TRACTIAN

Instruction Manual
Smart Trac Ultra

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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 maintenance control with hour meters, energy consumption 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 Receiver 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 retightened 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 automatically. 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 in relation to the sensors.

Warning

DO NOT place the device on surfaces that reach a temperature above 230°F.

DO NOT clean the device with solvents such as Acetones, Hydrocarbons, Ethers or Esters.

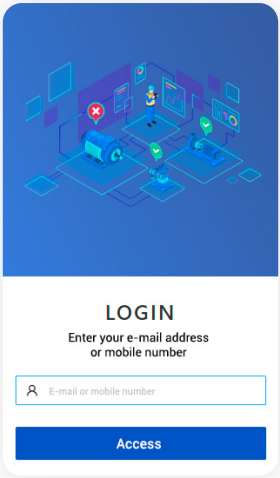
DO NOT subject the device to short or long-term submersion (IP69K).

DO NOT subject the device to excessive mechanical impact, dropping, crushing or friction.

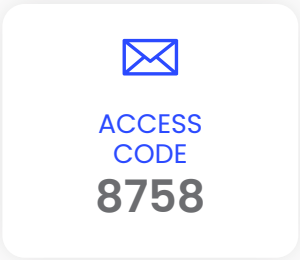
TRACTIAN doesn't take responsibility for damages caused by the use of devices outside the standards defined in this manual.

Activation

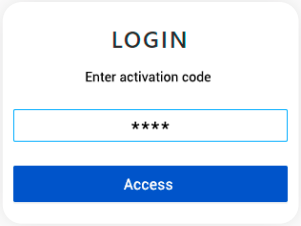
Before installing the devices,
activate your access to the platform as follows:



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



Check the code
sent to your e-mail.

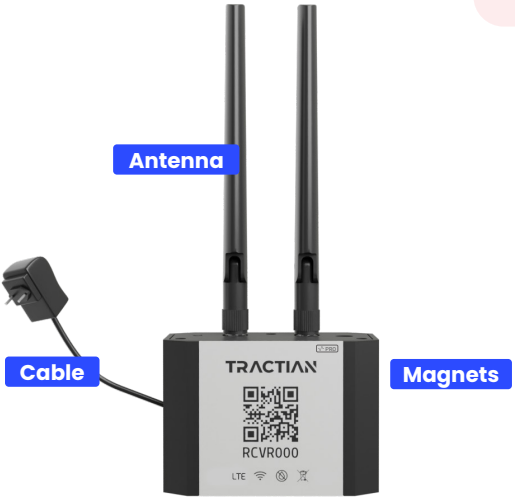


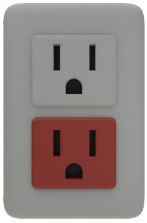
Go back to the
website and use the
code to unlock access
to the platform.

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.





Power Source
127 / 220 V

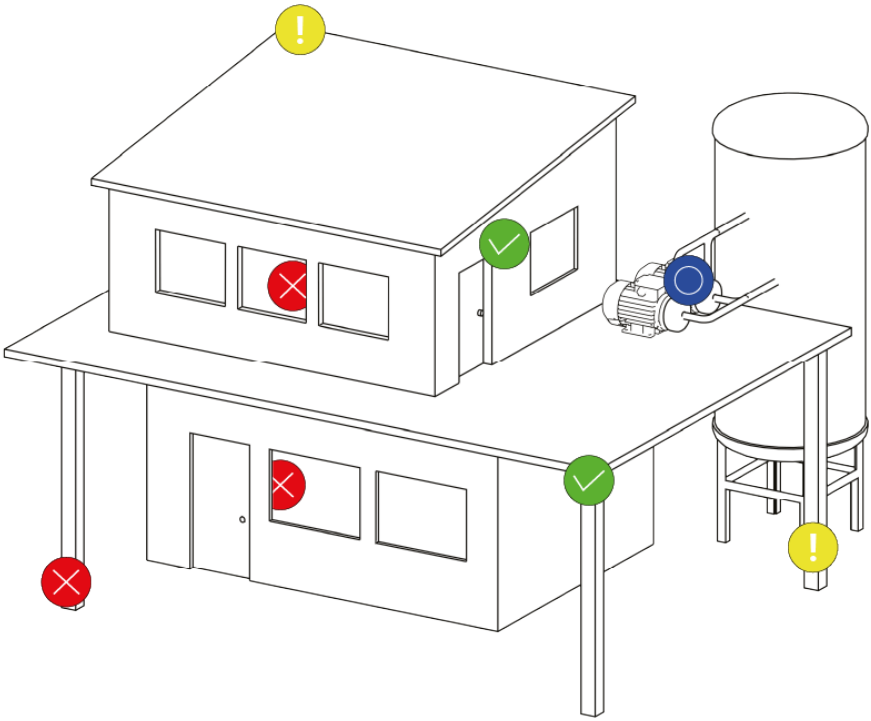
Range & Reach

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.

