MEGGiTT
smart engineering for
extreme environments

Piezoelectric pressure transducer

CP211

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

CP211

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 CP211 compression-mode dynamic pressure transducer produces an extremely stable and reliable device, even at extreme temperatures.

The CP211 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 (MI) cable with twin conductors that is terminated with either a LEMO connector or a Vibro-Meter high-temperature connector. Cable assemblies are available to connect the transducer to an IPC704 signal conditioner.

SPECIFICATIONS

General

Input power requirements	: None
Signal transmission	: 2-pole system insulated from casing, charge output
Signal processing	: Charge converter (IPC704 signal conditioner)

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 4**
Dynamic measurement 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 measurement 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 (61 pF/ft) of cable
• *Pole to casing*	: 10.0 pF for transducer + 300 pF/m (91 pF/m) of cable
Internal insulation resistance	: > 10^9 Ω. > 10^7 Ω at 300°C (572°F)

Environmental

Transducer temperature range	
• *Continuous operation*	: –54 to 650°C (–65 to 1202°F)
• *Extreme applications*	: –196 to 777°C (–321 to 1431°F). See **Typical response curves on page 4**.
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)*

Potentially explosive atmospheres

Available in Ex approved versions for use in hazardous areas

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
Korea	KGS certificate of conformity*	KGS 17-GA4BO-0552X Ex ib IIC T6 to T790°C
Russian Federation	TR CU certificate of conformity*	TC RU C-CH.МШ06.B.00134 1Ex ib IIC T6…790°C Gb

* Not engraved on the product marking.

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

⚠ **For the most recent information on the Ex certifications that are applicable to this product, refer to the *Ex product register* (*PL-1511*) that is available from Meggitt SA.**

Approvals

Conformity	: CE marking, European Union (EU) declaration of conformity. EAC marking, Eurasian Customs Union (EACU) certificate/declaration of conformity.
Electromagnetic compatibility	: EN 61000-6-2:2005. EN 61000-6-4:2007 + A1:2011. TR CU 020/2011.
Electrical safety	: EN 61010-1:2010
Environmental management	: RoHS compliant (2011/65/EU)
Hazardous areas	: Ex (see **Potentially explosive atmospheres on page 3**)
Russian federal agency for technical regulation and metrology (Rosstandart)	: Pattern approval certificate CH.C.30.001.A N° 60183, dated 30.10.2015

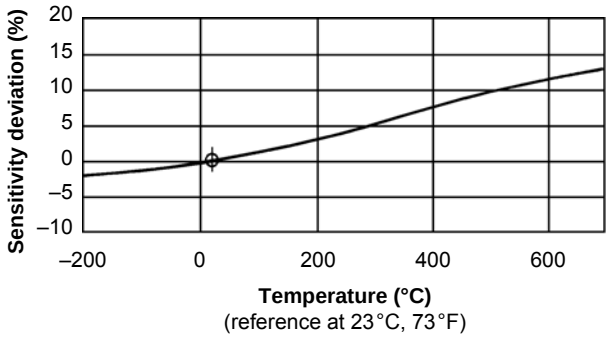
Calibration

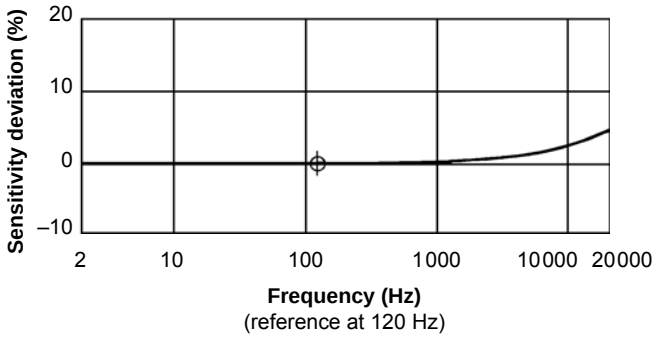
Dynamic calibration at factory at 1 bar peak and 2 Hz (23°C, 73°F). No subsequent calibration necessary.

