KISTLER measure. analyze. innovate.

# **High-Temperature Pressure Sensor**

Туре 6052С...

# for Engine Measuring Technology

High-temperature pressure sensor with very small dimensions are ideal for use in internal combustion engines with complex structural geometry of the cylinder head. The sensor is installed with front sealing in an M5x0,5 bore.

- Good temperature stability of the sensitivity
- High sensitivity
- Low thermal shock error
- Long service life due to front seal

#### Description

Type 6052C... uses a piezoelectric crystal which achieves high sensitivity in conjunction with an extremely small sensor structure. This sensitivity varies by not more than  $\pm 1,0$  % in the operating temperature range. The passive acceleration compensation patented by Kistler keeps the influence of engine vibrations to a minimum.

The front seal allows very good heat dissipation and thus briefly a maximum operating temperature of 400 °C. The diaphragm, optimized by finite element calculation, produces good measuring results and ensures a long service life.

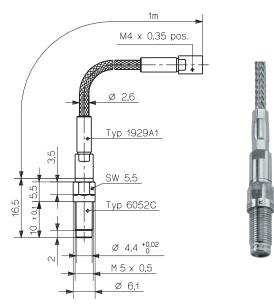
#### Application

The sensor Type 6052C... is an excellent all-rounder. Its rugged construction makes it suitable for measurements at the knock limit as well as for thermodynamic investigations. This sensor is used mainly on multi-valve engines, motor cycle and other small engines and for combustion analysis.

For applications mainly in the knocking range or at very high peak pressures, use of Type 6052C...U20 with reinforced diaphragm (heavy duty version) is recommended.

Type 6052C...U40 is provided with additional damping and is suitable for applications on engines with extremely high vibrations, e.g. racing engines.

These sensors are always provided with an integrated cable. For standard applications, a rugged cable with steel braiding Type 1929A1 is used. If the sensor connector is exposed directly to engine oil, e.g. when installed through the valve cover, the oil proof cable (IP67) Type 1983AA1 is recommended.



#### Technical Data

#### Туре 6052С...

Measuring range	bar	0 250
Calibrated partial ranges	bar	0 50, 0 100,
		0 150
Overload	bar	300
Sensitivity	pC/bar	≈–20
Natural frequency (measuring element)	kHz	≈160
Linearity, all ranges (at 23 °C)	%/FSO	≤±0,4
Acceleration sensitivity		
axial	bar/g	<0,0002
radial	bar/g	<0,0005
Operating temperature range	°C	-20 350
Temperature min./max.		-50 400
Sensitivity change		
200 °C ±50 °C	%	≤±0,5
23 350 °C	%	≤±2
Thermal shock error		
(at 1500 1/min, p <sub>mi</sub> = 9 bar)		
$\Delta p$ (short time drift)	bar	≤±0,5
$\Delta p_{mi}$	%	≤±2
$\Delta p_{max}$	%	≤±1,5
Insulation resistance at 23 °C	Ω	≥10 <sup>13</sup>
Shock resistance	g	2 000
Tightening torque	N∙m	1,5
Capacitance, without cable	рF	5
Weight with cable	g	30
Connector, ceramic insulator	_	M4 x0,35

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#### Technical Data

#### **Type 6052C...U20** (other specifications as for Type 6052C...)

Measuring range	bar	0 300
Calibrated partial ranges	bar	0 100, 0 200
Overload	bar	350
Acceleration sensitivity		
axial	bar/g	<0,0005
radial	bar/g	<0,0005
Thermal shock error		
(at 1500 1/min, $p_{mi} = 9$ bar)		
$\Delta p$ (short time drift)	bar	≤±0,7
$\Delta p_{mi}$	%	≤±3
$\Delta p_{max}$	%	≤±2

Type 6052C...U40 (other specifications as for Type 6052C...)

Operating temperature range	°C	-20 200
Temperature min./max.		-50 200
Sensitivity shift		
150 200 °C	%	≤±0,5
23 200 °C	%	≤±2

#### Mounting

5052C\_000-552e-10.06

Direct mounting:

Sensor Type 6052C... can be mounted directly in the cylinder head, see Fig. 2. Machining of the bore must correspond exactly to the bore specifications shown in Fig. 1.

The Kistler tools: Step drill Special tap Finishing tool for bore

Type 1300A51 Type 1357A and the Type 1300A79

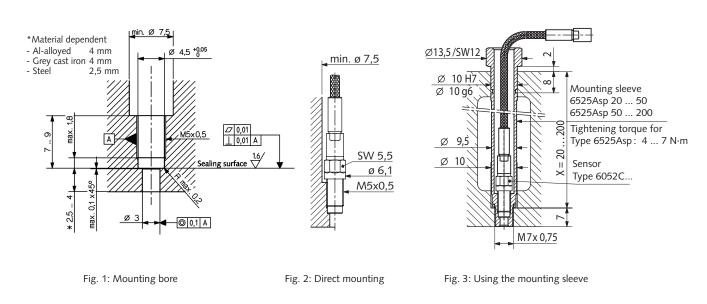
must be used in order to comply with the tolerances required. The bore must be machined in one clamping. Before mounting the sensor, the sealing surface in particular must be checked; use of the finishing tool (reamer) Type 1300A79 is mandatory. When mounting the sensor, it is essential to comply with the tightening torque of 1,5 N·m. The sensor should therefore be mounted with the cable connected using the socket wrench Type 1300A9 and the torque wrench Type 1300A17. You will find additional information for machining the bore and mounting in the instruction manual. Your Kistler distributor will provide you with information, for example concerning the preferred position of the indicating bore in the combustion chamber.

