RSTAR Affinity Data Logger
Installation and User Manual

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REVISION HISTORY

Rev.	Revision History	Date	Prepared By	Approved By
A	Initial Release	Aug 15, 2022	MP	AB
B	Replaced sample calibration chart, added note on p.10 about silicone grease on the connectors.	28 Apr 2023	Ariel V., MP	EG, AV
C	Edits to Table 1: IIM Pin Assignment. Removed TH/TH and 4-20mA IIM Type. Removed from Appendix C: Instrument Interface Module. - Thermistor and Thermistor IIM - Dual 4-20 MA IIM - Figure 12: 4-20 mA Circuit Diagram Removed from Appendix A: RSTAR Affinity Data Logger Specification - Thermistor and Thermistor IIM - Dual Channel 4-20 mA IIM - Single Channel 4-20 mA IIM	20 Oct 2023	SM	GL
D	Table 1: IIM Pin Assignment: Removed the TH/TH and 4-20mA IIM Type entries. Appendix A: RSTAR Affinity Data Logger Specifications: Added a reference to the product page for specifications. New Section on Standalone Setup: Added a new section detailing how to use the RSTAR Affinity loggers in remote areas without a connected gateway. This section includes: - An overview - Equipment and tools needed - Configuration and deployment steps - Troubleshooting tips - Best practices for handling cached actions in areas with no cellular signal	08 July 2025	SM	AB, SP, NN, JC
E	IIM Pin Assignment table (Table 1) updated. Architectural diagram (Figure 1) updated. Contact information updated. Note about data file download format option available added.	17 October 2025	SM	AB, SP, CA

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1 Intended Audience

This guide is for the service personnel responsible for installing and commissioning an RSTAR Affinity Data Logger.

2 Icons used in this Guide

This guide uses the following icons to call attention to important information:

	**WARNING:** This icon appears when an operating procedure or practice, if not correctly followed, could result in personal injury or loss of life.
	**CAUTION**: This icon appears when an operating procedure or practice, if not strictly observed, could result in damage to or destruction of equipment.
	**NOTE**: This icon appears to highlight specific non-safety related information.
	**CHECK**: This icon appears to remind the user of quality-related features.
	**RSTAR Affinity Field App:** This icon appears when the user needs to refer to an RSTAR Affinity Field App documentation.

3 Abbreviations and Acronyms

Abbreviation or acronym	Definition
IIoT	Industrial Internet of Things
BLE	Bluetooth Low Energy
LoRa	Long Range
LoRaWAN	Long Range Wide Area Network
SAA	ShapeArray

4 INTRODUCTION

4.1 RSTAR AFFINITY CONNECTIVITY SOLUTION

The RSTAR Affinity Connectivity Solution comprises data loggers, gateways, secure communications for data telemetry, and mobile and desktop applications. RSTAR Affinity is a complete industrial internet of things (IIoT) solution for reliable, real-time data flow from your worksite to your desktop – all from a single vendor.

The RSTAR Affinity Connectivity Solution is a scalable and flexible system that can be customized to satisfy the complex and demanding requirements for data collection. The topology and communications options including cell and LoRaWAN radio protocol (for better signal and range), cover all on-site and remote monitoring scenarios.

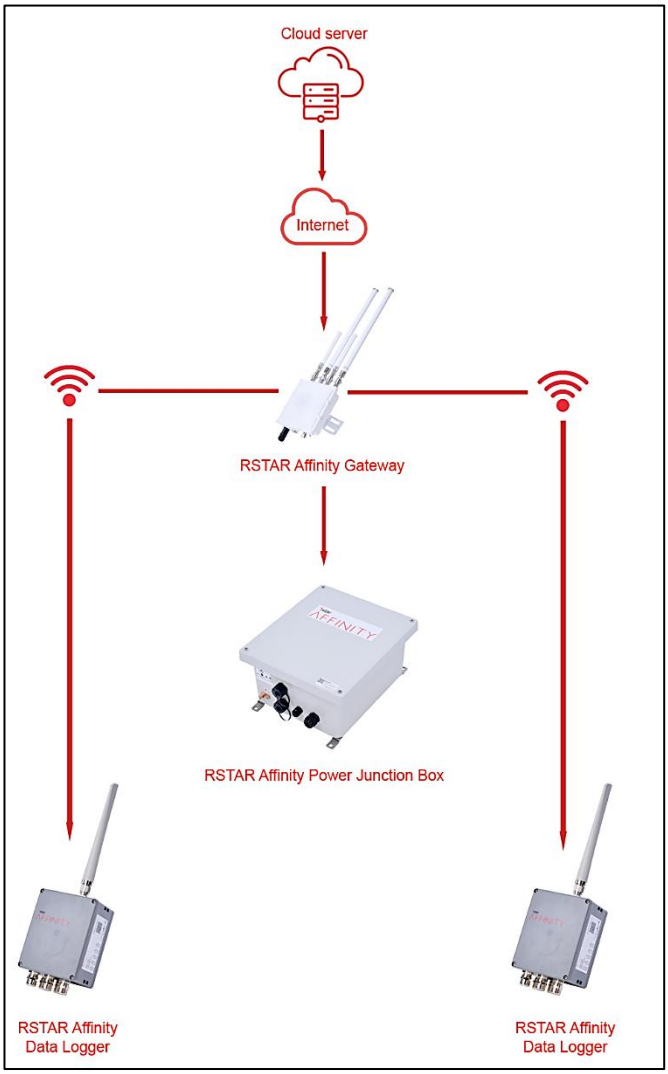

Figure 1: RSTAR Affinity Cloud-Based Solution

4.2 RSTAR AFFINITY DATA LOGGER

The RST Affinity Data Logger is part of the only turnkey solution on the geotechnical Industrial Internet of Things (IIoT) market that provides data collection, communications, site management, data insight, and remote monitoring together in one comprehensive product line. It collects data in a variety of applications with high accuracy. It passes this data securely to an RST Affinity Gateway or a mobile device running the RSTAR Affinity Field Utility App through Bluetooth Low Energy (BLE) for monitoring and analysis away from the site.

The data logger is highly flexible and designed to interface with a wide range of measurement instruments. It is a wireless data collection device for measuring geotechnical instruments. It is battery-powered and provides reliable, unattended monitoring, and telemetry for mission critical instruments.

The data logger uniquely features five customizable ports capable of supporting your mission-specific instruments. This allows one data logger to interface with a variety of instruments, reducing overall equipment and installation costs.

4.3 RSTAR AFFINITY DASHBOARD

The RSTAR Affinity Dashboard is a browser-based user interface that has an essential suite of mapping, graphing, data visualization, and reporting utilities developed specifically for geotechnical space.

The Dashboard also has automatic and transparent field calculations, alarm functionality, and a unique relative elevation mapping feature, along with user management. The open API supports integration with third-party data management and presentation software.

4.4 RSTAR AFFINITY FIELD UTILITY APP

The RSTAR Affinity Field Utility App is a mobile application that has account-based sign-in to ensure security and traceability through a built-in audit trail.

Bluetooth connectivity and a QR code scanner make for quick, easy, and accurate instrument installation and commissioning, saving an average of four hours per sensor and eliminating human error during setup.

