WS300 Series ConnectSens™ Wireless Triaxial Accelerometer Installation Guide

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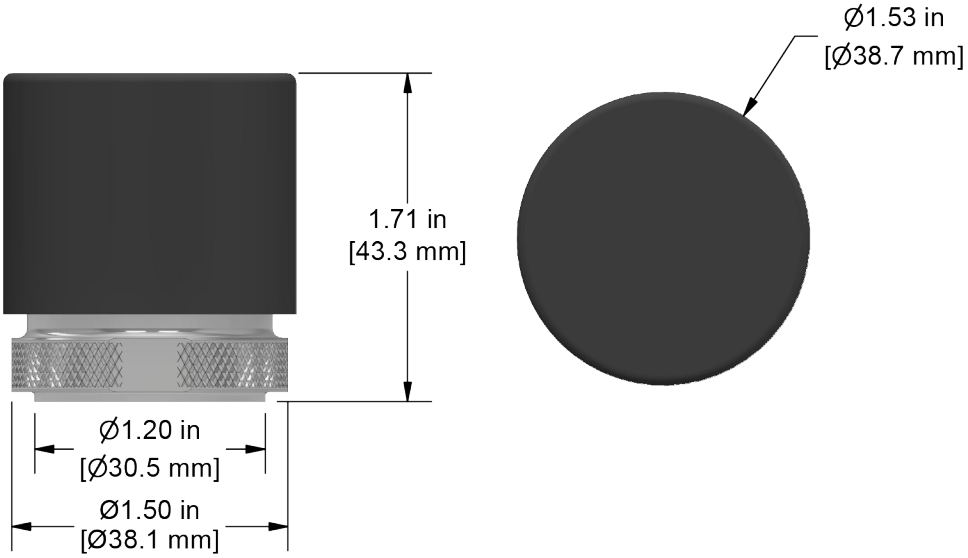
Introduction

This document contains information on the installation of the WS300 Series of wireless triaxial sensors.

WS300 Series Product Overview
CTC Connect WS300 Series Wireless Sensors capture and transmit three axes of dynamic vibration signals over a **Bluetooth®** Low Energy 5.2 connection, as well as temperature measurements. Within a clear line of sight, they can transmit data as far as 1200 ft/365 m.

Data can be accessed via CTC ConnectView™ Web App running on a CTC Gateway, or through custom software integration with the CTC Connect API and CTC Gateway.

WS300 Series sensors are designed for permanent mounting on the machine surface. To prepare the machine surface for installation, spot face, drill, and tap the mounting location. CTC suggests using MH117 Series Installation Tool Kits. To view in depth mounting instructions, please view our Mounting Guide.



Pre-installation Guide

Use this guide to plan the wireless environment first, then configure, install, power, and validate the system.

PHASE 1 - PLAN THE DEPLOYMENT

1. SURVEY BLUETOOTH COVERAGE
Perform a Bluetooth site survey (heat map). Evaluate desired sensor locations, signal strength, noise floor, metal obstructions, and ambient EMI / RFI. Use the survey to determine the best gateway locations.

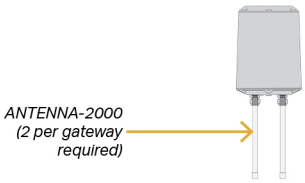
SIGNAL STRENGTH QUICK REFERENCE
Closer to 0 dBm = stronger signal

-50 dBm	-60 dBm	-70 dBm	-75 dBm	-80 dBm

Target -75 dBm or better

2. PLAN THE ENVIRONMENT
Confirm machine surface and ambient temperatures. CTC WS Series sensors: -40 to 80 °C (-40 to 176 °F). ACCESS2000: -40 to 65 °C (-40 to 149 °F). If the machine surface exceeds 80 °C but ambient conditions remain within the sensor range, use the CTC MH170-2A Heat Isolation Mounting Pad.

3. DESIGN COVERAGE AND PLACEMENT
Plan for 30 sensors or fewer per gateway and -75 dBm or better. Add gateways in challenging coverage areas and plan to amount gateways high above monitored equipment. For heavy metal saturation, obstacles, or high ambient EMI / RFI, consider the CTC ANTENNA-2000 external antenna.



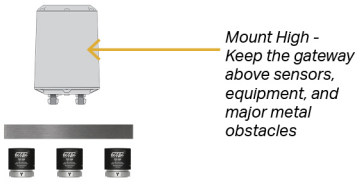
4. MAP AND PLAN CONFIGURATION
Create a logical map showing gateway and sensor locations and catalog site photos. Determine each gateway's allowed and blocked sensor lists before deployment.

