

Installation Planning Guide EZDP-2150 Rev A

Erbesd Sensor and Gateway
Configuration for InsightCM™



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1. About Cutsforth

Cutsforth specializes in developing innovative new technologies and services to support the power generation industry. Cutsforth's patented EASYchange® brush holder design, online truing service, InsightCM™ condition monitoring software, and patented shaft grounding and monitoring systems have been installed across the globe in generators of all sizes and in nearly every industry application, including nuclear, natural gas, coal, wind, and hydroelectric.

Cutsforth's knowledge and commitment to excellence drives our innovative solutions for the changing needs of the power industry. Whether it is a quick response to a critical situation or a new way of solving an old problem, our commitment to quality ensures that our customers receive best-in-class products and services—Cutsforth is the Power of Innovation.

Cutsforth started back in 1991 as a small company focused primarily on making replacement brush holders for generators and exciters. Today, after 30+ years in business, Cutsforth's experience and innovative designs have brought its best-in-class excitation brush holder and shaft grounding replacements and collector ring services to some of the world's largest power companies.

1.1. Cutsforth Products

- [EASYchange® Removable Brush Holders](#)
- [EASYchange® Brush Condition Monitoring](#)
- [Cutsforth Shaft Grounding Systems](#)
- [Rotor Flux Monitoring](#)
- [Electro-Magnetic Interference Monitoring](#)
- [InsightCM™ Condition Monitoring Software](#)

1.2. Cutsforth Field Services

Cutsforth provides comprehensive product installations for all product offerings as well as on-site training after the installation. We work efficiently during your outage to ensure a smooth upgrade to our innovative solutions such as Product Installations, Online Collector Ring and Commutator Truing, Spiral Groove Restoration, and Consulting and Emergency Services.

1.3. Cutsforth Automation and Control Services

Cutsforth provides comprehensive Automation and Control services which include data historian integration, InsightCM™ integration, DCS logic, engineered drawings and much more. This further complements our turnkey monitoring system installations.

2. Legal Information

2.1. Limited Warranty

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For a period of ninety (90) days from the date of invoice, Cutsforth warrants that (i) its software products will perform substantially in accordance with the applicable documentation provided with the software, and (ii) the software media will be free from defects in materials and workmanship. If Cutsforth receives notice of a defect or non-conformance during the applicable warranty period, Cutsforth will, in its discretion: (i) repair or replace the affected product, or (ii) refund the fees paid for the affected product. Repaired or replaced hardware will be warranted for the remainder of the original warranty period or ninety (90) days, whichever is longer. If Cutsforth elects to repair or replace the product, Cutsforth may use new or refurbished parts or products that are equivalent to new in performance and reliability and are at least functionally equivalent to the original part or product. You must obtain an RMA number from Cutsforth before returning any product to Cutsforth. Cutsforth reserves the right to charge a fee for examining and testing hardware not covered by the Limited Warranty.

This Limited Warranty does not apply if the defect of the product resulted from improper or inadequate maintenance, installation, repair, or calibration performed by a party other than Cutsforth; unauthorized modification; improper environment; use of an improper hardware or software key; improper use or operation outside of the specification for the product; improper voltages; accident, abuse, or neglect; or a hazard such as lightning, flood, or other act of nature.

THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND THE CUSTOMER'S SOLE REMEDIES, AND SHALL APPLY EVEN IF SUCH REMEDIES FAIL OF THEIR ESSENTIAL PURPOSE.

WARNING REGARDING USE OF CUTSFORTH SHAFT MONITORING EQUIPMENT: CUSTOMER IS ULTIMATELY RESPONSIBLE FOR VERIFYING AND VALIDATING THE SUITABILITY AND RELIABILITY OF THE PRODUCTS WHENEVER THE PRODUCTS ARE INCORPORATED IN THEIR SYSTEM OR APPLICATION, INCLUDING THE APPROPRIATE DESIGN, PROCESS, AND SAFETY LEVEL OF SUCH SYSTEM OR APPLICATION. PRODUCTS ARE NOT DESIGNED, MANUFACTURED, OR TESTED FOR USE IN LIFE OR SAFETY CRITICAL SYSTEMS, OR ANY OTHER APPLICATION IN WHICH THE FAILURE OF THE PRODUCT OR SERVICE COULD LEAD TO DEATH, PERSONAL INJURY, SEVERE PROPERTY DAMAGE OR ENVIRONMENTAL HARM (COLLECTIVELY, "HIGH-RISK USES"). FURTHER, PRUDENT STEPS MUST BE TAKEN TO PROTECT AGAINST FAILURES, INCLUDING PROVIDING BACK-UP AND SHUT-DOWN MECHANISMS. CUTSFORTH EXPRESSLY DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY OF FITNESS OF THE PRODUCTS OR SERVICES FOR HIGH-RISK USES.

CUTSFORTH DOES NOT WARRANT, GUARANTEE, OR MAKE ANY REPRESENTATIONS REGARDING THE USE OF OR THE RESULTS OF THE USE OF THE PRODUCTS IN TERMS OF CORRECTNESS, ACCURACY, RELIABILITY, OR OTHERWISE. CUTSFORTH DOES NOT WARRANT THAT THE OPERATION OF THE PRODUCTS WILL BE UNINTERRUPTED OR ERROR FREE. INCIDENTAL AND CONSEQUENTIAL DAMAGES, INCLUDING LOSS OF USE, ARE SPECIFICALLY EXCLUDED FROM THIS WARRANTY; THE MAXIMUM VALUE OF A WARRANTY CLAIM CANNOT EXCEED THE ORIGINAL VALUE OF THE ASSEMBLY OR COMPONENT.

