

SKF Machine Condition Transmitters (MCT) Series

Introduction

The CMSS 500 Series of SKF Machine Condition Transmitters (MCT) are 4-20 mA Transmitters. They convert part of the input signal to a 4-20 mA output proportional to the overall measurement and can be directly interfaced to an existing process control system (PLC or DCS). Combining transmitters with a Programmable Logic Controller (PLC) or a Distributed Control System (DCS) results in a high density, low cost vibration monitoring system.

Features

- *Low cost system for continuous condition monitoring*
 - *With alert and danger alarms as two independent set points with LED alarm indicators and output relay contacts*
 - *Trip multiply*
 - *Remote reset*
 - *Fault detection*
- *Compact DIN-rail mount, for both "G"-rail and "T"-rail*
- *Two buffered acceleration outputs*
- *4-20 mA DC output signal*
- *Small size due to surface mount technology (SMT)*

The MCT modules have a number of factory set and user selectable configuration options to tailor the modules to the specific application needs. Furthermore the MCTs can be ordered as a price sensitive basic model or as a stand alone Monitor.

The basic model provides a sensor input, a buffered BNC output, a buffered screw-terminal output and a 4-20 mA output suitable for a direct connection to a process control system.

When ordered with the Monitor option, the unit includes in addition an alarm module front



panel, trip-multiply function, two alarm relays and one transducer 'OK' relay. The alarm module has a front panel accessible BNC connector and an associated selector switch for reading the current vibration or alarm set points (alert and danger respectively) with a standard digital voltmeter, without opening the housing.

Series of Machine Condition Transmitters (MCT) include:

- *CMSS 530(A) Velocity Transmitter*
- *CMSS 590(A) Enveloped Acceleration Transmitter*
- *CMSS 525(A) Acceleration Transmitter*
- *CMSS 540(A) Displacement Transmitter*
- *CMSS 545(A) Position Transmitter*
- *CMSS 570(A) Temperature Transmitter*

Approvals



The Machine Condition Transmitters (MCT) Series is CE approved. In order to stay within the CE conformity, the installation should be within a closed metal enclosure and shielded power and signal cables should be used. Refer to the manuals and the CE approved installation guide supplied with the unit(s) for installations details.

Other MCT module system components, including power supplies and sensor, must also be CE approved for the industrial environment.

The CSA electrical safety approval is pending.

CMSS 530(A) Series Velocity Module

Introduction

The Machine Condition Transmitter (MCT) CMSS 530 is a 4-20 mA Velocity Transmitter. It converts part of the wide-band input signal to a signal proportional to the RMS or Peak (True Peak) value of the velocity signal and can be directly interfaced to a process control system (PLC or DCS).

Functional description

Accelerometers with a built-in amplifier (ICP), a Velocity Transducer or an Electromechanical Pick Up Sensor are input for the CMSS 530 Velocity Module. The conversion of the pre-amplified wide-band raw signal to a standard ISO or non-standard velocity signal is done by filtering, integration and analog true RMS or True Peak conversion. The full-scale value for the velocity signal is converted to a 4-20 mA DC output current and can be further converted to a 1-5 V DC output voltage by using a 250-Ohm precision resistor.

With the Monitor, option the derived velocity signal is compared with the alert and danger alarm level preset (set points). These set points are adjustable via two front panel accessible potentiometers, from 0 to 110% of full scale and directly measured on the BNC output connector of the monitor module. Each has an adjustable delay of 0.1 to 10 seconds. Relay contacts can be independently configured by the user for either Normally Open (NO) (standard) or Normally Closed (NC) operation. Relays are normally de-energized and can be configured for latching or non-latching (standard) operation. Latched alarms may be reset locally or by remote contact closure. Single Pole Single Throw (SPST) output relay contacts are rated 5 Amps at 30 Vdc or 125 Vac for resistive loads. The Monitor option also provides the Trip Multiply feature, basically a set point multiplication of either 2x or 3x via contact closure.

The second BNC connector mounted on the front of the Transmitter unit provides easy access to the buffered transducer output signal. This includes both the unfiltered vibration signal, and the DC bias voltage.

Portable test equipment or analyzers like the SKF Microlog can be connected to this output without disturbing other system outputs. The buffered transducer output signal is also available on the screw terminal connector for a permanent connection when needed.

Normally, the MCT module measures velocity signals from vibrations in a broadband according to ISO (International Standard Organization) Standards. ISO 10816-1 to ISO 10816-6 are the reference standards for the measurement and evaluation of vibration intensity levels. Standard Transmitters, like the 10 Hz to 1.0 kHz filter-module, are available with the Model Number extension '-ISO'.

Dependent on the type of machine and its rotational speed, other (non-ISO) filters with various corner frequencies from 2 Hz to 2.0 kHz in the broadband can be selected. Velocity is measured in Metric units (mm/s RMS) or in English units (in/s True Peak or RMS). The velocity signal directly relates to the vibration energy.



The Machine Condition Transmitter (MCT) CMSS 530(A) Velocity Module is also available as a Basic Model (pictured at right) or as a stand-alone Monitor (left).

