


High temperature pressure sensor for gas turbine- and thermoacoustics applications

Type 6021A...

Differential, acceleration compensated, piezoelectric pressure sensor for operating temperatures up to 700 °C.

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

Description

Core of the sensor is the single crystal PiezoStar measuring element, which has a temperature capability of over 700 °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.

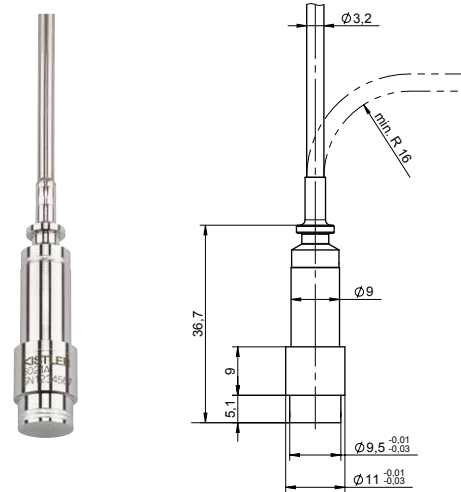
Ex-protection (ATEX/IECEX certification) allows operation in potentially explosive environments.

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 700 °C
- Measurements of smallest pressure fluctuations
- Ex approvals for use in potentially explosive environments
- 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 ¹¹
@ 400 °C	Ω	≥10 ⁶
@ 650 °C	Ω	≥10 ⁵
Insulation resistance pin – case		
@ 25 °C	Ω	≥10 ¹⁰
@ 400 °C	Ω	≥10 ⁶
@ 650 °C	Ω	≥10 ⁵
Capacitance pin – pin	pF	≤20 + 60 pF/m cable length
Capacitance pin – case	pF	≤8 + 175 pF/m cable length

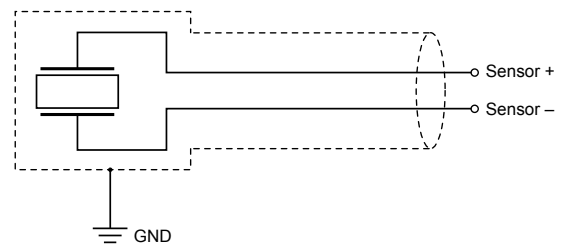


Fig. 1: Diagram, 2-wire, internally case isolated

Technical data (continuation)

Operation

Pressure measuring range	bar/psi	0 ... 100 / 0 ... 1 450
Calibrated partial range	bar/psi	0 ... 20 / 0 ... 290
Overload	bar/psi	200 / 2 900
Sensitivity (nom. ±10 %)	pC/bar	62
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 ¹⁾

¹⁾ In combination with differential charge amplifier Types 5181, 5183, 5185.

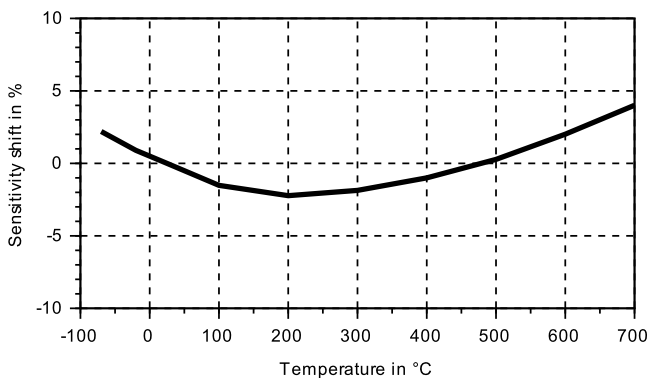


Fig. 2: Typical thermal sensitivity shift relative to room temperature

Environment

Operating temperature range		
Continuous	°C	–55 ... 650
Extreme (t < 100 h)	°C	700
Termination	°C	–55 ... 180
LEMO PCA.0S.302		
7/16"-27 UNS-2A	°C	–55 ... 200
Open leads		–55 ... 180
Shock	g	<1 000
Corrosion		see material
Humidity		
Housing with integr. cable		hermetically sealed
Connector		IP50

