

vibro-meter®

CP751 dynamic pressure sensor



CP751



CP751 with cable protection



KEY FEATURES AND BENEFITS

- From the vibro-meter® product line
- Operating temperature range: -40 to 700°C
- Pressure sensitivity: >120 pC/bar
- High-pressure capability: up to 350 bar
- Frequency response: 2 to 10000 Hz
- Ex certified for use in hazardous areas (potentially explosive atmospheres)
- Single-crystal piezoelectric material
- Integral mineral-insulated (MI) cable
- Versions with additional cable protection

APPLICATIONS

- Dynamic pressure monitoring over a very wide temperature range, requiring very high reliability
- Hazardous areas (potentially explosive atmospheres) and/or harsh industrial environments

DESCRIPTION

The CP751 is a dynamic pressure sensor (piezoelectric pressure sensor) from Parker Meggitt's vibro-meter® product line.

The CP751 sensor measures dynamic pressure via a metal membrane on the sensing element, which features single-crystal piezoelectric material in a compression-mode design and internal case insulation, housed in a special high-temperature alloy case.

The CP751 uses single-crystal material and a special acceleration-compensated design in order to produce an extremely stable and reliable device, even at extreme temperatures (up to 700°C).

The CP751 dynamic pressure sensor is fitted with an integral mineral-insulated (MI) cable that is hermetically attached to the sensor and connector in order to produce a sealed assembly. The MI cable uses twin conductors and is terminated with either a vibro-meter® high-temperature or LEMO type 0 connector. Versions of the sensor with additional cable protection (a stainless-steel double overbraid) are also available.



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DESCRIPTION (continued)

A range of compatible cable assemblies are available to connect the sensor to a monitoring system, such as a VM600^{Mk2}/VM600 or VibroSmart[®] system, via the required IPC707 signal conditioner.

The CP751 dynamic pressure sensor is designed for long-term monitoring or development testing over very wide temperature ranges in extreme environments, such as gas turbines. Accordingly, all versions of the CP751 sensor are Ex certified for installation in hazardous areas (potentially explosive atmospheres).

As the CP751 sensor head has the same reduced dimensions as the CP21x sensors, it can easily be used as a replacement for these devices as well as other larger dynamic pressure sensors. This is enabled by a range of specific mounting adaptors and seals that are available for use with different pressure measurement apertures.

For specific applications, contact your local Parker Meggitt representative.

SPECIFICATIONS

General

Input power requirements	: None
Signal transmission	: 2-pin system, insulated from case, charge output
Signal processing	: IPC707 signal conditioner (charge converter)

Operating

(At 23°C ±5°C, 73°F ±9°F)

Sensitivity (typical, at 2 Hz)	: >120 pC/bar (8.3 pC/psi). 137 pC/bar (9.4 pC/psi) nominal ±10%.
Sensitivity deviation	: -2 to 12% over operating temperature range (-40 to 700°C). See also Typical response curve on page 5 .
Dynamic measurement range (random)	: 0.0005 to 50 bar _{peak} (0.0073 to 725.2 psi _{peak}). Note: The dynamic measurement range is largely determined by the IPC707 signal conditioner used.
Overload capacity (spikes)	: Up to 350 bar (5076 psi) (static + dynamic components)
Linearity	: ±1% over dynamic measurement range
Acceleration sensitivity	: ≤0.002 bar/g (0.0029 psi/g) in axial direction (at 120 Hz). ≤0.003 bar/g (0.0044 psi/g) in all directions (from 10 Hz to 10 kHz).
Resonant frequency	: >50 kHz. 70 kHz nom.
Frequency response	: 2 to 10000 Hz ±5%. Note: The lower cutoff frequency is determined by the IPC707 signal conditioner used.
Thermal transients	: ≤0.1 bar (1.45 psi) signal perturbation (for example, due to pulse noise)
Capacitance (nominal)	
• Pin to pin	: 60 pF for sensor + 200 pF/m (61 pF/ft) of cable
• Pin to casing	: 7 pF for sensor + 300 pF/m (91 pF/m) of cable

SPECIFICATIONS *(continued)*

Internal insulation resistance (pin to ground)	: $\geq 10^9 \Omega$ at 23°C (73°F). $\geq 10^8 \Omega$ at 300°C (572°F). $\geq 10^6 \Omega$ at 700°C (1292°F).
Internal resistance (pin to pin)	: $\geq 10^9 \Omega$ at 23°C (73°F). $\geq 10^7 \Omega$ at 300°C (572°F). $\geq 5 \times 10^4 \Omega$ at 700°C (1292°F).


