ADS® ForeSITE™ FS-UL-4G
Installation, Operation, and Maintenance Manual

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ADS ForeSITE FS-UL-4G O&M Manual

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Introduction and Overview

The FS-UL-4G Level Monitor is a specific variant of the ForeSITE™ monitor family, providing highly reliable, direct-to-host non-contact level monitoring in a single package, aimed at water utilities, municipalities, agriculture, tidal, food warning, and irrigation sectors.

The ForeSITE FS-UL is designed for direct mounting above a water source such as a dam, channel, creek, basin, or tank. The ForeSITE FS-UL measures water level with +/- 0.04 inch (1mm) accuracy. It provides non-contact measurement, ideal for situations where deployment of other level sensing techniques is not possible.

Swift deployment is made possible thanks to the built-in front panel mounted ultrasonic level sensor, a true single box design that requires no external sensing devices. Data is stored internally on non-volatile flash memory with upstream communications provided using an internal cellular modem.
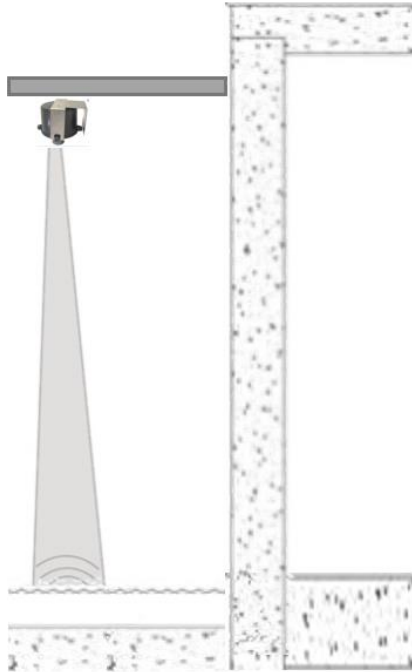
The cellular option provides support for 4G, permitting use on CAT-M1 and NB-IoT Networks.

Complete control is handed to the user to allow custom data reporting and wake-from-sleep regimes to be configured to balance battery life against data logging and data reporting requirements. Expected battery life may exceed five (5) years, depending on device configuration and reporting regime.

Remote configuration and device management is supported via ADS® PRISM™ software application, permitting device tuning and upgrades without requiring site visits.

The device is housed in a low-profile, robust ABS-plastic enclosure that is UV stabilised and IP68 rated, enabling direct outdoor installation, capable of withstanding brief submersion.

Each ForeSITE™ product is shipped with a battery, stainless steel mounting bracket, installation kit and a default device configuration, permitting operation straight out of the box with minimal device personalization effort required.

IMPORTANT NOTICE

This manual covers the operation of the ForeSITE FS-UL-4G.

Specifications described are typical only and are subject to normal manufacturing and service tolerances.

ADS, LLC reserves the right to modify the equipment, its specification or this manual without prior notice, in the interest of improving product performance, reliability or servicing.

At the time of publication all data is correct for the operation of the equipment referred to. Performance data indicates typical values related to the product.

IMPORTANT WARNINGS

The ForeSITE Series product is subject to the following important warnings.

Failure to follow these warnings may void the product warranty and may result in product failure or the product being operated in an unintended manner or outside of manufacturer's specification, which may void regulatory approvals.

Lithium Batteries

This product is approved for use ONLY when powered by the factory supplied lithium battery pack assemblies with Part Numbers FS-BAT-001.

Lithium battery packs must be handled with extreme care and transported via road or sea freight **ONLY**.

Battery packs must not be exposed to excessive moisture, water, shock, vibration, excessive heat or flame.

Battery packs must not be opened or modified in any way.

*IF A BATTERY PACK IS DROPPED ONTO A HARD SURFACE IT MUST BE CONSIDERED DAMAGED AND NOT PUT INTO SERVICE UNDER ANY CIRCUMSTANCES.

Hazardous Area Use

This product is NOT approved for use in declared known hazardous area locations.

Safety/Critical Control

This Electronic Equipment is NOT designed for safety control and does not comply with any safety control specifications or directives. It therefore must not be used as a Safety Controller or for safety of life monitoring in any way.

This electronic equipment, being a radio-based device is not recommended for direct Machine Control.

This Device is designed as an 'endpoint' device for remote Data collection.

