MEGGiTT
smart engineering for
extreme environments

Piezoelectric pressure transducer

CP 211

FEATURES

- From the Vibro-Meter® product line
- Extreme temperature capability:
  –196 to 777 °C
- High-pressure capability:
  up to 350 bar
- Pressure sensitivity:
  25 pC/bar
- Frequency range:
  2 Hz to 15 kHz
- Operational in primary circuit of PWR, BWR, FBR and HTGR
- Meets NRC guide 1.20, IEEE 323-1974
- VC2 type crystal element and internal case insulation
- Certified for use in potentially explosive atmospheres

CP 211

APPLICATIONS

- Dynamic pressure monitoring over a very wide temperature range, requiring very high reliability

DESCRIPTION

The use of VC2 type single crystal material in the CP 211 compression-mode dynamic pressure transducer produces an extremely stable and reliable device, even at extreme temperatures.

The CP 211 is designed for long-term monitoring or development testing over very wide temperature ranges in extreme environments, such as gas turbines.

The transducer is fitted with an integral mineral insulated cable (twin conductors) that can be terminated with either a LEMO connector or a high-temperature connector developed by Vibro-Meter. Cable assemblies are available to connect the transducer to an IPC 704 signal conditioner.

SPECIFICATIONS

General

Input power requirements	: None
Signal transmission	: 2-pole system insulated from casing, charge output
Signal processing	: Charge converter

Operating

(at 23°C ±5°C, 73°F ±9°F)

Sensitivity (typical, at 2 Hz)	: 25 pC/bar (1.72 pC / psi)
Sensitivity deviation	: See Typical response curves on page 3
Dynamic measuring range (random)	: 0.0005 bar to 250 bar (0.007 psi to 3626 psi)
Overload capacity (spikes)	: Up to 350 bar (5076 psi) (static + dynamic components)
Linearity	: < ±1% over dynamic measuring range
Acceleration sensitivity	: ≤ 0.0625 pC/g (0.0025 bar/g, 0.036 psi/g)
Resonant frequency	: > 80 kHz
Frequency response	: 2 to 15000 Hz ±5%. The lower cutoff frequency is determined by the electronics used.
Capacitance (nominal)	
• *Pole to pole*	: 17.5 pF for transducer + 200 pF/m of cable
• *Pole to casing*	: 10.0 pF for transducer + 300 pF/m of cable
Internal insulation resistance	: > 10^9 Ω. > 10^7 Ω at 300°C (572°F)

Environmental

Transducer temperature range	
• *Continuous*	: –54 to 650°C (–65 to 1202°F)
• *Extreme applications*	: –196 to 777°C (–321 to 1431°F). See Typical response curves on page 3.
Connector temperature range	
• *Vibro-Meter high-temperature connector*	: −70 to +650°C (−94 to +1202°F)
• *LEMO connector*	: −55 to +155°C (−67 to +311°F)
Shock acceleration	: < 2000 g peak (half sine, 1 ms duration) along sensitive axis
Corrosion, humidity	: NIMONIC® alloy 90, hermetically welded. (INCONEL® alloy 600 for the cable.)
Radiation	
• *Gamma flux*	: 10^{11} erg/g no effect
• *Neutron flux*	: 10^{18} n/cm^2 no effect

SPECIFICATIONS *(continued)*

Explosive atmospheres

Available in Ex approved versions for use in hazardous locations

Type of protection Ex i: intrinsic safety		
Europe	EC type examination certificate	LCIE 02 ATEX 6106 X II 2 G (Zones 1, 2) Ex ib IIC T6 … 790°C Gb

⚠ **For specific parameters of the mode of protection concerned and special conditions for safe use, please refer to the Ex certificates that are available from Meggitt SA on demand.**