Sensitivity and range selection

To match the sensor signal output characteristics with the MCT module input sensitivity, the input signal is amplified by a jumper-selectable one of five fixed range values before it is processed. These jumper settings also define the full-scale range selection of the signal and the output level of the buffered velocity output signal.

The MCT CMSS 530 Velocity is factory calibrated in Metric (mm/s RMS) or in English (in/s True Peak or RMS) units. This must be specified in the ordering code for the MCT module. The full scale range 2 is the factory preset.

Table 1. Full scale, based on 100 mV/g sensor input*.

System	Range 1	Range 2 factory preset	Range 3	Range 4	Range 5**
English (IPS, RMS or true peak)	0.5	1.0	1.5	2.0	2.5
Metric (mm/s RMS)	12.5	25.0	37.5	50.0	62.5

* Full scale ranges are multiplied by 3.3 if 30 mV/g sensor is used and by 10.0 if 10 mV/g sensor is used. The same values in Table 1 only apply for the 30 mV/g sensor or the 10 mV/g sensor when specified in the ordering code for the MCT module.

** Higher full scale values can be supplied when specified in the ordering code for the MCT module.

CMSS 530(A) Series Velocity Module

Specifications

POWER REQUIREMENTS

Supply voltage: +24 V DC (23 V to 28 V). Reverse polarity and transient protection included.

Supply current:

CMSS 530: 55 mA

CMSS 530A: 110 mA

Total power: 3.1 W maximum

External fuse: F250 mA/250 V

Relay ratings:

Switching voltage: 30 V DC maximum or 125 V AC

Switching current: 5 A maximum

INPUT

Sensor: Accelerometer, velocity transducer or electromechanical pick up

Sensor sensitivity: 100 mV/g, 100 mV/in/sec, 500 mV/in/sec; or specified.

TIP – For rolling element bearing applications with high vibration levels, before using a sensor with less sensitivity, select a higher full-scale of up to 5.0 in/sec.

Sensor approvals: For CE approved systems, the sensor must be CE approved.

Sensor OK detection: Continuously monitors the transmitter bias and signal voltage. If this voltage exceeds preset limits, the 4–20 mA output current is reduced to less than 2 mA (typically 0 mA).

OUTPUT

Buffered acceleration output: BNC connector, screw terminal

Sensitivity: Depending on used sensor input sensitivity, $\pm 10\%$

4–20 mA DC output: 4–20 mA proportional to the full-scale range.

Accuracy: $\pm 5\%$ of full-scale range with single pole filter -3 dB points at specified frequencies for ISO and ISO-LF filters.

TIP – A precision 250 Ohm resistor will convert the 4–20 mA current reading into a 1–5 V dc reading suitable for a direct connection to a Programmable Logic Controller (PLC) or a Distributed Control System (DCS).

ENVIRONMENTAL

Operating temperature: -20 °C to +80 °C (-4 °F to +176 °F)



Storage temperature: -55 °C to +125 °C (-67 °F to +257 °F)

Relative humidity: 0–95% relative humidity non-condensing

MECHANICAL

Weight: 6.0 ounces (170 grams)

Enclosure: Thermoplast ABS

Color: Black, with gray front panel

Connectors: 12-pole screw terminal, 2 BNC's and two 6-pole pluggable connectors.

Mounting: 32 mm (G style) or 35 mm (T style) DIN-Rail

Dimensions: Length: 79 mm (3.11 inches)
Base: 46 mm (1.80 inches)
Height: 100 mm (3.95 inches)

Ordering information

The ordering code for the MCT CMSS 530 Velocity Module includes information about its basic measurement system and filter options.

Example: CMSS 530A100A-ER-ISO Velocity transmitter with monitor (stand-alone). Input 100 mV/g accelerometer, english system, RMS detection and ISO filter band from 10 Hz to 1.0 kHz.

Accessories

- **CMSS 500-HSG-00** NEMA 4 (steel box, painted), IP 66, no BNC's, houses one (1) to four (4) MCT's with companion monitor. Includes power supply and wire kit.
 - **CMSS 500-PWRSUP** +24 Vdc, 600 mA power supply, adequate for up to four (4) MCT's with companion monitor, CE certified.
 - **CMSS 500-WIRE** Wire kit, color coded to wire four (4) MCT's.
- **CMSS 500-INSTALL** Installation charge for factory installation and wiring of MCT modules. (MCT modules must be ordered separately.)

CMSS 530

V W W W W - X Y - Z

V	Monitor option
A	With monitor (standalone unit)
-	Without monitor

WWW	Input
100A	100 mV/g accelerometer
100V	100 mV/in/sec velocity transducer
500E	500 mV/in/sec electro-mechanical pick up

X	Measurement system
E	English system
M	Metric system

Y	Detection type
R	RMS
P	True peak

Z	Filter option
ISO	10 Hz to 1.0 kHz (-3 dB)
ISO LF	2 Hz to 2.0 kHz (-3 dB)
HxxLxxx	Specify high pass corner frequency as low as 2 Hz and low pass corner frequency, as high as 2.0 kHz

CMSS 590(A) Enveloped Acceleration Module

Introduction

The Machine Condition Transmitter (MCT) CMSS 590 is a 4-20 mA Enveloped Acceleration Transmitter. Used in conjunction with a low-impedance accelerometer, it processes the dynamic vibration acceleration input signal to distinguish repetitive impacts generated by over-rolling bearing defects or gearbox problems. The output is a standard 4-20 mA current proportional to the overall energy in the specified filter band and is suitable for direct connection to a Programmable Logic Controller (PLC) or Distributed Control System (DCS).