Sensitive Area Use

This product is not approved for use in declared sensitive areas where it could interfere with other electronic devices in environments such as hospitals, airports, aircraft etc.

Tampering

Do not disassemble the product beyond normal requirements for setup, configuration and servicing; any mark of tampering or modification will compromise the product warranty and may lead to operation in an unintended manner or outside of published technical specification.

Opening and Closing the Device

Do not open or close the product enclosure if directly exposed in times of adverse weather conditions (rain, snow, mud etc.) and to avoid the entry of humid air into the enclosure.

Third Party Cellular Networks

No responsibility will be taken for the operation of the chosen Cellular Network Service providers network coverage or network performance and reliability.

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As this equipment connects to third party cellular networks no responsibility is taken for future changes made by the network providers/network operators that render this equipment unusable or to the reliability of the device connectivity.

Regulatory Compliance

The ForeSITE FS-UL features the following regulatory approvals and compliance:

	• Supplier Number: E6148 • EN 61326-1:2013
	• RoHS Compliant
	• IP68 Compliant. • Ingress Protection against Liquids and Solids. • Rated to IP68 one (1) Metre Depth, for one (1) Day duration. • AS60529-2004, IP68 Rating.
	• FCC Part 15 • 4G (Cat-M1 / NB-IoT) Product Variants (USA): • Contains device with FCC ID: R17ME910G1WW
	• 4G (Cat-M1 / NB-IoT) Product Variants (AU/NZ): • Contains TELSTRA APPROVED DEVICE: ME910G1-WW
	• 4G (Cat-M1 / NB-IoT) Product Variants (Canada): • Contains device with ICES ID: 5131A-ME910G1WW

*Other regulatory standards are available upon request.

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WEEE Notice (Europe)

This symbol on the product or its packaging indicates that this product must not be disposed of with other waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact ADS Customer Support.
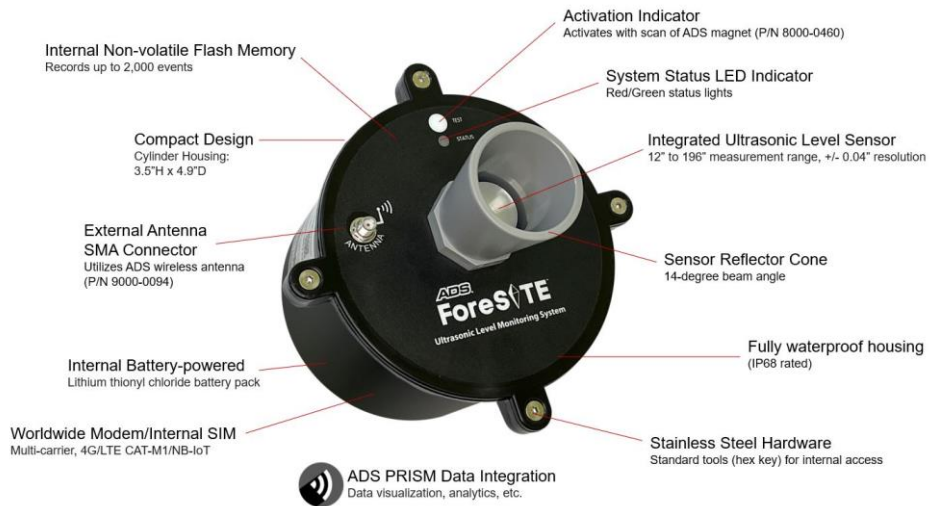
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Product Warranty

All new products manufactured by ADS carry a warranty as specified in the Terms and Conditions available on the ADS website. Likewise, after the new product warranty expires, a product may be returned to ADS for repair, pursuant to the Terms and Conditions. Any repairs or replacements deemed necessary shall be covered as described therein.

Device Overview

This section describes the device, its components and their respective function.

