AMS 9420 Wireless Vibration Transmitter

Quick Start Guide

EMERSON.

Copyright

Disclaimer

Patents

The product(s) described in this manual are covered under existing and pending patents.

Safety messages

Instructions in this manual may require special precautions to ensure the safety of the personnel performing the operations.

This AMS 9420 device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference, this device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to ensure a minimum antenna separation of 20 cm from all persons.

Refer to the following safety messages before performing an operation preceded by the warning symbol:

⚠ WARNING!

Failure to follow these installation guidelines can result in death or serious injury. Only qualified personnel should install AMS 9420s.

Explosions could result in death or serious injury:

- Before connecting a Field Communicator in an explosive environment, make sure the instruments are installed in accordance with applicable field wiring practices.
- Verify that the operating environment of the AMS 9420 is consistent with the appropriate hazardous locations certifications.
- Do not remove the front electronics end cap or LCD cover while the device is in a hazardous area.

Electrical shock can cause death or serious injury. Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

Contents

1   Introduction

This Quick Start Guide applies to the 2.4 GHz *Wireless*HART™ version of the AMS 9420. It describes a typical installation with standard low-powered sensors (25 mV/g) and a power module.

This document includes basic guidelines for the AMS 9420 Wireless Vibration Transmitter. It does not provide instructions for detailed configuration, diagnostics, maintenance, or service. The AMS 9420 Wireless Vibration Transmitter Reference Manual (part number MHM-97408) contains more instructions, and other sensor and power options. A digital version of this document is available on the Emerson website, *http://www.emerson.com/en-us/catalog/ams-a9420*.

The term "sensor" applies to both an accelerometer and an accelerometer with embedded temperature; the word "accelerometer" refers to a sensor that measures only acceleration.

The transmitter's main parts are shown in *Figure 1-1*.

Figure 1-1: AMS 9420 overview
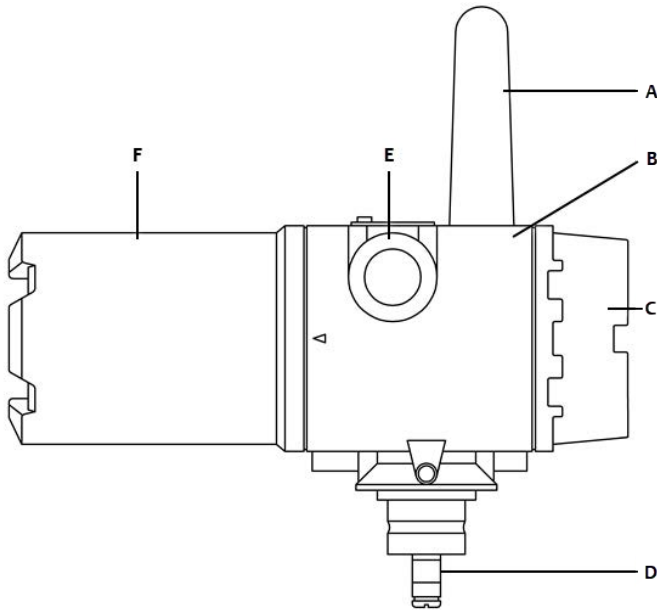
A. Antenna
B. Housing
C. Front electronics end cap or LCD cover
D. Mounting post
E. Cable entry port (one on left and right)
F. Extended end cap or power module cover

2   Install the AMS 9420

Before beginning installation procedures:

Insert the power module only when you are ready to commission the device.

Install the Emerson Wireless Gateway and ensure it functions properly before you activate the AMS 9420 or any other wireless devices. Power up wireless devices in order of proximity from the Emerson Wireless Gateway, beginning with the closest. This will result in a simpler and faster network installation.

⚠ WARNING!

If the sensor is installed in a high-voltage environment and a fault condition or installation error occurs, the sensor leads and transmitter terminals could carry lethal voltages. Use extreme caution when making contact with the leads and terminals.

2.1   Prepare sensors for use with the AMS 9420

This procedure describes installing the AMS 9420 with standard low-powered sensors (25 mV/g nominal sensitivity). See the Reference Manual for information about other options such as using ICP accelerometers (100 mV/g nominal sensitivity).

Procedure

1. Install sensors according to standard sensor installation practices. Use thread sealant on all connections.

    See the Reference Manual for detailed sensor mounting instructions.

    Note
    The AMS 9420 uses special low-power sensors (available for purchase from Emerson) to reduce power consumption and increase power module life.