Functional description

Accelerometers with a built-in amplifier (ICP) are the input for the CMSS 590 Enveloped Acceleration Module. The conversion of the pre-amplified wide-band raw acceleration signal to a proportional peak value of the defect signal is done by pass band filtering, rectifying and low-pass filtering.

The full-scale value for the derived enveloped acceleration signal is converted to a 4-20 mA DC output current and can be further be converted to a 1-5 V DC output voltage by using a 250-Ohm precision resistor.

With the Monitor option the derived signal, representing the enveloped acceleration signal, is compared with the alert and danger alarm level preset (set points). These set points are adjustable via two front panel accessible potentiometers, from 0 to 110% of full scale and directly measured on the BNC output connector of the monitor module. Each has an adjustable delay of 0.1 to 10 seconds. Relay contacts can be independently configured by the user for either Normally Open (NO) (standard) or Normally Closed (NC) operation. Relays are normally de-energized and can be configured for latching or non-latching

(standard) operation. Latched alarms may be reset locally or by remote contact closure. SPST (Single Pole Double Throw) output relay contacts are rated 5 Amps at 30 Vdc or 125 Vac for resistive loads. The Monitor option also provides the Trip Multiply feature, basically a set point multiplication of either 2x or 3x via contact closure.

The second BNC connector mounted on the front of the Transmitter unit provides easy access to the buffered transducer output signal. This includes both the unfiltered acceleration signal, and the DC bias voltage. Portable test equipment or analyzers like the SKF Microlog can be connected to this output without disturbing other system outputs. The buffered transducer output signal is also available on the screw terminal connector for a permanent connection when needed.

Sensitivity and range selection

To match the sensor signal output characteristics with the MCT module input sensitivity, the input signal is amplified by a jumper-selectable one of three fixed range values before it is processed. These jumper settings also define the full-scale range of the signal.

Table 1. Full-scale, based on 100 mV/g sensor input*.

Unit	Range 1	Range 2	Range 3
gE (Enveloped Acceleration)	10	30	80

* Full-scale ranges are multiplied by 3.3 if 30 mV/g sensors are used and by 10.0 if 10 mV/g sensors are used.



The Machine Condition Transmitter (MCT) CMSS 590(A) Enveloped Acceleration Module is also available as a Basic Model (pictured at left) or a stand-alone Monitor (right).

The MCT CMSS 590 Enveloped Acceleration is factory calibrated in gE. A gE is the engineering unit for enveloped acceleration and is acceptable in both the English and Metric communities. The full-scale range 1 is the factory preset.

Filter selection

The MCT CMSS 590 ENV is delivered with three standard band pass filters. Table 2 shows the available filter for each unit.

The factory preset for the MCT CMSS 590 modules is Filter #3 (500 to 10,000 Hz).

The filter selection to obtain the proper band pass for the application can be defined using the following guideline:

- The low frequency roll off of the pass band filter to eliminate rotational components is:

$$F_{min} > = 10 \times \text{RPM} / 60$$

CMSS 590(A) Enveloped Acceleration Module

Table 2. Integrated enveloped acceleration filter.

Band number (Microlog)	Band pass filter frequency (Hz)	Setting of Fmax in Microlog for comparison (Hz)	Filter option (MCT)	Jumper
#2	50 to 1,000	100	-44	E4 and E7
#3	500 to 10,000	1,000	-66	E3 and E6
#4	5,000 to 40,000	10,000	-88	E2 and E5

Specifications

POWER REQUIREMENTS

Supply voltage: +24 V DC (23 V to 28 V). Reverse polarity and transient protection included.

Supply current:

CMSS 590: 75 mA maximum

CMSS 590A: 125 mA maximum

Total power: 3.5 W maximum

External fuse: F250 mA/250 V

Relay ratings:

Switching voltage: 30 V DC maximum or 125 V AC

Switching current: 5 A maximum

INPUT

Sensor: Accelerometer

Sensor sensitivity: 100 mV/g

TIP – To achieve greater full-scale values (greater than 80 g) connect a 30 mV/g sensor.

Sensor approvals: For CE approved systems, the sensor must be CE approved.

Sensor OK detection: Continuously monitors the transmitter bias and signal voltage. If this voltage exceeds pre-set limits, the 4–20 mA output current is reduced to less than 2 mA (typically 0 mA).

OUTPUT

Buffered acceleration output: BNC connector, screw terminal

Sensitivity: Depending on used sensor input sensitivity, $\pm 10\%$

4–20 mA DC output: 4–20 mA proportional to the full-scale range

Accuracy: $\pm 1\%$ of full-scale range

TIP – A precision 250 Ohm resistor will convert the 4–20 mA current reading into a 1–5 V dc reading suitable for a direct connection to a Programmable Logic Controller (PLC) or a Distributed Control System (DCS).

