

Pressure sensors

Grundfos Direct Sensors™













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1. Product overview

This data booklet is for the latest version of Grundfos Direct Sensors™. Customers already buying Grundfos Direct Sensors™ might be buying a sensor with another specification.

Variant	Description	Technical data
RPI	 Relative Pressure transmitter, Industry <ul style="list-style-type: none"> stainless-steel housing. 	Pressure range: 0 - 0.6 to 25 bar (0 - 8.7 to 363 psig) System pressure range: Maximum 30 bar (435 psig) Liquid temperature: -30 to +120 °C (-22 to +248 °F) Signal: 4 - 20 mA (2-wire) Power supply: 12.5 - 30 VDC Enclosure class: IP67
RPI+T	 Relative Pressure transmitter, Industry <ul style="list-style-type: none"> combined pressure and temperature measurement stainless-steel housing. 	Pressure range: 0 - 0.6 to 25 bar (0 - 8.7 to 363 psig) Temperature range: 0 - 120 °C (32 - 248 °F) System pressure: Maximum 30 bar (435 psig) Liquid temperature: -30 to +120 °C (-22 to +248 °F) Signal: 2 x 0 - 10 VDC (4-wire) Power supply: 16.6 - 30 VDC Enclosure class: IP67
DPI	 Differential Pressure transmitter, Industry <ul style="list-style-type: none"> conventional sensor with two capillaries stainless-steel and composite housing. 	Differential pressure range: 0 - 0.6 to 10 bar (0 - 8.7 to 145 psid) System pressure: Maximum 30 bar (435 psig) Liquid temperature: -10 to +70 °C (14 - 158 °F) Signal: 4 - 20 mA (3-wire) Power supply: 12 - 30 VDC Enclosure class: IP55
DPI 2	 Differential Pressure transmitter, Industry <ul style="list-style-type: none"> G 1/2 connection and one capillary stainless-steel housing. 	Differential pressure range: 0 - 0.6 to 16 bar (0 - 8.7 to 232 psid) System pressure: Maximum 30 bar (435 psig) Liquid temperature: -30 to +120 °C (-22 to +248 °F) Signal: 4 - 20 mA (2-wire) Power supply: 12.5 - 30 VDC Enclosure class: IP67
DPI 2+T	 Differential Pressure transmitter, Industry <ul style="list-style-type: none"> G 1/2 connection and one capillary combined pressure and temperature measurement stainless-steel housing. 	Differential pressure range: 0 - 0.6 to 16 bar (0 - 8.7 to 232 psid) Temperature range: 0 - 120 °C (32 - 248 °F) System pressure: Maximum 30 bar (435 psig) Liquid temperature: -30 to +120 °C (-22 to +248 °F) Signal: 2 x 0 - 10 VDC (4-wire) Power supply: 12.5 - 30 VDC Enclosure class: IP67
RPS	 Relative Pressure sensor, Standard <ul style="list-style-type: none"> combined pressure and temperature measurement composite transmitter. 	Pressure range: 0 - 0.6 to 16 bar (0 - 8.7 to 232 psig) Temperature range: 0 - 120 °C (32 - 248 °F) System pressure: Maximum 24 bar (348 psig) Liquid temperature: 0 - 120 °C (32 - 248 °F) Signal: 2 x 0.5 - 3.5 VDC (4-wire) Power supply: 5 VDC (PELV) Enclosure class: IP44 (with connected cable)
RPS7	 Relative Pressure sensor, Standard <ul style="list-style-type: none"> pressure measurement composite transmitter. 	Pressure range: -1 to +16 bar (-14.5 to +232 psig) System pressure: Maximum 24 bar (348 psig) Liquid temperature: 0 - 100 °C (32 - 212 °F) Signal: 4 - 20 mA (3-wire) Power supply: 12 - 30 VDC (PELV) Enclosure class: IP54 (with connected cable)
RPS8	 Relative Pressure sensor, Standard <ul style="list-style-type: none"> combined pressure and temperature measurement composite transmitter. 	Pressure range: 0 - 0.1 bar (0 - 1.45 psig) Temperature range: 0 - 100 °C (32 - 212 °F) System pressure: Maximum 24 bar (348 psig) Liquid temperature: 0 - 120 °C (32 - 248 °F) Signal: 2 x 0.5 - 3.5 VDC (4-wire) Power supply: 6 - 30 VDC (PELV) Enclosure class: IP54 (with connected cable)

Variant	Description	Technical data
DPS	 <p>Differential Pressure sensor, Standard</p> <ul style="list-style-type: none"> combined pressure and temperature measurement composite transmitter. 	<p>Pressure range: 0 - 0.6 to 6 bar (0 - 8.7 to 87 psid)</p> <p>Temperature range: 0 - 120 °C (32 - 248 °F)</p> <p>System pressure: Maximum 24 bar (348 psig)</p> <p>Liquid temperature: 0 - 120 °C (32 - 248 °F)</p> <p>Signal: 2 x 0.5 - 4.5 VDC (4-wire)</p> <p>Power supply: 5 VDC (PELV)</p> <p>Enclosure class: IP44 (with connected cable)</p>
DPS11	 <p>Differential Pressure sensor, Standard</p> <ul style="list-style-type: none"> pressure measurement composite transmitter. 	<p>Pressure range: -1 to +10 bar (-14.5 to +145 psid)</p> <p>Temperature range: 0 - 120 °C (32 - 248 °F)</p> <p>System pressure: Maximum 24 bar (348 psig)</p> <p>Liquid temperature: 0 - 120 °C (32 - 248 °F)</p> <p>Signal: 4 - 20 mA (3-wire)</p> <p>Power supply: 12 - 30 VDC (PELV)</p> <p>Enclosure class: IP54 (with connected cable)</p>

2. Product introduction

This data booklet describes these Grundfos products:

- industrial relative- and differential-pressure sensors
- standard relative- and differential-pressure sensors.



Grundfos pressure sensors

Three different types of pressure are used in pressure measurement:

- Absolute pressure: the measured value is zero-referenced against vacuum.
- Relative pressure: the measured value is zero-referenced against the ambient pressure.
- Differential pressure: the measured value is the difference between two pressures.

The Grundfos pressure sensor ranges contain relative- and differential-pressure sensors as well as relative- and differential-pressure sensors combined with temperature measurement capable of measuring temperatures from 0 to 100 °C (32 to 212 °F). This makes Grundfos sensors™ suitable for a wide range of applications.

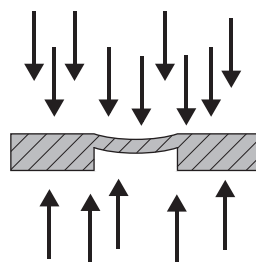
2.1 Relative-pressure sensor

The central part of a relative-pressure sensor is a chip which transforms the pressure into electrical signals. The difference between the ambient air pressure and the system pressure causes the chip to warp which is registered as a change of resistance in the strain gauges of a Wheatstone bridge. The change in resistance is converted into an analog output signal. The sensors incorporating temperature measurement also transform the temperature of the liquid into electrical signals.

The signals are linearised and compensated for the influence of temperature variations.

2.2 Differential-pressure sensor

The central part of a differential-pressure sensor is a chip which transforms the differential pressure into electrical signals. The difference between the two system pressures on either side of the chip, called the differential pressure, causes the chip to warp. This is registered as a change of resistance in the strain gauges of a Wheatstone bridge. The change in resistance is converted into an analog output signal. The sensors incorporating temperature measurement also transform the temperature of the liquid into electrical signals.



Schematic view of how the chip is affected by pressure on both sides

2.3 Sensor chip

The steady-state properties of silicon protect the chip against wear and tear. Lifelong nano-coating protection enables direct measurement (wet-wet) in a cost-effective packaging for aqueous media. The secret is a metal-glass alloy coating, Silicoat®, which is extremely resistant to corrosion. Compared to conventional sensor technologies, which encapsulate the unprotected measuring cell to protect it from the liquid, Silicoat® ensures protection of the chip from aqueous media (pH2 - pH11) at temperatures up to 120 °C (248 °F) through the entire life of the product.

2.4 Definitions

2.4.1 Burst pressure

The maximum allowable pressure (relative to ambient) in a system, which will not destroy the sensor or transmitter. Measured in [bar].

2.4.2 Maximum system pressure

Maximum allowable static pressure (relative to ambient pressure) in a system, where the flow is zero.

TM078650

TM034055

3. Relative Pressure transmitter, Industry (RPI and RPI+T)

3.1 General data



RPI, RPI+T transmitter

TM047865

3.1.1 Technical overview

The RPI relative-pressure transmitter from Grundfos Direct Sensors™ is designed for industrial applications. The transmitter is designed to be mounted direct on a unit, for example a pump.

The RPI transmitter is fully compatible with aqueous media. The transmitter is based on MEMS sensing technology in combination with the corrosion-resistant Silicoat® coating technology on the transmitter chip.

This makes the RPI transmitter very robust and ideal for pump integration and monitoring in harsh environments. The RPI+T transmitter offers a two-in-one solution with combined pressure and temperature measurement.

3.1.2 Applications

- Pump control
- HVAC systems
- renewable energies such as heat pumps, solar thermals, fresh water and micro-CHP systems
- monitoring and control systems
- water treatment plants
- water utility and distribution systems
- HPC and IT cooling systems.

3.1.3 Features and benefits

- Pressure and temperature measurement in one transmitter (two-in-one solution) for easy and cost-efficient installation (RPI+T)
- MEMS technology
- direct contact with the aqueous media resulting in a fast response time
- plug and play for quick setup
- smart system solution with Grundfos pump controls
- compact and robust design
- compatible with aggressive aqueous media
- suitable for a wide temperature range
- suitable for a wide range of applications.

3.1.4 Pressure range

Pressure range	
[bar]	[psig]
0 - 0.6	0 - 8.7
0 - 1.0	0 - 14.5
0 - 1.6	0 - 23.2
0 - 2.5	0 - 36.3
0 - 4.0	0 - 58.0
0 - 6.0	0 - 87.0
0 - 10.0	0 - 145.0
0 - 16.0*	0 - 232.1
0 - 25.0	0 - 362.6

* RPI+T2 is a special 0 - 16.0 bar Relative Pressure Transmitter, Industry measuring up to 120 C at 10 V intended for Magna3 and TPE3.

3.1.5 Approvals (w/EPDM O-rings)

- WRAS
- KTW
- A4020
- ACS.

3.1.6 Certificates

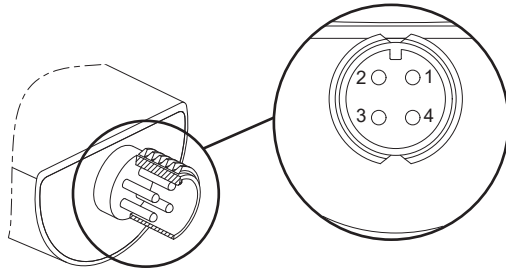


C, CSA, US



EAC

3.1.7 Electrical connections



TM061070

Electrical connections

RPI

Signal condition: 2-wire (loop-powered)

Pin	1	2	3	4
Wire colour	Brown	White	Blue	Black
I/O	Power supply	Not used	Pressure signal 4-20 mA	Not used

RPI+T

Signal condition: 4-wire

Pin	1	2	3	4
Wire colour	Brown	White	Blue	Black
I/O	Power supply	Pressure signal 0-10 V	GND*	Temperature signal 0-10 V

* Common ground for pressure and temperature signals.

Power supply, screened cable: SELV or PELV.

3.1.8 Directives

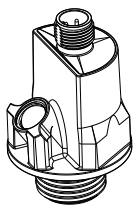
Grundfos Direct Sensors™ are in conformity with all applicable EU product legislation:

- 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:

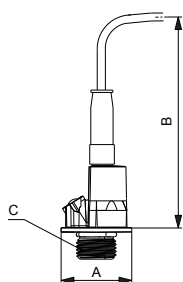
- Pressure Equipment Directive (2014/68/EU) according to article 4, paragraph 3.
- Low Voltage Directive (2014/35/EU) because the supply voltage is below 75 VDC.

3.2 RPI and RPI+T, 0 - 0.6 bar (0 - 8.7 psig)



RPI and RPI+T transmitter

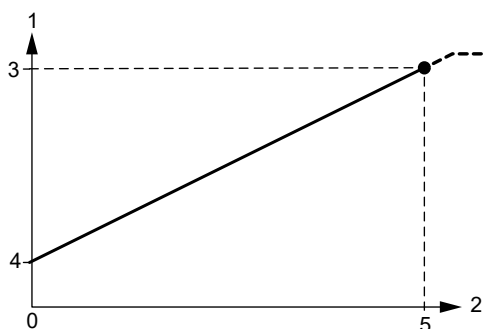
Dimensions



Dimensions, RPI and RPI+T

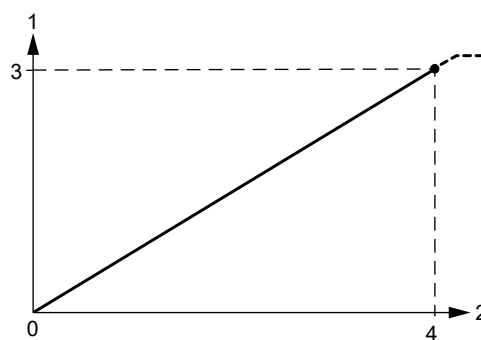
	A	B	C
mm	36.95	110	ISO 228/1 - G 1/2
in	1.45	4.33	

Output signals



Pressure response, RPI

Pos.	Description
0	P_{\min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{\max}



Pressure and temperature response, RPI+T

Pos.	Description
0	P_{\min} T_{\min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{\max} T_{\max}

3.2.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 0.6 bar (0 - 8.7 psig)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
Resolution	1/1000 FS

Temperature, RPI+T with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-100 °C (32-212 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-100 °C (32-212 °F)	$\pm 2 K$
Response time for sensor elec- tronics	< 100 ms (typically 50 ms)
Resolution	0.1 K

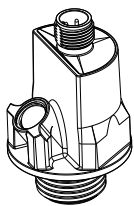
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation, not freezing	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)

Electrical data, RPI without temperature output	
Power supply, RPI	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 0.6 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
Maximum load impedance	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)

Electrical data, RPI+T with temperature output	
Power supply, RPI+T	16.6 - 30 VDC
Output signals	0-10 VDC
Corresponding range pressure	0 V at 0 bar, 10 V at 0.6 bar
Corresponding range temp.	0 V at 0 °C, 10 V at 100 °C
Signal cut off	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

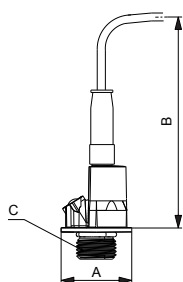
Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM
	Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable-connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

3.3 RPI and RPI+T, 0 - 1.0 bar (0 - 14.5 psig)



RPI and RPI+T transmitter

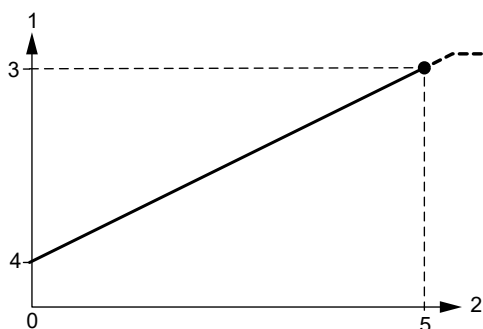
Dimensions



Dimensions, RPI and RPI+T

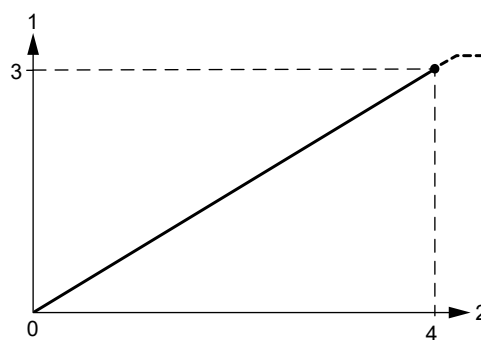
	A	B	C
mm	36.95	110	ISO 228/1 - G 1/2
in	1.45	4.33	

Output signals



Pressure response, RPI

Pos.	Description
0	P_{\min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{\max}



Pressure and temperature response, RPI+T

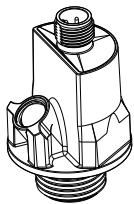
Pos.	Description
0	P_{\min} T_{\min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{\max} T_{\max}

3.3.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 1.0 bar (0 - 14.5 psig)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
Resolution	1/1000 FS
Temperature, RPI with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-100 °C (32-212 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-100 °C (32-212 °F)	$\pm 2 K$
Response time for sensor elec- tronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wet- ted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Electrical data, RPI without temperature output	
Power supply, RPI	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 1 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
Maximum load impedance	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, RPI+T with temperature output	
Power supply, RPI+T	16.6 - 30 VDC
Output signals	0-10 VDC
Corresponding range pressure	0 V at 0 bar, 10 V at 1 bar
Corresponding range temp.	0 V at 0 °C, 10 V at 100 °C
Signal cut off	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

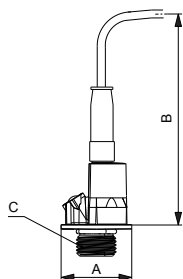
Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM
	Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

3.4 RPI and RPI+T, 0 - 1.6 bar (0 - 23.2 psig)



RPI and RPI+T transmitter

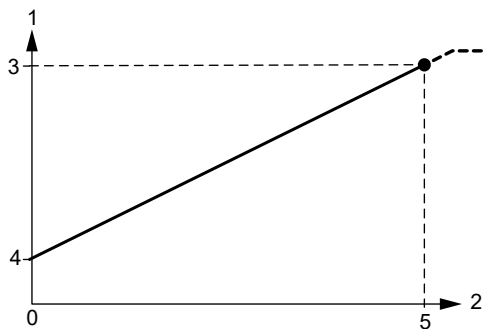
Dimensions



Dimensions, RPI and RPI+T

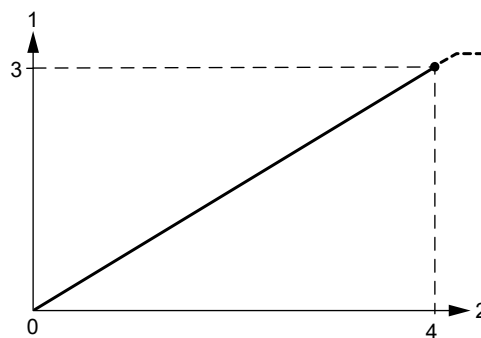
	A	B	C
mm	36.95	110	ISO 228/1 - G 1/2
in	1.45	4.33	

Output signals



Pressure response, RPI

Pos.	Description
0	P_{\min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{\max}



Pressure and temperature response, RPI+T

Pos.	Description
0	P_{\min} T_{\min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{\max} T_{\max}

3.4.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 1.6 bar (0 - 23.2 psig)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \%$ FS
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \%$ FS
Response time	< 100 ms (typically 50 ms)
Resolution	1/1000 FS

Temperature, RPI with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-100 °C (32-212 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	± 1 K
Accuracy ($\pm 1 \sigma$), 0-100 °C (32-212 °F)	± 2 K
Response time for sensor electronics	< 100 ms (typically 50 ms)
Resolution	0.1 K

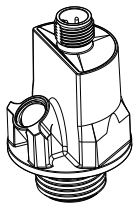
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)

Electrical data, RPI without temperature output	
Power supply, RPI	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 1.6 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
Maximum load impedance	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)

Electrical data, RPI+T with temperature output	
Power supply, RPI+T	16.6 - 30 VDC
Output signals	0-10 VDC
Corresponding range pressure	0 V at 0 bar, 10 V at 1.6 bar
Corresponding range temp.	0 V at 0 °C, 10 V at 100 °C
Signal cut off	11 VDC
Power consumption	Maximum 270 mW
Load impedance	Minimum 10 k Ω
Maximum cable length	30 m (98 ft)

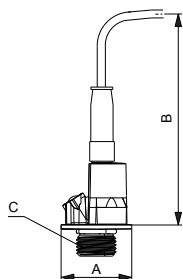
Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM
	Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

3.5 RPI and RPI+T, 0 - 2.5 bar (0 - 36.3 psig)



RPI and RPI+T transmitter

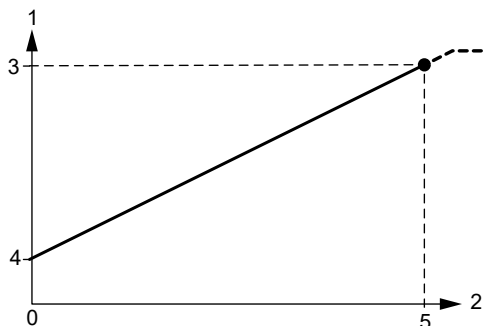
Dimensions



Dimensions, RPI and RPI+T

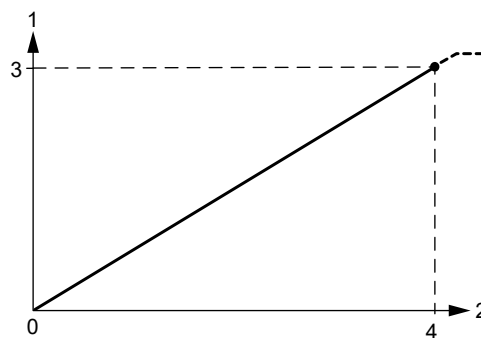
	A	B	C
mm	36.95	110	ISO 228/1 - G 1/2
in	1.45	4.33	

Output signals



Pressure response, RPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}



Pressure and temperature response, RPI+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

3.5.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 2.5 bar (0 - 36.3 psig)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	± 2 % FS
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	± 2.5 % FS
Response time	< 100 ms (typically 50 ms)
Resolution	1/1000 FS

Temperature, RPI with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-100 °C (32-212 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	± 1 K
Accuracy ($\pm 1 \sigma$), 0-100 °C (32-212 °F)	± 2 K
Response time for sensor elec- tronics	< 100 ms (typically 50 ms)
Resolution	0.1 K

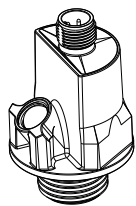
System conditions and environment	
Liquid types	Aqueous media compatible with wet- ted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)

Electrical data, RPI without temperature output	
Power supply, RPI	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 2.5 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
Maximum load impedance	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)

Electrical data, RPI+T with temperature output	
Power supply, RPI+T	16.6 - 30 VDC
Output signals	0-10 VDC
Corresponding range pressure	0 V at 0 bar, 10 V at 2.5 bar
Corresponding range temp.	0 V at 0 °C, 10 V at 100 °C
Signal cut off	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

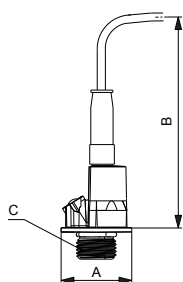
Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM
	Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

3.6 RPI and RPI+T, 0 - 4.0 bar (0 - 58.0 psig)



RPI and RPI+T transmitter

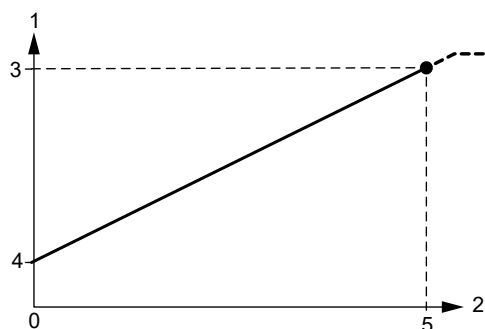
Dimensions



Dimensions, RPI and RPI+T

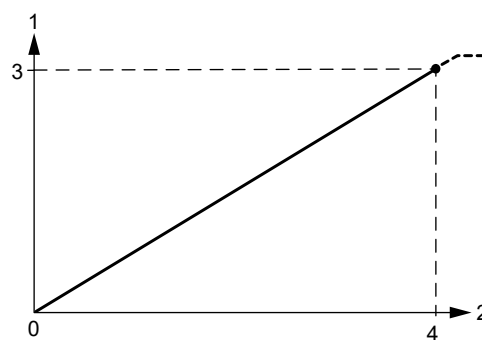
	A	B	C
mm	36.95	110	ISO 228/1 - G 1/2
in	1.45	4.33	

