

Centeron® Digital Radar Series Instruction Manual

Model # DR Series

Document # 040154C0001

Revision # B

Dated 09/14/2007



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1.0 Introduction

This manual describes how to install, test, and service the Centeron[®] Digital Radar Series (hereafter referred to as the DR). The DR is part of the Centeron[®] Level Monitoring System, which includes the Centeron[®] Web View (hereafter referred to as Web View) internet data and device configuration access.

This guide does not include the detailed operation of the WebView internet access. Refer to the internet help screens or Robertshaw Technical Support (See Section 5.3) for this information.

The description herein is based on a standard installation. The DR is to be installed as fixed, permanently connected equipment. This means that the DR should be fastened to a tank on either a 1.5" NPT or 2" NPT pipe thread.

Due to the power required to operate the cellular modem, **do NOT install the DR on tanks that are located in Classified Hazardous Locations or contain flammable vapors.**

2.0 Product Overview

2.1 Description

The DR is a battery-powered unit that measures and transmits the level, device temperature, and other status information to Web View for display to the customer. The DR can be configured in the field using Web View. The DR uses a digital cellular modem to transmit and receive data.

2.2 Operation

The DR uses a scheduler to determine when to make a level measurement. The DR also measures the device's temperature at the same time that it measures the fluid level. Based on the device's schedule and any alarm conditions, the DR transmits the data to Web View. Web View further processes the data and displays it on the internet. Web View also has the ability to send alerts to the end user via e-mails or faxes.



WARNING: Do not install the DR on tanks that are located in Classified Hazardous Locations or contain flammable vapors.

2.2.1 Measurement Operation

All measurements are taken immediately prior to the DR reporting to Web View. Using the scheduler on Web View, the user can schedule additional measurements for use with level setpoints and other alarms.

2.2.1.1 Radar Level Measurement

The DR measures liquid level by detecting the vertical position of a float that rides on the probe at the top of the liquid. The Monitor's electronic circuitry measures the time that it takes for an electromagnetic pulse to travel to the float and back to the Monitor. Travel time for the electromagnetic pulse is proportional to distance, allowing the Monitor to calculate fluid level. The DR measures fluid level with a resolution of 0.1" of liquid product. The raw level value reported by the Monitor is the distance from the lower housing reference to the top of the fluid surface. Web View uses this data along with the tank dimensions to calculate actual product amount.

2.2.1.2 Temperature Measurement

The temperature inside the DR's enclosure is measured at the same time as the level with a resolution of 0.2 °C.

2.2.1.3 System Quality and Status Measurements

The DR measures the status of its internal battery. The battery level is reported as a numeric value to indicate the amount of life left in the battery. Web View interprets the reported value to provide the user with an indication of when the battery should be changed.

The DR measures the cellular signal strength. This value is displayed by Web View to indicate the quality of the communication link.

2.2.2 Scheduler Operation

The DR has a sophisticated scheduler that allows the user to configure:

- daily or weekly reporting,
- number and time of reports per day or week, and
- how frequently to perform extra measurements between transmissions.

The user can configure the schedule using Web View. Please refer to the online help or contact technical support (See Section 5.3) if you have any questions regarding the configuration of the DR.

2.2.3 Data Transmissions

The DR will transmit data on a preset schedule, on an alarm condition, or when the disable magnet is removed from its slot in the enclosure.

2.2.3.1 Regularly Scheduled Transmissions

All transmission scheduling is configurable from Web View. Internal timekeeping allows the user to configure the times for transmissions within 15 minutes of accuracy. The schedule can be set from once per hour (maximum of nine transmits per day) to once per week. Measurements will be performed immediately before regularly scheduled transmissions.

IMPORTANT NOTE: The DR battery life has been optimized for a schedule of (3) transmissions per day with hourly measurements. Changing the DR schedule will affect unit battery life.

2.2.3.2 Alarm Transmissions

The DR will transmit immediately upon detecting an alarm condition. Web View can be configured to send e-mail alerts whenever it receives an alarm from the DR. Please refer to Section 2.2.4 for more detail.

2.2.3.3 Forced Transmissions

Whenever the disable magnet is removed from the housing, the DR will take its measurements and transmit immediately. If the magnet is left in the housing for more than one minute before it's removed, the DR will take its measurements, transmit immediately, and request that Web View update its configuration.

2.2.4 Alarm Operation

The DR provides flexible alarm capabilities. The DR has alarms for level setpoints. The alarms can be configured using Web View. Upon an alarm condition, the DR will immediately transmit to Web View. Web View can be configured to send an e-mail alert whenever an alarm is reported by the DR.

To take advantage of the alarms, the DR should be configured to take more frequent measurements than just immediately prior to regular transmissions. For example, having the unit measure once per hour allows the detection of alarms within an hour of when it happens. Having the unit measure every five minutes would detect an alarm condition within five minutes of when it happened. Increasing the frequency of measurements does affect battery life. If you have questions regarding how frequently to measure, please contact Robertshaw Technical Support (See Section 5.3).

