



5534/5535/5544/5545 SIGNAL CONDITIONER SENSORS

Installation Manual



OVERVIEW

These Accelerometer Signal Conditioners accept signals from machine casing mounted Metrix Seismic Accelerometer or most competitive accelerometers and produce a 4-20 mA current source output proportional to the measured variable. The detection circuit is responsive to true RMS vibration but the output may be scaled either to peak or RMS units. A green LED indicates sensor and cable integrity. In the event of sensor failure, the LED extinguishes and the output current is driven below 3.6 mA, thereby signaling a malfunction. A BNC connector gives access to the buffered input signal for local analysis. Optional features for either model include filters and galvanic isolation between input, output and power supply.

INSTALLATION

Each signal conditioner is supplied with either a flat mounting base or a DIN rail adapter. When mounting in the Metrix Part #7595 explosionproof housing, the DIN rail adapter version must be used. The Metrix Part #7876 and Metrix Part #8172 weatherproof housings may be specified for flat base or DIN rail mounted signal conditioners. For the best results, the signal conditioner should be installed within 1000 feet (300 m) of the transducer.

WIRING

SENSOR (Signal Input): Connect the transducer or charge amp output cable leads to these terminals. If the transducer is a self-generating velocity pickup, polarity is arbitrary unless the signal polarity at the SIG

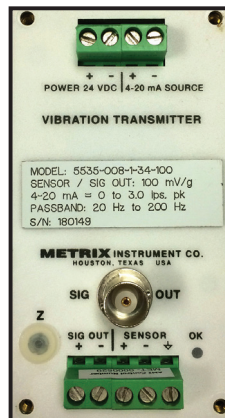
OUT BNC connector is important for analysis purposes. If an accelerometer, piezoelectric velocity transducer or charge amp is used, correct polarity must be observed. The cable shield should be wired to the terminal as follows:

4-20 mA (Current Source Output): Wire the receiving device to these terminals, observing correct polarity. The total resistance of the receiver input and wiring must be between 25 and 600 ohms.

SIG OUT (Signal Output): This signal is identical to the input signal and is buffered for driving remote vibration analysis instruments. The terminal block terminals and the BNC connector are wired in parallel.

24 VDC (Power Input): For best results, the sum of the DC power voltage, plus or minus AC ripple and noise, should be within 20 to 30 volts.

In Class I, Div. 2, Groups A, B, C & D locations, the signal conditioner may be wired in accordance with page 4 or drawing 9031. Pages 6 and 7 show wiring diagrams for the 5534/5544 and 5535/5545, respectively.



INSTALLATION CONSIDERATIONS

Many variables exist in transmitter installations such as location, type of enclosure, proximity and type of other devices, type and length of wiring, etc.

In general, the transmitter should be located in a separate enclosure from electrical systems, which switch electrical power at large voltages or currents, such as motor controls. Grounded metal enclosures are much preferred to nonmetallic ones in areas where strong AC power or radio frequency (RF) fields are present, even on an intermittent basis. Possible sources of electrical interference are electrical motors and generators, SCR drives, motor contactors, RF heaters, engine ignition systems, handheld transceivers (walkie-talkies), cell phones, etc.

Handheld transceivers and cell phones are capable of interfering with the proper operation of the transmitter, especially with the enclosure door open and the device held in close proximity to wiring. The RF filtering components in the transmitter protect against normally expected RF levels, but excessive levels can cause interference. It is good practice to keep operating RF sources as far away from electronic devices as possible. In severe cases a ferrite core (Metrix Part# 97007-006) may be required to be added on power or signal wiring. These commonly available devices are either snapped over the wiring or the wiring is looped several times through the device.

In some installations, the 24VDC power source can have significant electrical noise present. Common sources of noise are battery chargers, unregulated power supplies and switching type power supplies. 24VDC relays and solenoids that are not protected with snubbing diodes or transient protectors will generate voltage transients that may interfere with the proper operation of the transmitter. Ensure that the 24VDC power source is a regulated type and free from electrical noise under all conditions.

None of the wiring connected to the transmitter or other devices within the enclosure should be run in conduits or cable trays with plant power wiring or control relay and solenoid wiring. All inputs and outputs should be wired with shielded cables. Totally shielded (100% foil) cables are preferred to 90% braided type shielded cables. The shield should be

continued to within 1 to 2 inches (25 to 50mm) of the transmitter terminals. The shield itself should be connected to the provided shield terminal. The shield connection should be as short as possible. Ensure that all shields are connected only at one end, preferably at the transmitter. Alternate shield connections are possible such as to instrumentation grounds, etc. In general, connection of shields to earth grounds should be avoided except at one central earth grounding point for a complete system as “ground loops” may be created, which can introduce unwanted power frequency pickup.

SENSOR MALFUNCTION

The signal conditioners are provided with a sensor malfunction detector, which causes the output current to drop below 3.5 mA, the SENSOR OK LED to extinguish and the Display (5544 & 5545 only) to read zero, in the event of an open circuit. The 5535 and 5545 also detect incorrect polarity or shorted cable conditions.

CALIBRATION

NULL OFFSET

The offset calibration can be checked as follows:

Disconnect the transducer cable leads from the signal conditioner and connect the following in its place:

- Model 5534, 5544: Short circuit transducer connections, except for -40X, -50X, -60X and -70X (piezovelocity) units which require a resistor as specified for Models 5535 & 5545.
- Model 5535, 5545: Tie the transducer connections together as follows:
 4mA sensor current source conditioners — 2.49K ohm resistor
 10mA sensor current source conditioners — 1K ohm resistor
 No sensor current source conditioners — short circuit

To adjust, remove the plastic plug from the Z (Zero) control and adjust the latter to obtain exactly 4 mA output. Remove the short (or the resistor) and reconnect the transducer cable.