Output signals



Pressure response, RPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}



Pressure and temperature response, RPI+T

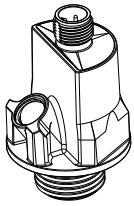
Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

3.6.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 4.0 bar (0 - 58.0 psig)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
Resolution	1/1000 FS
Temperature, RPI with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-100 °C (32-212 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-100 °C (32-212 °F)	$\pm 2 K$
Response time for sensor elec- tronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wet- ted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Electrical data, RPI without temperature output	
Power supply, RPI	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 4 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
Maximum load impedance	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, RPI+T with temperature output	
Power supply, RPI+T	16.6 - 30 VDC
Output signals	0-10 VDC
Corresponding range pressure	0 V at 0 bar, 10 V at 4 bar
Corresponding range temp.	0 V at 0 °C, 10 V at 100 °C
Signal cut off	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

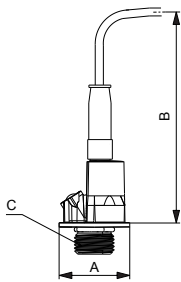
Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM
	Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

3.7 RPI and RPI+T, 0 - 6.0 bar (0 - 87.0 psig)



RPI and RPI+T transmitter

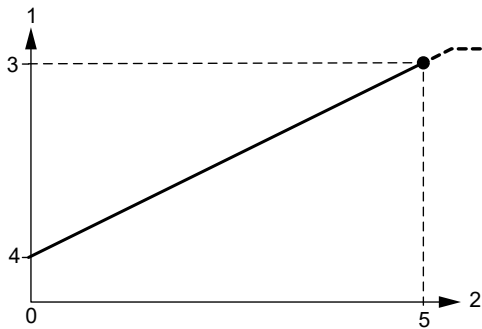
Dimensions



Dimensions, RPI and RPI+T

	A	B	C
mm	36.95	110	ISO 228/1 - G 1/2
in	1.45	4.33	

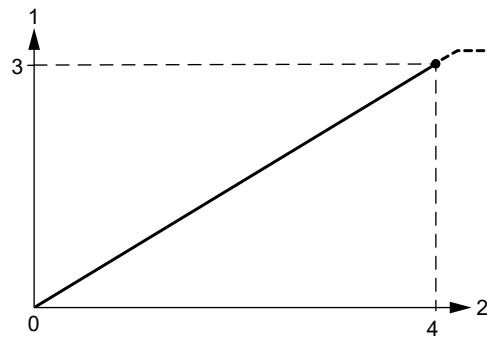
Output signals



Pressure response, RPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

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Pressure and temperature response, RPI+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

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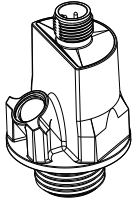
TM063358

3.7.1 Specifications

Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 6.0 bar (0 - 87.0 psig)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	± 2 % FS
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	± 2.5 % FS
Response time	< 100 ms (typically 50 ms)
Resolution	1/1000 FS
Temperature, RPI with temperature output	
Measuring range (T_{\min} - T_{\max})	0-100 °C (32-212 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	± 1 K
Accuracy ($\pm 1 \sigma$), 0-100 °C (32-212 °F)	± 2 K
Response time for sensor elec- tronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wet- ted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Electrical data, RPI without temperature output	
Power supply, RPI	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 6 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
Maximum load impedance	660 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, RPI+T with temperature output	
Power supply, RPI+T	16.6 - 30 VDC
Output signals	0-10 VDC
Corresponding range pressure	0 V at 0 bar, 10 V at 6 bar
Corresponding range temp.	0 V at 0 °C, 10 V at 100 °C
Signal cut off	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

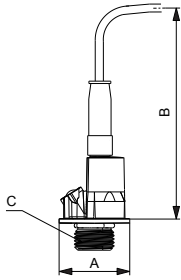
Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM
	Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

3.8 RPI and RPI+T, 0 - 10.0 bar (0 - 145.0 psig)



RPI and RPI+T transmitter

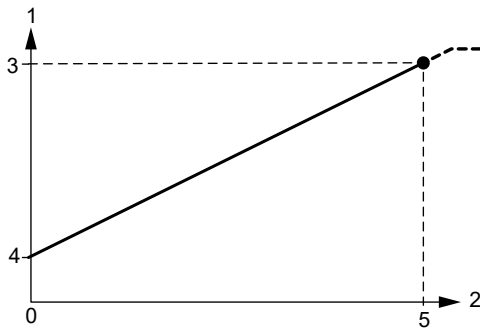
Dimensions



Dimensions, RPI and RPI+T

	A	B	C
mm	36.95	110	ISO 228/1 - G 1/2
in	1.45	4.33	

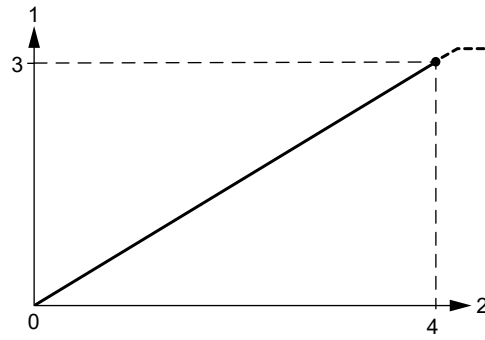
Output signals



Pressure response, RPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

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Pressure and temperature response, RPI+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

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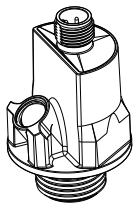
TM063358

3.8.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 10.0 bar (0 - 145.0 psig)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
Resolution	1/1000 FS
Temperature, RPI with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-100 °C (32-212 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-100 °C (32-212 °F)	$\pm 2 K$
Response time for sensor elec- tronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wet- ted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Electrical data, RPI without temperature output	
Power supply, RPI	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 10 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
Maximum load impedance	660 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, RPI+T with temperature output	
Power supply, RPI+T	16.6 - 30 VDC
Output signals	0-10 VDC
Corresponding range pressure	0 V at 0 bar, 10 V at 10 bar
Corresponding range temp.	0 V at 0 °C, 10 V at 100 °C
Signal cut off	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

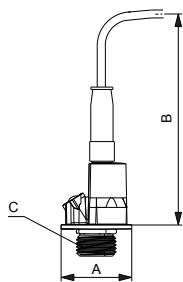
Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM
	Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

3.9 RPI and RPI+T, 0 - 16.0 bar (0 - 232.1 psig)



RPI and RPI+T transmitter

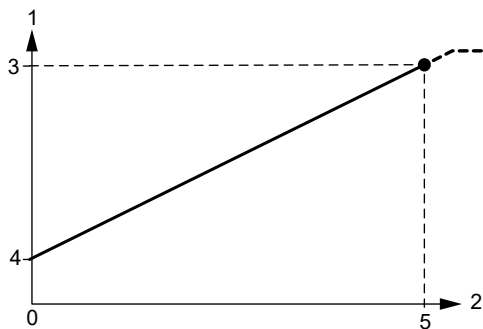
Dimensions



Dimensions, RPI and RPI+T

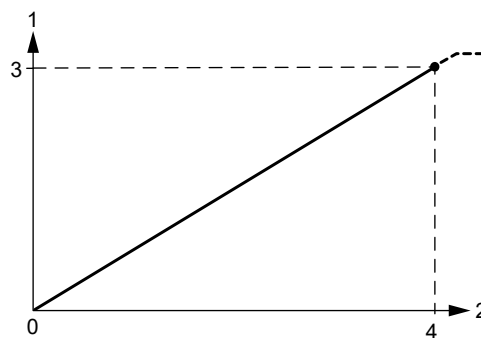
	A	B	C
mm	36.95	110	ISO 228/1 - G 1/2
in	1.45	4.33	

Output signals



Pressure response, RPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}



Pressure and temperature response, RPI+T

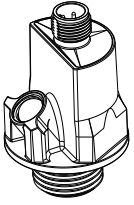
Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

3.9.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 16.0 bar (0 - 232.1 psig)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
Resolution	1/1000 FS
Temperature, RPI with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-100 °C (32-212 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-100 °C (32-212 °F)	$\pm 2 K$
Response time for sensor elec- tronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wet- ted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Electrical data, RPI without temperature output	
Power supply, RPI	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 16 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
Maximum load impedance	660 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, RPI+T with temperature output	
Power supply, RPI+T	16.6 - 30 VDC
Output signals	0-10 VDC
Corresponding range pressure	0 V at 0 bar, 10 V at 16 bar
Corresponding range temp.	0 V at 0 °C, 10 V at 100 °C
Signal cut off	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM
	Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

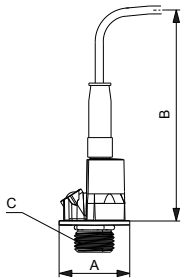
3.10 RPI+T2, 0 - 16.0 bar (0 - 232.1 psig)



TM049240

RPI+T transmitter

Dimensions

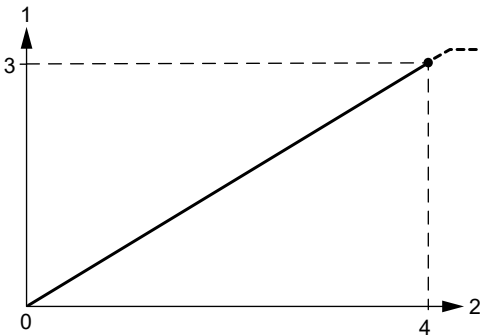


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Dimensions, RPI+T transmitter

	A	B	C
mm	36.95	110	ISO 228/1 - G 1/2
in	1.45	4.33	

Output signals



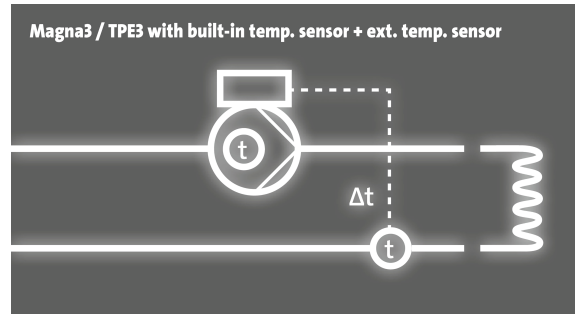
TM063359

Pressure and temperature response, RPI+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

3.10.1 Specifications

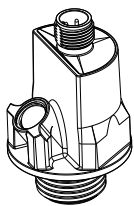
Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 16.0 bar (0 - 232.1 psig)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +120 °C (-22 to +248 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
Resolution	1/1000 FS
Temperature, RPI with temperature output	
Measuring range ($T_{min} - T_{max}$)	-10 to +120 °C (14-248 °F)
Accuracy ($\pm 1 \sigma$), -10 to +15 °C (14-59 °F) and 90-120 °C (194-248 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 15-90 °C (59-194 °F)	$\pm 0.5 K$
Response time for sensor elec- tronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wet- ted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Electrical data, RPI+T with temperature output	
Power supply, RPI+T	16.6 - 30 VDC
Output signals	0-10 VDC
Corresponding range pressure	0 V at 0 bar, 10 V at 16 bar
Corresponding range temp.	0 V at -10 °C, 10 V at 120 °C
Signal cut off	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)
Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1



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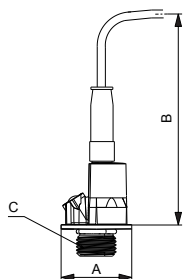
MAGNA3 and TPE3 with RPI+T2 transmitter

3.11 RPI and RPI+T, 0 - 25.0 bar (0 - 362.6 psig)



RPI and RPI+T transmitter

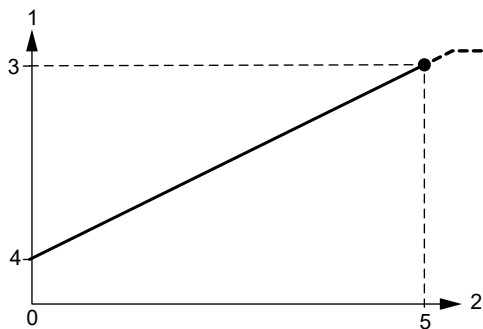
Dimensions



Dimensions, RPI and RPI+T

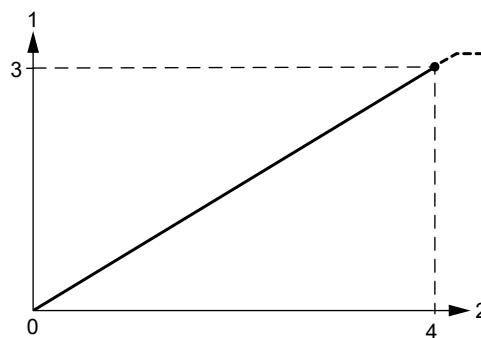
	A	B	C
mm	36.95	110	ISO 228/1 - G 1/2
in	1.45	4.33	

Output signals



Pressure response, RPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}



Pressure and temperature response, RPI+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

3.11.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 25.0 bar (0 - 362.6 psig)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
Resolution	1/1000 FS
Temperature, RPI with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-100 °C (32-212 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-100 °C (32-212 °F)	$\pm 2 K$
Response time for sensor elec- tronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wet- ted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Electrical data, RPI without temperature output	
Power supply, RPI	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 25 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
Maximum load impedance	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, RPI+T with temperature output	
Power supply, RPI+T	16.6 - 30 VDC
Output signals	0-10 VDC
Corresponding range pressure	0 V at 0 bar, 10 V at 25 bar
Corresponding range temp.	0 V at 0 °C, 10 V at 100 °C
Signal cut off	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM
	Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

4. Differential Pressure transmitter, Industry (DPI 1)

4.1 General data



DPI sensor

TN044738

4.1.1 Technical overview

The DPI differential-pressure transmitter from Grundfos Direct Sensors™ is designed for industrial purposes.

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

This makes the DPI transmitter very robust and ideal for pump integration and monitoring in harsh environments.

4.1.2 Applications

- Pump control
- HVAC systems
- renewable energies such as heat pumps, solar thermals, fresh water and micro-CHP systems
- monitoring and control systems
- water treatment plants
- water utility and distribution systems
- HPC and IT cooling systems.

4.1.3 Features and benefits

- MEMS technology
- no wear and tear
- plug and play for quick setup
- smart system solution with Grundfos pump controls
- compact and robust design
- compatible with aqueous media
- suitable for a wide range of applications.

4.1.4 Pressure range

Pressure range	
[bar]	[psid]
0 - 0.6	0 - 8.7
0 - 1.0	0 - 14.5
0 - 1.2	0 - 17.4
0 - 1.6	0 - 23.2
0 - 2.5	0 - 36.3
0 - 4.0	0 - 58.0
0 - 6.0	0 - 87.0
0 - 10.0	0 - 145.0

4.1.5 Certificates

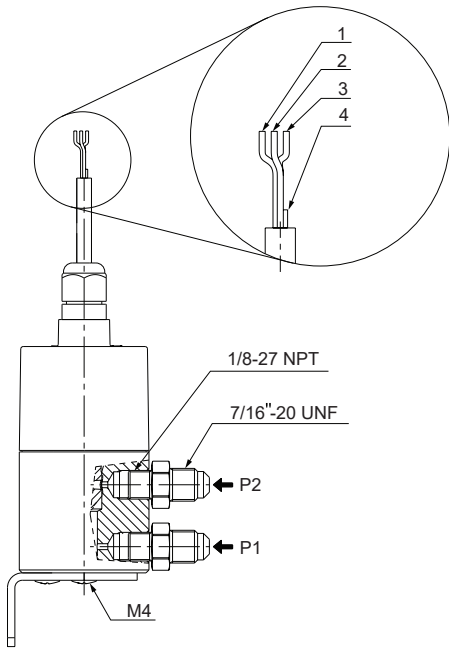


C, CSA, US



EAC

4.1.6 Electrical connections



TMD032225

Electrical connections

Pin	Description	Colour
1	12-30 V supply voltage	Brown
2	GND (earth conductor)	Yellow
3	Signal conductor	Green
4	Test conductor The conductor can be cut off during mounting. The conductor must not be connected to the power supply.	White

4.1.7 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:

- 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.

For outside usage, the DPI 1 is IP55, and may only be used outside in it's 0.9 m variants powered by a Grundfos pump or the SI power supply.

Related information

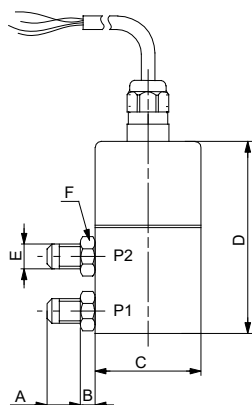
[13.1 Installation of RPI and DPI 2 transmitters](#)

4.2 DPI, 0 - 0.6 bar (0 - 8.7 psid)



DPI transmitter

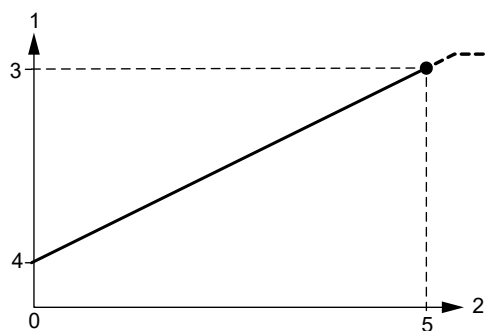
Dimensions



Dimensions, DPI

	A	B	C	D	E	F
mm	14	6	∅45	77	7/16 - 20 UNF	SW 14
in	0.55	0.24	∅1.77	3.03	0.25" flare	

Output signal



Differential-pressure response, DPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

4.2.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 0.6 bar (0 - 8.7 psid)
Accuracy (IEC 61298-2)	3.5 % FS
Response time	< 0.5 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-10 to +70 °C (14-158 °F)
Liquid temperature, peak	Up to 80 °C (176 °F)
Ambient temperature	-40 to +70 °C (-40 to +158 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Humidity, relative	0-95 %, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 0.6 bar
Signal cut off	21 mA
	500 Ω at 24 V
Maximum load impedance	200 Ω at 16 V
	100 Ω at 12 V
Maximum cable length	30 m (98 ft)
Materials	
Sensing element	Silicon-based MEMS
O-ring	FKM
Housing	Stainless steel 1.4305 (AISI 303)
Wetted materials	FKM, PPS and 1.4305
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	550 g (1.21 lbs)

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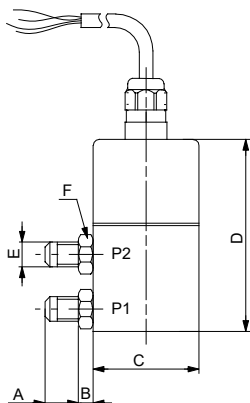
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4.3 DPI, 0 - 1.0 bar (0 - 14.5 psid)



DPI transmitter

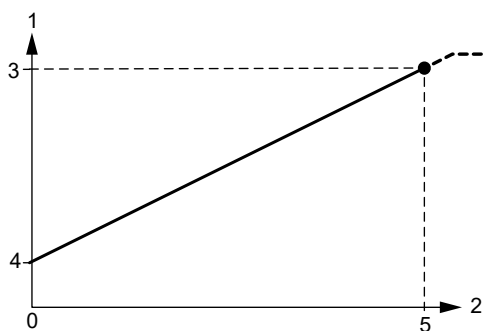
Dimensions



Dimensions, DPI

	A	B	C	D	E	F
mm	14	6	∅45	77	7/16 - 20 UNF	SW 14
in	0.55	0.24	∅1.77	3.03	0.25" flare	

Output signal



Differential-pressure response, DPI

Pos.	Description
0	P _{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P _{max}

4.3.1 Specifications

Pressure	
Measuring range (P _{min} - P _{max})	0 - 1.0 bar (0 - 14.5 psid)
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-10 to +70 °C (14-158 °F)
Liquid temperature, peak	Up to 80 °C (176 °F)
Ambient temperature	-40 to +70 °C (-40 to +158 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Humidity, relative	0-95 %, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 1 bar
Signal cut off	21 mA
	500 Ω at 24 V
Maximum load impedance	200 Ω at 16 V
	100 Ω at 12 V
Maximum cable length	30 m (98 ft)
Materials	
Sensing element	Silicon-based MEMS
O-ring	FKM
Housing	Stainless steel 1.4305 (AISI 303)
Wetted materials	FKM, PPS and 1.4305
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	550 g (1.21 lbs)

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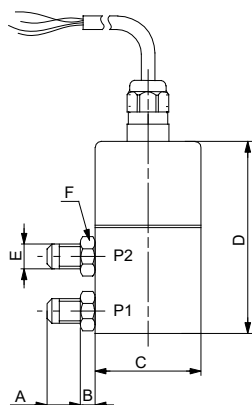
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4.4 DPI, 0 - 1.2 bar (0 - 17.4 psid)



DPI transmitter

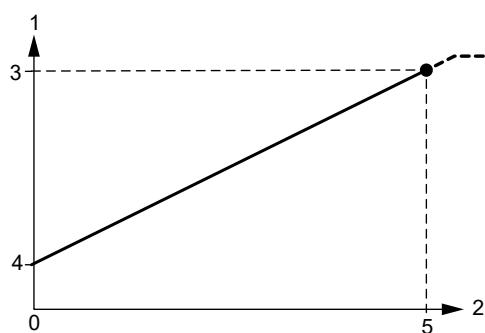
Dimensions



Dimensions, DPI

	A	B	C	D	E	F
mm	14	6	∅45	77	7/16 - 20 UNF	SW 14
in	0.55	0.24	∅1.77	3.03	0.25" flare	

Output signal



Differential-pressure response, DPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

4.4.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 1.2 bar (0 - 17.4 psid)
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-10 to +70 °C (14-158 °F)
Liquid temperature, peak	Up to 80 °C (176 °F)
Ambient temperature	-40 to +70 °C (-40 to +158 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Humidity, relative	0-95 % non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 1.2 bar
Signal cut off	21 mA
	500 Ω at 24 V
Maximum load impedance	200 Ω at 16 V
	100 Ω at 12 V
Maximum cable length	30 m (98 ft)
Materials	
Sensing element	Silicon-based MEMS
O-ring	FKM
Housing	Stainless steel 1.4305 (AISI 303)
Wetted materials	FKM, PPS and 1.4305
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	550 g (1.21 lbs)

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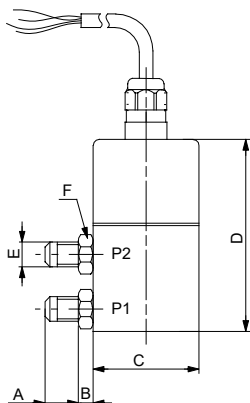
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4.5 DPI, 0 - 1.6 bar (0 - 23.2 psid)



DPI transmitter

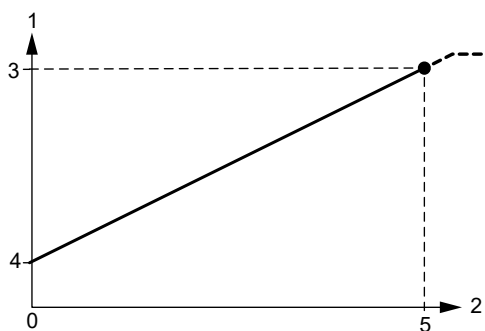
Dimensions



Dimensions, DPI

	A	B	C	D	E	F
mm	14	6	∅45	77	7/16 - 20 UNF	SW 14
in	0.55	0.24	∅1.77	3.03	0.25" flare	

