WESROC® RMS
Industrial LTE Cellular Tank Monitor

Models MT9104CTMA, MT9104CTMR, and MT9104CTMV
Operation Manual

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Table of Contents

Safety Information **5**
Hazardous Environments 5
Battery Replacement 5
Radio Frequency Exposure 5
Compliance Information 5

Overview **6**
Device Characteristics 6
Installation 6
Power 6

Installation **7**
Mounting Location 7
Tank Gauge 7
Cellular Signal 7
Host Information 8
Installation Steps 8

Operation **10**
General 10
Operating Modes 10
OFF Mode: 10
NORMAL Mode: 10
INITIALIZATION Mode: 11
CONFIGURATION Mode: 11
Reporting To Host 11
Tank Level Measurement 12
Tank Level Events and Conditions 12
Tank Fill Event: 12
Tank Draw Event: 12
Tank Level Change Event: 12
Tank Critical High Condition: 12
Tank Warning High Condition: 12
Tank Warning Low Condition: 12
Tank Critical Low Condition: 13
Missing Sensor Condition: 13
Temperature Alarms 13
Low Battery Notification 13

Portable Diagnostic Unit **14**
General 14
PDU Screen Map 14
PDU Screens 15
Logo Screen: 15
Device List Screen: 15
Main Menu Screen: 16
Summary Screen: 16
System Configuration Screen: 17
Application Configuration Screen: 17
View Details Screens: 18
View Raw Data Screens: 18
Command List Screen: 19

General 20
Parameter List....20
Base ID: 20
Primary IP Address:....20
Primary IP Port: 20
Secondary IP Address:....20
Secondary IP Port: 20
Host Response Timeout:....20
Maximum Packet Retries:....20
Report Interval:....20
Low Battery Threshold (mV):....20
High Temperature Threshold:....21
Low Temperature Threshold:....21
Local Display Mode:....21
ISM Transmitter Number:....21

Application Configuration Parameters 21
General 21
Parameter List....21
Sensor Scaling: 21
Sensor Scaling....22
Tank Fill Threshold: 22
Tank Draw Threshold: 22
Critical High Threshold: 22
Warning High Threshold: 22
Warning Low Threshold:....22
Critical Low Threshold:....22
Level Change Threshold:....22
Gain Adjust:....22
Offset Adjust:....22

Battery Replacement 23

Specifications 24
Mechanical 24
Environment 24
Power Source....24
Tank Level Sensor....24
Cellular Radio....24
ISM Radio 24

Certifications....25
Safety....25
FCC 25
PTCRB 25
Cellular Carrier....25

Safety Information

Hazardous Environments

The WESROC® RMS Industrial Cellular Tank Monitor (CTM) is designed for safe use in environments containing hazardous vapors. However, certain precautions need to be taken to ensure the safety of the person(s) working with the CTM, the tank, and any associated equipment.
TO ENSURE SAFE OPERATION: Install the CTM according to the instructions contained in this CTM Operation Manual.

WARNING!!!
Do NOT loosen or remove float gauge from a pressurized tank!
Tank decompression can cause serious injury or property damage!

WARNING!!!
Do NOT connect the CTM to any apparatus or wiring from another manufacturer!
Substitution of components may impair the intrinsic safety of the CTM!
Clean only with a damp cloth to prevent the possibility of electrostatic discharge!
Enclosure mounting bracket may contain aluminum – take care to avoid ignition hazards due to impact or friction!

Battery Replacement

The CTM uses a replaceable, intrinsically safe battery pack. Only replace with a model MT-9100BPK-02 battery pack from Independent Technologies, Inc. Use of any other power source will compromise the intrinsic safety of the CTM and will void the CTM warranty. Dispose of used battery pack properly.

Radio Frequency Exposure

To ensure that exposure to hazardous radio frequency radiation is prevented, the CTM must NOT be installed in a location where humans will be routinely within 20 centimeters of the CTM.
To ensure that FCC requirements are met regarding radio frequency exposure, the CTM is NOT to be placed in operation where it will be co-located with another CTM. Co-location is considered to be where one operating CTM is within 20 centimeters of another operating CTM.

Compliance Information

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

This product meets the applicable FCC Part 15 rules and Industry Canada's license exempt RSSs. 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 materiel est conforme aux CNRexempts de licence d'Industrie Canada. Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne peut pas provoquer d'interférences, et (2) cet appareil doit accepter toute interférence, y compris celles susceptibles de provoquer le fonctionnement du dispositive.

Overview

Device Characteristics

The WESROC® RMS Industrial LTE Cellular Tank Monitor (CTM) is used to remotely monitor the level of the contents of a tank. The tank level and additional event and status information are reported to the WESROC® RMS Host System (Host) at scheduled intervals. In addition, the CTM will report to the Host immediately to track tank events in real time. The CTM uses the public cellular network and the internet to transport this information.

Communication with the Host is always originated by the CTM, but is bi-directional once a data session has been established. This allows for remote configuration of the CTM should the tank monitoring requirements change or in the event that the CTM is moved to another site.

The CTM also provides a local tank level display capability. The CTM can be configured to send ISM radio data packets to a nearby WESROC® RMS Base Unit (Base Unit). Once initialized to the CTM, the Base Unit will provide the customer with a local display of tank level for up to eight tanks (depending on which Base Unit is used).

