

SKF Vibration Sensors Catalog



- Vibration sensors
- Sensor selection, installation and mounting
- Cables and connectors
- Mounting accessories

Contents

Introduction	3
SKF – the knowledge engineering company	4
Overview for the SKF family of vibration sensors	7
Vibration sensor selection	8
Pulp and Paper	9
General purpose, food and beverage	10
Oil and gas, refining, petrochemicals	11
Power generation (fossil fuel, nuclear, hydro)	12
Power generation (wind turbines).	13
Metalworking	14
Mining, mineral processing and cement	15
Specialized models for data collector / analyzer usage	16
Other specialized models	17
Industrial accelerometers for widespread applications	18
Economical accelerometers	27
Integral cable accelerometers	32
Accelerometers with extended temperature range.	47
Combination vibration and temperature sensors	52
Hazardous area approved sensors.	65
Velocity sensors	80
Portable analysis accelerometers	87
Special purpose sensors.	96
Low frequency accelerometers	98
High frequency accelerometers	104
Machine tool accelerometers	106
Acceleration and AEE sensors.	110
Small diameter accelerometers	112
High temperature accelerometers	114
Vibration sensor installation and mounting requirements.	116
Vibration sensor cables and accessories	125
Mounting hardware	143

Introduction

The measurement of vibration is the most common method of assessing the mechanical status of machinery for condition monitoring purposes.

Although advances have been made in the field of vibration monitoring and analysis equipment, the selection of sensors and the way they are installed on a machine remain critical factors in determining the success of any condition monitoring program. Investments made for installing superior sensors are a prudent investment since the information provided about the machine of interest is accurate and reliable. Poor quality sensors and inadequate installation can easily give misleading data or, in some cases, cause a critical machine condition to be completely overlooked.

SKF has developed a range of industrial vibration sensors that incorporates over three decades of practical experience from providing transducers such as eddy current probe displacement sensors, accelerometers and velocity sensors, to machinery monitoring of all classes in multiple industries.

The measurements of vibration

The three parameters representing motion detected by vibration monitors are:

- Displacement
- Velocity
- Acceleration

These parameters can be measured by a variety of motion sensors and are mathematically related:

- Velocity is the first time derivative of displacement
- Acceleration is the first time derivative of velocity

Selection of a sensor proportional to displacement, velocity or acceleration depends upon the type and design of the equipment that is to be monitored, the frequencies of interest and the signal levels involved.

Displacement sensors

Eddy current probes are non-contact sensors primarily used to measure displacement that reflects shaft radial vibration, shaft/rotor position and clearance and rotational speed. Also referred to as “proximity probes” or “displacement probes”, eddy current probes are typically applied on machines utilizing sleeve/journal bearings. They have excellent frequency response with no lower frequency limit and can also be used to provide a trigger input for phase-related measurements. Eddy current probe systems are the best solution for shaft position measurements in sleeve bearing equipment. The selection and specifications of SKF’s range of eddy current probes is detailed in a separate catalog.

Velocity sensors

Velocity sensors are used for low to medium frequency measurements. They are useful for vibration monitoring and balancing operations on rotating machinery. As compared to accelerometers, velocity sensors have lower sensitivity to high frequency vibrations. There are two types:

- Traditional, “self-generating” velocity sensors or “velocity pickups”. These are of a mechanical design that use an electromagnetic (coil and magnet) system to generate the velocity signal. Their advantage is a direct measurement of velocity. Their disadvantages are that they wear out over time, owing to the moving parts, and are sensitive to mounting orientation.
- Piezoelectric velocity sensors (internally integrated accelerometers). These are more common today, as they have improved capabilities over self-generating types and are a more rugged and smaller size design.

Accelerometers

The acceleration sensor is versatile, reliable and the most popular vibration sensor for machinery monitoring. For a given mechanical acceleration level, piezoelectric accelerometers have a constant signal over a wide frequency range, typically up to 20 kHz, and are very useful for all types of vibration measurements. Acceleration integrated to velocity can be used for low frequency measurements. Acceleration signals in the high frequency range added with various signal processing techniques like Acceleration Enveloping (gE) are very useful for bearing and gear measurements.

The basic acceleration sensor has a good signal to noise ratio over a wide dynamic range. They are useful for measuring low to very high frequencies and are available in a wide variety of general purpose and application specific designs.

When combined with vibration monitors capable of integrating from acceleration to velocity, accelerometers can be useful components in a multi-parameter monitoring program.

Sensor wiring, mounting hardware and accessories

In addition to sensor selection, sensor mounting and wiring are important aspects of vibration sensor installation. As with sensors and monitoring equipment, using superior installation components is a good investment. Time and effort to troubleshoot problems related to poor cabling and inferior mounting can easily exceed the original cost of an inferior installation.

SKF offers a comprehensive product line of sensor wiring, mounting hardware and accessories. These are the same components that SKF uses in its own bearing manufacturing plants and for customer systems that are installed and maintained under SKF service contracts.

SKF – the knowledge engineering company

From one simple but inspired solution to a misalignment problem in a textile mill in Sweden, and fifteen employees in 1907, SKF has grown to become a global industrial knowledge leader.



Over the years we have built on our expertise in bearings, extending it to seals, mechatronics, services and lubrication systems. Our knowledge network includes 46 000 employees, 15 000 distributor partners, offices in more than 130 countries, and a growing number of SKF Solution Factory sites around the world.

Research and development

We have hands-on experience in over forty industries, based on our employees' knowledge of real life conditions. In addition our world-leading experts and university partners who pioneer advanced theoretical research and development in areas including tribology, condition monitoring, asset management and bearing life theory. Our ongoing commitment to research and development helps us keep our customers at the forefront of their industries.

Meeting the toughest challenges

Our network of knowledge and experience along with our understanding of how our core technologies can be combined helps us create innovative solutions that meet the toughest of challenges. We work closely with our customers throughout the asset life cycle, helping them to profitably and responsibly grow their businesses.



Working for a sustainable future

Since 2005, SKF has worked to reduce the negative environmental impact from our own operations and those of our suppliers. Our continuing technology development introduced the SKF BeyondZero portfolio of products and services which improve efficiency and reduce energy losses, as well as enable new technologies harnessing wind, solar and ocean power. This combined approach helps reduce the environmental impact both in our own operations and in our customers'.

SKF Solution Factory makes SKF knowledge and manufacturing expertise available locally, to provide unique solutions and services to our customers.

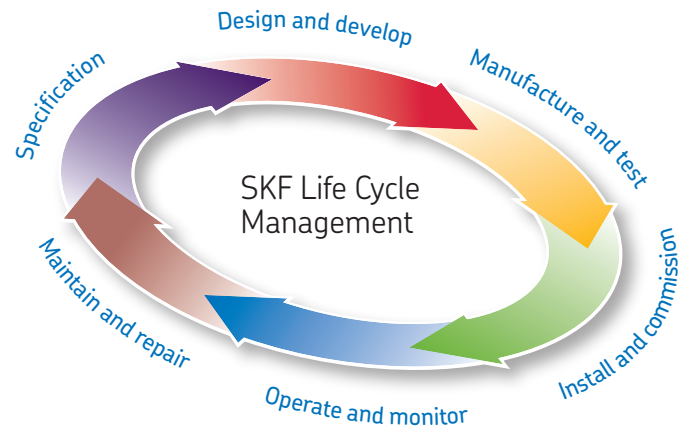


Working with SKF IT and logistics systems and application experts, SKF Authorized Distributors deliver a valuable mix of product and application knowledge to customers worldwide.



Our knowledge – your success

SKF Life Cycle Management is how we combine our technology platforms and advanced services, and apply them at each stage of the asset life cycle, to help our customers to be more successful, sustainable and profitable.



Working closely with you

Our objective is to help our customers improve productivity, minimize maintenance, achieve higher energy and resource efficiency, and optimize designs for long service life and reliability.

Innovative solutions

Whether the application is linear or rotary or a combination of the two, SKF engineers can work with you at each stage of the asset life cycle to improve machine performance by looking at the entire application. This approach doesn't just focus on individual components like bearings or seals. It looks at the whole application to see how each component interacts with the next.

Design optimization and verification

SKF can work with you to optimize current or new designs with proprietary 3-D modeling software that can also be used as a virtual test rig to confirm the integrity of the design.



Bearings

SKF is the world leader in the design, development and manufacture of high performance rolling bearings, plain bearings, bearing units and housings.



Machinery maintenance

Condition monitoring technologies and maintenance services from SKF can help minimize unplanned downtime, improve operational efficiency and reduce maintenance costs.



Sealing solutions

SKF offers standard seals and custom engineered sealing solutions to increase uptime, improve machine reliability, reduce friction and power losses, and extend lubricant life.



Mechatronics

SKF fly-by-wire systems for aircraft and drive-by-wire systems for off-road, agricultural and forklift applications replace heavy, grease or oil consuming mechanical and hydraulic systems.



Lubrication solutions

From specialized lubricants to state-of-the-art lubrication systems and lubrication management services, lubrication solutions from SKF can help to reduce lubrication related downtime and lubricant consumption.



Actuation and motion control

With a wide assortment of products – from actuators and ball screws to profile rail guides – SKF can work with you to solve your most pressing linear system challenges.

Overview for the SKF family of vibration sensors

With the proper sensor to supply the critical operating information, the machine operates in a safer condition for both the machine as well as the personnel operating the machine.

Various machine operating conditions concerning temperature extremes, magnetic fields, vibration range, frequency range, electromagnetic compatibility (EMC) and electrostatic discharge (ESD) conditions and the required signal quality necessitate the need for a variety of sensors.

The measurement of vibration is a complex subject. SKF has optimized its selection of vibration sensors to obtain the best performance, in a multiplicity of industrial applications, from its range of vibration instrumentation systems, including:

- SKF Microlog portable data collectors/analyzers
- SKF Multilog On-line System DMx
- SKF Multilog On-line System IMx (-C, -M, -R, -S, -T, -W)
- SKF Multilog On-line System WMx
- SKF Machine Condition Transmitter (CMSS 500 series)



SKF Multilog On-line System WMx



SKF Multilog On-line System DMx



SKF Machine Condition Transmitter (CMSS 500 series)



SKF Multilog On-line System IMx-M



SKF Microlog AX series (CMXA 80)



SKF Microlog GX series (CMXA 75)



SKF Multilog On-line System IMx-S

Vibration sensor selection

The range of vibration sensors offered is wide, as a vibration sensor has many different characteristics that may vary, including measurement related factors such as frequency response, sensitivity and accuracy. Physical characteristics such as temperature rating, size and connector orientation are also considerations.

The following is a guide to SKF's experience in sensor use in the most common industrial sectors in which vibration monitoring is employed.

For each industry, the top four features required of a quality vibration sensor are stated and explained. Industrial sensor choices are graded:

- “Good” – A general purpose choice that has adequate measurement and physical characteristics for condition monitoring programs, where data is trended for change and absolute precision is not so important.
- “Better” – A general purpose choice that has adequate measurement and physical characteristics for condition monitoring programs, but adds a specific feature such as an extended temperature range or mounting orientation better suited to the application.
- “Best” – A premium choice that has optimum measurement and physical characteristics, but also offers the longest history as evidence of reliability. These are particularly suited to critical machinery applications where the sensor may be used in safety-related functions such as machinery protection.



Pulp and paper

Following are the top features required of a quality vibration sensor in the pulp and paper industry, along with the reasons why:

- Low frequency response $\leq 1,0$ Hz
 - For low rotational speed of rolls
- Elevated temperature 120 to 150 °C (250 to 300 °F)
 - For dryer section heat and humidity
- IP 68 cable/connector assembly
 - For wet environment and frequent roll changes
- Good signal to noise ratio
 - For bearing defect detection



Good – General purpose monitoring



CMSS 2100



CMSS 2100T

Better – Installation robustness



CMSS 2200T



CMSS 2200

Best – Elevated temperatures



CMSS 2106



CMSS 2207

General purpose, food and beverage

Following are the top features required of a quality vibration sensor in the food and beverage industry, along with the reasons why:

- Low frequency response $\leq 1,0$ Hz
 - For low rotational speed of machines
- Small physical size
 - Small bearing and access restrictions
- Corrosion precautions
 - Cleaning fluid and chemical attack
- Integral cable or IP 68 connector/cable
 - Frequent hose-down environment



Good – General purpose monitoring



CMSS 780C

Better – Installation robustness



CMSS 2100F

Best – Frequency and precision



CMSS 2100



CMSS 793T-3



CMSS 2200



CMSS 797T-1

Oil and gas, refining, petrochemicals

Following are the top features required of a quality vibration sensor in the oil and gas, refining and petrochemical industries:

- ATEX/NEC certification
 - Hazardous area
- Minimum 10 Hz to 10 kHz frequency response
 - For turbines, blades and gears
- $\pm 5\%$ sensitivity precision
 - May be used for API 670 machine trip
- High EMI/RFI shielding
 - May be used for API 670 machine trip



Good – Monitoring in Class I, Division 2 areas



CMSS 786A-D2 CMSS 787A-D2 CMSS 786T-D2 CMSS 786F-D2

Better – Monitoring in Intrinsically Safe areas



CMSS 786A-IS CMSS 787A-IS CMSS 786T-IS CMSS 786F-IS

Best – High precision and long experience



CMSS 793-EE (-FM, -CA)

CMSS 797-EE (-FM, -CA)

CMSS 793V-EE (-FM, -CA)

Industrial accelerometers for widespread applications

- CMSS 2100 Industrial accelerometer, straight exit
- CMSS 2200 / CMSS 2200-M8 Industrial accelerometer, side exit
- CMSS 793 Superior accelerometer, straight exit
- CMSS 797 Superior accelerometer, side exit



CMSS 2100



CMSS 2200 / CMSS 2200-M8



CMSS 793



CMSS 797

CMSS 2100

Industrial accelerometer, straight exit

The CMSS 2100 accelerometer is a good multi-purpose sensor. The sensor is most commonly deployed in the following industries:

- Power Generation (Fossil, Nuclear, Hydro)
- Pulp and Paper
- Food and Beverage

Features

- For use with all SKF on-line systems, protection systems and the portable data collection instruments
- Rugged, economical and all around general purpose sensor
- 100 mV/g sensitivity to optimize use in multiple applications
- Exceptional bias voltage (BV) stability at elevated temperatures
- Designed for exceptional low noise level over a wide temperature range
- Meets stringent CE, EMC requirements
- Two mounting studs (1/4-28 and M8 x 1,25) provided
- Corrosion resistant and hermetically sealed for installation in high humidity areas
- Reverse polarity wiring protection

Recommended connector/cable assembly

- CMSS 932 series

Specifications

Specifications conform to ISA-RP-37.2 (1-64) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 100 Hz.

Dynamic

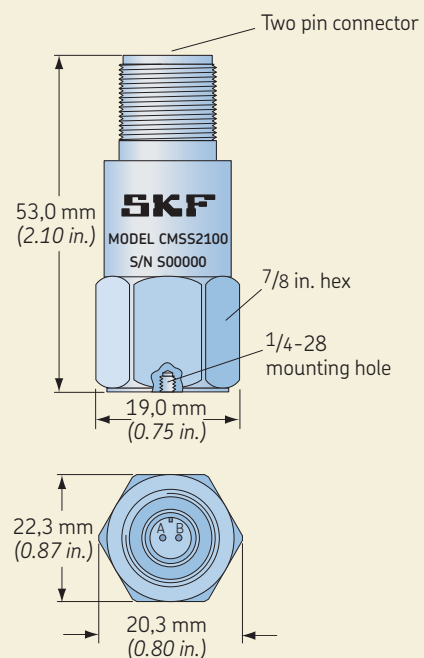
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude linearity: $\leq 1\%$, up to full scale
- Frequency range:
 - $\pm 5\%$: 3,0 to 5 000 Hz
 - $\pm 10\%$: 1,0 to 9 000 Hz
 - ± 3 dB: 0,5 to 14 000 Hz
- Resonance frequency, mounted, nominal: 30 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph



Electrical

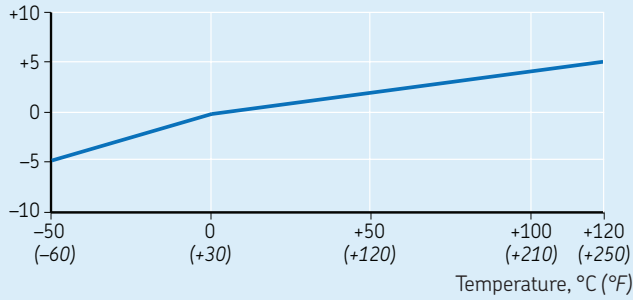
- Power requirements:
 - Voltage source: 24 V DC nominal, 18 to 30 V DC
 - Constant current diode: 2 to 10 mA, recommended 4 mA
- Electrical noise:
 - 2,0 Hz: 20 $\mu\text{g}/\sqrt{\text{Hz}}$
- Output impedance: $< 100 \Omega$
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded

Dimensions



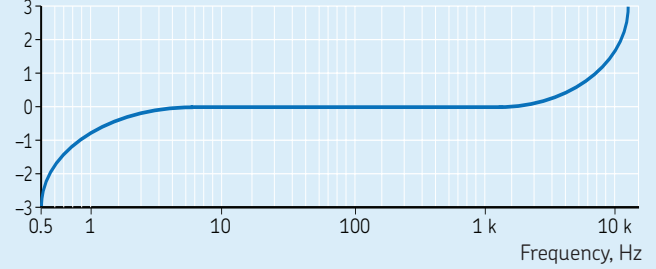
Typical temperature response

Deviation, % sensitivity



Typical frequency response

Deviation, dB



Environmental

- Temperature range: -50 to $+120$ °C (-60 to $+250$ °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 70 μ g/gauss
- Sealing: Hermetic
- Base strain sensitivity: 200 μ g/ μ strain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 90 g (3.2 oz.)
- Case material: 316L stainless steel
- Mounting:
 - Internal $1/4$ -28 thread
 - M8 $\times$ 1,25 and $1/4$ -28 to $1/4$ -28 mounting studs provided
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Pin A: Signal/Power
 - Pin B: Common
- Mating connector: CMSS 932-68LC or CMSS 932-68TL, two pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-DY-XXM, two conductor, twisted pair, single or double shielded, yellow

Ordering information

CMSS 2100 Industrial accelerometer, straight exit with MIL-C-5015 two pin connector.

- $1/4$ -28 and M8 mounting studs provided. Calibration sensitivity and nominal sensitivity is provided for each accelerometer package.
- For corresponding cables, refer to the section *Vibration sensor cables and accessories* ($\rightarrow$ page 127).

CMSS 2200 / CMSS 2200-M8

Industrial accelerometer, side exit

The CMSS 2200 accelerometer is a good multi-purpose sensor. The sensor is most commonly deployed in the following industries:

- Power Generation (Fossil, Nuclear, Hydro)
- Pulp and Paper
- Mineral Processing
- Food and Beverage

Features

- For use with all SKF on-line systems, protection systems and the portable data collection instruments
- Rugged, economical and all around general purpose sensor
- 100 mV/g sensitivity to optimize use in multiple applications
- Exceptional bias voltage (BV) stability at elevated temperatures
- Designed for exceptional low noise level over a wide temperature range
- Meets stringent CE, EMC requirements
- Captive mounting bolts (1/4-28, M6 × 1,00 or M8 × 1,25) provided
- Corrosion resistant and hermetically sealed for installation in high humidity areas
- Reverse polarity wiring protection

Recommended connector/cable assembly

- CMSS 932 series

Specifications

Specifications conform to ISA-RP-37.2 (1-64) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 100 Hz.

Dynamic

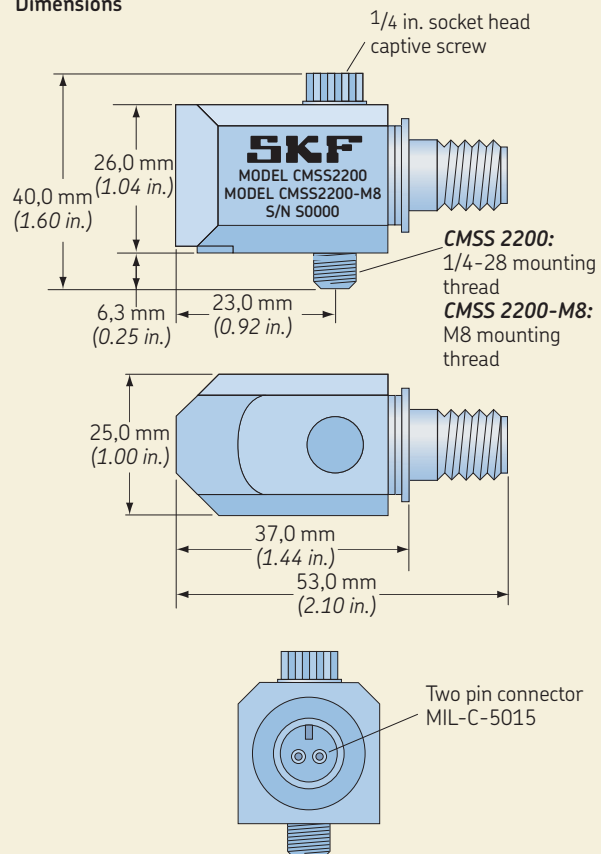
- Sensitivity: 100 mV/g
- Sensitivity precision: ±5% at 24 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude linearity: 1%
- Frequency range:
 - ±10%: 1,0 to 5 000 Hz
 - ±3 dB: 0,7 to 10 000 Hz
- Resonance frequency, mounted, minimum: 22 kHz
- Transverse sensitivity: ≤ 5% of axial
- Temperature response: See graph



Electrical

- Power requirements:
 - Voltage source: 18 to 30 V DC
 - Constant current diode: 2 to 10 mA, recommended 4 mA
- Electrical noise:
 - 2,0 Hz: 20 µg/√Hz
- Output impedance: < 100 Ω
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded

Dimensions



Economical accelerometers

- CMSS 780C / CMSS 780C-M8 Small economical accelerometer, straight exit
- CMSS 2100-M12 Industrial accelerometer, straight exit, with M12 connector



*CMSS 780C /
CMSS 780C-M8*



CMSS 2100-M12

CMSS 780C / CMSS 780C-M8

Small economical accelerometer, straight exit

The CMSS 780C is a cost-effective, small sensor for use with portable data collector routes found in the following industries:

- General Industry
- Food and Beverage

Common applications include general purpose machines such as pumps, motors, fans and gearboxes, where a trend of normal condition is the main measurement objective, rather than absolute sensitivity precision.

Features

- For use with all SKF on-line surveillance systems and portable data collection instruments
- Economical top-exit design
- Small physical size
- Rugged corrosion resistant and hermetically sealed
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Reverse wiring protection

Recommended connector/cable assembly

- CMSS 932 series

Specifications

Dynamic

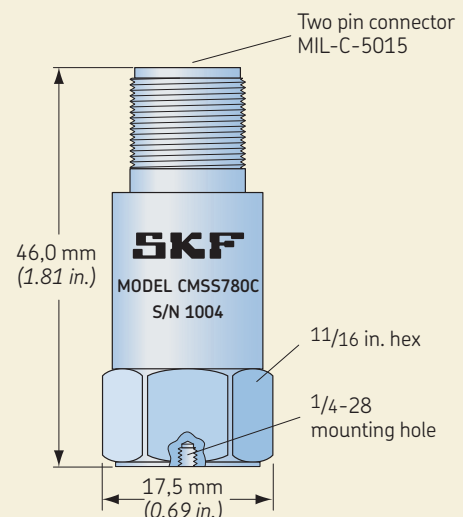
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 15\%$ at 25 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 5\%$: 1,0 to 7 000 Hz
 - $\pm 10\%$: 0,7 to 9 000 Hz
 - ± 3 dB: 0,4 to 14 000 Hz
- Resonance frequency, mounted, nominal: 30 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature sensitivity:
 - -50 °C (-60 °F): -5%
 - +120 °C (+250 °F): +5%



Electrical

- Power requirements:
 - Voltage source: 18 to 30 V DC
 - Constant current diode: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 500 μ g
 - Spectral:
 - 10 Hz: 7 μ g/ $\sqrt$ Hz
 - 100 Hz: 4 μ g/ $\sqrt$ Hz
 - 1 000 Hz: 2 μ g/ $\sqrt$ Hz
- Output impedance: $< 100 \Omega$
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded

Dimensions



Environmental

- Temperature range: –50 to +120 °C (–60 to +250 °F)
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 70 µg/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0002 g/µstrain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 62 g (2.2 oz.)
- Case material: 316L stainless steel
- Sensing element design: PZT ceramic/shear
- Mounting:
 - CMSS 780C: 1/4-28 stud
 - CMSS 780C-M8: 1/4-28 to M8 stud
- Connections:
 - Sensor casing to ground
 - Pin A: Power/Signal
 - Pin B: Common
- Output connector: Two pin, MIL-C-5015 style
- Mating connector/cable: CMSS 932 series
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-DY-XXM, two conductor, twisted pair, single or double shielded, yellow

Ordering information

CMSS 780C Small economical accelerometer, straight exit with 1/4-28 stud.

CMSS 780C-M8 Small economical accelerometer, straight exit with 1/4-28 to M8 stud.

- A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMSS 2100-M12

Industrial accelerometer, straight exit, with M12 connector

The CMSS 2100-M12 is a cost-effective sensor ideal for light to medium-duty applications where vibration measurements are required. The CMSS 2100-M12 is typically used in the following industries:

- Automation
- Food and Beverage
- Power Generation

Common applications include general purpose machines such as pumps, motors and fans.

Features

- For use with all SKF on-line systems, protection systems and switch box applications
- M12 four-pin connector
- Rugged, corrosion resistant and hermetically sealed for installation in high humidity areas
- 100 mV/g sensitivity to optimize use in multiple applications
- Mounting studs provided (1/4-28 stud and 1/4-28 to M8 adapter mounting stud)

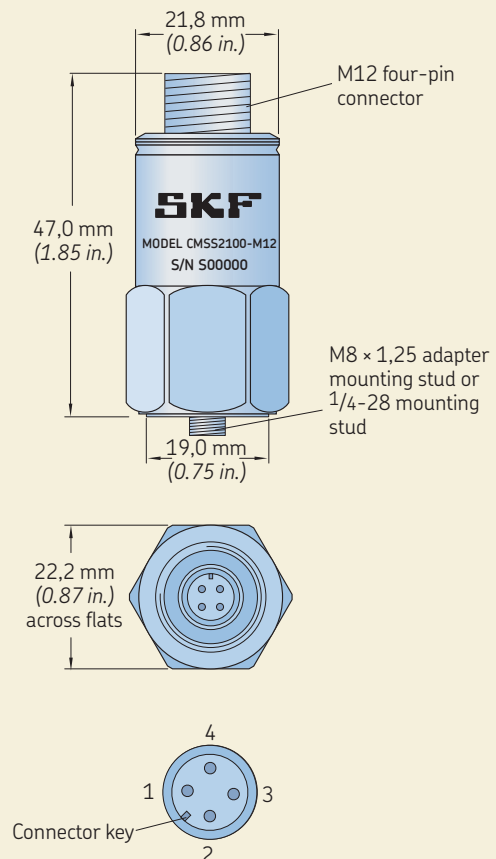
Recommended connector/cable assembly

- CMSS R75SI-J9T2A-XX (length in feet)

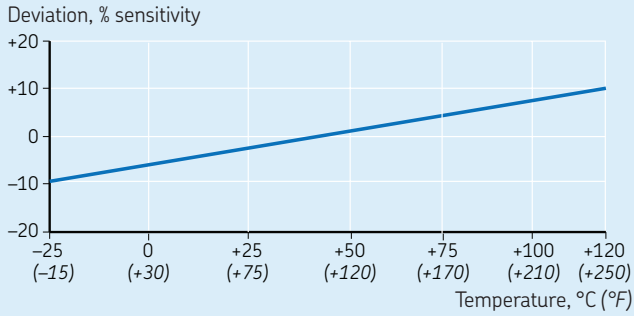
Connector/cable assembly description: Cable connector assembly with M12 connector, two-wire, IP 68 rated, shielded, various lengths.



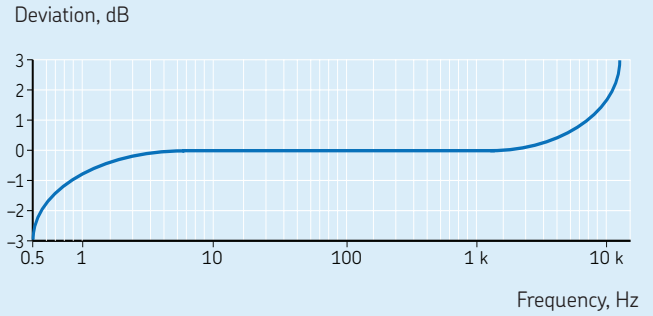
Dimensions



Typical temperature response



Typical frequency response



Specifications

Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude linearity: 1%
- Frequency range:
 - $\pm 5\%$: 3,0 to 5 000 Hz
 - $\pm 10\%$: 1,0 to 9 000 Hz
 - ± 3 dB: 0,5 to 14 000 Hz
- Resonance frequency, mounted, minimum: 30 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response:
 - -25 °C (-15 °F): -10%
 - +120 °C (+250 °F): +10%

Electrical

- Power requirements:
 - Voltage source: 18 to 30 V DC
 - Constant current diode: 2 to 10 mA, recommended 4 mA
- Electrical noise, equivalent g:
 - Broadband:
 - 2,5 Hz to 25 kHz: 700 μ g
 - Spectral:
 - 10 Hz: 10 μ g/ $\sqrt{\text{Hz}}$
 - 100 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
 - 1 000 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
- Output impedance: < 100 Ω
- Bias output voltage, nominal: 12 V DC
- Grounding: Case isolated, internally shielded

Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 70 μ g/gauss
- Sealing: Hermetic
- Base strain sensitivity: 200 μ g/ μ strain

Physical

- Dimensions: See drawing
- Weight: 90 g (3.2 oz.)
- Case material: 316L stainless steel
- Mounting: 1/4-28 and 1/4-28 to M8 mounting studs provided
- Mounting torque: 3,4 Nm (30 in. lbs.)
- Connections:
 - Shell: Ground
 - Pin 1: Power/Signal
 - Pin 2: Common
 - Pin 3: N/C
 - Pin 4: N/C
- Mating connector: M12-style

Ordering information

CMSS 2100-M12 Industrial accelerometer, straight exit with M12 connector, with 1/4-28 and M8 mounting studs.

- A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

Integral cable accelerometers

- CMSS 2100F Accelerometer with integral cable, straight exit
- CMSS 2200F Industrial accelerometer with integral cable, side exit
- CMSS 2110 Accelerometer with integral, braided cable, straight exit
- CMSS 2110-3 Accelerometer with integral, braided cable, straight exit
- CMPT 2310 Accelerometer for mining industry, with integral, braided cable, side exit
- CMPT 2323 Accelerometer for mining industry, with integral, braided cable, side exit
- CMSS WIND-100-10 Small accelerometer for wind turbines, with integral cable, side exit



CMSS 2100F



CMSS 2200F



CMSS 2110



CMSS 2110-3



CMSS 2310



CMSS 2323



CMSS WIND-100-10

CMSS 2100F

Accelerometer with integral cable, straight exit

The CMSS 2100F accelerometer is a good multi-purpose sensor with integral cable for light to medium-duty applications in the following industries:

- Food and Beverage

Common applications include general purpose machines such as pumps, motors and fans.

Features

- For use with all SKF on-line systems, protection systems and the portable data collection instruments
- Economical, top exit design
- Rugged, corrosion resistant and hermetically sealed
- Case isolation
- Meets stringent CE, EMC requirements
- ESD protection
- Reverse wiring protection

Specifications

Dynamic

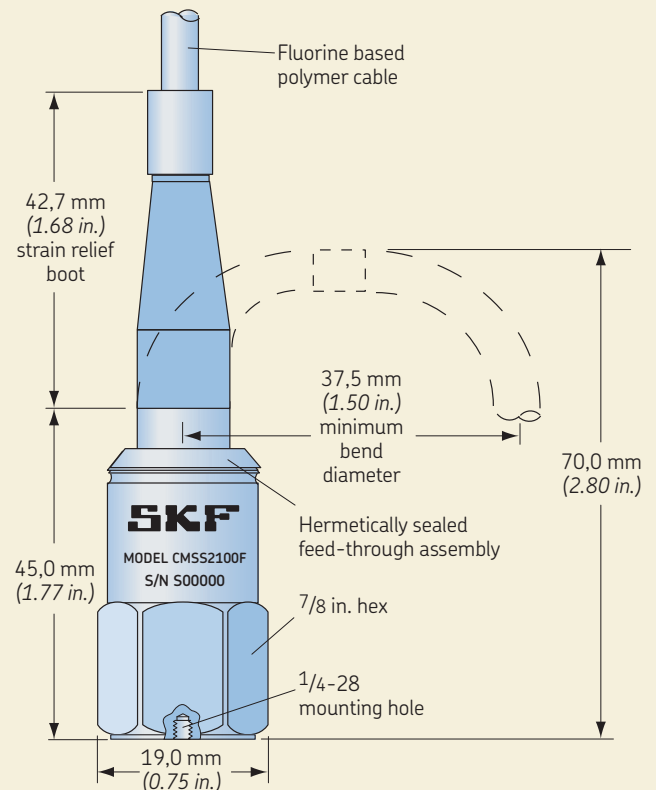
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude linearity: 1%
- Frequency range:
 - $\pm 10\%$: 1,0 to 8 000 Hz
 - ± 3 dB: 0,5 to 13 000 Hz
- Resonance frequency, mounted, nominal: 30 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph

Electrical

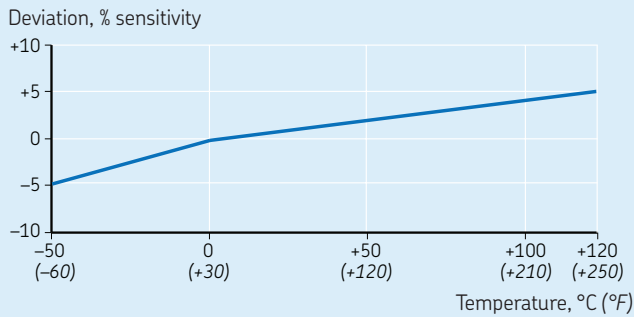
- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode¹⁾, ²⁾: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 700 μ g
 - Spectral:
 - 10 Hz: 10 μ g/ $\sqrt{\text{Hz}}$
 - 100 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
 - 1 000 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
- Output impedance: < 100 Ω
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded



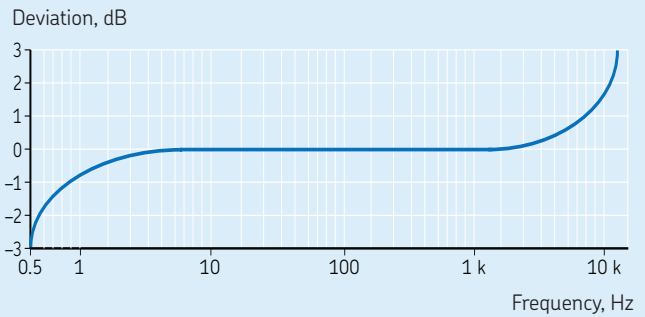
Dimensions



Typical temperature response



Typical frequency response



Environmental

- Temperature range: -50 to $+120$ °C (-60 to $+250$ °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g maximum: 70 μ g/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0002 g/ μ strain
- Hydrostatic pressure: 100 psi
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 90 g (3.2 oz.)
- Case material: 316L stainless steel
- Mounting: Internal $\frac{1}{4}$ -28 thread
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Power/Signal: White
 - Common: Black
 - Case: Shield
- Integral cable: Fluorine based polymer, 5 m (16.4 ft.) blunt cut

¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Ordering information

CMSS 2100F	Accelerometer with 5 meter (16,4 ft) integral cable, straight exit.
CMSS 2100F-33	Accelerometer with 10 meter (33 ft) integral cable, straight exit.
CMSS 2100F-50	Accelerometer with 15 meter (50 ft) integral cable, straight exit.
CMSS 2100F-66	Accelerometer with 20 meter (66 ft) integral cable, straight exit.
CMSS 2100F-100	Accelerometer with 30 meter (100 ft) integral cable, straight exit.
CMSS 2100F-XX (ft)	Accelerometer with custom integral cable length, straight exit, in 10-meter (33 ft) increments.

- $\frac{1}{4}$ -28 and M8 mounting studs provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMSS 2200F

Industrial accelerometer with integral cable, side exit

The CMSS 2200 accelerometer is a good multi-purpose sensor. The integral cable delivers a tight connection to the sensor.

The sensor is commonly deployed in the following industries:

- Power Generation
- Mineral Processing
- Food and Beverage



Features

- For use with all SKF on-line systems and protection systems
- Rugged, economical and all around general purpose sensor
- Standard 100 mV/g sensitivity to optimize use in multiple applications
- Designed for exceptional low noise level over a wide temperature range
- Meets stringent CE, EMC requirements
- Captive mounting bolts (1/4-28 and M6 TM 1.00) provided
- Corrosion resistant and hermetically sealed for submersion in water up to 65 meter depth
- Reverse polarity wiring protection
- Mounts in any orientation

Electrical

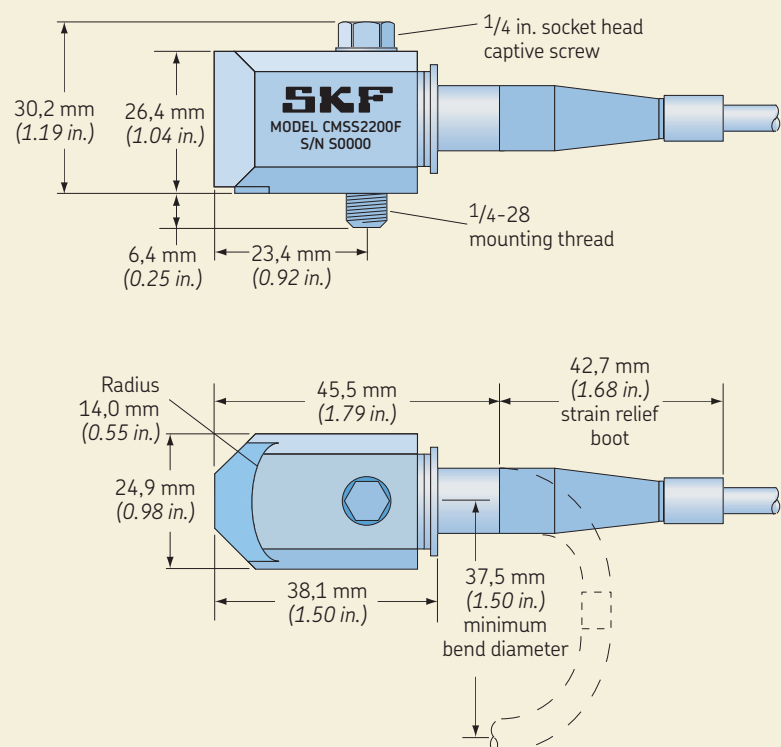
- Power requirement:
 - Voltage source: 18 to 30 V DC
 - Constant current diode: 2 to 10 mA
- Electrical noise, equivalent g:
 - Broadband:
 - 2.5 Hz to 25 kHz: 700 µg
 - Spectral:
 - 10 Hz: 10 µg/√Hz
 - 100 Hz: 5 µg/√Hz
 - 1000 Hz: 5 µg/√Hz
- Output impedance: ≤ 100 Ω
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded

Specifications

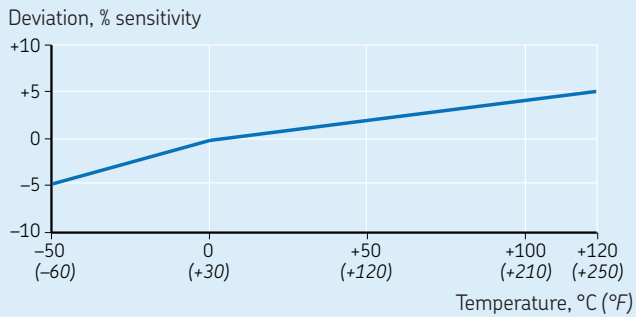
Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: ±10% at 24 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude nonlinearity: 1%
- Frequency range:
 - ±10%: 1.0 to 5,000 Hz
 - ±3 dB: 0.7 to 10,000 Hz
- Resonance frequency, mounted: 22 kHz
- Transverse sensitivity: ≤ 5% of axial
- Temperature response: See graph

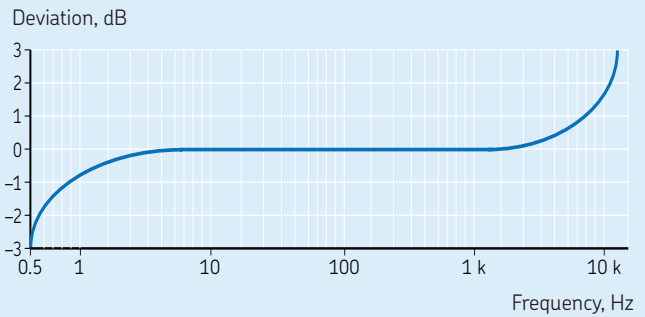
Dimensions



Typical temperature response



Typical frequency response



Environmental

- Temperature range: -50 to $+120$ °C (-60 to $+250$ °F) operating temperature
- Vibration limit: 500 g
- Shock limit: 5,000 g
- Electromagnetic sensitivity, equivalent g, maximum: 70 μ g/gauss
- Sealing: Hermetic
- Base strain sensitivity: 2 mg/ μ strain
- Hydrostatic pressure: 100 psi

Physical

- Dimensions: See drawing
- Weight: 145 g (5.1 oz.)
- Case material: 316L stainless steel
- Sensing element: PZT ceramic / shear
- Mounting: M6 and $\frac{1}{4}$ -28 captive mounting bolts
- Connections:
 - White: Accelerometer power / signal
 - Black: Accelerometer common
- Integral cabling: 5 meter (16 feet), blunt cut

Ordering information

CMSS 2200F Industrial accelerometer with 5 meter (16 feet) integral cable, side exit

- $\frac{1}{4}$ -28 and M6 captive mounting bolts provided. Calibration sensitivity and nominal sensitivity is provided for each accelerometer package.

CMSS 2200F-33 Industrial accelerometer with 10 meter (33 feet) integral cable, side exit

CMSS 2200F-66 Industrial accelerometer with 20 meter (66 feet) integral cable, side exit

CMSS 2110

Accelerometer with integral, braided cable, straight exit

The CMSS 2110 is a rugged accelerometer designed for installation where cable protection is paramount without the luxury of cable trays or protective conduit. The CMSS 2110 is typically used in the following industries:

- Pulp and Paper
- Food and Beverage

Common applications include motors and bearings on conveyor systems.