2.2. Copyright

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2.3. Patents

Please send patent information requests to patents@cutsforth.com.

3. Safety Information


3.1. Safety Information [English]

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

3.1.1. Safety Conventions

 NOTE: Additional information.	 ELECTRICAL DANGER Indicates an action or specific equipment area that can result in personal injury or death from an electrical hazard if proper precautions are not taken.
 CAUTION Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury or equipment damage.	 WARNING Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
 ROTATING PART CAUTION Indicates possible injury from rotating parts.	 DANGER Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

3.1.2. General Safety Instructions

**ELECTRICAL DANGER**

Only qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid injury should work with Cutsforth products. Among the many considerations are the following:

- Avoid contact with energized circuits.
- Avoid contact with rotating parts.
- Never install any component that appears not to be functioning in a normal manner.
- Always ensure proper installation of the holder assembly and shaft grounding rope.



ELECTRICAL DANGER

Before working on the generator, de-energize, lock out, and tag out all power sources to the generator, shaft, and accessory devices. Electric shock and death may result due to failure to heed this warning.



ROTATING PART CAUTION

High-voltage and rotating parts can cause serious or fatal injury. Installation, operation, and maintenance of this product must be performed only by qualified personnel, in accordance with all applicable safety regulations and guidelines.

3.2. Consignes de Sécurité [Français]

Les informations qui suivent sont essentielles afin d'assurer la sécurité de l'utilisateur lors de l'installation et de l'opération de l'équipement. Assurez-vous de bien lire et de comprendre tous les avertissements et mises en garde qui suivent.

3.2.1. Conventions de Sécurité



NOTE:

Informations supplémentaires.



RISQUES DE CHOC ÉLECTRIQUE

Indique que l'action ou la partie de l'équipement concernée peut mener à des blessures par électrisation ou à la mort par électrocution si les précautions adéquates ne sont pas prises.



MISE EN GARDE

Indique la présence d'une situation dangereuse qui, si elle n'est pas évitée, pourrait mener à des blessures mineures à modérées ou à des dommages matériels.



AVERTISSEMENT

Indique la présence d'une situation dangereuse qui, si elle n'est pas évitée, pourrait mener à des blessures sévères ou à la mort.



MISE EN GARDE : PIÈCE ROTATIVE

Indique la présence de pièces d'équipement rotatives pouvant causer des blessures.



DANGER

Indique la présence d'une situation dangereuse qui, si elle n'est pas évitée, pourrait mener à des blessures sévères ou à la mort.

3.2.2. Consignes de Sécurité Générales



RISQUES DE CHOC ÉLECTRIQUE

L'utilisation des produits Cutsforth n'est recommandée qu'aux professionnels qualifiés qui savent comment reconnaître la présence de risques de choc électrique ainsi que les consignes de sécurité à suivre pour éviter les blessures liées à ces risques. Lesdites consignes de sécurité incluent, sans s'y limiter :

- Éviter tout contact avec des circuits alimentés;
- Éviter tout contact avec des pièces d'équipement rotatives;
- Ne jamais installer de composante ne paraissant pas fonctionner normalement;
- Toujours s'assurer que la structure de soutien et le câble de terre de l'arbre de la génératrice sont correctement installés.



RISQUES DE CHOC ÉLECTRIQUE

Avant de travailler sur la génératrice, désalimentez, cadenassez et étiquetez toutes les sources d'énergies liées à la génératrice, à l'arbre et aux appareils accessoires. L'opérateur s'expose à des risques de chocs électriques pouvant causer la mort s'il ne tient pas compte de cet avertissement.



MISE EN GARDE : PIÈCE ROTATIVE

Les pièces d'équipement rotatives et sous haute tension peuvent causer des blessures sévères ou fatales. L'installation, l'opération et la manutention de ce produit ne doivent être faites que par des professionnels qualifiés et en respectant toutes les règles et consignes de sécurité applicables.

4. Configuring Phantom Sensors

This guide describes adding the Erbesd wireless sensors and gateways to InsightCM™.

InsightCM™ supports the following Erbesd Phantom wireless sensors: V10E, V11E, ATX15, ATX16, T20, T25, T70, and S40.

4.1. Sensor Physical Installation Notes

To precisely identify individual sensors and monitored data collection locations, every Phantom sensor is encoded with a unique serial number – which is translated to a QR Code for quick scanning purposes.

The model of the sensor shown in [Figure 1](#) is: EPH-V11E (accelerometer high-sensitivity).



Figure 1. Phantom Expert sensor with serial number

The 2-digit product code for all EPH-V11E sensors is: 11.

The 2-digit product code for all EPH-V10E sensors is: 10.

The unique 9-digit serial number for the sensor pictured is: 189295990.

For InsightCM and Gateway Commissioning, note the sensor serial number and the location on the machine where the sensor is installed.

The Gen 3 Phantom Expert sensors consist of four parts, the base, sensor body, battery, and knurled ring with setscrew (see [Figure 2](#)). The Expert Phantoms are shipped with a Panasonic CR2477 battery. The battery slides out of the holder easily for replacement.



Figure 2. Phantom sensor parts with replaceable battery

All Expert Phantoms have the axis orientation marked on top to align the sensor when installing on the machine point (see Figure 3). This must be administered in software correctly to obtain accurate time waveform data.



Figure 3. Axis orientation marker

In Figure 3 above, the sensor is mounted on the drive end top side of a motor. The X-axis corresponds to the horizontal direction; the Y-axis corresponds to the vertical direction; the Z-axis corresponds to the axial direction. The vibration sensor should be configured as X=Horizontal, Y=Vertical, Z=Axial.