PLANNING COMPLETE → CONFIGURE → INSTALL

PHASE 2 - DEPLOY & VALIDATE

5. CONFIGURE BEFORE MOUNTING
Apply the planned allowed / blocked sensor list before mounting. In multi-gateway environments, allow desired sensors to block all other sensors in that environments on each gateway to reduce sensor hopping.

6. MOUNT THE GATEWAY
Mount the configured gateway well above monitored equipment to minimize line-of-sight obstacles between the gateway and the CTC WS Series Wireless Sensors.

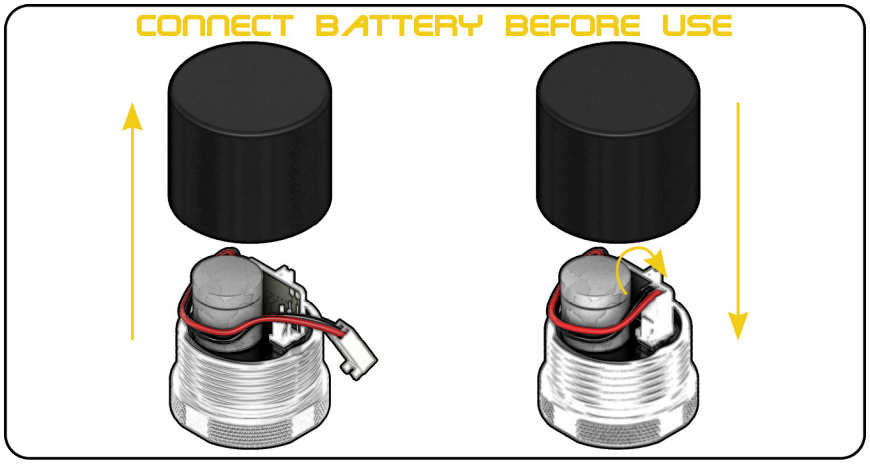


7. POWER ON AND VALIDATE
Power on CTC WS Series Wireless Sensors only after the gateway configuration is complete. Confirm each sensor connects to its intended gateway and verify signal strength is -75 dBm or better.

8. FINALIZE DOCUMENTATION
Update the logical deployment map and catalog final photos of gateway placement, sensor locations, and the surrounding environment for future maintenance and support.

Battery Installation

To avoid premature battery usage, CTC Wireless sensors ship with the battery disconnected. To install, remove the cap and connect the battery's connector to the receptacle on the back of the exposed circuit board. Tighten down the sensor cap and your sensor will now begin sending out Bluetooth® advertisements for discovery. CTC Gateways and the preloaded Web App will automatically be scanning for these advertisements when running, making all detected sensors visible and autonomously establishing connections to newly discovered sensors.



Mounting Instructions

Prior to any installation, ensure that the sensor's battery is properly connected and functioning.

Note: DO NOT install CTC wireless sensors under metal guards, behind machine safety cages, or in locations shielded by metal structures.

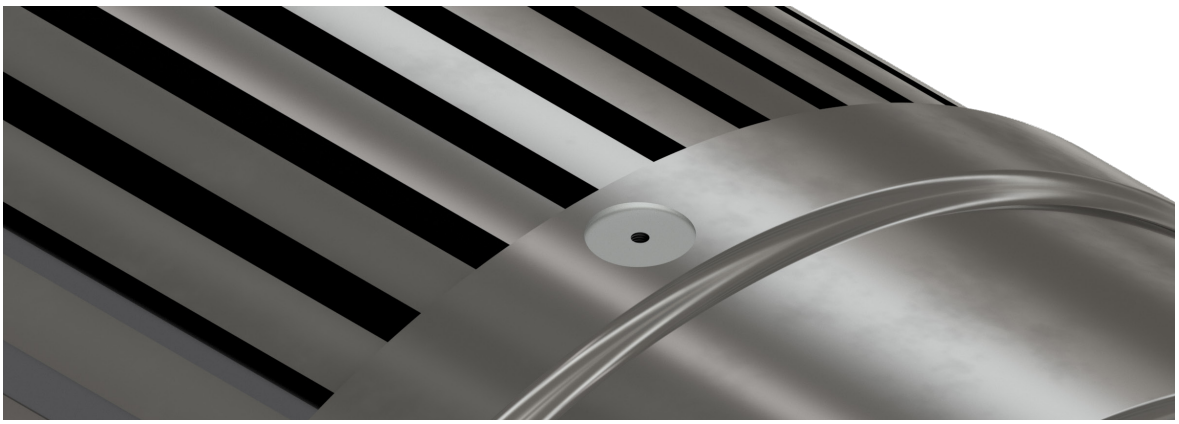
Metal obstructions can significantly attenuate RF signals, leading to reduced range, intermittent communication, or data loss. Wireless sensors should be installed with a clear RF path to the gateway or access point.

