



CDS551 Cirrus Modbus Logger User Manual

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1 CDS551 CIRRUS MODBUS LOGGER

1.1 Introduction

The Cirrus Modbus logger is a robust, sophisticated LTE/4G GSM logger/controller equipped with a broad range of input capabilities, making it suitable for numerous measurement applications.

Communication with your own server and database can be facilitated via the internet or a private APN. The software required for these servers is provided free of charge. The Cirrus Modbus Logger is designed for easy installation and setup, eliminating the need for complex server infrastructure. Additionally, setup and management software, CloudWorks, is also provided free of charge, enabling clients to manage their own networks and data independently. There are no monthly charges for data collection and hosting, as clients can manage these services themselves.



1.2 Features

- Uses GPRS/EDGE/LTE/4G technology. 4G has become essential as many cellular network providers around the world will soon no longer be supporting older GPRS/3G technologies, rendering these legacy dataloggers obsolete.
- Bluetooth interface - setup and manual data collection can be achieved through the Bluetooth interface negating the need for cables that invariably fail during continuous use.
- Optional external power operation with battery failover.
- Uses standard off-the-shelf alkaline batteries. This logger uses 3x standard D Cell alkaline batteries that can last in excess of 5 years under normal usage. Many other loggers use lithium batteries that are expensive and difficult to obtain. Other problems involving lithium batteries are the restrictions when shipping using airfreight. All lithium batteries need to be shipped as hazardous cargo that is becoming increasingly difficult to achieve as many airlines are no longer allowing these batteries on their aircraft.
- Onboard Modbus/RS485 interface. The Modbus/RS485 interface can be used on a large number applications or sensing equipment. This port is also well protected against large voltage transients.
- Isolated 4-20mA interface. Used for any sensing device with a 4-20mA output.

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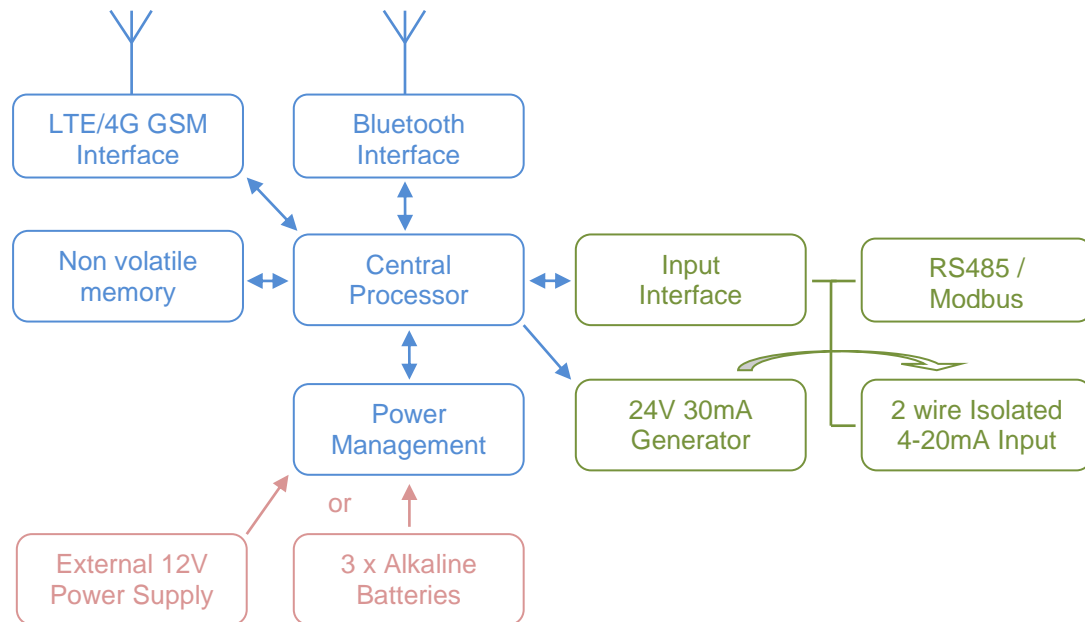
- Onboard 24V 30mA power generator. The Cirrus Modbus logger can generate a stable 24V output at a maximum of 30mA allowing for the powering of an external piece of equipment or current loop device eliminating the need for a secondary power supply. This option will also function under battery operation.
- Large onboard non-volatile memory - This logger can record in excess of 20000 datalog records (application dependent).
- Logging intervals from 1 minute to 1 month. Information is internally logged, time and date stamped and transmitted at programmable intervals.
- Remote programming of all setup parameters via GPRS link or SMS.
- Ideal for leak detection, alarming to prevent water loss.
- Onboard Bluetooth can stream diagnostic information about signal strength, network status etc.
- Touch sensitive button and LED's for manual wakeup to server and diagnostic purposes etc.
- Available with the standard internal antenna or a connector (SMA) for an external antenna. Note that the external connector will affect the IP rating.