Explosive environment

Protection class		
Ex-nA	ATEX	⊕ II 3G Ex nA IIC T6...T710 Gc Baseefa15ATEX0232X ²⁾
	IECEx	Ex nA IIC T6...T710 Gc IECEx BAS 15.0159X ²⁾
	EAC Ex	2Ex nA IIC <<T6...710°C>> Gc X TC RU C-CH.MIO62.B.04701
Ex-ia	ATEX	⊕ II 3G Ex ia IIC T6...T710 Ga Baseefa15ATEX0231X ²⁾
	IECEx	Ex ia IIC T6...T710 Ga IECEx BAS 15.0158X ²⁾
	EAC Ex	0Ex ia IIC <<T6...710°C>> Ga X TC RU C-CH.MIO62.B.04701
Entity Parameter (intrinsic safety)		
U _i	V	≤30
I _i	mA	≤130
P _i	W	≤0,8
C _i	pF	≤15 + 170 pF/m
L _i	μH	0

Physical

Weight sensor and cable	g	14 + 47 g/m cable length
Material		Nimonic alloy 90 INCONEL alloy 718
Cable jacket		INCONEL alloy 600
Wire		Nickel

²⁾ Special conditions for safe use are described in the instruction manual

Nimonic is a registered trade mark of Special Metals Wiggins Ltd.

INCONEL alloy 718 und INCONEL alloy 600 are registered trade marks of INCO family of companies.