5 SYSTEM OVERVIEW

5.1 ENCLOSURE

The RSTAR Affinity Data Logger enclosure is designed with a detachable front cover to allow work on the wiring terminal blocks, batteries, and micro-USB diagnostic port. The antenna connector is on the top of the enclosure while the instrument interface module (IIM) ports are on the bottom.

> **NOTE**: Use of the USB-C is restricted to RST service personnel.

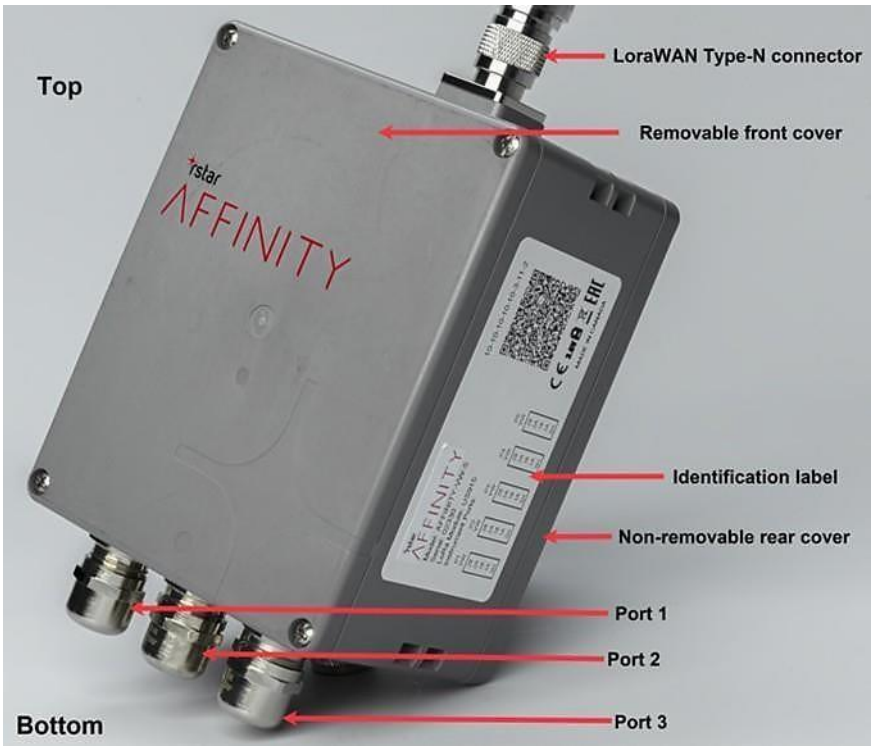

Figure 2: Enclosure and Components

5.2 INTERNAL COMPARTMENT

The internal compartment is in the back of the data logger. It contains sensitive electronics and is not accessible to field personnel. This compartment has no serviceable components and uses anti-tamper screws to prevent inadvertent access.

5.3 SERVICE PORT COMPARTMENT

The data logger's service port compartment houses the batteries, micro-USB port, and instrument interface modules (IIM).

Figure 3: Service Port Compartment

The data logger accommodates up to five instrument interface modules (IIM). Each IIM is equipped with a five-wire terminal strip. The pins are arranged with pin 5 at the top and pin 1 at the bottom.

Table 1 shows the functional label for each of the IIM. Appendix C lists some of the instruments and sensors that can be connected to the corresponding IIM. Contact RST Instruments for information on instruments not listed.

IIM Type	Terminal Pin 1	Terminal Pin 2	Terminal Pin 3	Terminal Pin 4	Terminal Pin 5
VW*/TH**	Shield	VW 1	VW 1	Thermistor 1	Thermistor 1
VW/VW	Shield	VW 1	VW 1	VW 2	VW 2
TH/TH	Shield	Thermistor 1	Thermistor 1	Thermistor 2	Thermistor 2
RS-485	Shield	Ground	+12V Output	RS-485 - B	RS-485 - A

Table 1: IIM Pin Assignment

*VW stands for vibrating wire

**TH stands for thermistor

5.4 CONNECTIVITY

The data logger comes with options for different instrument interfaces. The connectors on the enclosure include up to five port cable glands and/or Quick Connect cables for sensors and instruments, and a LoRaWAN external antenna.

5.4.1 Quick Connect

The Quick Connect option on the data logger is IP67-rated and can be used in harsh environments. It simplifies field installation and is ideal where sensors are frequently replaced. The connectors are installed by RST for specific instruments. There are no modifications required for the Quick Connect option.

5.4.2 LoRaWAN External Antenna

The data logger can use either a factory installed LoRaWAN antenna (mounted inside the enclosure) or an optional external antenna (using the data logger's type-N connector). Refer to the data logger's configuration identification label (discussed in section 3.2.1) to see if your data logger comes with a built-in antenna.

The LoRaWAN network operates in three radio frequency bands. If you are using an optional external LoRaWAN antenna, refer to Table 2 for the recommended antennas to match the different bands.

Band	Antenna Recommendation	Gain	Dimensions
900-928 MHz	Taoglas Blade 868/ 915Mhz Omnidirectional	1 dBi	228 x 23 mm
863-870 MHz	Taoglas Blade 868/ 915Mhz Omnidirectional	1 dBi	228 x 23 mm
433 MHz	Taoglas OMB.433.B06F21	6dBi	1473 mm (max) x 24mm

Table 2: Recommended LoRaWAN Antenna

6 INSTALLATION PROCEDURES

This section details the installation of the RSTAR Affinity Data Logger's components.

6.1 INSTALLATION TOOLS

The following are the tools you need to install the data logger:

- number 2 Phillips head screwdriver
- 2 mm flat head screwdriver
- 20 mm open wrench or an optional gland wrench available from RST Instruments

6.2 CONNECT THE CABLE GLAND

> **NOTE**: The cable gland seals the connection and protects the data logger from moisture and contamination. It accepts instruments with ½" (12.70 mm) diameter cables.

To connect the cable gland to the data logger, complete the following steps:

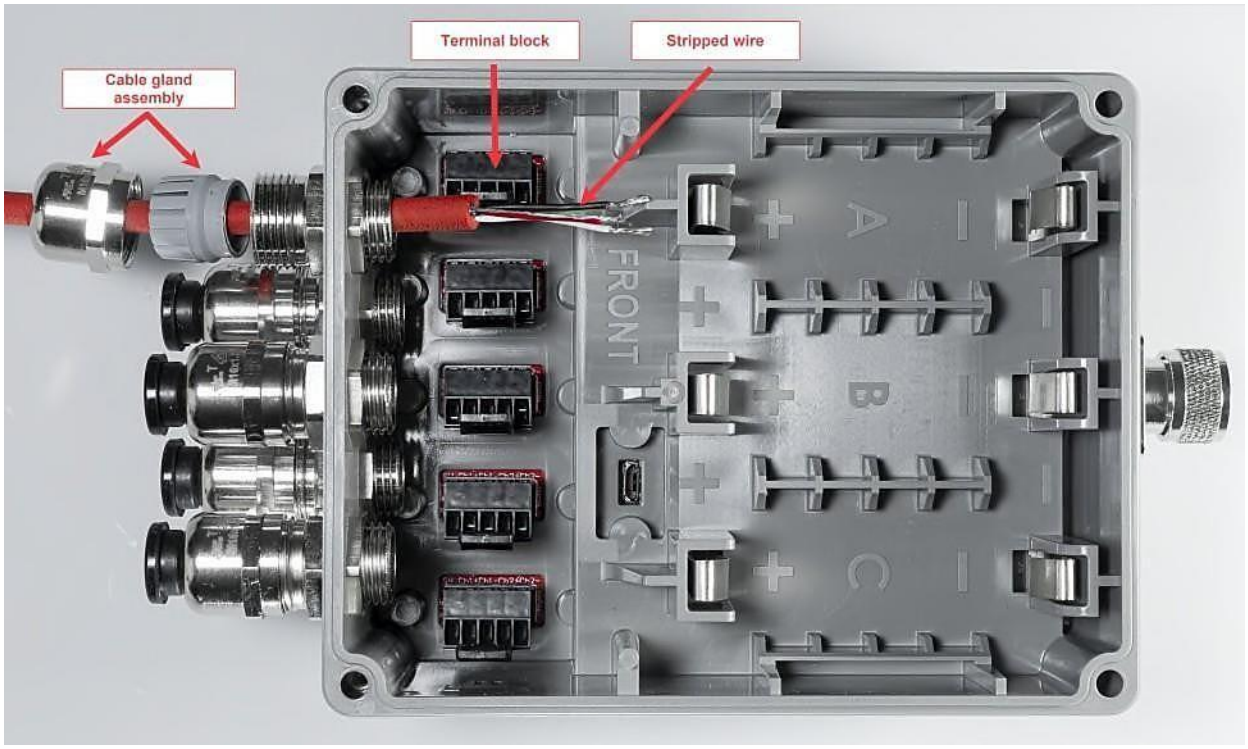

Figure 4: Cable Gland Connection

1. Unscrew the front cover of the data logger using a screwdriver to access the service port compartment.

2. Remove the cable gland assembly from the enclosure.

3. Thread the instrument or sensor cable through the cable gland and into the enclosure.

4. Pull the terminal tab to detach the terminal block from the data logger.

5. Use a 2 mm flat head screwdriver to tighten each of the stripped instrument wire to the assigned pins on the terminal block.

6. Tighten the cable gland to seal the connection and protect the data logger from moisture and dirt.

7. Screw the front cover back on the data logger following the tightening sequence shown in Figure 5. Make sure the rubber seal on the cover is free of debris and seated in its groove before tightening the screws.

Figure 5: Front Cover Tightening Sequence

6.2.1 Configuration Identification Label

The data logger's flexible design supports a variety of instruments. Specific instrument interface modules (IIM) are installed at the factory. The label on the side of the enclosure shows the data logger's serial number and the configuration option shows as **aa-bb-cc-dd-ee-f-gg-h**, where:

- aa = instrument port 1 interface (sensor type and connection) *
- bb = instrument port 2 interface (sensor type and connection) *
- cc = instrument port 3 interface (sensor type and connection) *
- dd = instrument port 4 interface (sensor type and connection) *
- ee = instrument port 5 interface (sensor type and connection) *
- f = Number of batteries (1=one battery, 2=2 batteries, 3=3 batteries)
- gg = communication type and antenna (1=internal, 2=external antenna required)
- h = mounting type

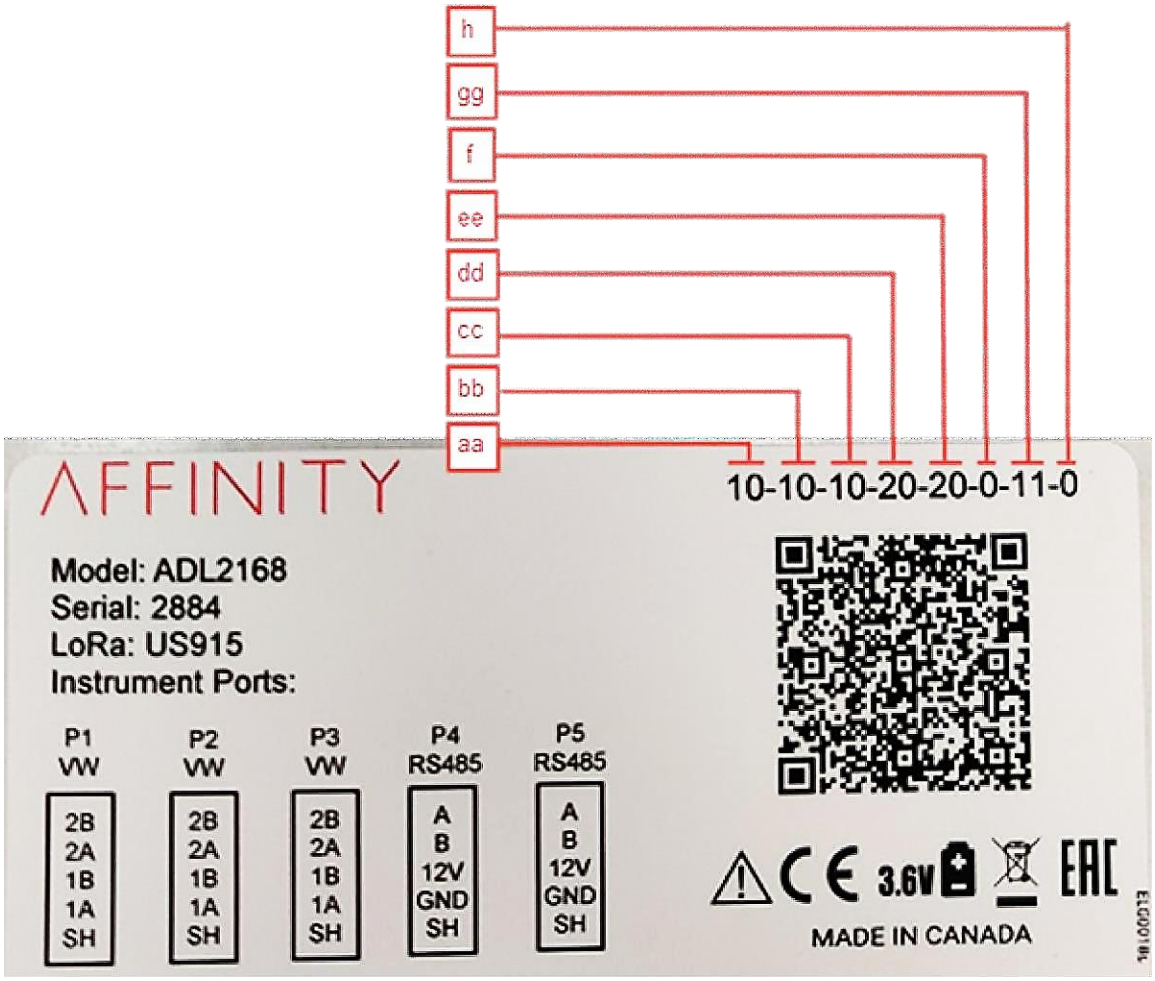

Figure 6: Configuration Identification Label

Items with an asterisk (*) mean that IIM configuration is encoded as a two-digit number that identifies the IIM type and the connection option shown in Table 3.

