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Phantom EPH-V10E & V11E Trixial Vibration Sensors

Every Phantom is Unique

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 this sensor is: EPH-V11E (accelerometer high-sensitivity)

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**.

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Fast and Easy Installation

Phantom Gen 3 vibration sensors can be installed 3 ways:

1. **Adhesive** mount. V10/11 sensors have an integral adhesive mounting surface suitable for epoxy.
2. **Drill and Tap** using a common ¼”-28 thread receptacle. Phantoms are shipped with a stud installed.
3. **Magnetic Base** (optional) for sensor portability.

The large knurled ring compresses an o-ring between the top of the sensor and the base. When loosened, the orientation of the sensor may be rotated as needed. The knurled ring is locked in place by a set screw. Tighten the knurled ring hand-tight or to approx. 25 in/lbs of torque to compress the o-ring for a proper seal.

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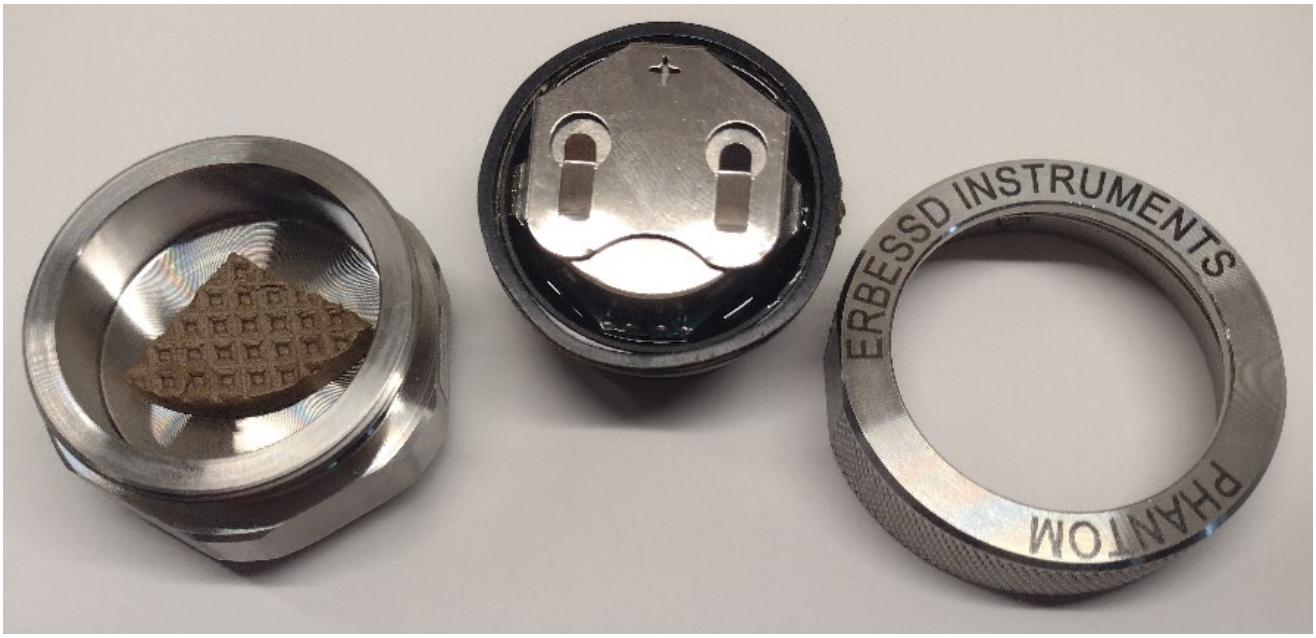
The Gen 3 Phantom Expert sensors consist of four parts, the base, sensor body, battery and knurled ring with set-screw.



The Expert Phantoms are shipped with a Panasonic CR2477 battery. The battery slides out of the holder easily for replacement. **Note** – Not all CR2477 batteries have the same specifications. For example, the maximum operating temperature may vary between manufacturers. Panasonic batteries are recommended.

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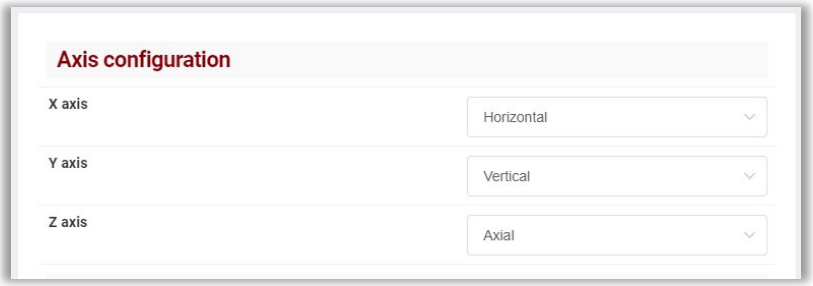
All Expert Phantoms have the axis orientation marked on top to align the sensor when installing on the machine point. This must be administered in software correctly to obtain accurate time waveform data.