1.3 Specifications

- GPRS/EDGE/ LTE/4G Modem Technology
- LTE-FDD B1/B3/B5/B7/B8/B20/B28
- LTE-TDD B38/B40/B41
- GSM 850MHz/900MHz/1800MHz/1900MHz
- Bluetooth interface
- Powered by battery or external 12V supply
- Option of external power with battery failover and sleep
- All management software supplied free
- Standard Alkaline Batteries - 3 x D cells (5+ years)
- RS485 Modbus Port (2-wire)
- Isolated 4-20mA Input port
- 24V 30mA Generated Power Output
- Up to 20000 record datalog memory (application dependent)
- Full SMS driven command set
- Logging intervals 1 minute to 1 month
- Rugged housing with seal eye
- Touch sensitive button and LED Diagnostics
- Configuration and diagnostics through Bluetooth interface
- Fully configurable remotely
- Stream data in real-time when powered by external supply
- Size 185mm x 130mm x 55mm (including cable glands)
- Housing Protection Class :
 - Standard internal antenna : IP68 - Max 1.2m, 30 days
 - External antenna connection : IP65
- Environment : -20°C to 80°C humidity = 90% non condensing. Check battery specifications for low power systems
- Uses a Micro SIM card

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1.4 Architecture



1.5 Power Modes

The Cirrus Modbus Logger can operate in one of three power configurations:

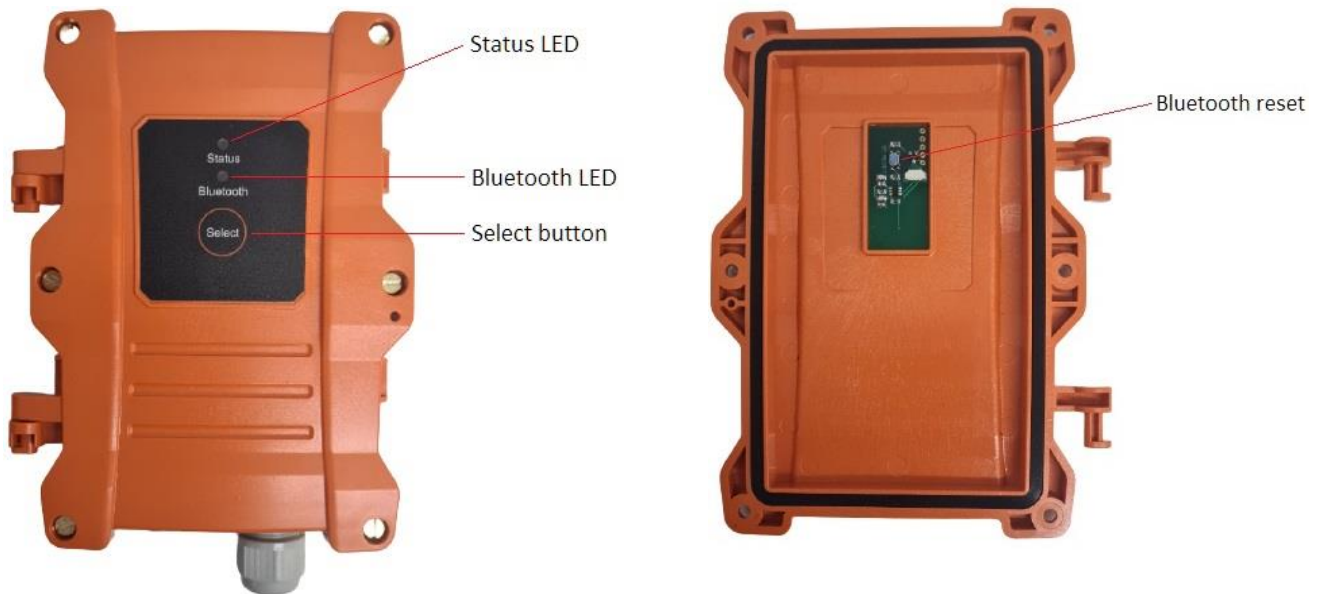
- **Mains Powered:** In this mode, the logger can be continuously connected to the server, allowing for the streaming of live data.
- **Battery Powered:** The Cirrus Modbus logger uses standard 'D' Cell alkaline batteries that can last several years, depending on usage. In this mode, the logger will 'wake up' (normally every 6 hours, though this is adjustable) and upload its recorded data to a remote database.
- **External 12V (8-15V) 2A Supply:** In this mode, the logger can be continuously connected to the server, allowing for the streaming of live data. Batteries can be fitted, and the logger will automatically switch to battery mode should the power fail. This configuration ensures continuous operation even during power outages.



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1.6 LED and button functions

On the front of the logger, there are 2 LED's and a touch sensitive 'SELECT' button. Internally on the reverse side of the lid is the Bluetooth reset button.



1.6.1 LED functions

Blue LED - Bluetooth status

- Flashing indicates the Bluetooth is ready to receive an incoming connection
- Solid light indicates and active connection

Red LED - Logger status

- Solid - Logger is in Command Mode (normally accompanied by an active Bluetooth connection)
- Fast flash - Logger is currently initiating a connection to the server
- Fast double flash – Same as fast flash, but wakeup was manually initiated from the pushbutton
- Slow Flash - Connection has been established to the server

1.6.2 Pushbutton Functions

SELECT touch button - Please note, this button is touch sensitive in order to maintain the waterproof status of the housing.

- A single short (1 second) push will toggle the Bluetooth radio on and off.
- A push of more than 3 seconds will result in the logger establishing a connection to the server and uploading its datalog.

BLUETOOTH RESET button - This button is used to reset the Bluetooth interface in the event of a lost password or general configuration loss.

The Bluetooth interface of this logger can be secured with an access password to restrict external access to authorised users only. If this password is lost, the logger can be physically accessed, and the Bluetooth interface reset to disable the security feature. It is advisable to then reconnect to the logger and establish a new password. Further details on this process are provided later in this document.

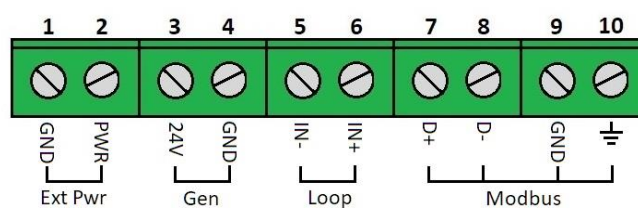
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In order to reset the Bluetooth interface, with the housing open, please follow the below procedure.

- Remove all power from the logger - remember to remove the batteries if external power is present.
- Press and hold the Bluetooth reset button.
- Power up the logger again while holding the button. Bluetooth LED will be on confirming the button has been pressed.
- Once the Red Status LED comes on again, the button can be released.
- This will now reset the Bluetooth interface.

