

# Grundfos Direct Sensor™

Pressure transmitter



<b>1. Pressure transmitter</b>	<b>3</b>	<b>7. Product range-RPI Transmitter</b>	<b>52</b>
Introduction	3		
<b>2. Relative pressure transmitter, industrial (RPI)4</b>		<b>8. Product range - RPS sensor</b>	<b>53</b>
RPI general data	4	<b>9. Product range - DPS sensor</b>	<b>54</b>
RPI 0-9 psi [0-0.6 bar]	6	<b>10. Product range - DPI transmitter V.2</b>	<b>55</b>
RPI 0-14.5 psi [0-1.0 bar]	7	<b>11. Product range - DPI transmitter</b>	<b>56</b>
RPI 0-25 psi [0-1.6 bar]	8	<b>12. Accessories</b>	<b>57</b>
RPI 0-40 psi [0-2.5 bar]	9	Sensor interface, type SI 001 PSU	57
RPI 0-60 psi [0-4.0 bar]	10	<b>13. Further product documentation</b>	<b>58</b>
RPI 0-90 psi [0-6.0 bar]	11	WebCAPS	58
RPI 0-145 psi [0-10.0 bar]	12	WinCAPS	59
RPI 0-232 psi [0-16.0 bar]	13		
RPI 0-360 psi [0-25.0 bar],	14		
<b>3. Differential pressure transmitter, industrial (DPI) V.215</b>			
DPI V.2 general data	15		
DPI 0-9 psi [0-0.6 bar]	17		
DPI 0-14.5 psi	18		
DPI 0-25 psi [0-1.6 bar]	19		
DPI 0-40 psi [0-2.5 bar]	20		
DPI 0-60 psi [0-4.0 bar]	21		
DPI 0-90 psi [0-6.0 bar]	22		
DPI 0-145 psi [0-10.0 bar]	23		
DPI 0-232 psi [0-16.0 bar]	24		
<b>4. Differential pressure transmitter, industrial (DPI)25</b>			
DPI general data	25		
DPI 0-9 psi [0-0.6 bar]	27		
DPI 0-14.5 psi [0-1.0 bar]	28		
DPI 0-17.4 psi [0-1.2 bar]	29		
DPI 0-25 psi [0-1.6 bar]	30		
DPI 0-40 psi [0-2.5 bar]	31		
DPI 0-60 psi [0-4.0 bar]	32		
DPI 0-90 psi [0-6.0 bar]	33		
DPI 0-145 psi [0-10.0 bar]	34		
<b>5. Relative pressure sensor standard (RPS) 35</b>			
RPS general data	35		
RPS 0-9 psi [0-0.6 bar]	37		
RPS 0-14.5 psi [0-1.0 bar]	38		
RPS 0-25 psi [0-1.6 bar]	39		
RPS 0-40 psi [0-2.5 bar]	40		
RPS 0-60 psi [0-4.0 bar]	41		
RPS 0-90 psi [0-6.0 bar]	42		
RPS 0-145 psi [0-10.0 bar]	43		
<b>6. Differential pressure sensor, standard (DPS)44</b>			
DPS general data	44		
DPS 0-9 psi [0-0.6 bar]	46		
DPS 0-14.5 psi [0-1.0 bar]	47		
DPS 0-25 psi [0-1.6 bar]	48		
DPS 0-40 psi [0-2.5 bar]	49		
DPS 0-60 psi [0-4.0 bar]	50		
DPS 0-90 psi [0-6.0 bar]	51		

# 1. Pressure transmitter

## Introduction

This Product guide describes Grundfos pressure transmitters.



Fig. 1 Grundfos pressure transmitters

The three pressure measuring methods are absolute, relative and differential pressure.

- Absolute pressure is zero referenced against a perfect vacuum.
- Relative pressure is zero referenced against ambient air pressure.
- Differential pressure is the difference between two pressures

The Grundfos pressure transmitter range contains both relative and differential pressure transmitters. The combination of the temperature transmitter with either the relative or differential pressure transmitter are able to measure temperatures in the range of -22 to 248 °F [-30 to 120 °C].

### Relative Pressure Transmitter (RPI)

The central part of the relative pressure transmitter is a sensor chip, which transforms the pressure into electrical signals. The pressure differences between the ambient pressure and the measured pressure will cause the sensor chip to warp. The warping is registered as a change of resistance in the strain gauges of a Wheatstone bridge. The change in resistance is converted into an analogue output signal. The RPI+T will also transform the temperature of the medium into electrical signals.

The signals are calibrated, conditioned and presented in analogue or digital format by means of a microprocessor. The pressure signals are temperature compensated and linearized for the influence of temperature variations.

### Differential Pressure transmitter (DPI and DPS)

The central part of the differential pressure transmitter is a sensor chip, which transforms the differential pressure into electrical signals. The difference between the two pressures, called the differential

pressure, will cause the sensor chip to warp. The warping is registered as a change of resistance in the strain gauges of a Wheatstone bridge. The change in resistance is converted into an analogue output signal. The DPI+T also transforms the temperature of the medium into an electrical signal.

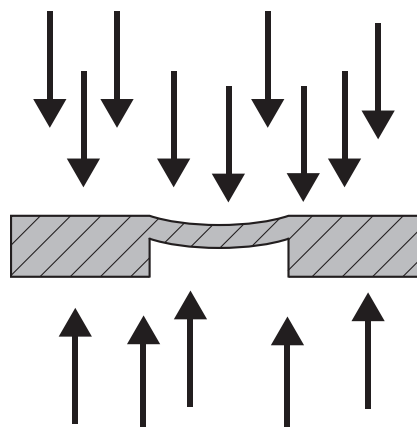


Fig. 2 Schematic view of how the sensor chip is affected by pressure on both sides.

### Sensor chip

Steady state properties of silicon protects the sensor chip against wear and tear. Lifelong nano-coating protection enables for the first time, direct measurement (wet and wet-wet) in a cost effective packaging for aggressive media. The secret is a metal-glass alloy coating, Silicoat® with an extreme resistance to corrosion. Compared to traditional sensor technologies which encapsulate the unprotected measuring cell from the Media, Silicoat® ensures a continuous protection of the Sensor Chip in aggressive media (ph 2-ph 11) at temperatures up to 248 °F [120 °C].

The trademark for Grundfos Direct Sensors™ is owned and controlled by the Grundfos group.

## 2. Relative pressure transmitter, industrial (RPI)

### RPI general data

Relative pressure transmitter, Industrial



TMO4 7865 2510

Fig. 3 RPI/RPI+T transmitter

### Technical overview

Grundfos Direct Sensors™, type RPI, are an industrial relative pressure transmitter designed to be mounted directly in the pipe system or application. The RPI+T version can also measure temperature in the range -22 to 248 °F [-30 to 120 °C]

### Sensor chip

Steady state properties of silicon protects the sensor chip against wear and tear. Lifelong nano-coating protection enables for the first time, direct measurement (wet and wet-wet) in a cost effective packaging for aggressive media. The secret is a metal-glass alloy coating, Silicoat® with an extreme resistance to corrosion. Compared to traditional sensor technologies which encapsulate the unprotected measuring cell from the Media, Silicoat® ensures a continuous protection of the Sensor Chip in aggressive media (ph 2-ph 11) at temperatures up to 248 °F [120 °C].

### Applications

- Water treatment and distribution
- light chemical industry
- water management
- pool and water resort
- heat pump
- HVAC
- cooling towers
- condensing units
- solar system.

### Features

- Pressure ranges: 9 to 360 psi [0.6 to 25.0 bar]
- M12 connector
- approved for potable water: WRAS (pending), KTW (pending), ACS (pending)
- wide temperature range -22 to 248 °F [-30 to 120 °C] (RPI+T).
- Max cable length (industry): 100 ft [30 meters]\*

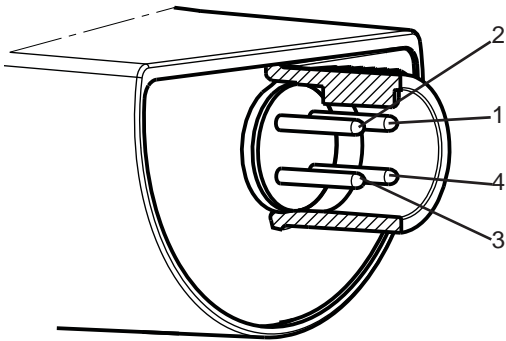
### Benefits

- No moving parts
- compatible with wet, aggressive media
- cost-effective and robust construction
- system solution with Grundfos pumps
- pressure and temperature measurement in one transmitter (RPI+T).

**Type key**

Type designation	RPI	+T	0-6	G½"	020	E	,Set
<b>Product group:</b> RPI: Relative pressure transmitter, industrial							
<b>Temperature sensor:</b> +T = with temperature sensor							
<b>Pressure range:</b> 0-6 = 0-6 bar 0-9 psi							
Thread size							
<b>Output signal:</b> 020 = 4-20 mA							
<b>O-ring material:</b> E = EPDM F = FKM							
Set = Complete pressure transmitter							

**Electrical connections**



TM04 7156 1610

**Fig. 4** Electrical connections

PIN	1	2	3	4
<b>Wire color</b>	Brown	Grey	Blue	Black
<b>Output 4 to 20 mA</b>	+	not used	-	not used
<b>Output 2 x 0 to 10 V</b>	+	Pressure signal	_*	Temperature signal

\* Common ground for both pressure and temperature signal.  
\* Power supply (screened cable): SELV or PELV.

**Approvals**

- WRAS
- KTW
- ACS
- NSF 61
- EU, US, and Canadian markets

\*Grundfos will not be liable for damage or wear to products caused by abnormal operating conditions, accident abuse, misuse unauthorized alteration or repair, or if the product was not installed in accordance with Grundfos' printed installation and operating instructions. Splicing of the supplied cable would void any warranty.

## RPI 0-9 psi [0-0.6 bar]

Relative pressure transmitter, industrial 0-9 psi

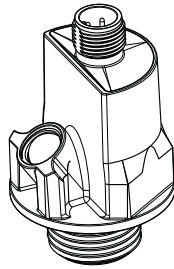


Fig. 5 RPI/RPI+T

### Dimensions

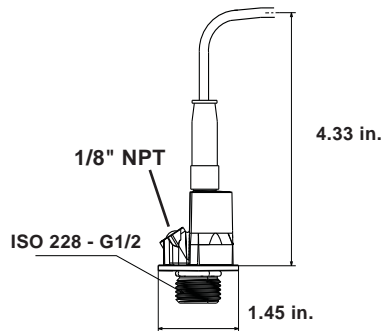


Fig. 6 Dimensions RPI transmitter

### Sensor output signals

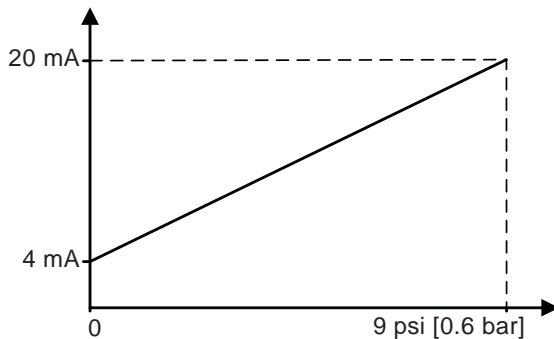


Fig. 7 Pressure response of RPI 0-9 psi

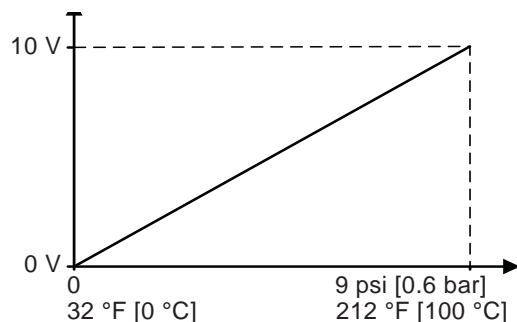


Fig. 8 Pressure and temperature response of RPI + T

## Specifications

Pressure	
Measuring range	0 to 9 psi [0 to 0.6 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only RPI with temperature sensor)	
Range (relative)	-22 to 248 °F [-30 to 120 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6$ °F [ $\pm 2$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 248 °F [0 to 120 °C]	$\pm 5.4$ °F [ $\pm 2.5$ °C]
Response time for sensor electronics	< 100 ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 248 °F [-30 to 120 °C]
Ambient air temperature (operation)	-13 to 140 °F [-25 to 60 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only RPI without temperature sensor)	
Power supply RPI	12 to 30 VDC
Output signals - cut off	4 to 20 mA
Power consumption	660 mW
Load impedance	max. 60 $\Omega$ at 12.5 VDC max. 100 $\Omega$ at 13.3 VDC m.ax 900 $\Omega$ at 30 VDC
Electrical data (Only RPI with temperature sensor)	
Power supply RPI + T	16.6 to 30 VDC
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	450 mW
Load impedance	min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP67
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9240 3510

TM04 9237 1612

TM04 9189 3610

TM04 91890 3610

## RPI 0-14.5 psi [0-1.0 bar]

Relative pressure transmitter, industry 0-14.5 psi

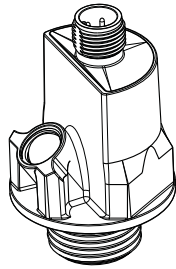


Fig. 9 RPI/RPI+T 0-14.5 psi transmitter

### Dimensions

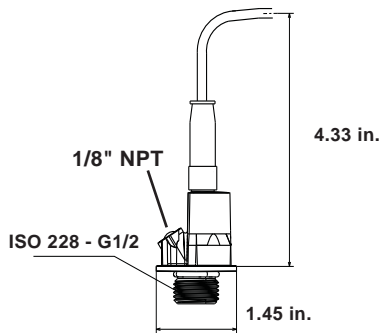


Fig. 10 Dimensions RPI transmitter

### Sensor output signals

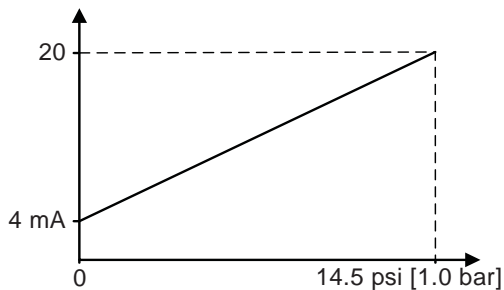


Fig. 11 Pressure response RPI 0-14.5 psi

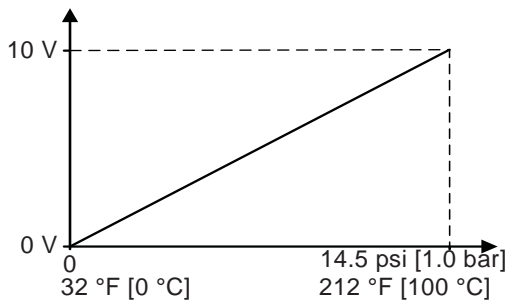


Fig. 12 Pressure and temperature response RPI +T

## Specifications

Pressure	
Measuring range	0 to 14.5 psi [0 to 1.0 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only RPI with temperature sensor)	
Range (relative)	-22 to 212 °F [-30 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ [ $\pm 2\%$ °C]
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ [ $\pm 2.5\%$ °C]
Response time for sensor electronics	< 100 ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 212 °F [-30 to 100 °C]
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only RPI without temperature sensor)	
Power supply RPI	12 to 30 VDC
Output signals	4 to 20 mA
Power consumption	660 mW
Load impedance	max. 60 $\Omega$ at 12.5 VDC max. 100 $\Omega$ at 13.3 VDC max. 900 $\Omega$ at 30 VDC
Electrical data (Only RPI with temperature sensor)	
Power supply RPI + T	16.6 to 30 VDC
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	450 mW
Load impedance	min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP67
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9240 3510

TM04 9237 1612

TM04 9189 3610

TM04 91890 3610

## RPI 0-25 psi [0-1.6 bar]

Relative pressure transmitter, industry 0-25 psi

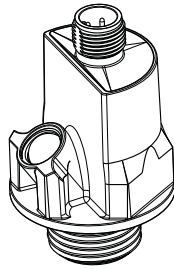


Fig. 13 RPI/RPI+T 0-25 psi transmitter

### Dimensions

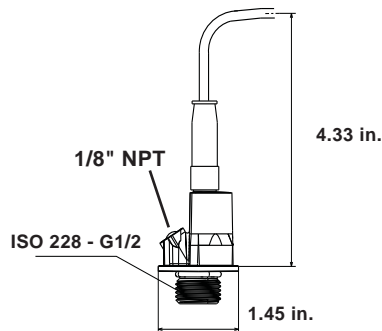


Fig. 14 Dimensions RPI transmitter

### Sensor output signals

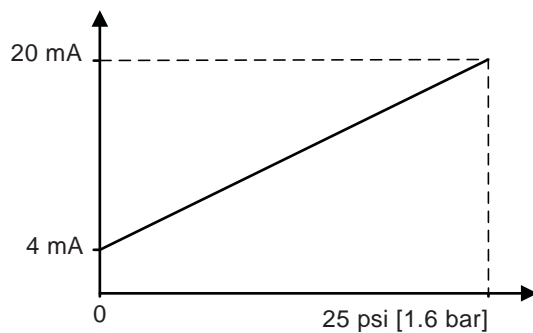


Fig. 15 Pressure response RPI 0-25 psi

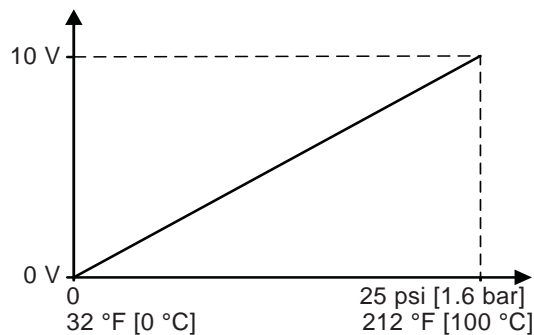


Fig. 16 Pressure and temperature response RPI +T

## Specifications

Pressure	
Measuring range	0 to 25 psi [0 to 1.6 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only RPI with temperature sensor)	
Range (relative)	-22 to 212 °F [-30 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ F [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ F [ $\pm 2\%$ °C]
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ F [ $\pm 2.5\%$ °C]
Response time for sensor electronics	< 100 ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 212 °F [-30 to 100 °C]
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only RPI without temperature sensor)	
Power supply RPI	12 to 30 VDC
Output signals - cut off	4 to 20 mA
Power consumption	660 mW
Load impedance	max. 60 $\Omega$ at 12.5 VDC max. 100 $\Omega$ at 13.3 VDC m.ax 900 $\Omega$ at 30 VDC
Electrical data (Only RPI with temperature sensor)	
Power supply RPI + T	16.6 to 30 VDC
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	450 mW
Load impedance	min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP67
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9240 3510

