TRACTIAN ST-ULTRA Smart Trac Ultra Sensor Instruction Manual

Contents

TRACTIAN ST-ULTRA Smart Trac Ultra Sensor

Product Information

Specifications

- **Product Name:** Smart Trac Ultra
- **Sensor Power Source:** Lithium battery
- **Sensor Autonomy:** 3 years (default configuration)
- **Communication:** 2G, 3G, 4G/LTE mobile network, Wi-Fi
- **Receiver Range:** Up to 100 sensors within a radius of 100 meters (330 feet) with obstacles, 1 kilometer (0.62 miles) in the open field

Product Usage Instructions

Smart Trac Ultra Sensor

The Smart Trac Ultra sensor is designed to monitor assets by integrating vibration and temperature sensors.

Follow these steps for usage:

1. Power on the sensor using the lithium battery.
2. Register the sensor in the asset via the Smart Receiver Pro.
3. Attach the sensor to the asset using the magnet base. For secure attachment, glue, screw, or weld the base to the surface.
4. Ensure to tighten the lock nut on the base if you need to remove the sensor from the asset.

Smart Receiver Pro

The Smart Receiver Pro acts as a transmitter to send sensor data to TRACTIAN's platform. Here's how to use it.

1. Install the Smart Receiver Pro in an elevated location for optimal coverage.
2. The receiver supports up to 100 sensors within its range.
3. Connect the receiver to a power source and configure it to send data via mobile networks or Wi-Fi.

Warnings

Follow these warnings to ensure the longevity of your devices.

- DO NOT clean the device with solvents like Acetones, Hydrocarbons, Ethers, or Esters.
- DO NOT submerge the device in water (IP69K rating).
- Avoid excessive mechanical impact, dropping, crushing, or friction on the devices.

Frequently Asked Questions

Activation Process

Q: How do I activate my access to the platform?

A: Follow these steps for activation:

1. Go to app.tractian.com and provide your email address.
2. Enter the access code sent to your email (Code: 8758).
3. Return to the website and use the code to unlock access to the platform.

About your Smart Trac Ultra

TRACTIAN System

- By monitoring assets online and in real-time, the TRACTIAN system guarantees solutions to optimize daily maintenance management.
- The system integrates vibration and temperature sensors with mathematical models, generating alerts that avoid unwanted shutdowns and high costs resulting from unexpected failures.

Fault detection

- TRACTIAN’s unique analysis system enables accurate fault detection. The algorithms are constantly trained based on feedback from field analysis, always under the supervision of our vibration specialists.
- Thousands of spectra are collected daily in a system that pinpoints asset failures before they happen.

Real-time data

- Collections and analyses are displayed intuitively on TRACTIAN’s online platform, which is easily accessible from a computer or cell phone, enabling integrations with other systems.
- The platform also allows for complete main-tenance control with hour meters, energy con-sumption, and automatic calculation of asset indicators.

Smart Trac Ultra

- The Smart Trac Ultra sensor is powered by a lithium battery and has an autonomy of 3 years in the default configuration.
- The sensor communicates with the Smart Re-ceiver Pro to send collections. Just register the sensor in the asset and start using the system.

Attachment

- The base of the sensor has a magnet which aids the installation process but does not guarantee fixing. To prevent the sensor from coming loose and guarantee the quality of data acquisition, the base must be glued, screwed, or welded to the surface of the asset.
- If it is necessary to remove the sensor from the asset, the lock nut on the base must be tightened to maintain the original orientation.

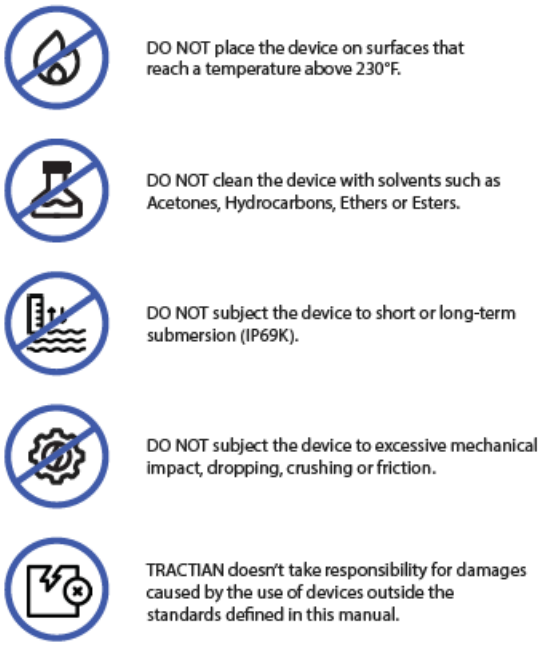
Smart Receiver Pro

- The Smart Receiver Pro is a transmitter responsible for receiving sensor data and sending it to TRACTIAN's platform. The data is sent via the 2G, 3G, and 4G/LTE mobile network via the best available operator in the region, selected automati-cally.
- If necessary, data can be sent via a Wi-Fi network.

Installation

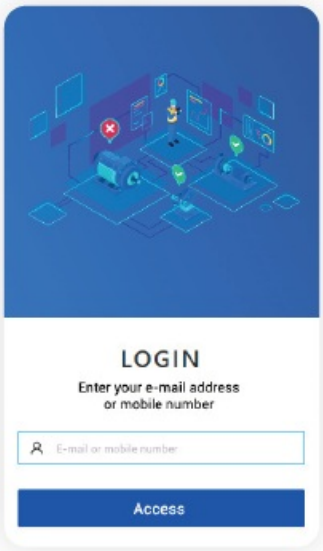
- Smart Receiver Pro supports up to 100 sensors within a radius of 100 meters (330 feet) with obstacles and 1 kilometer (0.62 mile) in the open field, depending on the topography of the plant.
- To install more sensors or cover greater distances, more receivers are required. It is recommended to position the receiver in an elevated location, centered with the sensors.