Features

- For use with all SKF on-line systems, protection systems and the portable data collection instruments
- Economical, top exit design
- Rugged, corrosion resistant and hermetically sealed
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Cable shield and braid connected to sensor housing
- Reverse wiring protection

Specifications

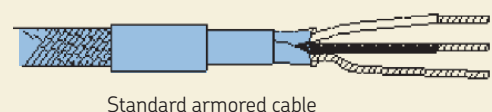
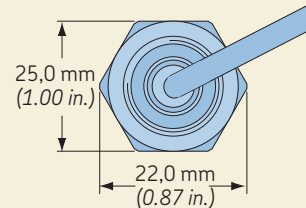
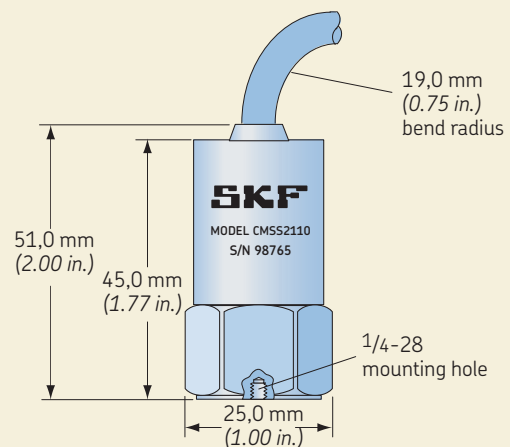
Specifications conform to ISA-RP-37.2 (1-64) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 100 Hz.

Dynamic

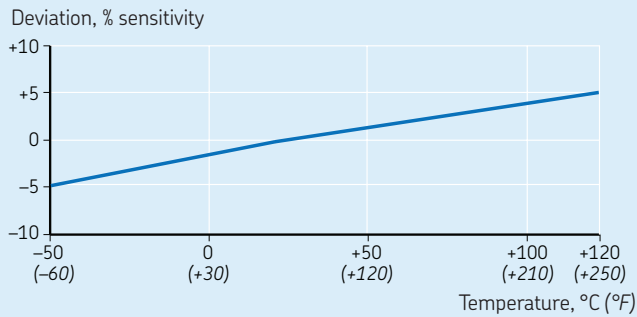
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 10\%$
- Sensitivity deviation over full temperature range: $\leq \pm 10\%$
- Acceleration range: Minimum ± 8 V equivalent to 80 g peak; turn-on time to within 10% of final bias is $\leq 1,0$ s
- Amplitude linearity: $\leq 1\%$, up to full scale
- Frequency range:
 - ± 3 dB: 0,8 Hz to 10,0 kHz
- Resonance frequency:
 - Nominal 25 kHz or higher
 - Controlled resonance amplitude
 - +15 dB maximum at resonance
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph



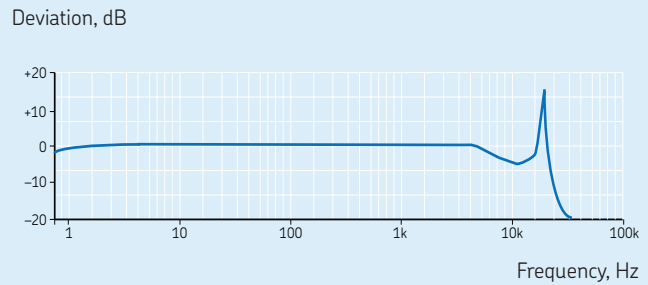
Dimensions



Typical temperature response



Typical frequency response



Electrical

- Power requirements:
 - Voltage source: 24 V DC nominal, $\pm 20\%$
 - Constant current diode: 2 to 10 mA, recommend 4 mA
- Electrical noise:
 - Broadband (2,5 Hz to 25,0 kHz): < 0,6 mg RMS
- Output impedance: < 50 Ω
- Bias output voltage:
 - 12,5 to 13,5 V DC for 24 V DC supply over temperature range -50 to +100 °C (-60 to +210 °F)
 - 11,0 to 14,0 V DC for 24 V DC supply over temperature range 100 to 120 °C (210 to 250 °F)
- Grounding:
 - Case isolated, internally shielded (Faraday cage)
 - The internal Faraday cage is connected to the signal return of the shielded twisted pair
 - The internal shield, as well as the stainless steel braid, is connected to the sensor housing
- Isolation to sensor housing: > 10 M Ω over full temperature range
- Over-voltage protection
- Reverse polarity (wiring) protection

Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 1 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: < 100 $\mu\text{g/gauss}$ at 50 to 60 Hz
- Base strain sensitivity: 200 $\mu\text{g}/\mu\text{strain}$
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Cable length: 5 m (16.4 ft.)
- Weight: 350 g (12.4 oz.), including cable
- Case material: 316L stainless steel
- Mounting:
 - Internal 1/4-28 thread
 - M8 $\times$ 1,25 and 1/4-28 to 1/4-28 mounting studs provided
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Power signal: White
 - Common: Black
 - Shielding: Drain
- Cable:
 - Integral cable, 5 m (16.4 ft.) long
 - Shielded twisted pair; two times AWG 20
 - Shield grounded to sensor housing
 - Cable armored with stainless steel braid
 - Braid also connected to sensor housing
 - High temperature cable
 - Cable diameter less than 5 mm (0.19 in.)
- Cable specifications: 2/C 20 AWG FEP/A/M/FEP 10-1254; recommend two wire, twisted, shielded

Ordering information

CMSS 2110	Accelerometer with 5 meter (16,4 ft) overbraided integral cable, straight exit.
CMSS 2110-33	Accelerometer with 10 meter (33 ft) integral braided cable, straight exit.
CMSS 2110-50	Accelerometer with 15 meter (50 ft) integral braided cable, straight exit.
CMSS 2110-64	Accelerometer with 19,5 meter (66 ft) integral braided cable, straight exit.
CMSS 2110-100	Accelerometer with 30 meter (100 ft) integral braided cable, straight exit.
CMSS 2110-XX (ft)	Accelerometer with custom integral braided cable in 10-meter (33 ft) increments.

- 1/4-28 and M8 mounting studs provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMSS 2110-3

Accelerometer with integral, braided cable, straight exit

The CMSS 2110-3 is a rugged accelerometer designed for installation where cable protection is paramount without the luxury of cable trays or protective conduit. The CMSS 2110-3 is typically used in the following industries:

- Pulp and Paper
- Food and Beverage

Common applications include motors and bearings on conveyor systems.

Features

- For use with all SKF on-line systems, protection systems and the portable data collection instruments
- Economical, top exit design
- 30 mV/g sensitivity to optimize use in most applications
- Rugged, corrosion resistant and hermetically sealed
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Cable shield and braid connected to sensor housing
- Reverse wiring protection

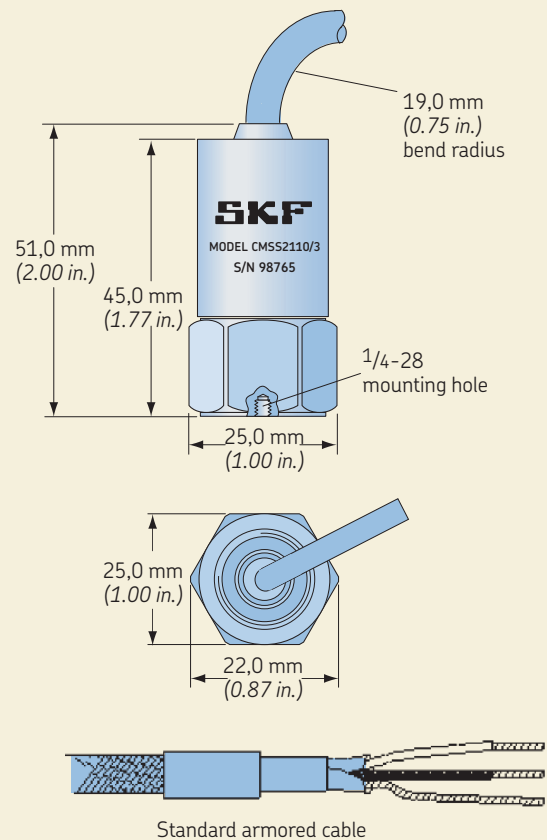
Specifications

Dynamic

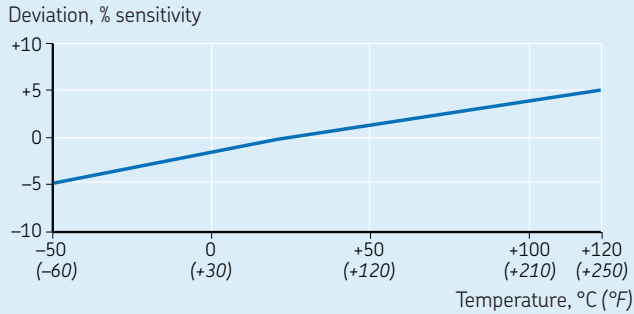
- Sensitivity: 30 mV/g
- Sensitivity precision: $\pm 10\%$ at 20 °C (70 °F)
- Sensitivity deviation over full temperature range: $\leq \pm 10\%$
- Acceleration range: Minimum ± 6 V equivalent to 200 g peak; turn-on time for one time constant is 0,5 s
- Amplitude linearity: $\leq 1\%$, up to full scale
- Frequency range:
 - $\pm 10\%$: 3,0 to 8,0 kHz
 - ± 3 dB: 0,8 to 10,0 kHz
- Resonance frequency:
 - Nominal 20 kHz or higher
 - Controlled resonance amplitude
 - Second order Q limiting filter
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph



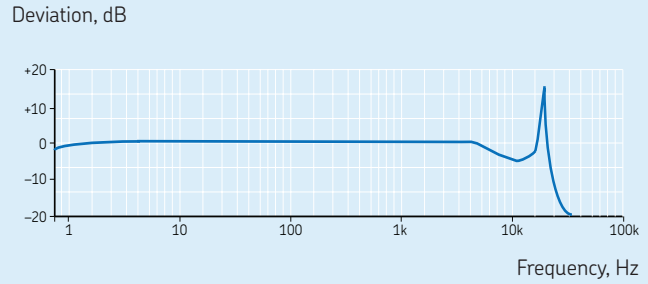
Dimensions



Typical temperature response



Typical frequency response



Electrical

- Power requirements:
 - Voltage source: 24 V DC, $\pm 20\%$
 - Constant current diode: 2 to 6 mA
- Electrical noise:
 - Broadband (2,0 to 20,0 kHz): < 0,7 mg RMS
- Output impedance: < 50 Ω
- Bias output voltage: 11,5 V DC ($\pm 10\%$) for 24 V DC supply voltage over the temperature range from -50 to $+100$ °C (-60 to $+210$ °F)
- Grounding:
 - Case isolated, internally shielded (Faraday cage)
 - The internal Faraday cage is connected to the signal return of the shielded twisted pair
 - The internal shield, as well as the stainless steel braid, is connected to the sensor housing
- Isolation to sensor housing: > 10 M Ω over full temperature range
- Over-voltage protection
- Reverse polarity (wiring) protection

Environmental

- Temperature range: -50 to $+120$ °C (-60 to $+250$ °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 1 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: < 100 $\mu\text{g/gauss}$ at 50 to 60 Hz
- Base strain sensitivity: 200 $\mu\text{g}/\mu\text{strain}$
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Cable length: 5 m (16.4 ft.)
- Weight: 350 g (12.3 oz.), including cable
- Case material: 316L stainless steel
- Mounting: 1/4-28 to M8 and 1/4-28 to 1/4-28 mounting studs provided
- Mounting torque: 2,9 Nm (24 in- lbs.)
- Connections:
 - Integral cable
 - Power/Signal: White
 - Common: Black
 - Shielding: Drain
- Cable:
 - Integral cable, 5 m (16.4 ft.) long
 - Shielded twisted pair; two times AWG 20
 - Shield grounded to sensor housing
 - Cable armored with stainless steel braid
 - Braid also connected to sensor housing
 - High temperature cable
 - Cable diameter less than 5 mm (0.19 in.)
- Cable specifications: 2/C 20 AWG FEP/A/M/FEP 10-1254
- Cable capacitance: 25 pF/m (80 pF/ft.)

Ordering information

CMSS 2110-3	Accelerometer, 30mV/g, with 5 meter (16,4 ft) integral braided cable, straight exit.
CMSS 2110-3-50	Accelerometer, 30mV/g, with 15 meter (50 ft) integral braided cable, straight exit.
CMSS 2110-3-XX (ft)	Accelerometer, 30mV/g, with custom integral braided cable, straight exit

- 1/4-28 and M8 mounting studs provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMPT 2310

Accelerometer for mining industry, integral, braided cable, side exit

The CMPT 2310 is a physically rugged accelerometer optimized for use in heavy-duty environments in the following industries:

- Mining
- Mineral Processing
- Cement

In these industries, dust, mud and flying debris are commonplace, together with low rotational speeds. When used on shakers and screens, the accelerometer must also withstand high levels of continuous and random vibration. The sensor uses an integral cable with stainless over-braid for mounting where protective conduit is not available.

Features

- For use with the SKF on-line system IMx-S, IMx-M, MCT and CTU
- 100 mV/g sensitivity
- Physically rugged
- Meets CE, EMC requirements
- Low profile, side exit industrial accelerometer with M6 × 1 and 1/4-28 UNF socket head cap screws provided
- 5 m (16.4 ft.) integral cable with stainless steel over-braid
- Corrosion resistant and hermetically sealed
- The internal sensor capsule is isolated from the machine ground
- Low noise, highly shock resistant
- Overload protected electronics



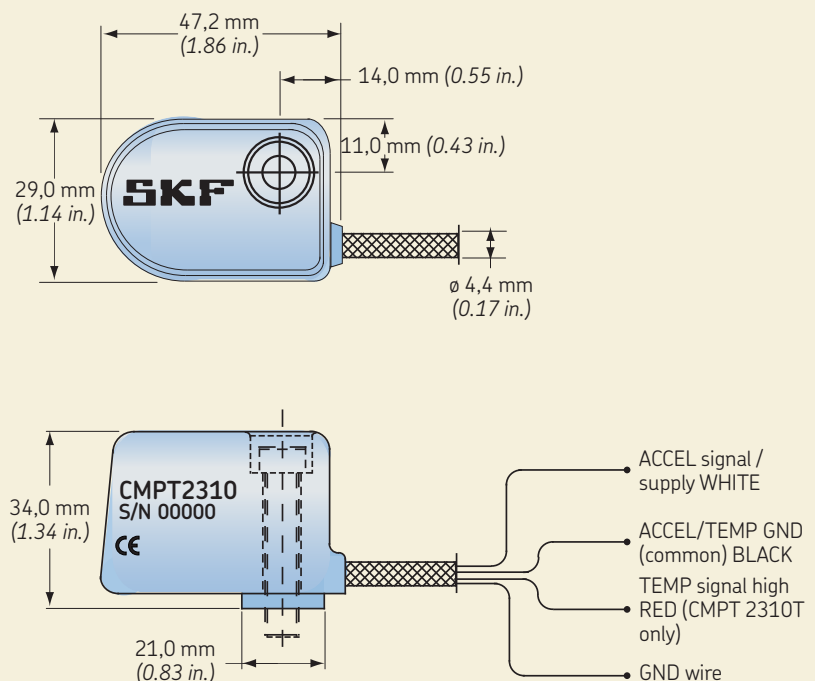
Specifications

Specifications conform to ISA-RP-37.2 (1-95) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 80 Hz.

Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: ±10%
- Sensitivity deviation over full temperature range: 10%, approximately -5% at -50 °C (-60 °F) and +5% at +120 °C (+250 °F)
- Acceleration range: 70 g
- Amplitude linearity: < 1%, up to full scale
- Frequency range: 1 Hz to 10 kHz
- Transverse sensitivity: ≤ 5% of axial

Dimensions



Electrical

- Power requirements:
 - Voltage source: 24 V DC nominal, 18 to 30 V DC
 - Constant current diode: 4 mA at 24 V, 2 to 10 mA is permissible
- Electrical noise: < 1 mg RMS broadband 2,5 Hz to 25,0 kHz
- Bias output voltage: 11,5 V DC, $\pm 10\%$ for 24 V DC supply at 25 °C (75°F)
- Grounding: Case isolated, internally shielded (Faraday cage)
 - Faraday cage connected to power supply return
- Over-voltage protection: Approximately 18 V DC
- Reverse polarity (wiring) protection installed

Environmental

- Temperature range:
 - Accelerometer measurement temperature range: –50 to +120 °C (–60 to +250 °F)
 - Maximum operating temperature: 120 °C (250 °F)
 - Storage temperature: –50 to +150 °C (–60 to +300 °F)
- Vibration limit: 70 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum:
 - < 100 $\mu\text{g/gauss}$ at 50 to 60 Hz
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak
- IEC: 529, IP 67

Physical

- Dimensions: See drawing
- Weight:
 - Sensor without cable: 210 g (7.4 oz.)
 - Sensor with cable: 410 g (14.5 oz.)
- Case material: 304 stainless steel
- Mounting: M6 $\times$ 1 and 1/4-28 UNF socket head cap screws included
- Mounting torque: 6 Nm (50 in. lbs.)
- Cable: Integral cable, 5 m (16.4 ft.) length
- Wire specification: 0,32 mm² (AWG 22) stranded tin copper (seven strands at 0,05 mm² each)
- Connections:
 - White: ACCEL signal/power (connected to constant current source)
 - Black: ACCEL signal ground (GND)
 - Blank twisted wire: Screen connected to internal shield

Ordering information

CMSS 2310	Copperhead accelerometer for mining industry with 5 meter (16,4 ft) integral braided cable, side exit.
CMSS 2310x10	Copperhead accelerometer for mining industry with 10 meter (33 ft) integral braided cable, side exit.
CMSS 2310x15	Copperhead accelerometer for mining industry with 15 meter (50 ft) integral braided cable, side exit.

- 1/4-28 and M6 $\times$ 1 socket head cap screws provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMPT 2323

Accelerometer for mining industry, integral, braided cable, side exit

The CMPT 2323 is a physically rugged accelerometer optimized for use in heavy-duty environments in the following industries:

- Mining
- Mineral Processing
- Cement

In these industries, dust, mud and flying debris are commonplace, together with low rotational speeds. When used on shakers and screens, the accelerometer must also withstand high levels of continuous and random vibration. The sensor uses an integral cable with stainless over-braid for mounting where protective conduit is not available.

A higher sensitivity is used for detection of low amplitude signals in slow moving equipment.

Features

- For use with the SKF on-line system IMx-S, IMx-M, MCT and CTU
- 230 mV/g sensitivity
- Physically rugged
- Meets CE, EMC requirements
- Low profile, side exit industrial accelerometer with M6 × 1 and 1/4-28 UNF socket head cap screws provided
- 5 m (16.4 ft.) integral cable with stainless steel over-braid
- Corrosion resistant and hermetically sealed
- The internal sensor capsule is isolated from the machine ground
- Low noise, highly shock resistant
- Overload protected electronics



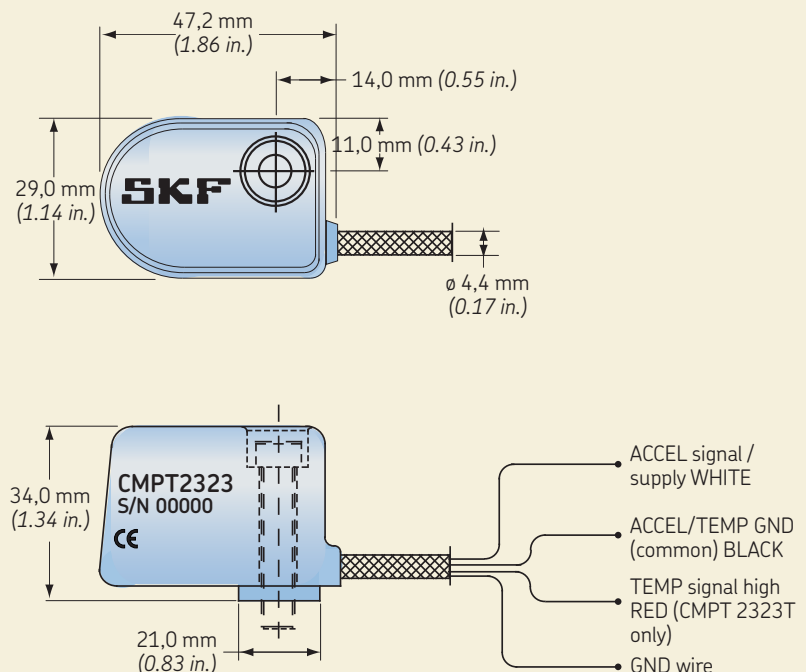
Specifications

Specifications conform to ISA-RP-37.2 (1-95) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 80 Hz.

Dynamic

- Sensitivity: 230 mV/g
- Sensitivity precision: ±10%
- Sensitivity deviation over full temperature range: 10%, approximately -5% at -50 °C (-60 °F) and +5% at +120 °C (+250 °F)
- Acceleration range: 70 g
- Amplitude linearity: < 1%, up to full scale
- Frequency range: 0,2 Hz to 10 kHz
- Transverse sensitivity: ≤ 5% of axial

Dimensions



Electrical

- Power requirements:
 - Voltage source: 24 V DC nominal, 18 to 30 V DC
 - Constant current diode: 4 mA at 24 V, 2 to 10 mA is permissible
- Electrical noise: < 1 mg RMS broadband 2,5 Hz to 25,0 kHz
- Bias output voltage: 11,5 V DC, $\pm 10\%$ for 24 V DC supply at 25 °C (75 °F)
- Grounding: Case isolated, internally shielded (Faraday cage)
 - Faraday cage connected to power supply return
- Over-voltage protection: Approximately 18 V DC
- Reverse polarity (wiring) protection installed

Environmental

- Temperature range:
 - Accelerometer measurement temperature range: –50 to +120 °C (–60 to +250 °F)
 - Maximum operating temperature: 120 °C (250 °F)
 - Storage temperature: –50 to +150 °C (–60 to +300 °F)
- Vibration limit: 70 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum:
 - < 100 $\mu\text{g/gauss}$ at 50 to 60 Hz
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak
- IEC: 529, IP 67

Physical

- Dimensions: See drawing
- Weight:
 - Sensor without cable: 210 g (7.4 oz.)
 - Sensor with cable: 410 g (14.5 oz.)
- Case material: 304 stainless steel
- Mounting: M6 $\times$ 1 and 1/4-28 UNF socket head cap screws provided
- Mounting torque: 6 Nm (50 in. lbs.)
- Cable: Integral cable, 5 m (16.4 ft.) length
- Wire specification: 0,32 mm² (AWG 22) stranded tin copper (7 strands at 0,05 mm² each)
- Connections:
 - White: ACCEL signal/power (connected to constant current source)
 - Black: ACCEL signal ground (GND)
 - Blank twisted wire: Screen connected to internal shield

Ordering information

CMPT 2323	Copperhead accelerometer for mining industry, 230 mV/g, with 5 meter (16,4 ft) integral braided cable, side exit.
CMSS 2323x10	Copperhead accelerometer for mining industry, 230 mV/g, with 10 meter (33 ft) integral braided cable, side exit.
CMSS 2323x15	Copperhead accelerometer for mining industry, 230 mV/g, with 15 meter (50 ft) integral braided cable, side exit.

- 1/4-28 and M6 $\times$ 1 socket head cap screws provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMSS-WIND-100-10

Small accelerometer for wind turbines, with integral cable, side exit

The CMSS WIND-100-10 is an accelerometer optimized for use with wind turbine applications:

- Wind turbine gearboxes
- Wind turbine generators

The small-size accelerometer is specially configured for unobtrusive mounting on wind turbine drive components, within the relatively protected environment of the turbine's nacelle. An integral cable is used to eliminate any cause to travel to a remote site to fix a loose connector.

Features

- For use with the SKF on-line system IMx-W
- 100 mV/g sensitivity
- Meets CE, EMC requirements
- High resistance to electrical noise
- Low profile integral cable accelerometer
- Compact design ideal for mounting with limited space
- Corrosion resistant



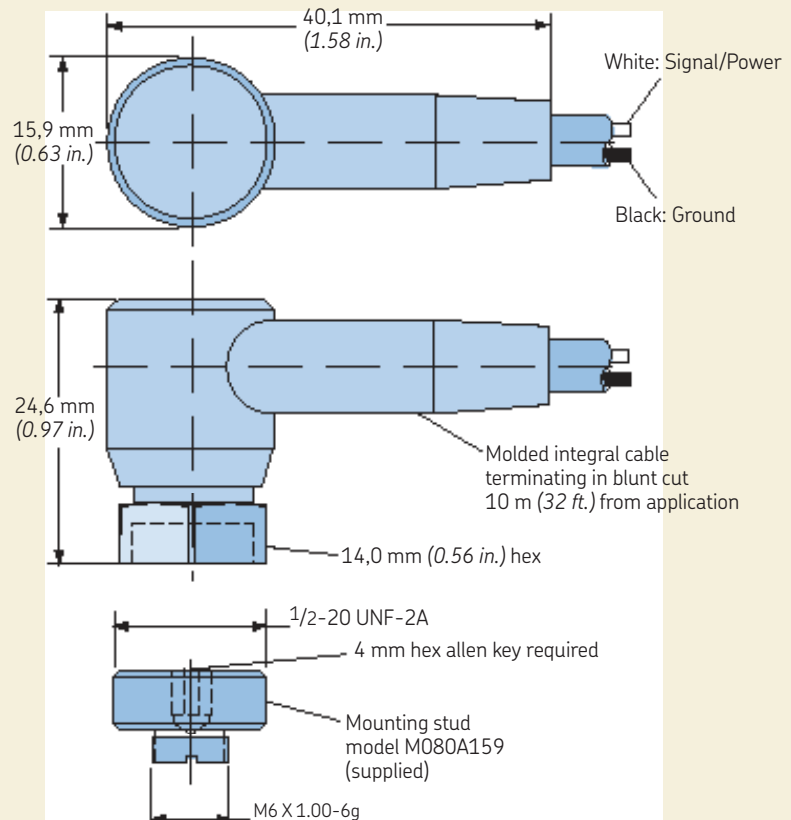
Specifications

Specifications based on low-profile industrial constant current accelerometer, 100 mV/g, 0,5 to 10 000 Hz, side exit, 10 m (32 ft.) integral cable and swiveled base.

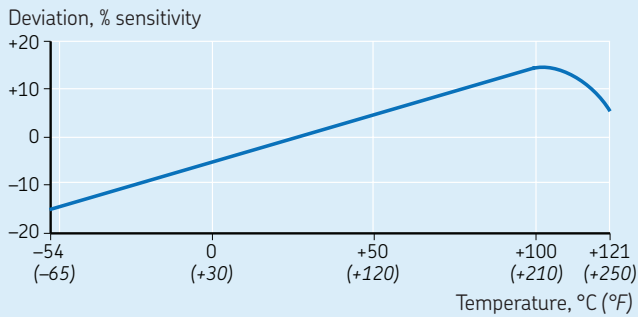
Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 10\%$
- Acceleration range: $\pm 490 \text{ m/s}^2 (\pm 50 \text{ g})$
- Amplitude linearity: $\pm 1\%$
- Frequency range: 0,5 Hz to 10 kHz (30 to 600 000 cpm)
- Resonance frequency, mounted, nominal: 25 kHz (1 500 kcpm)
- Transverse sensitivity: $\leq 7\%$
- Temperature response: See graph

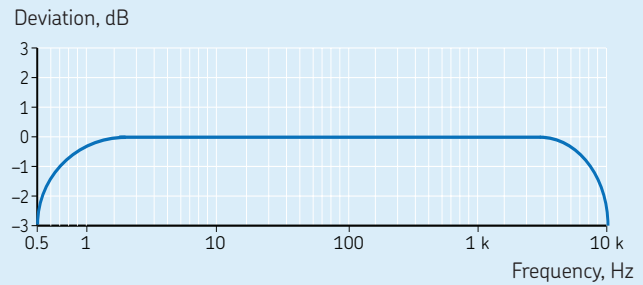
Dimensions



Typical temperature response



Typical frequency response



Electrical

- Power requirements:
 - Voltage source: 18 to 28 V DC
 - Constant current diode: 2 to 20 mA
- Electrical noise:
 - Spectral:
 - Output impedance: < 150 Ω
- Bias output voltage: 8 to 12 V DC
- Electrical isolation (case): > 10⁸ Ω

Environmental

- Temperature range: -55 to +120 °C (-65 to +250 °F)
- Shock limit: 5 000 g peak
- Sealing: Welded hermetic
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 31 g (1.1 oz.)
- Case material: Stainless steel
- Enclosure rating: IP 68
- Sensing element: Ceramic, shear
- Mounting: Threaded stud M6 x 1 male
- Mounting torque:
 - Stud: 9,5 to 10,8 Nm (7 to 8 ft. lbs.)
 - Hex nut: 2,7 to 6,8 Nm (2 to 5 ft. lbs.)
- Connection: Molded integral cable, side
- Cable type: steel over braided FEP

Ordering information

CMSS WIND-100-10 Small accelerometer for wind turbines with integral cable, side exit, 10 m (32.8 ft.).

CMSS WIND-100-15 Small accelerometer for wind turbines with integral cable, side exit, 15 m (49.2 ft.).

Accelerometers with extended temperature range

- CMSS 2106 Superior accelerometer, straight exit
- CMSS 2207 Superior accelerometer, side exit



CMSS 2106



CMSS 2207

CMSS 2106

Superior accelerometer, straight exit

The CMSS 2106 accelerometer is a multi-purpose sensor with an elevated temperature resistance to extend life and performance in applications that are known to provide a challenging hot environment. The sensor is most commonly deployed in the following industries:

- Pulp and Paper – dryer sections
- Mineral Processing – ovens and kilns
- Metalworking – hot rolling mills

Features

- Optimal for use with SKF on-line system IMx-S and all portable data collection instruments
- Rugged, economical and all around high temperature, general purpose sensor for up to 150 °C (300 °F) operating temperature
- 100 mV/g sensitivity to optimize use in multiple applications
- Exceptional bias voltage (BV) stability at elevated temperatures
- Designed for exceptional low noise level over a wide temperature range
- Meets stringent CE, EMC requirements
- Two mounting studs (1/4-28 and M8 x 1,25) provided
- Corrosion resistant and hermetically sealed for installation in high humidity areas
- Reverse polarity wiring protection

Recommended connector/cable assembly

- CMSS 932 series

Specifications

Specifications conform to ISA-RP-37.2 (1-64) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 100 Hz.

Dynamic

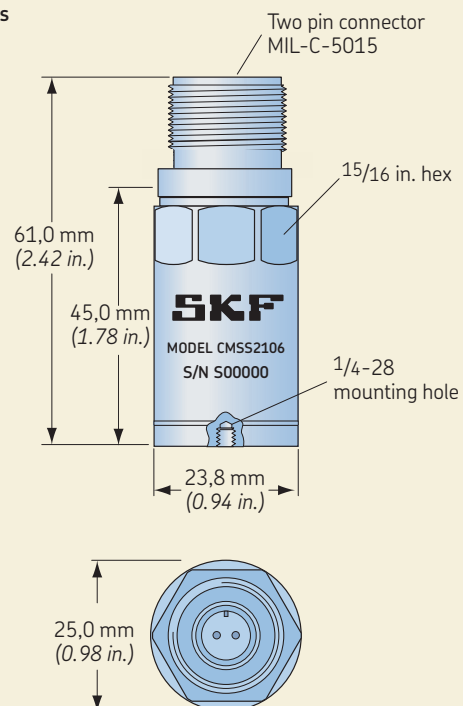
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 10\%$ at -50 to $+150$ °C (-60 to $+300$ °F)
- Acceleration range: 50 g peak
- Amplitude linearity: 1%
- Frequency range:
 - $\pm 5\%$: 4,0 to 4 000 Hz
 - $\pm 10\%$: 3,0 to 6 000 Hz
 - ± 3 dB: 1,0 to 10 000 Hz
- Resonance frequency, mounted, nominal: 20 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph



Electrical

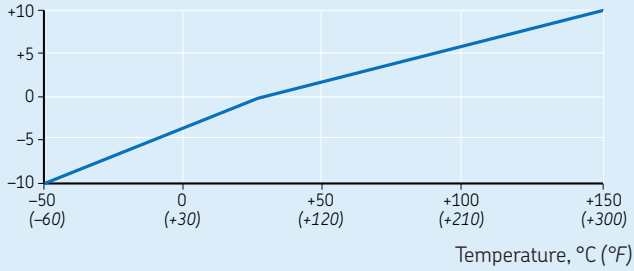
- Power requirements:
 - Voltage source: 24 V DC nominal, 18 to 30 V DC
 - Constant current diode: 2 to 4 mA, recommended 4 mA
- Electrical noise:
 - 2,0 Hz: 30 μ g/ $\sqrt{\text{Hz}}$
- Output impedance: $< 100 \Omega$
- Bias output voltage:
 - 12 V DC at 25 °C (75 °F)
 - 11 V DC at 150 °C (300 °F)
- Grounding: Case isolated, internally shielded

Dimensions



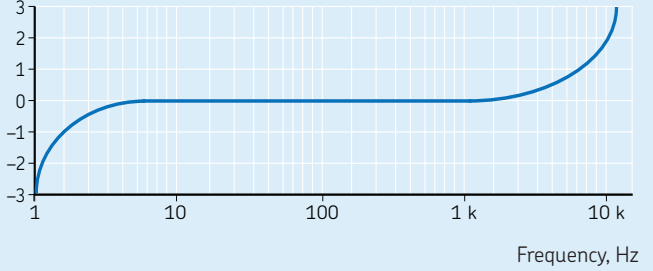
Typical temperature response

Deviation, % sensitivity



Typical frequency response

Deviation, dB



Environmental

- Temperature range: -50 to $+150$ °C (-60 to $+300$ °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 2 500 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 15 μ g/gauss
- Sealing: Hermetic
- Base strain sensitivity: 500 μ g/ μ strain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 135 g (4.8 oz.)
- Case material: 316L stainless steel
- Mounting:
 - Internal $1/4$ -28 thread
 - M8 $\times$ 1,25 and $1/4$ -28 to $1/4$ -28 mounting studs provided
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Pin A: Signal/Power
 - Pin B: Common
- Mating connector: CMSS 932-68LC or CMSS 932-68TL, two pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-DY-XXM, two conductor, twisted pair, single or double shielded, yellow

Ordering information

CMSS 2106 Superior accelerometer, straight exit with MIL-C-5015 two pin connector.

- $1/4$ -28 and M8 mounting studs provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMSS 2207

Superior accelerometer, side exit

The CMSS 2207 accelerometer is a multi-purpose sensor with an elevated temperature resistance to extend life and performance in applications that are known to provide a challenging hot environment. The sensor is most commonly deployed in the following industries:

- Pulp and Paper – dryer sections
- Mineral Processing – ovens and kilns
- Metalworking – hot rolling mills

Features

- Optimal for use with SKF on-line system IMx-S and all portable data collection instruments
- Rugged, economical and all around high temperature, general purpose sensor for up to 150 °C (300 °F) operating temperature
- 100 mV/g sensitivity to optimize use in multiple applications
- Exceptional bias voltage (BV) stability at elevated temperatures
- Designed for exceptional low noise level over a wide temperature range
- Meets stringent CE, EMC requirements
- Captive mounting bolts (1/4-28 or M6 × 1,0) provided
- Corrosion resistant and hermetically sealed for installation in high humidity areas
- Reverse polarity wiring protection

Recommended connector/cable assembly

- CMSS 932 series

Specifications

Specifications conform to ISA-RP-37.2 (1-64) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 100 Hz.

Dynamic

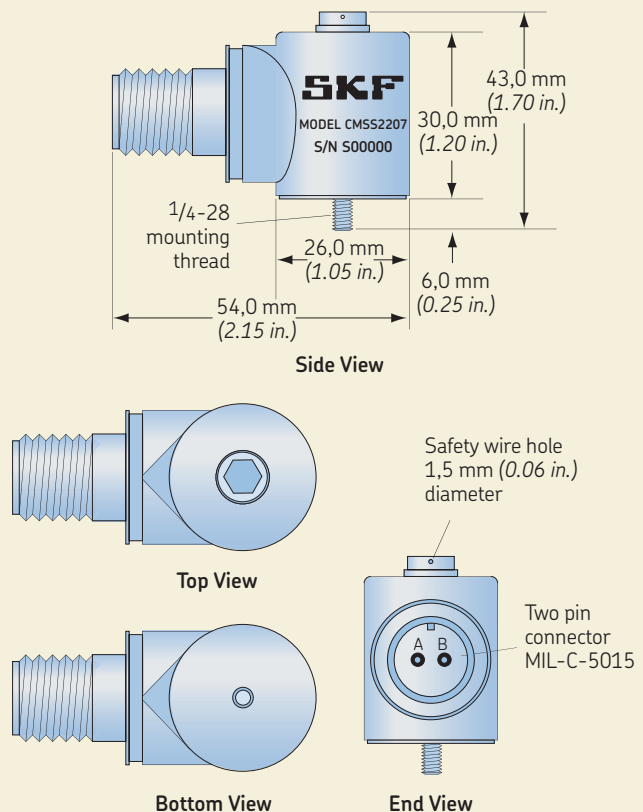
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 10\%$ at 25 °C (75 °F)
- Acceleration range: 50 g peak
- Amplitude linearity: $\leq 1\%$, up to full scale
- Frequency range:
 - $\pm 5\%$: 4,0 to 5 000 Hz
 - $\pm 10\%$: 3,0 to 7 000 Hz
 - ± 3 dB: 1,0 to 11 000 Hz
- Resonance frequency, mounted, nominal: 20 kHz
- Transverse sensitivity, maximum: $\leq 5\%$ of axial
- Temperature response: See graph



Electrical

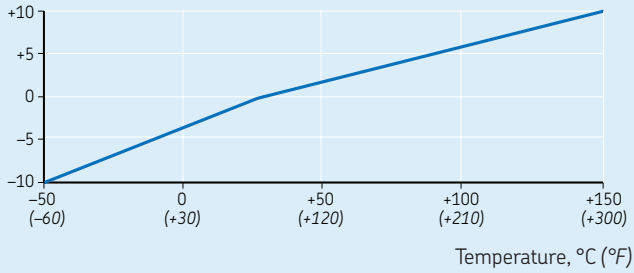
- Power requirements:
 - Voltage source: 24 V DC nominal, 18 to 30 V DC
 - Constant current diode: 2 to 4 mA, recommended 4 mA
- Electrical noise:
 - 2,0 Hz: 30 $\mu\text{g}/\sqrt{\text{Hz}}$
- Output impedance: $< 100 \Omega$
- Bias output voltage:
 - 12 V DC at 25 °C (75 °F)
 - 11 V DC at 150 °C (300 °F)
- Grounding: Case isolated, internally shielded

Dimensions



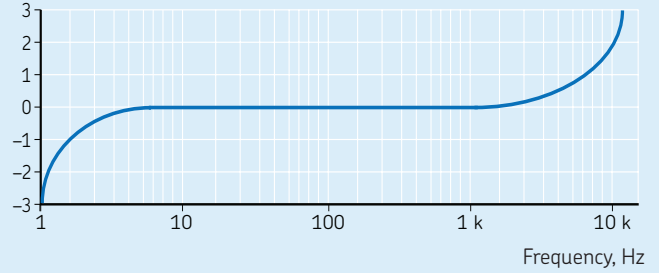
Typical temperature response

Deviation, % sensitivity



Typical frequency response

Deviation, dB



Environmental

- Temperature range: -50 to $+150$ °C (-60 to $+300$ °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 2 500 g peak
- Electromagnetic sensitivity, equivalent g, maximum: < 5 $\mu\text{g/gauss}$
- Base strain sensitivity: 100 $\mu\text{g}/\mu\text{strain}$
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 145 g (5.1 oz.)
- Case material: 316L stainless steel
- Mounting: M6 $\times$ 1,0 and $\frac{1}{4}$ -28 captive mounting bolts provided
- Mounting torque: 3,4 Nm (30 in. lbs.)
- Connections:
 - Pin A: Signal/Power
 - Pin B: Common
- Mating connector: CMSS 932-68LC or CMSS 932-68TL, two pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-DY-XXM, two conductor, twisted pair, single or double shielded, yellow

Ordering information

CMSS 2207 Superior accelerometer, side exit with MIL-C-5015 two pin connector.

- $\frac{1}{4}$ -28 and M6 mounting studs provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

Combination vibration and temperature sensors

- CMSS 2100T Industrial sensor, straight exit, acceleration and temperature
- CMSS 2200T Industrial sensor, side exit, acceleration and temperature
- CMSS 793T-3 Superior sensor, straight exit, acceleration and temperature
- CMSS 797T-1 Superior sensor, ring mode, side exit, acceleration and temperature
- CMPT 2310T Sensor for mining industry, side exit, acceleration and temperature
- CMPT 2323T Sensor for mining industry, side exit, acceleration and temperature



CMSS 2100T



CMSS 2200T



CMSS 793T-3



CMSS 797T-1



CMPT 2310T



CMPT 2323T

CMSS 2100T

Industrial sensor, straight exit, acceleration and temperature

The CMSS 2100T is a cost-effective, dual output sensor ideal for light to medium-duty applications, where both vibration and surface temperature measurements are required. The CMSS 2100T is typically used in the following industries:

- Pulp and Paper
- Food and Beverage

Common applications include general purpose machines such as pumps, motors and fans.

Features

- For use with all SKF on-line systems, protection systems and the portable data collection instruments
- Rugged, corrosion resistant and hermetically sealed
- Case isolation
- Meets stringent CE, EMC requirements
- ESD protection
- Miswiring protection

Recommended connector/cable assembly

- CMSS 933 series

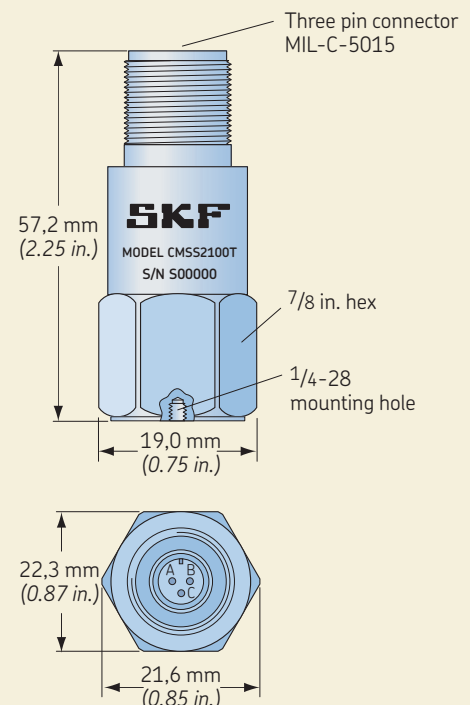
Specifications

Dynamic

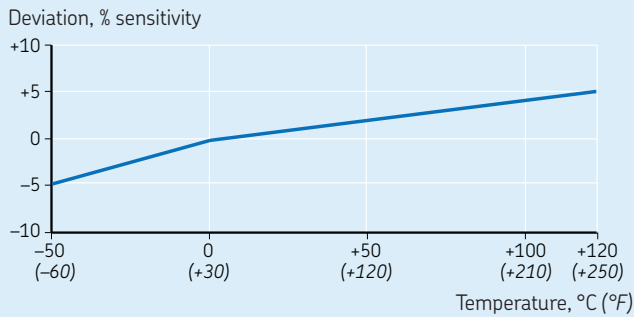
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 60 g peak
- Amplitude linearity: 1%
- Frequency range:
 - $\pm 5\%$: 3,0 to 5 000 Hz
 - $\pm 10\%$: 1,0 to 7 000 Hz
 - ± 3 dB: 0,5 to 12 000 Hz
- Resonance frequency, mounted, nominal: 30 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph
- Temperature output sensitivity:
 - $\pm 1,5$ °C ($\pm 2,7$ °F): 10 mV/°C (18 mV/°F)
 - 120 °C (250 °F): +6%
- Temperature measurement range: 2 to 120 °C (36 to 250 °F)



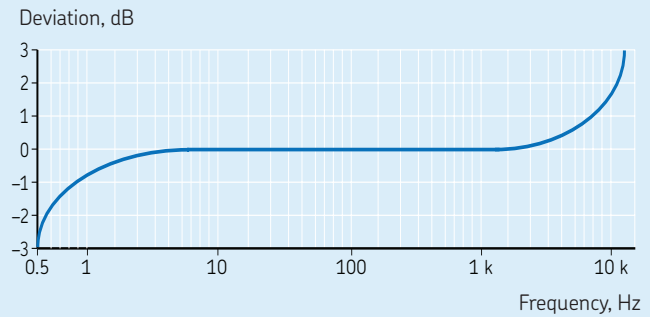
Dimensions



Typical temperature response



Typical frequency response



Electrical

- Power requirements:
 - Voltage source: 18 to 30 V DC
 - Constant current diode: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 700 µg
 - Spectral:
 - 10 Hz: 10 µg/√Hz
 - 100 Hz: 5 µg/√Hz
 - 1 000 Hz: 5 µg/√Hz
- Output impedance: < 100 Ω
- Bias output voltage: 10 V DC
- Grounding: Case isolated, internally shielded

Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 70 µg/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0002 g/µstrain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 90 g (3.2 oz.)
- Case material: 316L stainless steel
- Mounting:
 - Internal 1/4-28 thread
 - M8 × 1,25 and 1/4-28 to 1/4-28 mounting studs provided
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Pin A: Accelerometer signal/power
 - Pin B: Accelerometer common
 - Pin C: Temperature sensor signal
- Mating connector: CMSS 933-68LC or CMSS 933-68TL, three pin, IP 68, locking collar or twist lock or three pin MIL-C-5015 style
- Recommended cable: CMSS 933-SY-XXM, three conductor, triad cable, single shielded, yellow

Ordering information

CMSS 2100T Industrial sensor, straight exit, acceleration and temperature, with MIL-C-5015 three pin connector.