Housing – UV resistant ABS housing consists of the bottom "bucket" and the "lid". When securing the lid to the bucket, use a cross pattern for tightening the screws

Ultrasonic Transducer – Sensor for measuring range from device to water level

Antenna Connection – SMA connection to cellular antenna

User Interface – Consists of a magnet swipe location "TEST" used to wake the device and initiate cellular communication on-demand and a Status LED

Hex key   Magnet

Rubber splicing tape   Desiccant

Mounting bracket

Installation Guide Supplement

ForeSITE-UL (FS-UL)

Small O-ring to install battery   Lithium battery

Antenna

Pre-installed SIM card

Postcard QR code   O-ring grease   Large O-Ring   Medium, bagged O-Ring   Mounting hardware

Assembly

Battery Installation

NOTE THIS SECTION IS CRITICAL TO ENSURE PROPER OPERATION

The internal battery (FS-BAT-001) is field replaceable when required, without the use of special tools. The internal battery is held in place with a black rubber O-ring, which retains the battery against the central mounting plate within the ForeSITE™ device.
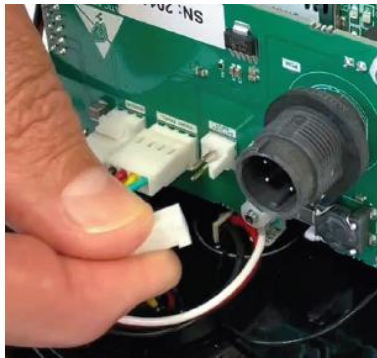
Every battery pack is supplied with a complete set of new O-rings, O-ring grease, and desiccant packet. Each time a logger is opened for battery installation or replacement, the O-ring seals and desiccant shall be changed to preserve its IP68 environmental rating. Desiccant is good when blue and will turn pink when moisture is absorbed and needs to be replaced.

Three O-rings are provided for each device/battery.

- The smallest O-ring is the battery retaining O-ring.

- o After installing battery O-ring, ensure battery is connected to the battery input on the PCBA.
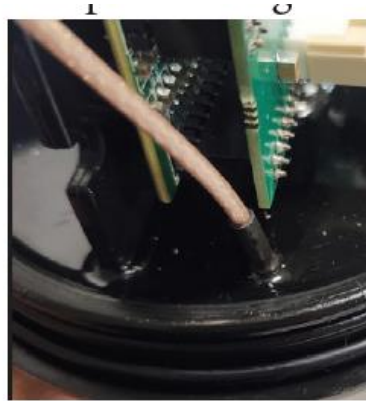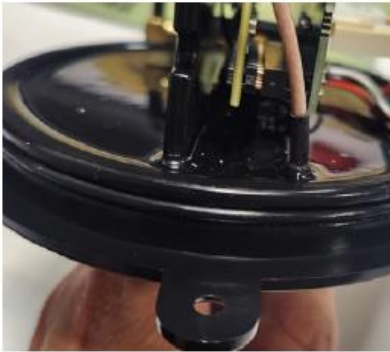

Device Assembly

- The O-ring supplied in the separately labelled bag MUST be installed in the groove of the device lid.
- The largest O-ring MUST be installed between the back of the device lid and the bottom "bucket" of the housing.
- Ensure that the two large O-rings are greased with the supplied O-ring grease once they are installed. A light smear of grease is to be run completely around the O-rings before

the lid is closed. This grease provides protection for the O-rings and is REQUIRED for system warranty.
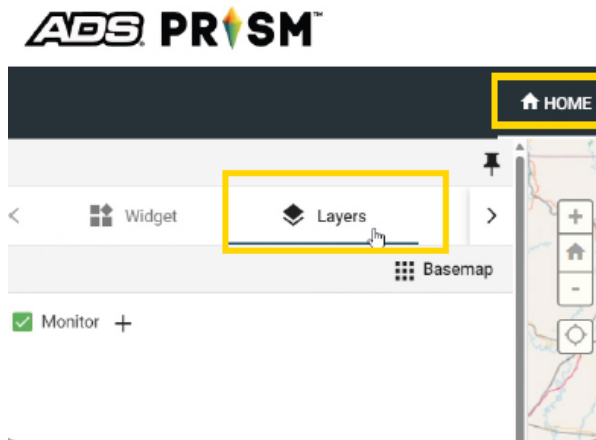