TM04 9237 1612

TM04 9189 3610

TM04 91890 3610



## RPI 0-40 psi [0-2.5 bar]

Relative pressure transmitter, industry 0-40 psi

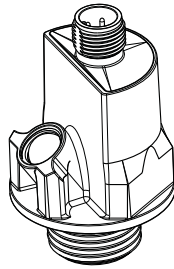


Fig. 17 RPI/RPI+T 0-40 psi transmitter

### Dimensions

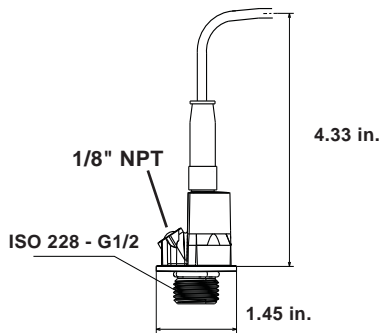


Fig. 18 Dimensions RPI transmitter

### Sensor output signals

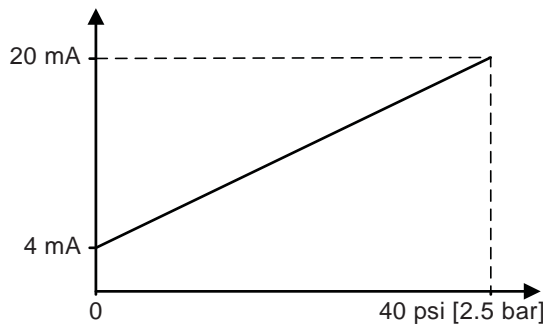


Fig. 19 Pressure response of RPI 0-40 psi

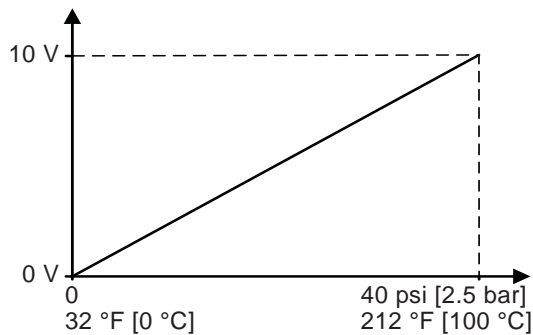


Fig. 20 Pressure and temperature response of RPI +T

## Specifications

Pressure	
Measuring range	0 to 40 psi [0 to 2.5 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only RPI with temperature sensor)	
Range (relative)	-22 to 212 °F [-30 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ F [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ F [ $\pm 2\%$ °C]
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ F [ $\pm 2.5\%$ °C]
Response time for sensor electronics	< 100 ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 212 °F [-30 to 100 °C]
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only RPI without temperature sensor)	
Power supply RPI	12 to 30 VDC
Output signals	4 to 20 mA
Power consumption	660 mW
Load impedance	max. 60 $\Omega$ at 12.5 VDC max. 100 $\Omega$ at 13.3 VDC m.ax 900 $\Omega$ at 30 VDC
Electrical data (Only RPI with temperature sensor)	
Power supply RPI + T	16.6 to 30 VDC
Output signals	0 to 10 VDC xxx
Max. signal cable length	98 ft [30 m]
Power consumption	450 mW
Load impedance	min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP67
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9240 3510

TM04 9237 1612

TM04 9189 3610

TM04 91890 3610

## RPI 0-60 psi [0-4.0 bar]

Relative pressure transmitter, industry 0-60 psi

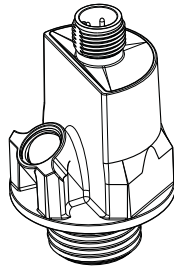


Fig. 21 RPI/RPI+T 0-60 psi transmitter

### Dimensions

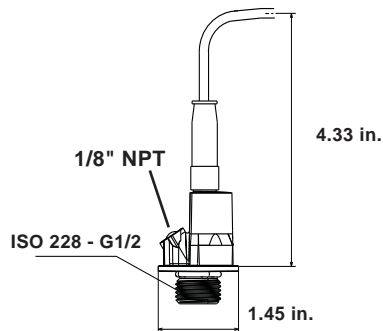


Fig. 22 Dimensions RPI transmitter

### Sensor output signals

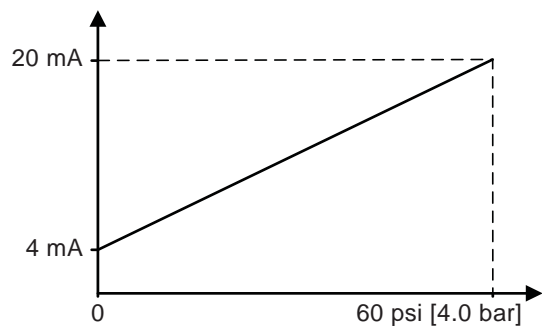


Fig. 23 Pressure response of RPI 0-60 psi

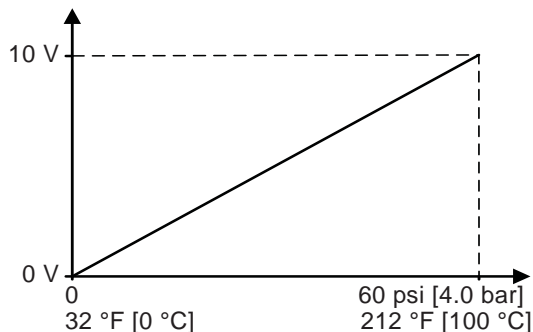


Fig. 24 Pressure and temperature response of RPI +T

## Specifications

Pressure	
Measuring range	0 to 60 psi [0 to 4.0 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only RPI with temperature sensor)	
Range (relative)	-22 to 212 °F [-30 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ F [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ F [ $\pm 2\%$ °C]
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ F [ $\pm 2.5\%$ °C]
Response time for sensor electronics	< 100 ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 212 °F [-30 to 100 °C]
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only RPI without temperature sensor)	
Power supply RPI	12 to 30 VDC
Output signals - cut off	4 to 20 mA
Power consumption	660 mW
Load impedance	max. 60 $\Omega$ at 12.5 VDC max. 100 $\Omega$ at 13.3 VDC m.ax 900 $\Omega$ at 30 VDC
Electrical data (Only RPI with temperature sensor)	
Power supply RPI + T	16.6 to 30 VDC
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	450 mW
Load impedance	min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP67
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9240 3510

TM04 9237 1612

TM04 9189 3610

TM04 91890 3610

## RPI 0-90 psi [0-6.0 bar]

Relative pressure transmitter, industry 0-90 psi

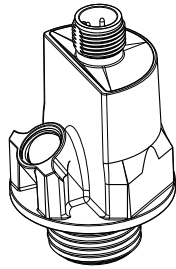


Fig. 25 RPI/RPI+T 0-90 psi transmitter

### Dimensions

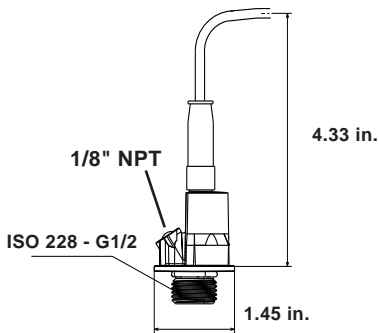


Fig. 26 Dimensions RPI transmitter

### Sensor output signals

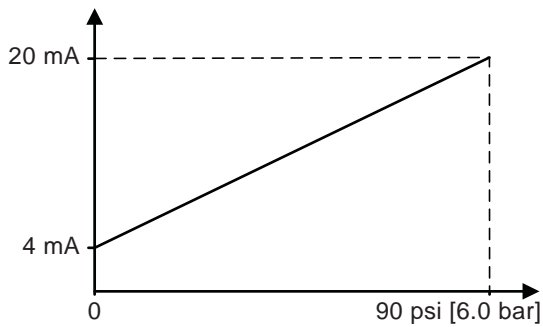


Fig. 27 Pressure response of RPI 0-90 psi

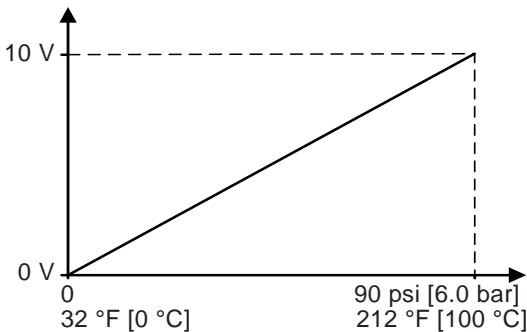


Fig. 28 Pressure and temperature response of RPI +T

## Specifications

Pressure	
Measuring range	0 to 90 psi [0 to 6.0 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only RPI with temperature sensor)	
Range (relative)	-22 to 212 °F [-30 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ F [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ F [ $\pm 2\%$ °C]
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ F [ $\pm 2.5\%$ °C]
Response time for sensor electronics	< 100 ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 212 °F [-30 to 100 °C]
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only RPI without temperature sensor)	
Power supply RPI	12 to 30 VDC
Output signals	4 to 20 mA
Power consumption	660 mW
Load impedance	max. 60 $\Omega$ at 12.5 VDC max. 100 $\Omega$ at 13.3 VDC m.ax 900 $\Omega$ at 30 VDC
Electrical data (Only RPI with temperature sensor)	
Power supply RPI + T	16.6 to 30 VDC
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	450 mW
Load impedance	min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP67
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9240 3510

TM04 9237 1612

TM04 9189 3610

TM04 91890 3610

## RPI 0-145 psi [0-10.0 bar]

Relative pressure transmitter, industry 0-145 psi

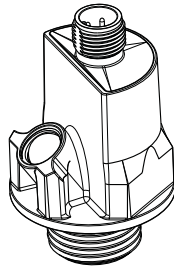


Fig. 29 RPI/RPI+T 0-145 psi transmitter

### Dimensions

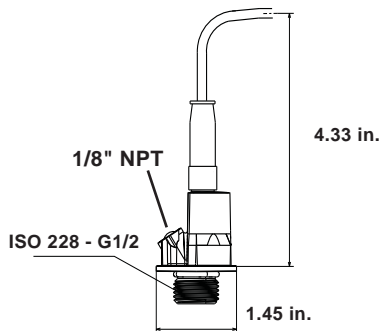


Fig. 30 Dimensions RPI transmitter

### Sensor output signals

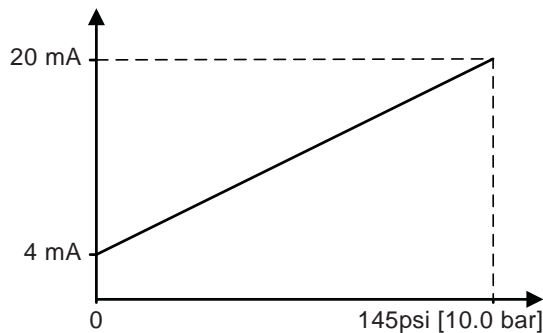


Fig. 31 Pressure response of RPI 0-145 psi

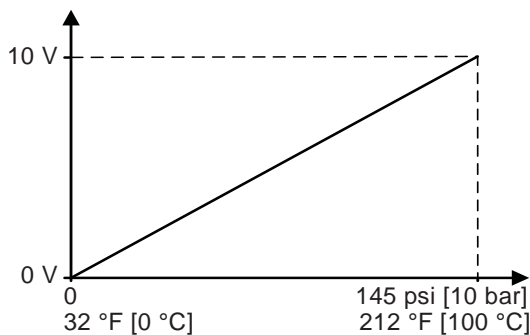


Fig. 32 Pressure and temperature response of RPI +T 0-10.0

## Specifications

Pressure	
Measuring range	0 to 145 psi [0 to 10 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only RPI with temperature sensor)	
Range (relative)	-22 to 212 °F [-30 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6$ °F [ $\pm 2$ °C]
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 5.4$ °F [ $\pm 2.5$ °C]
Response time for sensor electronics	< 100 ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 212 °F [-30 to 100 °C]
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only RPI without temperature sensor)	
Power supply RPI	12 to 30 VDC
Output signals	4 to 20 mA
Power consumption	660 mW
Load impedance	max. 60 $\Omega$ at 12.5 VDC max. 100 $\Omega$ at 13.3 VDC m.ax 900 $\Omega$ at 30 VDC
Electrical data (Only RPI with temperature sensor)	
Power supply RPI + T	16.6 to 30 VDC
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	450 mW
Load impedance	min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP67
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9240 3510

TM04 9237 1612

TM04 9189 3610

TM04 91890 3610

## RPI 0-232 psi [0-16.0 bar]

Relative pressure transmitter, industry 0-232 psi

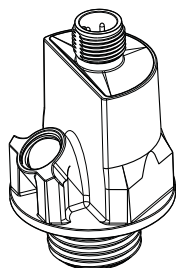


Fig. 33 RPI/RPI+T 0-232 psi transmitter

### Dimensions

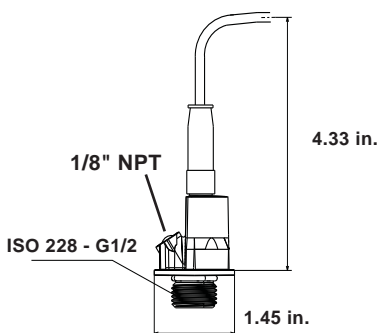


Fig. 34 Dimensions RPI transmitter

### Sensor output signals

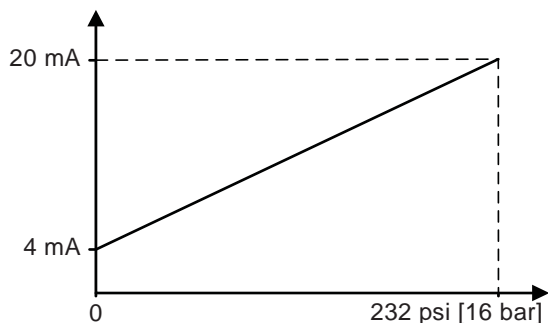


Fig. 35 Pressure response of RPI 0-232 psi

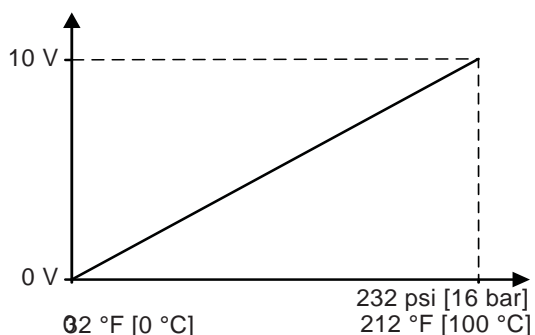


Fig. 36 Pressure and temperature response of RPI +T

## Specifications

Pressure	
Measuring range	0 to 232 psi [0-16 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2.5\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 3\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only RPI with temperature sensor)	
Range (relative)	-22 to 212 °F [-30 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 1.8\text{ °F}$ [ $\pm 1\text{ °C}$ ]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6\text{ °F}$ [ $\pm 2\text{ °C}$ ]
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\text{ °F}$ [ $\pm 2.5\text{ °C}$ ]
Response time for sensor electronics	< 100 ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 212 °F [-30 to 100 °C]
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only RPI without temperature sensor)	
Power supply RPI	12 to 30 VDC
Output signals	4 to 20 mA
Power consumption	660 mW
Load impedance	max. 60 $\Omega$ at 12.5 VDC max. 100 $\Omega$ at 13.3 VDC m.ax 900 $\Omega$ at 30 VDC
Electrical data (Only RPI with temperature sensor)	
Power supply RPI + T	16.6 to 30 VDC
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	450 mW
Load impedance	min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP67
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9240 3510

TM04 9237 1612

TM04 9189 3610

TM04 91890 3610

## RPI 0-360 psi [0-25.0 bar],

Relative pressure transmitter, industry 0-360 psi

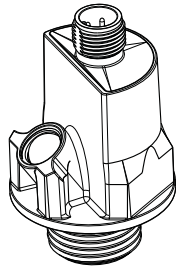


Fig. 37 RPI/RPI+T 0-360 psi transmitter

### Dimensions

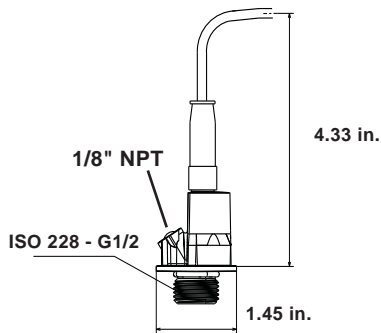


Fig. 38 Dimensions RPI transmitter

### Sensor output signals

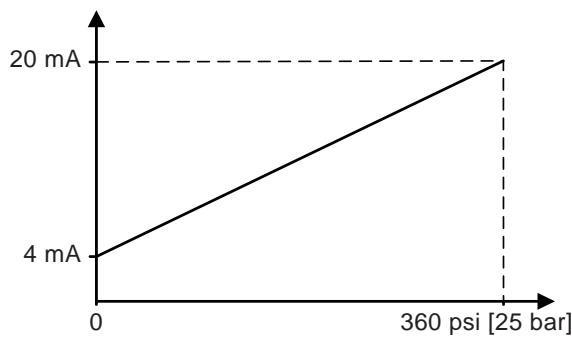


Fig. 39 Pressure response of RPI 0-360 psi

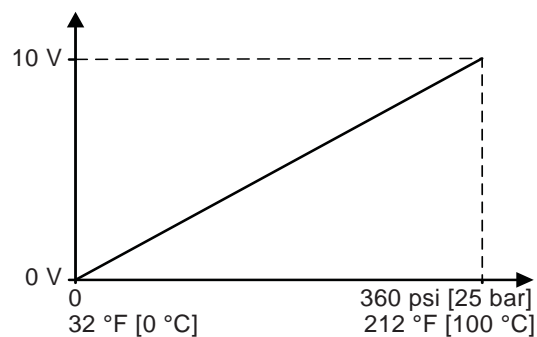


Fig. 40 Pressure and temperature response of RPI +T

## Specifications

Pressure	
Measuring range	0 to 360 psi [0 to 25 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2.5\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 3\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only RPI with temperature sensor)	
Range (relative)	-22 to 212 °F [-30 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6$ °F [ $\pm 2$ °C]
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 5.4$ °F [ $\pm 2.5$ °C]
Response time for sensor electronics	< 100 ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 212 °F [-30 to 100 °C]
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only RPI without temperature sensor)	
Power supply RPI	12 to 30 VDC
Output signals	4 to 20 mA
Power consumption	660 mW
Load impedance	max. 60 $\Omega$ at 12.5 VDC max. 100 $\Omega$ at 13.3 VDC m.ax 900 $\Omega$ at 30 VDC
Electrical data (Only RPI with temperature sensor)	
Power supply RPI + T	16.6 to 30 VDC
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	450 mW
Load impedance	min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP67
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9240 3510

TM04 9237 1612

TM04 9189 3610

TM04 91890 3610

## 3. Differential pressure transmitter, industrial (DPI) V.2

### DPI V.2 general data

#### Differential pressure transmitter, industrial V.2



TM04 7866 2510

Fig. 41 DPI transmitter

### Technical overview

Grundfos Direct Sensors™, type DPI, are an industrial differential pressure transmitter, designed to be mounted directly in the pipe system (V.2). The DPI +T version can also measure temperature in the range 32 to 212 °F [0 to 100 °C]. The DPI have a standard M12 connector.

