

6320 SureSense™ Capacitance Propane Sensor Installation Guide

BLE output sensor and capacitance probe for use with high pressure propane tanks



The 6320 SureSense™ Capacitive Propane Level Sensor is designed to read liquid levels in propane cylinders without any moving parts unlike many traditional sensors. The capacitive sensing element inside the tank is coupled to an out-of-tank electronics to read the level and transmit either wirelessly over Bluetooth or through a voltage output cable connection. The electronics module includes an integrated LCD display showing tank volume in % full.

The electronics module is battery operated and fully sealed. It is mounted on top of the capacitance sensor and sealed from the environment with an o-ring and plastic housing. Electrical connections to the mechanical sensor are made at the joint between the module and the mechanical sensor.

The electronics module is fully sealed and not serviceable. The module can be replaced when the battery life is reached. The battery is non-replaceable.

The Sensor is suitable for field applications including high pressure washing systems.

General Information and Features

- Temp Range Static: -40°C to +70°C
- Ingress Protection: IP67, IP69K Rated
- System Accuracy: +/- 1%
- Always on LCD
- Bluetooth data broadcast every 2.4 seconds
- Operational Life Span: Up to 10 Years
- Operational Range: up to 8 meters
- See SD-588 for entity parameters.

These instructions are made to assist tradesmen and others generally familiar with liquid storage tank equipment. Most consumers are not qualified to perform the installation described herein. If you have any questions concerning installation or operation of this product, contact Rochester Gauges LLC or one of our authorized distributors for assistance. The sensing element inside the tank is not intended to be replaced or serviced and should only be replaced by qualified personnel trained in safe handling of propane.

Special Conditions of Use

- Equipment is intended for fixed and grounded installation only.
- Potential Electrostatic Charging Hazard - See Instructions.
- The device contains an internal battery that cannot be changed by the user.
- Equipment contains metallic parts with material Brass and Aluminum. For EPL Ga, the material composition is greater than 10 % in total of aluminum, magnesium, titanium and zirconium, with more than 7,5 % in total of magnesium, titanium and zirconium. The end user shall conduct an ignition hazard assessment to ensure that the equipment does not pose an impact or friction ignition hazard prior to installation in the explosive atmosphere.

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- The product has a capacitance average 121nF on Outer Electrode tube, 113nF on Propane Head, 103.66nF on Compression nut and 85.66nF on screws which are in excess of 3pF and may pose electrostatic charging hazard. All metal parts of product must be connected to ground through < 1GΩ impedance or the user must determine the suitability for the specific application.
- Equipment does not provide a dielectric isolation of 500 Vrms between the circuit inputs and the metallic frame. Care shall be taken to avoid circulating earth currents and potential floating voltages. Refer to the user installation manual for guidance on safe installation.

Full Probe 1" NPTF Installation Instructions

These instructions are applicable when 6320 SureSense™ Capacitance Propane Level Sensors are installed in forged steel and threaded weld adaptors. These sensors are intended for use with 1"-11 1/2 NPTF adaptors or 1"-11 1/2 NPT adaptors. Heads for 6320 series sensors are supplied with 1" NPTF threads where the pitch diameter tolerance is 1 turn large to 1/2 turn small. Threaded gauge heads are coated with Everseal thread compound which is suitable for LP-Gas service applications.

Verify Tank Compatibility

1. Inspect adaptor thread pitch diameter with 1"-11 1/2 NPTF L1 basic notch plug gage or 1"-11 1/2 NPT basic notch plug gage. Typical commercial tolerance is flush with notch between one turn large and one turn small.
2. If adaptor threads are correct, they may be welded into the tank. However, steps should be taken to minimize thread distortion due to heat and to shield threads from weld spatter.
3. After welding, reinspect adaptors as described in step one. If threads are correct after welding, proceed to step six. If threads are no longer correct go to step four.
4. Undersize, distorted or weld spattered adaptor threads must be re-tapped with a 1"-11 1/2 NPTF OR 1"-11 1/2 NPT tap using thread cutting oil. Be careful not to tap threads too deep. After tapping, clean adaptor threads of metal chips and excess oil.
5. Re-inspect adaptor threads as described in step one. If threads are correct, go to step six. If threads are still undersized, go back to step four.
6. To prevent or reduce galvanic corrosion, the exterior of threaded weld adaptor should be painted or powder coated after welding it into the tank.