Connecting the Antenna

Connect ADS antenna (9000-0096) to the antenna port, then cover the antenna port and connector using rubber splicing (self-amalgamating) tape to ensure waterproof seal.
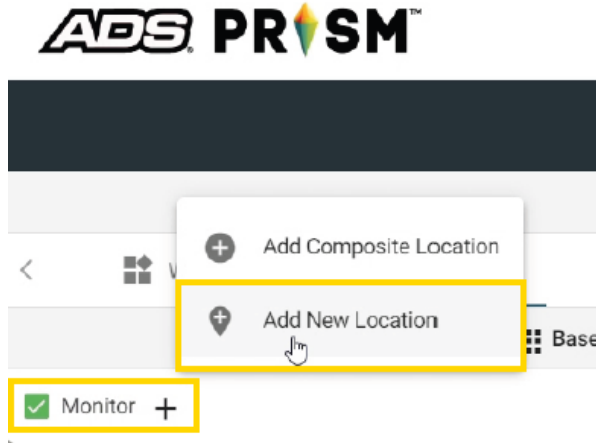

Configuration

Create PRISM™ Location

Log into www.adsprism.com and on home page, go to "Layers"

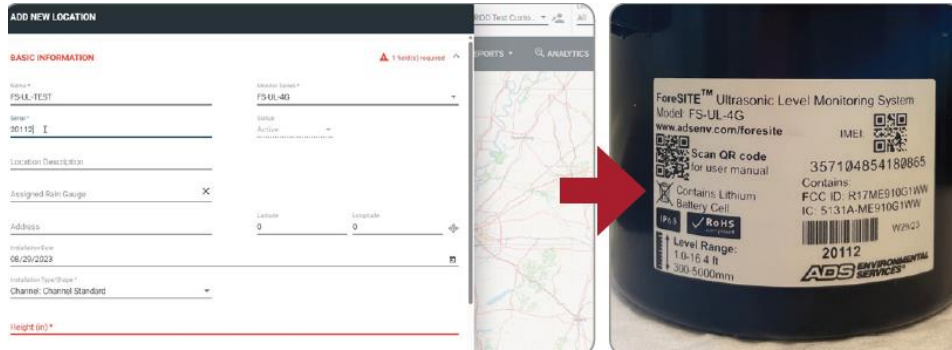ADS ForeSITE FS-UL-4G Manual

Select "+" by "Monitor" to add a new location

Enter location name, monitor series of FS-UL-4G and Serial number from Product label. Enter Latitude/longitude and height from installation site. Enter the installation Date/Time. Select Save/Close.
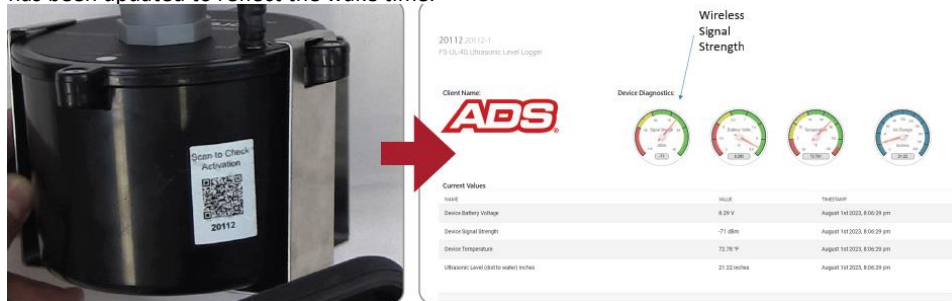
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Place the magnet over the white dot labelled "TEST" until the "STATUS" light turns green. Remove magnet. Wait for light to start flashing green again before moving to activation validation:

- No LED = Device in sleep/standby mode
- Green Flashing = Device is awake
- Red Solid = Device is searching for cellular network
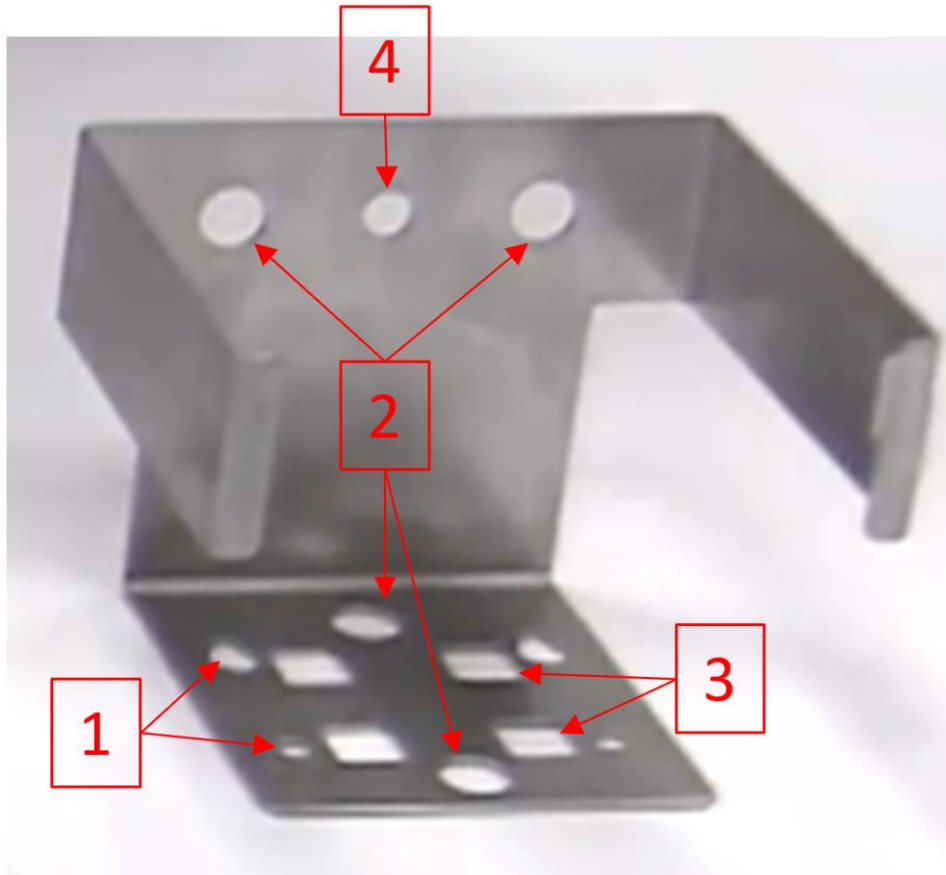- Red Flashing = Device is transmitting/receiving data via cellular network

Use Phone to scan Check the Activation QR Code to navigate to the FS-UL device diagnostic dashboard. (The serial number for your unit is also printed under the QR code). Check the Diagnostics screen for Signal strength, Battery level, Depth reading and ensure ethe Date/Time has been updated to reflect the wake time.

Installation

The ForeSITE FS-UL product is provided with a stainless-steel quick release mounting bracket assembly. The mounting bracket has been designed for multiple mounting scenarios.

1. M5 (0.197 inch) diameter mounting holes with keyslots on one set for simple installations.
2. Top and side mounting options to accommodate 0.375 inch (9.5mm) anchor bolts (included with kit).
3. Side square slots to accommodate band clamps.
4. Top 0.5 inch (12.7mm) hole at top to accommodate stage clamp for mounting to pole.

For additional security, a 'lock-wire' seal can be placed through both square slots that retain the device in the bracket and then sealed with either a lead seal or plastic single use wind up seal. This provides visual evidence of tampering with the device and/or removal of the device from the mounting bracket.

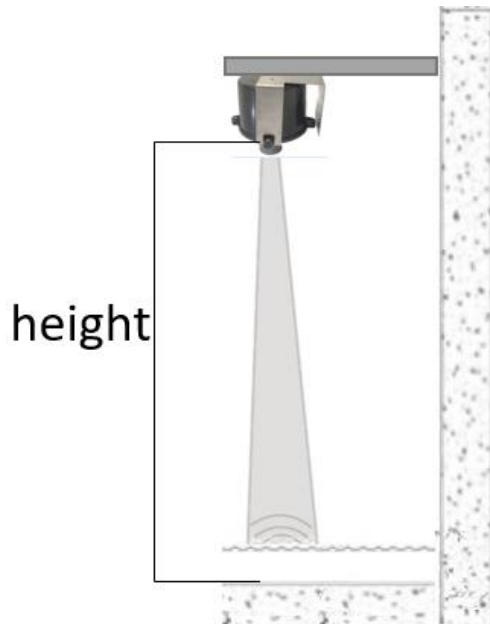Ensure mounting is level in the X, Y, and Z axes.

Once the mounting bracket is secured to the application structure, insert the device into the bracket by placing the unit housing tabs through the two holes on the bracket. Some flexing of the large tabs on the bracket may be required.