1.7 Connections

Connections are available on a series of 10 terminal connectors.

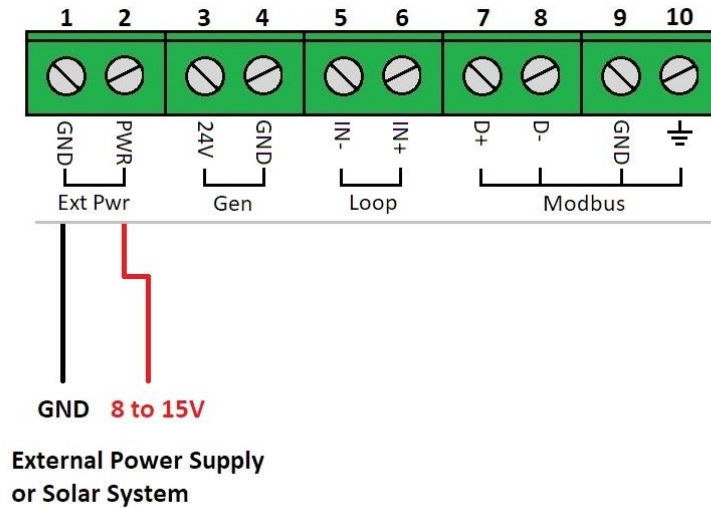


These connections are as follows:

1. External Power Supply / Solar system ground (optional)
2. External 12V Power Supply / Solar system (optional)
3. 24V 30mA max power generator output (used for powering a current loop device)
4. Ground for the 24V generator
5. Isolated negative connection for 4-20mA isolated loop input
6. Isolated positive connection for 4-20mA isolated loop input
7. Modbus/RS485 Data positive input (D+)
8. Modbus/RS485 Data negative input (D-)
9. Isolated ground for Modbus/RS485 input
10. Earthing connection Modbus/RS485 input (transient voltage protection)

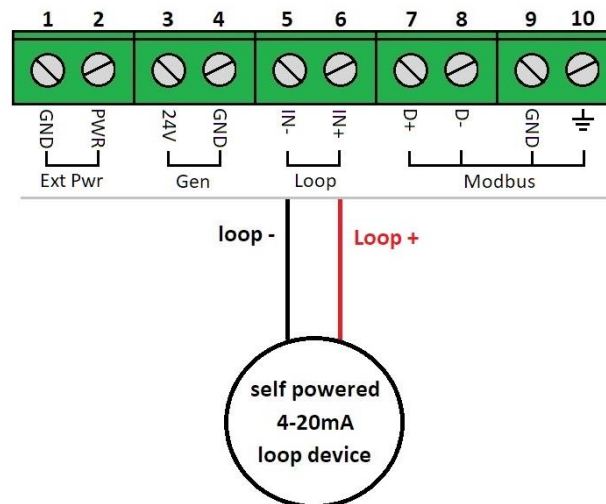
1.7.1 External Power Supply / Solar System Connection

The CDS545 Cirrus Modbus logger can be powered entirely from an external 12V (8-15V) 2A power supply or solar power source. Using a solar power source and also populating the logger with alkaline batteries means that the logger can be put into dual mode. In this mode, while there is solar power available, the logger will remain online with the server. Should the solar power fail, the logger will automatically switch to 'battery' mode until the solar power source is restored. This is ideal for remote applications where there is no mains power available and streaming data is required.



