

## 6320 SureSense™ Capacitance Propane Level Sensor Guide

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



The 6320 SureSense™ Capacitance Propane Level Sensor measures liquid level in a propane tank without relying on a mechanical system. The capacitive technology used in the 6320 Sensor removes any moving parts inside the tank eliminating interference between the sensor, tank wall, and other components. The replaceable electronics module is battery powered and provides a periodic BLE broadcast output and a visual digital readout. These options not only allow users to read the tank level in person but enable telemetry units to connect and monitor the level as well. The device conforms to typical IECEx/ATEX/UKEx/CSA/NOM/IFT safety requirements for use in Class 1 Division 1 (Zone 0) hazardous locations.

The electronics module is designed to support an 8-year battery life and can be replaced at the end of its service interval. The probe inside the tank is permanently mounted and left in place when the electronics module is replaced. The electronics module is not user serviceable.

A local LCD shows the current tank level in percentage on a large, easy-to-read display. The LCD is always on and is automatically updated anytime the sensor reads a new level. Sensor status information is displayed on the LCD as well as level to assist the user in maintaining their propane level.

Wireless operation simplifies installation and eliminates common issues with cable connection and cable damage. A broadcast occurs every 2.4 seconds so telemetry units can scan at any time and get the latest level and sensor status. The broadcast status will indicate additional information such as errors and low or high warnings. Estimated battery life is included in the broadcast and can be used to create an estimated battery percentage.

### Application

The Rochester 6320 SureSense™ Capacitance Propane Level Sensor is a versatile sensing unit with no moving parts. A new level reading is acquired every 20 seconds and will update the LCD and BLE broadcast on the fly. The 6320 SureSense™ incorporates a fill detect mode. When a fill is detected, the 6320 Sensor will acquire new level readings every second and update the LCD. The 6320 Sensor will automatically exit fill detect mode.

The capacitive sensing element is permanently installed into the tank and the calibration data for the unit is stored inside it. Replacing the electronics is simple and can be performed when the battery is consumed without the user needing to perform any set up or calibration to use the system.

- Wide Temperature Range: -40°C to +65°C
- Probe Assembly
  - No moving parts
  - Excellent accuracy especially at low tank levels
  - Mechanically robust, designed for the rigors of transporting and setting tanks & cylinders
  - Sensor mounting options include 4-bolt and various NPTF adapter sizes
  - Patented probe seal – designed to prevent content leakage under extreme conditions



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## General Information and Features

- Polycarbonate housing offers excellent mechanical properties, UV, and chemical resistance
- No exposed sensing elements, all components are located on the PCB inside the housing
- Housing: IK9 impact rating
- Ingress Protection: IP6K9K rated

## Key Benefits

- BLE broadcast for simple and robust communications
- Fast installation time
- Easy to read digital display shows tank volume in 1% increments.
- Rugged plastic housing
- 1" NPTF threaded connection to tank standard. Contact your local Rochester Sensors sales team for additional mounting options

## LCD Status Indicators

The 6320 Sensor is equipped with a 2-digit 7-segment LCD display. The LCD will show the level in 1% increments with time-multiplexed status codes to indicate different sensor conditions. Some status codes are considered errors while some are considered warnings. Refer to each code for an expected system behavior. Refer to Appendix A for all system errors and warnings.

| LCD OUTPUT  | DESCRIPTION  |
|---|--|
|  | nC: Electronics are not connected to probe. The level will be set to 0% and alternate with this code. Typically, will be seen when a replacement unit is shipped without a probe attached, but may indicate a physical issue has developed on a previously working system. |
|  | bL: Battery Low. Battery is estimated to be within 1-2 years of expected end of life. The measured level will alternate on the LCD with this code.   |
|  | bC: Battery Critical. Battery is estimated to be < 1 year of expected end of life. The measured level will alternate on the LCD with this code.  |
|  | Er: Device Error. Contact Rochester Sensors.   |
|  | Lo: Low Low Warning. Tank level is below sensor operating range. This is the typical value for a newly installed probe in a tank that has not been filled.   |
|  | Hi: High High Warning. Tank level is above sensor operating range.   |

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## Effect of Temperature on Measurements

Changes in ambient temperature cause a corresponding change in density of propane and in the dielectric constant of propane. Changes in density vs temperature will appear as a change in tank level. This behavior is also observed in float-style gauges and 6320 SureSense™ will report the actual liquid level. The tank level will increase as temperatures go up and decrease as temperatures go down corresponding to the changes in fluid density vs temperature.

6320 SureSense™ Sensors have built-in temperature compensation for the dielectric constant of propane. 6320 SureSense™ will read temperature from the probe and use this temperature to adjust the dielectric constant of propane. This temperature-corrected dielectric constant is used in calculations to allow 6320 SureSense™ to provide an output indicating the actual liquid level including the changes in level due to density changes as a function of temperature.