- 1/4-28 and M8 mounting studs provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMSS 2200T

Industrial sensor, side exit, acceleration and temperature

The CMSS 2200T is a cost-effective, dual output sensor ideal for light to medium-duty applications, where both vibration and temperature measurements are required. The CMSS 2200T is typically used in the following industries:

- Pulp and Paper
- Food and Beverage

Common applications include general purpose machines such as pumps, motors and fans.

Features

- For use with SKF on-line systems and protection systems (note that DMx requires adapter module CMMA 9700); recommended sensor for the WMx
- Measures both acceleration and temperature
- Low profile
- Rugged, corrosion resistant and hermetically sealed for installation in high humidity areas
- 100 mV/g sensitivity to optimize use in multiple applications
- 10 mV/°C temperature output sensitivity
- CE approved, meets EMC requirements
- ESD protection
- M6 and 1/4-28 captive mounting bolts provided
- Reverse wiring protection

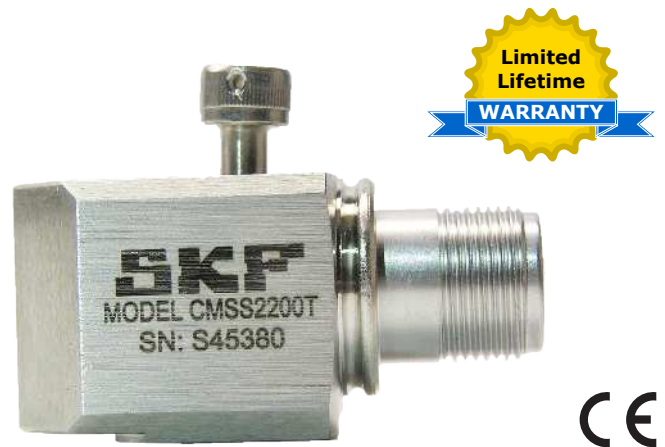
Recommended connector/cable assembly

- CMSS 933 series, three pin connector, IP 68 locking, collar or twist lock

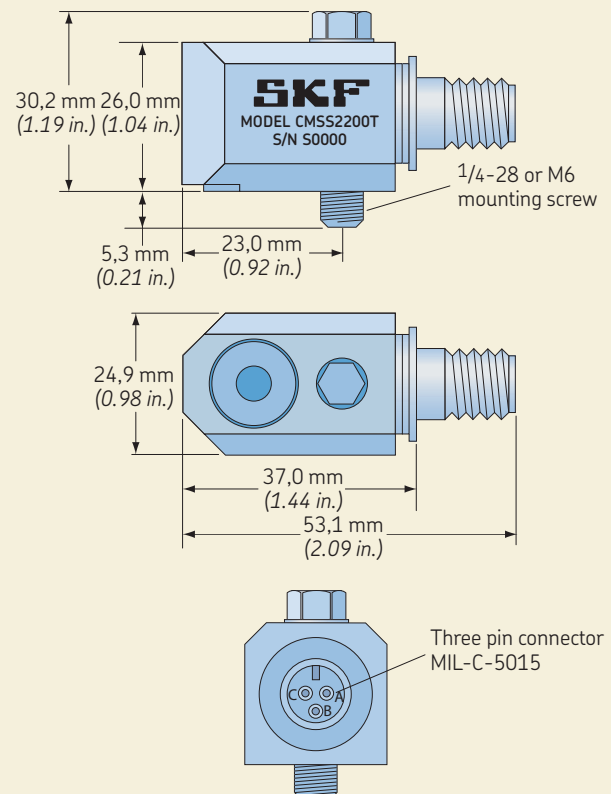
Specifications

Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 60 g peak
- Amplitude linearity: 1%
- Frequency range:
 - $\pm 5\%$: 1,0 to 5 000 Hz
 - $\pm 10\%$: 0,7 to 10 000 Hz
 - ± 3 dB: 0,5 to 12 000 Hz
- Resonance frequency, mounted, minimum: 22 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph
- Temperature output sensitivity:
 - $\pm 1,5$ °C (± 2.7 °F): 10 mV/°C (18 mV/°F)
- Temperature measurement range: 2 to 120 °C (36 to 250 °F)

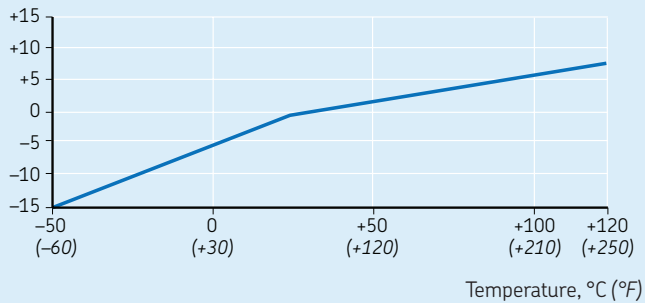


Dimensions



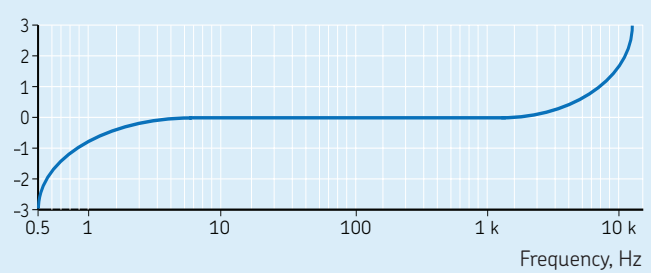
Typical temperature response

Deviation, % sensitivity



Typical frequency response

Deviation, dB



Electrical

- Power requirements:
 - Voltage source: 20 to 30 V DC
 - Constant current diode: 2 to 10 mA
- Electrical noise, equivalent g:
 - Broadband:
 - 2,5 Hz to 25 kHz: 700 μ g
 - Spectral:
 - 10 Hz: 10 μ g/ $\sqrt{\text{Hz}}$
 - 100 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
 - 1 000 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
- Output impedance: $\leq 100 \Omega$
- Bias output voltage, nominal: 12 V DC
- Grounding: Case isolated, internally shielded

Environmental

- Temperature range: -50 to $+120$ °C (-60 to $+250$ °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 70 μ g/gauss
- Sealing: Hermetic
- Base strain sensitivity: 2 mg/ μ strain

Physical

- Dimensions: See drawing
- Weight: 145 g (5.1 oz.)
- Case material: 316L stainless steel
- Mounting: M6 and $\frac{1}{4}$ -28 mounting studs provided
 - Black stud = M6
 - Silver stud = $\frac{1}{4}$ -28
- Mounting torque: 3,4 Nm (30 in. lbs.)
- Connections:
 - Pin A: Accelerometer power/signal
 - Pin B: Accelerometer common
 - Pin C: Temperature sensor signal
- Mating connector: CMSS 933-68LC or CMSS 933-68TL, three pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 933-SY-XXM, three conductors, twisted pair, single shielded, yellow

Ordering information

CMSS 2200T Industrial sensor, side exit, acceleration and temperature, with MIL-C-5015 three pin connector.

- $\frac{1}{4}$ -28 and M6 mounting studs provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMSS 793T-3

Superior sensor, straight exit, acceleration and temperature

The CMSS 793T-3 is a higher precision accelerometer that also offers an in-built measurement of the temperature of the mounting point surface. The sensor is most applicable in the following industries:

- Power Generation (Fossil, Nuclear, Hydro) – pumps and fans, where regulatory expectations may require a higher vibration precision

The surface temperature measurement is good for rolling element (anti-friction) bearing housings and small journal bearing housings. Temperature measurements in large journal bearings should use established measurement locations.

Features

- Optimal for use with the SKF on-line system DMx, IMx-S, IMx-M and all portable data collection instruments
- Measures both temperature and acceleration
- Rugged construction
- Hermetically sealed
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Miswiring protection

Recommended connector/cable assembly

- CMSS 933 series

Specifications

Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Peak amplitude (24 V supply): 80 g
- Frequency range:
 - $\pm 5\%$: 1,5 to 5 000 Hz
 - $\pm 10\%$: 1,0 to 7 000 Hz
 - ± 3 dB: 0,5 to 15 000 Hz
- Resonance frequency, mounted, nominal: 24 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph
- Temperature output sensitivity: $\pm 5\%$ of 10 mV/°K
- Temperature measurement range: –50 to +120 °C (–60 to +250 °F)

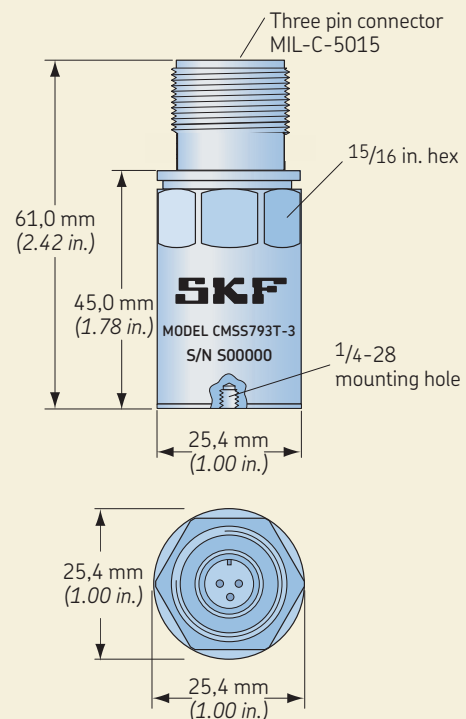


Electrical

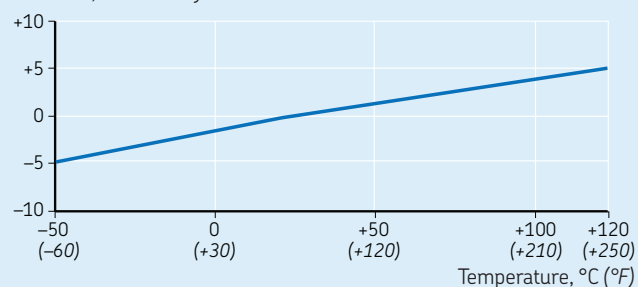
Temperature sensor

- Power requirements:
 - Voltage source: 18 to 30 V DC
 - Constant current diode: 2 to 4 mA
- Grounding: Case isolated, internally shielded

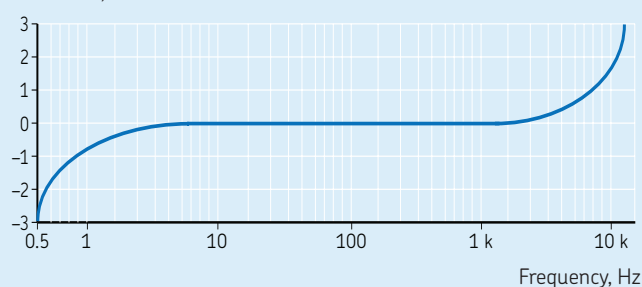
Dimensions



Deviation, % sensitivity



Deviation, dB



- Power requirements:
 - Voltage source: 18 to 30 V DC
 - Constant current diode: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 600 μ g
 - Spectral:
 - 10 Hz: 8 μ g/ $\sqrt$ Hz
 - 100 Hz: 5 μ g/ $\sqrt$ Hz
 - 1 000 Hz: 5 μ g/ $\sqrt$ Hz
- Output impedance: < 100 Ω
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded

Note: Each channel (acceleration and temperature) requires standard current powering for use with multiplexed sensors and data collector voltage inputs. Common leads are connected together inside the sensor.

- Temperature range: -50 to +120 °C (-60 to +250 °F)
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 10 µg/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0005 g/µstrain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

- Dimensions: See drawing
- Weight: 115 g (4 oz.)
- Case material: 316L stainless steel
- Mounting: 1/4-28 tapped hole
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Shell: Ground
 - Pin A: Power and accelerometer signal
 - Pin B: Accelerometer, temperature common
 - Pin C: Power and temperature signal
- Mating connector: CMSS 933-68LC or CMSS 933-68TL, three pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 933-SY-XXM, three conductor, triad cable, single shielded, yellow

Piezofet Amplifier

Pin A
Power and accelerometer signal

Pin C
Power and temperature signal

Pin B
Accelerometer return, temperature common

CMSS 793T-3 Superior sensor, straight exit, acceleration and temperature, with MIL-C-5015 three pin connector.

- 1/4-28 and M6 mounting studs provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMSS 797T-1

Superior sensor, ring mode, side exit, acceleration and temperature

The CMSS 797T-1 is a higher precision accelerometer that also offers an in-built measurement of the temperature of the mounting point surface. The sensor is most applicable in the following industries:

- Power Generation (Fossil, Nuclear, Hydro) – pumps and fans, where regulatory expectations may require a higher vibration precision

The surface temperature measurement is good for rolling element (anti-friction) bearing housings and small journal bearing housings. Temperature measurements in large journal bearings should use established measurement locations.

Features

- Optimal for use with the SKF on-line system DMx, IMx-S, IMx-M and all portable data collection instruments
- Measures both temperature and acceleration
- Rugged construction
- Hermetically sealed
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Reverse wiring protection

Recommended connector/cable assembly

- CMSS 933 series

Specifications

Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 5\%$: 3,0 to 5 000 Hz
 - $\pm 10\%$: 2,0 to 7 000 Hz
 - ± 3 dB: 1,0 to 12 000 Hz
- Resonance frequency, mounted, nominal: 26 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph
- Temperature output sensitivity: $\pm 5\%$ of 10 mV/°K
- Temperature measurement range: –50 to +120 °C (–60 to +250 °F)

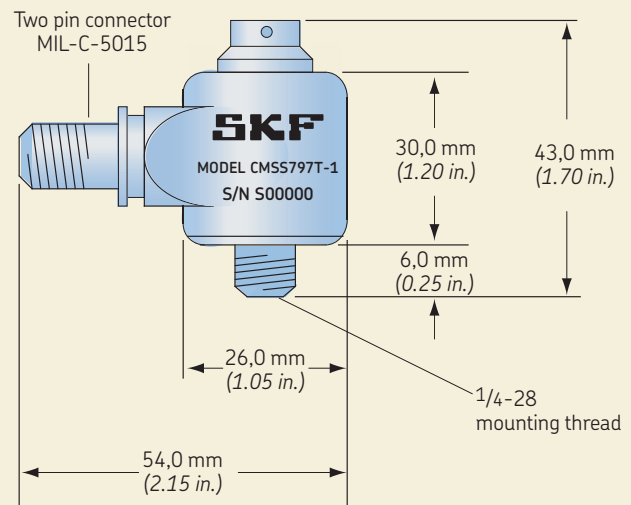


Electrical

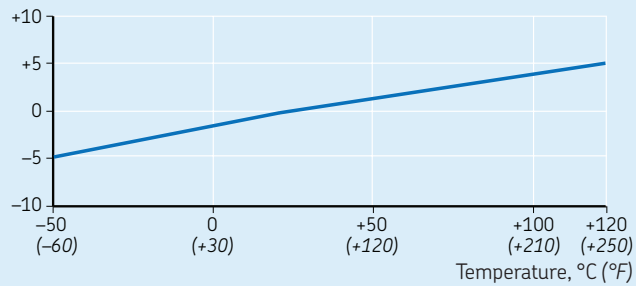
Accelerometer

- Power requirements:
 - Voltage source: 18 to 30 V DC
 - Constant current diode: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 600 μ g
 - Spectral:
 - 10 Hz: 8 μ g/ $\sqrt$ Hz
 - 100 Hz: 5 μ g/ $\sqrt$ Hz
 - 1 000 Hz: 5 μ g/ $\sqrt$ Hz
- Output impedance: < 100 Ω
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded

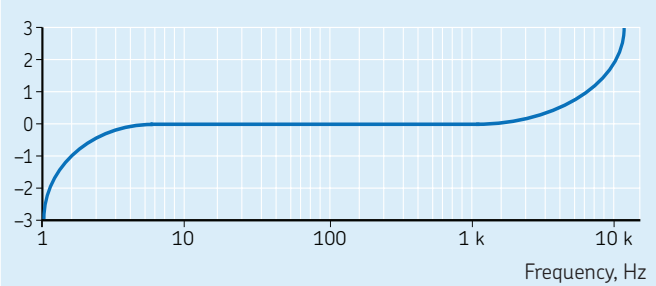
Dimensions



Deviation, % sensitivity



Deviation, dB



Temperature sensor

- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode^{1), 2)}: 2 to 4 mA
- Grounding: Case isolated, internally shielded

Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F)
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 30 µg/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,002 g/µstrain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

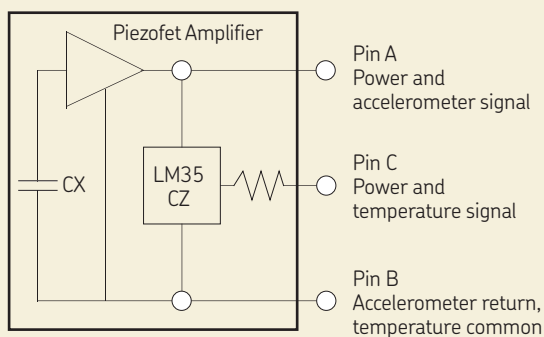
Physical

- Dimensions: See drawing
- Weight: 135 g (4.8 oz.)
- Case material: 316L stainless steel
- Mounting: 1/4-28 captive socket head screw
- Mounting torque: 3,4 Nm (30 in. lbs.)
- Connections:
 - Shell: Ground
 - Pin A: Power and accelerometer signal
 - Pin B: Accelerometer, temperature common
 - Pin C: Power and temperature signal
- Mating connector: CMSS 933-68LC or CMSS 933-68TL, three pin, IP 68, locking collar or twist lock or three pin MIL-C-5015 style
- Recommended cable: CMSS 933-SY-XXM, three conductor, triad cable, single or shielded, yellow

1) To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Block diagram



Ordering information

CMSS 797T-1 Superior sensor, ring mode, side exit, acceleration and temperature, with MIL-C-5015 three pin connector.

- 1/4-28 captive socket head screw provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMPT 2310T

Sensor for mining industry, side exit, acceleration and temperature

The CMPT 2310T is a physically rugged accelerometer that also provides a surface temperature measurement. The sensor is optimized for use in heavy-duty environments in the following industries:

- Mining
- Mineral Processing
- Cement

In these industries, dust, mud and flying debris are commonplace, together with low rotational speeds. When used on shakers and screens, the accelerometer must also withstand high levels of continuous and random vibration. The sensor uses an integral cable with stainless over-braid for mounting where protective conduit is not available.

Features

- For use with the SKF on-line system IMx-S, IMx-M, MCT and CTU
- 100 mV/g sensitivity
- Acceleration (mV/g) and temperature (mV/°C)
- Physically rugged
- Meets CE, EMC requirements
- Low profile, side exit industrial accelerometer with M6 × 1 and 1/4-28 UNF socket head cap screws provided
- 5 m (16.4 ft.) integral cable with stainless steel over-braid
- Corrosion resistant and hermetically sealed
- The internal sensor capsule is isolated from the machine ground
- Low noise, highly shock resistant
- Overload protected electronics



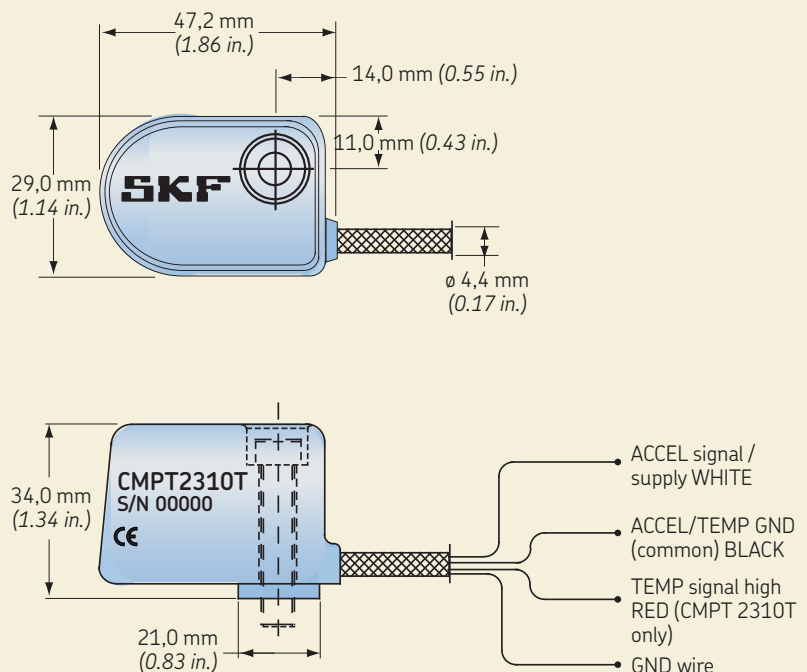
Specifications

Specifications conform to ISA-RP-37.2 (1-95) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 80 Hz.

Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: ±10%
- Sensitivity deviation over full temperature range: 10%, approximately -5% at -50 °C (-60 °F) and +5% at +120 °C (+250 °F)
- Acceleration range: 70 g
- Amplitude linearity: < 1%, up to full scale
- Frequency range: 1 Hz to 10 kHz
- Transverse sensitivity: ≤ 5% of axial
- Temperature sensitivity: 10 mV/°C
- Temperature sensor measurement range: 0 to 120 °C (30 to 250 °F)
- Temperature precision: ±1,5 °C (±2.7 °F)

Dimensions



Electrical

- Power requirements:
 - Voltage source: 24 V DC nominal, 18 to 30 V DC
 - Constant current diode: 4 mA at 24 V, 2 to 10 mA is permissible
- Electrical noise: < 1 mg RMS broadband 2,5 Hz to 25,0 kHz
- Bias output voltage: 11,5 V DC, $\pm 10\%$ for 24 V DC supply at 25 °C (75 °F)
- Grounding: Case isolated, internally shielded (Faraday cage)
 - Faraday cage connected to power supply return
- Over-voltage protection: Approximately 18 V DC
- Reverse polarity (wiring) protection installed

Environmental

- Temperature range:
 - Accelerometer measurement temperature range: –50 to +120 °C (–60 to +250 °F)
 - Maximum operating temperature: 120 °C (250 °F)
 - Storage temperature: –50 to +150 °C (–60 to +300 °F)
- Vibration limit: 70 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum:
 - < 100 $\mu\text{g/gauss}$ at 50 to 60 Hz
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak
- IEC: 529, IP 67

Physical

- Dimensions: See drawing
- Weight:
 - Sensor without cable: 210 g (7.4 oz.)
 - Sensor with cable: 410 g (14.5 oz.)
- Case material: 304 stainless steel
- Mounting: M6 $\times$ 1 and 1/4-28 UNF socket head cap screws provided
- Mounting torque: 6 Nm (50 in. lbs.)
- Cable: Integral cable, 5 m (16.4 ft.) length
- Wire specification: 0,32 mm² (AWG 22) stranded tin copper (seven strands at 0,05 mm² each)
- Connections:
 - White: ACCEL signal/power
 - Black: ACCEL/TEMP signal ground (GND)
 - Red: TEMP signal high
 - Blank twisted wire: Screen connected to internal shield

Ordering information

CMPT 2310T	Acceleration and temperature sensor for mining industry with 5 meter (16,4 ft) integral braided cable, side exit.
CMPT 2310Tx10	Acceleration and temperature sensor for mining industry with 10 meter (33 ft) integral braided cable, side exit.
CMPT 2310Tx15	Acceleration and temperature sensor for mining industry with 15 meter (50 ft) integral braided cable, side exit.

- 1/4-28 and M6 $\times$ 1 socket head cap screws provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMPT 2323T

Sensor for mining industry, side exit, acceleration and temperature

The CMPT 2323T is a physically rugged accelerometer optimized for use in heavy-duty environments in the following industries:

- Mining
- Mineral Processing
- Cement

In these industries, dust, mud and flying debris are commonplace, together with low rotational speeds. When used on shakers and screens, the accelerometer must also withstand high levels of continuous and random vibration. The sensor uses an integral cable with stainless over-braid for mounting where protective conduit is not available.

A higher sensitivity is used for detection of low amplitude signals in slow moving equipment.

Features

- For use with the SKF on-line system IMx-S, IMx-M, MCT and CTU
- 230 mV/g sensitivity
- Acceleration (mV/g) and temperature (mV/°C)
- Physically rugged
- Meets CE, EMC requirements
- Low profile, side exit industrial accelerometer with M6 × 1 and 1/4-28 UNF socket head cap screws provided
- 5 m (16.4 ft.) integral cable with stainless steel over-braid
- Corrosion resistant and hermetically sealed
- The internal sensor capsule is isolated from the machine ground
- Low noise, highly shock resistant
- Overload protected electronics



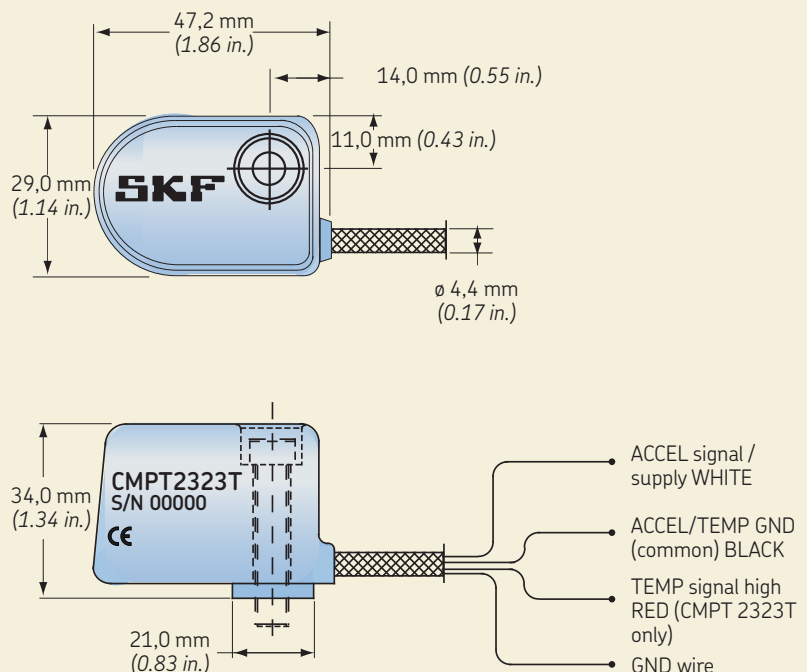
Specifications

Specifications conform to ISA-RP-37.2 (1-95) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 80 Hz.

Dynamic

- Sensitivity: 230 mV/g
- Sensitivity precision: ±10%
- Sensitivity deviation over full temperature range: 10%, approximately -5% at -50 °C (-60 °F) and +5% at +120 °C (+250 °F)
- Acceleration range: 70 g
- Amplitude linearity: < 1%, up to full scale
- Frequency range: 0,2 Hz to 10 kHz
- Transverse sensitivity: ≤ 5% of axial
- Temperature sensitivity: 10 mV/°C
- Temperature sensor measurement range: 0 to 120 °C (30 to 250 °F)
- Temperature precision: ±1,5 °C (±2.7 °F)

Dimensions



Electrical

- Power requirements:
 - Voltage source: 24 V DC nominal, 18 to 30 V DC
 - Constant current diode: 4 mA at 24 V, 2 to 10 mA is permissible.
- Electrical noise: < 1 mg RMS broadband 2,5 Hz to 25,0 kHz
- Bias output voltage: 11,5 V DC, $\pm 10\%$ for 24 V DC supply at 25 °C (75 °F)
- Grounding: Case isolated, internally shielded (Faraday cage)
 - Faraday cage connected to power supply return
- Over-voltage protection: Approximately 18 V DC
- Reverse polarity (wiring) protection installed

Environmental

- Temperature range:
 - Accelerometer measurement temperature range: –50 to +120 °C (–60 to +250 °F)
 - Maximum operating temperature: 120 °C (250 °F)
 - Storage temperature: –50 to +150 °C (–60 to +300 °F)
- Vibration limit: 70 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum:
 - < 100 $\mu\text{g/gauss}$ at 50 to 60 Hz
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak
- IEC: 529, IP 67

Physical

- Dimensions: See drawing
- Weight:
 - Sensor without cable: 210 g (7.4 oz.)
 - Sensor with cable: 410 g (14.5 oz.)
- Case material: 304 stainless steel
- Mounting: M6 $\times$ 1 and 1/4-28 UNF socket head cap screws provided
- Mounting torque: 6 Nm (50 in. lbs.)
- Cable: Integral cable, 5 m (16.4 ft.) length
- Wire specification: 0,32 mm² (AWG 22) stranded tin copper (seven strands at 0,05 mm² each)
- Connections:
 - White: ACCEL signal/power
 - Black: ACCEL/TEMP signal ground (GND)
 - Red: TEMP signal high
 - Blank twisted wire: Screen connected to internal shield

Ordering information

CMPT 2323T	Acceleration and temperature sensor for mining industry, 230 mV/g, with 5 meter (16,4 ft) integral braided cable, side exit.
CMPT 2323Tx10	Acceleration and temperature sensor for mining industry, 230 mV/g, with 10 meter (33 ft) integral braided cable, side exit.
CMPT 2323Tx15	Acceleration and temperature sensor for mining industry, 230 mV/g, with 15 meter (50 ft) integral braided cable, side exit.

- 1/4-28 and M6 $\times$ 1 socket head cap screws provided. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

Hazardous area approved sensors

- CMSS 786A-IS / CMSS 786A-D2 Agency approved accelerometer, straight exit
- CMSS 786F-IS / CMSS 786F-D2 Agency approved accelerometer with integral cable
- CMSS 787A-IS / CMSS 787A-M8-IS / CMSS 787A-D2 / CMSS 787A-M8-D2 Agency approved accelerometer, side exit
- CMSS 786T-IS / CMSS 786T-D2 Agency approved sensor, acceleration and temperature, straight exit
- CMSS 793-CA / CMSS 793-EE / CMSS 793-FM Superior, agency approved accelerometer, straight exit
- CMSS 797-CA / CMSS 797-EE / CMSS 797-FM Superior, agency approved accelerometer, ring mode, side exit
- CMPT 2310A / CMPT 2310TA Mining Group 1 Intrinsically Safe accelerometer (IECEx / ATEX certified)
- CMPT 2310AC / CMPT 2310ACT Mining Group 1 Intrinsically Safe accelerometer (IECEx ITA Australia certified)



CMSS 786A-IS /
CMSS 786A-D2



CMSS 786F-IS /
CMSS 786F-D2



CMSS 787A-IS /
CMSS 787A-M8-IS /
CMSS 787A-D2 /
CMSS 787A-M8-D2



CMSS 786T-IS /
CMSS 786T-D2 /



CMSS 793-CA /
CMSS 793-EE /
CMSS 793-FM



CMSS 797-CA /
CMSS 797-EE /
CMSS 797-FM



CMPT 2310A /
CMPT 2310TA



CMPT 2310AC /
CMPT 2310ACT

CMSS 786A-IS / CMSS 786A-D2

Agency approved accelerometer, straight exit

The CMSS 786A-IS / CMSS 786A-D2 is a cost-effective sensor for use in hazardous areas typically found in the following industries:

- Oil and Gas
- Refining
- Petrochemicals

Common applications include general purpose machines such as pumps, motors, fans and gearboxes. The CMSS 786A-IS is particularly suitable for the SKF Multilog On-line System DMx since, in this case, no additional barriers are required for use in hazardous areas.

Features

- Optimal for use with SKF on-line system DMx, WMx and IMx-M when used with the appropriate safety barriers, accessories and/or methods as required by the particular hazardous area classification
- Economical, top exit design
- Rugged, corrosion resistant and hermetically sealed
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Reverse wiring protection

Recommended connector/cable assembly

- CMSS 932 series

Specifications

Dynamic

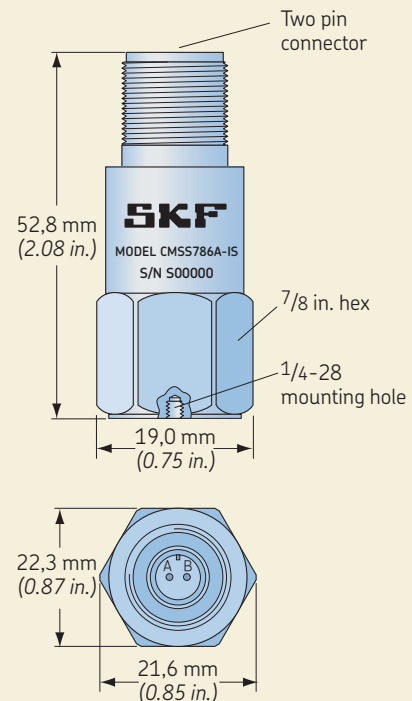
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 5\%$: 3,0 to 5 000 Hz
 - $\pm 10\%$: 1,0 to 9 000 Hz
 - ± 3 dB: 0,5 to 14 000 Hz
- Resonance frequency, mounted, nominal: 30 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph



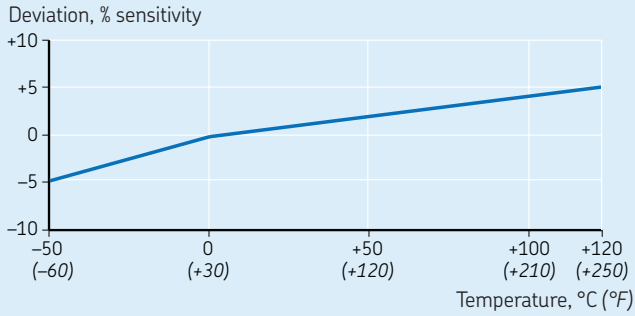
Electrical

- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode^{1), 2)}: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 700 μ g
 - Spectral:
 - 10 Hz: 10 μ g/ $\sqrt{\text{Hz}}$
 - 100 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
 - 1 000 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
- Output impedance: $< 100 \Omega$
- Bias output voltage: 12 V DC
- Grounding: Case isolated ($> 108 \Omega$ at 100 V), internally shielded

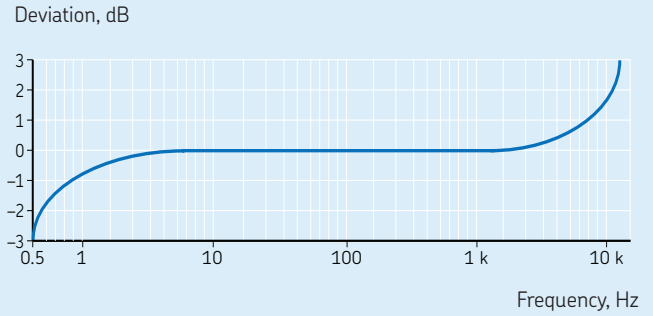
Dimensions



Typical temperature response



Typical frequency response



Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 70 µg/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0002 g/µstrain
- Certifications: CE, CSA and ATEX (see table)
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 90 g (3.2 oz.)
- Case material: 316L stainless steel
- Mounting: 1/4-28 tapped hole
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Shell: Ground
 - Pin A: Power/Signal
 - Pin B: Common
- Mating connector: CMSS 932-68LC or CMSS 932-68TL, two pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-DY-XXM, two conductor, twisted pair, single shielded, yellow or blue

¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Agency approvals for hazardous area

CMSS 786A-IS



Intrinsically Safe
Class I, Zone 0, AEx / Ex ia IIC; T4



Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1



ATEX Zone 0
II 1 G Ex ia IIC; T4

KEMA

Must be installed per drawing 12881.

CMSS 786A-D2



Non-incendive
Class I, Division 2, Groups A, B, C, D
Class I, Zone 2, Ex nA II; T4



ATEX Zone 2
II 3 G Ex nA II; T4

KEMA

Must be installed per drawing 13031.

Ordering information

CMSS 786A-IS Agency approved accelerometer, straight exit (intrinsically safe (IS) rated).

CMSS 786A-D2 Agency approved accelerometer, straight exit (non-incendive rated).

- Both models with MIL-C-5015 style two pin connector. 1/4-28 and M8 mounting studs provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMSS 786F-IS / CMSS 786F-D2

Agency approved accelerometer with integral cable

The CMSS 786F-IS / CMSS 786F-D2 is a cost effective sensor for use in hazardous areas typically found in the following industries:

- Oil and Gas
- Refining
- Petrochemicals

Common applications include general purpose machines such as pumps, motors, fans and gearboxes. The CMSS 786F-IS is particularly suitable for the SKF Multilog On-line System DMx since, in this case, no additional barriers are required for use in hazardous areas.

Features

- Optimal for use with SKF on-line system DMx, WMx, IMx-S and IMx-M when used with the appropriate safety barriers, accessories and/or methods as required by the particular hazardous area classification
- Economical, top exit design
- Rugged, corrosion resistant and hermetically-sealed
- Case isolation
- Meets stringent CE, EMC requirements
- ESD protection
- Reverse wiring protection

Specifications

Dynamic

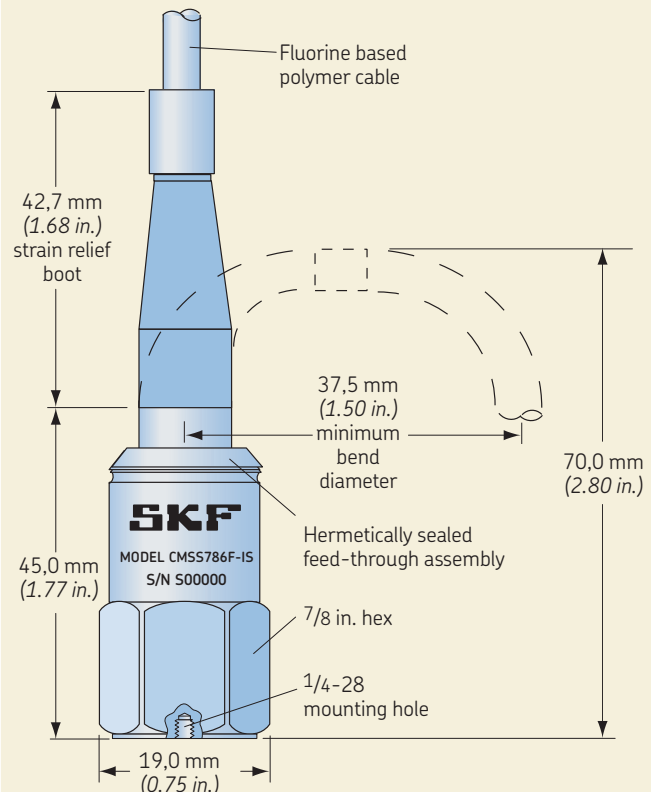
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 10\%$: 1,0 to 8 000 Hz
 - ± 3 dB: 0,5 to 13 000 Hz
- Resonance frequency, mounted, nominal: 30 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph

Electrical

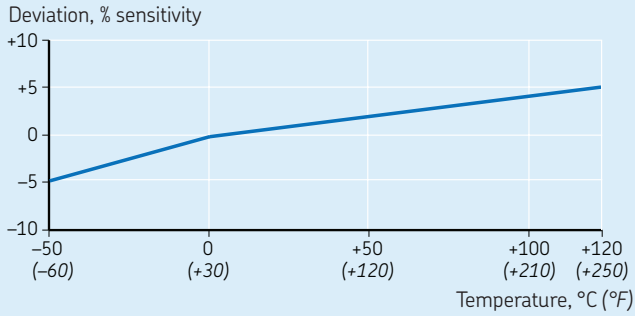
- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode¹⁾, ²⁾: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 700 μ g
 - Spectral:
 - 10 Hz: 10 μ g/ $\sqrt{\text{Hz}}$
 - 100 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
 - 1 000 Hz: 5 μ g/ $\sqrt{\text{Hz}}$



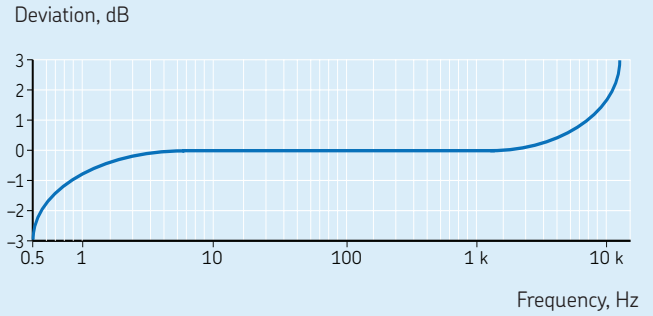
Dimensions



Typical temperature response



Typical frequency response



- Output impedance: < 100 Ω
- Bias output voltage: 12 V DC
- Grounding: Case isolated (> 108 Ω at 100 V), internally shielded

Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 70 μ g/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0002 g/ μ strain
- Certifications: CE, CSA and ATEX (see table)
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
 - Weight:
 - Sensor: 90 g (3.2 oz.)
 - Sensor with 5 m (16.4 ft.) integral cable supplied: 340 g (12 oz.)
 - Case material: 316L stainless steel
 - Mounting: 1/4-28 tapped hole
 - Mounting torque: 2,9 Nm (24 in. lbs.)
 - Connections:
 - Shell: Ground
 - Pin A: Power/Signal
 - Pin B: Common
- 1) To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).
- 2) A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Agency approvals for hazardous area

CMSS 786F-IS



Intrinsically Safe
Class I, Zone 0, AEx / Ex ia IIC; T4



Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1



ATEX Zone 0
II 1 G Ex ia IIC; T4

KEMA

Must be installed per drawing 12881.

CMSS 786F-D2



Non-incendive
Class I, Division 2, Groups A, B, C, D
Class I, Zone 2, Ex nA II; T4



ATEX Zone 2
II 3 G Ex nA II; T4

KEMA

Must be installed per drawing 13031.

Ordering information

CMSS 786F-IS Agency approved accelerometer with integral cable, intrinsically safe (IS) rated.

CMSS 786F-D2 Agency approved accelerometer with integral cable, non-incendive rated.