### Sensor chip

Steady state properties of silicon protects the sensor chip against wear and tear. Lifelong nano-coating protection enables for the first time, direct measurement (wet and wet-wet) in a cost effective packaging for aggressive media. The secret is a metal-glass alloy coating, Silicoat® with an extreme resistance to corrosion. Compared to traditional sensor technologies which encapsulate the unprotected measuring cell from the Media, Silicoat® ensures a continuous protection of the Sensor Chip in aggressive media (ph 2-ph 11) at temperatures up to 248 °F [120 °C].

### Applications

- Water treatment and distribution
- light chemical industry
- water management
- pool and water resort
- heating
- heat pump
- air conditioning
- cooling towers
- condensing units
- solar system.

### Features

- Pressure range: 9 to 232 psi
- approved for potable water: WRAS (pending), KTW (pending), ACS (pending)
- wide temperature range 32 to 212 °F [0 to 100 °C] (DPI +T).
- 1/8" NPT-SW 27 capillary tube connection for P2 connection
- Max cable length (industry): 100 ft [30 meters]\*

### Benefits

- No moving parts
- compatible with wet, aggressive media
- cost-effective and robust construction
- system solution with Grundfos pumps
- Pressure and temperature measurement in one transmitter.

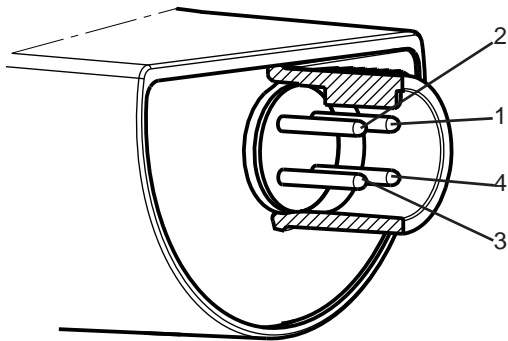
### Approvals

- WRAS
- KTW
- ACS
- NSF 61
- EU, US, and Canadian markets

## Type key

	DPI	+T	0-6	G½"	020	E	,Set
Type							
Temperature sensor:							
+T = with temperature Sensor							
Flow range [m3/h]							
Thread size							
Output signal:							
020 = 4-20mA							
O-ring material:							
E = EPDM							
F = FKM							
Set = Complete pressure transmitter							

## Electrical connections



TM04 7156 1610

Fig. 42 Electrical connections

PIN	1	2	3	4
Wire color	Brown	Grey	Blue	Black
Output 4 - 20 mA	+	not used	-	not used
Output 2 x 0 - 10 V	+	Pressure signal	-*	Temperature signal

- \* Common ground for both pressure and temperature signal.
- \* Power supply (screened cable): SELV or PELV.

\*Grundfos will not be liable for damage or wear to products caused by abnormal operating conditions, accident abuse, misuse unauthorized alteration or repair, or if the product was not installed in accordance with Grundfos' printed installation and operating instructions. Splicing of the supplied cable would void any warranty.



## DPI 0-9 psi [0-0.6 bar]

Differential pressure transmitter, industry V.2

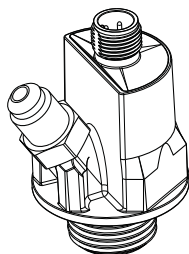


Fig. 43 DPI /DPI+T transmitter

### Dimensions

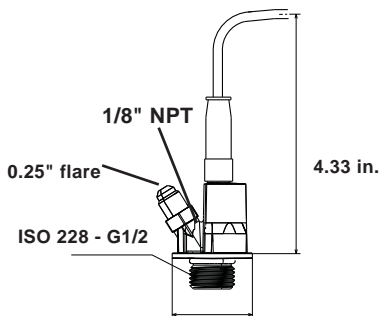


Fig. 44 Dimensions DPI/DPI+T

### Sensor output signals

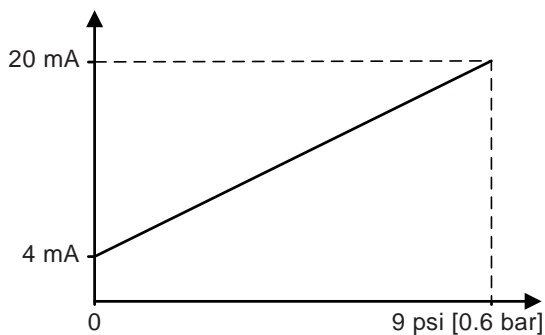


Fig. 45 Pressure response DPI

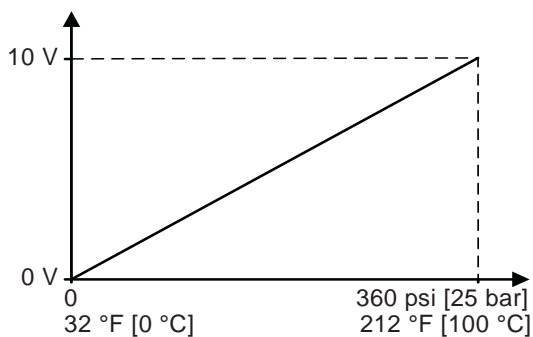


Fig. 46 Pressure and temperature response DPI +T

## Specifications

Pressure	
Measuring range	0 to 9 psi [0 to 0.6 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only DPI with temperature sensor)	
Range (relative)	-22 to 212 °F [-30 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6$ °F [ $\pm 2$ °C]
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 5.4$ °F [ $\pm 2.5$ °C]
Response time for sensor electronics	< 100ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 212 °F [-30 to 100 °C]
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only DPI without temperature sensor)	
Power supply DPI	12 to 30 VDC
Output signals	4 to 20 mA
Power consumption	660 mW
Load impedance	max. 60 $\Omega$ at 12.5 VDC max. 100 $\Omega$ at 13.3 VDC max. 900 $\Omega$ at 30 VDC
Electrical data (Only DPI with temperature sensor)	
Power supply DPI + T	16.6 to 30 VDC
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	450 mW
Load impedance	min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP67
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9239 3510

TM04 4963 2612

TM04 9189 3610

TM04 91890 3610

## DPI 0-14.5 psi

Differential pressure transmitter, industry V.2

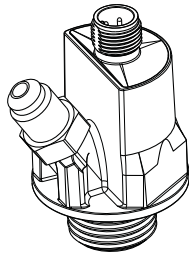


Fig. 47 DPI/DPI+T transmitter

### Dimensions

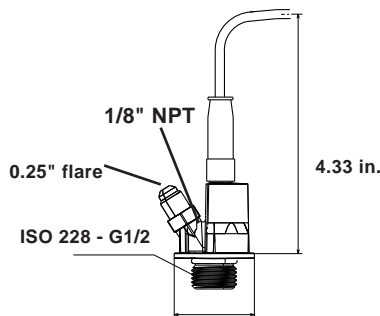


Fig. 48 Dimensions DPI/DPI+T

### Sensor output signals

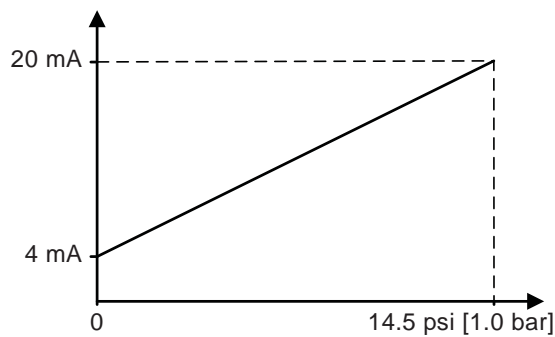


Fig. 49 Pressure response DPI

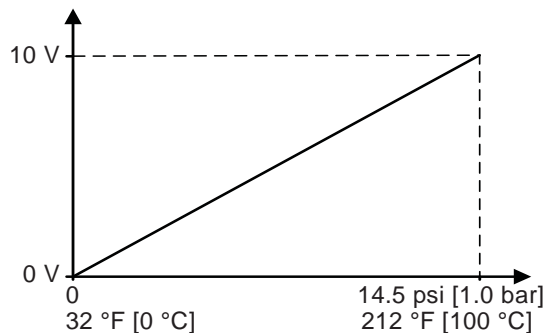


Fig. 50 Pressure and temperature response DPI+T

## Specifications

Pressure	
Measuring range	0 to 14.5 psi [0 to 1.0 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only DPI with temperature sensor)	
Range (relative)	-22 to 248 °F [-30 to 120 °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ F [ $\pm 1\%$ C]
Accuracy ( $\pm 1\sigma$ ) 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ F [ $\pm 2\%$ C]
Accuracy ( $\pm 1\sigma$ ) -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ F [ $\pm 2.5\%$ C]
Response time for sensor electronics	< 100ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 248 °F [-30 to 120 °C]
Media temperature (peak)	-22 to 266 °F [-30 to 130 °C], non-freezing
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 158 °F [-55 to 70 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only DPI without temperature sensor)	
Power supply DPI	11 to 30 VDC ( $\pm 5\%$ )
Output signals	4 to 20 mA
Max. signal cable length	98 ft [30 m]
Power consumption	22 mA
Load impedance	Max 100 $\Omega$ at 11 VDC Max 1000 $\Omega$ at 30 VDC
Electrical data (Only DPI with temperature sensor)	
Power supply DPI + T	14 to 30 VDC ( $\pm 5\%$ )
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	< 15 mA
Load impedance	Min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9239 3510

TM04 4963 2612

TM04 9189 3610

TM04 91890 3610

## DPI 0-25 psi [0-1.6 bar]

Differential pressure transmitter, industry V.2

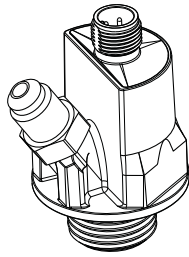


Fig. 51 DPI/DPI+T transmitter

### Dimensions

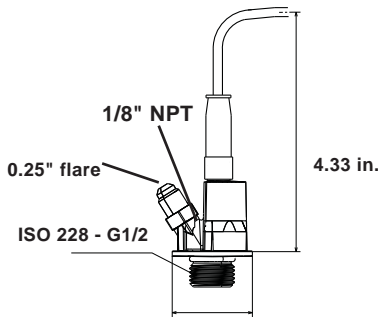


Fig. 52 Dimensions DPI/DPI+T

### Sensor output signals

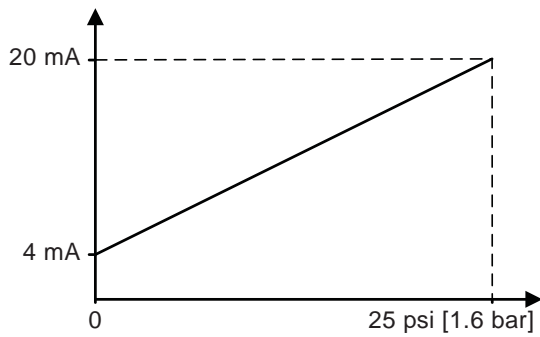


Fig. 53 Pressure response DPI

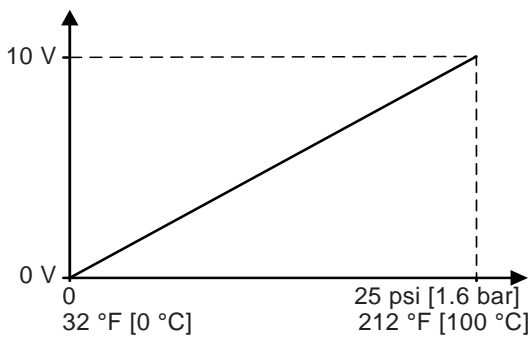


Fig. 54 Pressure and temperature response DPI+T

## Specifications

Pressure	
Measuring range	0 to 25 psi [0 to 1.6 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only DPI with temperature sensor)	
Range (relative)	-22 to 248 °F [-30 to 120 °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ F [ $\pm 1\%$ C]
Accuracy ( $\pm 1\sigma$ ) 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ F [ $\pm 2\%$ C]
Accuracy ( $\pm 1\sigma$ ) -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ F [ $\pm 2.5\%$ C]
Response time for sensor electronics	< 100ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 248 °F [-30 to 120 °C]
Media temperature (peak)	-22 to 266 °F [-30 to 130 °C], non-freezing
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 158 °F [-55 to 70 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only DPI without temperature sensor)	
Power supply DPI	11 to 30 VDC ( $\pm 5\%$ )
Output signals - cut off	4 to 20 mA
Max. signal cable length	98 ft [30 m]
Power consumption	22 mA
Load impedance	Max 100 $\Omega$ at 11 VDC Max 1000 $\Omega$ at 30 VDC
Electrical data (Only DPI with temperature sensor)	
Power supply DPI + T	14 to 30 VDC ( $\pm 5\%$ )
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	< 15 mA
Load impedance	Min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9239 3510

TM04 4963 2612

TM04 9189 3610

TM04 91890 3610

## DPI 0-40 psi [0-2.5 bar]

Differential pressure transmitter, industry V.2

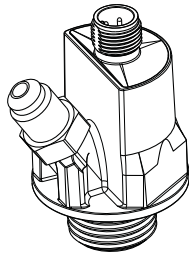


Fig. 55 DPI/DPI+T transmitter

### Dimensions

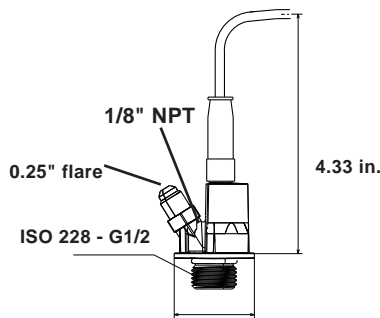


Fig. 56 Dimensions DPI/DPI+T

### Sensor output signals

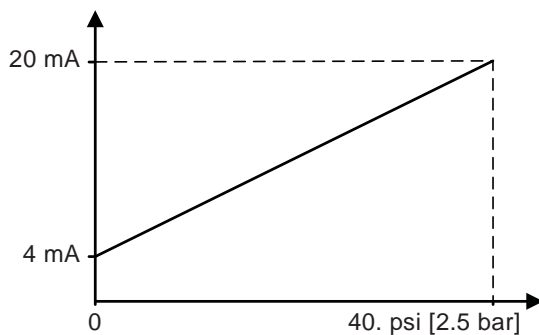


Fig. 57 Pressure response DPI

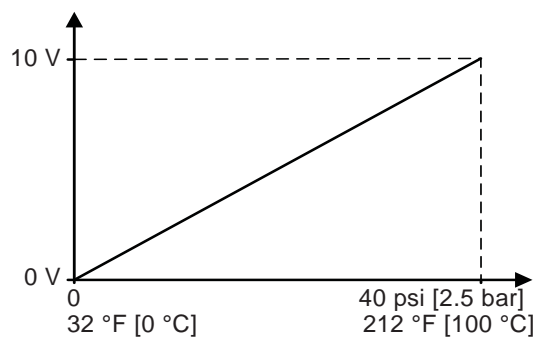


Fig. 58 Pressure and temperature response DPI+T

## Specifications

Pressure	
Measuring range	0 to 40 psi [0 to 2.5 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only DPI with temperature sensor)	
Range (relative)	-22 to 248 °F [-30 to 120 °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ [ $\pm 2\%$ °C]
Accuracy ( $\pm 1\sigma$ ) -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ [ $\pm 2.5\%$ °C]
Response time for sensor electronics	< 100ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 248 °F [-30 to 120 °C]
Media temperature (peak)	-22 to 266 °F [-30 to 130 °C], non-freezing
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 158 °F [-55 to 70 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only DPI without temperature sensor)	
Power supply DPI	11 to 30 VDC ( $\pm 5\%$ )
Output signals - cut off	4 to 20 mA
Max. signal cable length	98 ft [30 m]
Power consumption	22 mA
Load impedance	Max 100 $\Omega$ at 11 VDC Max 1000 $\Omega$ at 30 VDC
Electrical data (Only DPI with temperature sensor)	
Power supply DPI + T	14 to 30 VDC ( $\pm 5\%$ )
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	< 15 mA
Load impedance	Min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9239 3510

