

**Long Range  
Wireless LP Gas Tank Level Meter**

**Model Number: RS-228**

**Owner's Manual**

**Please read before using this equipment.**

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

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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:

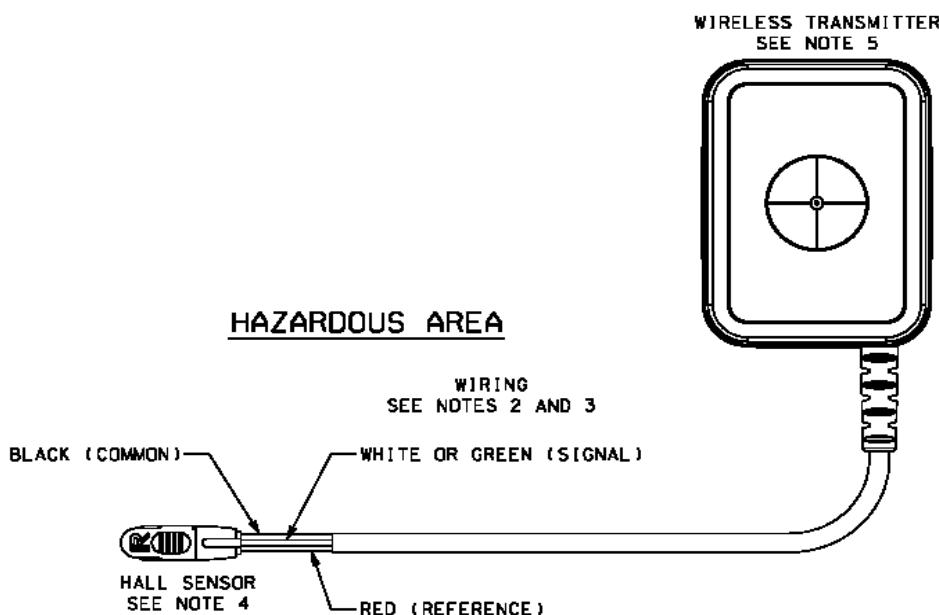
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## INTRINSIC SAFETY INFORMATION

The remote transmitter is Intrinsically Safe Apparatus for use in Class I, Division 1, Group D Hazardous (Classified) Locations per ANSI/UL 913 and CAN/CSA C22.2 No. 157

Securite Intrinseque: Ex ia

Control Drawing # 040108A0001



1. WHEN INSTALLED AS SHOWN THE WIRELESS TRANSMITTER AND HALL SENSOR ARE INTRINSICALLY SAFE FOR HAZARDOUS LOCATION: CLASS 1, DIVISION 1, GROUP D
2. INTRINSICALLY SAFE WIRING MUST BE INSTALLED IN ACCORDANCE WITH ARTICLE 504 OF THE NEC ANSI/NFPA 70 OR IF APPLICABLE THE CANADIAN ELECTRICAL CODE.
3. WIRELESS TRANSMITTER AND HALL SENSOR SHALL BE INSTALLED IN ACCORDANCE WITH RS-228 INSTALLATION INSTRUCTIONS.
4. HALL SENSOR: ROCHESTER GAUGES R3D SENSOR.
5. WIRELESS TRANSMITTER: ROBERTSHAW RS228 WIRELESS LP TANK LEVEL TRANSMITTER.
6. WARNING! TO REDUCE RISK OF IGNITION OF A FLAMMABLE OR EXPLOSIVE ATMOSPHERE, BATTERY MUST BE CHANGED ONLY IN A LOCATION KNOWN TO BE NON-HAZARDOUS.
7. WARNING: TO REDUCE THE RISK OF EXPLOSION, DO NOT MIX OLD BATTERIES WITH NEW BATTERIES, OR MIX BATTERIES FROM DIFFERENT MANUFACTURES.
8. WARNING! SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
9. WARNING! TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTABLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING.

