

Compact M5 Pressure Sensor for Minimal Mounting Space

Type 6054BR...

Type 6054BR... is used to achieve precise measurements when limited space is available for the sensor. Due to its high resonance frequency it is suitable for measurements at high power engines where high vibrations are present. A long service life is reached due to the rugged design.

- High accuracy
- Very compact packaging
- Low sensitivity to solid borne sound
- High resonant frequency
- Highly miniaturised connector (M3 size)

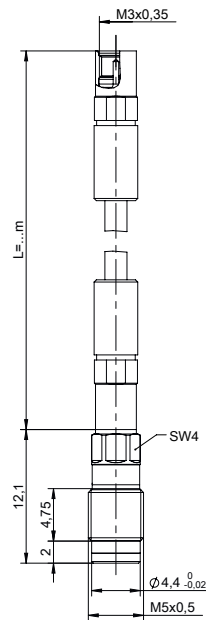
Description

Type 6054BR... is a complete new design despite the well known M5 dimensions. It is based on the new PiezoStar® crystal from Kistler. In face of the compact size the sensitivity of Type 6054BR... is remarkable -14 pC/bar with high temperature stability. The new designed front sealing permits good heat transfer. This allows the sensor to be used in engines with high specific power and thus high temperatures. Combined with the flame guard Type 6539A1Q01 the sensor achieves a high thermodynamic accuracy. Due to the compact size and the high resonance frequency the noise of engine vibrations, for example valve slap, is kept to a minimum.

Application

Sensor Type 6054BR... needs little mounting space. It can be mounted in the Type 6052C... bore. The access bore can be as small as 5,7 mm if the Type 6054BR... is used solely. That way the Type 6054BR... is applicable for small engines, compact multi-valve engines as well as for motorcycle engines and vehicle combustion analysis.

The robust metal braided cable Type 1989A311/1989A321 is used for all standard applications. When used where engine oil is present, for example when routed through the valve cover, the oil proof cable Type 1989A711/1989A721 is recommended.



Technical Data

Measuring range	bar	0 ... 250
Calibrated partial ranges	bar	0 ... 100, 0 ... 150, 0 ... 200, 0 ... 250
Overload	bar	300
Sensitivity	pC/bar	≈ -14
Natural frequency (sensor)	kHz	≈ 150
Linearity in all ranges Lin (at room temperature)	%FSO	$\leq 0,3$
Acceleration sensitivity		
axial	bar/g	$< 0,0002$
radial	bar/g	$< 0,0002$
Operating temperature range	°C	-20 ... 350
temperature, min./max.		-40 ... 400
Sensitivity change		
200 °C ± 50	%	$\pm 0,5$
23 ... 200 °C	%	$\pm 1,5$
Thermal shock error (at 1 500 1/min, IMEP = 9 bar)		
Δp (short-term drift)	bar	$\leq 0,5$
Δp_{mi}	%	$\leq \pm 2$
Δp_{max}	%	$\leq \pm 1$
Insulation resistance at 23 °C	Ω	$\leq \pm 10^{13}$
Shock resistance	g	2 000

Technical Data (Continuation)

Tightening torque, greased	N·m	1,5
Capacitance, without cable	pF	5
Weight with cable	g	25
Connector, ceramic insulator	–	M3x0,35

Type 6054BR...U20 (U55)

(other specifications as for Type 6054BR...)

Measuring range	bar	0 ... 300
Calibrated partial ranges	bar	0 ... 100, 0 ... 200, 0 ... 300
Overload	bar	(400) 350
Sensitivity	pC/bar	(≈-9) ≈-13
Linearity in all ranges Lin (at room temperature)	%/FSO	(≤0,5) ≤0,3
Acceleration sensitivity		
axial	bar/g	(<0,0005) <0,0003
radial	bar/g	(<0,0005) <0,0003
Sensitivity change		
200 °C ±50	%	±0,5
23 ... 200 °C	%	(±2,5) ±2,0
Thermal shock error (at 1 500 1/min, p _{ni} = 9 bar)		
Δp (short time drift)	bar	(≤±1) ≤±0,7
Δp _{ni}	%	(≤±3) ≤±2,5
Δp _{max}	%	≤±1,5

Mounting

When mounting the sensor, it is essential to apply a tightening torque of 1,5 N·m. The sensor with the connected cable should therefore be mounted with the socket wrench Type 1300A14 and the torque wrench Type 1300A17.