ENVIRONMENTAL

Operating temperature: -20 °C to +80 °C (-4 °F to +176 °F)

Storage temperature: -55 °C to +125 °C (-67 °F to +257 °F)

Relative humidity: 0–95% relative humidity non-condensing

MECHANICAL

Weight: 6.0 ounces (170 grams)

Enclosure: Thermoplast ABS

Color: Black, with gray front panel

Connectors: 12-pole screw terminal, 2 BNC's and two 6-pole pluggable connectors.

Mounting: 32 mm (G style) or 35 mm (T style) DIN-Rail

Dimensions: Length: 79 mm (3.11 inches)

Base: 46 mm (1.80 inches)

Height: 100 mm (3.95 inches)

Ordering information

- **CMSS 590A100A** Enveloped acceleration transmitter stand-alone monitor. Input 100 mV/g accelerometer.
- **CMSS 590-100A** Enveloped acceleration transmitter basic model. Input 100 mV/g accelerometer.
The ordering code for the Machine Condition Transmitter (MCT) CMSS 590 Enveloped acceleration module includes information about which model, basic or stand-alone unit, and its input sensitivity.

Example: Ordering the MCT with the model number **CMSS 590A100A** specifies a stand-alone enveloped acceleration transmitter configured to use with a 100 mV/g low-impedance, constant current powered accelerometer.

Accessories

- **CMSS 500-HSG-00** NEMA 4 (Steel box, painted), IP 66, no BNC's, houses one (1) to four (4) MCT's with companion monitor. Includes power supply and wire kit.
 - **CMSS 500-PWRSUP** +24 Vdc, 600 mA power supply, adequate for up to four (4) MCT's with companion monitor, CE certified.
 - **CMSS 500-WIRE** Wire kit, color coded to wire four (4) MCT's.
- **CMSS 500-INSTALL** Installation charge for factory installation and wiring of MCT modules. (MCT modules must be ordered separately.)



CMSS 525(A) Series Acceleration Transmitter/Monitor

Introduction

The CMSS 525(A) Series are vibration acceleration transmitters/monitors. They are compatible with piezo, voltage output accelerometer inputs, they provide a 4–20 mA output proportional to the overall measurement. Each unit provides power for the associated transducer, processes the vibration signal to determine overall amplitude, and outputs a 4–20 mA dc current that is proportional to a user specified range such as 0–10 g's in RMS detection. Combining transmitters with an existing PLC or DCS system results in a high density, low cost vibration monitoring system. When specified with the alarm feature, the unit functions as a complete single channel monitor that includes alert and danger alarms, and output relays.

Buffered output

A BNC connector mounted on the front of the unit provides access to the buffered transducer output signal. This includes both the unfiltered vibration signal, and the DC bias voltage. Portable test equipment or analyzers can be connected to this output without disturbing other system outputs.

Fault detection

On board fault detection circuitry continuously monitors the transducer for normal operation. If a fault occurs, the output current is reduced to 2 mA to indicate the fault to the readout system. A red LED on the front of the unit is turned on to provide a local indication of the fault.

Filters

For applications that require monitoring specific frequency bands, optional high-pass and low-pass filters can be ordered. These filters are modular and can be installed in the field.

Each module attenuates out-of-band signals at a rate of approximately 24 dB/octave. Corner frequencies from 2 Hz to 20 kHz may be specified. Filter modules may be cascaded to form higher order filters or to create a band-pass response. Filtering does not effect the buffered transducer output.

Alarms

This monitoring option adds two independent set points, with LED alarm indicators and output relay contacts (Alert and Danger). Set points are adjustable via potentiometer, from 0 to 110% of full scale. Each has an adjustable delay of 1 to 10 seconds. Relay contacts can be independently configured by the user for either Normally Open (NO) (standard) or Normally Closed (NC) operation.

Relays are normally de-energized and can be configured for latching or non-latching (standard) operation. Latched alarms may be reset locally or by remote contact closure. SPST Relay contacts are rated 5 Amps at 30 Vdc or 125 Vac for resistive loads. The Alarm option also provides set point multiplication of 3x via contact closure (2x available).

Displays and assemblies

Various display options, NEMA and explosion-proof enclosures, and assembled multi-channel systems are available. Consult your SKF Reliability Systems Sales Representative.

Specifications

POWER REQUIREMENTS

Supply voltage: +24 V DC (23 V to 28 V). Reverse polarity and transient protection included.

Supply current:

CMSS 525: 55 mA

CMSS 525A: 110 mA

Total power: 3.1 W maximum

External fuse: F250 mA/250 V

Relay ratings:

Switching voltage: 30 V DC maximum or 125 V AC

Switching current: 5 A maximum

INPUT

Sensor: Accelerometer

Sensor sensitivity: 100 mV/g

OUTPUT

Frequency response (without optional filters): -3 dB, 2 Hz to 20 kHz

Buffered output: BNC connector 0 to 20 kHz

Accuracy: $\pm 5\%$ of full-scale range with single pole filter -3 dB points at specified frequencies

Output: 4–20 mA proportional to the full-scale range

Maximum load: 600 Ohms resistive

Case: Isolated

ENVIRONMENTAL

Operating temperature: -20 °C to +80 °C (-4 °F to +176 °F)

Storage temperature: -55 °C to +125 °C (-67 °F to +257 °F)

Relative humidity: 0–95% relative humidity non-condensing

MECHANICAL

Weight: 6.0 ounces (170 grams)

Enclosure: Thermoplast ABS

Color: Black, with gray front panel

Connectors: 12-pole screw terminal, 2 BNC's and two 6-pole pluggable connectors.

