Smart Proximity System

PSP-121, PSE-100, DPT-100

The SPS is a smart non-contact eddy-current system with Modbus interface, 4–20 mA output, high-frequency response, wide temperature range, and modular design for vibration and position monitoring.

KEY FEATURES

- Linear measurement ranges: 2 and 4 mm
- Frequency range: DC to 10 kHz (-3 dB)
- Temperature range (sensor & cable): −35 to +180 °C
- 4-20 mA processed output option
- Built-in digital Modbus interface
- Robust and sealed design
- 5m or 10m total length systems

MADE IN SWITZERLAND

MONITORING SOLUTIONS

- Axial thrust position
- Shaft & bearing vibration
- Phase reference & speed

TYPICAL APPLICATIONS

- Hydrogenerators
- Pumps, fan, cooling towers...

CE

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).

It is an eddy current measuring system allowing measurement 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. With a frequency range from DC to 10 kHz (-3 dB), it effectively captures 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

The Digital Proximity Transmitter DPT-100 is a sophisticated signal conditioner designed to work seamlessly with the PSP-121 and PSE-100. It provides a high frequency signal to the probe to create an electromagnetic field at the probe tip that induce 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 then processes these variations, converting them into a signal that accurately reflects the distance to the target. The DPT-100 provides a selectable dynamic signal of 8mV/µm for 2mm measurement range or 4mV/µm for 4mm measurement range for commissioning or for raw signal analysis.

It also provides a 4 to 20 mA processed signal in option as a power looped device for direct connection to PLCs, DCSs or SCADA systems. Different thrust and radial position or vibration ranges are available. A built-in Modbus interface provides time-based calculated values such as pk-pk, pk, mean (gap). 5m or 10m system length, several target materials and different sampling rates are selectable when ordering to accommodate all application needs.

GLOBAL SPECIFICATIONS

COMMON

Power supply	+20VDC to +28VDC
Current consumption	30mA typ. (4-20mA output non included)
Linear output range	+2V to +18V
Output impedance	
Voltage output	100Ω
Current loop output	>1MΩ
Output protection	Short-circuit
Output voltage swing	0V to 20V with 10kOhm load
Frequency response	0 to 10 kHz (-3dB)
4 to 20 mA processed output	Vibration (pk-pk): full, 1/2, 1/4, 1/8 of measuring range Position (average): full range
Processing window size	Minimum recommended value: 0.6s for machine rotating speed > 200rpm 1.2s for machine rotating speed > 100rpm 2.4s for machine rotating speed > 50rpm
Target material	AISI 4140 (DIN 1.7225, VCL140) by default For other target 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/µm	4mV/µm
Linear measuring range	0.2 (0/+0.1mm) to 2.2mm	0.2 (0/+0.1mm) to 4.2mm
Sensitivity error (% of nominal sensitivity)		
All system at 25°C ±5°C	±5%	±10%
All system at -35°C to 85°C	±10%	±15%
PSP and PSE at -35°C to 180°C and DPT at -35°C to 85°C	±15%	±20%
Deviation from straight line (DSL)		
All system at 25°C ±5°C	±25µm	±50µm
All system at -35°C to 85°C	±200µm	±400µm
PSP and PSE at -35°C to 180°C and DPT at -35°C to 85°C	±300µm	±600µm

SELF-DIAGNOSTIC

Detection	Sensor cable open or broken
Means of reporting	Output current fixed to 2.0mA
	Status LED blinking

MODBUS RTU

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

ENVIRONMENTAL

Temperature	
PSP-121	-35°C to 180°C operating
	220°C survival short therm
PSE-100	-35°C to 200°C
DPT-100	-35°C to 85°C
Humidity	
PSP-121 and PSE-100	0 to 100%, non-condensing
DPT-100	0 to 95%, non-condensing
Pressure between probe tip and body	6 bars differential without leakage
Protection rating	
PSP-121 / PSE-100	IP68
DPT-100	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)

