

# BODAS Pressure sensor PR3 series 10

**RE 95155**

Edition: 04.2014

Replaces: 12.2013



- ▶ Measurement ranges to 25, 50, 160, 200, 250, 400, 600 bar
- ▶ Ratiometric output signal 0.5 to 4.5 V with 5 V supply voltage
- ▶ Fixed output signal 0.5 to 4.5 V with 8 to 36 V supply voltage
- ▶ Output signal 25% to 75% supply voltage with 8 to 12 V supply voltage
- ▶ Type of protection: IP67 and IP69K

**Features**

- ▶ Thin-film measurement principle
- ▶ Compact dimensions for all pressure ranges
- ▶ Shock and vibration resistant
- ▶ EMC characteristics to 100 V/m
- ▶ High resistance to pressure spikes
- ▶ Very good resistance to temperature shock

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## Ordering code

	01	02	03	04	05	06
<b>BODAS -</b>	<b>PR3</b>				/	<b>10</b>

### Type

01	Pressure sensor	<b>PR3</b>
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### Measurement range

02	0 to 25 bar	<b>025</b>
	0 to 50 bar	<b>050</b>
	0 to 160 bar	<b>160</b>
	0 to 200 bar	<b>200</b>
	0 to 250 bar	<b>250</b>
	0 to 400 bar	<b>400</b>
	0 to 600 bar	<b>600</b>

### Mechanical connection

		<b>25, 50, 160, 200, 250, 400</b>	<b>600</b>	
03	G1/4 A in according to DIN EN ISO 1179-2		●	<b>G</b>
	M14 x 1.5 according to ISO 6149-2		-	<b>M</b>

### Electrical connection

		<b>25, 50</b>	<b>160</b>	<b>200</b>	<b>250, 400</b>	<b>600G</b>	<b>600M</b>	
04	AMP Superseal 1.5	●	●	-	●	●	-	<b>S</b>
	DEUTSCH DT04-3P	-	-	-	-	-	●	<b>D</b>
	Jet connector	-	●	●	-	-	-	<b>J</b>

### Supply

		<b>Output signal</b>	<b>25, 50</b>	<b>160GS</b>	<b>160GJ</b>	<b>200</b>	<b>250, 400</b>	<b>600GS</b>	<b>600MD</b>	
05	5 ±0.5 V	0.5 to 4.5 V ratiometric	●	●	-	-	●	●	-	<b>05</b>
	8 to 36 V	0.5 to 4.5 V fixed	-	-	-	-	-	-	●	<b>36</b>
	8 to 12 V	25% to 75% $U_{sup}$	-	-	●	●	-	-	-	<b>12</b>

### Series

06		<b>10</b>
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### Available variants

Type							Material number
PR3	025	G	S	05	/	10	R917008819
PR3	050	G	S	05	/	10	R917008821
PR3	160	G	S	05	/	10	R917008822
PR3	250	G	S	05	/	10	R917008823
PR3	400	G	S	05	/	10	R917008824
PR3	600	G	S	05	/	10	R917008825
PR3	160	G	J	12	/	10	R917008828
PR3	200	G	J	12	/	10	R917008829
PR3	600	M	D	36	/	10	R917008826

● = Available    - = Not available

## Description

This sensor is used for measuring pressure in hydraulic circuits, but is also suitable for measuring all kinds of gases of fluid group 2 according to the pressure vessel directive up to 200 bar (e.g. air). Due to its outstanding characteristics, it is also ideally suited for use in mobile hydraulics: shock and vibration resistance, type of protection,

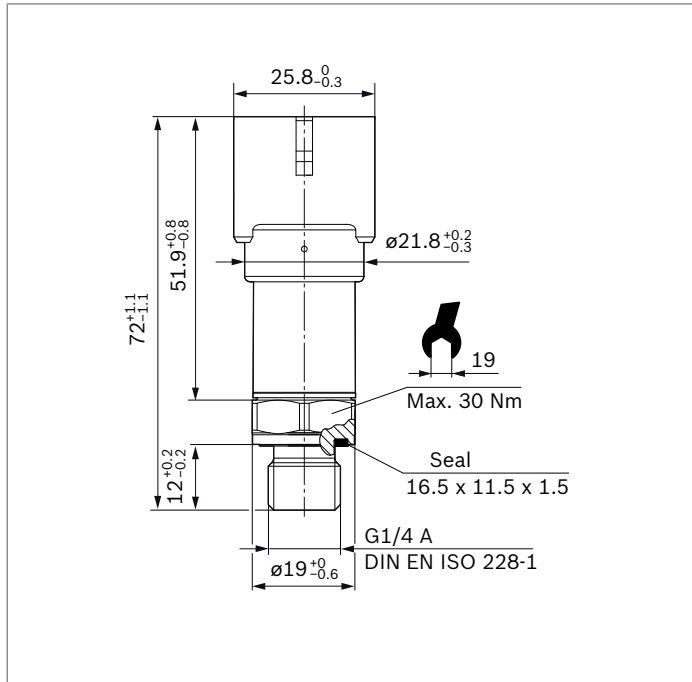
resistance to pressure spikes, resistance to temperature shock, EMC characteristics (up to 100 V/m), and much more. The measurement principle uses a hermetically welded thin-film measurement cell, which ensures long-term leak resistance. The sensor signal can be directly evaluated by a BODAS controller RC.