#### Mounting sleeve:

When space allows or if the water jacket of the cylinder head will be breached, a mounting sleeve is recommended. Mounting sleeves are manufactured to customer requirements; Fig. 3 shows a version with M7x0,75 thread. An additional advantage of mounting sleeves is that the actual sensor bore in the sleeve can be very precisely machined. On request, Kistler will provide drawings for your particular mounting situation.

#### Spark plug adapter:

Sensor 6052C... can also be used in the spark plug adapter 6517B..., see data sheet 6517B\_000-491.



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Accessories Included	Туре
Cable according to ordering key	
<ul> <li>Coupling M4 neg. – BNC pos.</li> </ul>	1705
Optional Accessories	Туре
<ul> <li>Spare cable with metal braiding, L = 1 m</li> </ul>	1929A1
<ul> <li>Spare cable oil proof of Viton<sup>®</sup>, L = 1 m</li> </ul>	1983AA1
<ul> <li>Coupling M4 neg. – 10-32 UNF neg.</li> </ul>	1700A13
<ul> <li>Mounting sleeve incl. O-ring</li> </ul>	6525Asp
<ul> <li>Mounting key SW 5,5</li> </ul>	1300A9
<ul> <li>Torque wrench 1 … 6 N⋅m</li> </ul>	1300A17
<ul> <li>Special tap M5x0,5</li> </ul>	1357A
• Step drill	1300A51
<ul> <li>Dummy sensor (for Type 6052C)</li> </ul>	6445
<ul> <li>Extraction tool for dummy sensor</li> </ul>	1319
• Adapter for pressure generator Type 6904	6585A
<ul> <li>O-ring for Mounting sleeve Type 6525</li> </ul>	5.110.078
<ul> <li>Finishing tool for bore,</li> </ul>	1300A79
bore depth ≤60 mm	
<ul> <li>Finishing tool for bore,</li> </ul>	1300A79Q0
bore depth ≤170 mm	
<ul> <li>Adapter M8x0,75</li> </ul>	6595
<ul> <li>Adapter M10x1</li> </ul>	6595A1

Ordering Key			
	6052C		
Without PiezoSmart®	-		
With PiezoSmart®	S		
Cable Version			
With metal braiding, Type 1929A	3		
Viton <sup>®</sup> , oil proof	7		
Cable length 1 m	1		
2 m	2		
Cables with special length, specify cable	9	··	
length L in m ( $L_{min} = 0,15 \text{ m/}L_{max} = 3,5 \text{ m}$ )			
Version		1	
Standard	-		
Reinforced diaphragm	U20		
Additional damping	U40		

#### Ordering Examples: Type 6052C...

0	•							
Version with	1 m bra	ided cable				Туре	6052C31	
Version with	PiezoSn	nart® and '	1 m V	′iton® c	able	Туре	6052CS71	
Version with	PiezoSn	nart® and '	1 m V	′iton® c	able,	Туре	6052CS71U2	20
and reinfo	orced dia	phragm						
	D' C				~	-		. ~

Version with PiezoSmart<sup>®</sup>, braided cable L = 3 m Type 6052CS39U40 and additional damping L = 3 m

Viton® is a registered Trademark of DuPont Performance Elastomers

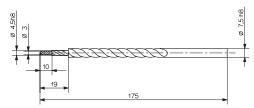


Fig. 8: Step drill Type 1300A51

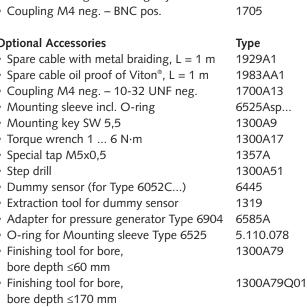


Fig. 9: Special tap M5x0,5 Type 1357A

M 5 ×0,5 Ø 6,1 SW5,5 Μ4

Fig. 10: Dummy sensor (for Type 6052C...)

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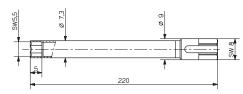


Fig. 4: Mounting key SW 5,5 Type 1300A9

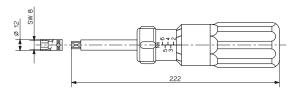


Fig. 5: Torque wrench 1 ... 6 N·m Type 1300A17

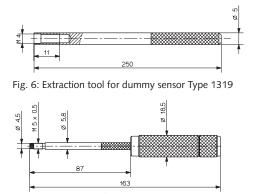


Fig. 7: Finishing tool for bore Type 1300A79

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