## IMPORTANT Information

Warning! – Substitution of Components May Impair Intrinsic Safety

Warning! – To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

Warning! – To reduce risk of ignition of a flammable or explosive atmosphere, batteries must be changed only in a location known to be non-hazardous.

Warning! – To reduce the risk of explosion, do not mix old batteries with used batteries, or mix batteries from different manufacturers.

Caution! – Replace batteries only with two of each (3V total):

1. Duracell MN1500 LR6 1.5 volt AA alkaline batteries
2. Energizer 2012 L91 1.5volt AA lithium batteries
3. Novacell AM3 LR6 1.5V AA Alkaline Batteries.

The following additional precautions should be observed:

1. Use only the type and size batteries specified in the user manual.
2. Do not dispose of the batteries in fire. They may explode. Check with local codes for possible special disposal instructions.
3. Do not open or mutilate the batteries. Released electrolyte is corrosive and may cause damage to the eyes, skin. It may be toxic if swallowed.
4. Exercise care in handling batteries in order not to short the battery with conducting materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.
5. Do not attempt to recharge the batteries identified for use with this product. The batteries may leak corrosive electrolyte or explode.
6. Do not attempt to rejuvenate the batteries identified for use with this product by heating them. Sudden release of the battery electrolyte may occur causing burns or irritation to eyes or skin.
7. When replacing batteries, all batteries should be replaced at the same time. Mixing fresh and discharged batteries could increase internal cell pressure and rupture the discharged batteries.
8. When inserting batteries into this product, the proper polarity or direction must be observed. Reverse insertion of the batteries can cause charging, and that may result in leakage or explosion.
9. Remove batteries from this product if the product will not be used for a long period of time (Several months or more) since during this time the battery could leak in the product.
10. Discard “dead” batteries as soon as possible since “dead” batteries are more likely to leak in the product.
11. Do not store this product, or the batteries identified for use with this product in high-temperature areas. Batteries that are stored in a freezer or refrigerator for the purpose of extending shelf life should be protected from condensation during storage and defrosting. Batteries should be stabilized at room temperature prior to use after cold storage.

## Features

Your RS-228 Wireless LP Gas Tank Level Meter is a useful addition to your home or business. You can monitor the tank level from the comfort and safety of your home with this completely wireless system.

The system's other features include:

- **150 Foot Range** – Allows you more flexibility in base station location.
- **Large Multifunction Liquid Crystal Display (LCD)** – Shows current tank level numerically in percent, and graphically on a bar chart.
- **Low Tank Level Alarm** – The current level will flash 1 time per second when the tank level drops below the re-order point (25%). The level reading will continue to flash until the tank is refilled.
- **Low Battery Indicator** – Lets you know when the base station's or the remote transmitter's battery power is low.
- **Horizontal and Vertical Tank Level** – The remote transmitter has a switch that allows accurate tank level readings for both vertical and horizontal LP gas tanks.
- **Rugged Remote Transmitter** – The remote transmitter is UL50 type 3 approved and is suitable for continuous outdoor exposure.
- **Intrinsically Safe Transmitter** – The remote transmitter is approved intrinsically safe to ANSI/UL913 and CAN/CSA 22.2 No. 157. So it can be mounted safely anywhere on your LP Tank. *Note: Please contact your LP Gas Distributor for professional installation of the Remote Transmitter.*

# Installing Batteries

Your LP Gas Tank Level System requires 2 AA batteries and 2 AAA batteries (not supplied) for power – Two AA batteries for the remote transmitter and 2 AAA batteries for the base station. For best performance and longest life, Alkaline or Lithium batteries are recommended.

**Caution! Use only fresh batteries of the required size and recommended type.**

**Caution! Do not mix old and new batteries, different types of batteries, or rechargeable batteries of different capacities.**

**Warning!: To reduce risk of ignition of a flammable or explosive atmosphere, batteries must be changed only in a location known to be non-hazardous.**

**Warning!: To reduce the risk of explosion, do not mix old batteries with used batteries, or mix batteries from different manufacturers.**

**Caution! – Use 2 Duracell AA 1.5 volt alkaline batteries or 2 Energizer L91 AA 1.5V lithium batteries or equivalent**

Notes:

- If you plan on using the remote transmitter in temperatures below -4°F (-20°C), we recommend you use lithium batteries in the remote transmitter.
- Install the batteries in the base station first to insure that the base station and remote transmitter are properly synchronized.

