CNI4 Operating and Installation Guide

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1 Introduction

The CNI4 is a 4G/LTE, battery-operated, easy to configure dual-channel pulse data logger designed to support most commercial & Industrial (C&I) smart metering/automatic meter reading (AMR) analog as well as 2G/3G modem-based applications. The basic CNI4 assembly includes a Cloud Link 4G Modem to provide cellular communication.

With this advanced cellular pulse data logger, both input channels and stored consumptions can be independently scaled to different units of measure, providing maximum value and flexibility.

The CNI4 Pulse Data Logger is designed for low-power and outdoor operation.

It is ideal for call-In applications involving meter data management (MDM) and can directly connect to PowerSpring or couple with the InvisiConnect software to interface with third-party MDM systems.

The CNI4 is fully integrated in the Honeywell Mercury® Instruments ecosystem and is easy to program through its Bluetooth Low Energy interface and associated configuration software. The unit can be configured using the same MasterLink software that is used to configure Honeywell Mercury electronic volume correctors, data loggers and modems. No additional software is required. In addition, MasterLink is now available as an app that can be installed on IOS and Android devices.

The CNI4 is CSA Class I Div 2 approved, making it a perfect solution for gas measurement applications where safety is always a concern

Two independent pulse sources may be connected to the input channels, each having its own 3.5vdc wetting voltage. Since the two channels act as independent accumulators, typical installations might include:

    a. One pulse source (pulse transmitter or meter pulse) connected to either Ch1 or Ch2.
    b. Two separate pulse sources (pulse transmitters or meter pulses): Ch1 for the first source and Ch2 for the second source.
    c. Pulse outputs from one volume corrector connected to both channels, Ch1 for corrected volume pulses and Ch2 for uncorrected volume pulses.

In an operational CNI4, pulses received at either input are assigned a fixed amount of volume via their respective Input Pulse Value selections. Additional pulse scaling can be applied using their respective Input Pulse Scaling items (if needed) before the pulses are stored (added) to their respective accumulated totals. Ch1 versus Ch2 volume units can be independently scaled. The number of digits (from 4 to 8 digits) can also be assigned for both channels. Below are the items associated with Accumulated Volumes:

Description	Ch1 Item#	Ch2 Item#
Input Pulse Value	098	912
Input Pulse Scaling (this feature is normally not needed)	114	913

Description	Ch1 Item#	Ch2 Item#
Accumulated Volume	002	910
Incremental Accumulated Volume	226	911
Accumulated Volume Units	092	458
Accumulated Volume # of Digits	097	

2 Product Features

- Two independent channels
- Low power consumption
- Field-proven composite material case with hinged door
- Easy software-based configuration
- Multi-vendor data collection capability
- Force-a-call feature
- Wireless communications Cloud Link 4G cellular modem

3 Specifications

Environmental

- -25°C to +65°C
- Ambient Humidity: 0 to 95% non-condensing

Software

- Configuration: MasterLink R510+ (Windows, IOS, Android)
- Data Collection: TDS, PowerSpring, DC2009, Itron MV90, and other third-party software providers

Data Inputs

Max frequency: 3Hz - 50% duty cycle, 10 Hz – 40% duty cycle

Memory

1 year+ of hourly/10 user-specified log items

Pulse Input Circuit

- Full temperature range
- Max wetting current provided = 35 microamps
- Max transmitter leakage current - 7 microamps
- Max Pulser + Line Resistance = 200 ohms
- Max line length = 300 feet

Parameter	Conditions	Min.	Typical	Unit
LTE Connectivity	Band 2, 4, 5, 13 and 17			
Receiver Input Sensitivity@ ARP (ch.bandwidth 5MHz)	LTE 700 Band 17	-97	-102	dBm
	LTE 700 Band 13	-98	-103	dBm
	LTE 850 Band 5	-98	-104	dBm
	LTE AWS Band 4	-100	-103	dBm
	LTE 1900 Band 2	-98	-103	dBm

Power

- 2 D-cell Lithium disposable battery pack for pulse accumulator
- 2 D-Cell Lithium disposable battery pack with super-capacitor for cellular radio

Certifications

- Class 1, Division 2, Group D
- PTCRB
- Verizon, AT&T, Rogers
- FCC

Security

SSL/TLS 1.2

Enclosure

- 20% glass-filled polycarbonate
- Weight: 3.7 lbs
- Wall-mount or meter-mount

Communications

- 4G/LTE cellular modem
- Operates with major carriers in North America: Certified with AT&T, Verizon, Rogers Falls back to UMTS/HSPA and GSM/GPRS, T3C
- Bluetooth Low Energy interface can be used for wireless configuration
- Wireless specifications:
    - LTE: Five band, 700 (Bd13)/700 (Bd17)/850 (Bd5)/ AWS (Bd4)/1900MHz (Bd2)
    - UMTS/HSPA+: Triple band, 850 (BdV)/AWS (BdIV)/1900MHz (BdII)
    - GSM/GPRS/EDGE: Quad band, 850/900/1800/1900MHz
    - Bluetooth Low Energy: v.4.0 (2402- 2480MHz)

4 Safety

4.1 Limited Warranty

Mercury Instruments, Inc. warrants all instruments covered by this manual to be free from defects in material and workmanship under normal use and service of this product. If returned to our factory, transportation charges prepaid, within 4 years of the original purchase shipment date, Mercury Instruments agrees to repair or replace any instrument which its examination reveals to have been defective due to faulty workmanship or material. All obligations or liabilities on Mercury Instruments part is to repair or replace warranty instruments, and does not include any other type of claims or damages, including but not limited to consequential damages following the use or misuse of instruments sold by it.

Mercury Instruments reserves the right to, at any time make changes, modification or enhancements to this product without prior notification. This warranty is in lieu of all other warranties, express or implied. No agent is authorized to assume for Mercury Instruments any liability except as set forth above.

4.2 Intrinsic Safety for Hazardous Locations

The Mercury Instruments CNI4 is certified by CSA (CUS) for Class I, Div-2, Group D hazardous locations when installed in accordance with CSA (CUS) control drawing 40-6144 in this manual.

Warning: **Use only Mercury Instruments manufactured battery packs with part numbers as specified on the certification label or control drawing. Use of third party battery packs voids product warranty, voids intrinsic safety certifications and may impair safety.**

Related Item: Installation Drawing

4.3 Label

Check the following material label and serial number label:

NAME	CNI4
MODEL NO.	
S/N	XXXXXXXX

YYYY/MM

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.

Honeywell

**MERCURY
INSTRUMENTS**
**Country of origin:
Mexico**

Figure 4–1: Label – Serial Number
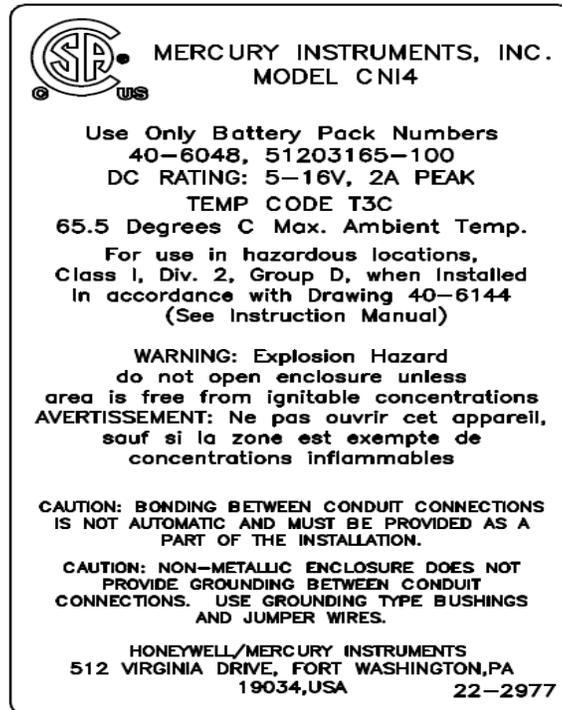
Figure 4-2: Label – Material

4.4 Security

The CNI4 device can be configured through the following interfaces:

- Serial
- Bluetooth
- Cellular

A valid user name and password are required for accessing the Cloud Link 4G Modem. The device supports different privilege levels like Read / Write, Read Only.

The CNI4 supports whitelisting of cellular communications. You can configure up to 10 host IP addresses for the device to allow specific hosts in case of call outs.

For communication over Cellular interface the Cloud Link 4G Modem can use SSL/TLS 1.2 Certificates for mutual authentication and secure connection. The following certificates can be loaded for secure communication over cellular interface.

- Client Certificate
- Server Certificate
- Private Key(Encrypted)
- CA Certificate

5 Instrument Mounting Options

A number of options are available for conveniently installing the CNI4 product. These should be clearly specified at the time of order to ensure that everything the field technician needs is available at the time of product installation.

5.1 Wall Mounting

Where a flat wall surface is available, such as on the side of a building or shed, stainless steel "hangers" can be utilized. Illustrated below is the rear view of a CNI4, along with associated mounting dimensions (in inches).
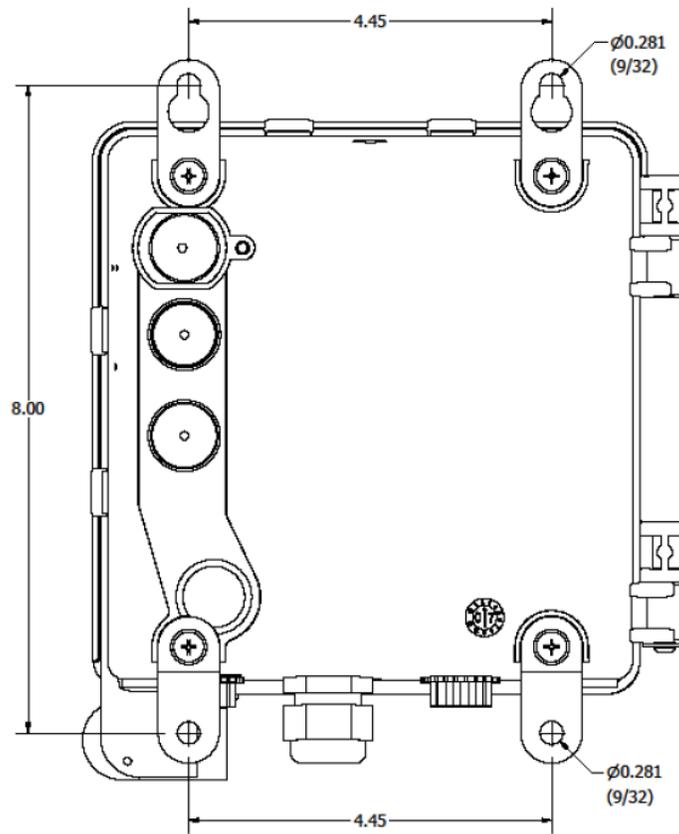

Figure 5-1: Wall Mounting Tabs and Dimensions

The lockwasher contacts directly with the enclosure, then the hanger, the flat washer, and lastly the screw. To secure, tighten the screw until snug, but do not over-tighten.

Recommended wall and fasteners:

Recommended Wall	Brick Wall
Fasteners	STAINLESS STEEL THREAD FORMING ¼ dia–1.25" length

5.2 Meter Mounting

Where it is desired to have an index base mounted directly to a meter, the UMB (Universal Mounting Bracket) option is available. The advantages of this package is that the entire instrument can be mounted without any concerns about routing external meter pulse signal wires. Mounting the UMB index base is possible on rotary, turbine, and diaphragm gas meters that have a rotating instrument drive output. This includes American, Rockwell, Romet, Roots, or Schlumberger meters.

The UMB housing may be rotated about the base plate so that the instrument and index will face in any of the four directions. Remove all four screws which attach the base plate to the bracket housing. Replace and tighten the four screws after you have repositioned the UMB housing.

Figure 5-2: CNI4 with Universal Mounting Bracket (UMB)

The bottom side of the UMB meter index is seen below, along with the 'wriggler' mechanism.