Install Sensor Into Tank

1. If not already coated with Everseal, apply thread compound and/or lubricant to threads of brass head. It is permissible to apply suitable lubricating oil over Everseal.
2. Insert 6320 sensor through welded adaptor.
3. Install head to have a final engagement between .52" and .39" from the top of the spud and the bottom of the hex as pictured in Figure 1. This engagement allows for a range of between 5.5 and 7 engaged threads respectively. Minimum torque shall be 100 pound-feet.
4. Figure 2 below notes the condition of the as supplied probe and its compression nut condition. The compression nut shall not be tampered with in any way to ensure safe use in the field.

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Note: The plastic housing may not be compatible with some chemicals which may be in common use on a tank line. Examples include: rust inhibitors, solvent based paints, lubricants, leak check fluids and cleaning solvents, etc.. The use of chemicals which attack plastic on or near the plastic housing can result in exposure of electronics to the environment. Chemical compatibility should be checked using full strength chemicals. After 72 hours of immersion, examine dials carefully for evidence of cracks or crazing.

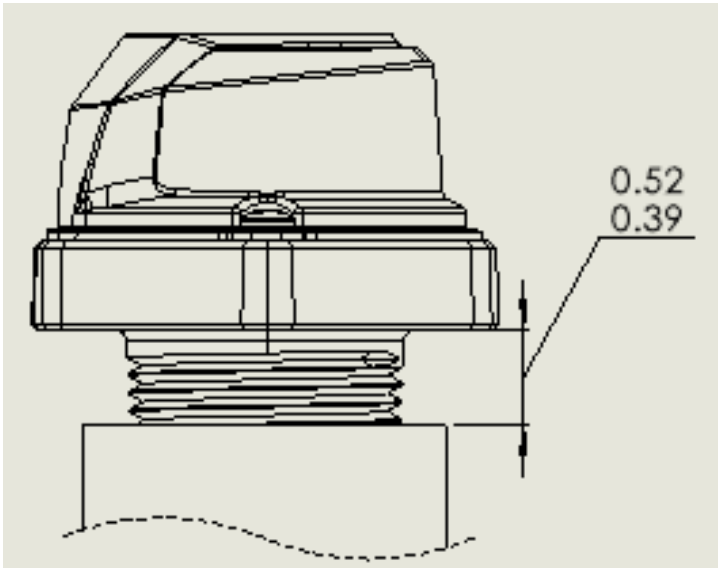


Figure 1: Installed Gap Between Probe Hex Bottom and Top of Spud

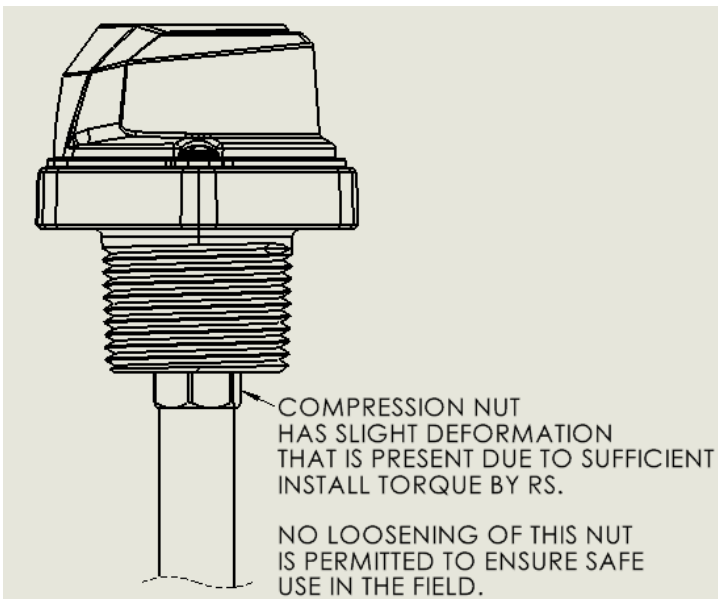


Figure 2: Compression Nut Condition Due to Rochester' Assembly Process with Warning of Its Loosening

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Jr. Bolted Sensor Installation Instructions



WARNING: Determine and install the appropriate sensor & gasket based on system requirements. The gasket type supplied may not be suitable for all applications and for those applications other gasket materials may be available. The information contained herein is intended for guideline use only and the suitability of any part for a particular application must be determined by the user prior to installation. Improper gasket selection or application may result in seal failure, subsequent release of tank contents and serious injury and or property damage.