- Both models with 1/4-28 and M8 mounting studs provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMSS 787A-IS / CMSS 787A-M8-IS / CMSS 787A-D2 / CMSS 787A-M8-D2

Agency approved accelerometer with side exit

The CMSS 787A-IS / CMSS 787A-D2 is a cost-effective sensor for use in hazardous areas typically found in the following industries:

- Oil and Gas
- Refining
- Petrochemicals

Common applications include general purpose machines such as pumps, motors, fans and gearboxes. The CMSS 787A-IS is particularly suitable for the SKF Multilog On-line System DMx since, in this case, no additional barriers are required for use in hazardous areas.



Features

- Optimal for use with SKF on-line system DMx, WMx and IMx-M when used with the appropriate safety barriers, accessories and/or methods as required by the particular hazardous area classification
- Low profile, side exit design
- Rugged, corrosion resistant and hermetically sealed
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Reverse wiring protection

- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 700 µg
 - Spectral:
 - 10 Hz: 10 µg/√Hz
 - 100 Hz: 5 µg/√Hz
 - 1 000 Hz: 5 µg/√Hz
- Output impedance: < 100 Ω
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded

Recommended connector/cable assembly

- CMSS 932 series

Specifications

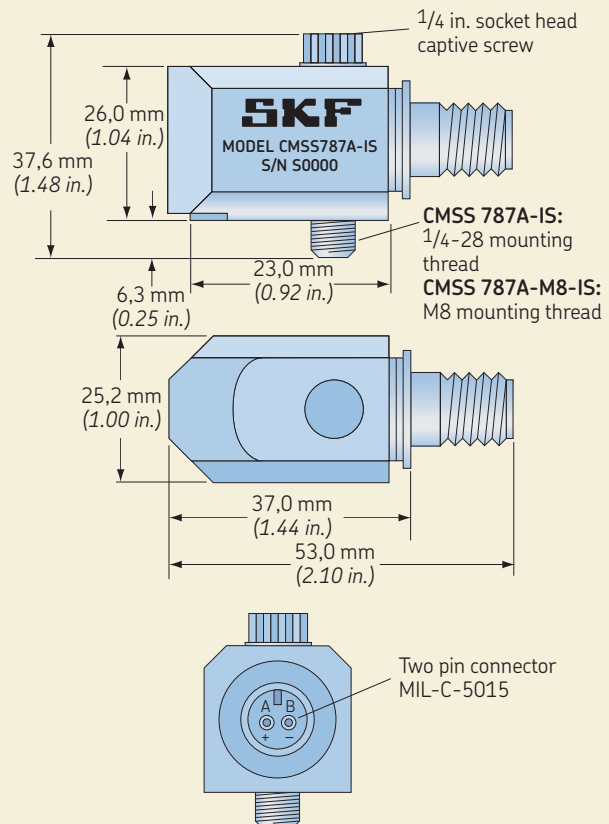
Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: ±5% at 25 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - ±10%: 1,0 to 5 000 Hz
 - ±3 dB: 0,7 to 10 000 Hz
- Resonance frequency, mounted, nominal: 22 kHz
- Transverse sensitivity: ≤ 5% of axial
- Temperature response: See graph

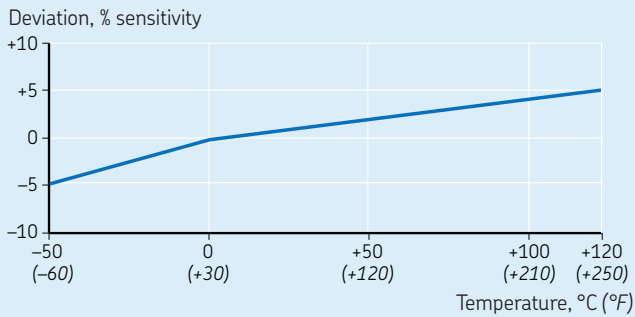
Electrical

- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode¹⁾, ²⁾: 2 to 10 mA

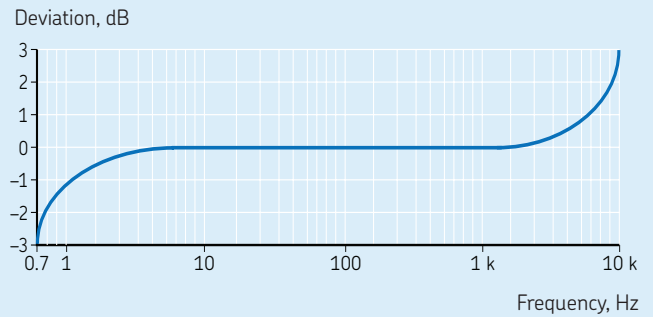
Dimensions



Typical temperature response



Typical frequency response



Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 70 µg/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0002 g/µstrain
- Certifications: CE, CSA and ATEX (see table)
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 90 g (3.2 oz.)
- Case material: 316L stainless steel
- Mounting: With 1,5 mm (0.06 in.) diameter safety wire hole
 - CMSS 787A-IS: 1/4-28 tapped hole
 - CMSS 787A-M8-IS: M8 captive screw
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Shell: Ground
 - Pin A: Power/Signal
 - Pin B: Common
- Mating connector: CMSS 932-68LC or CMSS 932-68TL, two pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-DY-XXM, two conductor, twisted pair, single shielded, yellow or blue

- ¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).
- ²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Agency approvals for hazardous area

CMSS 787A-IS / CMSS 787A-M8-IS



Intrinsically Safe
Class I, Zone 0, AEx / Ex ia IIC; T4



Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1



ATEX Zone 0
II 1 G Ex ia IIC; T4

KEMA

Must be installed per drawing 12881.

CMSS 787A-D2 / CMSS 787A-M8-D2



Non-incendive
Class I, Division 2, Groups A, B, C, D
Class I, Zone 2, Ex nA II; T4



ATEX Zone 2
II 3 G Ex nA II; T4

KEMA

Must be installed per drawing 13031.

Ordering information

CMSS 787A-IS Agency approved accelerometer with side exit, intrinsically safe (IS) rated.

CMSS 787A-D2 Agency approved accelerometer with side exit, non-incendive rated.

- Both models with MIL-C-5015 style two pin connector. 1/4-28 captive hex head screw. Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMSS 787A-M8-IS Agency approved accelerometer with side exit, intrinsically safe (IS) rated.

CMSS 787A-M8-D2 Agency approved accelerometer with side exit, non-incendive rated.

- Both models with MIL-C-5015 style two pin connector. M8 captive hex head screw. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMSS 786T-IS / CMSS 786T-D2

Agency approved sensor, acceleration and temperature, straight exit

The CMSS 786T-IS / CMSS 786T-D2 is a cost-effective, dual output sensor ideal for applications where both vibration and surface temperature measurements are required. The sensor is suitable for use in hazardous areas typically found in the following industries:

- Oil and Gas
- Refining
- Petrochemicals

Common applications include general purpose machines such as pumps, motors, fans and gearboxes. The CMSS 786T-IS is particularly suitable for the SKF Multilog On-line System DMx, and the CMSS 786T-D2 is suitable for the Machine Condition Transmitters (MCT), as in both cases no additional barriers are required for use in hazardous areas.

Features

- Optimal for use with SKF on-line systems DMx, WMx, IMx-M and MCT when used with the appropriate safety barriers, accessories and/or methods as required by the particular hazardous area classification
- Economical, top exit design
- Rugged, corrosion resistant and hermetically sealed
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Reverse wiring protection

Recommended connector/cable assembly

- CMSS 933 series

Specifications

Dynamic

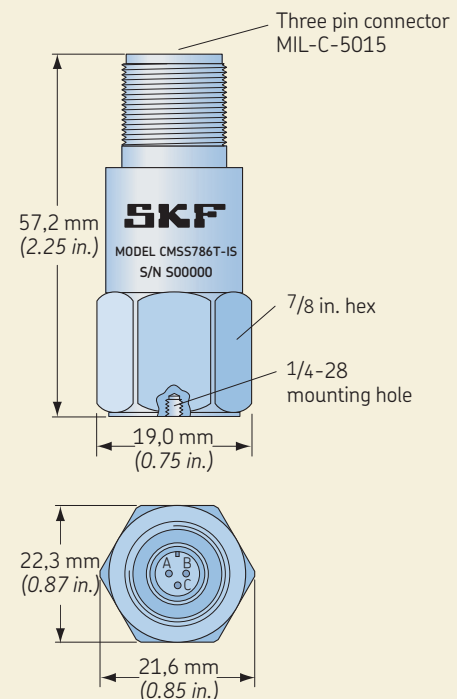
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 60 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 5\%$: 3,0 to 5 000 Hz
 - $\pm 10\%$: 1,0 to 7 000 Hz
 - ± 3 dB: 0,5 to 12 000 Hz
- Resonance frequency, mounted, nominal: 30 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph
- Temperature output sensitivity:
 - $\pm 1,5$ °C ($\pm 2,7$ °F): 10 mV/°C (18 mV/°F)
- Temperature measurement range: 2 to 120 °C (36 to 250 °F)



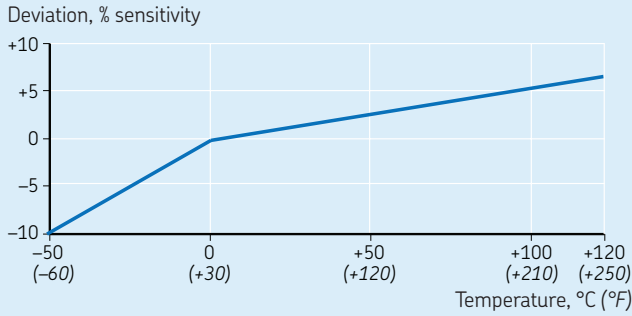
Electrical

- Power requirements:
 - Voltage source: 18 to 30 V DC
 - Constant current diode: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 700 μ g
 - Spectral:
 - 10 Hz: 10 μ g/ $\sqrt{\text{Hz}}$
 - 100 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
 - 1 000 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
- Output impedance: $< 100 \Omega$
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded

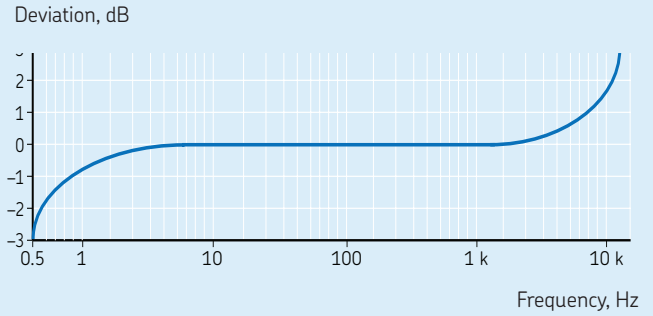
Dimensions



Typical temperature response



Typical frequency response



Environmental

- Temperature range: -50 to $+120$ °C (-60 to $+250$ °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 70 μ g/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0002 g/ μ strain
- Certifications: CE, CSA and ATEX (see table)
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 90 g (3.2 oz.)
- Case material: 316L stainless steel
- Mounting:
 - Internal $1/4$ -28 thread
 - M8 $\times$ 1,25 and $1/4$ -28 to $1/4$ -28 mounting studs provided
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Pin A: Accelerometer signal/power
 - Pin B: Accelerometer and temperature signal common
 - Pin C: Temperature sensor signal
- Mating connector: CMSS 933-68LC or CMSS 933-68TL, three pin, IP 68 locking collar or twist lock or three pin MIL-C-5015 style
- Recommended cable: CMSS 933-SY-XXM, three conductor, triad cable, single shielded, yellow

Agency approvals for hazardous area

CMSS 786T-IS



Intrinsically Safe
Class I, Zone 0, AEx / Ex ia IIC; T4



Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1



ATEX Zone 0
II 1 G Ex ia IIC; T4
Must be installed per drawing 12882.

CMSS 786T-D2



Non-incendive
Class I, Division 2, Groups A, B, C, D
Class I, Zone 2, Ex nA II; T4



ATEX Zone 2
II 3 G Ex nA II; T4
Must be installed per drawing 13032.

Ordering information

CMSS 786T-IS Agency approved sensor, acceleration and temperature, straight exit, intrinsically safe (IS) rated.

CMSS 786T-D2 Agency approved sensor, acceleration and temperature, straight exit, non-incendive rated.

- Both models with MIL-C-5015 style three pin connector. $1/4$ -28 and M8 mounting studs provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMSS 793-CA / CMSS 793-EE / CMSS 793-FM

Superior, agency approved accelerometer,
straight exit

The CMSS 793-CA, CMSS 793-EE and CMSS 793-FM are superior acceleration sensors with a top exit, two pin connector and agency approvals. They are based on the CMSS 793 sensor specifications.

Features

- Agency approval
 - CMSS 793-CA: Canadian Standards Association (CSA) Class I, II, III, Division 1 certification
 - CMSS 793-EE: ATEX Zone 0 intrinsically safe (IS) certification
 - CMSS 793-FM: Factory Mutual (FM) intrinsically safe (IS) certification
- Ground isolated
- Rugged construction
- Corrosion resistant and hermetically sealed for installation in high humidity areas
- ESD protection
- Reverse wiring protection

For more information about this hazardous area approved sensor, refer to the section *Industrial accelerometers for widespread applications* (→ page 16).



Agency approvals for hazardous area

CMSS 793-CA

Class I, Division 1, Groups A, B, C, D



CSA

Must be installed per drawing 31256700.

CMSS 793-EE

ATEX Zone 0

II 1 G

Ex ia IIC T4 Ga ($T_a = -50$ to $+120$ °C (-60 to $+250$ °F))



SIRA

Must be installed per drawing 11535.

CMSS 793-FM

Intrinsically Safe

Class I, II, III, Division 1, Groups A, B, C, D, E, F, G

NI

Class I, II, III, Division 2, Groups A, B, C, D, F, G



FM

Must be installed per document drawing set 31533600.

Ordering information

CMSS 793-CA Superior, CSA approved accelerometer, straight exit.

CMSS 793-EE Superior, ATEX approved accelerometer, straight exit.

CMSS 793-FM Superior, FM approved accelerometer, straight exit.

- 1/4–28 mounting studs are provided for all models. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

Optional accessories

CMSS 908-MD Medium duty magnetic base

CMSS 797-CA / CMSS 797-EE / CMSS 797-FM

Superior, agency approved accelerometer,
ring mode, side exit

The CMSS 797-CA, CMSS 797-EE and CMSS 797-FM are superior acceleration sensors with a side exit, two pin connector and agency approvals. They are based on the CMSS 797 sensor specification.

Features

- Agency approval
 - CMSS 797-CA: Canadian Standards Association (CSA) Class I, II, III, Division 1 certification
 - CMSS 797-EE: ATEX Zone 0 intrinsically safe (IS) certification
 - CMSS 797-FM: Factory Mutual (FM) intrinsically safe (IS) certification
- Rugged construction
- Corrosion resistant and hermetically sealed for installation in high humidity areas
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Reverse wiring protection

For more information about this hazardous area approved sensor, refer to the section *Industrial accelerometers for widespread applications* (→ page 16).



Agency approvals for hazardous area

CMSS 797-CA



CSA

Class I, Division 1, Groups A, B, C, D

Must be installed per drawing 31256700.

CMSS 797-EE



SIRA

ATEX Zone 0

II 1 G

Ex ia IIC T4 Ga ($T_a = -50$ to $+120$ °C (-60 to $+250$ °F))

Must be installed per drawing 11537.

CMSS 797-FM



Intrinsically Safe

Class I, II, III, Division 1, Groups A, B, C, D, E, F, G

NI

Class I, II, III, Division 2, Groups A, B, C, D, F, G

Must be installed per document drawing set 31533600.

Ordering information

CMSS 797-CA Superior, CSA approved accelerometer, ring mode, side exit.

CMSS 797-EE Superior, ATEX approved accelerometer, ring mode, side exit.

CMSS 797-FM Superior, FM approved accelerometer, ring mode, side exit.

- 1/4–28 captive hex head screws are provided for all models. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMPT 2310A / CMPT 2310TA

Ex Mining Group 1 Intrinsically Safe accelerometer (IECEx / ATEX certified)

The CMPT 2310A / CMPT 2310TA models are piezoelectric accelerometer sensors especially made for the monitoring of machinery operating in hazardous mining environments. They are highly reliable with their high shock limit, excellent thermal stability and minimum mass loading effects.

The CMPT 2310TA model sensors includes a precision integrated circuit temperature sensor. The CMPT 2310TA temperature output voltage is linearly proportional to the temperature (°C) and does not require external calibration or trimming to provide high accuracy over the full 0 to +110 °C temperature range.

The CMPT 2310A / CMPT 2310TA sensors are hermetically sealed in a stainless steel body and have an integral stainless steel wire over-braided cable. The sensors have low profile housing and a side exit integral cable for use in a wide range of industrial applications where harsh operating conditions and limited mounting space prevail. The stainless steel and hermetic construction makes them suitable in corrosive and wet environments. The sensor cable is double insulated and highly resistant to abrasion and wear. It has excellent signal transmission characteristics, low capacitance, redundant shielding and high mechanical durability. The transducer and internal cable shield/ground are isolated from the sensor housing to prevent ground loops.

The Intrinsic Safe CMPT 2310A / CMPT 2310TA sensors can be used with any Intrinsic Safe portable vibration data collector having the allowable terminal and isolation parameters, as defined in the features section.



- Integral 5 meters (16.4 feet) stainless steel wire over-braided shielded cable
- Straightforward sensor interface with color-coded cabling
- Standard mounting techniques, utilizing a low profile side exit cable with recessed mounting screws
- The internal sensor capsule is isolated from the machine ground
- Low noise, highly shock resistant, and overload protected electronics

Certified to the following standards

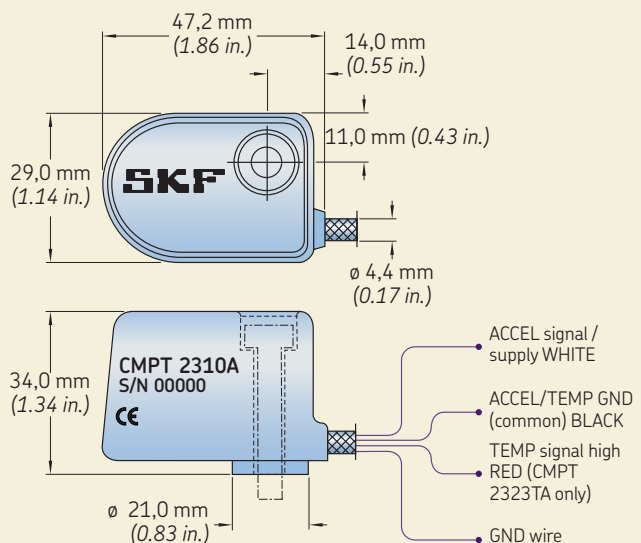
- IEC Standards for IECEx
 - IEC 60079-0:2011
 - IEC 60079-11:2011
- Essential Health and Safety Requirements for ATEX
 - EN 60079-0:2012
 - EN 60079-11:2012
 - EN 50303:2000

Features



- ATEX certification: I M 1 Ex ia I Ma (-50 °C ≤ Ta ≤ +110 °C)
- IECEx certification: Ex ia I Ma (-50 °C ≤ Ta ≤ +110 °C)
- IP 67
- 100 mV/g sensitivity
- CMPT 2310TA includes an integral temperature sensor (10 mV/°C)
- Rugged design, stainless steel hermetically sealed sensor housing

Dimensions



Specifications

Specifications conform to ISA-RP-37.2 (1-95) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 80 Hz.

Sensor Accelerometer (CMPT 2310A / CMPT 2310TA)

- Mounted base resonance: 22 kHz (nominal)
- Sensitivity: 100 mV/g, $\pm 10\%$, nominal 80 Hz at 22 °C (72 °F)
- Frequency response: 2 Hz to 10 kHz, $\pm 5\%$, 0,8 Hz to 15 kHz
- Isolation: Base isolated
- Acceleration output range: 70 g
- Transverse sensitivity: <5% of axial
- Accelerometer measurement temperature range: -50 to +110 °C (-58 to +230 °F)

Sensor – Temperature (CMPT 2310TA)

- Sensitivity: 10 mV/°C
- Temperature sensor measurement range: 0 to +110 °C (32 to +230 °F)

Electrical

- Power requirements:
 - Voltage source: +24 V DC nominal, +18 to +30 V DC
 - Constant current diode: 4 mA DC at +24 V DC, 2 to 10 mA is permissible
- Acceleration sensor electrical noise: <1 mg RMS broadband 2,5 Hz to 25,0 kHz
- Acceleration sensor bias output voltage: 11,5 V DC, $\pm 10\%$ for +24 V DC supply at 25 °C (77 °F)
- Over-voltage protection: Approximately 18 V DC
- Reverse polarity (wiring) Protection installed
- Settling time: 2 seconds
- Output impedance: 200 Ohms maximum
- Case isolation: $>10^8$ Ohms at 500 V

Wire connections (CMPT 2310A)

- White: ACCEL signal/power (connected to constant current source)
- Black: ACCEL signal ground (GND)
- Drain wire: Screen connected to internal shield (isolated from case)

Wire connections (CMPT 2310TA)

- White: ACCEL signal/power (connected to constant current source)
- Black: ACCEL signal ground (GND)
- Red: Temperature signal high
- Drain wire: Screen connected to internal shield (isolated from case)

Environmental

- Storage temperature range: -50 to +110 °C (-58 to +230 °F)
- Vibration limit: 70 g peak
- Shock limit: 5 000 g
- Electromagnetic sensitivity, equivalent g, maximum: <100 μ g/gauss at 50 to 60 Hz
- Emissions: EN 61000-6-4:2001
- Immunity: EN 61000-6-2:1999

- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak
- IEC: 529, IP 67

Physical

- Dimensions: See drawing
- Weight: Sensor with cable 410 g (14.5 oz.)
- Case material: 304 stainless steel
- Sensing element/construction: PZT/Compression
- Mounting: M6 TM 1 (30 mm long) and 1/4-28 UNF (1.25 in. long) socket head cap screws included
- Mounting torque: 6 Nm (50 in. lbs.)
- Cable: Integral cable, 5 m (16.4 ft.)
- Wire specification: 0,32 mm² (AWG 22) stranded tin copper (seven strands at 0,02 mm² each)

Intrinsically Safe Requirements

- Cable: Integral cable, 5 m (16.4 ft.)
- Certificate details: Group I
 - IECEx BAS 08.0087, Ex ia I Ma (-50 °C $\leq$ Ta $\leq$ +110 °C)
 - Baseefa08ATEX0268, I M 1 Ex ia I Ma (-50 °C $\leq$ Ta $\leq$ +110 °C)
- Terminal parameters: U_i = 28 V, I_i = 93 mA, P_i = 0.65 W
- 500 V isolation: Units will pass a 500 V Isolation Test
- Equipment: The equipment must be returned to the manufacturer for maintenance or replacement
 - Address:
SKF Condition Monitoring Centre (Livingston) Ltd
2 Michaelson Square, Kirkton Campus,
Livingston, United Kingdom EH54 7DP

Ordering information

Standard sensor, 5 m (16.4 ft.) configuration*

Sensor with 5 m (16.4 ft.) integral cable, 1/4-28 and M6 TM 1 socket head cap screws provided.

- **CMPT 2310A** Sensor for mining industry, side exit and acceleration.
- **CMPT 2310TA** Sensor for mining industry, side exit, acceleration and temperature.

10 m (32.8 ft.) configuration*

Sensor with 10 m (32.8 ft.) integral cable, 1/4-28 and M6 TM 1 socket head cap screws provided.

- **CMPT 2310A-10** Sensor for mining industry, side exit and acceleration.
- **CMPT 2310TA-10** Sensor for mining industry, side exit, acceleration and temperature.

15 m (49.2 ft.) configuration*

Sensor with 15 m (49.2 ft.) integral cable, 1/4-28 and M6 TM 1 socket head cap screws provided.

- **CMPT 2310A-15** Sensor for mining industry, side exit and acceleration.
- **CMPT 2310TA-15** Sensor for mining industry, side exit, acceleration and temperature.

* Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

CMPT 2310AC / CMPT 2310ACT

Ex Mining Group 1 Intrinsically Safe accelerometer (IECEx ITA Australia certified)

The CMPT 2310AC / CMPT 2310ACT models are piezoelectric accelerometer sensors especially made for the monitoring of machinery operating in hazardous mining environments. They are highly reliable with their high shock limit, excellent thermal stability and minimum mass loading effects.

The CMPT 2310ACT model sensors includes a precision integrated circuit temperature sensor. The CMPT 2310ACT temperature output voltage is linearly proportional to the temperature (°C) and does not require external calibration or trimming to provide high accuracy over the full 0 to +110 °C temperature range.

The CMPT 2310AC / CMPT 2310ACT sensors are hermetically sealed in a stainless steel body and have an integral stainless steel wire over-braided cable. The sensors have low profile housing and a side exit integral cable for use in a wide range of industrial applications where harsh operating conditions and limited mounting space prevail. The stainless steel and hermetic construction makes them suitable in corrosive and wet environments. The sensor cable is double insulated and highly resistant to abrasion and wear. It has excellent signal transmission characteristics, low capacitance, redundant shielding and high mechanical durability. The transducer and internal cable shield/ground are isolated from the sensor housing to prevent ground loops.

The Intrinsic Safe CMPT 2310AC / CMPT 2310ACT sensors can be used with any Intrinsic Safe portable vibration data collector having the allowable terminal and isolation parameters, as defined in the features section.



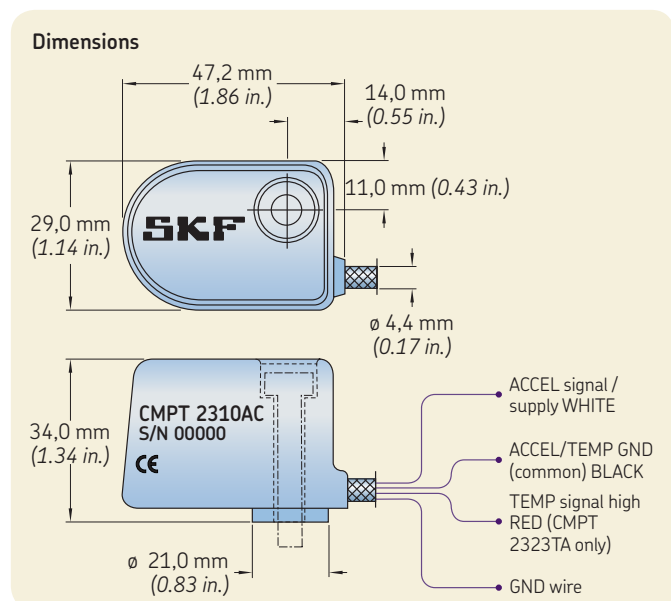
- Integral 5 meters (16.4 feet) stainless steel wire over-braided shielded cable
- Straightforward sensor interface with color-coded cabling
- Standard mounting techniques, utilizing a low profile side exit cable with recessed mounting screws
- The internal sensor capsule is isolated from the machine ground
- Low noise, highly shock resistant, and overload protected electronics

Certified to the following standards

- IEC Standards for IECEx
 - IEC 60079-0:2011
 - IEC 60079-11:2011

Features

- IECEx certification: Ex ia I Ma (–50 °C ≤ Ta ≤ +110 °C)
- IP 67
- 100 mV/g sensitivity
- CMPT 2310ACT includes an integral temperature sensor (10 mV/°C)
- Rugged design, stainless steel hermetically sealed sensor housing



Specifications

Specifications conform to ISA-RP-37.2 (1-95) and are typical values referenced at 24 °C (75 °F), 24 V DC supply, 4 mA constant current and 80 Hz.

Sensor Accelerometer (CMPT 2310AC / CMPT 2310ACT)

- Mounted base resonance: 22 kHz (nominal)
- Sensitivity: 100 mV/g, $\pm 10\%$, nominal 80 Hz at 22 °C (72 °F)
- Frequency response: 2 Hz to 10 kHz, $\pm 5\%$, 0,8 Hz to 15 kHz
- Isolation: Base isolated
- Acceleration output range: 70 g
- Transverse sensitivity: <5% of axial
- Accelerometer measurement temperature range: -50 to +110 °C (-58 to +230 °F)

Sensor – Temperature (CMPT 2310ACT)

- Sensitivity: 10 mV/°C
- Temperature sensor measurement range: 0 to +110 °C (32 to +230 °F)

Electrical

- Power requirements:
 - Voltage source: +24 V DC nominal, +18 to +30 V DC
 - Constant current diode: 4 mA DC at +24 V DC, 2 to 10 mA is permissible
- Acceleration sensor electrical noise: <1 mg RMS broadband 2,5 Hz to 25,0 kHz
- Acceleration sensor bias output voltage: 11,5 V DC, $\pm 10\%$ for +24 V DC supply at 25 °C (77 °F)
- Over-voltage protection: Approximately 18 V DC
- Reverse polarity (wiring) Protection installed
- Settling time: 2 seconds
- Output impedance: 200 Ohms maximum
- Case isolation: $>10^8$ Ohms at 500 V

Wire connections (CMPT 2310AC)

- White: ACCEL signal/power (connected to constant current source)
- Black: ACCEL signal ground (GND)
- Drain wire: Screen connected to internal shield (isolated from case)

Wire connections (CMPT 2310ACT)

- White: ACCEL signal/power (connected to constant current source)
- Black: ACCEL signal ground (GND)
- Red: Temperature signal high
- Drain wire: Screen connected to internal shield (isolated from case)

Environmental

- Storage temperature range: -50 to +110 °C (-58 to +230 °F)
- Vibration limit: 70 g peak
- Shock limit: 5 000 g
- Electromagnetic sensitivity, equivalent g, maximum: <100 μ g/gauss at 50 to 60 Hz
- Emissions: EN 61000-6-4:2001
- Immunity: EN 61000-6-2:1999

- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak
- IEC: 529, IP 67

Physical

- Dimensions: See drawing
- Weight: Sensor with cable 410 g (14.5 oz.)
- Case material: 304 stainless steel
- Sensing element/construction: PZT/Compression
- Mounting: M6 TM 1 (30 mm long) and 1/4-28 UNF (1.25 in. long) socket head cap screws included
- Mounting torque: 6 Nm (50 in. lbs.)
- Cable: Integral cable, 5 m (16.4 ft.)
- Wire specification: 0,32 mm² (AWG 22) stranded tin copper (seven strands at 0,02 mm² each)

Intrinsically Safe Requirements

- Cable: Integral cable, 5 m (16.4 ft.)
- Certificate details: Group I
 - IECEx ITA 13.0008X, Ex ia I Ma (-50 °C to +110 °C)
- Terminal parameters: $U_i = 28$ V, $I_i = 93$ mA, $P_i = 0.65$ W
- 500 V isolation: Units will pass a 500 V Isolation Test
- Equipment: The equipment must be returned to the manufacturer for maintenance or replacement
 - Address:
SKF Condition Monitoring Centre (Livingston) Ltd
2 Michaelson Square, Kirkton Campus,
Livingston, United Kingdom EH54 7DP

Ordering information

Standard sensor, 5 m (16.4 ft.) configuration*

Sensor with 5 m (16.4 ft.) integral cable, 1/4-28 and M6 TM 1 socket head cap screws provided.

- **CMPT 2310AC** Sensor for mining industry, side exit and acceleration.
- **CMPT 2310ACT** Sensor for mining industry, side exit, acceleration and temperature.

10 m (32.8 ft.) configuration*

Sensor with 10 m (32.8 ft.) integral cable, 1/4-28 and M6 TM 1 socket head cap screws provided.

- **CMPT 2310AC-10** Sensor for mining industry, side exit and acceleration.
- **CMPT 2310ACT-10** Sensor for mining industry, side exit, acceleration and temperature.

15 m (49.2 ft.) configuration*

Sensor with 15 m (49.2 ft.) integral cable, 1/4-28 and M6 TM 1 socket head cap screws provided.

- **CMPT 2310AC-15** Sensor for mining industry, side exit and acceleration.
- **CMPT 2310ACT-15** Sensor for mining industry, side exit, acceleration and temperature.

* Calibration sensitivity is provided for each accelerometer package with nominal sensitivity etched on each unit.

Velocity sensors

- CMSS 793V series; CMSS 793V-CA / CMSS 793V-EE / CMSS 793V-FM Piezoelectric industrial velocity sensor, straight exit
- CMSS 797V Piezoelectric industrial velocity sensor, iso-ring, side exit
- CMSS 85 series High temperature velocity sensor



CMSS 793V series



CMSS 797V



CMSS 85 series

CMSS 793V CMSS 793V-CA / CMSS 793V-EE / CMSS 793V-FM

Piezoelectric industrial velocity sensor, straight exit

The CMSS 793V is a precision velocity sensor mainly for use in the following industries:

- Oil and Gas
- Refining
- Petrochemicals
- Power Generation

Corporate standards and practices in these industries often require the use of velocity transducers, and piezoelectric devices such as the CMSS 793V eliminate the moving parts associated with self-generating velocity sensors (which will lead to degradation over time). The CMSS 793V is an accelerometer with internal integration electronics in order to provide velocity as an output.

This series of sensor is one of the most long-standing models from SKF, with over 25 years of installed experience, together with a long track record of proven reliability. It is recommended for use when the vibration signal is to be used for machinery protection applications, where a higher precision may be required.

Common applications would include API 670 standard monitoring of pumps, fans and compressors.

Features

- Optimal for use with SKF on-line system DMx, IMx-M and MCT when used with the appropriate safety barriers, accessories and/or methods as required by the particular hazardous area classification
- Rugged, corrosion resistant and hermetically sealed
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Reverse wiring protection

Recommended connector/cable assembly

- CMSS 932 series

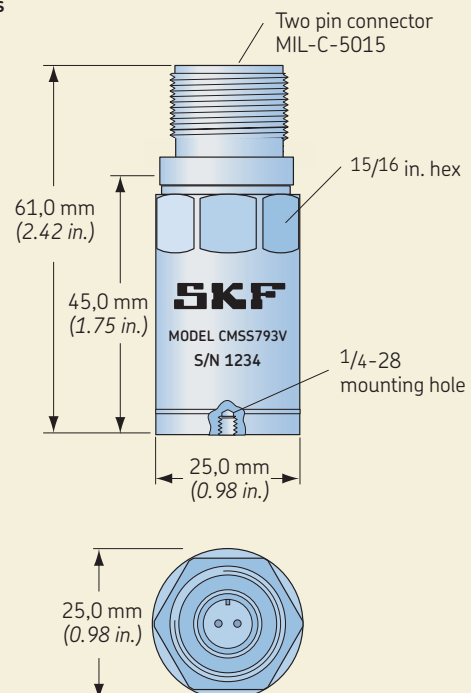


Specifications

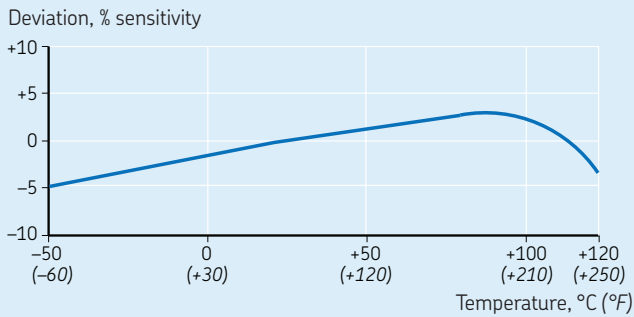
Dynamic

- Sensitivity: 100 mV/in./s
- Sensitivity precision: $\pm 10\%$ at 25 °C (75 °F)
- Velocity range: 50 in./s peak Amplitude non-linearity: 1%
- Frequency range:
 - 10%: 3,0 to 3 500 Hz
 - ± 3 dB: 2,5 to 7 000 Hz
- Resonance frequency, mounted, nominal: 15 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph

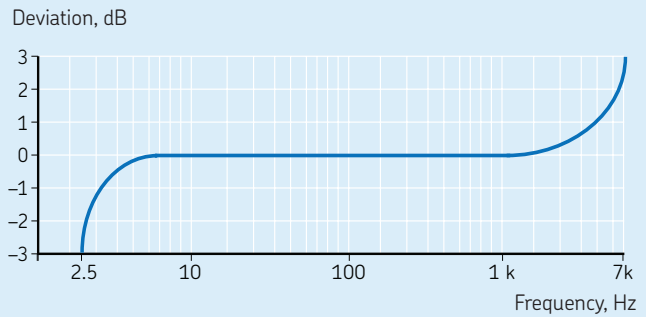
Dimensions



Typical temperature response



Typical frequency response



Electrical

- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode¹⁾, ²⁾: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 100 $\mu\text{in./s}$
 - Spectral:
 - 10 Hz: 10,0 $\mu\text{in./s}/\sqrt{\text{Hz}}$
 - 100 Hz: 1,0 $\mu\text{in./s}/\sqrt{\text{Hz}}$
 - 1 000 Hz: 0,2 $\mu\text{in./s}/\sqrt{\text{Hz}}$
- Output impedance: < 200 Ω
- Bias output voltage: 10 V DC
- Grounding: Case isolated, internally shielded
- Absolute phase shift, nominal: > 2°

Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F) operating temperature

Agency approvals for hazardous area

CMSS 793V-CA



Class I, Division 1, Groups A, B, C, D

Must be installed per drawing 31256700.

CMSS 793V-EE



ATEX Zone 0

II 1 G

Ex ia IIC T4 Ga ($T_a = -50$ to +120 °C (-60 to +250 °F))

Must be installed per drawing 11535.

CMSS 793V-FM



Intrinsically Safe

Class I, II, III, Division 1, Groups A, B, C, D, E, F, G

NI

Class I, II, III, Division 2, Groups A, B, C, D, F, G

Must be installed per document drawing set 31533600.

- Vibration limit: 250 g peak
- Shock limit: 2 500 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 25 $\mu\text{in./s/gauss}$
- Sealing: Hermetic
- Base strain sensitivity: 0,0005 $\mu\text{in./s}/\mu\text{strain}$
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 145 g (5.1 oz.)
- Case material: 316L stainless steel
- Mounting: 1/4-28 tapped hole
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Pin A: Power/Signal
 - Pin B: Common
- Mating connector: CMSS 932-68LC or CMSS 932-68TL, two pin, IP 68 locking collar or twist lock
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-SB-XXM, two conductor, twisted pair, single shielded, yellow or blue

¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Ordering information

CMSS 793V Piezoelectric industrial velocity sensor, straight exit.

- CMSS 793V-CA, CMSS 793V-EE or CMSS 793V-FM agency approved intrinsically safe (IS) version.
- All models with MIL-C-5015 style two pin connector. 1/4-28 mounting studs provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMSS 797V

Piezoelectric industrial velocity sensor, iso-ring, side exit

The CMSS 797V is a precision velocity sensor mainly for use in the following industries:

- Oil and Gas
- Refining
- Petrochemicals
- Power Generation

Corporate standards and practices in these industries often require the use of velocity transducers. Piezoelectric devices such as the CMSS 797V eliminate the moving parts associated with self-generating velocity sensors (which will lead to degradation over time). The CMSS 797V is an accelerometer with internal integration electronics in order to provide velocity as an output.

This series of sensor is one of the most long-standing models from SKF, with over 25 years of installed experience, together with a long track record of proven reliability. It is recommended for use when the vibration signal is to be used for machinery protection applications, where a higher precision may be required.

Common applications would include API 670 standard monitoring of pumps, fans and compressors.

Features

- Optimal for use with SKF on-line system DMx, IMx and MCT when used with the appropriate safety barriers, accessories and/or methods as required by the particular hazardous area classification
- Rugged, corrosion resistant and hermetically sealed
- Case isolated
- Meets stringent CE, EMC requirements
- ESD protection
- Reverse wiring protection

Recommended connector/cable assembly

- CMSS 932 series

Specifications

Dynamic

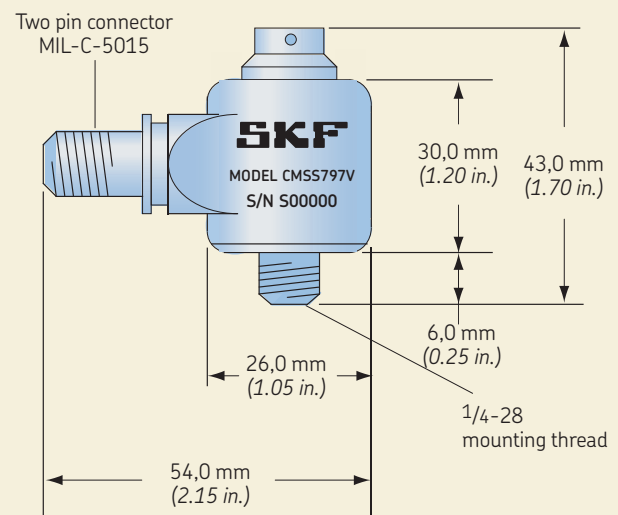
- Sensitivity: 100 mV/in./s
- Sensitivity precision: $\pm 10\%$ at 25 °C (75 °F)
- Velocity range: 50 in./s peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 10\%$: 2,0 to 3 500 Hz
 - ± 3 dB: 1,6 to 7 000 Hz
- Resonance frequency, mounted, nominal: 18 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph



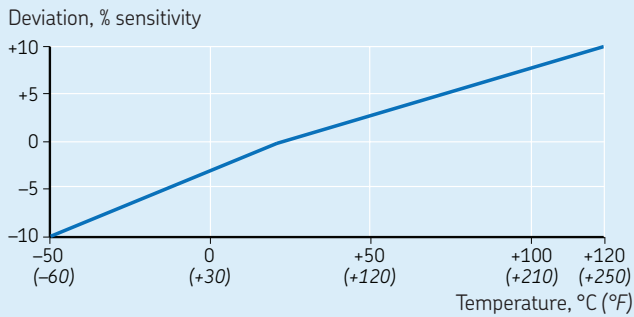
Electrical

- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode^{1), 2)}: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 100 μ in./s
 - Spectral:
 - 10 Hz: 10 μ in./s/ $\sqrt{\text{Hz}}$
 - 100 Hz: 0,8 μ in./s/ $\sqrt{\text{Hz}}$
 - 1 000 Hz: 0,1 μ in./s/ $\sqrt{\text{Hz}}$
- Output impedance: $< 200 \Omega$
- Bias output voltage: 10 V DC
- Grounding: Case isolated, internally shielded

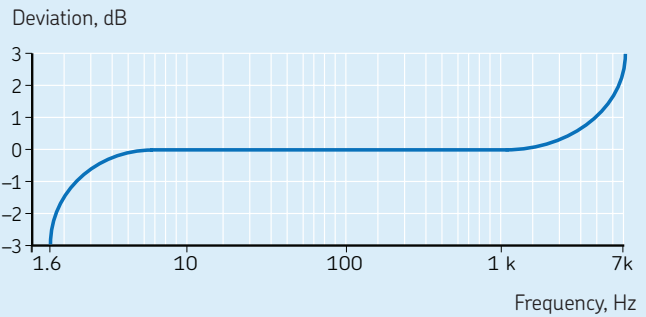
Dimensions



Typical temperature response



Typical frequency response



Environmental

- Temperature range: -50 to $+120$ °C (-60 to $+250$ °F) operating temperature
- Vibration limit: 250 g peak
- Shock limit: 2 500 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 5 μ in./s/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,004 in./s/ μ strain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 148 g (5.2 oz.)
- Case material: 316L stainless steel
- Mounting: $\frac{1}{4}$ -28 captive socket head screw
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Shell: Ground
 - Pin A: Power/Signal
 - Pin B: Common
- Mating connector: CMSS 932-68LC or CMSS 932-68TL, two pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-SB-XXM, two conductor, twisted pair, single shielded, yellow or blue

¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Ordering information

CMSS 797V Piezoelectric industrial velocity sensor, iso-ring, side exit.

