

High temperature pressure sensor
for cylinder pressure measurement in glow plug adapter

Type 6056B



Specifically developed for use in glow plug adapters, the new generation of the cylinder pressure sensor Type 6056B offers the perfect combination of accuracy and durability. Type 6056B has the required sensitivity and accuracy for thermodynamic and efficiency studies, combined with the robustness needed for calibration and validation activities. Type 6056B sets a new standard for cylinder pressure measurement in glow plug adapter and can be used in applications with classic fuels as well as with alternative fuels including hydrogen.

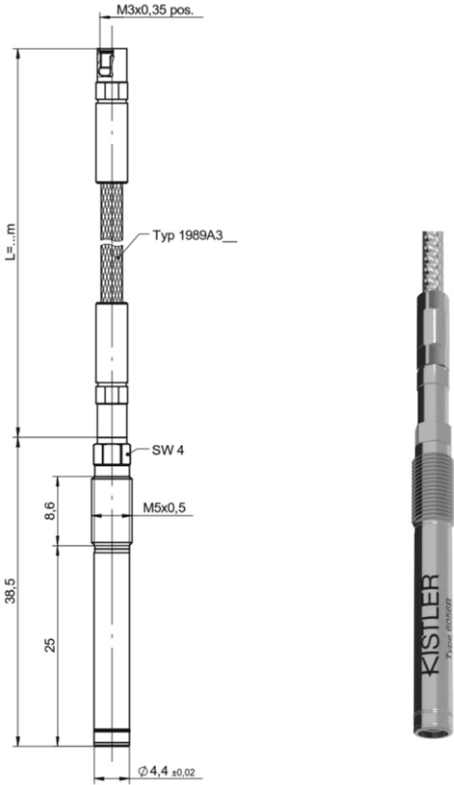
- Mounting dimensions compatible to sensor Type 6056A
- Ideal for measurements with glow plug adapter Type 6542Q...
- Excellent strain interference rejection (latest Anti-strain design)
- Minimal sensitivity shift across the working temperature range
- Very low linearity deviation
- Low thermal shock error
- High durability without compromising thermodynamic accuracy
- Suitable for use in hydrogen combustion engines

Description

With sensor Type 6056B, a large number of different glow plug adapters can be equipped. No sensors with special lengths are necessary. This distinctly simplifies the preparation for indicating measurements and storekeeping.

The excellent strain rejection, due to the decoupled measuring element from the sensor housing, allows installations even under demanding boundary conditions, Type 6056B is therefore ideally suited for modern and challenging engine applications.

The new PiezoStar crystal from Kistler offers a high sensitivity combined with thermal and mechanical stability. Thanks to the very compact design and the high natural frequency of the sensor, the influences of engine vibrations, such as valve closing, are minimized.



Technical data

Measuring range	bar	0 ... 300
Calibrated ranges (23°C, 200°C, 350°C)	bar	0 ... 100, 0 ... 150, 0 ... 200, 0 ... 300
Overload	bar	350
Sensitivity (at 23°C)	pC/bar	-17
Natural frequency (meas. element)	kHz	≈185
Linearity (at 23°C)	% FSO	±0,3
Tightening torque, greased	N·m	1.5
Shock resistance (half sine 0,2 ms)	g	≥2 000
Acceleration sensitivity		
axial	mbar/g	0.8
radial	mbar/g	0.2
Sensitivity shift		
23°C ... 350°C	%	±0.75
200 ±50°C	%	±0.25

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Technical data (continued)

Operating temperature range	°C	–20 ... 350
Temperature, min./max.	°C	–40 ... 400
Thermal shock error (at 1 500 1/min, IMEP = 9 bar)		
Δp (Short term drift)	bar	±0.25
ΔIMEP	%	±1.5
Δp _{max}	%	±1.0
Insulation resistance (at 23°C)	Ω	≥10 ¹³
Capacitance sensor	pF	8
Connector, sapphire insulator		M3x0.35
Protection rating, with cable Type 7 (IEC 60529)	IP	65
Weight sensor	g	3.5

Application

The miniature sensor Type 6056B... is used typically in glow plug adapters for pressure measurement in diesel engines (Fig. 2); see also data sheet 6542Q_000-570.

