

# Piezoresistive High Pressure Sensor

Type 4067...

## with Amplifier

High pressure sensor with rugged diaphragm and front seal for measuring on hydraulic Systems, (eg. fuel injection Systems of internal combustion engines), and gas pressure measurements. Suitable for static and dynamic pressures. Its small dimensions allow its use with a clamp adapter on the injection pipe.

- Measuring range up to 1 000, 2 000, 3 000 and 5 000 bar
- Measures static and dynamic pressures
- High natural frequency
- This is one of the smallest sensors for static measurement

### Description

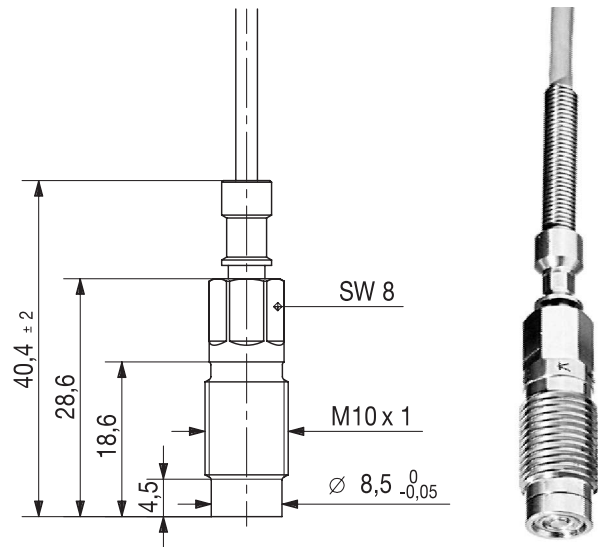
The pressure to be measured acts through a rugged diaphragm on an arrangement of piezoresistive "rods". The pressure changes the values of the resistances diffused into the rods. These resistances are arranged in a Wheatstone bridge.

The pressure sensor itself is not temperature compensated. The amplifier Type 4618A... provides temperature compensation, linearisation of the pressure signal and contains a stabilized power supply. For this reason, the sensor must always be operated with the amplifier adjusted to it.

Amplifier Type 4618A... additionally contains two adjustable limit switches with optocouplers. A version with simultaneous temperature measurement is available as an option.

### Application

Sensor Type 4067... is used appropriately wherever high pressures with a static component have to be measured in confined spaces. Examples are the fine tuning of injection systems in diesel engines or measurements on hydraulic systems.



### Mounting

The device can be mounted directly (Fig. 4) or with the aid of a clamp adapter (Fig. 6) available for different diameters of injection lines.

The sealing joint Type 1100 (Fig. 5) supplied provides good leak-tightness even at high static pressures and small tightening torques.

Tightening must be carried out with a torque wrench. The permissible tightening torque must on no account be exceeded, otherwise the sensor will be damaged beyond repair. In the event of a leakage, the sealing joint Type 1100 should be exchanged and the contact surface re-machined with end finishing tool Type 1300A25. The sensor zero is sensitive to tightening. If the zero point is displaced, it can be corrected at the amplifier with an externally accessible potentiometer.

## Technical Data

### Typ 4067...

Range	bar	0 ... 1 000	0 ... 2 000	0 ... 3 000	0 ... 5 000
Overload	bar	1 500	2 500	3 500	6 000
Sensitivity ( $\pm 0,5$ % at 25 °C)	mV/bar	10	5	3,3	2
Natural frequency	kHz	>100	>100	>200	>200
Output signal:		Depends on measuring chain <sup>1)</sup>			
Output Impedance	$\Omega$	10			
Supply (amplifier)	V DC	18 ... 30			
Zero (at 25 °C, 1 bar abs)	mV	< $\pm 100$ **)			
Endpoint Linearity	% FSO	< $\pm 0,5$			
Thermal error:					
Zero Shift	% FSO	< $\pm 2$			
sensitivity shift	%	< $\pm 1$	< $\pm 1$	< $\pm 2$ *)	< $\pm 2$
Operating temperature range					
Sensor	°C	20 ... 120			
Amplifier Type 4618Ax	°C	0 ... 70			
Storage temperature	°C	-40 ... 140			
Operatung temperature	°C	0 ... 120			
Tightening Torque	N·m	15	15	15	20
Degree of protection		IP65			
Acceleration error	mbar/g	<10			
Service Life	Typical	>10 <sup>7</sup>	>10 <sup>7</sup>	>10 <sup>7</sup>	>10 <sup>6</sup>

<sup>1)</sup> Refer to table measuring chain

\*) A Version with reduced sensitivity shift (< $\pm 1$ %) is available. Type 4067C3000... Please see data sheet 4067C\_000-708.