When the sensor is attached to the side of the motor (see Figure 4), the axis orientation is different. For this setting, the configuration is X=Vertical, Y=Horizontal, Z=Axial.



Figure 4. Side motor orientation

Sensors are shipped from the factory in sleep mode. They will not be detected by any Phantom Gateway until they are reset using the provided magnetic key. This will “wake up” the sensor and make it visible to gateways.

After the sensor is installed, and orientation is located, begin “wake up” by placing the magnet on the sensor just left of the LED and hold until the LED illuminates (see Figure 5). If it does not, move the magnet around the sensor’s radius slowly until it does. Remove the magnet and the LED will stay lit for several seconds, then blink three (3) times and turn off. The sensor is now activated/reset.



Figure 5. Magnetic “wake up” key



IMPORTANT

In addition to the location on the equipment and the serial number of the sensor, make note of the orientation of the sensor to identify the Horizontal, Vertical, and Axial measurement directions.

4.2. Commission Phantom Gateway

Before adding Phantom wireless sensor assets, commission the Phantom Gateway so it connects to InsightCM.

1. Plug an Ethernet-wired connection into the Phantom Gateway.
2. Power on the Gateway.

3. Note the IP address displayed on the Gateway screen.
4. Open a web browser window and access the Gateway IP address.
5. Update the firmware of the Phantom Gateway: (see [Figure 6](#)).
 - Contact Cutsforth support to download the Phantom Gateway firmware officially supported by InsightCM.
 - Manually apply the firmware update on the System tools tab.

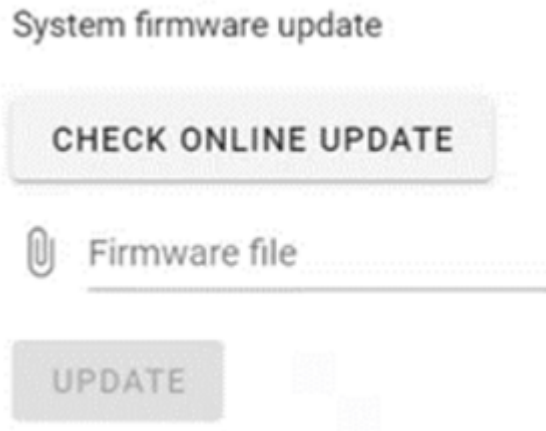


Figure 6. Dialog in the Erbessd gateway web page for updating firmware

6. Pair Phantom Sensors to the Gateway using the gateway web page “Live State” menu. Click the Pair button before configuring the sensor in InsightCM (see [Figure 7](#)).

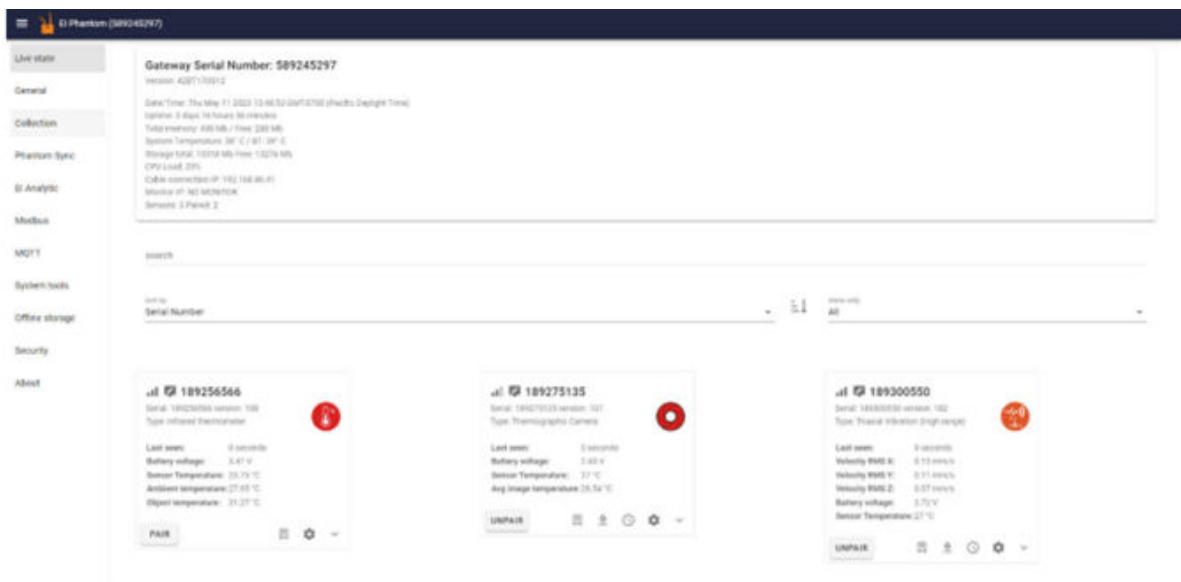


Figure 7. Pairing sensors with the Erbessd “Live State” web page menu

7. Within the General menu of the Erbessd gateway webpage, ensure that “Send data to EI Monitor/ PhantomLib” and “Store data offline until manually collected” are both checked (see [Figure 8](#))

