Echo® Wireless Vibration Sensor
Installation and Operation Manual

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FCC ID: ZOC-IMI670A01

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

IC: 9732A-IMI670A01

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Introduction

The Echo® Wireless Vibration Sensor is a one-way wireless transmitter used for the condition monitoring of plant equipment. The sensor, when activated by a magnet, will "wake up" at determined intervals (8 hours by default) to measure and transmit vibration levels. An Echo® Receiver connected to a computer with the Echo® Data Server software installed is required to receive and collect transmissions. For information on the setup and installation of the Echo® Receiver and Echo® Data Server, please consult the Echo® Receiver System Manual.

Proper Handling

Proper handling of the Echo® Wireless Vibration Sensor is critical to preventing damage. The following should be avoided:

- Dropping the unit.
- Hitting the unit against hard surfaces.
- "Slapping" the unit when mounting with a strong magnet.
- Submersing or spraying the units with fluids of any kind.
- Touching the electronic components under the cap.
- Using excessive torque when mounting the unit.
- Forcing a stud without ¼-28 UNF threads into the base.
- Twisting the isolated base and housing of transmitter.
- Exposing the unit to temperatures above 170° F.
- Exposing the cap to any reactive chemicals.

<table>
<tr><td>
Caution</td><td>**The sensor cap is easily cross threaded. To avoid cross threading the sensor cap, turn the cap counter-clockwise until a click is heard. When a click is heard, begin turning the cap clockwise slowly and carefully. If the cap does not easily thread on do not force it.**</td></tr>
</table>

The Magnet Switch and LED Status Indicator

The Echo® Wireless Vibration Sensor is activated by a magnet switch located on the side of the housing. The exact location of the magnet is etched on the sensor housing. If a fairly strong magnet is held near the location of the magnet switch, the **blue LED light** will begin blinking quickly. If the sensor was previously deactivated it will become active and immediately take its first measurement. If the sensor was previously active it will deactivate and no longer take measurements. The **blue LED light** allows the user to quickly.

LED Status Messages

Blue LED Message	Current Sensor Status
Fast continuous blinking	Magnet switch is currently being activated.
4 second intermittent blink	Sensor is turned on and waiting for the next transmission.
8 second intermittent blink	Sensor is turned off and will not make measurements.
Dim illuminated LED	Sensor is currently measuring vibration levels.
Bright illuminated LED	Sensor is currently transmitting information to receiver.

Programming the Echo® Wireless Sensor

The Echo® Wireless Vibration Sensor can be programmed with a computer running the Echo® Data Server software through a serial port.

Tip	**If your computer is not equipped with a serial port, a USB to RS232 adaptor can be used. These are readily available from computer electronics vendors.**

Attaching the Programming Cable

To begin programming the Echo® Wireless Vibration Sensor, unscrew the cap carefully to expose the USB port inside the sensor. Carefully attach the programming cable to the sensor and your computer's serial port (use the USB to RS232 adaptor if necessary).

**Connecting to the Sensor with the Echo® Data Server Software**

Launch the PCB Echo® Data Server and click Echo® EchoPlus® Sensors under the Configuration drop down menu in the upper left hand corner of the screen.

The program will then ask if you wish to set up a Echo® Wireless Sensor or an EchoPlus® Wireless Junction Box. Select "I want to add, update, or view an Echo® Wireless Sensor's Parameters".
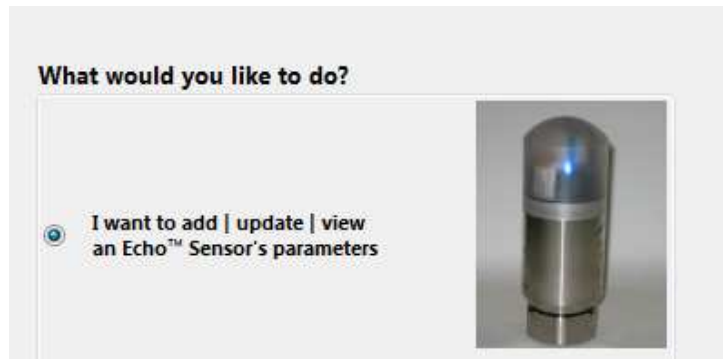