## In the Remote Transmitter

1. Remove the sensor from the tank gauge.
2. Remove the remote transmitter from the mounting holster
3. Use a Phillips screwdriver to remove the screw in the battery compartment cover, then lift off the cover.
4. Set the **Horizontal/Vertical** switch to the desired setting for the application. If the LP tank is a horizontal tank, set the switch to horizontal (default setting). If the LP tank is a vertical tank, set the switch to vertical.
5. Place the batteries in the compartment as indicated by the polarity symbols (+ and -) marked inside.
6. Replace the cover and reinsert and tighten the screw, ensuring the battery door gasket is in place.
7. Reattach the sensor to the tank gauge.
8. Reinstall the remote transmitter in it's holster. It is a good idea to use wire ties to secure the sensor cable securely to the LP gas line to insure the cable will not be cut when the access dome is closed.

## In the Base Station

1. Carefully remove the battery compartment cover.
2. Place the batteries in the compartment as indicated by the polarity symbols (+ and -) marked inside.
3. Replace the cover

When **LOW BAT IN** appears at the top of the LCD, replace the batteries in the base station. When **LOW BAT OUT** appears at the top of the LCD, replace the batteries in the remote transmitter. When **LOW BAT IN OUT** appears at the top of the LCD, replace the batteries in both the base station and the remote transmitter.

## Mounting the System

You can place the base station on flat surfaces (such as a table, counter top or window sill). The remote transmitter should be installed using the supplied mounting bracket.

## Selecting a Location

Choose locations for the base station and remote transmitter that are within about 150feet (50 meters) of each other. The base station should be located indoors, and the remote transmitter is mounted on or near the LP tank.

The construction of your home or office may affect the transmission range between the base station and remote transmitter. If you have a choice of several locations, try each to see which provides the best performance.

Cautions:

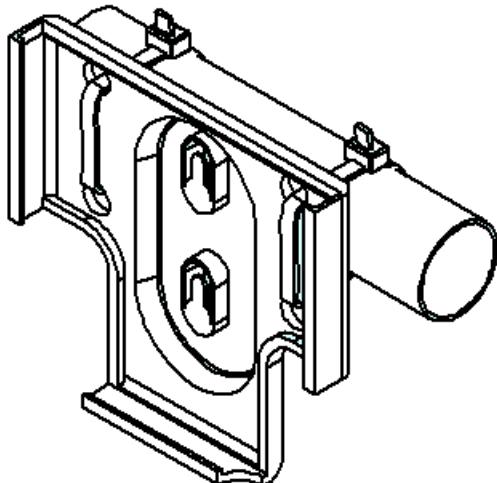
- Do not place the base station where it will be in direct sun-light.
- Do not place the base station in a location where it is likely to get wet. Only the remote transmitter is weather tight.
- Do not place the base station near electrical appliances.

## Mounting the Remote Transmitter

*Please contact your local propane dealer for professional installation.*

To mount the remote transmitter on the propane supply line, you will need two small zip ties (not supplied) that fit through the 4 holes in the back of the supplied mounting bracket.

1. Secure the bracket to the supply line by using the zip ties as shown.
2. Slide the remote transmitter into the mounting bracket.
3. Install the R3D level sensor in to the existing R3D LP level gauge assembly. If a non compatible gauge is present, a new R3D gauge will need to be installed.



To mount the remote transmitter on a wall or a post outdoors, you need two 1/8-inch (3.5mm) screws (not supplied) with heads that fit into the key-hole slots on the back of the supplied mounting bracket.