Mounting: 32 mm (G style) or 35 mm (T style) DIN-rail

Dimensions:

Length: 79 mm (3.11 inches)

Base: 46 mm (1.80 inches)

Height: 100 mm (3.95 inches)



The Machine Condition Transmitter (MCT) CMSS 525(A) Series Acceleration Transmitter/Monitor available as a Basic Model (pictured at right) or as a stand-alone Monitor (left).

Ordering information

- **CMSS525A100-02R**
Acceleration transmitter with monitor, 100 mV/g sensitivity, RMS-detection, factory preset to 10 g, filter band from 2 Hz to 20.0 kHz
- **CMSS525-100-02R**
Acceleration transmitter, 100 mV/g sensitivity, RMS-detection, factory preset to 10 g, filter band from 2 Hz to 20.0 kHz

NOTES:

1. The full-scale option specified at order entry is used by the factory for initial calibration. However, several other ranges can be jumper selected in the field.

Available full-scale values: 5, 10 (factory preset), 15, 20 and 25 g's.
2. Transducer and full-scale options not listed are available. Contact your SKF Reliability Systems Sales Representative.

CMSS 540(A) Series Displacement Transmitter/Monitor

Introduction

The CMSS 540(A) Series are displacement transmitters/monitors. They are compatible with proximity (eddy) probe inputs, they provide a 4–20 mA output proportional to the overall measurement. Each unit provides power for the associated transducer, processes the vibration signal to determine overall amplitude, and outputs a 4–20 mA dc current that is proportional to a user specified range such as 10 mils peak-to-peak detection. Combining transmitters with an existing PLC or DCS system results in a high density, low cost vibration monitoring system. When specified with the alarm feature, the unit functions as a complete single channel monitor that includes alert and danger alarms, and output relays.

Buffered output

A BNC connector mounted on the front of the unit provides access to the buffered transducer output signal. This includes both the unfiltered vibration signal, and the DC bias voltage. Portable test equipment or analyzers can be connected to this output without disturbing other system outputs.

Fault detection

On board fault detection circuitry continuously monitors the transducer for normal operation. If a fault occurs, the output current is reduced to 2 mA to indicate the fault to the readout system. A red LED on the front of the unit is turned on to provide a local indication of the fault.

Filters

For applications that require monitoring specific frequency bands, optional high-pass and low-pass filters can be ordered. These filters are modular and can be installed in the field.

Each module attenuates out-of-band signals at a rate of approximately 24 dB/octave. Corner frequencies from 2 Hz to 2.0 kHz may be specified. Filter modules may be cascaded to form higher order filters or to create a band-pass response. Filtering does not effect the buffered transducer output.

Alarms

This monitoring option adds two independent set points, with LED alarm indicators and output relay contacts (Alert and Danger). Set points are adjustable via potentiometer, from 0 to 110% of full scale. Each has an adjustable delay of 1 to 10 seconds. Relay contacts can be independently configured by the user for either Normally Open (NO) (standard) or Normally Closed (NC) operation.

Relays are normally de-energized and can be configured for latching or non-latching (standard) operation. Latched alarms may be reset locally or by remote contact closure. SPST Relay contacts are rated 5 Amps at 30 Vdc or 125 Vac for resistive loads. The Alarm option also provides set point multiplication of 3x via contact closure (2x available).

Displays and Assemblies

Various display options, NEMA and explosion-proof enclosures, and assembled multi-channel systems are available. Consult your SKF Reliability Systems Sales Representative.

Specifications

POWER REQUIREMENTS

Supply voltage: +24 V DC (23 V to 28 V). Reverse polarity and transient protection included.

Supply current:

CMSS 540: 75 mA

CMSS 540A: 125 mA

Total power: 3.1 W maximum

External fuse: F250 mA/250 V

Relay ratings:

Switching voltage: 30 V DC maximum or 125 V AC

Switching current: 5 A maximum

INPUT

Sensor: Eddy Probe System

Sensor Sensitivity: 200 mV/mil

OUTPUT

Frequency response (without optional filters): -3 dB, 2 Hz to 20 kHz

Buffered output: BNC connector 0 to 20 kHz

Accuracy: $\pm 5\%$ of full-scale range with single pole filter -3 dB points at specified frequencies

Output: 4–20 mA proportional to the full-scale range

Maximum load: 600 Ohms resistive

Case: Isolated

ENVIRONMENTAL

Operating temperature: -20 °C to +80 °C (-4 °F to +176 °F)

Storage temperature: -55 °C to +125 °C (-67 °F to +257 °F)

Relative humidity: 0–95% relative humidity non-condensing

MECHANICAL

Weight: 6.0 ounces (170 grams)

Enclosure: Thermoplast ABS

Color: Black, with gray front panel

Connectors: 12-pole screw terminal, 2 BNC's and two 6-pole pluggable connectors.