Stud Mounting

Please be aware that due to the WS300 Series Sensor being triaxial, stud mounting may present challenges in maintaining precise control over the orientation of the axes during mounting.

1. Spot face, drill, and tap the mounting location. CTC recommends MH117 Series Installation Tool Kits inclusive of spot face tools that are 1.25 inches in diameter:

PN	Spot Face Tool Type	Spot Face Diameter	Tap Thread
MH117-1B	High Speed Steel	1.25 in. (31.75 mm)	¼-28
MH117-4B	High Speed Steel	1.25 in. (31.75 mm)	M6x1
MH117-6B	High Speed Steel	1.25 in. (31.75 mm)	M8x1.25
MH117-11B	Carbide Tipped	1.25 in. (31.75 mm)	¼-28



2. Thread the sensor onto the machine using 2 to 5 ft-lbs of mounting force. A coupling agent (such as MH109-2A epoxy) will maximize the high-frequency response of your hardware but is not required. Ensure that once fully threaded, the mounting base of the WS300 is completely flush with the mounting surface.

NOTE: If the sensor is not tight enough, proper coupling between the base of the sensor and the mounting disk will not be achieved. If the sensor is over-tightened, stud failure may occur.

Quick Disconnects with Adhesive Mounting Stud

1. Prepare the mounting location by spot facing using MH117 Series Installation Tool Kit spot face drills. For Quick Disconnect Studs, it's advisable to use tools with a diameter of at least one inch.

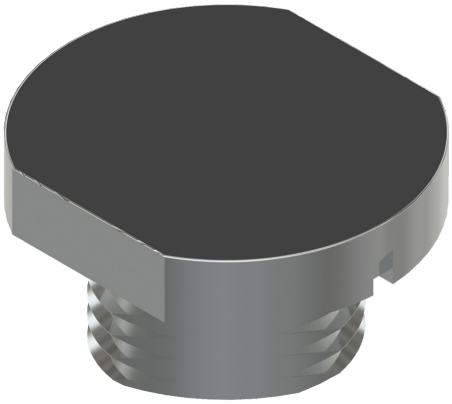
PN	Spot Face Tool Type	Spot Face Diameter
MH117-3A	High Speed Steel	1.0 in. (25.4 mm)
MH117-13A	Carbide Tipped	1.0 in. (25.4 mm)

2. Remove the stud adapter from the sensor. Using a 3/16 in. allen wrench, loosely thread the MH107-3A receptacle onto the base of the sensor. Align the receptacle with the axes of the sensor and attach securely. It is recommended to align the thumbgrip of the receptacle with the Y axis of the sensor, and the locator notch with the X axis.

3. Place the sensor and receptacle assembly onto the MH107-1B Quick Disconnect stud by aligning the locator notches on each mounting piece, then give a quarter turn clockwise. If using the alignment method above, this will place the Y axis of the sensor over the locator notch of the stud.
4. Place the entire sensor assembly onto the prepared machine surface. Use a marker to indicate the landing points of each axis.

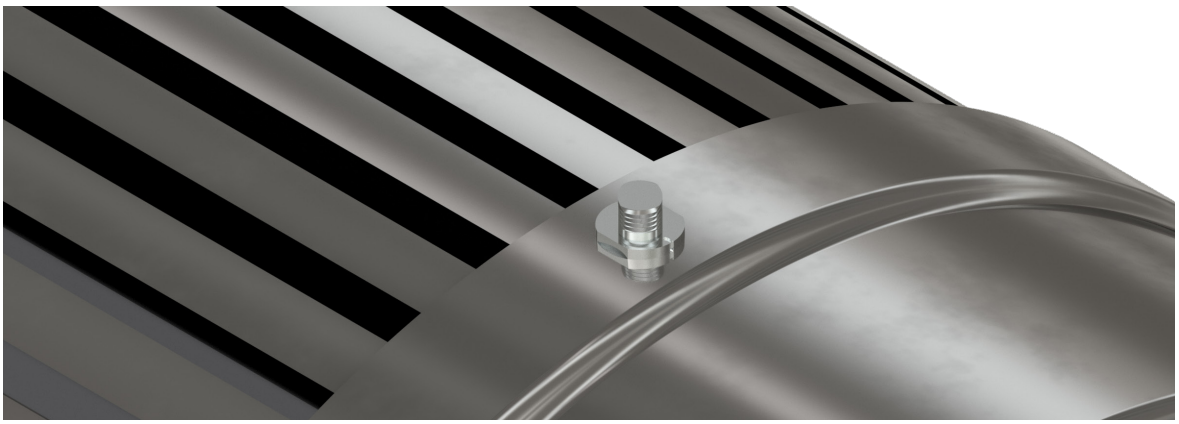
5. Disconnect the mounting stud. Apply epoxy (suggested MH109-2A) to the roughened surface on the bottom of the stud.