Mechanical

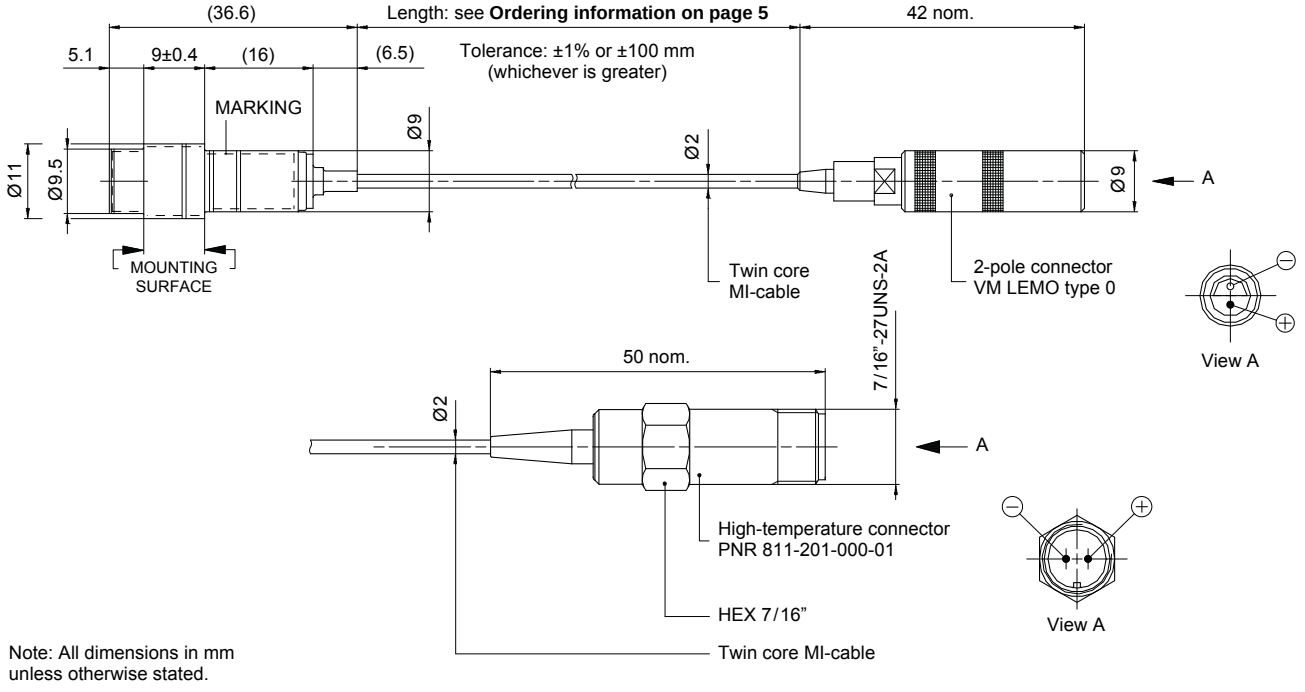
Dimensions	: See **Mechanical drawings on page 4**
Weight	
• *Transducer*	: 12 g (0.4 oz) approx.
• *Cable*	: 20 g/m (0.2 oz/ft) approx.
Cable	: Mineral-insulated (MI) cable, two conductors
Connection	: LEMO connector or Vibro-Meter high-temperature connector
Mounting	: See the mounting adaptors in **Accessories on page 5**. Refer also to the *CPxxx dynamic pressure sensors (piezoelectric pressure transducers)* installation manual.

TYPICAL RESPONSE CURVES





MECHANICAL DRAWINGS



Note: All dimensions in mm
unless otherwise stated.