Output signal



Differential-pressure response, DPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

4.5.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 1.6 bar (0 - 23.2 psid)
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-10 to +70 °C (14-158 °F)
Liquid temperature, peak	Up to 80 °C (176 °F)
Ambient temperature	-40 to +70 °C (-40 to +158 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Humidity, relative	0-95 %, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 1.6 bar
Signal cut off	21 mA
	500 Ω at 24 V
Maximum load impedance	200 Ω at 16 V
	100 Ω at 12 V
Maximum cable length	30 m (98 ft)
Materials	
Sensing element	Silicon-based MEMS
O-ring	FKM
Housing	Stainless steel 1.4305 (AISI 303)
Wetted materials	FKM, PPS and 1.4305
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	550 g (1.21 lbs)

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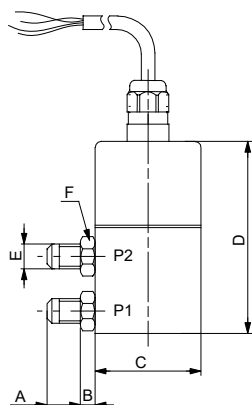
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4.6 DPI, 0 - 2.5 bar (0 - 36.3 psid)



DPI transmitter

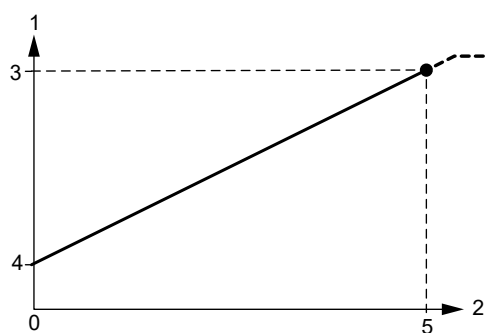
Dimensions



Dimensions, DPI

	A	B	C	D	E	F
mm	14	6	∅45	77	7/16 - 20 UNF	SW 14
in	0.55	0.24	∅1.77	3.03	0.25" flare	

Output signal



Differential-pressure response, DPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

4.6.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 2.5 bar (0 - 36.3 psid)
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-10 to +70 °C (14-158 °F)
Liquid temperature, peak	Up to 80 °C (176 °F)
Ambient temperature	-40 to +70 °C (-40 to +158 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Humidity, relative	0-95 %, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 2.5 bar
Signal cut off	21 mA
	500 Ω at 24 V
Maximum load impedance	200 Ω at 16 V
	100 Ω at 12 V
Maximum cable length	30 m (98 ft)
Materials	
Sensing element	Silicon-based MEMS
O-ring	FKM
Housing	Stainless steel 1.4305 (AISI 303)
Wetted materials	FKM, PPS and 1.4305
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	550 g (1.21 lbs)

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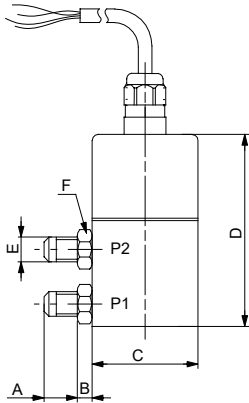
TM063358

4.7 DPI, 0 - 4.0 bar (0 - 58.0 psid)



DPI transmitter

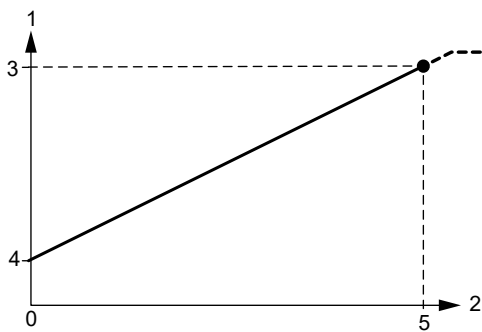
Dimensions



Dimensions, DPI

	A	B	C	D	E	F
mm	14	6	∅45	77	7/16 - 20 UNF	SW 14
in	0.55	0.24	∅1.77	3.03	0.25" flare	

Output signal



Differential-pressure response, DPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

4.7.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 4.0 bar (0 - 58.0 psid)
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-10 to +70 °C (14-158 °F)
Liquid temperature, peak	Up to 80 °C (176 °F)
Ambient temperature	-40 to +70 °C (-40 to +158 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Humidity	0-95 %, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 4 bar
Signal cut off	21 mA
	500 Ω at 24 V
Maximum load impedance	200 Ω at 16 V
	100 Ω at 12 V
Maximum cable length	30 m (98 ft)
Materials	
Sensing element	Silicon-based MEMS
O-ring	FKM
Housing	Stainless steel 1.4305 (AISI 303)
Wetted materials	FKM, PPS and 1.4305
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	550 g (1.21 lbs)

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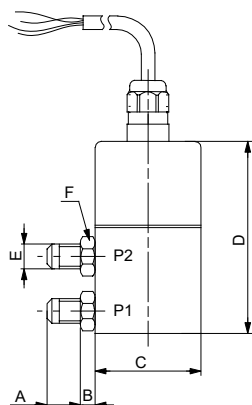
TM063358

4.8 DPI, 0 - 6.0 bar (0 - 87.0 psid)



DPI transmitter

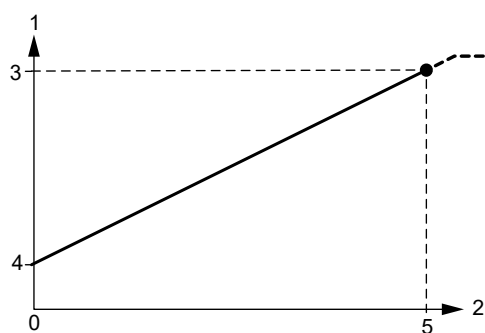
Dimensions



Dimensions, DPI

	A	B	C	D	E	F
mm	14	6	∅45	77	7/16 - 20 UNF	SW 14
in	0.55	0.24	∅1.77	3.03	0.25" flare	

Output signal



Differential-pressure response, DPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

4.8.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 6.0 bar (0 - 87.0 psid)
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-10 to +70 °C (14-158 °F)
Liquid temperature, peak	Up to 80 °C (176 °F)
Ambient temperature	-40 to +70 °C (-40 to +158 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Humidity, relative	0-95 %, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 6 bar
Signal cut off	21 mA
	500 Ω at 24 V
Maximum load impedance	200 Ω at 16 V
	100 Ω at 12 V
Maximum cable length	30 m (98 ft)
Materials	
Sensing element	Silicon-based MEMS
O-ring	FKM
Housing	Stainless steel 1.4305 (AISI 303)
Wetted materials	FKM, PPS and 1.4305
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	550 g (1.21 lbs)

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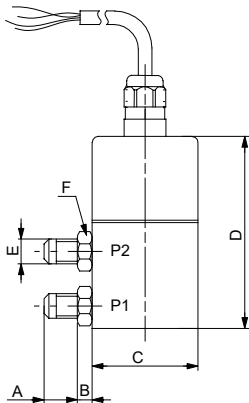
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4.9 DPI, 0 - 10.0 bar (0 - 145.0 psid)



DPI transmitter

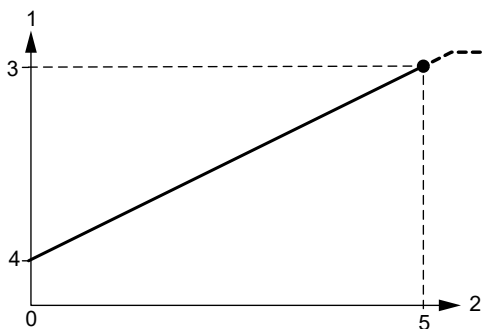
Dimensions



Dimensions, DPI

	A	B	C	D	E	F
mm	14	6	∅45	77	7/16 - 20 UNF	SW 14
in	0.55	0.24	∅1.77	3.03	0.25" flare	

Output signal



Differential-pressure response, DPI

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

4.9.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 10.0 bar (0 - 145.0 psid)
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-10 to +70 °C (14-158 °F)
Liquid temperature, peak	Up to 80 °C (176 °F)
Ambient temperature	-40 to +70 °C (-40 to +158 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Humidity, relative	0-95 %, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 10 bar
Signal cut off	21 mA
	500 Ω at 24 V
Maximum load impedance	200 Ω at 16 V
	100 Ω at 12 V
Maximum cable length	30 m (98 ft)
Materials	
Sensing element	Silicon-based MEMS
O-ring	FKM
Housing	Stainless steel 1.4305 (AISI 303)
Wetted materials	FKM, PPS and 1.4305
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	550 g (1.21 lbs)

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5. Differential Pressure transmitter, Industry (DPI 2 and DPI 2+T)

5.1 General data



DPI 2 transmitter

5.1.1 Technical overview

The DPI 2+T combined differential-pressure and temperature transmitter (two-in-one) from Grundfos Direct Sensors™ is designed for industrial applications.

The capillary tube makes it possible to measure the differential pressure.

The DPI 2+T transmitter is fully compatible with aqueous media. The transmitter is based on MEMS sensing technology in combination with the corrosion-resistant Silicoat® coating technology on the transmitter chip.

This makes the DPI 1+T transmitter very robust and ideal for pump integration and monitoring in harsh environments.

5.1.2 Applications

- Pump control
- HVAC systems
- renewable energies such as heat pumps, solar thermals, fresh water and micro-CHP systems
- monitoring and control systems
- water treatment plants
- water utility and distribution systems
- HPC and IT cooling systems.

5.1.3 Features and benefits

- Differential pressure and temperature measurement in one transmitter (two-in-one solution) for easy and cost-efficient installation (DPI 2+T)
- MEMS technology
- direct contact with the aqueous media resulting in a fast response time
- plug and play for quick setup
- smart system solution with Grundfos pump controls
- compact and robust design
- compatible with aqueous media
- suitable for a wide temperature range
- suitable for a wide range of applications.

5.1.4 Pressure range

Pressure range	
[bar]	[psid]
0 - 0.6	0 - 8.7
0 - 1.0	0 - 14.5
0 - 1.6	0 - 23.2
0 - 2.5	0 - 36.3
0 - 4.0	0 - 58.0
0 - 6.0	0 - 87.0
0 - 10.0	0 - 145.0
0 - 16.0	0 - 232.1

5.1.5 Approvals (w/EPDM O-rings)

- WRAS
- KTW
- AS 4020
- ACS.

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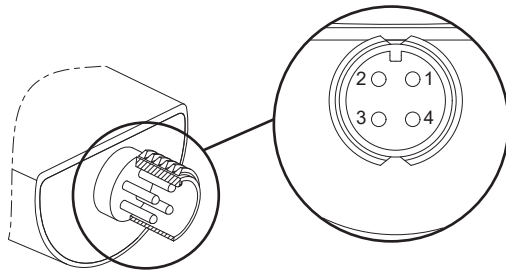
5.1.6 Certificates



C, CSA, US

EAC

5.1.7 Electrical connections



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Electrical connections

DPI 2

Signal condition: 2-wire (loop-powered)

Pin	1	2	3	4
Wire colour	Brown	White	Blue	Black
I/O	Power supply	Not used	Pressure signal 4-20 mA	Not used

DPI 2+T

Signal condition: 4-wire

Pin	1	2	3	4
Wire colour	Brown	White	Blue	Black
I/O	Power supply	Pressure signal 0-10 V	GND*	Temperature signal 0-10 V

* Common ground for pressure and temperature signals. Power supply, screened cable: SELV or PELV.

5.1.8 Directives

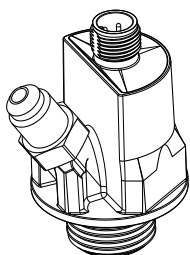
Grundfos Direct Sensors™ are in conformity with all applicable EU product legislation:

- 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:

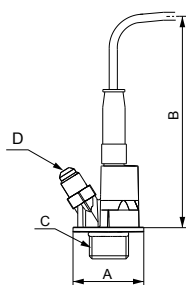
- Pressure Equipment Directive (2014/68/EU) according to article 4, paragraph 3.
- Low Voltage Directive (2014/35/EU) because the supply voltage is below 75 VDC.

5.2 DPI 2 and DPI 2+T, 0 - 0.6 bar (0 - 8.7 psid)



DPI 2 and DPI 2+T transmitter

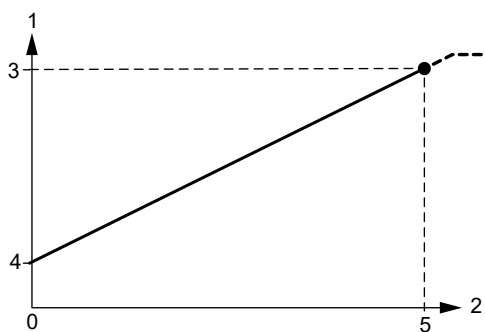
Dimensions



Dimensions, DPI 2 and DPI 2+T

	A	B	C	D
mm	36.95	110	ISO 228/1 - G	7/16 - 20 UNF
in	1.45	4.33	1/2	0.25" flare

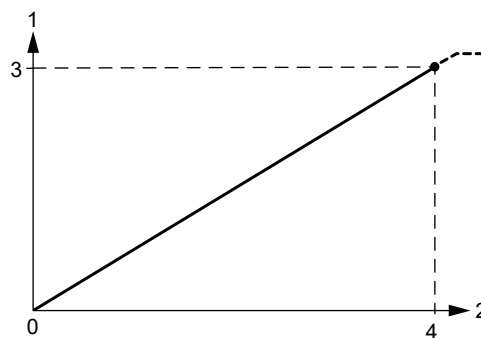
Output signals



Pressure response, DPI 2

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

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Pressure and temperature response, DPI 2+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

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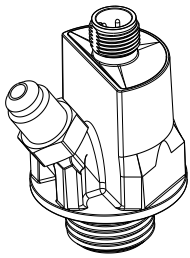
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5.2.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 0.6 bar (0 - 8.7 psid)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1/1000 FS
Temperature, DPI 2+T with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-100 °C (32-212 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-100 °C (32-212 °F)	$\pm 2 K$
Response time for sensor electronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity, relative	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data, DPI 2 without temperature output	
Power supply, DPI 2	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 0.6 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
Maximum load impedance	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, DPI 2+T with temperature output	
Power supply, DPI 2+T	16.6 - 30 VDC
	0-10 VDC
Output signals	(0 V at 0 bar, 10 V at 0.6 bar)
Signal cut off	(0 V at 0 °C, 10 V at 100 °C)
	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

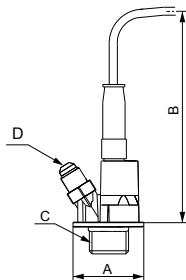
Materials	
Sensing element	Silicon-based MEMS
O-ring	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

5.3 DPI 2 and DPI 2+T, 0 - 1.0 bar (0 - 14.5 psid)



DPI 2 and DPI 2+T transmitter

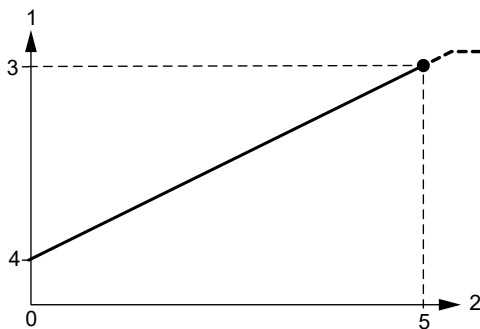
Dimensions



Dimensions, DPI 2 and DPI 2+T

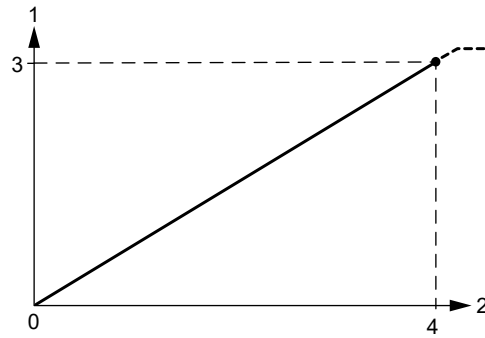
	A	B	C	D
mm	36.95	110	ISO 228/1 - G	7/16 - 20 UNF
in	1.45	4.33	1/2	0.25" flare

Output signals



Pressure response, DPI 2

Pos.	Description
0	P_{\min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{\max}



Pressure and temperature response, DPI 2+T

Pos.	Description
0	P_{\min} T_{\min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{\max} T_{\max}

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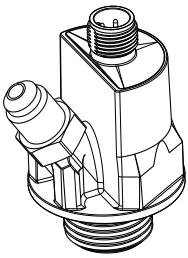
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5.3.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 1.0 bar (0 - 14.5 psid)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1/1000 FS
Temperature, DPI 2+T with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-120 °C (32-248 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	$\pm 2 K$
Response time for sensor electronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity, relative	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data, DPI 2 without temperature output	
Power supply, DPI 2	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 1 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
Maximum load impedance	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, DPI 2+T with temperature output	
Power supply, DPI 2+T	16.6 - 30 VDC
	0-10 VDC
Output signals	(0 V at 0 bar, 10 V at 1 bar)
Signal cut off	(0 V at 0 °C, 10 V at 100 °C)
	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

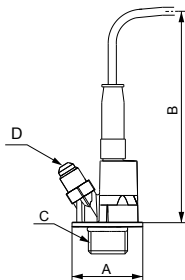
Materials	
Sensing element	Silicon-based MEMS
O-ring	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

5.4 DPI 2 and DPI 2+T, 0 - 1.6 bar (0 - 23.2 psid)



DPI 2 and DPI 2+T transmitter

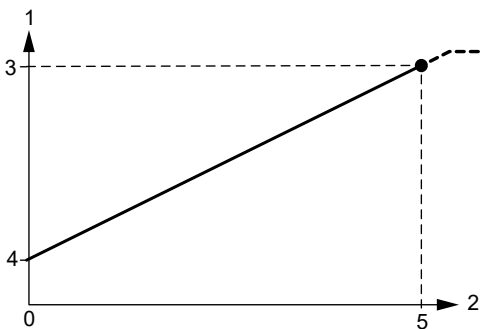
Dimensions



Dimensions, DPI 2 and DPI 2+T

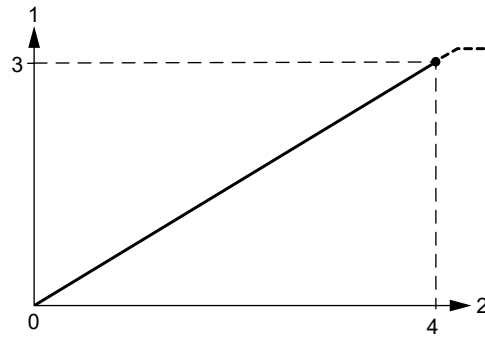
	A	B	C	D
mm	36.95	110	ISO 228/1 - G	7/16 - 20 UNF
in	1.45	4.33	1/2	0.25" flare

Output signals



Pressure response, DPI 2

Pos.	Description
0	P_{\min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{\max}



Pressure and temperature response, DPI 2+T

Pos.	Description
0	P_{\min} T_{\min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{\max} T_{\max}

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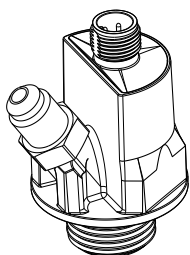
TM063358

5.4.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 1.6 bar (0 - 23.2 psid)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	± 2 % FS
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	± 2.5 % FS
Response time	< 100 ms (typically 50 ms)
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1/1000 FS
Temperature, DPI 2+T with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-120 °C (32-248 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	± 1 K
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	± 2 K
Response time for sensor electronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity, relative	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data, DPI 2 without temperature output	
Power supply, DPI 2	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 1.6 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
Maximum load impedance	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, DPI 2+T with temperature output	
Power supply, DPI 2+T	16.6 - 30 VDC
	0-10 VDC
Output signals	(0 V at 0 bar, 10 V at 1.6 bar)
Signal cut off	(0 V at 0 °C, 10 V at 100 °C)
	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

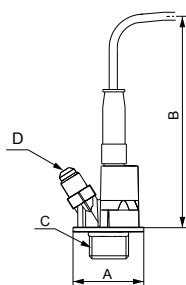
Materials	
Sensing element	Silicon-based MEMS
O-ring	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

5.5 DPI 2 and DPI 2+T, 0 - 2.5 bar (0 - 36.3 psid)



DPI 2 and DPI 2+T transmitter

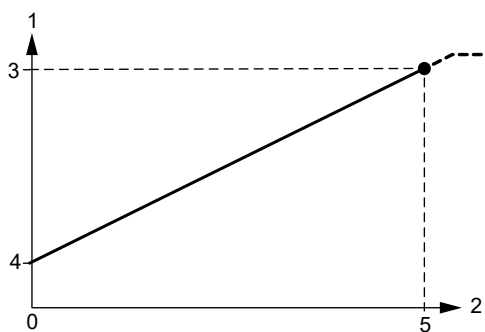
Dimensions



Dimensions, DPI 2 and DPI 2+T

	A	B	C	D
mm	36.95	110	ISO 228/1 - G	7/16 - 20 UNF
in	1.45	4.33	1/2	0.25" flare

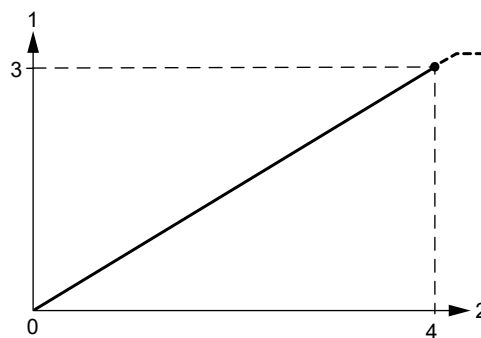
Output signals



Pressure response, DPI 2

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

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Pressure and temperature response, DPI 2+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

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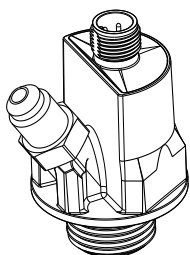
TM063359

5.5.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 2.5 bar (0 - 36.3 psid)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1/1000 FS
Temperature, DPI 2+T with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-120 °C (32-248 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	$\pm 2 K$
Response time for sensor electronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity, relative	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data, DPI 2 without temperature output	
Power supply, DPI 2	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 2.5 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
Maximum load impedance	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, DPI 2+T with temperature output	
Power supply, DPI 2+T	16.6 - 30 VDC
	0-10 VDC
Output signals	(0 V at 0 bar, 10 V at 2.5 bar)
Signal cut off	(0 V at 0 °C, 10 V at 100 °C)
	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

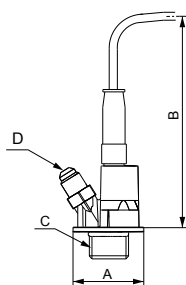
Materials	
Sensing element	Silicon-based MEMS
O-ring	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