## Product Certification

Rochester's 6320 Sensors are certified as intrinsically safe for Class 1, Division 1, Groups C & D (Zone 0) hazardous locations. Products are marked and approved by ETL, ATEX, UKCA, CE, NOM, AND IFT. Certification and testing have been performed to the following standards:

| <b>Ordinary Locations Safety Standards</b>         |   |
|--|---|
| <b>Conforms to UL STD 61010-1 Ed.3</b>             | Electrical Equipment for Measurement, Control, and Laboratory Use; Part1: General Requirements<br>*Note: for USA ordinary locations listing certification                                 |
| <b>Certified to CSA STD C22.2 #61010-1-12 Ed.3</b> | Electrical Equipment for Measurement, Control, and Laboratory Use; Part1: General Requirements<br>*Note: for Canada ordinary locations listing certification                              |
| <b>UL 565 Revision 6</b>                           | Liquid-Level Gauges for Anhydrous Ammonia and LP-Gas <ul style="list-style-type: none"> <li>• Complete for NPT threaded version</li> <li>• Pending for 4-bolt mounting pattern</li> </ul> |
| <b>EN 13799:2022</b>                               | Pending   |
| <b>NOM-208-SCFI-2016 (IFT-008-2015)</b>            | Standard for radicommunication products   |
| <b>NOM-001-SCFI-2018 (NMX-I-60950-1-NYCE-2015)</b> | Safety requirements for electronic equipment marketed within the territory of United Mexican States   |
| <b>Hazardous Locations Safety Standards</b>        |   |
| <b>IEC 60079-0: 2017</b>                           | Explosive atmospheres – Part 0: Equipment – General requirements<br>*Note: For IECEx Certification  |
| <b>EN 60079-0: 2011 + C1: 2012</b>                 | Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"<br>*Note: For IECEx Certification   |
| <b>EN 60079-0: 2018</b>                            | Explosive atmospheres – Part 0: Equipment – General requirements<br>*Note: For ATEX Certification   |
| <b>EN 60079-0: 2012</b>                            | Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"<br>*Note: For ATEX Certification  |
| <b>UL 60079-11, 6th Ed., Issued 03/26/2019</b>     | Explosive atmospheres – Part 0: Equipment – General requirements<br>*Note: For USA listing Certification  |
| <b>UL 60079-11, 6th Ed., Revised 03/28/2014</b>    | Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"<br>*Note: For USA listing Certification   |
| <b>CSA C22.2 No. 60079-0: 2011</b>                 | Explosive atmospheres – Part 0: Equipment – General requirements<br>*Note: For Canada listing Certification   |
| <b>CSA C22.2 No. 6009-11: 2011</b>                 | Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"<br>*Note: For Canada listing Certification  |

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### **FCC Interference statement (Part 15.19)(a)(3)**

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### **FCC Interference Statement — PART 15.105 (B)**

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### **ISED Canada compliance statement**

This device complies with ISED Canada license-exempt RSS standard(s). 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.

Le présent appareil est conforme aux CNR d'ISDE 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'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### **Environmental Ratings**

| Parameter                             | Condition         | Min | Typical | Max | Unit  |
|---------------------------------------|-------------------|-----|---------|-----|-------|
| Operating & Storage Temperature Range | Temperature Range | -40 | -       | 65  | °C    |
| Module Accuracy                       |                   | -   | <1%     | -   | Level |