Without Epoxy



With Epoxy

6. Affix the stud to the mounting location, ensuring alignment with the desired axis orientations.

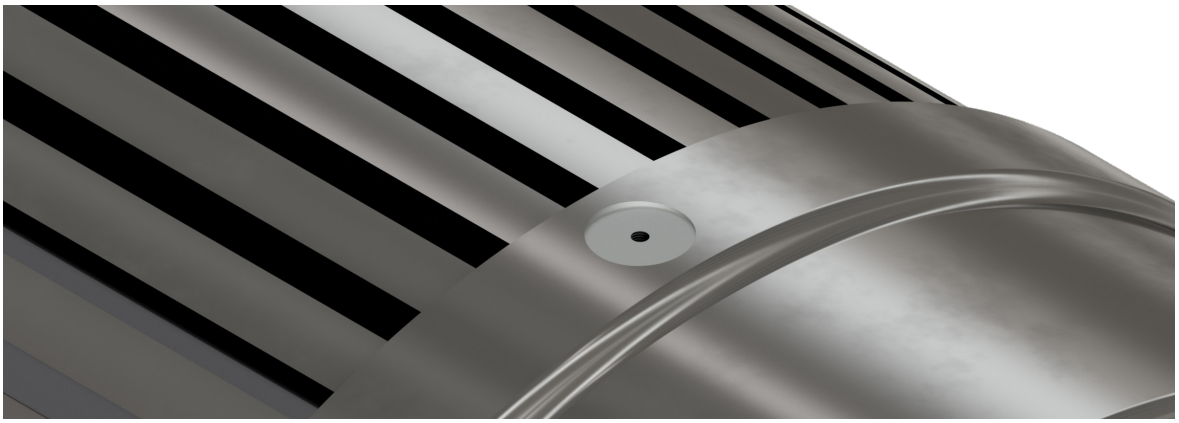


7. After the stud has fully adhered to the machine, proceed to attach the sensor and receptacle assembly securely.

Quick Disconnects With Through Hole Mounting Stud

1. Spot face, drill, and tap the mounting location. CTC recommends MH117 Series Installation Tool Kits inclusive of spot face tools that are at least one inch in diameter:

PN	Spot Face Tool Type	Spot Face Diameter	Tap Thread
MH117-3A	High Speed Steel	1.0 in. (25.4 mm)	¼-28
MH117-7A	High Speed Steel	1.0 in. (25.4 mm)	M6x1
MH117-13A	Carbide Tipped	1.0 in. (25.4 mm)	M6x1



2. Remove the stud adapter from the sensor. Using a 3/16 in. allen wrench, loosely thread the MH107-3A receptacle into the base of the sensor. Align the receptacle with the axes of the sensor and attach securely.

3. Place the sensor and receptacle assembly onto the Quick Disconnect stud by aligning the locator notches on each mounting piece, then give a quarter turn clockwise. If using the alignment method above, this will place the Y axis of the sensor over the locator notch of the stud.
4. Place the entire sensor assembly onto the prepared machine surface. Use a marker to indicate the landing points of each axis.

5. Disconnect the mounting stud. Insert the through bolt into the top of the stud.
6. Affix the stud to the mounting location by tightening down the through bolt, ensuring alignment with the desired axis orientations.

7. After the stud is fully adhered to the machine, proceed to attach the sensor and receptacle assembly securely.

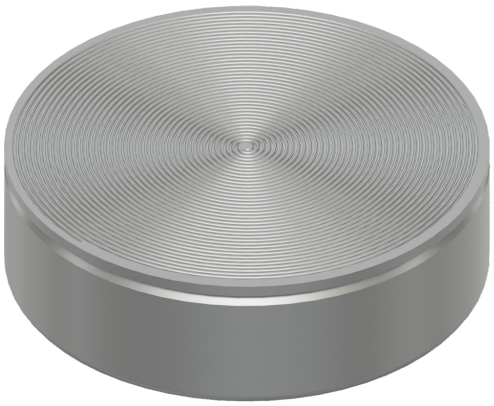
Adhesive Mounting Pads

CTC recommends using MH130-3A Adhesive Mounting Disk with ¼-28 blind tapped hole.

