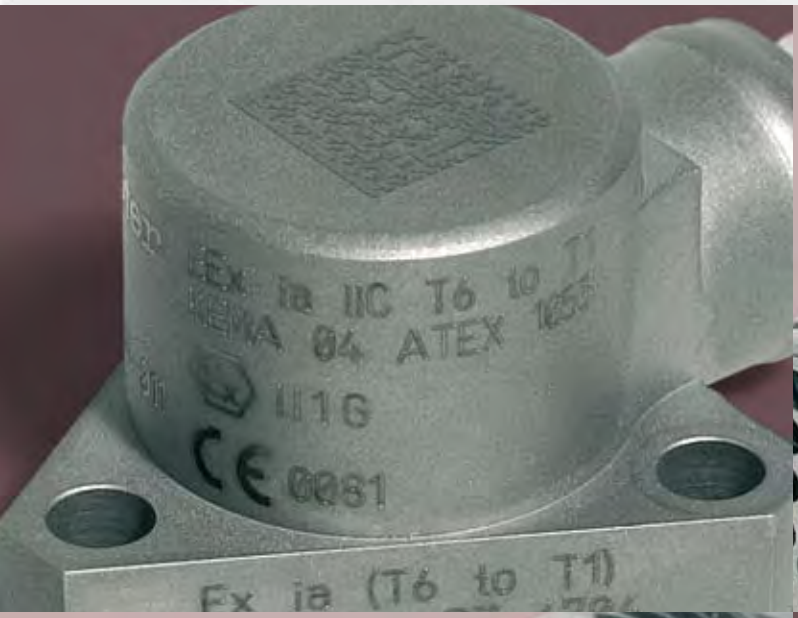
Vibro-Meter

Sensor systems for turbomachinery



Sensor systems applications

For over 50 years, Vibro-Meter has provided superior quality vibration sensing systems to monitor critical plant and equipment.

Today, our sensor systems are successfully used in numerous industries where high capital rotating machinery represents a major asset. They protect and monitor thousands of machines worldwide:

- Heavy-duty gas turbines
- Industrial and aero-derivative gas turbines
- Steam turbines (nuclear and conventional)
- Hydro turbines
- Large generators
- Large pumps, compressors and fans
- Large electric motors and propellers

Whether your business is power generation, oil and gas production, petrochemical or marine, understanding the condition of your machinery and its mechanical behavior is necessary, to prevent failure and achieve optimum efficiency.

We make it our business to provide the best solutions for your measurement and monitoring requirements, to protect your investment. This helps you reach higher levels of reliability, machine availability and output.

Today, our highly reliable sensor systems for harsh environments are adopted by most major OEMs.

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Sensor systems overview

Whether measuring dynamic pressure, acceleration or displacement, Vibro-Meter offers the most accurate, reliable and cost-effective solutions available. We have a comprehensive range of sensor systems which are standard solutions with numerous OEMs.:

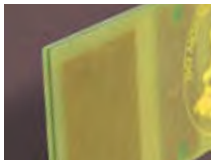
provide vibration measurements in harsh industrial conditions. We have a wide range of sensors with sensitivities from 10 to 100pC/g, for a wide range of temperatures:
from standard (120°C) up to extreme (700°C). The CA series work in the most severe environments, while the CE series include conditioners and are hence more economical and simpler to integrate.

are qualified by major OEMs for gas turbine combustor pulsation monitoring. The CP series use Vibro-Meter's acceleration compensation patented technology, and reach the highest sensitivity in the industry (over 750pC/bar). They have an extreme temperature capability (up to 777°C) and a very high frequency response range (up to 15 kHz).
Vibro-Meter's CP sensors are key to optimizing low NO_x emissions.

are eddy current transducers, for contactless measurements of relative vibration or axial displacement in turbines, alternators, turbo-compressors and centrifugal pumps. Our wide series of probes is API 670 compliant and available for high-pressure and watertight applications, with measuring ranges up to 12 mm.

are widely installed on all types of low speed turbomachinery, especially hydro turbine-generator sets. The CV series measure absolute vibration down to very low frequencies, thanks to the conditioner's low frequency linearization function.

detects initiation of ice on gas turbines inlets. The EW system discriminates between ice and water, and optimizes the use of bleed air in gas turbine de-icing systems.



measures the air gap between rotor and stator, using a capacitive technology. LS systems are an important indicator of machine condition in hydroelectric generators.