Example from Phantom config screen:



The image below shows a Phantom Triaxial Vibration Sensor attached to the top of a common electric 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.

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

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.

Begin by placing the magnet on the sensor just left of the LED and hold until the LED illuminates. 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 3 times and turn off. The sensor is now activated/reset.

For complete details regarding the installation of the Phantom monitoring solution, please refer to the Phantom Setup Guide V4 document, which can be downloaded here:

https://www.erbessd-instruments.com/wp-content/uploads/2024/01/Phantom-Setup-Guide-v4-X.pdf

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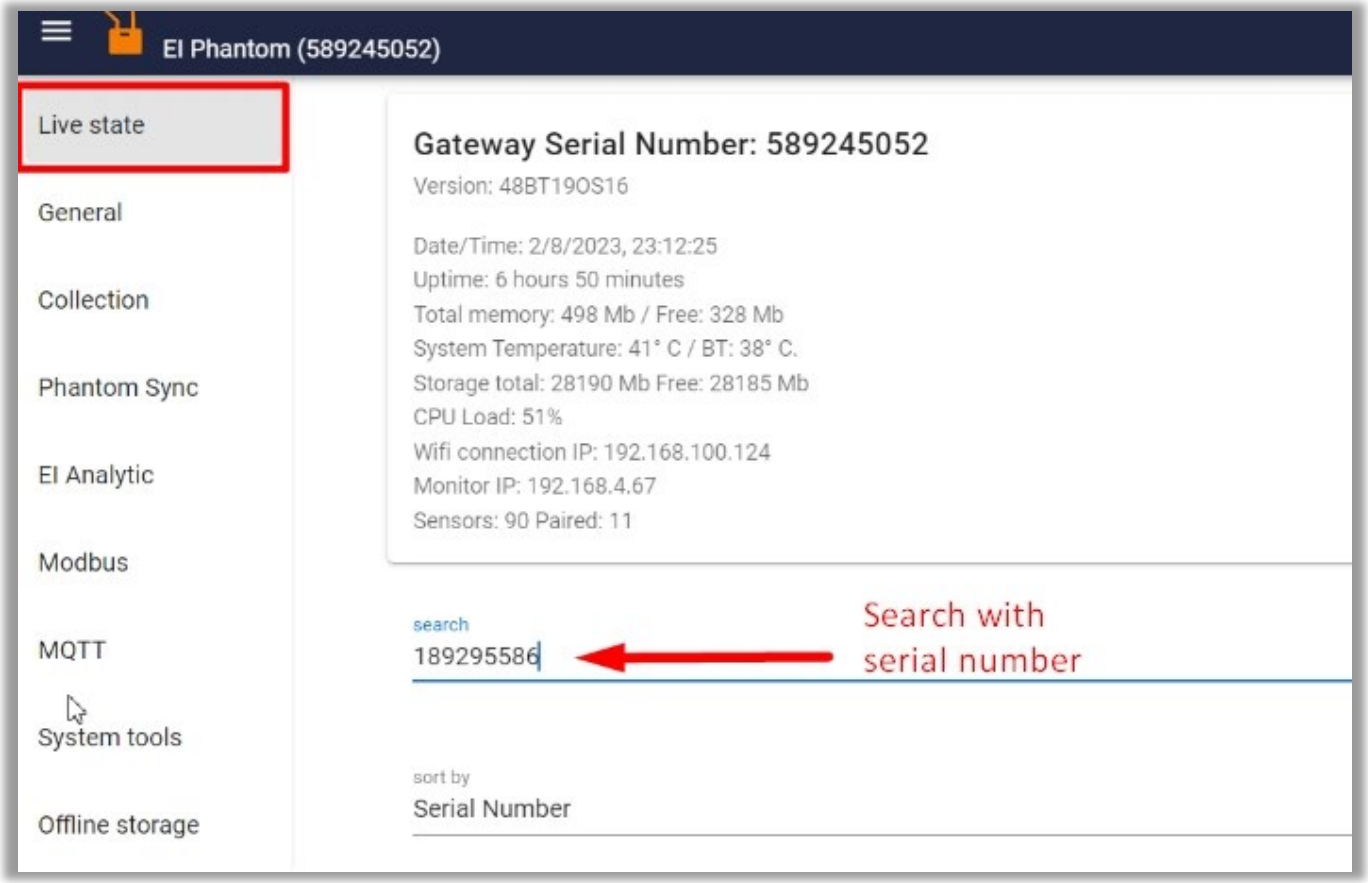
Parameter settings

Once a Phantom Gateway is operational, the Admin Console web interface is used to manage the gateway and Phantom sensors within Bluetooth range.

Complete details regarding Gateway installation, how to access the Gateway Admin Console, and database connectivity are included in the **Phantom Setup Guide**.

The Live State screen will show all detected sensors. If a large number of sensors appear, a given sensor can be found using the **Search** function.