PHYSICAL CHARACTERISTICS

DPT-100

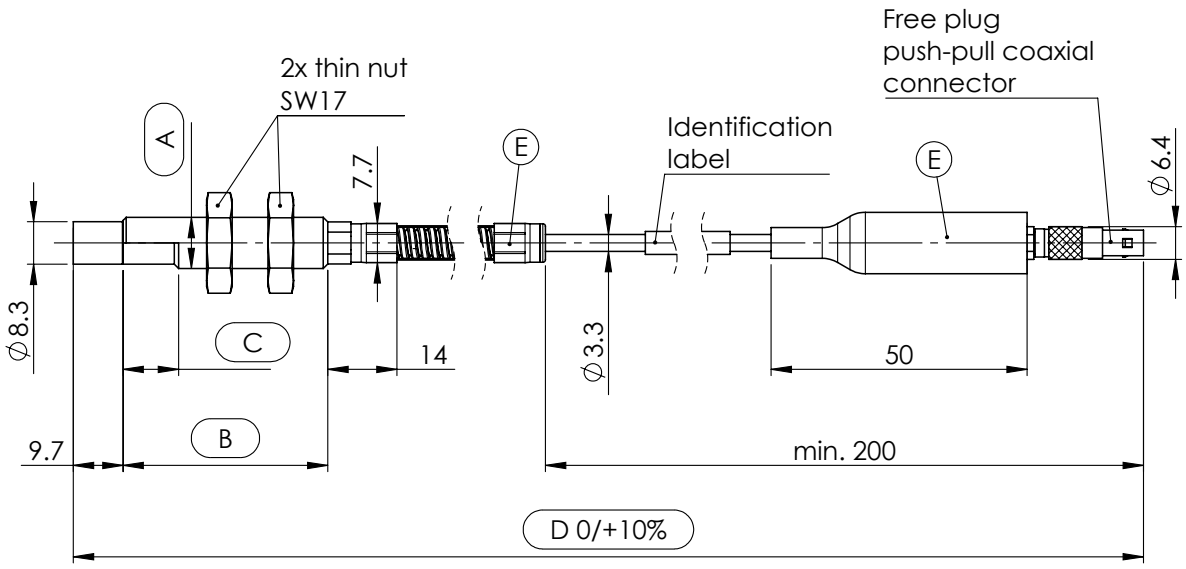
Housing material	Aluminum powder coated
Coaxial connector	Elbow socket miniature coaxial LEMO connector Type 00
I/O connectors type	FMC 1,5/4-ST-3,81 BK
Wires section range	0.2 to 1.5mm^2

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, Ø 3,3 mm
PSP-121 tip	PPS polyphenylene sulfide high performance thermoplastic tip
PSP-121 housing	AISI 316L stainless steel body, grounded via the cable shield
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 tensil load	
Between probe and integral cable	330 N without damage
Between cable and connector	270 N without damage

PSP-121 ORDERING INFORMATION

Part type	PSP-121
Ordering Number	051.121.011 – A**XX**.B**XXX**.C**XXX**.D**XXX**.E**XX**.F**XX**



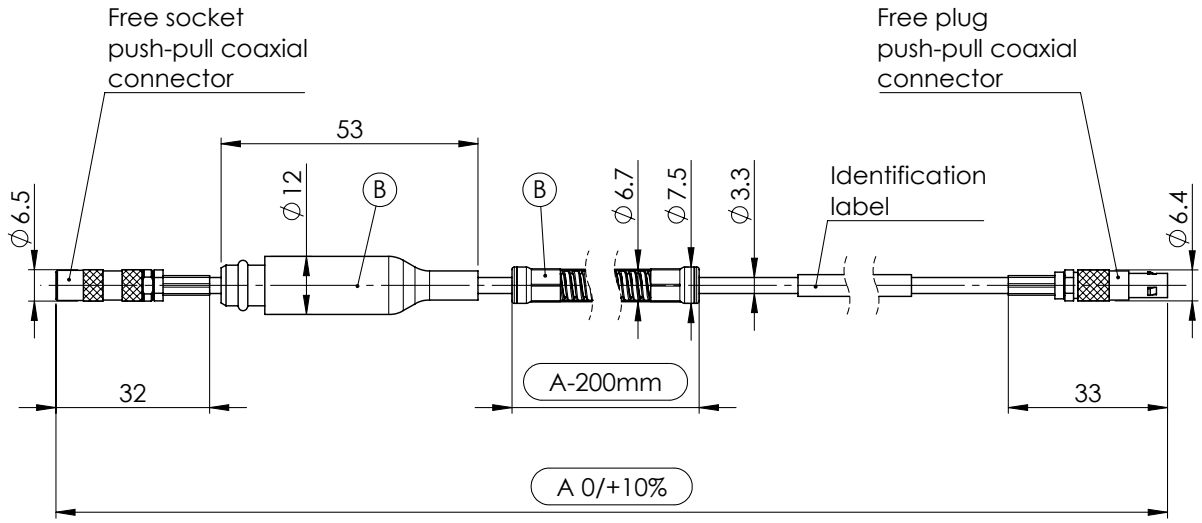
A	Case thread	**01** **02**	M10x1 3/8-24 UNF-2A
B	Thread length	**020 to 250**	Requested length in mm (per 10mm) Preferred options*: 070, 100 Ex. 070 = 70 mm case length
C	Unthreaded length	**000 to 230**	Requested length in mm (per 10mm) Preferred options*: 000 Ex. 040 = 40 mm unthreaded length
D	Sensor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

* Preferred options offer the best lead times.