\*\*\*) Tightened to specified torque

**Dimensions**

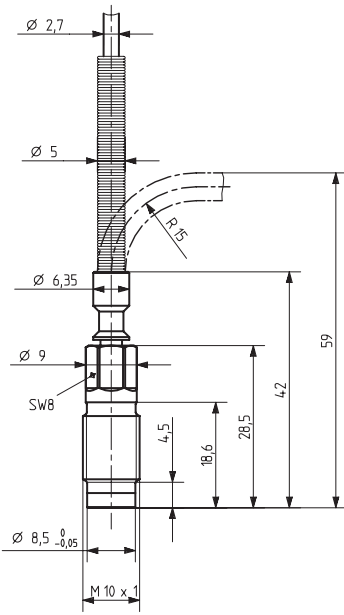


Fig. 1: Type 4067A...

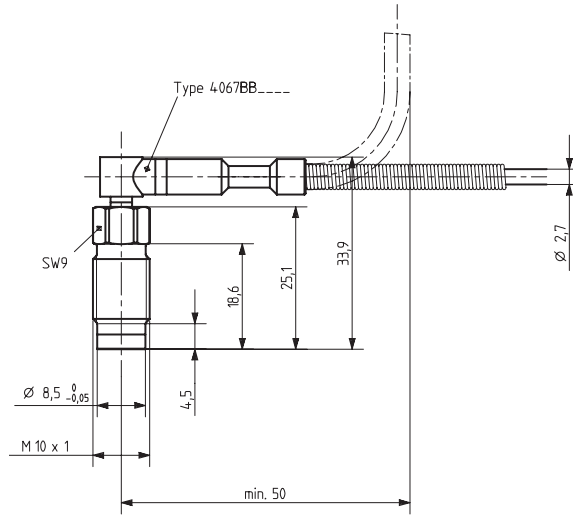


Fig. 2: Type 4067BB...

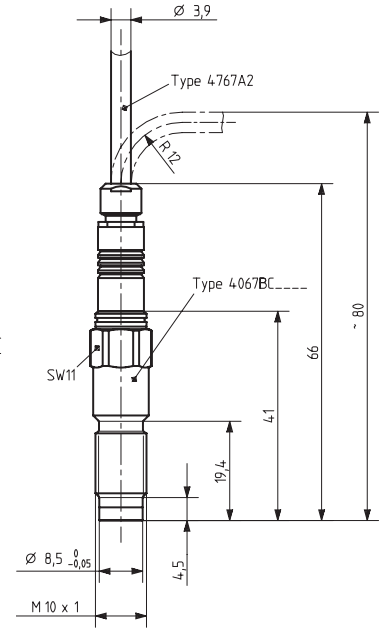


Fig. 3: Type 4067BC...

**Installation**

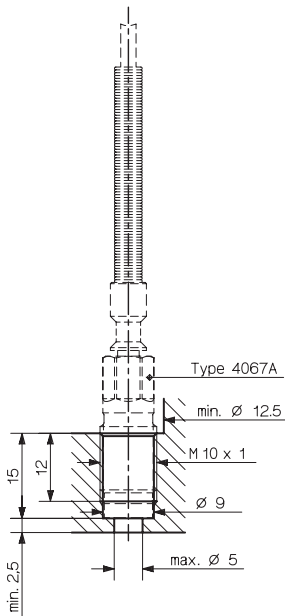


Fig. 4: Bore for direct mounting

**Hardened seal seat**

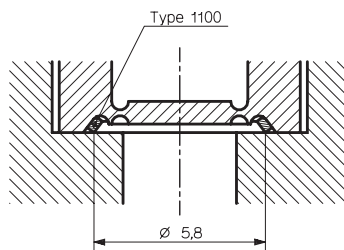


Fig. 5: Sealing with metal seal Type 1100

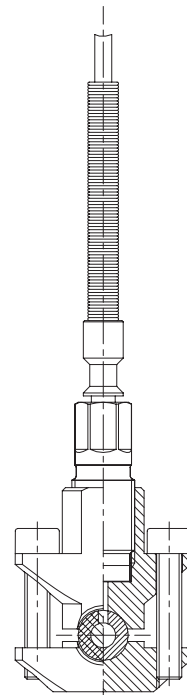


Fig. 6: Mounting in clamp adapter Type 6533A...

