

IoT SENSOR

Smart Trac^{UG2}

Overview

Smart Trac UG2 is a wireless condition monitoring sensor for continuous assessment of machine health in industrial applications.

The sensor integrates vibration, ultrasonic, temperature, magnetic field, and rotational speed with secure connectivity and cloud-based analytics to ensure reliable data acquisition, transmission, and processing.

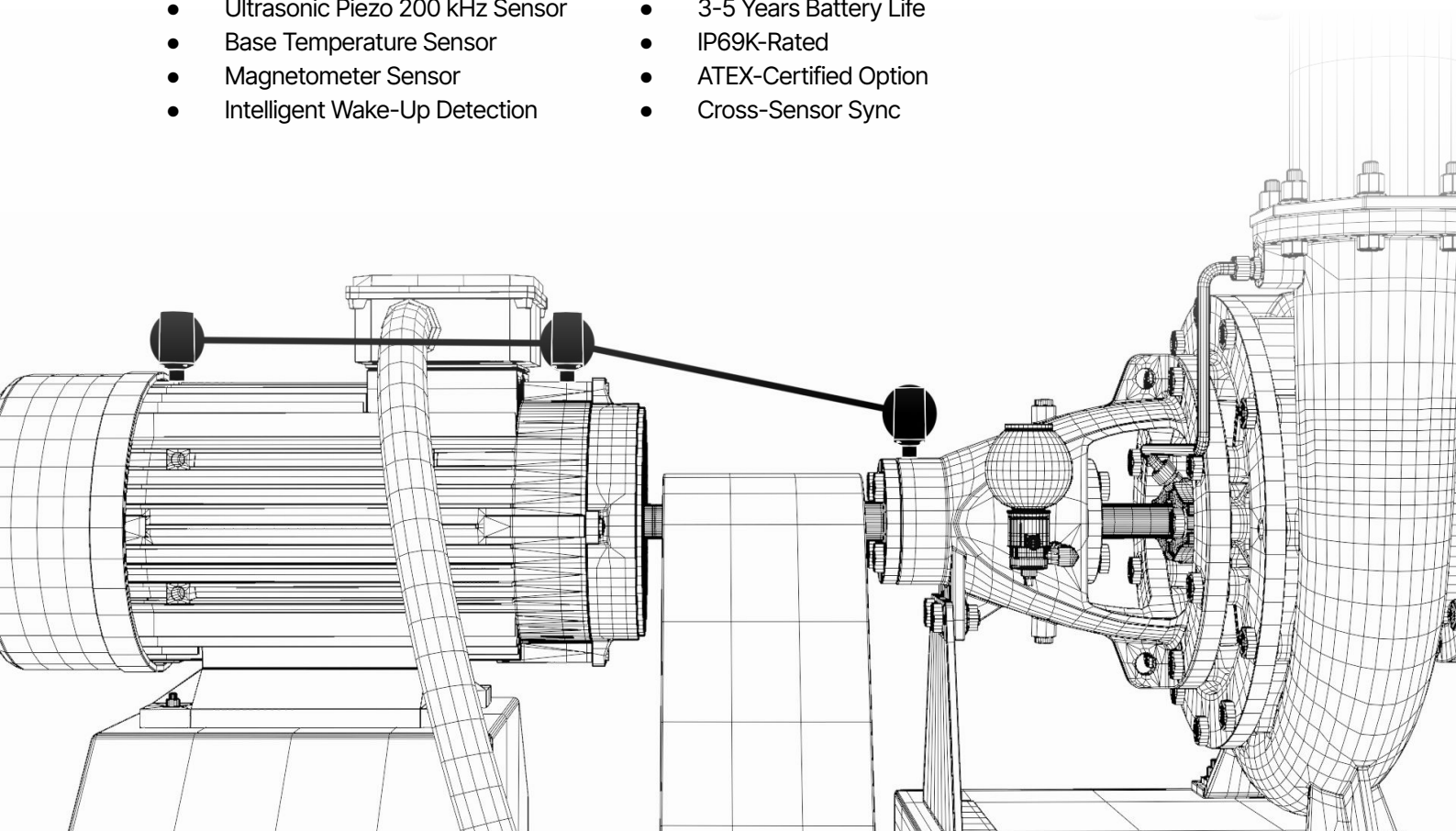
Integrated with Traction platform, Smart Trac UG2 provides real-time monitoring, automated diagnostics, and structured visualization to support predictive and prescriptive maintenance strategies.