5.6 DPI 2 and DPI 2+T, 0 - 4.0 bar (0 - 58.0 psid)



DPI 2 and DPI 2+T transmitter

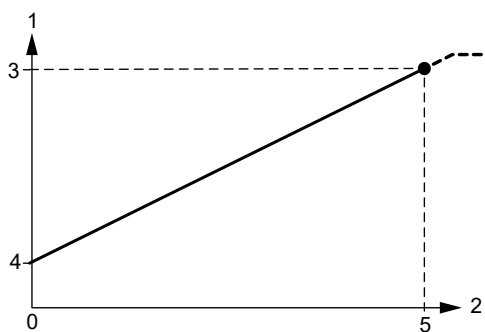
Dimensions



Dimensions, DPI 2 and DPI 2+T

	A	B	C	D
mm	36.95	110	ISO 228/1 - G	7/16 - 20 UNF
in	1.45	4.33	1/2	0.25" flare

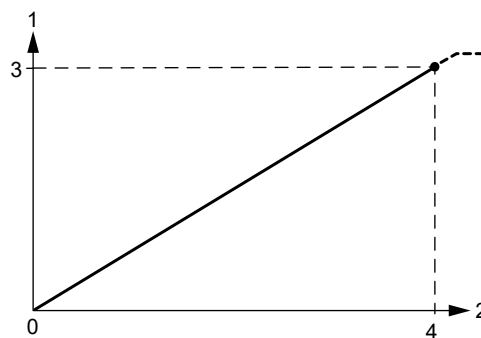
Output signals



Pressure response, DPI 2

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

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Pressure and temperature response, DPI 2+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

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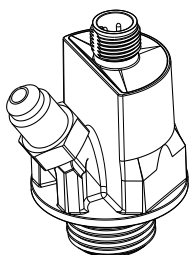
TM063358

5.6.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 4.0 bar (0 - 58.0 psid)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1/1000 FS
Temperature, DPI 2+T with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-120 °C (32-248 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	$\pm 2 K$
Response time for sensor electronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity, relative	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data, DPI 2 without temperature output	
Power supply, DPI 2	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 4 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
	60 Ω at 12.5 VDC
Maximum load impedance	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, DPI 2+T with temperature output	
Power supply, DPI 2+T	16.6 - 30 VDC
	0-10 VDC
Output signals	(0 V at 0 bar, 10 V at 4 bar)
Signal cut off	(0 V at 0 °C, 10 V at 100 °C)
	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

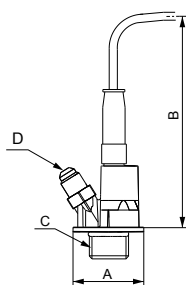
Materials	
Sensing element	Silicon-based MEMS
O-ring	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

5.7 DPI 2 and DPI 2+T, 0 - 6.0 bar (0 - 87.0 psid)



DPI 2 and DPI 2+T transmitter

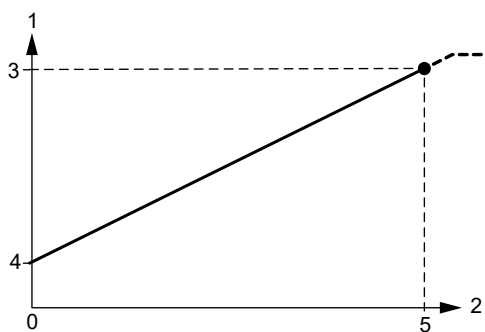
Dimensions



Dimensions, DPI 2 and DPI 2+T

	A	B	C	D
mm	36.95	110	ISO 228/1 - G	7/16 - 20 UNF
in	1.45	4.33	1/2	0.25" flare

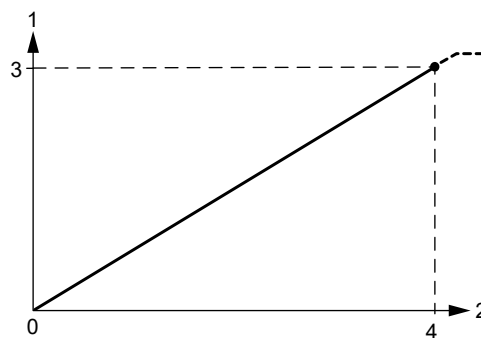
Output signals



Pressure response, DPI 2

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

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Pressure and temperature response, DPI 2+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

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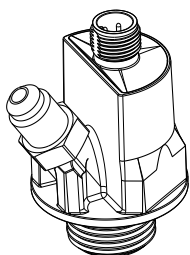
TM063358

5.7.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 6.0 bar (0 - 87.0 psid)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1/1000 FS
Temperature, DPI 2+T with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-120 °C (32-248 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	$\pm 2 K$
Response time for sensor electronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity, relative	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data, DPI 2 without temperature output	
Power supply, DPI 2	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 6 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
	60 Ω at 12.5 VDC
Maximum load impedance	100 Ω at 13.3 VDC
	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, DPI 2+T with temperature output	
Power supply, DPI 2+T	16.6 - 30 VDC
	0-10 VDC
Output signals	(0 V at 0 bar, 10 V at 6 bar)
Signal cut off	(0 V at 0 °C, 10 V at 100 °C)
	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

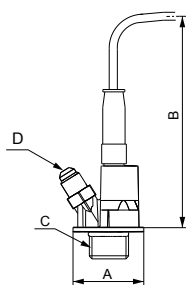
Materials	
Sensing element	Silicon-based MEMS
O-ring	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

5.8 DPI 2 and DPI 2+T, 0 - 10.0 bar (0 - 145.0 psid)



DPI 2 and DPI 2+T transmitter

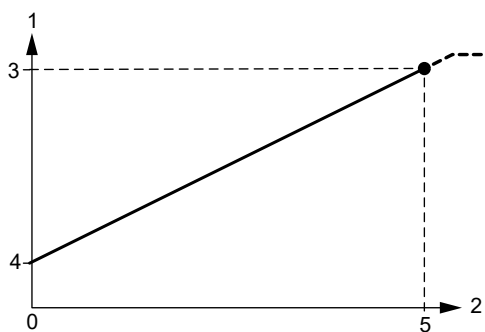
Dimensions



Dimensions, DPI 2 and DPI 2+T

	A	B	C	D
mm	36.95	110	ISO 228/1 - G	7/16 - 20 UNF
in	1.45	4.33	1/2	0.25" flare

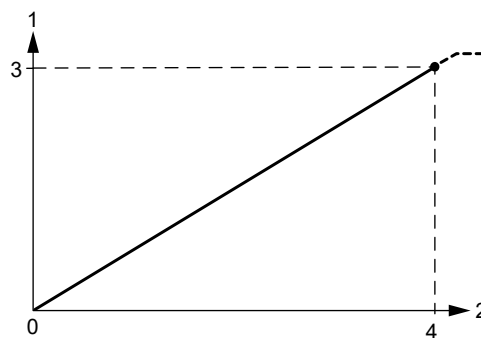
Output signals



Pressure response, DPI 2

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

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Pressure and temperature response, DPI 2+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

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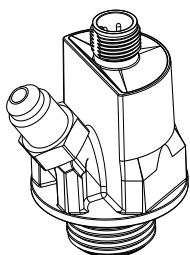
TM063359

5.8.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 10.0 bar (0 - 145.0 psid)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 2 \% FS$
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	$\pm 2.5 \% FS$
Response time	< 100 ms (typically 50 ms)
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1/1000 FS
Temperature, DPI 2+T with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-120 °C (32-248 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	$\pm 1 K$
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	$\pm 2 K$
Response time for sensor electronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity, relative	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data, DPI 2 without temperature output	
Power supply, DPI 2	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 10 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
Maximum load impedance	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, DPI 2+T with temperature output	
Power supply, DPI 2+T	16.6 - 30 VDC
	0-10 VDC
Output signals	(0 V at 0 bar, 10 V at 10 bar)
Signal cut off	(0 V at 0 °C, 10 V at 100 °C)
	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

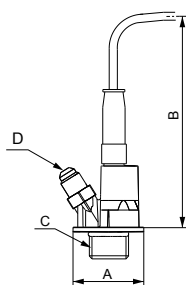
Materials	
Sensing element	Silicon-based MEMS
O-ring	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

5.9 DPI 2 and DPI 2+T, 0 - 16.0 bar (0 - 232.1 psid)



DPI 2 and DPI 2+T transmitter

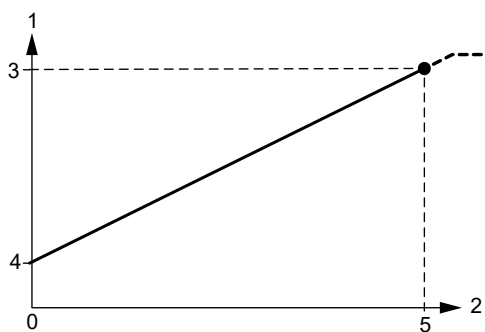
Dimensions



Dimensions, DPI 2 and DPI 2+T

	A	B	C	D
mm	36.95	110	ISO 228/1 - G	7/16 - 20 UNF
in	1.45	4.33	1/2	0.25" flare

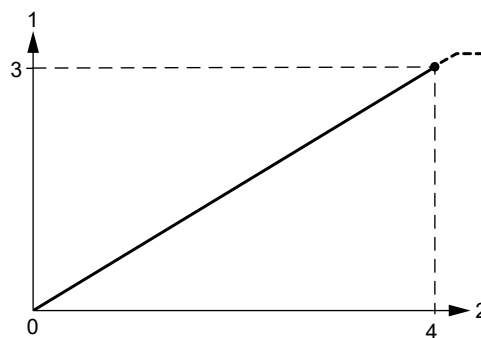
Output signals



Pressure response, DPI 2

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

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Pressure and temperature response, DPI 2+T

Pos.	Description
0	P_{min} T_{min}
1	Pressure and temperature output signals
2	Pressure and temperature
3	10 V
4	P_{max} T_{max}

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5.9.1 Specifications

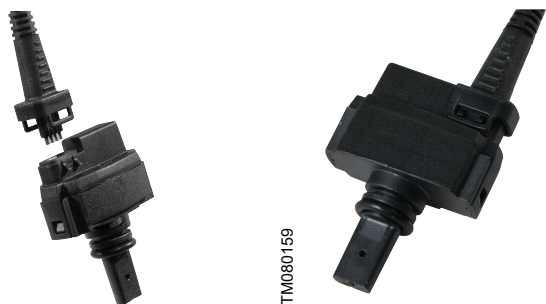
Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 16.0 bar (0 - 232.1 psid)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	± 2.5 % FS
Accuracy ($\pm 1 \sigma$), -30 to +100 °C (-22 to +212 °F)	± 3 % FS
Response time	< 100 ms (typically 50 ms)
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1/1000 FS
Temperature, DPI 2+T with temperature output	
Measuring range ($T_{min} - T_{max}$)	0-120 °C (32-248 °F)
Accuracy ($\pm 1 \sigma$), 0-80 °C (32-176 °F)	± 1 K
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	± 2 K
Response time for sensor electronics	< 100 ms (typically 50 ms)
Resolution	0.1 K
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	-30 to +120 °C (-22 to +248 °F)
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Storage temperature	-55 to +70 °C (-67 to +158 °F)
Humidity, relative	0-95 % RH, non-condensing
Maximum system pressure	30 bar (435 psig)
Burst pressure	40 bar (580 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data, DPI 2 without temperature output	
Power supply, DPI 2	12.5 - 30 VDC
Output signal	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 16 bar
Signal cut off	21 mA
Maximum power consumption	660 mW
	60 Ω at 12.5 VDC
	100 Ω at 13.3 VDC
Maximum load impedance	600 Ω at 24 VDC
	900 Ω at 30 VDC
Maximum cable length	30 m (98 ft)
Electrical data, DPI 2+T with temperature output	
Power supply, DPI 2+T	16.6 - 30 VDC
	0-10 VDC
Output signals	(0 V at 0 bar, 10 V at 16 bar)
Signal cut off	(0 V at 0 °C, 10 V at 100 °C)
	11 VDC
Maximum power consumption	270 mW
Minimum load impedance	10 k Ω
Maximum cable length	30 m (98 ft)

Materials	
Sensing element	Silicon-based MEMS
O-ring	EPDM or FKM
Housing	Stainless steel 1.4404 (AISI 316 L)
Wetted materials	Corrosion-resistant coating, EPDM or FKM Stainless steel 1.4404 (AISI 316 L)
Environmental standards	
Enclosure class	IP67, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

6. Relative Pressure sensor Standard, RPS

6.1 General data

RPS sensor



6.1.1 Technical overview

The RPS is a combined pressure and temperature sensor (two in-one) from Grundfos Direct Sensors™.

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

6.1.2 Applications

- Pump control
- HVAC systems
- renewable energies such as heat pumps, solar thermals, fresh water and micro-CHP systems
- monitoring and control systems
- water treatment plants
- water utility and distribution systems
- HPC and IT cooling systems.

6.1.3 Features and benefits

- Pressure and temperature measurement in one sensor (two-in-one solution) for easy and cost-efficient installation
- MEMS technology
- direct contact with the aqueous media resulting in a fast response time
- plug and play for quick setup
- smart system solution with Grundfos pump controls
- compact and robust design
- compatible with aqueous media
- suitable for a wide temperature range
- suitable for a wide range of applications.

6.1.4 Pressure range

Pressure range	
[bar]	[psig]
0 - 0.6	0 - 8.7
0 - 1.0	0 - 14.5
0 - 1.6	0 - 23.2
0 - 2.5	0 - 36.3
0 - 4.0	0 - 58.0
0 - 6.0	0 - 87.0
0 - 10.0	0 - 145.0
0 - 16.0	0 - 232.0

6.1.5 Approvals (w/EPDM O-rings)

- WRAS
- KTW
- AS 4020
- ACS.

6.1.6 Certificates

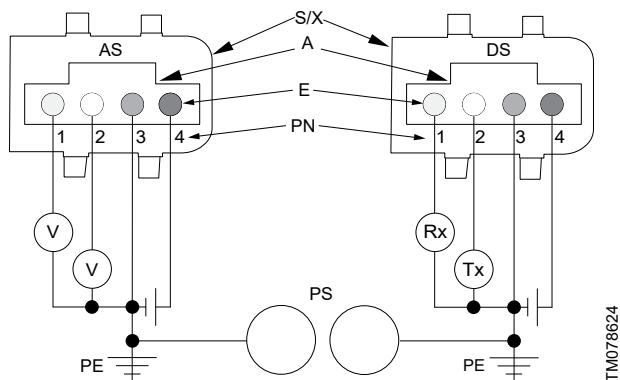


C, CSA, US



EAC

6.1.7 Electrical connections



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Electrical connections

Pos.	Description	
S/X	Snap-on connector	
A	Standard connector	
E	Electrical connector	
PN	Pin No.	
PS	Pipe system	
AS	Analog signal	
DS	Digital signal	
PE	Protective Earth	

Pin	Description Analog signal	Description Digital signal	Colour
1	Temperature signal	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

Power supply requirements

- VDC ± 5 % PELV (Ratiometric)
- The sensor must be separated from hazardous live circuitry by double or reinforced insulation
- Maximum 10 mV ripple, 50 Hz
- Minimum output current 25 mA
- Grounding of sensor supply is required.

6.1.8 Options



Sensor options

Description
1/2" nipple, stainless steel (316L)

TM066671

6.1.9 Differential temperature

The differential temperature is between two standard Direct Sensors™ from Grundfos.

6.1.10 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:

- 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.

Remarks

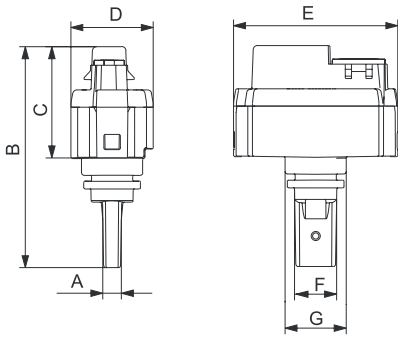
For RPS sensors with condensation protection, the protection applied has a maximum influence on the pressure accuracy of up to ± 0.22 bar for transient temperature changes of up to dT 15 °C. However, for RPS 0-16, the maximum influence is ± 0.80 bar. For compensation in the controller, please request the RPS Gel Compensation Note from your sensor representative.

6.2 RPS, 0 - 0.6 bar (0 - 8.7 psig)



RPS sensor

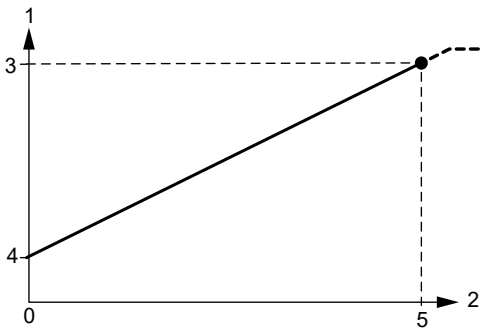
Dimensions



Dimensions, RPS

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

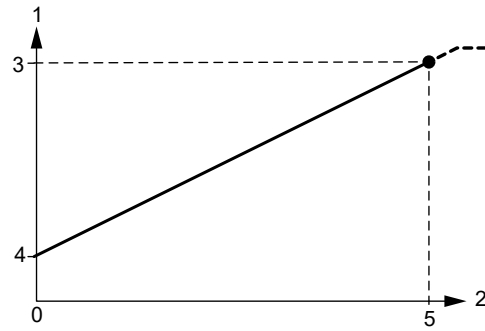
Output signal



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}

TM060158



Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

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6.2.1 Specifications

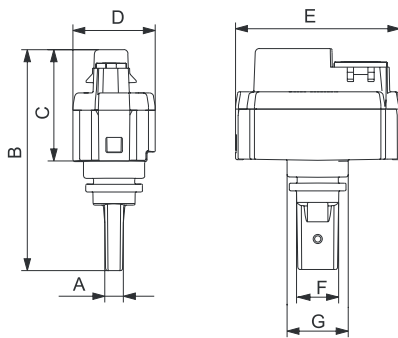
Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 0.6 bar (0 - 8.7 psig)
Accuracy ($\pm 1 \sigma$), in water, 15-90 °C (59-194 °F)	± 1.5 % FS
Accuracy ($\pm 1 \sigma$), in water, 0-120 °C (32-248 °F)	± 2 % FS
Response time (63.2 %)	< 1 s
Resolution	0.6 mbar (0.009 psig)
Temperature	
Measuring range (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 elec- tronics	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 wet- ted materials
Liquid temperature, operation	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	5 VDC (± 5 %), PELV Grounding of sensor supply is re- quired.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol
Analog output signal	0.5 - 3.5 VDC (0.5 V at 0 bar, 3.5 V at 0.6 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter ISO 7/1 - R1/2" and NPT 1/2", EN 1.4408 (AISI 316)
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

6.3 RPS, 0 - 1.0 bar (0 - 14.5 psig)



RPS sensor

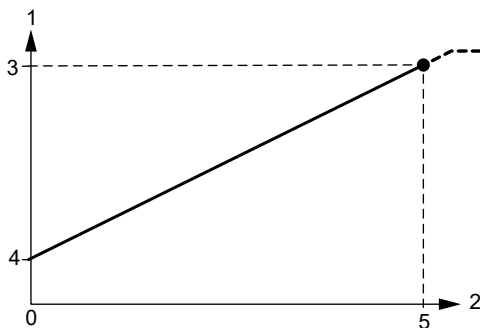
Dimensions



Dimensions, RPS

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

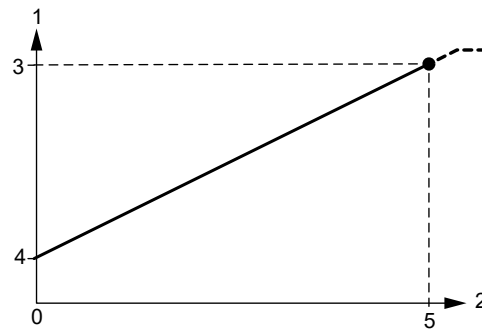
Output signal



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}

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Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

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6.3.1 Specifications

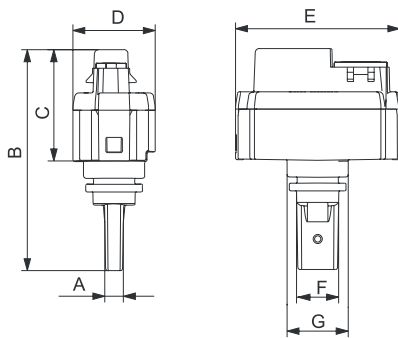
Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 1.0 bar (0 - 14.5 psig)
Accuracy ($\pm 1 \sigma$), 15-90 °C (59-194 °F)	± 1.5 % FS
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	± 2 % FS
Response time	< 1 s
Resolution	0.6 mbar (0.009 psig)
Temperature	
Measuring range (T_{\min} - T_{\max})	0-120 °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 elec- tronics	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 wet- ted materials
Liquid temperature, operation	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	5 VDC (± 5 %), PELV Grounding of sensor supply is re- quired.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol
Analog output signal	0.5 - 3.5 VDC (0.5 V at 0 bar, 3.5 V at 1 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter ISO 7/1 - R1/2" and NPT 1/2", EN 1.4408 (AISI 316)
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

6.4 RPS, 0 - 1.6 bar (0 - 23.2 psig)



RPS sensor

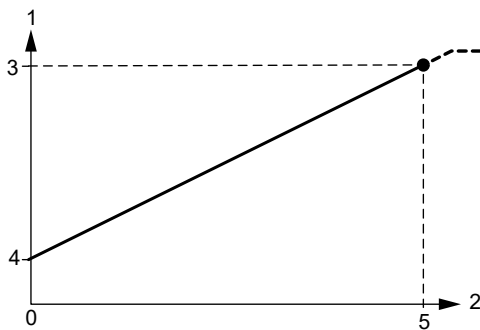
Dimensions



Dimensions, RPS

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

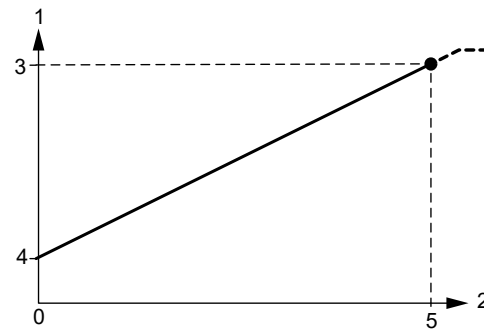
Output signal



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}

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Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

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6.4.1 Specifications

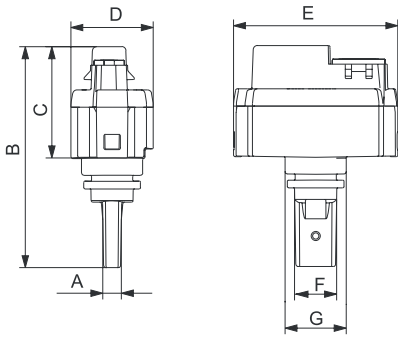
Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 1.6 bar (0 - 23.2 psig)
Accuracy ($\pm 1 \sigma$), 15-90 °C (59-194 °F)	± 1 % FS
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	± 1.5 % FS
Response time	< 1 s
Resolution	0.6 mbar (0.009 psig)
Temperature	
Measuring range (T_{\min} - T_{\max})	0-120 °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	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	5 VDC (± 5 %), PELV Grounding of sensor supply is required.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol
Analog output signal	0.5 - 3.5 VDC (0.5 V at 0 bar, 3.5 V at 1.6 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter ISO 7/1 - R1/2" and NPT 1/2", EN 1.4408 (AISI 316)
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

