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Piezoresistive high pressure sensor

Type 4065B...DS

for measurements at gas and hydraulic systems

Compact high pressure sensor with robust diaphragm for measurements at hydraulic systems (e.g. injection systems of combustion engines). Suitable for static and dynamic pressure.

- For measuring static and dynamic pressure
- Minimal sensor dead volume, therefore high acoustic natural frequency
- High mechanical natural frequency
- Digital temperature compensation

Description

In Type 4065B...DS, the pressure acts through a robust diaphragm onto a piezoresistive measuring element. The compact dimensions and the shoulder sealing of the sensor provide ideal access to the measuring point. Only a minimal dead volume is created between the sensor front and the measured medium. The sensor is therefore suitable for applications with a high requirement for frequency-accurate pressure measurements.

Zero point and sensitivity shift caused by temperature changes are corrected through the use of a digital temperature compensation without impairing the signal bandwidth. In addition, the digital temperature compensation provides a monitoring of the sensor temperature (amplifier Type 4665B... and Type 4624A...).

Application

The sensor Type 4065B...DS is used in applications where average to high pressures must be measured with a static and a dynamic component. Examples include:

- General pressure measurements in gas and hydraulic systems
- Frequency-accurate analysis of pressure curves in gasoline or diesel injection pressure systems
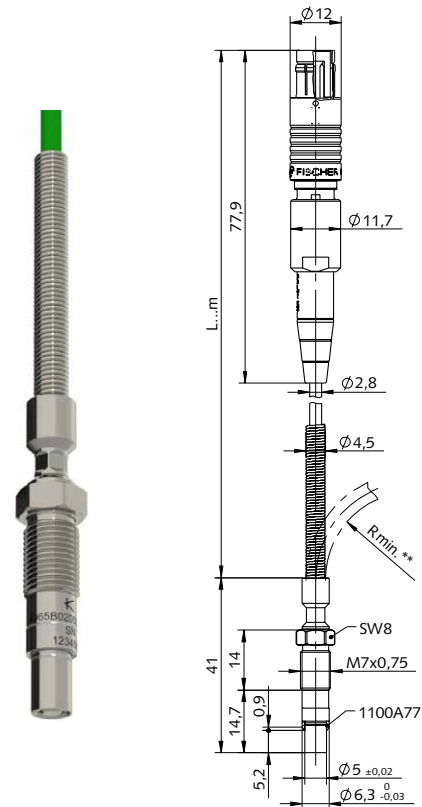
** Rmin. 20 fixed installation
Rmin. 41 free movement

Technical Data

Measuring range	bar	0 ... 200, 0 ... 500, 0 ... 1 000
Overload	bar	300, 750, 1 000
Electrical connection		Fischer connector 5 pole (S103A054)
Amplifier compatibility	Type	4665, 4665B, 4624A
Power supply		amplifier integrated
Reference temperature (Tref)	°C	25
Sensor temperature, min./max.	°C	–40/140
Temperature compensation		digital
Temperature compensation range	°C	25 ... 120
Max. deviation pressure*	%FSO	≤±1,5
Max. deviation temperature*	°C	≤±3
Linearity at Tref (LSQ)	%FSO	≤±0,3
Natural frequency 200, 500 bar	kHz	>40
1 000 bar	kHz	>100

Technical Data (Continuation)

Acceleration sensitivity	mbar/g	≤10
Life cycle (typical)	load change	>10^7
Mounting torque sensor	N·m	5
Weight (without connector and cable)	g	9
Protective class		IP65

* Measuring results based on digital compensation with DS-compatible amplifier. The deviations include measuring errors due to sensor characteristics (linearity, hysteresis, thermal effects) and a compensation model.

Installation

The sensor can be mounted directly in a mounting bore (fig. 1) or by using (clamp) adapters (fig. 2, fig. 3). Clamp adapters are available for various diameters of injection lines.

Mounting

Using the correct drill dimensions and tolerances is extremely important when machining the mounting bores. The sealing surface must be clean and free of metal particular to guarantee leak tightness.

The pressure sensor is always installed together with a cone-shaped metallic sealing (Type 1100A77). Following the recommended tightening torque is mandatory when tightening the pressure sensor. Therefore, the sensor must be mounted using a suitable fork wrench (e.g. Type 1300A29, figure 7) and the torque wrench (Type 1300A11, figure 8).