- All models with MIL-C-5015 style two pin connector. $\frac{1}{4}$ -28 captive hex head screw mounting studs provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMSS 85 series

High temperature velocity sensor

The CMSS 85 series is a self-generating type velocity sensor mainly for use in the following industries:

- Oil and Gas
- Refining
- Petrochemicals
- Power Generation

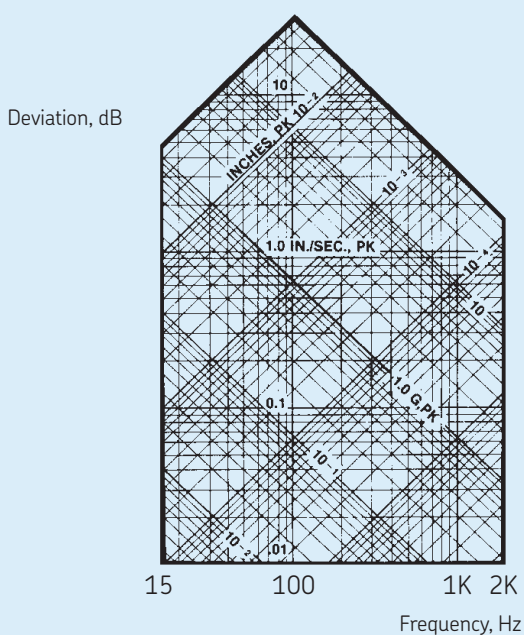
Corporate standards and practices in these industries often require the use of velocity transducers. The use of self-generating velocity sensors are often preferred by gas turbine original equipment manufacturers (OEM's). The CMSS 85 series is designed for the high temperature environment of the gas turbine casing and uses a friction-free, directionally independent design to maximize life and minimize error.

Features

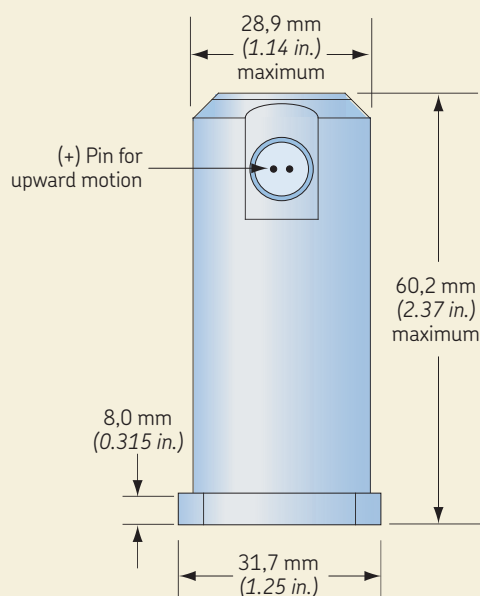
- Typical use on gas turbine engines
- Zero friction coil
- Hermetically sealed



Response limits



Dimensions



Specifications

- Axis orientation: Any
- Sensitivity: 145 mV/in./s
- Sensitivity precision: $\pm 5\%$
- Sensitivity versus temperature: Less than $0,02\%/^{\circ}\text{C}$ ($0,01\%/^{\circ}\text{F}$)
- Cross axis sensitivity: Less than 10%
- Acceleration range: 0 to 50 g
- Frequency range: 15 to 2 000 Hz
- Temperature limits: See temperature range table
- Displacement limits: 1,8 mm pk-pk ($0,07$ in. pk-pk)
- Damping (electromagnetic):
 - At 20°C (70°F): 0,80
 - At 200°C (390°F): 0,55
 - At 375°C (710°F): 0,40
- Case to coil isolation:
 - At 20°C (70°F): 100,0 M Ω minimum
 - At 200°C (390°F): 10,0 M Ω minimum
 - At 375°C (710°F): 1,0 M Ω minimum
- Sealing: Hermetic
- Dimensions: See drawing
- Weight: 213 g (7.5 oz.)
- Case material: Stainless steel

Temperature range

Model number	Temperature range	Coil resistance	Termination
CMSS 85-9	-55 to $+375^{\circ}\text{C}$ (-65 to $+710^{\circ}\text{F}$)	125 Ω	Two pin hermetically sealed connector
CMSS 85-10	-55 to $+375^{\circ}\text{C}$ (-65 to $+710^{\circ}\text{F}$)	125 Ω	Integral cable, 4,6 m (15 ft.)

Agency approvals for hazardous area

CMSS 85-9



Class I, Division 1, Groups A, B, C, D

Must be connected to CSA Certified Zener Barrier rated 22 V maximum, 300 Ω minimum, or 14 V maximum, 50 Ω minimum.

CMSS 85-10

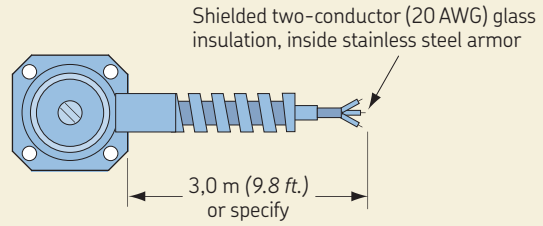


Class I, Division 1, Groups A, B, C, D

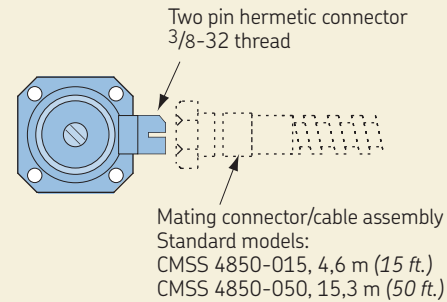
Must be connected to CSA Certified Zener Barrier rated 22 V maximum and 300 Ω minimum, or 14 V maximum and 50 Ω minimum.

Cable configurations

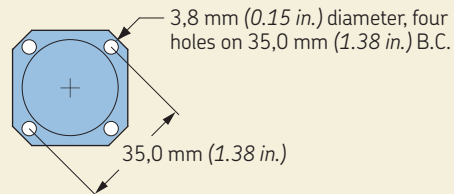
Fixed cable configuration



Connector configuration



Bottom view



Notes:

- The "015" in the model number of the cables designates the cable length. If other cable lengths are desired, specify the length in feet (i.e., 020, 025, etc.). It is preferred that cable lengths be ordered in increments of five feet, i.e., 015, 020, 025, etc.
- The termination of the cable end opposite the mating to the velocity transducer is trimmed wire only.
- The cable mating connectors are custom designed and proprietary assembled by the vendor and consequently are not available for on-site cable fabrication.

Ordering information

CMSS 85-9 High temperature velocity sensor, up to 375°C (710°F).
CMSS 85-10 High temperature velocity sensor with integral cable, up to 375°C (710°F).

Cables:

- **CMSS 4850-015** Armored 4,6 m (15 ft.) cable that mates to the CMSS 85-9 velocity sensor with the two pin connector.
- **CMSS 4850-015-593** Unarmored 4,6 m (15 ft.) cable with only 0,6 m (2 ft.) of the cable having armor at the velocity sensor end of the cable. This cable mates to the CMSS 85-9 velocity sensor with the two pin connector.

Portable analysis accelerometers

- CMSS 2200 / CMSS 2200-M8 Industrial accelerometer, side exit
- CMSS 2111 Small footprint accelerometer with integral cable
- CMSS 2114-K High frequency accelerometer kit
- CMSS 4370-K Triax accelerometer kit
- CMSS 2222 Intrinsically safe (IS) accelerometer for the SKF Micrologs



CMSS 2200 / CMSS 2200-M8



CMSS 2111



CMSS 2114-K



CMSS 4370-K



CMSS 2222

Data capture from a range of sources

SKF Microlog analyzers automatically collect both dynamic (vibration) and static (process) measurements from almost any source, including handheld and magnetically mounted accelerometers, permanently mounted vibration sensors or on-line monitoring systems. Temperature measurements can be collected with a non-contact infrared sensor or with a contact probe.



CMSS 2200 / CMSS 2200-M8

Industrial accelerometer, side exit

The CMSS 2200 and CMSS 2200-M8 industrial accelerometers, with their side exit and two pin connector, offer a low profile for machinery with limited clearance. The sensor mounts in any orientation.

Please refer to the *Industrial accelerometers for widespread applications* section earlier in this catalog for more information about this portable sensor.



Ordering information

CMSS 2200 Industrial accelerometer with side exit MIL-C-5015 two pin connector.

- 1/4-28 and M6 mounting studs provided. Calibration sensitivity and nominal sensitivity is provided for each accelerometer package.

CMSS 2200-M8 Industrial accelerometer with side exit MIL-C-5015 two pin connector.

- M8 mounting stud provided. Calibration sensitivity and nominal sensitivity is provided for each accelerometer package.

CMSS 2111

Small footprint accelerometer with integral cable

The CMSS 2111 is a small footprint accelerometer that includes an integrated 2 m (6.56 ft.) cable along with a magnetic mount.

Specifications

Dynamic

- Sensitivity: 100 mVg
- Sensitivity precision: $\pm 10\%$
- Measurement range: ± 50 g
- Frequency range (± 3 dB): 0,5 to 10 000 Hz
- Resonance frequency, mounted, nominal: 22 kHz
- Broadband resolution (1 to 10 000 Hz): 350 μ g
- Amplitude non-linearity: $\pm 1\%$
- Transverse sensitivity: $\leq 7\%$

Electrical

- Electrical noise:
 - Spectral:
 - 10 Hz: 8 μ g/ $\sqrt{\text{Hz}}$
 - 100 Hz: 5 μ g/ $\sqrt{\text{Hz}}$
 - 1 kHz: 4 μ g/ $\sqrt{\text{Hz}}$
- Output impedance: $< 150 \Omega$
- Bias output voltage: 8 to 12 V DC
- Settling time (within 1% of bias): $\leq 2,0$ s
- Discharge time constant: $\leq 0,3$ s
- Excitation voltage: 18 to 28 V DC
- Constant current diode: 2 to 20 mA
- Electrical connector: Molded integral cable
- Electrical connection position: Top

Environmental

- Temperature range (operating): -55 to $+120$ °C (-65 to $+250$ °F)
- Shock limit: 5 000 g peak
- Enclosure rating: IP 68
- Sealing: Molded

Physical

- Dimensions:
 - Accelerometer (hex $\times$ height): 14 $\times$ 64 mm (0.55 $\times$ 2.52 in.)
 - Magnetic mount: 25,4 $\times$ 25,9 mm (1.00 $\times$ 1.02 in.)
- Weight (with cable): 99,3 g (3.5 oz.)
- Case material: Stainless steel
- Sensing element: Ceramic
- Sensing geometry: Shear
- Mounting: Magnet
- Mounting thread (accelerometer and magnetic base): 1/4-28 tapped hole
- Magnetic mount pull strength: 156 N (35 lb.)
- Cable length: 2 m (6.56 ft.)
- Cable type: Polyurethane
- Connection: Fischer type 103 six pin

Note: Compatible with SKF Microlog models CMXA 70, CMXA 75, CMXA 80 and CMXA 50.



Ordering information

CMSS 2111 Small footprint accelerometer with an integrated cable and a magnetic mount; includes 1/4-28 stud and 1/4-28 to M6 adapter stud to connect the magnetic base to the accelerometer.

CMSS 2114-K

High frequency accelerometer kit

The CMSS 2114-K is a high frequency accelerometer kit that includes a high frequency cable with an adhesive mounting base.

Specifications

Dynamic

- Sensitivity: 10 mVg
- Sensitivity precision: $\pm 15\%$
- Measurement range: ± 500 g peak
- Amplitude non-linearity: $\leq 1\%$
- Frequency range (± 3 dB): 5 to 60 000 Hz
- Resonance frequency, mounted, nominal: ≥ 95 kHz
- Broadband resolution (1 to 10 000 Hz): 0,002 g RMS
- Transverse sensitivity: $\leq 5\%$

Electrical

- Electrical noise:
 - Spectral:
 - 10 Hz: 160 $\mu\text{g}/\sqrt{\text{Hz}}$
 - 100 Hz: 40 $\mu\text{g}/\sqrt{\text{Hz}}$
 - 1 kHz: 15 $\mu\text{g}/\sqrt{\text{Hz}}$
 - 10 kHz: 10 $\mu\text{g}/\sqrt{\text{Hz}}$
- Output impedance: $\leq 100 \Omega$
- Bias output voltage: 8 to 12 V DC
- Excitation voltage: 18 to 30 V DC
- Constant current diode: 2 to 20 mA
- Discharge time constant: 0,02 to 0,06 s
- Electrical connector: 5-44 Coaxial
- Electrical connection position: Top

Environmental

- Temperature range: -55 to $+120$ °C (-65 to $+250$ °F)
- Shock limit: 5 000 g peak
- Base strain sensitivity: $\leq 0,05$ g μ
- Sealing: Welded hermetic
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated "false equivalent g level" under the above test conditions should be less than 2 mg measured peak to peak

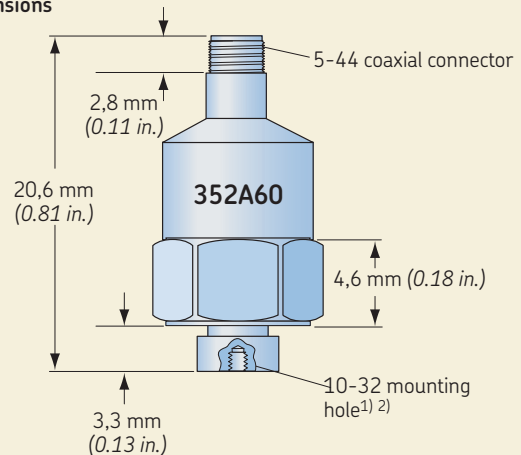


Physical

- Dimensions: See drawing
- Weight: 6,0 g (0.21 oz.)
- Case material: Stainless steel
- Sensing element: Ceramic
- Sensing geometry: Shear
- Mounting thread: 10-32, male
- Mounting torque: 1,13 to 2,25 Nm (10 to 20 in. lbs.)

Note: All specifications are at room temperature unless otherwise specified. Compatible with SKF Microlog models CMXA 70, CMXA 75, CMXA 80 and CMXA 50. Loctite 454 insensitive adhesive gel is the recommended adhesive. This item is not included in the kit

Dimensions



1) Stud removed for sensor with adhesive mount option.

2) M6 x 0,75 thread for Metric option

Kit contents

- 352A60: High frequency constant current accelerometer
- CMAC 5062: High frequency accelerometer cable, Fischer six pin to Microdot connector (5-44 coaxial connector)
- Adhesive mounting base



CMAC 5062 high frequency accelerometer cable

Adhesive mounting base

Ordering information

CMSS 2114-K High frequency accelerometer kit, including a high frequency accelerometer, cable and adhesive mounting base.

CMAC 4370-K

Triax accelerometer kit

SKF's triax accelerometer quickly and automatically measures horizontal, vertical and axial (triaxial) data with the press of a button. Triaxial measurements offer the user additional information on the condition of machinery, enabling a more complete diagnostic analysis. For example, measuring in a vertical direction often provides insight into how the shaft is restrained when considering bearing looseness. A horizontal orientation is preferred for bearing fault diagnosis and an axial measurement can provide clues as to the severity of shaft misalignment.

The SKF Microlog can acquire data simultaneously from all three axes. The triax accelerometer also enables measurement in any of the three axes where, in specialized cases, a single point accelerometer would be unable to measure data due to physical mounting restrictions or a difficult to access mounting surface.

For those who typically collect triaxial data, the sensor dramatically reduces data collection time. For users who up until now have collected only one data point per sensor location, triax offers the advantage of additional information for improved diagnostics. The triax accelerometer facilitates the efficient collection of accurate and repeatable machine data for enhanced decision making.



Specifications for triax accelerometer

Dynamic

- Sensitivity: 100 mVg
- Sensitivity precision: $\pm 5\%$
- Range full scale: 50 g, RMS
- Resolution (electrical noise): 0,0005 g, RMS
- Amplitude non-linearity: $\pm 1\%$, full scale maximum
- Frequency range:
 - $\pm 5\%$: 0,5 to 3 000 Hz
 - $\pm 10\%$: 0,3 to 5 000 Hz
 - ± 3 dB: 0,2 to 10 000 Hz
- Discharge time constant: 0,6 s
- Resonance frequency, mounted, nominal: 25 kHz
- Transverse sensitivity: $\leq 5\%$
- Strain sensitivity: 0,001 g per μstrain at 250/ $\mu\Omega$

Electrical

- Output impedance: $< 100 \Omega$
- Bias output voltage: 12 to 13 V DC
- Supply voltage range*: 18 to 30 V DC
- Supply current range: 2 to 20 mA
- Case ground isolation, signal/power ground pin to case: 10 M Ω

* Do not apply power to this instrument without current limiting in the range of 20 mA maximum. To do so will immediately destroy the integral amplifier. It is suggested that only SKF approved power units be utilized for powering this instrument.

Environmental

- Temperature range: -55 to $+120$ °C (-65 to $+250$ °F)
- Maximum vibration: 1 000 g, RMS
- Shock limit: 2 000 g peak
- Environmental seal: Welded / glass to metal seal / O-rings, hermetic
- Thermal coefficient of sensitivity: 0,03%/°F

Physical

- Dimensions (not including connector): $41 \times 41 \times 24$ mm ($1.625 \times 1.625 \times 0.950$ in.)
- Weight: 115 g (4 oz.)
- Mounting provision: Captive $\frac{1}{4}$ –28 mounting screw
- Connection, coaxial, radially mounted: Four pin MIL-C-26482, 8-4P
- Case material: Aluminum alloy
- Recommended magnetic base: CMSS 908-MD

Note: Compatible with SKF Microlog models CMXA 70, CMXA 75, CMXA 80 and CMXA 50.

Kit contents

- Triax accelerometer
- Anti-rotation pin mounted on the bottom surface of the sensor (the anti-rotation pin can be carefully unthreaded from the sensor so that it can be permanently mounted)
- CMAC 5009: Triaxial accelerometer cable
- CMAC 4300: Stud adapter
- CMSS 2620-3: Studs (three)
- Calibration certificate traceable to NIST



CMAC 5009 triaxial accelerometer cable



CMAC 4300 stud adapter



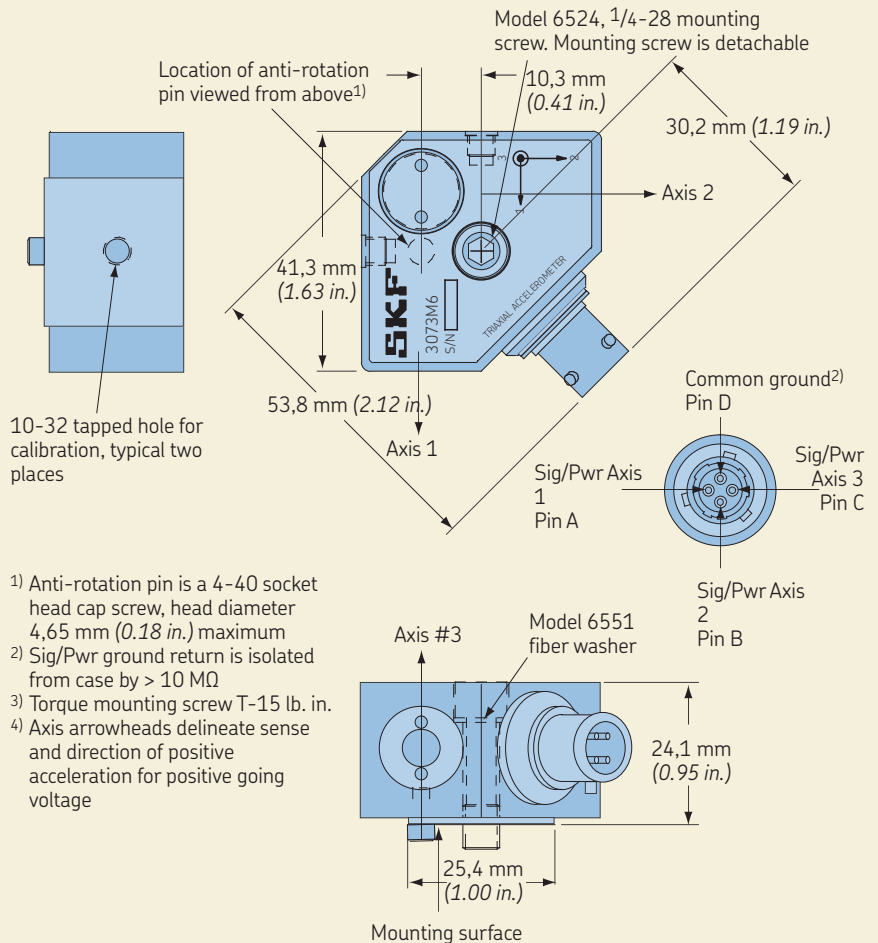
CMSS 2620-3 stud

Optional accessories



CMAC 9600-01 toolkit for 1/4-28 stud

Dimensions



- 1) Anti-rotation pin is a 4-40 socket head cap screw, head diameter 4,65 mm (0.18 in.) maximum
- 2) Sig/Pwr ground return is isolated from case by > 10 MΩ
- 3) Torque mounting screw T-15 lb. in.
- 4) Axis arrowheads delineate sense and direction of positive acceleration for positive going voltage

Ordering information

CMAC 4370-K Triax accelerometer kit. Each kit includes a triax accelerometer, triax accelerometer cable, stud adapter and three studs. A calibration certificate traceable to NIST is also supplied with each instrument.

Optional Accessories

CMAC 9600-01 Toolkit for 1/4-28 stud
CMSS 908-MD Medium duty magnetic base

CMSS 2222

Intrinsically safe (IS) accelerometer for the SKF Microlog series

The CMSS 2222 industrial accelerometer is intrinsically safe and is ATEX and IECEx Group I and II approved. The CMSS 2222 accelerometer is compatible with the CMXA 45/CMXA 48/CMXA 75/CMXA 80-Z2 (ATEX Zone 2) and CMXA 51-IS (Zone 0 and Mining) SKF Microlog series.

These approvals are most commonly needed in the following industries:

- Mining
- Petrochemicals
- Offshore
- Gas

Applications include Fans, Motors, Pumps, Compressors, Centrifuges, Conveyors, Air Handlers, Gearboxes, Rolls, Dyers, Presses, Cooling, HVAC, Spindles, Machine Tooling, Process Equipment and others.

Specifications

Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 10\%$ nominal at 80 Hz
- Frequency range: 2 Hz to 10 kHz $\pm 5\%$ (-3 dB at 0,8 Hz)
- Mounted base resonance: 22 kHz, nominal
- Isolation: Base isolated
- Transverse sensitivity: $< 5\%$

Electrical

- Electrical noise: 0,1 mg maximum
- Bias output voltage: 10 to 12 V DC
- Current range: 0,5 to 8 mA
- Output impedance: 200 Ohms, maximum
- Case isolation: > 108 Ohms at 500 Volts

Environmental

- Certified temperature range:
 - Ex ia IIC T6 Ga ($-55\text{ }^{\circ}\text{C} \leq T_a \leq +60\text{ }^{\circ}\text{C}$) (Gas)
 - Ex ia IIIC T80 $^{\circ}\text{C}$ IP65 Da ($-55\text{ }^{\circ}\text{C} \leq T_a \leq +60\text{ }^{\circ}\text{C}$) (Dust)*
 - Ex ia I Ma ($-55\text{ }^{\circ}\text{C} \leq T_a \leq +110\text{ }^{\circ}\text{C}$) (Mining)

* Although the sensor is Dust certified, the SKF Micrologs are not

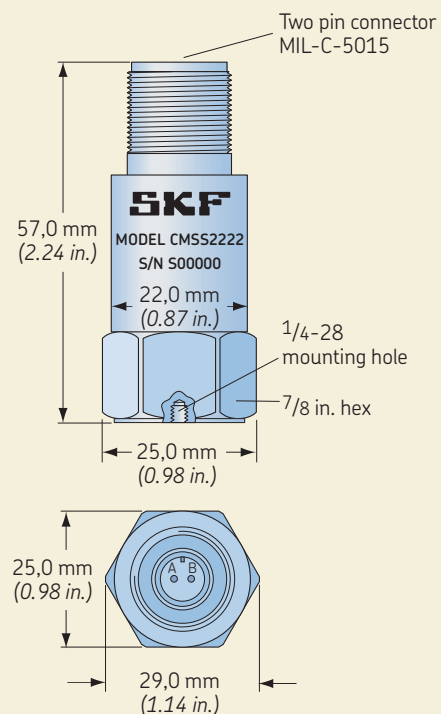
- Sensor Temperature Range: -55 to $+140\text{ }^{\circ}\text{C}$ (-65 to $+284\text{ }^{\circ}\text{F}$)
- Emissions: EN61000-6-4:2007, Electromagnetic compatibility (EMC, Generic standards – Emission standard for industrial environments)
- Immunity: EN61000-6-2:2005, Electromagnetic compatibility (EMC), Generic standards – Immunity for industrial environments



Physical

- Dimensions: See drawing
- Weight: 110 g (3.9 oz.), nominal
- Sealing: IP 67
- Mounting torque: 8 Nm (70.8 in. lbs.)
- Case material: Stainless steel
- Maximum shock: 5,000 g
- Recommended cable for CMXA 51-IS: CMAC 5115
- Recommended cable for CMXA 45/CMXA 48/CMXA 75/CMXA 80-Z2 (ATEX Zone 2): CMAC 5209
- Recommended magnetic base: CMSS 908-MD

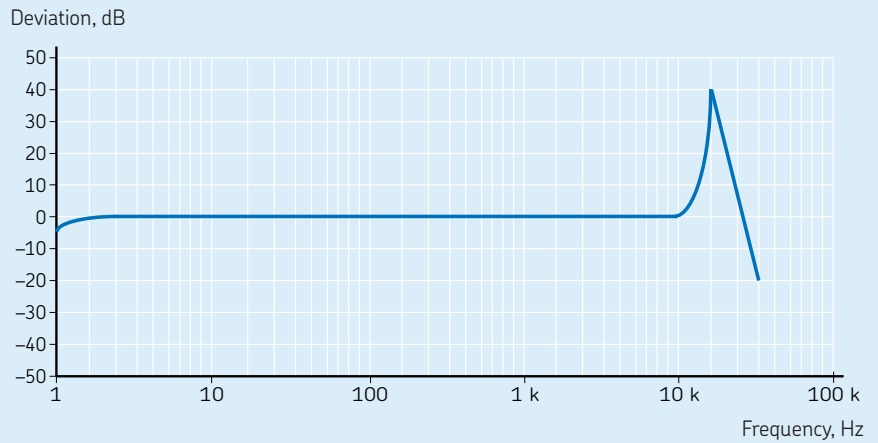
Dimensions



Intrinsically Safe Requirements

- Terminal parameters (connector only):
 - $U_i = 28\text{ V}$
 - $I_i = 93\text{ mA}$
 - $P_i = 0.65\text{ W}$
 - $C_i = 1.0\text{ nF}$
 - $L_i = \text{negligible}$
- Certificate details:
 - Group I
 - IECEx BAS07.0037X
 - Baseefa07ATEX0149X
 -  I M1
 - Ex ia I Ma
 - $(-55\text{ °C} \leq T_a \leq +110\text{ °C})$
 - Group II
 - IECEx BAS07.0035X
 - Baseefa07ATEX0144X
 -  II 1GD
 - Ex ia IIC T6 Ga
 - Ex ia IIIC T80 °C IP65 Da
 - $(-55\text{ °C} \leq T_a \leq +60\text{ °C})$

Typical frequency response



Ordering information

CMSS 2222 Intrinsically safe (IS) accelerometer for the SKF Microlog series

Optional accessories

CMSS 908-MD Medium duty magnetic base

Special purpose sensors

Low frequency accelerometers

- CMSS 793L / CMSS 793L-FM Low frequency accelerometer, straight exit
- CMSS 797L / CMSS 797L-FM Low frequency industrial accelerometer, ring mode, side exit
- CMSS 799LF Low frequency, filtered accelerometer

High frequency accelerometer

- CMSS 732A Medium-high frequency accelerometer, small diameter

Machine tool accelerometers

- CMSS MT-1 Machine tool industry accelerometer, low profile
- CMSS MT-3 Machine tool industry accelerometer, low profile, adhesive mount



CMSS 793L /
CMSS 793L-FM



CMSS 797L /
CMSS 797L-FM



CMSS 799LF



CMSS 732A



CMSS MT-1



CMSS MT-3

Special purpose sensors

Acceleration and AEE sensor

- CMSS 786M Industrial sensor, straight exit, acceleration and AEE

Small diameter accelerometer

- CMSS 726 Small diameter, piezoelectric accelerometer

High temperature accelerometer

- CMSS 376 High temperature accelerometer with charge amplifier system



CMSS 786M



CMSS 726



CMSS 376

Low frequency accelerometers

CMSS 793L / CMSS 793L-FM

Low frequency accelerometer, straight exit

The CMSS 793L /CMSS 793L-FM is an industrial accelerometer for higher precision measurements at rotational frequencies as low as 12 r/min. These speeds are most commonly found in the following industries:

- Power Generation (Wind Turbines)
- Pulp and Paper
- Petrochemicals

Applications include rotors, rolls and extruders. The CMSS 793L combines high sensitivity (to reveal low amplitude signals) with a narrow band of frequency response. The value of the high-pass filtering within the sensor makes it ideal for use in specialized, low speed analysis tasks using portable instruments or at specific measurement points on on-line systems. However, the low-pass filtering makes the CMSS 793L unsuitable as a general purpose accelerometer for rolling element bearing defect detection at more normal rotational speeds.

Features

- Optimal for use with SKF on-line system DMx, IMx-S, IMx-M and all portable data collection instruments
- 500 mV/g high sensitivity
- Ultra low-noise electronics for clear signals at very low vibration levels
- Low-pass filtered to attenuate high frequencies
- Hermetically sealed
- ESD protection
- Reverse wiring protection

Recommended connector/cable assembly

- CMSS 932 series

Specifications

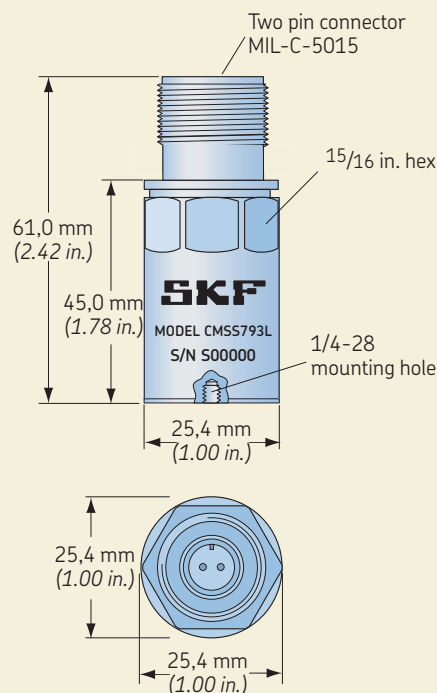
Dynamic

- Sensitivity: 500 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 10 g peak



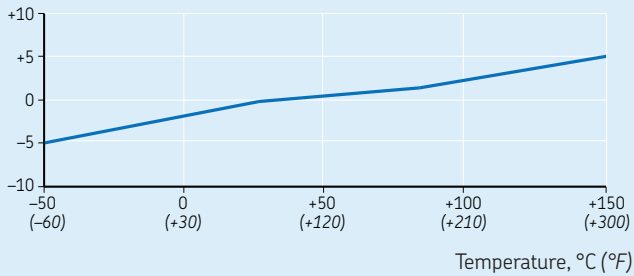
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 5\%$: 0,6 to 700 Hz
 - $\pm 10\%$: 0,4 to 1 000 Hz
 - ± 3 dB: 0,2 to 2 300 Hz
- Resonance frequency, mounted, nominal: 15 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph

Dimensions



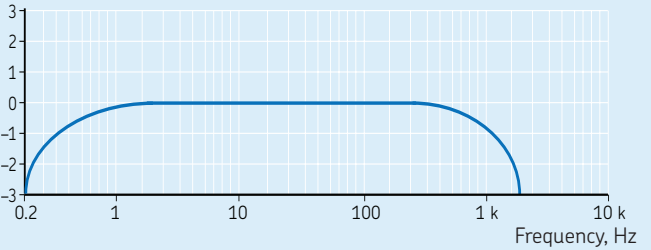
Typical temperature response

Deviation, % sensitivity



Typical frequency response

Deviation, dB



Electrical

- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode^{1), 2)}: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 8,0 µg
 - Spectral:
 - 2 Hz: 2,0 µg/√Hz
 - 10 Hz: 0,4 µg/√Hz
 - 100 Hz: 0,2 µg/√Hz
- Output impedance: < 100 Ω
- Bias output voltage: 10 V DC
- Grounding: Case isolated, internally shielded

Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F) operating temperature
- Vibration limit: 250 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 20 µg/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0001 g/µstrain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 142 g (5 oz.)
- Case material: 316L stainless steel
- Mounting: 1/4-28 tapped hole
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Shell: Ground
 - Pin A: Power/Signal
 - Pin B: Common
- Mating connector: CMSS 932-68LC or CMSS 932-68TL, two pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-DY-XXM, two conductor, twisted pair, single or double shielded, yellow

¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Agency approvals for hazardous area

CMSS 793L-FM



Intrinsically Safe
Class I, II, III, Division 1, Groups A, B, C, D, E, F, G

Must be installed per drawing 31413400 (in drawing set 31475400).

Ordering information

CMSS 793L Low frequency accelerometer, straight exit.
CMSS 793L-FM FM Agency approved, intrinsically safe (IS), low frequency accelerometer, straight exit.

- All models with MIL-C-5015 style two pin connector. 1/4-28 captive hex head screw mounting studs provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMSS 797L / CMSS 797L-FM

Low frequency industrial accelerometer, ring mode, side exit

The CMSS 797L / CMSS 797L-FM is an industrial accelerometer for higher precision measurements at rotational frequencies as low as 12 r/min. These speeds are most commonly found in the following industries:

- Power Generation (Wind Turbines)
- Pulp and Paper
- Petrochemicals

Applications include rotors, rolls and extruders. The CMSS 797L combines a high sensitivity (to reveal low amplitude signals) with a narrow band of frequency response. The value of the high-pass filtering within the sensor makes it ideal for use in specialized, low speed analysis tasks using portable instruments or at specific measurement points on on-line systems. However, the low-pass filtering makes the CMSS 797L unsuitable as a general purpose accelerometer for rolling element bearing defect detection at more normal rotational speeds.

Features

- Optimal for use with SKF on-line system DMx, IMx-S, IMx-M and all portable data collection instruments
- 500 mV/g high sensitivity
- Ultra low-noise electronics for clear signals at very low vibration levels
- Low-pass filtered to attenuate high frequencies
- Hermetically sealed
- ESD protection
- Reverse wiring protection

Recommended connector/cable assembly

- CMSS 932 series

Specifications

Dynamic

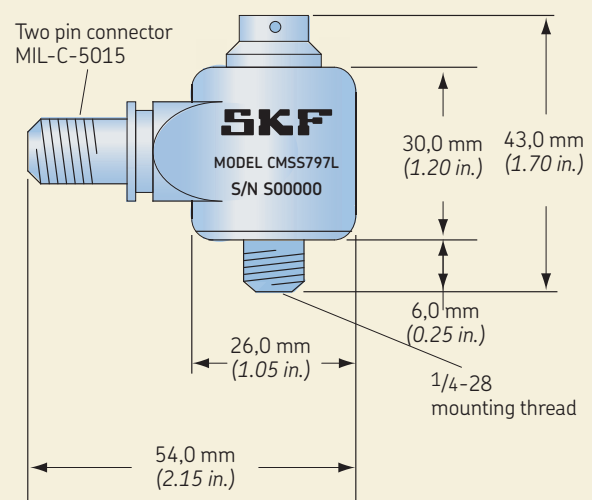
- Sensitivity: 500 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 10 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 5\%$: 0,6 to 850 Hz
 - $\pm 10\%$: 0,4 to 1 500 Hz
 - ± 3 dB: 0,2 to 3 700 Hz
- Resonance frequency, mounted, nominal: 18 kHz
- Transverse sensitivity: $\leq 7\%$ of axial
- Temperature response: See graph



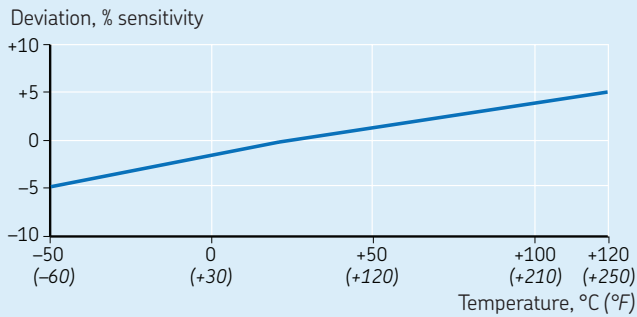
Electrical

- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode^{1), 2)}: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 12,0 μ g
 - Spectral:
 - 2 Hz: 2,0 μ g/ $\sqrt{\text{Hz}}$
 - 10 Hz: 0,6 μ g/ $\sqrt{\text{Hz}}$
 - 100 Hz: 0,2 μ g/ $\sqrt{\text{Hz}}$
- Output impedance: $< 100 \Omega$
- Bias output voltage: 10 V DC
- Grounding: Case isolated, internally shielded

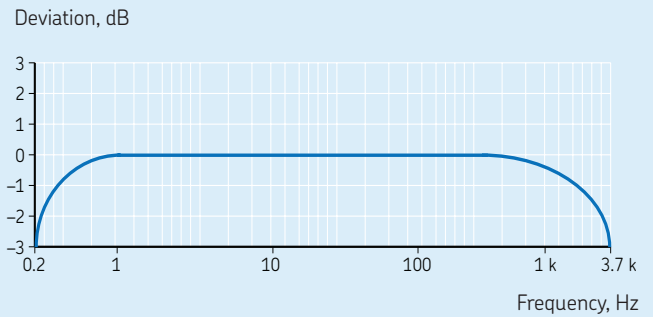
Dimensions



Typical temperature response



Typical frequency response



Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F) operating temperature
- Vibration limit: 250 g peak
- Shock limit: 2 500 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 5 µg/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0001 g/µstrain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 148 g (5.2 oz.)
- Case material: 316L stainless steel
- Mounting: 1/4-28 captive socket head screw
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Shell: Ground
 - Pin A: Power/Signal
 - Pin B: Common
- Mating connector: CMSS 932-68LC or CMSS 932-68TL, two pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-DY-XXM, two conductor, twisted pair, single or double shielded, yellow

¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Agency approvals for hazardous area

CMSS 797L-FM



Intrinsically Safe
Class I, II, III, Division 1, Groups A, B, C, D, E, F, G

Must be installed per drawing 31413400 (in drawing set 31475400).

Ordering information

CMSS 797L Low frequency, industrial accelerometer, ring mode, side exit.

CMSS 797L-FM FM Agency approved, intrinsically safe (IS), low frequency industrial accelerometer, ring mode, side exit.

- 1/4-28 mounting studs provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

CMSS 799LF

Low frequency, filtered accelerometer

Low frequency measurements are critical for many industries, such as:

- Petrochemicals
- Machine tool
- Pulp and Paper

Low frequency can be used for both condition monitoring and process measurements. Other applications include slow speed agitators, cooling towers, semi-conductor lithography and structural testing.

Acceleration levels decrease at low frequencies. In order to have adequate voltage signals at the acquisition equipment, this low frequency sensor has an output sensitivity of 500 mV/g. Additionally, the low-end frequency cut-off is improved down to 0,1 Hz at -3 dB in order to read slow speed vibration signals. However, the narrowed frequency response makes the CMSS 799LF unsuitable as a general purpose accelerometer for rolling element bearing defect detection at the usual rotational speeds.

Features

- For use with the SKF on-line systems, protection systems and the portable data collection instruments
- High sensitivity
- Ultra low-noise electronics for clear signals at very low vibration levels
- Optimized for 15 V supply
- Filtered to eliminate high frequencies
- Hermetically sealed
- ESD protection
- Reverse wiring protection
- Fast turn-on time
- Reduced settling time

Specifications

Dynamic

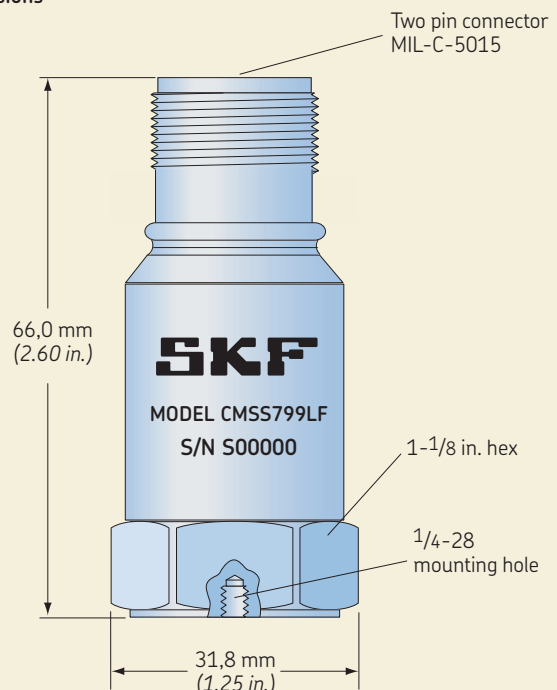
- Sensitivity: 500 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 10 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 5\%$: 0,3 to 1 200 Hz
 - $\pm 10\%$: 0,2 to 1 600 Hz
 - ± 3 dB: 0,1 to 2 500 Hz
- Resonance frequency, mounted, nominal: 18 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph



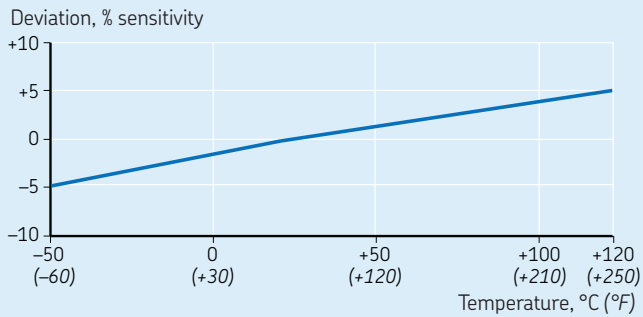
Electrical

- Power requirements:
 - Voltage source¹⁾: 15 to 30 V DC
 - Constant current diode^{1), 2)}: 2 to 10 mA
- Electrical noise:
 - Spectral:
 - 0,1 Hz: 15 $\mu\text{g}/\sqrt{\text{Hz}}$
 - 1 Hz: 3 $\mu\text{g}/\sqrt{\text{Hz}}$
 - 10 Hz: 1 $\mu\text{g}/\sqrt{\text{Hz}}$
 - 100 Hz: 1 $\mu\text{g}/\sqrt{\text{Hz}}$
- Output impedance: $< 400 \Omega$
- Bias output voltage: 8 V DC
- Grounding: Case isolated, internally shielded

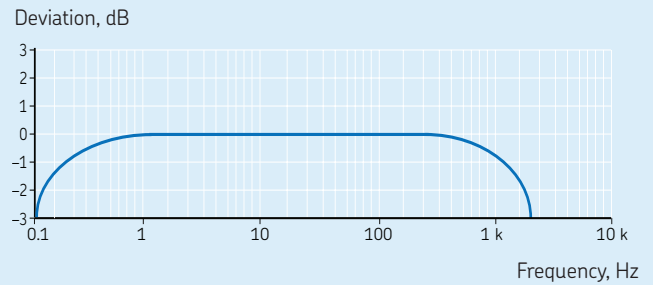
Dimensions



Typical temperature response



Typical frequency response



Environmental

- Temperature range: -50 to $+120$ °C (-60 to $+250$ °F) operating temperature
- Vibration limit: 250 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 150 μ g/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,0005 g/ μ strain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 205 g (7.2 oz.)
- Case material: 316L stainless steel
- Mounting: $\frac{1}{4}$ -28 tapped hole
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Shell: Ground
 - Pin A: Power/Signal
 - Pin B: Common
- Mating connector: CMSS 932-68LC or CMSS 932-68TL, two pin, IP 68, locking collar or twist lock
- Recommended cable: CMSS 932-SY-XXM and CMSS 932-DY-XXM, two conductor, twisted pair, single or double shielded, yellow

¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Ordering information

CMSS 799LF Low frequency, filtered accelerometer.

