



VIBRATION & TEMPERATURE NODE

ASSEMBLY & INSTALLATION GUIDE





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Overview

The Vibration & Temperature Node has a tri-axial accelerometer and RTD that monitors the vibration signature and surface temperature of rotating machinery. The node has a built-in advanced edge processor that locally processes data at the sensor level and communicates via a proprietary Zigbee compatible protocol. Multiple mounting options support a variety of deployment options across any industry and application. Refer to your specific mounting installation details inside this document.

This instruction manual provides important information regarding safe installation and operation of GraceSense™ Vibration and Temperature Node. **Please read these instructions in their entirety before attempting node installation.**

ATTENTION!

The Vibration and Temperature Node should be installed by technically qualified personnel. Failure to install the node in accordance with applicable codes and regulations and according to the manufacturer's specified guidelines may result in electrical shock, fire hazard, poor performance or equipment failure, and may also void the product warranty.

⚠️ WARNING

Warning: Only qualified persons who are familiar with the equipment being serviced and those who have received proper safety training related to the hazards of the equipment should attempt to install these nodes. The individual must also possess proper tools, training, and be capable of repair or modification of the related equipment and its accessories. Installation should conform to appropriate codes and standards. Failure to follow these instructions may result in serious personal injury, death, and/or property damage. Always follow your facility's PPE requirements when performing installation and maintenance tasks on your equipment.

⚠️ WARNING

Electrical Hazard Warning: The Vibration and Temperature Node installation DOES NOT require any wired connections to your equipment. Do not touch electrically live parts of the equipment. Disconnect, lockout and tagout the input power source to your equipment before installing or servicing the node.

⚠️ WARNING

Surface Temperature Warning: The external surface of the equipment may reach temperatures which can cause discomfort, burns or injury to individuals who come into contact with the hot surface. For safety reasons, the equipment should be switched off and allowed to cool before attempting to install the node. Equipment surface temperatures should only be measured with suitable instruments and not estimated by hand touch or direct skin contact. Failure to observe this precaution could result in bodily injury.

Battery

The battery life is expected to be approximately 3-5 years, dependent upon use and operating environments. The battery is a non-rechargeable lithium metal battery and will require a replacement when depleted.

Battery Replacement

Do not attempt to replace batteries when the equipment is running and in operation. Only use GraceSense™ replacement batteries and follow battery replacement instructions. Incorrect use of batteries may void node warranty and other product certifications. Dispose batteries according to the battery recycle procedures.

Note: There are no serviceable components inside the Vibration & Temperature Node and battery assembly.

We recommend installing your Vibration & Temperature Node on your equipment using any one of the following methods:

Figure 1: Mounting Options



Magnetic Mount

Refer to page 9



Fin Mount with Epoxy

Refer to page 12



Plate Mount with Epoxy

Refer to page 17

Note: There must be at least one GraceSense® CloudGate™ or ControlGate™ within 30 m radius line-of-sight from any Field Mount Vibration and Temperature Node.

Node Mounting on the Asset

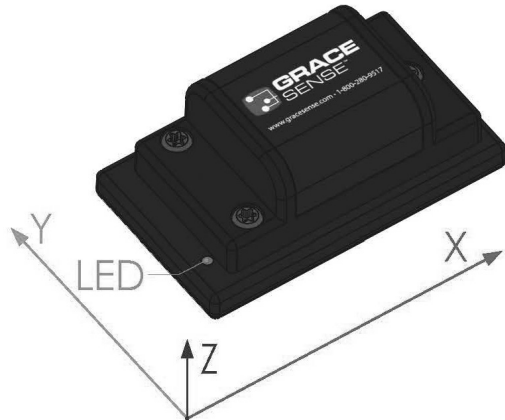
Selecting the most suitable location to deploy the node is important because certain locations on a machine can influence the node's ability to monitor temperature and vibration accurately.

For accurate measurements, the orientation of the axes must be known and the proper Axis Alignment must be selected in the Maintenance Hub (see *GraceSense™ Maintenance Hub User Guide for more information*). The following pages provide diagrams to aid with proper Axis Alignment.

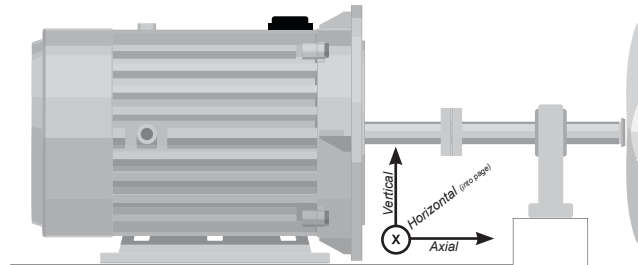
Figure 2: Node Orientation

The node to the right shows the orientation of the X, Y, and Z axes.

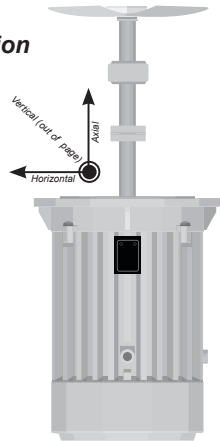
The following horizontal and vertical applications show the axes that need to be related to the sensors axes in Axis Alignment.