Installation

A basic CTM installation is easily performed in a few minutes by persons with a basic understanding of the tank equipment to be monitored and of the CTM device itself. Since the CTM is self-contained, the complete installation can be performed at the tank. No access to the customer's residence or place of business is required when local tank level display is not needed.

By default, the CTM is configured to monitor the most common type of tanks, but may be re-configured to monitor a wide variety of tank configurations. The CTM may be remotely configured by the Host, or may be configured on site by using the handheld WESROC® RMS Portable Diagnostic Unit (PDU).

Refer to the 'WRMS Hydrostatic Sensor Interface Quick Installation Guide' and the 'WRMS Dual Hydrostatic Sensor Kit Quick Installation Guide' for installation of the additional equipment associated a hydrostatic CTM.

Power

The CTM is battery powered, and due to its low power design will provide many years of remote monitoring before battery pack replacement is required. Battery pack replacement may be performed at the tank as the CTM and battery pack are both designed to be intrinsically safe for use in hazardous environments.

Installation

Mounting Location

The WESROC® RMS Industrial LTE Cellular Tank Monitor (CTM) is designed to be installed directly on the tank to be monitored. The CTM is connected to the tank gauge by the tank level sensor and sensor cable. The CTM itself may be attached to the tank with the supplied mounting magnets or with a mounting bracket. The CTM may also be located a few feet away from the tank if necessary to improve cellular reception. Versions of the CTM are available with a longer sensor cable to facilitate mounting the CTM further away from the tank.

Tank Gauge

The standard CTM is equipped with a hall-effect based tank level sensor. This sensor is designed to be snapped into a remote ready tank gauge dial. The sensor and dial are part of the R3D dial and sensor system manufactured by Rochester Gauges. R3D dials are available for a wide variety of tank and gauge types. The CTM is configurable to work correctly with all available types. In addition, a version of the CTM is available that has an in-line connector at the end of sensor cable. This enables the CTM to work on large bulk tanks with large remote ready dials using the standard sensor manufactured by Rochester Gauges, or the newer Precision Large Dial Sensor manufactured by Independent Technologies, Inc.

Cellular Signal

The CTM must be installed in a location served by LTE based cellular service. (The MT-9104CTMR and MT-9104CTMV model CTMs also support 3G GSM service.) The CTM is supported by the largest LTE and GSM carriers in the U.S. and Canada, and by a number of other smaller regional service provider partners.

The CTM has a robust cellular sub-system, but there are limits to the capabilities of the cellular network in general. As with most wireless technologies, cellular signal reception can be affected by obstructions such trees, mountainous terrain, buildings, metal structures, large vehicles parked nearby, etc. In addition, cellular signal reception will be directly affected by the distance between the CTM and the nearest cellular tower.

The best signal reception will be achieved with a line of sight path between the CTM and the cellular tower. Obviously, this is rarely the case in the real world, but it should be kept in mind when selecting a mounting location for the CTM. Elevation can also help; typically performance will increase as the CTM is raised higher above the ground. The orientation of the CTM itself will also affect performance. The CTM should be installed upright, and if possible, with the sensor cable exit from the CTM enclosure pointed AWAY from the nearest cellular tower.

Host Information

The customer information, installation location, and tank configuration for the installation site must be entered into the WESROC® RMS Host System (Host) BEFORE the CTM is installed on the tank. A CTM Installation Information Worksheet outlining the required information is included in the box and is also available from your host administrator or from Independent Technologies, Inc. Email or fax the completed worksheet to the host administrator before beginning the installation. Installation information can also be called in verbally provided your host administrator considers this an acceptable method.

Installation Steps

Performing the installation steps in the order shown will help ensure proper operation of the CTM. A large percentage of “trouble sites” are caused by improper installation.

1] If possible, perform a site visit to the location of the tank to be monitored. Determine the size of the tank and the type of gauge on the tank. This will help you select the right equipment to bring with at installation time. This is also a good time to try to determine if you have cellular service available. Access to a cell phone can help with checking for the presence of a usable cellular signal.

2] Send a completed CTM Installation Information Worksheet to your host administrator. *Try to do this at least one day BEFORE you intend to perform the actual installation so that the host administrator has time to enter the information into the Host.*

3] If not already done, install the correct remote ready dial or large dial assembly on the tank gauge. This step is covered in more detail in the WESROC® RMS Dial Replacement Guide available from Independent Technologies, Inc.

4] Remove the CTM from the box and make sure it has the right type of sensor and sensor cable for your application. Make sure the small round programming magnet is secured in the OFF position on the CTM enclosure. This is important to ensure proper operation of the CTM when you are ready to perform the first report to the Host.

5] Mount the CTM directly on or near the tank to be monitored. The maximum distance from the tank will be determined by the length of the sensor cable on the particular type of CTM that you are using. The CTM may be mounted to the steel surface of the tank using the mounting magnets on the bottom of the CTM. Another option is to mount the CTM to a pole or another nearby structure using a right-angle mounting bracket. Mounting brackets can be obtained from Independent Technologies, Inc.

Try not to place the CTM right next to a vertical metal object such as a tank dome or hood. Metal objects higher than the bottom of the CTM enclosure tend to have a negative effect on cellular signal quality. As mentioned before, the CTM should be installed upright, and if possible, with the sensor cable exit from the CTM enclosure pointed AWAY from the nearest cellular tower.