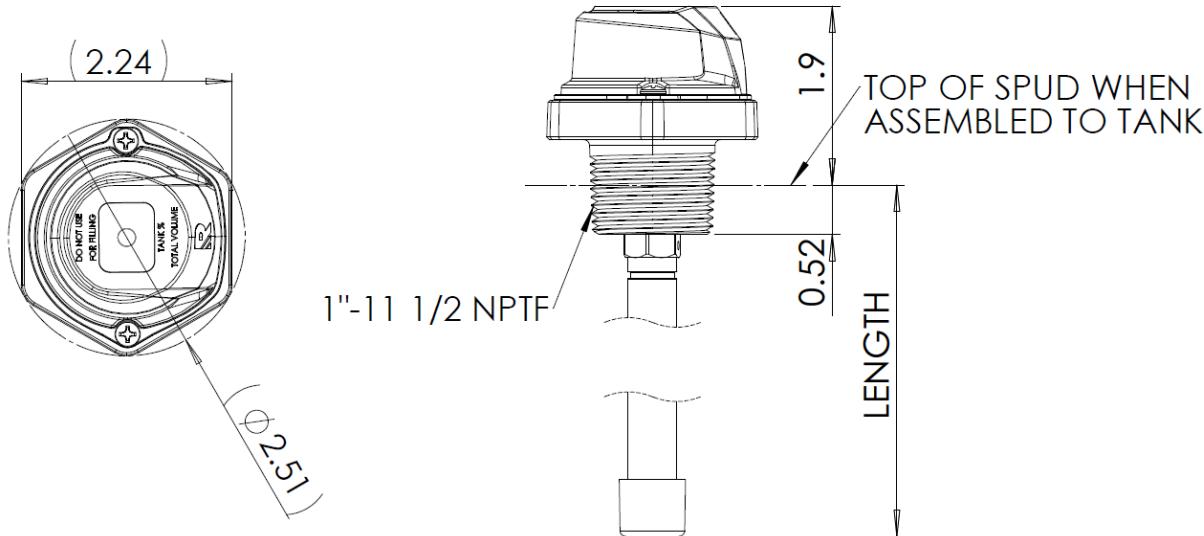
### **Environmental Testing**

| Test          | Condition   |
|---------------|---|
| UV withstand  | 600 hrs, UVA-340 @.76W/m2, 65°C                     |
| VIBRATION     | MIL-STD-810; 5 Hz, 12.7mm amplitude, 1G, 45 minutes |
| IP Rating     | IP69  |
| Impact Rating | IK09  |

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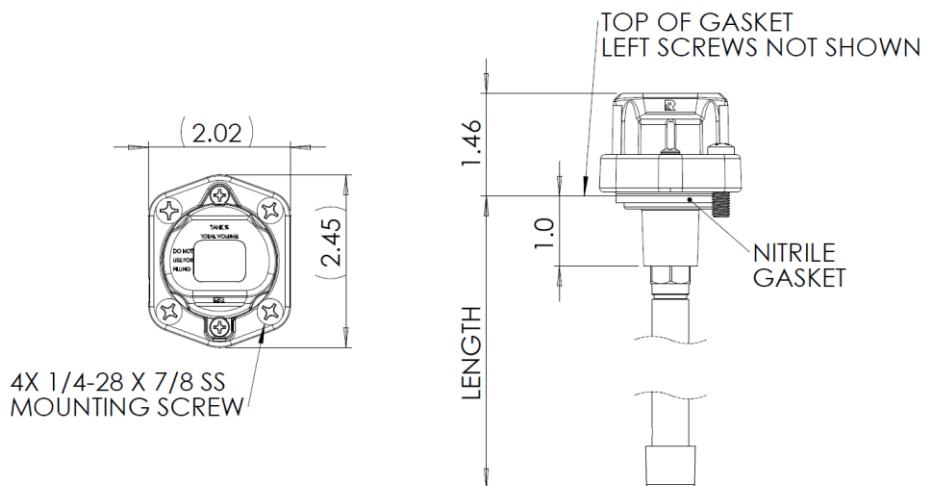
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## *Dimensions for 1" NPTF*



| Model       | Length (in) |
|-------------|-------------|
| 6320-XA0425 | 42.5        |
| 6320-XA0370 | 37.0        |

### ***Dimensions for 4-bolt mounting***

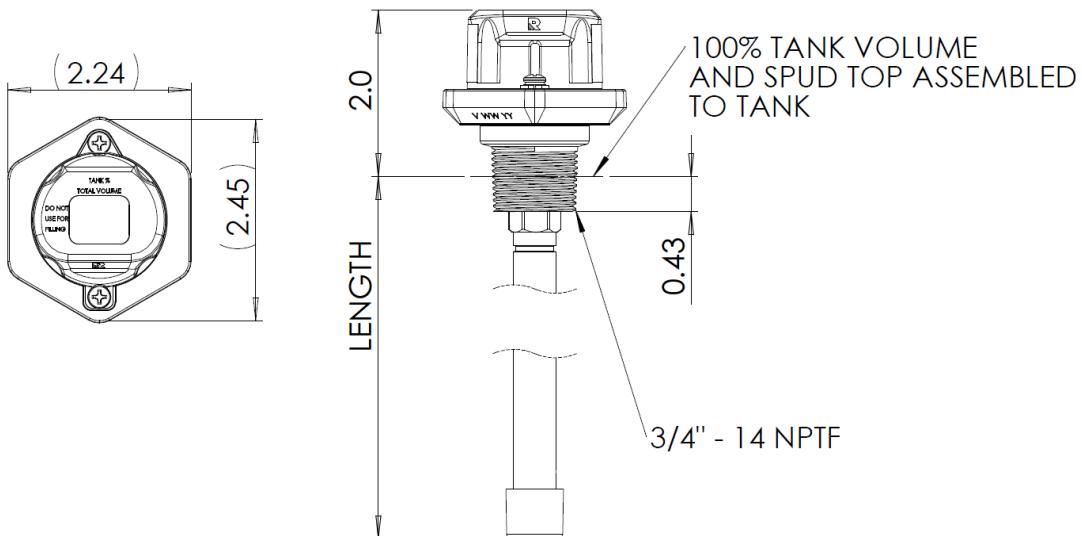


| <b>Model</b> | <b>Length (in)</b> |
|--------------|--------------------|
| 6320-XB0545  | 54.5               |
| 6320-XB0475  | 47.5               |