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**Measuring Chain**

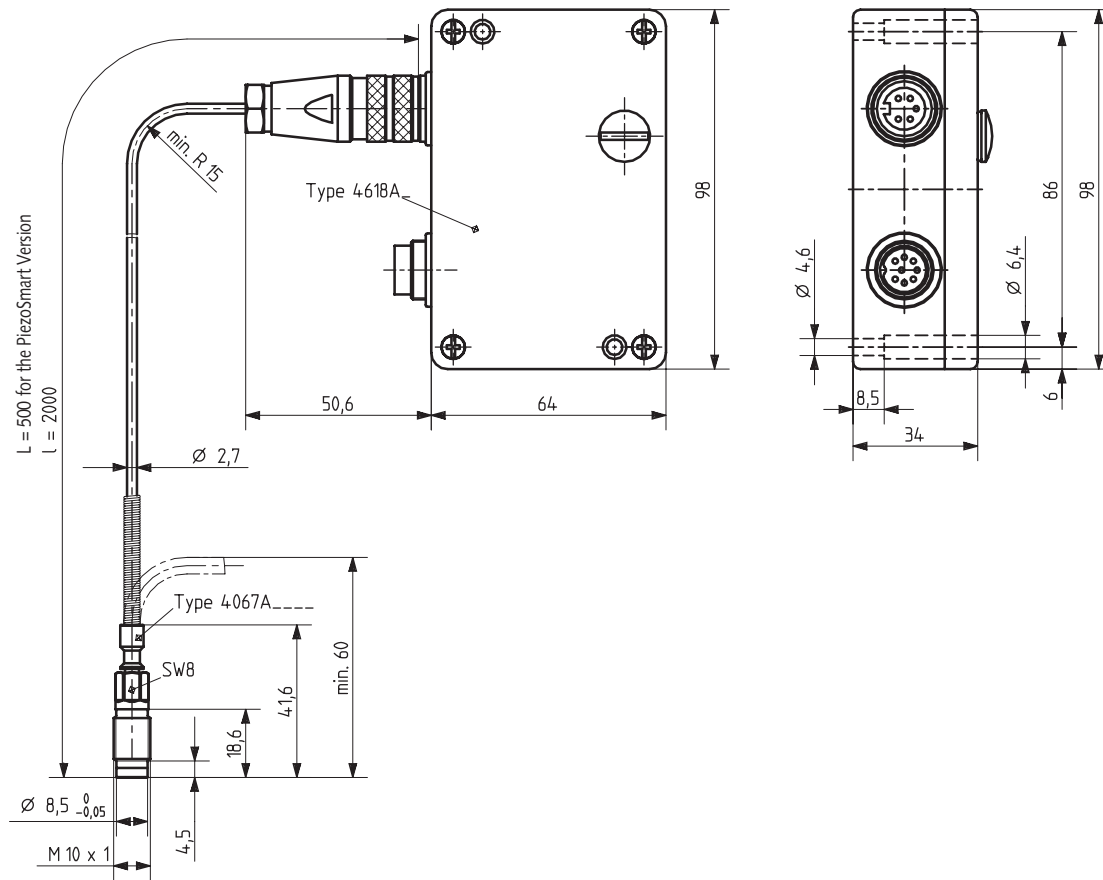


Fig. 7: Measuring chain

**Connector Pinout**

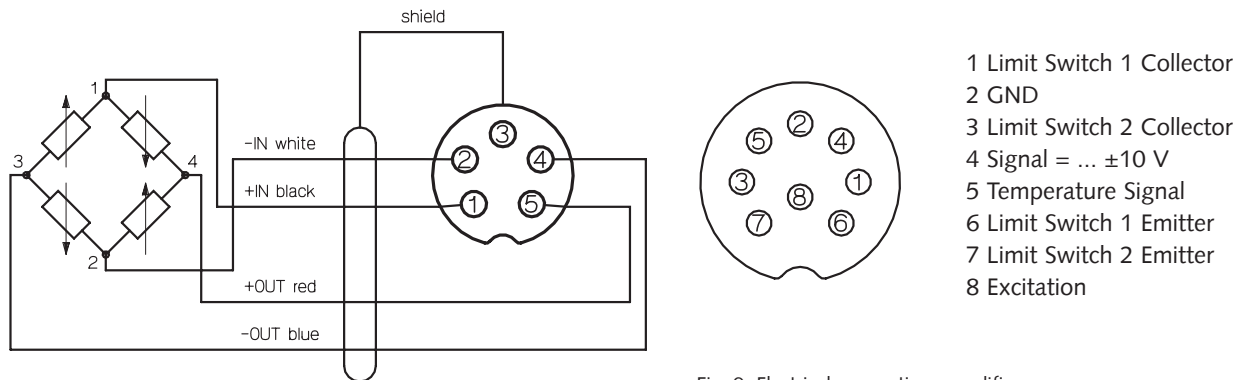


Fig. 8: Pin assignment

Fig. 9: Electrical connections amplifier

Connector Type 1500A81 is permanently fixed on the sensor cable (Fig. 8). The connector Type 1500A67 must be soldered to a suitable cable to supply the amplifier and for the signal and limit switch output (Fig. 9)

For more complete information on the amplifier Type 4618A... see data sheet 4618A\_000-293.

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## Accessories Included

The complete measuring chain

Type 4067xxxxAx includes the following components:

- |   |         |
|---|---------|
| • Sensor with integrated cable L = 2 m                        | 4067... |
| • Amplifier, adjusted   | 4618A   |
| • 8-pole connector for supply, output signal and limit switch | 1500A57 |
| • Spare sealing joints  | 1100    |

## Optional Accessories

- |  |          |
|--|----------|
| • Extension cable                              | 4757A... |
| • Drill  | 1327     |
| • Sealing joint                                | 1100     |
| • Screw tap M10x1                              | 1353     |
| • Finishing tool                               | 1300A25  |