HAZARDS: Even if a sensor registers empty, tank may contain high pressure and flammable gas. A hazard of fire or explosion may exist if proper methods are not used when removing or installing the sensor or gasket. Replace gasket if sensor is removed. Do not reuse gasket.

1. Sensors are normally fastened to tank using a mounting adapter which has previously been welded or otherwise installed into the tank or it's fittings. Check adapter for correct dimensions and finish, see dimensions below. These dimensions and gaskets are consistent with the Junior sized legacy gauges from Rochester Sensors.
 - i. Check color stripe on O.D. of gasket for material.
 - ii. BLUE STRIPE= NEOPRENE. Order Junior part# 0015-00855 recommended for anhydrous ammonia and specific refrigerant applications.
 - iii. CAUTION: Adjustable gauges are NOT intended for ammonia service.
 - iv. RED STRIPE= BUNA-N. Order Junior part# 0015-00007, recommended for specific LP Gas & petroleum applications.
 - v. GREEN OR BROWN STRIPE = VITON. Order Junior part# 0015-00039.
 - vi. WHITE GASKET = TEFLON. Order Junior part# 0015-00405.

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2. Fit gasket onto gauge boss.
3. Carefully insert bottom of probe through gauge boss.
4. Check to see that gasket is properly seated in boss gasket recess.
5. Align head for proper orientation with key in gauge boss. Torque bolts evenly in several steps to the desired torque value. When torquing, use a crossing torque pattern.
6. Leak test.

NOTE: See 115-793 for replacement gasket instructions.

CAUTION: Do not over torque. Do not re-torque later unless leaking. Overtightening may cause damage to head and gasket.

BOLT SIZE	DRY TORQUE	GASKET TYPE
1/4-28	35 In. Lb. [4 Nm]	BUNA, NEOPRENE, VITON, TEFLON

*Materials and specifications are subject to change without notice.
Pressure ratings subject to change due to temperature and other environmental considerations.

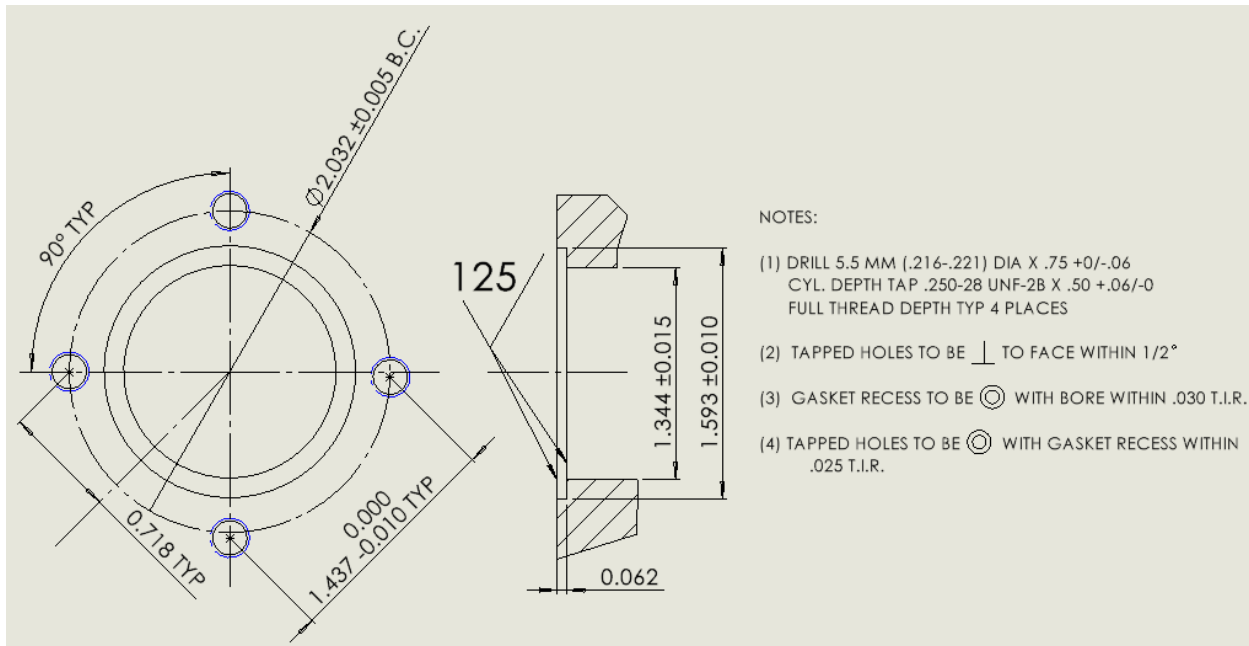


Figure 3: 4 Bolt Adaptor Instructions

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Full Probe 3/4" NPTF Installation Instructions