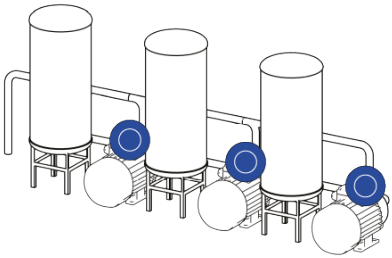
For this reason, to obtain the best results in places with a large number of assets, it is recommended to use more receivers in the same area.

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 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 its own 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.

Awaiting Connection (continuous white)

Settings Page

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.

Searching for Connection (blinking blue)

Sending data (blinking green)

Connected (continuous green)

Not connected (blinking red)

Damaged device (continuous red)

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.

IP69K protection

Complete protection against solid particles, including dust.

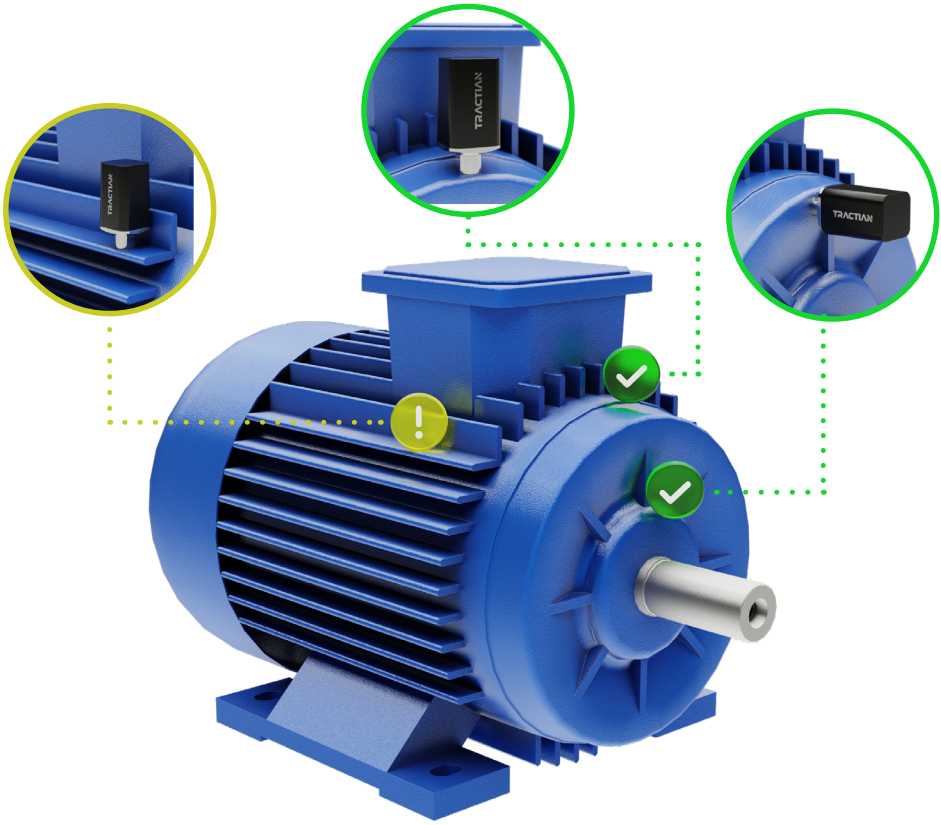
Protection against rain, water splashes, and steam. Does not protect against submersion.