Figure 5-3: Bottom View of the Universal Mounting Bracket (UMB)

The following illustration provides reference dimensions for the base plate. All dimensions are in inches.
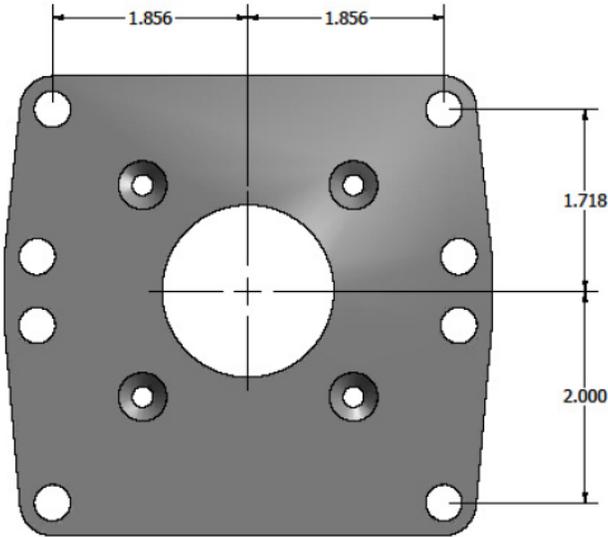
Figure 5-4: Universal Mounting Bracket (UMB) Hole Pattern

6 Electrical Assemblies

6.1 Internal Battery Power Options

Shown below is the dual-cell lithium power pack. This pack is inserted onto the enclosure door with the right-side of the metal plate tilted inwards first, and then snapping secure on the left side. Removal is the opposite, and it is a simple matter of pressing outwards against the plastic lever.

The Pulse Accumulator battery pack

The Cloud Link 4G Modem battery packs

Y cable for the Pulse Accumulator battery pack
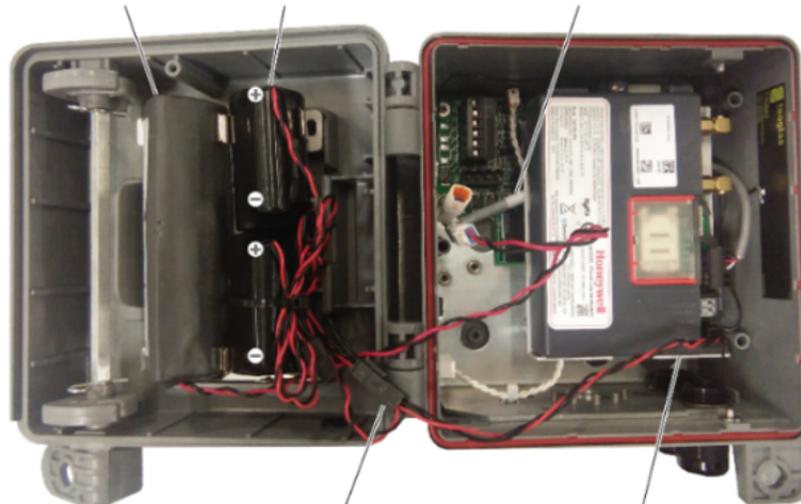
The Cloud Link 4G Modem battery packs connected in parallel

Batteries connecting to the Cloud Link 4G Modem

Figure 6-1: Lithium Battery Pack Mounting

Component	Battery pack	Part Number
Pulse Accumulator	Dual-cell lithium power pack	40-6048
Cloud Link 4G Modem	Single Lithium D-Cell	51203165-100

6.2 Simplified Wiring Diagrams (with internal modem)
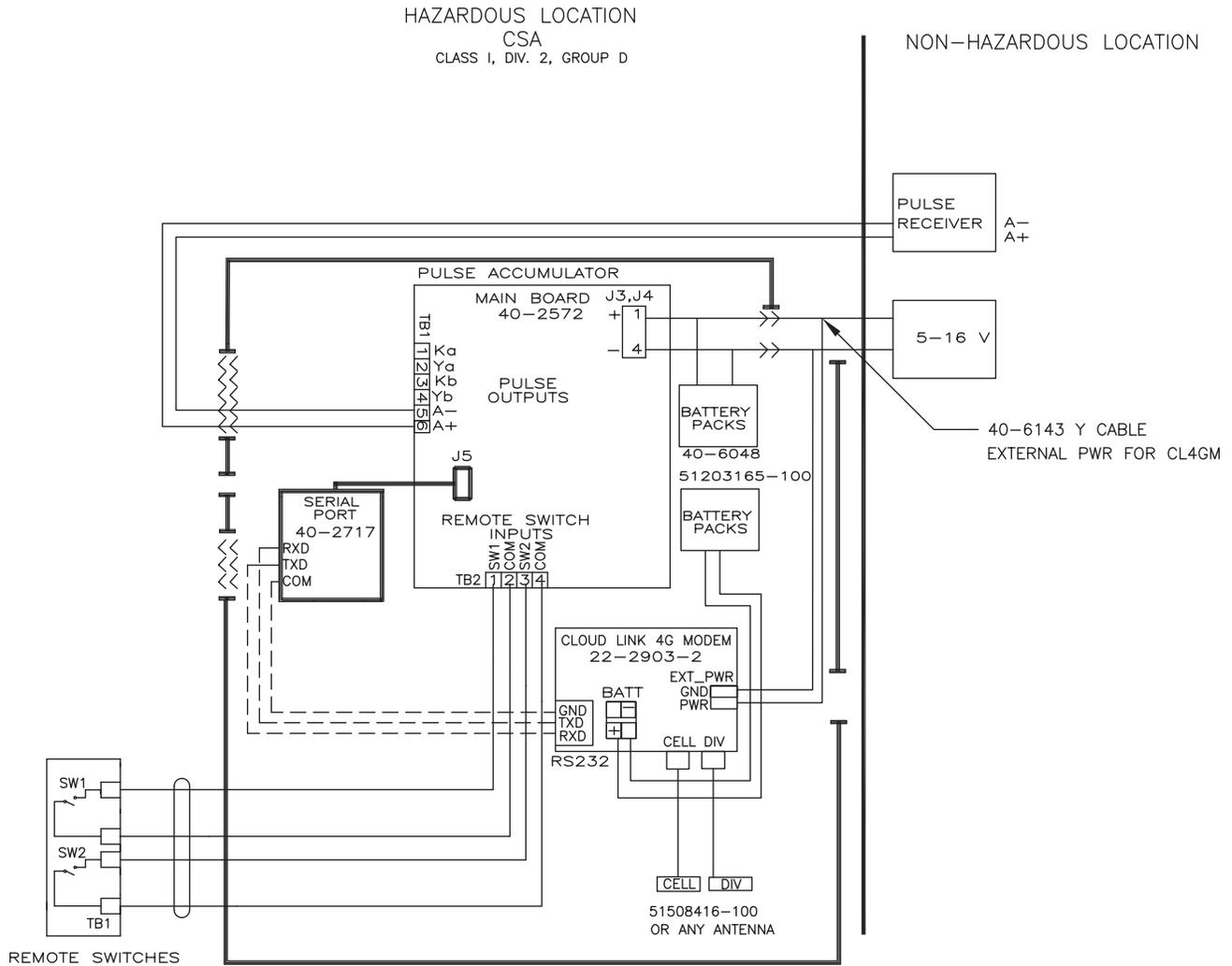
Notes:

- For Canadian installations, install in accordance with Canadian electrical code part 1.
- For US installations install in accordance with the national electrical code, ANSJ/NFPA 70, article 504.
- Warning: substitution of components may impair suitability for CLASS 1, DIV2 battery packs must be replaced only in a non-hazardous atmosphere.
- Tb2 is for pulse inputs: connections to tb2 can be made via conduit as per note#1 or without conduit if one of the following pulse generator options used passive, resistive, non-energy storing device or devices having entity parameters conforming to table1. These pulse generators can be located in DIV2 or non hazardous locations. Maximum cable length 200ft. Any combination of the options for pulse generators are not to be connected simultaneously.

Table 6-2: Output Parameters

OUTPUT PARAMETERS			
OPEN CIRCUIT VOLTAGE	Voc	Uo	3.9V
SHORT CIRCUIT VOLTAGE	lsc	lo	0.40mA
POWER OUTPUT	Po	Po	0.39mW
MAXIMUM ALLOWABLE CAPACITANCE	Ca	Co	1μF
MAXIMUM ALLOWABLE INDUCTANCE	La	Lo	100mH

- Do not connect 51203165-100 battery pack and external power simultaneously to the Cloud Link 4G modem.
- For DIV2 installations only, the enclosure must have a rigid metal conduit hub for wiring entry.
- For CNI4 devices without a modem, the serial port connection must be made by routing the serial cable through the conduit.
- The cables must be installed and supported in an appropriate manner such that the tensile stress at the cable glands is avoided.

7 Getting Started

7.1 Introduction

The CNI4 comprises of two components: The Pulse Accumulator and the Cloud Link 4G Modem.

You can use the MasterLink Software (R510.1 or higher) to configure the Pulse Accumulator and the Cloud Link 4G Modem as two independent sites, using the USB-to-serial cable (40-6147-kit).
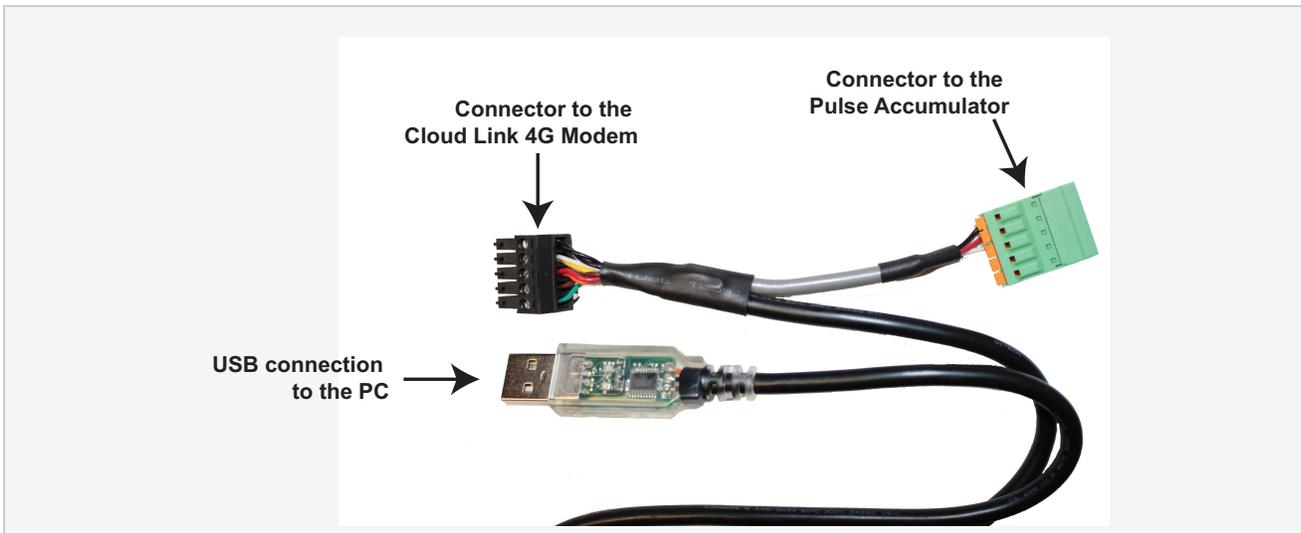
Figure 7-1: The USB-to-serial cable (40-6147-kit)

One end of the cable has a USB connector and the other end includes a male and female connector. The male (black) connector connects to the Cloud Link 4G Modem and the female (green) connector connects to the Pulse Accumulator.

Steps to configure the CNI4:

Step 1: Open the door of the CNI4 and install the SIM Card.

Step 2: Power-up the CNI4 - battery or external power supply.

Step 3: Connect the external pulse inputs (for wall mounted only)

Step 4: Disconnect the serial cable interfacing the Pulse Accumulator and the Cloud Link 4G Modem.

Step 5: Configure the Pulse Accumulator.

Step 6: Configure the Cloud Link 4G Modem.

Step 7: Restore the original serial cable connection.

Step 8: Close and lock the door.

7.2 Installing the SIM Card

1. Lift the cover on the Cloud Link 4G modem.
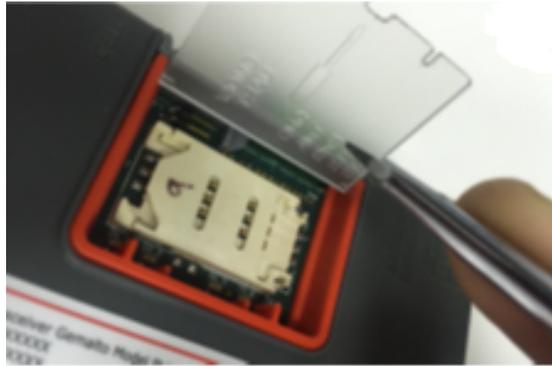
2. Slide the white SIM card holder to the right, then lift the left edge.
3. Insert a SIM card into the slot provided and close the card holder.
4. Slide the SIM card holder to the left until it snap locks.
5. Close the cover.

7.3 Connecting power supply

The CNI4 can be powered using battery or external power.