- $\frac{1}{4}$ -28 mounting stud provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

High frequency accelerometers

CMSS 732A

Medium-high frequency accelerometer, small diameter

The CMSS 732A accelerometer is a lightweight sensor that can be used in all industries, mainly for temporary analysis purposes, or for special on-line applications that require a high frequency measurement combined with restricted space.

The small mass of the sensor makes it a good choice for use in structural analyses such as Operating Deflection Shape (ODS).

Features

- For use with all SKF on-line systems, protection systems and the portable data collection instruments
- Wide dynamic range
- Wide frequency range
- Small size, lightweight
- Hermetically sealed

Recommended connector/cable assembly

- CMSS R1-J93-16: Coaxial, high temperature cable with 10-32 connector, 4,8 m (16 ft.)
- CMSS R1-J93-32: Coaxial, high temperature cable with 10-32 connector, 9,7 m (32 ft.)

Specifications

Dynamic

- Sensitivity: 10 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 500 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 5\%$: 2,0 to 15 000 Hz
 - ± 3 dB: 0,5 to 25,000 Hz
- Resonance frequency, mounted, nominal: 60 kHz
- Transverse sensitivity: 5% of axial
- Temperature response: See graph

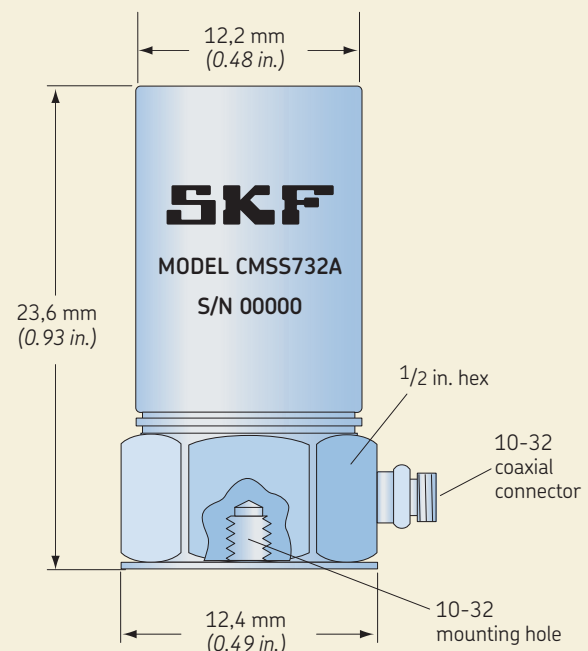
Electrical

- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode¹⁾, ²⁾: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 200 μ g

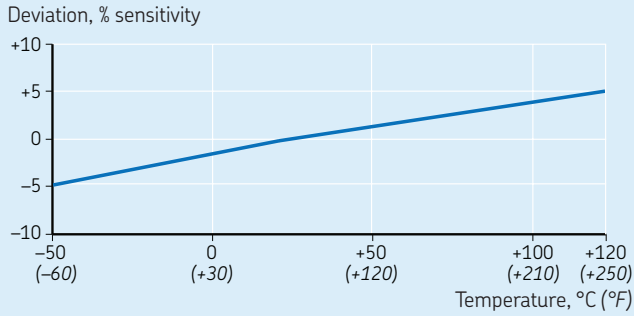


- Spectral:
 - 10 Hz: 20 μ g/ $\sqrt{\text{Hz}}$
 - 100 Hz: 3 μ g/ $\sqrt{\text{Hz}}$
 - 1 000 Hz: 2 μ g/ $\sqrt{\text{Hz}}$
 - 10 000 Hz: 2 μ g/ $\sqrt{\text{Hz}}$
- Output impedance: $< 100 \Omega$
- Bias output voltage: 10 V DC
- Grounding: Case isolated, internally shielded

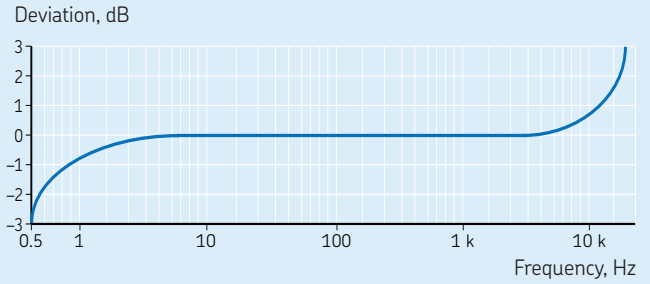
Dimensions



Typical temperature response



Typical frequency response



Environmental

- Temperature range: -50 to $+120$ °C (-60 to $+250$ °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 100 μ g/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,005 g/ μ strain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 13 g (0.46 oz.)
- Case material: 316L stainless steel
- Mounting: 10-32 tapped hole
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Shell: Common
 - Pin A: Power/Signal
- Mating connector: 10-32 coaxial connector
- Recommended cable: Coaxial, high temperature cable

¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Optional accessories



CMSS B13 magnetic base mounting

CMSS B13 magnetic mounting base specifications:

- Description: Rare earth, two-pole magnet
- Pull strength: 16 kg (35 lb.)
- Outside diameter: 25 mm (1.0 in.)
- Mount: 1/4-28 tapped hole (Metric studs available)
- Knurled gripping edge

Ordering information

CMSS 732A Medium-high frequency accelerometer, small diameter.

- A 10 × 32 mounting stud is provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

Optional accessories

CMSS B13 Magnetic base mounting

CMSS 30205300 Mounting stud (10 × 32 to 1/4-28) for use with the CMSS B13 magnet

CMAC 5061 High frequency accelerometer cable

Machine tool accelerometers

CMSS MT-1

Machine tool industry accelerometer, low profile

The CMSS MT-1 accelerometer is optimized for use with on-line monitoring systems in machine tool applications:

- Machine tool drives
- Machine tool gearboxes
- Machine tool carriages

The small size accelerometer is a low profile, bolt mounted sensor used for ease of location in inaccessible and guarded locations. To exclude noise from electrical transients, it uses a double-shielded integral cable.

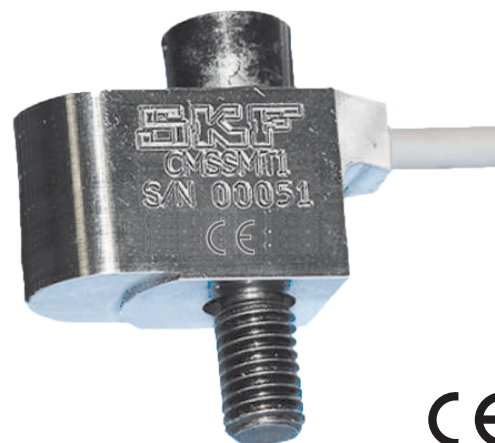
Features

- For use with the SKF on-line system DMx, IMx and TMU
- Meets CE, EMC requirements
- High resistance to electrical noise
- Low profile, side exit, industrial accelerometer with captive bolt (M8 × 1,25, 33 mm (1.3 in.) length) provided
- Compact design ideal for mounting with limited space
- Corrosion resistant and hermetically sealed

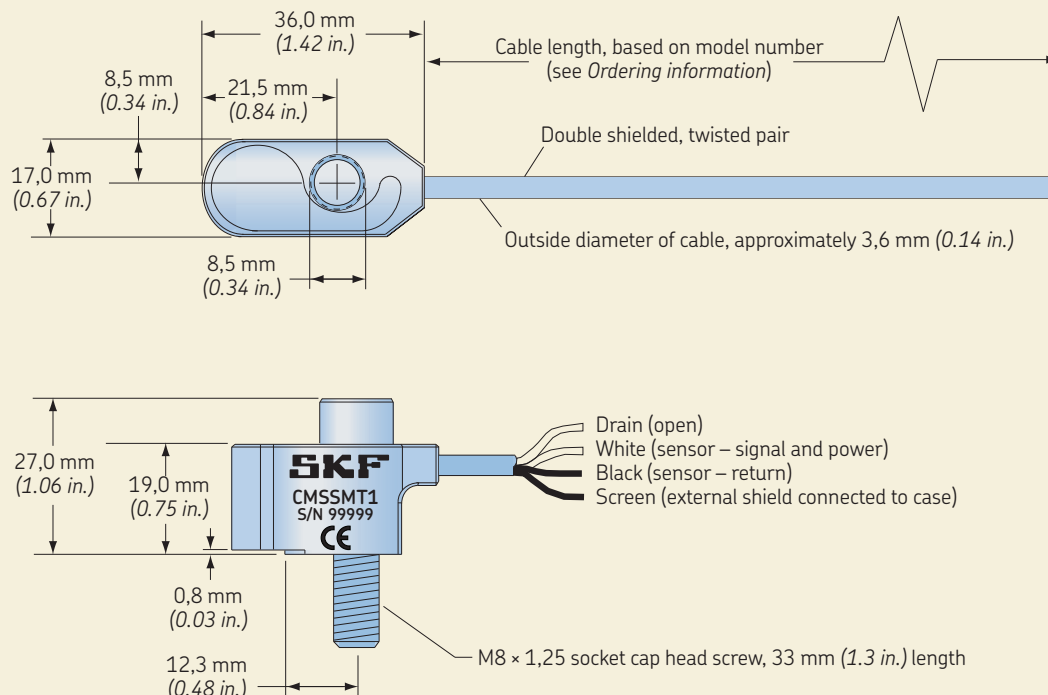
Specifications

Dynamic

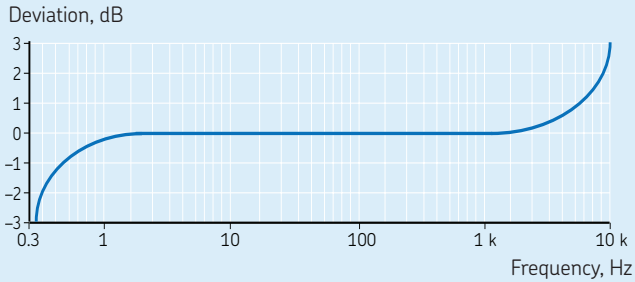
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 10\%$ at 25 °C (75 °F)
- Acceleration range: 50 g peak
- Amplitude linearity: 1% of full scale
- Frequency range:
 - ± 3 dB: 0,32 to 10 000 Hz
- Resonance frequency, mounted, nominal: 10 kHz
- Transverse sensitivity: $\leq 5\%$ of axial



Dimensions



Typical frequency response



Electrical

- Power requirements:
 - Voltage source: 18 to 28 V DC
 - Constant current diode: 2 to 10 mA, recommended 4 mA
- Electrical noise: < 100 μ V from 2,5 Hz to 25 kHz
- Output impedance: < 100 Ω
- Bias output voltage: 8 to 12 V DC
- Grounding: Case connected to outer shield, inner shield open

Environmental

- Temperature range:
 - Operating: -40 to $+85$ $^{\circ}\text{C}$ (-40 to $+185$ $^{\circ}\text{F}$)
 - Storage: -55 to $+120$ $^{\circ}\text{C}$ (-65 to $+250$ $^{\circ}\text{F}$)
- Shock limit: 7 000 g peak
- Sealing: Encapsulated
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2, Heavy Industrial
 - Acceptance criteria: The generated "false equivalent g level" under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: Shipping weight, see table under "Ordering information"
- Case material: 304 stainless steel
- Mounting: M8 $\times$ 1,25 (33 mm (1.3 in.) length) captive mounting bolt provided
- Mounting torque: 4,5 Nm (40 in. lbs.)

Cable

- Wires:
 - 20 AWG Tin-plated Copper
 - Stranded 19 $\times$ 0,20
 - Overall diameter: 0,96 to 1,30 mm (0.04 to 0.05 in.)
- Termination:
 - Signal/Power: White wire
 - Common: Black wire
 - Inner shield: Drain wire
 - Outer shield: Braid
- Jacket:
 - Fluorinated polyimide (FPI) 155
 - Final diameter: 3,9 mm, $\pm 0,20$ mm (0.15 in., ± 0.01 in.)
 - Color: Transparent
- Rating: 600 V
- Temperature: -65 to $+150$ $^{\circ}\text{C}$ (-85 to $+300$ $^{\circ}\text{F}$)
- Cond. resist (maximum): 32,4 Ω/km
- Insulation resist: > 1 500 M Ω $\times$ km
- Test voltage: 3 kV DC
- Weight (approximate): 30 kg/km (106 lb./mile)
- Minimum bend radius (MBR):
 - Installation: 35 mm (1.38 in.)
 - Dynamic use: 70 mm (2.76 in.)

Ordering information

CMSS MT-1 Machine tool industry accelerometer, low profile.

Part number	Cable length	Weight
CMSS MT1-16	4,88 m (16 ft.)	256 g (9 oz.)
CMSS MT1-32	9,75 m (32 ft.)	482 g (17 oz.)
CMSS MT1-64	19,51 m (64 ft.)	964 g (34 oz.)

CMSS MT-3

Machine tool industry accelerometer, low profile, adhesive mount

The CMSS MT-3 is optimized for use with on-line monitoring systems in machine tool applications:

- Machine tool spindles

The small size accelerometer is specially shaped to be adhesive mounted in a pre-machined hole within a machine tool spindle assembly. This ensures closest proximity to the spindle bearings, which produce low amplitude signals easily attenuated by the bearing housing. To exclude noise from electrical transients, it uses a double-shielded integral cable.

Features

- For use with the SKF on-line system DMx, IMx and TMU
- Machine tool spindles (adhesive mounting in pre-machined hole)
- Meets CE, EMC requirements
- High resistance to electrical noise
- Compact design ideal for mounting with limited space
- Corrosion resistant and hermetically sealed

Specifications

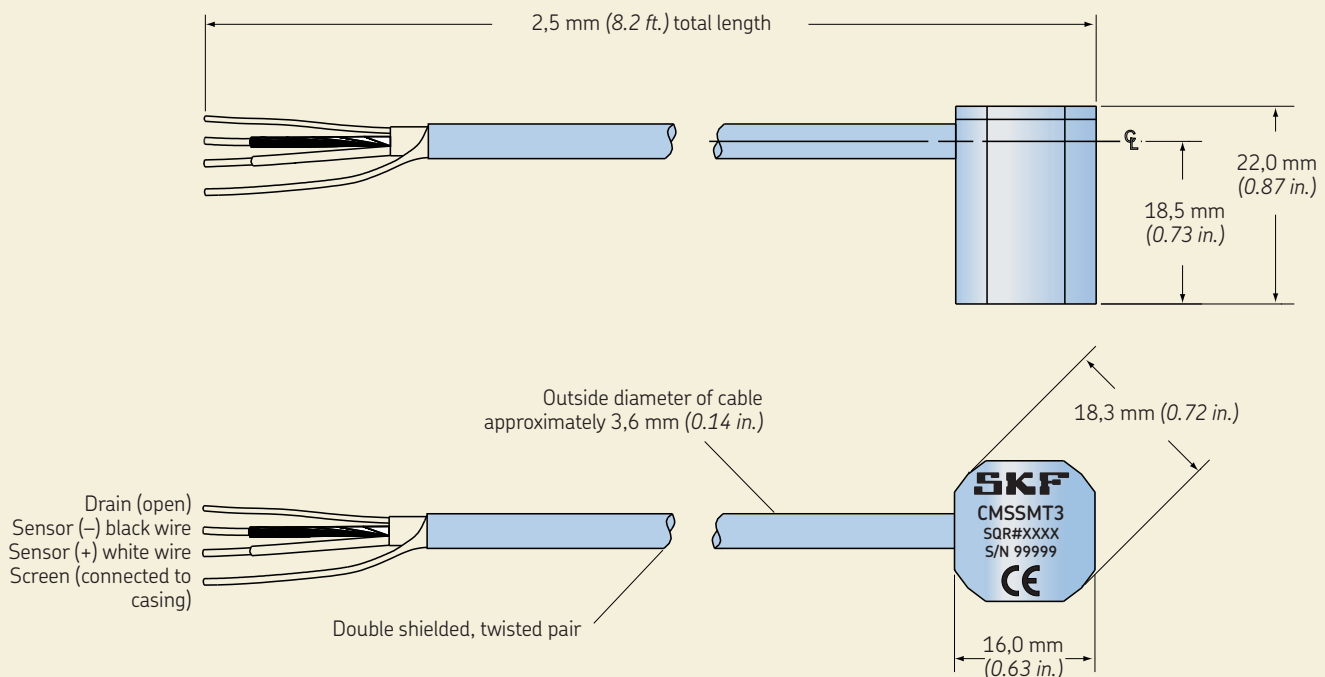
Dynamic

- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 10\%$ at 25 °C (75 °F)
- Acceleration range: 50 g peak
- Amplitude linearity: 1% of full scale
- Frequency range:
 - ± 3 dB: 0,32 to 10 000 Hz
- Resonance frequency, mounted, nominal: ≥ 10 kHz
- Transverse sensitivity: $< 9\%$ of axial

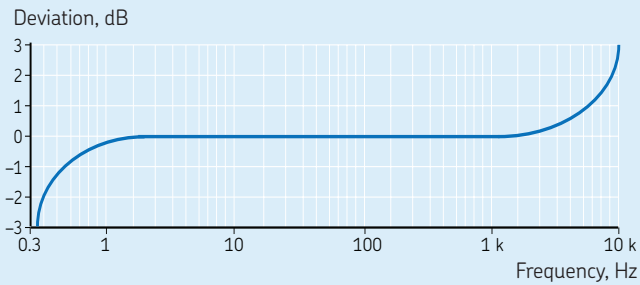


CE

Dimensions



Typical frequency response



Electrical

- Power requirements:
 - Voltage source: 18 to 28 V DC
 - Constant current diode: 2 to 10 mA, recommended 4 mA
- Electrical noise: < 100 µV from 2,5 Hz to 25 kHz
- Output impedance: < 100 Ω
- Bias output voltage: 8 to 12 V DC
- Grounding: Case connected to outer shield, inner shield open

Environmental

- Temperature range:
 - Operating: -40 to +85 °C (-40 to +185 °F)
 - Storage: -50 to +120 °C (-60 to +250 °F)
- Shock limit: 7 000 g peak
- Sealing: Encapsulated
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2, Heavy Industrial
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: The sensor case dimensions are 18,3 × 22,0 mm (0.72 × 0.87 in.); refer to drawing for details
- Weight: 185 g (6.5 oz.)
- Case material: 316L stainless steel
- Mounting: Glued onto machine in pre-machined hole

Cable

- Wires:
 - 20 AWG Tin-plated Copper
 - Stranded 19 × 0,20
 - Overall diameter: 0,96 to 1,30 mm (0.04 to 0.05 in.)
- Termination:
 - Signal/Power: White wire
 - Common: Black wire
 - Inner shield: Drain wire
 - Outer shield: Braid
- Jacket:
 - Fluorinated polyimide (FPI) 155
 - Final diameter: 3,9 mm, ±0,20 mm (0.15 in., ±0.01 in.)
 - Color: Transparent
- Rating: 600 V
- Temperature: -65 to +150 °C (-85 to +300 °F)
- Cond. resist (maximum): 32,4 Ω/km
- Insulation resist: > 1 500 MΩ × km
- Test voltage: 3 kV DC
- Weight (approximate): 30 kg/km (106 lb./mile)
- Minimum bend radius (MBR):
 - Installation: 35 mm (1.38 in.)
 - Dynamic use: 70 mm (2.76 in.)

Ordering information

CMSS MT-3-08 Machine tool industry accelerometer, low profile, adhesive mount with 2,5 m (8 ft.) integral cable.

Acceleration and AEE sensors

CMSS 786M

Industrial sensor, straight exit, acceleration and AEE

AEE (SKF Acoustic Emission Enveloping) is a bearing fault detection method developed by SKF in order to better monitor bearings. This method of monitoring bearings breaks away from the traditional approaches to the problem by using high frequency, acoustic emission detection in the frequency range of 250 000 to 350 000 Hz. This technology has characteristics that set it apart from normal vibration analysis and provides an excellent way of monitoring problems with bearings that other current technologies cannot provide. Some of these advantages are detection of early bearing defects, lubrication problems that stem from contamination and fretting.

The acoustic emissions transducer is sensitive to metal-to-metal contact that occurs when bearing elements roll over a bearing race without an intervening lubricating layer. The transducer emits a high frequency, pulsed voltage that gives evidence of the defective event. Thus, AEE technology, like enveloping, provides an early warning of deteriorating mechanical condition. Combined with the traditional information extracted from the acceleration readings, this multi-parameter sensor delivers the basis for a broad spectrum of data.



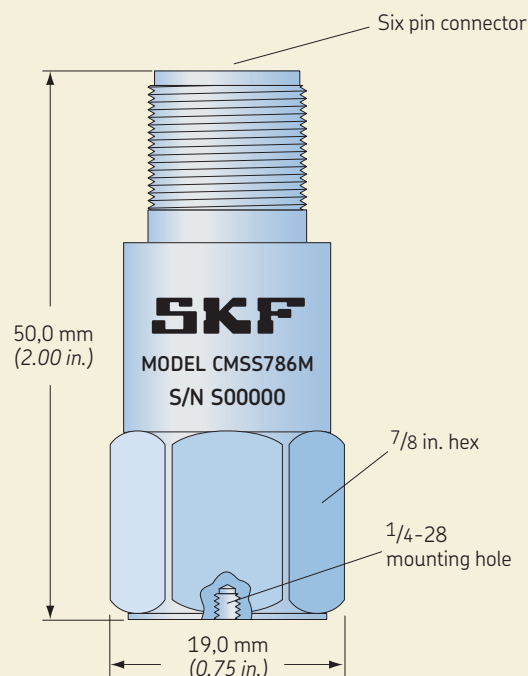
Features

- For use with the SKF on-line systems, protection systems and the portable data collection instruments
- Measures acceleration and AEE (SKF Acoustic Emission Enveloping) units
- Meets CE requirements
- Electronic resonance damping
- Miswiring protection
- One second current settling time
- Low sensitivity to thermal gradients and base strain

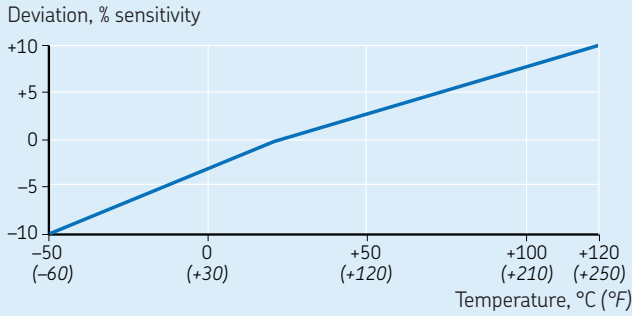
Recommended connector/cable assembly

- CMSS R19-J9T2PS-XX: Shielded cable with PC06 connector
- CMSS R19SL-J9T2PS-XX: Shielded cable with splash-proof connector

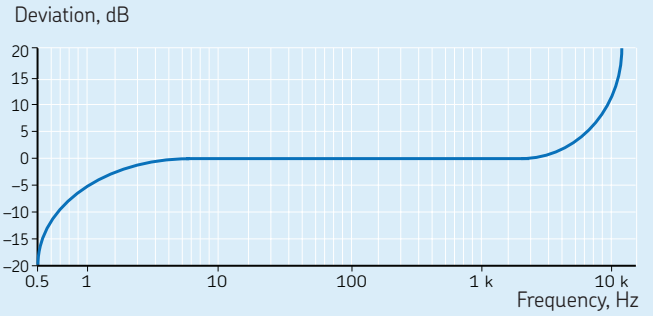
Dimensions



Typical temperature response



Typical frequency response for accelerometer



Specifications

Dynamic

Accelerometer

- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 10\%$ at 25 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 10\%$: 1,0 to 9 000 Hz
 - $\pm 20\%$: 0,5 to 14 000 Hz
- Resonance frequency, mounted, nominal: 22 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Base strain sensitivity: 0,0002 g/ μ strain
- Temperature response: See graph

AEE sensor

- Sensitivity: 100 to 500 kHz
- Nominal: 10 mV/AEE ± 2 dB
- Sensor capacitance, nominal: 500 pF
- Grounding: Case isolated
- Coupling capacitance to case: < 25 pF

Electrical

- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode¹⁾, ²⁾: 2 to 10 mA
- Electrical noise: 2 Hz: 20 μ g/ $\sqrt{\text{Hz}}$
- Output impedance: $< 100 \Omega$
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded

Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F)
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak

- Electromagnetic sensitivity, equivalent g, maximum: 70 μ g/gauss
- Sealing: Hermetic
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated “false equivalent g level” under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 95 g (3.4 oz.)
- Case material: 316L stainless steel
- Mounting: 1/4-28 tapped hole
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Pin A: Case
 - Pin B: AEE Sensor (-)
 - Pin C: AEE Sensor (+)
 - Pin D: Accelerometer, common
 - Pin E: Accelerometer, power and signal
- Mating connector (six pin): CMSS R19 (meets requirements of MIL-C-26482)
- Recommended cable: Type J9T2PS, two shielded conductor pairs, clear fluorine based polymer jacket (100 Ω nominal)

¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Ordering information

CMSS 786M Industrial sensor, straight exit, acceleration and AEE, with PC06-10-98S six pin connector.

- 1/4-28 mounting studs provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

Small diameter accelerometers

CMSS 726

Small diameter, piezoelectric accelerometer

This model is a lightweight piezoelectric accelerometer with integral electronics, designed specifically for measuring vibration on small structures. The unit is hermetically sealed against environmental contamination. The CMSS 726 features a standard output sensitivity of 100 mV/g, a high signal-to-noise ratio and a wide bandwidth.

Features

- For use with the SKF on-line systems, protection systems and the portable data collection instruments
- Meets CE requirements
- Wide frequency range
- Low noise floor
- Temperature compensated
- Wide dynamic range
- Small size, lightweight
- Hermetically sealed

Recommended connector/cable assembly

- CMSS R1-J93-16: Coaxial, high temperature cable with 10-32 connector, 4,8 m (16 ft.)
- CMSS R1-J93-32: Coaxial, high temperature cable with 10-32 connector, 9,7 m (32 ft.)

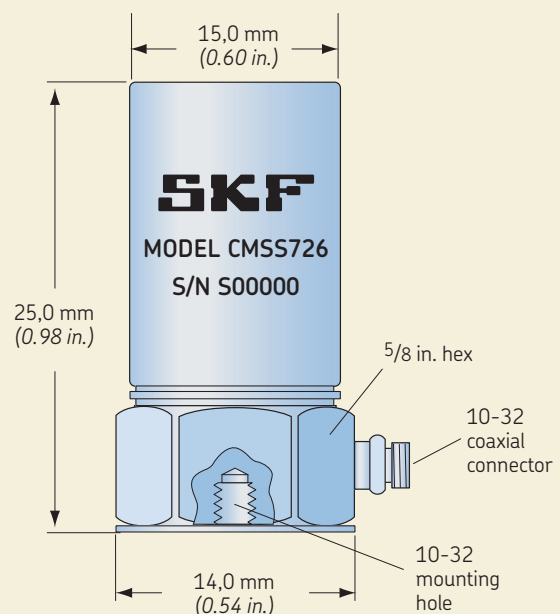
Specifications

Dynamic

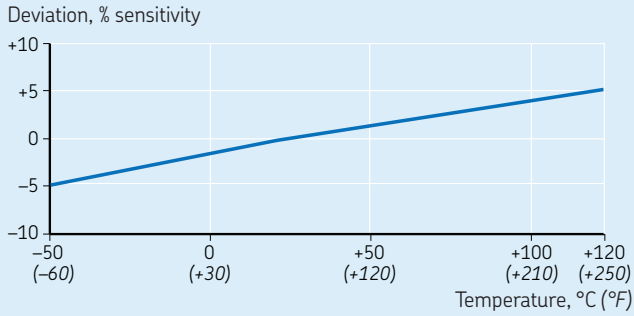
- Sensitivity: 100 mV/g
- Sensitivity precision: $\pm 5\%$ at 25 °C (75 °F)
- Acceleration range: 80 g peak
- Amplitude non-linearity: 1%
- Frequency range:
 - $\pm 5\%$: 2,0 to 10 000 Hz
 - $\pm 10\%$: 1,0 to 12 000 Hz
 - ± 3 dB: 0,6 to 15 000 Hz
- Resonance frequency, mounted, nominal: 132 kHz
- Transverse sensitivity: $\leq 5\%$ of axial
- Temperature response: See graph



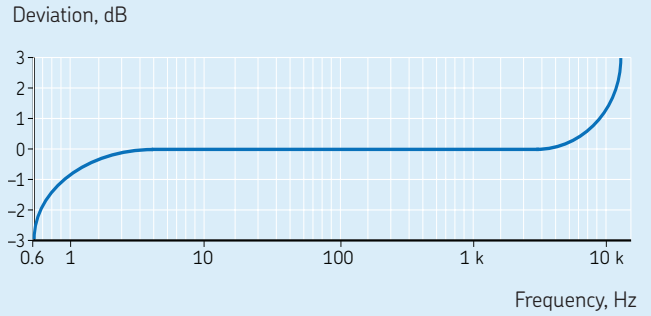
Dimensions



Typical temperature response for accelerometer and AEE sensor



Typical frequency response for accelerometer



Electrical

- Power requirements:
 - Voltage source¹⁾: 18 to 30 V DC
 - Constant current diode¹⁾, ²⁾: 2 to 10 mA
- Electrical noise:
 - Broadband:
 - 2,5 Hz to 25 kHz: 60 µg
 - Spectral:
 - 10 Hz: 8,0 µg/√Hz
 - 100 Hz: 0,8 µg/√Hz
 - 1 000 Hz: 0,3 µg/√Hz
 - 10 000 Hz: 0,2 µg/√Hz
- Output impedance: < 100 Ω
- Bias output voltage: 12 V DC
- Grounding: Case isolated, internally shielded

Environmental

- Temperature range: -50 to +120 °C (-60 to +250 °F) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Electromagnetic sensitivity, equivalent g, maximum: 40 µg/gauss
- Sealing: Hermetic
- Base strain sensitivity: 0,002 g/µstrain
- CE: According to the generic immunity standard for Industrial Environment EN 50082-2
 - Acceptance criteria: The generated "false equivalent g level" under the above test conditions should be less than 2 mg measured peak to peak

Physical

- Dimensions: See drawing
- Weight: 30 g (1 oz.)
- Case material: 316L stainless steel
- Mounting: 10-32 tapped hole
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Connections:
 - Shell: Common
 - Pin A: Power/Signal
- Mating connector: 10-32 connector
- Recommended cable: Coaxial, high temperature cable

¹⁾ To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 V DC powering is recommended. The higher level constant current source should be used when driving long cables (please consult SKF).

²⁾ A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C (210 °F).

Ordering information

CMSS 726 Small diameter, piezoelectric accelerometer.

- 10-32 mounting stud provided. A calibration data certificate with the actual sensitivity of the accelerometer is included in each package. The nominal sensitivity is etched on each unit.

High temperature accelerometers

CMSS 376K

High temperature accelerometer with charge amplifier system

The CMSS 376K high temperature acceleration system set consists of a CMSS 376 accelerometer, CMSS 628 charge amplifier and CMSS R1-2-J3-25 cable connector assembly.

Typically, this sensor finds its application in temperatures greater than 150 °C (300 °F). Using this arrangement, the temperature-sensitive converter (CMSS 628 charge amplifier) is removed from the sensor and placed within a separate component outside the intense heat. One end of the charge converter will be connected to the sensor via the supplied cable and the other will be available to connect to analysis or acquisition equipment.

Features

- Operates up to 260 °C (500 °F)
- Charge output
- Hermetically sealed
- Ground isolated
- Industrial ruggedness

CMSS 376 accelerometer

Specifications

Dynamic

- Sensitivity, 25 °C (75 °F): 25 pC/g
- Amplitude non-linearity, to 250 g: 1%
- Frequency response¹⁾:
 - ±5%: 3,0 to 7 000 Hz
 - ±10%: 2,0 to 10 000 Hz
 - ±3 dB: 1,0 to 13 000 Hz
- Resonance frequency, maximum: 32 kHz
- Transverse sensitivity, maximum: 7% of axial
- Temperature response: See graph

Electrical

- Capacitance, nominal²⁾: 500 pF
- Resistance, minimum: 1 000 MΩ
- Grounding: Case isolated

¹⁾ As measured through a CMSS 628 charge amplifier.

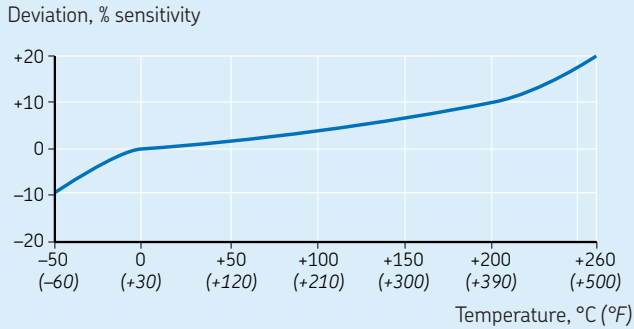
²⁾ Tested at output connector.



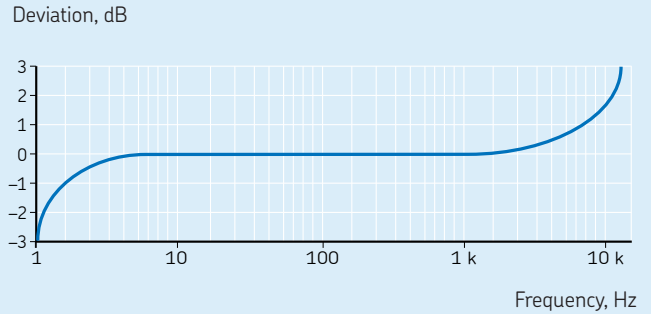
CMSS 376 accelerometer dimensions



Typical temperature response for accelerometer



Typical frequency response for accelerometer



Environmental

- Temperature range: -50 to +260 °C (-60 to +500 °F)
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Base strain sensitivity, maximum: 0,002 g/μstrain
- Humidity limit: 100% relative

Physical

- Dimensions: See drawing
- Weight: 75 g (2.6 oz.)
- Case material: 316L stainless steel
- Mounting: 1/4-28 tapped hole for 1/4-28 stud
- Mounting torque: 2,9 Nm (24 in. lbs.)
- Output connector: 10-32 coaxial
- Cabling, mating connector: Microdot 10-32 (R1)
- Recommended cable: Low noise, fluorine based polymer jacket, 30 pF/ft; 100 pF/m (J3)

CMSS 628 charge amplifier

The CMSS 628 charge amplifier accepts the low level output of the CMSS 376 high temperature accelerometer and amplifies it to 100 mV/g peak. The charge amplifier accepts constant current power on the same line as the signal output. The interconnect cable between the CMSS 376 and the CMSS 628 is the CMSS R1-2-J3-25.

Specifications

Input

- Sensitivity: 25 pC/g peak nominal at 100 Hz, 25 °C (75 °F)
- Power: 2 to 10 mA constant current driven by 18 to 30 V DC (24 V DC minimum for full output range)

Output

- CMSS 628 sensitivity: 100 mV/g peak, ±7% at 100 Hz
- CMSS 376K system sensitivity: 100 mV/g peak, ±10% at 100 Hz and 20 °C (70 °F)
- Range: ±0,1 g to ±80 g
- Frequency: 3 Hz to 6 kHz, ±10%
- Amplitude linearity: ±1% of full scale
- Noise floor: 120 microV pk-pk
- Overload recovery time: 10 seconds for 150% overload
- Impedance: 100 Ω or less
- Bias voltage: 12 V DC, ±2 V DC

Connections

- Input: BNC (Center-HI, Shld-LO)
- Output: 5-pin terminal strip; two connections: Signal/Power (SIG), Common (COM)

Environmental

- Operating temperature: -45 to +120 °C (-50 to +250 °F)

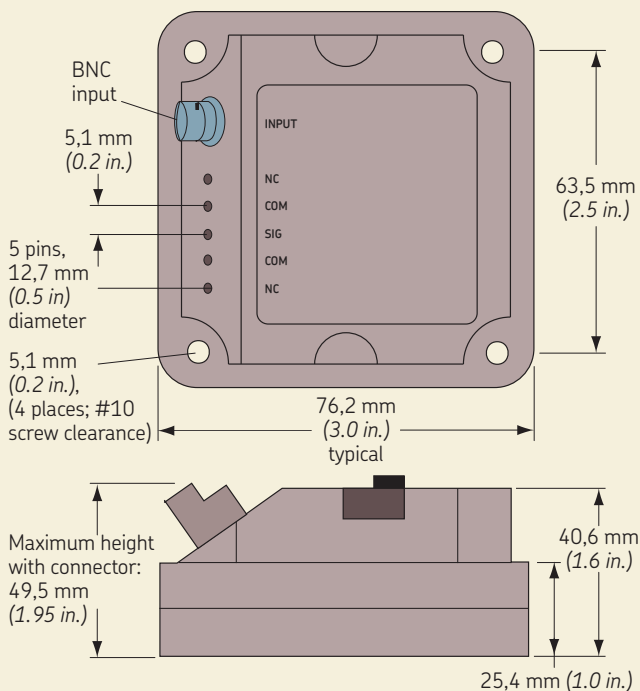
Ordering information

CMSS 376K High temperature accelerometer kit with charge amplifier.

Consists of:

- CMSS 376 high temperature accelerometer
- CMSS 628 charge amplifier
- CMSS R1-2-J3-25 cable connector assembly
- 1/4-28 mounting stud
- Calibration data for each set

CMSS 628 charge amplifier dimensions



Vibration sensor requirements, installation and mounting

Sealing requirements

The sealing specification for our sensors is defined as hermetic, if not stated otherwise. Hermetic sealing, however, can be a vague term. In order to quantify and compare levels of hermetic sealing, we use a leakage scale where the leakage rate of helium is stated in cc/second at one (1) atmosphere of pressure. SKF's industrial sensors have the highest hermetic seal rating in the industry. A Helium Leak Test (HLT) is used to qualify the sealing of all sensor designs and maintains a continuous monitoring program to ensure the proper sealing of all hermetically-rated accelerometers. In this context, hermetic sealing exceeds Ingress Protection ratings of IP68, or even IP69K. The weaker link is then the cable connector assembly with the highest Ingress Protection rating of IP68. For greater protection against corrosion and moisture, it is recommended to fill one-half of the connector with silicone grease. For continuous submersion in water or other fluids, we recommend use of accelerometer with integral cable if possible.

Cabling requirements

Cabling is one of the most important aspects of vibration sensor installation. As with sensors and monitoring equipment, money saved by purchasing inferior components is usually a poor investment. Time and effort to troubleshoot problems related to poor cabling can easily cost several times the cost of the original cable. Furthermore, measurement results can be unreliable and inaccurate, thereby defeating the purpose of the condition monitoring program in the first place. Careful attention must be given to six major cable considerations:

- Type
- Length
- Routing
- Grounding
- Anchoring
- Environment

Each of these will be discussed on the following pages.

Cable type

Vibration signals are dynamic, usually voltage-modulated and of low amplitude (millivolts per engineering unit), thus the type of cable used is an important factor in determining the quality of the signals that reach the vibration monitoring device. This is true for both handheld and permanently mounted sensors, but typically the con



sideration is more important for permanently installed sensors, since the length of the cable is usually longer and, therefore, exposed to more possible sources of noise. High quality cable is recommended. In the context of vibration, "high quality" can be defined as twisted pair, shielded cable. The sensor power and signal are carried on individual wires and the cable's shield(s) is grounded at either the sensor or the vibration monitor (see the section on Cable Grounding).

In general, *coaxial cables* are not recommended for use with vibration monitors in an industrial environment. They are not rugged enough and are susceptible to noise intrusion, since any type of noise will be picked up on the coaxial cable's shield and amplified along with the signal.

Integral cables

Some vibration sensor models have a cable permanently fixed (or "integral") to the sensor body.

As there is no connector, this has the advantage of reducing cost and eliminating any doubt about connectors working loose over time and introducing noise. This feature is suited to environments where the cable may be exposed to high ambient vibration, such as on a vibrating screen, or the sensor is on a moving body, such as a press.

However, the integral cable brings with it significant maintenance disadvantages. Should either the sensor or cable be damaged, the entire sensor and cable must be replaced. In applications where the sensor may need to be removed relatively frequently, such as with paper machine roll changes, then an integral cable complicates the procedure, particularly if a simple stud-mount has been used. In this case, the cable will "coil up" and eventually break after repeated changes (see the section on Mounting Requirements). Cable runs greater than 5 to 10 m (16 to 33 ft.) should also be avoided – it introduces costly installation rework in the event of a sensor change.



Connector and cable assemblies

The most common and practical approach is to use a connector and cable assembly with a vibration sensor.

This approach has the advantage of easy and quick sensor replacement or first installation without the need to disturb installed field cabling. The sensor can be stud-mounted without any cable “coil up”, and cable runs up to 20 m (65.6 ft.) remain practical. Most SKF sensors utilize a sturdy “MIL-style” connector – when correctly installed, these connectors do not work loose over time.

SKF offers a range of connector/cable assemblies designed to withstand most industrial environments, from a simple fan to the hot and wet environment of a paper machine dryer section.

Cable impedance

For monitoring vibration at higher frequencies or for applications requiring a cable to carry a signal over a long distance with minimum loss and distortion, the characteristic impedance is possibly the most important cable parameter.

The characteristic impedance (Z_0) is the combined resistive and reactive components of the cable's resistance to the flow of electrons. Its value depends on the type of conductors, their size, spacing, whether (and how tightly) they are twisted together and the type and amount of insulating material used.

If there is a substantial mismatch between the characteristic impedance of the transducer and the cable, or the cable and the monitoring system, an electrical reflection will occur at the point of the impedance mismatch. This electrical reflection will distort both signal strength and quality. Additionally, if there is a lack of control in the manufacture of the cable, then Z_0 can vary over the length of the cable, causing electrical reflections, distortion and reduction in signal integrity within the cable itself.

For these reasons, it is important to use high quality cable that is matched to both the transducer and the monitoring system. With SKF sensors and monitoring equipment, best results will be obtained with signal cable having a characteristic impedance of 120 Ω .

Cable capacitance

All cables have capacitance across their leads; therefore, the capacitance load on the output of the sensor increases with cable length.

Cable length

Length versus cable capacitance

All cables have a capacitance across their leads related to length. Depending on the cable construction, this capacitance is generally 100 to 200 pF/m (30 to 60 pF/ft.).

After the cable length has been determined, its effect on the sensor installation should first be evaluated. This is particularly important in intrinsically safe applications, where a maximum permissible cable capacitance is required by the certifications of the hazardous area rated sensors and vibration monitoring device.