These instructions are applicable when 6320 SureSense™ Capacitance Propane Level Sensors are installed in forged steel and threaded weld adaptors. These sensors are intended for use with 3/4"-14 NPTF adaptors or 3/4"-14 NPT adaptors. Heads for 6320 series sensors are supplied with 3/4" NPTF threads where the pitch diameter tolerance is 3/4 turn large to 0 turns. Threaded gauge heads are coated with Everseal thread compound which is suitable for LP-Gas service applications.

Verify Tank Compatibility

1. Inspect adaptor thread pitch diameter with 3/4"-14 NPTF L1 basic notch plug gage or 3/4"-14 NPT basic notch plug gage. Typical commercial tolerance is flush with notch between one turn large and one turn small.
2. If adaptor threads are correct, they may be welded into the tank. However, steps should be taken to minimize thread distortion due to heat and to shield threads from weld spatter.
3. After welding, reinspect adaptors as described in step one. If threads are correct after welding, proceed to step six. If threads are no longer correct go to step four.
4. Undersize, distorted or weld spattered adaptor threads must be re-tapped with a 3/4"-14 NPTF OR 3/4"-14 NPT tap using thread cutting oil. Be careful not to tap threads too deep. After tapping, clean adaptor threads of metal chips and excess oil.
5. Re-inspect adaptor threads as described in step one. If threads are correct, go to step six. If threads are still undersized, go back to step four.
6. To prevent or reduce galvanic corrosion, the exterior of threaded weld adaptor shall be painted or powder coated after welding it into the tank.

Install Sensor into Tank

1. If not already coated with Everseal, apply thread compound and/or lubricant to threads of brass head. It is permissible to apply suitable lubricating oil over Everseal.
2. Insert 6320 sensor through welded adaptor.
3. Install head to have a final engagement between 9/16" and 11/16" from the top of the spud and the bottom of the hex as pictured in Figure 4. This engagement allows for a range of between 5 and 7 engaged threads respectively. The minimum torque to be applied is 70 pound-feet.
4. Figure 5 below notes the condition of the as supplied probe and its compression nut condition. The compression nut shall not be tampered with in anyway to ensure safe use in the field.

Note: The plastic housing may not be compatible with some chemicals which may be in common use on a tank line. Examples include: rust inhibitors, solvent based paints, lubricants, leak check fluids and cleaning solvents, etc.. The use of chemicals which attack plastic on or near the plastic housing can result in exposure of electronics to the environment. Chemical compatibility should be checked using full strength chemicals. After 72 hours of immersion, examine dials carefully for evidence of cracks or crazing.

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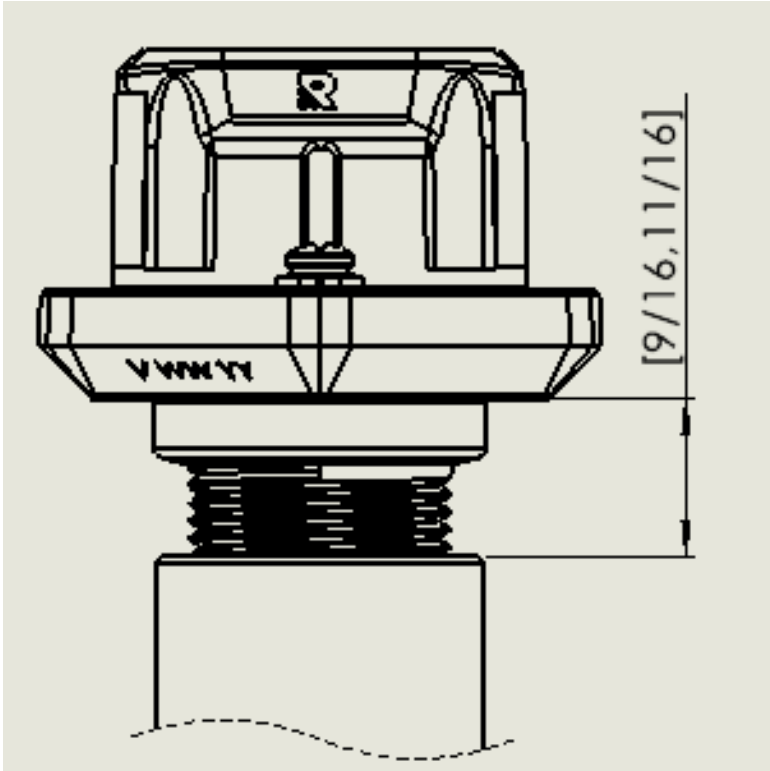