TM04 4963 2612

TM04 9189 3610

TM04 91890 3610

## DPI 0-60 psi [0-4.0 bar]

Differential pressure transmitter, industry V.2

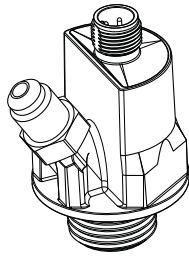


Fig. 59 DPI/DPI+T transmitter

### Dimensions

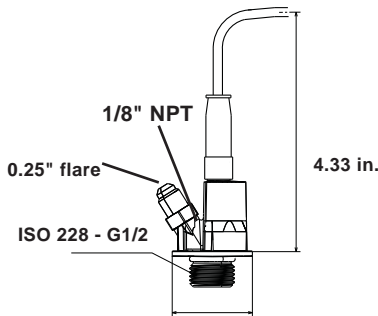


Fig. 60 Dimensions DPI/DPI+T

### Sensor output signals

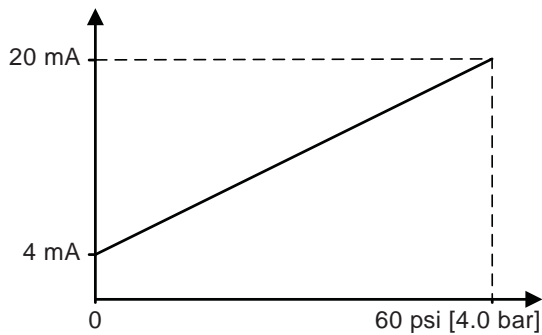


Fig. 61 Pressure response DPI

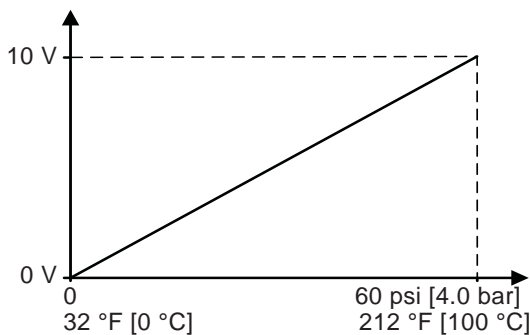


Fig. 62 Pressure and temperature response DPI+T

## Specifications

Pressure	
Measuring range	0 to 60 psi [0 to 4.0 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only DPI with temperature sensor)	
Range (relative)	-22 to 248 °F [-30 to 120 °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ F [ $\pm 1\%$ C]
Accuracy ( $\pm 1\sigma$ ) 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ F [ $\pm 2\%$ C]
Accuracy ( $\pm 1\sigma$ ) -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ F [ $\pm 2.5\%$ C]
Response time for sensor electronics	< 100ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 248 °F [-30 to 120 °C]
Media temperature (peak)	-22 to 266 °F [-30 to 130 °C], non-freezing
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 158 °F [-55 to 70 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only DPI without temperature sensor)	
Power supply DPI	11 to 30 VDC ( $\pm 5\%$ )
Output signals - cut off	4 to 20 mA - 21 mA
Max. signal cable length	98 ft [30 m]
Power consumption	22 mA
Load impedance	Max 100 $\Omega$ at 11 VDC Max 1000 $\Omega$ at 30 VDC
Electrical data (Only DPI with temperature sensor)	
Power supply DPI + T	14 to 30 VDC ( $\pm 5\%$ )
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	< 15 mA
Load impedance	Min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9239 3510

TM04 4963 2612

TM04 9189 3610

TM04 91890 3610

## DPI 0-90 psi [0-6.0 bar]

Differential pressure transmitter, industry V.2

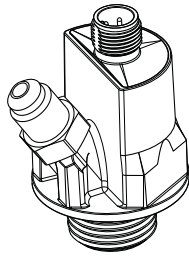


Fig. 63 DPI/DPI+T transmitter

### Dimensions

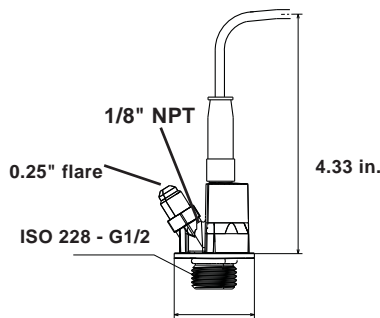


Fig. 64 Dimensions DPI/DPI+T

### Sensor output signals

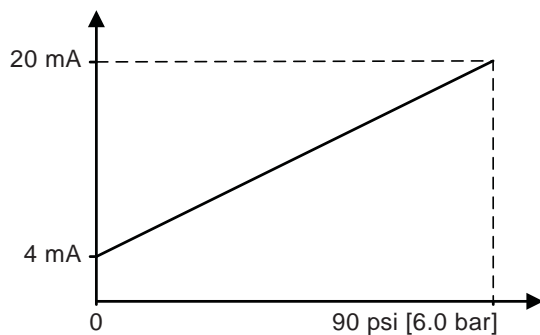


Fig. 65 Pressure response DPI

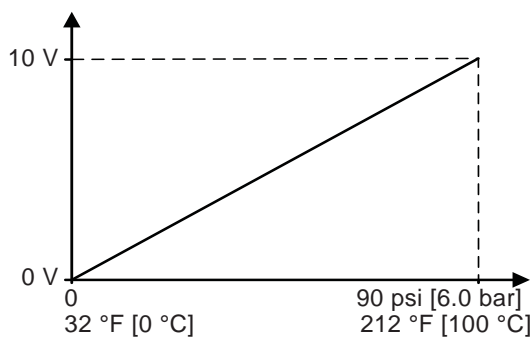


Fig. 66 Pressure and temperature response DPI+T

## Specifications

Pressure	
Measuring range	0 to 90psi [0 to 6.0 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only DPI with temperature sensor)	
Range (relative)	-22 to 248 °F [-30 to 120 °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ [ $\pm 2\%$ °C]
Accuracy ( $\pm 1\sigma$ ) -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ [ $\pm 2.5\%$ °C]
Response time for sensor electronics	< 100ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 248 °F [-30 to 120 °C]
Media temperature (peak)	-22 to 266 °F [-30 to 130 °C], non-freezing
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 158 °F [-55 to 70 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only DPI without temperature sensor)	
Power supply DPI	11 to 30 VDC ( $\pm 5\%$ )
Output signals	4 to 20 mA
Max. signal cable length	98 ft [30 m]
Power consumption	22 mA
Load impedance	Max 100 $\Omega$ at 11 VDC Max 1000 $\Omega$ at 30 VDC
Electrical data (Only DPI with temperature sensor)	
Power supply DPI + T	14 to 30 VDC ( $\pm 5\%$ )
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	< 15 mA
Load impedance	Min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9239 3510

TM04 4963 2612

TM04 9189 3610

TM04 91890 3610

## DPI 0-145 psi [0-10.0 bar]

Differential pressure transmitter, industry V.2

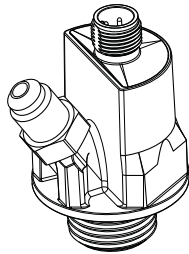


Fig. 67 DPI/DPI+T transmitter

### Dimensions

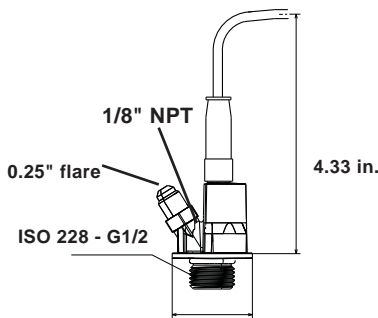


Fig. 68 Dimensions DPI/DPI+T

### Sensor output signals

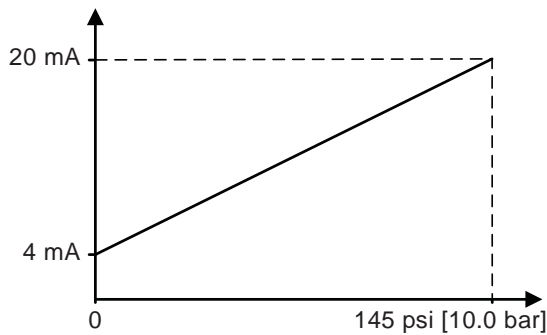


Fig. 69 Pressure response DPI

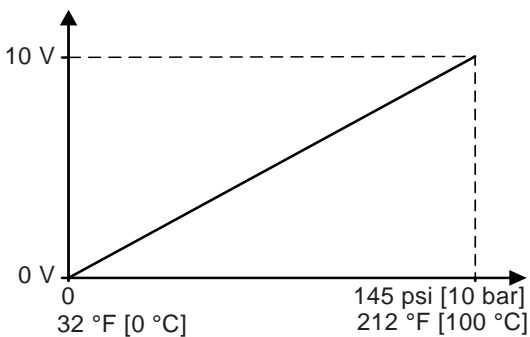


Fig. 70 Pressure and temperature response DPI+T

## Specifications

Pressure	
Measuring range	0 to 145 psi [0 to 10.0 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only DPI with temperature sensor)	
Range (relative)	-22 to 248 °F [-30 to 120 °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ F [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ F [ $\pm 2\%$ °C]
Accuracy ( $\pm 1\sigma$ ) -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ F [ $\pm 2.5\%$ °C]
Response time for sensor electronics	< 100ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 248 °F [-30 to 120 °C]
Media temperature (peak)	-22 to 266 °F [-30 to 130 °C], non-freezing
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 158 °F [-55 to 70 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only DPI without temperature sensor)	
Power supply DPI	11 to 30 VDC ( $\pm 5\%$ )
Output signals - cut off	4 to 20 mA
Max. signal cable length	98 ft [30 m]
Power consumption	22 mA
Load impedance	Max 100 $\Omega$ at 11 VDC Max 1000 $\Omega$ at 30 VDC
Electrical data (Only DPI with temperature sensor)	
Power supply DPI + T	14 to 30 VDC ( $\pm 5\%$ )
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	< 15 mA
Load impedance	Min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9239 3510

TM04 4963 2612

TM04 9189 3610

TM04 91890 3610

## DPI 0-232 psi [0-16.0 bar]

Differential pressure transmitter, industry V.2

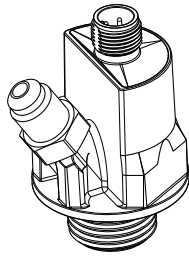


Fig. 71 DPI/DPI+T transmitter

### Dimensions

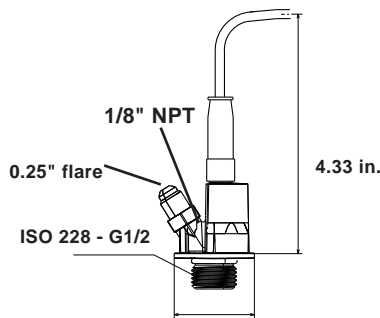


Fig. 72 Dimensions DPI/DPI+T

### Sensor output signals

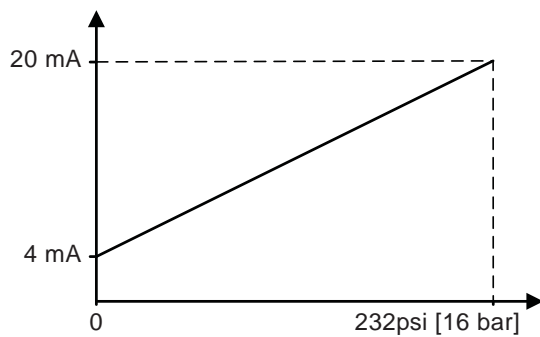


Fig. 73 Pressure response DPI

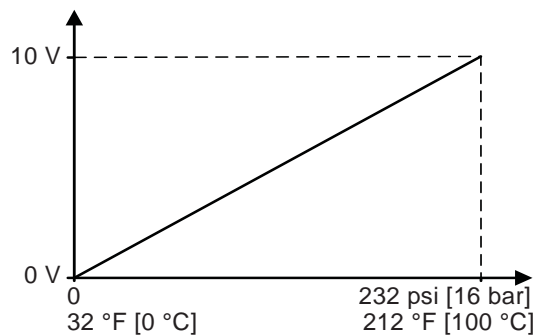


Fig. 74 Pressure and temperature response DPI+T

## Specifications

Pressure	
Measuring range	0 to 232 psi [0 to 16.0 bar]
Accuracy ( $\pm 1\sigma$ ), 32 to 176 °F [0 to 80 °C]	$\pm 2.5\%$ FS
Accuracy ( $\pm 1\sigma$ ), -22 to 212 °F [-30 to 100 °C]	$\pm 3\%$ FS
Response time	< 100 ms (typical 50 ms)
Resolution	1/1000 FS
Temperature (Only DPI with temperature sensor)	
Range (relative)	-22 to 248 °F [-30 to 120 °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 176 °F [0 to 80 °C]	$\pm 1.8\%$ [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ) 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ [ $\pm 2\%$ °C]
Accuracy ( $\pm 1\sigma$ ) -22 to 212 °F [-30 to 100 °C]	$\pm 5.4\%$ [ $\pm 2.5\%$ °C]
Response time for sensor electronics	< 100ms (typical 50 ms)
Resolution	0.18 °F [0.1 °C]
Media and environment	
Media types	liquids, gasses and air
Media temperature (operation)	-22 to 248 °F [-30 to 120 °C]
Media temperature (peak)	-22 to 266 °F [-30 to 130 °C], non-freezing
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 158 °F [-55 to 70 °C]
Storage temperature	-67 to 158 °F [-55 to 70 °C]
Humidity	0 to 95 % RH, non-condensing
System burst pressure	870 psi [60 bar]
Electrical data (Only DPI without temperature sensor)	
Power supply DPI	11 to 30 VDC ( $\pm 5\%$ )
Output signals - cut off	4 to 20 mA
Max. signal cable length	98 ft [30 m]
Power consumption	22 mA
Load impedance	Max 100 $\Omega$ at 11 VDC Max 1000 $\Omega$ at 30 VDC
Electrical data (Only DPI with temperature sensor)	
Power supply DPI + T	14 to 30 VDC ( $\pm 5\%$ )
Output signals	0 to 10 VDC
Max. signal cable length	98 ft [30 m]
Power consumption	< 15 mA
Load impedance	Min. 10 k $\Omega$
Sensor materials	
Measurement element	silicon-based MEMS sensor
Packing material	EPDM or FKM rubber
Sensor housing	stainless steel AISI 316 L
Wetted materials	corrosion-resistant coating EPDM or FKM rubber stainless steel AISI 316 L
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1

TM04 9239 3510

TM04 4963 2612

TM04 9189 3610

TM04 91890 3610



## 4. Differential pressure transmitter, industrial (DPI)

### DPI general data

#### Differential pressure transmitter, Industrial



TM04 4738 0509

Fig. 75 DPI transmitter

### Benefits

- Compatible with wet, aggressive media
- accurate, linearized output signal
- cost-effective and robust design.

### Technical overview

Grundfos Direct Sensors™, type DPI, are a series of differential pressure transmitters for industry. The DPI sensors are compatible with wet, aggressive media and are available for differential pressure ranges from 0-9 psi to 0-145 psi.

### Sensor chip

Steady state properties of silicon protects the sensor chip against wear and tear. Lifelong nano-coating protection enables for the first time, direct measurement (wet and wet-wet) in a cost effective packaging for aggressive media. The secret is a metal-glass alloy coating, Silicoat® with an extreme resistance to corrosion. Compared to traditional sensor technologies which encapsulate the unprotected measuring cell from the Media, Silicoat® ensures a continuous protection of the Sensor Chip in aggressive media (ph 2-ph 11) at temperatures up to 248 °F [120 °C].

### Applications

- Pumps and pumping control systems
- filters (monitoring)
- cooling and temperature control systems
- water treatment systems
- heat pump
- boiler control systems
- renewable energy systems
- heat exchanger efficiency (monitoring of fouling).

### Features

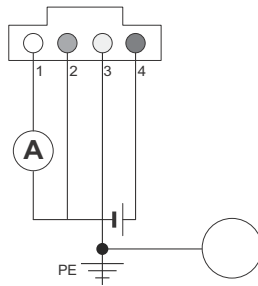
- Differential Pressure ranges: 9 to 145 psi
- designed for harsh environments
- analog output signal
- compact and well proven design
- MEMS sensing technology
- approved for the EU, US and Canadian markets.
- Max cable length (industry): 100 ft [30 meters]\*

## Type key

The sensor is labelled with a type designation.

	96561232	- XX	- XXX	XXXXX
Product number				
Version				
Production year and week				
Consecutive number				

## Electrical connections



TM04 9191 3610

Fig. 76 Electrical connections

Pin configuration	color
1 Test conductor (can be cut off during mounting). Do not connect this conductor to the voltage supply.	White
2 Signal conductor	Green
3 GND (earth conductor)	Yellow
4 12 to 30 V supply voltage	Brown

\*Grundfos will not be liable for damage or wear to products caused by abnormal operating conditions, accident abuse, misuse unauthorized alteration or repair, or if the product was not installed in accordance with Grundfos' printed installation and operating instructions. Splicing of the supplied cable would void any warranty.

## DPI 0-9 psi [0-0.6 bar]

Differential pressure transmitter, industry



Fig. 77 DPI transmitter

### Dimension

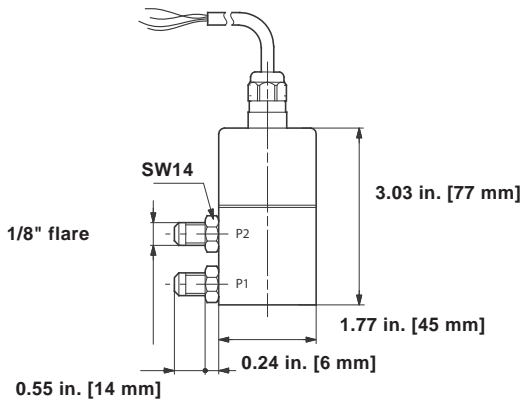


Fig. 78 Dimensions DPI transmitter

### Output signals

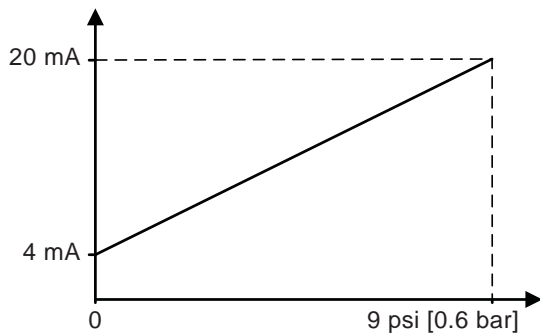


Fig. 79 Differential pressure response

## Specifications

Pressure	
Measuring range (differential)	0 to 9 psi [0 to 0.6 bar]
Accuracy (IEC 61298-2)	3.5 % FS
Response time	< 0.5 s
Static Pressure P <sub>1</sub>	232 psi [16.0 bar]
Static Pressure P <sub>2</sub>	145 psi [10.0 bar]
Max system pressure	232 psi [16.0 bar]
Media and environment	
Media	Liquids, gases and air
Media temperature (operation)	14 to 158 °F [-18 to 106 °C]
Media temperature (peak)	up to 176 °F [80 °C]
Ambient air temperature	-40 to 158 °F [-40 to 106 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	360 psi [25.0 bar]
Electrical data	
Power supply	12 to 30 VDC
Output signals	4 to 20 mA
Load impedance	24 V max. 500 kΩ
	16 V max. 200 kΩ
	12 V max. 100 kΩ
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Seal	FKM rubber
Housing	AISI 303 stainless steel
Wetted materials	FKM and PPS
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	1.2 lbs