6.5 RPS, 0 - 2.5 bar (0 - 36.3 psig)



RPS sensor

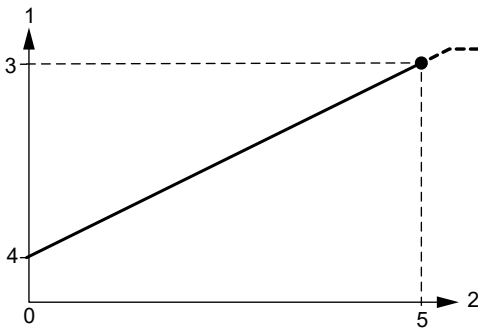
Dimensions



Dimensions, RPS

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

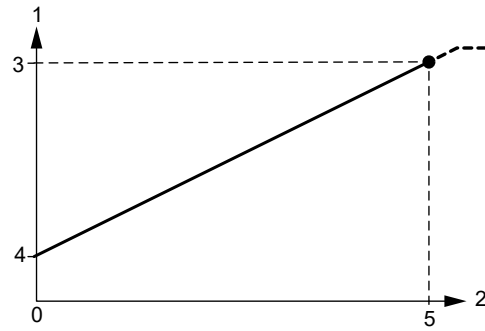
Output signal



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}

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Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

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6.5.1 Specifications

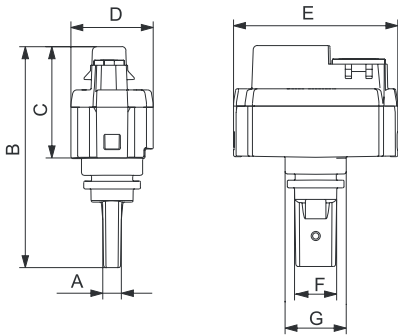
Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 2.5 bar (0 - 36.3 psig)
Accuracy ($\pm 1 \sigma$), 15-90 °C (59-194 °F)	± 1 % FS
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	± 1.5 % FS
Response time	< 1 s
Resolution	0.6 mbar (0.009 psig)
Temperature	
Measuring range (T_{\min} - T_{\max})	0-120 °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 elec- tronics	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 wet- ted materials
Liquid temperature, operation	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	5 VDC (± 5 %), PELV Grounding of sensor supply is re- quired.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol
Analog output signal	0.5 - 3.5 VDC (0.5 V at 0 bar, 3.5 V at 2.5 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter ISO 7/1 - R1/2" and NPT 1/2", EN 1.4408 (AISI 316)
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

6.6 RPS, 0 - 4.0 bar (0 - 58.0 psig)



RPS sensor

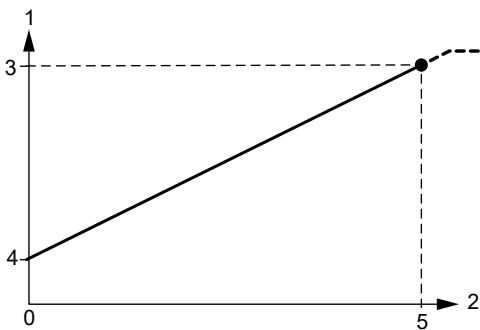
Dimensions



Dimensions, RPS

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

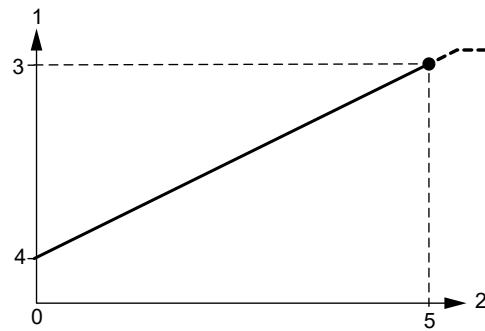
Output signal



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}

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Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

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6.6.1 Specifications

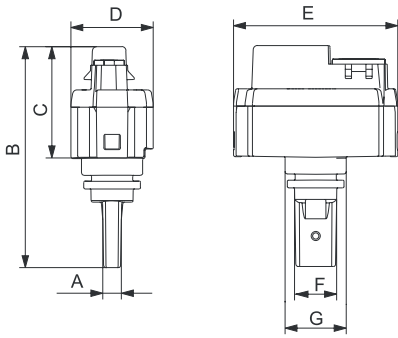
Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 4.0 bar (0 - 58.0 psig)
Accuracy ($\pm 1 \sigma$), 15-90 °C (59-194 °F)	± 1 % FS
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	± 1.5 % FS
Response time	< 1 s
Resolution	0.6 mbar (0.009 psig)
Temperature	
Measuring range (T_{\min} - T_{\max})	0-120 °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 elec- tronics	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 wet- ted materials
Liquid temperature, operation	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	5 VDC (± 5 %), PELV Grounding of sensor supply is re- quired.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol
Analog output signal	0.5 - 3.5 VDC (0.5 V at 0 bar, 3.5 V at 4 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter ISO 7/1 - R1/2" and NPT 1/2", EN 1.4408 (AISI 316)
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

6.7 RPS, 0 - 6.0 bar (0 - 87.0 psig)



RPS sensor

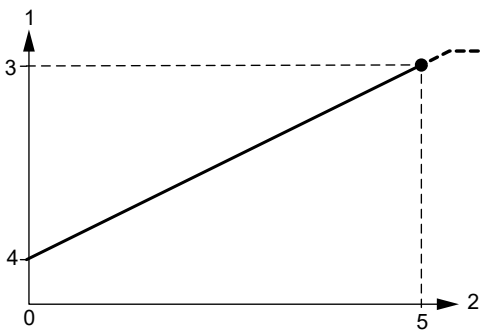
Dimensions



Dimensions, RPS

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

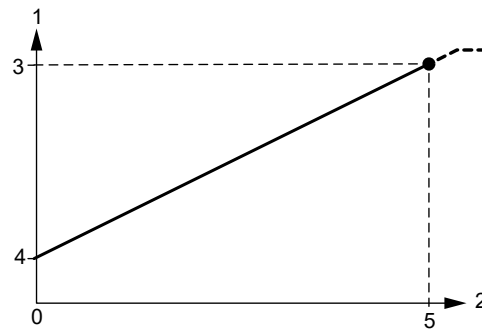
Output signal



Pressure response in analog mode

Pos.	Description
0	P_{\min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{\max}

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Temperature response in analog mode

Pos.	Description
0	T_{\min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{\max}

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6.7.1 Specifications

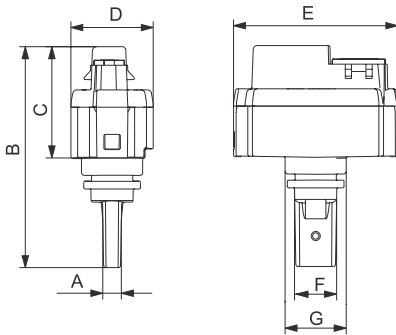
Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 6.0 bar (0 - 87.0 psig)
Accuracy ($\pm 1 \sigma$), 15-90 °C (59-194 °F)	± 1 % FS
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	± 1.5 % FS
Response time	< 1 s
Resolution	0.6 mbar (0.009 psig)
Temperature	
Measuring range (T_{\min} - T_{\max})	0-120 °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 elec- tronics	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 wet- ted materials
Liquid temperature, operation	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	5 VDC (± 5 %), PELV Grounding of sensor supply is re- quired.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol
Analog output signal	0.5 - 3.5 VDC (0.5 V at 0 bar, 3.5 V at 6 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter ISO 7/1 - R1/2" and NPT 1/2", EN 1.4408 (AISI 316)
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

6.8 RPS, 0 - 10.0 bar (0 - 145.0 psig)



RPS sensor

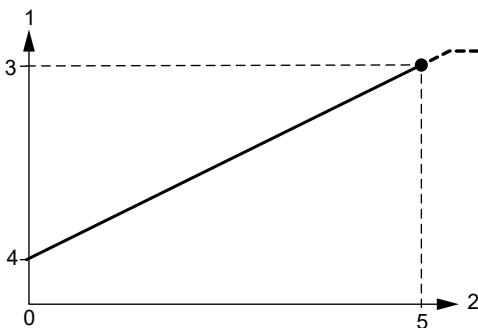
Dimensions



Dimensions, RPS

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

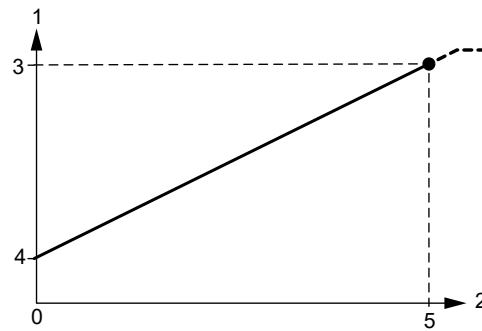
Output signals



Pressure response in analog mode

Pos.	Description
0	P_{\min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{\max}

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Temperature response in analog mode

Pos.	Description
0	T_{\min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{\max}

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6.8.1 Specifications

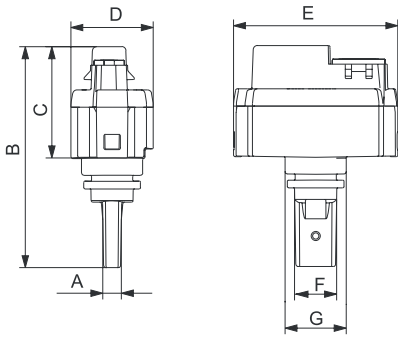
Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 10.0 bar (0 - 145.0 psig)
Accuracy ($\pm 1 \sigma$), 15-90 °C (59-194 °F)	± 1 % FS
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	± 1.5 % FS
Response time	< 1 s
Resolution	0.6 mbar (0.009 psig)
Temperature	
Measuring range (T_{\min} - T_{\max})	0-120 °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 elec- tronics	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	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	5 VDC (± 5 %), PELV Grounding of sensor supply is required.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol
Analog output signal	0.5 - 3.5 VDC (0.5 V at 0 bar, 3.5 V at 10 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter ISO 7/1 - R1/2" and NPT 1/2", EN 1.4408 (AISI 316)
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

6.9 RPS, 0 - 16.0 bar (0 - 232.1 psig)



RPS sensor

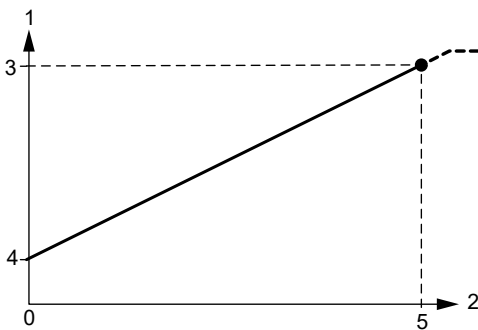
Dimensions



Dimensions, RPS

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

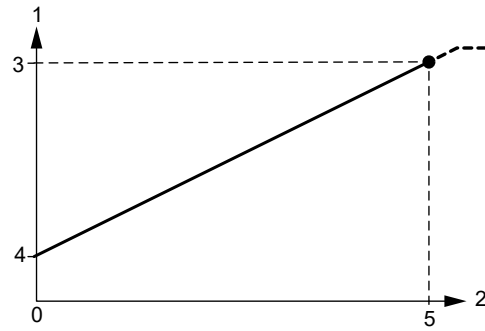
Output signal



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}

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Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

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6.9.1 Specifications

Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 16.0 bar (0 - 232.1 psid)
Accuracy ($\pm 1 \sigma$), 15-90 °C (59-194 °F)	± 1 % FS
Accuracy ($\pm 1 \sigma$), 0-120 °C (32-248 °F)	± 1.5 % FS
Response time	< 1 s
Resolution	0.6 mbar (0.009 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 elec- tronics	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	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 to +248 °F), non-freezing
Ambient temperature, opera- tion	-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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	5 VDC (± 5 %), PELV Grounding of sensor supply is required.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol
Analog output signal	0.5 - 3.5 VDC (0.5 V at 0 bar, 3.5 V at 16 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter ISO 7/1 - R1/2" and NPT 1/2", EN 1.4408 (AISI 316)
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

7. Relative Pressure sensor Standard, RPS7

7.1 General data

RPS sensor



7.1.1 Technical overview

RPS7 is a pressure sensor from Grundfos Direct Sensors™.

The RPS7 sensor is fully compatible with wet, aqueous media. The sensor is based on MEMS sensing technology in combination with the corrosion-resistant Silicoat® coating technology on the sensor chip.

7.1.2 Applications

- Pump control
- HVAC systems
- renewable energies such as heat pumps, solar thermals, fresh water and micro-CHP systems
- monitoring and control systems
- water treatment plants
- water utility and distribution systems
- HPC and IT cooling systems.

7.1.3 Features and benefits

- MEMS technology
- direct contact with the aqueous media resulting in a fast response time
- plug and play for quick setup
- smart system solution with Grundfos pump controls
- compact and robust design
- compatible with aqueous media
- suitable for a wide temperature range
- suitable for a wide range of applications.

7.1.4 Pressure range

Pressure range	
[bar]	[psig]
-1.0 to +5.0	-14.5 to +72.5
0 - 6.0	0 - 87.0
0 - 10.0	0 - 145.0
0 - 16.0	0 - 232.0

7.1.5 Approvals (w/EPDM O-rings)

- WRAS
- AS 4020
- ACS.

7.1.6 Certificates

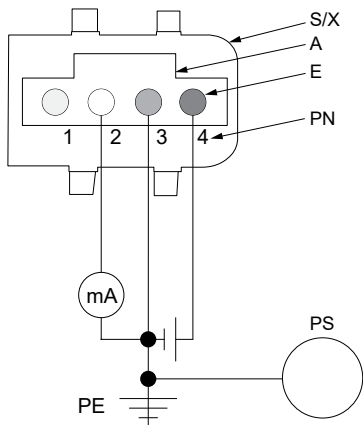


C, CSA, US



EAC

7.1.7 Electrical connections



Electrical connections

Pos.	Description
S/X	Snap-on connector
A	Standard connector
PS	Pipe system
A1	Pressure signal
E	Electrical connector
PN	Pin No.
PE	Protective Earth

Pin	Description	Colour
1	Not used	Yellow
2	Pressure signal	White
3	GND, 0 V PELV	Green
4	Voltage supply, 12-30 VDC	Brown

Power supply requirements

- 12-30 VDC PELV.
- The sensor must be separated from hazardous live circuitry by double or reinforced insulation.
- Minimum output current: 37 mA.
- Grounding of sensor supply is required.

7.1.8 Options



Sensor options

Description
1/2" nipple, stainless steel (316L)

7.1.9 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:

- 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.

Remarks

For RPS sensors with condensation protection, the protection applied has a maximum influence on the pressure accuracy of up to ± 0.22 bar for transient temperature changes of up to $\Delta T 15$ °C. However, for RPS 0-16, the maximum influence is ± 0.80 bar. For compensation in the controller, please request the RPS Gel Compensation Note from your sensor representative.

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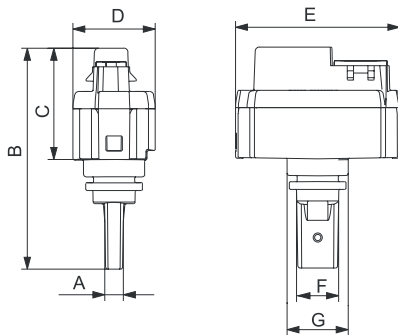
TM066671

7.2 RPS7, -1.0 to +5.0 bar (-14.5 to +72.5 psig)



RPS sensor

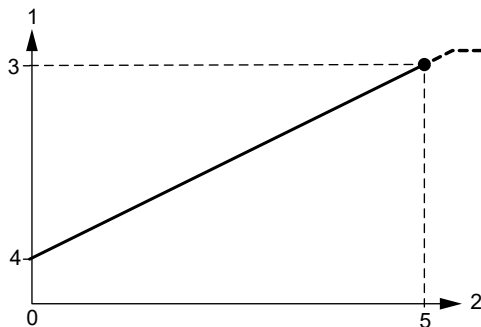
Dimensions



Dimensions, RPS

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

Output signal



Pressure response

Pos.	Description
0	P_{\min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{\max}

7.2.1 Specifications

Pressure	
Measuring range ($P_{\min} - P_{\max}$)	-1.0 to +5.0 bar (-14.5 to +72.5 psig)
Accuracy ($\pm 1 \sigma$), in water, 0-100 °C (32-212 °F)	$\pm 2 \% \text{ FS}$ $\pm 5 \% \text{ FS}$ with gel
Response time (63.2 %)	< 0.25 s
Resolution	1:500
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	12-30 VDC, PELV Grounding of sensor supply is required.
Output signals	4-20 mA
Corresponding range	4 mA at -1 bar, 20 mA at 5 bar
Signal cut off	21 mA
Power consumption, 0 °C	255 mW*
Power consumption, 100 °C	655 mW**
Load impedance	See the curve below.
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter 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, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

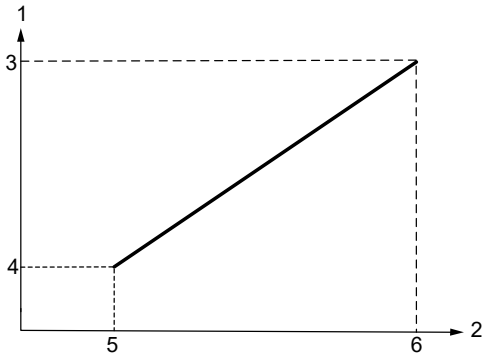
* Measured at $V_{CC} = 24 \text{ V}$, $P = P_{\min}$ and $R_{\text{load}} = 147 \Omega$. Power consumption also includes the output signal.

** Measured at $V_{CC} = 24 \text{ V}$, $P = P_{\max}$ and $R_{\text{load}} = 147 \Omega$. Power consumption also includes the output signal.

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Maximum load impedance vs. supply voltage

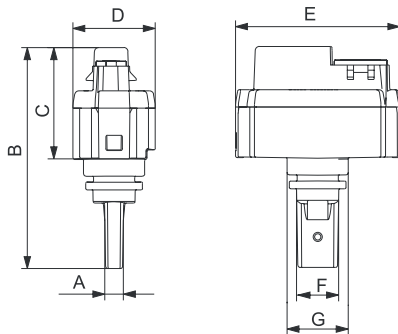
Pos.	Description
1	Supply voltage
2	R_{load}
3	30 V
4	12 V
5	100 Ω
6	1000 Ω

7.3 RPS7, 0 - 6.0 bar (0 - 87.0 psig)



RPS sensor

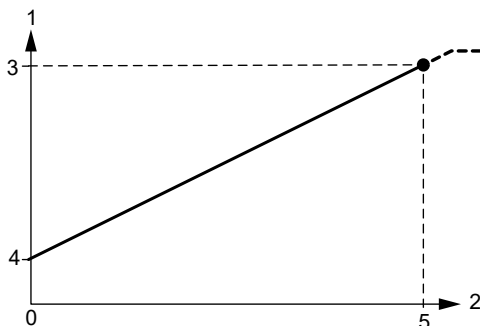
Dimensions



Dimensions, RPS

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

Output signal



Pressure response

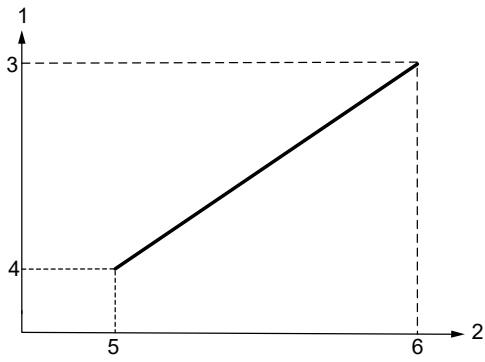
Pos.	Description
0	P_{\min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{\max}

7.3.1 Specifications

Pressure	
Measuring range ($P_{\min} - P_{\max}$)	0-6 bar (0-87 psig)
Accuracy ($\pm 1 \sigma$), in water, 0-100 °C (32-212 °F)	$\pm 2 \% \text{ FS}$ $\pm 5 \% \text{ FS with gel}$
Response time (63.2 %)	< 0.25 s
Resolution	1:500
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	12-30 VDC, PELV Grounding of sensor supply is required.
Output signals	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 6 bar
Signal cut off	21 mA
Power consumption, 0 °C	255 mW*
Power consumption, 100 °C	655 mW**
Load impedance	See the curve below.
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter 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, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

* Measured at $V_{CC} = 24 \text{ V}$, $P = P_{\min}$ and $R_{\text{load}} = 147 \Omega$. Power consumption also includes the output signal.

** Measured at $V_{CC} = 24 \text{ V}$, $P = P_{\max}$ and $R_{\text{load}} = 147 \Omega$. Power consumption also includes the output signal.



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Maximum load impedance vs. supply voltage

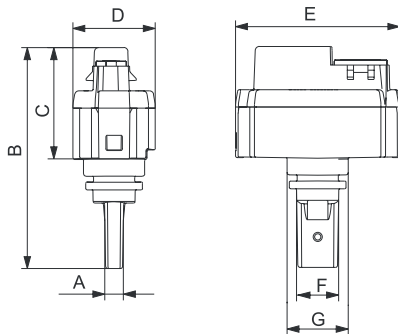
Pos.	Description
1	Supply voltage
2	R_{load}
3	30 V
4	12 V
5	100 Ω
6	1000 Ω

7.4 RPS7, 0 - 10.0 bar (0 - 145.0 psig)



RPS sensor

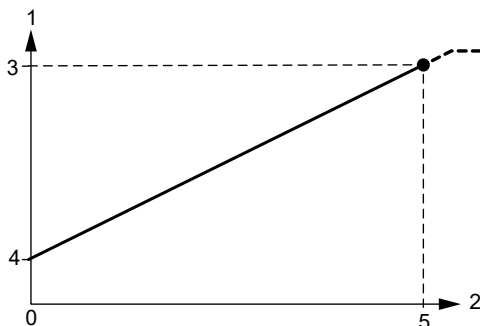
Dimensions



Dimensions, RPS

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

Output signal



Pressure response

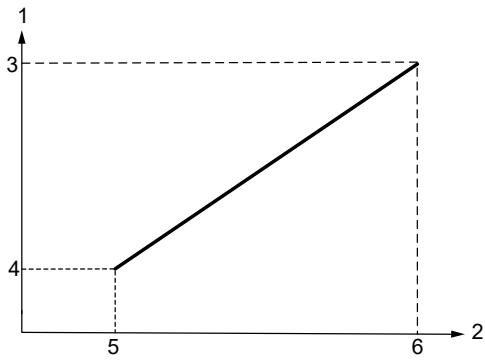
Pos.	Description
0	P_{\min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{\max}

7.4.1 Specifications

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)	$\pm 2 \% \text{ FS}$ $\pm 5 \% \text{ FS with gel}$
Response time (63.2 %)	< 0.25 s
Resolution	1:500
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	12-30 VDC, PELV Grounding of sensor supply is required.
Output signals	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 10 bar
Signal cut off	21 mA
Power consumption, 0 °C	255 mW*
Power consumption, 100 °C	655 mW**
Load impedance	See the curve below.
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter 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, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

* Measured at $V_{CC} = 24 \text{ V}$, $P = P_{\min}$ and $R_{\text{load}} = 147 \Omega$. Power consumption also includes the output signal.

** Measured at $V_{CC} = 24 \text{ V}$, $P = P_{\max}$ and $R_{\text{load}} = 147 \Omega$. Power consumption also includes the output signal.