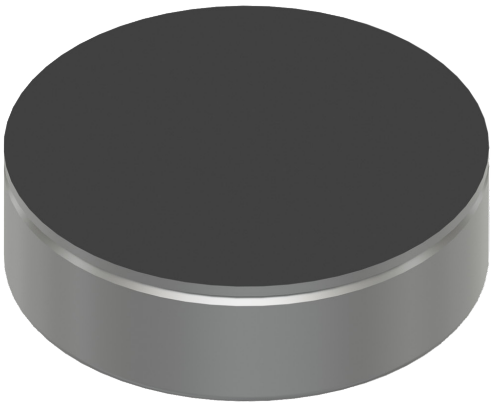
1. Prepare the mounting location by spot facing using MH117 Series Installation Tool Kit spot face drills. For the MH130-3A, it's advisable to use tools with a diameter of 1.25 inches:

PN	Spot Face Tool Type	Spot Face Diameter
MH117-1A	High Speed Steel	1.25 in. (31.75 mm)
MH117-11a	Carbide Tipped	1.25 in. (31.75 mm)

2. Thread the sensor fully onto the mounting pad. Use a marker to indicate the landing points of each axis on the mounting pad. Once complete, unthread the sensor.
3. Apply epoxy (suggested MH109-2A) to the roughened surface on the bottom of the mounting pad.

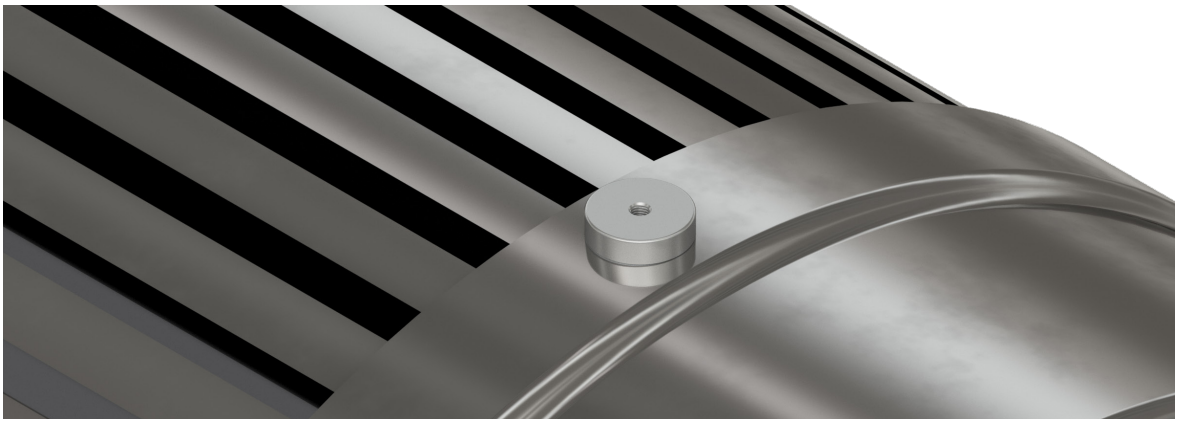


Without Epoxy



With Epoxy

4. Affix the mounting pad to the mounting location, ensuring alignment with the desired axis orientations.



5. After the mounting pad has fully adhered to the machine, proceed to attach the sensor and stud to the mounting pad and **tighten securely,** approximately 2 to 5 ft. lbs.

Adjustable Orientation Magnetic Mounting Base

1. Insert the provided allen wrench into the socket on the bottom of the MH214-3A magnet.

2. Holding the magnet and wrench in one hand, thread the sensor and stud onto the front of the magnet until sensor and magnet make loose contact. Remove the allen wrench.

3. Align the the axes of the sensor as desired with respect to the rails of the magnet. Reinsert the allen wrench, and tighten the entire assembly.

4. Gently rock the sensor and magnet assembly onto the machine at the intended location.

Magnetic Mounting Base

1. Thread the sensor and stud onto the MH114-3A magnet.

2. Gently rock the sensor and magnet assembly onto the machine at the intended location, ensuring that the axes of the sensor are in the intended alignment with the machine.

Warranty and Refund

Please visit www.ctconline.com to view a complete recapitulation of our warranty and refund policies.

Need Additional Technical Support?

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Scan the QR code or use the hyperlink to access our convenient web form to submit your request online at any time.

CTC's experienced support team will review your inquiry and work quickly to resolve your issues.

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