Connector Types

2 pole connector
LEMO PCA.0S.302

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

2 pole
open leads

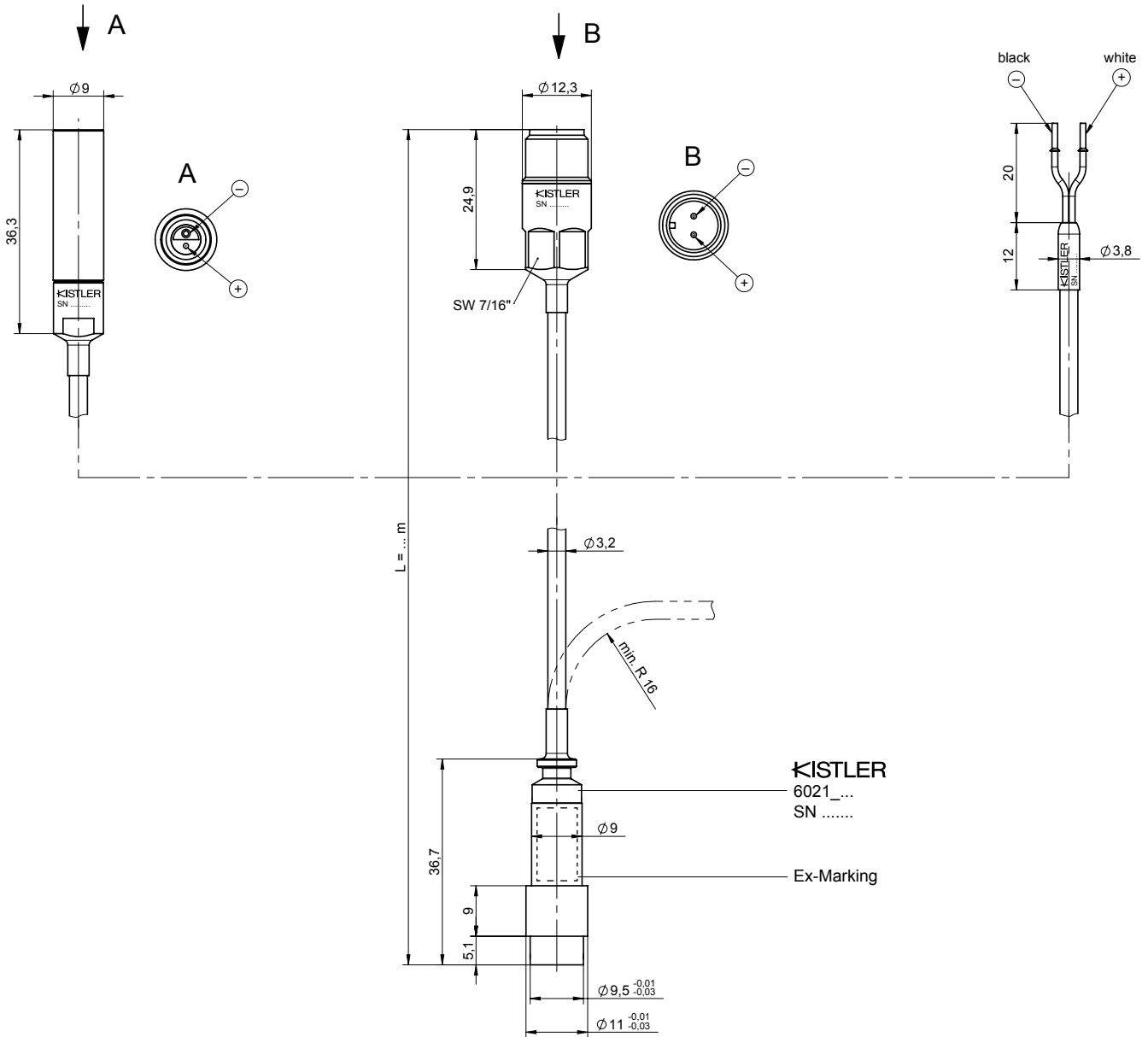


Fig. 3: Sensor dimensions Type 6021A... including cable terminations

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Sensor mounting bore

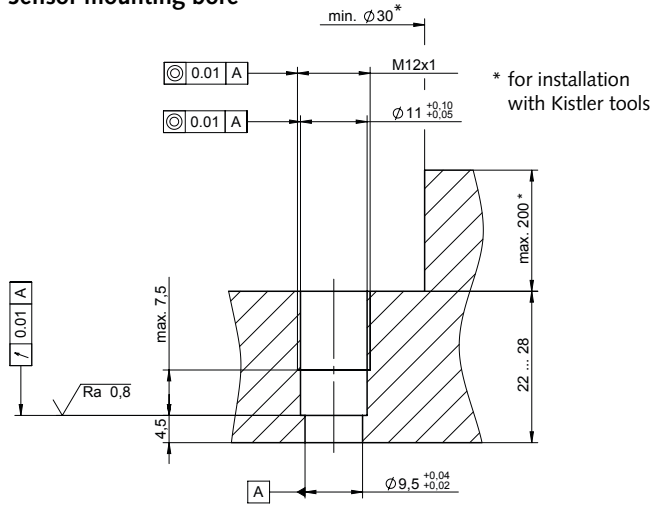


Fig. 4: Direct installation for Sensor with Lemo connector or open leads

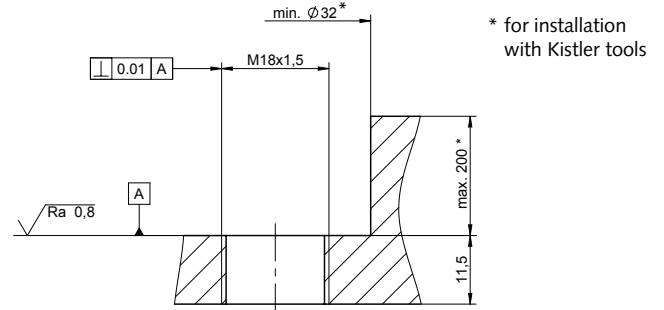


Fig. 5: Installation with adapter Type 6419A21C or Type 6419A21E

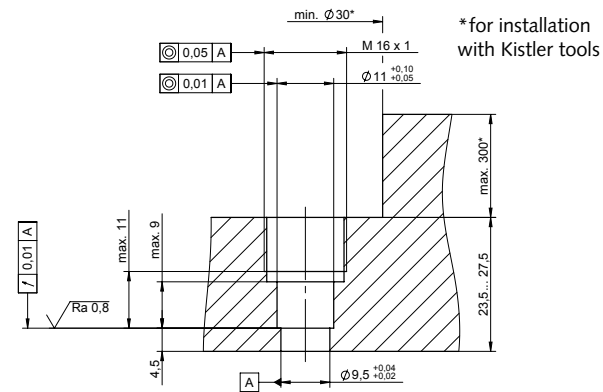


Fig. 6: Direct installation for Sensor with 7/16" connector

Sensor mounting

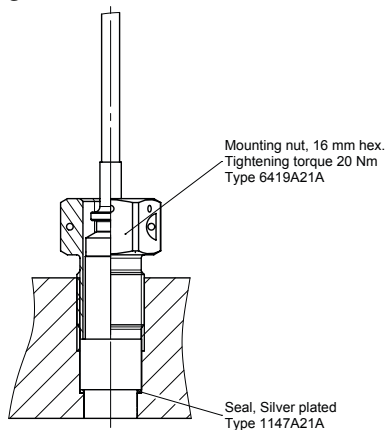