Figure 4: Installed Gap Between Probe Flange at Hex Bottom and Top of Spud

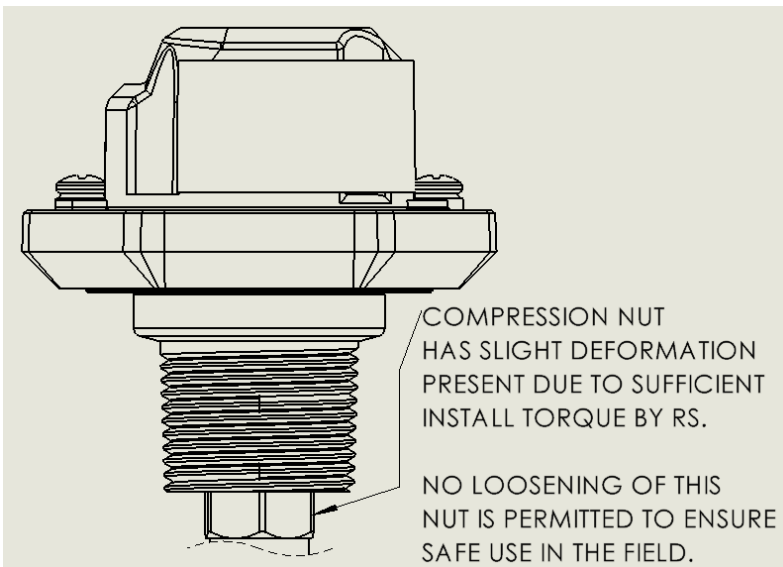


Figure 5: Compression Nut Condition Due to Rochester' Assembly Process with Warning of Its Loosening

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Electronics Module Installation Instructions

These instructions apply when replacing only the upper electronics assembly.

1. Unscrew the mounting screws from the module.
2. Gently pull the module up to remove it from the mechanical sensor.
3. Clean any debris or liquid on the mechanical sensor with a dry cloth.
4. If the dielectric grease shows signs of dirt, remove with a dry cloth.
5. Remove the new module from the shipping container.
6. Optionally lubricate the o-ring with jet-lube or similar o-ring lubricant.
7. Optionally apply the enclosed dielectric grease to the permanent PCBA cavity.
8. Place the new module in the keyed orientation and gently press down to install and seat the o-ring.
9. Install the screws and tighten to 2 in-lb with hand tools only.
10. Dispose of the old electronics according to location standards for metal and electronic disposal.
11. Confirm the LCD level reads the correct value (if known).
12. The installer may optionally verify the BLE dial is broadcasting over Bluetooth. Refer to the Manufacturer's instructions on parsing BLE broadcast packets.

Tank Grounding

For applications where the 6320 SureSense™ Capacitance Level Sensor is connected to a line-powered telemetry unit, the tank must be connected to earth ground to avoid any floating voltage potentials or circulating earth currents.

If the 6320 SureSense™ Capacitance Level Sensor is connected to a battery-powered telemetry unit, best practice would be to connect the tank to earth ground to minimize any possible effects of mis-wiring or unforeseen cable damage.

For applications where the 6320 SureSense™ Capacitance Level Sensor is not connected to a telemetry system and only the wireless connection is used, no additional earth grounding is required since the 6320 SureSense™ Capacitance Level Sensor is battery powered internally.

Warnings

Tank may contain high pressure and flammable gas.

These units are not meant to be repaired or serviced. Doing so will void the intrinsically safe rating of the device.

The product is a sealed unit and is never meant to be opened or modified in any way. Doing so will invalidate all certifications and safety listings.