The zero point may shift slightly after the installation due to the sensor's sensitivity to tightening torques. Therefore, a zero point correction is recommended. For the Kistler amplifiers Type 4665B… and 4624A…, this functionality is provided at the amplifier itself or in the software.
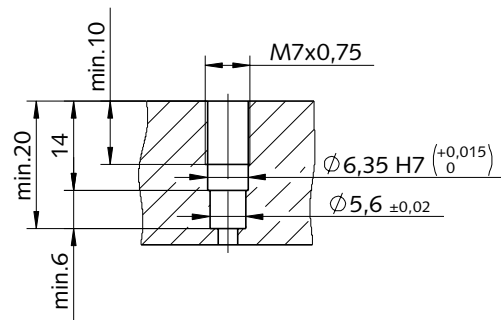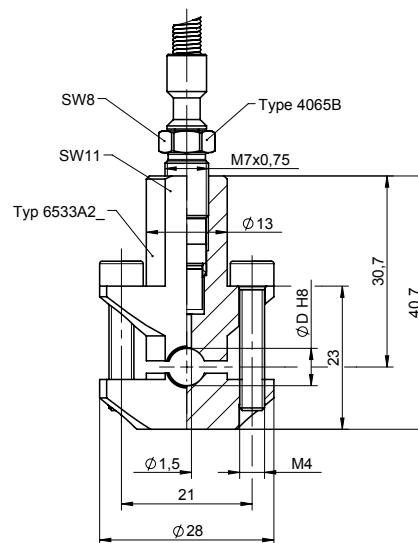
Fig. 1: Mounting bore for direct mounting

Fig. 2: Installation in clamp adapter Type 6533A2… (D6,0 with Type 6533A21, D6,35 with Type 6533A22, D6...8 with Type 6533A28)
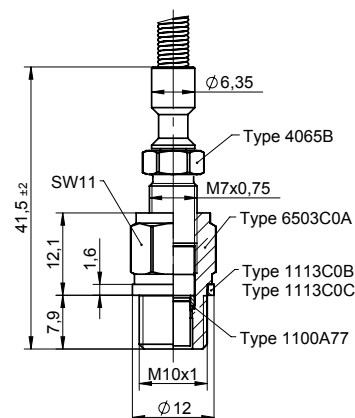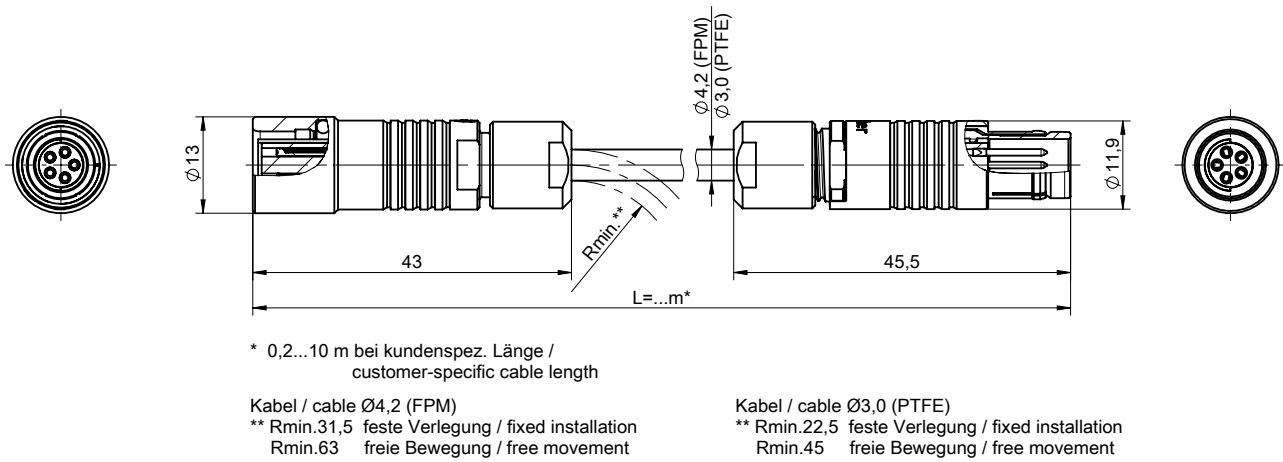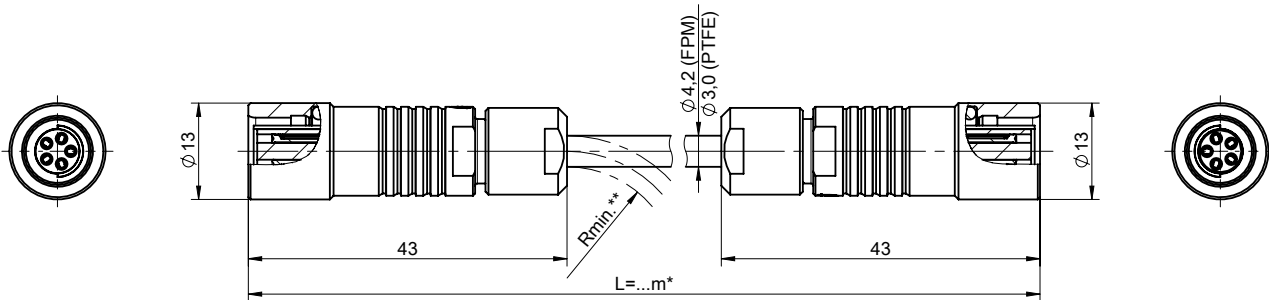
Fig. 3: Installation in adapter Type 6503C0A

