

## 1. General data

CPS 1 sensor



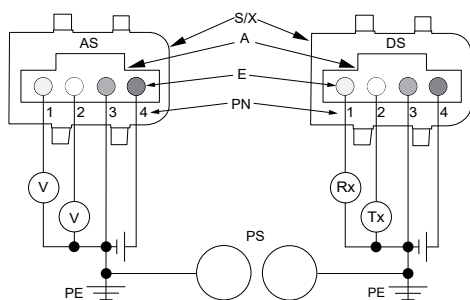
CPS 1 (Combi Pressure Standard 1st generation) sensor is a combined dry-running, pressure and temperature sensor (three-in-one) from Grundfos Direct Sensors™.

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

E: Electrical connector pins

A: Standard cover

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 US
CE	C, CSA, US

## 5. Power supply requirements

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

## 6. Installation options



Sensor with anti-sedimentation sealing cap



CPS fitting



CPS fitting with CPS sensor

## 7. Directives

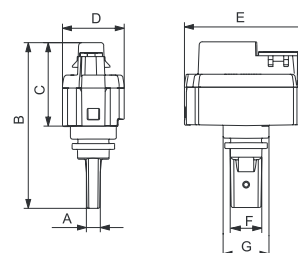
Grundfos Direct Sensors™ are in conformity with all applicable EU product legislation:

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

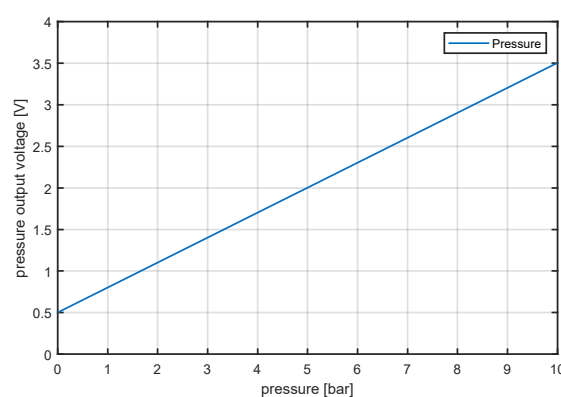
Dry-running	
Dry-running states (digital output mode)	0 (wet) 1 (inconclusive) 2 (dry)
Dry-running response time	3 seconds
Dry-running output signal types	1. Digital mode (see GDS protocol, sensor auto-detects digital or analog output mode at start-up) 2. Analog output with temperature voltage output 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)	$\pm 5$ 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)	$\pm 0.5$ K
Accuracy ( $\pm 1 \sigma$ ), 0-120 °C (32-248 °F)	$\pm 1$ 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)
Analog output signals	0.25 - 4.2 VDC (0.5 V at 0 bar, 3.5 V at 10 bar)
	(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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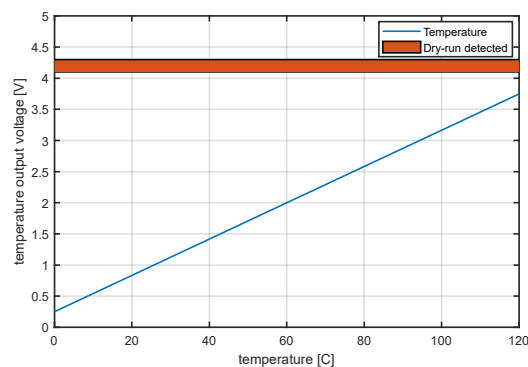
ECM: 1399078

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
- AS4020
- NSF
- ACS