Warning

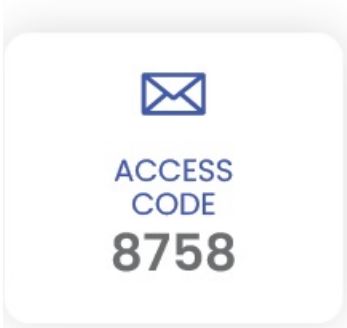


Activation

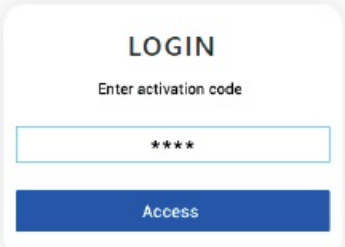
Before installing the devices, activate your access to the platform as follows:



Go to ***app.tractian.com*** and fill in your e-mail.



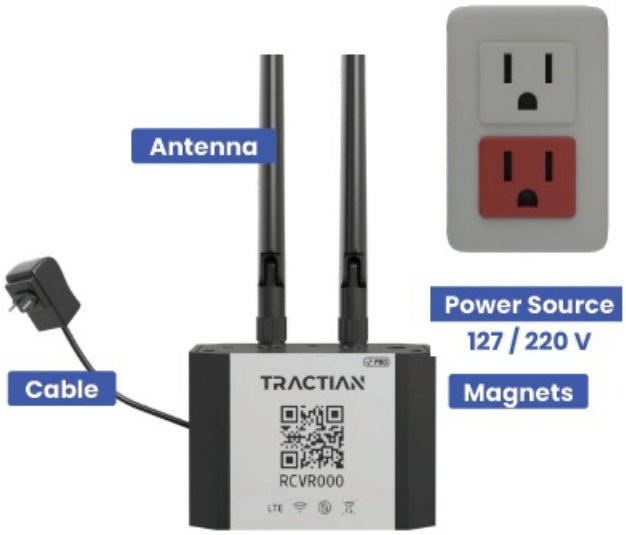
Check the code sent to your e-mail.



Go back to the website and use the code to unlock access to the platform.

Receivers

- TRACTIAN’s Smart Receiver Pro requires an external power supply.
- So make sure there are electrical connections near the installation site.
- DO NOT set up the Smart Receiver Pro inside metal electrical panels, because these may block the receiver’s signal.
- As for other types of electrical panels, such as plastic ones, there is no risk to receivers.

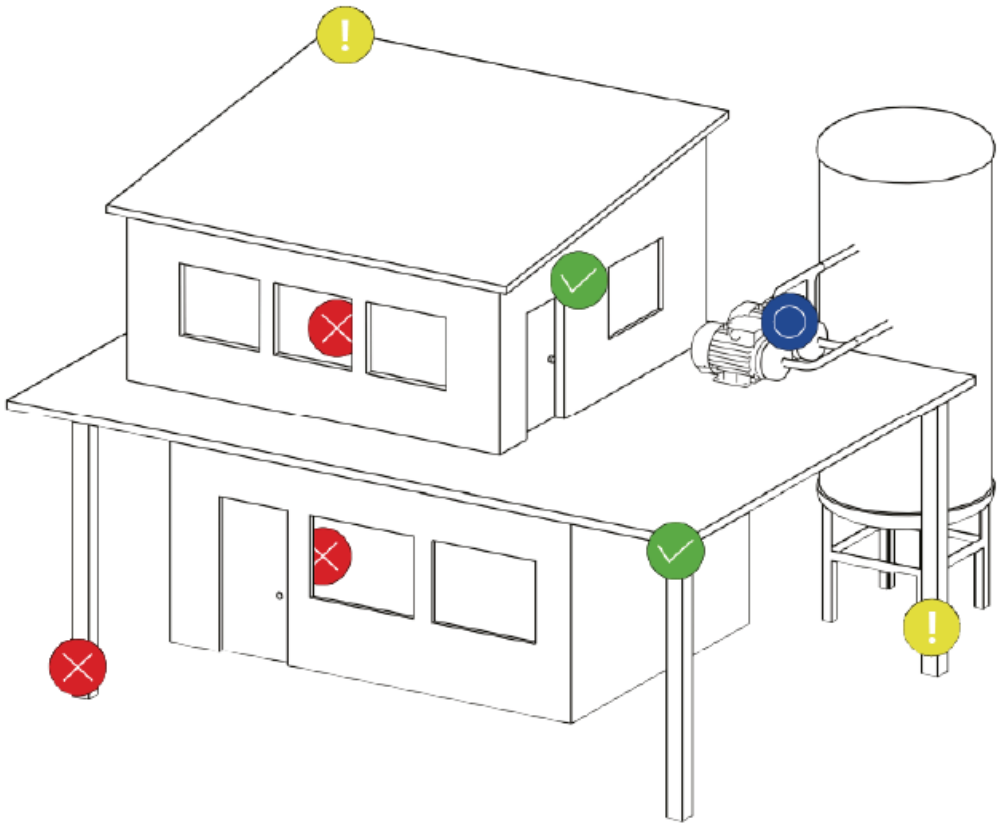


Range & Reach

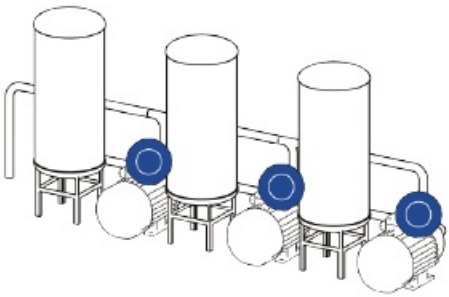
- The receiver supports a maximum distance of 100 meters (330 feet) from the sensors with obstacles and 1 kilometer (0.62 mile) in the open field. It can communicate with up to 100 sensors, depending on the case.
- For this reason, to obtain the best results in places with a large number of assets, it is recommended to use more receivers in the same area.

Installation Site

- For best results, set up the receiver only in elevated places with the antenna in front of the sensors. Also, note areas with no obstacles between the sensors and the receiver.



