

1. General data

CPS 1 sensor



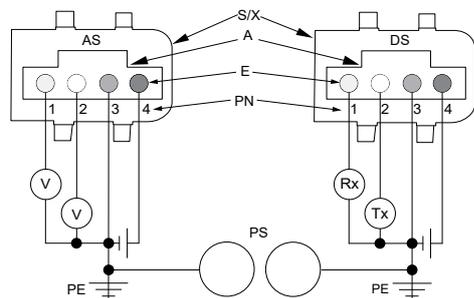
CPS 1 (Combi Pressure Standard 1st generation) sensor is a combined dry-running, pressure and temperature sensor (three-in-one) from Grundfos Direct Sensors™.

The CPS 1 sensor is fully compatible with wet and aqueous media. The sensor is based on MEMS sensing technology in combination with the corrosion-resistant Silicoat® coating technology on the sensor chip.

2. Dry-running detection functionality

Dry-running detection algorithms run on-sensor using the high speed, high resolution pressure signatures. Dry-running evaluations are done every 3-second. In case of a dry-running situation, the temperature analog output signal reaches high level over > 4.1 VDC. The CPS 1 sensor is intended for use in CR pump systems, installed in the top part of the CR pump using the compatible sensor fitting or CPS fitting with venting functionality.

3. Electrical connection



TM078624

S/X: Snap-on cover
A: Standard cover
E: Electrical connector pins
PN: Pin numbers

PN	Description Analogue signal	Description Digital signal	Colour
1	Temperature signal, dry-running	Rx	Yellow
2	Pressure signal	Tx	White
3	GND, 0 V PELV	GND, 0 V PELV	Green
4	Voltage supply (5 VDC)	Power supply (5 VDC)	Brown

4. Compliance

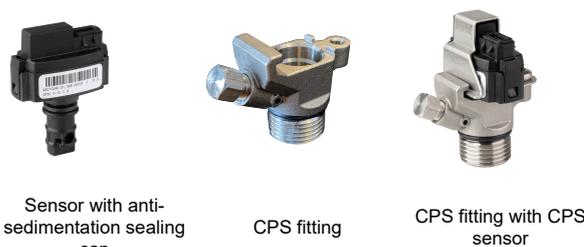
The EDPM versions are compliant with the requirements of the evaluation criteria according to German drinking water regulations (UBA).

Markings	Certificates
CE	C, CSA, US

5. Power supply requirements

- 5 VDC PELV
- Minimum output current: 25 mA
- The sensor must be separated from hazardous live circuitry by double or reinforced insulation.
- Grounding of sensor supply is required.

6. Installation options



7. Directives

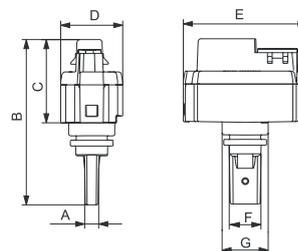
Grundfos Direct Sensors™ are in conformity with all applicable EU product legislation:

- EMC Directive (2014/30/EU)
Standards used: EN 61326-1:2013 and EN 61326-2-3:2013
- RoHS Directive (2011/65/EU) and (2015/863/EU)
Standard used: EN IEC 63000:2018.

Grundfos Direct Sensors™ are not in the scope of the following directives:

- Pressure Equipment Directive (2014/68/EU) according to article 4, paragraph 3
- Low Voltage Directive (2014/35/EU) because the supply voltage is below 75 VDC.