6] Connect the sensor at the end of the sensor cable to the remote ready dial. This is accomplished by sliding the sensor into the sensor slot on the top of the dial. Slide the sensor from the side towards the center of the dial until it is fully seated. You will hear or feel a small “snap” once it is fully seated. To remove the sensor from the dial, *gently* lift up on the end of the sensor before attempting to slide it out of the dial.

Large dial installations use an in-line connector to attach the CTM to the dial. *When attaching an in-line connector, make sure the connector is fully seated and that the locking ring has been fully turned to ensure a weather tight seal.*

7] (Optional.) If you are going to be using a WESROC® RMS Base Unit (Base Unit) as a local display device, now is the time to initialize the CMT to the Base Unit. See section “Operation” of this document for details. *The “Local Display” system configuration parameter on the CTM must be enabled for this feature to work.*

8] *This step assumes that the installation site information has already been entered into the Host and that this particular installation does not require any unusual configuration of the CTM.* Remove the programming magnet from the OFF position on the CTM enclosure and step away from the CTM. (Do not degrade the CTM cellular signal quality by leaning over it while it is attempting to report.)

At this time, the CTM will attempt a configuration report to the Host. The report is typically completed in under a minute, but can take up to 4 minutes to complete under adverse cellular signal conditions.

The CTM does not provide any direct feedback regarding report success or failure; therefore it is highly recommended to make use of a handheld WESROC® RMS Portable Diagnostic Unit (PDU) when performing CTM installations. The PDU will provide the installer with a wealth of information regarding report status, tank level status, CTM system status, and cellular network performance. See section “Portable Diagnostic Unit” of this document, or the WESROC® RMS Portable Diagnostic Unit Operation Manual for more information on operating the PDU.

Another option for checking report status is to have the Host send a text alert message to the installer’s cell phone once a successful report has completed. This of course requires that the host administrator enter the installer’s texting address into the Host before installation time. *Once installation is completed, the installer will want to have their texting address taken off of the alert list for this site to prevent the Host from sending the installer future tank activity alerts.*

9] Once a successful report has completed, secure the sensor cable using appropriate fasteners (cable ties, etc.). Route the sensor cable to make sure the cable will not be damaged by a moving object such as a tank dome or hood. Before leaving the installation site, make sure any programming magnets are removed from the CTM enclosure. Normal operating mode is with NO programming magnets installed.

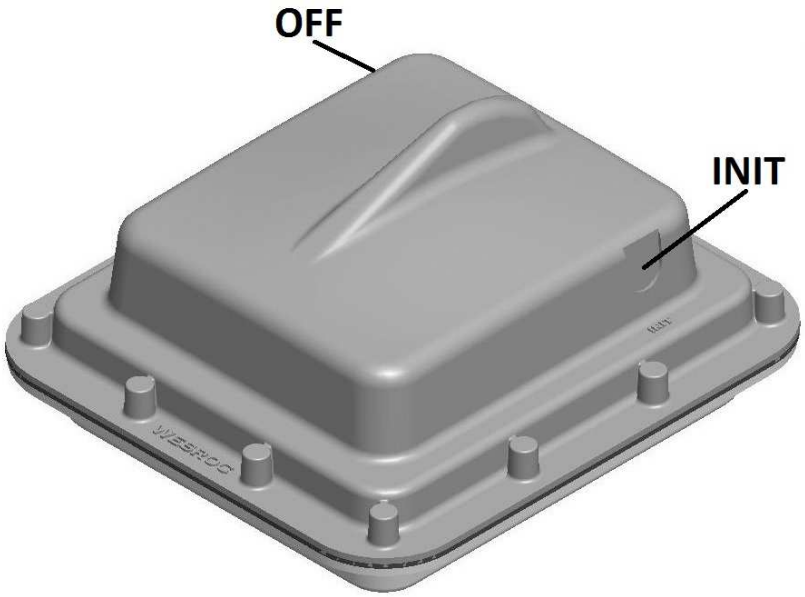
Operation

General

After the WESROC® RMS Industrial LTE Cellular Tank Monitor (CTM) has been installed on the tank to be monitored; it will periodically report tank level and activity data, and system status information to the WESROC® RMS Host System (Host). Reports can be triggered by expiration of a scheduled report interval timer, or by tank level events or conditions.

Operating Modes

The CTM has four basic operating modes, only one of which is used during normal operation. The other three modes are used for installation, configuration, or storage purposes. The four modes are selected by the installer using one or two small round programming magnets. The magnets are placed in the programming magnet recesses on the sides of the CTM enclosure when selecting different operating modes. *One programming magnet is supplied with each CTM – it is recommended to keep a few extra magnets on hand for use when configuring a CTM.*



OFF Mode: (One programming magnet in OFF position.)
Off mode is used for storage of the CTM. This is the mode the CTM will be in when shipped from the factory. When in Off mode, the CTM will wake up once per second and check the position of the programming magnets. If the installer has moved the programming magnet position(s) the CTM will switch to the newly selected mode. If not, the CTM will resume sleeping for another second. *Always leave the CTM in the Off mode to minimize battery drain and to minimize cellular data charges when a CTM is not in use.*

