

Cylinder pressure sensor for close loop combustion control (CLCC)

Type 6635A1

Robust piezoelectric pressure for continuous cylinder pressure measurement of medium speed engines. This sensor is ready for new fuels including hydrogen.

- 350 bar
- 4 ... 20 mA signal output
- Signal and supply galvanically isolated
- Suitable for hydrogen combustion application
- Excellent life time and stability

Description

Sensor designed for continuous cylinder pressure measurement of medium speed engines. The new patented membrane and new joining technologies enable optimal reliability and life time performance. The piezoelectric-measuring element is extremely stable resulting in a very accurate and repeatable output signal over the whole life time.

Ex approval (ATEX/IECEx) allows operation in hazardous areas, Zone 2.

Application

Close loop combustion control (CLCC) of medium speed engines, e.g. knock detection, cylinder balancing and power calculation.

Technical data

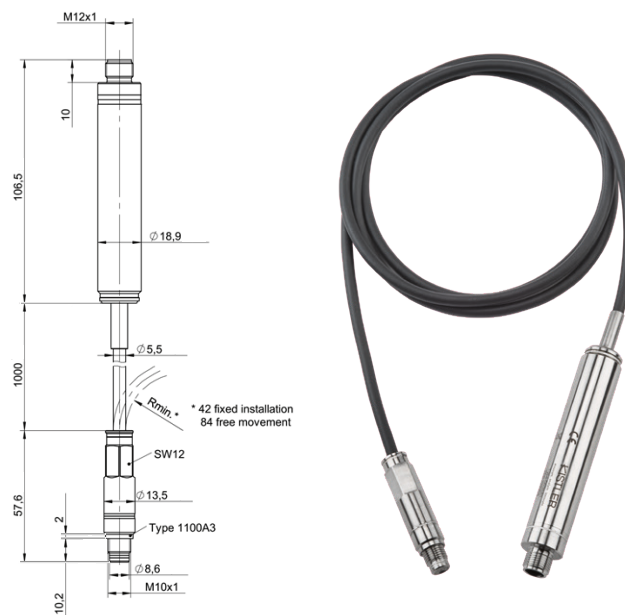
Measuring range	bar	0 ... 350
Overload	bar	500
Burst pressure	bar	>2 000
Linearity	% FSO	≤±0.5
Sensitivity shift 250 ± 100 °C	% FSO	≤±1.5
Thermal shock at 1500 rpm	bar	≤±0.5
Mounting torque of sensor	N·m	15

Operation temperature ranges

Sensing element	°C	–40 ... 350
Cable	°C	–40 ... 200
Charge amplifier	°C	–40 ... 120

Power supply & signal

Sensitivity calibrated at 250 °C	μA/bar	37.0
Signal span (FS)	mA	12.950
Zero line (stable temp. no dynamic pressure)	mA	6.5 ± 0.2
Signal range	mA	4 ... 20
Supply voltage	VDC	18 ... 32



Load resistor	Ω	200 ... 600
Cut off frequency (-3 dB)	Hz	≤0.016 / ≥10 000
Supply current	mA	<20
Max. voltage galvanic isolation	VDC	500
Isolation resistance galvanic isolation ¹⁾	MΩ	>10
Connector		M12x1 8 -pol
Weight	g	180
Degree of protection mated	EN 60529	IP67
CE approval	EMC	2014/30/EU
	ROHS	2011/65/EU
EMC Emission Standards		EN 61000-6-3:2007 + A1:2011
		EN 61000-6-4:2007 + A1:2011
		EN 61326-1:2013 (Class A equipment)
EMC Immunity Standards		EN 61000-6-1:2007
		EN 61000-6-2:2005
		EN 61326-1:2013 (Class A+B equipment)
Marine qualification	IACS	E10

1) Between signal output or power supply and sensor case or engine ground

Explosion protection

Type of protection:	ATEX	II 3G Ex nA IIC T3 Gc II 3G Ex ec IIC T3 Gc SEV 18 ATEX 0115 X ¹⁾
	IECEx	Ex nA IIC T3 Gc Ex ec IIC T3 Gc IECEx SEV 18.0002X ¹⁾

¹⁾ Specific conditions for safe use are described in the instruction manual

Mounting

For CLCC the sensor should be installed in the cylinder head close to the combustion chamber, the optimal length of the pressure bore between sensor and combustion chamber depends mainly on the engine speed, a too long bore may generate pipe oscillations disturbing the measuring signal.

