

# CSI 9420 Wireless Vibration Transmitter

## Quick Installation Guide





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## 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 CSI 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 CSI 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 CSI 9420 is consistent with the appropriate hazardous locations certifications.

**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.

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## Scope

This Quick Installation Guide applies to the 2.4 GHz *WirelessHART™* version of the CSI 9420.

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.

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### Note

This installation guide provides basic guidelines for the CSI 9420. It does not provide instructions for detailed configuration, diagnostics, maintenance, or service. Refer to the CSI 9420 Wireless Vibration Transmitter Reference Manual (part number MHM-97408) for more instruction—navigate to <http://www.emersonprocess.com/csi> and select Documentation.

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## Install the CSI 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 CSI 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.

## Prepare sensors for use with the CSI 9420

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

Refer to the Reference Manual for detailed sensor mounting instructions.

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### Note

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

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

The CSI 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).

3. Pull the wiring through the threaded conduit entry of the CSI 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 CSI 9420.

## Attach sensor wiring to the CSI 9420 terminals

### Prerequisites

- If you are using armor-jacketed cable, you must attach the ferrites before attaching sensor wiring the CSI 9420 terminals. See [Attach 3 ferrites to an accelerometer with armor-jacketed cable](#).
- If the sensor signal wires are not equipped with spade lugs, Emerson recommends installing them before proceeding.

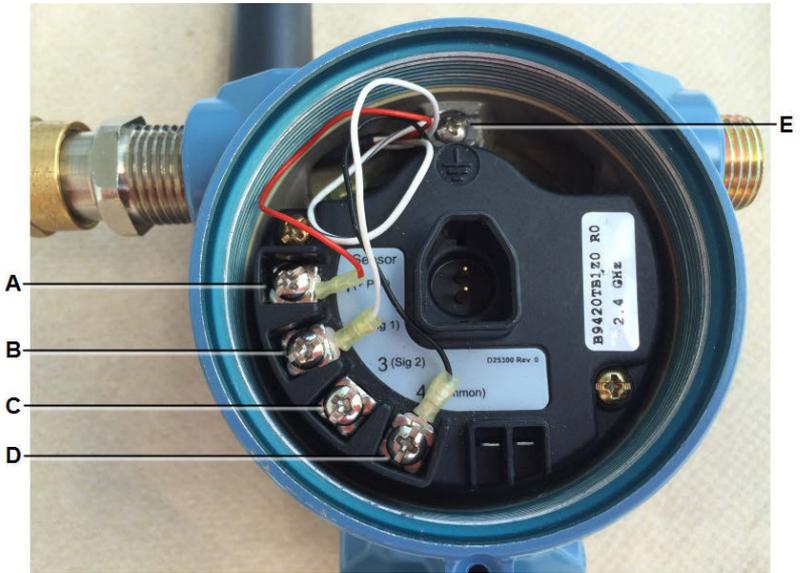
### Procedure

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

See callout E in the figures below.

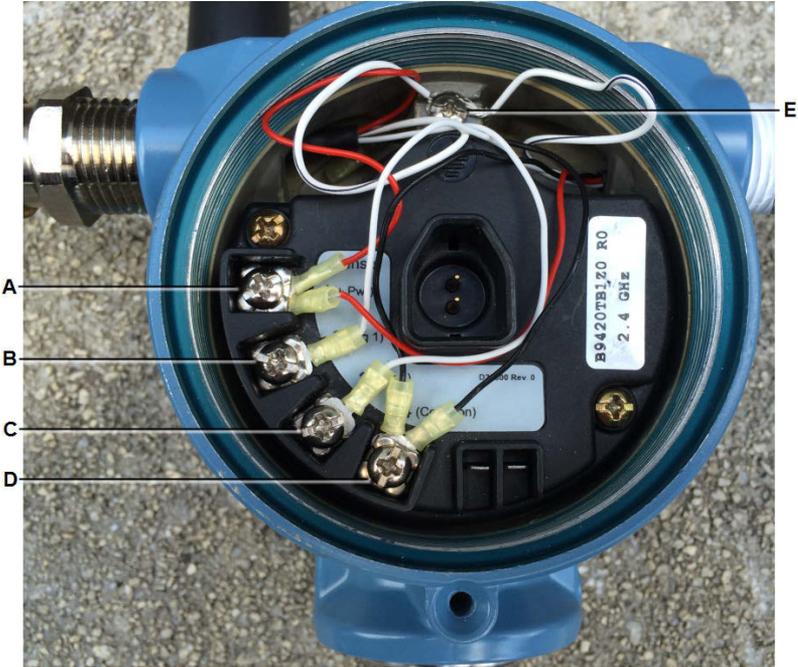
2. Refer to the appropriate figure to connect the sensor signal wires.
  - a. Insert a beryllium copper washer on top of each spade lug.
  - b. Tighten the screw to 15 in-lbs (1.7 N-m).