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Maximum load impedance vs. supply voltage

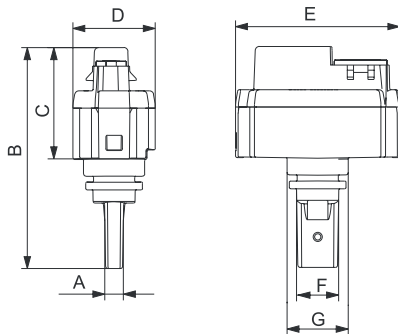
Pos.	Description
1	Supply voltage
2	R_{load}
3	30 V
4	12 V
5	100 Ω
6	1000 Ω

7.5 RPS7, 0 - 16.0 bar (0 - 232.0 psig)



RPS sensor

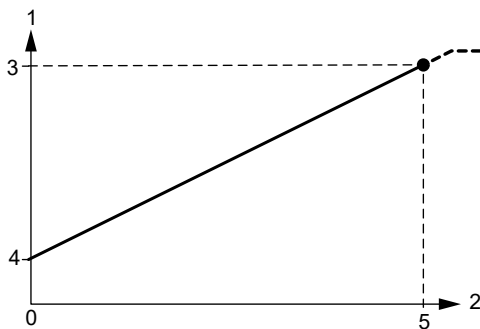
Dimensions



Dimensions, RPS

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

Output signal



Pressure response

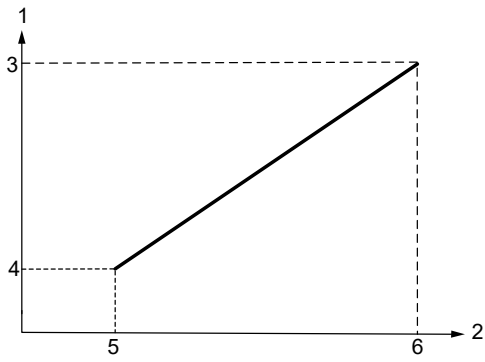
Pos.	Description
0	P_{\min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{\max}

7.5.1 Specifications

Pressure	
Measuring range ($P_{\min} - P_{\max}$)	0-16 bar (0-232 psig)
Accuracy ($\pm 1 \sigma$), in water, 0-100 °C (32-212 °F)	$\pm 2 \%$ FS $\pm 5 \%$ FS with gel
Response time (63.2 %)	< 0.25 s
Resolution	1:500
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	12-30 VDC, PELV Grounding of sensor supply is required.
Output signals	4-20 mA
Corresponding range	4 mA at 0 bar, 20 mA at 16 bar
Signal cut off	21 mA
Power consumption, 0 °C	255 mW*
Power consumption, 100 °C	655 mW**
Load impedance	See the curve below.
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter 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, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

* Measured at $V_{CC} = 24$ V, $P = P_{\min}$ and $R_{load} = 147 \Omega$. Power consumption also includes the output signal.

** Measured at $V_{CC} = 24$ V, $P = P_{\max}$ and $R_{load} = 147 \Omega$. Power consumption also includes the output signal.



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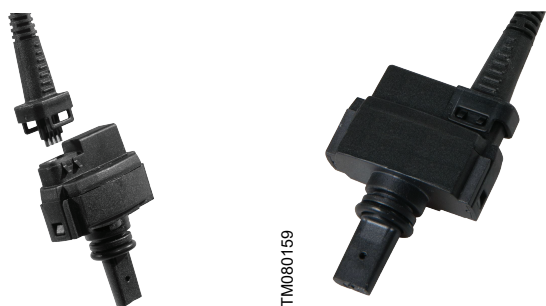
Maximum load impedance vs. supply voltage

Pos.	Description
1	Supply voltage
2	R_{load}
3	30 V
4	12 V
5	100 Ω
6	1000 Ω

8. Relative Pressure sensor Standard, RPS8

8.1 General data

RPS sensor



8.1.1 Technical overview

RPS7 is a pressure sensor from Grundfos Direct Sensors™.

The RPS7 sensor is fully compatible with wet, aqueous media. The sensor is based on MEMS sensing technology in combination with the corrosion-resistant Silicoat® coating technology on the sensor chip.

8.1.2 Applications

- Pump control
- HVAC systems
- renewable energies such as heat pumps, solar thermals, fresh water and micro-CHP systems
- monitoring and control systems
- water treatment plants
- water utility and distribution systems
- HPC and IT cooling systems.

8.1.3 Features and benefits

- MEMS technology
- direct contact with the aqueous media resulting in a fast response time
- plug and play for quick setup
- smart system solution with Grundfos pump controls
- compact and robust design
- compatible with aqueous media
- suitable for a wide temperature range
- suitable for a wide range of applications.

8.1.4 Pressure range

Pressure range	
[bar]	[psig]
0 - 0.1	0 - 1.45

8.1.5 Approvals (w/EPDM O-rings)

- WRAS
- AS 4020
- ACS.

8.1.6 Certificates

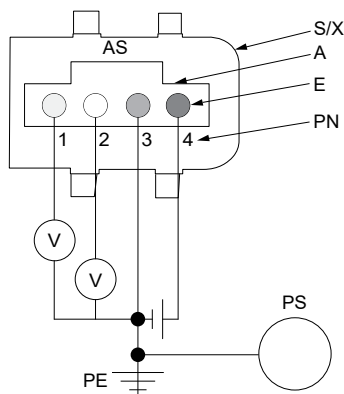


C, CSA, US



EAC

8.1.7 Electrical connections



Electrical connections

Pos.	Description
S/X	Snap-on connector
A	Standard connector
E	Electrical connector
PN	Pin No.
PS	Pipe system
AS	Analog signal
PE	Protective Earth

Pin	Description	Colour
1	Temperature signal	Yellow
2	Pressure signal	White
3	GND, 0 V PELV	Green
4	Voltage supply, 6-30 VDC	Brown

Power supply requirements

- 6-30 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.

8.1.8 Options



Sensor options

Description
1/2" nipple, stainless steel (316L)

TM050318

TM066671

8.1.9 Differential temperature

The differential temperature is between two standard Direct Sensors™ from Grundfos.

8.1.10 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:

- 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.

Remarks

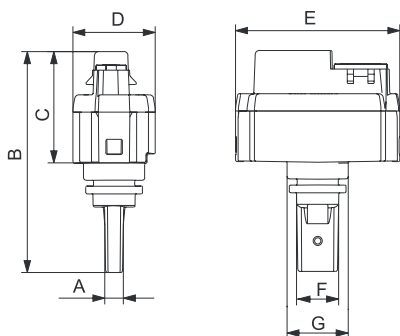
For RPS sensors with condensation protection, the protection applied has a maximum influence on the pressure accuracy of up to ± 0.22 bar for transient temperature changes of up to dT 15 °C. However, for RPS 0-16, the maximum influence is ± 0.80 bar. For compensation in the controller, please request the RPS Gel Compensation Note from your sensor representative.

8.2 RPS8, 0 - 0.1 bar (0 - 1.45 psig)



RPS sensor

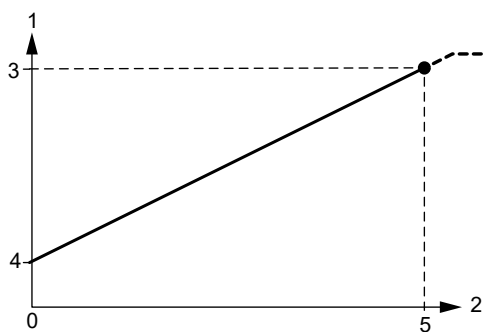
Dimensions



Dimensions, RPS

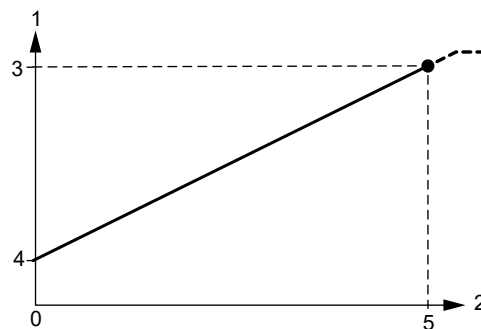
	A	B	C	D	E	F	G
mm	4.5	53.7	27	20	39.9	10.2	14.8
in	0.18	2.11	1.06	0.79	1.57	0.40	0.58

Output signals



Pressure response

Pos.	Description
0	P_{\min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{\max}



Temperature response ($^{\circ}\text{C}$)

Pos.	Description
0	T_{\min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{\max}

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TM063358

8.2.1 Specifications

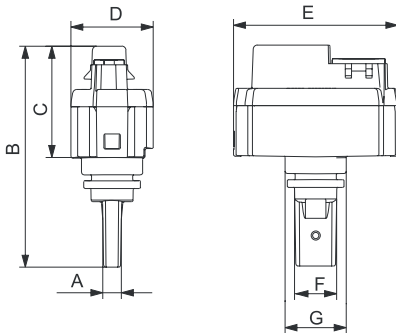
Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 0.1 bar (0 - 1.45 psig)
Accuracy ($\pm 1 \sigma$), in water, 0-100 °C (32-212 °F)	± 5 mbar
Offset drift ($\pm 1 \sigma$)	1.5 mbar / year
Offset	0.08 mbar/°C
Response time (63.2 %)	< 1 s
Resolution	0.01 mbar (0.000145 psig)
Temperature	
Measuring range (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	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	6-30 VDC, PELV Grounding of sensor supply is required.
Analog output signals	0.5 - 3.5 VDC (0.5 V at 0 bar, 3.5 V at 0.1 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	360 mW at 0 °C, $V_{CC} = 24$ V 450 mW at 100 °C, $V_{CC} = 24$ V
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter 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, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

8.3 RPS8, -0.1 to +0.15 bar (-1.45 to + 2.176 psig)



RPS sensor

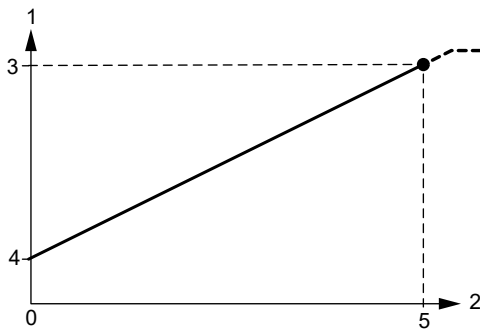
Dimensions



Dimensions, RPS

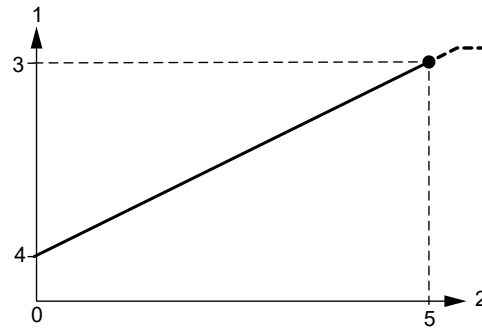
	A	B	C	D	E	F	G
mm	4.5	53.7	27	20	39.9	10.2	14.8
in	0.18	2.11	1.06	0.79	1.57	0.40	0.58

Output signals



Pressure response

Pos.	Description
0	P_{\min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{\max}



Temperature response ($^{\circ}\text{C}$)

Pos.	Description
0	T_{\min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{\max}

8.3.1 Specifications

Pressure	
Measuring range (P_{\min} - P_{\max})	-0.1 to + 0.15 bar -1.45 to + 2.176 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 elec- tronics	< 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 wet- ted materials
Liquid temperature, operation	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °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 psig)
Burst pressure	30 bar (435 psig)
Electrical data	
Power supply	6-30 VDC, PELV Grounding of sensor supply is re- quired.
Analog output signals	0.5 - 3.5 VDC (0.5 V at -0.1 bar, 3.5 V at 0.15 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	360 mW at 0 °C, $V_{CC} = 24$ V 450 mW at 100 °C, $V_{CC} = 24$ V
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)
Materials	
Sensor	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 Adapter 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, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

9. Differential Pressure sensor Standard, DPS

9.1 General data



DPS sensor



DPS sensor with adapter

9.1.1 Technical overview

DPS11 is a differential-pressure sensor from Grundfos Direct Sensors™.

The DPS11 sensor is fully compatible with aqueous media. The sensor is based on MEMS sensing technology in combination with the corrosion-resistant Silicoat® coating technology on the sensor chip.

9.1.2 Applications

- Pump control
- HVAC systems
- renewable energies such as heat pumps, solar thermals, fresh water and micro-CHP systems
- monitoring and control systems
- water treatment plants
- water utility and distribution systems
- HPC and IT cooling systems.

9.1.3 Features and benefits

- MEMS technology
- direct contact with the aqueous media resulting in a fast response time
- plug and play for quick setup
- smart system solution with Grundfos pump controls
- compact and robust design
- compatible with aqueous media
- suitable for a wide temperature range
- suitable for a wide range of applications.

9.1.4 Pressure range

Pressure range	
[bar]	[psid]
0 - 0.6	0 - 8.7
0 - 1.0	0 - 14.5
0 - 1.6	0 - 23.2
0 - 2.5	0 - 36.3
0 - 4.0	0 - 58.0
0 - 6.0	0 - 87.0

9.1.5 Approvals (w/EPDM O-rings)

- WRAS
- KTW
- ACS.

9.1.6 Certificates



C, CSA, US

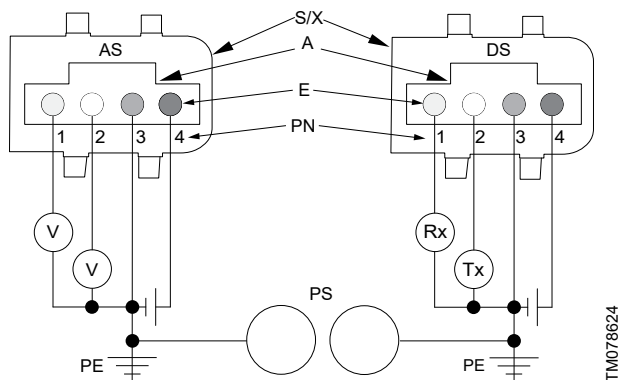


EAC

TM075936

TM061682

9.1.7 Electrical connections



TM078624

Electrical connections





Pos.	Description	
S/X	Snap-on connector	
A	Standard connector	
E	Electrical connector	
PN	Pin No.	
PS	Pipe system	
AS	Analog signal	
DS	Digital signal	
PE	Protective Earth	

Pin	Description Analog signal	Description Digital signal	Colour
1	Temperature signal	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

Power supply requirements

- VDC ± 5 % PELV (Ratiometric).
- The sensor must be separated from hazardous live circuitry by double or reinforced insulation.
- Maximum 10 mV ripple, 50 Hz.
- Minimum output current: 25 mA.
- Grounding of sensor supply is required.

9.1.8 Options

Part			
	Adapter, 1/8" - 27 NPT	1.4408 (AISI 316)	Pressure adapter
	Fitting, 6 mm (0.23") Fitting, 8 mm (0.31")		Tube fitting
	Fitting, 6 mm (0.23") Fitting, 8 mm (0.31")	1.4408 (AISI 316)	Compression fitting
	Wall bracket for DPS with stainless steel adapter		

9.1.9 Differential temperature

The differential temperature is between two standard Direct Sensors™ from Grundfos.

9.1.10 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:

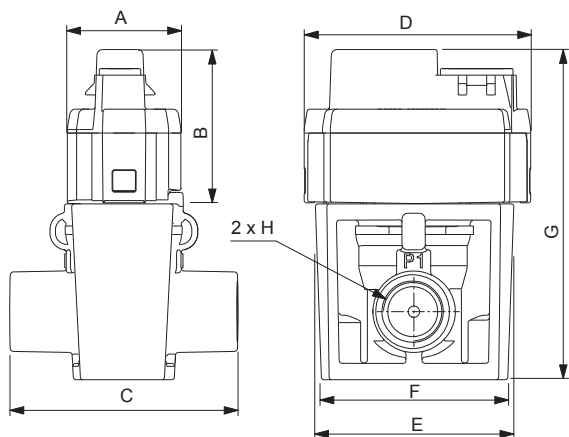
- Pressure Equipment Directive (2014/68/EU) according to article 4, paragraph 3.
- Low Voltage Directive (2014/35/EU) because the supply voltage is below 75 VDC.

9.2 DPS, 0 - 0.6 bar (0 - 8.7 psid)



DPS sensor

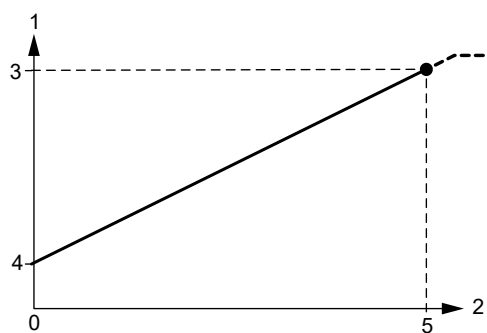
Dimensions



Dimensions, DPS including adapter

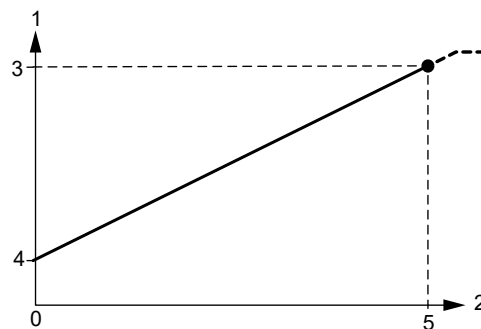
	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signals



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}



Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

9.2.1 Specifications

Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 0.6 bar (0 - 8.7 psid)
Accuracy ($\pm 1 \sigma$), in water, 15-90 °C (59-194 °F)	± 1.5 % FS
Accuracy ($\pm 1 \sigma$), in water, 0-120 °C (32-248 °F)	± 2 % FS
Response time (63.2 %)	< 1 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1.2 mbar (0.02 psid)
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	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	5 VDC (± 5 %), PELV. Grounding of sensor supply is required.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol 0.5 - 3.5 VDC
Analog output signals	(0.5 V at 0 bar, 3.5 V at 0.6 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)

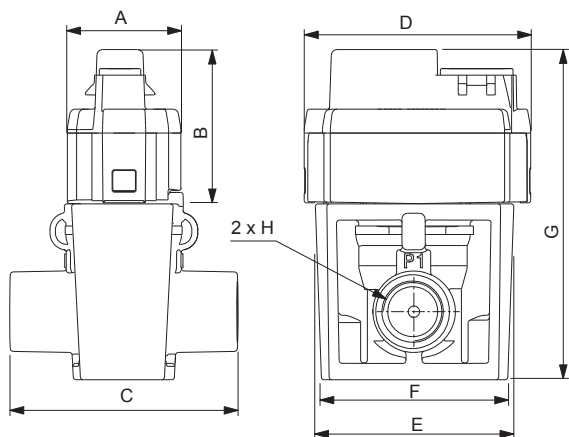
Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

9.3 DPS, 0 - 1.0 bar (0 - 14.5 psid)



DPS sensor

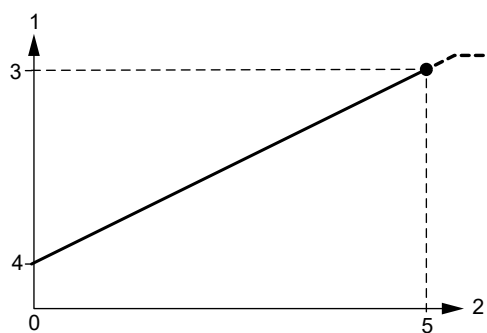
Dimensions



Dimensions, DPS including adapter

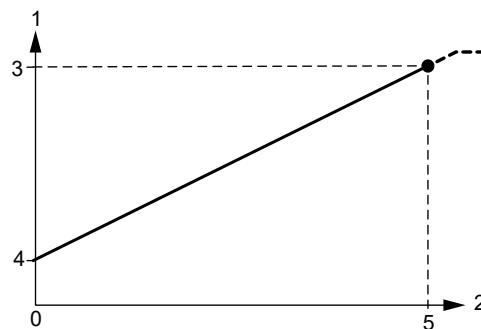
	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signals



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}



Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

9.3.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 1.0 bar (0 - 14.5 psid)
Accuracy ($\pm 1 \sigma$), in water, 15-90 °C (59-194 °F)	$\pm 1.5 \% FS$
Accuracy ($\pm 1 \sigma$), in water, 0-120 °C (32-248 °F)	$\pm 2 \% FS$
Response time (63.2 %)	< 1 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1.2 mbar (0.02 psid)
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	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	5 VDC ($\pm 5 \%$), PELV. Grounding of sensor supply is required.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol
Analog output signals	0.5 - 3.5 VDC (0.5 V at 0 bar, 3.5 V at 1 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)

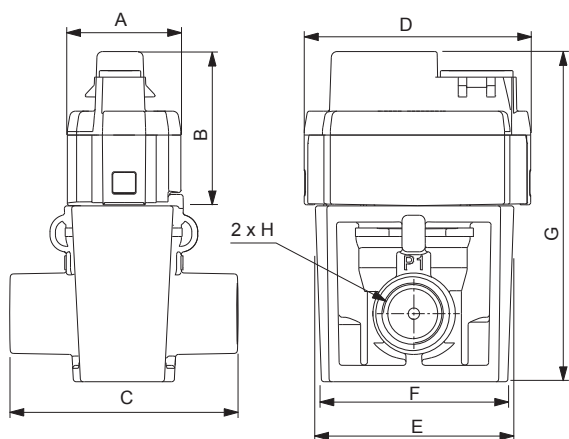
Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

9.4 DPS, 0 - 1.6 bar (0 - 23.2 psid)



DPS sensor

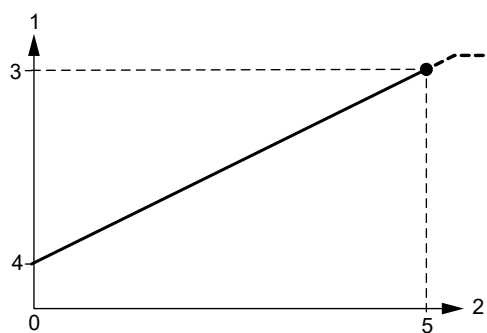
Dimensions



Dimensions, DPS including adapter

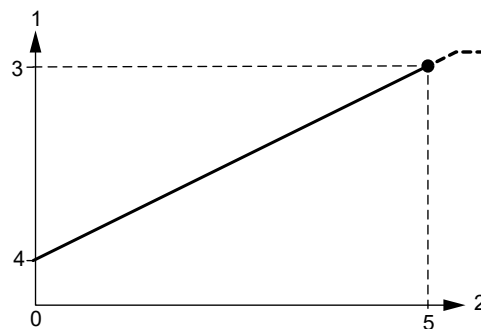
	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signals



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}



Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

9.4.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 1.6 bar (0 - 23.2 psid)
Accuracy ($\pm 1 \sigma$), in water, 15-90 °C (59-194 °F)	$\pm 1.5 \% FS$
Accuracy ($\pm 1 \sigma$), in water, 0-120 °C (32-248 °F)	$\pm 2 \% FS$
Response time (63.2 %)	< 1 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1.2 mbar (0.02 psid)
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	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	5 VDC ($\pm 5 \%$), PELV. Grounding of sensor supply is required.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol 0.5 - 3.5 VDC
Analog output signals	(0.5 V at 0 bar, 3.5 V at 1.6 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)

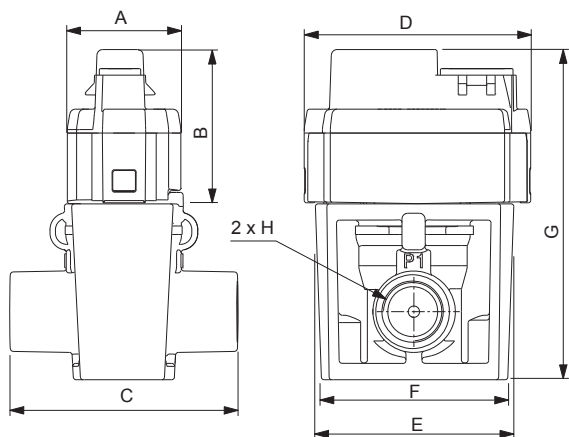
Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