Its scalable architecture allows deployment across assets and plants of different sizes, supporting critical equipment monitoring and systematic maintenance planning.



Features

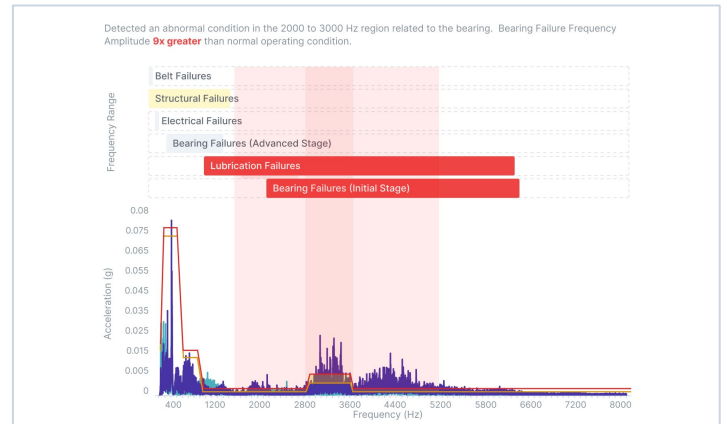
- 3-Axis 64 kHz Accelerometer
- Ultrasonic Piezo 200 kHz Sensor
- Base Temperature Sensor
- Magnetometer Sensor
- Intelligent Wake-Up Detection
- 60 g Acceleration Range
- 3-5 Years Battery Life
- IP69K-Rated
- ATEX-Certified Option
- Cross-Sensor Sync



Automated Diagnostics

The platform features machine learning models trained on millions of industrial data points to automatically identify and classify failure modes. These models perform a multidimensional analysis by correlating trend, spectrum, and waveform data.

This automated diagnostic capability supports maintenance and reliability teams by accelerating analysis, standardizing diagnostics, and providing actionable insights for faster decision-making.

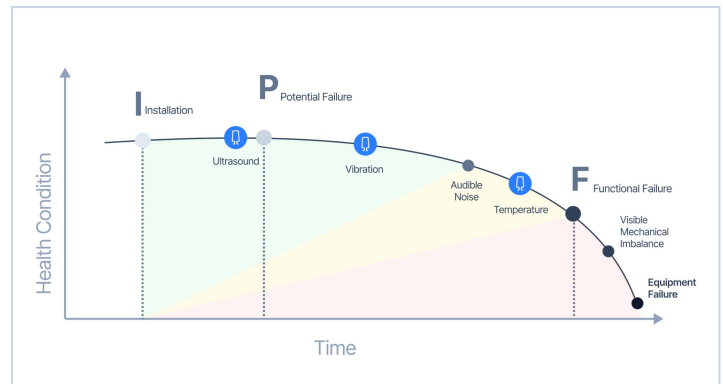


Sensing Capabilities

The device integrates multiple sensing technologies into a single compact unit, including:

- Triaxial vibration measurement
- High-frequency ultrasonic sensing
- Contact temperature measurement
- Magnetometer for precise RPM detection

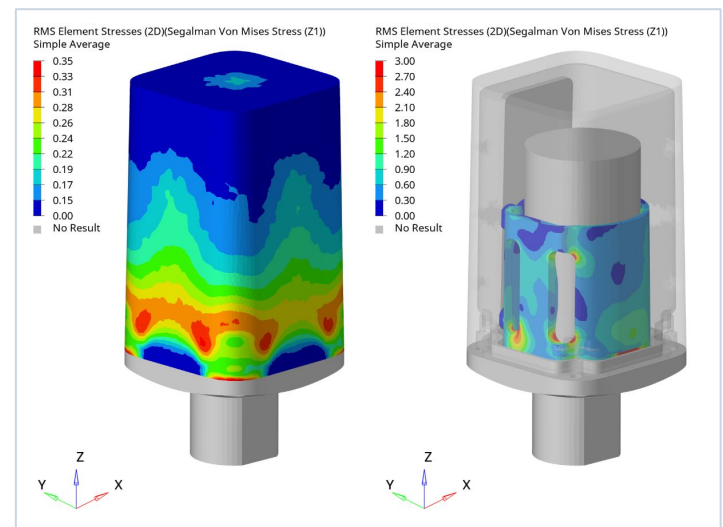
This multi-sensor architecture enables comprehensive machine health assessment, eliminating false alarms and allowing early failure detection on different use cases.