1. Drill two holes 1 inch apart on the mounting surface, then thread a screw into each hole so the heads extend about  $\frac{1}{4}$  inch from the mounting surface. ***WARNING! Never drill holes into a propane tank or apparatus associated with propane tanks. DO NOT USE ELECTRICAL EQUIPMENT SUCH AS AN ELECTRIC DRILL IN LOCATIONS KNOWN TO BE HAZARDOUS.***
2. Align the keyhole slots on the mounting bracket with the screws and slide the bracket downward to secure it.
3. Slide the remote transmitter into the mounting bracket.
4. Install the R3D level sensor in to the existing R3D LP level gauge assembly. If a non-compatible gauge is present, a new R3D gauge will need to be installed.

## Operation

Once the batteries are installed in the base station, the display will flash 1 time per second with a level indication of 5% and all of the level bars on. This indicates that the base station is searching for a remote transmitter. The display will continue to flash until the batteries are installed in the remote transmitter at which time the display should indicate a level of approximately 50%.

After the remote transmitter is successfully installed on the LP tank, the level displayed on the base station should match that of the dial indicator on the LP tank.

The display will continue to update the level readings every 6 seconds for the first 4 minutes after the batteries are installed. After 4 minutes the display will update once every  $2\frac{1}{2}$  minutes.

### ***Reading the tank level***

The base station display will show the level in the propane tank numerically as percent full with a resolution of 1%, and graphically with a bar chart at a resolution of 10%. A full LP tank should read a level of approximately 80%.

There is a color bar located below the bar graph on the base station. When the bars are in the green band, the level in the tank is ok. Once the bars drop below the yellow and into the red zone, it is time to schedule a delivery of LP gas.

### ***Low Tank Level Alarm***

The base station is equipped with a low level alarm feature. If the level in the tank drops below the 25% point, both the bar chart and the numeric level reading will flash once per second until the LP tank is re-filled.

## **Forcing a signal search**

If the base station loses connection with the remote transmitter, the base station display will begin to flash %5 and all of the level bars will be on. You should repeat the battery installation procedure to re-synchronize the units.

## **Horizontal vs. Vertical tank configuration**

There are many configurations of LP tanks on the market today. The RS-228 is compatible with most. The RS-228 remote transmitter is equipped with a configuration switch located in the battery compartment, which must be set to indicate what type of LP tank is being measured.

If the LP tank is a horizontal cylinder, then the switch should be set to the HORIZONTAL setting (factory default).

If the LP tank is a vertical cylinder, then the switch should be set to the VERTICAL setting.

## **Care**

Keep the system dry; if it gets wet, wipe it dry immediately. Use and store the system only in normal temperature environments. Handle the system carefully; take care not to drop it. Keep the system away from dust and dirt, and wipe it with a damp cloth occasionally to keep it looking new.

Modifying or tampering with the system's internal components can cause a malfunction, can effect intrinsic safety and invalidate its warranty. If the system is not performing as it should, please contact the place of purchase for assistance.

## **Specifications**

### **Power**

Base Station: 3v with 2 AAA batteries  
Remote Transmitter: 3v with 2AA batteries

### **Battery Life (Typical)**

Base Station: 1 1/2 years  
Remote Transmitter: 2 years

### **Operating Temperature Range**

Base Station: +23°F to +122°F (-5°C to +50°C)  
Remote Transmitter: -4°F to +140°F (-20°C to +60°C)

**RF transmission frequency: 433MHz**

**RF Transmission Power:** 1mW maximum

**RF Transmission Range:** 150 feet line of site (50m line of site)

**Resolution:** 1% of water capacity

**Approximate Sampling Time:** 2 1/2 Minutes

**Accuracy:** ±3%

### **Weight (without batteries)**

Base Station: 2.75oz. (78g)  
Remote Transmitter: 7.5oz. (213g)

### **Dimensions**

Base Station: 3 7/8 x 1 x 2 3/8 inches (98 x 25 x 60mm)  
Remote Transmitter: 2 7/8 x 1 x 3 3/4 inches (73 x 25 x 95mm)

Specifications are typical; individual units may vary. Specifications are subject to change and improvements without notice.