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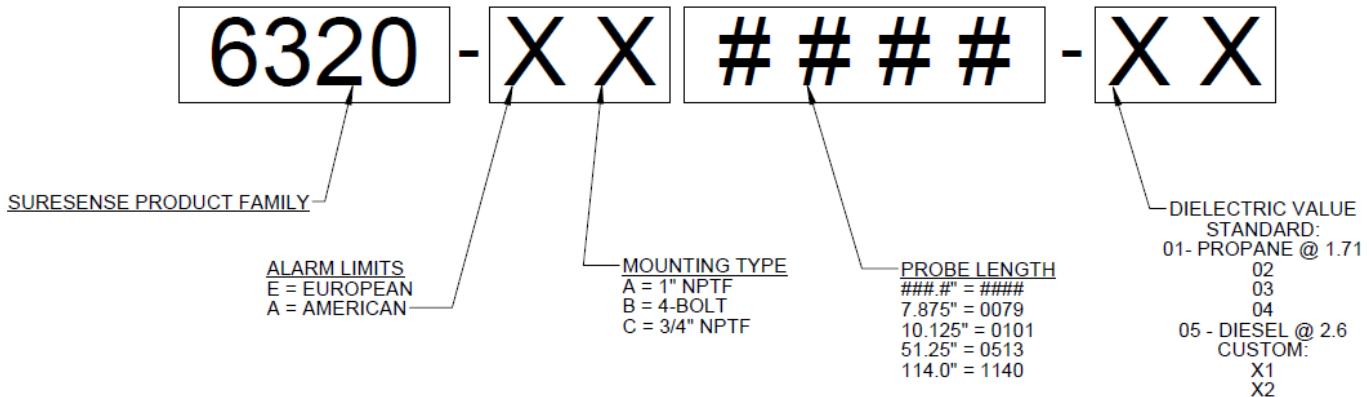
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### Dimensions for 3/4" NPTF



| Model       | Length (in) |
|-------------|-------------|
| 6320-XC0272 | 27.2        |

### Part Number Options: 6320-XX#####-##



### Ordering Information

Contact your local sales representative for samples, availability, and pricing information.

### Installation

See Document INS-6320

### Disposal

This product contains a battery. At the end of product life, waste batteries should either be recycled or taken to a hazardous waste collection point.

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## Appendix A

| <b>System Conditions</b>     | <b>BLE STATUS BYTE</b> | <b>BLE BROADCAST LEVEL</b> | <b>LCD OUTPUT</b> | <b>Description</b>   |
|------------------------------|------------------------|----------------------------|-------------------|--|
| <b>Normal</b>                | 0x0                    | Level                      | Level             | Normal Operation   |
| <b>Device Error</b>          | 0x1                    | 0                          | 88/00             | Er: Device error. Contact Rochester Sensors.   |
| <b>Tank Level &lt; 5%</b>    | 0x2                    | Level                      | 88                | Measurement Low Low Warning <ul style="list-style-type: none"> <li>LCD displays static "Lo"</li> <li>Typical value for new tanks before initial propane fill</li> </ul>                  |
| <b>Tank Level &lt; 10%**</b> | 0x6                    | Level                      | 88/Level          | Measurement Low Warning <ul style="list-style-type: none"> <li>LCD displays alternating "Lo" and level</li> </ul>  |
| <b>Tank Level &gt; 85%</b>   | 0x7                    | Level                      | 88/Level          | Measurement High Warning <ul style="list-style-type: none"> <li>LCD displays alternating "Hi" and level</li> </ul>   |
| <b>Tank Level &gt; 95%</b>   | 0x3                    | Level                      | 88                | Measurement High High Warning <ul style="list-style-type: none"> <li>LCD displays static "Hi"</li> </ul>   |
| <b>NOT CONNECTED</b>         | 0x4                    | 0xFFFF (65535)             | 88                | nC: Electronics are not connected to probe.<br>The BLE Broadcast level will be set to 0xFFFF.  |
| <b>Battery Low</b>           | -                      | Level                      | 88/Level          | bL: Battery low. Battery is estimated to be within 1-2 years of expected end of life. The measured level will alternate on the LCD with this code plus any level warning codes (if any). |
| <b>Battery Critical</b>      | -                      | Level                      | 88/Level          | bC: Battery critical. Battery is estimated to be < 1 year of expected end of life. The measured level will alternate on the LCD with this code plus any level warning codes (if any).    |

\*\* For EU products the LO warning level is 20%

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