Mounting: 32 mm (G style) or 35 mm (T style) DIN-rail

Dimensions:

Length: 79 mm (3.11 inches)

Base: 46 mm (1.80 inches)

Height: 100 mm (3.95 inches)



The Machine Condition Transmitter (MCT) CMSS 540(A) Series Displacement Transmitter/Monitor available as a Basic Model (pictured at left) or as a stand-alone Monitor (right).

Ordering information

- **CMSS540A200-02**
Displacement Transmitter with monitor, input 200 mV/mil, factory preset to 10 mils, Filter band from 2 Hz to 2.0 kHz
- **CMSS540-200-02**
Displacement Transmitter, input 200 mV/mil, factory preset to 10 mils, filter band from 2 Hz to 2.0 kHz

NOTES:

1. The full-scale option specified at order entry is used by the factory for initial calibration. However, several other ranges can be jumper selected in the field.

Available full-scale values: 5, 10 (factory preset), 15, 20 and 25 mil's.

Corresponding full-scale values: 127, 254, 381, 508, 635 microns.
2. Transducer and full-scale options not listed are available. Contact your SKF Reliability Systems Sales Representative.

CMSS 545(A) Series Position Transmitter/Monitor

Introduction

The CMSS 545(A) Series are position transmitters/monitors. They are compatible with proximity (eddy) probe inputs, they provide a 4–20 mA output proportional to the overall measurement. Each unit provides power for the associated transducer, processes the vibration signal to determine overall amplitude, and outputs a 4–20 mA dc current that is proportional to a user specified range such as ± 40 mils detection. Combining transmitters with an existing PLC or DCS system results in a high density, low cost vibration monitoring system. When specified with the alarm feature, the unit functions as a complete single channel monitor that includes alert and danger alarms, and output relays.

Buffered output

A BNC connector mounted on the front of the unit provides access to the buffered transducer output signal. This includes both the unfiltered vibration signal, and the DC bias voltage. Portable test equipment or analyzers can be connected to this output without disturbing other system outputs.

Fault detection

On board fault detection circuitry continuously monitors the transducer for normal operation. If a fault occurs, the output current is reduced to 2 mA to indicate the fault to the readout system. A red LED on the front of the unit is turned on to provide a local indication of the fault.

Alarms

This monitoring option adds two independent set points, with LED alarm indicators and output relay contacts (Alert and Danger). Set points are adjustable via potentiometer, from 0 to 110% of full scale. Each has an adjustable delay of 1 to 10 seconds. Relay contacts can be independently configured by the user for either Normally Open (NO) (Standard) or Normally Closed (NC) operation.

Relays are normally de-energized and can be configured for latching or non-latching (standard) operation. Latched alarms may be reset locally or by remote contact closure. SPST (Single Pole Double Throw) Relay contacts are rated 5 Amps at 30 Vdc or 125 Vac for resistive loads. The Alarm option also provides set point multiplication of 3x via contact closure (2x available).

Displays and assemblies

Various display options, NEMA and explosion-proof enclosures, and assembled multi-channel systems are available. Consult your SKF Reliability Systems Sales Representative.

Specifications

POWER REQUIREMENTS

Supply voltage: +24 V DC (23 V to 28 V). Reverse polarity and transient protection included.

Supply current:

CMSS 545: 55 mA

CMSS 545A: 110 mA

Total power: 3.1 W maximum

External fuse: F250 mA/250 V

Relay ratings:

Switching voltage: 30 V DC maximum or 125 V AC

Switching current: 5 A maximum

INPUT

Sensor: Eddy Probe System

Sensor sensitivity: 200 mV/mil

OUTPUT

Buffered acceleration output: BNC connector, screw terminal

Sensitivity: Depending on used sensor input sensitivity, $\pm 10\%$

4–20 mA DC output: 4–20 mA proportional to the full-scale range

Accuracy: $\pm 5\%$ of full-scale range with single pole filter -3 dB points at specified frequencies

ENVIRONMENTAL

Operating temperature: -20 °C to +80 °C (-4 °F to +176 °F)

Storage temperature: -55 °C to +125 °C (-67 °F to +257 °F)

Relative humidity: 0–95% relative humidity non-condensing

MECHANICAL

Weight: 6.0 ounces (170 grams)

Enclosure: Thermoplast ABS

Color: Black, with gray front panel

Connectors: 12-pole screw terminal, 2 BNC's and two 6-pole pluggable connectors.

Mounting: 32 mm (G style) or 35 mm (T style) DIN-rail

Dimensions:

Length: 79 mm (3.11 inches)

Base: 46 mm (1.80 inches)

Height: 100 mm (3.95 inches)



The Machine Condition Transmitter (MCT) CMSS 545(A) Series Position Transmitter/Monitor available as a Basic Model (pictured at right) or as a stand-alone Monitor (left).

