

OPERATION MANUAL

MODEL 8042 4-20mA

Accelerometer & Velocity Transmitter



WARRANTY

Measurement Specialties, Inc. accelerometers are warranted during a period of one year from date of shipment to original purchaser to be free from defects in material and workmanship. The liability of Seller under this warranty is limited to replacing or repairing any instrument or component thereof which is returned by Buyer, at his expense, during such period and which has not been subjected to misuse, neglect, improper installation, repair, alteration, or accident. Seller shall have the right to final determination as to the existence and cause of a defect. In no event shall Seller be liable for collateral or consequential damages. This warrant is in lieu of any other warranty, expressed, implied, or statutory; and no agreement extending or modifying it will be binding upon Seller unless in writing and signed by a duly authorized officer.

RECEIVING INSPECTION

Every Measurement Specialties, Inc. accelerometer is carefully inspected and is in perfect working condition at the time of shipment. Each accelerometer should be checked as soon as it is received. If the unit is damaged in any way, or fails to operate, a claim should immediately be filed with the transportation company.

SERVICE CONCERNS

If a Measurement Specialties, Inc. instrument requires service, first contact the nearest Measurement Specialties, Inc. representative. They may be able to solve the problem without returning the unit to the factory. If it is determined that factory service is required, call Customer Service at the regional headquarters for an RMA number before return.

RETURNS

All units being returned to the factory require an RMA (Return Material Authorization) number before they will be accepted. This number may be obtained by calling Customer Service at the regional headquarters with the following information; model number(s), quantity, serial number(s), and symptoms of the problem, if being returned for service. You must include the original purchase order number if under warranty.

RECALIBRATION SERVICES

The Vibration Sensors Design Center and its two manufacturing facilities in China and France offer factory re-calibration services for Variable Capacitance, Piezoresistive, Piezoelectric (including IEPE, ICP etc.) accelerometers and Electronics. NIST (US), DKD (Germany), COFRAC (France) traceable calibration services on sensitivity at 100 Hz (102 or 120 Hz in Europe) and full frequency sweeps are offered. Contact the regional headquarters for pricing information.

MODEL 8042 4-20mA

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DESCRIPTION

The 4-20mA loop power model 8042 submersible accelerometer is available in either Acceleration or Velocity output options. Both models feature a welded Titanium housing with an integral cable that is custom designed for submersible applications.

The model 8042-AR & 8042-AP are the submersible accelerometer variants available in ranges from $\pm 5g$ to $\pm 100g$, in either 4-20mA RMS or Peak acceleration output options. The accelerometer includes internal shielding and a wide usable bandwidth to 5000Hz.

The 8042-VR & 8042-VP are the submersible velocity transmitter variants available in ranges from 0.5 to 5.0 in/sec, in either 4-20mA RMS or Peak velocity output options. The velocity transmitter includes internal shielding and a usable bandwidth to 1000Hz.

PART NUMBER CONFIGURATION

The accelerometer part number configurations are illustrated below.

8042-XX-GGG-TZZZZ

____ Cable Length (0360 is 360 inches)
____ Cable Jacket Option (T is Tefzel, U is Urethane)
____ Range (080 is 80g, 05 is 0-0.5 in/sec)
____ Range Type (AR is RMS Acceleration, VR is RMS Velocity)

-XX
AR or VR = RMS
AP or VP = Peak

Example: 8042-AR-080-U0360

Model 8042, RMS Acceleration Output, 80g Range, Urethane Cable, 360 inch (30ft) Cable Length

Model	4-20mA Configuration	Ranges	Dash Number	Cable Options
8042	AP, Acceleration Peak AR, Acceleration RMS	5g 10g 20g 50g	-005 -010 -020 -050	T, Tefzel U, Urethane
8042	VP, Velocity Peak VR, Velocity RMS	0.50in/sec 1.00in/sec 2.00in/sec 3.00in/sec 5.00in/sec	-05 -10 -20 -30 -50	T, Tefzel U, Urethane