NORMAL Mode: (No programming magnets.)
Normal mode is used while the CTM is monitoring the level of the tank. This is the default operating mode of the CTM once it has been installed. While in this mode, the CTM will

wake up once per minute and measure the level of the tank contents. The CTM will then go back to sleep or will take the appropriate action if the tank level has changed since the last measurement. Actions may include starting or ending the qualification of a tank level event, reporting a tank level event to the Host, or reporting to the Host at a scheduled report time. While in Normal mode, the CTM is also constantly monitoring itself for any conditions that may require reporting to the Host. *The CTM will also simulate a WESROC® RMS Tank Transmitter and will send ISM radio data packets to a Base Unit while in this mode if the "Local Display" system configuration parameter has been enabled.*

INITIALIZATION Mode: (One programming magnet in INIT position.)
Initialization mode is used for initializing the CTM to a WESROC® RMS Base Unit (Base Unit) before using the Base Unit as a local tank level display device. Once the CTM has been put into Initialization mode, it will simulate a WESROC® RMS Tank Transmitter and will send an initialization data packet to the Base Unit once every 15 seconds (or sooner if the tank level changes.) The CTM will time out of Initialization mode and will revert to the Normal operating mode after 60 minutes. This is done to conserve battery life and to ensure that the CTM continues reporting to the Host once the installer has left the site. *See the operating manual for the type of Base Unit that you are using for instructions on putting the Base Unit into Initialization mode.*

CONFIGURATION Mode: (One programming magnet in both OFF and INIT positions.)
Configuration mode is used to change one or more of the internal CTM configuration parameters. When in this mode, system (CTM) or application (tank level) operating characteristics can be changed using a PDU.

Changes made with a PDU are reported to the Host once the CTM is returned to Normal mode. If field configuration is enabled in the Host, the Host will store the changes to its configuration database, and will send the changes back to the CTM to confirm acceptance of the changes. If field configuration is not enabled in the Host, the Host will overrule the CTM and will send the previous configuration back to the CTM. The CTM will time out of Configuration mode and return to Normal mode if it has not received a configuration command from the PDU for 15 minutes. This is done to conserve battery life and to ensure that the CTM continues reporting to the Host once the installer has left the site.

Reporting To Host

The CTM reports to the Host on a schedule determined by the Host configuration. The reporting schedule can range from once per hour to once per month. The report interval will directly affect battery life as the cellular sub-system is the major consumer of power in the CTM. ***It is not recommended to leave the CTM configured with an hourly reporting schedule for more than 24 hours as it will shorten battery life and may lead to excessive cellular data charges.***

In addition to scheduled reporting, the CTM will contact the Host to report CTM configuration changes, tank level events, and high or low temperature conditions.

Tank Level Measurement

The CTM wakes up and measures the level of the tank contents once per minute. This enables the CTM to be very responsive to changing tank level conditions and to more accurately qualify events such as tank fills or tank draws. The tank level is reported in a number ranging from 0 to 99, representing the tank level in percent full. This is the predominant measurement unit in the propane industry, and also serves well when monitoring low pressure fuels such as gasoline, diesel fuel, heating oil, etc.

Tank Level Events and Conditions

The CTM tracks and qualifies a number of different tank level events and conditions. Qualification of a tank level event or condition will cause the CTM to report to the Host ahead of its scheduled report time. A tank level event such as a tank fill is a one time event and will be reported and then cleared from the tank status. A tank level condition such as a low tank level will be reported, but will not be cleared from the tank status until the condition is no longer true. The following is a summary of the tank level events and conditions supported by the CTM. The configuration parameters referred to in this section can be referenced in the “Application Configuration” section of this document.

Tank Fill Event:
A tank fill event will be qualified by the CTM when the tank level increases by the configured amount.

Tank Draw Event:
A tank draw event will be qualified by the CTM when the tank level has decreased by the configured amount within one hour. A tank draw event will NOT be qualified if the tank level has dropped to 0% (bad or missing sensor).

Tank Level Change Event:
A tank level change event will be qualified by the CTM when the tank level has moved above or below the configured tank level change threshold since the last report to the Host. This threshold can be positive or negative, depending on if the user is looking to track a rising or falling tank level.

Tank Critical High Condition:
A tank critical high condition will be qualified by the CTM when the tank level has risen above the configured tank critical high threshold.

Tank Warning High Condition:
A tank warning high condition will be qualified by the CTM when the tank level has risen above the configured tank warning high threshold.

Tank Warning Low Condition:
A tank warning low condition will be qualified by the CTM when the tank level has dropped below the configured tank warning low threshold.

Tank Critical Low Condition:
A tank critical low condition will be qualified by the CTM when the tank level has dropped below the configured tank critical low threshold.

Missing Sensor Condition:
A bad or missing sensor condition will be qualified by the CTM when the tank level has dropped to 0% for a pre-determined amount of time. The qualification of this condition is not configurable.

Temperature Alarms

The CTM contains an accurate temperature measurement device and can be used to track ambient temperature at the installation site. The CTM also has configurable high and low temperature alarms and can be used to report abnormal temperature conditions to the Host. The CTM will report a new high or low temperature alarm to the Host, and will also report to the Host once the high or low temperature condition no longer exists.

Keep in mind that measured temperatures will be greatly affected by direct sunlight and somewhat affected by night time thermal radiation from the tank if installed on top of the tank.

Low Battery Notification

A low battery condition will not immediately trigger a report to the Host, but it will set a CTM system status flag that will be picked up by the Host at the next scheduled or event report.