Length/Capacitance also has an effect on performance. Capacitive loading attenuates the high frequency output of accelerometers. For example, for a 160 pF/m multi-pair cable with 35 Ω /km resistance, the effect of cable length on maximum frequency attenuation is shown below

Effect of cable length on maximum frequency attenuation

Distance: sensor to online device	Maximum frequency attenuation (kHz) in acceleration
100 m (330 ft.)	18,0
300 m (984 ft.)	6,0
500 m (1 640 ft.)	3,5
700 m (2 296 ft.)	2,5
1 000 m (3 281 ft.)	1,8

Note: Cable lengths for velocity transducers are less important since they are employed at low frequencies and contain filtering of acceleration components.

The use of high quality, twisted pair(s), shielded cable can greatly improve the quality and reliability of vibration measurements, together with permitting the use of longer cable runs in the installation.

Amplitude range versus cable capacitance

When the amplifier in the monitor drives a long cable, its performance is limited by the current available from the Constant Current Diode (CCD) to charge the cable capacitance at high frequencies. This limits the amount of voltage swing from the amplifier and may reduce the high frequency amplitude range. The reduction of the amplitude range increases the sensor's susceptibility to high frequency amplifier overload. This will cause signal distortion and produce erroneous signals at low frequencies. Sources of high frequency overload could be gear impacts or the broadband hiss of a steam release valve. SKF sensors are protected from distortion caused by moderate overloads.

SKF recommendations for cables

Cable characteristic	SKF recommendation
Type	Twisted pair(s) or triads, shielded
Capacitance across leads	< 60 pF/m (20 pF/ft.)
Impedance	120 Ω for signal cable
Size (gauge) Shield	20 to 24 AWG (American Wire Gauge) Braided or foil, single or double shield
Insulation	As required by operating environment. A fluorine based polymer is standard. A fluoropolymer is recommended where fire retardation or some radiation resistance is needed.

Powering versus cable length

Proper powering will reduce signal distortion in long cable applications. It is recommended that for cable lengths over 30 m (100 ft.), the constant current source should be 6 to 10 mA. In addition, the voltage source should be no less than 24 V for maximum amplitude range. Even when using very short cables, the current source should be increased if amplifier overload signals are present or suspected.

Cable routing

Cable routing and electromagnetic interference

Walkie-talkies, power lines or even electrical sparks may cause signal interference. The following guidelines will eliminate many measurement errors due to electromagnetic interference (EMI) and electrostatic discharge (ESD):

- Assure that high quality, well shielded cables are used; in such environments, 100% shield coverage is necessary
- If cable splices are made, shielding continuity must be maintained
- Never run sensor cable alongside AC power lines
- Cables must cross AC power lines at right angles 1 m (3 ft.) away from the power line
- Where possible, provide a separate grounded conduit to enclose the sensor cable
- Where possible, route the cable away from radio transmission equipment, motors/generators, transformers and other high current charging conductors
- Finally, avoid routing the cable through areas prone to ESD, except in applications where it is unavoidable; for example, in the area around a paper machine, ESD cannot be escaped

Even though SKF sensors are protected against ESD failure, temporary signal distortion may appear at the monitor. Such signals usually appear as an overload or a "ski-slope" shaped FFT (Fast Fourier Transform).

Cable routing and junction boxes

The practicalities of cabling result in the following typical arrangement:

- Sensor and connector/cable assembly, typically 5 m (16.4 ft.) length
- Junction box, mounted on or near the machine skid
- Multi-pair cabling to monitor, up to 500 m (1 640 ft.) in length, with or without intermediate marshalling junction boxes

The short connector/cable assembly is to facilitate sensor maintenance without disturbance to field cabling. When designing, attempt to minimize the number of physical connections per "wire loop" between sensor and monitor – it reduces the number of potential failure points, sources of interference and is less to check when commissioning or troubleshooting.

Cable grounding

The purpose of having one or more shields around a pair of signal lines is to reduce the coupling between the shielded signal line and other signal lines and to reduce the intrusion of external noise. Doing so protects the strength and fidelity of the signal of interest. Grounding of shields, and the way in which they are grounded, has a remarkable effect on their effectiveness. An improperly grounded shield may actually be worse than no shield at all. In order to provide proper shielding and prevent ground loops, cable grounding should be carefully considered.

Ground loops

Ground loops are developed when a common line is grounded at two points of differing electrical potential; for example, a single shield is connected to ground on the sensor and on the instrument side. Inadequate grounding results from not connecting the shield to any side. As a first step to avoid ground loops, the signal, return and internal shielding of all SKF sensors are isolated from the sensor casing (housing).

Cable and shield

The cable shield serves to protect the signal from ESD and EMI. As a second step to avoid ground loops, the shield should be grounded at only one point, normally either to the instrument or to the sensor casing. All SKF instruments are designed to accommodate grounding of the sensor cable shield at the instrument (→ fig. 2).

Alternatively, it is possible to ground at the sensor side. Most of SKF's sensors are designed to allow for such a grounding scheme. Assuming the sensor is stud-mounted to the machine and the machine is properly grounded, the shield is thus grounded to the machine through the sensor, and the drain wire should not be connected to ground at the instrument end (→ fig. 3).

Non-isolated cable/connector assemblies

Within a single-shielded cable/connector assembly, "non-isolated" means the drain wire (and hence the shield) is connected to the sensor casing (→ fig. 3).

Within a single-shielded cable/connector assembly, "isolated" means the drain wire (and hence the shield) are not connected to the sensor casing, and the drain wire must be connected to ground at the instrument end (→ fig. 2).

Double-shielded cable

When double-shielded cable is selected, then the outer shield is non-isolated through the connector (to be grounded at the sensor end only) and the inner shield is isolated (to be connected to ground at the instrument end only) (→ fig. 4). Hence, double-shielded cable cannot be selected in conjunction with isolated cable connector assemblies.

Note: Sensors mounted in hazardous areas should be installed and grounded according to the installation drawings associated with their certification.

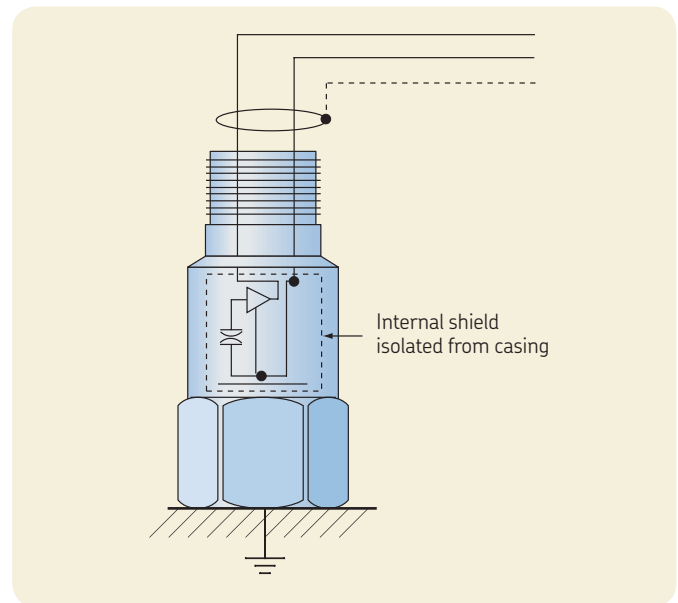


Fig. 1. Electronic circuit isolated from sensor casing.

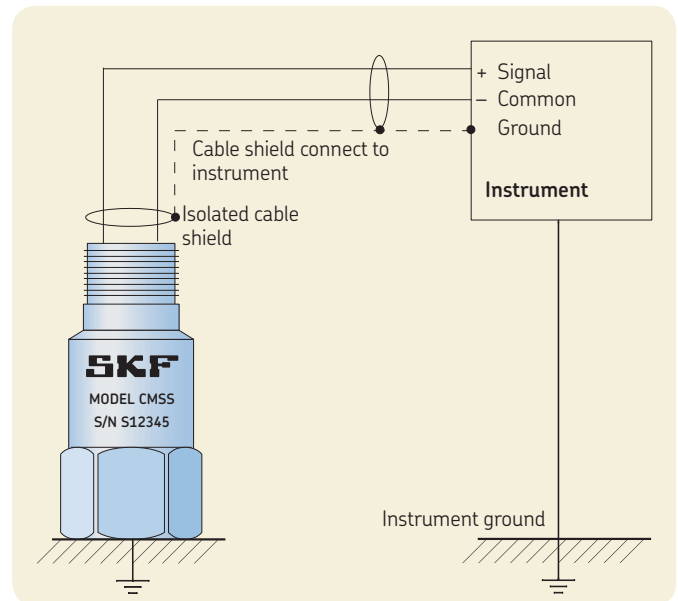


Fig. 2. Grounding at instrument side.

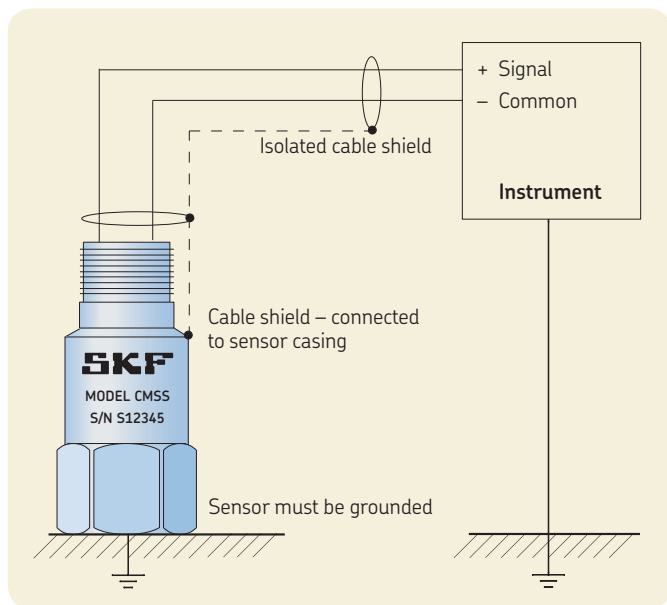


Fig. 3. Grounding at sensor side.

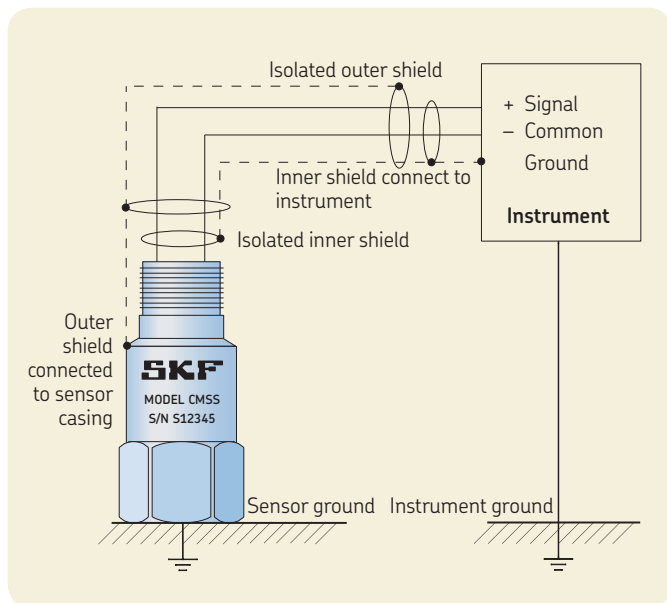


Fig. 4. Grounding with double-shielded cable.

Grounding at the machine

If the machine being monitored is well grounded and the transducer has a case terminal, the shield can be connected there. If the machine is not well grounded, or if there is no terminal available on the transducer, the shield should be connected to a good electrical ground point at the machine.

However, if a junction box is used at the machine being monitored, it is acceptable practice to leave the shields open at the transducers and electrically connect all of the shields together in the junction box. A ground wire should then be run from the “daisy chained” shields to a good electrical ground at the machine being monitored.

Some cables contain more than one individually shielded signal pair with the entire cable enclosed by an overall shield. In this case, the recommended practice is to ground the individual shields at the transducer and leave them open at the instrument. The overall shield should then be grounded at the instrument and left open at the transducers.

If a junction box is used, the overall shield must be electrically continuous through the junction box and not connected to the other shields.

If, when grounding at the sensor, EMI signals are found to affect the vibration signal, a filtering capacitor (0,01 μ F, 200 V low loss) should be placed between the shield and the grounded monitor. This capacitor prevents the passage of low frequency ground currents, yet diverts high frequency EMI signals to ground.

Sources producing high levels of electromagnetic noise (such as radio transmitters, static discharge and motor bush arcing) may require a cable with dual isolated shields. In this configuration, the outer shield is grounded to the sensor housing. The inner shield, which is electrically isolated from the outer, is grounded to the transmitter.

The double shielding allows electrical charges impressed on the cable to be attenuated twice to minimize influence on the vibration signal. Similar to the previous configuration, it is recommended that a capacitor (0,01 μ F, 200 V low loss) be placed in the terminal box between the inner and outer shields to maximize this protection.

Note: In all cases, it is very important that the cable shield be properly grounded. Failure to do so in high EMI/ESD environments can result in damage to the sensor electronics.

Cable anchoring

The cable should not be bent into a radius less than approximately 50 mm (2.0 in.) and should be anchored to reduce stress at the cable terminations. When securing the cable, leave just enough slack to allow free movement of the accelerometer. Failure to leave enough slack will cause undue stress on the cable and dramatically influence the sensor's output (→ fig. 5).

Silicone grease

When assembling any cable/connector to the vibration sensor, application of a small amount of silicone grease to the pin contacts is recommended to ensure reliable operation over a long period.

Top exit or side exit

The cable anchoring shown in fig. 5 also illustrates the different orientations of accelerometer – a “top exit” or “side exit” sensor.

Top exit accelerometers have the connector axis in line with the measurement and mounting axis, and are used most commonly on small to medium bearing housings. Their main advantages are that they can be fitted in narrow access locations. Their disadvantages are that they provide ideal hand- and foot-holds, the small studs mounting them to the machine cannot take high bending loads and the cable loops can also be entangled with other objects passing by during maintenance.

Side exit accelerometers have the connector axis perpendicular to the measurement and mounting axis and are used most commonly on medium to large bearing housings. They have a cylindrical design with a central mounting hole through which a sturdy hexagon type screw (for example socket head, captive mounting bolts) can be used to mount the sensor to the machine. Their main advantages are that they can be mounted flush to the surface, allowing the cable to be tied down, and they present a smaller foot- hold target. In addition, side-exit sensors can be detached from the machine without breaking the seal of the sensor cable connector assembly connection. Their only disadvantage is a higher cost compared to top exit.

Cable environment

In addition to the EMI/ESD environment discussed above, the heat, humidity and general nature of the cable's environment needs to be considered.

On some machines, the location of the bearing may be at a temperature well suited to the sensor, but the path of the cable back to the local junction box may well pass hot surfaces that exceed the rating of the cable.

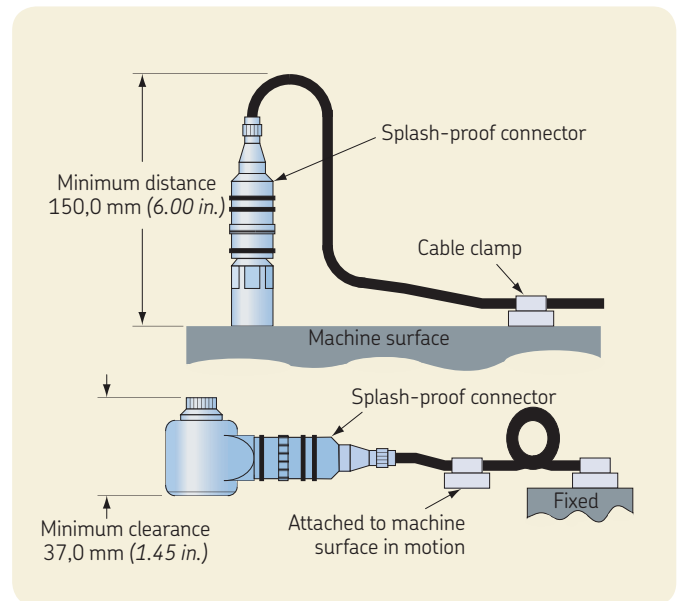


Fig. 5. Cable anchoring.

It is recommended that the cable be enclosed in appropriate steel or non-metallic protective conduit. In some applications, such as those found in the mineral processing industry, there may be a high chance of physical contact with flying process debris. In these instances, when protective conduit is not possible, then metal-braided (or “armored”) cable would be suitable.

Other times, the need can arise to disconnect the cable connector assembly from the sensor (for example for felt changes).

When Cable connector assemblies are disconnected from the sensors, the connectors should not be left unprotected to the harsh environment. Corrosion and dirt will enter the connection, -even when silicone grease is used. Best practices are to use the blue cap that comes with the sensor to protect the sensor's connector and to tie a small plastic bag, secured with a rubber band around the cable connector when the connection is open.

Most of today's on-line systems can trend the bias voltage of the sensors, it should remain stable and unchanging. Shifting biases are linked to poor or contaminated connections, as do low frequency bias and contact noises. Look for corroded, dirty or loose connections. Repair or replace the connection as necessary. Non-conducting silicone grease should always be applied to connectors to reduce contamination.

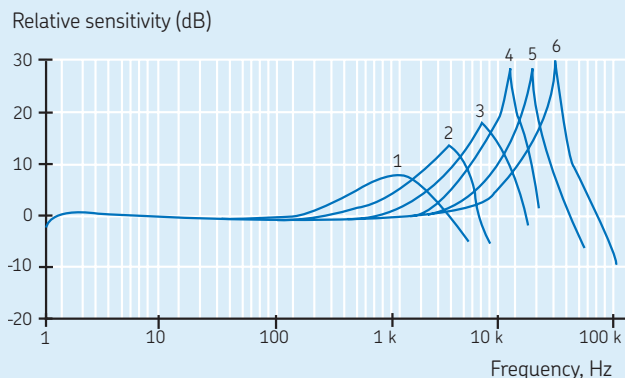
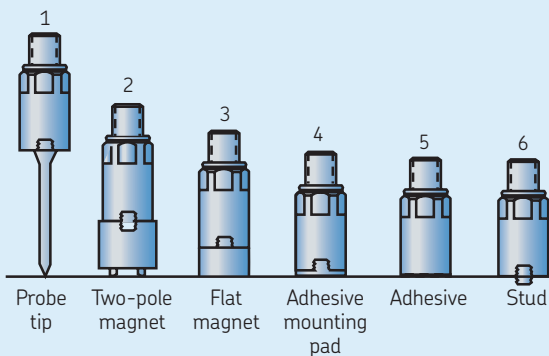
Mounting requirements

The mounting configuration depends upon the dynamic measurement requirements, such as frequency and amplitude range. Other factors to be considered are mounting location, prohibitions, accessibility and temperature. In general, there are four mounting configurations:

- Handheld probe tips
- Magnets
- Adhesives
- Threaded studs

The following table illustrates each method. A clear observation is how the mounting method affects the frequency range that can be measured; the less rigid the method, the lower the maximum frequency.

Frequency range based on mounting techniques



Handheld probe tip

Handheld “stingers” are commonly used in walk-around monitoring programs. The main task of any such program is basic screening and seeking changes in trends, rather than absolute measurements. Hence, the handheld method offers a fast and convenient way of locating the sensor. The frequency attenuation experienced with the method is still insufficient to affect the rotational vibration components of most machines. However, good operator training and diligence is required to ensure that measurements taken are reasonably repeatable, and consideration must be given to any higher frequency measurements.

Because probe tips may have structural resonances in the frequency range of interest, they should be made of steel and should not exceed 150 mm (6 in.) in length.

Magnetic mounting

Magnetic mounts are also popular in walk-around monitoring programs. The method removes the variations associated with handheld probes being applied by different users, and the frequency response is better, although still dramatically reduced when compared to stud or adhesive mounts.

Magnetic mounts are available with flat surfaces for flat locations or two pole configurations for curved surfaces. Ensuring the magnet is firmly attached is vital for good measurements.

Adhesive mounting

If a hole cannot be tapped properly into the machine, an adhesive mount is recommended. The rigidity of an adhesive mount is very dependent on the suitability of the adhesive used for the environment and whether it has been applied in accordance to the manufacturer’s instructions. An acrylic adhesive is the recommended adhesive type.

Mounting pads

When using an adhesive, the sensor may be directly attached to the machine or onto an adhesive mounting pad. The adhesive mounting pad is flat on one side with a threaded stud on the other. After the pad is adhered to the machine, the sensor is torqued onto the stud. A coupling fluid should be applied to the stud face that mates with the sensor. Use of an adhesive mounting pad is recommended if repeated removal of the sensor is required.



Note: If the circuit grounding scheme requires the sensor case to be grounded to the machine, then the installer must ensure that the adhesive mounting pad is electrically grounded to the machine. If grounding at the adhesive mounting pad is not practical, a suitable option is to place a junction box between the sensor and the monitor. The sensor shields can then be jumpered together and a common ground established at the machine.

Motor fin mounts

Motor fin mounts provide a mounting location for either magnetically mounted or permanently mounted accelerometers on motors. They are adhesive mounted between the cooling fins of the motor.



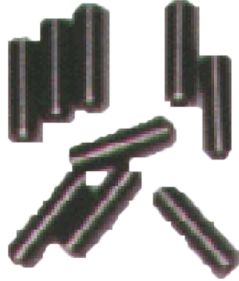
Before stud mounting the accelerometer, silicone dielectric coupling fluid should be applied to the mating surfaces. The coupling fluid protects the mounting surface and optimizes the frequency response by increasing the coupling stiffness. Suggested coupling fluids are machine oil or vacuum grease. It is recommended that a thread adhesive such as Loctite 222 be used.

Threaded studs

The use of stud mounting results in the widest frequency measurement range. It is recommended for permanent monitoring systems, high frequency testing and harsh environments.

The mounting point on the structure should be spot-faced 1,1 times greater than the diameter of the mounting surface of the sensor. For measurements involving frequencies above 1 kHz, the surface should be flat within 25 µm (0.001 in.) and have surface texture no greater than 0,8 µm (32 µin.). The tapped hole must be perpendicular to the mounting surface and at least two threads deeper than the stud. This will prevent a gap between the sensor and the mounting surface, producing optimum frequency response.

Proper screw torque on the mounting stud is also required. Under-torque of the sensor reduces the stiffness of the coupling. Over-torque can cause permanent thread damage to the sensor. The following table shows recommended nominal mounting torques.



Pipe thread adapters

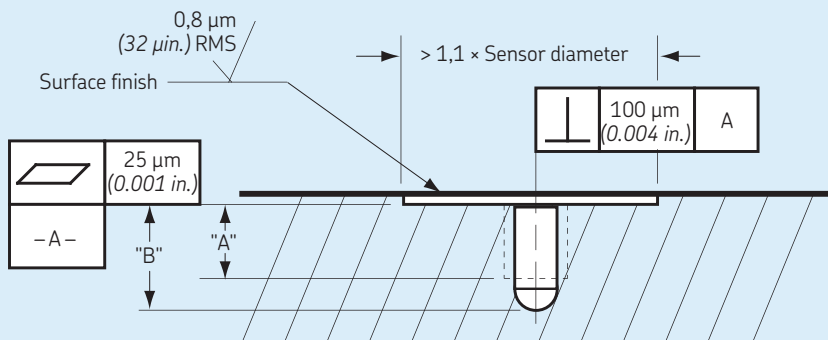
Pipe thread mounting adapters provide a mounting location for either magnetically mounted or permanently mounted accelerometers, but avoid the need to drill a hole in the machine and spot-face. They can make use of existing plugged holes on the machine.



Quick connects

A "quick connect" assembly allows the advantages of stud mounting to be combined with repeated fitting and removal of the accelerometer, which is most typically required in a walk-around monitoring program.

Stud mounting surface preparation



Stud	Stud size	"A" Dimension	"B" Dimension	Torque
SF1	10-32	4,78 mm (0.19 in.)	6,35 mm (0.25 in.)	20 Nm (2.3 lbf. in.)
CMAC 230	1/4-28	6,35 mm (0.25 in.)	8,90 mm (0.35 in.)	24 Nm (2.7 lbf. in.)
1/4-28 captive screw		6,35 mm (0.25 in.)	8,90 mm (0.35 in.)	30 Nm (3.4 lbf. in.)

Maintenance considerations

In general, piezoelectric accelerometers are almost maintenance-free, with only a small number of factors that need to be remembered, as follows.

Sensitivity validation

Regular sensitivity validation (or “calibration”) is not usually a requirement. For example, the procedure is unnecessary in condition monitoring applications where changes in gross vibrations are being measured and extreme accuracy is not a concern.

If high accuracy amplitude measurements are required, sensor calibration should be verified once a year and can normally be done on-site by a qualified technician with a vibration generator/shaker device. A piezoelectric accelerometer cannot be adjusted, so any variation measured must be accommodated by adjusting the sensitivity used by the monitor system.

Bias output voltage monitoring

A good indicator of accelerometer health can be found in its “bias output voltage”. The bias output voltage is the base DC voltage upon which the AC vibration signal is carried and is typically around 12 V DC.

A regular check of the bias output voltage, or a continuous trend in an on-line system, can reveal deterioration in the electronics within the sensor, which may be caused by the environment (such as temperature). It can also flag damage to cabling. Complete absence of the bias output voltage will indicate a break in the cable or circuit.

Self generating velocity sensors

These sensors wear out over time, as they contain moving parts. An annual sensitivity check is recommended.

Summary

Vibration sensors are the initial source of machinery information upon which productivity, product quality and personnel safety decisions are based.

It is crucial that sensors be properly selected and installed to ensure reliable signal information. Procedures should be implemented to monitor the performance of all measurement channels to further ensure the integrity of the vibration information base. Following this process will increase the effectiveness of your vibration monitoring program and improve productivity of plant personnel and equipment.

Vibration sensor cables and accessories

CMSS 932-SY / CMSS 932-DY / CMSS 932-SB / CMSS 933-SY

Bulk cable: single or double shielded, yellow or blue jacket, twisted pair or triads cables

SKF's CMSS 93X-XX cables are premium sensor cables providing superior performance in demanding environments.

Description

CMSS 932 is a single or double shielded, twisted pair cable with the conductors individually insulated with a fluorine based polymer, a braided shield with drain wire and an outer insulated jacket also made of a fluorine based polymer. Two insulated conductors are cabled together with one un-insulated drain wire and two glass cord fillers. The double shielded option adds an inner shield of aluminum polyester foil with drain wire.

The CMSS 933 cable has the same characteristics as the CMSS 932 cable, except it is a three-wire version for use with dual temperature and vibration sensors. This cable does not have a double shielded option. There are two wire colors (jacket) available:

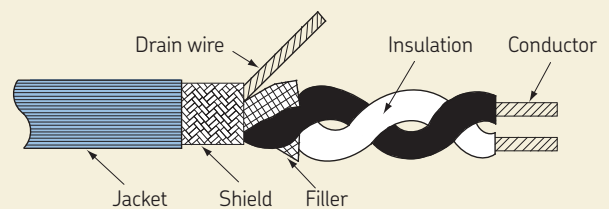
- Yellow: For high visibility in the often dusty and debris laden industrial environment
- Blue: For use in intrinsically safe circuits in the Oil/Gas and Hydrocarbon Processing industries

Recommended uses

The single shield cable is recommended for use with sensors in normal industrial applications where these cable types have been historically used and installed.

The double shield cable is highly recommended for use with sensors in industrial installations where there is a high noise field, such as machine tools and power generating facilities.

Two-wire cable assembly



Specifications (all models)

Electrical

- Capacitance: Approximately 89 pF/m (27 pF/ft.)
- Voltage rating: 600 V RMS maximum continuous use

Environmental

- Minimum bend radius: 48 mm (1.9 in.)
- Working temperature range: -80 to +200 °C (-110 to +390 °F)
- Heat and flame resistance: Non-flame propagating
- Plenum rated
- Meets ROHS requirements

Physical

- Materials:
 - Conductor: Tin plated copper, 19 × 32 strands, size 20 AWG (American Wire Gauge)
 - Insulation: Extruded FEP
 - Drain wire: Tin plated copper, 7 × 32 strands, size 24 AWG
 - Shield: 36 AWG tin plated copper braid
 - Jacket: Extruded FEP

- Color code:
 - Conductor: Black and white pair
 - Jacket: Yellow (Y) or blue (B)
- Color code for CMSS 932:
 - A = White = Acceleration signal/power
 - B = Black = Common
- Color code for CMSS 933:
 - A = Red = Acceleration signal/power
 - B = Black = Acceleration and temperature common
 - C = White = Temperature signal
- Dimensions:
 - Conductor: 0,96 mm (0.038 in.) nominal
 - Insulation: 1,40 mm (0.058 in.) nominal
 - Drain wire: 0,61 mm (0.024 in.) nominal
 - Shield: 3,50 mm (0.138 in.) nominal
 - Jacket: 4,80 mm, ±0,1 mm (0.190 in., ±0.005 in.)

Ordering information

CMSS 932-SY-150M Two-conductor, twisted pair, single shield, yellow cable with continuous cable length, 150 m (500 ft.) spool.
CMSS 932-SY-300M Two-conductor, twisted pair, single shield, yellow cable with continuous cable length, 300 m (1 000 ft.) spool.
CMSS 932-DY-150M Two-conductor, twisted pair, double shield, yellow cable with continuous cable length, 150 m (500 ft.) spool.
CMSS 932-SB-150M Two-conductor, twisted pair, single shield, blue cable with continuous cable length, 150 m (500 ft.) spool.
CMSS 933-SY-150M Three-conductor, triad, single shield, yellow cable with continuous cable length, 150 m (500 ft.) spool.

CMSS 932 / CMSS 933

Connector and cable assemblies for vibration sensors

Using detailed knowledge acquired from many years of supplying high quality sensors to a broad spectrum of industry users, SKF offers rugged cable and connector assemblies for use with vibration transducers employed in the Pulp and Paper, Petrochemical, Steel, Mining and Construction, Metal Working and Machine Tool industries.

The weakest part of any vibration monitoring system is the sensor and field cabling. Selection of a quality sensor is the first important step towards the integrity of a system, but equally important is the choice of mating connector and cable.

Features

- For use with the SKF range of vibration sensors
- Rugged, economical
- Shielding for low-voltage dynamic vibration signals
- Proven, advanced styles of connectors
- Two levels of dust and water ingress protection

Description

CMSS 932-68

The CMSS 932-68 is a cable connector assembly designed for use with piezoelectric vibration sensors that require high specification shielded cable to maximize the quality of the signal transmitted to the monitoring system.

The CMSS 932-68 is a two wire assembly, using a single or double shield, twisted pair cable with the conductors individually insulated with a fluorine based polymer, a braided shield with drain wire and an outer insulated jacket also made of a fluorine based polymer.

The double shielded option adds an inner shield of aluminum polyester foil with drain wire. There are two wire colors (jacket) available:

- Yellow: For high visibility in the often dusty and debris laden industrial environment
- Blue: For use in intrinsically safe circuits in the Oil/Gas and Hydrocarbon Processing industries

CMSS 933-68

The CMSS 933-68 has the same characteristics as the CMSS 932-68, except it is a three wire version for use with dual temperature and vibration sensors.

All IP 68 connectors are heavy duty MIL-style, with sealing against dust and water ingress. The stainless steel connectors are also physically protected by a fluoroelastomer "rubber boot" with SKF molded logo for easy vendor identification.

At the other end, the cables are blunt cut, ready for installation in field termination boxes.



CMSS 932 / CMSS 933 IP 68 cable connector assemblies with locking collar (top) and with twist lock (bottom).

Recommended uses

The single shield cable is recommended for use with sensors in normal industrial applications where these cable types have been previously used and installed.

The double shield cable is highly recommended for use with sensors in industrial installations where there is a high noise field, such as machine tools and power generating facilities.

For double shielded versions, the inner shield is isolated and the outer shield is non-isolated.

Specifications

Cables

- Two insulated conductors are cabled together with one uninsulated drain wire and two glass cord fillers

Materials

- Conductor: Tin plated copper, 19 × 32 strands, size 20 AWG (American Wire Gauge)
- Insulation: Extruded FEP
- Drain wire: Tin plated copper, 7 × 32 strands, size 24 AWG
- Shield: 36 AWG tin plated copper braid
- Jacket: Extruded FEP
- Molded boot: Black fluoroelastomer, offering better chemical resistance
- Adaptor / Locking rings: Stainless steel

Color code

- Conductor: Black and white pair
- Jacket: Yellow or blue
- Color code for CMSS 932:
 - A = White = Acceleration signal/power
 - B = Black = Common
- Color code for CMSS 933:
 - A = Red = Acceleration signal/power
 - B = Black = Acceleration and temperature common
 - C = White = Temperature signal

Dimensions

- Conductor: 0,96 mm (0.038 in.) nominal
- Insulation: 1,40 mm (0.058 in.) nominal
- Drain wire: 0,61 mm (0.024 in.) nominal
- Shield: 3,50 mm (0.138 in.) nominal
- Jacket: 4,80 mm, $\pm 0,1$ mm (0.190 in., ± 0.005 in.)

Electrical

- Capacitance: Approximately 89 pF/m (27 pF/ft.)
- Voltage rating: 600 V RMS maximum continuous use

Environmental

- Minimum bend radius: 48 mm (1.9 in.)
- Working temperature range: -80 to $+200$ °C (-110 to $+390$ °F)
- Heat and flame resistance: Non-flame propagating
- Plenum rated
- Meets ROHS requirements



IP 68 sensor/connector/cable assembly with twist lock (CMSS 932-68TLX-XX-XXX).



IP 68 sensor/connector/cable assembly with locking collar (CMSS 932-68LCX-XX-XXX).

Connectors

MIL-style stainless steel connectors are designed for use with SKF sensors. There are two different styles of IP 68 connectors: twist lock and locking collar.

With the twist lock connector, a quarter twist of the fluoroelastomer boot locks the assembly into a tight fit.

The locking collar is a threaded connector that threads onto an accompanying sensor adapter. It is recommended to secure the sensor adapter to the accelerometer connector using thread lock (Loctite).

Both provide excellent protection against dust and water, and achieved an ingress protection rating of IP 68. However, the connector/cable assembly with locking collar features an O-ring and metal locking ring and is therefore more suitable for applications under water.

Definition of IP 68 (Immersion)

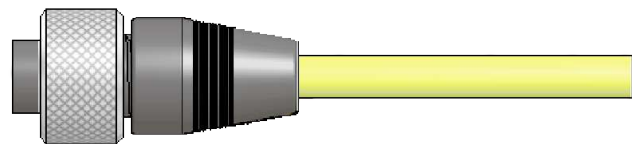
- No ingress of dust; complete protection against contact
- Suitable for continuous immersion in water depth greater than 1 m (3.3 ft.) when the connector and mating connector on the sensor is assembled with silicone grease

Connector specifications

Molded boot:	Black fluoroelastomer
Adaptor/locking collar:	Stainless steel
Temperature range:	-23 to $+150$ °C (-9.4 to $+302$ °F)

CMSS 932-64 / CMSS 933-64

The MIL-style IP 64 rated connector is an economical choice and suits application in lighter industrial environments.



IP 64 connector/cable assembly with standard build (CMSS 932-64SBI-XX-XXX).

Due to its size, the standard build does not feature an SKF logo and has limited options. The IP 64 connector/cable assembly is only available isolated, the shield is not connected to the sensor body.

Definition of IP 64 (splash-proof)

- Complete protection against contact; protection from infiltration of dust and protection from splashed water (splash-proof)
- Maximum temperature: $+80$ °C ($+176$ °F)

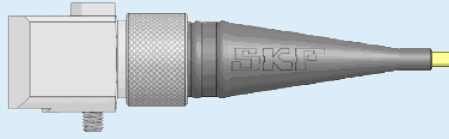
Cable assemblies

Industrial two pin accelerometer assemblies for SKF Multilog systems

MIL-style stainless steel connectors are designed for use with SKF sensors. There are two different styles of IP 68 connectors: an assembly with a twist lock and an assembly with a locking collar.

The locking collar is a threaded connector that threads onto an accompanying sensor adapter. It is recommended to secure the sensor adapter to the accelerometer connector using thread lock (Loctite).

Both provide excellent protection against dust and water, and both achieved an ingress protection rating of IP 68. However, the connector/cable assembly with locking collar features an O-ring and metal locking ring and is therefore more suitable for applications under water.

Model number	Description	Compatible accelerometers	
Twist lock cables			
			
	Twist lock, non-isolated		
CMSS 932-68TLN-SY-5M	Two wire, IP 68 connector, twist lock, non-isolated, single shield, yellow cable, 5 m (16.4 ft.) length	• CMSS 780A-IS • CMSS 780A-D2 • CMSS 780C • CMSS 780C-M8 • CMSS 786A-IS • CMSS 787A-IS • CMSS 787A-M8-IS • CMSS 793-CA • CMSS 793-EE • CMSS 793-FM • CMSS 793L • CMSS 793V • CMSS 793V-CA • CMSS 793V-EE • CMSS 793V-FM • CMSS 797-CA • CMSS 797-EE • CMSS 797L • CMSS 797L-FM • CMSS 797V • CMSS 2100 • CMSS 2106 • CMSS 2200 • CMSS 2200-M8 • CMSS 2207	
CMSS 932-68TLN-SY-10M	Two wire, IP 68 connector, twist lock, non-isolated, single shield, yellow cable, 10 m (32.8 ft.) length		
CMSS 932-68TLN-SY-10M	Two wire, IP 68 connector, twist lock, non-isolated, single shield, yellow cable, 20 m (65.6 ft.) length		
	Twist lock, isolated		
CMSS 932-68TLI-SY-5M	Two wire, IP 68 connector, twist lock, isolated, single shield, yellow cable, 5 m (16.4 ft.) length		
CMSS 932-68TLI-SY-10M	Two wire, IP 68 connector, twist lock, isolated, single shield, yellow cable, 10 m (32.8 ft.) length		
CMSS 932-68TLI-SY-10M	Two wire, IP 68 connector, twist lock, isolated, single shield, yellow cable, 20 m (65.6 ft.) length		
Locking collar cables			
			
	Locking collar, non-isolated		
CMSS 932-68LCN-SY-5M	Two wire, IP 68 connector, locking collar, non-isolated, single shield, yellow cable, 5 m (16.4 ft.) length		
CMSS 932-68LCN-SY-10M	Two wire, IP 68 connector, locking collar, non-isolated, single shield, yellow cable, 10 m (32.8 ft.) length		
CMSS 932-68LCN-SY-10M	Two wire, IP 68 connector, locking collar, non-isolated, single shield, yellow cable, 20 m (65.6 ft.) length		
	Locking collar, isolated		
CMSS 932-68LCI-SY-5M	Two wire, IP 68 connector, locking collar, isolated, single shield, yellow cable, 5 m (16.4 ft.) length		
CMSS 932-68LCI-SY-10M	Two wire, IP 68 connector, locking collar, isolated, single shield, yellow cable, 10 m (32.8 ft.) length		
CMSS 932-68LCI-SY-10M	Two wire, IP 68 connector, locking collar, isolated, single shield, yellow cable, 20 m (65.6 ft.) length		

IP 68 rated cable/connector assembly – industrial

Ordering information

CMSS 932 Two-wire twisted pair cable / two-pin connector assembly.

CMSS 933 Three-wire twisted triad cable / three-pin connector assembly.

		CMSS 93a-68bbc-de-fff
a: Wire		
2	Two-wire twisted pair, two-pin connector	
3	Three-wire twisted triad, three-pin connector	
68: IP 68 connector (immersion)		
bb: Lock type		
TL	Twist lock	
LC	Locking collar	
c: Isolated/Non-isolated		
I	Isolated (must use single shielded)	
N	Non-isolated	
d: Shield		
D	Double shielded (must use non-isolated)	
S	Single shielded	
e: Jacket		
Y	Yellow jacket	
B	Blue jacket	
fff: Length		
5M	Length: 5 meters (16.4 ft.)	
10M	Length: 10 m (32.8 ft.)	
20M	Length: 20 m (65.6 ft.)	
XXM	Length: Specify XX meters, in 5 m increments	

Note: Isolated connectors cannot be selected with double shielded cables (e.g., part number CMSS 932-68LCI-DY-XXM is not valid).

As such, if a double shielded cable is required (shield = **D**), select a non-isolated connector (non-isolated = **N**); for example:

- CMSS 932-68LCN-DY-5M

If a isolated connector is required (isolated = **I**), select a single shielded cable (shield = **S**); for example:

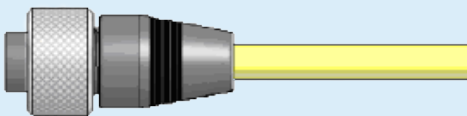
- CMSS 932-68LCI-SY-5M

Double shielded cable should be grounded on both sides: the instrument side and the sensor side (through the machine). If an isolated connector is selected with a double shielded cable, the sensor side will be cut off and never connected to the sensor ground.

Cable assemblies

Economical two pin accelerometer assemblies

The MIL-style IP 64 rated connector is an economical choice and suits applications in lighter industrial environments. Due to its size, the standard build does not feature an SKF logo and has limited options. The IP 64 connector/cable assembly is only available isolated; the shield is not connected to the sensor body.

Model number	Description	Compatible accelerometers
	Standard build cables 	• CMSS 780A-IS • CMSS 780A-D2 • CMSS 780C • CMSS 780C-M8 • CMSS 786A-IS • CMSS 787A-IS • CMSS 787A-M8-IS • CMSS 793-CA • CMSS 793-EE • CMSS 793-FM • CMSS 793L • CMSS 793V • CMSS 793V-CA • CMSS 793V-EE • CMSS 793V-FM • CMSS 797-CA • CMSS 797-EE • CMSS 797L • CMSS 797L-FM • CMSS 797V • CMSS 2100 • CMSS 2106 • CMSS 2200 • CMSS 2200-M8 • CMSS 2207
CMSS 932-64SBI-SY-5M	Standard build, isolated Two wire, IP 64 connector, standard build, isolated, single shield, yellow cable, 5 m (16.4 ft.) length	
CMSS 932-64SBI-SY-10M	Two wire, IP 64 connector, standard build, isolated, single shield, yellow cable, 10 m (32.8 ft.) length	
CMSS 932-64SBI-SY-10M	Two wire, IP 64 connector, standard build, isolated, single shield, yellow cable, 20 m (65.6 ft.) length	
	Longer cable lengths are available upon request. Please contact your SKF Sales Representative.	

IP 64 rated cable/connector assembly – economical

Ordering information

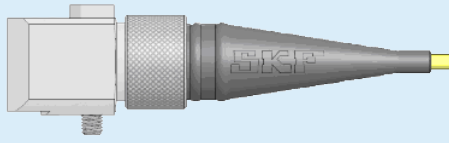
CMSS 932 Two-wire twisted pair cable / two-pin connector assembly.

CMSS 933 Three-wire twisted triad cable / three-pin connector assembly.