Select the receiver that you would like this specific sensor attuned to. If you are using a single receiver select the default setting.
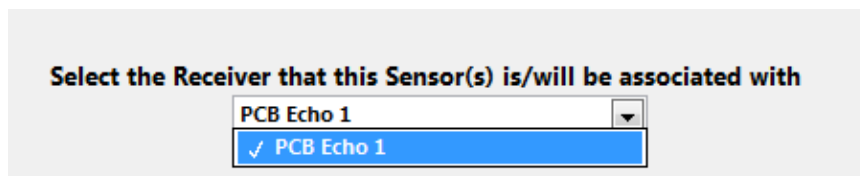
The software will then ask if you would like to set up the sensor, the database, or both. *If this is the first time you are activating this sensor you must do both.* Installing a new sensor and configuration of the database is covered in the Echo® System Setup Manual. We will continue by only changing the programming of the Echo® Sensor. Select "I will only configure the Echo® device at this time" button and click Next.
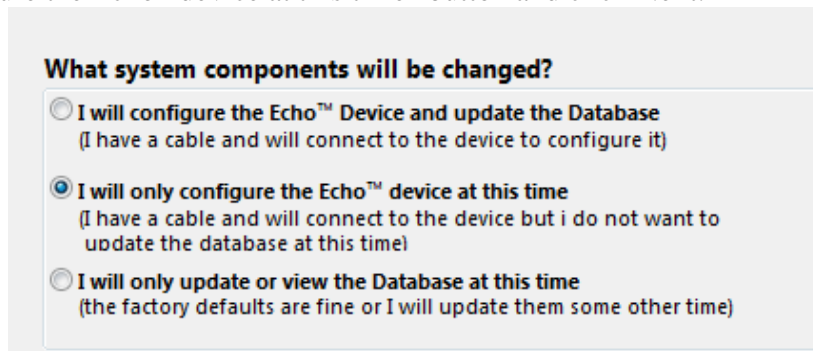
Make sure the sensor is connected to the computer through the USB to RS232 programming cable and hit OK.
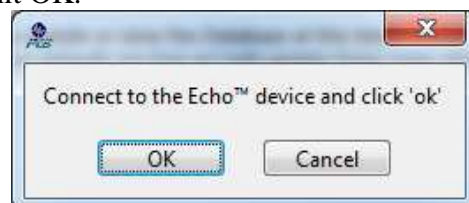
The connection window will appear. Select the appropriate COM port to which the cable is connected.
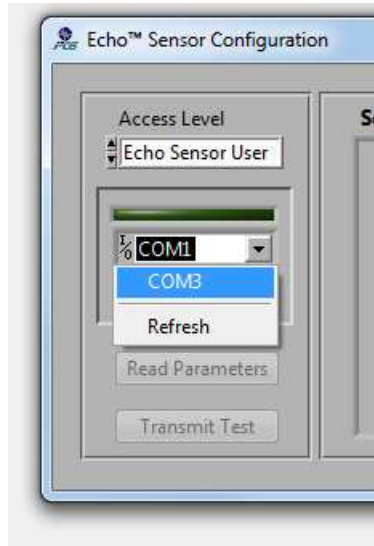
Reading the Current Programmed Parameters

Click "Link to Echo®" and the green light will illuminate indicating the connection has been made. The fields at the right of the window will populate with the current programmed parameters.
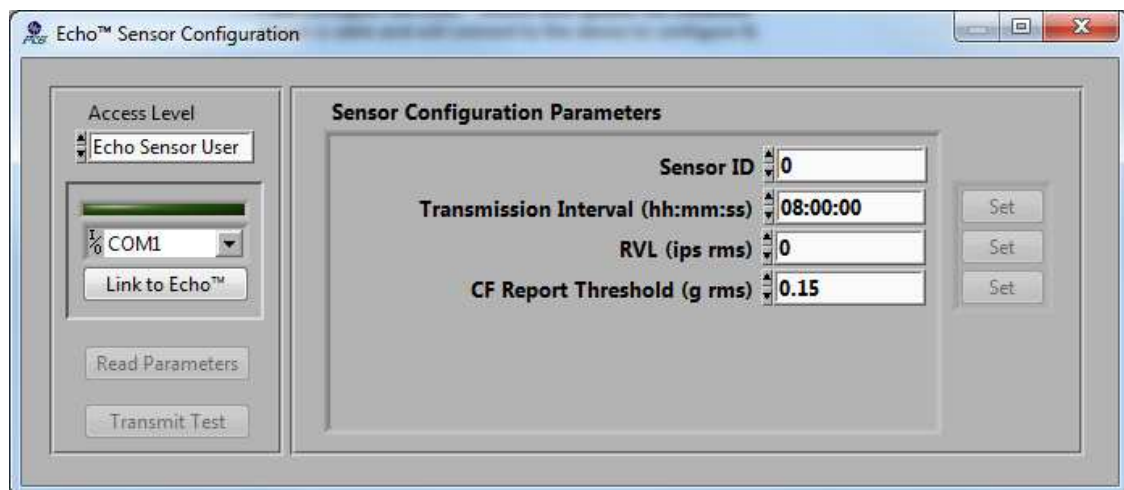
Tip	**The Sensor ID is set at the factory and CANNOT be changed. This ID is unique to each sensor we manufacture. The factory default the Transmission Interval is 8 hours, RVL is 0 (off), and the CF Report Threshold is 0.15.**