Reliability

Smart Trac UG2 uses a Flexible PCB with optimized mechanical design to decouple the sensing element from the internal components, reducing vibration interference. This architecture is validated through HALT/QALT stress testing to ensure consistent performance across harsh industrial environments.

Our lab tests demonstrate a stable and flat amplitude response across the entire 1 Hz to 10,000 Hz range during Frequency Response Function (FRF) testing. Validated against a calibrated reference, the device maintained a gain deviation within ± 1.7 dB.



Smart Trac UG2



Category	Parameter	Technical Specification
Measurements	Vibration	Up to 64,000 Hz (Triaxial Accelerometer)
	Ultrasound	Up to 200,000 Hz (Uniaxial Acoustic Sensor)
	Frequency Response	± 3 dB from 1 to 10,000 Hz (Z axis)
	Acceleration Range	Up to 60 g
	Rotation	1 to 15,000 RPM
	Surface Temperature	-40°C to +120°C -40°F to +250°F
	Spectral Resolution	Up to 65,536 lines (triaxial) or 196,608 lines (uniaxial)
	Trends	Vibration (Acceleration RMS, Peak-to-Peak, Envelope) Vibration (Velocity RMS, Peak-to-Peak, Envelope) Vibration (PeakTrac™) Ultrasound (dB) Magnetic Field (RPM) Waveform (Acceleration) Waveform (Velocity) Crest-Factor Temperature
Battery	Automated Diagnostics	Up to 65 Failure Modes
	Range	3 to 5 years (Lithium Battery LiSOCl ₂)
	Standard Configuration	3 years (Samples every 10 min)
	Saver Configuration	5 years (Samples every 20 min)
Network	Frequency Bands Sensor to Receiver	Americas: 915 MHz Europe: 868 MHz
	Signal Range Sensor to Receiver	100 m / 330 ft (Indoor) 1 km / 3,300 ft (Open Field)
	Transmission Receiver to Cloud	4G/LTE (Automatic carrier selection) or Wi-Fi
	Field Interface	Near Field Communication (Activation) - NFC
	Capacity	Up to 100 sensors per receiver
	Cybersecurity	AES-256 bit end-to-end encryption
Mechanical & Environmental	Housing Materials	Engineered Polymer and Stainless Steel
	Protection Rating	IP69K (High-pressure water and steam resistant)
	Ambient Operating Temperature	-40°C to +90°C -40°F to +194°F
	Total Dimensions	40 × 71.75 × 40 mm (Sensor body)
	Device Weight	180 g (6.4 oz)
	Mounting Torques	20 Nm (Base to machine) / 8 Nm (Sensor to base)
	Mounting Methods	M8×1.25 Threaded Base or Structural Adhesive



Smart Receiver

Category	Parameter	Technical Specification
Wireless Communication	Frequency Bands Sensor to Receiver	Americas: 915 MHz Europe: 868 MHz
	Protocol	IEEE 802.15.4g and IEEE 802.11 b/g/n
	Bands	902-928 MHz: 11 channels, dynamically assigned 863-870 MHz: 3 channels, dynamically assigned
	Signal Range Sensor to Receiver	100 m / 330 ft (Indoor) 1 km / 3,300 ft (Open Field)
Network	Mobile Network	LTE (4G)
	Mobile Frequencies	LTE B2/B3/B4/B5/B12/B13/B25/B26/B41/B66
	Wi-Fi Network	802.11 b/g/n, 2.4 GHz, WPA2-Personal and WPA2- Enterprise
Connections	Physical Input	Power supply and external antennas (LTE and Wi-Fi)
	Physical Output	LED to indicate functioning status
Wi-Fi Setup	Wi-Fi network setup	Captive Portal through a smartphone or a computer
Power Supply	Input	100 - 240 VAC 0.6 A, 50/60 Hz
Mechanical & Environmental	Cable Length	2 m or 6.6 ft
	Device Weight	425 g (15 oz), excluding cable weight
	Mounting Methods	Magnets, Nylon cable ties, Screws
Other	RTC (Real Time Clock)	Yes
	Receiver firmware updates	Yes
	Sensor firmware updates	Yes, when associated with a receiver