SPAN

The 20 mA output (SPAN) is factory set to the full scale value indicated on the nameplate and is not field adjustable. The most reliable way to check the calibration of the sensor and signal conditioner as a system is to compare the indicated vibration with an independent, accurate vibration measurement at the same location.

FORMULA:
$$\frac{\text{Measured mA} - 4 \text{ mA}}{20 \text{ mA} - 4 \text{ mA}}$$

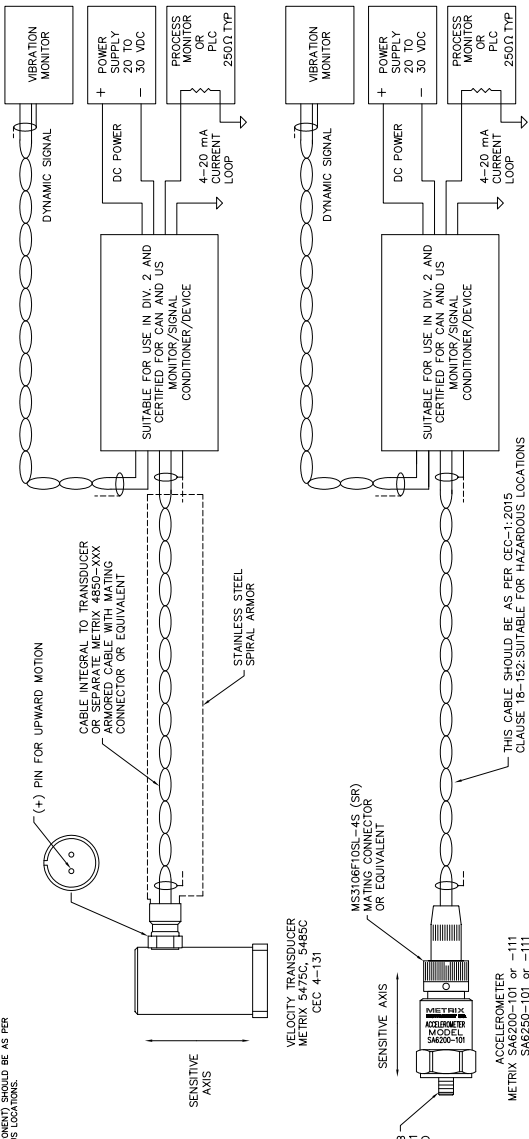
EXAMPLE:

Measured mA	Full Scale Vib	Actual Vib
<3.5	1.0 ips, pk	Sensor fault
4.0	1.0 ips, pk	0.0 ips, pk
12.0	1.0 ips, pk	0.5 ips, pk
20.0	1.0 ips, pk	1.0 ips, pk

STARTUP CURRENT

The signal conditioners employ a DC-DC converter. As with all converters of this nature, a large current spike occurs at startup. The current spike has a peak of 100 mA and lasts for 40 ms. Care should be exercised when wiring several units onto one supply. Power supplies without adequate capacity will not allow the units to start properly. The internal power supply fuse may open as a result of this condition.

CLASS 1 DIVISION 2 DRAWING



AGENCY APPROVED PRODUCT
DO NOT DEVIATE FROM
DOCUMENTED CONSTRUCTION
OR LISTED PARTS

Verifie et Certifie
conforme à l'exécution

Date: _____
Signature: _____

- NOTES: (UNLESS OTHERWISE SPECIFIED)
- SUBSTITUTE OF COMPONENT
 - SUBSTITUTE FOR USE IN DIV. 2 AND CERTIFIED FOR CAN AND US MONITOR/SIGNAL CONDITIONER/DEVICE.
 - THIS CABLE (BETWEEN SENSOR AND SUBSTITUTE COMPONENT) SHOULD BE AS PER CEC-1-2016 CLAUSE 18-152; SUITABLE FOR HAZARDOUS LOCATIONS.

THIS CABLE SHOULD BE AS PER CEC-1-2015 CLAUSE 18-152; SUITABLE FOR HAZARDOUS LOCATIONS

DATE	REV	DESCRIPTION
05-11-2016	01	ISSUE FOR CONSTRUCTION
05-25-2016	02	REVISED FOR CEC-1-2016
05-25-2016	03	REVISED FOR CEC-1-2016
05-25-2016	04	REVISED FOR CEC-1-2016
05-25-2016	05	REVISED FOR CEC-1-2016

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CLASS 1 DIVISION 2
 SIGNAL CONDITIONER
 MODEL NO. 9031
 PART NO. B
 DO NOT SCALE DRAWING

ENVIRONMENTAL INFORMATION



This electronic equipment was manufactured according to high quality standards to ensure safe and reliable operation when used as intended. Due to its nature, this equipment may contain small quantities of substances known to be hazardous to the environment or to human health if released into the environment. For this reason, Waste Electrical and Electronic Equipment (commonly known as WEEE) should never be disposed of in the public waste stream. The “Crossed-Out Waste Bin” label affixed to this product is a reminder to dispose of this product in accordance with local WEEE regulations. If you have questions about the disposal process, please contact Metrix Customer Services.

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