- Ideal
- Not ideal, but acceptable
- Inadequate position
- Smart Trac Ultra Sensor



Connection

Mobile Network

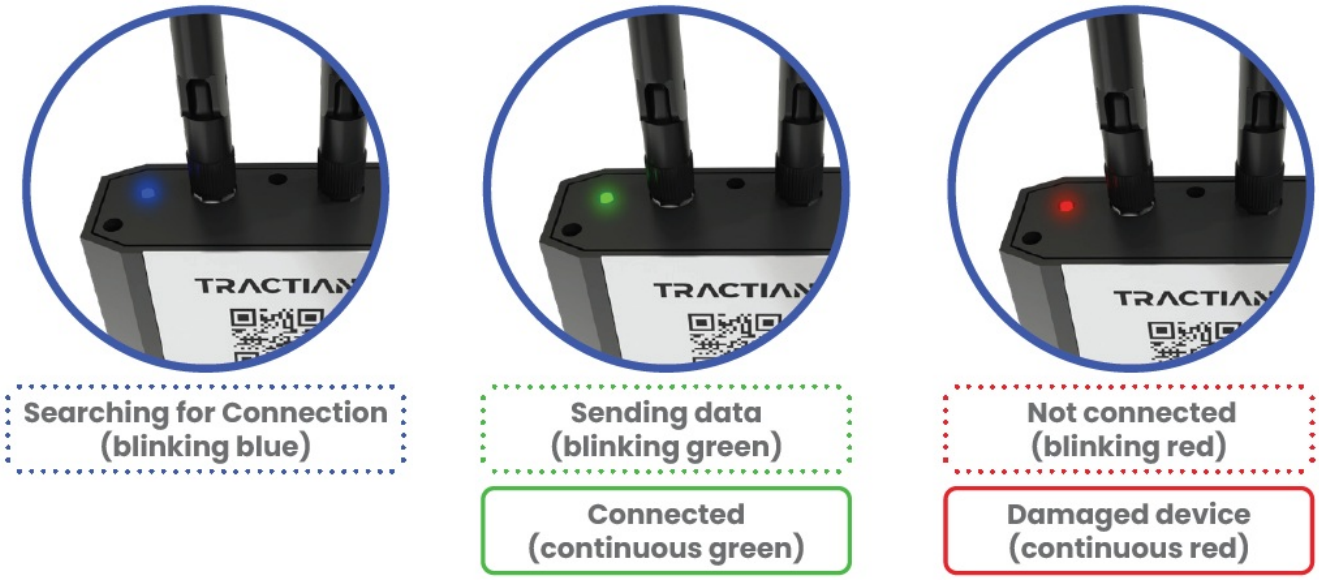
- The Smart Receiver Pro connects automatically to the best available LTE/4G network in your region.

Wi-Fi

- In case there is no mobile network available or you would rather connect it to a Wi-Fi network, the connection is possible.
- When plugged into the power outlet, the receiver will turn on a white light and generate a network that can be found in the Wi-Fi settings of nearby devices (such as smartphones or computers).
- By connecting your device to the receiver’s temporary network, you will see a form that must be filled out with

your company’s Wi-Fi information so the receiver can connect to it.

- The receiver’s own network will be generated 10 seconds after it is plugged in. If no device connects within 1 minute, the receiver will search for the best available mobile network.



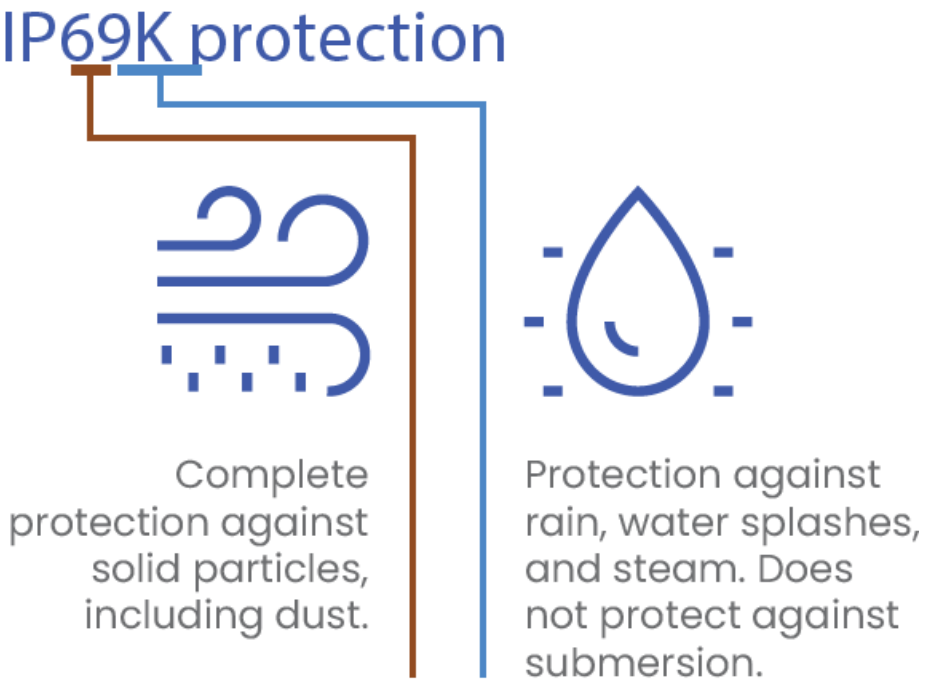
Sensors

Your Smart Trac Ultra sensor is already working!

All you have to do is install it on your equipment and monitor this chosen asset on the TRACTIAN platform.

Sensor Setup

- The most critical step for the correct setup of the sensors is choosing an appropriate location to place them in the asset.
- This has a direct impact on the assertiveness of the insights, so pay attention to the following tutorials.



Positioning

Electric Motor

Inappropriate Positions	Acceptable Positions	Recommended Positions
Moving parts Moving parts will cause the sensor t o detach from the equipment, incre asing the chances of accidents, as well as making the measurement in accurate. **Uneven or curved surfaces** Uneven surfaces can make it difficu lt to plug the sensor, reducing meas urement accuracy. **Regions close to where the engi ne is attached** The regions close to where the mot or is attached are less sensitive to vibrations, making it impossible to d etect failures related to unbalance and misalignment. **Distant from the bearings** Locations distant from the bearings pick up little vibration and may suff er interference from other vibration sources.	**Engine core areas** Although they are not close to the s haft bearing, a good fixture ensures that the sensor can collect vibration data, but with lower sensitivity. **A sensor positioned with at least 1 axis aligned to the motor axial** If it is not possible to fix the sensor t o make all axes align, ensure that a t least 1 axis of the sensor is aligne d to the motor axial.	**Flat surfaces** Flat surfaces give more stability for sensor attachment, allowing a more accurate vibration data collection. **Sensor shafts aligned to the engi ne** The sensor axes' alignment with th e motor makes the training of our al gorithms more effective. **Close to the bearings** The closer the sensor is to the beari ngs on the shaft of the motor, the m ore accurate the measurement will be.