Safe Operating Range - Combined Limit of Surface and Ambient Temperature

		Surface Temperature							
		60°C / 140°F	70°C / 158°F	80°C / 176°F	90°C / 194°F	100°C / 212°F	110°C / 230°F	120°C / 248°F	>130°C / 266°F
Environment	50°C / 122°F	✓	✓	✓	✓	✓	✓	✓	✗
	60°C / 140°F	✓	✓	✓	✓	✓	✓	✓	✗
	70°C / 158°F	✓	✓	✓	✓	✓	✓	✗	✗
	80°C / 176°F	✓	✓	✓	✓	✓	✗	✗	✗
	90°C / 194°F	✓	✓	✓	✓	✗	✗	✗	✗

NOTE: The Safe Operating Range graph applies only to the standard version of the sensor.

Sample Configuration Matrix

Sampling Rate (Hz)		Resolution (Hz per Line)					
500	0.12	0.06	0.03	0.02	0.01	0.01	0.003
1,000	0.24	0.12	0.06	0.03	0.02	0.01	0.01
2,000	0.49	0.24	0.12	0.06	0.03	0.02	0.01
4,000	0.98	0.49	0.24	0.12	0.06	0.04	0.02
8,000	1.95	0.98	0.49	0.24	0.12	0.08	0.04
16,000	3.91	1.95	0.98	0.49	0.24	0.16	0.08
32,000	7.81	3.91	1.95	0.98	0.49	0.33	0.16
64,000	15.63	7.81	3.91	1.95	0.98	0.65	0.33
Number of lines	4,096	8,192	16,384	32,768	65,536	98,304	196,608
Triaxial				Uniaxial			

Sampling Rate (Hz)		Duration (s)						Min RPM	
500	8.2	16.4	32.8	65.5	131.1	196.6	393.2	0.2	
1,000	4.1	8.2	16.4	32.8	65.5	98.3	196.6	0.3	
2,000	2.0	4.1	8.2	16.4	32.8	49.2	98.3	0.6	
4,000	1.0	2.0	4.1	8.2	16.4	24.6	49.2	1.2	
8,000	0.5	1.0	2.0	4.1	8.2	12.3	24.6	2.4	
16,000	0.3	0.5	1.0	2.0	4.1	6.1	12.3	4.9	
32,000	0.1	0.3	0.5	1.0	2.0	3.1	6.1	9.8	
64,000	0.1	0.1	0.3	0.5	1.0	1.5	3.1	19.5	
Number of lines	4,096	8,192	16,384	32,768	65,536	98,304	196,608		
Triaxial						Uniaxial			

NOTE: RPM calculated considering one full cycle of the machine.

Protection

Smart Trac UG2 is built for continuous operation in demanding industrial environments.

- IP69K-rated enclosure: Full ingress protection against dust, high-pressure water jets, steam, and washdown procedures;
- Chemical and mechanical resistance: Engineering polymer case and stainless steel structure withstand exposure to common industrial solvents, oils, and cleaning agents (see Chemical Resistance table);
- Certified for hazardous areas: UL Class I/II/III Div 1, ATEX, IECEx, and INMETRO rated for environments with combustible gases, dusts, and fibrous atmospheres.