Acoustic resonance frequency of mounting bore

Bore length l [mm]	Acoustic resonance [Hz]
5	39 290
10	19 630
15	13 080
20	9 800

Connector

With the excitation current limitation of < 50mA, wrong polarity protection is guaranteed, except when the Exct GND is not connected.

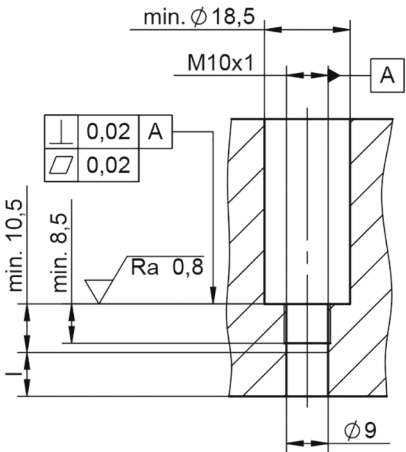


Fig. 1: Mounting bore shoulder sealed

- 1 Exct GND
- 2 don't connect
- 3 don't connect
- 4 don't connect
- 5 Signal output
- 6 don't connect
- 7 don't connect
- 8 + Exct (18 ... 32V)

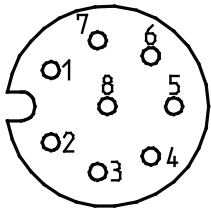


Fig. 2: Connector

Signal output

The integrated charge amplifier provides a current output signal in a range of 4 ... 20 mA. The sensor has a zero line of about 6.5 mA (at dynamic pressure 0 bar).

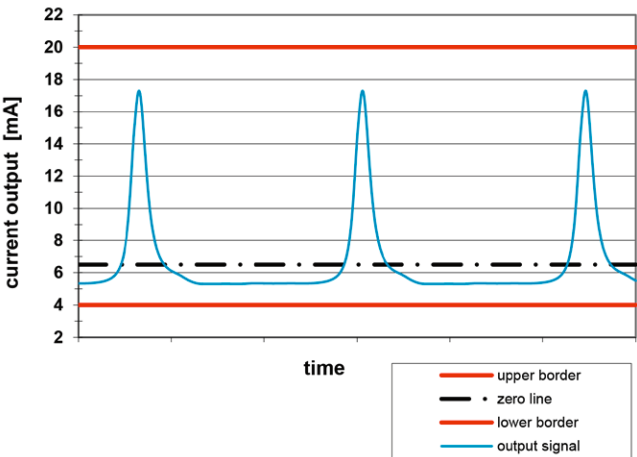
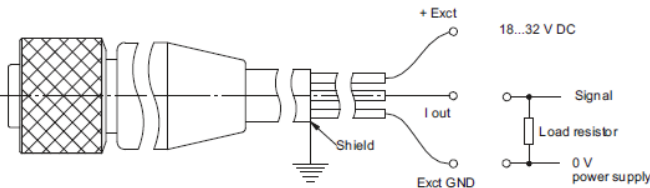


Fig. 3: Example of output signal from 4- stroke engine

Connecting to engine control unit or monitoring system with connecting cable Type 1700B69A ...



Important

Shield must be connected to the case/shield of the data acquisition system (or engine control unit).
Shield and Exct GND must not be connected!

Optional accessories

- Torque wrench 8 ... 40 Nm
- Fork wrench SW 12 for 1300A11
- Tubular socket
- Connecting cable

Zero-halogen cable, operating temperature range -15 °C ... 120 °C, flame retardant according to EN 60332-1-2, oil-resistant

Mat. No./Type

- 1300A11
- 1300A13
- 1300B6
- 1700B69A ...

Ordering key

Connecting cable

Zero-halogen cable L in m	1.5
	3
	10
	15
	20
	30

Type 1700B69A

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