Electric Motor

It is recommended to plug the sensor in a way where the Z axis is oriented in the vertical direction of the equipment. The X and Y axes must be in the horizontal and axial directions, respectively.

- Ideal
- Not ideal, but acceptable
- Inadequate position

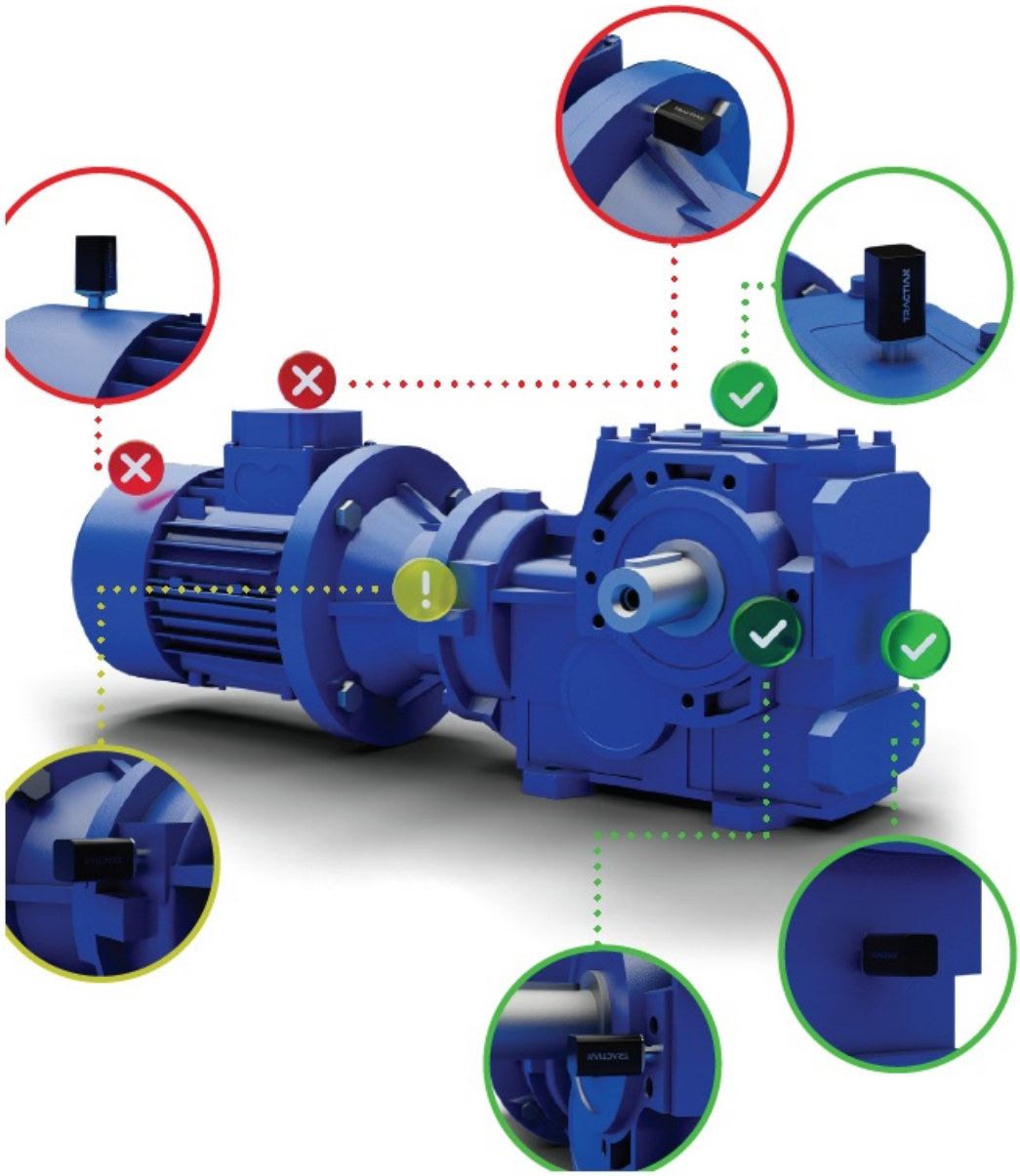
Electric Motor

If it is not possible to plug the Z-axis in the radial direction, fix the sensor with at least two of its axes oriented both vertically and horizontally. Prioritize locations near bearings and with flat surfaces.