8. Dimensions



TM054669

Dimensions of a CPS 1 sensor

	A	B	C	D	E	F	G
[mm]	4.5	53.7	27	20	39.9	10.2	14.8
[inch]	0.18	2.11	1.06	0.79	1.57	0.40	0.58

9. Technical data

Dry-running	
Dry-running states (digital output mode)	0 (wet) 1 (inconclusive) 2 (dry)
Dry-running response time	3 seconds
Dry-running output signal types	1. Digital mode (see GDS protocol, sensor auto-detects digital or analog output mode at start-up) 2. Analog output with temperature voltage output signal
Pressure	
Measuring range ($P_{min} - P_{max}$)	0-10 bar (0-145 psig)
Accuracy ($\pm 1 \sigma$, in water 0-100°C (32-212°F))	± 5 mbar
Offset drift ($\pm 1 \sigma$)	1.5 mbar/year
Offset	0.08 mbar/°C
Response time (63.2 %)	< 1 s
Resolution	0.01 mbar (0.000145 psig)
Temperature	
Measuring range ($T_{min} - T_{max}$)	0-120 °C (32-248 °F)
Accuracy ($\pm 1 \sigma$, 15-90 °C (59-194 °F))	± 0.5 K
Accuracy ($\pm 1 \sigma$, 0-120 °C (32-248 °F))	± 1 K
Response time for sensor electronics	< 250 ms
Resolution	0.008 K
Differential temperature	
Accuracy 15-90 °C (59-194 °F)	0.3 K
Accuracy 0-120 °C (32-248 °F)	0.5 K
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	0 to +120 °C (+32 to 248 °F)
Liquid temperature, peak	-10 to +120 °C (+14 to +248 °F), non-freezing
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Humidity, relative	0-95 %, non-condensing
Maximum system pressure	24 bar (348 psi)
Burst pressure	30 bar (435 psi)
Electrical data	
Power supply	5 VDC, PELV (grounding of sensor supply required) 0.25 - 4.2 VDC (0.5 V at 0 bar, 3.5 V at 10 bar)
Analog output signals	(0.25 V at 0 °C, 3.75 V at 120 °C) Temperature output voltage > 4.1 V at dry-running
Power consumption	Approx. 75 mW
Load impedance	> 47 kΩ
Maximum cable length	3 m (9.10 ft)

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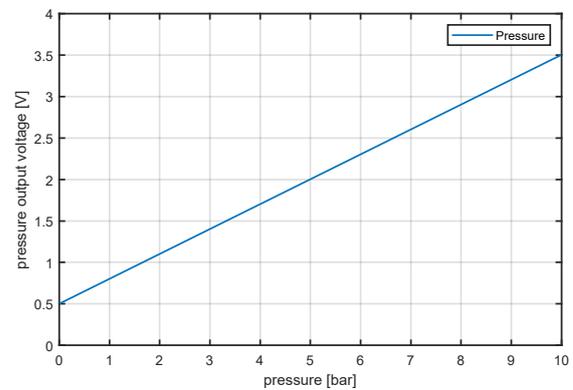
ECM: 1399078

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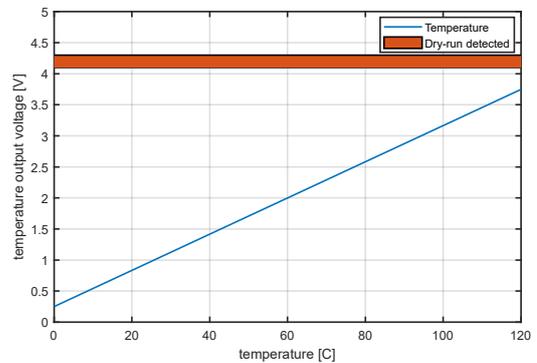
Materials

Sensing element	Silicon-based MEMS
Sealing	EPDM O-rings, FKM O-rings or EPDM sealing sleeve with FKM O-rings
Housing	Composite, PPS
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM fitting ISO 7/1 - R1/2" and NPT 1/2", EN 1.4408 (AISI 316)
Environmental standards	
Enclosure class	IP54
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10G, 4 h
Electromagnetic compatibility	EN 61326-1

10. Sensor output signals



Pressure response in analogue mode



Temperature and dry-running response in analogue mode

11. Approvals (w/EPDM O-rings)

- WRAS
- NSF
- AS4020
- ACS