Code	IIM Type	Number of Channels	Connector Type
10	Vibrating Wire and Thermistor IIM	2	Cable Gland
11	Vibrating Wire and Thermistor IIM	2	Quick Connect
20	RS-485 instrument IIM	1	Cable Gland
21	RS-485 instrument IIM	1	Quick Connect

Table 3: IIM Instrument Encoding Table

6.2.2 QR Identification Code

The QR code in the data logger contains the following configuration information:

- ID – data logger serial number
- P1 – port 1 IIM type and description
- P2 – port 2 IIM type and description
- P3 – port 3 IIM type and description
- P4 – port 4 IIM type and description
- P5 – port 5 IIM type and description
- Band – LoRaWAN frequency band
- Antenna – internal or external
- Battery – number of batteries installed

6.3 INSTALL OR REPLACE BATTERIES

Depending on the destination country, a data logger may or may not have factory-installed Li-$SOCl_2$ D cell batteries. If it has factory-installed batteries, you must remove the insulating pull tabs which prevent the batteries from energizing during shipping and storage.

The data logger has three battery compartments labelled as A, B and C. The data logger detects batteries in the compartments and uses the first available battery in the sequence. The data logger continuously monitors battery consumption over time, disables the depleted battery and enables the next available battery in the sequence.

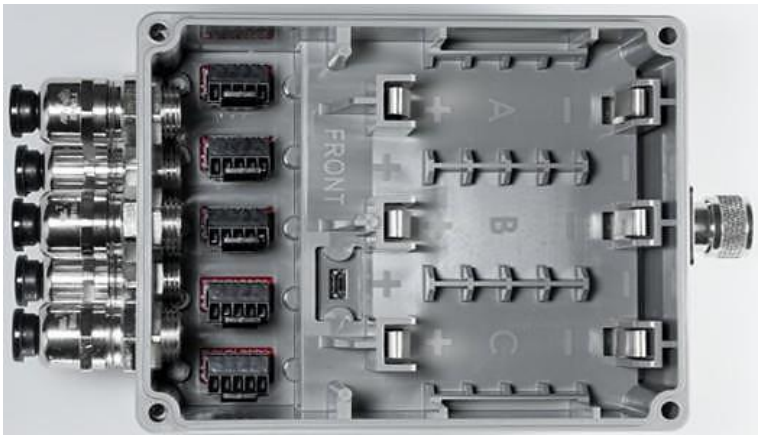

Figure 7: Battery Compartment

To install batteries on the data logger, complete the following steps:

1. Unscrew the data logger's front cover to access the service port compartment.
   - If the data logger has factory-installed batteries, remove the insulating pull tabs.
   - If replacing the batteries, remove the installed batteries and go to step 2.

NOTE: It is possible to install up to three batteries, based on power requirements. If installing only one battery, use battery compartment A. If installing two, use compartments A and B. All 3 compartments will be utilized if using three batteries.

2. Insert the new batteries into the battery compartment.
3. Screw the front lid back on the data logger following the tightening sequence shown in Figure 5.

Please refer to the RSTAR Affinity Field Utility App User Guide (in Downloads section of the RSTAR Affinity Data Logger product page) for information on resetting the battery meter.

4. Reset the battery meter in the RSTAR Affinity Field Utility App.

> **NOTE**: Ensure a secure connection between the antenna and logger to prevent damage from water ingress.

6.4 INSTALL EXTERNAL ANTENNA

RSTAR Affinity Data Loggers are provided with a dipole antenna as a standard, which can simply be attached to the logger.

If the logger is ordered with external antenna with an extension coaxial cable, please ensure the following steps are completed:

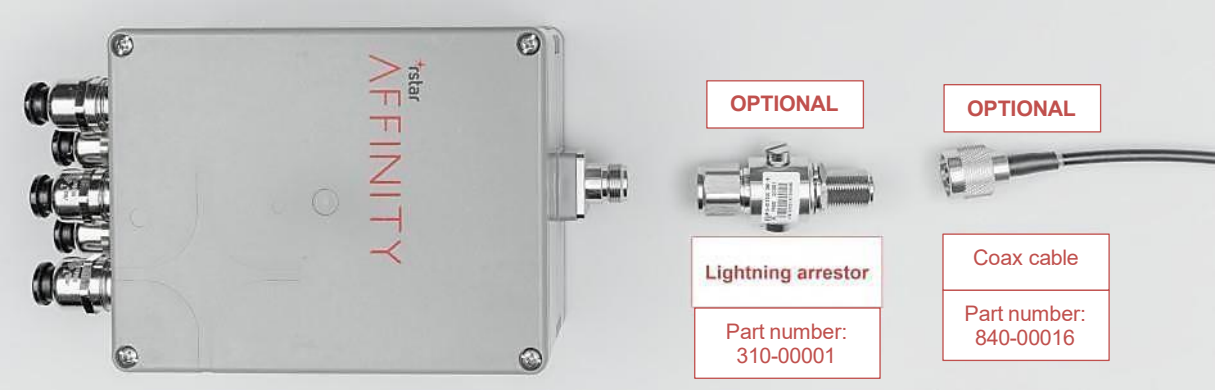

Figure 8: Antenna Connection

1. Make sure the data logger has a line of sight to the RSTAR Affinity Gateway.
   - If the line of sight is blocked, consider elevating the antenna on an antenna mast.
2. Connect the coax cable to the antenna.
   - If using an optional lightning arrestor, connect it between the data logger and the coax cable.

6.5 INSTALL THE DATA LOGGER

Keep in mind when installing the data logger that although it is designed to withstand harsh environmental conditions and its IP67-rated enclosure is dust-tight and weather-resistant, it can be exposed to elements such as rain and splashes of water but cannot be submerged in liquid.

Options for installing or mounting the data logger include the following:

- Pole mount – compatible with poles between 120 mm (5”) and 254 mm (10”) in diameter
- Wall mount – for use on a flat wall or panel
- Magnet mount – for use on a magnetic wall or panel
- Secondary enclosure mount – for use within a secondary enclosure

6.5.1 Pole Mount Option

Figure 9: Pole Mount Plate

To mount the data logger onto a pole, complete the following steps:

1. Remove the four screws from the back of the data logger.
2. Install the back plate using the same four screws. Tighten the screws.
3. Thread the hose clamps through the top and bottom slots on the back plate.
4. Wrap the hose clamps around the pole and tighten the screws.