TM04 5034 2409

TM03 2059 1612

TM04 9189 3610

## DPI 0-14.5 psi [0-1.0 bar]

Differential pressure transmitter, industry



Fig. 80 DPI transmitter

### Dimension

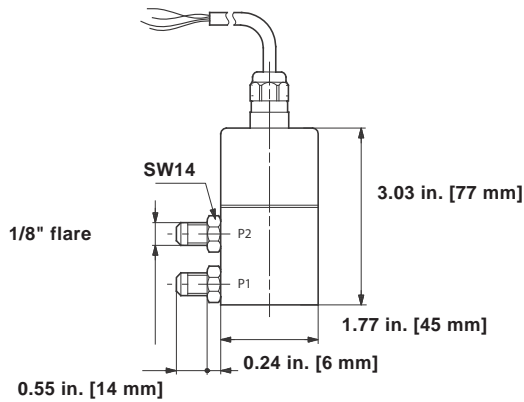


Fig. 81 Dimensions DPI transmitter

### Output signals

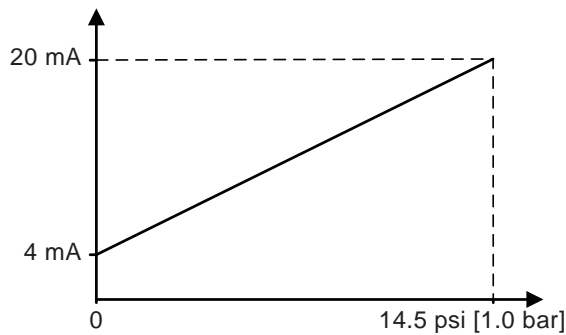


Fig. 82 Differential pressure response

## Specifications

Pressure	
Measuring range (differential)	0 to 14.5 psi [0 to 1.0 bar]
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
Static Pressure P <sub>1</sub>	232 psi [16.0 bar]
Static Pressure P <sub>2</sub>	145 psi [10.0 bar]
Max system pressure	232 psi [16.0 bar]
Media and environment	
Media	Liquids, gasses and air
Media temperature (operation)	14 to 158 °F [-18 to 106 °C]
Media temperature (peak)	up to 176 °F [80 °C]
Ambient air temperature	-40 to 158 °F [-40 to 106 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	360 psi [25.0 bar]
Electrical data	
Power supply	12-30 VDC
Output signals	4-20 mA
Load impedance	24 V max. 500 kΩ
	16 V max. 200 kΩ
	12 V max. 100 kΩ
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Seal	FKM rubber
Housing	AISI 303 stainless steel
Wetted materials	FKM and PPS
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	1.2 lbs

TM04 5034 2409

TM03 2059 1612

TM04 9189 3610

## DPI 0-17.4 psi [0-1.2 bar]

Differential pressure transmitter, industry



Fig. 83 DPI transmitter

### Dimension

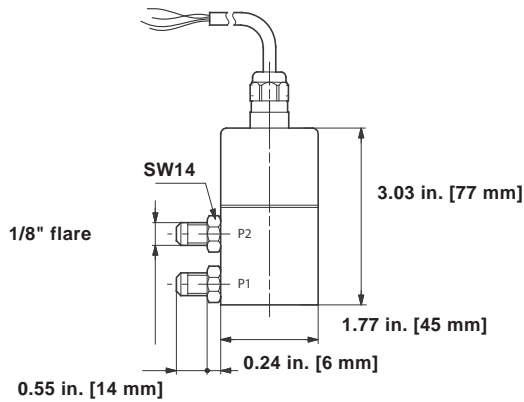


Fig. 84 Dimensions DPI transmitter

### Output signals

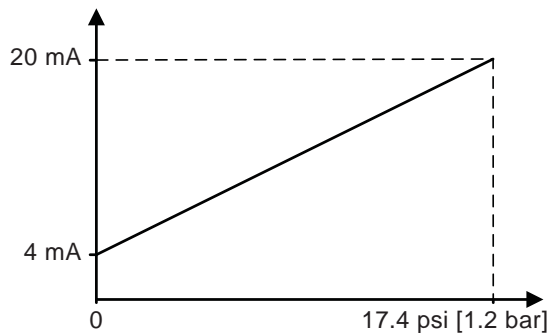


Fig. 85 Differential pressure response

## Specifications

Pressure	
Measuring range (differential)	0 to 17.4 psi [0 to 1.2 bar]
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
Static Pressure P <sub>1</sub>	232 psi [16.0 bar]
Static Pressure P <sub>2</sub>	145 psi [10.0 bar]
Max system pressure	232 psi [16.0 bar]
Media and environment	
Media	Liquids, gasses and air
Media temperature (operation)	14 to 158 °F [-18 to 106 °C]
Media temperature (peak)	up to 176 °F [80 °C]
Ambient air temperature	-40 to 158 °F [-40 to 106 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	360 psi [25.0 bar]
Electrical data	
Power supply	12-30 VDC
Output signals	4-20 mA
Load impedance	24 V max. 500 kΩ
	16 V max. 200 kΩ
	12 V max. 100 kΩ
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Seal	FKM rubber
Housing	AISI 303 stainless steel
Wetted materials	FKM and PPS
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	1.2 lbs

TM04 5034 2409

TM03 2059 1612

TM04 9189 3610

## DPI 0-25 psi [0-1.6 bar]

Differential pressure transmitter, industry



Fig. 86 DPI transmitter

### Dimension

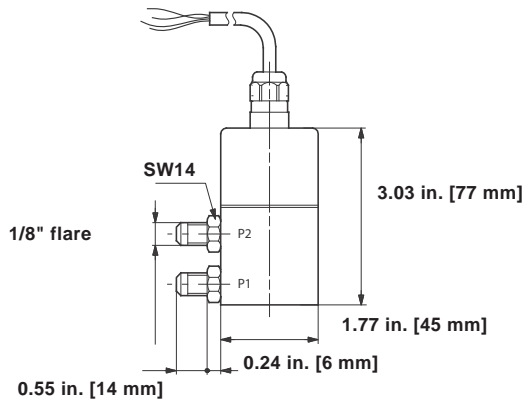


Fig. 87 Dimensions DPI transmitter

### Output signals

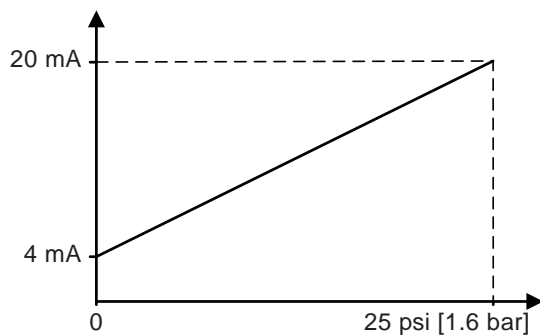


Fig. 88 Differential pressure response

## Specifications

Pressure	
Measuring range (differential)	0 to 25 psi [0 to 1.6 bar]
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
Static Pressure P <sub>1</sub>	232 psi [16.0 bar]
Static Pressure P <sub>2</sub>	145 psi [10.0 bar]
Max system pressure	232 psi [16.0 bar]
Media and environment	
Media	Liquids, gasses and air
Media temperature (operation)	14 to 158 °F [-18 to 106 °C]
Media temperature (peak)	up to 176 °F [80 °C]
Ambient air temperature	-40 to 158 °F [-40 to 106 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	360 psi [25.0 bar]
Electrical data	
Power supply	12-30 VDC
Output signals	4-20 mA
Load impedance	24 V max. 500 kΩ
	16 V max. 200 kΩ
	12 V max. 100 kΩ
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Seal	FKM rubber
Housing	AISI 303 stainless steel
Wetted materials	FKM and PPS
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	1.2 lbs

TM04 5034 2409

TM03 2059 1612

TM04 9189 3610

## DPI 0-40 psi [0-2.5 bar]

Differential pressure transmitter, industry



Fig. 89 DPI transmitter

### Dimension

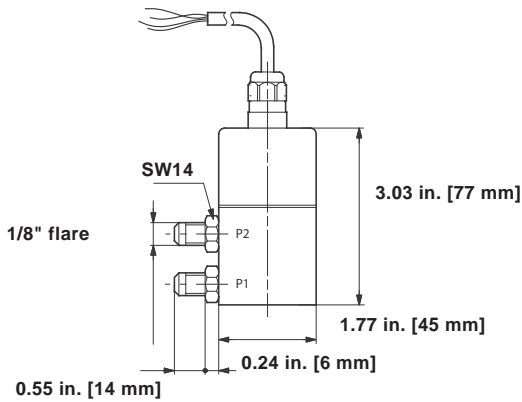


Fig. 90 Dimensions DPI transmitter

### Output signals

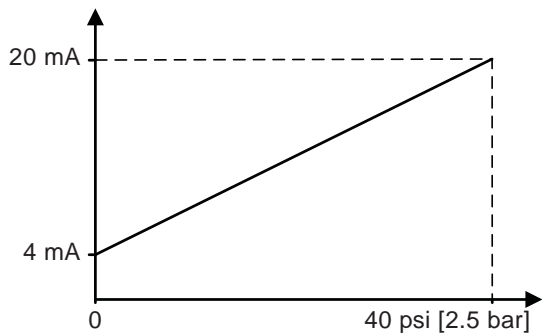


Fig. 91 Differential pressure response

## Specifications

Pressure	
Measuring range (differential)	0 to 40 psi [0 to 2.5 bar]
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
Static Pressure P <sub>1</sub>	232 psi [16.0 bar]
Static Pressure P <sub>2</sub>	145 psi [10.0 bar]
Max system pressure	232 psi [16.0 bar]
Media and environment	
Media	Liquids, gasses and air
Media temperature (operation)	14 to 158 °F [-18 to 106 °C]
Media temperature (peak)	up to 176 °F [80 °C]
Ambient air temperature	-40 to 158 °F [-40 to 106 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	360 psi [25.0 bar]
Electrical data	
Power supply	12-30 VDC
Output signals	4-20 mA
Load impedance	24 V max. 500 kΩ
	16 V max. 200 kΩ
	12 V max. 100 kΩ
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Seal	FKM rubber
Housing	AISI 303 stainless steel
Wetted materials	FKM and PPS
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	1.2 lbs

TM04 5034 2409

TM03 2059 1612

TM04 9189 3610

## DPI 0-60 psi [0-4.0 bar]

Differential pressure transmitter, industry



Fig. 92 DPI transmitter 0 to 60 psi

### Dimension

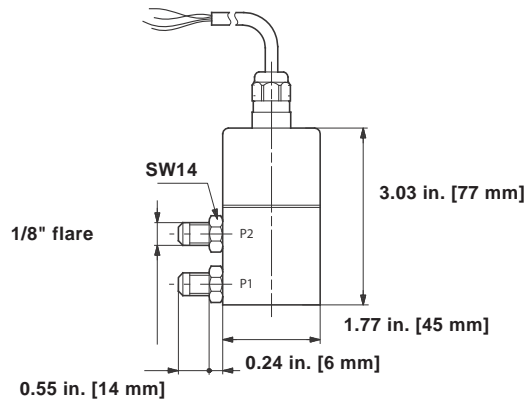


Fig. 93 Dimensions DPI transmitter

### Output signals

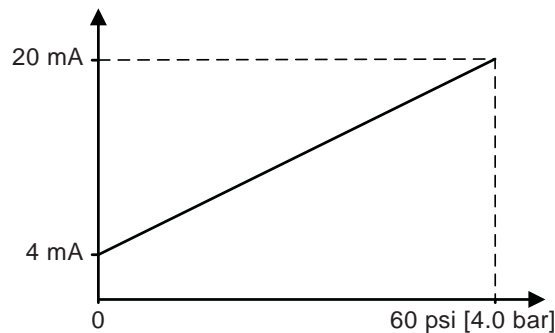


Fig. 94 Differential pressure response

## Specifications

Pressure	
Measuring range (differential)	0 to 60 psi [0 to 4.0 bar]
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
Static Pressure P <sub>1</sub>	232 psi [16.0 bar]
Static Pressure P <sub>2</sub>	145 psi [10.0 bar]
Max system pressure	232 psi [16.0 bar]
Media and environment	
Media	Liquids, gasses and air
Media temperature (operation)	14 to 158 °F [-18 to 106 °C]
Media temperature (peak)	up to 176 °F [80 °C]
Ambient air temperature	-40 to 158 °F [-40 to 106 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	360 psi [25.0 bar]
Electrical data	
Power supply	12-30 VDC
Output signals	4-20 mA
Load impedance	24 V max. 500 kΩ
	16 V max. 200 kΩ
	12 V max. 100 kΩ
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Seal	FKM rubber
Housing	AISI 303 stainless steel
Wetted materials	FKM and PPS
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	1.2 lbs

TM04 5034 2409

TM03 2059 1612

TM04 9189 3610



## DPI 0-90 psi [0-6.0 bar]

Differential pressure transmitter, industry



Fig. 95 DPI transmitter 0 to 90 psi [0 to 6.0 bar]

### Dimension

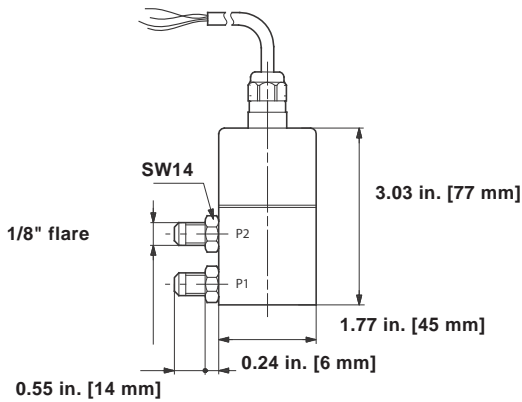


Fig. 96 Dimensions DPI transmitter

### Output signals

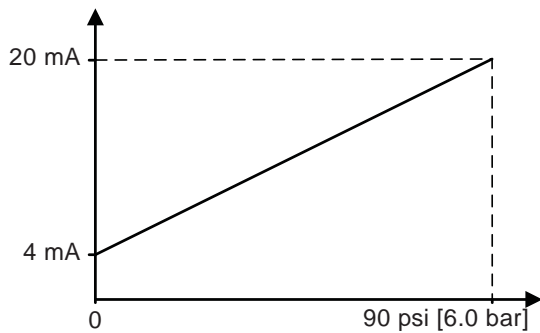


Fig. 97 Differential pressure response

## Specifications

Pressure	
Measuring range (differential)	0 to 90 psi [0 to 6.0 bar]
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
Static Pressure P <sub>1</sub>	232 psi [16.0 bar]
Static Pressure P <sub>2</sub>	145 psi [10.0 bar]
Max system pressure	232 psi [16.0 bar]
Media and environment	
Media	Liquids, gasses and air
Media temperature (operation)	14 to 158 °F [-18 to 106 °C]
Media temperature (peak)	up to 176 °F [80 °C]
Ambient air temperature	-40 to 158 °F [-40 to 106 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	360 psi [25.0 bar]
Electrical data	
Power supply	12-30 VDC
Output signals	4-20 mA
Load impedance	24 V max. 500 kΩ
	16 V max. 200 kΩ
	12 V max. 100 kΩ
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Seal	FKM rubber
Housing	AISI 303 stainless steel
Wetted materials	FKM and PPS
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	1.2 lbs

TM04 5034 2409

TM03 2059 1612

TM04 9189 3610

## DPI 0-145 psi [0-10.0 bar]

Differential pressure transmitter, industry



Fig. 98 DPI transmitter 0 to 145 psi

### Dimension

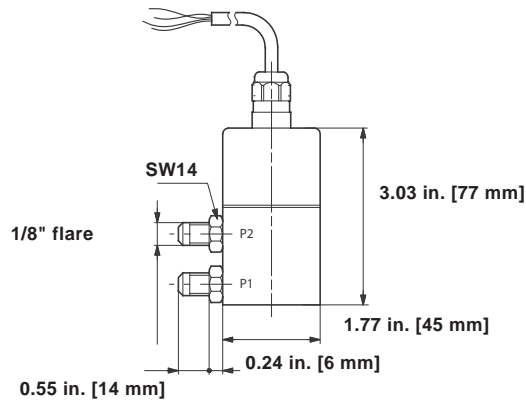


Fig. 99 Dimensions DPI transmitter

### Output signals

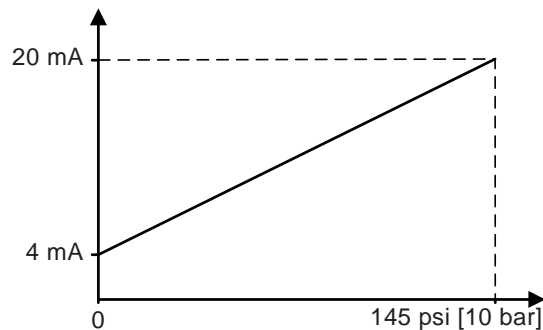


Fig. 100 Differential pressure response

## Specifications

Pressure	
Measuring range (differential)	0 to 145 psi [0 to 10 bar]
Accuracy (IEC 61298-2)	2 % FS
Response time	< 0.5 s
Static Pressure P <sub>1</sub>	232 psi [16.0 bar]
Static Pressure P <sub>2</sub>	145 psi [10.0 bar]
Max system pressure	232 psi [16.0 bar]
Media and environment	
Media	Liquids, gasses and air
Media temperature (operation)	14 to 158 °F [-18 to 106 °C]
Media temperature (peak)	up to 176 °F [80 °C]
Ambient air temperature	-40 to 158 °F [-40 to 106 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	360 psi [25.0 bar]
Electrical data	
Power supply	12-30 VDC
Output signals	4-20 mA
Load impedance	24 V max. 500 kΩ
	16 V max. 200 kΩ
	12 V max. 100 kΩ
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Seal	FKM rubber
Housing	AISI 303 stainless steel
Wetted materials	FKM and PPS
Environmental standards	
Enclosure class	IP55
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Immunity	EN 61000-6-2
Emission	EN 61000-6-3
Weight	1.2 lbs

TM04 5034 2409

TM03 2059 1612

TM04 9189 3610

## 5. Relative pressure sensor standard (RPS)

### RPS general data

#### Relative pressure sensor, standard



TM03 8138 0607

Fig. 101RPS sensor

### Technical overview

Grundfos Direct Sensors™, type RPS, is a series of combined pressure and temperature sensors (two-in-one) designed for high-volume production. The RPS sensors are fully compatible with wet, aggressive media and are available for pressure ranges from 0-8.7 to 0-145 psi (relative pressure).

### Sensor chip

Steady state properties of silicon protects the sensor chip against wear and tear. Lifelong nano-coating protection enables for the first time, direct measurement (wet and wet-wet) in a cost effective packaging for aggressive media. The secret is a metal-glass alloy coating, Silicoat® with an extreme resistance to corrosion. Compared to traditional sensor technologies which encapsulate the unprotected measuring cell from the Media, Silicoat® ensures a continuous protection of the Sensor Chip in aggressive media (ph 2-ph 11) at temperatures up to 248 °F [120 °C].