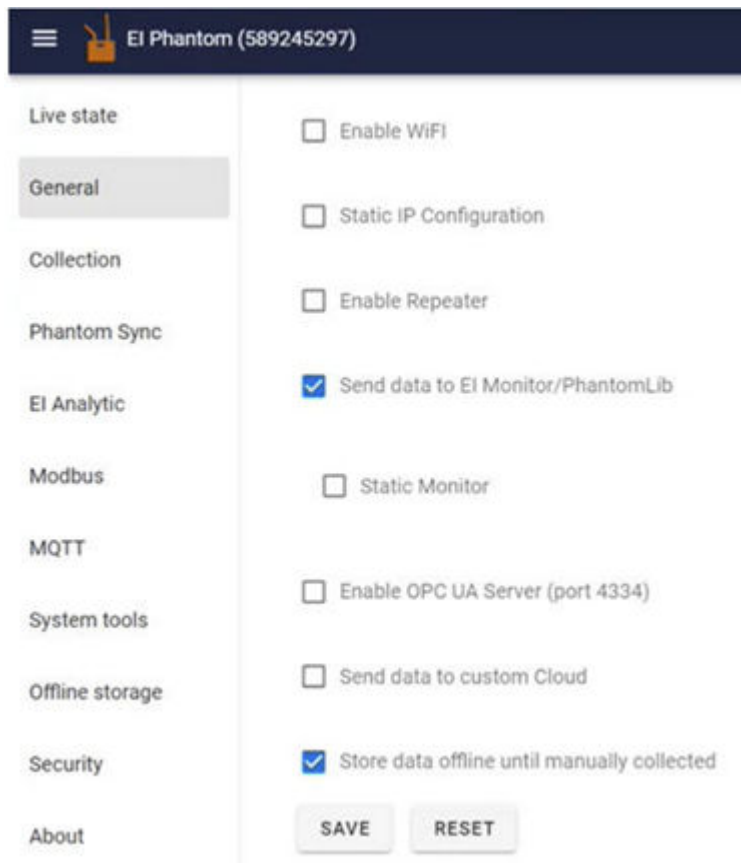


Figure 8. Phantom General menu selection dialog

- Optional: Within the General menu, one has the options to set up a static IP address and enable Wi-Fi (unplug the ethernet-wired connection after Wi-Fi configuration).

4.3. Add Phantom Equipment Sensors

- Within the InsightCM application, Click the Configuration button (🔧) and ensure that you are on the Asset Configuration page (see Figure 9). If you need to create your equipment in the tree, right-click on the parent for your equipment, select "Add child assets", "General" and "Equipment", and press "OK". Then the "Select Monitors" dialog will appear and select "Vibration" (see Figure 10).