Explanation of Echo® Wireless Sensor Parameters

Sensor ID – The Sensor ID is a unique ID programmed and etched onto each sensor at the factory. This number cannot be changed.

Transmission Interval – The Transmission Interval is the time between transmissions. The factory default level is 8 hours, that is the sensor will "wake up" and make a measurement every 8 hours (3 times per day). At the default 8 hour transmission interval the primary lithium-ion batteries are expected to last 5 to 10 years.

 Tip

Decreasing the Transmission Interval will provide data more often; however, transmitting more often will decrease battery life. Keep in mind "more data is not better data" and may be more than you can process and manage.

RVL (Residual Vibration Level) – This is the minimum Residual Vibration (that is, vibration that is currently present) for the sensor to wake up and make a measurement. If the current vibration is below the RVL, the sensor will assume the equipment is turned off and will not waste battery power transmitting unusable data. If the value is set to "0" this feature is disabled and will always make a measurement.

CF Report Threshold – Because crest factor is the ratio of true peak divided by RMS vibration, in some instances where the RMS value is extremely low (such as slow speed equipment) the crest factor will appear exceptionally high. This report factor is the minimum RMS level in g for the Crest Factor to be reported.

Saving Changes to the Echo® Sensor

Click the "Set" button next to each field you wish to update. The new value will be saved in the Echo® Sensor. To verify the programming has been saved click "Link to Echo®" and verify the desired values re-populate the fields.

When you are satisfied with the programming of the sensor, click the X close button in the upper right hand corner of the window.
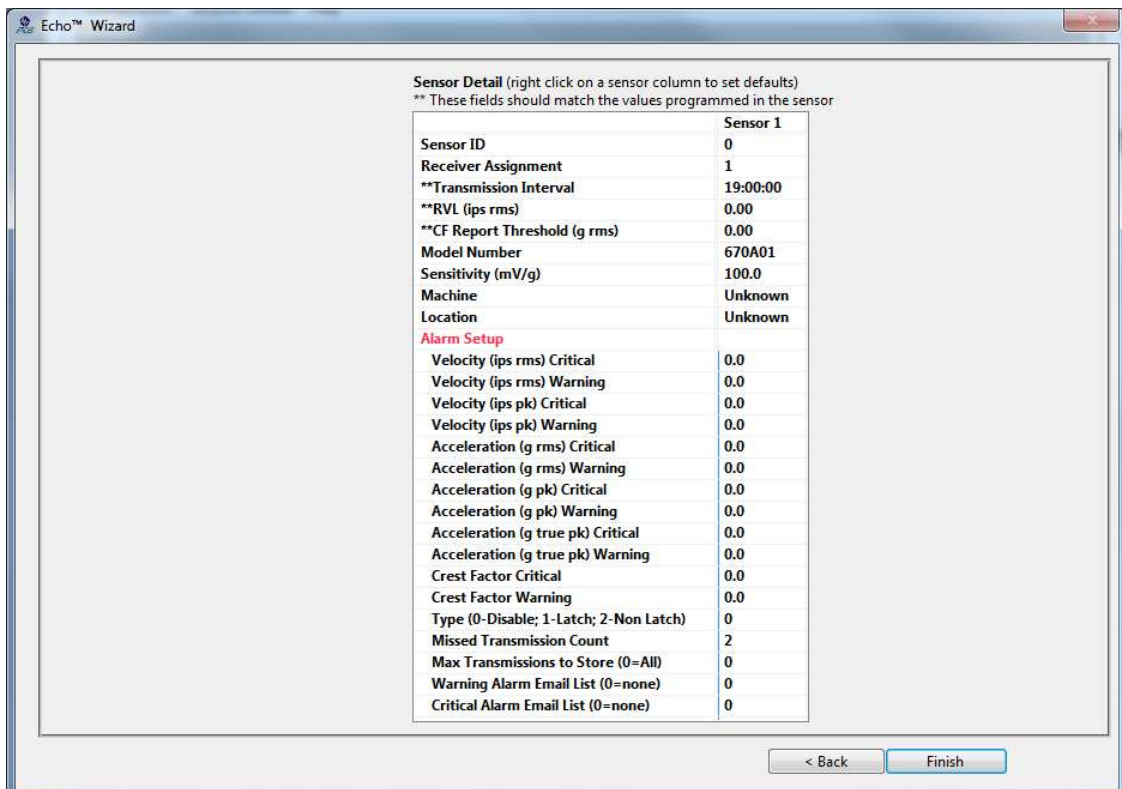
Updating the Database to Match Sensor Programming

