

Piezoelectric pressure sensor for Test & Measurement applications

Type 601C...

The miniature pressure sensors of the Type 601C series are, due to their high sensitivity, suited for a variety of applications where very small pressure pulsations need to be measured. In addition, the optimized diaphragm ensures accurate dynamic pressure measurements, even when the diaphragm is simultaneously exposed to a high temperature transient.

- Pressure range up to 250 bar (3 626 psi)
- High sensitivity
- Membrane optimized for thermal transients
- Small sensor size
- Short rise time & high natural frequency
- Extremely wide operating temperature range
- Charge (PE) or Voltage (IEPE) output

Description

Due to their high natural frequencies, piezoelectric pressure sensors can be used for a variety of applications where dynamic pressures need to be measured. Another unique characteristic of piezoelectric pressure sensors is their ability to measure small pressure fluctuations that are superimposed on top of high static pressures with exceptional resolution. By contrast, piezoresistive pressure sensors are the right choice when measuring static pressure curves.

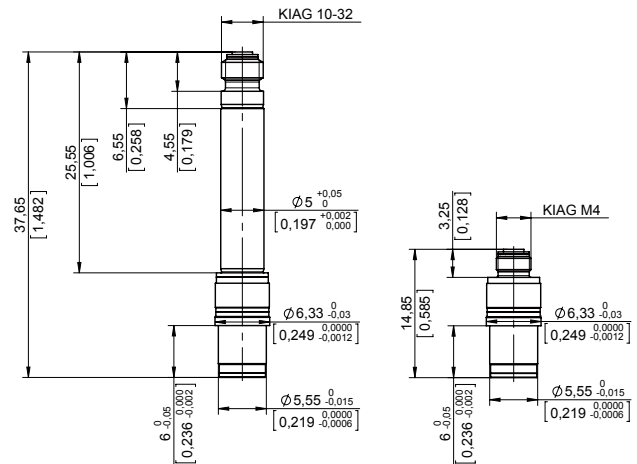
At the core of the all-welded, hermetically sealed 601C series there is a high performance PiezoStar[®] crystal grown by Kistler. This PiezoStar crystal gives the sensor a far higher sensitivity than an equivalently sized pressure sensor based on synthetic Quartz, which results in a lower noise level and so enables lower pressure to be measured more accurately.

The pressure to be measured acts on the sensor's diaphragm and compresses the PiezoStar crystal. The compressed crystal produces a charge which is proportional to the pressure. Finally the charge signal needs to be converted, by a charge amplifier, into a voltage which can then be read.

Two variants of the sensor are available, charge output (PE) and voltage output (IEPE resp. Piezotron[®]). The instruction manual gives an overview on the characteristics of both variants, an indication of which type of application they are best suited to and the full measuring chain.

Typical applications

- Pressure pulsations on pumps, compressors, etc.
- Dynamic measurements with high transient temperatures as Ex-Proof, pyrotechnical devices, closed vessel testing, energetic material testing, etc.



Technical data – PE sensors¹⁾

Type 601CA...

Output signal	pC	Charge (PE)
Pressure range	bar	0 ... 250
	psi	0 ... 3 626
Calibrated partial range	%	2; 20; 100
Overload	bar	300
	psi	4 350
Sensitivity	(nom.) pC/bar	-37.0
	pC/psi	-2.6
Linearity	(typ.) %FSO	≤±0.1
	(max.) %FSO	≤±0.5
Operating temperature range	°C	-196 ... +350
	°F	-321 ... +662
Rise time (10 ... 90 %)	µs	<1.4
Natural frequency ²⁾	kHz	>215
Temp. coefficient of sensitivity	25 °C ... 100 °C	%/°C ≈+0.009
	77 °F ... 212 °F	%/°F ≈+0.005
	25 °C ... 350 °C	%/°C ≈+0.014
	77 °F ... 662 °F	%/°F ≈+0.008
	25 °C ... -196 °C	%/°C ≈-0.035
	77 °F ... -321 °F	%/°F ≈-0.019
Acceleration sensitivity (axial)	bar/g	≤0.0020
	psi/g	≤0.0290
Acceleration sensitivity (radial)	bar/g	≤0.0001
	psi/g	≤0.0015
Insulation resistance	Ω	≥10 ¹³
Weight	Type 601CAA / 601CAB	gram 4.5 / 1.9
Housing and diaphragm material		17-4 S.S.