Ordering information

- **CMSS545A200-04**
Position Transmitter with Monitor, Input 200 mV/mil, factory preset to 0–80 mils (40–0–40)
- **CMSS545-200-04**
Position Transmitter, Input 200 mV/mil, factory preset to 0–80 mils (40–0–40)

NOTES:

1. Full-scale values: 0–80 mils (40–0–40) (factory preset).
Corresponding full-scale values: 0–2.0 mm (1.0–0–1.0).
2. Transducer and full-scale options not listed are available. Contact your SKF Reliability Systems Sales Representative.

CMSS 570(A) Series Temperature Transmitter/Monitor

Introduction

The CMSS 570(A) Series are solid state temperature transmitters/monitors. They can be used with solid-state temperature sensor or dual output vibration/temperature sensor that provides a 10 mV/K output. The input signal is processed to provide temperature in degrees F or C. The output is a standard 4-20 mA current proportional to this temperature, within the specified full-scale range of 0-250 Degrees F. The 4-20 mA output is suitable for direct connection to a Programmable Logic Controller (PLC) or Distributed Control System (DCS).

Buffered output

A BNC connector mounted on the front of the unit provides buffered access to a 0-5 Vdc temperature proportional signal that can be read with a standard voltmeter or data analyzer (Microlog).

Fault detection

On board fault detection circuitry continuously monitors the transducer for normal operation. If a fault occurs, the output current is reduced to 2 mA to indicate the fault to the readout system. A red LED on the front of the unit is turned on to provide a local indication of the fault.

Alarms

This monitoring option adds two independent set points, with LED alarm indicators and output relay contacts (Alert and Danger). Set points are adjustable via potentiometer, from 0 to 110% of full scale. Each has an adjustable delay of 1 to 10 seconds. Relay contacts can be independently configured by the user for either Normally Open (NO) (Standard) or Normally Closed (NC) operation.

Relays are normally de-energized and can be configured for latching or non-latching (standard) operation. Latched alarms may be reset locally or by remote contact closure. SPST (Single Pole Double Throw) Relay contacts are rated 5 Amps at 30 Vdc or 125 Vac for resistive loads. The Alarm option also provides set point multiplication of 3x via contact closure (2x available).

Displays and assemblies

Various display options, NEMA and explosion-proof enclosures, and assembled multi-channel systems are available. Consult your SKF Reliability Systems Sales Representative.

Specifications

POWER REQUIREMENTS

Supply voltage: +24 V DC (23 V to 28 V). Reverse polarity and transient protection included.

Supply current:

CMSS 570: 55 mA

CMSS 570A: 110 mA

Total power: 3.1 W maximum

External fuse: F250 mA/250 V

Relay ratings:

Switching voltage: 30 V DC maximum or 125 V AC

Switching current: 5 A maximum

INPUT

Sensor: CMSS 793T-3, CMSS 797T-1 sensors

Sensor sensitivity: 10 mV/K

OUTPUT

Buffered acceleration output: BNC Connector, screw terminal

Sensitivity: Depending on used sensor input sensitivity, $\pm 10\%$

4-20 mA DC output: 4-20 mA proportional to the full-scale range

Accuracy: $\pm 5\%$ of full-scale range with single pole filter -3 dB points at specified frequencies

ENVIRONMENTAL

Operating temperature: -20 °C to +80 °C (-4 °F to +176 °F)

Storage temperature: -55 °C to +125 °C (-67 °F to +257 °F)

Relative humidity: 0-95% relative humidity non-condensing

MECHANICAL

Weight: 6.0 ounces (170 grams)

Enclosure: Thermoplast ABS

Color: Black, with gray front panel

Connectors: 12-pole screw terminal, 2 BNC's and two 6-pole pluggable connectors.

Mounting: 32 mm (G style) or 35 mm (T style) DIN-Rail

Dimensions:

Length: 79 mm (3.11 inches)

Base: 46 mm (1.80 inches)

Height: 100 mm (3.95 inches)



The Machine Condition Transmitter (MCT) CMSS 570(A) Series Temperature Transmitter/Monitor available as a Basic Model (pictured at left) or as a stand-alone Monitor (right).

Ordering information

- **CMSS570A** Temperature Transmitter with Monitor, Input CMSS 793T-3 or CMSS 797T-1, full scale set to +250 °F
- **CMSS570** Temperature Transmitter, Input CMSS 793T-3 or CMSS 797T-1, full scale set to +250 °F

NOTES:

1. The full-scale option specified at order entry is used by the factory for initial calibration. However, several other ranges can be jumper selected in the field.
Full-scale values: 0 to +250 °F.
Corresponding full-scale values: -17.8 °C to +121.0 °C.
2. Transducer and full-scale options not listed are available. Contact your SKF Reliability Systems Sales Representative.

Recommended Vibration Sensors

Applying decades of on-line and portable vibration monitoring experience, SKF has developed and can provide the epitome of industrial vibration sensors and sensor mounting accessories for your machine condition monitoring needs. Despite the advances made in vibration monitoring and analysis equipment, the selection of sensors and the way they are mounted on a machine remain critical factors in determining the success of any monitoring program. Money saved by installing inferior sensors is not a prudent investment since the information provided about the machine of interest often is not accurate or reliable. Poor quality sensors can easily give misleading data or,

in some cases, cause a critical machine condition to be completely overlooked.