If this is the first time you are putting the sensor in the database the following dialog will appear. This dialog will indicate the standard template has been assigned to this sensor. If this is the case, refer to the Echo® System Manual for instructions on setting up the database.
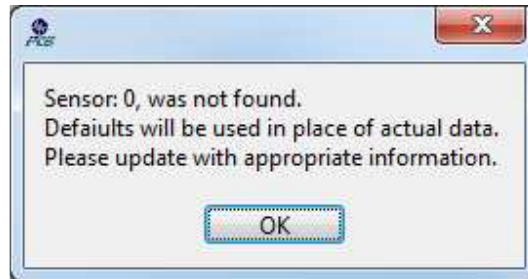
When a sensor programming has been changed the database will automatically update to match the current programming.

Sensor Detail (right click on a sensor column to set defaults) ** These fields should match the values programmed in the sensor	Sensor 1
Sensor ID	0
Receiver Assignment	1
**Transmission Interval	19:00:00
**RVL (ips rms)	0.00
**CF Report Threshold (g rms)	0.00
Model Number	670A01
Sensitivity (mV/g)	100.0
Machine	Unknown
Location	Unknown
Alarm Setup	
Velocity (ips rms) Critical	0.0
Velocity (ips rms) Warning	0.0
Velocity (ips pk) Critical	0.0
Velocity (ips pk) Warning	0.0
Acceleration (g rms) Critical	0.0
Acceleration (g rms) Warning	0.0
Acceleration (g pk) Critical	0.0
Acceleration (g pk) Warning	0.0
Acceleration (g true pk) Critical	0.0
Acceleration (g true pk) Warning	0.0
Crest Factor Critical	0.0
Crest Factor Warning	0.0
Type (0-Disable; 1-Latch; 2-Non Latch)	0
Missed Transmission Count	2
Max Transmissions to Store (0=All)	0
Warning Alarm Email List (0=none)	0
Critical Alarm Email List (0=none)	0

Tip — **Changing the Transmission Interval, RVL, or CF Report Threshold manually in the Database is NOT recommended. These values determine what the software *expects* the sensor to do, not what the sensor will *actually* do. For example, if you change the Database from 8 hours to 1 hour, the sensor will still transmit every 8 hours, but the Database will expect transmissions every 1 hour. The software will think the transmitter is late or missing transmissions.**

The values below should only be changed in the sensor programming.

Sensor ID	0
Receiver Assignment	1
**Transmission Interval	19:00:00
**RVL (ips rms)	0.00
**CF Report Threshold (g rms)	0.00

The RV (Raw Vibration) Option

Sensors ordered with the RV prefix including the optional raw vibration output feature. These sensors are easily distinguished due to the small connector located on the side of the unit. This connector is not present on the standard unit.

A special cable can be used to connect to the sensor's 4 pin connector and a standard BNC connector on your data collector. To collect data, treat the sensor like a standard ICP® or IEPE 100 mV/g accelerometer. Your data collector should provide 18-30VDC 2-20mA constant current excitation power. The output will be a 5 VAC dynamic signal from -50 to +50 g.