### Applications

- Domestic hot-water system efficiency
- water level in central heating system
- dry-running protection in solar systems and gas boilers
- monitoring of pressure and temperature.
- solar system
- heat pumps

### Features

- Pressure ranges: 8.7 to 145 psi.
- voltage output (ratio metric, ideal for use with micro controller)
- compact and robust mechanical design
- approved for potable water: WRAS, KTW, W270, ACS.
- Max cable length (standard): 10 ft [3 meters]\*
- Approved for EU, US and Canadian markets.

### Benefits

- Pressure and temperature sensor in one package (two-in-one sensor)
- compatible with wet, aggressive media
- accurate, linearised and temperature-compensated pressure sensor
- quick temperature response (direct media contact).

## Type key

The sensor is labelled with a type designation.

	96XXXXXX	- XX	- XXX	XXXXX
Product number				
Revision				
Production year and week				
Consecutive number				

## Electrical connections

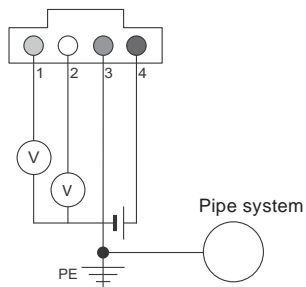


Fig. 102 Electrical connections

TM05 2253 4711

Pin configuration	Colour
1 Temperature signal (0.5 to 3.5 V relative to pin 3)	Yellow
2 Pressure signal (0.5 to 3.5 V relative to pin 3)	White
3 GND (0 V)	Green
4 Voltage supply (+5 VDC), PELV	Brown

## Power supply requirements

- 5 VDC
- separated from hazardous live circuitry by double or reinforced insulation
- power limitation: 150 VA; current limitation: 8 A.

## Options

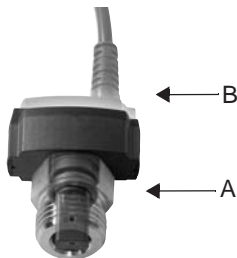


Fig. 103 Sensor options

TM03 8139 0607

Pos.	Description
A	1/2" nipple, stainless steel (316L) or 3/8" composite
B	simple connector

\*Grundfos will not be liable for damage or wear to products caused by abnormal operating conditions, accident abuse, misuse unauthorized alteration or repair, or if the product was not installed in accordance with Grundfos' printed installation and operating instructions. Splicing of the supplied cable would void any warranty.

## RPS 0-9 psi [0-0.6 bar]

Relative pressure transmitter, standard 0-9 psi



Fig. 104 RPS sensor, 0-9 psi

### Dimensions In. [mm]

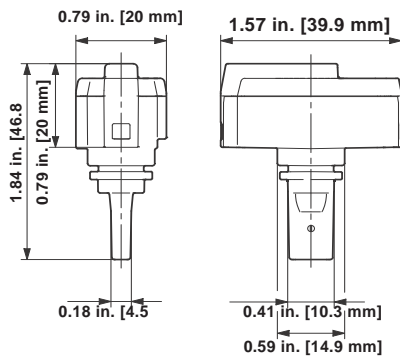


Fig. 105 Dimensions RPS sensor

### Output signals

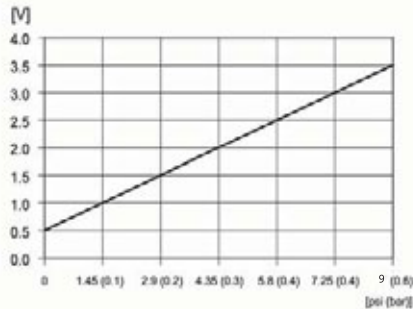


Fig. 106 Pressure response

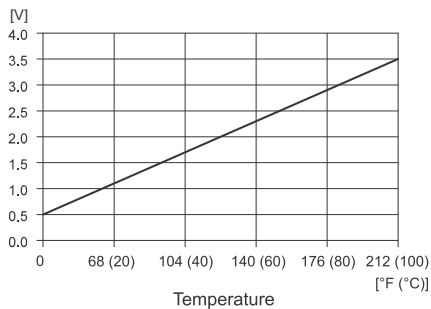


Fig. 107 Temperature response

### Specifications

Pressure	
Measuring range (relative)	0 to 9 psi [0 to 0.6 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3\%$ FS
Response time	< 0.5 s
Resolution	.07 psi [0.005 bar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6$ °F [ $\pm 2$ °C]
Response time (63.3 % at flow velocity >2 m/s)	< 1.5 s
Resolution	1 °F [0.56 °C]
Media and environment	
Media	Liquids
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], non-freezing
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	> 435.1 psi [30 bar]
Electrical data	
Power supply (ground req)	5 VDC ( $\pm 5\%$ ).
Output signals	Ratiometric
Pressure signal	0.5 to 3.5 V
Temperature signal	0.5 to 3.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensor	Silicon-based MEMS sensor
Seal (sensor to housing)	EPDM rubber
Housing	Composites (PPS)
Wetted materials	Corrosion-resistant coating EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensor	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM05 2254 4711

TM03 8136 1612

TM03 8141 1612

TM03 8149 1612

## RPS 0-14.5 psi [0-1.0 bar]

Relative pressure transmitter, standard 0-14.5 psi



Fig. 108 RPS sensor, 0-14.5 psi

### Dimensions In. [mm]

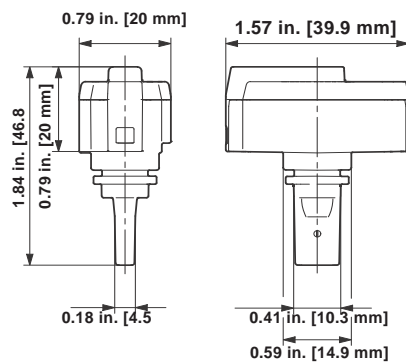


Fig. 109 Dimensions RPS sensor

### Output signals

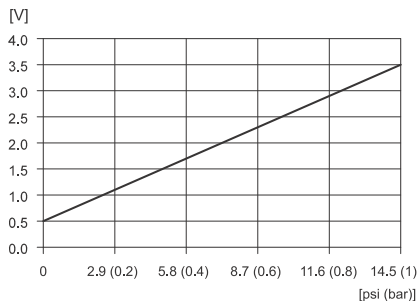


Fig. 110 Pressure response

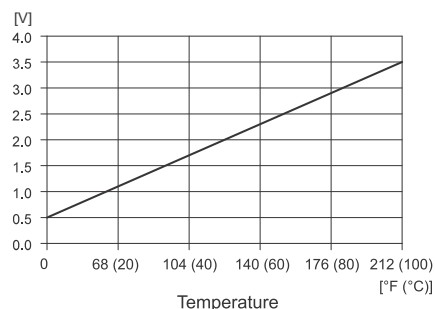


Fig. 111 Temperature response

## Specifications

Pressure	
Measuring range (relative)	0 to 14.5 psi [0 to 1.0 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3\%$ FS
Response time	< 0.5 s
Resolution	.07 psi [0.005 bar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6$ °F [ $\pm 2$ °C]
Response time (63.3 % at flow velocity > 2 m/s)	< 1.5 s
Resolution	1 °F [0.56 °C]
Media and environment	
Media	The sensor is compatible with liquids
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], non-freezing
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	> 435.1 psi [30 bar]
Electrical data	
Power supply (ground req)	5 VDC ( $\pm 5$ %).
Output signals	Ratiometric
Pressure signal	0.5 to 3.5 V
Temperature signal	0.5 to 3.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensor	Silicon-based MEMS sensor
Seal (sensor to housing)	EPDM rubber
Housing	Composites (PPS)
Wetted materials	Corrosion-res coating, EPDM, PPS
Environmental standards	
Enclosure class	IP44 (Non over molded IP20)
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensor	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM05 2254 4711

TM03 8136 1612

TM03 8142 1612

TM03 8149 1612

## RPS 0-25 psi [0-1.6 bar]

Relative pressure transmitter, standard 0-25 psi



Fig. 112 RPS sensor, 0-25 psi

### Dimensions In. [mm]

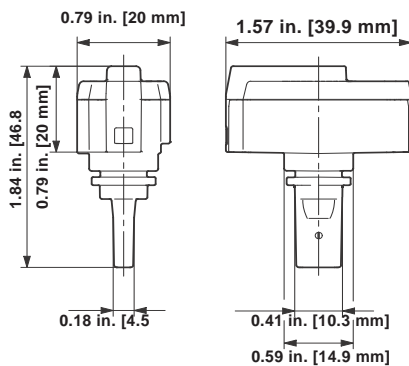


Fig. 113 Dimensions RPS sensor

### Output signals

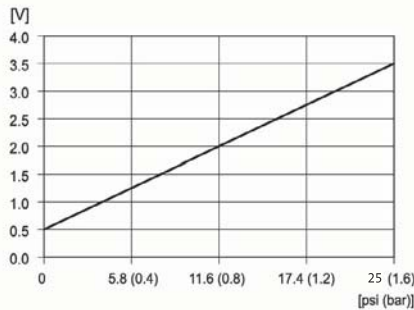


Fig. 114 Pressure response

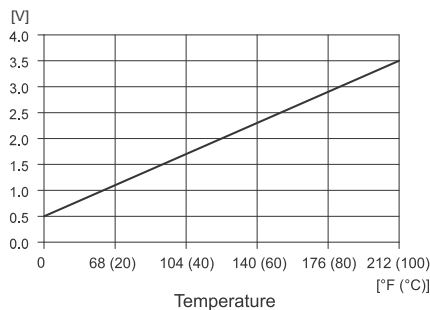


Fig. 115 Temperature response

## Specifications

Pressure	
Measuring range (relative)	0 to 25 psi [0 to 1.6 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.5$ % FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 2.5$ % FS
Response time	< 0.5 s
Resolution	.07 psi [0.005 bar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6$ °F [ $\pm 2$ °C]
Response time (63.3 % at flow velocity > 2 m/s)	< 1.5 s
Resolution	1 °F [0.56 °C]
Media and environment	
Media	The sensor is compatible with liquids
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], non-freezing
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Relative humidity	0 to 95 %, non-condensing
System burst pressure	> 435.1 psi [30 bar]
Electrical interface	
Power supply (ground req)	5 VDC ( $\pm 5$ %).
Output signals	Ratiometric
Pressure signal	0.5 to 3.5 V
Temperature signal	0.5 to 3.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensor	Silicon-based MEMS sensor
Seal (sensor to housing)	EPDM rubber
Housing	Composites (PPS)
Wetted materials	Corrosion-res coating, EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensor	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM05 2254 4711

TM03 8136 1612

TM03 8143 1612

TM03 8149 1612

## RPS 0-40 psi [0-2.5 bar]

Relative pressure transmitter, standard 0-40 psi



Fig. 116 RPS sensor, 0-40 psi

### Dimensions In. [mm]

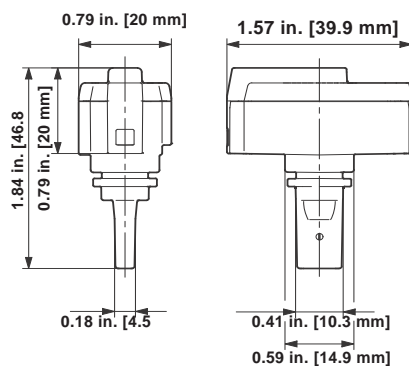


Fig. 117 Dimensions RPS sensor

### Output signals

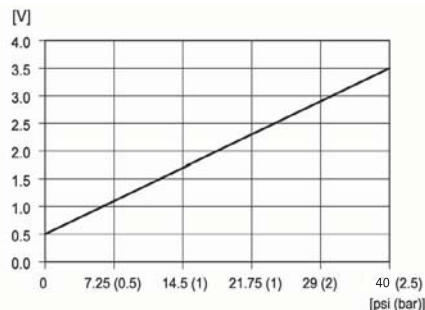


Fig. 118 Pressure response

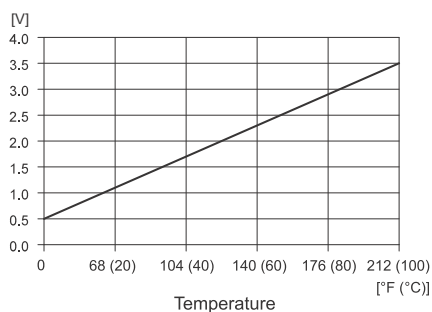


Fig. 119 Temperature response

## Specifications

Pressure	
Measuring range (relative)	0 to 40 psi [0 to 2.5 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.5$ % FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 2$ % FS
Response time	< 0.5 s
Resolution	0.3 psi [0.02 bar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 37$ °F [ $\pm 2.8$ °C]
Response time (63.3 % at flow velocity > 2 m/s)	< 1.5 s
Resolution	1 °F [0.56 °C]
Media and environment	
Media	The sensor is compatible with liquids
Media temperature (operating)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], non-freezing
Ambient air temperature (operating)	-13 to 140 °F [-25 to 95 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	> 435.1 psi [30 bar]
Electrical data	
Power supply	5 VDC ( $\pm 5$ %). Grounding of the sensor supply is recommended.
Output signals	Ratiometric
Pressure signal	0.5 to 3.5 V
Temperature signal	0.5 to 3.5 V
Power consumption	< 50 mW
	> 10 k $\Omega$
Sensor materials	
Sensor	Silicon-based MEMS sensor
Seal (sensor to housing)	EPDM rubber
Housing	Composites (PPS)
Wetted materials	Corrosion-res coating, EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN61326-1
Dimensions	
Sensor	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM05 2254 4711

TM03 8136 1612

TM03 8144 1612

TM03 8149 0607



# RPS 0-60 psi [0-4.0 bar]

Relative pressure transmitter, standard 0-60 psi



Fig. 120 RPS sensor, 0-60 psi

## Dimensions In. [mm]

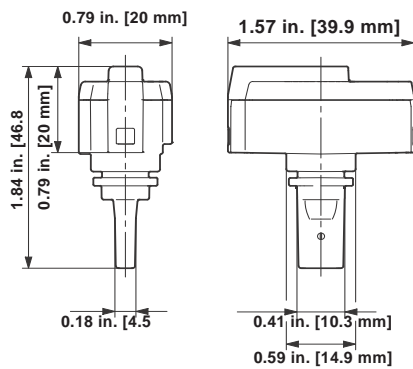


Fig. 121 Dimensions RPS sensor

## Output signals

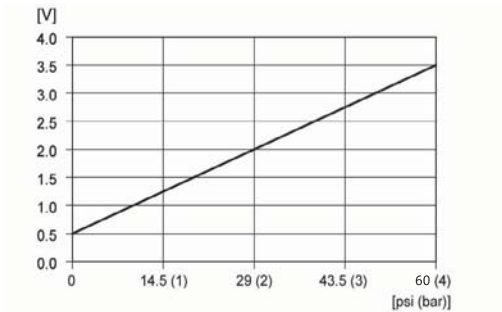


Fig. 122 Pressure response

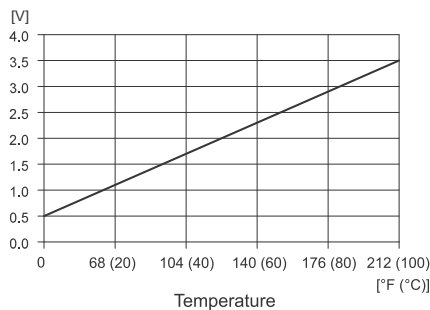


Fig. 123 Temperature response

## Specifications

Pressure	
Measuring range (relative)	0 to 60 psi [0 to 4.0 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 0.5 s
Resolution	0.3 psi [0.02 bar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8\text{ °F}$ [ $\pm 1\text{ °C}$ ]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6\text{ °F}$ [ $\pm 2\text{ °C}$ ]
Response time (63.3 % at flow velocity > 2 m/s)	< 1.5 s
Resolution	1 °F [0.56 °C]
Media and environment	
Media	The sensor is compatible with liquids
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], non-freezing
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	> 435.1 psi [30 bar]
Electrical data	
Power supply	5 VDC ( $\pm 5\%$ ). Grounding of the sensor supply is recommended.
Output signals	Ratiometric
Pressure signal	0.5 to 3.5 V
Temperature signal	0.5 to 3.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensor	Silicon-based MEMS sensor
Seal (sensor to housing)	EPDM rubber
Housing	Composites (PPS)
Wetted materials	Corrosion-res coating, EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensor	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM05 2254 4711

TM03 8136 1612

TM03 8145 1612

TM03 8149 1612

## RPS 0-90 psi [0-6.0 bar]

Relative pressure transmitter, standard 0-90 psi



Fig. 124 RPS sensor, 0-90 psi

### Dimensions In. [mm]

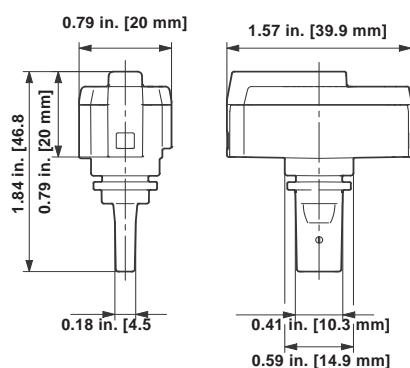


Fig. 125 Dimensions RPS sensor

### Output signals

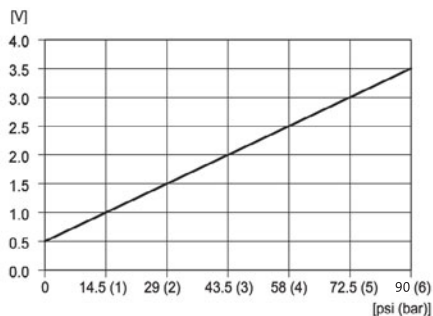


Fig. 126 Pressure response

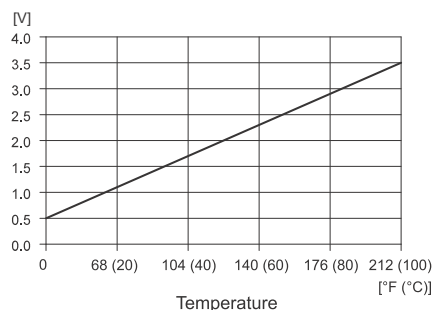


Fig. 127 Temperature response

## Specifications

Pressure	
Measuring range (relative)	0 to 90 psi [0 to 6.0 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 0.5 s
Resolution	0.3 psi [0.02 bar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 37$ °F [ $\pm 2.8$ °C]
Response time (63.3 % at flow velocity > 2 m/s)	< 1.5 s
Resolution	1 °F [0.56 °C]
Media and environment	
Media	The sensor is compatible with liquids
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], non-freezing
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	> 435.1 psi [30 bar]
Electrical data	
Power supply	5 VDC ( $\pm 5$ %). Grounding of the sensor supply is recommended.
Output signals	Ratiometric
Pressure signal	0.5 to 3.5 V
Temperature signal	0.5 to 3.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensor	Silicon-based MEMS sensor
Seal (sensor to housing)	EPDM rubber
Housing	Composites (PPS)
Wetted materials	Corrosion-resistant coating EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensor	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM05 2254 4711