To connect the battery packs to the Cloud Link 4G Modem

1. Install the Cloud Link battery packs with the positive terminal on top.
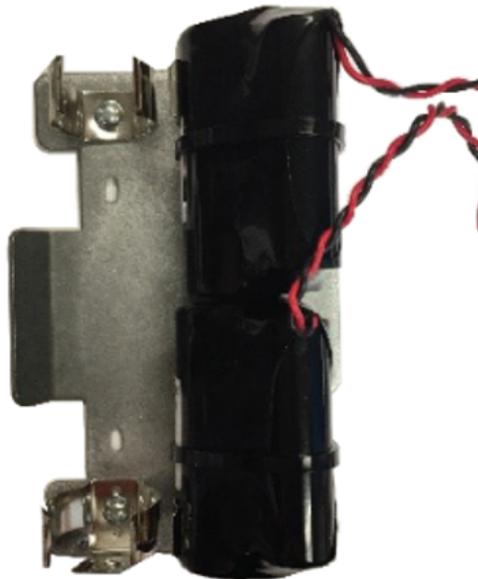
2. Tie wrap the batteries to the metal plate.
3. Connect the female connector from the first battery to the male connector of the second battery.
4. Remove the warning label as shown in the picture (on next page), and then remove the dummy battery connector plug on the Cloud Link.

**Cloud Link 4G Modem
battery connector**

5. Attach the connector from the second battery to the Cloud Link battery connector.
6. Wrap the extra wire using a cable tie.

To connect the battery pack to the Pulse Accumulator

1. Install the Pulse Accumulator battery pack on the left side of the battery plate.
2. Connect the Pulse Accumulator battery pack to the Y cable.
3. Wrap the extra wire using a cable tie

**The Pulse Accumulator
battery pack**

**The Cloud Link 4G
Modem battery packs**

**Y cable for the Pulse Accumulator
battery pack**

**The Cloud Link 4G Modem battery
packs connected in parallel**

**Batteries connecting to the
Cloud Link 4G Modem**
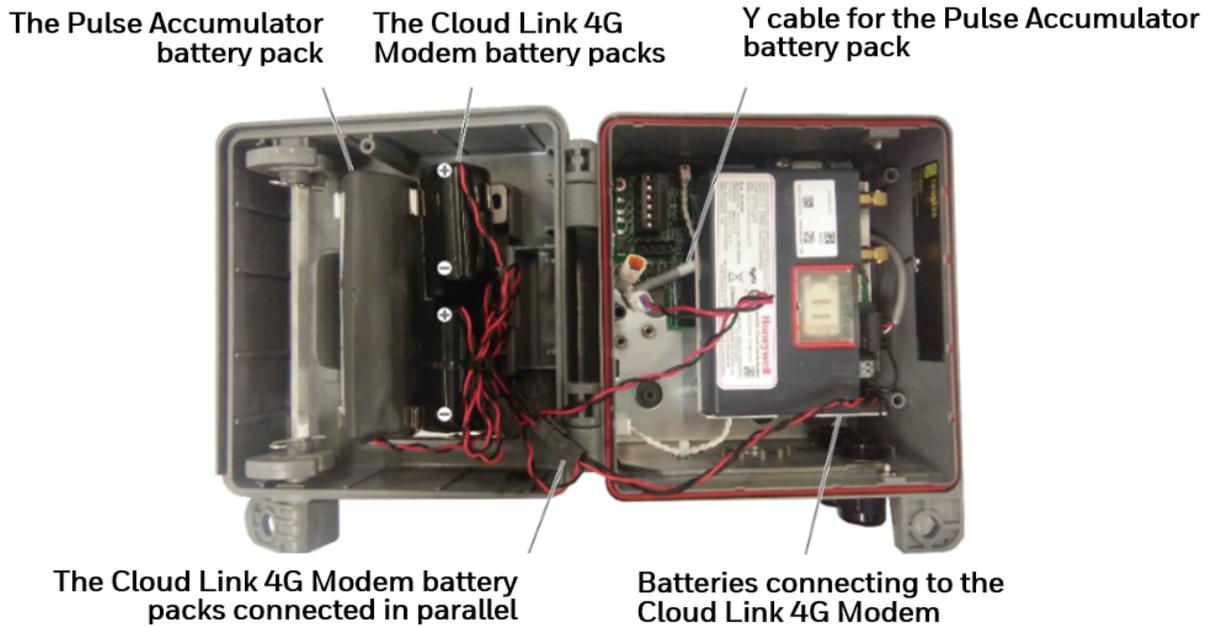
To setup external power supply

1. Remove the housing of the cable gland and route the power cable through it.
2. Connect the power cable to the 3-pin power connector on the Pulse Accumulator board.
3. Connect the other end of the power cable to an external power source (5V to 16V, 2A peak current).

Connection to backup power supply

Connection to external power supply

3-pin connector
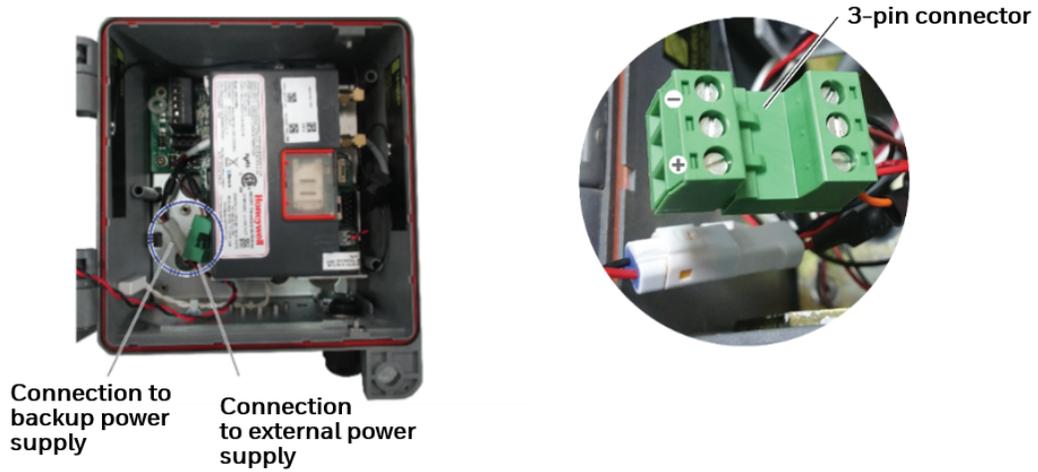
7.4 Connecting the external pulse inputs

(Applicable for wall-mounted units only)

It is possible to connect a maximum of two external pulse inputs at TB2 (Terminal Block 2) of the Pulse Accumulator.

A 3.5 VDC wetting voltage is provided by each Pulse Accumulator input channel. If the pulse channel is to be wired to an active device, i.e. transistor-type output, then be sure to observe polarity.

To connect the external pulse inputs

1. Remove the housing on the cable gland and route the pulse input(s) cable through it.
2. Unplug the male 4-pin terminal block connector.
3. Connect the external input pulse wires of the cable into the appropriate slot on the 4-pin terminal block connector.
4. Reconnect the 4-pin terminal block connector.

7.5 Disconnecting the serial interface cable

Disconnect the serial cable interface connecting the Pulse Accumulator and the Cloud Link 4G Modem

Disconnect the RS232 connector from the Cloud Link 4G Modem.

7.6 Configuring the Pulse Accumulator

To configure the Pulse Accumulator

1. Insert the female connector of the Pulse Accumulator into the male connector of the USB-to-serial cable (40-6147-kit).

2. Connect the USB end of the serial cable to a PC running the MasterLink R510.xx desktop application.

3. Launch and login to the MasterLink R510.xx desktop application.

4. To select the COM port used by the USB-to-serial cable, navigate to the **Settings** menu, set the baud rate to the recommended value (9600), and click **OK**.

5. Click **Connect** to connect to the Pulse Accumulator.

6. Close the warning pop-up, enter site name, and click **Save**.
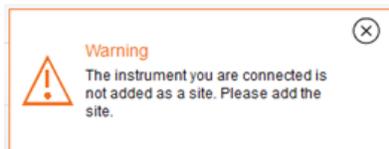
7. Wait for the dashboard to load. Click the center of the **Time Sync** widget and perform a time synchronization between the Pulse Accumulator and the PC by clicking **Sync**.

8. Navigate to **View/Edit > Configure by Group > Site Information** and change the Site ID to the value required by MDM software.

9. Navigate to **View/Edit > Configure by Group > Modem Call-in Configuration**, and set the following (Honeywell default) parameters.

Item No.	Description	Recommended Value
333	Call-in Trigger	3 = Alarm & Scheduled Call-in
449	Switch Filtering	1 = Filter Both Channels
486	Modem AT-Command Enable	1-yes
334	Scheduled Call-In Date	Set to the desired call-in date
335	Scheduled Call-In Time	Set to the desired call-in time
336	Call-In Retry By	Instrument
339	Scheduled Call-In Phone number	<IP>/<Port>Example: 192.168.1.1/50467
485	Call-Out Stop Time	00:00:00
490	Call-Out Start Time	00:00:00
493	Alarm Call-In Phone number	<IP>/<Port> Example: 192.168.1.1/50467
495	Modem Retry Interval A	5 minutes
496	Modem Retry Interval B	1440 minutes
497	Modem Retry A Count	3

10. Click **Disconnect** to disconnect MasterLink from the Pulse Accumulator. On successful disconnection from the Pulse Accumulator, a status message is displayed. Close the pop-up to acknowledge the message.

7.7 Configuring the Cloud Link 4G Modem

To configure the Cloud Link 4G Modem

1. Disconnect the male connector of the USB-to-serial cable that was previously connected to the Pulse Accumulator.

2. Insert the female connector, so far unused, of the USB-to-serial cable into the male RS232 connector slot on the Cloud Link 4G Modem.

3. Click **Connect** to connect to the Cloud Link 4G Modem.
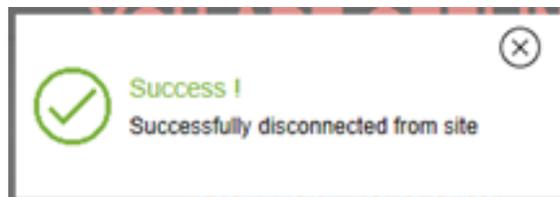

4. Close the warning pop-up, enter site name, and click **Save**.

5. Wait for the dashboard to load. Click the center of the **Time Sync** widget and perform a time synchronization between Cloud Link and the PC by clicking **Sync**.

6. Navigate to **View/Edit > Configure by Group > Radio Configuration**, and set the following parameters.

Item No.	Description	Verizon	Non-Verizon
3071	Verizon enable	1 = Enable	0 = Disable
3016	Fetch Radio Parameters	1 = Set	1 = Set
3021	ModemIPType	2 = IPv6	0 = IPv4
3022	Packet service Connection command	ATD*99***3#	ATD*99#
3064	Manual APN Enable	1 = Enable	1 = Enable
3023	APN Name	Provided By Verizon	Example for AT&T: 12221.mcs

7. Cloud Link must be externally powered and modem session timeout must be configured to 180 seconds if MiWireless mode is enabled.

Item No.	Description	Recommended Value
3142	MiWireless Enable	1 = Enable
3028	Modem session timeout	180 seconds

8. Disconnect MasterLink.
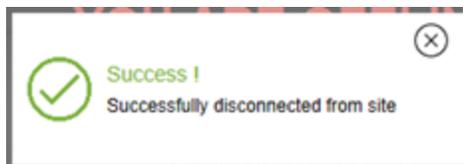
9. Power cycle the CNI4.

7.8 Restore the original serial cable connection

To restore the original serial cable connection

1. Disconnect the USB to serial cable.
2. Restore the original serial interface between the Pulse Accumulator and the Cloud Link 4G Modem.

7.9 Close and lock the door

After configuring the CNI4 instrument, close the device lid and lock the door.