## Technical data

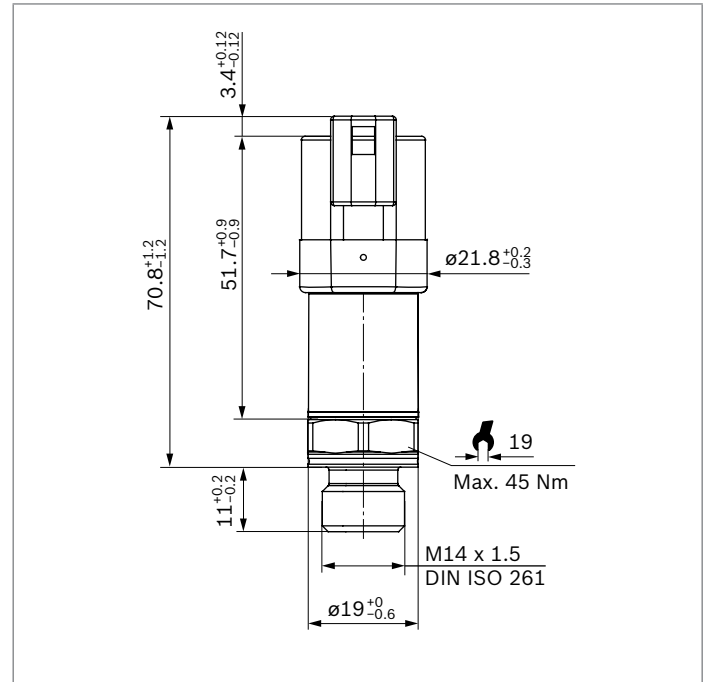
Type PR3		025 GS05	050 GS05	160 GS05	250 GS05	400 GS05	600 GS05	600 MD36	160 GJ12	200 GJ12
Measurement range	bar	0...25	0...50	0...160	0...250	0...400	0...600	0...600	0...160	0...200
Overload limit	bar	50	100	320	500	800	1200	1200	320	400
Bursting pressure	bar	125	250	800	1200	1700	2400	2400	800	1000
Output signal		0.5 V to 4.5 V, ratiometric						0.5 to 4.5 V, fixed	25 to 75% $U_{sup}$	
Supply voltage $U_{sup}$		5 V $\pm$ 0.5 V						8 to 36 V	8 to 12 V	
Connector		AMP Superseal 1.5						DEUTSCH DT04-3P	Jet connector	
Parts contacting measuring materials		CrNi steel, HNBR								
Housing material		PPS GF40/CrNi steel								
Maximum permissible burden		> 4.5 k $\Omega$ , for Jet connectors however > 1 k $\Omega$								
Maximum current consumption										
For voltage interface		$\leq$ 5 mA without load								
Jet connector variants		$\leq$ 10 mA without load								
Response time (10 to 90%)		$\leq$ 2 ms								
Overall accuracy		$\leq$ $\pm$ 2%								
Reproducibility		$\leq$ 0.2% of tensioning								
Stability per year		$\leq$ 0.3% of tensioning (with reference conditions)								
Medium temperature range		-40 °C to +125 °C								
Ambient temperature range		-40 °C to +100 °C								
Storage temperature range		-40 °C to +120 °C								
Compensated range		0 °C to +80 °C								
Middle temperature coefficient zero point		$\leq$ 0.15 % of tensioning / 10K in compensated range								
Middle temperature coefficient of tensioning		$\leq$ 0.15 % of tensioning / 10K in compensated range								
Temperature error in the nominal temperature range		$\leq$ 1 % of tensioning typ. $\leq$ 1.5% of tensioning								
CE conformity		Pressure vessel directive 97/23/EC UN ECE 10 Rev4 and ISO 11452-2, -4, -5 as well as according to IEC 61000-4-3.								
E1 type approval		existing								
Pressure cycles over service life		20 million cycles (10% to 90% of nominal pressure)								
Shock resistance		50 g (DIN EN 60068-2-27, 11 ms), 500 g (DIN EN 60068-2-27, 1 ms)								
Vibration resistance		20 g (DIN EN 60068-2-6, 5 Hz to 2000 Hz)								
Electromagnetic compatibility EMC		100 V/m Irradiation: ISO 11452-2 intensity IV; emissions: ISO 14982								
Electrical protection		Protection from voltage reversal, short circuits and undervoltage; protection from overvoltage in the defined supply voltage range								
Type of protection with installed mating connector		IP67 and IP69K								
Weight		approx. 50 g								