¹⁾ Indications are valid for 23 °C / 73 °F (if not specified otherwise)

²⁾ Calculated from rise time

Technical data – IEPE sensors ¹⁾

Type 601CBA...		00001.5	00003.5	00007.0	00014.0	00035.0	00070.0	00250.0
Output signal	V	Voltage (IEPE)						
Pressure range	bar psi	1.5 22	3.5 50	7 100	14 200	35 500	70 1 000	250 3 626
Maximum pressure	bar psi	250 3 626						
Overload	bar psi	300 4 350						
Sensitivity (nom.)	mV/bar mV/psi	3 333 230	1 429 99	714 49	357 25	143 9.9	71 4.9	20 1.4
Linearity	%FSO	≤±1.0						
Operating temperature range	°C °F	-55 ... +120 -67 ... +248						
Rise time (10 ... 90 %)	µs	<1.4						
Natural frequency ²⁾	kHz	>215						
Time constant (nom.)	s	2	3					
Low frequency response	-3 dB -5 %	0.080 0.242	0.053 0.161					
Temp. coefficient of sensitivity								
25 ... 120 °C	%/°C	≈+0.008						
77 ... 248 °F	%/°F	≈+0.005						
25 ... -55 °C	%/°C	≈-0.008						
77 ... -67 °F	%/°F	≈-0.005						
Acceleration sensitivity (axial)	bar/g psi/g	≤0.0020 ≤0.0290						
Acceleration sensitivity (radial)	bar/g psi/g	≤0.0001 ≤0.0015						
Supply voltage (by IEPE-Coupler)	VDC	22 ... 30						
Supply current (by IEPE-Coupler)	mA	2 ... 20						
Output bias voltage (nom.)	VDC	11						
Output voltage FSO	V	±5						
Weight	gram	3.6						
Housing and diaphragm material	-	17-4 S.S.						

¹⁾ Indications are valid for 23 °C / 73 °F (if not specified otherwise)

²⁾ Calculated from rise time

Mounting

Please check the T&M Pressure catalogue or sensor manual for an overview on the different mounting options.

Accessories (included)

- Sensor seal copper (5 pcs.)

Type/Art.-No.

1131

Accessories (optional)

- Sensor seal nickel (1 pcs)
- Floating clamp nut M7x0.75
- Floating clamp nut 5/16-24 UNF
- Adapter M10x1¹⁾
- Adapter seal for 6503C0A
- Adapter 3/8-24 UNF¹⁾
- Adapter seal for 6503C1A
- Adapter M3x0.5¹⁾
- Adapter 5-40 UNC¹⁾
- Adapter seal for 6507BxA
- Lubrication Grease (Adapter)
- Dummy sensor (standard housing)
- Dummy sensor (short housing)

Type/Art.-No.

1131A

6423B00

6423B11

6503C0A

1113C0B

6503C1A

1113C1B

6507B0A

6507B1A

1117B0C

1063

6487AA

6487AB

¹⁾ All of the adapters are delivered with 1 pc. of adapter seal and 1 pc. lubrication grease Type 1063.

Please check the T&M pressure catalogue or sensor manual for further accessories and mounting details.

Ordering key**Output signal**

Charge (PE)	A
Voltage (IEPE)	B

Housing

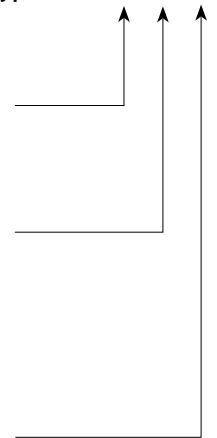
Standard housing (PE and IEPE)	A
Short housing (only PE)	B

Pressure range (only IEPE)

1.5 bar / 22 psi	00001.5
3.5 bar / 50 psi	00003.5
7 bar / 100 psi	00007.0
14 bar / 200 psi	00014.0
35 bar / 500 psi	00035.0
70 bar / 1 000 psi	00070.0
250 bar / 3 625 psi	00250.0

Ordering example

PE sensor with standard housing
PE sensor with short housing
IEPE sensor (250 bar / 3 625 psi)

Type 601C **Type**

601CAA

601CAB

601CBA00250.0