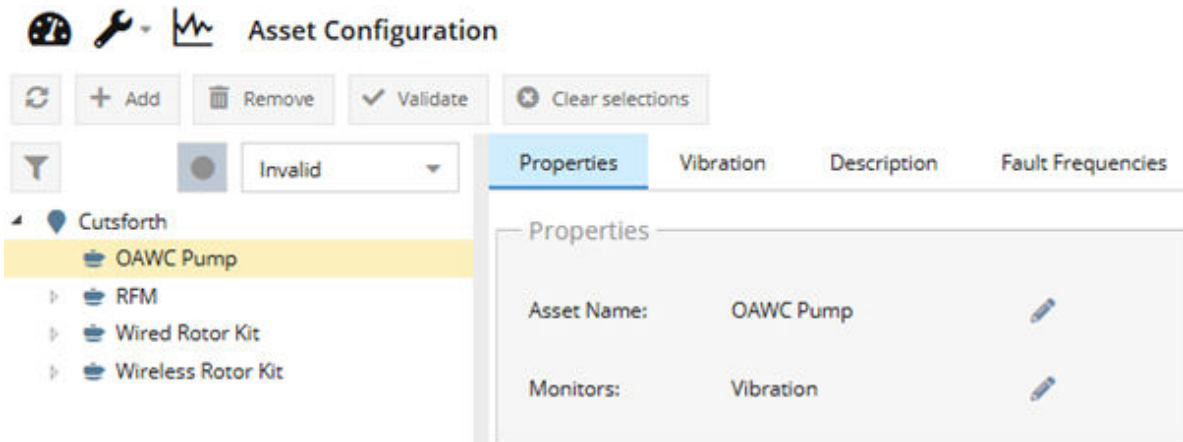


Figure 9. Adding new equipment to the asset hierarchy tree

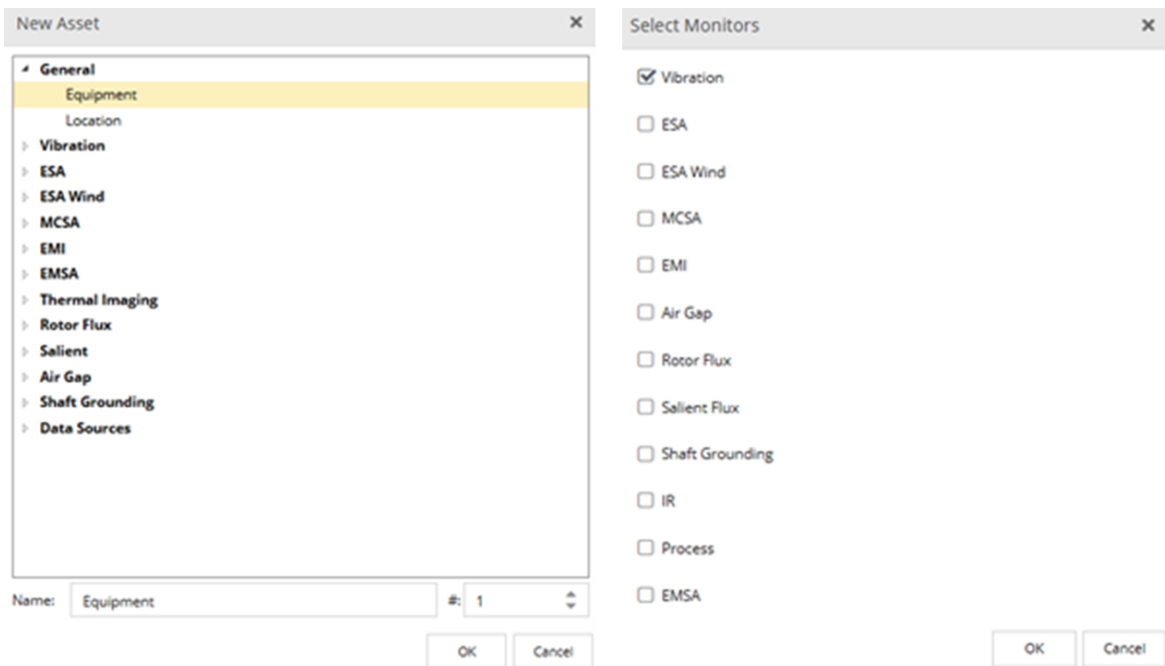


Figure 10. Vibration Monitor Selection

- a. Ensure that the equipment asset is defined and the monitor type is configured as “Wireless (Phantom)” for the Phantom sensor you are adding (see [Figure 11](#)).

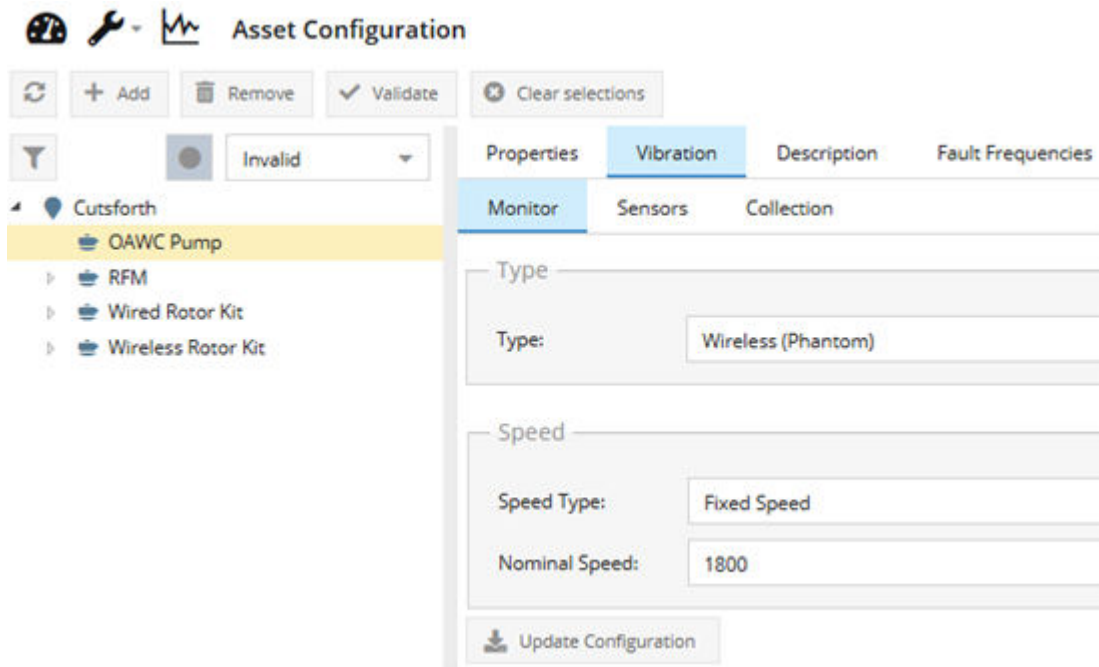


Figure 11. Select the Monitor Type as Wireless Phantom and set the nameplate speed

2. In the right-side configuration panel, select the Sensors tab (see Figure 12).
3. Enter the Gateway IP address in the IP address textbox (see Figure 12).

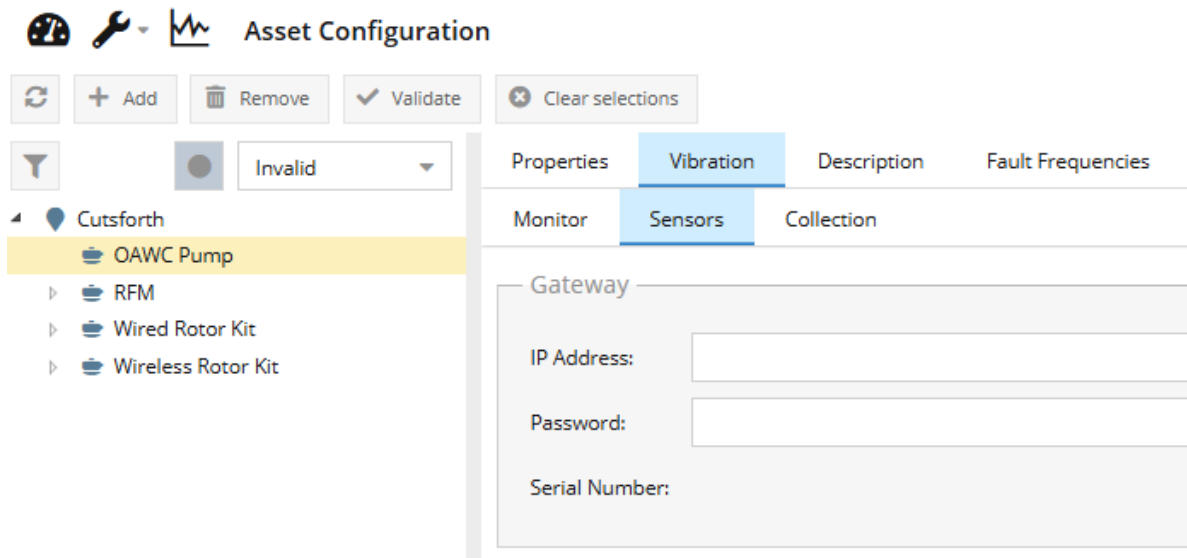


Figure 12. Setting the IP address for the Erbessd Gateway in InsightCM

Optionally enter the Gateway password in the textbox (see Figure 12), if the Gateway has a password previously configured using the Security menu on the Gateway configuration web page. To set the Gateway password, use a web browser to access the gateway webpage and select the Security item on the left. Check the "Enable Gateway Console password" box, enter and confirm the password (see Figure 13).