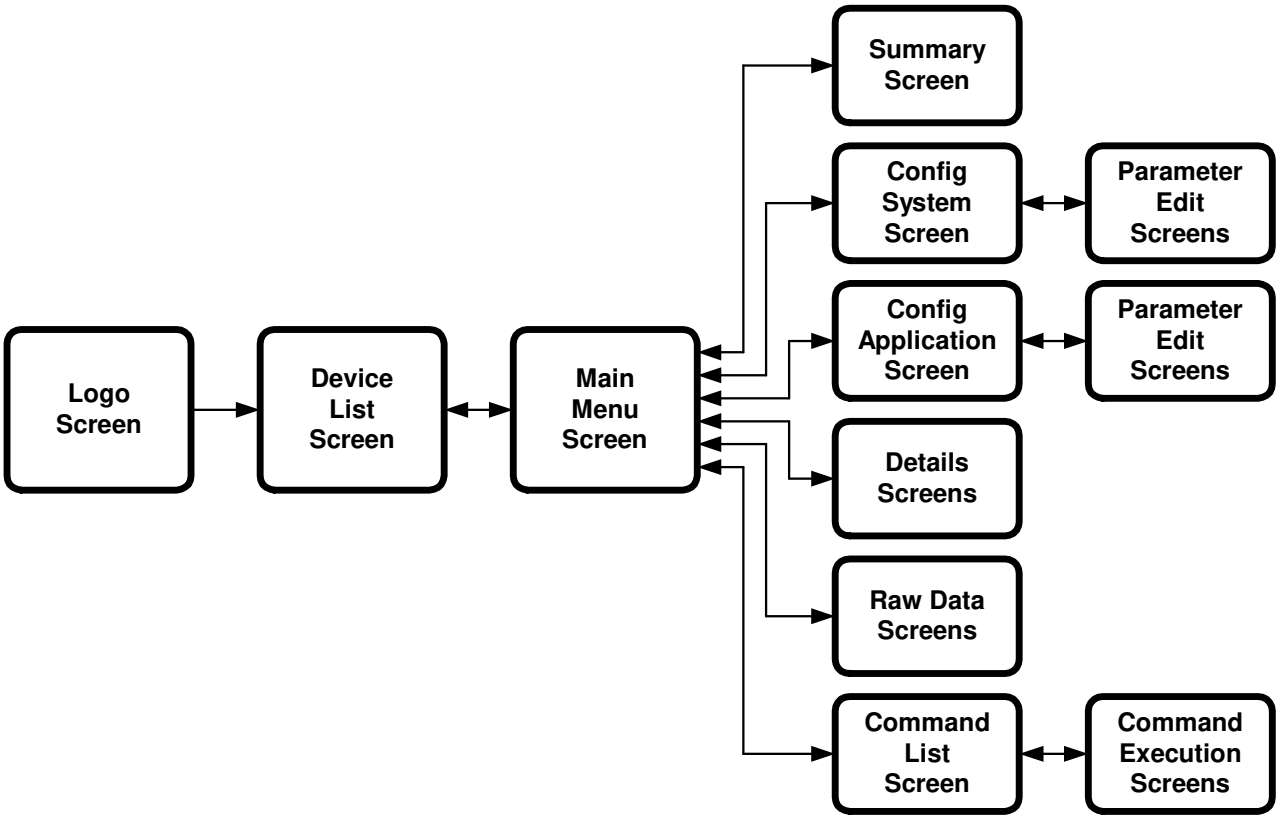
Portable Diagnostic Unit

General

The handheld WESROC® RMS Portable Diagnostic Unit (PDU) is used to configure and monitor the status of the WESROC® RMS Industrial LTE Cellular Tank Monitor (CTM). This valuable device should be considered an essential part of any installation tool kit. The following is a summary of the sections of the PDU interface that are designed for use with the CTM. *A more detailed description of the operation of the PDU can be found in the WESROC® RMS Portable Diagnostic Unit Operation Manual.*

A configuration data packet is required to be transmitted by the CTM before the PDU can be used to configure the CTM or view detailed data from the CTM. The CTM will transmit a configuration data packet before and after each report to the Host, when the CTM is placed in Configuration mode, and each time a configuration command is received from the PDU. *The CTM must be in Configuration mode to respond to configuration commands sent by the PDU. A configuration command is sent from the PDU to the CTM each time the user changes a configuration parameter value and leaves a configuration parameter editing screen.*

PDU Screen Map

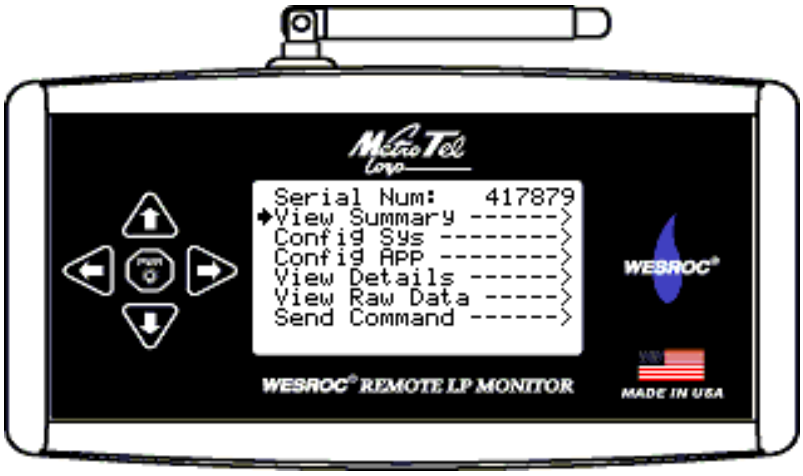


PDU Screens

Logo Screen:
This is the first screen displayed when the PDU is powered up. This screen will contain the Independent Technologies logo, or may contain your company logo if arrangements have been made for a custom logo. Press the right arrow key on the PDU to move to the List Screen. *This screen will only be displayed once when the PDU is powered on.*