9.5 DPS, 0 - 2.5 bar (0 - 36.3 psid)



DPS sensor

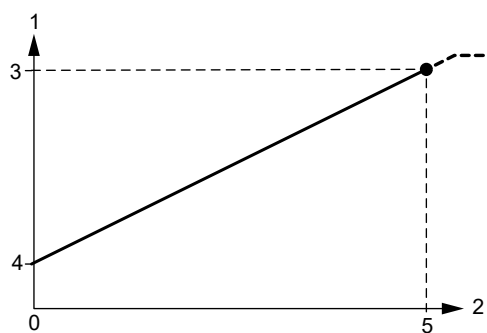
Dimensions



Dimensions, DPS including adapter

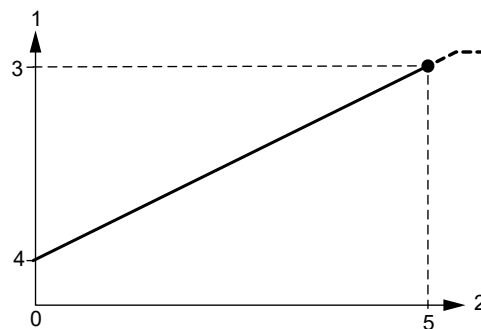
	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signals



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}



Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

9.5.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 2.5 bar (0 - 36.3 psid)
Accuracy ($\pm 1 \sigma$), in water, 15-90 °C (59-194 °F)	± 1.5 % FS
Accuracy ($\pm 1 \sigma$), in water, 0-120 °C (32-248 °F)	± 2 % FS
Response time (63.2 %)	< 1 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1.2 mbar (0.02 psid)
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	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	5 VDC (± 5 %), PELV. Grounding of sensor supply is required.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol 0.5 - 3.5 VDC
Analog output signals	(0.5 V at 0 bar, 3.5 V at 2.5 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)

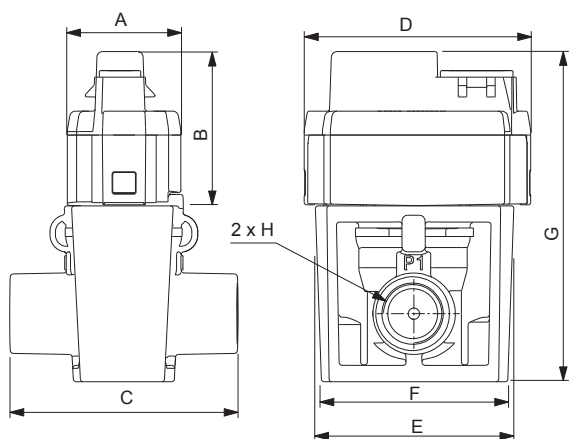
Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

9.6 DPS, 0 - 4.0 bar (0 - 58.0 psid)



DPS sensor

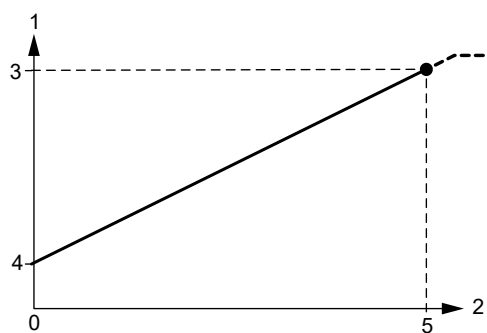
Dimensions



Dimensions, DPS including adapter

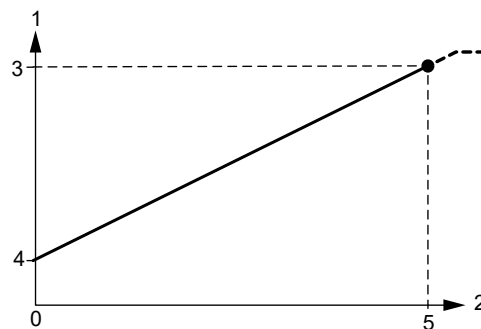
	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signals



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}



Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

9.6.1 Specifications

Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 4.0 bar (0 - 58.0 psid)
Accuracy ($\pm 1 \sigma$), in water, 15-90 °C (59-194 °F)	± 1.5 % FS
Accuracy ($\pm 1 \sigma$), in water, 0-120 °C (32-248 °F)	± 2 % FS
Response time (63.2 %)	< 1 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1.2 mbar (0.02 psid)
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	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	5 VDC (± 5 %), PELV. Grounding of sensor supply is required.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol 0.5 - 3.5 VDC
Analog output signals	(0.5 V at 0 bar, 3.5 V at 4 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)

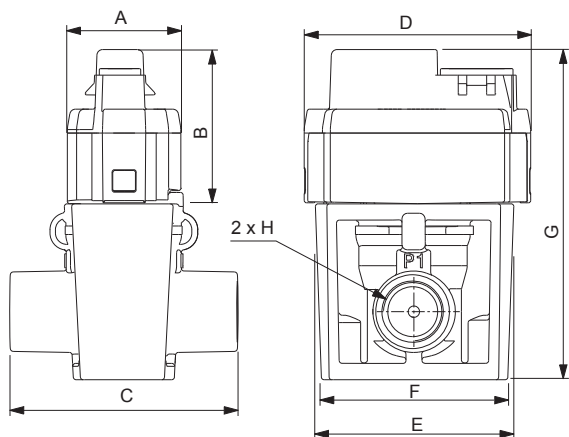
Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

9.7 DPS, 0 - 6.0 bar (0 - 87.0 psid)



DPS sensor

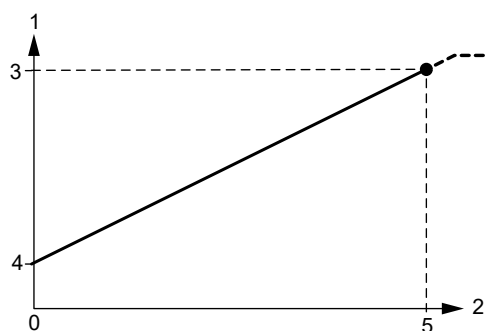
Dimensions



Dimensions, DPS including adapter

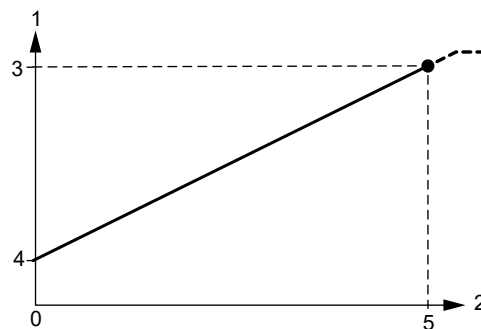
	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signals



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}



Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

9.7.1 Specifications

Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 6.0 bar (0 - 87.0 psid)
Accuracy ($\pm 1 \sigma$), in water, 15-90 °C (59-194 °F)	± 1.5 % FS
Accuracy ($\pm 1 \sigma$), in water, 0-120 °C (32-248 °F)	± 2 % FS
Response time (63.2 %)	< 1 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1.2 mbar (0.02 psid)
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	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	5 VDC (± 5 %), PELV. Grounding of sensor supply is required.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol 0.5 - 3.5 VDC
Analog output signals	(0.5 V at 0 bar, 3.5 V at 6 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)

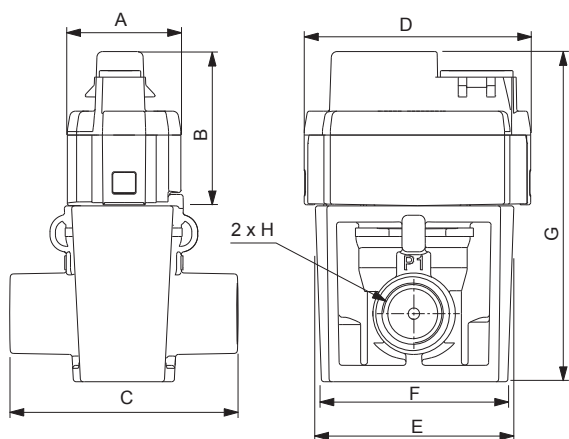
Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

9.8 DPS, 0 - 10.0 bar (0 - 145.0 psid)



DPS sensor

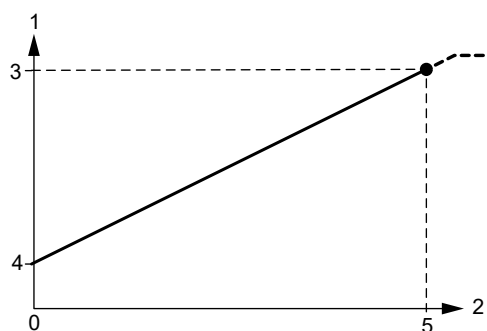
Dimensions



Dimensions, DPS including adapter

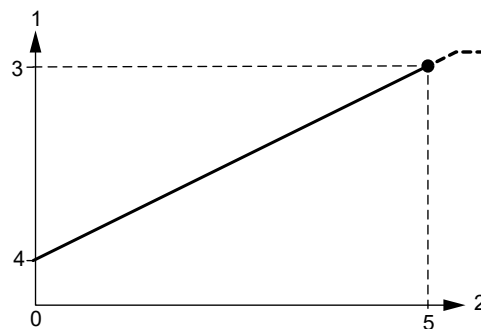
	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signals



Pressure response in analog mode

Pos.	Description
0	P_{min}
1	Pressure output signal
2	Pressure
3	3.5 V
4	0.5 V
5	P_{max}



Temperature response in analog mode

Pos.	Description
0	T_{min}
1	Temperature output signal
2	Temperature
3	4.1 V
4	0.5 V
5	T_{max}

9.8.1 Specifications

Pressure	
Measuring range (P_{\min} - P_{\max})	0 - 10.0 bar (0 - 145.0 psid)
Accuracy ($\pm 1 \sigma$), in water, 15-90 °C (59-194 °F)	± 1.5 % FS
Accuracy ($\pm 1 \sigma$), in water, 0-120 °C (32-248 °F)	± 2 % FS
Response time (63.2 %)	< 1 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1.2 mbar (0.02 psid)
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	0-120 °C (32-248 °F)
Liquid temperature, peak	-25 to +120 °C (-13 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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	5 VDC (± 5 %), PELV. Grounding of sensor supply is required.
Output signals	Ratiometric
Digital output signals	Grundfos open data protocol 0.5 - 3.5 VDC
Analog output signals	(0.5 V at 0 bar, 3.5 V at 10 bar) (0.5 V at 0 °C, 4.1 V at 120 °C)
Power consumption	Appr. 75 mW
Load impedance	> 47 k Ω
Maximum cable length	3 m (9.10 ft)

Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP44, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

10. Differential Pressure sensor Standard, DPS11

10.1 General data



DPS sensor



DPS sensor with adapter

10.1.1 Technical overview

DPS11 is a differential-pressure sensor from Grundfos Direct Sensors™.

The DPS11 sensor is fully compatible with aqueous media. The sensor is based on MEMS sensing technology in combination with the corrosion-resistant Silicoat® coating technology on the sensor chip.

10.1.2 Applications

- Pump control
- HVAC systems
- renewable energies such as heat pumps, solar thermals, fresh water and micro-CHP systems
- monitoring and control systems
- water treatment plants
- water utility and distribution systems
- HPC and IT cooling systems.

10.1.3 Features and benefits

- MEMS technology
- direct contact with the aqueous media resulting in a fast response time
- plug and play for quick setup
- smart system solution with Grundfos pump controls
- compact and robust design
- compatible with aqueous media
- suitable for a wide temperature range
- suitable for a wide range of applications.

10.1.4 Pressure range

Pressure range	
[bar]	[psid]
-1.0 to +1.0	-14.5 to +14.5
-1.0 to +5.0	-14.5 to +72.5
0 - 6.0	0 - 87.0
0 - 10.0	0 - 145.0

10.1.5 Approvals (w/EPDM O-rings)

- WRAS
- ACS.

10.1.6 Certificates



C, CSA, US

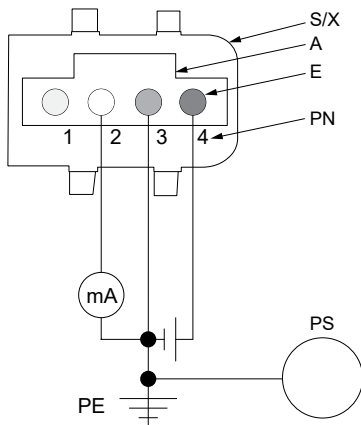


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10.1.7 Electrical connections



TM075637

Electrical connections





Pos.	Description
S/X	Snap-on connector
A	Standard connector
PS	Pipe system
A1	Pressure signal
E	Electrical connector
PN	Pin No.
PE	Protective Earth

Pin	Description	Colour
1	Not used	Yellow
2	Pressure signal	White
3	GND, 0 V PELV	Green
4	Voltage supply, 12-30 VDC	Brown

Power supply requirements

- 12-30 VDC PELV.
- The sensor must be separated from hazardous live circuitry by double or reinforced insulation.
- Minimum output current: 37 mA.
- Grounding of sensor supply is required.

10.1.8 Options

Part			
	Adapter, 1/8" - 27 NPT	1.4408 (AISI 316)	Pressure adapter
	Fitting, 6 mm (0.23") Fitting, 8 mm (0.31")	1.4408 (AISI 316)	Tube fitting
	Fitting, 6 mm (0.23") Fitting, 8 mm (0.31")		Compression fitting
	Wall bracket for DPS with stainless steel adapter		

10.1.9 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:

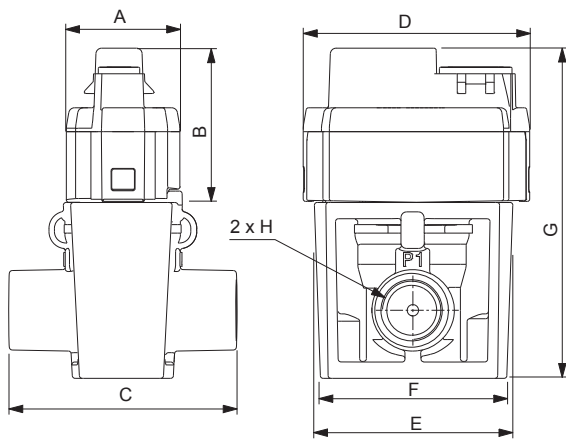
- Pressure Equipment Directive (2014/68/EU) according to article 4, paragraph 3.
- Low Voltage Directive (2014/35/EU) because the supply voltage is below 75 VDC.

10.2 DPS11, -1.0 to +1.0 bar (-14.5 to +14.5 psid)



DPS sensor

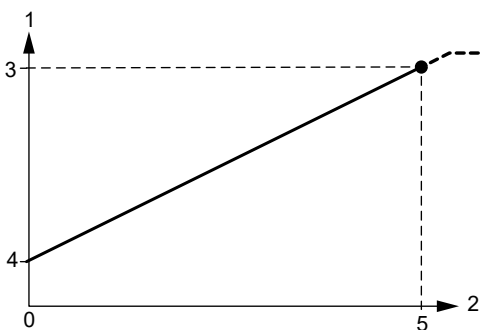
Dimensions



Dimensions, DPS including adapter

	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signal



Differential pressure response

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

10.2.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	-1.0 to +1 bar (-14.5 to +14.5 psid)
Accuracy ($\pm 1 \sigma$), in water, 0-100 °C (32-212 °F)	$\pm 2\%$ FS
Response time (63.2 %)	< 0.25 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1:500
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC, PELV Grounding of sensor supply is required.
Output signal	4-20 mA (4 mA at -1 bar, 20 mA at 1 bar)
Power consumption, 0 °C	255 mW*
Power consumption, 100 °C	655 mW**
Load impedance	See the curve below.
Maximum cable length	3 m (9.10 ft)
Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP54, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

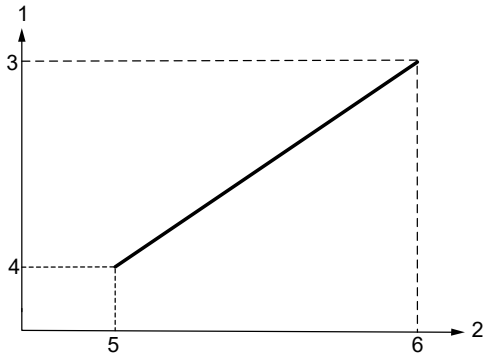
* Measured at $V_{CC} = 24$ V, $P = P_{min}$ and $R_{load} = 147 \Omega$. Power consumption also includes the output signal.

** Measured at $V_{CC} = 24$ V, $P = P_{max}$ and $R_{load} = 147 \Omega$. Power consumption also includes the output signal.

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Load impedance

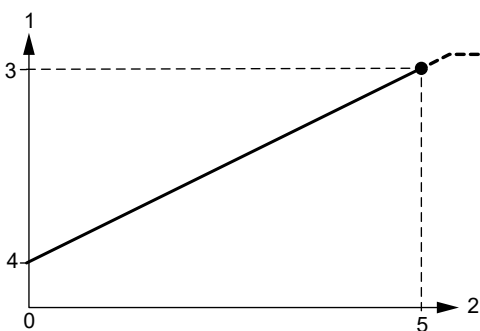
Pos.	Description
1	Supply voltage
2	R_{load}
3	30 V
4	12 V
5	100 Ω
6	1000 Ω

10.3 DPS11, -1.0 to +5.0 bar (-14.5 to +72.5 psid)



DPS sensor

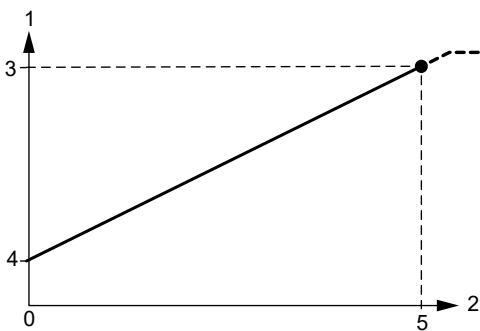
Dimensions



Dimensions, DPS including adapter

	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signal



Differential pressure response

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

10.3.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	-1.0 to +5.0 bar (-14.5 to +72.5 psid)
Accuracy ($\pm 1 \sigma$), in water, 0-100 °C (32-212 °F)	$\pm 2\%$ FS
Response time (63.2 %)	< 0.25 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1:500
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC, PELV Grounding of sensor supply is required.
Output signal	4-20 mA (4 mA at -1 bar, 20 mA at 5 bar)
Power consumption, 0 °C	255 mW*
Power consumption, 100 °C	655 mW**
Load impedance	See the curve below.
Maximum cable length	3 m (9.10 ft)
Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP54, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

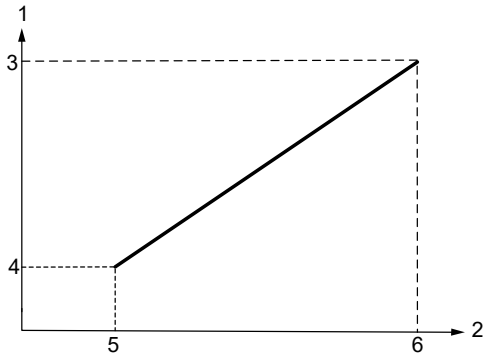
* Measured at $V_{CC} = 24$ V, $P = P_{min}$ and $R_{load} = 147 \Omega$. Power consumption also includes the output signal.

** Measured at $V_{CC} = 24$ V, $P = P_{max}$ and $R_{load} = 147 \Omega$. Power consumption also includes the output signal.

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TM063358



TM082014

Load impedance

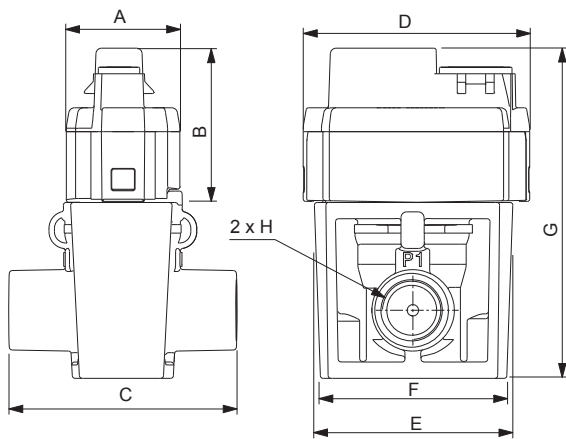
Pos.	Description
1	Supply voltage
2	R_{load}
3	30 V
4	12 V
5	100 Ω
6	1000 Ω

10.4 DPS11, 0 - 6.0 bar (14.5 - 87.0 psid)



DPS sensor

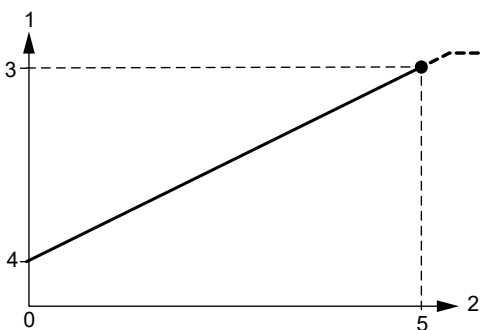
Dimensions



Dimensions, DPS including adapter

	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signal



Differential pressure response

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

10.4.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 6.0 bar (0 - 87.0 psid)
Accuracy ($\pm 1 \sigma$), in water, 0-100 °C (32-212 °F)	$\pm 2\%$ FS
Response time (63.2 %)	< 0.25 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1:500
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC, PELV Grounding of sensor supply is required.
Output signal	4-20 mA (4 mA at 0 bar, 20 mA at 6 bar)
Power consumption, 0 °C	255 mW*
Power consumption, 100 °C	655 mW**
Load impedance	See the curve below.
Maximum cable length	3 m (9.10 ft)
Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP54, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

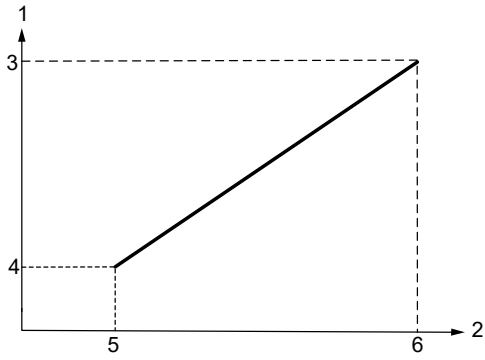
* Measured at $V_{CC} = 24$ V, $P = P_{min}$ and $R_{load} = 147 \Omega$. Power consumption also includes the output signal.

** Measured at $V_{CC} = 24$ V, $P = P_{max}$ and $R_{load} = 147 \Omega$. Power consumption also includes the output signal.

