



# High Temperature Pressure Sensor for Gas Turbine- and Thermoacoustics Applications

Type 6023A...

Differential, acceleration compensated, piezoelectric pressure sensor for operating temperatures up to 1 000 °C.

- Operating temperature –55 ... 700 °C
- Short time operating temperature –55 ... 1 000 °C
- Internally case isolated
- Differential charge output
- Highest reliability
- Not pyroelectric
- Acceleration compensated
-  ATEX/IECEX and EAC Ex certificated
-  CE and EAC conform

### Description

Core of the sensor is the single crystal PiezoStar measuring element, which has a temperature capability up to 1 000 °C and is not pyroelectric. The sensor is designed for maximum longevity.

To reach highest resolution in harsh environment, the sensor is internally case isolated featuring two-wire technology with differential signal output. The integrated, mineral insulated hardline cable is available with different terminations.

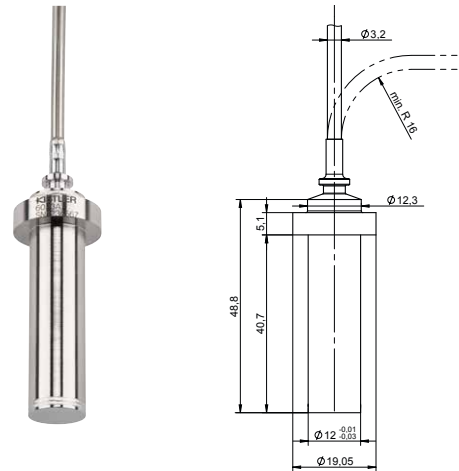
Ex-protection (ATEX/IECEX certification) allows for operation in potentially explosive environments.

### Application

Main applications are protection of equipment and condition monitoring of gas turbines. In addition, the sensor is used for the development of combustion chambers of gas turbines.

General purpose and thermoacoustics applications, which require

- Temperature capability up to 1 000 °C
- Measurements of smallest pressure fluctuations
- Ex approvals for use in potentially explosive environment
- EMI resistant measuring chains



### Technical data

Reference temperature for performance specifications is 25 °C unless otherwise noted.

#### Electric

Power		none
Output signal		charge
Signal mode		2-wire, differential
Signal conditioning		diff. charge amplifier
Insulation resistance pin – pin		
@ 25 °C	Ω	≥10 <sup>11</sup>
@ 400 °C	Ω	≥10 <sup>6</sup>
@ 700 °C	Ω	≥10 <sup>5</sup>
Insulation resistance pin – case		
@ 25 °C	Ω	≥10 <sup>10</sup>
@ 400 °C	Ω	≥10 <sup>6</sup>
@ 700 °C	Ω	≥10 <sup>5</sup>
Capacitance pin – pin	pF	≤20 + 60 pF/m cable length
Capacitance pin – case	pF	≤8 + 175 pF/m cable length

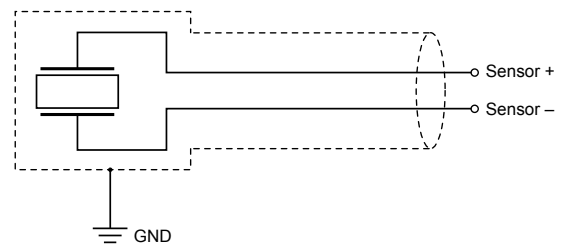


Fig. 1: Diagram, 2-wire, internally case isolated

**Technical data (continuation)**

**Operation**

Pressure measuring range	bar/psi	0 ... 100 / 0 ... 1 450
Calibrated partial range	bar/psi	0 ... 20 / 0 ... 145
Overload	bar/psi	200 / 2 900
Sensitivity (nom. ±10 %)	pC/bar	95
Thermal sensitivity shift		see Fig. 2
Linearity, hysteresis and repeatability	%FSO	≤1
Acceleration sensitivity, typical	mbar/g	≤0,4
Natural frequency, longitudinal	kHz	ca. 50
Frequency range		
upper range (+10 %)	Hz	ca. 20 000
lower range (–3 dB)	Hz	0,5 <sup>1)</sup>

<sup>1)</sup> in combination with differential charge amplifier Types 5181, 5183, 5185.