    ---

2. Run wiring (and conduit, if necessary) from the sensor to the AMS 9420.

    The AMS 9420 is not approved for use with a cable that is 30 m (100 ft) or longer. The recommended maximum cable length is 29 m (95 ft). Shorter is better.

    If your cable is longer than 3 meters, you must attach ferrites at the AMS 9420 end of the cable. For armored cables, add ferrites before attaching sensor wires to the transmitter. For standard cables, add the ferrites after attaching the sensor wires to the transmitter. See *page 18*.

3. Pull the wiring through the threaded conduit entry of the AMS 9420. If you are not using conduit, use an appropriate grommet or cable-gland to provide both strain relief for the cable and environmental isolation for the AMS 9420.

2.2   Attach sensor wiring to the AMS 9420 terminals

Prerequisites

- If you are using armor-jacketed cable longer than 3 meters, you must attach the ferrites before attaching sensor wiring the AMS 9420 terminals. See *Section 5.2*.
- If the sensor signal wires are not equipped with spade lugs, Emerson recommends installing them before proceeding.

Procedure

1. Tie the sensor's grounding wire (white with black stripe) to the ground screw inside the AMS 9420.

   See callout E in the figures below.

2. Refer to the appropriate figure to connect the sensor signal wires.

   Note
   You can connect one or two accelerometers to the AMS 9420. You can connect only one accelerometer with a temperature sensor.
   ---

   a. Insert a beryllium copper washer on top of each spade lug.
   b. Tighten the screw to 15 in-lbs (1.7 N-m).

Figure 2-1: AMS 9420 wiring with one accelerometer
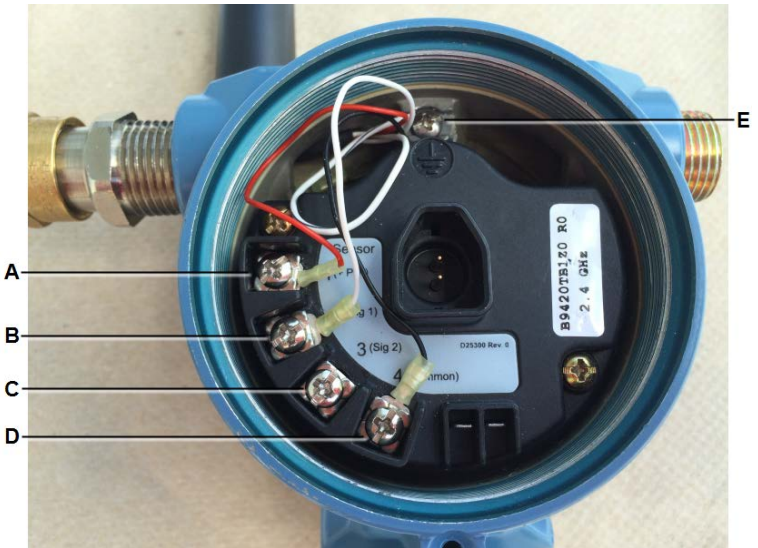
A	Sensor power	Red wire
B	Sensor signal	White wire
C	Unused	Unused
D	Sensor common	Black wire
E	Sensor grounding	White wire with black stripe

Figure 2-2: AMS 9420 wiring with two accelerometers
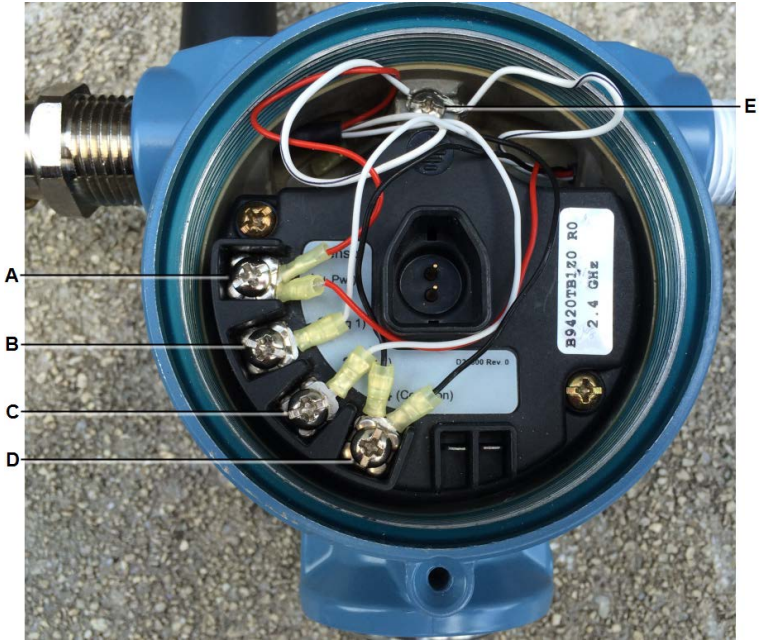
A	Sensor power	2 red wires
B	Sensor 1 signal	White wire
C	Sensor 2 signal	White wire
D	Sensor common	2 black wires
E	Sensor grounding	2 white wires with black stripe