Measure from the face of unit to bottom of channel, reservoir, tank, etc. This measurement should be the maximum distance in the event no water is present. Set this measurement as the HEIGHT in PRISM to ensure accurate Depth calculation.

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Installation Notices

Installing the unit underground, under the cover of natural or man-made obstructions such as steel reinforced concrete lids, steel manhole covers, or similar will compromise or hinder communications performance, more noticeably in areas with low cellular signal levels above ground. It is always

recommended that onsite signal tests be carried out prior to deployment in known low signal areas to determine installation suitability.

Proper field installation techniques must be employed to ensure long product life and reliable operation. Equipment must not be installed in locations known to fill with water/wastewater/sea water/other liquids for extended periods of time.

Prolonged exposure/submersion beyond the certified device standard may cause poor communications efficiency, damage to connectors and cables or product failure which is not covered by warranty.

DO NOT ASSEMBLE THE PRODUCT IN LOCATIONS OF HIGH HUMIDITY WHERE POSSIBLE – ALL REASONABLE CARE SHALL BE EXCERCISED WHEN ASSEMBLING THE PRODUCT IN HIGH HUMIDITY/MOISTURE ENVIRONMENTS.

AN 'INDICATING' SILICA DESICCANT PACKET IS PROVIDED WITH EVERY DEVICE AND EVERY REPLACEMENT BATTERY PACK.

THE SILICA DESICCANT PACKET MUST BE INSTALLED INSIDE THE DEVICE WHEN IT IS DEPLOYED.

THE SILICA DESICCANT PACKET MUST BE REPLACED IF THE UNIT IS OPENED.

THE SILICA DESICCANT PACKET IS EXPIRED IF ITS COLOUR IS PINK – THIS INDICATES THE PACKET HAS ABSORBED THE MAXIMUM AMOUNT OF MOISTURE IT CAN HOLD AND MUST BE REPLACED TO PROVIDE CONTINUED PROTECTION AGAINST CORROSION ATTACK FROM MOISTURE CONTAINED IN HUMID AIR.

Setting Alarms

Alarms can be configured for the following settings. When these set thresholds are triggered by measurements by the device, immediate data transmission will occur and user(s) will receive notifications as configured in PRISM.

- Low Level
- High Level
- High High
- Battery Low

These are configured on the location card for the PRISM installation

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BASIC INFORMATION ⌄

CONFIGURE ALARMS ⌃

Low Level 〇 Depth Threshold of Low Level (in)

High Level 〇 Depth Threshold of High Level (in)

High High 〇 Depth Threshold of High High (in)

Battery Low 〇 Battery Voltage Threshold (V)
6.5

CANCEL   SAVE & CLOSE ⌄

Maintenance and Troubleshooting

The device should be periodically checked to ensure no degradation or cracking of the housing that could introduce water or moisture intrusion.

The desiccant packet should be changed during each battery installation. This may be required more frequently in high humidity or moisture installations

Occasionally, debris or insects may become built up inside the cone of the ultrasonic transducer. To clean, use a soft brush or cloth and isopropyl alcohol to clean the sensor. DO NOT SCRUB the face of the transducer as this may damage the sensor.

If sensor readings are erratic, check the installation site to ensure no obstructions are in the path of the sensor measurement and clean any build-up within the transducer cone.

If experiencing inconsistent data communication:
- Verify antenna connection
- Ensure proper sealing around antenna connection
- Check antenna cable for any damage
- Ensure antenna is not placed on or within 12 inches (304mm) of any large metal objects and has a relatively clear path to local cellular towers.

Specifications

Supply Voltage	3.5-8.5VDC

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Current Draw	50uA sleep, 8mA active, 200mA cell communication, 2A (Peak) cell network detect
Environmental	IP68
Measurement Range	11.81-196.85 inches (300-5000mm)
Measurement Resolution	+/- 0.04 inch (+/- 1mm)
Measurement Accuracy	1.00%
Operating/Storage Temperature Range	-4°-149°F (-20°-+65°C)
Humidity	0-90% relative humidity, non-condensing
4G Cellular	Supports Cat-M1/NB-IoT, B3 (1800), B28 (700)

Customer Support

ADS Client Services
Email: adssupportcenter@idexcorp.com
Phone: 1-877-237-9585