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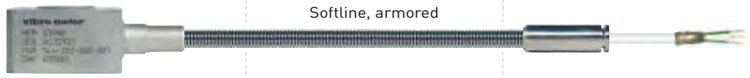
Accelerometers with external charge amplifiers

Transducer | Cable | Ext. cable | Conditioner | Cable | Galvanic separation

CA 202

100pC/g (400g)
-55 to 260°C
0.5 to 8000 Hz



For heavy duty gas and steam turbines. Piezoelectric accelerometer for use over an extended temperature range.

CA 280

100pC/g (500g)
-55 to 260°C
0.5 to 10000 Hz

For heavy duty and aero-derivative gas turbines, gear boxes, compressors and marine applications. Multi-purpose, compact piezoelectric accelerometer for use over an extended temperature range.

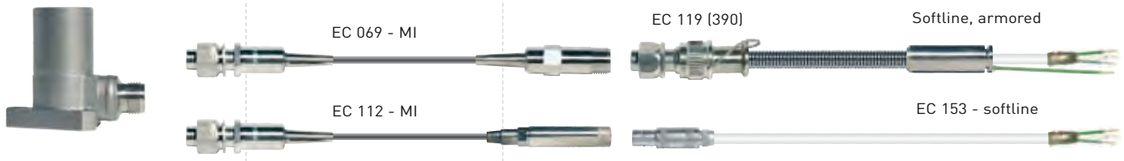
CA 306

50pC/g (100g)
-55 to 500°C
5 to 3000 Hz

For aero-derivative and industrial gas turbines. Piezoelectric accelerometer for use at high temperatures. Similar parts are standard with numerous OEMs.

CA 134

10pC/g (500g)
-196 to 500°C
0.5 to 6000 Hz



For cryogenic applications and gas turbines. Piezoelectric accelerometer for use over a very wide temperature range.

CA 901

10pC/g (500g)
-196 to 700°C
3 to 3700 Hz

For heavy duty gas turbines. Piezoelectric accelerometer for use at extreme temperatures. Similar parts are standard with numerous OEMs.

K2xx (3xx)

2 or 3-wire transmission

IPC 704 conditioner

- Signal conditioner for CA and CP sensors
- Configurable high and low-pass filters. Freq. range 0.5 Hz to 20 kHz
- Optional integrator for a velocity signal output
- Optional 2-wire current or 3-wire voltage transmission
- Ex certified versions

ABA 1xx industrial housings

- Protection against mechanical damage, water and dust (IP66 class)
- Several models and configurations, suitable for 1 up to 10 conditioners
- Diecast polyester or aluminium enclosure, fully insulated and corrosion-resistant
- Ex certified versions

GSI 124 galvanic separation unit

- Power supply for 2-wire transmission systems installed in potentially explosive environments
- AC signal transmission over long distances (1000 m)
- Galvanic separation, 4 kVRMS
- High rejection of frame voltage
- DIN-rail mounting
- Ex certified versions

MI = Mineral integral
Certified products versions for use in potentially explosive atmospheres are available.

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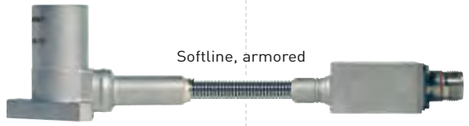
Accelerometers with built-in or attached electronics

Transducer | Cable | Ext. cable | Junction box | Cable | Galvanic separation

CE 134

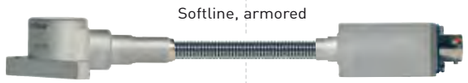
5µA/g (400g)
-55 to 350°C
5 to 10000 Hz



For heavy duty gas turbines, aero-derivative gas turbines and compressors. Piezoelectric accelerometer with attached electronics, for use over an extended temperature range.

CE 281

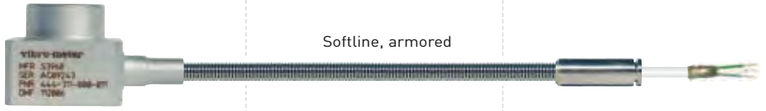
10µA/g (200g)
-55 to 260°C
3 to 10000 Hz



For gear boxes, compressors, pumps and fans. Compact piezoelectric accelerometer with attached electronics, for use over an extended temperature range.

CE 311

50µA/g (40g)
-55 to 125°C
2 to 8000 Hz



For heavy duty gas and steam turbines. Piezoelectric accelerometer with built-in electronics, for use in industrial environments.