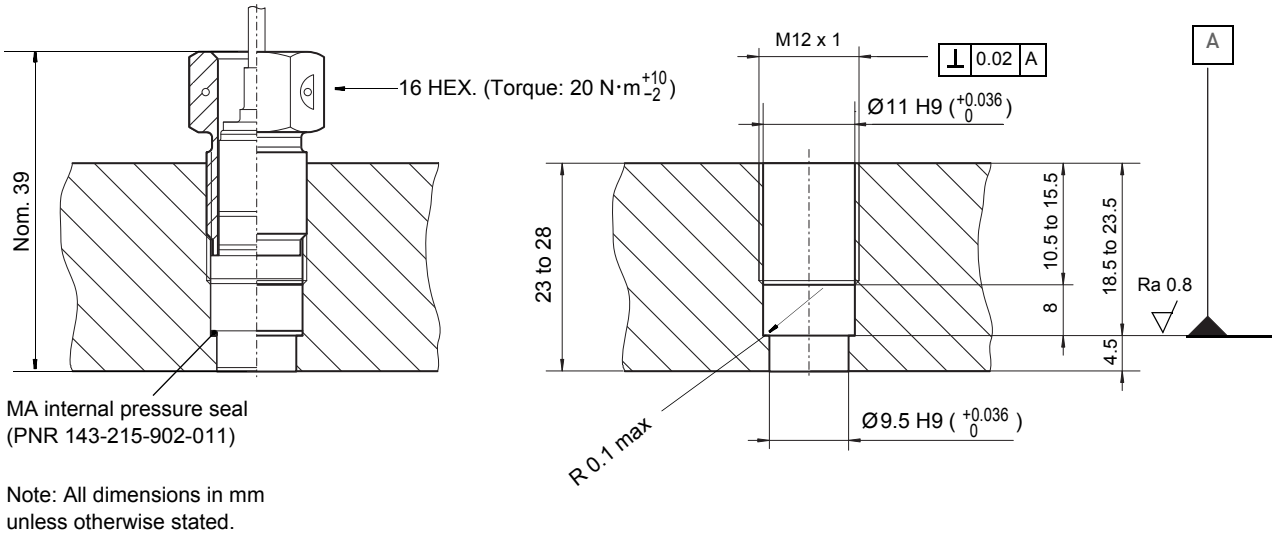
ORDERING INFORMATION

To order please specify

Type	Designation	Cable length	Ordering number
CP211	Piezoelectric pressure transducer with LEMO connector	Defined when ordering	143-211-000-012
		0.5 m	143-211-000-022
		1 m	143-211-000-032
		2 m	143-211-000-042
		3 m	143-211-000-052
		5 m	143-211-000-062
		40 m	143-211-000-072
		10 m	143-211-000-082
CP211	Piezoelectric pressure transducer with Vibro-Meter high-temperature connector	Defined when ordering	143-211-000-112
		0.5 m	143-211-000-122
		1 m	143-211-000-132
		2 m	143-211-000-142
		3 m	143-211-000-152
		5 m	143-211-000-162
		10 m	143-211-000-172

ACCESSORIES

MA104 mounting adaptor for CP211 with LEMO connector



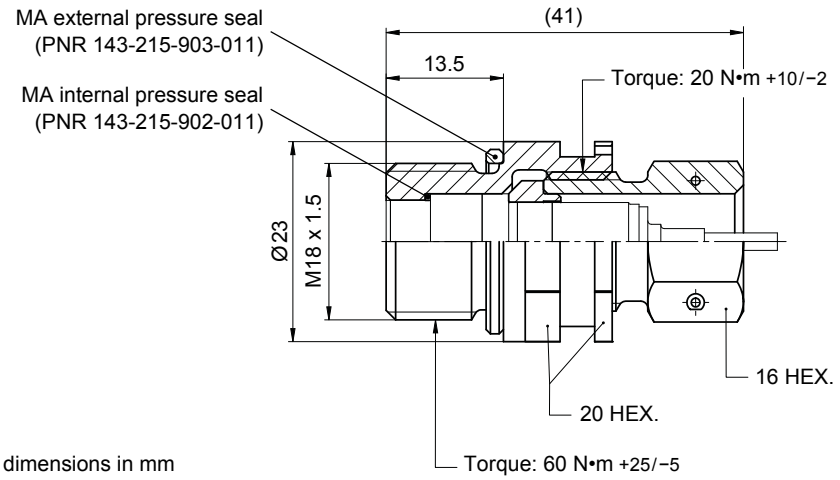
Note: All dimensions in mm
unless otherwise stated.

Ordering information

Type	Designation	Ordering number
MA104	Mounting adaptor	809-104-000-011
	Note: The MA104 mounting adaptor does not include the MA seal below.	
MA seal	MA internal pressure seal	143-215-902-011

ACCESSORIES *(continued)*

MA126 mounting adaptor for CP211 with Vibro-Meter high-temperature connector



Note: All dimensions in mm
unless otherwise stated.

Ordering information

Type	Designation	Ordering number
MA126	Mounting adaptor	809-126-000-011
	Note: The MA126 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

EC153	Refer to the data sheet
EC222	Refer to the data sheet
EC119	Refer to the data sheet

Signal conditioner

IPC704	Refer to the data sheet

Galvanic separation unit

GSI127	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 and Vibro-Meter. 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.

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

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