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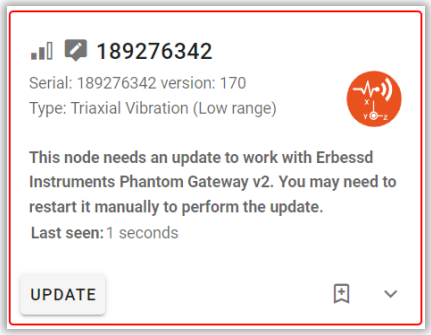
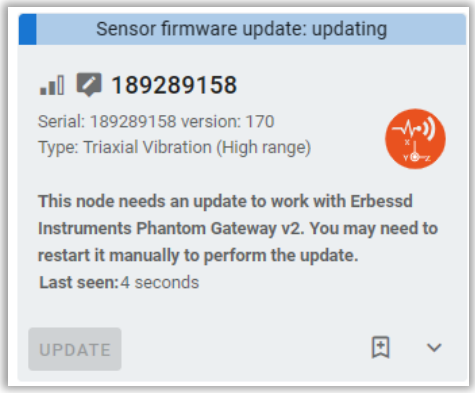
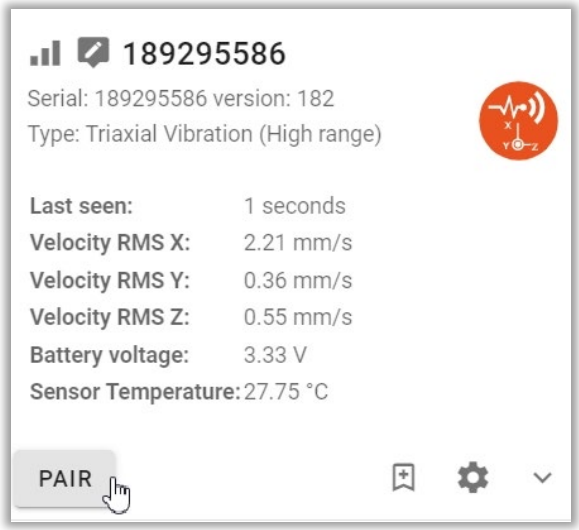
Many sensors will require a Firmware Update when they first connect to a Gateway 2.0. They will appear with an update button. Press the **Update** button to download and install the latest sensor firmware. A blue status bar shows the update progress. Note -You may need to reset the sensor using the magnetic key as part of the firmware update process.

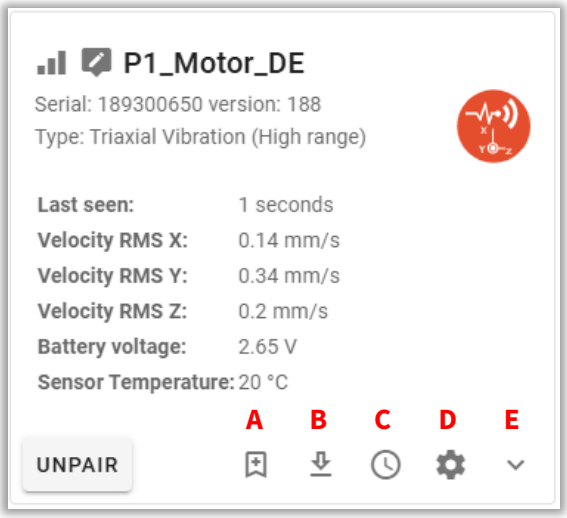




Now click **PAIR** to connect it with your gateway 2.0:

The sensor will download a time waveform signal the upon pairing to the gateway. The state settings of the sensor are now shown with **5 options** for each Phantom:





- **A**. Add to **Favorites** list
- **B**. **Collect Waveform now** will record a signal on demand.
- **C**. **Collection settings** – Timing and other settings.
- **D**.**In-sensor settings** (saved in the sensor's memory).
- **E**. **Expand** the Information tile