Horizontal Application



Vertical Application



Maintenance Hub Axis Alignment Options

Axis Alignment
X: Axial, Y: Vertical, Z: Radial
X: Axial, Y: Vertical, Z: Radial
X: Vertical, Y: Axial, Z: Radial
X: Radial, Y: Vertical, Z: Axial
X: Vertical, Y: Radial, Z: Axial
X: Axial, Y: Radial, Z: Vertical
X: Radial, Y: Axial, Z: Vertical

Figure 3: Magnetic Mount Assembly Stack

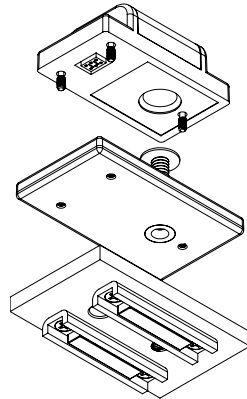
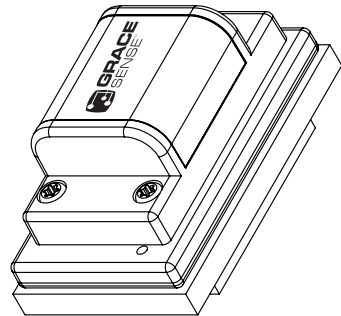


Figure 4: Magnetic Mount Assembled



Magnetic Mount Instructions

The Magnetic Mount utilizes a strong magnet, making it suitable to be mounted on most types of equipment.

⚠ CAUTION When affixing the magnet to the desired surface of any piece of equipment, avoid pinching fingers between the magnetic mount and the surface.

1. Verify communication between the node and CloudGate™ prior to installation. See *LED Indication Chart on Page 23 to verify communication.*
2. Determine the location and orientation of the node to be placed.
3. Verify the mounting surface is made of ferrous material.
4. Identify the threaded hole in the magnetic base metal plate.

5. Place the node squarely on the magnetic base metal plate lining up the through-hole of the node to the threaded hole of the magnetic base plate.
6. Insert the 1/4"-20 flanged headed bolt by turning clockwise until threads start to engage. For best results use a non-permanent thread retaining compound.
7. Use a 5/32" socket headed driver to tighten the 1/4"-20 bolt up to, but not exceeding, the torque value of 100 in. lbs.
8. Align the 6-pin connector and mounting screws of the battery to match the corresponding locations on the sensor board. Do not remove the foam gasket and force fit the battery to the connector pins as you may damage the sensor.
9. Insert all three battery mounting screws by turning clockwise until threads start to engage.

10. Use a 6-lobe T15 driver to tighten battery screws up to, but not exceeding, the torque value of 2.5 in. lbs.
11. Place the base magnets to the desired surface location making note of the node orientation to the reference axis.

Figure 5: Fin Mount Assembly Stack

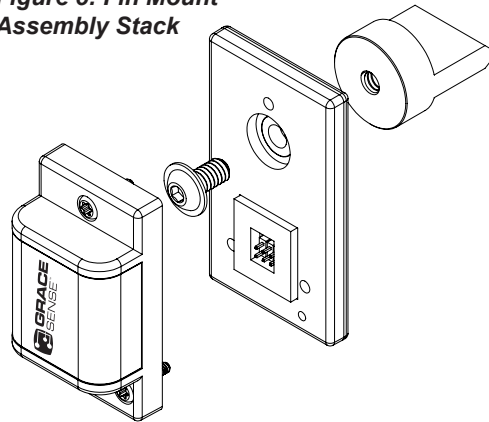
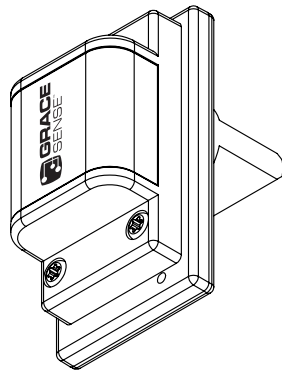


Figure 6: Fin Mount Assembled



Fin Mount Instructions

Epoxy, solvents, and other required tools are not included in the node kit, however, they are required for installation of the fin adapter accessory. *See page 22 of this guide for suggested epoxy.*



WARNING: Direct skin exposure to solvents and epoxy could cause discomfort, skin irritation, or injury. Use appropriate protective gloves and follow the respective manufacturer's safety instructions.

1. Verify communication between the node and CloudGate prior to installation. *See LED Indication Chart on Page 23 to verify communication.*
2. Determine location and orientation of the node to be placed.
3. Verify the area the node is to be mounted to is appropriately sized to fit the mounting tab.

4. Thoroughly clean area of determined mounting surface making sure any loose protective coatings are removed.
5. Use solvent (i.e. paint thinner or acetone) to remove debris, grease and oils from mounting location.
6. Use sand paper or similar abrasive material to remove paint from the mounting surface.
7. Determine how much epoxy will be needed to fully encapsulate the mounting tab and fill recessed area the tab is to be secured to.
8. Mix determined quantity of epoxy per manufacturer's instructions.
9. Apply the epoxy between the motor fins for the fin mount.