TM03 8136 1612

TM03 8146 1612

TM03 8149 0607

# RPS 0-145 psi [0-10.0 bar]

Relative pressure transmitter, standard 0-145 psi



Fig. 128 RPS sensor, 0-145 psi

## Dimensions In. [mm]

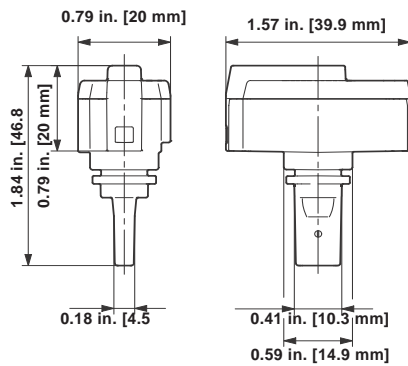


Fig. 129 Dimensions RPS sensor

## Output signals

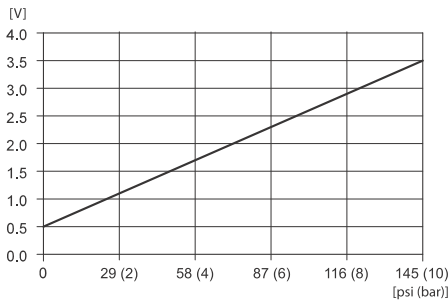


Fig. 130 Pressure response

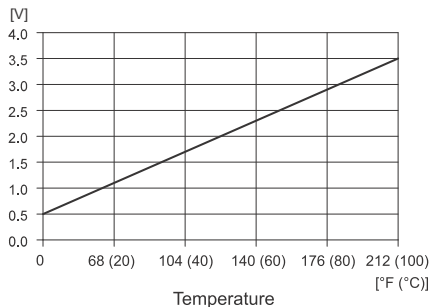


Fig. 131 Temperature response

## Specifications

Pressure	
Measuring range (relative)	0 to 145 psi [0 - 10.0 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 1.0 s / 1.5 s
Resolution	0.3 psi [0.02 bar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8\%$ F [ $\pm 1\%$ °C ]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 37\%$ F [ $\pm 2.8\%$ °C ]
Response time (63.3 % at flow velocity > 2 m/s)	< 1.5 s
Resolution	1 °F [0.56 °C]
Media and environment	
Media	The sensor is compatible with liquids
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], non-freezing
Ambient air temperature (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temperature (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity	0 to 95 % (relative), non-condensing
System burst pressure	> 435.1 psi [30 bar]
Electrical data	
Power supply	5 VDC ( $\pm 5\%$ ). Grounding of the sensor supply is recommended.
Output signals	Ratiometric
Pressure signal	0.5 to 3.5 V
Temperature signal	0.5 to 3.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensor element	Silicon-based MEMS sensor
Seal (sensor to housing)	EPDM rubber
Housing	Composites (PPS)
Wetted materials	Corrosion-resistant coating EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20-2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Physical properties	
Sensor dimensions	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM05 2254 4711

TM03 8136 1612

TM05 4947 2712

TM03 8149 1612

## 6. Differential pressure sensor, standard (DPS)

### DPS general data

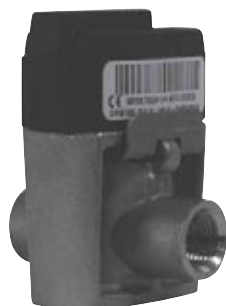


Fig. 132 DPS sensor

TMD4 4457 1309

### Technical overview

Grundfos Direct Sensors™, type DPS, is a series of combined differential-pressure and temperature sensors (two-in-one). The DPS sensors are fully compatible with wet, aggressive media.

### Sensor chip

Steady state properties of silicon protects the sensor chip against wear and tear. Lifelong nano-coating protection enables for the first time, direct measurement (wet and wet-wet) in a cost effective packaging for aggressive media. The secret is a metal-glass alloy coating, Silicoat® with an extreme resistance to corrosion. Compared to traditional sensor technologies which encapsulate the unprotected measuring cell from the Media, Silicoat® ensures a continuous protection of the Sensor Chip in aggressive media (ph 2-ph 11) at temperatures up to 248 °F [120 °C].

### Applications

- Pump and pump control systems
- water treatment systems
- filters (monitoring)
- floor heating
- heat pump
- valve-controlled systems
- cooling and temperature control systems
- building management systems.

### Features

- Differential pressure ranges: 9 to 90 psi
- high burst pressure
- compact and robust mechanical design
- voltage output (ratiometric, ideal for use with micro controller)
- approved for potable water: WRAS, KTW, ACS.
- designed for harsh environments.
- Max cable length (standard): 10 ft [3 meters]\*
- Approved for EU, US and Canadian markets

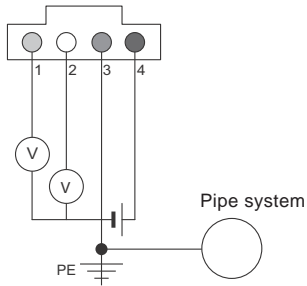
### Benefits

- Differential-pressure and temperature sensor in one package (two-in-one sensor)
- compatible with wet, aggressive media
- accurate, linearized and temperature-compensated differential-pressure transmitter
- quick temperature response (direct media contact).

**Type key**

	96XXXXXX	- XX	- XXXX	XXXXX
Product number				
Version				
Production year and week				
Consecutive number				

**Electrical connections**



TM05 2253 4711

**Fig. 133**Electrical connections

Pin configuration	color
1 Temperature signal (0.5 to 4.5 V relative to pin 3)	Yellow
2 Pressure signal (0.5 to 4.5 V relative to pin 3)	White
3 GND (0 V)	Green
4 Voltage supply (+5 VDC), PELV	Brown

**Power supply requirements**

- 5 VDC
- separated from hazardous live circuitry by double or reinforced insulation
- power limitation: 150 VA; current limitation: 8 A.

**Options**

Housing for DPS 316L	
Fitting 0.24 in. [6 mm]	AISI 316
Fitting 0.31 in. [8 mm]	
Fitting 0.24 in. [6 mm]	Tube connection
Fitting 0.31 in. [8 mm]	Compression fitting
Wall bracket	
Flow by pipe test set for sensor	
Sensor over moulded	

\*Grundfos will not be liable for damage or wear to products caused by abnormal operating conditions, accident abuse, misuse unauthorized alteration or repair, or if the product was not installed in accordance with Grundfos' printed installation and operating instructions. Splicing of the supplied cable would void any warranty.

## DPS 0-9 psi [0-0.6 bar]

Differential pressure sensor, standard 0-9 psi series 100



Fig. 134 DPS sensor

Dimension in. [mm]

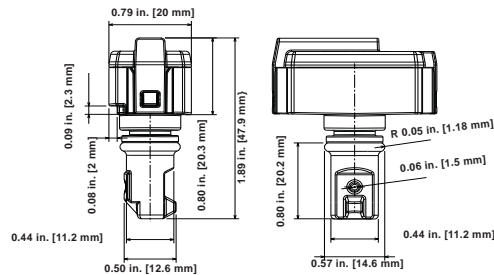


Fig. 135 Dimensional sketches of sensing element  
P<sub>1</sub> is the high-pressure side

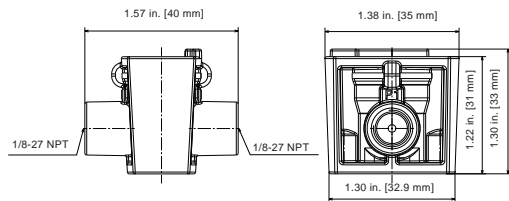


Fig. 136 Isometric view of housing for DPS

Output signals

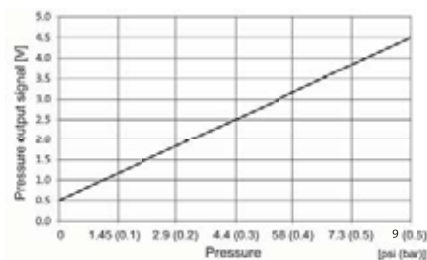


Fig. 137 Differential pressure response

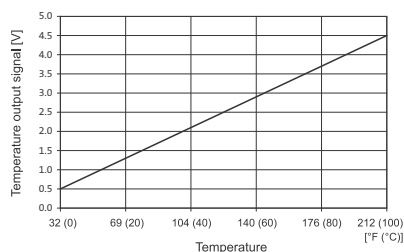


Fig. 138 Temperature response

## Specifications

Pressure	
Measuring range (differential)	0 to 9 psi [0 to 0.6 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.0\%$ FS
Response time	< 0.5 s
System pressure deviation	0.09 psi/psi [6 mbar/bar]
Resolution	0.02 psi [1.2 mbar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8\%$ F [± 1 °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ F [± 2 °C]
Response time, sensing element to output change	< 1.0 s
Resolution	$\pm 0.36\%$ F [± 0.2 °C]
Media and Environment	
Media	Liquids, air, and gases
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], media must not freeze
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity (relative)	0 to 95 %, non-condensing
Application pressure P <sub>1</sub>	Max. 232 psi at 158 °F [Max. 16 bar at 70 °C] Max. 174 psi at 212 °F [Max. 12 bar at 100 °C]
Differential pressure P <sub>1</sub> to P <sub>2</sub>	Max. 145 psi [Max. 10] bar
Burst pressure P <sub>1</sub>	Max. 435.1 psi [Max. 30 bar]
Burst pressure P <sub>2</sub>	Max. 145 psi [Max. 10 bar]
Electrical data	
Power supply	5 VDC ( $\pm 5\%$ ). Grounding of the sensor supply is required.
Output signals	Ratiometric
Pressure signal	0.5 to 4.5 V
Temperature signal	0.5 to 4.5 V
Power consumption	< 50 mW
Load impedance	> 10 kΩ
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Sealing Cap	EPDM rubber
Housing	Composite (PPS)
Wetted materials	Corrosion-res coating, EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensing element	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM04 4457 1309

TM04 4456 1612

TM04 4455 1612

TM04 4449 1612

TM04 4458 1612

## DPS 0-14.5 psi [0-1.0 bar]

Differential pressure sensor, standard 0-14.5 psi series 100



Fig. 139 DPS sensor

Dimension in. [mm]

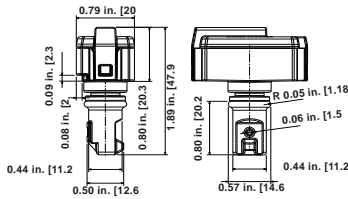


Fig. 140 Dimensional sketches of sensing element P<sub>1</sub> is the high-pressure side

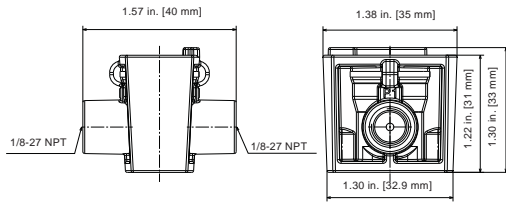


Fig. 141 Isometric view of housing for DPS

## Output signals

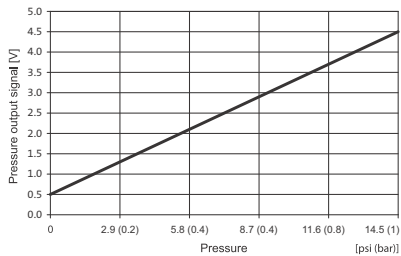


Fig. 142 Differential pressure response

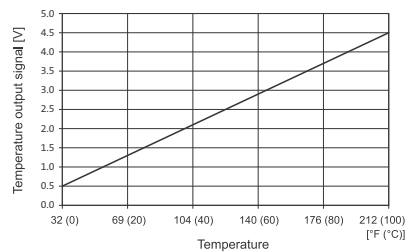


Fig. 143 Temperature response

## Specifications

Pressure	
Measuring range (differential)	0 to 14.5 psi [0 to 1.0 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2$ % FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.0$ % FS
Response time	< 0.5 s
System pressure deviation	0.09 psi/psi [6 mbar/bar]
Resolution	0.02 psi [1.2 mbar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6$ °F [ $\pm 2$ °C]
Response time, sensing element to output change	< 1.0 s
Resolution	$\pm 0.36$ °F [ $\pm 0.2$ °C]
Media and Environment	
Media	Liquids, air, and gases
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], media must not freeze
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity (relative)	0 to 95 %, non-condensing
Application pressure P <sub>1</sub>	Max. 232 psi at 158 °F [Max. 16 bar at 70 °C] Max. 174 psi at 212 °F [Max. 12 bar at 100 °C]
Differential pressure P <sub>1</sub> to P <sub>2</sub>	Max.  145  psi [Max.  10  bar]
Burst pressure P <sub>1</sub>	Max. 435.1 psi [Max. 30 bar]
Burst pressure P <sub>2</sub>	Max. 145 psi [Max. 10 bar]
Electrical data	
Power supply	5 VDC ( $\pm 5$ %).
Output signals	Ratiometric
Pressure signal	0.5 to 4.5 V
Temperature signal	0.5 to 4.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Sealing Cap	EPDM rubber
Housing	Composite (PPS)
Wetted materials	Corrosion-res. coating, EPDM, PPS
Environmental standards	
Enclosure class	IP44 (over moulded)
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensing element	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM04 4457 1309

TM04 4456 1612

TM04 4455 1612

TM04 4450 1612

TM04 4458 1612

## DPS 0-25 psi [0-1.6 bar]

Differential pressure sensor, standard 0-25 psi series 100



Fig. 144 DPS sensor

Dimension in. [mm]

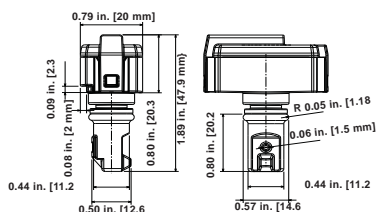


Fig. 145 Dimensional sketches of sensing element P<sub>1</sub> is the high-pressure side

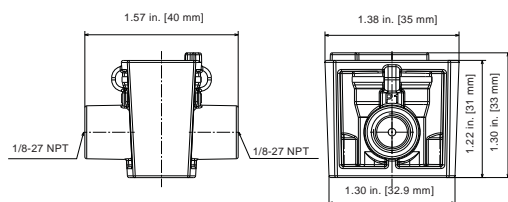


Fig. 146 Isometric view of housing for DPS

Output signals

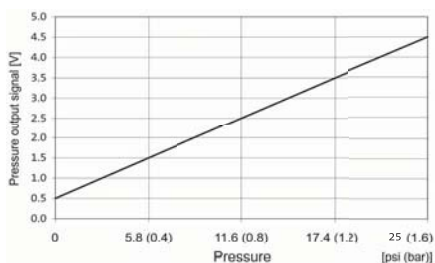


Fig. 147 Differential pressure response

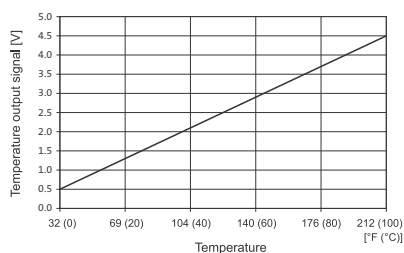


Fig. 148 Temperature response

## Specifications

Pressure	
Measuring range (differential)	0 to 25 psi [0 to 1.6 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2$ % FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 2.5$ % FS
Response time	< 0.5 s
System pressure deviation	0.09 psi/psi [6 mbar/bar]
Resolution	0.02 psi [1.6 mbar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6$ °F [ $\pm 2$ °C]
Response time, sensing element to output change	< 1.0 s
Resolution	$\pm 0.36$ °F [ $\pm 0.2$ °C]
Media and environment	
Media	Liquids, air, and gases
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], media must not freeze
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity (relative)	0 to 95 %, non-condensing
Application pressure P <sub>1</sub>	Max. 232 psi at 158 °F [Max. 16 bar at 70 °C] Max. 174 psi at 212 °F [Max. 12 bar at 100 °C]
Differential pressure P <sub>1</sub> to P <sub>2</sub>	Max. [145] psi [Max. 10 bar]
Burst pressure P <sub>1</sub>	Max. 435.1 psi [Max. 30 bar]
Burst pressure P <sub>2</sub>	Max. 145 psi [Max. 10 bar]
Electrical data	
Power supply	5 VDC ( $\pm 5$ %).
Output signals	Ratiometric
Pressure signal	0.5 to 4.5 V
Temperature signal	0.5 to 4.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Sealing Cap	EPDM rubber
Housing	Composite (PPS)
Wetted materials	Corrosion-res coating, EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensing element	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM04 4457 1309

TM04 4456 1612

TM04 4455 1612

TM04 4451 1612

TM04 4458 1612



## DPS 0-40 psi [0-2.5 bar]

Differential pressure sensor, standard 0 to 40 psi series 100



Fig. 149 DPS sensor

### Dimension in. [mm]

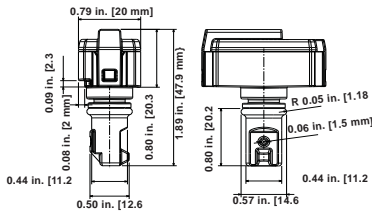


Fig. 150 Dimensional sketches of sensing element  
P<sub>1</sub> is the high-pressure side