A slotted mounting key must be used for sensors with PiezoSmart®. The mounting bore must either be exactly $\varnothing 5,7$ mm (with step drill) or larger than $\varnothing 7,5$ mm. The mounting key Type 1300B14 is for $\varnothing 5,7$ mm. The mounting key Type 1300B14Q01 is for $\varnothing \geq 7,5$ mm.

Direct Mounting

Sensor Type 6054BR... can be mounted directly in the cylinder head (Fig. 2). When drilling the hole, bore specifications (Fig. 1) must be hold exactly.

The following Kistler tools:

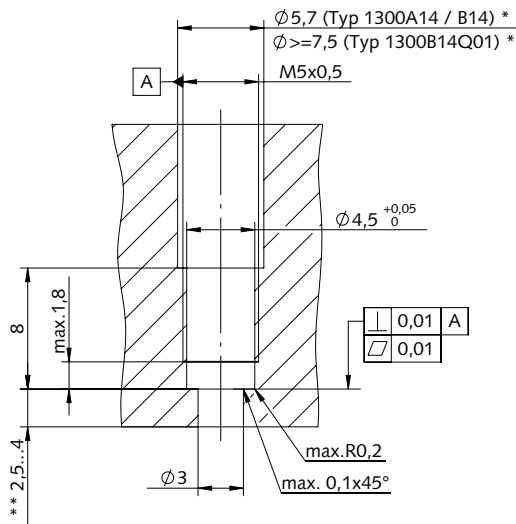
Step drill Type 1300B22

Tap Type 1357A

Reaming tool Type 1300A79

enable you to maintain the tolerances required. The hole must be drilled in one work holding fixture. Before mounting the sensors, in particular the sealing surface in the hole must be checked; use of the reaming tool Type 1300A79 is mandatory. You will find additional information on drilling the hole and mounting in the instruction manual. Your Kistler distributor will provide you with further information such as, for example, concerning the preferred location of the indicating bore in the combustion chamber.

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*Material dependent
 - AL alloyed 4 mm
 - Gray irons 4 mm
 - Steel 2,5 mm

Fig. 1: Mounting bore

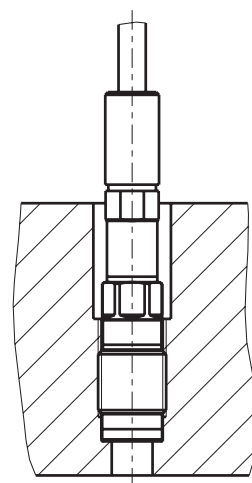


Fig. 2: Direct mounting

Included Accessories

- Cable according to ordering key

Type/Art. No.

Optional Accessories

- Flame guard 6539A1Q01
- Spare cable PFA metal braided, L = 1 m 1989A311
- Spare cable PFA metal braided, L = 2 m 1989A321
- Spare cable oil-proof Fluoropolymer, L = 1 m 1989A711
- Sprce cable oil-proof Fluoropolymer, L = 2 m 1989A721
- PiezoSmart® spare cable PFA metal braided, L = 1 m 1985A8S311
- PiezoSmart® spare cable PFA metal braided, L = 2 m 1985A8S321
- PiezoSmart® spare cable oil-proof Fluoropolymer, L = 1 m 1985A8S711
- PiezoSmart® spare cable oil-proof Fluoropolymer, L = 2 m 1985A8S721
- PiezoSmart® extension cable 1987B...
- Mounting wrench
 - ø5,6 mm, not slotted (L = 180 mm) 1300A14
 - ø5,6 mm, slotted (L = 140,5 mm) 1300B14
 - ø5,6 mm, slotted (L = 100,5 mm) 1300B14Q02
 - ø7,3 mm, slotted (L = 202 mm) 1300B14Q01
 - ø7,3 mm, slotted (L = 242 mm) 1300B14Q03
- Torque wrench 1 ... 6 N·m 1300A17
- Step drill 1300B22
- Special screw tap M5x0,5 1357A
- Adapter for pressure generator 6904 6585A
- Reaming tool 1300A79
- Dummy 6405A2
- Extraction tool for dummy 1349
- Coupling M3x0,35 neg. – BNC pos. 1706