Environmental


Sensor temperature range	: -40 to 700°C (-40 to 1292°F). See Typical response curve on page 5.
Connector temperatures	
• vibro-meter [®] high-temperature connector	: 650°C (1202°F) max.
• vibro-meter [®] LEMO type 0 connector	: 120°C (248°F) max.
Shock acceleration	: < 1000 g _{peak} (half sine impulse, 1 ms duration) along sensitive axis
Corrosion	
• Sensor housing	: Special high-temperature nickel alloys
• MI cable sheath	: Special high-temperature nickel alloy
• MI cable protection (overbraid)	: Stainless steel AISI 304 (DIN 1.4301)
Construction	: Hermetically welded seals. Note: Helium leak tested to 10^{-9} mbar·l/s.
Humidity	: 100% humidity has no influence
Hydrogen	: Hydrogen atmosphere has no influence

SPECIFICATIONS (continued)

Potentially explosive atmospheres

Available in Ex approved versions for use in hazardous areas

Type of protection Ex ia: intrinsic safety		
Europe	EU type examination certificate	 II 1 G (Zones 0, 1, 2) Ex ia IIC T6... 714°C Ga LCIE 17 ATEX 3003 X
International	IECEX certificate of conformity	Ex ia IIC T6... 714°C Ga IECEX LCIE 16.0054X
North America	cCSAus certificate of compliance	Class I, Division 1, Groups A, B, C, D Ex ia IIC T6... 714°C Ga Class I, Zone 0 AEx ia IIC T6... 714°C Ga cCSAus 70124133
Russian Federation	EAЭC RU certificate of conformity*	0Ex ia IIC T6... 714°C Ga X EAЭC RU C-CH.АД07.В.03025/21

Type of protection Ex nA: non-sparking		
Europe	Type examination certificate	 II 3 G (Zone 2) Ex nA IIC T6... 714°C Gc LCIE 17 ATEX 1004 X
International	IECEX certificate of conformity	Ex nA IIC T6... 714°C Gc IECEX LCIE 16.0054X
North America	cCSAus certificate of compliance	Class I, Division 2, Groups A, B, C, D Ex nA IIC T6... 714°C Gc Class I, Zone 2 AEx nA IIC T6... 714°C Gc cCSAus 70124133
Russian Federation	EAЭC RU certificate of conformity*	2Ex nA IIC T6... 714°C Gc X EAЭC RU C-CH.АД07.В.03025/21

* Not engraved/marked on all products.

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

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

SPECIFICATIONS *(continued)*

Approvals

Conformity	: European Union (EU) declaration of conformity (CE marking). EAC marking, Eurasian Customs Union (EACU) certificate/declaration of conformity.
Electromagnetic compatibility	: EMC compliant (2014/30/EU): EN 61000-6-2:2005. EN 61000-6-4:2007 + A1:2011.
Electrical safety	: EN 61010-1:2010
Environmental management	: RoHS compliant (2011/65/EU)
Hazardous areas	: Ex approved (see Potentially explosive atmospheres on page 4)