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Ø 13   Ø 4,2 (FPM)   Ø 3,0 (PTFE)   Ø 11,9

43   Rmin. **   45,5

L=...m*

* 0,2...10 m bei kundenspez. Länge /
  customer-specific cable length

Kabel / cable Ø4,2 (FPM)
** Rmin.31,5   feste Verlegung / fixed installation
   Rmin.63   freie Bewegung / free movement

Kabel / cable Ø3,0 (PTFE)
** Rmin.22,5   feste Verlegung / fixed installation
   Rmin.45   freie Bewegung / free movement

Fig. 4:   Extension cable Type 4785A_1

Ø 13   Ø 4,2 (FPM)   Ø 3,0 (PTFE)   Ø 13

43   Rmin. **   43

L=...m*

Fig. 5:   Adapter cable Type 4785A_2 for an easy connection of DS sensors to existing wiring with Type 4761B...

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This information corresponds to the current state of knowledge. Kistler reserves the right to make technical changes. Liability for consequential damage resulting from the use of Kistler products is excluded.

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Included accessories	Type
• Seals (2 units)	1100A77

Accessories (optional)	Type
• Stepped reamer	1331C
• Screw tap M7x0,75	1351
• Mounting key for deep bores	1300A41
• Torque wrench	
4 … 20 N·m	1300A39
8 … 40 N·m	1300A11
• Fork wrench for Type 1300A39 or Type 1300A11, SW8	1300A29
• Fork wrench for Type 1300A39 or Type 1300A11, SW11	1300A75

Adapter
• Blind sensor	6447
• Clamp adapter for 6 mm pipe	6533A21
• Clamp adapter for 6,35 mm pipe (6,35 mm = ¼")	6533A22
• Clamp adapter 6 ... 8 mm pipe	6533A28
• Clamp adapter 8 … 13 mm pipe	6533A29

• Adapter M14x1,25	4155
• Adapter M10x1	6503C0A
• Adapter seal (stainless steel) for Type 6503C0A	1113C0B
• Adapter seal (copper) for Type 6503C0A	1113C0C

Amplifier/SCP
• SCP (slim-) for 2 meas. modules	2852A…
• SCP for 8 meas. modules	2853A…
• Piezoresistive SCP amplifier	4665B…
• Piezoresistive 1 channel amplifier	4624A…

• Extension cable for sensor FPM (0 ... 180 °C)	
- L = 1 m	4785A41-1,00
- L = 2 m	4785A41-2,00
- L = 3 m	4785A41-3,00
- L = 5 m	4785A41-5,00
- L = 7,5 m	4785A41-7,50
- L = 10 m	4785A41-10,0
- L = ...m (L_{min} = 0,5/L_{max} = 10 m)	4785A41-SP-…
• Extension cable for sensor PTFE (–40 ... 180 °C)	
- L = ... m (L_{min} = 0,5/L_{max} = 10m)	4785A11-SP-…
• Adapter cable for connection of DS sensor to 4761B... cable	4785A42…

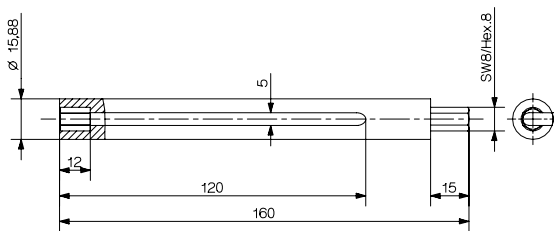Fig. 6: Mounting key for deep bores Type 1300A41
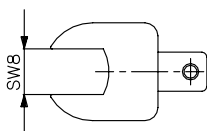
Fig. 7: Fork wrench Type 1300A29
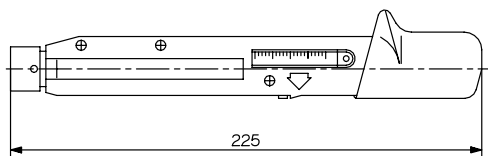
Fig. 8: Torque wrench Types 1300A11 and 1300A39

Ordering Key

Type 4065B ☐ DS ☐ - ☐

Pressure Range

0 … 200 bar	**0200**
0 … 500 bar	**0500**
0 … 1 000 bar	**1000**

Sensor Type

Digital compensation and PiezoSmart	**DS**

Cable Type

PTFE cable	**1**

Cable Length

2 m	**2,0**

Ordering example: Type 4065B0200DS1-2,0
• Version with measuring range 200 bar, with digital compensation and PiezoSmart, cable length 2 m. Compatible with Kistler amplifier Types 4665, 4665B... and 4624A... .