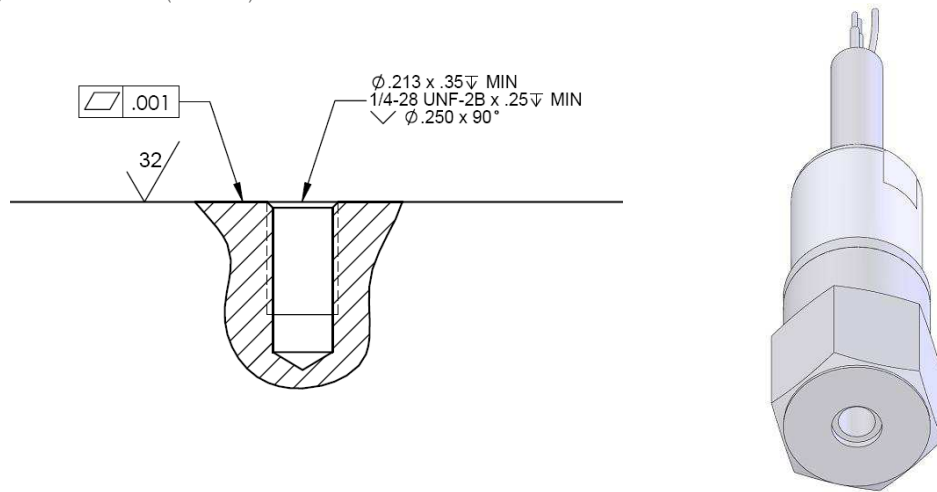
MOUNTING INSTALLATION

The model 8042 accelerometer is designed to be stud mounted for optimum frequency response. However, the unit can also be adhesively mounted with an adhesive mounting adaptor or mounted with a magnetic mounting adaptor for temporary installations.

Stud Mounting

For model 8042, the provided AC-A03663 stud should be used. This stud is designed for 1/4-28 thread mounting, please contact the factory for other stud adaptor options. The following guidelines should be followed:

- The mounting surface should be clean and free of any residue or foreign material.
- The mounting surface should be smooth, flat, and with a maximum surface roughness of 32 micro-inches rms.
- Apply a light coating of coupling fluid (machine oil or silicone grease) on the mating surface to maximize the usable frequency range.
- Torque mounting stud to 24 in-lbs (2.7 N-m)



Adhesive Mounting

To avoid damaging the accelerometer during subsequent removal, it is recommended to use an adhesive mounting adaptor for this method of attachment. For adhesively mounting of accelerometers the following guidelines should be followed:

- The mounting surface should be clean and free of any residue or foreign material.
- The mounting surface should be smooth, flat, and with a maximum surface roughness of 64 micro-inches rms.
- For best high frequency performance a cyanoacrylate adhesive is recommend. A thin layer offers best frequency response.
- Soften adhesive cured adhesive with a chemical debonder (eg. acetone) prior to removal. Gently shear accelerometer loose from the mounting surface after waiting a few minutes for the debonding agent to penetrate the epoxy. Make sure not to use excessive force as this may damage the accelerometer.

Magnet Mounting

For magnetic mounting a magnetic mounting adaptor should be used. Magnetic mounting offers a quick and easy installation portable installation method that is convenient for easy removals. For magnetic mounting of accelerometers the following guidelines should be followed:

- Verify that the mounting surface is magnetic and flat.
- The mounting surface should be clean and free of any residue or foreign material.
- The mounting surface should be smooth, flat, and with a maximum surface roughness of 64 micro-inches rms.
- Inspect the magnet surface of the adaptor which should also be clean and free of any residue or foreign material.
- Install the magnetic mounting adaptor on the accelerometer first. Torque to 24 in-lbs (2.7 N-m).
- Gently mount the accelerometer with adaptor to the mounting surface. Do NOT drop the accelerometer onto the mounting surface as this could potentially generate very high g-levels that can damage the accelerometer.
- Note that poor installation can drastically affect the frequency response of the accelerometer.