- Ideal
- Not ideal, but acceptable
- Inadequate position

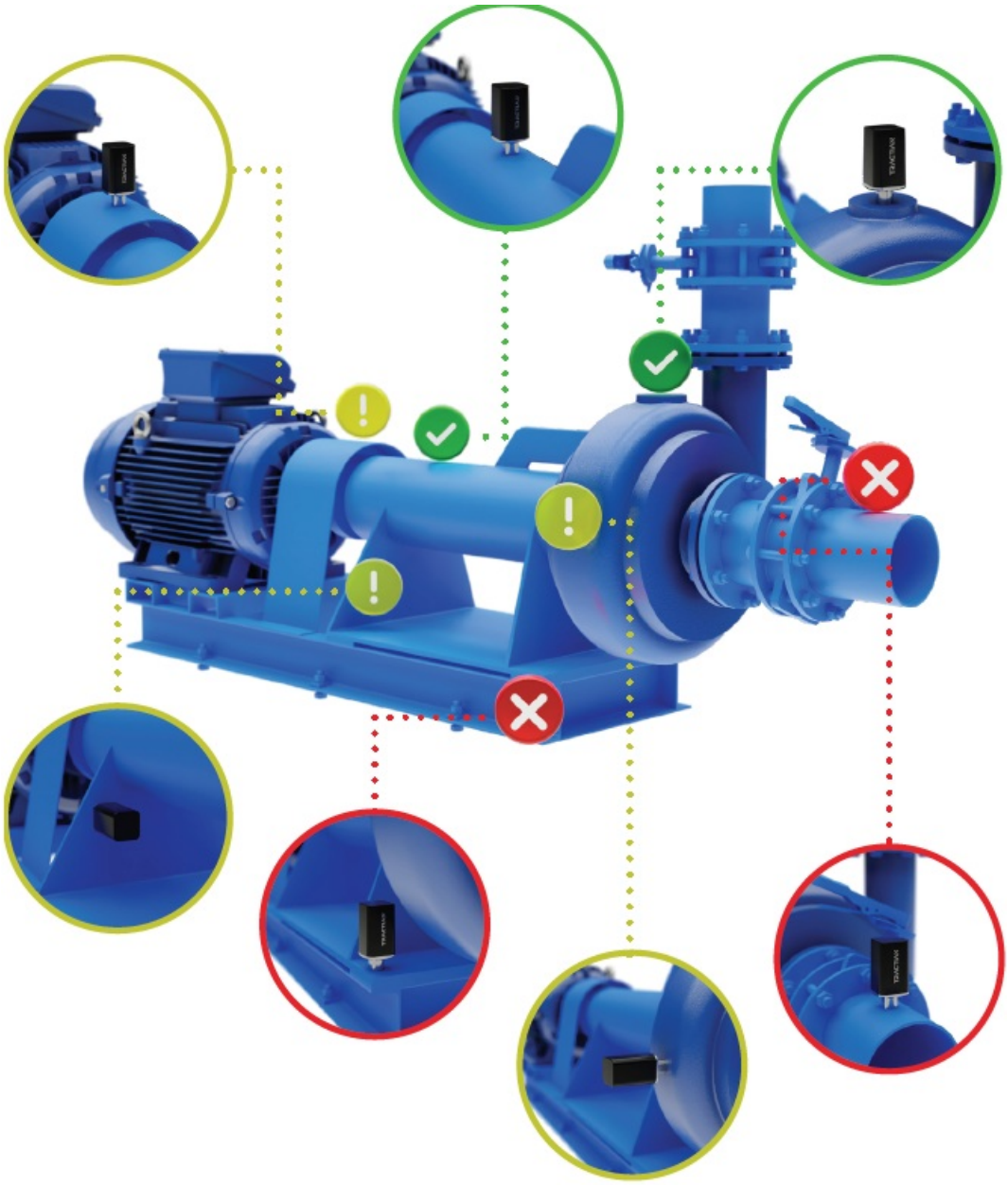
Reducer

For greater assertiveness and better gear monitoring, some gearbox models recommend installing two or more devices.



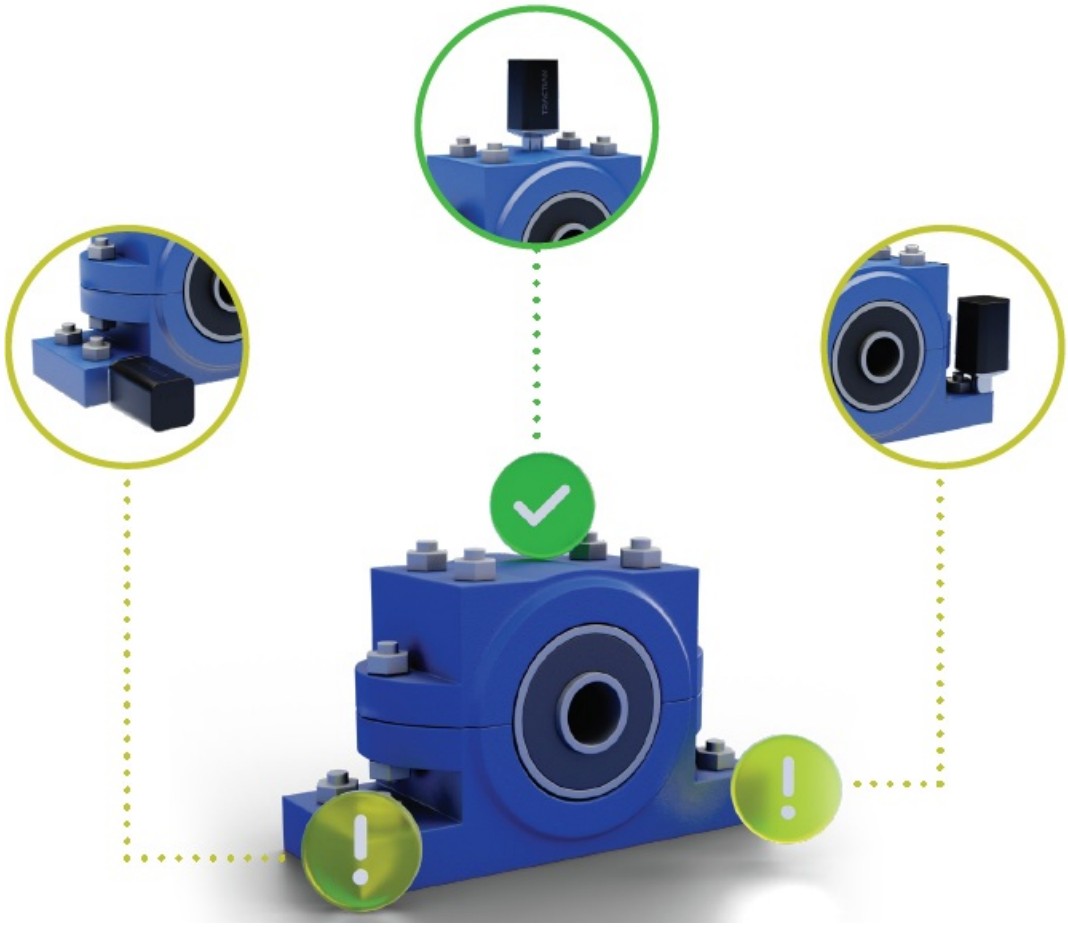
- Ideal
- Not ideal, but acceptable
- Inadequate position