2.2.4.1 Level Setpoint Alarm

The DR provides two level setpoints. The user can configure the setpoints to alarm as the level is increasing, decreasing, or passing the setpoint in either direction. The user can configure a deadband around each setpoint to avoid unnecessary calls.

2.2.5 Cellular Network Operation

The DR transmits its data using the normal standard cellular network using many cellular providers. As with all cellular devices, coverage includes most of the United States, Canada, and Mexico. If you have any issues regarding the DR communicating with Web View, please contact Robertshaw Technical Support (See Section 5.3). They may be able to provide information regarding any network issues in the area where the device is located.

2.3 Environmental Specifications

The following environmental specifications should be observed when installing the DR:

- Temperature Range: -30°C to +75°C
- Designed for indoor or outdoor use.
- Type 4 enclosure.
- Exposed parts are nylon, polypropylene, Buna-N, FEP Teflon, brass, and 316 stainless steel.
- Threads for 1.5” NPT and 2” NPT bung mounting.

2.4 Certifications

This equipment complies with Part 15 of the FCC Rules. On the enclosure of this equipment is a label that contains, among other information, the FCC number.

2.4.1 FCC Notice—Radio Frequency Communications

The DR generates and uses radio frequency energy. If not installed and used in accordance with the manufacturer’s instructions, it may cause interference to radio and television reception. The DR has been tested and found to comply with the specifications in Part 15 of Radiators and FCC Rules for Class B Computing Devices.

CAUTION: Robertshaw Industrial Products does not support field changes or modifications to any of the Centeron® Level Monitoring System equipment unless they are specifically covered in this manual. All adjustments must be made at the factory under the specific guidelines set forth in our manufacturing processes. Any modification to the equipment will void the manufacturer’s warranty and could void the user’s authority to operate the equipment and render the equipment in violation of FCC Part 15, Subpart C, 15.247.

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.

2.4.2 Canada

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

2.4.3 Safety and Regulatory

The DR complies with UL 61010B-1 Electrical Measuring and Test Equipment; Part 1.

The DR is self-contained and operates on an internal 12.8V non-rechargeable Lithium MnO₂ battery pack, which should only be serviced by certified service personnel (See Section 5.3).

3.0 Installation

A list of the provided equipment and additional tools required for installation can be found in the Installation Guide (p/n 040155C0001).

NOTE: The DR should be configured on Web View prior to installing the unit in the field. Otherwise the installation confirmation message cannot be sent.

3.1 Handling Guidelines

The DR should be handled with care. The electronics inside of the enclosure are static sensitive. Do not handle the electronics outside of their enclosure without proper static precautions.

3.2 Mounting



WARNING: Do not install on tanks that are located in Classified Hazardous Locations or contain flammable vapors.

IMPORTANT NOTE: The DR is designed for use on freely vented tanks. This device should not be used on tanks with vapor recovery systems or tanks with vents that allow a pressure or vacuum to exist inside the tank.

NOTE: For optimal performance, avoid mounting multiple cellular products within 2' of each other.

3.2.1 Mounting Step 1

Select a mounting bung on the top of the tank that will allow the DR's probe to hang down vertically inside the tank. Verify that there is adequate clearance to prevent the float, cable, or anchor from contacting obstructions such as walls, baffles, reinforcements, and other measurement equipment inside the tank. There should be at least two inches of clearance between the probe cable and any obstructions. Remove all materials from the desired bung. Verify that there is adequate clearance for the probe and anchor to reach the bottom of the tank. Check the size of the bung pipe thread. If different than 1.5" NPT or 2" NPT a pipe thread adapter is needed.

The Monitor may be installed in a vertical standpipe if necessary. In this case, the standpipe must have an inside diameter of at least two inches and its length should be minimized. If the Monitor is to be installed in a standpipe that is more than 6" tall, clip and remove the positive stop (wire tie) that is inserted through the probe cable about 4" below the Monitor housing. Verify that the standpipe is vertical and that the probe cable

and float will not contact the sides of the pipe. If the probe cable touches the inside of a standpipe at any point because the pipe is not vertical, a Probe Centering Kit (P/N 086655A0001) should be installed.

If the only access to the tank is where the vent is currently mounted, then a 2” NPT T-couple pipe adapter may be used to mount the Monitor with the vent connected to the perpendicular inlet.

3.2.2 Mounting Step 2

Measure from the top of the tank bung (or standpipe/adapter) to the inside bottom surface of the tank. The maximum installation height must not exceed the probe length as indicated on the DR model number for optimum monitoring. The DR will only be able to measure liquid level above the installed anchor position.