Figure 2-3:   AMS 9420 wiring with one accelerometer with embedded temperature
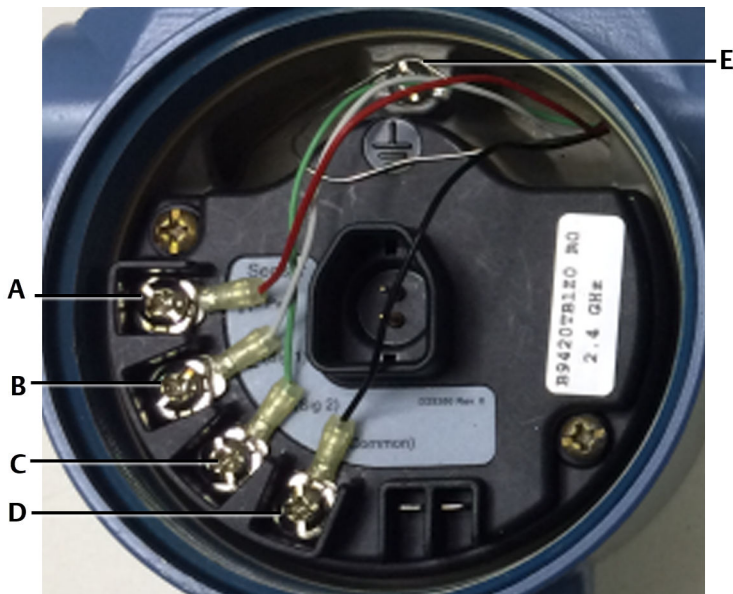
A	Sensor power	Red wire
B	Vibration signal (Signal 1)	White wire
C	Temperature signal (Signal 2)	Green wire
D	Sensor common	Black wire
E	Sensor grounding	Bare wire

2.3   Power the AMS 9420

If you have configured the sensor and network but are not ready to commission the device, remove the power module to extend operating life. See the Reference Manual for more detailed instructions on replacing the power module, and for details on other power options.

Procedure

1. Remove the rear cover of the device to access the power connections:

   - For the battery-powered version, plug in the power module.

   - For the battery-powered version using the A9000Px power adapter for external DC power, see the Reference Manual.

2. Use a strapping wrench to tighten the housing cover to safety specification.

Always ensure a proper seal by installing the housing cover so that metal touches metal and the black O-ring is no longer visible, but do not over tighten. A tight seal ensures that water, water vapor, or other gases do not penetrate into the housing.

3. Position the antenna so it points upward, for optimal performance.

3   Join the AMS 9420 to a wireless network

3.1   Join the AMS 9420 to a network using AMS Device Manager

Prerequisites

Configure the Emerson Wireless Gateway in the AMS Device Manager Network Configuration.

Procedure

1. Connect the AMS 9420 to the HART modem.

2. In AMS Device Manager, drag and drop the AMS 9420 on the Emerson Wireless Gateway icon.

   The AMS 9420 joins the network.

3. Navigate to the Emerson Wireless Gateway and verify the AMS 9420 has a checkmark.

   Example:

Recently Added(last 5 devices)	Date Added
✅ VT 55E6	01/23/18 08:12:47

4. Remove the HART modem.

   The AMS 9420 will begin publishing data when the modem is removed.

5. In Device Explorer view or Device Connection view, right-click the Emerson Wireless Gateway icon, and select Rebuild and Identify Hierarchy.

6. Right-click the Emerson Wireless Gateway icon, and select Scan Device.

3.2   Join the AMS 9420 to a network using a Field Communicator

This procedure describes using the 475 Field Communicator. For instructions on using the AMS Trex™ Device Communicator, refer to the AMS Trex Device Communicator User Guide.

Prerequisites

If you are connecting a Field Communicator directly to the device, make sure you are in a location that allows you to remove the AMS 9420 rear cover.