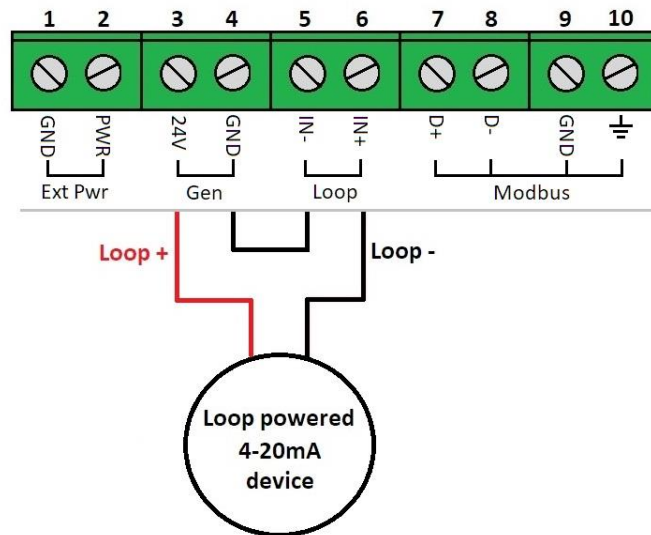
1.7.2 Using the 4-20mA loop input and 24V loop power generator

The Cirrus Modbus logger is equipped with a fully isolated (optical) 4-20mA interface. This interface is configured for 2 wire applications and should be connected as below. Please take note of the polarity of the loop connections.



To assist with powering loop devices, the Cirrus Modbus logger is equipped with an onboard 24V loop power generator. This generator is designed to provide power for devices that source directly from the loop. Given that the maximum current for a 4-20mA loop should be 20mA, the generators are designed to supply a maximum of 30mA. Please note that using the 24V power generator to power a loop device consumes a substantial amount of power. For this reason, in battery-operated devices, the loop should only be powered when the device needs to be read. This can be achieved by setting the Loop Power to 'Pulse' mode.

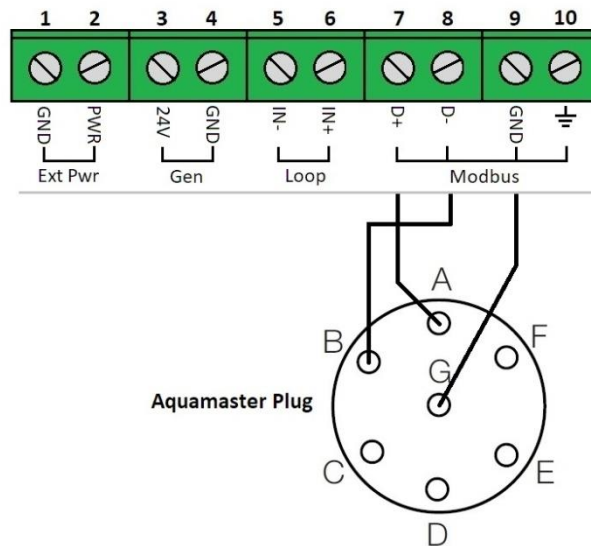
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Example configuration of the generator supplying power to a loop powered device