**Figure 1: CSI 9420 wiring with one accelerometer**



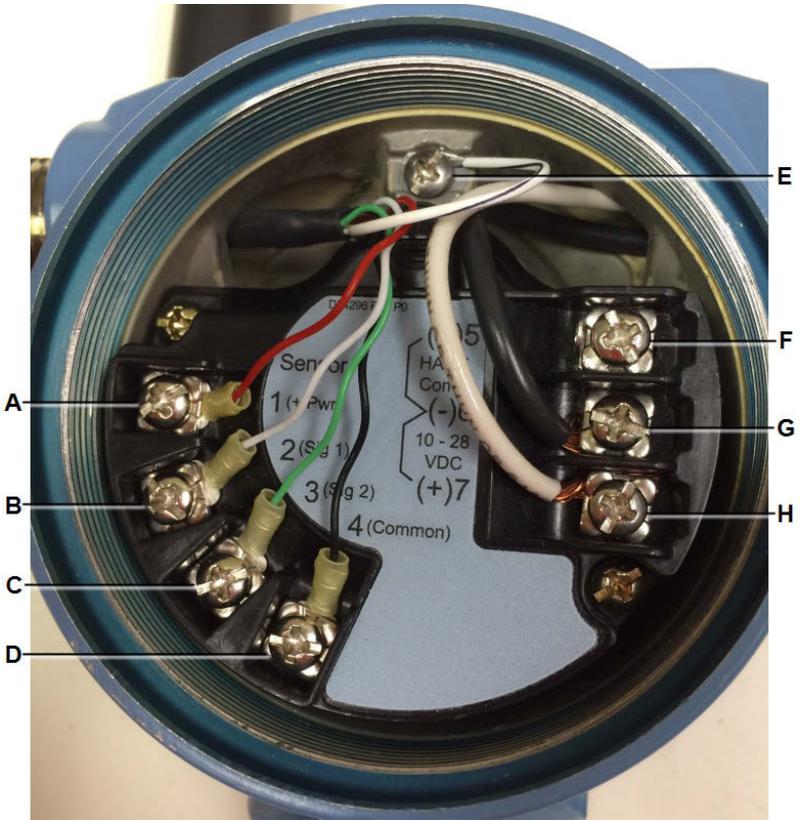
<b>A</b>	Sensor power	Red wire
<b>B</b>	Sensor signal	White wire
<b>C</b>	Unused	Unused
<b>D</b>	Sensor common	Black wire
<b>E</b>	Sensor grounding	White wire with black stripe

Figure 2: CSI 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	White wire with black stripe

**Figure 3: CSI 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	White wire with black stripe
F	HART Communication (+)	HART lead wire (+)
G	HART Communication & VDC (-)	HART lead wire and External Power (-)
H	VDC (+) 10–28 V	External Power (+)

## Power the CSI 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:

1. Disconnect the communication leads.
2. Remove the power module.
3. Replace the transmitter cover.

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 externally powered version, connect a 10–28 V DC (24 V nominal) power supply to screw terminals 6 and 7. See [Figure 3: CSI 9420 wiring with one accelerometer with embedded temperature](#).

When selecting the power supply, be aware that each CSI 9420 has a peak current draw of 40 mA when awake and powering sensors.

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.

## Join the CSI 9420 to a wireless network

### Join the CSI 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 CSI 9420 to the HART modem.
2. In AMS Device Manager, drag and drop the CSI 9420 on the Emerson Wireless Gateway icon.

The CSI 9420 joins the network.

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



Recently Added(last 5 devices)	Date Added
<input checked="" type="checkbox"/> VT 55E6	01/22/16 16:33:07

Example:

4. Remove the HART modem.

The CSI 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.

### Join the CSI 9420 to a network using a Field Communicator

#### 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 CSI 9420 front cover.

#### Procedure

1. With a Field Communicator, connect to the comm terminals on the device.
2. Configure the CSI 9420:

**Table 1: CSI 9420 quick configuration key sequences for a 2.4 GHz wireless network**

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 CSI 9420 to 2.4 GHz network:

**Table 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
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

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**Note**

The CSI 9420 does not publish any data to the gateway while a Field Communicator or HART modem is attached to it.

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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 CSI 9420 begins publishing data.

