

# CMCP700S-CVT Series User Manual





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#### Description

The CMCP700S-CVT is compatible with all industry standard IEPE Accelerometers and Piezo-Velocity transducers. Each transmitter provides constant current power for the associated sensor and processes the signal through a True RMS detector to determine the overall amplitude in terms of Acceleration or Velocity. A 4-20mA output proportional to one of the three user selectable ranges can then be sent to the plant's PLC, DCS, SCADA or other control system to allow operations and maintenance staff to view real time machinery health, set alarms and trigger machine shutdowns for scheduled preventative maintenance. An OK Fault Detection Circuit is provided so hardware or power failures will prompt the front panel LED to change (from green to red). Multiple transmitters can be combined into a single enclosure or cabinet to create a cost effective, multichannel machine protection system with solid state reliability. The CMCP700S-CVT features an additional temperature output which provides a second 4-20mA output for dual output accelerometers such as the CMCP786T.

#### **Available Model Numbers**

CMCP700S-CVT Vibration and Temperature Output (Dual 4-20mA Output)

#### Power

The CMCP700S Series Transmitters require externally supplied DC power. The power supply should have a nominal output of +24VDC and be capable of supplying a minimum of 100mA for each CMCP700S Series Transmitter in the system. A power-supply dedicated to the vibration monitoring system is recommended. It is also recommended that connections between the power-supply and the monitors be made with twisted-shielded instrument cable. The cable shield should float at the transmitter and connect to common at the power-supply / system common end only.

#### **Opening the Case**

The CMCP700S Series Transmitter is configured by a series of switches. The switches can be accessed by removing the PCB from the housing. The PCB can be removed by depressing the tabs located on the top and bottom behind the terminal blocks. With the tabs depressed, the PCB can then be pulled out the front of the case.



#### **Configuring the Transmitter**

The CMCP700S Series Transmitter features 8 DIP switches which allow the transmitter to be configured for various sensor inputs and measurement types. The images below show where the switches are located on the PCB and the direction in which they should be moved to turn features on or off. Switches can be moved with a small flat head screwdriver or with the tip of a pen. The following sections of this manual will cover the various settings and features.



# **Engineering Unit Selection**

Engineering Units are selected based on the sensor used in conjunction with the transmitter and the desired output. When using an IEPE accelerometer, choose either A-A, for a g's Acceleration output, or A-V for an output in terms of Velocity. When using a Velocity sensor, the transmitter must be in V-V mode for an output in Velocity only. Place the PCB in front of you with the BNC facing up. To turn a switch off, move the lever to the left. To turn the switch on, place it to the right. Only one of the Engineering Unit switches may turned on at one time.

A-A	V-V	A-V	Range	Sensor Input
ON	OFF	OFF	Acceleration Output (g's)	IEPE Accelerometer
OFF	ON	OFF	Velocity Output (in/s or mm/s)	Piezo-Velocity Sensor
OFF	OFF	ON	Velocity Output (in/s or mm/s)	IEPE Accelerometer

#### **Full Scale Range Selection**

One of three Full-Scale range options can be selected by using switches R1, R2 or R3. The Full-Scale Range controls the 4-20mA output scaling. To determine the Full-Scale range, choose the sensor type in the left-hand column and match it to the range setting. The factory default setting is Range 2 (R2) and will provide a 1.00 in/s (25.4mm/s) full scale output when used with a 100mV/g accelerometer. For example, when Range 2 (R2) is used with a 500mV/g accelerometer, the full-scale output is 0.2 in/s (5.0mm/s).Velocity measurements can be scaled for either English (in/s) or Metric (mm/s) units.

		R-1 (Bange 1)		R-2 (Range 2)		R-3 (Range 3)	
1	Sensor Sensitivity	Acceleration	Velocity	Acceleration	Velocity	Acceleration	Velocity
eter	50mV/g	10g's	1.0 in/s (25.4mm/s)	20g's	2.0 in/s (50.8mm/s)	40g's	4.0 in/s (101mm/s)
lerom	100mV/g	5g's	0.5 in/s (12.7mm/s)	10g's	1.0 in/s (25.4mm/s)	20g's	2.0 in/s (50.8mm/s)
Acce	500mV/g	1g	0.10 in/s (2.5mm/s)	2g's	0.2 in/s (5.0mm/s)	8g's	0.8 in/s (20mm/s)
Piezo-Velocity	100mV/in/s (4mV/mm/s)	N/A	0.5 in/s (12.7mm/s)	N/A	1.0 in/s (25.4mm/s)	N/A	2.0 in/s (50.8mm/s)
	500mV/in/s (20mV/mm/s)	N/A	0.10 in/s (2.5mm/s)	N/A	0.2 in/s (5.0mm/s)	N/A	0.8 in/s (20mm/s)

#### **Low Pass Filter Selection**

The CMCP700S-CVT's bandwidth is controlled by switches LP1 and LP2. Both switches should always in either on or off. The filters are based on ISO 2372 (10816) standards for machines which operate in the 600 to 12,000 RPM Range.

LP1	LP2	Filter Range	
ON	ON	10 to 1kHz (ISO Standard, Velocity)	
OFF	OFF	10 to 10kHz (ISO Standard, Acceleration)	

#### **Temperature Output**

The CMCP700S-CVT supports CMCP786T type (or compatible) dual output accelerometer and temperature sensors with a sensitivity of 10mV/°C. The maximum input voltage range is 1.5VDC which corresponds to a 0 to 150°C Full-Scale range on the 4-20mA output. The temperature signal is connected to terminal number 3. Power to CMCP786T type sensors is provided through the accelerometer circuit.

