

ThermoCOMP Quartz Pressure Sensor Type 6041A...

Cylinder pressure sensor for combustion engines

Water-cooled precision cylinder pressure sensor with small dimensions, especially suited for small combustion engines and for thermodynamic investigations in the laboratory.

Fitting with or without water cooling in a bore M8x0.75. High sensitivity, high natural frequency and excellent zero point stability because of integrated water cooling. When a special wrench is used the sensor can be mounted in a bore of $\varnothing 12$ mm.

- Miniature water-cooled cylinder pressure sensor (M8 thread)
- Thermo-shock optimized double diaphragm
- Long life thanks to TiN coating

Description

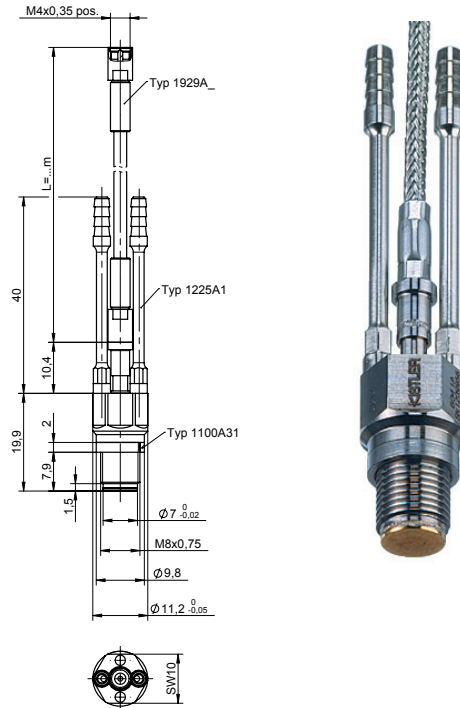
The use of Polystable quartz elements assures security against twinning even under high mechanical loading. As a result, the sensitivity remains largely constant from $-50 \dots 350 \text{ }^\circ\text{C}$ and the sensor continues to operate without damage even if the water-cooling fails. Thanks to its anticorrosive effect, the TiN coating extends the life of the diaphragm.

Application

The miniature sensor Type 6041A... is well suited for thermodynamic measurements in multivalve engines where space is at a premium. The low sensitivity to thermal shock and the excellent zero point stability thanks to the built-in water cooling yield precise measuring results. Moreover, the excellent linearity in the whole range and the high sensitivity allow gas exchange to be analyzed accurately.

Cooling fluid specification

- Demineralized water according to norm VDE-Norm 0510
- Cooling fluid BASF G30 / G40 / G48 or similar products (do not mix with each other)
- Mixing ratio: 1 part additive with 4 parts demineralized water suitable for applications down to -9°C
- For more information please refer to instruction manual of the cooling unit 2621G



Technical data

Range	bar	0 ... 250	
Calibrated partial ranges	bar	0 ... 50; 0 ... 100;	
	bar	0 ... 150; 0 ... 250	
Overload	bar	300	
Sensitivity	pC/bar	≈ -20	
Natural frequency	kHz	≈ 70	
Linearity, all ranges	% FSO	$\leq \pm 0.5$	
Acceleration sensitivity	axial (with cooling)	bar/g	< 0.012
	radial (with cooling)	bar/g	< 0.0045
Shock resistance	g	$< 2\ 000$	
Operating temperature range	$^\circ\text{C}$	$-50 \dots 350$	
Cooling water flow	l/min	0.3 ... 0.5	
(50 $^\circ\text{C}$, p_{max} 3 bar)			
Sensitivity shift	with cooling 50 $\pm 35 \text{ }^\circ\text{C}$	%	± 0.5
	without cooling 200 $\pm 150 \text{ }^\circ\text{C}$	%	$\leq \pm 2$
Insulation resistance at 20 $^\circ\text{C}$	T Ω	> 10	
Tightening torque	N·m	6	

66041A_000-013e-03_20

Technical data (continuation)

Thermal shock error		
Deviation from the reference (at 1 500 1/min, IMEP = 9 bar)		
Δp (short-time drift)	bar	$\leq \pm 0.25$
$\Delta IMEP$	%	$\leq \pm 2$
Δp_{max}	%	$\leq \pm 1$
Capacitance		
Sensor only	pF	6
Sensor with cable Type 1929A1	pF	109
Weight		
Sensor only	grams	10
Sensor with cable Type 1929A1	grams	28.5
Plug, ceramic insulator		M4x0.35

Type 6041A... U20

(other specifications as for Type 6041A...)

Overload	bar	350
Sensitivity	pC/bar	≈ -19
Thermal shock error		
(at 1 500 1/min, IMEP = 9 bar)		
Δp (short-time drift)	bar	$\leq \pm 0.5$
$\Delta IMEP$	%	$< \pm 3$
Δp_{max}	%	$< \pm 1$

Mounting

The bore must be machined exactly to specification. Kistler tap Type 1361 ensures the correct tolerances are achieved.