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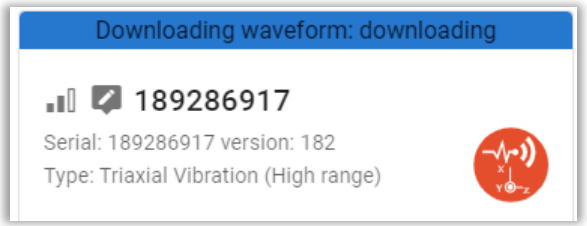
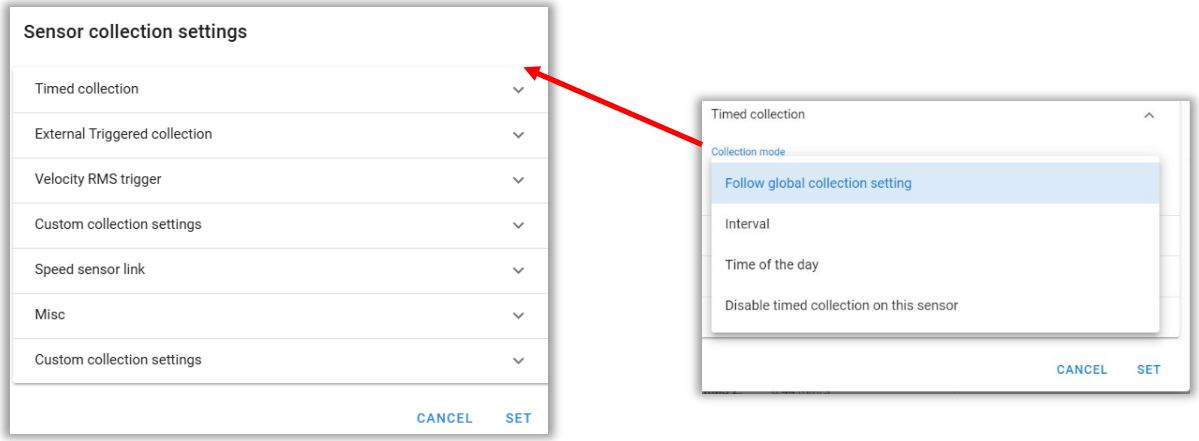
Favorite Adds the sensor to the list of favorites.

Collect waveform now Requests a data collection from the sensor. A blue message bar will appear, indicating the signal is downloading:



Sensor Collection settings contains multiple categories:

a) **Timed collection: S**elect the sensor collection mode from the four available options:



i. **Follow global collection setting:** Causes the sensor to record data according to the global configuration settings of the gateway. See *Global Collection Settings* in the Phantom Setup Guide.

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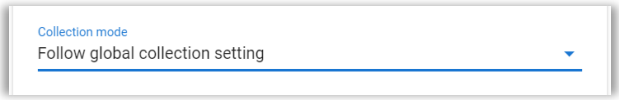
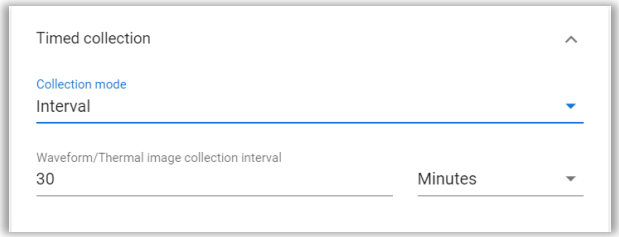
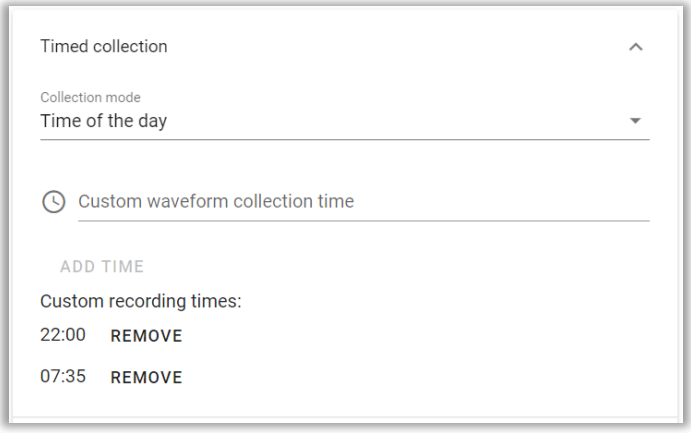
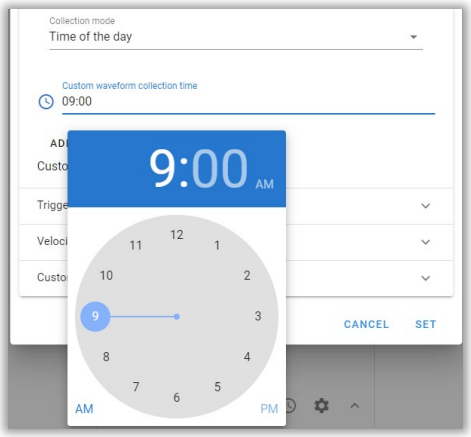


ii. **Interval:** Collect data using a defined interval. Select units of minutes, hours or days from 10 minutes to as long as 1000 days. The default Interval is 720 minutes(12 hrs).

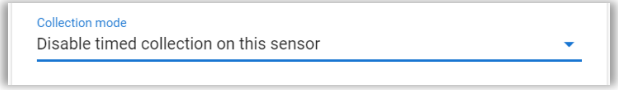


iii. **Time of the day:** You can choose specific times of the day to collect data. Click on **Custom waveform collection time;** a clock will appear allowing you to choose a time. Click on ADD TIME to add this time to the list. Multiple Custom recording times may be administered by repeating this process.





iv. **Disable timed collection on this sensor:** Disables time waveform data collection. RMS velocity, temperature and battery level will continue to be reported.