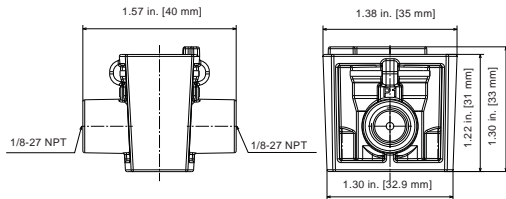


Fig. 151 Isometric view of housing for DPS

### Output signals

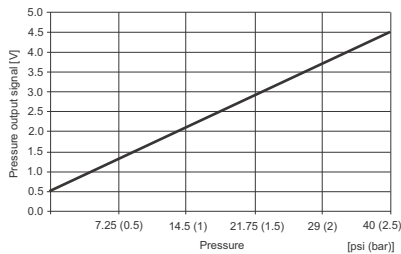


Fig. 152 Differential pressure response

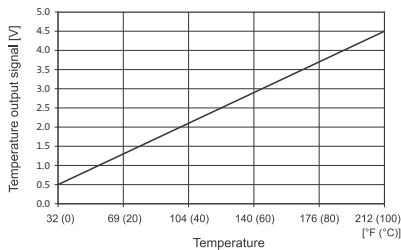


Fig. 153 Temperature response

## Specifications

Pressure	
Measuring range (differential)	0 to 40 psi [0 to 2.5 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 0.5 s
System pressure deviation	0.09 psi/psi [6 mbar/bar]
Resolution	0.04 psi [2.5 mbar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8\%$ [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ [ $\pm 2\%$ °C]
Response time, sensing element to output change	< 1.0 s
Resolution	$\pm 0.36\%$ [ $\pm 0.2\%$ °C]
Media and environment	
Media	Liquids, air, and gases
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], media must not freeze
Ambient air temp. (operation)	-13 to 140 °F [-25 to 65 °C]
Ambient air temp. (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity (relative)	0 to 95 %, non-condensing
Application pressure P <sub>1</sub>	Max. 232 psi at 158 °F [Max. 16 bar at 70 °C] Max. 174 psi at 212 °F [Max. 12 bar at 100 °C]
Differential pressure P <sub>1</sub> to P <sub>2</sub>	Max.  145  psi [Max.  10  bar]
Burst pressure P <sub>1</sub>	Max. 435.1 psi [Max. 30 bar]
Burst pressure P <sub>2</sub>	Max. 145 psi [Max. 10 bar]
Electrical data	
Power supply	5 VDC ( $\pm 5\%$ )
Output signals	Ratiometric
Pressure signal	0.5 to 4.5 V
Temperature signal	0.5 to 4.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Sealing Cap	EPDM rubber
Housing	Composite (PPS)
Wetted materials	Corrosion-res coating, EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensing element	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM04 4457 1309

TM04 4456 1612

TM04 4455 1612

TM04 4452 1612

TM04 4458 1612

## DPS 0-60 psi [0-4.0 bar]

Differential pressure sensor, standard 0-60 psi series 100



Fig. 154 DPS sensor

Dimension in. [mm]

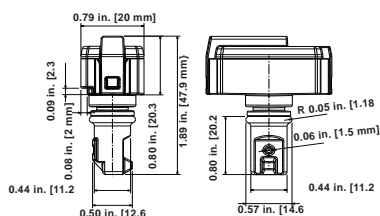


Fig. 155 Dimensional sketches of sensing element  
P<sub>1</sub> is the high-pressure side

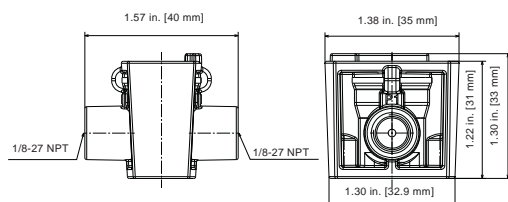


Fig. 156 Isometric view of housing for DPS

Output signals

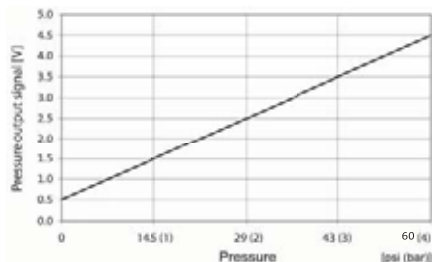


Fig. 157 Differential pressure response

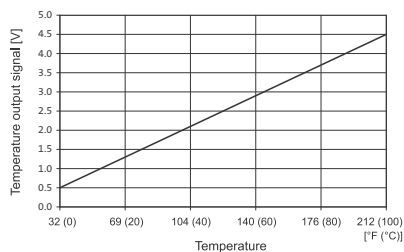


Fig. 158 Temperature response

## Specifications

Pressure	
Measuring range (differential)	0 to 60 psi [0 to 4.0 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2$ % FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 2.5$ % FS
Response time	< 0.5 s
System pressure deviation	0.09 psi/psi [6 mbar/bar]
Resolution	0.06 psi [4 mbar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8$ °F [ $\pm 1$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6$ °F [ $\pm 2$ °C]
Response time, sensing element to output change	< 1.0 s
Resolution	$\pm 0.36$ °F [ $\pm 0.2$ °C]
Media and environment	
Media	Liquids, air, and gases
Media temperature (operation)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], media must not freeze
Ambient air temp. (operation)	-13 to 140 °F [-25 to 95 °C]
Ambient air temp. (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity (relative)	0 to 95 %, non-condensing
Application pressure P <sub>1</sub>	Max. 232 psi at 158 °F [Max. 16 bar at 70 °C] Max. 174 psi at 212 °F [Max. 12 bar at 100 °C]
Differential pressure P <sub>1</sub> to P <sub>2</sub>	Max. [145] psi [Max. [10] bar]
Burst pressure P <sub>1</sub>	Max. 435.1 psi [Max. 30 bar]
Burst pressure P <sub>2</sub>	Max. 145 psi [Max. 10 bar]
Electrical data	
Power supply	5 VDC ( $\pm 5$ %)
Output signals	Ratiometric
Pressure signal	0.5 to 4.5 V
Temperature signal	0.5 to 4.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Sealing Cap	EPDM rubber
Housing	Composite (PPS)
Wetted materials	Corrosion-res coating, EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensing element	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM04 4457 1309

TM04 4456 1612

TM04 4455 1612

TM04 4453 1612

TM04 4458 1612

## DPS 0-90 psi [0-6.0 bar]

Differential pressure sensor, standard 0-90 psi series 100



Fig. 159 DPS sensor

### Dimension in. [mm]

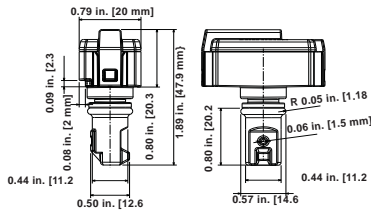


Fig. 160 Dimensional sketches of sensing element  
 P<sub>1</sub> is the high-pressure side

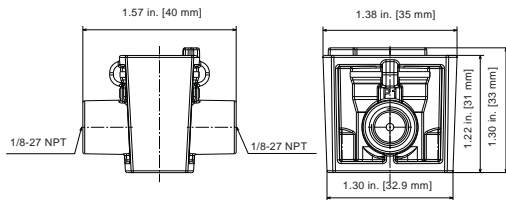


Fig. 161 Isometric view of housing for DPS

### Output signals

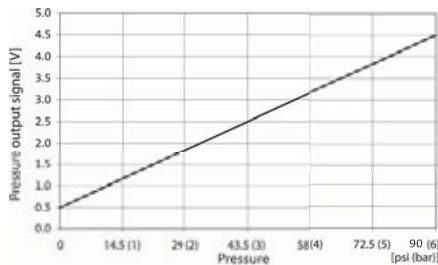


Fig. 162 Differential pressure response

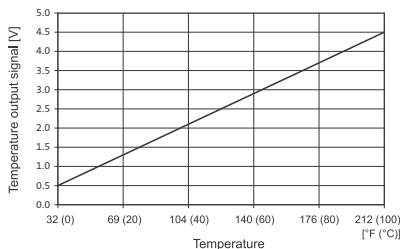


Fig. 163 Temperature response

## Specifications

Pressure	
Measuring range (differential)	0 to 90 psi [0 to 6.0 bar]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 2\%$ FS
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 2.5\%$ FS
Response time	< 0.5 s
System pressure deviation	0.09 psi/psi [6 mbar/bar]
Resolution	0.09 psi [6 mbar]
Temperature	
Measuring range	32 to 212 °F [0 to 100 °C]
Accuracy ( $\pm 1\sigma$ ), 77 to 176 °F [25 to 80 °C]	$\pm 1.8\%$ [ $\pm 1\%$ °C]
Accuracy ( $\pm 1\sigma$ ), 32 to 212 °F [0 to 100 °C]	$\pm 3.6\%$ [ $\pm 2\%$ °C]
Response time, sensing element to output change	< 1.0 s
Resolution	$\pm 0.36\%$ [ $\pm 0.2\%$ °C]
Media and environment	
Media	Liquids, air, and gases
Media temperature (opp)	32 to 212 °F [0 to 100 °C]
Media temperature (peak)	-13 to 248 °F [-25 to 120 °C], media must not freeze
Ambient air temp. (opp.)	-13 to 140 °F [-25 to 65 °C]
Ambient air temp. (peak)	-67 to 194 °F [-55 to 90 °C]
Humidity (relative)	0 to 95 %, non-condensing
Application pressure P <sub>1</sub>	Max. 232 psi at 158 °F [Max. 16 bar at 70 °C] Max. 174 psi at 212 °F [Max. 12 bar at 100 °C]
Differential pressure P <sub>1</sub> to P <sub>2</sub>	Max. [145] psi [Max. [10] bar]
Burst pressure P <sub>1</sub>	Max. 435.1 psi [Max. 30 bar]
Burst pressure P <sub>2</sub>	Max. 145 psi [Max. 10 bar]
Electrical data	
Power supply (ground req)	5 VDC ( $\pm 5\%$ )
Output signals	Ratiometric
Pressure signal	0.5 to 4.5 V
Temperature signal	0.5 to 4.5 V
Power consumption	< 50 mW
Load impedance	> 10 k $\Omega$
Sensor materials	
Sensing element	Silicon-based MEMS sensor
Sealing Cap	EPDM rubber
Housing	Composite (PPS)
Wetted materials	Corrosion-res coating, EPDM, PPS
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration (non-destructive)	20 to 2000 Hz, 10G, 4h
Electromagnetic compatibility	EN 61326-1
Dimensions	
Sensing element	1.85 x 1.57 x 0.79 in. [47 X 40 X 20 mm]

TM04 4457 1309

TM04 4456 1612

TM04 4455 1309

TM04 5111 1309

TM04 4458 1612

## 7. Product range-RPI Transmitter

Scope of delivery:

- RPI transmitter
- M12- 16.4ft [5 meter] cable
- Quick guide

Complete product	Pressure range psi [bar]	Thread	Temperature measurement	O-ring		Product number
				EPDM	FKM	
RPI	0 to 9 [0.6 bar]	G1/2"	•	•	•	97748907
			•	•	•	97748948
			•	•	•	97748926
	0 to 14.5 [1.0 bar]		•	•	•	97748957
			•	•	•	97748908
			•	•	•	97748949
	0 to 25 [1.6 bar]		•	•	•	97748928
			•	•	•	97748958
			•	•	•	97748909
	0 to 40 [2.5 bar]		•	•	•	97748950
			•	•	•	97748929
			•	•	•	97748959
	0 to 60 [4.0 bar]		•	•	•	97748910
			•	•	•	97748951
			•	•	•	97748930
	0 to 90 [6.0 bar]		•	•	•	97748960
			•	•	•	97748921
			•	•	•	97748952
	0 to 145 [10.0 bar]		•	•	•	97748941
			•	•	•	97748961
			•	•	•	97748922
	0 to 232 [16.0 bar]		•	•	•	97748953
			•	•	•	97748942
			•	•	•	97748962
	0 to 360 [25.0 bar]		•	•	•	97748923
			•	•	•	97748944
			•	•	•	97748963
			•	•	•	97748924
			•	•	•	97748955
			•	•	•	97748945
			•	•	•	97748964
			•	•	•	97748925
			•	•	•	97748956
			•	•	•	97748946
			•	•	•	97748955
			•	•	•	97748955

## 8. Product range - RPS sensor

- Scope of delivery
- RPS sensor
- Quick guide:

Complete product	Pressure range psi [bar]	O-ring	Product number
		EPDM	
RPS	0 to 9 [0.6 bar]	•	96701190
	0 to 14.5 [1.0 bar]	•	96701202
	0 to 25 [1.6 bar]	•	96701203
	0 to 40 [2.5 bar]	•	96701204
	0 to 60 [4.0 bar]	•	96657081
	0 to 90 [6.0 bar]	•	96701205
	0 to 145 [10.0 bar]	•	96701206

## 9. Product range - DPS sensor

- Scope of delivery
- DPS sensor
- Quick guide:

Complete product	Pressure range psi [bar]	O-ring	Product number
		EPDM	
DPS	0 to 9 [0.6 bar]	•	96567838
	0 to 14.5 [1.0 bar]	•	96567839
	0 to 25 [1.6 bar]	•	96605149
	0 to 40 [2.5 bar]	•	96605144
	0 to 60 [4.0 bar]	•	96804557
	0 to 90 [6.0 bar]	•	96804558

## 10. Product range - DPI transmitter V.2

Scope of delivery:

- DPI V.2 transmitter
- M12- 16.4ft [5 meter] cable
- Capillary pipe
- Quick guide

Complete product	Pressure range [psi]	Thread	Temperature measurement	O-ring		Product number
				EPDM	FKM	
DPI	0 to 9	G1/2"	•	•	•	97747194
			•	•	•	97747215
			•	•	•	97747202
			•	•	•	97747244
	0 to 14.5		•	•	•	97747195
			•	•	•	97747216
			•	•	•	97747203
			•	•	•	97747195
	0 to 25		•	•	•	97747196
			•	•	•	97747218
			•	•	•	97747204
			•	•	•	97747246
	0 to 40		•	•	•	97747197
			•	•	•	97747219
			•	•	•	97747205
			•	•	•	96841440
	0 to 60		•	•	•	97747198
			•	•	•	97747220
			•	•	•	97747206
			•	•	•	96841441
	0 to 90		•	•	•	97747199
			•	•	•	97747241
			•	•	•	97747207
			•	•	•	97747250
	0 to 145		•	•	•	97747200
			•	•	•	97747242
			•	•	•	97747208
			•	•	•	97747251
	0 to 232		•	•	•	97747201
			•	•	•	97747243
			•	•	•	97747209
			•	•	•	97747252
	0 to 360		•	•	•	
			•	•	•	

# 11. Product range - DPI transmitter

The DPI transmitter is available as both single transmitter and sets with capillary tubes.

Scope of delivery:

- DPI sensor
- Screws, nuts and washers necessary for installation
- Cable pin 0.01 in. [0.34 mm]
- Quick Guide
- See table below for special parts for each set.

Product description	Pressure range [psi]	Cable length ft [m]	Wall bracket	Motor bracket	Capillar tube	Reducing piece UNS 0.44"-R0.25"	I&O	Product number
DPI 0-0.6 Complete	0 to 9	5 [1.5]	•				•	96561232
DPI 0-1.0 Complete	0 to 14.5	5 [1.5]	•				•	96573681
DPI 0-1.6 Complete	0 to 25	5 [1.5]	•				•	96573682
DPI 0-2.5 Complete	0 to 40	5 [1.5]	•				•	96573683
DPI 0-4.0 Complete	0 to 60	5 [1.5]	•				•	96573684
DPI 0-6.0 Complete	0 to 90	5 [1.5]	•				•	96573685
DPI 0-10.0 Complete	0 to 145	5 [1.5]	•				•	96573686
DPI 0-0.6 Set 1	0 to 9	5 [1.5]	•	•	•	•	•	96611522
DPI 0-1.0 Set 1	0 to 14.5	5 [1.5]	•	•	•	•	•	96611523
DPI 0-1.6 Set 1	0 to 25	5 [1.5]	•	•	•	•	•	96611524
DPI 0-2.5 Set 1	0 to 40	5 [1.5]	•	•	•	•	•	96611525
DPI 0-4.0 Set 1	0 to 60	5 [1.5]	•	•	•	•	•	96611526
DPI 0-6.0 Set 1	0 to 90	5 [1.5]	•	•	•	•	•	96611527
DPI 0-10.0 Set 1	0 to 145	5 [1.5]	•	•	•	•	•	96611550
DPI 0-1.2 Set 2	0 to 17.4	16.5 [5]	•		•	•	•	96760247
DPI 0-2.5 Set 2	0 to 40	16.5 [5]	•		•	•	•	96760248
DPI 0-4.0 Set 2	0 to 60	16.5 [5]	•		•	•	•	96760249
DPI 0-6.0 Set 2	0 to 90	16.5 [5]	•		•	•	•	96760250
DPI 0-10.0 Set 2	0 to 145	16.5 [5]	•		•	•	•	96829235



## 12. Accessories

### Sensor interface, type SI 001 PSU

SI 001 PSU from Grundfos Direct Sensors™ is an external power supply for the DPI and other transmitters with 24 VDC supply voltage.

The power supply is to be used where the distance between the transmitter and the controller is longer than 100 ft [30 m].



TM04 4194 0809

**Fig. 164** Sensor interface, SI 001 PSU

#### Specification

- Voltage range: 110-400 VAC
- frequency range: 50-60 Hz
- ambient temperature: -20 to +50 °C
- enclosure class: IP54.

Part	Product No.
Sensor interface, SI 001 PSU	96915820





**Sizing**

This section is based on different fields of application and installation examples and gives easy step-by-step instructions in how to size a product:

- Select the most suitable and efficient pump for your installation.
- Carry out advanced calculations based on energy, consumption, payback periods, load profiles, life cycle costs, etc.
- Analyze your selected pump via the built-in life cycle cost tool.
- Determine the flow velocity in wastewater applications, etc.



**Replacement**

In this section you find a guide to selecting and comparing replacement data of an installed pump in order to replace the pump with a more efficient Grundfos pump. The section contains replacement data of a wide range of pumps produced by other manufacturers than Grundfos.

Based on an easy step-by-step guide, you can compare Grundfos pumps with the one you have installed on your site. When you have specified the installed pump, the guide will suggest a number of Grundfos pumps which can improve both comfort and efficiency.



**CAD drawings**

In this section, it is possible to download 2-dimensional (2D) and 3-dimensional (3D) CAD drawings of most Grundfos pumps.

These formats are available in WebCAPS:

- 2-dimensional drawings:
- .dxf, wireframe drawings
  - .dwg, wireframe drawings.
- 3-dimensional drawings:
- .dwg, wireframe drawings (without surfaces)
  - .stp, solid drawings (with surfaces)
  - .eprt, E-drawings.



**WinCAPS**



Fig. 165 WinCAPS DVD

WinCAPS is a **Windows-based Computer Aided Product Selection** program containing detailed information on more than 220,000 Grundfos products in more than 30 languages.

The program contains the same features and functions as WebCAPS, but is an ideal solution if an internet connection is unavailable.

WinCAPS is available on DVD and updated once a year.

Subject to alterations.

L-DS-PG-002 0812

ECM: -

The name Grundfos, the Grundfos logo, and the payoff Be-Think-Innovate are registered trademarks owned by Grundfos Management A/S or Grundfos A/S, Denmark. All rights reserved worldwide.