1.7.3 Using the RS485/Modbus interface

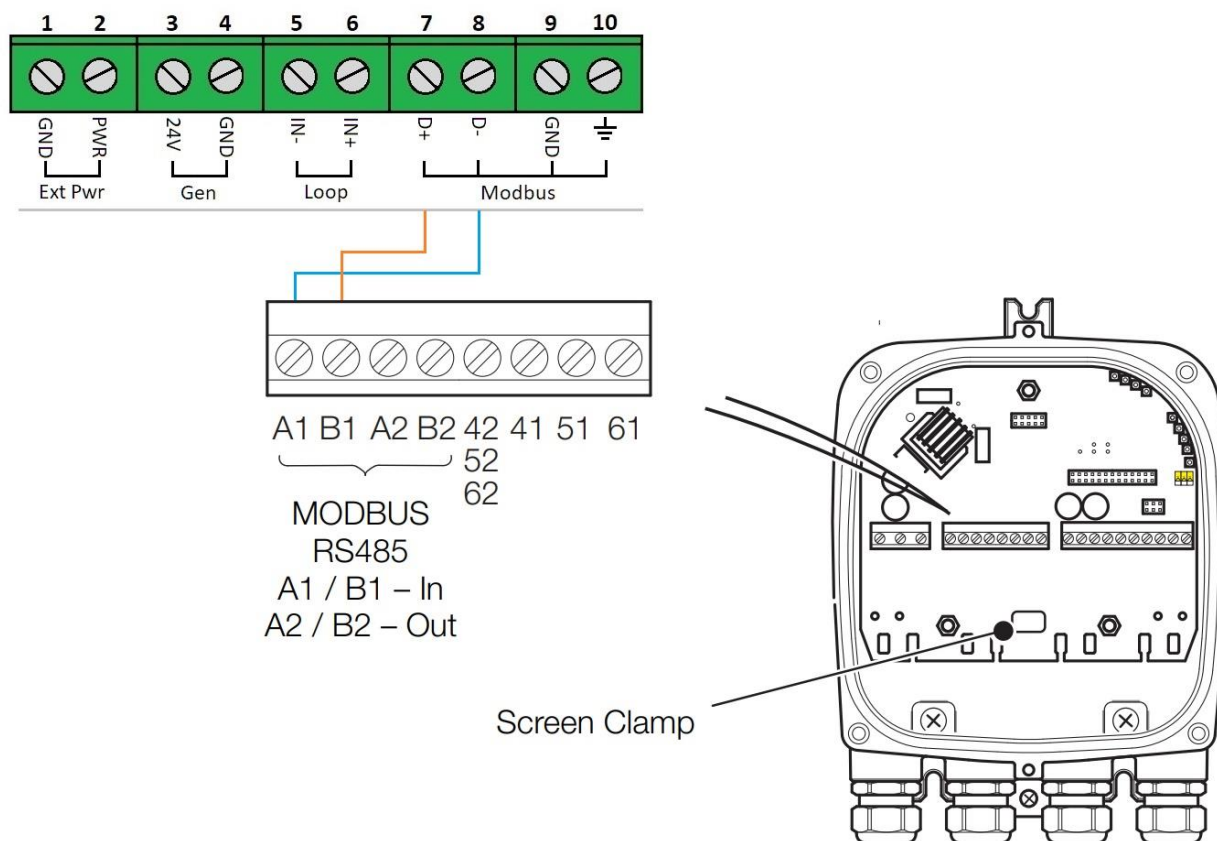
The Cirrus Modbus logger is equipped with a fully isolated RS485/Modbus interface. This interface is used for the connection to specific equipment with these kinds of output interfaces. e.g. ABB Aquamaster flow meters. These available devices are normally listed in the CloudWorks software as specific applications. Below are the connections for a Aquamaster flow meter.