The various machine operating conditions concerning temperature extremes, magnetic field, vibration range, frequency range, electromagnetic compatibility (EMC) and electrostatic discharge (ESD) conditions and signal quality, necessitates the need for a variety of sensors. Without a proper sensor to supply the critical operating information, the machine can be operating in a most hazardous condition to the machine as well as the personnel operating the machine.

CMSS 2100

Standard Industrial Acceleration Sensor



Features

- Recommended for use with the SKF Machine Condition Transmitters (MCT)
- Economical, rugged, general purpose
- Sensitivity, 100 mV/g to optimize use in multiple applications
- Exceptional bias voltage (BV) stability at elevated temperatures
- Designed for exceptional low noise level for low elevated temperatures
- Meets stringent CE, EMC requirements
- Smaller profile industrial accelerometers
- Two (2) mounting studs (1/4–28 and M8 x 1.25) provided
- Corrosion resistant and hermetically sealed for humidity areas
- Reverse polarity wiring protection

CMSS 2110

Industrial Acceleration Sensor with integral 5 meter (16.5 feet) over-braided cable



Features

- Recommended for use with the SKF Machine Condition Transmitters (MCT)
- Economical, rugged, general purpose
- Sensitivity, 100 mV/g to optimize use in most applications
- Meets stringent CE, EMC requirements
- Cable shield and braid connected to sensor housing for better noise rejection
- Corrosion resistant
- Miswiring protection

CMSS 793T-3

Multifunction Sensor – Acceleration and Temperature



Features

- Recommended for use with the CMSS 570(A) Series Temperature Transmitter/Monitor
- Measures both temperature and acceleration
- Rugged construction
- Hermetic seal
- Ground isolated
- ESD protection
- Miswiring protection

CMSS 797T-1

Low Profile, Multifunction Sensor – Acceleration and Temperature



Features

- Recommended for use with the CMSS 570(A) Series Temperature Transmitter/Monitor
- Measures both temperature and acceleration
- Rugged construction
- Corrosion resistant
- Hermetic seal
- Ground isolated
- ESD protection
- Miswiring protection
- Side exit

Eddy Probe Systems (RYTON® – based eddy current transducers)

The Eddy Probe is used to measure radial or axial shaft motion. It is mounted through or to the side of a bearing cap and observes the shaft's movement relative to its mounting position. An Eddy Probe System is comprised of a Probe, a Driver (oscillator demodulator), and an Extension Cable.

Shaft relative motion is the radial vibration of the shaft journal relative to the bearing. This method of vibration measurement is preferred for journal bearings since it directly relates to permissible clearances. In machines with relatively light rotors and stiff heavy casings (turbines and compressors), almost all of the shaft's vibration energy is dissipated as displacement (exhibit low transmissibility), which can only be measured as shaft relative motion.

Eddy Probe Systems have excellent frequency response. They have no lower frequency limit and are used to measure shaft axial position as well as vibration.

Features

- *Conforms to API 670 – American Petroleum Institute has published Standard 670 to define reliable protection systems for rotating equipment operating in the harsh conditions found in oil production, refining, and chemical processing.*
- *“Super tough” RYTON® probe tips and driver case – RYTON®’s strength approaches that of metal. The material is now beginning to be used in the manufacture of automobile engine camshafts. That’s what we mean when we say “Super tough”.*
- *DIN-rail mounting and compression connectors for optimum installation.*
- *Hazardous area approved units are available.*
- *Recommended in conjunction with the CMSS 540(A) Series Displacement Transmitter/Monitor and the CMSS 545(A) Series Position Transmitter/Monitor.*

CMSS 65/CMSS 665 Series 5 mm Eddy Probe System



A complete CMSS 65 Eddy Current Probe System is comprised of:

- CMSS 65 Eddy Current Probe
- CMSS 958 Extension Cable
- CMSS 665 or CMSS 665P Driver

At +23 °C (+73 °F), with a -24 VDC supply and target of AISI 4140 steel.

CMSS 68/CMSS 668 Series 8 mm Eddy Probe System



A complete CMSS 68 Eddy Current Probe System is comprised of:

- CMSS 68 Eddy Current Probe
- CMSS 958 Extension Cable
- CMSS 668 or CMSS 668P Driver

At +23 °C (+73 °F), with a -24 VDC supply and target of AISI 4140 steel.

MCT Integration – Enclosures/Housings Examples



Wireless MCT system

- CMSS 530 Velocity Transmitter
- CMSS 590 Enveloped Acceleration Transmitter
- Wireless ethernet connection to hard wired network



Typical pump or fan monitoring system

- CMSS 530 Velocity Transmitter
- Common display with channel selector switch
- NEMA 4x enclosure



Eddy probe system

- CMSS 530 Velocity Transmitter
- CMSS 545 Eddy Probe Position Transmitter
- Individual displays, NEMA 4x enclosure



12 channels of vibration velocity transmitters

- CMSS 530 Velocity Transmitter
- Common display with channel selector switch
- NEMA 4x enclosure



Solar gas turbine retrofit

- CMSS 530 Velocity Transmitter
- Explosion proof system
- Class I, Division I, continuous monitoring system for offshore installation
- I-S barriers, slave relays, independent displays



For additional information on SKF Reliability Systems products, contact:

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