## Verify the CSI 9420 is operational

You can verify the CSI 9420 operates properly using the following methods:

- CSI 9420 LCD screen
- Field Communicator
- Emerson Wireless Gateway web interface

### Verify operation with the CSI 9420 LCD

If the LCD is installed and enabled, it should display the measured values at the configured update rate during normal operation.

Remove the front cover of the LCD and press the DIAG button to display the Tag name, Device ID, Network ID, Network Join Status, and Device Status screens and make measurements.

### **⚠ CAUTION!**

The front electronics end cap (the cap covering the LCD) is certified for Class I, Division I in appropriate gas environments (check the nameplate on the device for details).

Exposing the electronics to a production environment may allow particulates, moisture, and other airborne chemicals to enter into the device, which could lead to contamination and potential product performance issues. In all cases, whenever opening the front end cap, be sure to seal it completely afterwards by tightening until the black O-ring is no longer visible.

### Verify operation with Field Communicator

You can verify the status of the CSI 9420 and configure it using a Field Communicator.

**Table 3: 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: 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**

The CSI 9420 does not publish any data to the gateway while a Field Communicator or HART modem is attached to it.

**Verify operation with Emerson Wireless Gateway**

1. From the Emerson Wireless Gateway web server, navigate to the Explorer page.

The Explorer 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, and update rate (burst rate). A checkmark 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 CSI 9420 to have a red “X” on the screen until the sensor is installed.

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**Figure 4: Emerson Wireless Gateway**

The screenshot displays the Emerson Smart Wireless Gateway web interface. The top navigation bar includes the Emerson logo, 'Smart Wireless Gateway' title, version '4.5.32', and user links for 'admin', 'About', 'Help', and 'Logout'. The main dashboard features several status cards: 'All Devices' (5), 'Live' (5), 'Unreachable' (0), and 'Power Module Low' (0). Below these is a 'Gateway Load' card showing 0% and a 'Network Best Practices' section with two 100% compliance indicators. The central 'Notifications' area has a 'Tasks' section with 'No Pending Tasks', an 'Unreachable' section with 'No results found', and a 'New' section with a table of recently added devices.

Recently Added(last 5 devices)	Date Added	Current PV
<input checked="" type="checkbox"/> VT 55E6	01/22/16 16:33:07	0.017
<input checked="" type="checkbox"/> VT B1	01/21/16 14:45:20	0.377
<input checked="" type="checkbox"/> VT F1DDL.org	12/24/15 02:08:09	0.013
<input checked="" type="checkbox"/> VT 3189	12/24/15 02:07:34	1.743
<input checked="" type="checkbox"/> VT 38FD	12/24/15 02:07:16	0.006

Below the table is a 'Changes' section with a table:

Description	From	To	Requested	Status
No results found.				

The bottom of the page features a dark footer with navigation links (HOME, DEVICES, SYSTEM SETTINGS, ABOUT, HELP) and version information (Version 4.5.32).

2. Click on a tag name to display more information about the device.

If the CSI 9420 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.

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 Setup > Network > Settings.
  - b. Verify the setting for "Show join key" is set to Yes.

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### Note

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

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## 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.

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### Note

The CSI 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).

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### Ferrites required on external DC power cable

CSI 9420s powered with external DC power require ferrites to be installed on the external power cable.

### Ferrites required on accelerometer cable

Accelerometer cables longer than 3 meters require additional ferrites to be installed at the CSI 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 CSI 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 CSI 9420 end of the cable

## Attach 3 ferrites to an accelerometer with standard cable

Use the three ferrites included in the sensor package.

### Procedure

1. Connect the accelerometer cable to the CSI 9420 terminal block and sensor grounding screw.

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### Note

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

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2. 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.

3. Snap the second ferrite onto the cable adjacent to the first.
4. Snap the remaining ferrite adjacent to the second.

**Figure 5: CSI 9420 with standard cable and ferrites**



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

Use the three ferrites included in the sensor package.

### 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.
4. Run the accelerometer cable(s) through the cable gland and make the standard connections to the CSI 9420 terminal block and sensor grounding screw.

**Figure 6: CSI 9420 with armor-jacketed cable and ferrites**



## Shipping considerations for wireless products (Lithium Batteries)

You may need to ship the CSI 9420 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.

## 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 Setup > Network > Settings.
2. Verify the setting for "Show join key" is set to Yes.

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### **Note**

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

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### **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 CSI 9420's configuration match the connected sensors?**

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

## Product certifications

The CSI 9420 has a number of certifications and approvals including CE, FCC, R&TTE, FM, CSA, and ATEX. Refer to the Reference Manual for a complete list of product certifications—navigate to <http://www.emersonprocess.com/csi> and select Documentation.

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