Procedure

1. With a Field Communicator, connect to the comm terminals on the device.

2. Configure the AMS 9420:

Table 3-1: Field communicator fast key sequence - configure AMS 9420 settings

Function	Fast key sequences	Menu items
Initial Setup	2,1 (Guided Setup)	Configure Sensors Configure Variable Mapping Configure Units Alert Limits Sensor Power Enable Join Device to Network Configure Publishing Configure Update Rate
Device Setup	2,2,1 (Manual Setup)	Network ID Broadcast Info Join Device to Network Configure Publishing Configure Update Rate Transmit Power Level Default Burst Config
Alert Setup	2,3 (Alert Setup)	Overall Velocity PeakVue Bias Ambient Temperature Supply Voltage

3. Join the AMS 9420 to 2.4 GHz wireless network:

Table 3-2: Field Communicator fast key sequence—connect to a network

Key sequence	Menu item
2, 2, 1 (Manual setup)	Network ID Broadcast Info Join Device to Network Configure Publishing Configure Update Rate Transmit Power Level Default Burst Config

**Table 3-2: Field Communicator fast key sequence—connect to a
network** *(continued)*

Key sequence	Menu item
2, 1 (Guided setup)	Configure Sensors Configure Variable Mapping Configure Units Alert Limits Sensor Power Enable Join Device to Network Configure Publishing Configure Update Rate

Note

Disconnect the leads when you are finished configuring or
troubleshooting. The AMS 9420 does not publish any new vibration data
to the gateway while connected to an AMS Trex Device Communicator,
475 Field Communicator, or HART modem. It can take up to three
minutes for the leads connection to time out; after which, the AMS 9420
resumes reporting new readings to the gateway.

4. Remove the Field Communicator and replace the cover. Use a strapping
   wrench to tighten the housing cover to safety specification.

   Always ensure a proper seal by installing the housing cover so that metal
   touches metal and the black O-ring is no longer visible, but do not over
   tighten. A tight seal ensures that water, water vapor, or other gases do
   not penetrate into the housing.

   With the Field Communicator removed, the AMS 9420 begins publishing
   data.

4   Verify the device is operational

You can verify the device operates properly using the following methods:

- Integral LCD (if installed)
- Field Communicator
- Emerson Wireless Gateway web interface

Verify operation with the integral LCD

If the LCD is installed and enabled, it displays a series of start-up screens as soon as you insert the power module.

Verify operation with a 475 Field Communicator

You can verify the status of the device and configure it using a 475 Field Communicator. For instructions on using the AMS Trex unit, refer to the AMS Trex Device Communicator User Guide for more information.

Table 4-1: Field Communicator fast key sequence—connect to a network

Key sequence	Menu item
2, 2, 1 (Manual setup)	Network ID Broadcast Info Join Device to Network Configure Publishing Configure Update Rate Transmit Power Level Default Burst Config
2, 1 (Guided setup)	Configure Sensors Configure Variable Mapping Configure Units Alert Limits Sensor Power Enable Join Device to Network Configure Publishing Configure Update Rate

Note

Disconnect the leads when you are finished configuring or troubleshooting. The AMS 9420 does not publish any new vibration data to the gateway while connected to an AMS Trex Device Communicator, 475 Field Communicator, or HART modem. It can take up to three minutes for the leads connection to time out; after which, the AMS 9420 resumes reporting new readings to the gateway.

Verify operation with Emerson Wireless Gateway

If the device is configured with the Network ID and Join Key, and sufficient time for network polling has passed, the transmitter will be connected to the network.

Note

The time to join a new device to the network is dependent upon the number of devices being joined and the number of devices in the current network. For one device joining an existing network with multiple devices, it may take up to five minutes. It may take up to 60 minutes for multiple new devices to join the existing network.

1. From the Emerson Wireless Gateway Home page, navigate to the Devices page.

   The Devices page shows if the device has joined the network and if it is communicating properly. It also displays the transmitter tag name, PV, SV, TV, QV, time of last update. A checkmark in a green box means that the device is working properly. A red indicator means there is a problem with either the device or its communication path.

   Note

   It is normal for the AMS 9420 to have a red "X", on the screen until the sensor is installed and configured.

Figure 4-1: Emerson Wireless Gateway Devices page

2. On the Devices page, click + beside a tag name to display more information about the device.

3. Verify the Network ID and Join Key in the device match those found on the Emerson Wireless Gateway:

a. From the Emerson Wireless Gateway, click System Settings > Network > Network Settings.

b. Verify Show join key has a check mark.

Note

The most common cause of incorrect operation is that the Network ID or Join Key are not set correctly in the device.

---

5   Installing required ferrites

To comply with the CE directive, additional ferrites are required on:

- accelerometer cables longer than 3 meters
- external power cable, when using DC power

Note

The AMS 9420 is not approved for use with a cable that is 30 m (100 ft) or longer. The recommended maximum cable length is 29 m (95 ft). Shorter is better.