6.5.2 Wall Mount Option

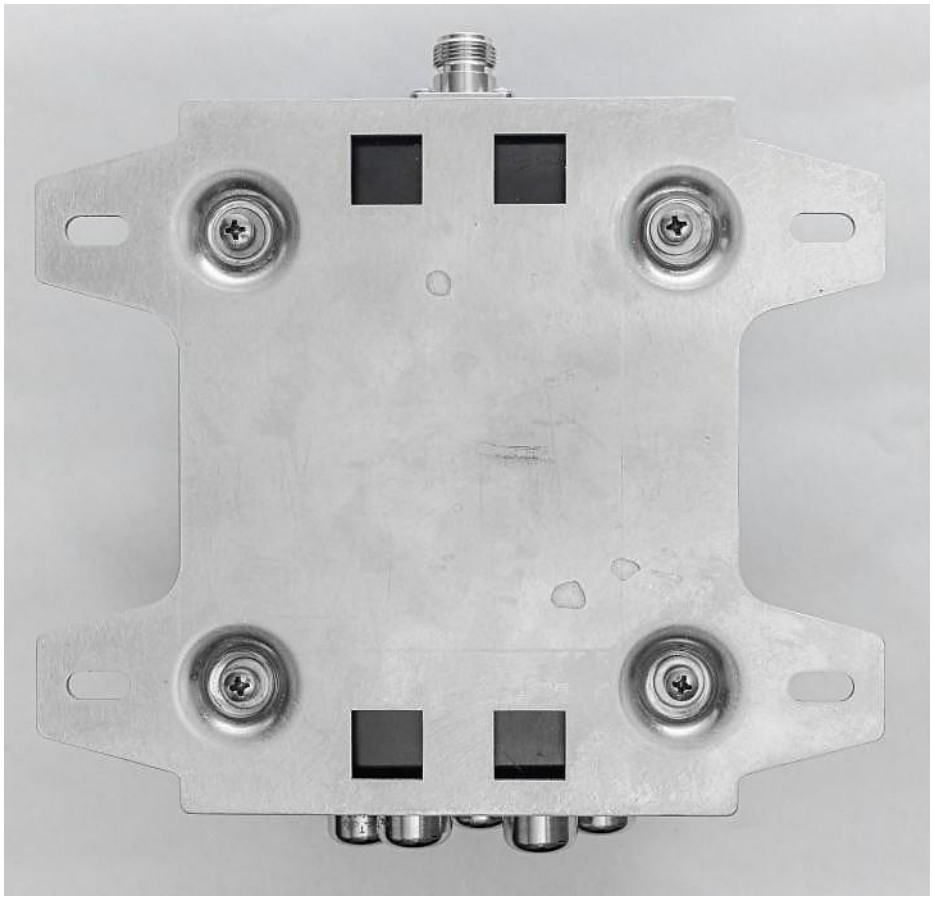

Figure 10: Wall Mount Plate

To mount the data logger to a wall, complete the following steps:

1. Remove the four screws from the back of the data logger.
2. Install the back plate using the same four screws. Tighten the screws.

> **NOTE**: The installer will need to source their own screws to mount the data logger to a wall.

3. Install the wall mount plates using the provided screws. Tighten the screws.
4. Mount the data logger to a wall.

6.5.3 Magnet Mount Option

The magnetic mount option uses four ring magnets with an attraction force of 10 pounds screwed to the rear panel of the data logger.

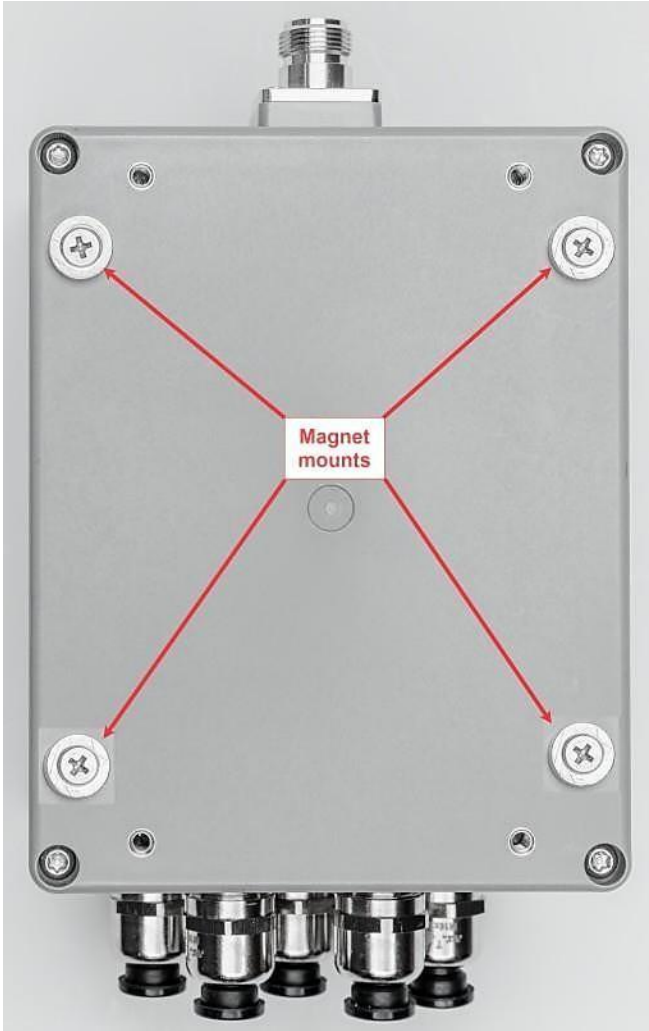

Figure 11: Magnet Mounts

To install the data logger using the magnet, complete the following steps:

1. Remove any screw from the back of the data logger used on previous installations.
2. Screw the magnets as shown in the picture. Tighten the screws.
3. Mount the data logger on a magnetic surface.

6.5.4 Mount to a Secondary Enclosure

Radio signals are affected by electrically conductive material that may absorb or reflect radio signals. If you're using a secondary enclosure that is electrically conductive, you can extend the external antenna and mount it outside the enclosure to allow for better signal.

6.6 CONFIGURE AND VERIFY INSTALLATION

To configure and verify the data logger's installation, use the RSTAR Affinity Field Utility app. It incorporates all the tools required to:

- Configure each sensor installed in the data logger
- Monitor the data collected from the sensor
- Reset the battery lifecycle accumulator whenever a new battery is installed
- Measure the radio signal strength from the data logger to the RSTAR Affinity Gateway
- Retrieve the data logger's operational statuses and information, historical collect data log files, error, and event logs for troubleshooting purposes
- Download new firmware to the data logger

Please refer to the RSTAR Affinity Field Utility App User Guide ((in Downloads section of the RSTAR Affinity Data Logger product page) for detailed instructions on the steps mentioned above.

7 SERVICE, REPAIR AND CONTACT INFORMATION

This product does not contain any user-serviceable parts.
Contact RST for product services or repairs.

- For sales information: RST_sales@orica.com
- For technical support: RST_support@orica.com
- Service portal: https://support.rstinstruments.com/support/tickets/new
- Website: www.rstinstruments.com
- Toll free: 1-800-665-5599

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Business hours: 9:00 a.m. to 6:30 p.m. (GMT) Monday to Friday, except holidays

Appendix A: RSTAR AFFINITY DATA LOGGER SPECIFICATIONS

> **NOTE**: Visit the RSTAR Affinity Data Logger product page for the complete and most recent list of specifications.

Appendix B: ESTIMATED BATTERY LIFE

> **NOTE**: This section only provides estimates of battery life. RST Instruments will provide more information as information becomes available

Battery life varies depending on various factors including:

- Number of sensors or instruments connected to each logger. The higher the number of instruments, the more power is consumed to retrieve, process, store and upload the collected data.
- Type of sensors or instruments. Sensors and instruments consume different power due to their inherited design. Typically, active instruments that require the data logger to provide power to the instrument shorten battery life more than passive sensors.
- Frequency of data collection. For each data collection, the data logger consumes power to wake up from dormant mode, perform data collection and re-enter dormant mode.
- Temperature. Environmental temperatures below 10° C may affect the charge retention capacity of Li $SOCl_2$ batteries.

> **NOTE**: The plots below assume room temperature climate (optimal battery conditions). For colder climates, reduce the estimate by ~30%.