Fig. 7: Direct sensor installation for Sensor with Lemo connector or open leads

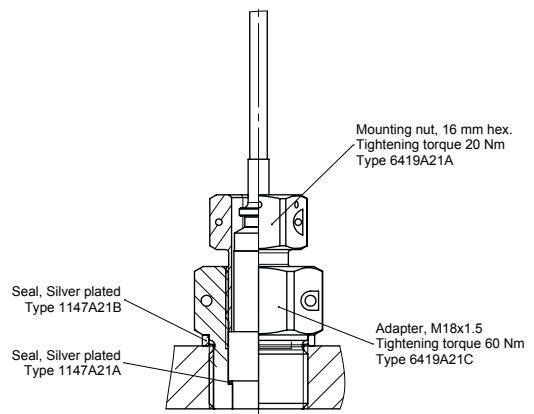


Fig. 8: Sensor installation with adapter Type 6419A21C for Sensor with Lemo connector or open leads

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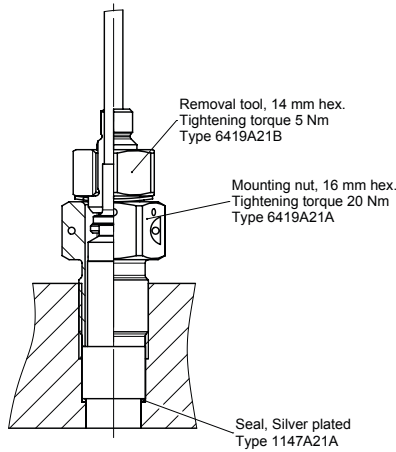


Fig. 9: Direct sensor installation with removal tool Type 6419A21B for Sensor with Lemo connector or open leads

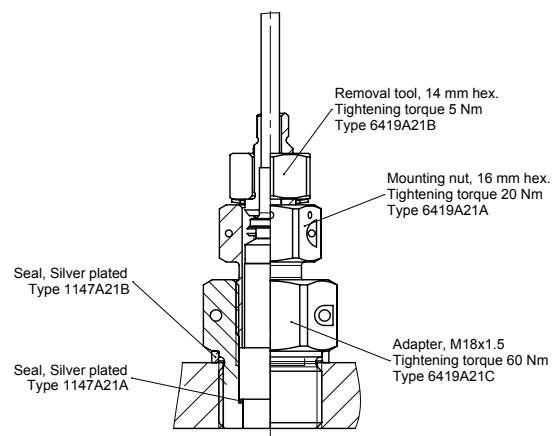


Fig. 10: Sensor installation with adapter Type 6419A21C and removal tool Type 6419A21B for Sensor with Lemo connector or open leads

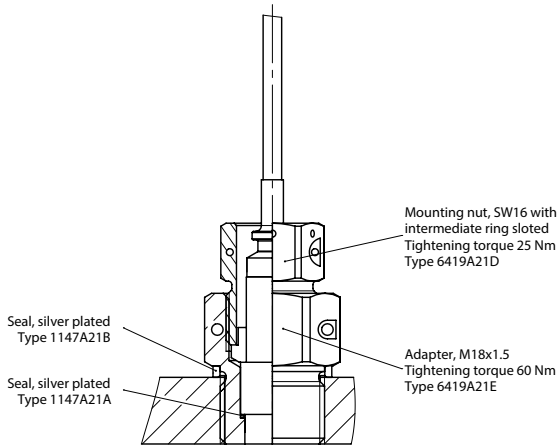


Fig. 11: Sensor installation with adapter Type 6419A21E for sensor with 7/16" connector