Hazardous Location Sensor Certifications

UL Class and Division System	Class I Division 1 Groups A, B, C, D
	Class II Division 1 Groups E, F, G
	Class III Division 1
	T4 (Gasses)/T ₂₀₀ 135°C (Dusts)
ATEX	II 1G Ex ia IIC T4 Ga
	II 1D Ex ia IIIC T ₂₀₀ 135°C Da
IECEx and INMETRO	Ex ia IIC T4 Ga
	Ex ia IIIC T ₂₀₀ 135°C Da
Ambient Temperature	-40°C < Ta < 85°C
Regulations	UL 913 (Ed. 8, 2022)
	UL 60079-0 (Ed. 7, 2024)
	UL 60079-11 (Ed. 6, 2023)
	CSA C22.2 No. 60079-0 (Ed. 4, 2019)
	CSA C22.2 No. 60079-11 (Ed. 2, 2014)
	IEC 60079-0 (Ed. 7, 2017)
	EN IEC 60079-0 (AMD 11, 2024)
	IEC 60079-11 (Ed. 6, 2011)
	EN 60079-11 (2012)
	UL 508 (Ed. 18, 2021)
	CSA C22.2 No. 14 (Ed. 13, 2018)
	ABNT NBR IEC 60079-0:2020
	ABNT NBR IEC 60079-11:2013 (Corrigenda 2017)
	INMETRO Ordinance 115/2022

For the ATEX version, please contact the Traction team.

General Certifications

	Sensor	Receiver
FCC	47 CFR Part 15, Subpart B	47 CFR Part 15, Subpart B
	47 CFR Part 15, Subpart C	47 CFR Part 15, Subpart C
ISED	RSS-247	RSS-247
	RSS-102	-
	RSS-Gen	-
ANATEL	Resolution n° 680 (27/06/2017)	-
	Act n° 14448 (04/12/2017)	Act n° 14448 (04/12/2017)
	Act n° 1120 (19/02/2018)	Act n° 1120 (19/02/2018)
IFT	IFT-008-2015 (NOM-208-SCFI-2016)	IFT-008-2015 (NOM-208-SCFI-2016)
	-	IFT-011-2017 Part 2 (NOM-221/2-SCFI-2018)
CE	RED (2014/53/EU)	RED (2014/53/EU)
	RoHS (2011/65/EU & 2015/863)	RoHS (2011/65/EU & 2015/863)
	EN 300 328	LVD (2014/35/EU)
	EN 300 220-1	EN 300 328 V2.2.2
	EN 301 489-1	EN 300 220-1 V3.1.1
	EN IEC 61010-1	EN 301 908-1 V11.1.1
	EN IEC 62311	EN 301 489-1 V2.2.3
	EN IEC 63000	EN IEC 62368-1:2020
	-	EN IEC 63000:2018



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Chemical Resistance

Solvents

Water	A
Xylene	A
Acetone	A
Methanol	A
Ethyl Acetate	A
Butyl Acetate	A
Benzene	A
Methyl Isobutyl Ketone	A
Methylene Chloride	A
Heptane	A
Cyclohexane	A
Toluene	A
Trichloroethylene	B
Hexane	A

Acids

Acetic Acid	A
Citric Acid	A
Hydrofluoric Acid	D
Lactic Acid	A
Hydrochloric Acid	D
Sulfuric Acid	B
Nitric Acid	D
Phosphoric Acid	A
Chromic Acid	B
Formic Acid	A
Hydrogen Peroxide	B

General information:

Adhesive mounting is not recommended for environments with prolonged exposure to chlorine or substances with high oxidative potential. Tractian is not responsible for any damage resulting from contact with materials classified as low chemical resistance.

NOTE:

For sensors installed using the screwing method this table should be used for reference purposes. In case of incompatibility or if a substance is not listed, please contact our support team.

Alcohols

Butyl Alcohol	A
Ethyl Alcohol	A
Isopropyl Alcohol	A
Methyl Alcohol	A

Bases

Calcium Hydroxide	A
Potassium Hydroxide (caustic potash)	A
Magnesium Hydroxide	A
Sodium Hydroxide	B
Ammonium Hydroxide	A
Sodium Hypochlorite	C

Oils

Diesel Fuel Oil (20, 30, 40, 50)	A
Fuel Oil (1, 2, 3, 5A, 5B, 6)	A
Hydraulic Oil (Synthetic)	B
Silicone Oil	B
Soybean Oil	A
Mineral Oil	A