MODEL 8042 4-20MA

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CABLE OPTIONS

The model 8042 accelerometer is offered with two different cable options. The standard polyurethane jacketed cable ('U' option) is used in most installations while the ETFE jacketed cable ('T' option) is used in more aggressive environments.

The specifications for the cables are as follows.

Parameters	Specifications
Weight	0.05 lbs/ft (0.07 kg/m)
Min. OD	0.28 inch (7.10 mm)
Max. OD	0.31 inch (7.87 mm)
Conductors	4x #22 AWG, 15.5 Ohms/1000 feet
Outer Jacket Insulation	Polyurethane ('U' option) ETFE ('T' option)
Shield	#36 AWG spiral tinned copper wire foil shield with drain wire

CHEMICAL RESISTANCE OF POLYURETHANE:

Wastewater, Borax, Butane, Animal Fat, Carbonic Acid, Citric Acid, Cod Liver Oil, Corn Oil, Glycerin, Glycol, Mineral Oils, Potassium Nitrate, Potassium Sulfate, Silicone Oils, Stoddard Solvent, Tannic Acid (10), Tartaric Acid, Turbine Oil.

CHEMICAL RESISTANCE OF ETFE:

Acetic Acid (Glacial), Acetic Anhydride, Acetone, Aluminum Chloride, Anti- Freeze, Bromine, Calcium Chloride, Calcium Hydroxide, Chlorine, Copper Chloride, Ferrous Chloride, Hydrochloric Acid, Ketones, Lacquer Thinners, Sulfuric Acid.

The vented cable termination end is specially prepared at the factory to eliminate the potential for moisture migration. Where the lead wires emerge from under the jacket, there's potting material and a shrink tube "boot", every effort should be made to leave this feature intact. Should the cable be longer than needed for the installation, it is recommended that the excess length be accommodated in a service loop and that the potted end of the cable NOT be shortened.

The cable attached to this instrument is specifically engineered for submersible applications. The polyurethane outer jacket provides long term reliability under most conditions. The cable should be handled carefully, however, as the jacket may be subject to cutting should it be "raked" over extremely sharp edges. To guard against water incursion should an inadvertent minor cut occur, the unit incorporates an exclusive "water block" feature immediately beneath the jacket. The cable is fully shielded, with the shield connected to the metal housing at the transducer end and terminated in a drain wire at the termination or user end. The shield should always be terminated to a good earth ground, unless the transducer is installed in an area where galvanic corrosion is known to be a serious problem.

CABLE ROUTING

The cable assembly should be properly secured at regular intervals. It is recommended to use clamps, wax, or tape to secure the cable to minimize cable motion that can add noise to the output signal. The initial attachment should be within two to three inches of the accelerometer.

Avoid routing cables near high-voltage wires and also ground the shield at the signal conditioner to minimize ground loops.

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4-20mA SIGNAL OUTPUT

The signal output from the 8042 sensor can be calculated using the following formulas.

8042-AR & 8042-AP Accelerometer

Vibration Level in G's = (Signal Output in mA – 4mA) x (Full Scale Range in G's / 16mA)

Typical outputs are illustrated in the tables below.

Signal Output	8042-AR & 8042-AP Accelerometer Ranges			
	5g	10g	20g	50g
4mA	0.00g	0.00g	0.0g	0.0g
8mA	1.25g	2.50g	5.0g	12.5g
12mA	2.50g	5.00g	10.0g	25.0g
16mA	3.75g	7.50g	15.0g	37.5g
20mA	5.00g	10.0g	20.0g	50.0g

8042-VR & 8042-VP Velocity Transmitter

Velocity Level in IPS (in/sec) = (Signal Output in mA – 4mA) x (Full Scale Range in IPS / 16mA)

Typical outputs are illustrated in the tables below.