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b) In the **Triggered collection** section, you can link vibration sensors with other sensors to use parameters such as current, speed, or dry contact to trigger a time waveform collection. For details see the *Triggering Sensors* section of the Phantom Setup guide.

c) In the **Velocity RMS Triggers** section, you can activate sensor Triggers.

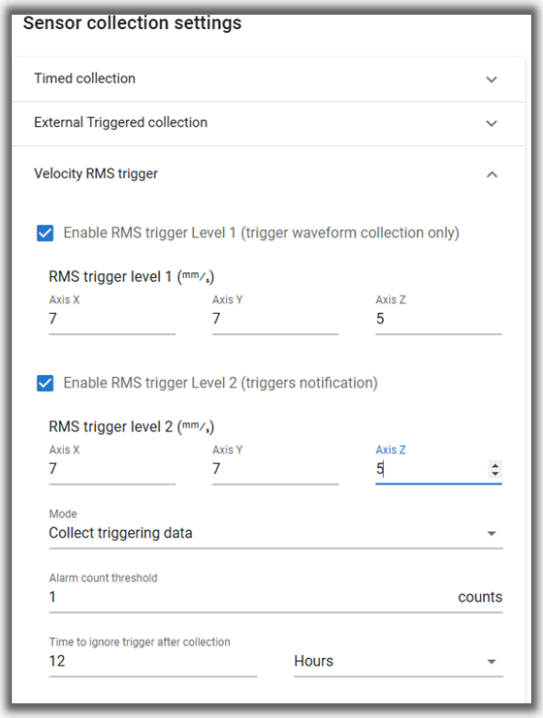
Trigger level 1 will cause the sensor to send a data collection if the RMS velocity threshold is exceeded on any of the measured axes.

Trigger level 2 will trigger an email/push notification if the RMS velocity threshold is exceeded on any of the measured axes.

The **Mode** field determines whether to use the original data that caused the trigger, or take new data:

Trigger count threshold: This parameter defines number of consecutive *counts* for which an Trigger condition exists before an alarm is triggered. A *count* is the amount of time defined by the **Sensor Update Interval** , which is set via the **In-Sensor Settings**

Time to ignore Trigger after collection indicates how much time must pass before the sensor can Trigger again (applies to both Level 1 and 2).



d) In **Custom collection settings** you can select **Override global collections settings** to modify the settings for *this sensor only*. Otherwise the sensor will take the global settings from the gateway.

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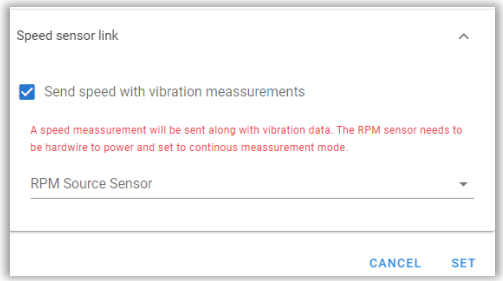
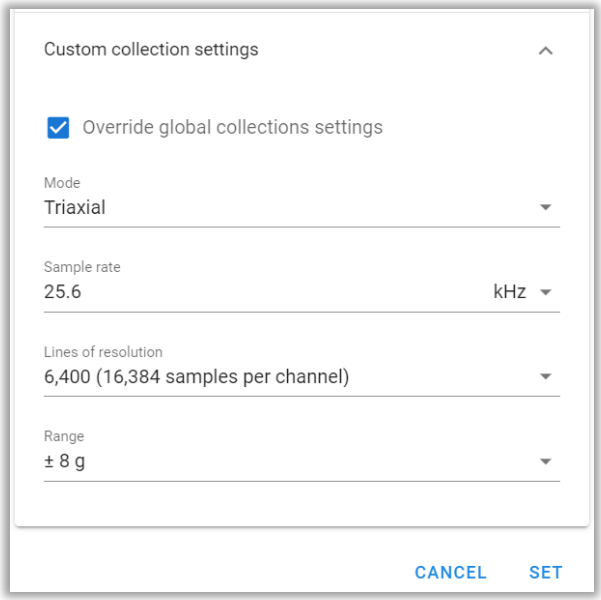
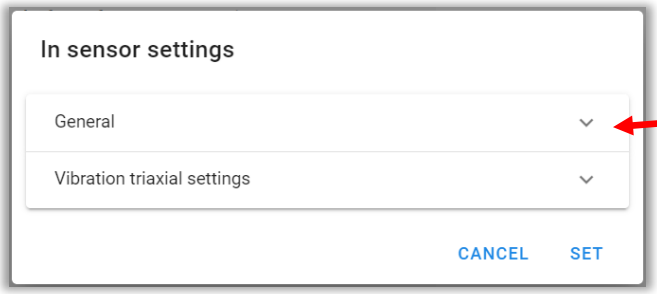
e) **Speed Sensor Link** When an EPH-S40 Phantom Speed sensor is installed in Continuous mode (powered locally via 5-24VDC), a parameter can be set to cause an RPM measurement to be sent whenever an Expert Triaxial Phantom sensor sends a full vibration signal file to the database.