Motor Pump



- Ideal
- Not ideal, but acceptable
- Inadequate position

Bearing

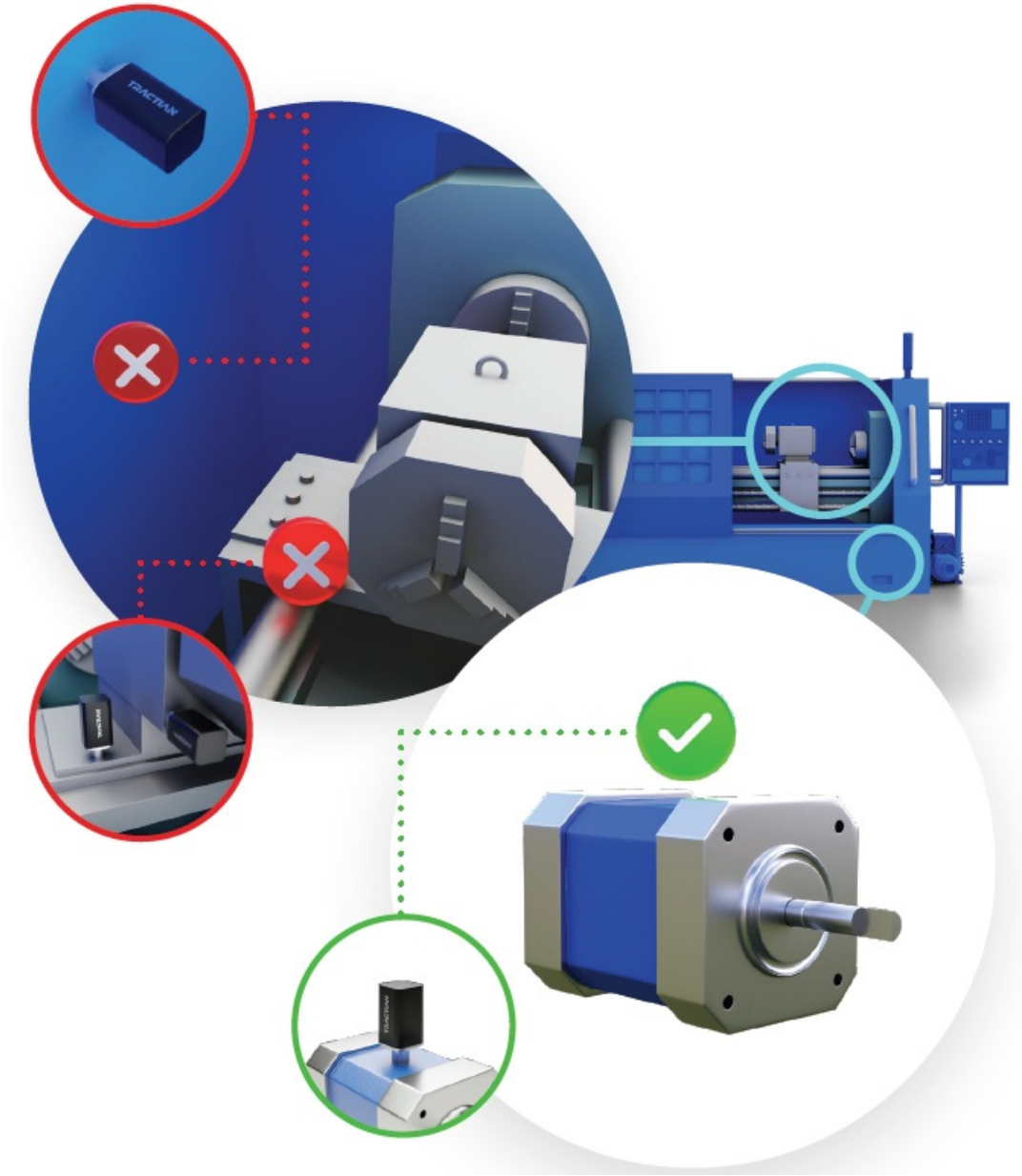


- Ideal
- Not ideal, but acceptable
- Inadequate position

CNC machines

Inappropriate Positions	Acceptable Positions	Recommended Positions
Moving parts In addition to providing an inaccurate measurement, the setup of the sensors on moving parts can loosen or crush the device, increasing the chance of accidents. **Uneven or curved surfaces** Uneven surfaces can make it difficult to plug the sensor, reducing measurement accuracy. **Distant from the engines** For the best vibration data collection, the sensors should be plugged directly into the CNC motors. **Machining area** Cutting fluid and material burrs can damage the sensor. **Areas with a temperature equal to or higher than 194 ºF** Sensor functionality is compromised if the location's temperature is higher than the 194ºF limit.	**Internal areas of the equipment** Placing the sensor in the internal areas of the machines is the best option. However, if the asset has many walls, the signal's range will be compromised.	**In direct contact with the engine** The sensor must be in an internal area of the asset, protected from the waste generated by machining, and attached to the motor. **Sensor shafts aligned to the engine** The sensor axis alignment with the motor increases our algorithms' effectiveness. **Close to the bearings** The closer the sensor is to the shaft bearings of the motor, the more accurate the measurement will be.

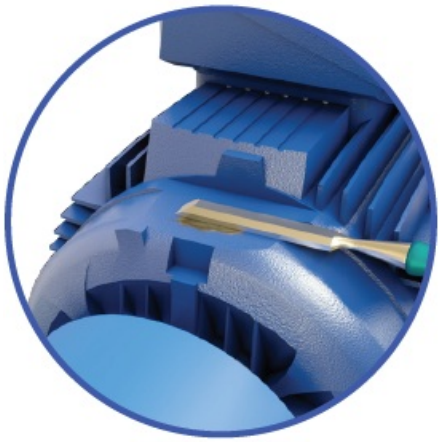
CNC machines



- Ideal
- Not ideal, but acceptable
- Inadequate position

Cleaning

- For greater assertiveness and better gear monitoring, some gearbox models recommend installing two or more devices.
- With a brush or sandpaper, remove solid particles and incrustations present on the surface where the Smart Trac Ultra will be set up.
- Clean and dry the attachment area so that no dust or oil residue is left on the installation surface.
- After preparing the surface, start the process of plugging the Smart Trac by gluing, screwing or welding, following the tutorials below. Remember: the rigid attachment of the sensor to the equipment is very important for the accuracy of the collections.