Example configuration for connection to an Aquamaster 3/4 flow meter

Aquamaster 3/4 Modbus Setup = 19200 baud, 8 bits, Even parity, 1 stop bit

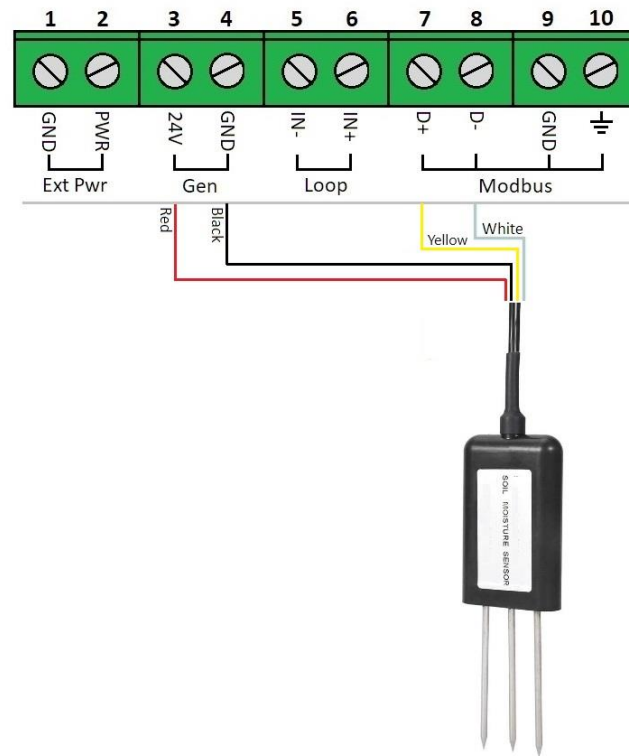
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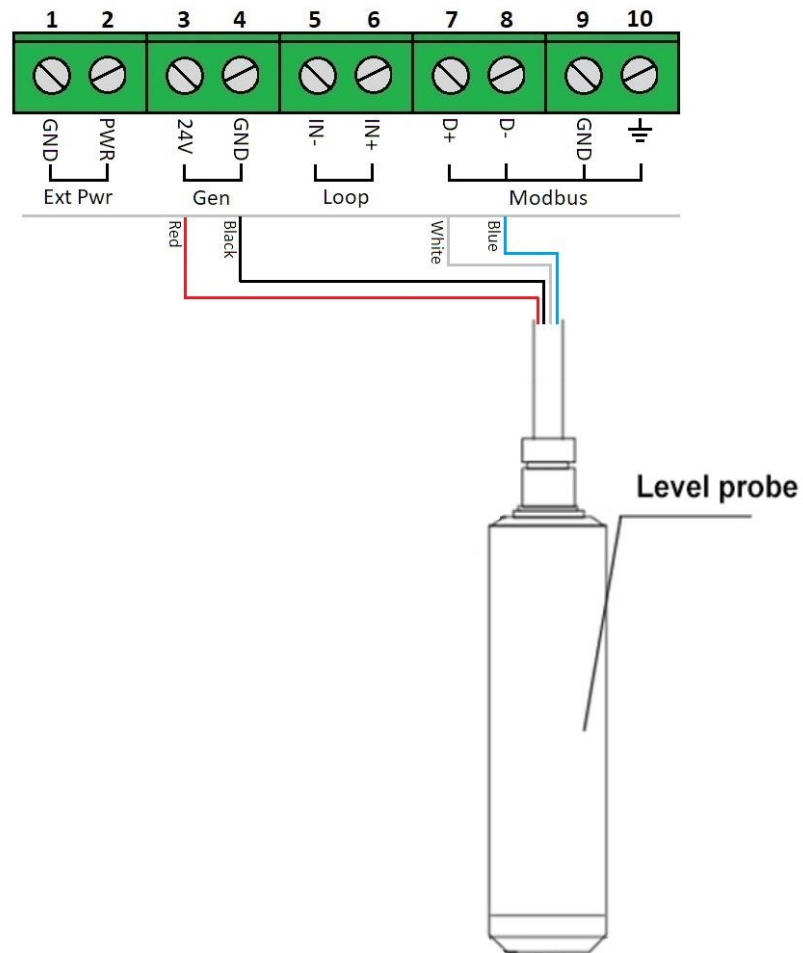
Example configuration for connection to an Watermaster flow meter

Watermaster Modbus Setup = 115200 baud, 8 bits, None parity, 1 stop bit

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Example configuration for connection SenseCap Soil Sensor