Device List Screen:
Each line on this screen represents a WESROC® RMS device that has transmitted a data packet in the recent past. The serial number of the device will be displayed on the left side of the screen. A configuration data packet from a CTM will be noted by the “CelMon” or “CelTnk” device label in the middle of the screen. The time since the last transmission from each device is listed on the right side of the screen. Press the up arrow or down arrow keys to select the desired device. Press the right arrow key to move to the Main Menu Screen.

Main Menu Screen:
This screen contains a list of screens that can be selected depending on what type of action you want to take. Press the up arrow or down arrow keys to select the desired screen. Press the right arrow key to move to the selected screen. Press the left arrow key to return to the Device List Screen.

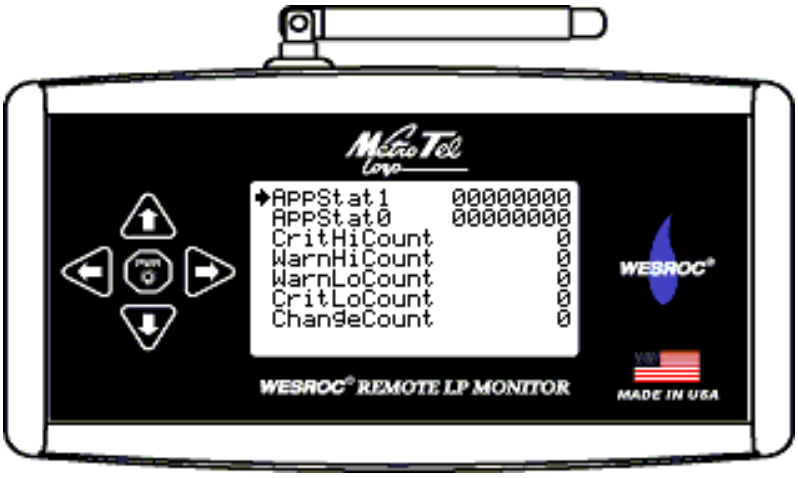


Summary Screen:
This screen contains a quick snapshot of the status of the CTM, the tank level, and the cellular network conditions during the last report to the Host. Press the left arrow key to return to the Menu Screen.

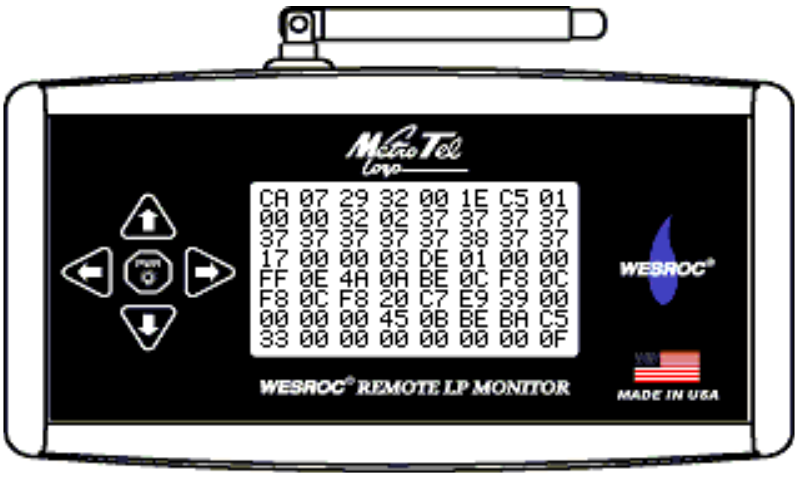
System Configuration Screen:
This screen contains a list of CTM system configuration parameters. Press the up arrow and down arrow keys to select a configuration parameter to change. Not all of the system configuration parameters are visible on the screen at the same time. Press the right arrow key to move to the selected configuration parameter editing screen. Press the left arrow key to return to the Menu Screen.

Application Configuration Screen:
This screen contains a list of application (tank level) configuration parameters. Press the up arrow and down arrow keys to select a configuration parameter to change. Not all of the application configuration parameters are visible on the screen at the same time. Press the right arrow key to move to the selected configuration parameter editing screen. Press the left arrow key to return to the Menu Screen.

View Details Screens:
This is a series of screens that can be used to view detailed information about the CTM system status, the tank level status and history, and information about the cellular network during the last report to the Host. Press the up arrow and down arrow keys to move between the various detail screens. Press the left arrow key to return to the Menu Screen.



View Raw Data Screens:
This is a series of screens that can be used to view the raw data contained in the data packets transmitted from the CTM to the PDU. This information will only be useful for very rare and specific diagnostic purposes. Press the up arrow and down arrow keys to move between the various raw data screens. Press the left arrow key to return to the Menu Screen.