#### **Buffered Dynamic Output**

A buffered, unfiltered version of the connected sensors AC signal is available on the front panel BNC connector. Buffered outputs allow for live, online signal analysis and/or sensor testing. The sensors DC bias voltage is passed through the buffered output to allow for proper operation of OK circuitry on portable data collectors as well as allow for easy troubleshooting of the associated sensor. The BNC buffered output is tied in parallel to the buffered output screw terminals which allow for hardwired connections to other test equipment. Buffered Outputs are short circuit protected and have an output impedance less than of 50 ohms.

Note – when connecting a portable data collector or online system, the devices constant current power source should be turned off. Failure to do so may result in a corrupt measurement.

#### Sensor OK/Fault Indicator

The CMCP700S-CVT features a local sensor status LED on the front panel. The LED is controlled by the transmitters "OK" circuitry. When the transmitter is powered on, and the sensor is operating normally, the LED will be Green. This indicates a good sensor signal. If the sensor's bias voltage (BOV) is low or high, the LED will turn Red to indicate a sensor fault.

#### 4-20mA Outputs

The CMCP700S-CVT provides two analog 4-20mA current outputs, one for vibration and the other for temperature. Both 4-20mA loops are active, meaning the transmitter source the voltage rom the transmitter. The 4-20mA outputs should be connected to a passive input on a PLC, SCADA or BMS or DCS system. The total loop resistance for each loop should not exceed 600 Ohms. If the temperature output loop is not used, do not connect any wires to the terminals.

#### Wiring

The CMCP700S-CVT provides power for low-impedance type transducers via a nominal 4.4 mA constant current source. This is generally enough current to allow operation with transducer cables extending up to about 200 ft. However, it is strongly recommended that the transmitter be mounted as close as practical to the associated transducer. This will prevent signal distortion associated with current drive limitations and will minimize interference from external electro-magnetic noise sources (EMI). A well shielded, properly installed transducer cable is necessary to obtain reliable operation. Twisted-shielded pair cables designed and pre-fitted with the proper transducer connector and sold for this specific purpose are highly recommended. The cable shield should be open at the transducer end and connected to common (VIB IN-) at the transmitter input only. The cable should be routed as far away from other electrical circuits and ran in metal conduit where possible.

# **Terminal Block Pin Assignments**

Input/Output	Terminal Number	Labeling	Function
Sensor Input	1	VIB +	Signal Input / Sensor Power
	2	VIB -	Sensor Input Common
	3	TEMP IN	Temperature Input (10mV/°C)
Buffered Output	4	BUF VIB	Buffered Dynamic Output Signal
	5	COM	Buffered Output Common
Analog Outputs	8	COM	Common
	9	4-20 OUT TEMP	4-20mA Output - Temperature
	12	4-20 OUT VIB	4-20mA Output - Vibration
DC Power	10	DC PWR +	+24VDC Input
	11	DC PWR -	Common



Dimensions







### Troubleshooting

OK Light Off:

Check +24VDC power at bottom left terminals.

If +24VDC is good, replace transmitter.

# OK Light Red:

Check to be sure sensor is wired properly to top left terminals. OK Light will turn on WITHIN 3 seconds if sensor is OK. If OK Light stays red, check sensor bias voltage or replace sensor. Accelerometer DC Bias should be between 4.0 to 16.0 VDC If sensor is good (DC bias or gap OK) replace transmitter.

#### No 4-20 mA Output:

Check to be sure OK light is green.

Disconnect field wiring and verify 4-20 mA directly with Digital Voltmeter.

If OK Light is green and there is no 4-20 mA output replace transmitter.

#### Erratic or Noisy Readings:

Check to be sure sensor shield is properly grounded.

Check for ground loops in system.

Verify sensor and cabling installation is in conduit and away from AC power or Variable Speed Drives. If radios are causing interference, be sure to use metal enclosure and conduit.

#### **Maintenance and Calibration**

The CMCP700S Series Transmitters contain no user-serviceable parts. All transmitters are factory calibrated and require no field adjustments or service. Transmitters are designed to provide years of continuous, trouble free service under normal operating conditions. To obtain a return materials authorization number please contact customer service at <u>techsupport@stiweb.com</u>, or by telephone at +1 888-777-7213 or +1 281-334-0766. When contacting us for technical support please have the model number and serial number ready.

#### **Technical Specifications**

Mechanical Mounting Housing Dimensions (W / H / D) Housing Material **Housing Color** Weight Environmental **Operating Temperature Range** Storage Temperature Range Humidity **Degree of Protection Terminal blocks Connection Method Conductor Gauge** Power input Supply Voltage Range Current Consumption Sensor input Input Type Sensitivity (Accelerometers) Sensitivity (Piezo-Velocity) Sensitivity (Temperature) Frequency Response (Velocity) Frequency Response (Acceleration) **IEPE Power Source** 

35 mm DIN rail 4.94"x43.84"x0.69" (125.4x97.66x17.5mm) Polycarbonate Light Gray 3.0 Ounces (85g)

0 to 70°C (-4 to 176°F) -40 to 95°C (-40 to 203°F) 0 – 95% Non-Condensing IP54

Screw Terminals 16 to 24 AWG

23.5 to 30VDC (24VDC Nominal) 100mA Max

IEPE Accelerometer or Piezo-Velocity Sensor 50, 100 or 500mV/g 100 or 500mV/in/s 10mV/°C (CMCP700T Series Sensors) 10 to 1kHz 10 to 10kHz Constant Current

# **Revision History**

Revision 1.0 1.1 Release Date July 2, 2021 July 27, 2021 Updates Manual Release OK fault detection circuit