| • Mounting key for deep bores                  | 1300A41  |
| • Torque wrench                                |          |
| 4 ... 20 N·m                                   | 1300A39  |
| 8 ... 40 N·m                                   | 1300A11  |
| • Fork wrench for Type 1300A39 or 1300A11, SW8 | 1300A29  |
| • Fork wrench for Type 1300A39 SW9             | 1300A97  |
| • Fork wrench for Type 1300A39 SW11            | 1300A75  |

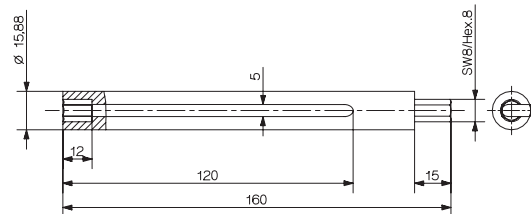


Fig. 10: Mounting key for deep bores Type 1300A41

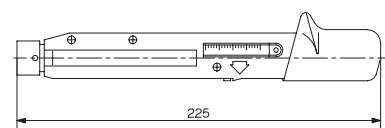


Fig. 11: Torque wrench Types 1300A11 and 1300A39

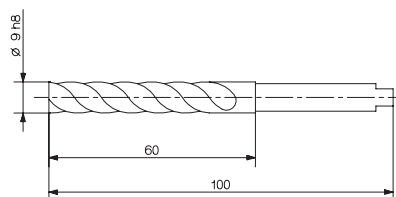


Fig. 12: Drill Type 1327

## Optional Accessories

- |   |            |
|---|------------|
| • Dummy sensor                              | 6449       |
| • Clamp adapter for 6 mm line               | 6533A11    |
| • Clamp adapter for 1/4" line               | 6533A12    |
| • Clamp adapter for 6 ... 8 mm line         | 6533A18    |
| • Clamp adapter for 8 ... 13 mm line        | 6533A19    |
| • Clamp adapter for 13 ... 20 mm line       | 6533A110   |
| • Adapter for Pressure generator Type 6905A | 6925       |
| • Replacement sensors                       | see Page 3 |
| • Cable for Type 4067BC...                  | 4767A2     |
| • Replacement amplifier, adjusted           | 4618A...   |