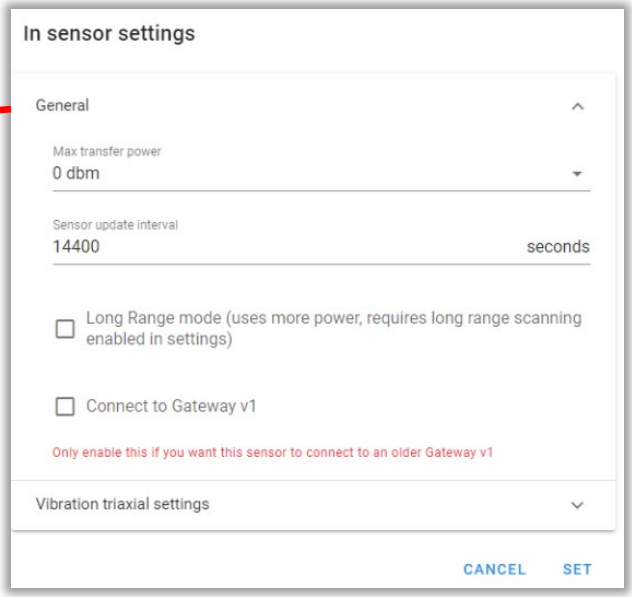




The **RPM Source Sensor** drop-down contains the phantom codes for all available RPM sensors.

In sensor settings are stored in the internal memory of the sensor.





In **General** , set the **Max transfer power**. The default and recommended setting is **8 dbm** for Expert Vibration sensors.

The **Sensor update interval** defines how often the sensor updates its status to a Gateway. For vibration sensors, this is the interval used to send an RMS velocity value, internal temperature and battery voltage level. This is called a sequence or **count**. This interval is also used to check the sensor's Trigger threshold status.

Check **Long Range mode** if this sensor is to use Long Range instead of Regular Bluetooth scanning mode.

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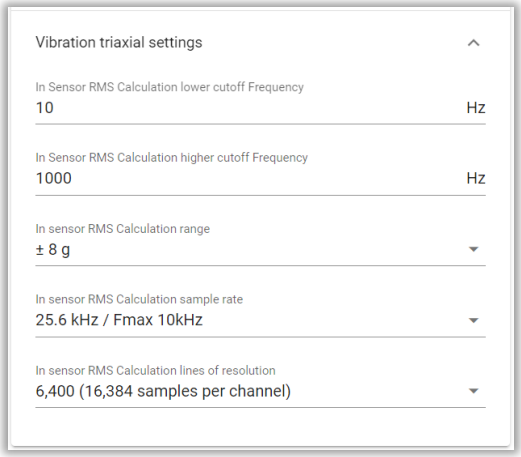
You can check the **Connect to Phantom Gateway v1** option if you want this sensor to connect to an older Gateway v1 receiver.

The **Vibration triaxial settings** contains the options for the **RMS** value calculation:

- **Lower cutoff or Higher cutoff**: Defines the frequency range.
- **Calculation range:** Choose the dynamic range.
- **Sample rate:** Sets the sample rate and maximum frequency.
- **Lines of resolution:** Select the resolution lines for calculation.



Click SET to save the changes in the sensor.

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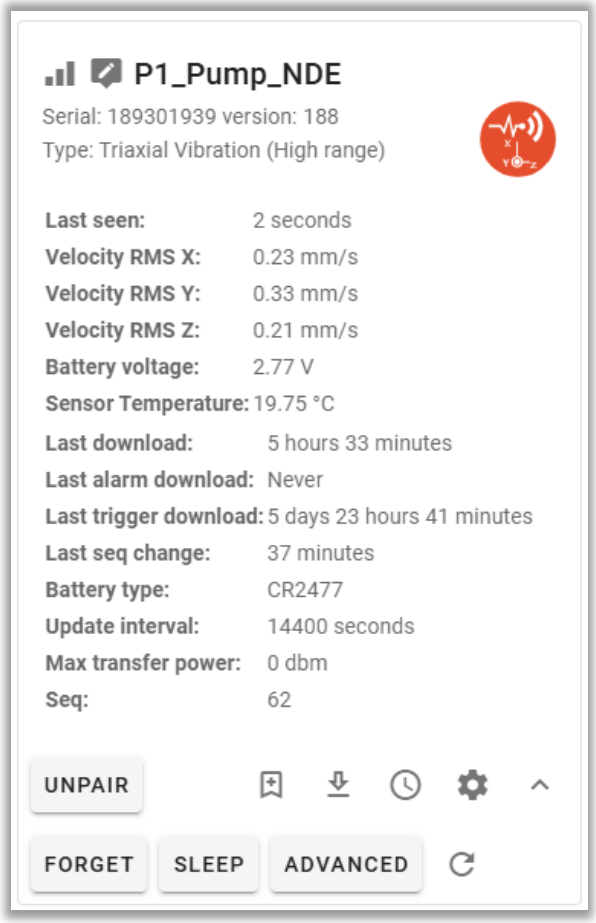
Additional information displayed after a sensor is paired includes:



- **Last download:** Time since last downloaded signal.
- **Last alarm download:** Time since last signal downloaded by alarm.
- **Last trigger download:** Time since last signal downloaded by trigger activation.
- **Last seq change:** Time elapsed in the last sequence.
- **Battery type:** Sensor battery type.
- **Update interval:** Update interval set in sensor.
- **Max transfer power:** Maximum transfer power set in sensor.
- **Seq:** Number of sequences that the sensor has been through.
- **Unpair**: Unlinks the sensor from the Gateway.
- **Forget**: Forgets this sensor and its settings. It will not appear in the Gateway list until it sends data again.
- **Sleep**: Disables the sensor for battery conservation. The sensor will not take measurements or save new settings until it is reset with the magnetic key.
- **Advanced**: Allows you to add codes for specific firmware updates. This option requires the Gateway to have internet access. To avoid damage to your Phantom sensors, do not enter a code without the help of a Technical Support assistant.
- **Request Measurement Update**  Causes the sensor to send an immediate RMS reading and resets the Update Interval timer to 0.

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Specific conditions of use

- **Range:** -30°C to 80°C (-22°F to 176°F)
  Guidelines: The sensor must be operated within this temperature range to prevent damage and ensure accurate measurements. Operating outside this range may result in malfunction or permanent damage to the sensor.
- **IP69 Rating:**
  Dust Protection: The sensor is completely dust-tight, preventing any ingress of dust particles that could interfere with its functionality.
  Water Protection: The sensor is protected against high-pressure water jets and steam cleaning, making it suitable for use in environments where it might be exposed to rigorous cleaning processes or wet conditions.
- Phantom sensors can be used for both indoor and outdoor locations (Please refer to the environmental conditions specified in this manual).
- Do not use any other battery than CR2477 (Please refer to Maintenance section in this manual).
- Epoxy glue is the recommended adhesive for machine mountings.
- Do not push or force any objects to open a Phantom sensor.
- Use a flat-head screwdriver to remove the locking set screw.
- Make sure the Phantom's O-Ring is correctly positioned before tightening.
- The communication range in ideal conditions is 100 meters (330 ft); however, due to the signal interference of other machines, competitive signals and solid obstructions, the maximum range may decrease.

Environmental Conditions

1. **Industrial Settings:** The sensor is ideal for use in various industrial environments, including factories, manufacturing plants, and processing facilities where it can monitor the vibrations of motors and machines.

- **Harsh Environments:** Thanks to its high protection grade, the sensor can be used in harsh environments with exposure to dust, water, and extreme temperatures without compromising its performance. Phantom is not suitable for submersible applications because the radio cannot transmit effectively through water.
- Do not place your Phantom sensor in corrosive environments (Acid or oil).

Environmental Conditions	
Ambient temperature	-30°C to +80°C (-22°F to 176 °F)

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Equipment Classifications

North America / ETL:

I. Class I Division 2 Groups A, B, C, D
II. Class II Division 2 Groups F, G
III. Class I Zone 2 AEx ic IIC T5 Gc
IV. Zone 22, AEx ic IIIC T85°C Dc

Certificates: **ETL24CA105792235**

IECEx / ATEX:

I. Ex ic IIC T5 Gc
II. Ex ic IIIC T85°C Dc

Certificates :

- IECEx: **IECEx ETL 24.0020X**
- ATEX: **ETL24ATEX0465X**

IEC EX Standards Compliance

The International Electrotechnical Commission (IEC) System is used for Certification to Standards Relating to Equipment for use in Explosive ('Ex') Atmospheres.

1. **Explosive Atmospheres - Part 0: Equipment - General Requirements [IEC 60079-0:2017 Ed.7], [EN IEC 60079-0:2018], [UL 60079-0:2019 Ed.7+R:15Apr2020], [CSA C22.2#60079-0:2019 Ed.4].**
   This specifies the general requirements for construction, testing and marking of Ex Equipment and Ex Components intended for use in explosive atmospheres. The standard atmospheric conditions (relating to the explosion characteristics of the atmosphere) under which it may be assumed that Ex Equipment can be operated

2. **Explosive Atmospheres - Part 11: Equipment Protection By Intrinsic Safety "I" [IEC 60079-11:2011 Ed.6], [EN 60079-11:2012], [CSA C22.2#60079-11:2014 Ed.2 (R2018)], [UL 60079-11:2013 Ed.6+R:25Jan2023].**
   This specifies the construction and testing of intrinsically safe apparatus intended for use in explosive atmospheres, and for associated apparatus which is intended for connection to intrinsically safe circuits which enter such atmospheres.