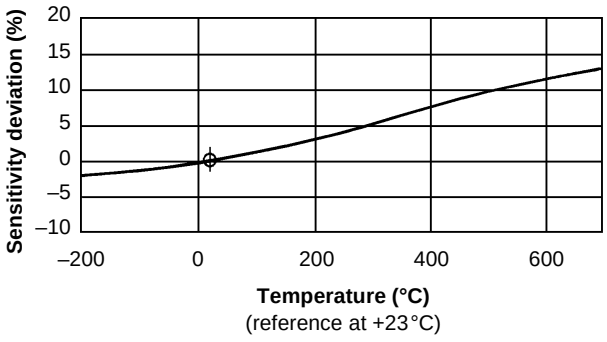
Calibration

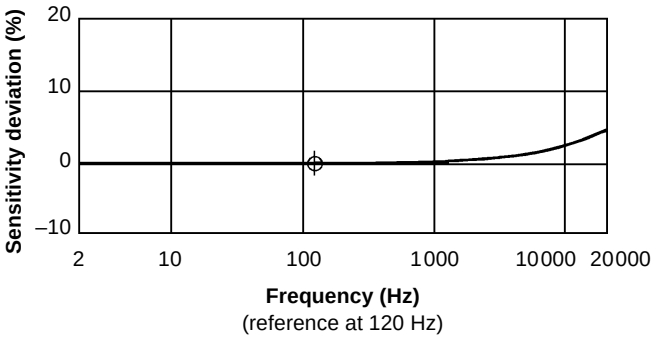
Dynamic calibration at factory at 1 bar peak and 2 Hz (+23°C). No subsequent calibration necessary.

Mechanical

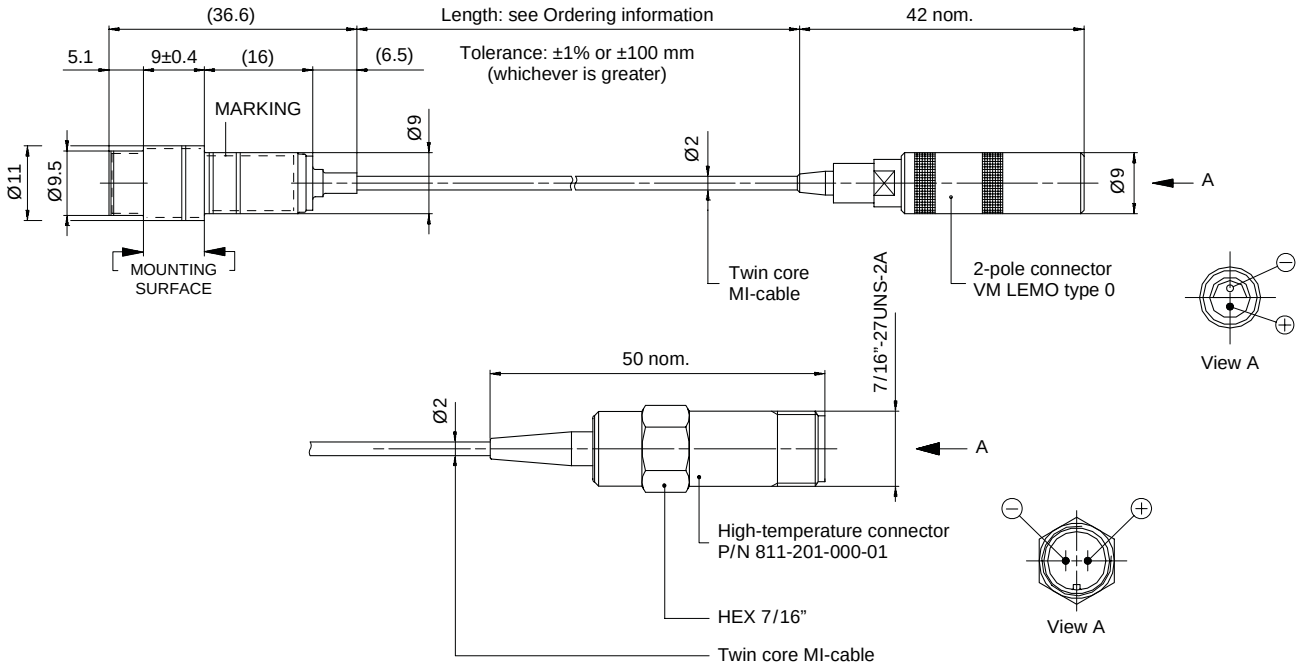
Dimensions	: See Mechanical drawings on page 4
Weight	
• *Transducer*	: 12 g
• *Cable*	: 20 g/m
Cable	: Mineral insulated (MI) cable, two conductors
Connector	: LEMO or Vibro-Meter high temperature
Mounting	: See the mounting adaptors in Accessories on page 5 and refer to the *CP xxx piezoelectric pressure transducers* installation manual