Positioning

Electric Motor

Inappropriate Positions	Acceptable Positions	Recommended Positions
Moving parts Moving parts will cause the sensor to detach from the equipment, increasing the chances of accidents, as well as making the measurement inaccurate. **Uneven or curved surfaces** Uneven surfaces can make it difficult to plug the sensor, reducing measurement accuracy. **Regions close to where the engine is attached** The regions close to where the motor is attached are less sensitive to vibrations, making it impossible to detect failures related to unbalance and misalignment. **Distant from the bearings** Locations distant from the bearings pick up little vibration and may suffer interference from other vibration sources.	**Engine core areas** Although they are not close to the shaft bearing, a good fixture ensures that the sensor can collect vibration data, but with lower sensitivity. **Sensor positioned with at least 1 axis aligned to the motor axial** If it is not possible to fix the sensor to make all axes align, ensure that at least 1 axis of the sensor is aligned 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 engine** The sensor axes alignment with the motor makes the training of our algorithms more effective. **Close to the bearings** The closer the sensor is to the bearings on the shaft of the motor, the more accurate the measurement will be.

Electric Motor



- Ideal
- Not ideal, but acceptable
- Inadequate position

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.

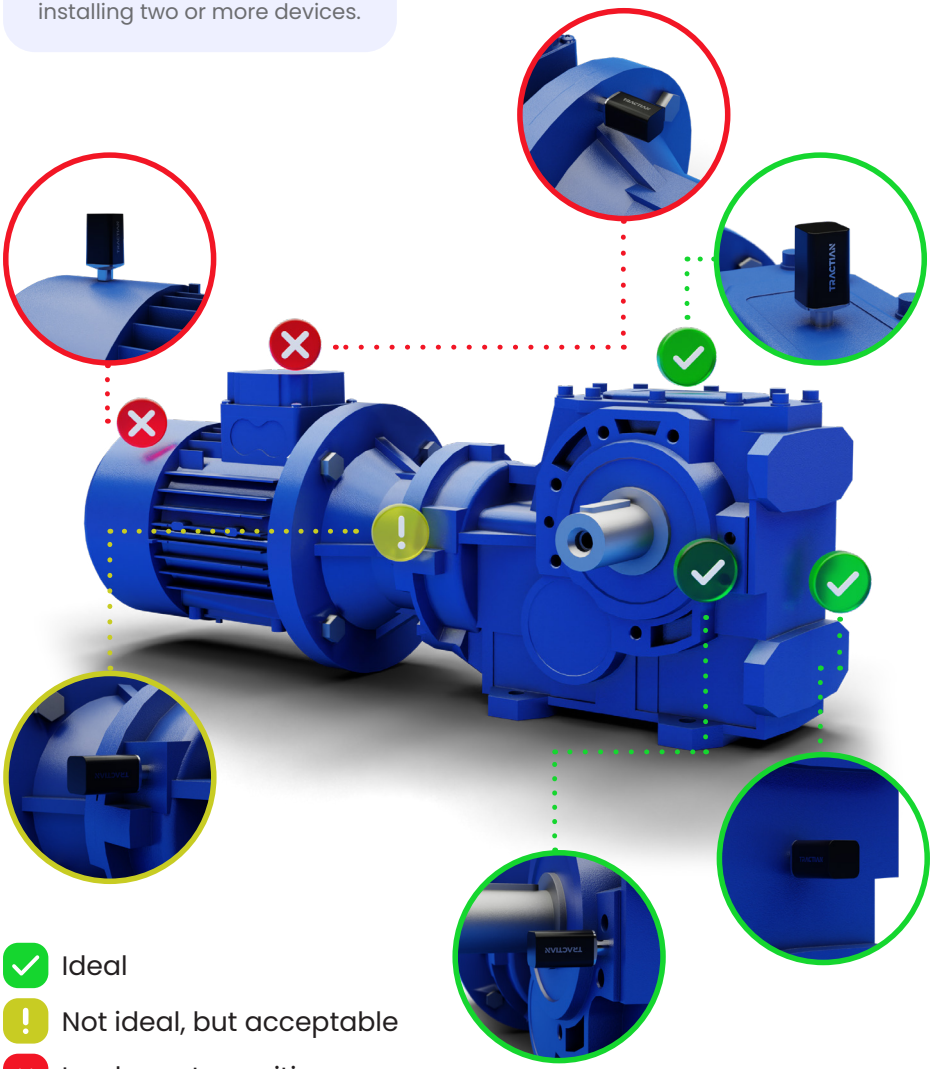
Electric Motor

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

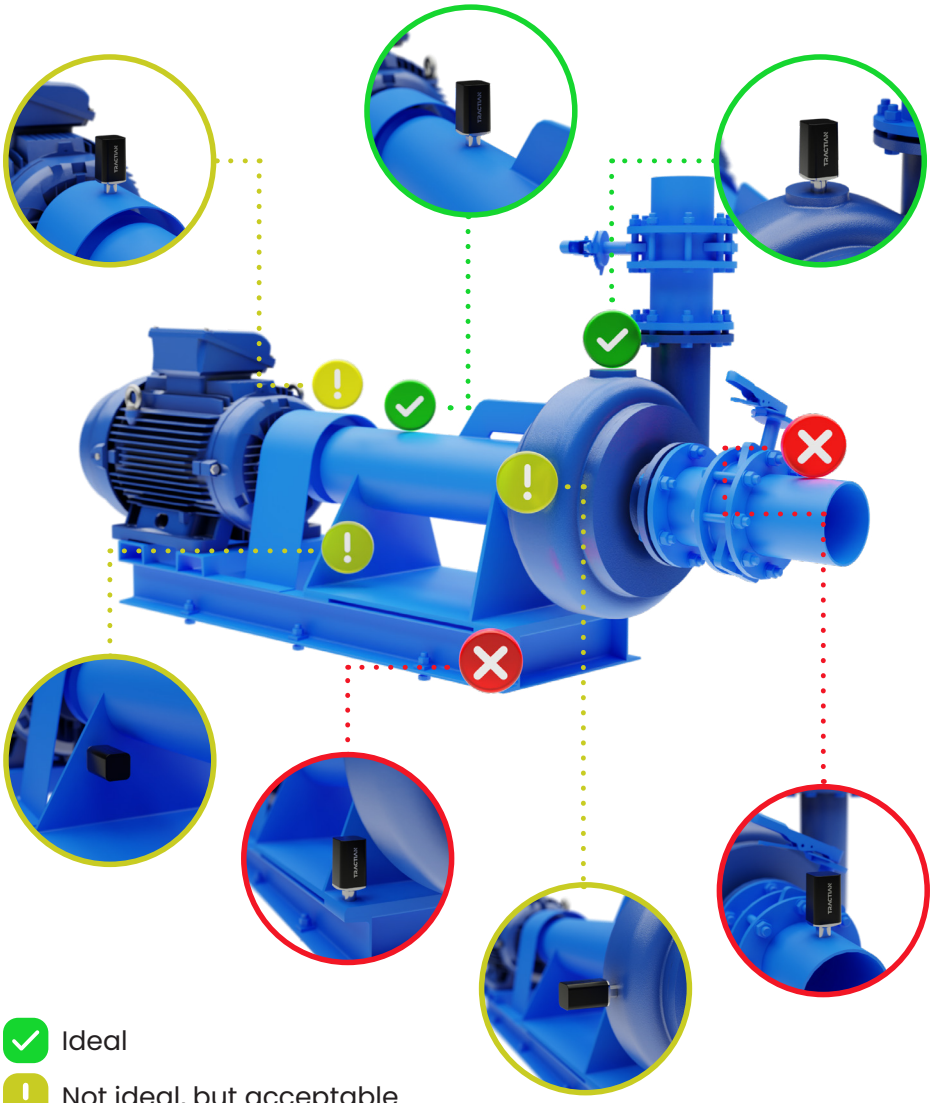
Reducer

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



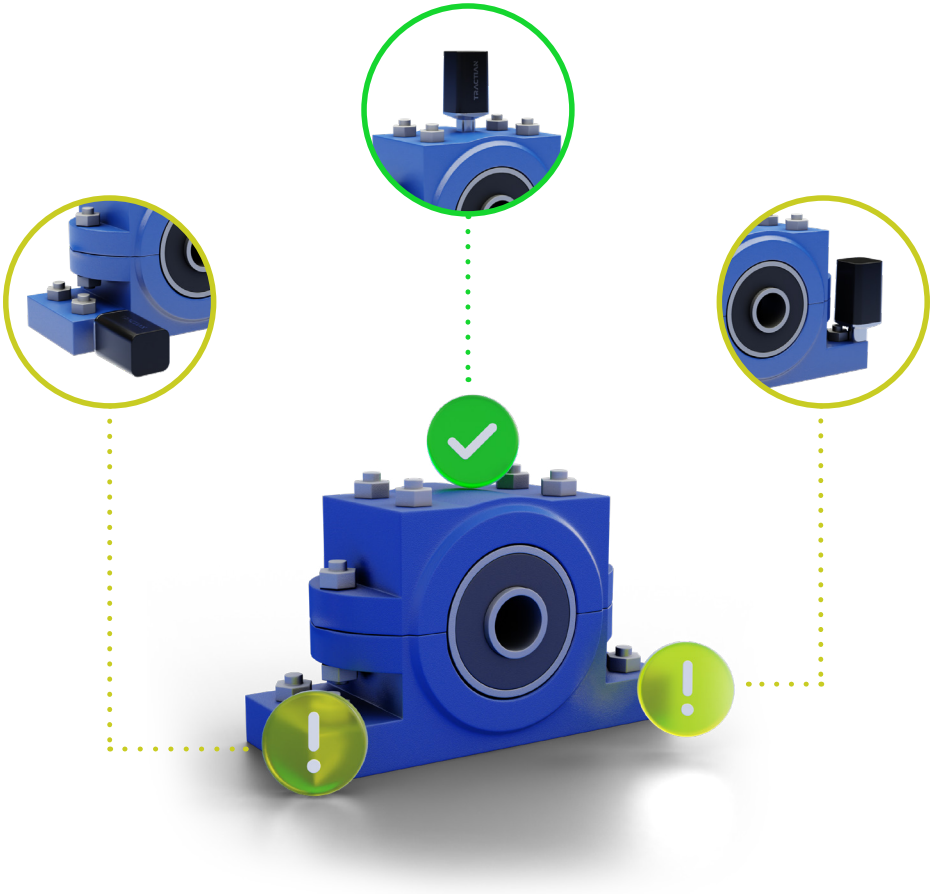
- Ideal
- Not ideal, but acceptable
- Inadequate position