## Dimensions

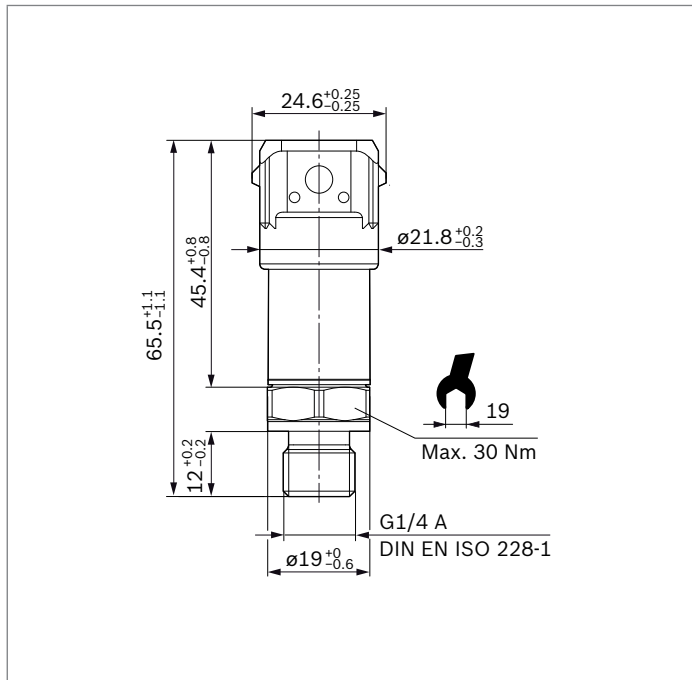
### AMP Superseal



### DEUTSCH DT04-3P



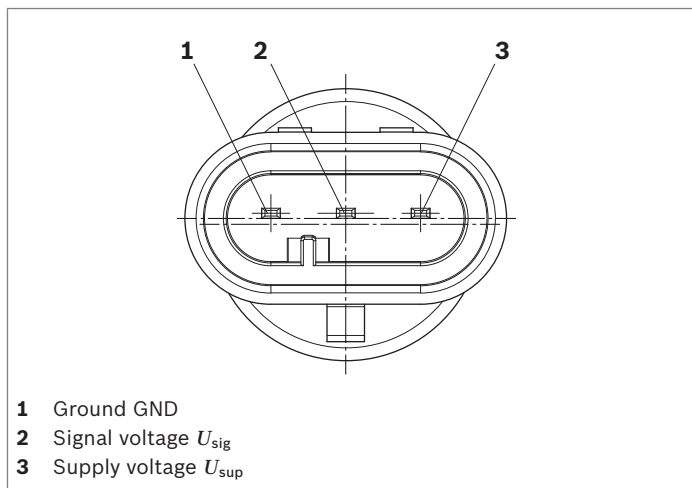
### Jet connector



## Connector

### AMP Superseal

#### ▼ Pin assignment

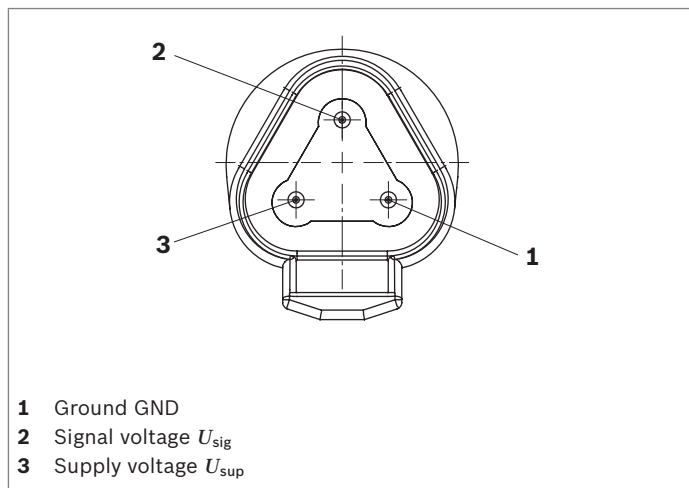


#### ▼ Mating connector<sup>1)</sup>

Designation	Number	Material number
Mating connector set		R902602132 <sup>1)</sup>
Socket housing 3-pin	1	282087-1 <sup>2)</sup>
Single-wire seal, yellow	3	281934-2 <sup>2)</sup>
Socket contact	3	183025-1 <sup>2)</sup>