Signal Output	8042-VR & 8042-VP Velocity Transmitter Ranges				
	0.50in/sec	1.00in/sec	2.00in/sec	3.00in/sec	5.00in/sec
4mA	0.00in/sec	0.00in/sec	0.00in/sec	0.00in/sec	0.00in/sec
8mA	0.125in/sec	0.25in/sec	0.50in/sec	0.75in/sec	1.25in/sec
12mA	0.25in/sec	0.50in/sec	1.00in/sec	1.50in/sec	2.50in/sec
16mA	0.375in/sec	0.75in/sec	1.50in/sec	2.25in/sec	3.75in/sec
20mA	0.50in/sec	1.00in/sec	2.00in/sec	3.00in/sec	5.00in/sec

MODEL 8042 4-20MA

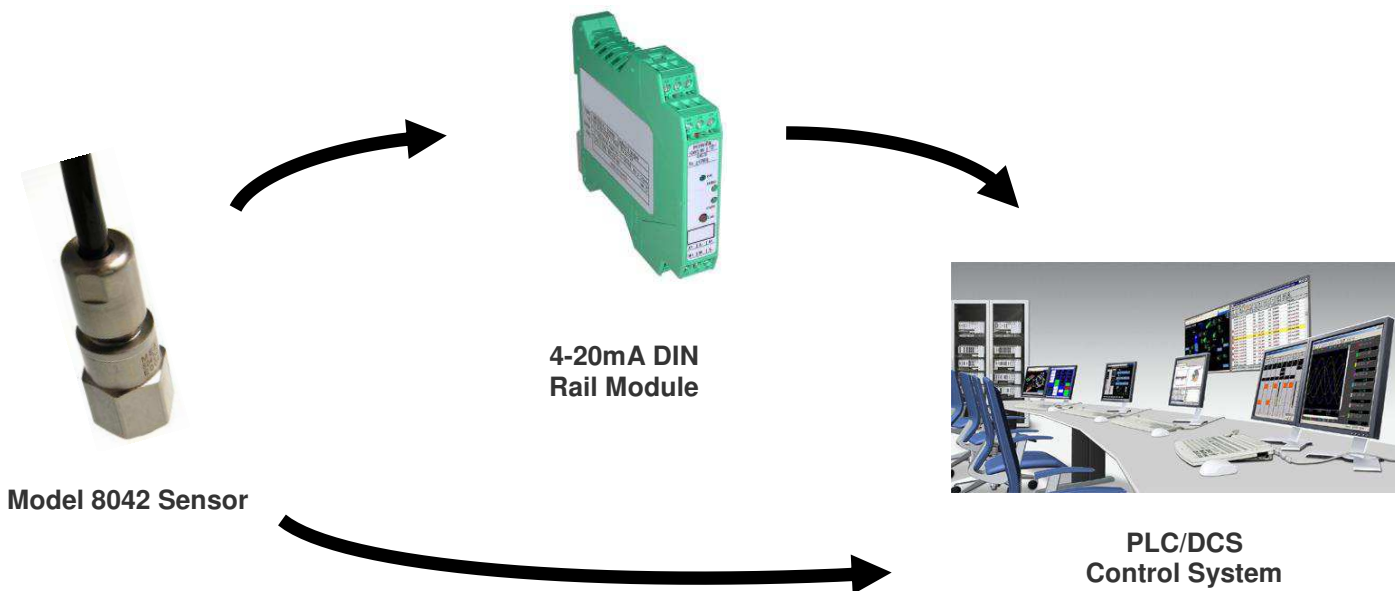
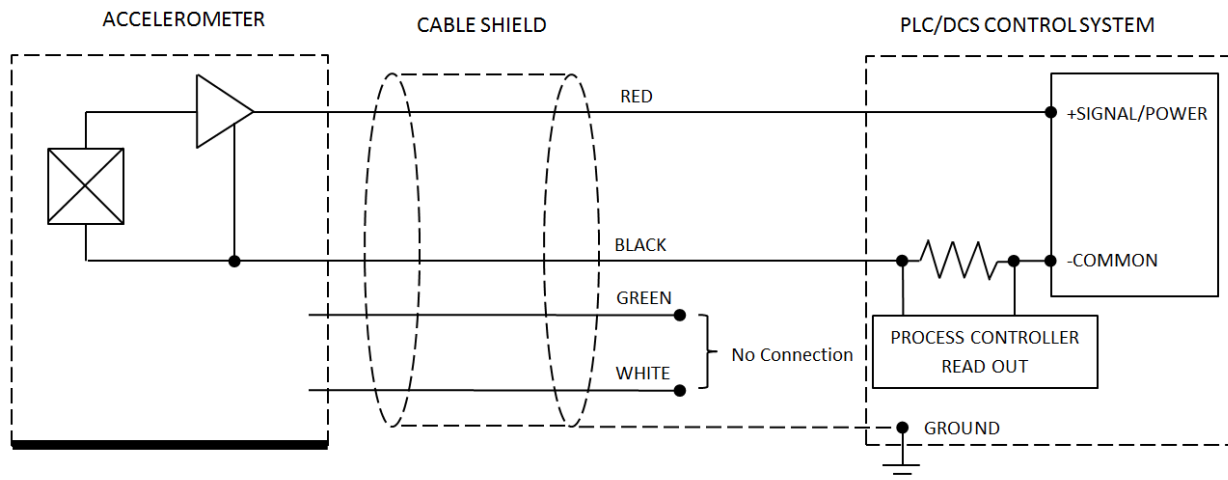
Accelerometer & Velocity Transmitter