Seal the enclosure either using a conventional lock through the larger hole or by a security wire seal through the smaller hole.
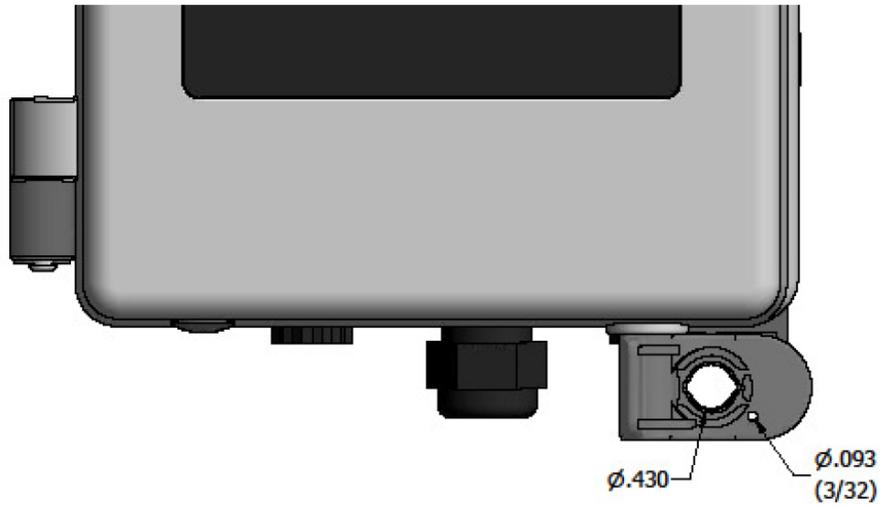
Figure 7-2: Enclosure Sealing Options

8 Adding a CNI4 Site in MasterLink

To add a CNI4 site to MasterLink:

1. Click **Connect to a Site**.
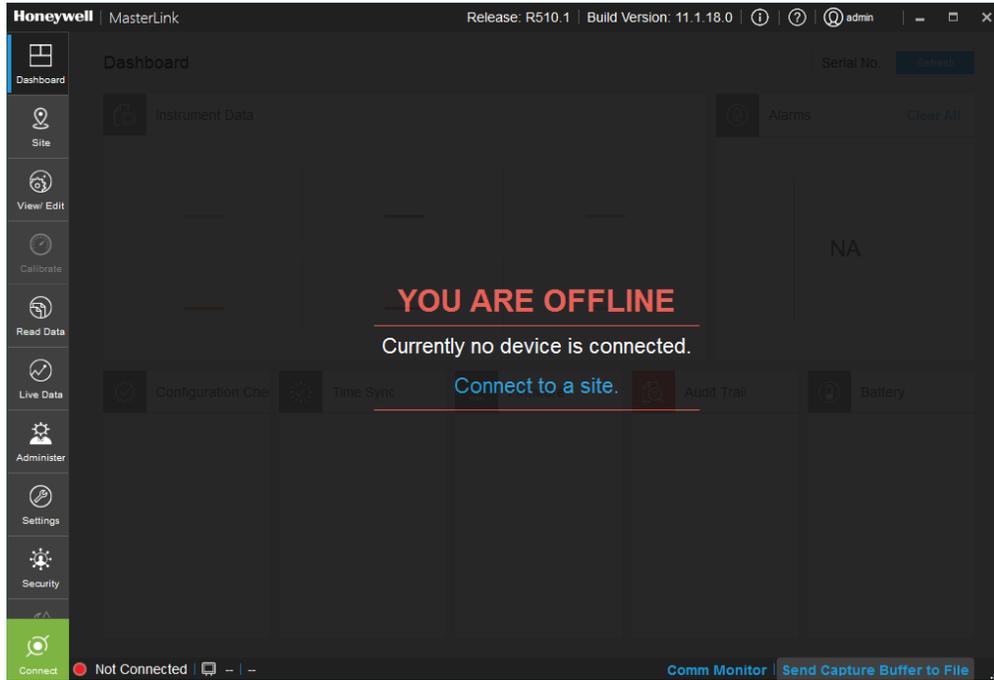
2. On the *Site Management* tab, click **Add Site**.
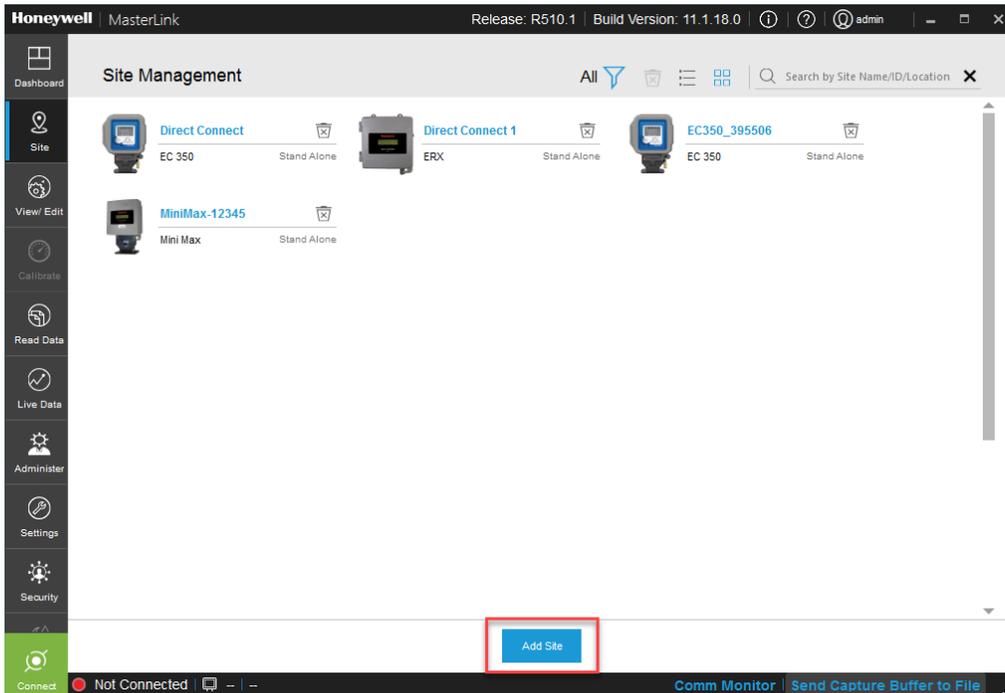
3. Configure the site properties.
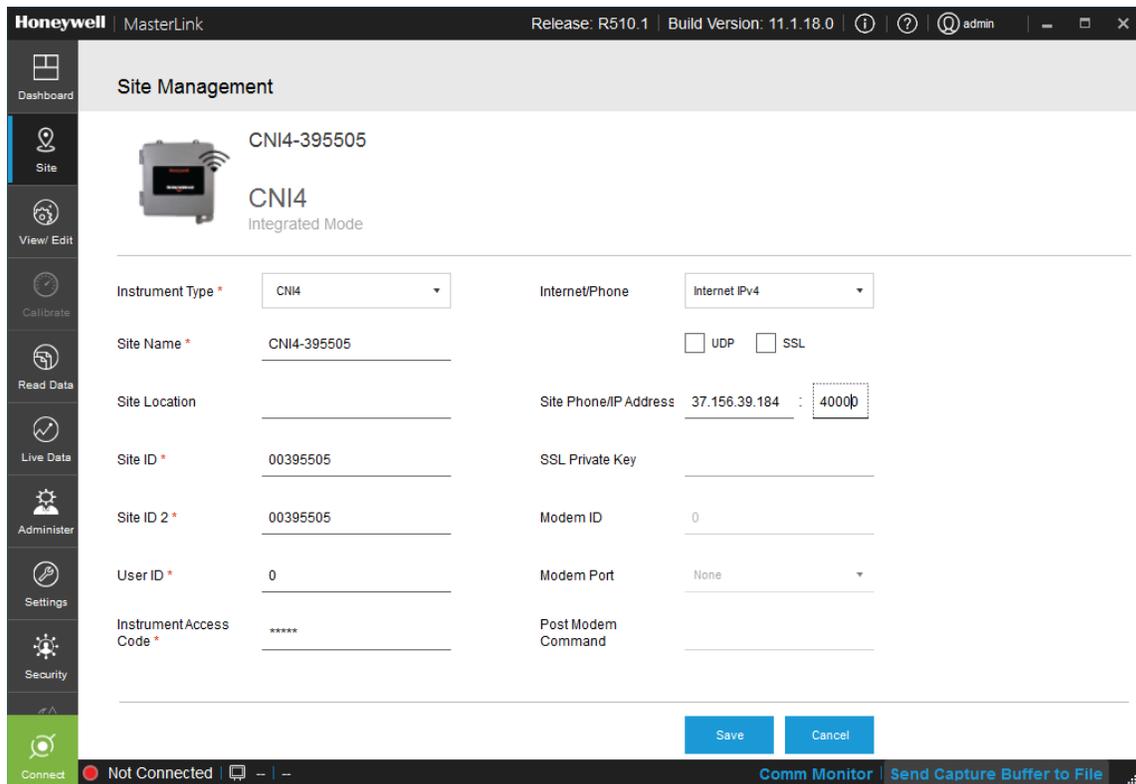
- **Instrument type**: CNI4
- **Site Name**: The name of the device
- **SITE ID** and **SITE ID2**
- **USER ID**: The User ID used to access the device
- **Instrument Access Code**: Access Passcode
- **Internet/Phone**: Internet IPv4
- **Site Phone/IP Address**: The IP address and the Port number of the 4G network used to communicate with the device

4. Click **Save**. The site now appears on the Site Management page.
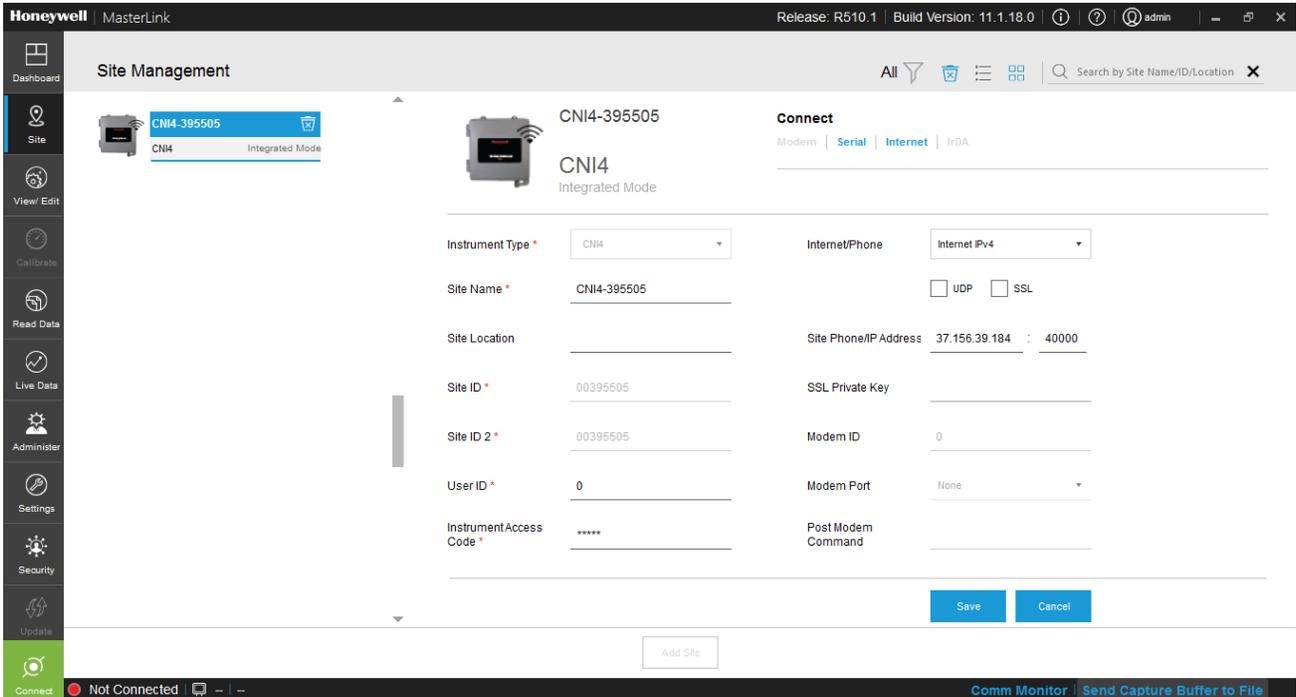
5. Select the Site Name, click **Internet**. This is to connect to the device over 4G internet network. Wait for the connection to be established.
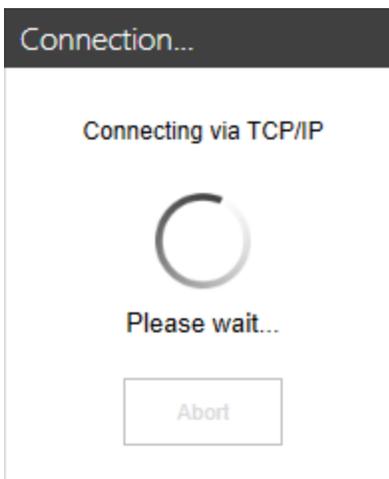
6. After a successful connection, the dashboard appears and displays all instrument data.
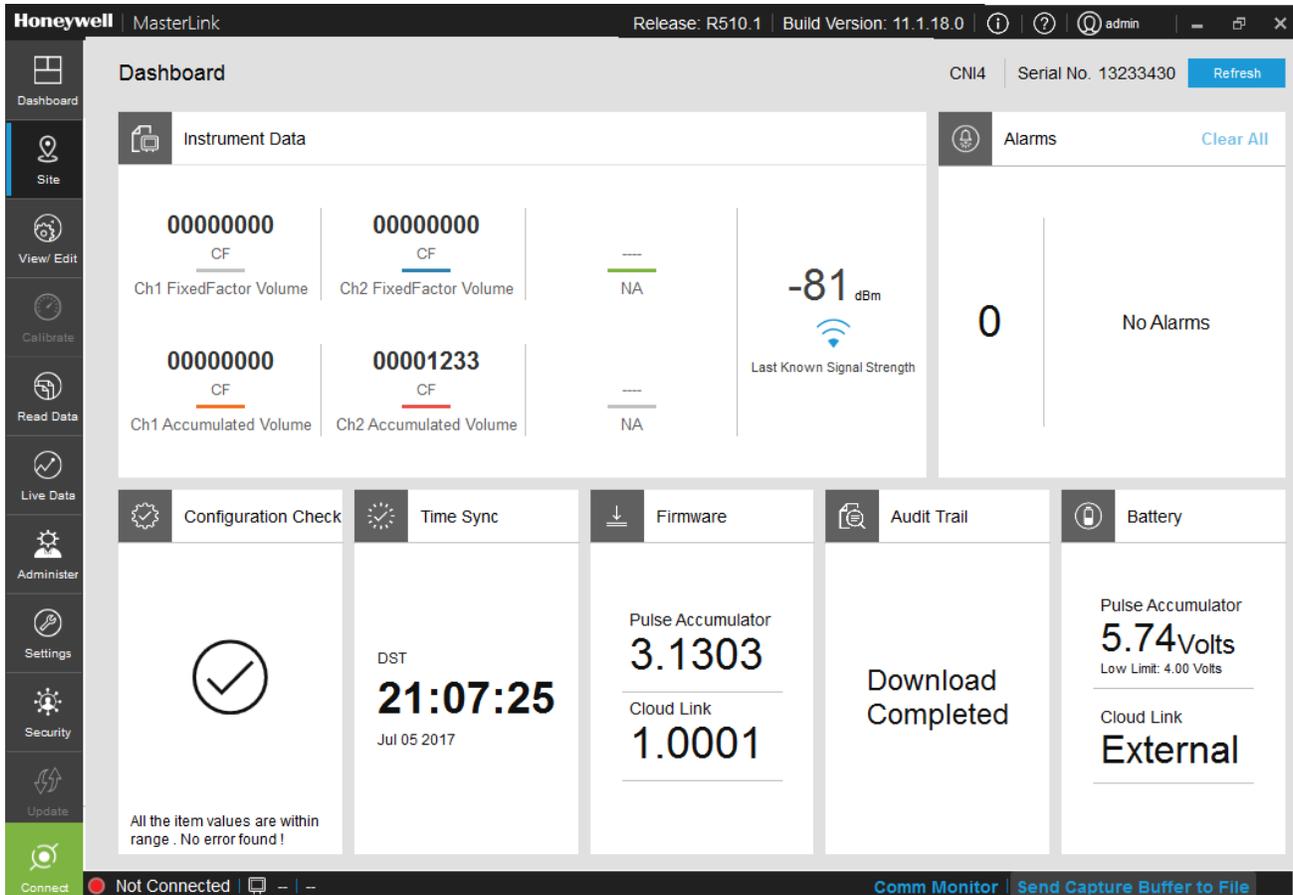
Click on the instrument data panels explore more on instrument data.