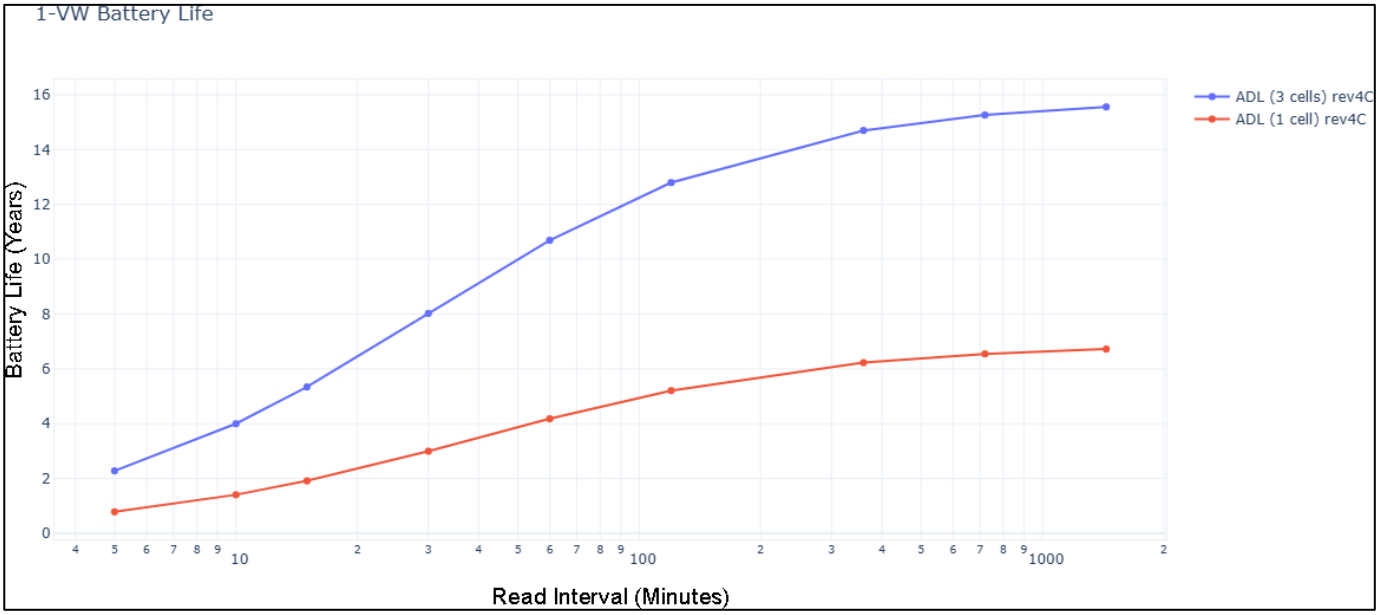


Figure 12: Vibrating Wire Battery Life Graphical Overview

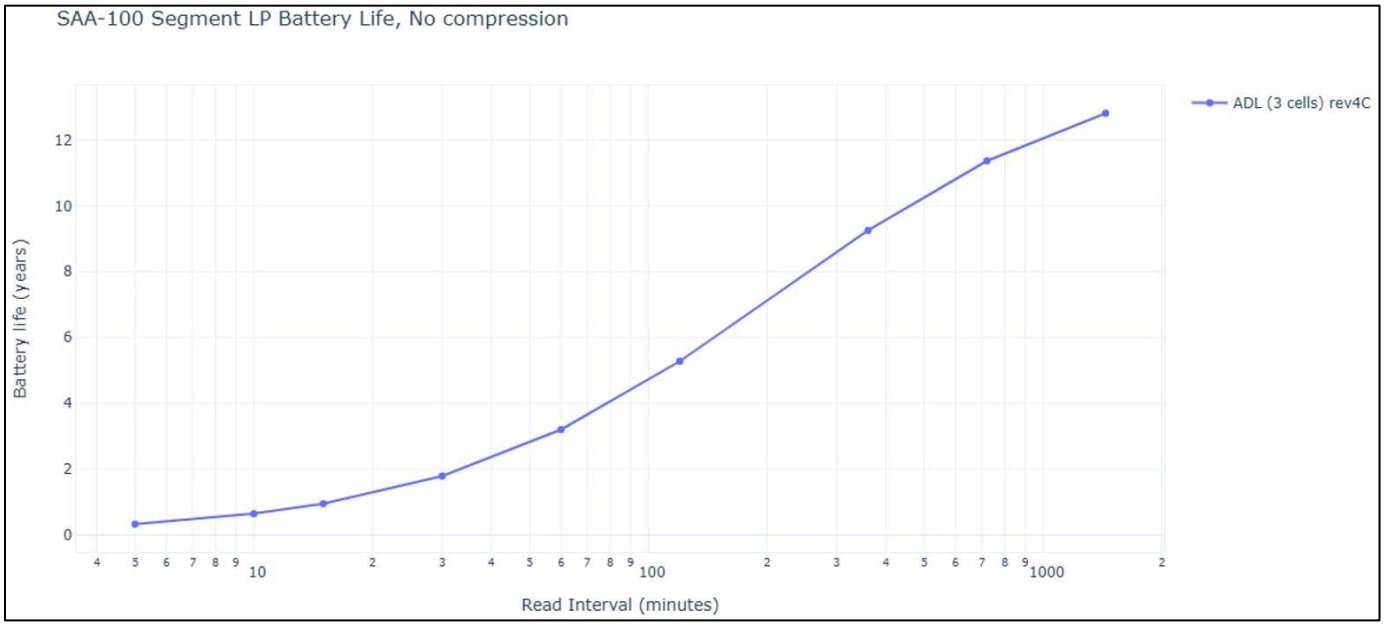


Figure 13: SAA-100 Segment LP Battery Life Graphical Overview

NOTE: For ShapeArray (SAA) exceeding 150 segments in cold temperature environments or 200 segments in mild temperature environments, the use of an SAA Power Booster is recommended to ensure optimal performance and reliable data transmission.

Please contact RST Instruments' Sales team for more information and assistance in selecting the appropriate Power Booster for your application.

Appendix C: Instrument Interface Module

Vibrating Wire and Thermistor IIM

The Vibrating Wire and Thermistor IIM (VW/TH) may be configured to support up to two sensors which may be a combination of:

- two vibrating wire sensors
- two thermistor sensors
- one vibrating wire and one thermistor sensor

This IIM module is designed for a vibrating wire piezometer with a resonant frequency between 2,000 and 3,500 Hz. This IIM module converts the thermistor's resistance in the range of 20 ohms to 200,000 ohms with accuracy of 0.1%.

The pin assignments are:

- Pin 1 – shield
- Pin 2, 3 – thermistor or vibrating wire piezometer
- Pin 4, 5 – thermistor or vibrating wire piezometer

RS-485 IIM

The RS-485 IIM connects to an RS-485 instrument that adheres to the RS-485 electrical standard. This IIM may be configured to process data communication rate between 1,200 and 115,200 Baud in half duplex operation. This IIM also has an optional +12V DC output.

The pin assignments are:

- Pin 1 – shield
- Pin 2 – ground
- Pin 3 - +12V DC power output
- Pin 4 – RS-485 B (inverting pin)
- Pin 5 – RS-485 A (non-inverting pin)

Appendix D: Instrument Wiring Diagram For Cable Gland Installation

Table 4 lists the instrument type, manufacturer model number, and conductor color. Custom means the interface wiring is dependent on the vendor's cables. Check with the vendor for the appropriate color-coded pin assignment.