TYPICAL RESPONSE CURVES





MECHANICAL DRAWINGS



Note: All dimensions in mm unless otherwise stated.

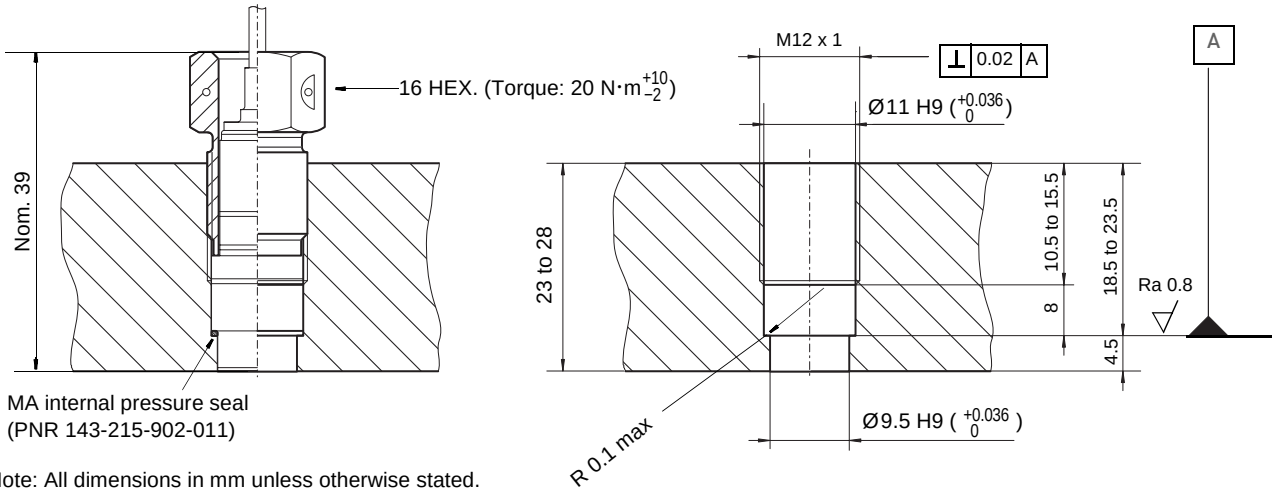
ORDERING INFORMATION

To order please specify

Type	Designation	Cable length	Ordering number
CP 211	Piezoelectric pressure transducer with LEMO connector	Defined when ordering	143-211-000-01x
		0.5 m	143-211-000-02x
		1 m	143-211-000-03x
		2 m	143-211-000-04x
		3 m	143-211-000-05x
		5 m	143-211-000-06x
		40 m	143-211-000-07x
		10 m	143-211-000-08x
CP 211	Piezoelectric pressure transducer with Vibro-Meter high-temperature connector	Defined when ordering	143-211-000-11x
		0.5 m	143-211-000-12x
		1 m	143-211-000-13x
		2 m	143-211-000-14x
		3 m	143-211-000-15x
		5 m	143-211-000-16x
		10 m	143-211-000-17x