9 Appendix

9.1 CNI4 Index Base

When the UMB index mount option is included with the instrument, a rotating magnet and several magnetic sensor switches will be present inside the enclosure as seen below. For convenience, wires from the sensor switches are pre-wired from the factory to the pulse counting input terminal block TB4. In the unlikely event that one of the two reed switches should fail, the redundant input channel will continue to register accurate counts.

The illustration below shows the CNI4 with the rotary magnet and dual reed switches.
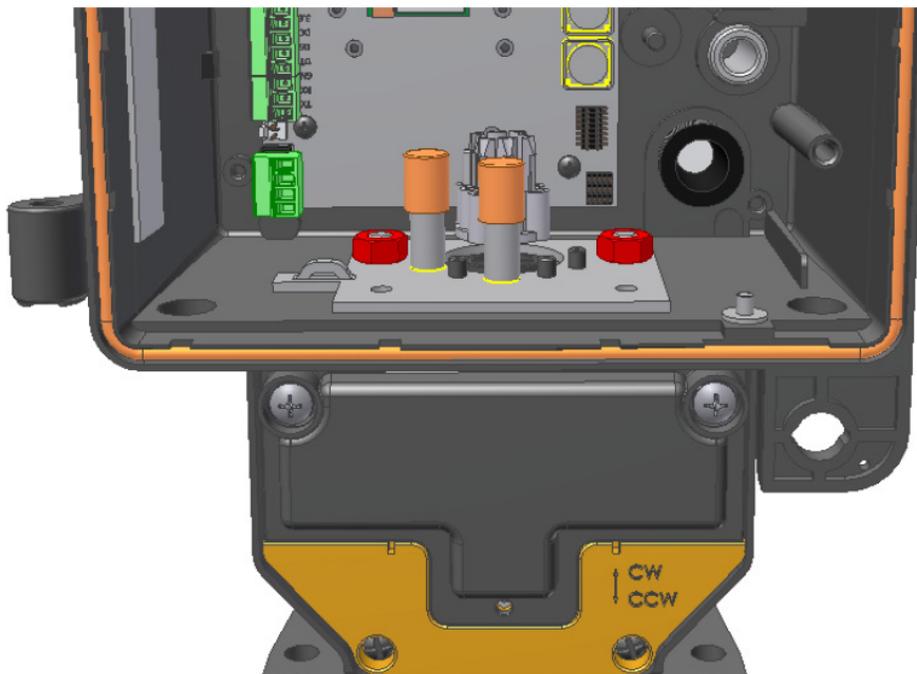
Figure 9-1: Index Base with Magnetic Switches

For the sake of clarity this illustration does not show the routing of wires from the sensor switches.

Another option is the Uncorrected Pulse Output board, as seen below. This provides an additional dry-signal pulse output that allows for connection to an external pulse counting instrument.
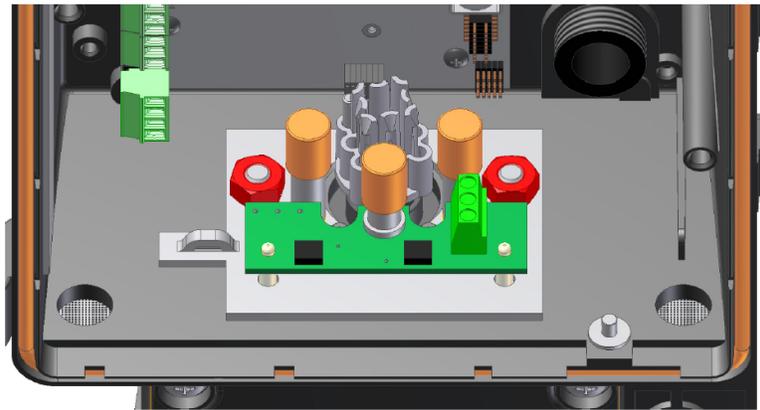
Figure 9-2: Pulse Output Board

For the sake of clarity this illustration does not show the routing of wires from the sensor switches.

Illustrated below is the UMB index without the front covers or enclosure housing. To change the direction of rotation, it is first necessary to remove the odometer. This is accomplished by removal of the screw in the top left corner, after which the odometer pulls straight out.
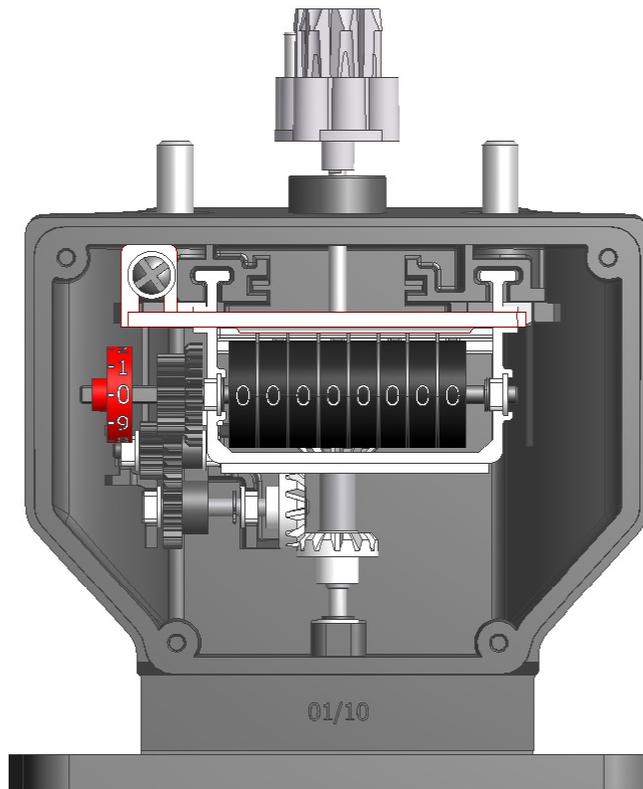
Figure 9-3: Internal View of the Index Base

A small Allen wrench tool is included with the index. Loosen the set screws on the top and bottom miter gears and swap the gear that engages. Shift the gear set upwards for meters with CW rotation and down for meters with CCW rotation. See the gear detail drawing below. After the gears are securely set, check for good gear engagement that is neither too loose (causing gear skipping) or too tight (causing gear binding). Then reinstall the odometer.
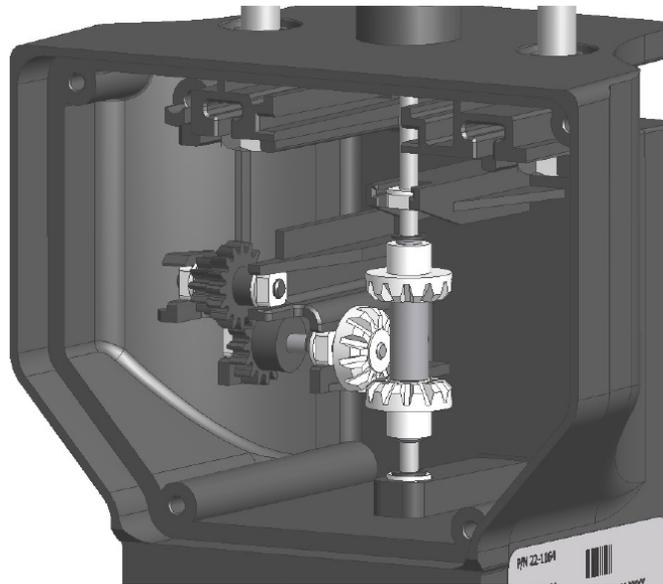
Figure 9-4: Rotation Gears within the Index Base

As a final note, it is also possible to change the number of digits visible on the mechanical odometer using horizontal sliding "windows". Up to three digits can be masked-off from the right side, and/or up to three digits from the left side.

9.2 Call-in and Call-out

The CNI4 can receive host-initiated calls (Call-out) or provide instrument-initiated calls (Call-in). Call-in type calls can be the result of an instrument Alarm, a Scheduled call, or by 'Forcing-a-call' by swiping a magnet next to the reed switch. The 'Force-a-call' function can only be used if item 333 (Call-In Trigger) is set to Alarm Call-in, Scheduled Call-in or both. If instrument-initiated calls fail to connect to a host system, primary and secondary call-in retries are activated in an effort to complete the call-in process.

The CNI4 can receive Call-outs by configuring the Cloud Link 4G Modem to function in MiWireless mode, and in this scenario the Cloud Link 4G Modem must be connected to external power source.