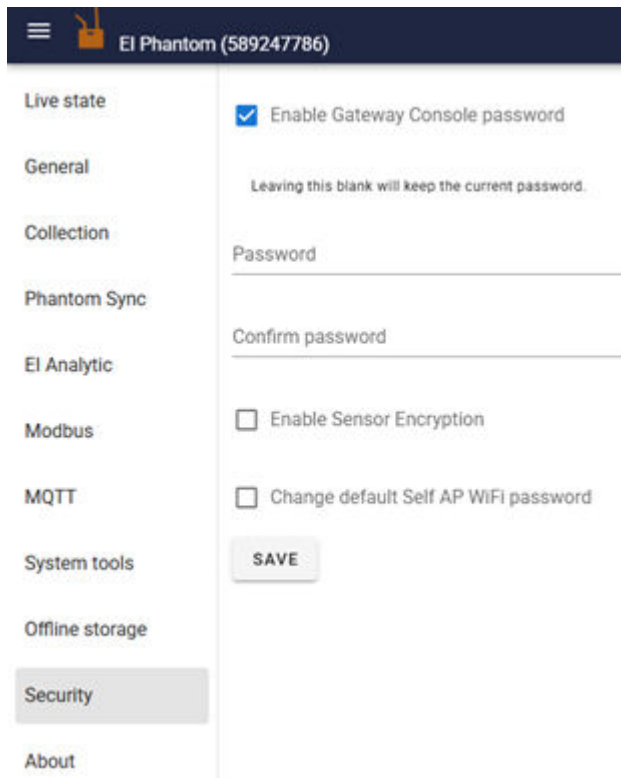


Figure 13. Setting the Gateway password

4. Press the Update Configuration button under the monitor tab (see Figure 14).

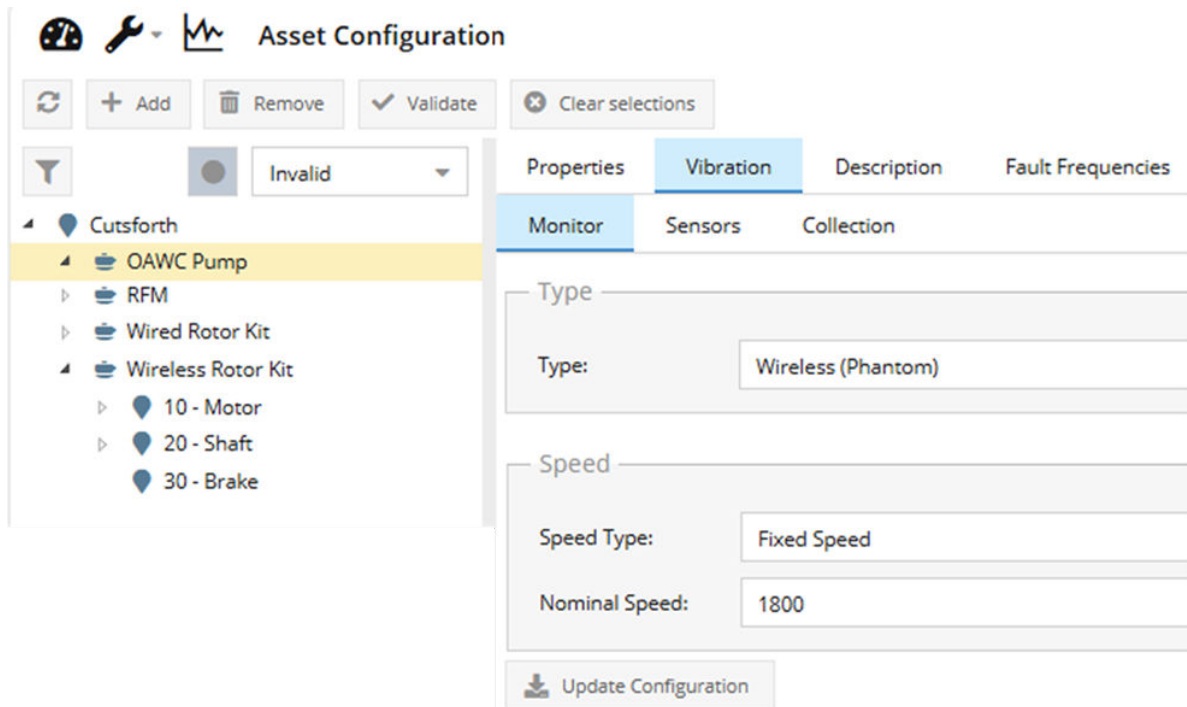


Figure 14. Update Configuration button on the Vibration>>Monitor tab

5. In the Sensors tab, click on Discover (see [Figure 15](#)).

The screenshot shows a configuration interface with a top navigation bar containing 'Properties', 'Vibration', 'Description', and 'Fault Frequencies'. Below this is a sub-navigation bar with 'Monitor', 'Sensors', and 'Collection'. The 'Sensors' tab is active. The main content area is divided into two sections: 'Gateway' and 'Sensors'. The 'Gateway' section contains three input fields: 'IP Address' with the value '10.200.141.15', 'Password' with a masked value of dots, and 'Serial Number' with the value '589246942'. The 'Sensors' section contains three buttons: '+ Add', 'Remove', and 'Discover'.