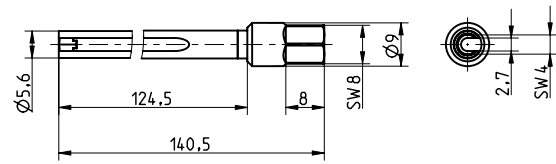


Fig. 5: Mounting wrench ø5,6 mm, slotted, Type 1300B14

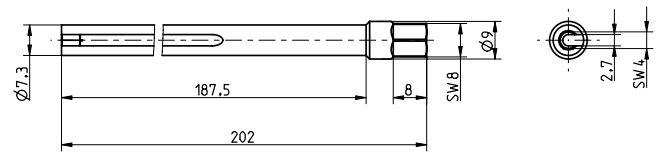


Fig. 6: Mounting wrench ø7,3 mm, slotted, Type 1300B14Q01

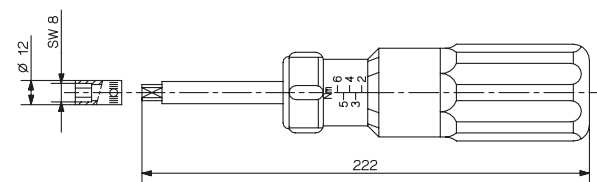


Fig. 7: Torque wrench Type 1300A17

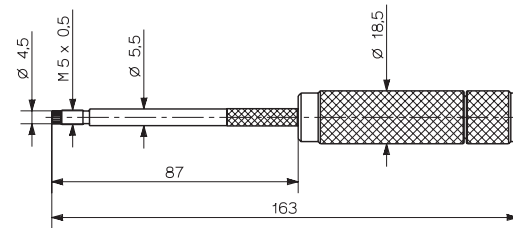


Fig. 8: Reaming tool Type 1300A79

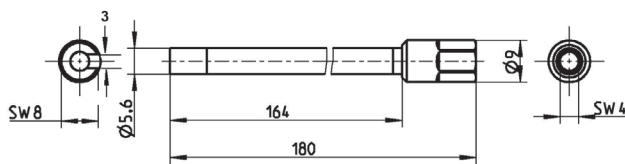


Fig. 3: Mounting wrench Type 1300A14

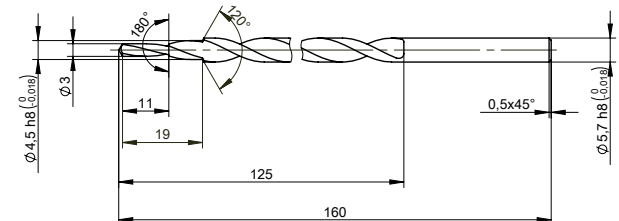


Fig. 9: Step drill Type 1300B22

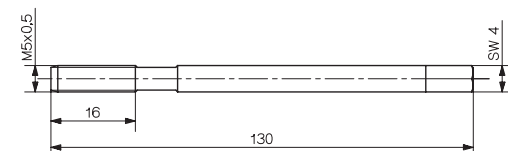


Fig. 4: Special screw tap Type 1357A

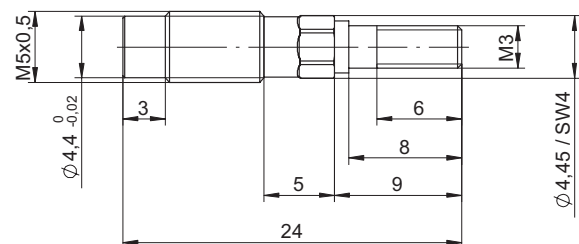


Fig. 10: Dummy Type 6405A2 with excerpt thread M3

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Ordering Key

Type 6054BR

Without PiezoSmart®	-
With PiezoSmart®	5

Cable Type

Without cable	-
PFA metal braided	3
Fluoropolymer, oil-proof	7

Cable Length

Without cable	-
1 m	1
2 m	2

Version

Standard	-
Reinforced diaphragm	U20
Extra reinforced diaphragm	U55

Ordering Examples

- Version without cable
- Version with 1 m fluoropolymer cable
- Version with PiezoSmart® and 1 m fluoropolymer cable

Type

6054BR
6054BR71
6054BRS71

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

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