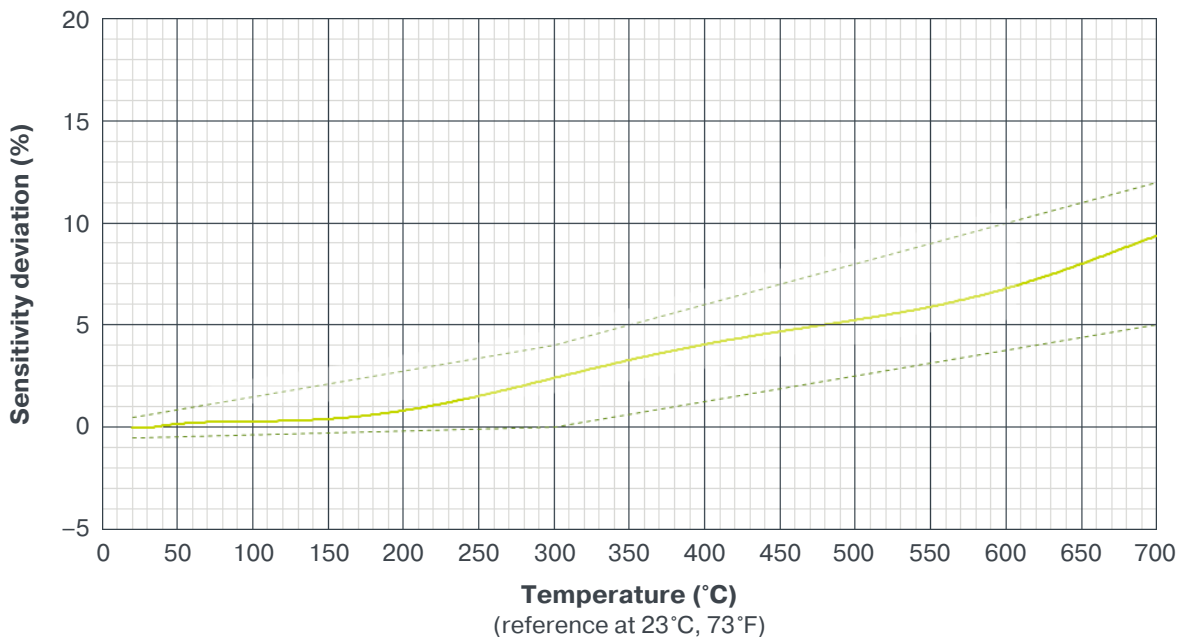
Calibration

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

Mechanical

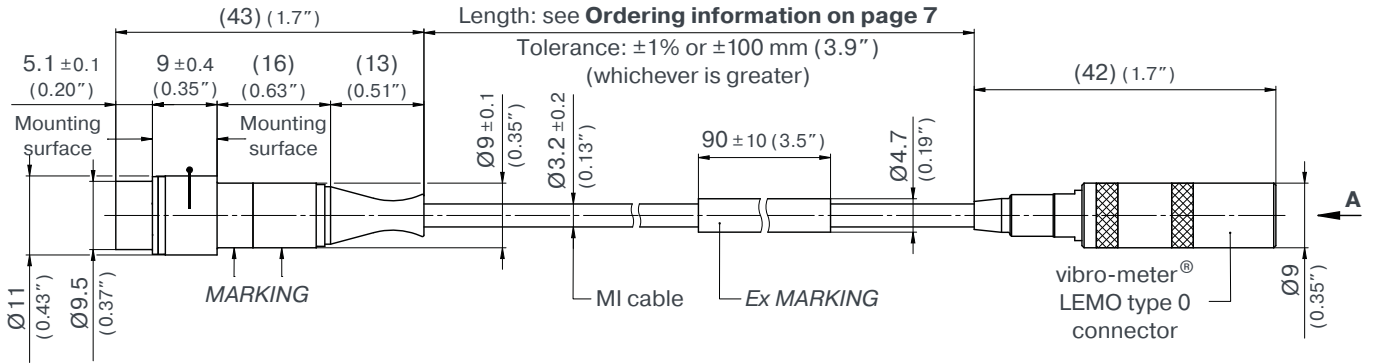
Dimensions	: See Mechanical drawings on page 6
Weight	
• Sensor head	: 20 g (0.044 lb) approx.
• MI cable	: 50 g/m (0.034 lb/ft) approx.
• Connector	: 20 g (0.044 lb) approx.
Cable	: Mineral-insulated (MI) cable, two conductors. Versions with additional cable protection (overbraid) available.
Connection	: vibro-meter [®] high-temperature or LEMO type 0 connector
Mounting	: See mounting adaptors in Accessories on page 8 . Refer also to the <i>Pressure measurement chains using CPxxx piezoelectric pressure sensors installation manual</i> .

TYPICAL RESPONSE CURVE

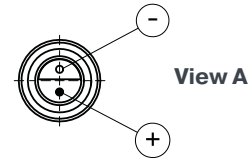
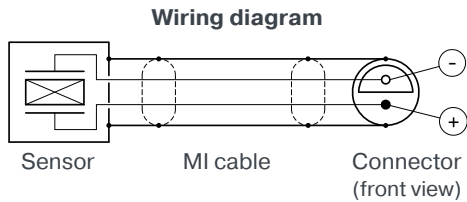