Figure 15. Click on the Discover button to find wireless sensors

6. Sensors within range of the Gateway will appear. Select a paired sensor with the serial number for the selected equipment and click OK (see [Figure 16](#)).

Sensor Type ↑	Serial Number	Signal Strength	Paired
Digital	189230109		No
HighRangeAccelerometer	189300641		No
HighRangeAccelerometer	189300873		No
HighRangeAccelerometer	189301415		No
HighRangeAccelerometer	189301426		No
HighRangeAccelerometer	189309232		No
HighRangeAccelerometer	189309243		No
HighRangeAccelerometer	189309262		No
HighRangeAccelerometer	189309378		Yes
HighRangeAccelerometer	189314527		No
HighRangeAccelerometer	189314572		No
HighSensitivityAccelerometer	189305431		No
IrCamera	189275140		No
IrCamera	189275202		No

Figure 16. Selecting paired sensors to associate with the equipment

- Click on the “Add” button and the new sensor nodes will appear in the left asset tree (see Figure 17).

Figure 17. Sensor appears in the asset tree under the asset where it was discovered or entered

- a. Alternative: Instead of using Discover, users have the option to manually add sensors in the asset tree list first. (Right-click on the asset and add child asset of "Vibration >> Phantom >> Phantom Vibration (High Range)").
 - i. Click Add and select Sensors » Phantom and select the appropriate sensor. Within the right Properties tab enter the Serial Number (see [Figure 18](#)).



Figure 18. Properties tab Serial Number

4.4. Phantom Node Properties

1. Rotating Equipment has three Speed Types available in the Monitor tab: Fixed Speed, Phantom Speed Sensor, and Data Source Speed. In many cases, machines run at a fixed speed (see [Figure 19](#)).

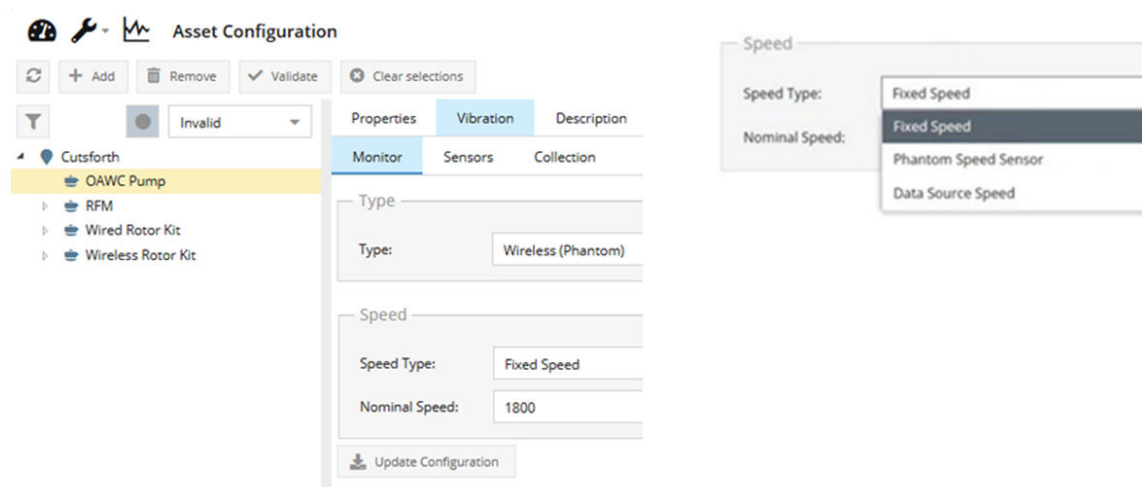


Figure 19. Setting the Speed Type for the Phantom Sensors

2. The Phantom Speed Sensor option uses a wireless speed sensor installed on the asset
3. The Data Source Speed obtains the current asset rotating speed from the configured data historian.
4. Phantom sensors have properties to configure their collection settings (see [Figure 20](#)). Note, these settings may have an impact on sensor battery life.