⚠️ **Caution**	**Ensure the shorting cap is replaced after raw vibration data is collected. The transmitter will not be able to collect data without it!**

Mounting

The Echo[®] Wireless Vibration Sensor should be stud mounted on a clean, flat surface. The sensor is sensitive in the axis that passes through the mounting hole in the base of the unit. It is not recommended to mount the sensor with a magnet or adhesive due to the size and mass of the sensor.

Outline Drawing
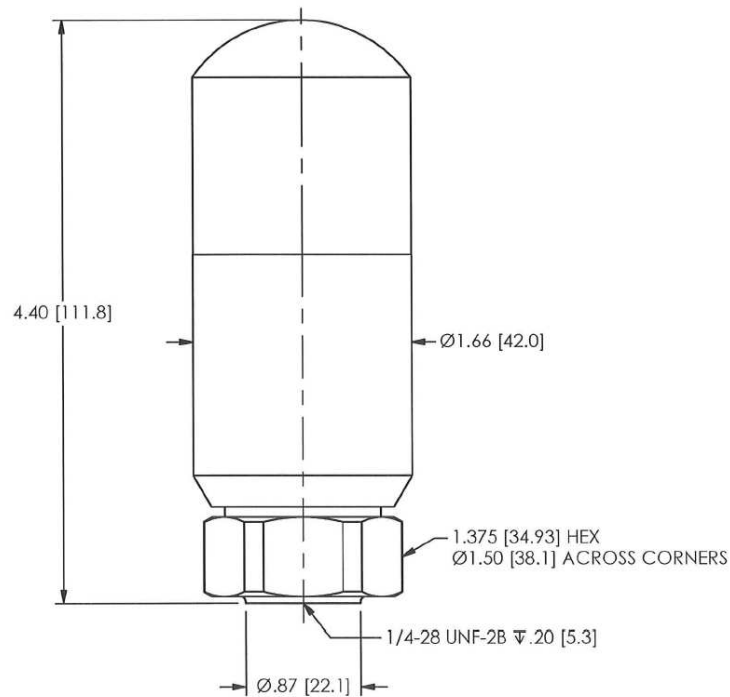
Spot Face Tool

If a clean and flat spot is not available, it is recommended to prepare a flat machined surface with IMI model 080A127 1" spot face tool. This tool will prepare a flat surface and drill the appropriate pilot hole for a ¼-28 UNF thread. The tap is not included in the kit.

Replacing the Battery Pack

To replace the battery pack, carefully slide the battery pack out and disconnect the small power connector on the circuit board.
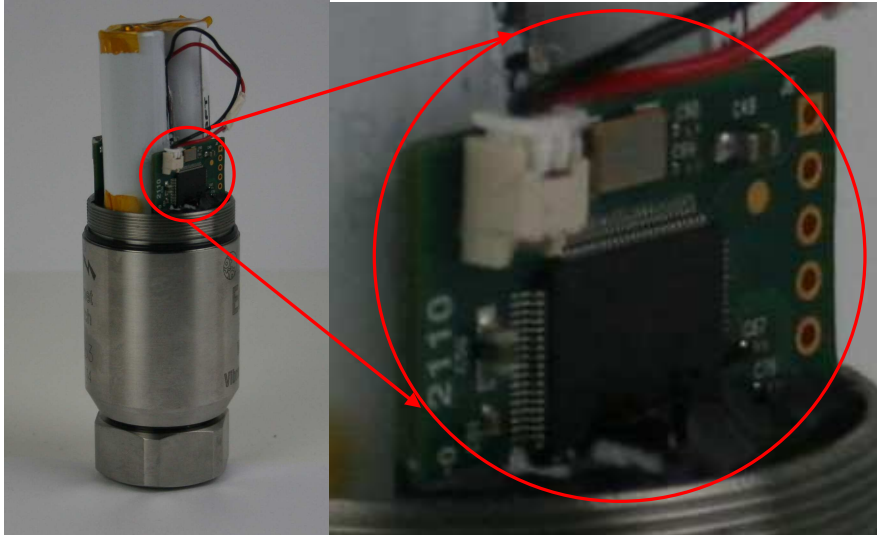
⚠ **Caution**	**DO NOT ATTEMPT TO RECHARGE BATTERIES.** **DO NOT REPLACE WITH STANDARD AA SIZE BATTERIES.** **The Echo® Sensor is equipped with primary lithium-ion batteries that are not rechargeable. Please consult the factory or your local**

distributor for replacement battery packs.