



Machine Condition Transmitter (MCT)

CMSS 530 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).

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 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



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

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). 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), a Velocity Transducer or an Electro-

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Mechanical 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 nonstandard 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 Double 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 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.

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.

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 Electro-Mechanical 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. 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 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: $\pm 0.5\%$ 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 grey 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 530 Velocity 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 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

Velocity Module

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

V	W	W	W	W	-	X	Y	-	Z
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V	Monitor Option
A	With Monitor (standalone unit)
-	Without Monitor

<i>WWWW</i>	<i>Input</i>
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	<i>Detection Type</i>
R	RMS
P	True Peak

Z	Filter Option
ISO	10 Hz to 1.0 kHz
ISO LF	2 Hz to 2.0 kHz
HxxLxxx	Specify High Pass Corner Frequency as Low as 2 Hz and Low Pass Corner Frequency, as High as 20 kHz

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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