Instrument Type	Model Numbers Prefix	IIM Type	IIM Pin 1	IIM Pin 2	IIM Pin 3	IIM Pin 4	IIM Pin 5
Generic Vibrating Wire	Generic	VW/TH	Shield	Custom	Custom	Custom	Custom
Generic Thermistor	Generic	VW/TH	Shield	Custom	Custom	Custom	Custom
Generic Vibrating Wire and Thermistor	Generic	VW/TH	Bare	Custom	Custom	Custom	Custom
VW Piezometer	VW2100 VW2190 VW2191	VW/TH	Bare	Black	Red	White	Green
VW Pressure Transducer	VW2180	VW/TH	Bare	Black	Red	White	Green
VW Push-in Pressure Cell	VWPC2100	VW/TH	Bare	Black	Red	White	Green
VW Total Earth Pressure Cell	LPTPC06 LPTPC09 LPTPC12	VW/TH	Bare	Black	Red	White	Green
VW Liquid Settlement	SSVW105	VW/TH	Bare	Black	Red	White	Green
VW In-Line Extensometer	EXINLINE	VW/TH	Bare	Black	Red	White	Green
VW Multi-Point Borehole Extensometer	EXMPBX	VW/TH	Bare	Black	Red	White	Green
VW Crack Meter	VWCM	VW/TH	Bare	Black	Red	White	Green
VW Soil Extensometer	EXSR	VW/TH	Bare	Black	Red	White	Green
VW Arc Weld Strain Gauge	VWSG-A	VW/TH	Bare	Black	Red	White	Green
VW Embedment Strain Gauge	VWSG-E	VW/TH	Bare	Black	Red	White	Green
VW Spot Weld Strain Gauge	VWSG-S	VW/TH	Bare	Black	Red	White	Green
VW Sister/Rebar Strain Gauge	VW5000	VW/TH	Bare	Black	Red	White	Green
VW Load Cell	VWS VWA	VW/TH	Bare	Black	Red	White	Green
Generic Modbus	Generic	RS485	Shield	Custom	Custom	Custom	Custom
ShapeArray™	SAAV SAAX SAAV Extend	RS485	Bare	Black	Red	Blue	White
Digital In-Place Tilt Meter	IC6656B	RS485	Bare	Black	Red	White	Green
Digital Submersible Tilt Meter	IC8160 IC8161	RS485	Bare	Black	Red	White	Green

Instrument Type	Model Numbers Prefix	IIM Type	IIM Pin 1	IIM Pin 2	IIM Pin 3	IIM Pin 4	IIM Pin 5
Vertical Tilt Beam	IC6083B	RS485	Bare	Black	Red	White	Green
Horizontal Tilt Beam	IC6018B	RS485	Bare	Black	Red	White	Green
Track Monitoring Settlement System	IC9052B IC9053B	RS485	Bare	Black	Red	White	Green
Vertical In Place Inclinometer – Legacy	IC7565B IC7575B IC7570B IC7525B IC7555B IC7520B IC7550B	RS485	Bare	White	Brown	Black	Blue
Horizontal In Place Inclinometer – Legacy	IC7600 IC7605 IC7650 IC7655 IC7660	RS485	Bare	White	Brown	Black	Blue
Vertical In Place Inclinometer	IPI27050-U	RS485	Bare	Black	Red	White	Green
Horizontal In Place Inclinometer	IPI27050-D	RS485	Bare	Black	Red	White	Green
Precision Liquid Settlement Array	SS5010 SS5020 SS5030	RS485	Bare	Black	Red	White	Green
Digital Bus Strain Gauge Piezometer	ELSGP510S ELSGP511S	RS485	Bare	Black	Red	White	Green

Table 4: Instrument Type, Manufacturer Model Number, and Conductor Color

APPENDIX E: USING RSTAR AFFINITY DATA LOGGERS IN A STANDALONE SETUP (WITHOUT GATEWAY)

OVERVIEW

The standalone setup for RST Affinity loggers is designed for use in remote areas without a connected gateway. In this configuration, loggers operate independently, and data is retrieved manually using a Bluetooth-enabled mobile device with the Field Utility app. This setup is ideal for sites where real-time data transfer is not required, but periodic manual synchronization is sufficient.

WHAT IS A STANDALONE SETUP?

In a standard deployment, Affinity Gateway provides remote communication between loggers and the server. It automates data collection, site provisioning, and instrument management. In contrast, a standalone setup **does not use a gateway**. Each logger remains in the field collecting data, and users must visit the site to manually interact with it via Bluetooth. Despite the lack of real-time communication, all functionality related to data synchronization and provisioning is maintained through direct access.

EQUIPMENT AND TOOLS NEEDED:

- RST Affinity Logger(s)
- Mobile device with LTE connection (Android or iOS)
- RST Field Utility App (installed and up to date)
- Onsite access to logger(s)

CONFIGURING STANDALONE AFFINITY LOGGER

Before deploying the logger to a remote site, it is crucial to configure it in an office or lab where an internet connection (LTE or Wi-Fi) is available. This ensures that the logger is properly set up and ready for deployment. Follow these steps to configure the logger:

1. **System Configuration**
   Claim Loggers to Site:
   - Log in to the RST Affinity Dashboard using your credentials.
   - Navigate to the "Loggers" section and select "Add Logger."
   - Enter the logger's unique identifier (UID) and assign it to the desired site.

Log on Dashboard:

- Verify that the logger has been successfully added to the site by checking the dashboard.

Add Gateway (Virtual):

- Although a physical gateway is not used in a standalone setup, you can add a virtual gateway to the site for organizational purposes.

Configure Sensors:

- Set up the sensors and readings that the logger will collect data for.

Initial Data Collection:

- Perform an initial data collection to ensure the logger is functioning correctly.

2. **Deployment (Site Installation)**

Prepare the Logger:

- Verify that the logger has been successfully added to the site by checking the dashboard.

Transport to Site:

- Transport the logger to the remote site where it will be deployed

Install the Logger:

- Place the logger in the desired location and ensure it is securely installed.

NOTES

- If the logger fails to connect to the site after a few attempts, a hard reset may be required. This is best done in the office or lab, as it is nearly impossible to perform with just a handheld device at the remote site.
- Ensure all necessary configurations and initial data collection are completed before deploying the logger to a site with limited internet access.

Step-by-Step: Standalone Data Sync Process

3. **Visit the Logger in the Field**
   Travel to the logger's physical location with your mobile device.
4. **Connect via Bluetooth**
   Open the Field Utility app and pair with the logger using Bluetooth.

   This may take a moment, depending on signal strength and environment.
5. **Access Logger Options**
   Once connected, tap the “Logger Options” in the bottom right of the app interface.
6. **Select ‘Sync Logger Data’**
   Tap the ‘Sync Logger Data’ option at the top. You’ll be prompted to choose the data range to transfer:
   - **All Data**
   - **Custom Range**
   - **Only New Readings**
7. **Initiate Data Transfer**
   Confirm your selection and begin the sync. The logger will transmit the selected data packets to your mobile device via Bluetooth.
8. **Upload to the Server**
   Once the sync is complete, your phone will automatically use its LTE (or Wi-Fi) connection to upload the data to the central server.