Ferrites required on external DC power cable

AMS 9420s powered with external DC power require ferrites to be installed on the external power cable. For more information about external DC power, see the Reference Manual.

Ferrites required on accelerometer cable

Accelerometer cables longer than 3 meters require additional ferrites to be installed at the AMS 9420 end of the cable. The sensor package contains these additional ferrites. You can attach ferrites to standard cable or armor-jacketed cable.

Emerson ships all low-power sensors used with the AMS 9420 with ferrites pre-installed at the accelerometer end. These ferrites maintain the stated performance of the accelerometer in noisy RF or electrical environments. Do not remove these ferrites.

Ferrites are not required with ferromagnetic conduit

Due to the shielding properties of ferromagnetic conduit, cables installed in ferromagnetic conduit (for example, galvanized steel), do not require additional ferrites at the AMS 9420 end of the cable.

5.1   Attach 3 ferrites to an accelerometer with standard cable

Use the three ferrites included in the sensor package. Attach them after inserting the sensor cable through the cable gland and connecting to the AMS 9420.

Note

Emerson recommends that you coil up any excess sensor cable. Do not cut sensor cable.

Procedure

1. Snap the first attenuator ferrite onto the transmitter end of the cable—approximately 1 in. from the point where the cable enters the gland.

    When attaching the ferrites, be sure that the keeper fully latches to ensure the ferrites remain securely fastened to the cable.

2. Snap the second ferrite onto the cable adjacent to the first.

3. Snap the remaining ferrite adjacent to the second.

Figure 5-1: AMS 9420 with standard cable and ferrites

5.2   Attach 3 ferrites to an accelerometer with armor-jacketed cable

Use the three ferrites included in the sensor package. Attach them before inserting the sensor cable through the cable gland and connecting to the AMS 9420.

Procedure

1. Slide the first ferrite onto the transmitter end of the cable—approximately 4 in. from the point where the cable enters the gland.

2. Secure the ferrite using wire ties, heat-shrink, or another method approved for your location.

3. Slide the second and third ferrites onto the cable adjacent to the first, and secure in place.

    When all three ferrites are attached, they should be located about 1 in. from the point where the cable enters the transmitter housing.

Figure 5-2:   AMS 9420 with armor-jacketed cable and ferrites

6   Shipping considerations for wireless products (Lithium Batteries)

You may need to ship the device to an Emerson Product Service Center for return or maintenance. Before shipping, contact Emerson Product Support to obtain a Return Materials Authorization (RMA) number and receive additional instructions.

- The unit was shipped to you without the power module installed. Please remove the power module prior to shipping the unit.

- Each blue power module contains two "D" size primary lithium-thionyl chloride battery cells; each black power module contains two "C" size primary lithium-thionyl chloride battery cells. Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation, and are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ADR (European Ground Transportation of Dangerous Goods).

- It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Please consult current regulations and requirements before shipping.

7   Troubleshooting

Are the Network ID and Join Key set correctly?

Verify the Network ID and Join Key in the device match those found on the Emerson Wireless Gateway:

1. From the Emerson Wireless Gateway, click System Settings > Network > Network Settings.

2. Verify Show join key has a check mark.

Note

The most common cause of incorrect operation is that the Network ID or Join Key are not set correctly in the device.

Have you disconnected your HART modem or Field Communicator after completing configuration?

Disconnect your HART modem or Field Communicator immediately after completing the configuration so the device will join the wireless network.

Does the AMS 9420's configuration match the connected sensors?

Ensure your configured parameters reflect the sensors installed on the device.

8   Product certifications

The AMS 9420 has a number of certifications and approvals including CE, FCC, RED, CSA, and ATEX. For a complete list of product certifications, see *http://www.emerson.com/en-us/catalog/ams-a9420*.

8.1   RoHS 2 (2011/65/EU)

The AMS 9420 was designed for incorporation into large, fixed industrial installations. Examples include - but are not limited to - cooling towers and other cooling systems, pumping systems, compressor systems, and systems utilizing agitators or centrifuges. As such, the AMS 9420 is covered under the exclusion provided for Large Scale Fixed Installations and is therefore out of scope for the current EU RoHS Directive 2011/65/EU.

Please contact Emerson's Reliability Solutions office at +1-865-672-1062 with any questions or concerns.

Emerson
835 Innovation Drive
Knoxville, TN 37932 USA
T +1 865-675-2400
F +1 865-218-1401
www.Emerson.com

EMERSON™