Glue Attachment

- To install the sensor by gluing the base, use the adhesive provided with the sensors.
- The proper placement of the sensor will vary depending on the machine type. Refer to the Positioning section of this manual to perform this step.
- Ensure the area is cleaned, dried, and free of debris by following the instructions on the previous page.

1. Remove the adhesive on the sensor’s magnetic base.
2. Apply the activator spray to the sensor base.
3. After the spray, apply a small amount of AA 330 adhesive to the base.

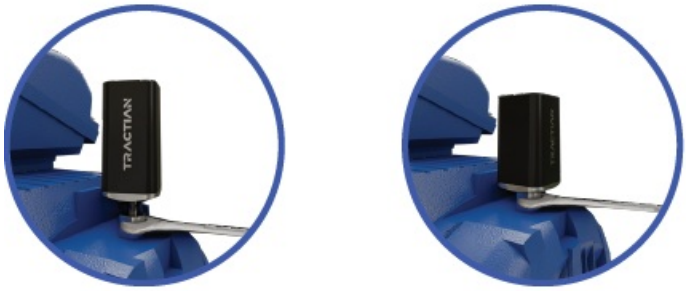
4. Apply the spray to the surface of the asset where the sensor will be attached.
5. Attach the sensor watching out for the positioning of the axes and hold it still for 60 seconds.

Screw Attachment

The proper placement of the sensor will vary depending on the machine type. Refer to the Positioning section of this manual to perform this step.

To install the Smart Trac Ultra by screwing, follow these instructions:

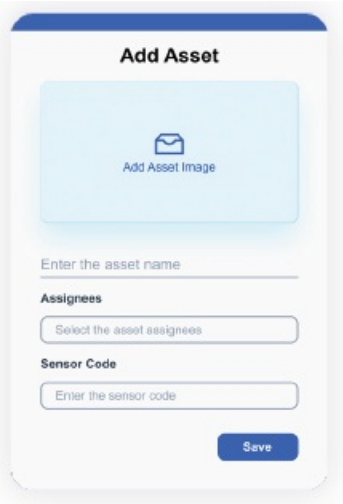
1. Do a 7mm-deep hole using a 6,8mm diameter drill bit. Important: The equipment must have sufficient wall thickness for the process.
2. Pass the M8x1,25 tap and remove the chips from inside the hole.
3. Loosen the sensor lock nut and remove the magnetic base with a 13mm fork wrench.



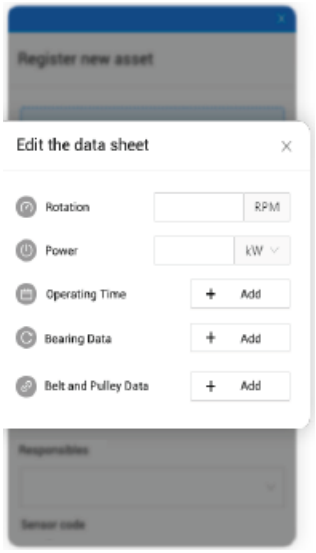
4. Rotating the sensor clockwise, thread the device until the screw reaches the bottom of the hole.
    - Then, adjust the orientation of the axes by turning counterclockwise.
5. Adjust the lock nut by making contact with the active surface while holding the sensor in the right position (apply from 10,5N.m).

Asset Registration

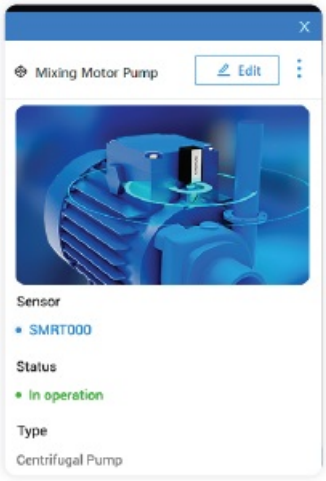
- Click Add Asset in the Assets tab of the platform and enter the machine information, including its sensor code.



- Click on Edit Datasheet and fill in as many fields as possible with the asset specifications. This step is crucial for specific insights.



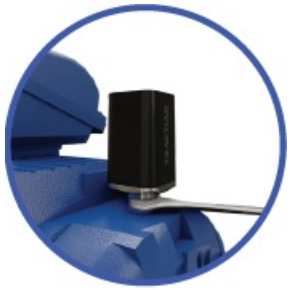
- Now, all you have to do is access your asset on the platform and check the date of the last collection to see if everything is working properly.



Sensor Removal

If you need to remove the sensor, follow the instructions below:

1. Loosen the padlock nut by turning counterclockwise.
2. Completely unscrew the sensor before removing the base.



3. With a wrench, apply torque in the tightening direction (will require more force). Never apply torque directly to

the sensor, as it may damage it.

Smart Trac Ultra Functionalities

Asset Tree	Yes
Complete Asset Health Check Up	Yes
Automatic Alerts	Yes (Artificial Intelligence)
Failure Modes	• Clearances • Cavitation • Wear • Unbalance • Misalignment • Bearing Faults • Gear Failures
Machine Learning	Yes
Analysis Tools	• BPF • BPFI • BPFO • BSF • FTF • GMF • Harmonics
Comparison between Assets	Yes (Automatic and Manual, in the trend of global values and spectrum, with a waterfall chart)
Access Profiles	Yes (Customizable Access Levels)
Smart Filters	Yes
Report & Indicators	• Availability • Energy Consumption • MTBF • Reliability • Customizable Indicators