Command List Screen:
This screen contains a list of commands that can be used to control or configure the CTM.
Press the up arrow and down arrow keys to move between the various commands.
Press the right arrow key to execute a command or to configure a parameter on the CTM.
Press the left arrow key to return to the Main Menu Screen.

NOTE: A PDU with firmware earlier than version 5.0 will not have a Command List Screen, but will instead show the 'Ping' command on the Main Menu Screen. The firmware on most PDUs can be updated to include the Command List Screen. Check with ITC customer support for assistance.

System Configuration Parameters

General

The WESROC® RMS Industrial LTE Cellular Tank Monitor (CTM) system configuration parameters can be modified using the WESROC® RMS Portable Diagnostic Unit (PDU). These configuration parameters can also be modified by the WESROC® RMS Host System (Host) during a report.

Parameter List

Base ID: Used to identify a particular CTM device in the Host database.
Min: 000000000001; Max: 999999999999
Default: 99xxxxxxxxxx; Disable: N/A

Primary IP Address: The IP address used to report to the primary Host.
Min: 0.0.0.1; Max: 255.255.255.255
Disable: 0.0.0.0 (Do not report.)

Primary IP Port: The IP port number used to report to the primary Host.
Min: 1; Max: 65535
Disable: 0 (Do not report.)

Secondary IP Address: The IP address used to report to the backup Host.
Min: 0.0.0.1; Max: 255.255.255.255
Disable: 0.0.0.0 (Do not report.)

Secondary IP Port: The IP port number used to report to the backup Host.
Min: 1; Max: 65535
Disable: 0 (Do not report.)

Host Response Timeout: The maximum number of seconds that the CTM will wait for a response from the Host before sending a data packet retry.
Min: 5; Max: 60
Default: 30; Disable: N/A

Maximum Packet Retries: The maximum number of times that the CTM will retry sending a data packet to the Host before terminating a report.
Min: 1; Max: 8
Default: 2; Disable: N/A

Report Interval: The number of minutes until the next scheduled report to the Host.
Min: 60 (One Hour); Max: 65535 (45.5 Days)
Default: 1440 (24 Hours); Disable: N/A

Low Battery Threshold (mV): The low battery threshold for the CTM system battery.
Min: 2500; Max: 3600
Default: 2808 (78%); Disable: N/A

High Temperature Threshold: The high temperature alarm threshold in degrees F.
Min: -67 F; Max: +302 F
Default: +150 F (Effectively Disabled); Disable: 0x8000 (From host only.)

Low Temperature Threshold: The low temperature alarm threshold in degrees F.
Min: -67 F; Max: +302 F
Default: -50 F (Effectively Disabled); Disable: 0x8000 (From host only.)

Local Display Mode: Enable Local Display mode to configure the CTM to transmit ISM radio data packets to a local display device. *Disable if not used to maximize battery life.*
Range: Enable or Disable
Default: Disabled

ISM Transmitter Number: Sets the transmitter number of the CTM. The local display device will display this number next to the displayed tank level. *This feature is very useful in multiple tank applications.*
Min: 1; Max: 127 (Maximum of 8 on handheld and current local display devices.)
Default: 1; Disable: N/A

Application Configuration Parameters

General

The WESROC® RMS Industrial LTE Cellular Tank Monitor (CTM) application (tank level) configuration parameters can be modified using the WESROC® RMS Portable Diagnostic Unit (PDU). These configuration parameters can also be modified by the WESROC® RMS Host System (Host) during a report.

Parameter List

Sensor Scaling: The sensor output scaling to be used to calibrate the CTM to the type of tank and gauge being monitored.
Min: 1; Max: 255 (Not all used at this time – see current list below.)
Default: 1 (Small horizontal tank dial.); Disable: N/A

1 = Std Horiz (small dial horizontal propane or fuel tank)
2 = Lg Dial (large dial horizontal tank - use on large dials with black Rochester sensor)
3 = 420# Vert (420# vertical propane cylinder)
4 = 200# Vert (200# vertical propane cylinder with Taylor type “A” dial)
5 = Liquid CO2 (vertical liquid CO2 cylinder – do not use, special use only)
6 = Fuel Horiz (small dial horizontal fuel tank – no longer used, use Std Horiz scaling)
7 = Flat (no dial scaling correction – used with hydrostatic CTM on a vertical tank)
8 = 20k Horiz (20k gallon horizontal fuel tank – do not use, special use only)
9 = 4-20mA (monitor 4-20mA industrial current loop – special use only)
10 = ITC LgDial (large dial horizontal tank - use on large dials with ITC Precision Sensor)
13 = RoundHoriz (used with hydrostatic CTM on a round horizontal tank)

Sensor Scaling (continued):

14 = GWR Flat (used with GWR sensor on vertical wall tanks)
15 = GWR RndHrz (used with GWR sensor on round horizontal tanks)
16 = 2012 Horiz (small dial horizontal propane or fuel tank w/ dial produced before 1/13)

Tank Fill Threshold: The tank fill event qualification amount in percent full.
Min: 3%; Max: 95%
Default: 10%; Disable: 0%

Tank Draw Threshold: The tank draw event qualification amount in percent full.
Min: 3%; Max: 95%
Default: 15%; Disable: 0%

Critical High Threshold: The tank critical high condition level in percent full.
Min: 5%; Max: 95%
Default: 0%; Disable: 0%

Warning High Threshold: The tank warning high condition level in percent full.
Min: 5%; Max: 95%
Default: 0%; Disable: 0%