### DEUTSCH DT04-3P

#### ▼ Pin assignment

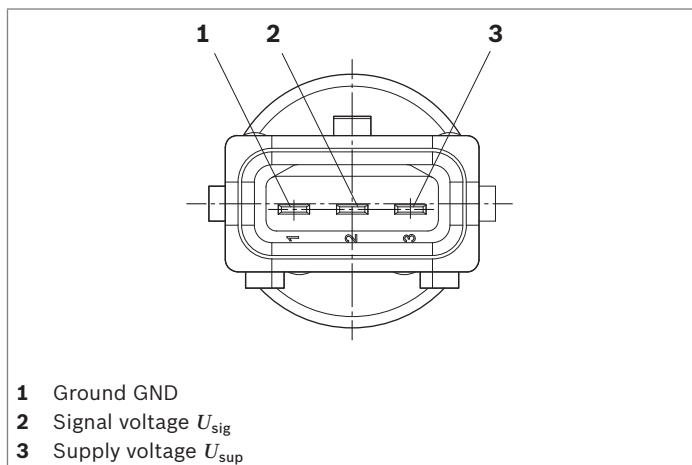


#### ▼ Mating connector<sup>1)</sup>

Designation	Number	Material number
Mating connector set		R902603524 <sup>1)</sup>
Housing 3-pin	1	DT06-3S-EP04 <sup>3)</sup>
Wedge	1	W3S <sup>3)</sup>
Sockets	3	0462-201-16141 <sup>3)</sup>

### Jet connector

#### ▼ Pin assignment



#### ▼ Mating connector<sup>1)</sup>

Designation	Number	Material number
Bosch connector, 3-pin		R917000515 <sup>1)</sup>
Connector housing with retention spring	1	1928402579 <sup>4)</sup>
Contact for mini timer	3	929939 <sup>2)</sup>
Protection cap	1	1280703022 <sup>4)</sup>
Single seal	3	828904-1 <sup>2)</sup>

1) The mating connectors are not included in the scope of supply. These are available from Bosch Rexroth under the corresponding material numbers.

2) Available from AMP

3) Available from DEUTSCH

4) Available from Bosch

## Installation instructions

### Electrical connection

- ▶ The device may only be installed by a trained electrician.
- ▶ The national and international specifications regarding the installation of electro-technical systems must be followed.
- ▶ Voltage supply according to SELV, PELV.
- ▶ De-energize the system.

### Mechanical connection

- ▶ Before installing and removing the device, make certain that the system is not pressurized.

## Safety instructions

### Risk of injury!

Overload pressures that exceed the specified maximum permissible pressure are to be prevented through appropriate measures. The specified bursting pressure must not be exceeded. Even exceeding the bursting pressure for brief periods can destroy the device.

### General instructions

- ▶ Before finalizing your design, request a binding installation drawing.
- ▶ The proposed circuits do not imply any technical liability for the system on the part of Bosch Rexroth.
- ▶ It is not permissible to open the BODAS pressure sensor PR3 or to modify or repair the BODAS pressure sensor PR3. Modifications or repairs to the wiring could result in dangerous malfunctions.
- ▶ Only allow pressure measurement devices to be installed by trained and specialist personnel who are authorized by the system owner.
- ▶ Connections must only be opened while in a depressurized state!
- ▶ System developments, installation and commissioning of electronic systems for controlling hydraulic drives must only be carried out by trained and experienced specialists who are sufficiently familiar with both the components used and with the complete system.
- ▶ While commissioning the BODAS pressure sensor PR3, the machine may pose unforeseen dangers. Before commissioning the system, you must therefore ensure that the vehicle and the hydraulic system are in a safe condition.
- ▶ Make sure that nobody is in the machine's danger zone.
- ▶ No defective or incorrectly functioning components may be used. If the BODAS pressure sensor PR3 should fail or demonstrate faulty operation, it must be replaced.
- ▶ Residual measurement materials in unmounted pressure measurement devices could endanger people, the environment and equipment. Take appropriate precautionary measures.
- ▶ In spite of taking great care in preparing this document, all conceivable application cases could not be taken into account. If information is lacking for your specific application, please contact Bosch Rexroth.