ACCESSORIES

MA 104 mounting adaptor for CP 211 with LEMO connector



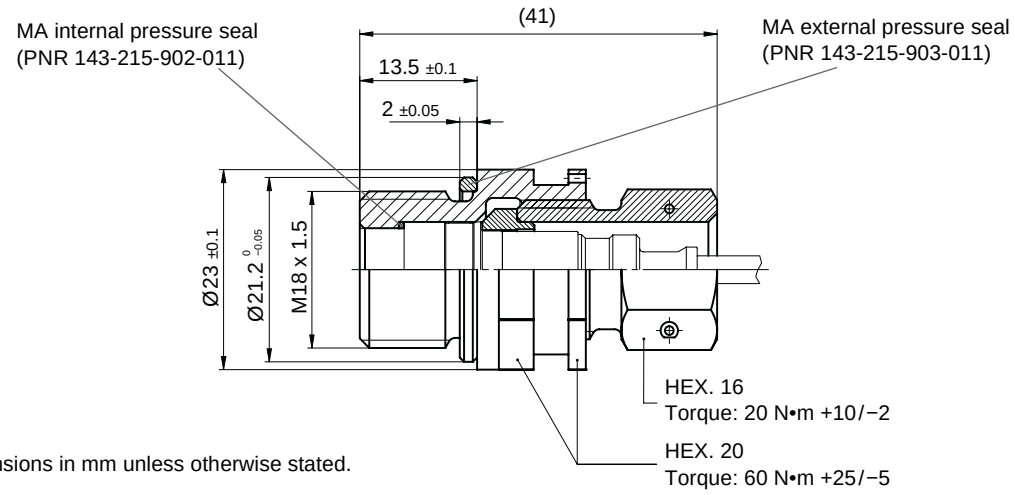
Note: All dimensions in mm unless otherwise stated.

Ordering information

Type	Designation	Ordering number
MA 104	Mounting adaptor Note: The MA 104 mounting adaptor does not include the MA seal below.	809-104-000-011
MA seal	MA internal pressure seal	143-215-902-011

ACCESSORIES *(continued)*

MA 126 mounting adaptor for CP 211 with Vibro-Meter high-temperature connector



Note: All dimensions in mm unless otherwise stated.

Ordering information

Type	Designation	Ordering number
MA 126	Mounting adaptor	809-126-000-511
	Note: The MA 126 mounting adaptor includes the MA seals below.	
MA seal	MA internal pressure seal	143-215-902-011
MA seal	MA external pressure seal	143-215-903-011

Cable assemblies

EC 153	Refer to the data sheet
EC 222	Refer to the data sheet
EC 119	Refer to the data sheet

Signal conditioner

IPC 704	Refer to the data sheet

Galvanic separation

GSI 127	Refer to the data sheet

Headquartered in the UK, Meggitt PLC is a global engineering group specializing in extreme environment components and smart sub-systems for aerospace, defence and energy markets.

Meggitt Sensing Systems is the operating division of Meggitt specializing in sensing and monitoring systems, which has operated through its antecedents since 1927 under the names of ECET, Endevco, Ferroperm Piezoceramics, Lodge Ignition, Sensorex, Vibro-Meter and Wilcoxon Research. Today, these operations are integrated under one strategic business unit called Meggitt Sensing Systems, headquartered in Switzerland and providing complete systems, using these renowned brands, from a single supply base.

The Meggitt Sensing Systems facility in Fribourg, Switzerland was formerly known as Vibro-Meter SA, but is now Meggitt SA. This site produces a wide range of vibration and dynamic pressure sensors capable of operation in extreme environments, leading-edge microwave sensors, electronics monitoring systems and innovative software for aerospace and land-based turbo-machinery.

In this publication, a dot (.) is used as the decimal separator and thousands are separated by thin spaces. Example: 12345.67890.

Sales offices

Meggitt Sensing Systems has offices in more than 30 countries. For a complete list, please visit our website.

ISO 9001
FS 584089

ISO 14001
BUREAU VERITAS
Certification

Your local agent

Head office

Meggitt SA
Route de Moncor 4
PO Box 1616
CH - 1701 Fribourg
Switzerland

Tel: +41 26 407 11 11
Fax: +41 26 407 13 01

www.meggittsensingsystems.com
www.vibro-meter.com