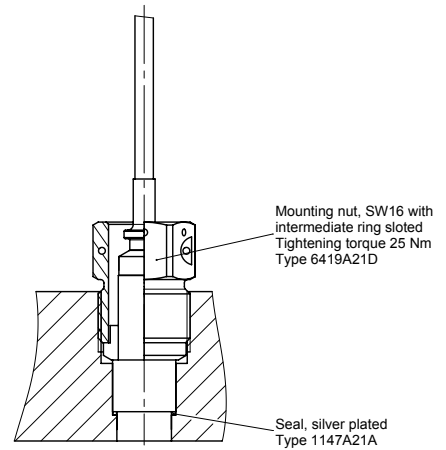


Fig. 12: Direct sensor installation for Sensor with 7/16" connector

Accessories

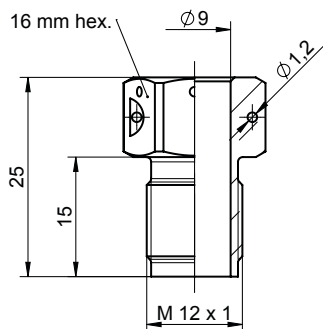


Fig. 13: Mounting nut M12x1, Type 6419A21A for sensor with Lemo connector and open leads

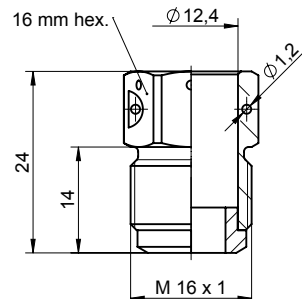


Fig. 14: Mounting nut M16x1, Type 6419A21D for Sensor with 7/16" connector

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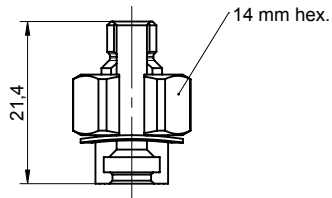


Fig. 15: Removal tool, Type 6419A21B on mounting nut Type 6419A21A

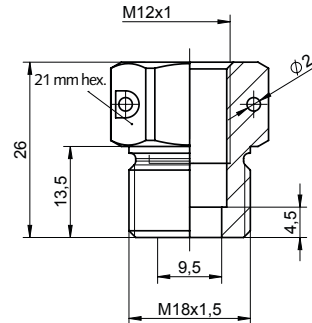


Fig. 16: Adapter M18x1,5, Type 6419A21C

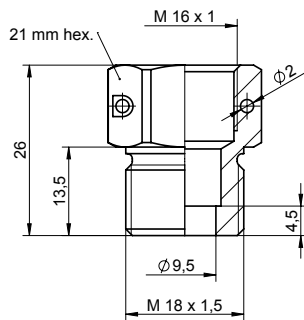


Fig. 17: Adapter M18x1,5, Type 6419A21E for sensor with 7/16" connector

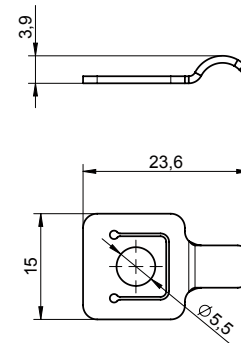


Fig. 18: Mounting bracket for hardline cable, Type 1423A1

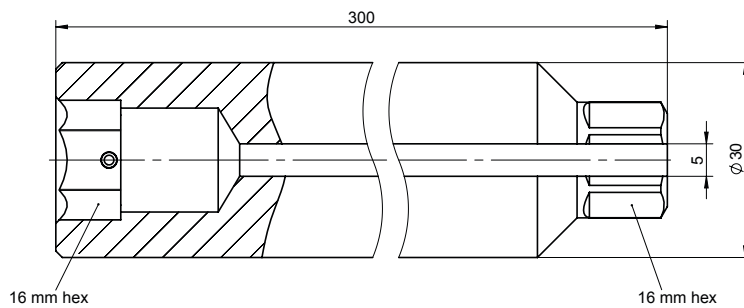


Fig. 19: Mounting tool, slotted, Type 1251A21A

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Included accessories

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

Optional accessories

- Sealing ring, silver plated (5 pieces)
- Sealing for intermediate adapter M18x1,5, silver plated
- Mounting nut
- Mounting nut
- Insertion/removal tool
- Adapter M18x1,5
- Adapter M18x1,5
- Mounting bracket for hardline cable
- Mounting tool, slotted
- High temperature thread paste
- Softline cable

Type/Mat. No.

6419A21A or
6419A21D
1147A21A

Type/Mat. No.

1147A21A
1147A21B

6419A21A
6419A21D
6419A21B
6419A21C
6419A21E
1423A1
1251A21A
1059
1652A...

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 6021A B0