MECHANICAL DRAWINGS

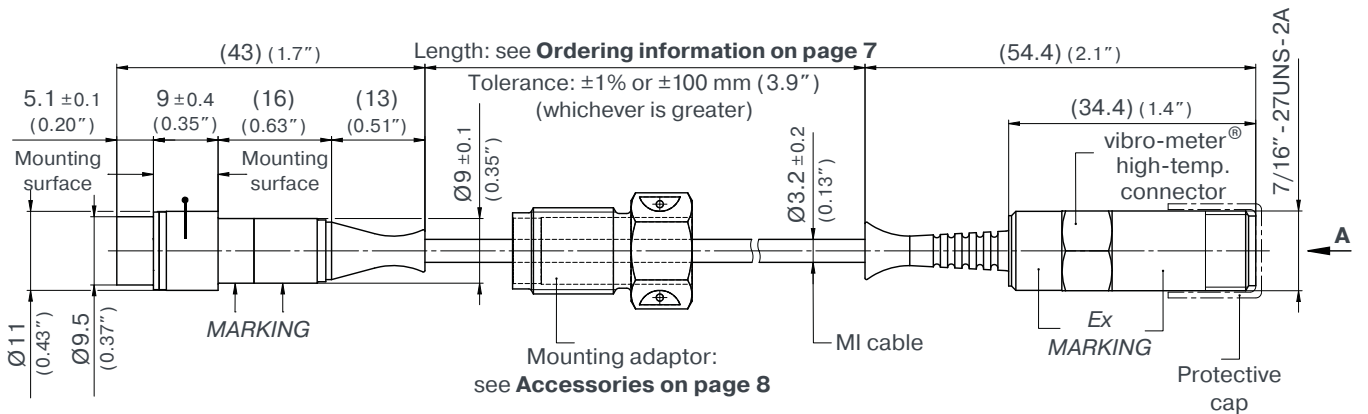
CP751 with vibro-meter® LEMO type 0 connector



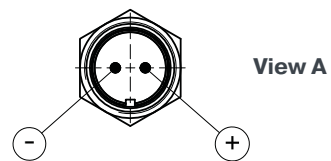
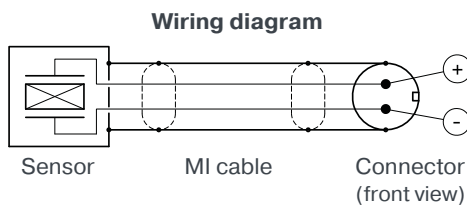
Note: All dimensions in mm (in) unless otherwise stated.



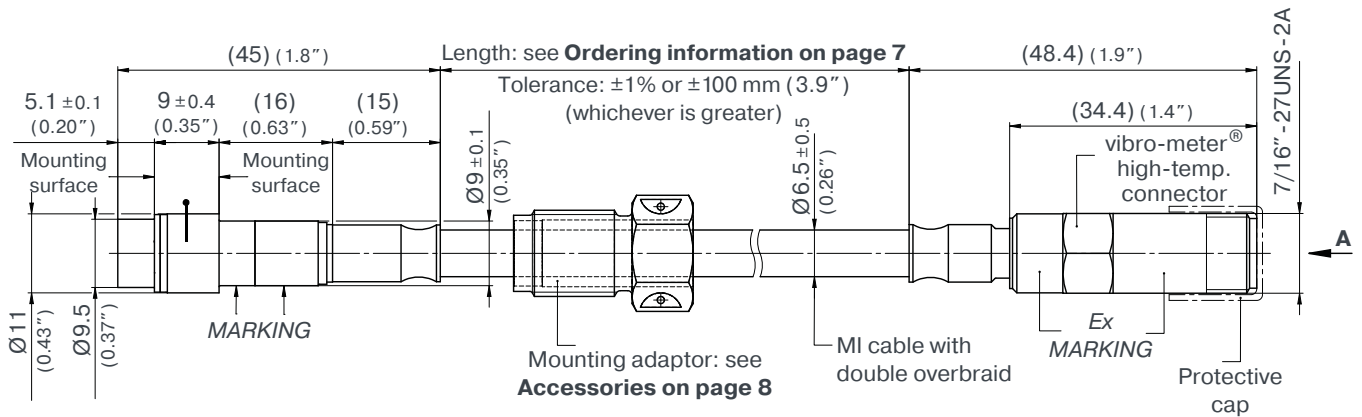
CP751 with vibro-meter® high-temperature connector



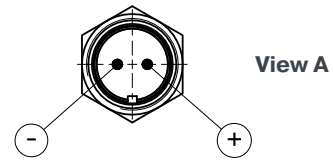
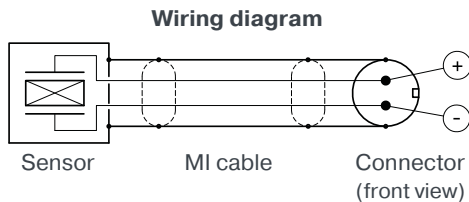
Note: All dimensions in mm (in) unless otherwise stated.