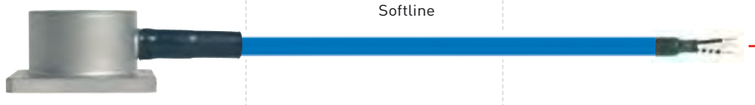
CE 680

100mV/g (80g)
-55 to 120°C
0.5 to 9000 Hz

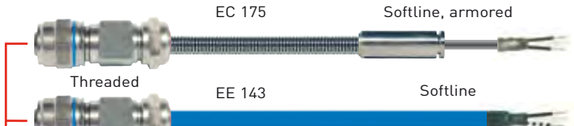
For auxiliary machines. Multi-purpose, compact piezoelectric accelerometer with built-in electronics, for use in industrial environments.

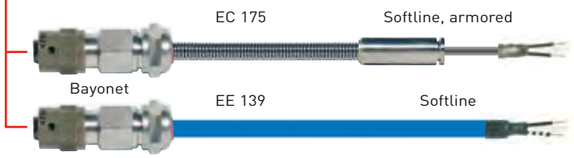
SE 120

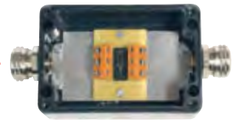
2 mA/g (4g)
0 to 75°C
0.2 to 750 Hz



For slow speed rotating machines, hydro turbines and fans. High-sensitivity piezoresistive accelerometer.







K2xx
2-wire transmission

K2xx
2-wire transmission

JB 1xx junction boxes

- Protection against mechanical damage, water and dust (IP65 class)
- Several models available
- Diecast polyester or aluminium enclosure, fully insulated and corrosion-resistant
- Ex certified versions

GSI 124 galvanic separation unit

- Power supply for 2-wire transmission systems installed in potentially explosive environments
- AC signal transmission over long distances (1000 m)
- Galvanic separation, 4 kVRMS
- High rejection of frame voltage
- DIN-rail mounting
- Ex certified versions

MI = Mineral integral
Certified products versions for use in potentially explosive atmospheres are available.

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Dynamic pressure sensors for combustion monitoring

Transducer | Cable | Ext. cable | Conditioner | Cable | Galvanic separation

CP 103

232pC/bar (20 bar)
Overload up to 250 bar
-196 to 700°C
2 to 10000 Hz

Very high temperature dynamic pressure sensor. Similar parts are standard with numerous OEMs.

K2xx

2-wire transmission

CP 235

750pC/bar (20 bar)
Overload up to 100 bar
-55 to 520°C
2 to 10000 Hz

High temperature, very high sensitivity dynamic pressure sensor. Similar parts are standard with numerous OEMs.

CP 211

25pC/bar (250 bar)
Overload up to 350 bar
-196 to 777°C
2 to 15000 Hz

Very high temperature, compact dynamic pressure sensor. Mostly used for laboratory measurements in extreme environments.

CP 216

200pC/bar (250 bar)
Overload up to 350 bar
-70 to 520°C
2 to 15000 Hz

High temperature, compact dynamic pressure sensor. Similar parts are standard with numerous OEMs.

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GSI 124 galvanic separation unit

- Power supply for 2-wire transmission systems installed in potentially explosive environments
- AC signal transmission over long distances (1000 m)
- Galvanic separation, 4 kVRMS
- High rejection of frame voltage
- DIN-rail mounting
- Ex certified versions

IPC 704 conditioners

- Signal conditioner for CA and CP sensors
- Configurable high and low-pass filters. Freq. range 0.5 Hz to 20 kHz
- Optional integrator for a velocity signal output
- Optional 2-wire current or 3-wire voltage transmission
- Ex certified versions

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Proximity probes for all displacement measurements

Transducer | Cable | Junction box / protection | Conditioner | Cable | Galvanic separation

TQ 401
8 mV/µm or 2.5 µA/µm (2 mm range)
-40 to 180°C
5mm Ø tip
Softline

TQ 402
8 mV/µm or 2.5 µA/µm (2 mm range)
4 mV/µm or 1.25 µA/µm (4 mm range)
-40 to 180°C
8.2mm Ø tip
Softline

TQ 422
4 mV/µm or 1.25 µA/µm (4 mm range)
-25 to 140°C
12.7mm Ø tip
Pressure proof, 100 bar (tip)
Softline

TQ 432
4 mV/µm or 1.25 µA/µm (4 mm range)
-25 to 140°C
12.7mm Ø tip
Pressure proof, 100 bar (tip)
Reverse mount
Softline

TQ 412
8 mV/µm or 2.5 µA/µm (2 mm range)
4 mV/µm or 1.25 µA/µm (4 mm range)
-40 to 180°C
8.2mm Ø tip
Reverse mount
Probe adaptor

TQ 403
1.33 mV/µm or 0.417 µA/µm (12 mm range)
-40 to 180°C
18mm Ø tip
Softline

TQ 423
1.33 mV/µm or 0.417 µA/µm (12 mm range)
-25 to 140°C
25 mm Ø tip
Pressure proof, 100 bar (tip)
Softline

Softline

SG 101 (102) — Movable, armored

KS 107 — Flexible conduit

JB 118 — EA 401 (402, 403)

PA 151 — EA 401 (402, 403)

Displacement range from 0.2 to 12mm. For measuring relative vibration, axial thrust, differential expansion, and phase reference on turbo-machinery. Transmission distances over 1000 m.