Fuels

Diesel Fuel	A
Gasoline	A
Kerosene	A

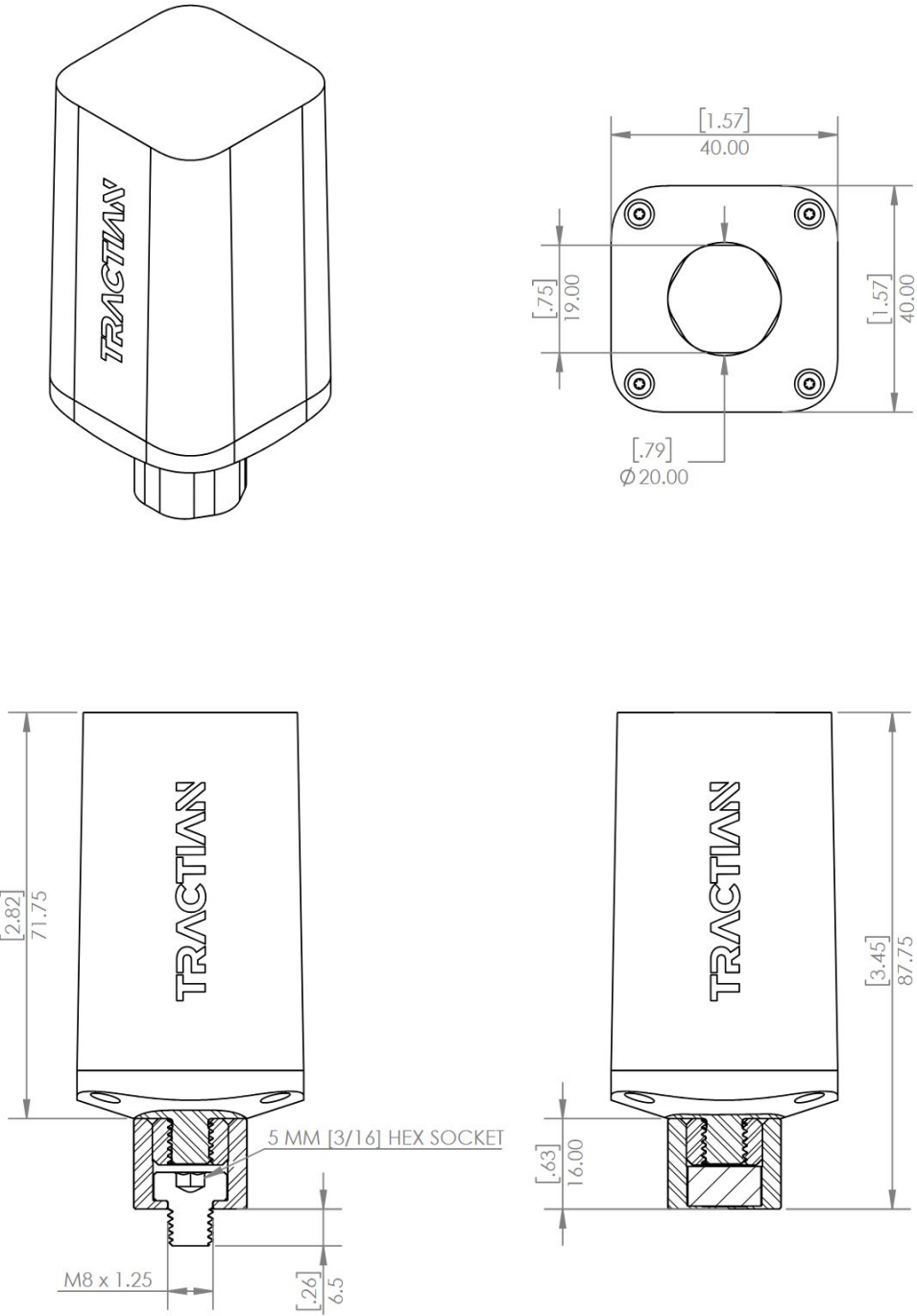
Others

Seawater	A
Detergents	A

Rating Guide

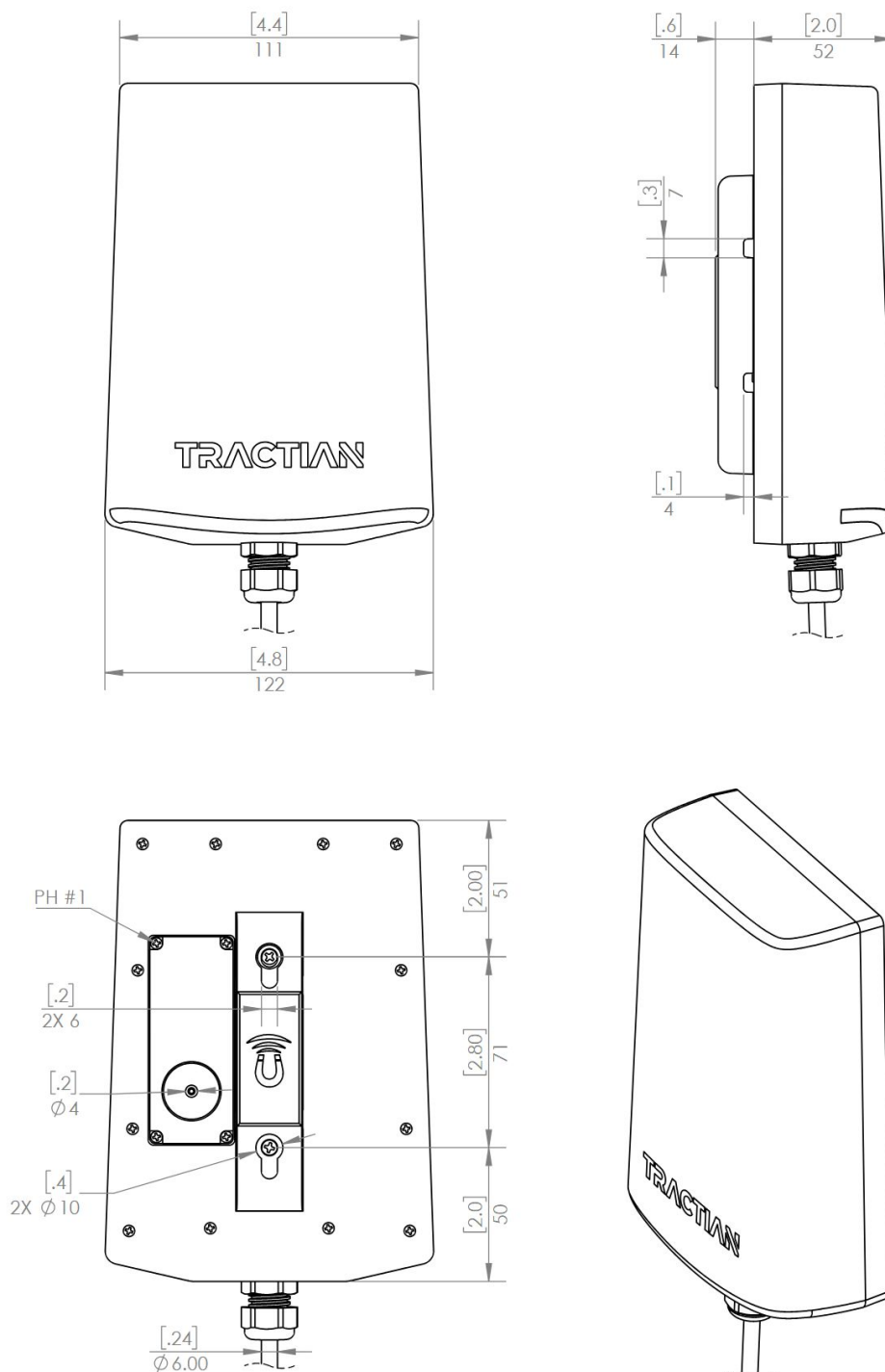
A	Good: No significant effect. Suitable for continuous exposure.
B	Fair: Minor effect. Slight corrosion or discoloration may occur.
C	Questionable: Moderate effect; not recommended for continuous use. Softening, loss of strength, or swelling may occur.
D	Poor: Severe effect; not recommended for any use. Material degradation expected.

Smart Trac UG2 Dimensions



[in] / mm

Smart Receiver Dimensions



[in] / mm