Safety Specifications

- **WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD**
Caution must be used when handling or cleaning products so there is no static charge buildup. Do not wipe off the 6320 Capacitance Sensor with dry cloth. Use only water damp cloth and allow to air dry for cleaning device. Do not use or install in high charge areas. See IEC60079-32-1 for further information.

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- **AVERTISSEMENT - RISQUE DE CHARGE ÉLECTROSTATIQUE POTENTIEL**
Il faut être prudent lors de la manipulation ou du nettoyage des produits afin qu'il n'y ait pas d'accumulation de charge statique. N'essuyez pas le capteur avec un chiffon sec. Utilisez uniquement un chiffon humide et laissez sécher à l'air pour nettoyer l'appareil. Ne pas utiliser ou installer dans des zones de charge élevée. Voir IEC 60079-32-1 pour plus d'informations.

Standards Information



Ordinary Locations Safety Standards	
Conforms to UL STD 61010-1 Ed.3	Electrical Equipment for Measurement, Control, and Laboratory Use; Part1: General Requirements *Note: for USA ordinary locations listing certification
Certified to CSA STD C22.2 #61010-1-12 Ed.3	Electrical Equipment for Measurement, Control, and Laboratory Use; Part1: General Requirements *Note: for Canada ordinary locations listing certification
UL 565 Revision 6	Liquid-Level Gauges for Anhydrous Ammonia and LP-Gas <ul style="list-style-type: none"> • Complete for NPT threaded version • Pending for 4-bolt mounting pattern
EN 13799:2022	Pending
Hazardous Locations Safety Standards	
IEC 60079-0: 2017	Explosive atmospheres – Part 0: Equipment – General requirements *Note: For IECEx Certification
EN 60079-0: 2011 + C1: 2012	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i” *Note: For IECEx Certification
EN 60079-0: 2018	Explosive atmospheres – Part 0: Equipment – General requirements *Note: For ATEX Certification
EN 60079-0: 2012	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i” *Note: For ATEX Certification
UL 60079-11, 6th Ed., Issued 03/26/2019	Explosive atmospheres – Part 0: Equipment – General requirements *Note: For USA listing Certification
UL 60079-11, 6th Ed., Revised 03/28/2014	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i” *Note: For USA listing Certification
CSA C22.2 No. 60079-0: 2011	Explosive atmospheres – Part 0: Equipment – General requirements *Note: For Canada listing Certification
CSA C22.2 No. 6009-11: 2011	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i” *Note: For Canada listing Certification

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Certification Information

Rochester Sensors, LLC 6320 Capacitance Sensor does not require any external connections or sources of power. The Sensor device is certified as complete intrinsic safety system (Reference Intrinsic Safety Control Drawings SD-588). Device is intended for use in Class I, Division 1, Groups C and D, T4 or Zone 1, Group IIB, T4 Hazardous Locations under the certification schemes and ratings noted below:

IECEX (Global Certification):	ATEX (EU Certification) :	North America (USA & Canada):	United Kingdom (UK):
Ex ia IIB T4 Ga	CE ₂₉₀₃  II 1G Ex ia IIB T4 Ga	Class I Zone 0 AEx ia IIB T4 Ga Class I, Division 1, Groups C & D, T4 Ex ia IIB T4 Ga	UKCA ₀₃₅₉  II 1G Ex ia IIB T4 Ga
-40°C ≤ T _{AMB} ≤ +80°C	-40°C ≤ T _{AMB} ≤ +80°C	-40°C ≤ T _{AMB} ≤ +80°C	-40°C ≤ T _{AMB} ≤ +80°C
IECEX Cert # IECEX ETL 23.0024X	ATEX Cert # ETL23ATEX0298X	CSA Cert # ETL23CA105370757X	UKEX Cert# ITS23UKEX0720X

CE Compliance Section

A. Electromagnetic Compatibility

1. EN 61000-6-2:2005 - Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments IEC 61000-6-2:2005
2. EN 61000-6-4:2007 - Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments IEC 61000-6-4:2006

B. Restriction of Hazardous Substances in Electrical and Electron Equipment

1. EN 50581:2012 - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

IEC 60079-0 Compliance Section

This device does not comply with IEC 60079-0 Clause 8.3 for compliance with the amount in total of < 10% aluminum, magnesium, titanium, and zirconium. The user of this equipment is required to take steps to avoid ignition hazards due to impact or friction.

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