Motor Pump



- Ideal
- Not ideal, but acceptable
- Inadequate position

Bearing



Ideal

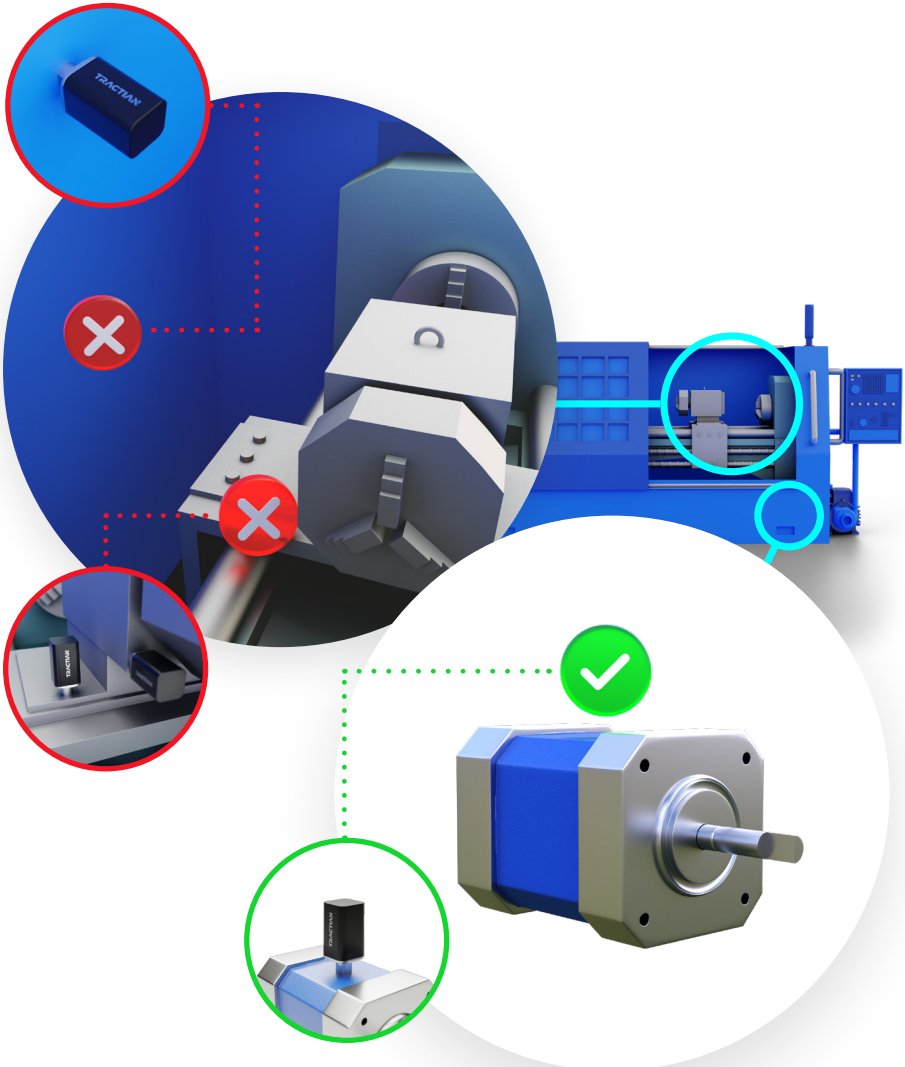
Not ideal, but acceptable

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 temperature equal or higher than 194 °F** Sensor functionality is compromised if the location's temperature is higher than the 194°F limit.	**Internal areas of the equipment** Placing the sensor in 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

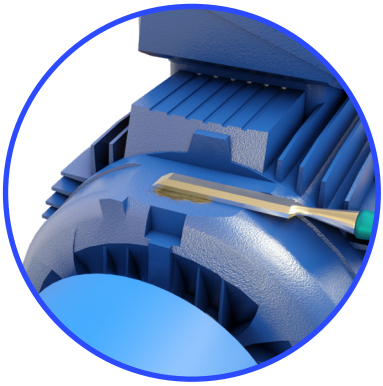
Cleaning

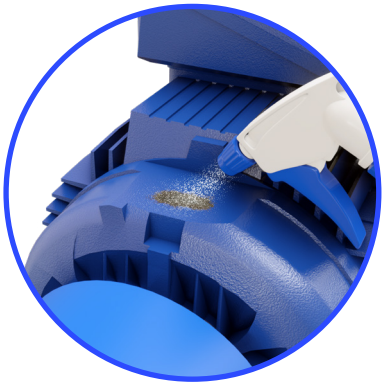
For greater assertiveness and better gear monitoring, some gearbox models recommend installing two or more devices.

1. With a brush or sandpaper, remove solid particles and incrustations present on the surface where the Smart Trac Ultra will be set up.

2. 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.

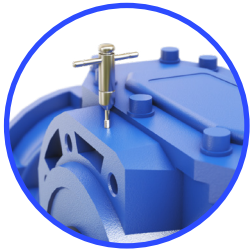