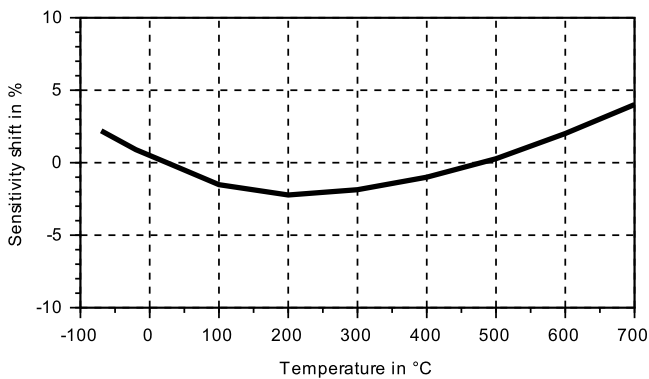


Fig. 2: Typical thermal sensitivity shift relative to room temperature

**Environment**

Termination		
LEMO PCA.0S.302	°C	–55 ... 180
7/16"-27 UNS-2A	°C	–55 ... 200
Open leads	°C	–55 ... 180
Corrosion		
see material		
Humidity		
Housing with integr. cable	hermetically sealed	
Connector	IP50	
Explosive Environment		
Explosion protection:		
Protection class		
Ex-nA	ATEX	⊕ II 3G Ex nA IIC T6...T710 Gc Baseefa15ATEX0232X <sup>2)</sup>
	IECEx	Ex nA IIC T6...T710 Gc IECEx BAS 15.0159X <sup>2)</sup>
	EAC Ex	2Ex nA IIC <<T6...710°C>> Gc X TC RU C-CH.MIO62.B.04701
Ex-ia	ATEX	⊕ II 1G Ex ia IIC T6...T710 Ga Baseefa15ATEX0231X <sup>2)</sup>
	IECEx	Ex ia IIC T6...T710 Ga IECEx BAS 15.0158X <sup>2)</sup>
	EAC Ex	0Ex ia IIC <<T6...710°C>> Ga X TC RU C-CH.MIO62.B.04701
Entity Parameter (intrinsic safety)		
Ui	V	≤30
Ii	mA	≤130
Pi	W	≤0,8
Ci	pF	≤15 + 170 pF/m
Li	μH	0

**Physical**

Weight sensor and cable	g	43 + 47 g/m cable length
Material		Nimonic alloy 90 INCONEL alloy 718
Cable jacket		INCONEL alloy 600
Wire		Nickel
Operating temperature range		
Continuous	°C	–55 ... 700
Extreme <sup>3)</sup>	°C	1 000 <sup>3)</sup>
Shock	g	<1 000

<sup>2)</sup> Special conditions for safe use are described in the instruction manual

<sup>3)</sup> For detailed information please contact the local Kistler sales office

