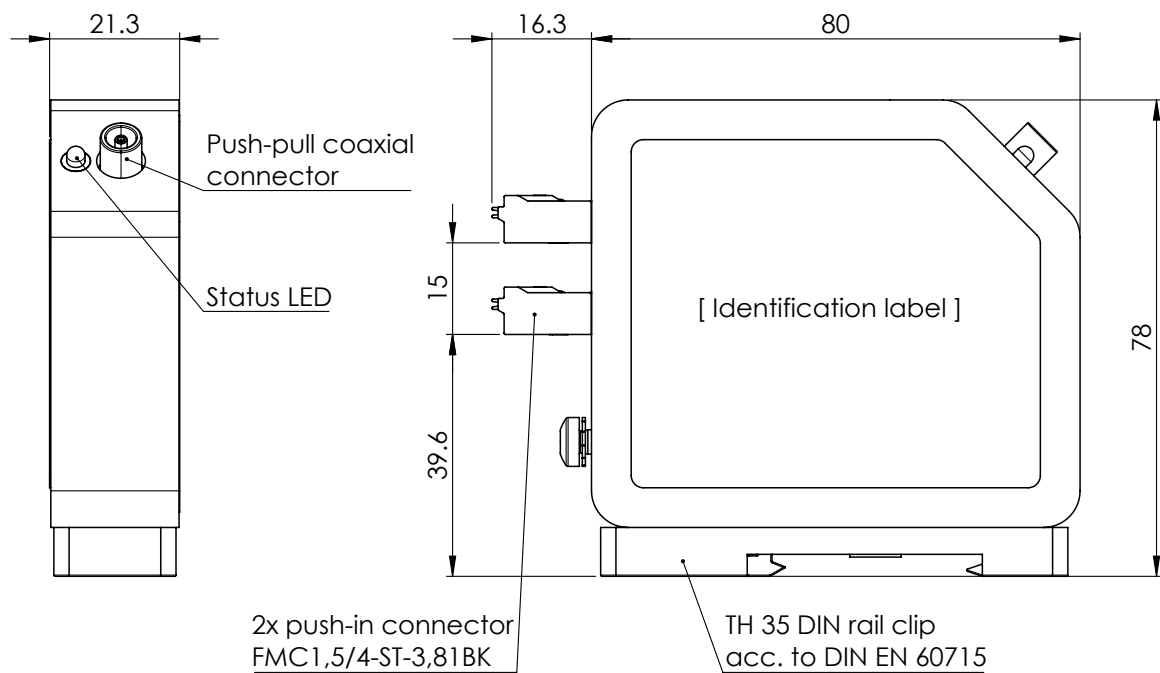
A	Measuring range	02	2mm / +8mV/μm
		04	4mm / +4mV/μm
B	4–20 mA processed output	00	None
		10	Position full range 0.2 to 2.2mm (2mm range) / 0.2 to 4.2mm (4mm range)
		20	Vibration full range 0–2000 μm (2mm) / 0–4000 μm (4mm)
		21	Vibration half range 0–1000 μm (2mm) / 0–2000 μm (4mm)
		22	Vibration quarter range 0–500 μm (2mm) / 0–1000 μm (4mm)
		23	Vibration 1/8 range 0–250 μm (2mm) / 0–500 μm (4mm)
C	System length	05	5m
		10	10m
D	Target materials ¹	01	DIN 1.7225 (AISI 4140, 42CrMo4, VCL140) - default
		02	DIN 1.0037 (ST37-2K)
		03	DIN 1.4313 (CA6NM, X3CrNiMo13-4)
		04	DIN 1.1181 (AISI 1034, C35E)
		05	DIN 1.5752 (AISI 3415, 15NiCr13)
		06	DIN 1.4317 (GX4CrNi13-4)
		07	DIN 1.6511 (36CrNiMo4)
E	Window size	00	None (4-20mA & Modbus disabled)
		01	0.6s
		02	1.2s
		03	2.4s
F	Certification	00	CE

Exemple : 057.100.011 - **A04.B23.C10.D02.E02.F00**: DPT-100 range 4mm (sensitivity 4mV/μm), 4-20mA output corresponding to 0-500μm mean updated every 1.2s, 10m Sytem length, DIN 1.0037 (ST37-2K) target materials, CE certified.

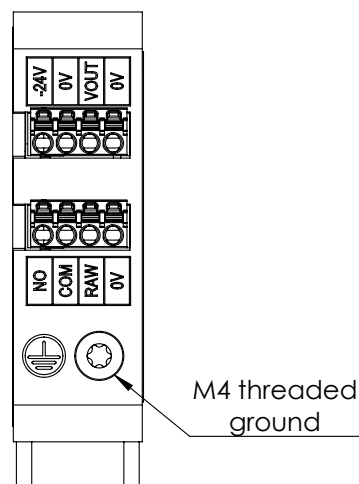
¹For other target materials, please contact MC-monitoring for evaluation. Additional engineering costs may apply.

PSD-200 ORDERING INFORMATION

Part type	PSD-200
Ordering Number	057.200.011 - AXX.CXX.FXX



PSD-200 PINOUT



A	Measuring range	02	2mm / -8mV/μm
		04	4mm / -4mV/μm
C	System length	05	5m
		10	10m
F	Certification	00	CE

Exemple : 057.200.011 - **A04.C10.F00**: PSD-200 range 4mm (sensitivity 4mV/μm), 10m Sytem length, CE certified.

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Quality certification



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