However, due to its small dimensions, it can also be used in engines with complex structural geometries, either directly mounted in an indicating bore (Fig. 3) or in a mounting sleeve (Fig. 4)

The rugged diaphragm allows measurements within the knock limit and ensures, thanks to its low thermal shock error, very accurate thermodynamic investigations.

Installation

When mounting the sensor, it is essential to respect the tightening torque of 1.5 N·m. The sensor with the connected cable without PiezoSmart is mounted with the mounting key Type 1300A14 or 1300A14Q01 and the torque wrench Type 1300A17.

For sensors with PiezoSmart, a slotted mounting key is used. The mounting bore must either be exactly ø5.7 mm (with step drill) or larger than ø7.5 mm. For the bore diameter ø5.7 mm, mounting keys Type 1300B14 or 1300B14Q04 and for bore diameter ø≥7,5 mm, mounting keys Type 1300B14Q01 or 1300B14Q03 are available. For the tightening torque of the glow plug adapter into the cylinder head please refer to the specific data sheet.

Mounting in glow plug adapter (Fig. 2)

For the use in glow plug adapters, Kistler offers customized adapters of Type 6542Q... (see also data sheet 6542Q_000-570). These adapters are provided with a highly accurate machined sensor bore according to requirements (Fig. 1) and are optimized regarding signal quality and sensor lifetime. It is not recommended to use self-manufactured glow plug adapters. On request, Kistler will provide engine-specific adapters.

Direct installation (Fig. 3)

Sensor Type 6056B... can be mounted directly in the cylinder head. The length of the access passage is depending on the material (Fig. 1). To achieve the highest measurement quality and to avoid a damage of the sensor, the bore must be machined exactly to specification (Fig. 1). The following Kistler tools allow you to achieve the required tolerances.

Step drill	Type 1300A16
Tap	Type 1357A
Reaming tool	Type 1300A99

The bore must be machined in one operation. Before mounting the sensors, it is mandatory to check the sealing surface. The use of the reaming tool Type 1300A99 is strongly recommended. You will find additional information in the instruction manual and your Kistler representative will provide further information such as e.g., the preferred location of the indicating bore in the combustion chamber.

Sleeve installation (Fig. 4)

Where space allows or if the sensor must be mounted through the water jacket of the cylinder head, it is recommended to use a mounting sleeve. Mounting sleeves are manufactured according to customer specifications. They are provided with a highly accurate machined sensor bore according to requirements (Fig. 1).

On request, Kistler supports you on your individual mounting situation, create drawings and manufacture the customized mounting sleeves.

Maintenance

Kistler recommends an annual calibration from the first use of the sensor. For further information refer to the instruction manual or contact your Kistler representative.