Warning Low Threshold: The tank warning low condition level in percent full.
Min: 5%; Max: 95%
Default: 30%; Disable: 0%

Critical Low Threshold: The tank critical low condition level in percent full.
Min: 5%; Max: 95%
Default: 15%; Disable: 0%

Level Change Threshold: The tank level change qualification amount in percent full. Set to a negative number to track a tank level decrease; set to a positive number to track a tank level increase.
Min: -95%; Max: +95%
Default: 0%; Disable: 0%; Invalid: +1 to +4%, -1% to -4%

Gain Adjust: Used to compensate for tank and gauge size mismatches and gauge gain calibration errors. ***For special applications only - use with caution.***
Min: -10.00x (Gain of -10.00); Max: +10.00x (Gain of +10.00)
Default: +1.00x (Gain of +1.00)
Disable: N/A; Invalid: +0.00

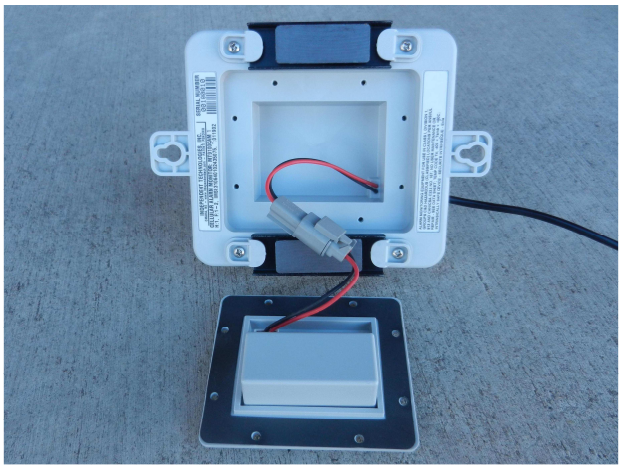
Offset Adjust: Used to compensate for gauge offset calibration errors.
For special applications only - use with caution.
Min: -100.00; Max: +100.00
Default: +0.00; Disable: N/A

Battery Replacement

The WESROC® RMS Industrial LTE Cellular Tank Monitor (CTM) uses a field replaceable, intrinsically safe battery pack designed and supplied by Independent Technologies, Inc. The CTM has been designed to operate on a very small amount of power, but eventually the battery pack will need replacement. Because the battery pack is intrinsically safe, the battery pack can be replaced at the tank without needing to remove the CTM to a safe location. The following steps and photos illustrate how to replace the battery pack.

1] Remove the eight screws from around the perimeter of the battery pack.

2] Remove the battery pack from the bottom of the CTM enclosure and disconnect the battery pack connector.



3] Connect the new battery pack to the CTM and arrange the battery pack cable to clear internal obstructions.

4] Replace the battery pack into the bottom of the CTM enclosure and replace the eight screws. *Do NOT over tighten the screws and strip the threads from the bottom of the CTM enclosure.*

Specifications

Mechanical

Size:	7.1”L x 6.5”W x 4.0”H
Weight:	Approximately 1.5 lbs
Mounting:	Dual channel magnet.

Environment

Storage Temp:	-50C to +70C
Operating Temp:	-40C to +60C
Humidity:	0 to 100%

Power Source

Model:	MT-9100BPK-02 (Available from Independent Technologies)
Type:	Field replaceable, sealed and intrinsically safe battery pack.
Voltage:	3.6VDC
Expected Life:	Greater than 5 years (reporting once per day).

Tank Level Sensor

Sensor Type:	R3D Hall-Effect (Straight or Right-Angle) or In-Line Connector
Cable Length:	5, 10, or 30 feet depending on model

Cellular Radio

Type:	MT9104CTMA: 3G UMTS \ LTE (United States) MT9104CTMR: 3G UMTS \ LTE (Canada) MT9104CTMV: LTE (United States)
Antenna:	Internal

ISM Radio

Type:	US 900MHz ISM Band FSK Transceiver (916.48MHz)
Antenna:	Internal

Certifications

Safety

The WESROC® RMS Industrial LTE Cellular Tank Monitor has been designed for use as Tank Monitoring Equipment in Class I, Division 1, Groups C and D Hazardous (Classified) Locations per ANSI/UL 913 and CAN/CSA C22.2 No. 157.
Temperature Code: T4; Ambient Temperature Range: -40C to +60C;
Intrinsically Safe Device – Securite Intrinseque – Ex ia

FCC

The WESROC® RMS Industrial LTE Cellular Tank Monitor (FCC ID number RWB-MT9104CTM and IC number 115A-MT9104CTM) has been tested and found to comply with part 15 of the FCC Rules.

PTCRB

The WESROC® RMS Industrial LTE Cellular Tank Monitor has been certified by a PTCRB approved test lab for use on 3G UMTS and LTE digital cellular networks.

Cellular Carrier

The WESROC® RMS Industrial LTE Cellular Tank Monitor has been certified for use on the AT&T 3G UMTS and LTE cellular networks.

The WESROC® RMS Industrial LTE Cellular Tank Monitor has been certified for use on the Rogers Wireless 3G UMTS and LTE cellular networks.

The WESROC® RMS Industrial LTE Cellular Tank Monitor has been certified for use on the Verizon LTE cellular network.

Independent Technologies, Inc. **www.wesrocproducts.net** **Blair, NE**

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