9.3 Installation Drawing
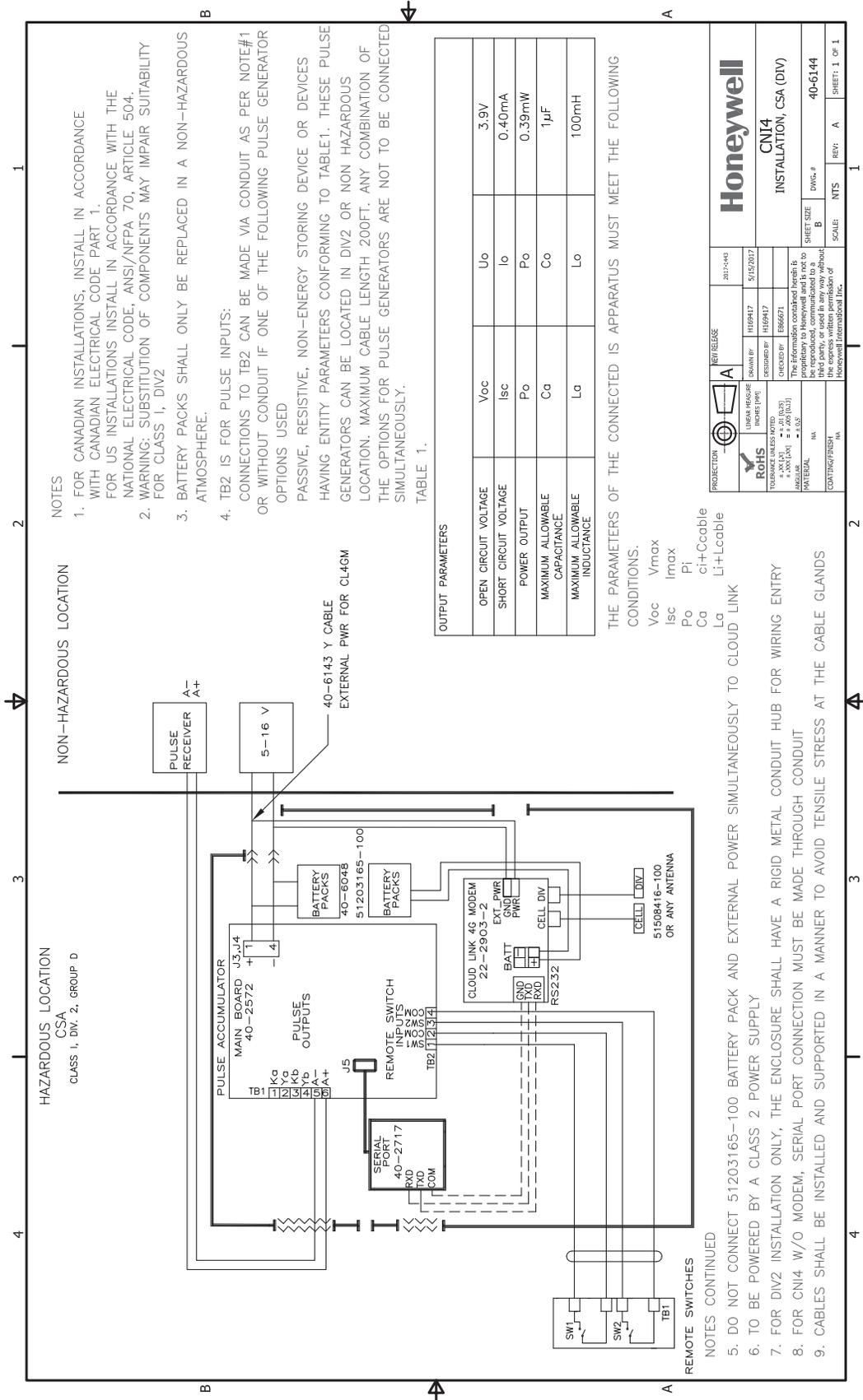
9.4 Item Code Types

There are two basic types of item codes used in the CNI4, Direct-read and Configuration. The Direct-read items are mainly used to store information or to accumulate readings. Except during the initial installation, these types of items are normally just read periodically to obtain the accumulated information. However, if needed, these values may be changed by directly typing in new information from the keyboard.

Configuration items are used to configure or customize the CNI4 to pro- vide specific functions or features. Usually, these items require choosing an option from a list. When using MasterLink (version 3.50 or higher), the available options are presented as text messages. However, if using an older version, the Raw Item Access feature must be used to send a numeric codes to the items that need changed.

9.4.1 Item Code List

The Items which make up the operating parameters, codes, alarms, voltage levels, and other information relative to operation or configuration of the CNI4 are listed below. Item code information can be changed using MasterLink software.

Pulse Accumulator Item Reference

Ch Item #	Item Name	Description
Volume Items		
002 910	Ch1 Accumulated Volume Ch2 Accumulated Volume	Totalized Accumulated Volume based on the volume signal connected to its input. The totalized value is scaled to the volume unit selected at item 092 for Ch1 and item 458 for Ch2. The number of digits is defined by item 097 for both
226 911	Ch1 Inc Accumulated Volume Ch2 Inc Accumulated Volume	The Incremental Accumulated Volumes are the same as Accumulated Volume (items 002 and 910) but is initialized (rezeroed) at the beginning of every Log Interval, (Hourly or Daily) as definded by item 202. If the CNI4 is accessed via a serial connection, this item will display the current value for that point in time.
098 912	Ch1 Input Pulse Value Ch2 Input Pulse Value Select: 0 – 1 CF 1 – 5 CF 2 – 10 CF (Default) 3 – 100 CF	Codes (0-13) to select the value for each pulse received at the Ch1 or Ch2 inputs. This selection should agree with the gas meter drive rate or meter pulse value when connected to a meter. When connected to a volume corrector, the value should agree to the value assigned to the corrector's output pulse.

Ch Item #	Item Name	Description
	4 – 1000 CF 5 – .1m3 6 – 1 m3 7 – 10 m3 8 – 100 m3 9 – 1000 m3 10 – 10000 CF 12 – 50 CF 13 – 500 CF	
114 913	Ch1 Input Pulse Scaling Ch2 Input Pulse Scaling Default = 1.0000	Additional scaling for item 098 ans 912 (Input Pulse Value), if required. Usually needed when the volume input is a value other than 0.1, 1, 5, 10, 100, or 1000.
000 908	Ch1 FixedFactor Volume Ch2 FixedFactor Volume	Totalized Accumulated Volume for Ch1 and Ch2, multiplied by a user-assigned scaling factor provided by item 044 for Ch1 and item 440 for Ch2. The totalized value is then scaled to the volume unit selected at item 090 for Ch1 and item 457 for Ch2. The number of digits is defined by item 096 for both.
225 909	Ch1 Inc FixedFactor Volume Ch2 Inc FixedFactor Volume	The Incremental FixedFactor Volumes are the same as FixedFactor Volume (item 000 and 908) but is initialized (re-zeroed) at the beginning of every Log Interval (Hourly or Daily) as definded by item 202. If the CNI4 is accessed via a serial connection, this item will display the current value for that point in time.
044 440	Ch1 FixedFactor Value Ch2 FixedFactor Value Default = 0.0000	User-assigned scaling factor to be applied to the FixedFactor Volumes for Ch1 and Ch2. The FixedFactor scaling is normally used to adjust the accumulated volume for a fixed pressure factor, a fixed temperature factor or both. The scaling factors default to a value of zero, which forces the FixedFactor Volumes to remain at zero when the fixed factor feature is not used.
092 090	Ch1 Accumulated Vol Units Ch1 FixedFactor Vol	Codes (0-20) for item 092 (Accumulated Vol Units) and item 090 (FixedFactor Vol Units) that selects the volume units of measure.

Ch Item #	Item Name	Description
	Units Select: 0 – CU FT 1 – CU FT x 10 2 – CUFT x 100 3 – CF 4 – CF x 10 5 – CF x 100 6 – CF x 1000 7 – CCF (Default) 8 – MCF 9 – m3 x 0.1 10 – m3 11 – m3 x 10 12 – m3 x 100 13 – m3 x 1000 14 – CF x 10,000 15 – THERMS 16 – DKTHERMS 17 – MJOULES 18 – GJOULES 19 – KILOCAL 19 – kWh 20 – CF x 100,000	
097 096	Ch1 & Ch2 Accumulated Vol Digits Ch1 & Ch2 FixedFactor Vol Digits	Codes (0-4) for items 097 (Accumulated Vol digits) and 096 (FixedFactor Vol Digits) that selects the number of digits when displaying either type of volume readings.

Ch Item #	Item Name	Description
	Select: 0 – 8 DIGITS, Example: 12345678 1 – 7 DIGITS, Example: 2345678 2 - 6 DIGITS, Example: 345678 3 - 5 DIGITS, Example: 45678 4 – 4 DIGITS, Example:5678	
Site Information Items		
200	Site ID Number Part 1 Default = 00000000	The first eight digits of the user assigned, site identification number. The entry is limited to only characters: 0-9, therefore characters "." and "-" are not valid. Note: All instruments downloaded using Mercury Instruments Window-based software must be configured for unique Site ID Numbers at Items 200 and 201.
201	Site ID Number Part 2 Default = 00000000	The second set of eight digit, site identification numbers. These eight digits are combined with the eight from item 200 to create a 16-digit identification number.
062	Instrument S/N Default = 00000000	Factory assigned Instrument Serial Number. Example: 09901234. x9901234 – disregard the leading zero x99xxxxx – 2 digit year of manufacture xxx01234 – 5 digit sequence number during year of manufacture
122	Firmware Version	A read-only version number indicating the instrument's operating firmware. The number reported is automatically updated when a different firmware file is up loaded into the instrument's FLASH memory.
126	Instrument Baud Rate Select:	Codes (0-8) to select the instrument's baud rate for serial communications. When a Cloud Link 4G Modem is installed, leave the selection set to 2400. For other communication

Ch Item #	Item Name	Description
	0 - 9600 - Default 1 - 4800 2 - 2400 3 - 1200 4 - Not Used 5 - Not Used 6 -19200 7 - 38400 8 - AutoBaud	devices, set the baud rate to match the baud rate of the connected device. Avoid using Autobaud unless local connections are the only types of serial connections to be used. When Autobaud is used, the instrument will automatically match the baud rate of the connected computer, otherwise the computer's baud rate must be set to match that of the instrument.
127	Instrument Type	A read-only numeric code assigned to all Mercury Instruments products used to identify the particular type of instrument CNI4 = 8
170	Protocol Code A Select: 0 – Send Time-out Errors (Default) 1 – Do not send Time-out Errors	Codes (0-1) to select if specific Time-out error codes are transmitted while attempting a serial link Sign-on. When this item is set to "0", (which is the recommended setting for most applications) all instrument error codes are transmitted. When set to "1", the CNI4 will not send Time-out errors during serial communications. The selection of "1" is provided as a convenience for some 3rd party communication interfaces.
171	Time-out Delay 1 Default = 20	The time (in seconds) the CNI4 waits for the host device to send protocol character "ENQ" (Ctrl-E) following the "EOT" (Ctrl-D) during instrument Sign-on. If the "ENQ" is not received in the specified time, an error "21" (Time-out error) is transmitted from the CNI4. This item is usually set to 7-seconds but when a Cloud Link 4G Modem is installed, the value must be set to at least 20-seconds. Range: 7 to 60,
172	Time-out Delay 2 Default = 20 seconds	The time (in seconds) the CNI4 waits for the "SN" protocol com- mand (Sign-on) following the receipt of the "ENQ" before issuing an error "21" (Time-out error). This item is usually set to 7-seconds but when a Cloud Link 4G Modem is installed, the value must be set to at least 20-seconds. Range: 7 to 60.
118	Reference Number 1 Default = 00000000	No specific function for this item other than to store a numeric value, for any reason. Examples of stored numbers: phone #, meter #, installation date, map coordinates,

Ch Item #	Item Name	Description
		elevation, etc.
119	Reference Number 2 Default = 00000000	Second location for a stored number. Same purpose as item 118 above.
449	Switch Filtering Select: 0 – Filter Neither Channel 1 – Filter Both Channels Default 2 – Filter Channel 1 only 3 – Filter Channel 2 only	Codes (0–3) to indicate whether the input switch filtering algorithm is enabled for either or both input channels. In general, switch filtering should be "On" when the input channel is wired to a mechanical-type switch (such as a reed switch) or "Off" if the input channel is wired to an electronic pulse output (such as the corrected volume pulses from an electronic volume corrector). Use Raw Item Access to change the selection for the codes listed below.
Battery Items		
48	Battery Voltage Reading	Battery voltage reading, measured at last wake-up
49	Battery Low Volt Limit Default = 4.30	Low voltage limit for main battery, initiates a low voltage battery alarm (Item 099) if the value a item 048 drops below this limit.
50	Shutdown Voltage Limit Default = 4.00	The voltage level at which the unit goes into Shutdown, meaning no more pulses will be accepted until the battery is replaced.
Date / Time Items		
202	Log Interval Select: 60 (minutes) Default 24 (hours)	User selected time period that determines how often a Time-related, 4-item audit trail record is placed in audit trail memory. The four audit trail items are selected at items 258 – 261.
203	Time Default = 12:00:00	Real Time Clock that displays hours, minutes, and seconds in 24-hour "military" format, i.e., 14:30:02 would be two seconds past 2:30 PM. When entering or changing the time, leading zeros are required where applicable.
204	Date	A numeric field indicating the calendar date provided by the