5. Attach the sensor watching out to the positioning of the axes and hold it still for 60 seconds.

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:

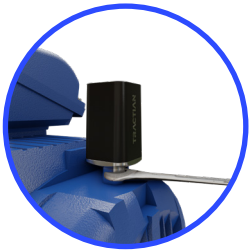
1. Do a 7mm-deep hole using a 6,8mm diameter drill bit. **Important:** The equipment must have sufficient wall thickness for the process.



2. Pass the M8x1,25 tap and remove the chips from inside the hole.

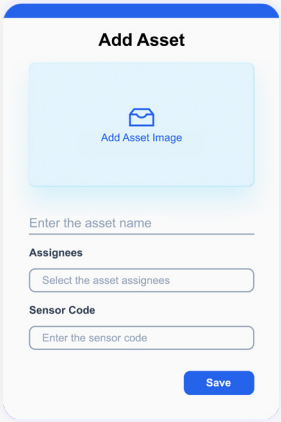
3. Loosen the sensor lock nut and remove the magnetic base with a 13mm fork wrench.

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.

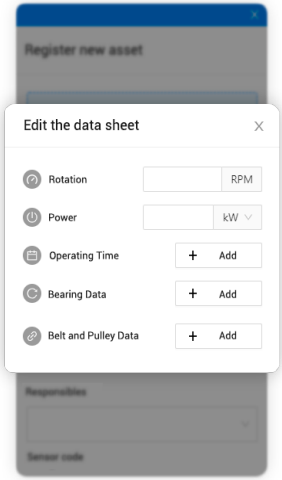


5. Adjust the lock nut by making contact with the active surface while holding the sensor in the right position (apply from10,5N.m).

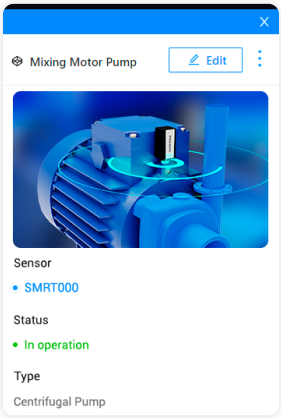
Asset Registration



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.