Virtual Plant	Yes (Visual Management)
Mobile Application	iOS & Android (Tablet and Mobile, with Remote Access)
Alert History	Yes
Instant Set Up	Yes (Plug & Play)
Connectivity with Mobile Network	Yes (2G, 3G, 4G/LTE receiver)
Measurement	1. Velocity and Acceleration – RMS – Peak – Peak-To-Peak – Crest Factor 2. Velocity and Acceleration Spectrum – Peak – Envelope 3. Temperature 4. Hour Meter
Non-Invasive Fixation	Yes (Magnet, Screw, Epoxy)
Energy Supply	Battery (3 years autonomy)
Degree of Protection	IP69K
Offline Storage	Yes (250 Samples on standard configuration)
Access by QR Code	Yes
Integration with ERP Market	Yes (Open API)
Real Time Notifications	Yes (App and e-mail)

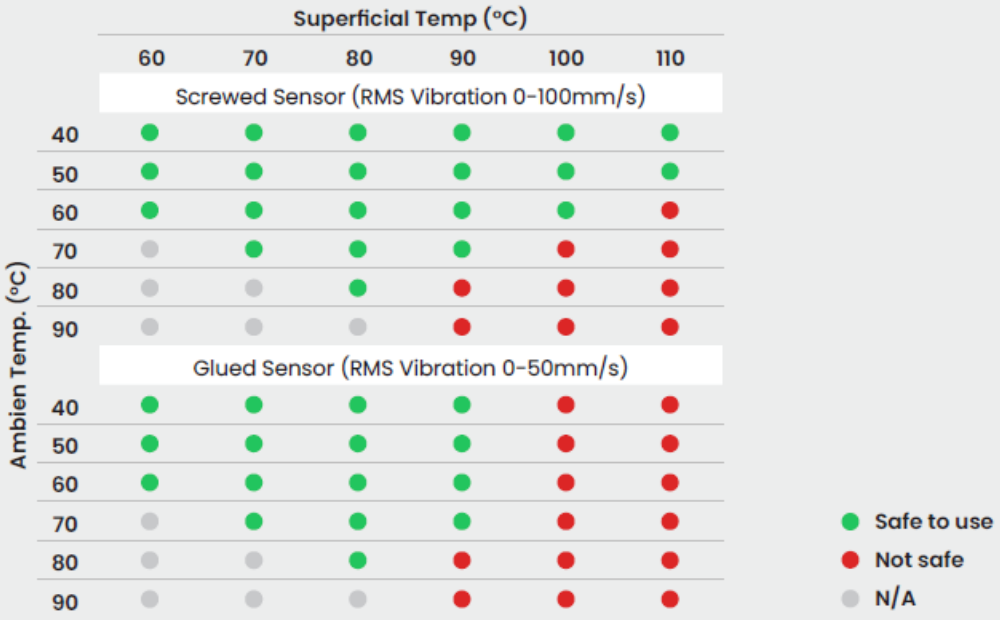
Support	24/7
Training	Included
Asset Status Overview	Yes
Unlimited Users	Yes

Smart Trac Ultra Technical Specifications

Measurements Frequency Acceleration Velocity Temperature Typical configuration	From 0 Hz to 32000 Hz Up to 16 g Up to 100 mm/s RMS -40°C to +110°C (-40°F to 230°F) New collections every 5 minutes
Freq. of Acquisition (Hz) **500** 8,2 **1000** 4,1 **2000** 2,1 **4000** 1,1 **8000** 0,6 **16000** 0,3 **32000** 0,2 **Number of lines 4096** ¹ RPM calculated considering a	**Duration (s) Min RPM¹** 16,4 32,8 65,6 **0,9** 8,2 16,4 32,8 **1,8** 4,1 8,2 16,4 **3,6** 2,1 4,1 8,2 **7,3** 1,1 2,1 4,1 **14,6** 0,6 1,1 2,1 **29,3** 0,3 0,6 1,1 **58,6** **8192 16384 32768** complete machine cycle
Wireless Communication Frequency Protocol Range in open field Range indoors	915MHz ISM IEEE 802.15.4g Up to 1km (0.62 miles) between sensor and receiver, depending on plant topology Up to 100m (330 feet) between sensor and receiver, depending on plant topology
Physical Characteristics Dimensions Max height (with base) Weight External Material Building Attachment	40mm / 1.6in (W) x 71mm / 2.8in (H) x 40mm / 1.6in (D), excluding the sensor base 85 mm 180g Makrolon 2407 The sensor base can be glued, screwed, or welded to the surface of the asset.

Environmental Characteristics

IP Rating	IP69K
Operation Temperature	From -40°C to +90°C (-40°F to 194°F)
Humidity	Suitable for installation in high humidity areas
Hazardous Area Rating	Safe areas only For zones 1 and 2 (gas) and zones 20, 21 and 22 (dust), request Smart Trac Ex from our team of experts.



Power Source

Battery	Replaceable lithium battery Up to 3 years, if in default setting
Average Life Time	
Adversely Factors Affecting	Temperature, transmission distance and data acquisition configuration.

Certification

FCC ID	2BCIS-ST-ULTRA
IC ID	31644-STULTRA

Regulatory Compliance

FCC Class A Information

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions.

1. This device may not cause harmful interference,
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, according to part 15 of the FCC Rules. These limits are designed. to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used per the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly proved by the party responsible for compliance could void the user's authority to operate this equipment. This device complies with the FCC RF exposure limits and has been evaluated in compliance with portable/mobile exposure conditions. The equipment must be installed operated and evaluated with a minimum distance of 20 cm

from the human body.

ISED Certification

This device complies with ISED Canada’s license-exempt RSSs. Operation is subject to the following two conditions.

1. This device may not cause interference;
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.
This device complies with the FCC RF exposure limits and has been evaluated in compliance with portable/mobile exposure conditions. The equipment must be installed and operated and was evaluated with a minimum distance of 20 cm from the human body

- get@tractian.com
- **201 17th Street NW, 2nd Floor Atlanta – GA, 30363**

Documents / Resources

	TRACTIAN ST-ULTRA Smart Trac Ultra Sensor [pdf] Instruction Manual ST-ULTRA, ST-ULTRA Smart Trac Ultra Sensor, Smart Trac Ultra Sensor, Trac Ultra Sensor, Ultra Sensor, Sensor

References

- TRACTIAN
- User Manual