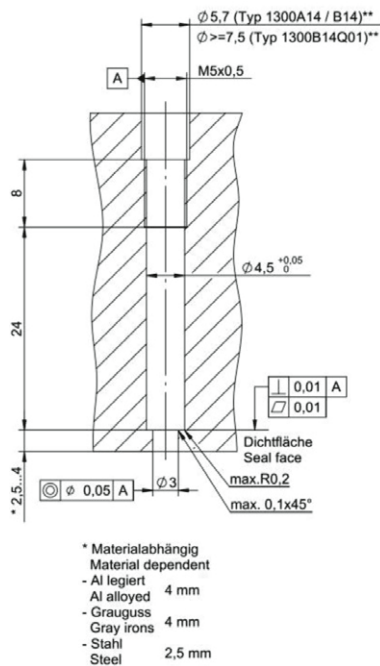


Fig. 1: Mounting bore

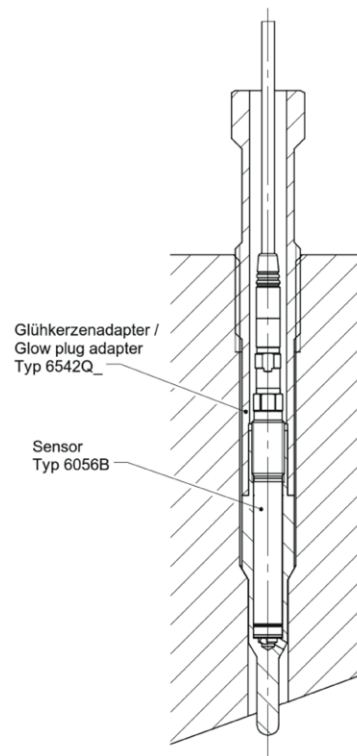


Fig. 2: Installation in glow plug adapter

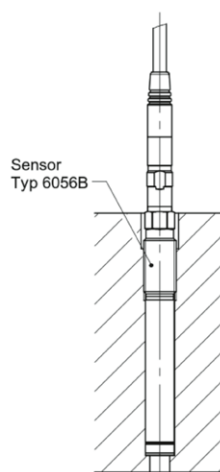


Fig. 3: Direct mounting

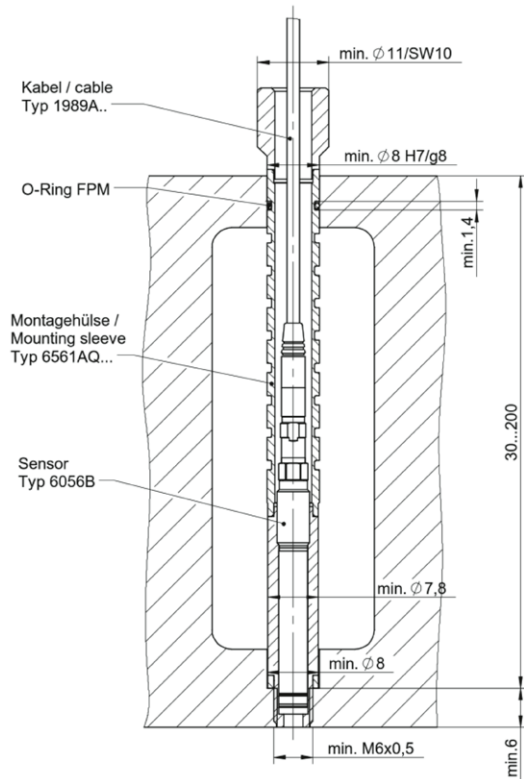


Fig. 4: Installation in mounting sleeve

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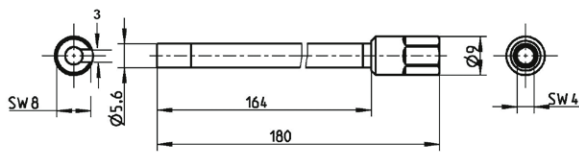


Fig. 5: Mounting key Type 1300A14

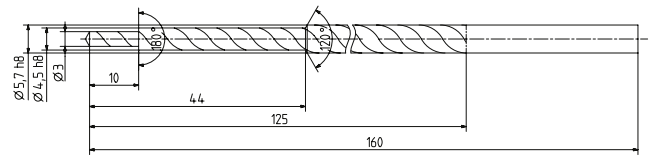


Fig. 9: Step drill Type 1300A16

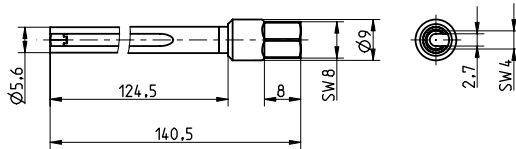


Fig. 6: Mounting key 5.6 mm, slotted, Type 1300B14

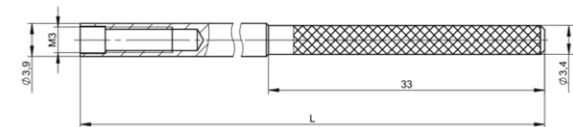


Fig. 10: Extraction tool for Type 6405 Type 1349...