Various body lengths and tip diameters are standard. High pressure versions, reversible mounting, armoured cable protection and probe adapters are available. These products are compliant with API 670 standards.

IQS 45x in ABA 150

3 x IQS 45x in ABA 151

6 x IQS 45x in ABA 153

K2xx (3xx)
2 or 3-wire transmission

GSI 124

GSV 14x

GSI 124 advantages:

- See p. 7

GSV 14x safety barriers

- Power supply for 3-wire transmission systems installed in potentially explosive environments
- Wide input voltage range
- Ex certified versions

IQS 45x conditioners

- Signal conditioner matched with TQ4xx probes
- Optional 2-wire current or 3-wire voltage transmission
- Diecast aluminium enclosure
- Ex certified versions

All “softline” cables can be delivered in armored version.

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Velocity sensors

Transducer | Ext. cable | Junction box | Conditioner | Cable | Controller

CV 210

50 mV / mm/s
50 µA/ mm/s
(50 mm/s)
-40 to 100°C
1 to 400 Hz

For hydroelectric generators. Low-speed velocity transducer, with stainless steel body, ideal for moist or corrosive environments.

ED 109 - softline (112 - armored)

IVC 632 in ABA 150

K2xx (3xx)

2 or 3-wire transmission

CV 213

20 mV / mm/s
(1000 mm/s)
-29 to 204°C
10 to 1000 Hz

ED 120 - softline

IVC 632 conditioner

- Signal conditioner for CV 210 velocity sensor
- Includes low-frequency compensation. Operates as low as 1 Hz (-3 dB)
- Optional 2-wire current or 3-wire voltage transmission
- 2-wire transmission over long distances (1000 m)
- Diecast aluminium enclosure

CV 214

20 mV / mm/s
(1000 mm/s)
-29 to 121°C
10 to 1000 Hz

For hydro and steam turbines. Low-speed velocity transducers, resistant to dust and moisture (IP64).

ED 121 - softline

ILS 730 conditioner

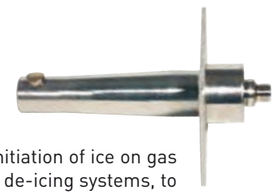
- Signal conditioner for LS air gap transducer
- Three voltage-based outputs (Pole Profile, Rotor Profile, Min. Gap). One selectable 4-20 mA output (factory setting)
- Diecast aluminium enclosure

Ice detection system

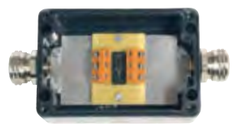
EW 140

0.2 to 2 mm ice
-55 to 120°C

For all gas turbines. Detects initiation of ice on gas turbine inlets. Used by turbine de-icing systems, to optimize the use of bleed air.



EC 119 - softline, armored



JB 116 (105)

K2xx

2-wire transmission

DIC 413

Air gap monitoring system

LS 120

2 to 33 mm
-15 to 125°C

For large hydroelectric generators. Monitors the air gap between the rotor and stator.

ILS 730 in ABA 151

K509 (709)

Certified products versions for use in potentially explosive atmospheres are available.

Since its foundation in 1952, Vibro-Meter in Fribourg (Switzerland) has been supplying reliable, high quality instrumentation for aviation and industrial customers worldwide. Vibro-Meter has been part of the Meggitt group since 1998. With its headquarters in the United Kingdom, Meggitt PLC is an international group of companies specialising in aerospace equipment, high performance sensing systems and defence.

Vibro-Meter's quality policy is fundamental to its success. The excellent reputation of our company is built on our dedication to fulfil our customers' needs, our continuous investment in technical innovation and the skills and experience of our staff.

We develop and supply engine monitoring units for new airliners produced by all leading aircraft manufacturers. For more than 30 years, our aerospace division has been the leading supplier of vibration and pressure monitoring systems for aircraft engines.

The power generation industry widely uses the complete monitoring solutions for turbomachinery offered by our Energy division. Our integrated systems are adopted by major manufacturers of gas turbines, steam turbines and water turbines.

Our international network of subsidiaries and distributors delivers outstanding support worldwide, for both our aerospace and power industry customers.

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smart engineering for
extreme environments