SYSTEM INSTALLATION

The loop powered model 8042 are designed to operate with 4-20mA read out devices or connected directly into a PLC/DCS Control System. A typical loop powered circuit and system installation are illustrated below.

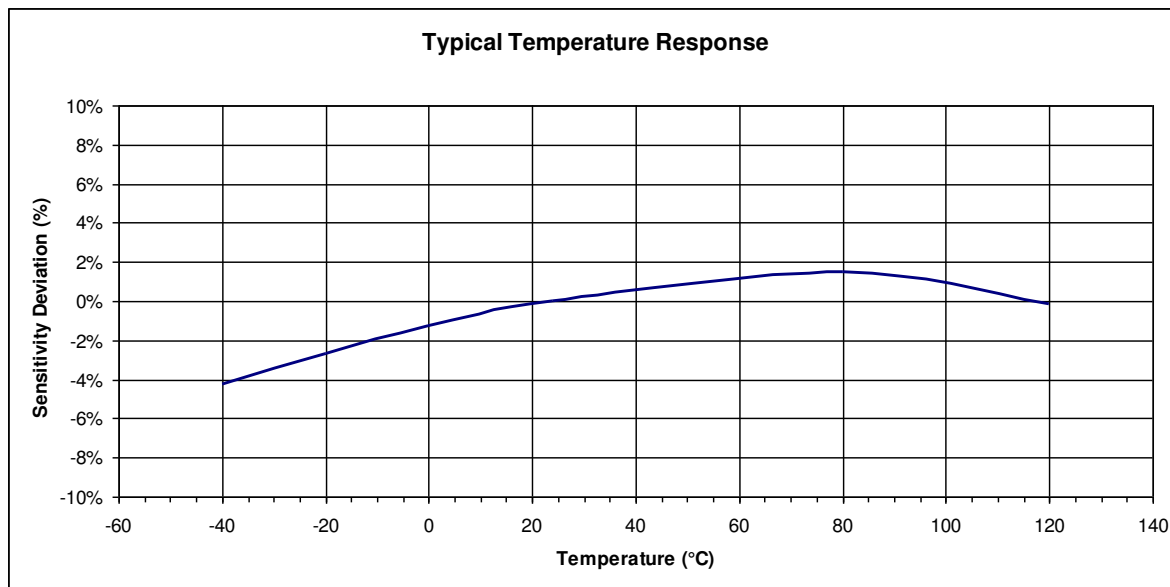
Please note that if using a read out device, then the maximum loop resistance is controlled by the following equation. Use this equation to calculate maximum cable length.

$$\text{Maximum Loop Resistance} = (\text{Excitation Voltage} - 12\text{Vdc}) / 20\text{Ma}$$



TEMPERATURE RESPONSE

The model 8042 accelerometers are designed to operate from -20°C to +80°C (+60°C for Urethane cable option). The typical temperature response curve is illustrated below.



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