Additional Notes and Best Practices

- Field Utility is also used for provisioning loggers in a standalone setup. Ensure you provision and configure the logger fully during your initial setup visit.
- Ensure the phone has a strong LTE or internet connection **after** the sync to complete the server upload.
- The logger will store data internally until it is retrieved. Regular visits should be scheduled based on the logger’s memory capacity and desired monitoring frequency.
- Ensure your mobile device is charged and Bluetooth is enabled before site visits.
- If syncing from a low-signal area, consider moving to a better reception zone before uploading to the server.

TROUBLESHOOTING & CAVEATS: WHAT TO KNOW IN THE FIELD

Even with a clean process, there are a few practical nuances to be aware of when working with Affinity loggers in standalone mode. These points often make the difference between a smooth sync and an overlooked data transfer.

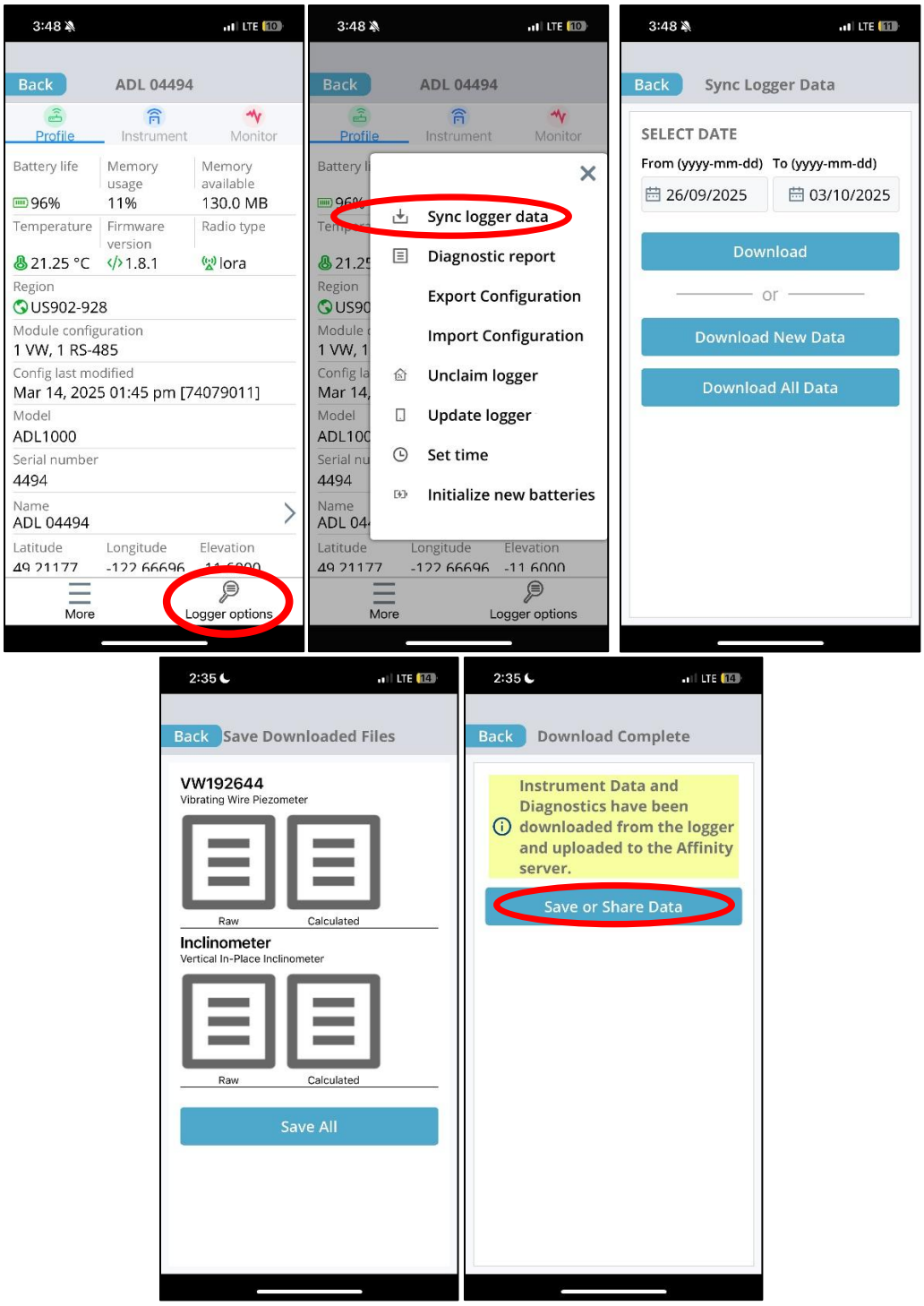
1. **No Cellular Signal? Your Data Isn't Lost - "Offline" Operation for Data Syncing**
   If your mobile device doesn't have an LTE or Wi-Fi connection when syncing logger data, the readings won't be uploaded immediately to the server. Instead, the Field Utility app will **store the data as a cached action**.

   The logger can operate and record data even when it is offline, making it ideal for use in remote, disconnected settings. It functions independently, allowing you to deploy it in areas without internet coverage. The logger will store all recorded data locally, and you can periodically visit the site to retrieve this information. However, if any actions are cached due to a lack of coverage at the time of synchronization, they will need to be sent later from a location where coverage is available.

   To check for these:
   - While connected to the logger via Bluetooth, tap **"More"** in the **bottom left** corner of the app.
   - Select **"Cached Actions."**
   - You'll see a list of pending data packets or actions queued for upload.

   When you return to an area with mobile signal—whether in your truck, at the hotel, or back at the office—open the Field Utility app again and **manually send** the cached data to the server.
   Failing to do this step can result in a false sense that the data has already been uploaded.

The RSTAR Affinity Field App also allows the user to download a .csv format data file for the readings:



- Starting from the Data Logger's screen, go to **Logger Options** → **Sync Logger Data**
- In the **Sync Logger Data** screen, specify the period for which data is to be downloaded
- The **Save Downloaded Files** screen allows the user to save either the raw or calculated data for each instrument attached to the logger, in .csv format

- To save the data file(s) onto the mobile device as well, tap **Save or Share Data** on the appearing **Download Complete** screen

2. Best Practices & Field Tips

- **Always verify signal** before syncing, if possible. If signal is weak, plan to send from cached actions later.
- **Check cached actions regularly** if you're working on multiple sites. It's easy to forget a sync that never left your phone.
- **Keep your app updated** and ensure your logger firmware is current to avoid compatibility issues.
- **Battery matters.** A weak phone battery or logger battery can interrupt the sync. Charge before visiting the field.
- **Bluetooth range is short.** Stay within a few meters of the logger and avoid obstructions like metal enclosures or thick brush.

CLOSING NOTE

This standalone method provides a rugged, flexible solution for remote deployments, empowering field personnel to collect high-quality data with nothing more than their phone, the Field Utility app, and their knowledge. By keeping an eye on connectivity, cached actions, and sync confirmations, the process remains reliable and effective, even in the most disconnected corners of the map.

SUMMARY

The standalone RST Affinity setup offers flexibility for monitoring in remote or infrastructure-limited areas. Using the Field Utility app, users can configure, sync, and manage logger data entirely on-site, uploading the collected information to the cloud via mobile LTE once the sync is complete. This method maintains data integrity while reducing the need for permanent gateway infrastructure.

With the additional feature of CSV file download at the logger source, users can have firsthand verification of their data. This feature is extremely valuable where no LTE signal is possible.