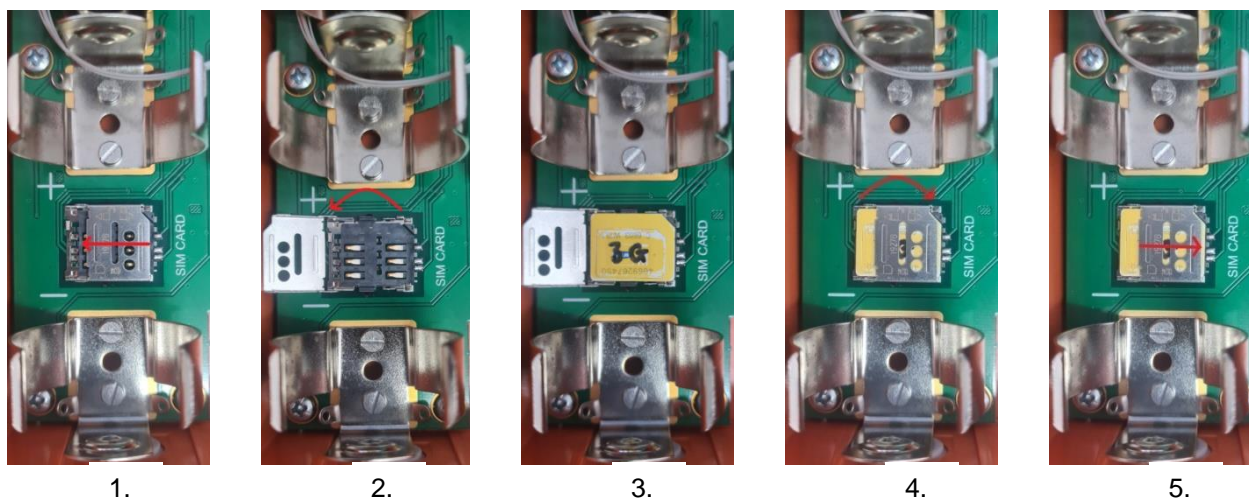
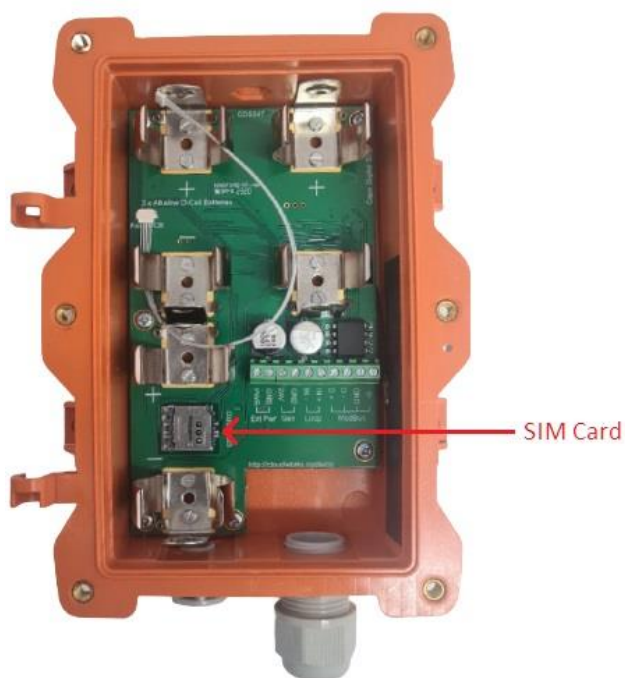
Example configuration for connection Cloudworks Hydrostatic BGT sensor

BGT Sensor Modbus Setup = 9600 baud, 8 bits, None parity, 1 stop bit

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1.1 Sim card and battery installation

The CDS551 Cirrus Modbus logger uses a MicroSIM and is installed as follows.



1. Slide the cover plate backwards to unlock.
2. Flip the cover plate up to expose the connections.
3. Place the sim card with the connections facing downwards. Please note the position of the notch.
4. Flip the cover plate down again to cover the sim card.
5. Slide the cover plate forward again to lock into the base.

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Battery Installation

1.2 Installation considerations

The CDS551 Cirrus Modbus logger is environmentally rated to IP68 - max1.2m. In order to achieve this, it is critical that any cables entering the logger are properly sealed by the IP68 gland. This gland is designed to only have one cable exiting the logger and not multiple ones. Multiple cables will prevent the gland from achieving a proper seal.



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1.3 Logger setup

This logger can be configured using 3 different methods:-

1. Through the local Bluetooth interface.
2. Remotely when a logger is powered and is currently online.
3. Via the Offline scripting method for battery operated loggers that sleep most of the time.

All the details for Bluetooth connections and related settings are available in the CloudWorks Client software and can be accessed directly from there.

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