Ch Item #	Item Name	Description
	Default = 01-01-99, Format: MM-DD-YY	onboard real-time clock. The format of the Date is determined by the selection at item 262 and may be displayed as MM-DD-YY, DD-MM-YY, or YY-MM-DD. The Date automatically tracks the days in the month, including leap year. When configuring this item, leading zeros are required where applicable. This Date and Time (from Item 203) are used to time-stamp the records in Audit Trail memory.
205	Gas Day Start Time Default = 09 00 00	User selectable time to indicate the beginning of the GAS DAY, which by definition for other items, is the time of day when daily computations are re-zeroed to begin the next day's computations. Note: The time entered should only contain zeros for minutes and seconds.
262	Date Format Select : 0 - MM-DD-YY Default 1 - DD-MM-YY 2 – YY-MM-DD	Codes (0-2) to select the format in which the Date is entered and displayed at item 204. The format for all date-related items will also be governed by this item
Audit Trial Configuration Items		
450	Memory Capacity	Aread-only value indicating audit trail memory capacity, expressed in days or months, based on the maximum number of audit trail records at item 481.
481	Audit Trail Max Records	A read-only value indicating the maximum number of audit trail records available for this particular product
258	Audit Trail Data Item 1 of 10 Default: 002 (Ch1Accumulated Volume)	The first of ten user selectable Audit Trail Report Items that can be configured for Audit Trail logging. To use these ten items, insert the desired item code number into any of the report locations (258 - 261 and 229 - 234). The value "255" at any of these Report Items will cause that position to be 'blank'.
259	Audit Trail Data Item 2 of 10	

Ch Item #	Item Name	Description
	Default: 226 (Ch1 Inc. Accumulated Volume)	
260	Audit Trail Data Item 3 of 10 Default: 910 (Ch2Accumulated Volume)	
261	Audit Trail Data Item 4 of 10 Default: 911 (Ch2 Inc. Accumulated Volume)	
229	Audit Trail Data Item 5 of 10 Default: 255 (blank)	
230	Audit Trail Data Item 6 of 10 Default: 255 (blank)	
231	Audit Trail Data Item 7 of 10 Default: 255 (blank)	
232	Audit Trail Data Item 8 of 10 Default: 255 (blank)	
233	Audit Trail Data Item 9 of 10 Default: 255 (blank)	
234	Audit Trail Data Item 10 of 10 Default: 255 (blank)	
Alarm Items		

Ch Item #	Item Name	Description
099	Battery Low Volt Alarm Default = 00000000	This item indicates if a low voltage alarm for the main battery was generated. During a wake-cycle, if the measurement for item 048 (Battery Voltage Reading) is a value less than the value at item 049 (Battery Low Volt Limit), an alarm is initiated and is indicated by placing "11111111" at this item. "00000000" indicates there is no Battery Low Volt Alarm. The alarm indication cannot be cleared until the batteries are replaced or the voltage becomes greater than item 049..
108	Alarm Output Default = 00000000	This item displays "11111111" to indicate that a Battery Low Volt Alarm has become active, and that an alarm pulse was transmitted out the Alarm Channel. "00000000" at item 108 indicates there are no active alarms.
462	Battery Low Alarm Time Default = 00 00 00	The time during the day (on the date indicated at item 463) the Battery Low Volt Alarm occurred.
463	Battery Low Alarm Date Default = 01-01-04	The date a Battery Low Volt Alarm (item 099) first occurred. After the battery pack is replaced, items 462 and 463 should be manually changed back to their default values so that the next battery alarm will be easily recognized
484	Alarm Channel Control Select: 0 - Alarm Pulse Output (Default) 1 - Modem Power Control	Selection that determines the function of the main board's Alarm Channel output, i.e., terminals A+ & A- at TB1. The traditional function is to output a 50 mSec Form-A alarm pulse, used for remote notification. The alternative function is to provide a Form-A control signal to activate DC power to an external, battery-operated device, such as a cellular or external modem. When configured for Power Control, use items 485 & 487 - 490 to define how and when power is to be applied to the external device.
493	Alarm Call-In Phone Number User supplied phone number to be dialed on all Alarm calls-in	
Modem Call-in Configuration Items		

Ch Item #	Item Name	Description
333	Call-In Trigger Select: 0 - No Call-in 1 - Alarm Call-in Only 2 - Scheduled Call-in Only - Default 3 - Alarm & Scheduled Call-in	Codes (0-3) to select the activity that will cause the instrument to make a call into a host system.
334	Sched Call-In Date Default = 01-01-04	Date of the next scheduled call-in. When used, this parameter is normally incre- mented to the next calendar date by the host data collection computer so that a future call-in will occur.
335	Sched Call-In Time Default = 12 00 00	Time of the next scheduled call-in. When used, this parameter is normally set once and then reused for the next day's call-in. However, the data collection computer might make slight adjustments to optimize call throughput if schedul- ing a large number of units.
336	Call-In Retry By: Select: 0 = Host - Default 1 = Alarm: Host / Scheduled: Instrument 2 = Alarm: Instrument / Scheduled: Host 3 = Instrument (Most Preferred)	Codes (0-3) to select the retry strategy that is to be implemented by the instrument based on the following guidelines; Host: Host is responsible for retrying failed call-ins after the initial hand shake. If a call-in fails, the instrument is responsible for retrying only until it receives the "+-+clralms" string from the host. Thereafter the instrument will not retry if the call is dropped. (It expects the host to do so.) Instrument: Instrument is responsible for retrying failed call-ins. For alarm call-ins, the call is considered successful when a sign-off command is received at the instrument. For scheduled call-ins, the call is only considered successful if the host writes a '0' to item 338 (Scheduled Call-in Occurred). Until that happens, the instrument will call back after a dropped call, or even after a sign-off command.
338	Sched Call-In Occurred Codes:	Status of scheduled call-in activity. "1" (Yes) indicates call-in activity has occurred. "0" (No) indicates call-in activity has

Ch Item #	Item Name	Description
	0 = No, call-in has not occurred – Default 1 = Yes, call-in has occurred	not occurred from the point in time this item was last reset. Following the successful transfer of data, this item is intended to be reset to "0" by the data collection computer just prior to instrument sign-off. Also see item 336.
339	Sched Call-In Phone Num	User supplied phone number the instrument will call when the Scheduled Call-in feature is enabled via items 333 and 486. The time of the scheduled call is deter- mined by items 334 and 335.
490	Call-out Start Time Default = 09 00 00	Parameter used to set the time of day to start the call-out cycle when using modem power control.
485	Call Out Stop Time Default: 23 59 00	User supplied time during the calendar day that Modem Power Control (enabled via item 484) will end. Also see item 490 for Start Time.
487	Call-in Keep Alive Time Default = 15 minutes	User selectable parameter to set the amount of time (in minutes) to leave the communication system (i.e. modem) powered up after an Alarm or Scheduled call-in. The purpose of this feature is to allow for a follow-up call to retrieve additional information (such as audit trail data) if needed.
488	Call-out RepeatInterval Default = 0	User selectable parameter to set the amount of time (in minutes) to wait until repeating the Call-out Window set by the Call-out Keep Alive Time (Item 489). Note: When used, the value set in Item 488 must be greater than the value set in Item 489, otherwise the power control feature is disabled.
489	Call-out KeepAlive Time Default = 0	User selectable parameter to set the amount of time (in minutes) that power is be applied to an external modem, starting at the time-of-day set into item 490 (Call-out Start Time). Note: Set items 488 and 489 to "0" (default) to disable Call-out power control. Call-in power control (item 487) will still provide modem power for scheduled and alarm calls-in
486	Modem AT-Command Enable	Codes (0-1) to select the method of instrument call-in.

Ch Item #	Item Name	Description
	Select: 0 – No (Call-in via Alarm Pulse. Wires from TB1 A- & A+ must be connected to a compatible modem, eg. MI Modem or ECI-2) 1 – Yes (Default) (Call-in via AT-commands @ J5 using CMOS or RS-232 serial communications)	
491	Modem Init String Default = ATE0Q0V0X4 Where:AT = Attention (required for each modem command string) E0 = Echo Off Q0 = Result Codes Enabled V0 = Verbose Mode Off (i.e. use number codes, not text) X4 = Modem waits for dial tone before dialing or sends No Dialtone code if not detected within 5-seconds or sends Busy code on busy signal	Character string used to initialize the instrument modem at the beginning of each AT-type call-in. The default string is for use with Mercury Instruments'Cloud Link 4G Modem. Other brands or types of modems may require a different init string.
492	Modem Dial String Default = ATDT	Dial Telephone Number modifier

Ch Item #	Item Name	Description
	Where:DT = Dial the phone number using Tones, not pulses (DP)	
494	Modem Hang-up Default = ATH Where:H (or H0) causes the modem to hang up	String Switch Hook Control
495	Modem Retry Interval A Default = 5	The amount of time (in minutes) to wait before attempting a retry, following a failed Scheduled or Alarm call-in. Often referred to as the primary retry interval.
496	Modem Retry Interval B Default = 1440 (i.e., 24 hours)	The amount of time (in minutes) to wait before attempting a retry, following the last failed primary retry call. Often referred to as the secondary retry interval.
497	Modem Retry ACount Default =3	Following a failed Scheduled orAlarm call-in, the maximum number of IntervalA (primary) retry attempts,

Cloud Link 4G modem Item Reference

ITEM Number	Parameter	Parameter Description
3002	Cloud Link 4G Modem Serial Number	Cloud Link 4G Modem Serial Number
3003	Cloud Link 4G Modem Manufacturing Date DD:MM:YYYY:	Cloud Link 4G Modem Manufacturing data
3004	Radio IMIE number	Radio identification number
3005	Change Battery	Reset Battery flag clears previously charge consumed data
3006	Advance Low Battery Indication (in days)	Advance Low Battery Indication (in days): Maximum allowed is 255 days and Min allowed is 15
3007	Battery Type	SINGLE_BATTERY_PACK = 0, DUAL_BATTERY_PACK = 1, QUAD_BATTERY_PACK = 2, ONE_BATT_ONE_SC_SEPARATE = 3 EXT_PS_SINGLE_BATT_PACK = 4,

ITEM Number	Parameter	Parameter Description
		EXT_PS_DUAL_BATT_PACK = 5, EXT_PS_ONLY = 6 (default), NO_SUFFICIENT_SUPPLY = 7
3008	Battery Charge Capacity	Battery Charge Capacity: is based on battery type
3009	Super Cap Low voltage to drop the call	Super cap voltage reading
3010	Battery Voltage Critically low Threshold	Battery critically low Threshold value
3011	Available % battery life	Percentage battery life
3012	Super Cap Charge Availabilty (in sec)	Super cap voltage in seconds
3013	Battery Voltage	Battery voltage
3014	Supercap Voltage	Super cap voltage
3015	Battery Charge Consumed	Battery Charge Consumed
3016	Fetch radio parameters	0 - Disable 1 - Enable
3017	SSL enable / Disable	0 - Disable (default) 1 - Enable
3020	SSL Security Cert Expiry Status	0 - Valid 1 -Expired
3021	Mobile or Simple Internet Protocol	0 = Simple Internet Protocol (SIP) 1 = Mobile Internet Protocol (MIP)
3022	Packet Service Connection Command	This command initiates a packet (internet) connection This can be different for different cellular providers, but generally the universally-accepted string is"ATD*99#"
3023	Access Point Name	This is the name of the gateway to the service provider's internet service. Examples: m2m@T-Mobile.com or isp.cingular
3024	PAP / CHAP Enable	0 = None 1= PAP only 2 = CHAP only 3 = CHAP first and then PAP as a fallback if CHAP fails.
3025	PAP / CHAP User Nam	If PAP or CHAP has been selected then this is the user name

ITEM Number	Parameter	Parameter Description
3026	PAP / CHAP Pass Word	If PAP or CHAP has been selected then this is the password.
3027	SIM PIN Number	A numeric string (ex: "54311") that protects the SIM card from being used by unauthorized persons.
3028	Cellular Session Timeout	10 sec – 300 sec
3029	SIM Number	Sim number of SIM card
3030	Mobile Directory Number	Mobile directory number
3031	Carrier Name	Mobile Carrier name
3032	Internet Protocol Version 4 or 6 (IPv4 or IPv6)	0 = IPv4 1 = IPv6
3033	Source Port Starting Number	When establishing a client connection (the CNI4 calls a server), it must assign itself a port number which will be reported to the host server. If the Source Port Ending Number is the same, then the customer can choose to use the same source port number for each call. If the Source Port Ending Number is greater, then the customer can use a range of port numbers. The first call will use the Source Port Starting Number. For each subsequent call, the source port number will be incremented until it is greater than the
3034	Source Port Ending Number	Source Port Ending Number. Once greater, the sequence will start over with the Source Port Starting Number. Example: Source Port range = 50000 – 50010 1st Call uses 50000 2nd Call uses 50001 11th Call uses 50010 12th Call uses 50000 and so on
3035	Maximum TCP/IP packet size	This defines the maximum data portion of the TCP/IP packet, which is usually referred to as the Maximum Segment Size, or MSS. Maximum is 65535 bytes. Legacy Ethernet v2 segment sizes were limited to about 1460 bytes.