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**Connector Types**

2 pin connector  
LEMO PCA.0S.302

2 pin connector  
7/16"-27 UNS-2A

2 pin  
open leads

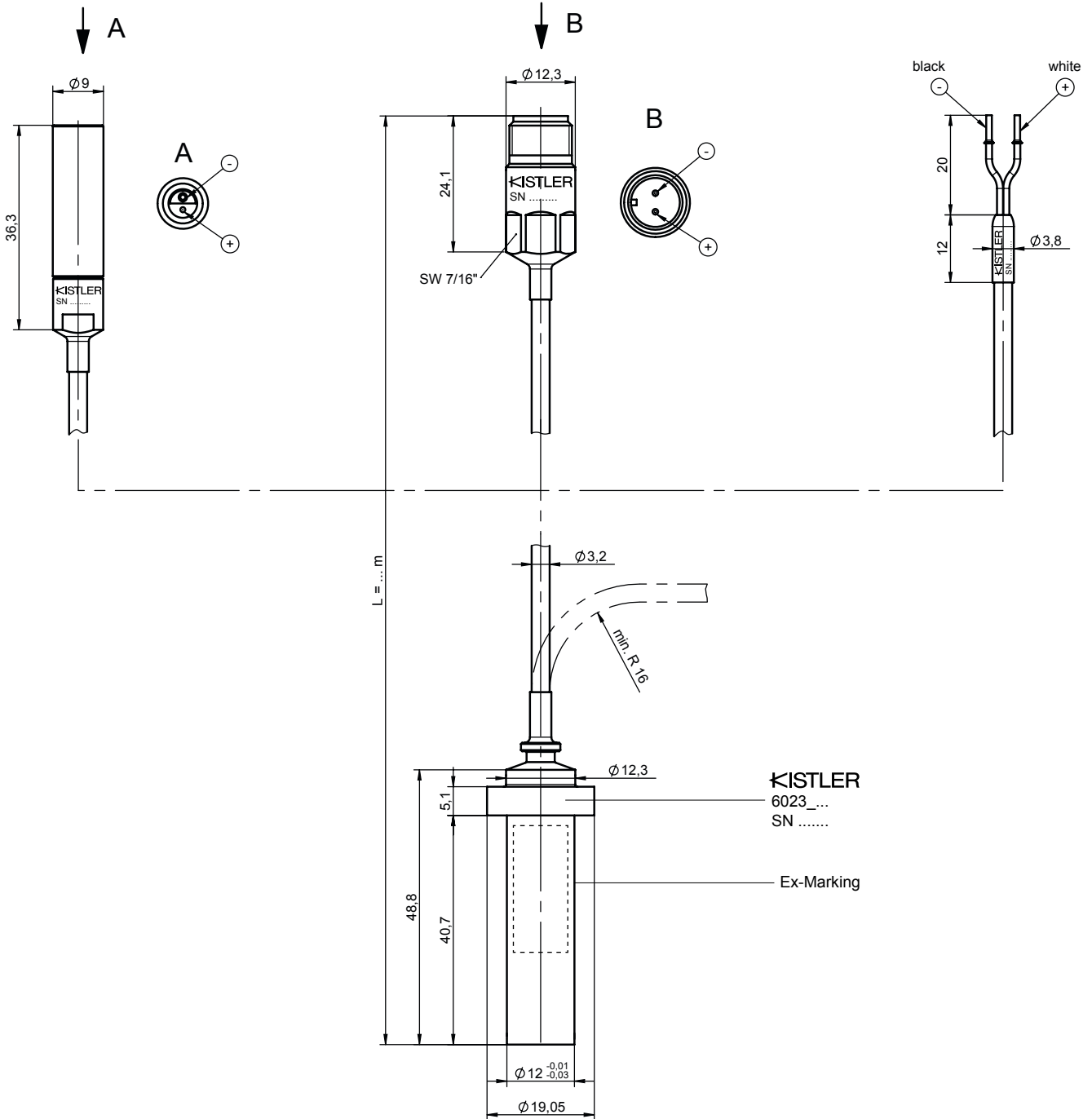


Fig. 3: Sensor dimensions Type 6023A... including cable terminations

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**Sensor mounting bore**

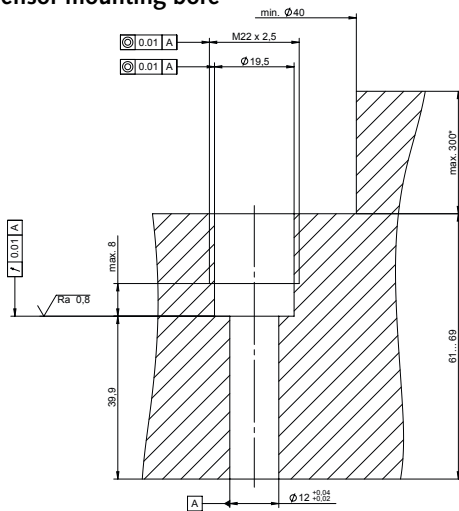


Fig. 4: Direct installation

**Sensor mounting**

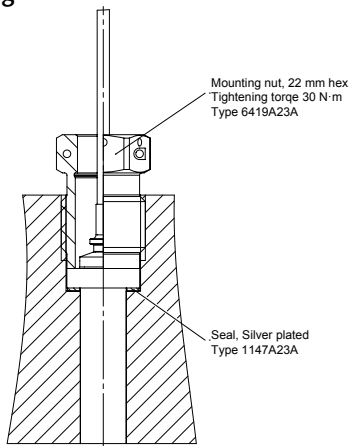


Fig. 5: Direct sensor installation

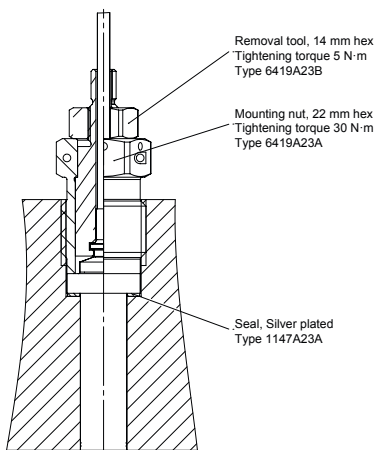


Fig. 6: Direct sensor installation with removal tool Type 6419A23B

**Accessories**

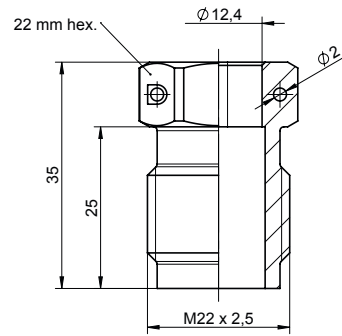


Fig. 7: Mounting nut M22x2,5, Type 6419A23A

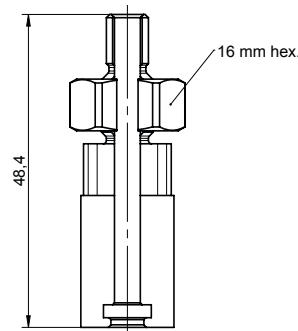


Fig. 8: Removal tool, Type 6419A23B to mounting nut

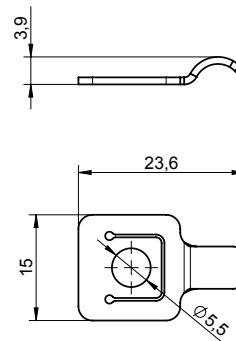


Fig. 9: Mounting bracket for hardline cable, Type 1423A1