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Load impedance

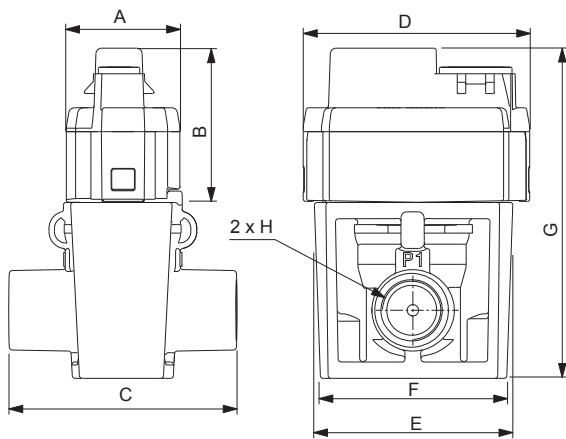
Pos.	Description
1	Supply voltage
2	R_{load}
3	30 V
4	12 V
5	100 Ω
6	1000 Ω

10.5 DPS11, 0 - 10.0 bar (14.5 - 145.0 psid)



DPS sensor

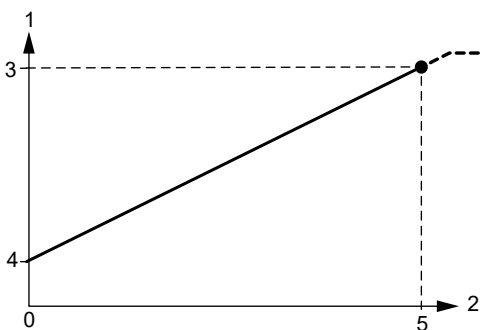
Dimensions



Dimensions, DPS including adapter

	A	B	C	D	E	F	G	H
mm	20	29.9	40	39.9	35	32.9	57.9	1/8" - 27
in	0.79	1.18	1.57	1.57	1.38	1.30	2.28	NPT

Output signal



Differential pressure response

Pos.	Description
0	P_{min}
1	Pressure output signals
2	Pressure
3	20 mA
4	4 mA
5	P_{max}

10.5.1 Specifications

Pressure	
Measuring range ($P_{min} - P_{max}$)	0 - 10.0 bar (0 - 145.0 psid)
Accuracy ($\pm 1 \sigma$), in water, 0-100 °C (32-212 °F)	$\pm 2\%$ FS
Response time (63.2 %)	< 0.25 s
System pressure deviation	6 mbar/bar (0.09 psid/psig)
Resolution	1:500
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials
Liquid temperature, operation	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °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 psig) 16 bar (232 psig) at 70 °C (158 °F) 12 bar (145 psig) at 100 °C (212 °F)
Burst pressure	30 bar (435 psig)
Maximum p1-p2 pressure	16 bar (232 psid)
Maximum p2-p1 pressure	10 bar (145 psid)
Electrical data	
Power supply	12-30 VDC, PELV Grounding of sensor supply is required.
Output signal	4-20 mA (4 mA at 0 bar, 20 mA at 10 bar)
Power consumption, 0 °C	255 mW*
Power consumption, 100 °C	655 mW**
Load impedance	See the curve below.
Maximum cable length	3 m (9.10 ft)
Materials	
Sensing element	Silicon-based MEMS
Sealing cap	EPDM
Housing	Composite (PPS)
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM
Environmental standards	
Enclosure class	IP54, cable connected
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

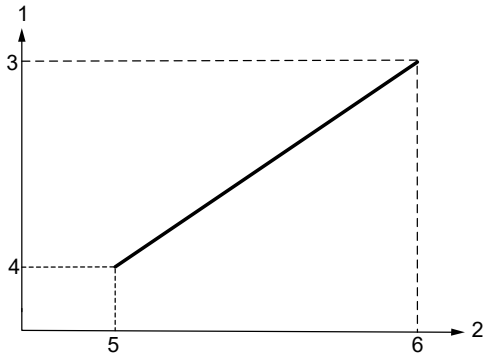
* Measured at $V_{CC} = 24$ V, $P = P_{min}$ and $R_{load} = 147 \Omega$. Power consumption also includes the output signal.

** Measured at $V_{CC} = 24$ V, $P = P_{max}$ and $R_{load} = 147 \Omega$. Power consumption also includes the output signal.

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Load impedance

Pos.	Description
1	Supply voltage
2	R_{load}
3	30 V
4	12 V
5	100 Ω
6	1000 Ω

11. Product range

11.1 RPI transmitter

Scope of delivery:

- RPI transmitter
- 2 m (6.5 ft) cable
- quick guide.

Complete product range	Pressure range	Thread	Temperature measurement	O-ring		Outside usage
				EPDM	FKM	
RPI--0-0.6b/1/C/M2.00-X/EG6/--/03P/SD-1	0 - 0.6 bar (0 - 8.7 psig)	G 1/2		•		•
RPI--0-0.6b/1/C/M2.00-X/VG6/--/03P/SD-1				•	•	
RPI--0-0.6b/1/F/M2.00-X/EG6/--/03P/SD-1			•		•	
RPI--0-0.6b/1/F/M2.00-X/VG6/--/03P/SD-1			•		•	
RPI--0-1.0b/1/C/M2.00-X/EG6/--/03P/SD-1	0 - 1.0 bar (0 - 14.5 psig)	G 1/2		•		•
RPI--0-1.0b/1/C/M2.00-X/VG6/--/03P/SD-1				•	•	
RPI--0-1.0b/1/F/M2.00-X/EG6/--/03P/SD-1			•		•	
RPI--0-1.0b/1/F/M2.00-X/VG6/--/03P/SD-1			•		•	
RPI--0-1.6b/1/C/M2.00-X/EG6/--/03P/SD-1	0 - 1.6 bar (0 - 23.2 psig)	G 1/2		•		•
RPI--0-1.6b/1/C/M2.00-X/VG6/--/03P/SD-1				•	•	
RPI--0-1.6b/1/F/M2.00-X/EG6/--/03P/SD-1			•		•	
RPI--0-1.6b/1/F/M2.00-X/VG6/--/03P/SD-1			•		•	
RPI--0-2.5b/1/C/M2.00-X/EG6/--/03P/SD-1	0 - 2.5 bar (0 - 36.3 psig)	G 1/2		•		•
RPI--0-2.5b/1/C/M2.00-X/VG6/--/03P/SD-1				•	•	
RPI--0-2.5b/1/F/M2.00-X/EG6/--/03P/SD-1			•		•	
RPI--0-2.5b/1/F/M2.00-X/VG6/--/03P/SD-1			•		•	
RPI--0-4.0b/1/C/M2.00-X/EG6/--/03P/SD-1	0 - 4.0 bar (0 - 58.0 psig)	G 1/2		•		•
RPI--0-4.0b/1/C/M2.00-X/VG6/--/03P/SD-1				•	•	
RPI--0-4.0b/1/F/M2.00-X/EG6/--/03P/SD-1			•		•	
RPI--0-4.0b/1/F/M2.00-X/VG6/--/03P/SD-1			•		•	
RPI--0-6.0b/1/C/M2.00-X/EG6/--/03P/SD-1	0 - 6.0 bar (0 - 87.0 psig)	G 1/2		•		•
RPI--0-6.0b/1/C/M2.00-X/VG6/--/03P/SD-1				•	•	
RPI--0-6.0b/1/F/M2.00-X/EG6/--/03P/SD-1			•		•	
RPI--0-6.0b/1/F/M2.00-X/VG6/--/03P/SD-1			•		•	
RPI---0-10b/1/C/M2.00-X/EG6/--/03P/SD-1	0 - 10.0 bar (0 - 145.0 psig)	G 1/2		•		•
RPI---0-10b/1/C/M2.00-X/VG6/--/03P/SD-1				•	•	
RPI---0-10b/1/F/M2.00-X/EG6/--/03P/SD-1			•		•	
RPI---0-10b/1/F/M2.00-X/VG6/--/03P/SD-1			•		•	
RPI---0-16b/1/C/M2.00-X/EG6/--/03P/SD-1	0 - 16.0 bar (0 - 232.1 psig)	G 1/2		•		•
RPI---0-16b/1/C/M2.00-X/VG6/--/03P/SD-1				•	•	
RPI---0-16b/1/F/M2.00-X/EG6/--/03P/SD-1			•		•	
RPI---0-16b/1/F/M2.00-X/VG6/--/03P/SD-1			•		•	
RPI---0-25b/1/C/M2.00-X/EG6/--/03P/SD-1	0 - 25.0 bar (0 - 362.6 psig)	G 1/2		•		•
RPI---0-25b/1/C/M2.00-X/VG6/--/03P/SD-1				•	•	
RPI---0-25b/1/F/M2.00-X/EG6/--/03P/SD-1			•		•	
RPI---0-25b/1/F/M2.00-X/VG6/--/03P/SD-1			•		•	

11.2 DPI 2 and DPI 2+T transmitter

Scope of delivery:

- DPI 2 and DPI 2+T transmitter
- 2 m (6.5 ft) cable
- capillary tube with fitting
- quick guide.

Complete product range	Pressure range	Thread	Temperature measurement	O-ring		Outside usage
				EPDM	FKM	
DPI/---0-0.6b/2/C/M2.00-X/EG6/---/03P/SD-1	0 - 0.6 bar (0 - 8.7 psid)	G 1/2		•		•
DPI/---0-0.6b/2/C/M2.00-X/VG6/---/03P/SD-1				•	•	
DPI/---0-0.6b/2/F/M2.00-X/EG6/---/03P/SD-1			•	•	•	
DPI/---0-0.6b/2/F/M2.00-X/VG6/---/03P/SD-1			•	•	•	
DPI/---0-1.0b/2/C/M2.00-X/EG6/---/03P/SD-1	0 - 1.0 bar (0 - 14.5 psid)	G 1/2		•		•
DPI/---0-1.0b/2/C/M2.00-X/VG6/---/03P/SD-1				•	•	
DPI/---0-1.0b/2/F/M2.00-X/EG6/---/03P/SD-1			•	•	•	
DPI/---0-1.0b/2/F/M2.00-X/VG6/---/03P/SD-1			•	•	•	
DPI/---0-1.6b/2/C/M2.00-X/EG6/---/03P/SD-1	0 - 1.6 bar (0 - 23.2 psid)	G 1/2		•		•
DPI/---0-1.6b/2/C/M2.00-X/VG6/---/03P/SD-1				•	•	
DPI/---0-1.6b/2/F/M2.00-X/EG6/---/03P/SD-1			•	•	•	
DPI/---0-1.6b/2/F/M2.00-X/VG6/---/03P/SD-1			•	•	•	
DPI/---0-2.5b/2/C/M2.00-X/EG6/---/03P/SD-1	0 - 2.5 bar (0 - 36.3 psid)	G 1/2		•		•
DPI/---0-2.5b/2/C/M2.00-X/VG6/---/03P/SD-1				•	•	
DPI/---0-2.5b/2/F/M2.00-X/EG6/---/03P/SD-1			•	•	•	
DPI/---0-2.5b/2/F/M2.00-X/VG6/---/03P/SD-1			•	•	•	
DPI/---0-4.0b/2/C/M2.00-X/EG6/---/03P/SD-1	0 - 4.0 bar (0 - 58.0 psid)	G 1/2		•		•
DPI/---0-4.0b/2/C/M2.00-X/VG6/---/03P/SD-1				•	•	
DPI/---0-4.0b/2/F/M2.00-X/EG6/---/03P/SD-1			•	•	•	
DPI/---0-4.0b/2/F/M2.00-X/VG6/---/03P/SD-1			•	•	•	
DPI/---0-6.0b/2/C/M2.00-X/EG6/---/03P/SD-1	0 - 6.0 bar (0 - 87.0 psid)	G 1/2		•		•
DPI/---0-6.0b/2/C/M2.00-X/VG6/---/03P/SD-1				•	•	
DPI/---0-6.0b/2/F/M2.00-X/EG6/---/03P/SD-1			•	•	•	
DPI/---0-6.0b/2/F/M2.00-X/VG6/---/03P/SD-1			•	•	•	
DPI/---0-10b/2/C/M2.00-X/EG6/---/03P/SD-1	0 - 10.0 bar (0 - 145.0 psid)	G 1/2		•		•
DPI/---0-10b/2/C/M2.00-X/VG6/---/03P/SD-1				•	•	
DPI/---0-10b/2/F/M2.00-X/EG6/---/03P/SD-1			•	•	•	
DPI/---0-10b/2/F/M2.00-X/VG6/---/03P/SD-1			•	•	•	
DPI/---0-16b/2/C/M2.00-X/EG6/---/03P/SD-1	0 - 16.0 bar (0 - 232.1 psid)	G 1/2		•		•
DPI/---0-16b/2/C/M2.00-X/VG6/---/03P/SD-1				•	•	
DPI/---0-16b/2/F/M2.00-X/EG6/---/03P/SD-1			•	•	•	
DPI/---0-16b/2/F/M2.00-X/VG6/---/03P/SD-1			•	•	•	

11.3 DPI 1 transmitter

The DPI 1 transmitter is available as an individual packaged transmitter as well as in sets with capillary tubes.

As standard, the scope of delivery includes: (for outside usage, only powered by Grundfos pump or the SI power supply. See the accessory section for more information.)

- DPI 1 transmitter
- cable with bracket
- installation and operating instructions.

See the table below for sets with special parts.

Product description	Pressure range	Cable length	Wall bracket	Motor bracket	Capillary tube	Reducing piece 7/16-20 UNF - R 1/4	Service instructions	Outside usage
DPI/--0-0.6b/1/G/D.900-B/V-5/--/---/VC-1	0 - 0.6 bar (0 - 8.7 psid)	0.9 m (2.9 ft)	•					•
DPI/--0-1.0b/1/G/D.900-B/V-5/--/---/VC-1	0 - 1.0 bar (0 - 14.5 psid)	0.9 m (2.9 ft)	•					•
DPI/--0-1.6b/1/G/D.900-B/V-5/--/---/VC-1	0 - 1.6 bar (0 - 23.2 psid)	0.9 m (2.9 ft)	•					•
DPI/--0-2.5b/1/G/D.900-B/V-5/--/---/VC-1	0 - 2.5 bar (0 - 36.3 psid)	0.9 m (2.9 ft)	•					•
DPI/--0-4.0b/1/G/D.900-B/V-5/--/---/VC-1	0 - 4.0 bar (0 - 58.0 psid)	0.9 m (2.9 ft)	•					•
DPI/--0-6.0b/1/G/D.900-B/V-5/--/---/VC-1	0 - 6.0 bar (0 - 87.0 psid)	0.9 m (2.9 ft)	•					•
DPI/--0-10b/1/G/D.900-B/V-5/--/---/VC-1	0 - 10.0 bar (0 - 145.0 psid)	0.9 m (2.9 ft)	•					•
DPI/--0-0.6b/1/G/D.900-B/V-5/-B/02B/SD-1	0 - 0.6 bar (0 - 8.7 psid)	0.9 m (2.9 ft)	•	•	•	•	•	•
DPI/--0-1.0b/1/G/D.900-B/V-5/-B/02B/SD-1	0 - 1.0 bar (0 - 14.5 psid)	0.9 m (2.9 ft)	•	•	•	•	•	•
DPI/--0-1.6b/1/G/D.900-B/V-5/-B/02B/SD-1	0 - 1.6 bar (0 - 23.2 psid)	0.9 m (2.9 ft)	•	•	•	•	•	•
DPI/--0-2.5b/1/G/D.900-B/V-5/-B/02B/SD-1	0 - 2.5 bar (0 - 36.3 psid)	0.9 m (2.9 ft)	•	•	•	•	•	•
DPI/--0-4.0b/1/G/D.900-B/V-5/-B/02B/SD-1	0 - 4.0 bar (0 - 58.0 psid)	0.9 m (2.9 ft)	•	•	•	•	•	•
DPI/--0-6.0b/1/G/D.900-B/V-5/-B/02B/SD-1	0 - 6.0 bar (0 - 87.0 psid)	0.9 m (2.9 ft)	•	•	•	•	•	•
DPI/--0-10b/1/G/D.900-B/V-5/-B/02B/SD-1	0 - 10.0 bar (0 - 145.0 psid)	0.9 m (2.9 ft)	•	•	•	•	•	•
DPI/--0-1.2b/1/G/D5.00-B/V-5/-B/02B/TD-1	0 - 1.2 bar (0 - 17.4 psid)	5 m (16.4 ft)	•		•	•		
DPI/--0-2.5b/1/G/D5.00-B/V-5/-B/02B/TD-1	0 - 2.5 bar (0 - 36.3 psid)	5 m (16.4 ft)	•		•	•		
DPI/--0-4.0b/1/G/D5.00-B/V-5/-B/02B/TD-1	0 - 4.0 bar (0 - 58.0 psid)	5 m (16.4 ft)	•		•	•		
DPI/--0-6.0b/1/G/D5.00-B/V-5/-B/02B/TD-1	0 - 6.0 bar (0 - 87.0 psid)	5 m (16.4 ft)	•		•	•		
DPI/--0-10b/1/G/D5.00-B/V-5/-B/02B/TD-1	0 - 10.0 bar (0 - 145.0 psid)	5 m (16.4 ft)	•		•	•		

11.4 RPS and DPS sensors

Grundfos offers a wide range of custom-built RPS and DPS sensors.

The RPS and DPS sensors can be customised depending on the application.

Therefore, contact Grundfos Direct Sensors™ when proceeding to selection.

12. Accessories

12.1 SI power supply

The SI power supply from Grundfos Direct Sensors™ is an external power supply for the DPI 1 transmitter. Use the external power supply where the distance between the sensor and the controller is longer than 30 m (98 ft).



SI power supply

Specifications:


- Voltage range: 110-400 VAC.
- Frequency: 50-60 Hz.
- Ambient temperature: -20 to +50 °C (-4 to +122 °F).
- Enclosure class: IP54.

Part

SI power supply

12.2 M12 cable

4-wire screened cable with M12 connector in the sensor end and open end in the equipment end. Use the cable for the industrial sensor series such as RPI, DPI 2 and VFI.


Description	Length
 Cable, industry, M2.000X	2 m (6.6 ft)
Cable, industry, M5.000X	5 m (16.4 ft)

TM044194

12.3 Capillary tube


Use the capillary tube together with the DPI 1, DPI 2 and DPI 2+T to connect the transmitter to the low-pressure side of the equipment.

The capillaries are available in copper and stainless steel as well as in various lengths.

Description
 Capillary tube, 7/16 - 20 UNF

12.4 Adapter

Use the adapter together with the capillary tube. The adapter enables the connection of the tube to the system.


Description
 Fitting, G 1/4 - 7/16, 20 UNF

12.5 Adapter for Grundfos CR pumps

This adapter is required when fitting the RPI, RPI+T or DPI 2, DPI 2+T on Grundfos CR pumps.

Pump type	Grundfos CR pump size											
	1	3	5	10	15	20	32	45	64	90	120	150
CR, CRE	-	-	-	-	○	○	○	●	●	●	●	●
CRI, CRIE	-	-	-	-	○	○	●	●	●	●	●	●
CRN, CRNE	-	-	-	-	○	○	○	●	●	●	●	●

- An adapter is not required.
- An adapter is required if the sensor and coupling guard are in direct contact. This will create unnecessary acoustic noise.
- An adapter is always required.


Description
 Adapter for RPI, RPI+T and DPI 2 and DPI 2+T

12.6 Snap-on cable

Cable with snap-on connection in the sensor end and different variants in the equipment end, such as open end, ferrules and various types of connectors.

Use the cable for the standard sensor series such as VFS, RPS and DPS.

The cable is available in various lengths, mainly 1.2 m and 2.9 m.

	Description	Length [mm]
	Ferrules, 1.2 m	1200
	Ferrules, 2.9 m	2900

12.7 SI converter

The SI converter from Grundfos Direct Sensors™ is an external power supply, signal amplifier and signal converter for Grundfos standard sensors: RPS, VFS and DPS.

The SI converter has built-in precision resistors enabling the sensor to transmit 4-20 mA, 1-5 V and 2 10 V output signals.

Use the SI converter in applications incorporating sensors from the standard product range. The sensor interface delivers a 4-20 mA input signal to external controllers.



TM044882

SI converter

Specifications:

- Voltage range: 115-230 VAC \pm 10 % or 24 VDC.
- Frequency: 50-60 Hz.
- Power consumption: Maximum 2.5 W.
- Ambient temperature: -20 to +50 °C (-4 to +122 °F).
- Enclosure class: IP20.

Part

SI converter, IP20

13. Appendix

13.1 Installation of RPI and DPI 2 transmitters

RPI

Sensor 2 (P2) → Pump/system → Sensor 1 (P1)

DPI

Sensor (P1) → Pump/system → (P+)

ISO 228/1 - G½

M12
M12, IP67, UL CCN: CYV and CYV7

EPDM, FKM

d1 = 16.3 mm
d2 = 2.4 mm

-25 to 60 °C (-13 to 140 °F)
Max. 28 bar (406 PSI)
IP67

-30 to 120 °C (-22 to 248 °F)

>65 °C (>149 °F)

32 mm
20 Nm

TM072421

Related information

[4.1.7 Directives](#)

14. Grundfos Product Center

Online search and sizing tool to help you make the right choice.

From the international view, you can select your specific country to view the product range available to you.

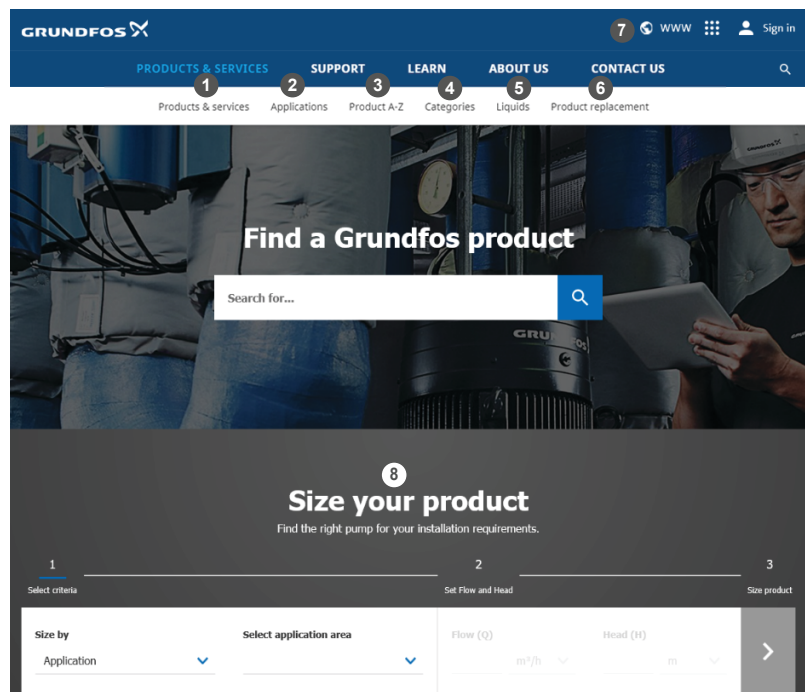
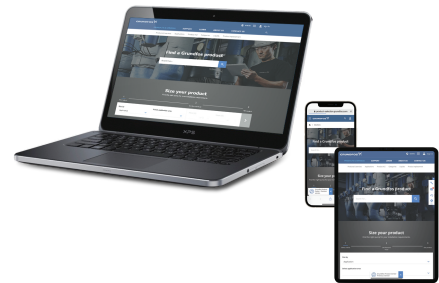
International view: <http://product-selection.grundfos.com>

All the information you need in one place

Performance curves, technical specifications, pictures, dimensional drawings, motor curves, wiring diagrams, spare parts, service kits, 3D drawings, documents, system parts. The Product Center displays any recent and saved items - including complete projects - right on the main page.

Downloads

On the product pages, you can download installation and operating instructions, data booklets, service instructions, etc., in PDF format.



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When you select your country, you will see the menus below. Note that some menus may not be available depending on the country.

Example: <https://product-selection.grundfos.com/uk>

Pos.	Description
1	Products & services enables you to find products and documents by typing a product number or name into the search field.
2	Applications enables you to choose an application to see how Grundfos can help you design and optimise your system.
3	Products A-Z enables you to look through a list of all the Grundfos products.
4	Categories enables you to look for a product category.
5	Liquids enables you to find pumps designed for aggressive, flammable or other special liquids.
6	Product replacement enables you to find a suitable replacement.
7	WWW enables you to select the country, which changes the language, the available product range and the structure of the website.
8	Sizing enables you to size a product based on your application and operating conditions.