		CMSS 93a-64SBI-Sb-ccc			
a: Wire					
2	Two-wire twisted pair, two-pin connector				
3	Three-wire twisted triad, three-pin connector				
64: IP 64 connector (splash-proof)					
SB: Standard build					
I: Isolated					
S: Single shielded					
b: Jacket					
Y	Yellow jacket				
B	Blue jacket				
ccc: Length					
5M	Length: 5 meters (16.4 ft.)				
10M	Length: 10 m (32.8 ft.)				
20M	Length: 20 m (65.6 ft.)				
XXM	Length: Specify XX meters, in 5 m increments				

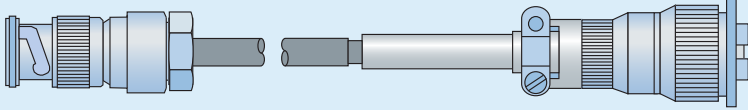
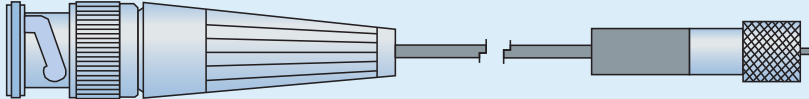
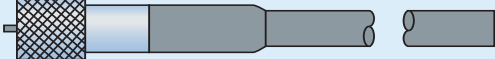
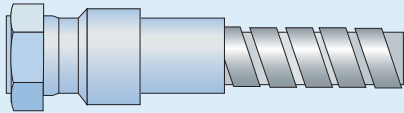
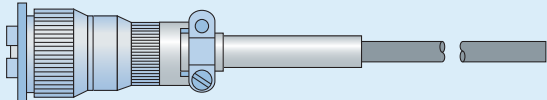
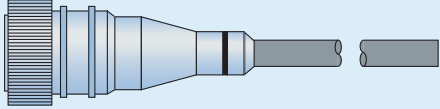
Cable assemblies

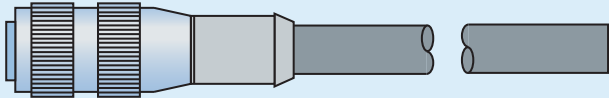
Industrial three pin cable assemblies

Model number	Description	Compatible accelerometers	
Twist lock cables			
			
	Twist lock, non-isolated		
CMSS 933-68TLN-SY-5M	Two wire, IP 68 connector, twist lock, non-isolated, single shield, yellow cable, 5 m (16.4 ft.) length	• CMSS 786T-IS • CMSS 793T-3 • CMSS 797T-1 • CMSS 2100T • CMSS 2200T	
CMSS 933-68TLN-SY-10M	Two wire, IP 68 connector, twist lock, non-isolated, single shield, yellow cable, 10 m (32.8 ft.) length		
CMSS 933-68TLN-SY-10M	Two wire, IP 68 connector, twist lock, non-isolated, single shield, yellow cable, 20 m (65.6 ft.) length		
	Twist lock, isolated		
CMSS 933-68TLI-SY-5M	Two wire, IP 68 connector, twist lock, isolated, single shield, yellow cable, 5 m (16.4 ft.) length		
CMSS 933-68TLI-SY-10M	Two wire, IP 68 connector, twist lock, isolated, single shield, yellow cable, 10 m (32.8 ft.) length		
CMSS 933-68TLI-SY-10M	Two wire, IP 68 connector, twist lock, isolated, single shield, yellow cable, 20 m (65.6 ft.) length		
Locking collar cables			
			
	Locking collar, non-isolated		
CMSS 933-68LCN-SY-5M	Two wire, IP 68 connector, locking collar, non-isolated, single shield, yellow cable, 5 m (16.4 ft.) length		
CMSS 933-68LCN-SY-10M	Two wire, IP 68 connector, locking collar, non-isolated, single shield, yellow cable, 10 m (32.8 ft.) length		
CMSS 933-68LCN-SY-10M	Two wire, IP 68 connector, locking collar, non-isolated, single shield, yellow cable, 20 m (65.6 ft.) length		
	Locking collar, isolated		
CMSS 933-68LCI-SY-5M	Two wire, IP 68 connector, locking collar, isolated, single shield, yellow cable, 5 m (16.4 ft.) length		
CMSS 933-68LCI-SY-10M	Two wire, IP 68 connector, locking collar, isolated, single shield, yellow cable, 10 m (32.8 ft.) length		
CMSS 933-68LCI-SY-10M	Two wire, IP 68 connector, locking collar, isolated, single shield, yellow cable, 20 m (65.6 ft.) length		
Longer cable lengths are available upon request. Please contact your SKF Sales Representative.			

Cable assemblies

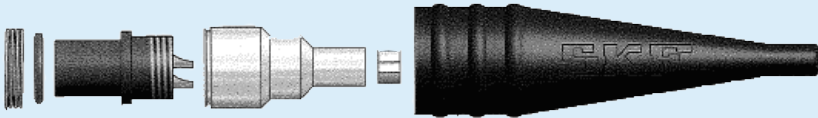
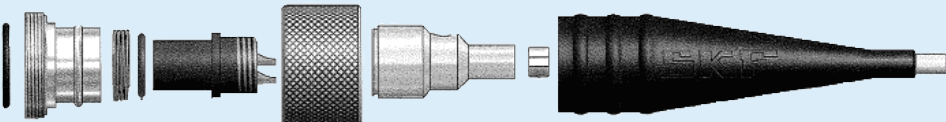
Miscellaneous cable assemblies

Model number	Description	Compatible accelerometers
CMSS 30150000-16	 BNC to sensor with two-pin MIL-C 5015 connector, coaxial connector cable, 4,88 m (16 ft.)	• All sensors with two-pin MIL-C 5015 connectors (CMSS 2100, CMSS 2200, CMSS 793, CMSS 797, etc.)
CMSS 30765400-10 CMSS R1-2-J3-25	 BNC to Microdot 10-32 connector, coaxial connector cable, 3,05 m (10 ft.) BNC to Microdot 10-32 connector, high temperature interconnect cable, 7,62 m (25 ft.)	• CMSS 726 • CMSS 732
CMSS R1-J93-16 CMSS R1-J93-32	 Coaxial, high temperature fluorine based polymer cable, Microdot 10-32 connector to blunt cut, 4,88 m (16 ft.) Coaxial, high temperature fluorine based polymer cable, Microdot 10-32 connector to blunt cut, 9,75 m (32 ft.)	• CMSS 726 • CMSS 732
CMSS 4850-015 CMSS 4850-050	 Two pin, hermetically sealed connector with armored cable and trimmed wire, 4,57 m (15 ft.) Two pin, hermetically sealed connector with armored cable and trimmed wire, 15,24 m (50 ft.)	• CMSS 85-7 • CMSS 85-9
Industrial cable assembly for special multi-parameter sensor, cables with PC06 connector		
CMSS R19-J9T3PS-16 CMSS R19-J9T3PS-32 CMSS R19-J9T3PS-64	 Shielded cable with PC06 connector, 4,88 m (16 ft.) Shielded cable with PC06 connector, 9,75 m (32 ft.) Shielded cable with PC06 connector, 19,51 m (64 ft.)	• CMSS 786M
Industrial cable assembly for special multi-parameter sensor, cables with splash-proof connector		
CMSS R19SL-J9T3PS-16 CMSS R19SL-J9T3PS-32 CMSS R19SL-J9T3PS-64	 Shielded cable with splash-proof connector, 4,88 m (16 ft.) Shielded cable with splash-proof connector, 9,75 m (32 ft.) Shielded cable with splash-proof connector, 19,51 m (64 ft.)	

Model number	Description	Compatible accelerometers
		
CMSS RM12-ST-J10-10	Cable connector assembly with M12 connector, IP 68, two-wire cable, isolated, single shield, grey, 3,05 m (10 ft.)	• CMSS 2100-M12
CMSS RM12-ST-J10-16	Cable connector assembly with M12 connector, IP 68, two-wire cable, isolated, single shield, grey, 4,88 m (16 ft.)	
CMSS RM12-ST-J10-32	Cable connector assembly with M12 connector, IP 68, two-wire cable, isolated, single shield, grey, 9,75 m (32 ft.)	
CMSS RM12-ST-J10-64	Cable connector assembly with M12 connector, IP 68, two-wire cable, isolated, single shield, grey, 19,51 m (64 ft.)	

Connectors and toolkits

For on-site cable fabrication

Model number	Description
Connector packs for cables with a twist lock connector	
	
	For CMSS 932 series
CMSS 932-68TL-1	Connector pack for CMSS 932 series cable, two pin, IP 68, twist lock, isolated and non-isolated, single and double shield, quantity one
CMSS 932-68TL-10	Connector pack for CMSS 932 series cable, two pin, IP 68, twist lock, isolated and non-isolated, single and double shield, quantity 10
CMSS 932-68TL-50	Connector pack for CMSS 932 series cable, two pin, IP 68, twist lock, isolated and non-isolated, single and double shield, quantity 50
	For CMSS 933 series
CMSS 933-68TL-1	Connector pack for CMSS 933 series cable, three pin, IP 68, twist lock, isolated and non-isolated, single shield, quantity one
CMSS 933-68TL-10	Connector pack for CMSS 933 series cable, three pin, IP 68, twist lock, isolated and non-isolated, single shield, quantity 10
CMSS 933-68TL-50	Connector pack for CMSS 933 series cable, three pin, IP 68, twist lock, isolated and non-isolated, single shield, quantity 50
Connector packs for cables with a locking collar connector	
	
	For CMSS 932 series
CMSS 932-68LC-1	Connector pack for CMSS 932 series cable, two pin, IP 68, locking collar, isolated and non-isolated, single and double shield, quantity one
CMSS 932-68LC-10	Connector pack for CMSS 932 series cable, two pin, IP 68, locking collar, isolated and non-isolated, single and double shield, quantity 10
CMSS 932-68LC-50	Connector pack for CMSS 932 series cable, two pin, IP 68, locking collar, isolated and non-isolated, single and double shield, quantity 50
	For CMSS 933 series
CMSS 933-68LC-1	Connector pack for CMSS 933 series cable, three pin, IP 68, locking collar, isolated and non-isolated, single shield, quantity one
CMSS 933-68LC-10	Connector pack for CMSS 933 series cable, three pin, IP 68, locking collar, isolated and non-isolated, single shield, quantity 10
CMSS 933-68LC-50	Connector pack for CMSS 933 series cable, three pin, IP 68, locking collar, isolated and non-isolated, single shield, quantity 50

Connectors and toolkits

For on-site cable fabrication (continued)

Model number	Description
CMSS 930-68-K	Toolkit for field installation Toolkit for field installation for CMSS 93x series cable, IP 68 connectors, single and double shield (excludes connectors), for 25 to 50 connectors Each toolkit contains: • Crimp tool • Crimp tool positioner • Crimp tool frame • Exacto knife • Exacto knife blades (15) • Scissors • Wire stripper • High temperature epoxy (3 pack) (must use within two months) • Epoxy mix applicator gun • Metal socket insertion tool • Plastic socket insertion tool (2) • Epoxy mixing plunger • Epoxy nozzle (static mixing tubes) (10)
Replenishable accessories	
CMAC 930-01	Epoxy nozzle (static mixing tube)
CMAC 930-02	High temperature epoxy (must use within two months)
CMAC 930-03	Plastic socket insertion tool

CMSS 930-68-K Toolkit for field installation



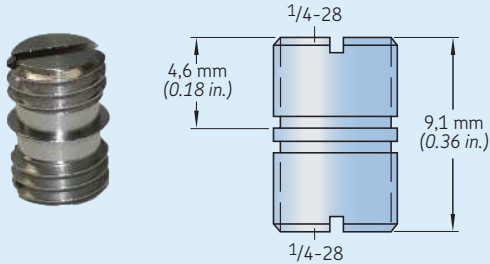
Mounting hardware

Accelerometer / Velocity sensor mounting hardware

Model number

Description

CMAC 230



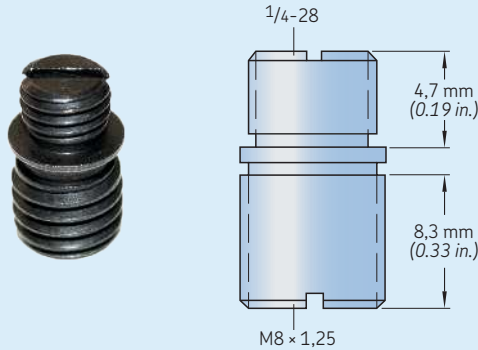
Threaded mounting stud (1/4-28 to 1/4-28)

- Flanged sensor mounting stud, 1/4-28 thread on both sides
- Material: Stainless steel
- Recommended mounting torque: 2,9 Nm (24 in. lbs.)
- Frequency response: Proper mounting on clean flat surface can achieve the specified frequency response of sensor

Ordering information:

- CMAC 230-10 Threaded mounting studs (1/4-28 to 1/4-28), stainless steel, 10-pack
- CMAC 230-50 Threaded mounting studs (1/4-28 to 1/4-28), stainless steel, 50-pack

CMAC 231



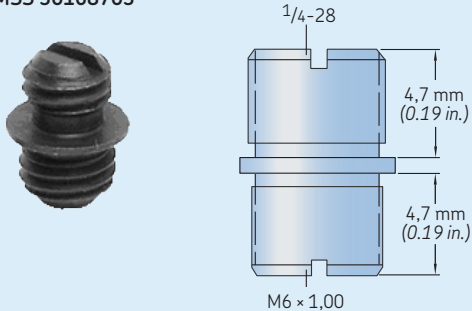
Adapter mounting stud (1/4-28 to M8)

- Flanged sensor mounting stud, adapts 1/4-28 threads to M8 thread
- Material: Stainless steel
- Recommended mounting torque: 2,9 Nm (24 in. lbs.)
- Frequency response: Proper mounting on clean flat surface can achieve the specified frequency response of sensor

Ordering information:

- CMAC 231-10 Adapter mounting studs (1/4-28 to M8), stainless steel, 10-pack
- CMAC 231-50 Adapter mounting studs (1/4-28 to M8), stainless steel, 50-pack

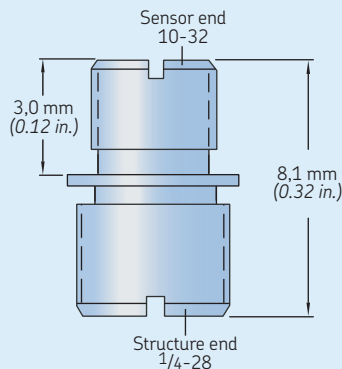
CMSS 30168703



Adapter mounting stud (1/4-28 to M6)

- Flanged sensor mounting stud, adapts 1/4-28 tapped threads to M6 thread
- Material: Stainless steel
- Recommended mounting torque: 2,9 Nm (24 in. lbs.)
- Frequency response: Proper mounting on clean flat surface can achieve the specified frequency response of sensor

CMSS 30205300



Mounting stud (1/4-28 to 10-32)

- Flanged sensor mounting stud, adapts 1/4-28 tapped threads to 10-32 thread
- Material: Stainless steel
- Recommended mounting torque: 2,3 Nm (20 in. lbs.)
- Frequency response: Proper mounting on clean flat surface can achieve the specified frequency response of sensor

Mounting hardware

Accelerometer / Velocity sensor mounting hardware (continued)

Model number		Description
CMSS 12105-03		Metric thread, socket head, captive mounting bolt M6 × 1.0 (37 mm overall), black oxide finish, for ring-mode superior accelerometers CMSS 2207, CMSS 797, CMSS 797-CA/EE/FM, CMSS 797L, CMSS 797L-FM, CMSS 797T-1, CMSS 797V
CMSS 12105-01		Imperial thread, socket head, captive mounting bolt 1/4-28 (1.40 in. overall), 18-8 stainless steel, for ring-mode superior accelerometers CMSS 2207, CMSS 797, CMSS 797-CA/EE/FM, CMSS 797L, CMSS 797L-FM, CMSS 797T-1, CMSS 797V
CMSS 11714-05		Metric thread, socket head, captive mounting bolt M6 × 1.0 (32 mm overall), black oxide finish, for standard side-exit accelerometers CMSS 2200, CMSS 2200T, CMSS 787A-D2, CMSS 787A-IS
CMSS 11714-04		Imperial thread, socket head, captive mounting bolt 1/4-28 (1.25 in. overall), 18-8 stainless steel, for standard side-exit accelerometers CMSS 2200, CMSS 2200T, CMSS 787A-D2, CMSS 787A-IS
CMSS 11714-06		Metric thread, socket head, captive mounting bolt M8 × 1.25 (33 mm overall), black oxide finish, for standard side-exit accelerometers CMSS 2200-M8, CMSS 787A-M8-D2, CMSS 787A-M8-IS

CMSS 910M

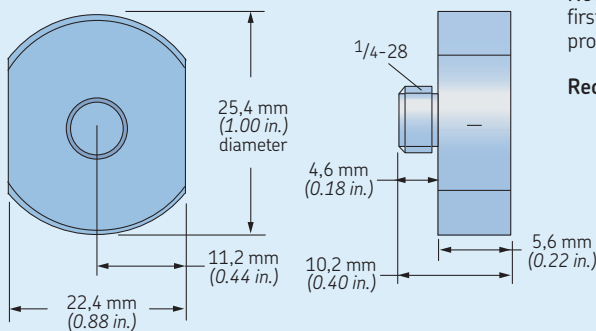


Cementing stud with 1/4-28 male

- Cementing studs for sensors with 1/4-28 tapped threads
- Material: Stainless steel
- Recommended mounting torque: 2,9 Nm (24 in. lbs.)
- Frequency response: Flat up to about 80% of the specified response value using epoxy or similar cement; flat up to about 30% of the specified response value using double-sided tape

Note: To avoid sensor damage, always remove the sensor from the cementing stud first, then remove the stud from the surface by means of a wrench using the flats provided.

Recommended with Loctite 454 adhesive gel (not included).

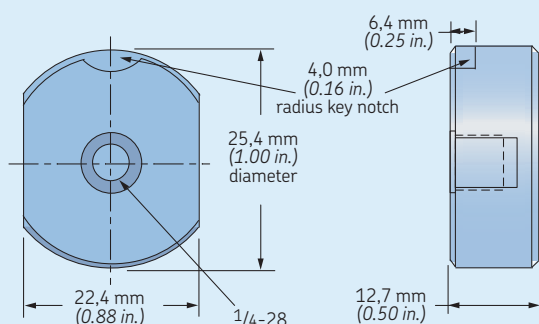
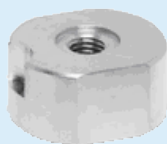


Mounting hardware

Accelerometer / Velocity sensor mounting hardware (continued)

Model number

CMSS 910F



Description

Cementing stud with 1/4-28 female

- Cementing studs for sensors requiring 1/4-28 tapped mounting threads (see **page 139** for adapters to M6, M8 and 10-32 thread accelerometers); includes key notch for consistent triaxial axis orientation
- Material: Stainless steel
- Recommended mounting torque: 2,9 Nm (24 in. lbs.)
- Frequency response: Flat up to about 80% of the specified response value using epoxy or similar cement; flat up to about 30% of the specified response value using double-sided tape

Note: To avoid sensor damage, always remove the sensor from the cementing stud first, then remove the stud from the surface by means of a wrench using the flats provided.

Recommended with Loctite 454 adhesive gel (not included).

CMSS 910QDB1
CMSS 910QDP1
CMSS 910QDP2

Quick connect/disconnect sensor mounting pads

Mounting pads allow vibration technicians using such instruments as the SKF Microlog on walkaround routes to quickly mount vibration sensors in less than one turn. This quick mount design results in a decrease in mounting time as compared to the older style threaded stud mounting pads.

Key benefits:

- Decreased sensor mounting time by 90%
- Eliminates wrist fatigue from repetitive twisting
- Combines ease and speed of a magnet mount with the accuracy and repeatability of a permanent mount
- Ensures the repeatable, reliable vibration data of a permanently mounted sensor
- Prevents cable twisting
- Upgrades existing installations

Features:

- Constructed of corrosion resistant 316 stainless steel
- Convenient cement mounting capability
- Accepts all 1/4-28 compatible vibration sensors, including SKF's low profile models
- Compatible with existing 1/4-28 stud mount installations
- Easily removed to upgrade to permanent mount allowing the sensor to be directly attached to the same measuring point

CMSS 910QDB1



Quick connect adapter sensor base

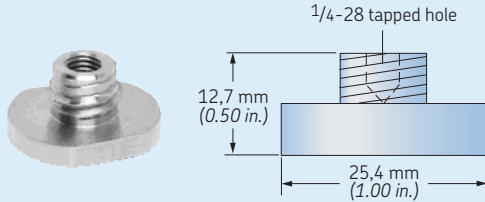
- The CMSS 910QDB1 attaches easily to 1/4-28 compatible sensors
- In walkaround data collection, the sensor can be attached in less than one turn to any of the quick connect/disconnect mounting pads
- The CMSS 910QDB1 can remain on the sensor or be removed and reattached to other popular SKF vibration sensors

Mounting hardware

Accelerometer / Velocity sensor mounting hardware (continued)

Model number

CMSS 910QDP1



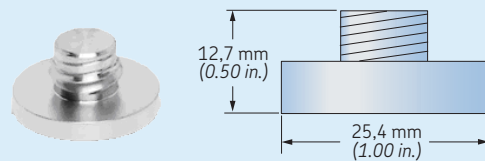
Description

Quick connect, threaded stud mounting pad

- The CMSS 910QDP1 is stud mounted to the measuring point or attached to an existing 1/4-28 stud
- Easy conversion to permanently mounted sensors
- Once the CMSS 910QDP1 is mounted, conversion to permanently mounted sensors is quick and easy
- By simply removing the pad and attaching an SKF vibration sensor to the existing 1/4-28 stud, sensor location and vibration data history remains reliable

Model number

CMSS 910QDP2



Quick connect, cement mounting pad

- The CMSS 910QDP2 is epoxied to the measuring point
- Removable for upgrading to permanently mounted sensors
- When upgrading to permanently mounted sensors, the cement pad can easily be removed to allow a stud mounted sensor to be installed in the location

Mounting hardware

Accelerometer / Velocity sensor mounting hardware (continued)

Model number	Description
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Toolkits for spot facing, drilling and tapping are available in three configurations:

CMAC 9600-01	Toolkit for spot face, 1/4-28 mounting
CMAC 9600-02	Toolkit for spot face, M8 × 1,25 mounting
CMAC 9600-10	Toolkit for spot face, M6 × 1 mounting

Additional drill bits, end mills and taps are also available:

CMAC 9600-03	Drill bit for 1/4-28 kit
CMAC 9600-04	Tap for 1/4-28 kit
CMAC 9600-05	Pilot for 1/4-28 kit
CMAC 9600-06	Drill bit for M8 × 1,25 kit
CMAC 9600-07	Tap for M8 × 1,25 kit
CMAC 9600-08	Pilot for M8 × 1,25 kit
CMAC 9600-09	End mill or counter bore for either kit



1. Spot face pilot
2. Drill bit
3. Spot face mill (counter bore)
4. Tap for threading
5. Allen wrench

How to mount a sensor

1 Select location for mounting.

Inspect for possible items behind the mounting area. A radial position, as close to the bearing load zone as possible, works best.

2 Prepare surface.

Within a 2 in. square area, prepare a flat surface and clean with a hand tool.

3 Drilling.

Drill a pilot hole with a 6,7 mm drill bit for the M8 × 1,25 thread or a #3 drill for the 1/4-28 thread, then enlarge the pilot hole with the drill bit (M8 × 1,25 or 1/4-28).

4 Insert pilot.

Insert the pilot (M8 × 1,25 or 1/4-28) into the spot face mill (counter bore) and secure with an allen wrench.

5 Spot face mounting area.

Using the piloted counter bore, spot face the surface until smooth and approximately one inch in diameter.

6 Tap hole.

Use the tap (M8 × 1,25 or 1/4-28) to hand tap the hole to the desired thread depth.

7 Mount sensor.

Mount and tighten the sensor stud according to the sensor specification, often 2,9 Nm (24 in. lbs.).

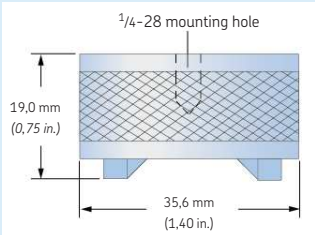
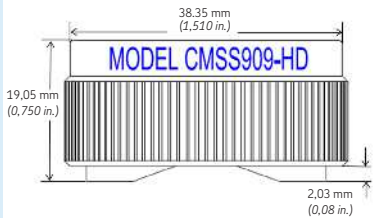
Mounting hardware

Magnetic bases

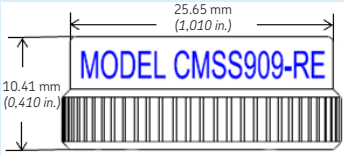
Magnetic bases for curved surfaces (CMSS 908-MD and CMSS 909-HD)

Models CMSS 908-MD and CMSS 909-HD are designed in a two-pole configuration for industrial vibration monitoring applications where flat surfaces are rarely found. Each magnet is supplied with a 1/4-28 mounting stud to allow compatibility with most SKF transducers.

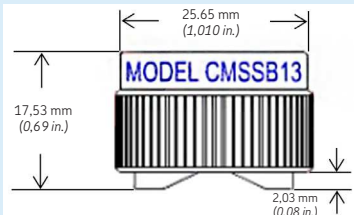
Note: Two-pole magnet bases are recommended for low-frequency measurements only, and only for applications where other mounting methods are now practical.

Model number	Description
CMSS 908-MD  	Medium-duty magnetic base for use in moderate conditions • Material: Stainless steel • Pull strength: 23 kg (50 lbs.) • Mounting hole: 1/4-28 • Dimensions: 19,0 mm (0.75 in.) height × 35,6 mm (1.40 in.) diameter
CMSS 909-HD  	High-strength magnet base for high duty. Features alignment holes for triaxial sensors. • Material: Rare earth neodymium, mounted in a stainless steel housing with steel poles. • Frequency response: Flat up to about 10% of resonance frequency (6,6 kHz) • Pull strength: Approximately 34 kg (75 lbs.) of force • Mounting: 1/4-28 hole • Dimensions: 20,52 mm (0,808 in.) height × 38,35 mm (1.51 in.) diameter

Magnet base for flat surfaces

CMSS 909-RE  	Rare earth flat-bottom magnetic base for flat surfaces • Material: Rare earth neodymium, mounted in a stainless steel housing • Frequency response: Flat up to about 20% of resonance frequency (8,4 kHz) • Pull strength: Approximately 18,1 kg (40 lbs.) • Mounting hole: 1/4-28 hole • Dimensions: 10,41 mm (0,410 in.) height × 25,65 mm (1,010 in.) diameter
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Magnet base for smaller sensors (CMSS 732A)

CMSS B13  	Rare earth two-pole magnet with knurled gripping surface • Pull strength: Approximately 16 kg (35 lbs.) • Mounting hole: 1/4-28 hole (studs and adapter available) • Dimensions: 17,53 mm (0,69 in.) height × 25,65 mm (1,01 in.) diameter
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Mounting hardware

CMSS 50042300

Case mounted transducer housing

The CMSS 50042300 case mounted transducer housing provides physical and environmental protection for the CMSS 766, CMSS 786 and CMSS 793 series seismic sensors. The housing is used in installations where the pickup can be subject to possible damage from adverse conditions. This housing meets API 670 standards when properly installed.

The mounting kit includes a dome cover, mounting base with a 3/4 in. conduit connection, neoprene gasket, mounting screws, washers and a 1/2 in. NPT reducing bushing.

Note: The seismic sensor must be ordered separately.

Installation

The housing is compatible with 1/2 in. and 3/4 in. flex, EMT and rigid conduit.

- 1 Selector prepare the flat surface for installation of the protective housing at the sensor location.

Note: If the machine housing is radiused, surface the mounting area flat to maintain a full 360° gasket seal in the radiused plane and install with a minimum of two mounting screws 180° apart.

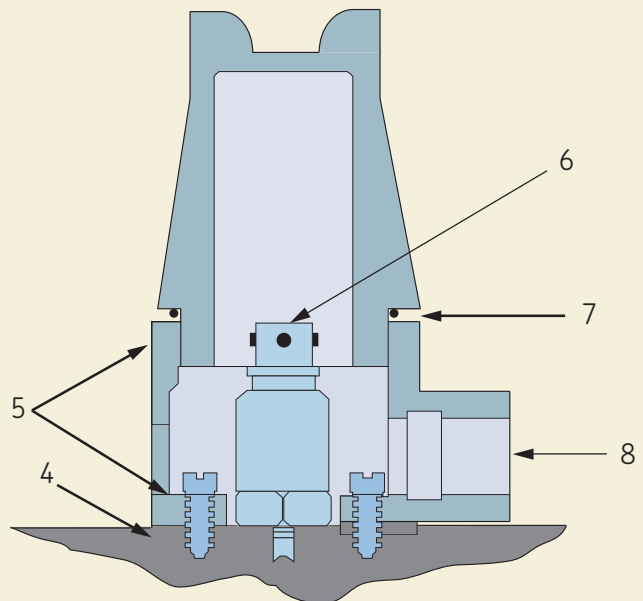
- 2 Drill center for 7/32 in. pilot hole 0.313 in. deep and spot face 1.0 in. surface to 0.030 in. deep to 63 RMS finish for direct mounted sensor installation. Tap center of the spot faced surface for 1/4-28 threads.

Note: A 63 RMS finish cannot normally be achieved using portable power tools, typically requiring the machine housing to be removed and milled to the proper specifications in a machine shop. An alternative is to install a mounting pad with the proper finish, such as Part Number 70005050.

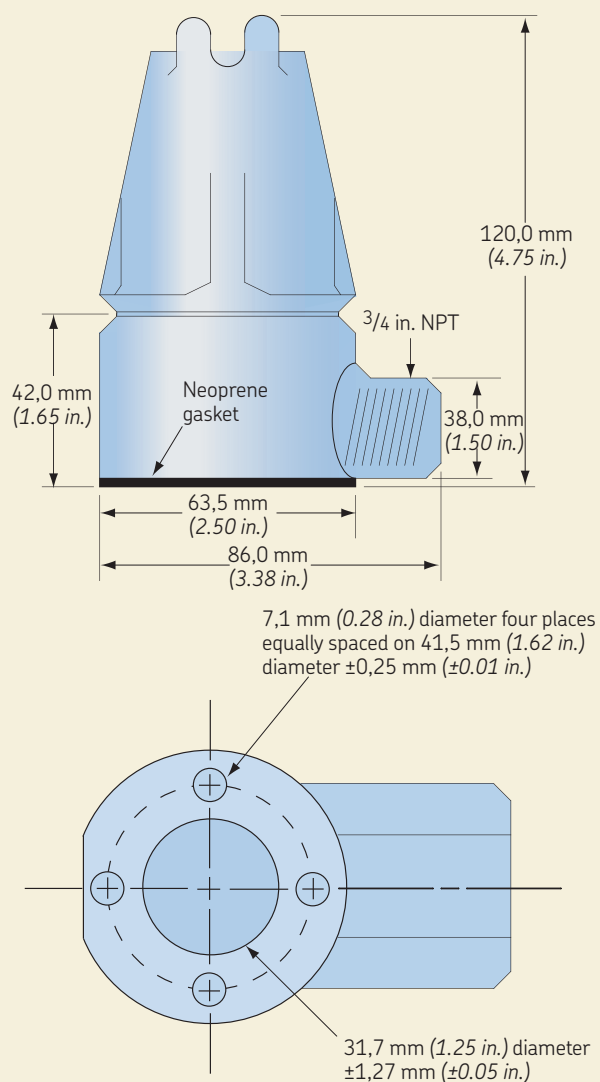
- 3 Drill and tap four equally spaced 1/4-20 UNC-2B × 10,0 mm (0.375 in.) deep on a 42,0 mm (1.62 in.) diameter bolt circle.
- 4 Place the neoprene gasket in place.
- 5 Install the housing base over the gasket, orienting the conduit outlet as required for your installation. Secure the housing base with four 1/4-20 UNC cap screws and lockwashers (provided).
- 6 Screw the transducer into the center mounting hole. Do not exceed the manufacturer's torque recommendations (23 Nm).
- 7 Place the O-ring on the dome cover and screw the dome cover into the housing base until finger-tight.
- 8 Optional 3/4 to 1/2 in. conduit reducing bushings can now be installed.



Installation steps



Dimensions



Ordering information

CMSS 50042300 Case mounted transducer housing.

CMSS 30266101

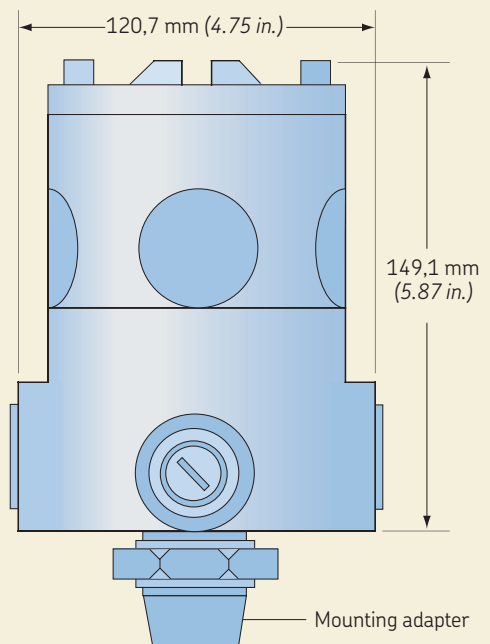
Transducer housing, 3/4 in. NPT with 1/4-28 thread

The transducer housing encloses a seismic transducer, protecting it from mechanical damage and shielding it and the electrical connections from water spray and other environmental hazards. The transducer mounts to the 1/4-28 mounting hole provided on the top of the mounting adapter (provided).

Note: The operating frequency response of an accelerometer may be affected when mounted in this housing due to the change in mass configuration. It is not recommended for higher speed or light case to rotor weight machinery applications (e.g., gearbox, gas turbines, etc.).



Dimensions



Ordering information

CMSS 30266101 Transducer housing, 3/4 in. NPT mounting with 1/4-28 thread.

Product index

Model number	Description	Page
CMAC 230	Threaded mounting stud (1/4-28 to 1/4-28)	137
CMAC 231	Adapter mounting stud (1/4-28 to M8)	137
CMAC 930 series	Replenishable accessories for CMSS 930-68-K toolkit for field installation	136
CMAC 4370-K	Triax accelerometer kit	92
CMAC 9600 series	Tools and toolkits for spot facing, drilling and tapping	141
CMPT 2310	Accelerometer for mining industry, integral, braided cable, side exit	41
CMPT 2310A	Mining Group 1 Intrinsically Safe accelerometer (IEXEcX / ATEX certified)	76
CMPT 2310AC	Mining Group 1 Intrinsically Safe accelerometer (IEXEcX ITA Australia certified)	78
CMPT 2310ACT	Mining Group 1 Intrinsically Safe accelerometer (IEXEcX ITA Australia certified)	78
CMPT 2310T	Sensor for mining industry, side exit, acceleration and temperature	61
CMPT 2310TA	Mining Group 1 Intrinsically Safe accelerometer (IEXEcX / ATEX certified)	76
CMPT 2323	Accelerometer for mining industry, integral, braided cable, side exit	43
CMPT 2323T	Sensor for mining industry, side exit, acceleration and temperature	63
CMSS 85 series	High temperature velocity sensor	85
CMSS 376K	High temperature accelerometer with charge amplifier system	114
CMSS 726	Small diameter, piezoelectric accelerometer	112
CMSS 732A	Medium-high frequency accelerometer, small diameter	104
CMSS 780C	Small economical accelerometer, straight exit	28
CMSS 780C-M8	Small economical accelerometer, straight exit	28
CMSS 786A-D2	Agency approved accelerometer, straight exit	66
CMSS 786A-IS	Agency approved accelerometer, straight exit	66
CMSS 786F-D2	Agency approved accelerometer with integral cable	68
CMSS 786F-IS	Agency approved accelerometer with integral cable	68
CMSS 786M	Industrial sensor, straight exit, acceleration and AEE	110
CMSS 786T-D2	Agency approved sensor, acceleration and temperature, straight exit	72
CMSS 786T-IS	Agency approved sensor, acceleration and temperature, straight exit	72
CMSS 787A-D2	Agency approved accelerometer with side exit	70
CMSS 787A-IS	Agency approved accelerometer with side exit	70
CMSS 787A-M8-D2	Agency approved accelerometer with side exit	70
CMSS 787A-M8-IS	Agency approved accelerometer with side exit	70
CMSS 793	Superior accelerometer, straight exit	23
CMSS 793-CA	Superior, CSA approved accelerometer, straight exit	74
CMSS 793-EE	Superior, ATEX approved accelerometer, straight exit	74
CMSS 793-FM	Superior, FM approved accelerometer, straight exit	74
CMSS 793L	Low frequency accelerometer, straight exit	98
CMSS 793L-FM	Low frequency, FM approved accelerometer, straight exit	98
CMSS 793T-3	Superior sensor, straight exit, acceleration and temperature	57

Product index (continued)

Model number	Description	Page
CMSS 793V	Piezoelectric industrial velocity sensor, straight exit	81
CMSS 793V-CA	Piezoelectric, CSA approved, industrial velocity sensor, straight exit	81
CMSS 793V-EE	Piezoelectric, ATEX approved, industrial velocity sensor, straight exit	81
CMSS 793V-FM	Piezoelectric, FM approved, industrial velocity sensor, straight exit	81
CMSS 797	Superior accelerometer, side exit	25
CMSS 797-CA	Superior, CSA approved accelerometer, ring mode, side exit	75
CMSS 797-EE	Superior, ATEX approved accelerometer, ring mode, side exit	75
CMSS 797-FM	Superior, FM approved accelerometer, ring mode, side exit	75
CMSS 797L	Low frequency accelerometer, ring mode, side exit	100
CMSS 797L-FM	Low frequency, FM approved accelerometer, ring mode, side exit	100
CMSS 797R	Radiation resistant, superior accelerometer, side exit	25
CMSS 797T-1	Superior sensor, ring mode, side exit, acceleration and temperature	59
CMSS 797V	Piezoelectric industrial velocity sensor, iso-ring, side exit	83
CMSS 799LF	Low frequency, filtered accelerometer	102
CMSS 908-HD	Heavy duty magnetic base	142
CMSS 908-MD	Medium duty magnetic base	142
CMSS 908-RE	Rare earth, flat bottom, magnetic base	142
CMSS 910F	Cementing stud with 1/4-28 female	139
CMSS 910M	Cementing stud with 1/4-28 male	138
CMSS 910QDB1	Quick connect adapter sensor base	139
CMSS 910QDP1	Quick connect, threaded stud mounting pad	140
CMSS 910QDP2	Quick connect, cement mounting pad	140
CMSS 930-68-K	Toolkit for field installation for CMSS 93 series cable	136
CMSS 932	Connector and cable assemblies for vibration sensors	127
CMSS 932-64SBI-SY series	Cable: two wire, IP 64 connector, standard build, isolated, single shield, yellow cable	131
CMSS 932-68LC series	Connector packs for CMSS 932 series locking collar cables	135
CMSS 932-68LCI-SY series	Cable: two wire, IP 68 connector, locking collar, isolated, single shield, yellow cable	129
CMSS 932-68LCN-SY series	Cable: two wire, IP 68 connector, locking collar, non-isolated, single shield, yellow cable	129
CMSS 932-68TL series	Connector packs for CMSS 932 series twist lock cables	135
CMSS 932-68TLI-SY series	Cable: two wire, IP 68 connector, twist lock, isolated, single shield, yellow cable	129
CMSS 932-68TLN-SY series	Cable: two wire, IP 68 connector, twist lock, non-isolated, single shield, yellow cable	129
CMSS 932-DY series	Bulk cable: double shielded, yellow, two conductor, twisted pair cables	125
CMSS 932-SB series	Bulk cable: single shielded, blue, two conductor, twisted pair cables	125
CMSS 932-SY series	Bulk cable: single shielded, yellow, two conductor, twisted pair cables	125
CMSS 933	Connector and cable assemblies for vibration sensors	127
CMSS 933-68LC series	Connector packs for CMSS 933 series locking collar cables	135
CMSS 933-68LCI-SY series	Cable: three wire, IP 68 connector, locking collar, isolated, single shield, yellow cable	133

Product index (continued)

Model number	Description	Page
CMSS 933-68LCN-SY series	Cable: three wire, IP 68 connector, locking collar, non-isolated, single shield, yellow cable	133
CMSS 933-68TL series	Connector packs for CMSS 933 series twist lock cables	135
CMSS 933-68TLI-SY series	Cable: three wire, IP 68 connector, twist lock, isolated, single shield, yellow cable	133
CMSS 933-68TLN-SY series	Cable: three wire, IP 68 connector, twist lock, non-isolated, single shield, yellow cable	133
CMSS 933-SY series	Bulk cable: single shielded, yellow, three conductor, triad cables	125
CMSS 2100	Industrial accelerometer, straight exit	19
CMSS 2100-M12	Industrial accelerometer, straight exit, with M12 connector	30
CMSS 2100F	Accelerometer with integral cable, straight exit	33
CMSS 2100T	Industrial sensor, straight exit, acceleration and temperature	53
CMSS 2106	Superior accelerometer, straight exit	48
CMSS 2110	Accelerometer with integral, braided cable, straight exit	37
CMSS 2110-3	Accelerometer with integral, braided cable, straight exit	39
CMSS 2111	Small footprint accelerometer with integral cable	89
CMSS 2114-K	High frequency accelerometer kit	90
CMSS 2200	Industrial accelerometer, side exit	21
CMSS 2200-M8	Industrial accelerometer, side exit	21
CMSS 2200F	Industrial accelerometer with integral cable, side exit	35
CMSS 2200T	Industrial sensor, side exit, acceleration and temperature	55
CMSS 2207	Superior accelerometer, side exit	50
CMSS 2222	Intrinsically safe (IS) accelerometer for the SKF Microlog	94
CMSS 4850 series	Two pin, hermetically sealed connector with armored cable and trimmed wire	134
CMSS 11714-04	Imperial thread, socket head, captive mounting bolt 1/4-28 (1.25 in. overall), 18-8 stainless steel, for standard side-exit accelerometer	138
CMSS 11714-05	Metric thread, socket head, captive mounting bolt M6 × 1.0 (32 mm overall), black oxide finish, for standard side-exit accelerometer	138
CMSS 11714-06	Metric thread, socket head, captive mounting bolt M8 × 1.25 (33 mm overall), black oxide finish, for standard side-exit accelerometer	138
CMSS 12105-01	Imperial thread, socket head, captive mounting bolt 1/4-28 (1.40 in. overall), 18-8 stainless steel, for ring-mode superior accelerometer	138
CMSS 12105-03	Metric thread, socket head, captive mounting bolt M6 × 1.0 (37 mm overall), black oxide finish, for ring-mode superior accelerometer	138
CMSS 30150000-16	BNC to sensor with two-pin MIL-C 5015 connector, coaxial connector cable	134
CMSS 30168703	Adapter mounting stud (1/4-28 to M6)	137
CMSS 30205300	Mounting stud (1/4-28 to 10-32)	137
CMSS 30266101	Transducer housing, 3/4 in. NPT with 1/4-28 thread	145
CMSS 30765400-10	BNC to Microdot 10-32 connector, coaxial connector cable	134
CMSS 50042300	Case mounted transducer housing	143
CMSS MT-1	Machine tool industry accelerometer, low profile	106
CMSS MT-3	Machine tool industry accelerometer, low profile, adhesive mount	108

Product index (continued)

Model number	Description	Page
CMSS R1-2-J3-25	BNC to Microdot 10-32 connector, high temperature interconnect cable	134
CMSS R1-J93 series	Coaxial, high temperature cable, Microdot 10-32 connector to blunt cut	134
CMSS R19-J9T2PS series	Industrial cable assembly for special multi-parameter sensor, cables with PC06 connector	134
CMSS R19SL-J9T2PS series	Industrial cable assembly for special multi-parameter sensor, cables with splash-proof connector	134
CMSS RM12-ST-J10 series	Cable connector assembly with M12 connector, IP 68, two-wire cable, isolated, single shield, grey	135
CMSS WIND-100-10	Small accelerometer for wind turbines, with integral cable, side exit	45



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