10. Firmly insert the mounting tab into the epoxy.
11. Secure the mounting tab in place until epoxy has cured.
12. Identify the threaded hole in the mount.
13. Place the node squarely to desired orientation on the mount lining up the through-hole of the node to the threaded hole of the mount.
14. Insert the 1/4"-20 flanged headed bolt by turning clockwise until threads start to engage. For best results, use a non-permanent thread retaining compound.
15. Use a 5/32" socket headed driver to tighten the 1/4"-20 bolt up to, but not exceeding, the torque value of 100 in. lbs.

16. Align the 6-pin connector and mounting screws of the battery to match the corresponding locations on the sensor board. Do not remove the foam gasket and force fit the battery to the connector pins as you may damage the sensor.
17. Insert all three battery mounting screws by turning clockwise until threads start to engage.
18. Use a 6-lobe T15 driver to tighten battery screws up to, but not exceeding, the torque value of 2.5 in. lbs.

Figure 7: Plate Mount Assembly Stack

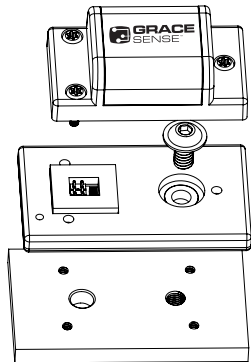


Figure 8: Plate Mount Assembly Stack

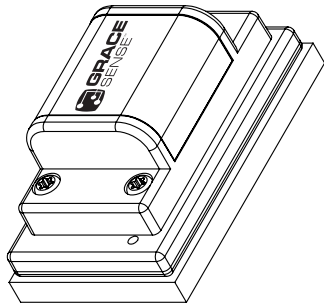


Plate Mount Instructions

Epoxy, solvents, and other required tools are not included in the node kit, however, they are required for installation of the fin adapter accessory. See page 22 of this guide for suggested epoxy.

⚠ WARNING Warning: Direct skin exposure to solvents and epoxy could cause discomfort, skin irritation, or injury. Use appropriate protective gloves and follow the respective manufacturer's safety instructions.

1. Verify communication between the node and CloudGate™ prior to installation. See LED Indication Chart on Page 23 to verify communication.
2. Determine location and orientation of the node to be placed.
3. Verify the area the node is to be mounted to is appropriately sized to fit the plate mount.

4. Thoroughly clean area of determined mounting surface making sure any loose protective coatings are removed. 4. Identify the threaded hole in the mount.
5. Use solvent (i.e. paint thinner or acetone) to remove debris, grease and oils from mounting location.
6. Use sand paper or similar abrasive material to remove paint from the mounting surface.
7. Determine how much epoxy will be needed to fully cover the plate.
8. Mix determined quantity of epoxy per manufacturer's instructions.
9. Apply the epoxy on the surface the metal plate is attached to.
10. Firmly apply the mounting plate with epoxy to the asset.

11. Secure the mounting plate in place until epoxy has cured.
12. Identify the threaded hole in the mount.
13. Place the node squarely to desired orientation on the mount lining up the through-hole of the node to the threaded hole of the mount.
14. Insert the 1/4"-20 flanged headed bolt by turning clockwise until threads start to engage. For best results, use a non-permanent thread retaining compound.
15. Use a 5/32" socket headed driver to tighten the 1/4"-20 bolt up to, but not exceeding, the torque value of 100 in. lbs.
16. Align the 6-pin connector and mounting screws of the battery to match the corresponding locations on the sensor board. Do not remove the foam gasket and force fit the battery to the connector pins as you may damage the sensor.

17. Insert all three battery mounting screws by turning clockwise until threads start to engage.
18. Use a 6-lobe T15 driver to tighten battery screws up to, but not exceeding, the torque value of 2.5 in. lbs.

Suggested Epoxy

Industrial epoxy suggested for use with Fin Mount and Plate Mount Assemblies.
Use epoxy rated for your specific application environment.

- a. Loctite®, Part No. EA 3463
- b. LPS Labs®, Part No. 60159



WARNING

Warning: Direct skin exposure to solvents and epoxy could cause discomfort, skin irritation, or injury. Use appropriate protective gloves and follow the respective manufacturer's safety instructions.

LED Indication Chart

Upon installation, activation of the Vibration & Temperature Node will be indicated by the intermittent flashing LED light (*see chart to the next page*).

Once the installation is complete, log into hub.gracesense.com to complete the set up.

Local LEDs	Behavior	Meaning
RED	One Flash	Acknowledgment was not received from parent on all attempted communications during this heartbeat period
	One Flash	Orphan - an adoption request was sent with no response
GREEN	One Flash	All data for this heartbeat period was acknowledged by parent
	One Flash	Orphan - parent was found successfully, changed from orphan to adopted
BLUE	One Flash	Bootup - node is initialized
GREEN THEN BLUE	One Flash Each	A new configuration is received from parent (Green Flash) then reboot with new configuration (blue flash)



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