3.2.3 Mounting Step 3

Carefully unpack the Monitor from the shipping box, un-coil the probe cable, remove the float and anchor from the bubble bags, and locate the mounting O-rings. Slip the appropriate size O-ring over the Radar probe cable, and Monitor mounting threads. Slide the O-ring backward past the lip at the base of the Monitor threads pressing along the O-ring circumference until it is snug. Install the float and then anchor on the probe cable. Carefully slide the anchor up the cable so that it will be positioned approximately two inches above the inside bottom surface of the tank when the Monitor is installed. Tighten the cable anchor screws to approximately 10 in. lb torque and cut off any excess cable flush with the bottom of the anchor. The cable and anchor must not touch the bottom of the tank when the Monitor is installed. Lower the anchor, probe, and float into the tank while being extremely careful not to nick the cable insulation on the tank threads. Verify that no twists or kinks are allowed to remain in the cable. Imperfections in the cable such as these must be straightened by hand as the cable is lowered into the tank.

3.2.4 Mounting Step 4

Carefully thread the Monitor into the tank opening by hand tightening it 1/8 turn clockwise past engaging the O-ring. Assembly requires only a snug fit.

Note: Over-tightening may cause damage to the Monitor threads and O-ring.

3.3 Activation

Following installation, the unit can be activated:

3.3.1 Activation Step 1

To activate the Monitor, pull the external slide magnet completely out of the top of the Monitor housing. This will activate the Monitor to make measurements and radio transmissions on a programmed interval (per customer configured schedule via the Centeron Web Site).

Note: Do not discard the magnet completely—keep it accessible for future use if needed. Do not store the magnet in the monitor upper housing slot since this will deactivate the monitor.

Once the external slide magnet is removed from the Monitor, the Monitor should take a measurement and send this data through a Cellular transmission. If the installer’s Cell Phone is available and active with the phone number set up on the Centeron® Web Site as an Email address a successfully installation text message should be received within 5 minutes. If an installer’s Cell Phone is not available, the installer can contact someone at his company who has access to Web View or call Robertshaw Technical Support for installation verification (See Section 5.3).

4.0 Troubleshooting

If the DR is not operating properly, locate the solution below:

| Issue | Resolution |
|---|--|
| Installer didn’t receive a confirmation page when magnet was pulled from unit. | Verify that installer’s e-mail address was set up on Web View to receive notification when data is sent. |
| When looking at Web View, configuration data wasn’t sent when a magnet pull was done. | See if “Downloaded” checkbox is checked. If so, configuration was already downloaded. Verify that magnet was left in the unit for over 1 minute before it was pulled. |
| All installation and activation instructions have been followed completely, but the DR will not report valid information to Web View. | Call Robertshaw Technical Support. (See Section 5.3) |

5.0 Warranty and Service

5.1 Warranty

Seller warrants title and that products sold to Buyer shall be free from defects in material and workmanship and shall conform to specifications for a period of one (1) year from purchase date for complete units and parts and subassemblies. Warranties on goods sold but not manufactured by the seller are expressly limited to the terms of warranties of the manufacturer of such goods.

Seller makes no representation or warranty of any kind, express or implied, as to merchantability, fitness for particular purpose or any other matter. Upon receipt of definite shipping instructions, Buyer shall return, transportation prepaid, all defective material, or material not conforming to specifications, to Seller, after inspection by Seller, or at Seller's election, subject to inspection by Seller. Material returned by Buyer must be returned in same condition as when received by Buyer. Defective material, or material not conforming to specifications, so returned shall be replaced or repaired by Seller and returned, freight prepaid, without any additional charge, or in lieu of such replacement or repair, Seller, may, at Seller's option, refund the purchase price applicable to such material. Seller agrees to pay return freight charges not exceeding the lowest rail or truck rate which would apply from the original destination on all defective material, or material not meeting specifications. However, Seller shall not be obligated for such charges when material returned proves to be free from defect and to meet specifications. Material which proves to be free from defect and to meet specifications shall be held by Seller for shipping instructions and Buyer shall furnish such instructions promptly upon request. Seller's liability shall be limited solely to the replacement or repair or to refunding the purchase price applicable to the defective material or material not meeting specifications. Seller shall not be liable for any consequential damages nor any loss, damages or expenses directly or indirectly arising from the use of the material.

5.2 Unit Disposal

The U.S. Environmental Protection Agency regulates the disposal of waste products in the United States. The EPA Regulations are listed in the "Code of Federal Regulations," CFR40, entitled "Protection of Environment." Additionally, individual states and local communities also may establish more stringent regulations covering the disposal of waste products. Thus, state and local agencies should be contacted for their disposal guidelines.

5.3 Service and Technical Support

If you experience trouble with this equipment, please contact **Robertshaw Industrial Products Technical Support at (865) 981-3118, Monday through Friday, EST 8:00 a.m. to 4:30 p.m.**

This unit is to be serviced by certified service personnel only.



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