The Erbessd Instruments models EPH-V10 and EPH-V11 triaxial vibration sensors are marked with the following:

Ex ic IIC T5 Gc This indicates compliance with max surface temperature of equipment up to 80° C (T5) in Gas, Vapour, Mist, Dust atmosphere types. (Gc) Group IIC covers Hydrogen and Acetylene gases.

Ex ic IIIC T85°C Dc Indicates compliance with Group IIIC (conductive dust type) for a maximum surface temperature up to 85° C in a dust tight enclosure.(Dc)

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Maintenance

Battery Replacement: The sensor uses a field replaceable CR2477 battery. Regularly monitor battery life and replace it when necessary to avoid data loss. This sensor is designed to facilitate easy battery replacement, just unscrew the lock, and turn the cabinet to open it. Make sure screw is properly place when closing the sensor.

Firmware Updates: Regularly update the firmware from the Gateway Admin Console. Keeping the firmware up-to-date ensures that the sensor benefits from the latest improvements and bug fixes.

Environmental Protection: While the sensor is robust with an IP69 rating, it's still advisable to periodically inspect the sensor for any physical damage or degradation, especially in harsh environments Clean the sensor periodically to remove any accumulated dust or debris. Use a soft, damp cloth and avoid harsh chemicals that might damage the sensor housing.

Repair

PROBLEM	POSSIBLE CAUSE	SOLUTION
Sensor does not turn on.	Battery is drained.	Battery replacement.
Sensor presents sign of dust or water inside enclosure.	Incorrectly O-ring position or screw unlocked	Make sure O-ring is well positioned.

ABS cover dielectric strength

The Erbessd Instruments EPG-V10 and EPH-V11 vibration sensors conform with the dielectric strength test of Clause 6.3.13 of IEC 60079-11.

Electrical	Value	Test Method
Hot-wire Ignition (HWI)		UL 746
1.50 mm	PLC 4	
3.00 mm	PLC 3	
High Amp Arc Ignition (HAI)		UL 746
1.50 mm	PLC 0	
3.00 mm	PLC 0	
Comparative Tracking Index (CTI)	PLC 0	UL 746
High Voltage Arc Tracking Rate (HVTR)	PLC 1	UL 746
Arc Resistance	PLC 7	ASTM D495

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List of Standards

We declare under our sole responsibility that Phantom EPH-V11E and EPH10VE sensors, are in conformity with the applicable requirements of the following directives and standards.

Directive	Standard or Description	Status
IC – sensors and gateway	RSS-102	Complied
KCC - sensors and gateway	Clause 2, Article 58-2	Complied
FCC - sensors and gateway	Part 15, Subpart C & Canada RSS-247	Complied
Japan Telec - sensors and gateway	ARIB STD-T66	Complied
Australia/New Zealand - sensors and gateway	AS/NZS 4268:2017	Complied
Taiwan - sensors and gateway	GFSK	Complied
Brazil - sensors and gateway	25.081.009/0001-03	Complied
D.C. 2014/53/EU	ETSI EN300 328 V2.1.1:2016	Complied
D.C. 2014/53/EU	EN301 489-1 V2.1.1:2017 – EMI EN 55032:2015 EN301 489-1 V2.1.1:2017 – EMS EN 55024:2010+A1:2015 EN301 489-1 V2.1.1:2017 – EMS EN 61000-4 2:2009 EN301 489-1 V3.11:2018 –EN 600-4-3:2006+A1:2008+A2:2010	Complied
D.C. 2014/53/EU	EN50566:2017, EN50663:2017	Complied
D.C. 2011/65/EU	Restriction on use of hazardous substances in Electronic and Electrical Equipment	Complied
D.C. 2014/30/EU	Electromagnetic Compatibility (EMC)	Complied
D.C. 2014/35/EU	Low Voltage Directive	Complied
D.C. 2001/95/EC	General Product Safety Directive	Complied
D.C. 1995/5/EC	Articles 31(a), 31(b), 3.1 Radio Frequency	Complied
MILSTD 810G	Drop & Shock Testing	Complied
IP-67 - All sensors & GX400	Intrusion Protection	Complied
IP 54 - gateway	Intrusion Protection	Complied

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Directive	Standard or Description	Status
Explosive Atmospheres - Part 0: Equipment - General Requirements [IEC 60079-0:2017 Ed.7], [EN IEC 60079-0:2018], [UL 60079-0:2019 Ed.7+R:15Apr2020], [CSA C22.2#60079-0:2019 Ed.4]	General requirements for equipment used in explosive atmospheres.	Complied
Explosive Atmospheres - Part 11: Equipment Protection By Intrinsic Safety "I" [IEC 60079-11:2011 Ed.6], [EN 60079-11:2012], [CSA C22.2#60079-11:2014 Ed.2 (R2018)], [UL 60079-11:2013 Ed.6+R:25Jan2023]	Construction of intrinsically safe apparatus for use in explosive atmospheres.	Complied

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