**Pressure vessel directive**

- ▶ Devices with MEV (measurement range end value) 600 bar correspond to directive 97/23/EC and are not designed for overheated fluids of fluid group 2. These devices are manufactured and inspected according to module A.
- ▶ Devices with MEV 25 to 400 bar correspond to article 3 paragraph (3) of directive 97/23/EC and are not designed and manufactured for overheated fluids of fluid group 2, in accordance with good engineering practice.

**Notes on the installation location and position**

- ▶ Do not install the BODAS pressure sensor PR3 close to parts that generate considerable heat (e.g. exhaust).
- ▶ A sufficiently large distance to radio systems must be maintained.
- ▶ The connector of the BODAS pressure sensor PR3 is to be unplugged during electrical welding and painting operations.
- ▶ Cables/wires must be sealed individually to prevent water from entering the device.

**Notes on transport and storage**

- ▶ Please inspect the device for any damages which may have occurred during transport. If there are obvious signs of damage, please immediately inform the transport company and Bosch Rexroth.
- ▶ If it is dropped, the BODAS pressure sensor PR3 must not be used any longer as invisible damage could have a negative impact on reliability.

**Notes on wiring and circuitry**

- ▶ Lines to the pressure sensors must be designed as short as possible and be shielded. The shielding must be connected to the electronics on one side or to the machine or vehicle ground via a low-resistance connection.
- ▶ The BODAS pressure sensor PR3 should only be plugged and unplugged when it is in a de-energized state.
- ▶ Lines from the BODAS pressure sensor PR3 to the electronics must not be routed close to other power-conducting lines in the machine or vehicle.
- ▶ The wiring harness should be fixated mechanically in the area in which the sensor is installed (spacing < 150 mm). The wiring harness should be fixated so that in-phase excitation with the sensor occurs (e.g. at the sensor mounting points).
- ▶ If possible, lines should be routed in the vehicle interior. If the lines are routed outside the vehicle, make sure that they are securely fixed.

- ▶ Lines must not be kinked or twisted, must not rub against edges and must not be routed through sharp-edged ducts without protection.
- ▶ Lines are to be routed with sufficient distance from hot or moving vehicle parts.
- ▶ The sensor lines are sensitive to radiation interference. For this reason, the following measures should be taken when operating the sensor:
  - Sensor lines should be attached as far away as possible from large electric machines.
  - If the signal requirements are satisfied, it is possible to extend the sensor cable.

**Intended use**

- ▶ The BODAS pressure sensor PR3 is designed for use in mobile working machines provided no limitations/restrictions are made to certain application areas in this data sheet.
- ▶ Prior to installation, commissioning and operation, make certain that the correct pressure measurement device was selected with respect to measurement range, design and – based on the specific measurement conditions – parts which are in contact with measuring materials (corrosion). Furthermore, the respective national safety regulations are to be observed.
- ▶ Operation of the BODAS pressure sensor PR3 must generally occur within the operating ranges specified and released in this data sheet, particularly with regard to voltage, temperature, vibration, shock and other described environmental influences.
- ▶ Use outside of the specified and released boundary conditions may result in danger to life and/or cause damage to components which could result in consequential damage to the mobile working machine.
- ▶ Failure to observe the respective specifications may result in serious bodily injury and/or property damage.

**Improper use**

- ▶ Any use of the BODAS pressure sensor PR3 other than that described in chapter "Intended use" is considered to be improper.
- ▶ Use in explosive areas is not permissible.
- ▶ Damages which result from improper use and/or from unauthorized, interference in the component not described in this data sheet render all warranty and liability claims with respect to the manufacturer void.

### Use in safety-related functions

- ▶ The customer is responsible for performing a risk analysis of the mobile working machine and determining the possible safety-related functions.
- ▶ In safety-related applications, the customer is responsible for taking suitable measures for ensuring safety (sensor redundancy, plausibility check, emergency switch, etc.).
- ▶ Product data that is necessary to assess the safety of the machine can be provided on request or are listed in this data sheet.

### Further information

- ▶ Further information about the BODAS pressure sensor PR3 can be found at [www.boschrexroth.com/mobile-electronics](http://www.boschrexroth.com/mobile-electronics).
- ▶ The BODAS pressure sensor PR3 must be disposed according to the national regulations of your country.

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