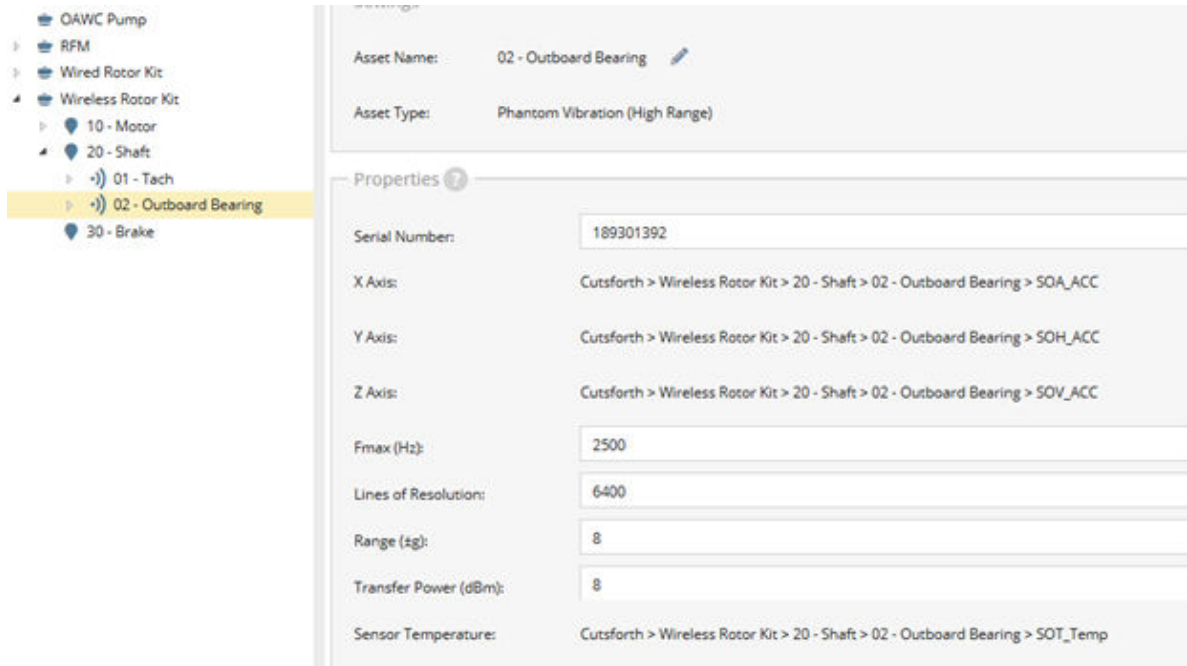


Figure 20. Phantom Sensor Properties

5. From the physical installation photograph or notes, map the X, Y, and Z, axis to the Axial (A), Horizontal (H), and Vertical (V) directions.
6. The four settings (see Figure 21) have the settings listed to the right.

		Options
Fmax (Hz):	2500	625, 1250, 2500, 5000, or 10000
Lines of Resolution:	6400	6400, or 12,800
Range (±g):	8	8, 16, or 32
Transfer Power (dBm):	8	0, 4, or 8

Figure 21. Phantom Wireless Setting Options

Settings that increase battery consumption include high transfer power and high lines of resolution. High transfer power may be necessary if the sensor is far from the gateway. Higher lines of resolution, require a larger data block, increasing data transfer time and consuming more battery life.

5. Acquiring Data for Wireless Devices

When the wireless gateway is online with all endpoints mapped to sensor assets, you can test your wireless device's ability to acquire data. Automatic acquisitions occur periodically, but you can force an acquisition at any time by using Force Trigger.

Complete the following steps to acquire data from one of your endpoints.



NOTE

Acquiring data from all a device's endpoints can create network congestion.

1. Click the Data Viewer () button on the top left of the screen.
2. Expand one of the wirelessly monitored equipment assets, select a sensor asset, and then select one of the features. By selecting a feature, you activate the Trend viewer chart (see [Figure 22](#)).

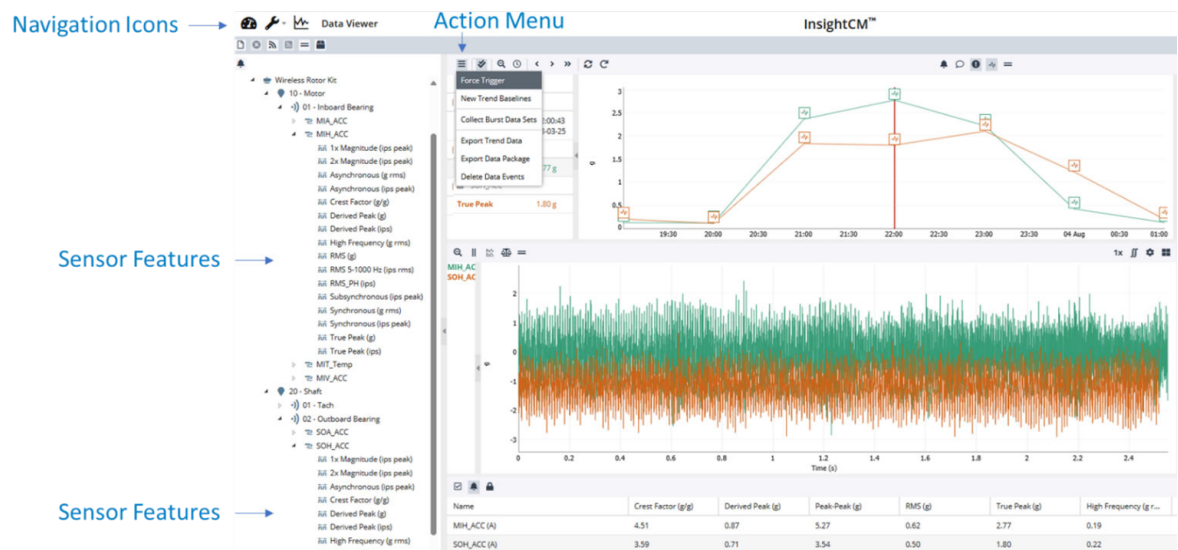


Figure 22. Data Viewer InsightCM page with Navigation, Features, and Action Menu indicated in blue text and arrows

3. In the Trend viewer chart, click the Action menu () and select Force Trigger to acquire data from the endpoint mapped to this equipment asset.
4. Wait several seconds for the acquisition to complete and click the Refresh button () to confirm that your device received new data points. If you force an acquisition for all endpoints, it could take several minutes for the wireless gateway to complete the acquisition.
5. Repeat the force acquisition several times to acquire multiple data sets.

6. Select a feature level asset for a different equipment asset to confirm in the Trend viewer chart not yet populated with new data. Before the data is available, devices must finish performing the acquisition and the InsightCM server must receive and store the data.