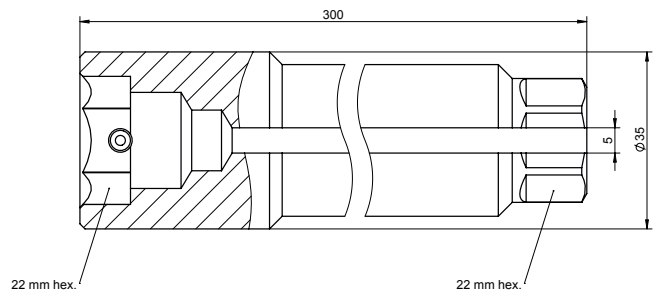


Fig. 10: Mounting tool slotted, Type 1251A23A

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**Included accessories**

- Mounting nut
- Sealing ring, silver plated (5 pieces)

**Optional accessories**

- Sealing ring, silver plated (5 pieces)
- Mounting nut
- Insertion/removal tool
- Mounting bracket for hardline cable
- Mounting tool, slotted
- High temperature thread paste
- Softline-cable
- Differential charge amplifier
  - Standard version
  - Ex-iA version
  - Ex-nA version

**Type/Mat. No.**

6419A23A  
1147A23A

**Type/Mat. No.**

1147A23A  
6419A23A  
6419A23B  
1423A1  
1251A23A  
1059  
1652A...

5181A  
5183A  
5185A

**Ordering key**

**Ex certification**

Not Ex certificated	–
ATEX (ia, nA)	E

**Cable termination**

LEMO 2 pole connector	A
7/16" 2 pole connector	B
Open leads	C

**Cable length**

1 m	01
2 m	02
5 m	05
Special cable length (0,5 ... 10 m)	sp

Type 6023A  B0

