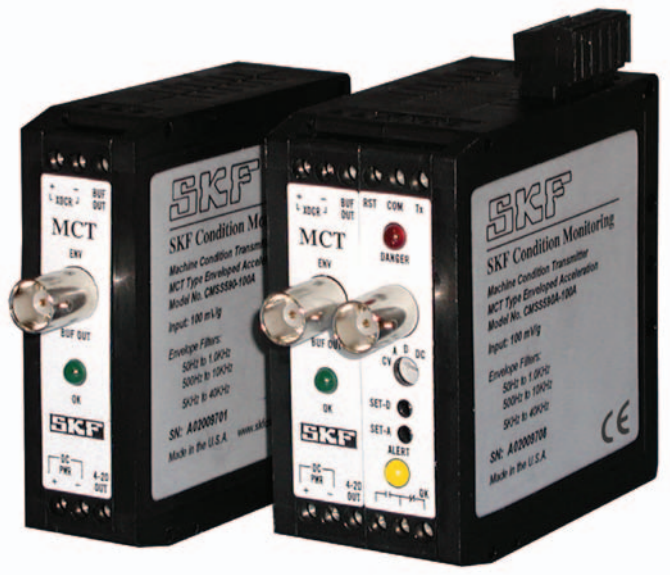
Machine Condition Transmitter (MCT)

CMSS 590 Enveloped Acceleration Module



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

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).

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***
- ***Three standard Filter bands integrated and jumper selectable***
- ***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 module has a number of factory set and user selectable configuration options to tailor the module 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 Programmable Logic Controller (PLC) or a Distributed Control System (DCS). Three standard filter options are supported by each model to cover most applications.

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.

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 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.

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.

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.*

Filter Selection

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

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

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:

$$Fmin > = 10 \times RPM/60$$

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. For explosion-proof (Ex) systems, the sensor must be Intrinsically Safe (I-S).

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, ± 10%

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

Accuracy: ± 0.5% 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: -4°F to +176°F (-20°C to +80°C)

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

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

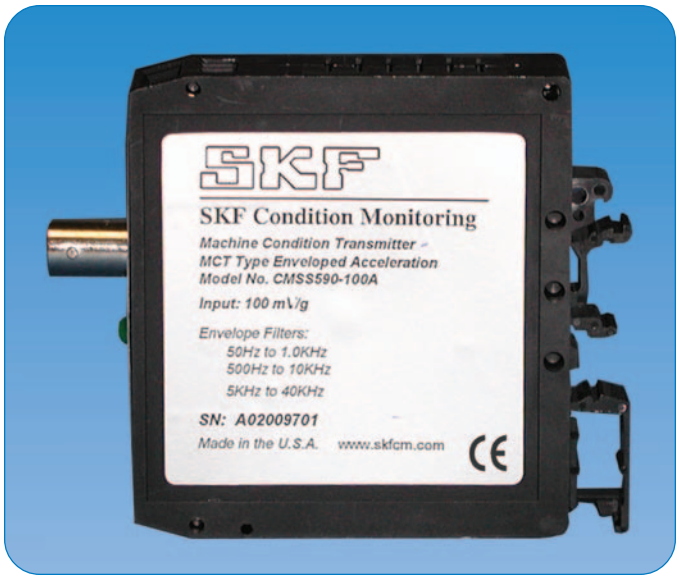
Dimensions: *Length:* 3.11 inches (79mm)
Base: 1.80 inches (46mm)
Height: 3.95 inches (100mm)

APPROVALS

The Machine Condition Transmitter (MCT) CMSS 590 Enveloped Acceleration Module 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 installation 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.



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Ordering Information

The ordering code for the Machine Condition Transmitter (MCT) CMSS 590 Enveloped Acceleration Module includes information about which model, basic or standalone unit, and its input sensitivity.

CMSS 590 | Y | Z | Z | Z | Z |

Y	*Monitor Option*
A	With Monitor (standalone unit)
–	Without Monitor (without alarm functionalities)

ZZZZ	*Input*
100A	100 mV/g Accelerometer

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.)

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