ITEM Number	Parameter	Parameter Description
3036	DNS or IP address	This parameter is to select IP address / DNS name 0– IP address 1– DNS
3037	Primary Destination IP Address (Client Mode) (Can be IPv4 or IPv6 address	ASCII form size based on IPv4 or IPv6 address
3038	Primary Destination Port Number (Client Mode).	Destination port number
3039	Alternate Destination IP Address (Client Mode)	ASCII form size based on IPv4 or IPv6 address
3040	Alternate Destination Port Number (Client Mode)	Alternate destination port number
3041	Domain Name Server (DNS) #1	URL of DNS1
3042	Domain Name Server (DNS) #2	URL of DNS2
3043	Domain Name Server (DNS) #3	URL of DNS3
3044	Server Mode Friends (White) List Enable	0 – Disable 1 – Enable
3045–3054	Server Mode Friends (White) List(10 IP adress)	Server White list IP addresses 1 – 10
3055	Device Wakeup time	Device wakeup time after receiving AT commands
3056	Number of total Items	Total number of Cloud Link 4G Modem item codes
3057	MI session timeout	BLE session timeout for both Cloud Link 4G Modem & EVC connection
3058	Last call / Known Signal Strengthl	Last call known signal strength
3059	Last Known Source IP Address	Last call IP address
3060	Last Known Source Port	Last call IP Port
3061	Modem server timeout	Server mode timeout
3062	Modem Firmware Version	Mounted cellular modem firmware version
3063	Radio Modem model	Model name for mounted cellular modem
3064	Manual APN Enable	For Verison Only, for static IP SIM cards. 0 = Disabled

ITEM Number	Parameter	Parameter Description
		1 = Enable (default)
3065	RS-232 / RS-485 Serial Port Baud Rate	Baud rate from 1200(0) to 115200(7)
3066	CMOS Serial Port Baud Rate	Baud rate from 1200(0) to 115200(7)
3067	RS-232 Serial Port Flow Control	Baud rate from 1200(0) to 115200(7)
3068	CMOS Serial Port Flow Control	0 = Enabled (default) 1 = Disabled
3069	BLE Baud Enable	0 = 115200 baud rate 1 = 38400 baud rate
3070	Include Baud in CONNECT Message	0= Disable (default) 1= Enable
3071	Verizon Enable	0= Disable (default) 1= Enable
3072	Use Non-Verbose (Numeric) Response Codes	0 = NonVerbose (default) 1= Verbose
3073	Serial Port Delay Before Sending Packet	1-10000 msc
3074	Verizon Dynamic IP SIM startup delay	Required when the SIM is changed.
3075	RS485 enable	0= Disable (default) 1= Enable
3076	BLE MAC Address	MAC address of the bluetooth device
3077	BLE Device Name	Bluetooth device name
3078	Advertisement interval(in msec)	320-10000 msc
3079	BLE Module Status	BLE Module status : Diagnostic purpose Good - '0' UART Failure - '1'
3080	BLE firmware version	Bluetooth firmware version
3081	BLE stack version	Bluetooth stack version

ITEM Number	Parameter	Parameter Description
3082	BLE forget all bonds	0= Disable (default) 1= Enable
3083	BLE host White List Enable	0= Disable (default) 1= Enable
3084	BLE Last RSSI	0 = default Signal strength of the last recent bluetooth connection signal.
3085	BLE Security type	1–Just works 2- Passkey entry
3086	SSL Passkey	Password used for the SSL security certificates
3112	BLE conn interval	Advertisement interval max : data value in mSec
3094	Cloud Link 4G Modem Mode	Integrated Mode – 0 Standalone Mode – 1
3095	Remote Unit ID (RUID)	Default Value : 000000 Must be same as that of the connected instrument.
3096	Running / Existing Firmware Version	Cloud Link 4G Modem firmware revision
3097	Running Firmware CRC checksum	Cloud Link 4G Modem firmware checksum
3098	Downloading Firmware Version	Firmware version that's being downloaded to the device
3099	Firmware upgrade max packet size	The maximum packet size that can be uploaded
3100	Firmware image max size allowed	The maximum file size that can be uploaded
3101	Coordinated Universal Time (UTC)	When the Cloud Link 4G Modem receives a time and date, it is relative to Coordinated Universal Time (UTC) which is essentially the same thing as Greenwich Mean Time (GMT).
3102	Date format type	0 = MM_DD_YY 1 = DD_MM_YY 2 = YY_MM_DD
3103	Cloud Link 4G Modem Bootloader version	Version number of the Cloud Link 4G Modem Bootloader

ITEM Number	Parameter	Parameter Description
3104	Cloud Link 4G Modem Bootloader CRC	CRC number of the Cloud Link 4G Modem Bootloader
3105	Immediate Call on Low-Battery Condition Enable	0 = Disable (default) 1= Enable
3106	Immediate Call on Alarm Active Enable	0 = Disable (default) 1= Enable
3107	Immediate call on for wrong login failure	0 = Disable (default) 1= Enable
3108	Date	CNI4 device date
3109	Time	CNI4 device time
3110	Server mode IP address	The IP address used by CNI4 in server mode
3111	Server mode IP port number	The port number used by CNI4 in server mode
3113	Pulse count	The number of counts recorded by the connected pulse count recorder
3114	Cloud Link 4G Modem board temperature	Cloud Link 4G Modem board temperature
3115	Cloud Link 4G Modem Configuration Change Event	Date and time when a configuration change was done to the Cloud Link 4G Modem
3116	Cloud Link 4G Modem Firmware Upgrade Event	Date and time when the Cloud Link 4G Modem firmware was upgraded
3117	Cloud Link 4G Modem Password Change Event	Password credential change
3118	Cloud Link 4G Modem POR counter	Cloud Link 4G Modem power on reset count Event
3119	Login Failure Event	Cloud Link 4G Modem login failure Event
3120	Low Battery Alarm Event	0 – Not Active 1 – Active
3121	Emergency Callin Alarm Event	0 – Not Active 1 – Active
3122	BLE transmit power	Bluetooth transmit power
3123	BLE enable	Enable bluetooth
3124	Last call Cellular service	The cellular network type using which the last call was made.

ITEM Number	Parameter	Parameter Description
		0 = 2G 1 = 3G 2 = 4G 3 = No Call (default)
3125	Last call cellid	Cell ID of the last call
3126	Last cal Loc ID	Location identifier of the last call
3127	Last cal RSCP	RSCP number of the last 3G call
3128	Last cal RSRQ	RSRQ number of the last 4G call
3129	Last cal MCC	MCC number of the last call
3130	Last cal RSRQ	RSRQ number of the last cals
3131	Last cal Physical cell id	Physical Cellular ID of the last call
3132	Last call Cellular RSRP	RSCP number of the last call
3133	Last call Cellular TAC	Cellular TAC number of the last call
3134	Last call duration	Duration of the last call
3135	Last call status	RADIO_CALL_NO_INIT = 0 (default) RADIO_CALL_INIT, RADIO_DIALING, RADIO_DIAL_FAILED, RADIO_CONNECTED, RADIO_CALL_FAIL_DUE_TO_NOREPONSE, RADIO_CALL_FAIL_DUE_TO_PPP, RADIO_CALL_FAIL_DUE_TO_SOCK_CONN_FAIL, RADIO_CALL_FAIL_DUE_TO_LOW_SUPERCAP, RADIO_CALL_SUCCESS = 9
3136	Pulse count enable	0 = Disable (default) 1 = Enable
3137	Restore/Reset/Clear logs	0 = ITEM_NO_ACTION = 0, (default) 1 = ITEM_RESTORE_DEFAULTS_DEVICECONFIG 2 = ITEM_CLEAR_EVENT_LOGS 3 = ITEM_CLEAR_ALARM_LOGS 4 = ITEM_CLEAR_DIAGNOSTIC_LOGS 5 = ITEM_CLEAR_CELLULAR_LOGS 6 = ITEM_CLEAR_ALL_LOGS

ITEM Number	Parameter	Parameter Description
		7 = ITEM_RESTORE_DEFAULTS_SECURITYCONFIG
		8 = ITEM_RESTORE_DEFAULTS_BATTERYCONFIG
		9 = ITEM_INITIATE_RESET
		10 = ITEM_INITIATE_BLE_RESET
		11 = ITEM_RESTORE_DEFAULTS_ INTERNALCONFIG
3138	Modem server timeout	This timeout is used in EC 350 mode whenever modem IP/Port numbers are for found.
3139	Remote Unit ID 2 (RUID)	Default Value : 000000 Must be same as that of the connected instrument.
3140	Temperature units	0 = °C 1 = °F (default)
3141	BLE number of bonds	The number of bluetooth bonds. A bond information is used to establish a secure link or to verify a device's identity, so when the devices reconnect they do not have to go through the initial stages like performing service discovery, configuring the descriptors again.
3142	MIWireless Enable	0 = for EC 350 (default) 1 = MiWiress (When this item number is changed, the instrument must be restarted)
3143	BLE start time	Time when bluetooth communication started
3144	BLE stop time	Time when bluetooth communication stopped
3425	Factory test access number	Access code to enter into factory mode
3426	Factory test mode status	Status to check whether CNI4 board is in Factory mode or not
3427	Factory test item number	FT_MODEM_POWER_ON= 1, FT_MODEM_POWER_OFF= 2, FT_SIM_TEST= 3, FT_SRAM_TEST= 4, FT_DATA_FLASH= 5, FT_OTA_FLASH= 6,

ITEM Number	Parameter	Parameter Description
		FT_SUPER_CAP_VOLTAGE = 7,
		FT_BATTERY_VOLTAGE= 8,
		FT_EXT_POWER_VOLTAGE = 9,
		FT_MAGNETIC_SWITCH= 10,
		FT_TEMPERATURE= 11,
		FT_BLE_MODULE= 12,
		FT_LED_TEST= 13,
		FT_SLEEP_TEST= 14,
		FT_MET_JUMPER= 16,
3428	Modem power ON Result	Item code to see the result of Modem ON test. If modem is ON, the value will be 0. Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3
3429	Modem power OFF Result	Item code to see the result of Modem OFF test. If modem is OFF, the value will be 0 Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3
3430	SIM test Result	Item code to see the result of SIM test. If SIM test is passed, the value will be 0 Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2

ITEM Number	Parameter	Parameter Description
		TEST_FAILED = 3
3431	BLE test Result	Item code to see the result of BLE test. If BLE test is passed, the value will be 0 Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3
3433	Test data flash Result	Item code to see the result of data flash test. If flash test is passed, the value will be 0 Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3
3434	Test OTA flash Result	Item code to see the result of OTA flash test. If flash test is passed, the value will be 0 Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3
3435	Test SRAM	Item code to see the result of SRAM test. If SRAM test is passed, the value will be 0 Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3

ITEM Number	Parameter	Parameter Description
3436	Magnetic switch status	Item code to see the status of magnetic switch, If the switch is open, this code will read 1 and if the switch is closed, this will read as 0
3437	Metrology jumper status	Item code to see the status of metrology jumper, If the jumper is not connected, this code will read 1 and if the jumper is connected, this will read as 0
3148	Cloud Link 4G Modem model number	Cloud Link 4G Modem model number/name
3149	PWA serial number	PWA Serial number (for only internal production)
3150	PWA revision number	PWA revision number (for only internal production)
3151	IFT test result	Production can use to store the IFT test result for tracebility Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3
3152	FFT test result	Production can use to store the FFT test result for tracebility Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3
3153	Programming test result	Production can use to store the Programming test result for tracebility Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3
3154	EOL test result	Production can use to store the EOL test result for

ITEM Number	Parameter	Parameter Description
		tracebility Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3
3155	FFT (Selective) Test Result	Production can use to store the FFT(Selective) test result for tracebility Statues: TEST_NOT_INITIATED = 0 TEST_INITIATED = 1 TEST_PASSED = 2 TEST_FAILED = 3
3156	Last magnetic alarm time	Unix time for last magnetic alarm
3157	Last battery alarm time	Unix time for last battery alarm
3145	BLE Passkey	Display BLE pairing passkey
3146	External Voltage	Voltage of the external battery powering the CNI4
3147	Alarm Call Retries	Retries for alarm call like Magnetic call or battery low alarm call
3158	Security certificate issue time	Security certificate issue time in UTC format
3159	Security certificate expiry time	Security certificate expiry time in UTC format