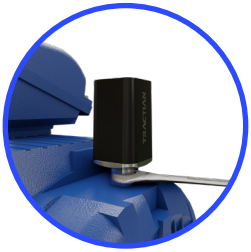
Now, all you have to do is access your asset on the platform and check the date of the last collection to see if everything is working properly.

Sensor Removal

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

1. Loosen the parlock 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 trend of global values and spectrum, with 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	From 0 Hz to 32000 Hz
Acceleration	Up to 16 g
Velocity	Up to 100 mm/s RMS
Temperature	-40°C to +110°C (-40°F to 230°F)
Typical configuration	New collections every 5 minutes

Freq. of Acquisition (Hz)		**Duration (s)**			**Min RPM[1]**
500	8,2	16,4	32,8	65,6	**0,9**
1000	4,1	8,2	16,4	32,8	**1,8**
2000	2,1	4,1	8,2	16,4	**3,6**
4000	1,1	2,1	4,1	8,2	**7,3**
8000	0,6	1,1	2,1	4,1	**14,6**
16000	0,3	0,6	1,1	2,1	**29,3**
32000	0,2	0,3	0,6	1,1	**58,6**
Number of lines	**4096**	**8192**	**16384**	**32768**	

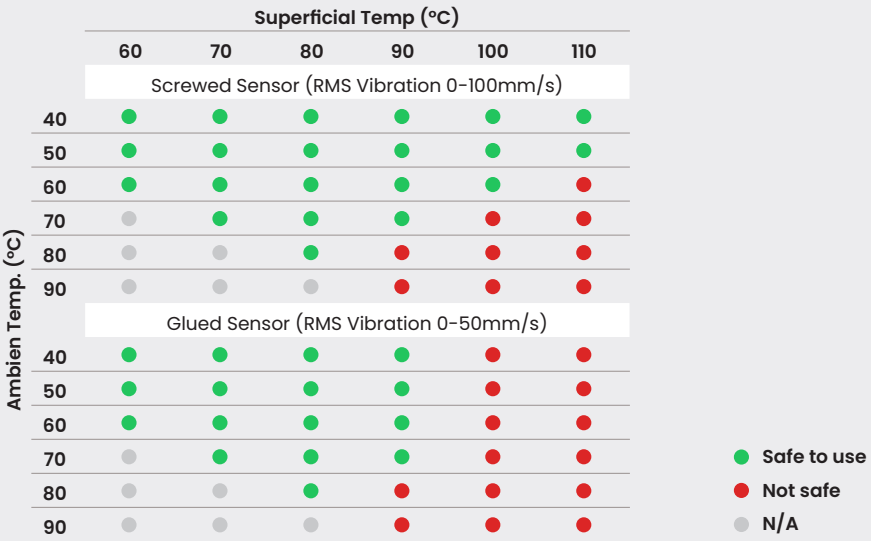
[1] RPM calculated considering a complete machine cycle

Wireless Communication	
Frequency	915MHz ISM
Protocol	IEEE 802.15.4g
Range in open field	Up to 1km (0.62 miles) between sensor and receiver, depending on plant topology
Range indoors	Up to 100m (330 feet) between sensor and receiver, depending on plant topology

Physical Characteristics	
Dimensions	40mm / 1.6in (W) x 71mm / 2.8in (H) x 40mm / 1.6in (D), excluding the sensor base
Max height (with base)	85 mm
Weight	180g
External Material Building	Makrolon 2407
Attachment	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 receive, 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, pursuant 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 in accordance with 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 a 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 and operated and was evaluated with minimum distance of 20 cm of the human body.

ISED Certification

This device complies with ISED Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference; and
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 minimum distance of 20 cm of the human body

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et,
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Les changements ou modifications non expressément approuvés par la partie responsable de la conformité peuvent annuler le droit de l'utilisateur à utiliser l'équipement.

Cet appareil est conforme aux limites d'exposition RF d'ISED et a été évalué conformément aux conditions d'exposition portable.
L'équipement doit être installé et utilisé à une distance minimale de 20 cm du corps humain.

Cet appareil numérique de classe A est conforme à la norme canadienne NMB-003.

TRACTIAN

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