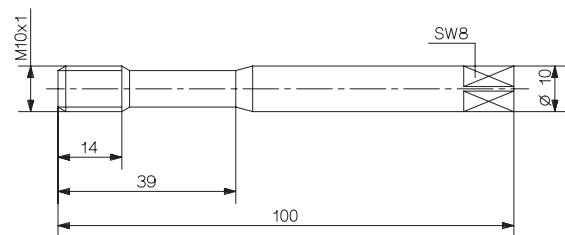


Fig. 13: Screw tap Type 1353

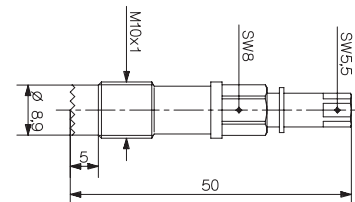


Fig. 14: Finishing tool Type 1300A25

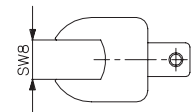


Fig. 15: Fork wrench Type 1300A29

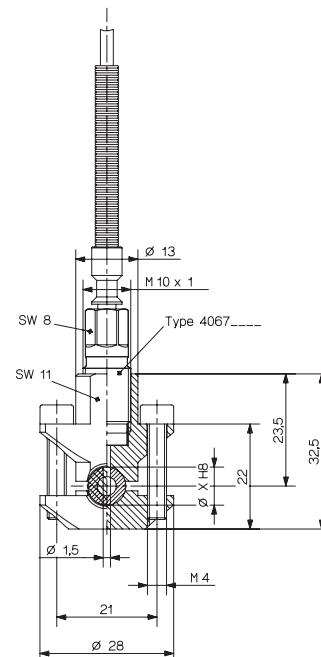


Fig. 16: Clamp adapter Type 6533A1...

## Ordering Key

### Measuring Chain

#### Design

integrated cable	A
Cable with 90° connector	BB
With plug	BC

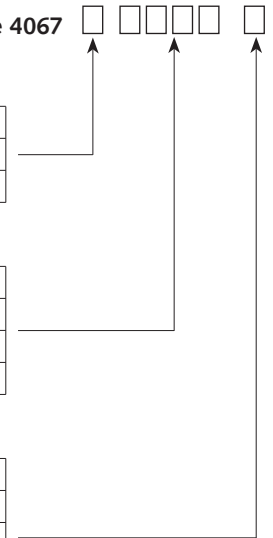
#### Measuring Range

0 ... 1 000 bar	1000
0 ... 2 000 bar	2000
0 ... 3 000 bar	3000
0 ... 5 000 bar	5000

#### Signal Output

for pressure measurement 10 V and 4 ... 20 mA	A0
for pressure measurement (0 ... 10 V) and temperature measurement (10 mV/°C)	A2
for pressure measurement (4 ... 20 mA) and temperature measurement (10 mV/°C)	A4
for pressure measurement (10 V or 4 ... 20 mA) and temperature measurement (with Type 4620A2)	D2
with PiezoSmart® *) cable length L = 500 mm	S

Type 4067



### Sensors

Sensor as replacement comes with calibration plug Type 4958A0 or disk for digital compensation.

0 ... 1 000 bar	Type 4067 __1000
0 ... 2 000 bar	Type 4067 __2000
0 ... 3 000 bar	Type 4067 __3000
0 ... 5 000 bar	Type 4067 __5000

### Amplifiers

as replacement, adjusted to a given sensor (including Type 4958A)

for pressure measurement (0 ... 10 V) and (4 ... 20 mA) Type 4618A0

Sensors with temperature measurement have to be calibrated at our factory

for pressure measurement (0 ... 10 V) and temperature measurement (10 mV/°C) Type 4618A2

for pressure measurement (4 ... 20 mA) and temperature measurement (10 mV/°C) Type 4618A4

for pressure and temperature measurement with digital compensation Type 4620A2

\*) For PiezoSmart® specifications please refer to the PiezoSmart® brochure doc. no. 100-421.