Example: 051.121.011 – A**01**.B**100**.C**050**.D**010**.E**03**.F**00**: 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.

PSE-100 ORDERING INFORMATION

Part type	PSE-100
Ordering Number	056.100.011 – A**XXX**.B**XX**.C**XX**

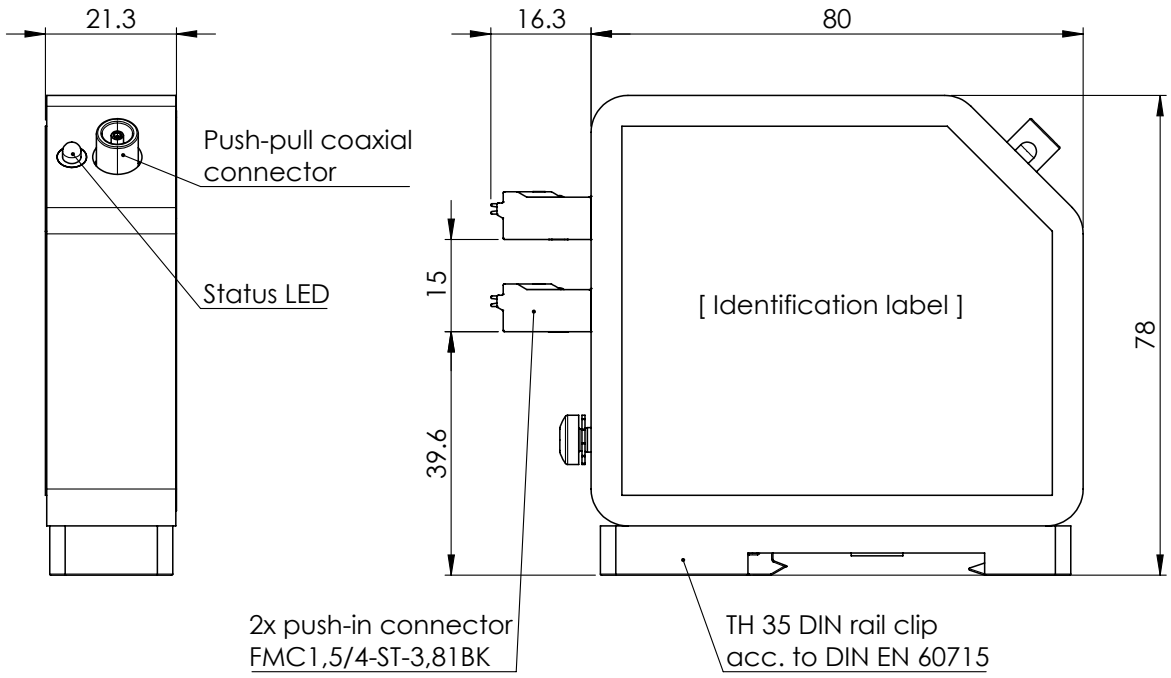


A	Cable length	**040**	4m
		090	9m
B	Cable and connector protections	**00**	Standard cable
		01	Standard cable with insulating sleeve on connector
		02	Armored cable
		03	Armored cable with insulating sleeve on connector
C	Certification	**00**	CE

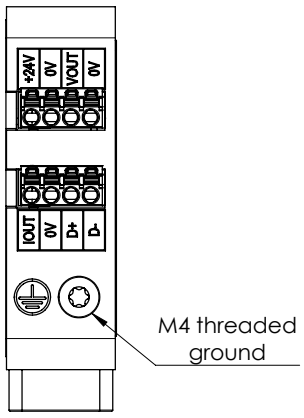
Example: 056.100.011 – A**090**.B**03**.C**00**: PSE-100 — 9 m Cable length, Armored cable with insulating sleeve on connector, CE certified.

DPT-100 ORDERING INFORMATION

Part type	DPT-100
Ordering Number	057.100.011 - A**XX**.B**XX**.C**XX**.D**XX**.E**XX**.F**XX**



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	**01**	DIN 1.7225 (AISI 4140, 42CrMo4, VCL140)
		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)
		99	On request
E	Window size	**00**	N/A
		01	0.6s
		02	1.2s (default)
		03	2.4s
F	Certification	**00**	CE

Exemple : 057.100.011 - A**04**.B**23**.C**10**.D**02**.E**02**.F**00**: 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.

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Quality certification

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