CP751 with vibro-meter® high-temperature connector and cable protection



Note: All dimensions in mm (in) unless otherwise stated.



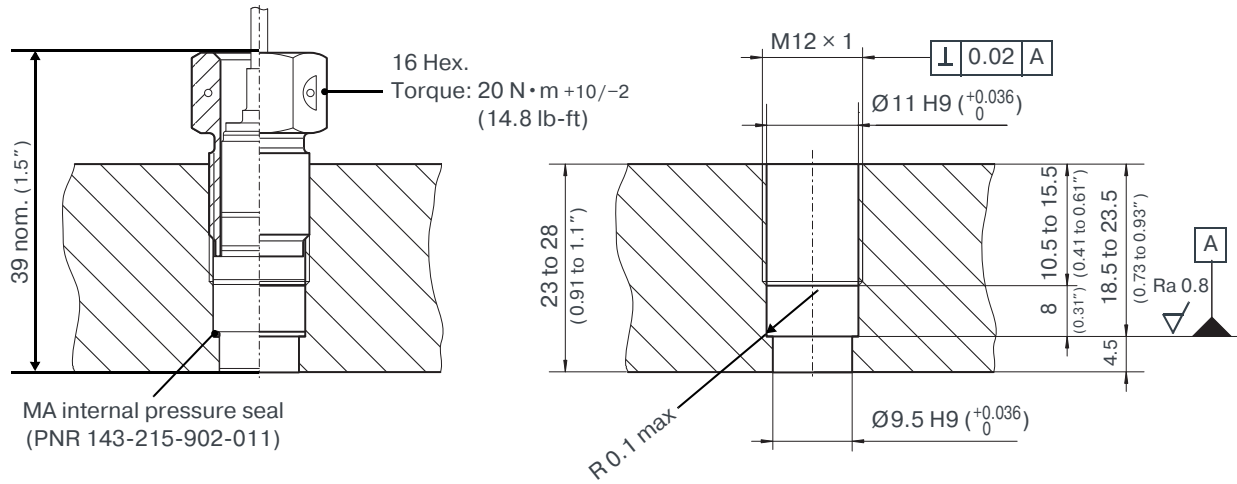
ORDERING INFORMATION

To order, please specify the version(s) of the CP751 dynamic pressure sensor required ...

Type	Designation	Integral cable length	Part number (PNR)
CP751	Dynamic pressure sensor with vibro-meter® LEMO type 0 connector	1 m (39.4")	143-751-000-011
		2 m (78.7")	143-751-000-021
		3 m (118.1")	143-751-000-031
		5 m (196.9")	143-751-000-041
		12.5 m (492.1")	143-751-000-051
CP751	Dynamic pressure sensor with vibro-meter® high-temperature connector Note: Includes integrated mounting adaptor	1 m (39.4")	143-751-000-111
		2 m (78.7")	143-751-000-121
		3 m (118.1")	143-751-000-131
		5 m (196.9")	143-751-000-141
		12.5 m (492.1")	143-751-000-151
CP751	Dynamic pressure sensor with vibro-meter® high-temperature connector and cable protection (overbraided) Note: Includes integrated mounting adaptor	1 m (39.4")	143-751-000-211
		2 m (78.7")	143-751-000-221
		3 m (118.1")	143-751-000-231
		5 m (196.9")	143-751-000-241
		12.5 m (492.1")	143-751-000-251

ACCESSORIES

MA104 mounting adaptor for CP751 with vibro-meter® LEMO type 0 connector



Note: All dimensions in mm (in) unless otherwise stated.

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

Cable assemblies

EC069	Refer to the product drawing
EC112	Refer to the product drawing
EC119	Refer to the product drawing
EC153	Refer to the product drawing
EC222	Refer to the product drawing
EC390	Refer to the product drawing

Signal conditioner

IPC707	Refer to the data sheet
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Galvanic separation unit

GSI127	Refer to the data sheet
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Parker Meggitt joined the Parker Aerospace Group in September 2022 following the successful acquisition of Meggitt PLC, a world leader in aerospace, defense and energy. This includes the Meggitt facility in Fribourg, Switzerland, operating as the legal entity Meggitt SA (formerly Vibro-Meter SA). Accordingly, the vibro-meter® product line is now owned by Parker.



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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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