In order to avoid pipe oscillations we recommend flush-mounting the sensor in the cylinder head (Fig. 1). To reduce the thermal effect on the sensor, a recessed mounting position (up to 2 mm) is recommended.

An alternative installation method uses a mounting position with a small diameter bore in front of the diaphragm. This offers excellent thermal-shock protection but can be prone to pipe oscillations (Fig. 2).

Mounting example

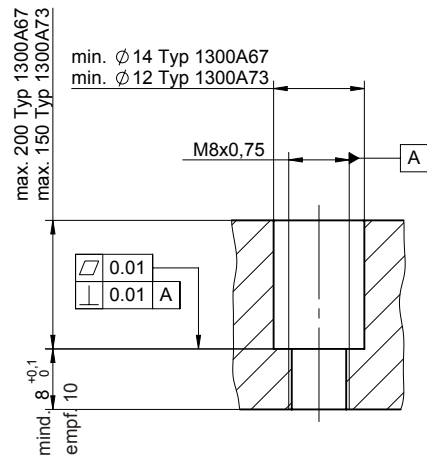


Fig. 1: Shows the bore of 14 resp. 12 mm diameter for the standard mounting

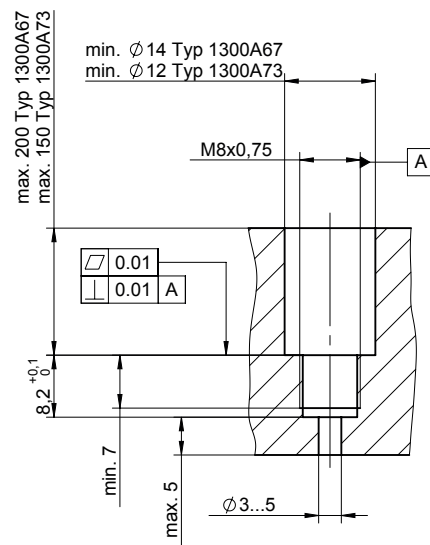


Fig. 2: Recessed mounted sensor. Shows the bore of 14 resp. 12 mm diameter for the standard mounting

6041A_000-013e-03.20

Scope of delivery

- Pressure sensor with pressed-on seal 1100A31
- Connecting cable acc. to ordering key
- Calibration certificate
- Adapter M4 neg. – BNC pos. (not for PiezoSmart)

Type/Art. No.

6041A

1705

Mounting tools (optional)

- Mounting key for bore Ø12 SW12
 - L = 155
 - L = 205
 - L = 265
 - L = 315
 - L = 365
- Wrench jaw insert SW12 for 1300A73
- Mounting key for bore min. Ø14
- Wrench jaw insert SW14 for Type 1300A67
- Torque wrench (4 ... 20 N·m)
- Screw tap M8x0.75

Type/Art. No.

1300A73
1300A73Q01
1300A73A250
1300A73A300
1300A73A350
1300A13
1300A67
1300A71
1300A39
1361

Optional accessories

- PiezoSmart extension cables
 - L = 1 m 1987B1
 - L = 2 m 1987B2
 - L = 10 1987B10
- Connecting cables, PFA steel braiding
 - L = 1 m 1929A1
 - L = 2 m 1929A2
 - L = 3 m 1929A3
 - with PiezoSmart, L = 1 m 1985A1S311
 - with PiezoSmart, L = 2 m 1985A1S321
 - with PiezoSmart, L = 3 m 1985A1S331
- Connecting cables, FPM oil-tight
 - L = 1 m 1983AA1
 - L = 2 m 1983AA2
 - L = 3 m 1983AA3
 - with PiezoSmart, L = 1 m 1985A1S711
 - with PiezoSmart, L = 2 m 1985A1S721
 - with PiezoSmart, L = 3 m 1985A1S731
- Cr-Ni seal ring (replacement for pressed-on sensor seal) 1100A31
- Connecting hose for cooling water 1225A1
- Fluoropolymer-hose for cooling water 1203Csp
- Dummy sensor 6475
- Extraction tool for dummy sensor Type 6475 1319
- Mounting sleeve M12x1.25 (custom made) 6556AQ...
- Adapter for pressure generator Type 6904 6589
- Adapter for pressure generator Type 6905A 6929
- Engine adapter M14/M8, flush 6589Q01
- Engine adapter M14/M8, set back 6589Q02
- Conditioning system 2621G
- Protective cap for sensor plug M4x0.35 neg. 1895

Type/Art. No.**Ordering key**

Type 6041A		□ □ □ □
Standard		↑
Reinforced diaphragm	U20	
Without PiezoSmart	-	↑
With PiezoSmart	S	
Metal braided PFA cable	3	↑
Oilproof FPM cable	7	
Cable length 1 m	-1	↑
Cable length 2 m	-2	
Cable length 3 m	-3	

Type 6041A... can no longer be ordered.

Available variants Type 6041AU20:

- 6041AU20
- 6041AU20-3-2
- 6041AU20-7-3
- 6041AU20S3-1