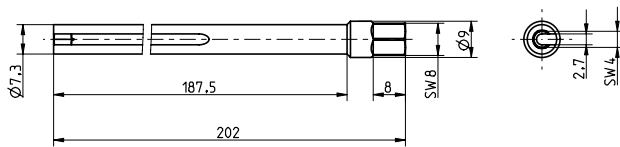


Fig. 7: Mounting key 7.3 mm, slotted, Type 1300B14Q01

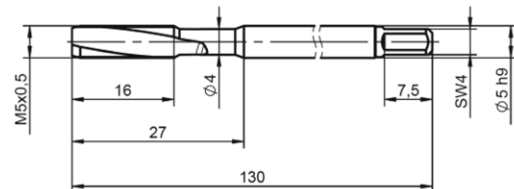


Fig. 11: Screw tap M5x0.5 Type 1357A

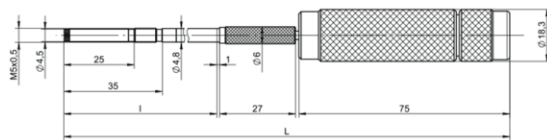


Fig. 8: Reaming tool Type 1300A99

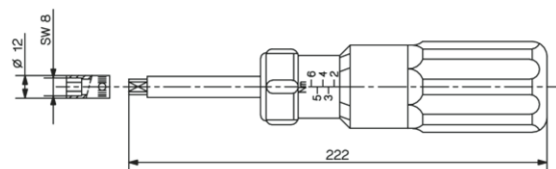


Fig. 12: Torque wrench Type 1300A17

Scope of delivery

- Pressure sensor
- Connecting cable acc. to ordering key
- Calibration certificate
- Adapter M3x0.35 neg.-BNC pos.
(only for not PiezoSmart versions)

Optional accessories

- Adapter Triax. pos. – BNC pos.
- PiezoSmart extension cables
 - L = 1 m
 - L = 2 m
 - L = 10 m
- Replacement connecting cables, PFA steel braiding
 - L = 1 m
 - L = 2 m
 - L = 3 m
 - incl. PiezoSmart, L = 1 m*
 - incl. PiezoSmart, L = 2 m*
 - incl. PiezoSmart, L = 3 m*
- Replacement connecting cables, FPM oil-tight
 - L = 1 m
 - L = 2 m
 - L = 3 m
 - incl. PiezoSmart, L = 1 m*
 - incl. PiezoSmart, L = 2 m*
 - incl. PiezoSmart, L = 3 m*
- Temperature sensor
- Dummy sensor
- Extraction tool for dummy sensor Type 6405
 - L = 160 mm
 - L = 230 mm
 - L = 310 mm
- Mounting key standard (not slotted)
 - Ø5,6 mm, L = 180 mm
 - Ø5,6 mm, L = 257 mm
- Mounting key for PiezoSmart (slotted)
 - Ø5,6 mm, L = 140,5 mm
 - Ø5,6 mm, L = 190 mm
 - Ø7,3 mm, L = 202 mm
 - Ø7,3 mm, L = 242 mm
- Torque wrench 1 ... 6 N·m
- Step drill
- Tap M5x0,5
- Reaming tool for sensor mounting surface
 - L = 224/l = 120
 - L = 278/l = 174
- Glow plug adapter¹⁾
- Mounting sleeve incl. o-ring¹⁾
- O-ring for mounting sleeve
- Adapter for pressure generator Type 6904

Type/Mat. Nr.
6056B

1706

Type/Mat. Nr.
1704A4

1987B1

1987B2

1987B10

1989A311

1989A321

1989A331

1985A8S311

1985A8S321

1985A8S331

1989A711

1989A721

1989A731

1985A8S711

1985A8S721

1985A8S731

6056AT

6405

1349

1349AQ01

1349AQ02

1300A14

1300A14Q01

1300B14

1300B14Q04

1300B14Q01

1300B14Q03

1300A17

1300A16

1357A

1300A99

1300A99Q03

6542Q...

6561AQ...

65007541

6591

Ordering key

PiezoSmart

Without PiezoSmart	–
With PiezoSmart	S

Cable version

PFA with steel braiding	3
FPM oil-proof	7

Cable length

1 m	-1
2 m	-2
3 m	-3

Typ 6056B

Ordering examples:

Standard sensor with PiezoSmart and
2 m FPM cable (oil-proof):

Type 6056BS7-2

Standard sensor without PiezoSmart and
1 m PFA cable:

Type 6056B-3-1

* with factory calibration data, state SN with order

¹⁾ Customer specific

Description of Icons

	H2 tested: Suitable for the use in hydrogen combustion engines		Anti Strain Design: Insensitive to mechanical strain effects
	Ready to Use: Easy installation - minimal modifications		High Thermal Stability: Temperature stable over measuring range
	Closed Loop Combustion Control: Suitable for closed loop control applications		High Robustness: High durability with good thermodynamic performance

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