User manual

4G / 5G LTE module

ARCTIC LINK

ENDLESS CONNECTION

Radiofrequency & relayoutput

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Connections

Your LTE Module is equipped with various connection points to facilitate its setup, configuration, and integration into your existing systems. Below is an overview of the available connections and their respective uses:

1. **Antenna Connection:** This is where the included antenna attaches to the LTE Module. The antenna is crucial for ensuring your module maintains a strong and stable connection to the GSM network.
2. **Power Input:** This is the primary power connection for the module. The power cable included in the package connects here, providing the necessary energy to operate the module. Ensure that the power source matches the module's requirements to prevent any damage.
3. **USB:** The module features a USB-C port which can be utilized to power the module, offering an alternative to the dedicated power input. Note that USB power cabling is not included in the package.
4. **Relays 1 and 2:** These are output relays for controlling external devices. They can be used for a variety of applications, including switching on/off heating systems, lights, or other electrical devices, depending on your needs.

12v/24v power

USB-C

Antenna

Temp sensor
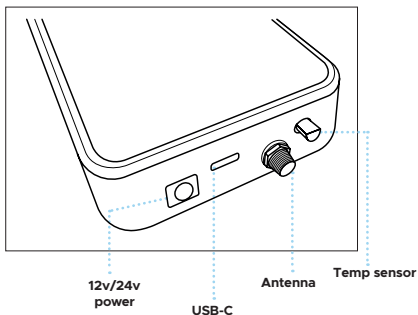
Setting Up Your Arctic link

Introduction
To ensure a smooth experience and proper installation of your new GSM module, please follow these steps in the order described to avoid potential issues.

Step-by-Step Guide

1.   Prepare Your SIM Card

»   Before installing the SIM card in the module, insert it into a phone to disable any PIN or PUK codes. This step ensures the module can connect to the network.on your needs.

2.   Install the SIM Card in the Module

»   To access the SIM card slot, open the cover on the back of the GSM module. Make sure the module is not connected to any power source during this step to avoid electrical shock or damage. Carefully place your SIM card in the SIM-slot.

3.   Choose the Optimal Location for the Module

»   Select a suitable location for the module to ensure optimal signal both to the LTE network (4G/5G) network but also the diesel heater. The module should be placed at a height that reflects average room temperature to avoid inaccurate temperature readings caused by rising warm air or sinking cold air. Avoid exposure to direct sunlight, drafts, or other factors that could affect temperature readings. An ideal location is near the diesel heater, preferably in the same room as the heater's display but away from moisture, dust, or extreme temperatures.

4.   Secure the Unit:

»   After selecting a suitable location, attach the back cover to the wall or other chosen surface. Click the unit into place on the back cover and use the lock screw to firmly secure the unit.

5.   Install the Antenna

»   Attach the antenna to the module

6.   Connect the Power Supply

»   Power the module either from a battery (12v / 24v) to the module's round power connector OR via a USB cable to the USB-C input. Note that USB cabling for power is not included in the package.

7. **Monitor the Indicator Light**

» Immediately after connection, a red light will indicate that the module is in the startup phase. Once startup is complete, the module will switch to searching for network signal, indicated by a green light. A successful connection changes the light to blue, showing that the module is properly connected and operational. If the module instead indicates a blinking red light, it means the module has failed to find a network. Recheck the SIM card installation and ensure it is not protected by a PIN or PUK code.

8. **Configure Communication with the Diesel Heater**

»

9. **Set Up Admin Users**

» To secure, setting up admin users is crucial. This allows designated users to have exclusive control over the device operations. Admin setup involves assigning specific mobile numbers as administrators who can then execute commands and manage configurations.

Device Indicators and Operations

SOLID RED:
The module is turning on.

SOLID GREEN:
Searching for network connection.

SOLID BLUE:
Successfully connected to the network.

BLINKING RED:
The module has failed to find a network.

TEMPORARY GREEN:
Recived a known command.

TEMPORARY RED:
Recived an unknown command.

Compatible Diesel Heaters

The Arctic Link module is engineered to work seamlessly with various diesel heater brands, allowing for optimal compatibility. Below are details on how to configure Arctic Link for each heater type:

Sunster

» **Standard Models:** Use the command `SUNSTER`
» **Bluetooth Models:** For Bluetooth-enabled Sunster heaters, use SUNSTER-BT

VEVOR

» **Standard Models:** Use the command `VEVOR`
» **Bluetooth Models:** For Bluetooth-enabled Sunster heaters, use VEVOR-BT

Airdrome

» **Command:** Initiate configuration by sending the command `AIRDROME` to Arctic Link. This sets the module to communicate specifically with Airdrome heaters.
» (This mode is the factory preset)

Hcalory

» **Command:** Initiate configuration by sending the command `HCALLORY` to Arctic Link. This sets the module to communicate specifically with Hcalory heaters.
» **Initiate Pairing:** On the diesel heater's control panel, press and hold the 'Up Arrow' button until "HFA" is displayed, indicating that the heater is ready for pairing.
» **Establish Connection:** Send the "ON" command to Arctic Link. If the diesel heater activates, the pairing is successful and the heater is now connected to Arctic Link.

Important Note

Remote Control Becomes Inoperative
Be aware that after pairing your diesel heater with the Arctic Link system, your current remote control might become inoperative. This means you will need to use the Arctic Link system for future operations of the heater.

Pairing

🏄 Airdrome

- » **12 or 24v:** Hold arrow up till `HFA` appears on the screen, then initiate an `ON` command through the arctic link. The dieselheater will start if the pairing i s sucessfull.
- » **Multivolt:** Hold settings and arrow up till `PE` appears on the screen, thens initiate an ON command through the arctic link. The dieselheater will start if the pairing i s sucessfull.

VEVOR

- » **Standard Models:** Use the command `VEVOR`
- » **Bluetooth Models:** For Bluetooth-enabled Sunster heaters, use VEVOR-BT

🜲 Sunster

- » **Standard Models:** Use the command `SUNSTER`
- » **Bluetooth Models:** For Bluetooth-enabled Sunster heaters, use SUNSTER-BT

🜲 calory

- » **Command:** Initiate configuration by sending the command `HCALORY` to Arctic Link. This sets the module to communicate specifically with Hcalory heaters.
- » **Initiate Pairing:** On the diesel heater's control panel, press and hold the 'Up Arrow' button until "HFA" is displayed, indicating that the heater is ready for pairing.
- » **Establish Connection:** Send the "ON" command to Arctic Link. If the diesel heater activates, the pairing is successful and the heater is now connected to Arctic Link.

Important Note

Remote Control Becomes Inoperative
Be aware that after pairing your diesel heater with the Arctic Link system, your current remote control might become inoperative. This means you will need to use the Arctic Link system for future operations of the heater.

Command List

This section details the comprehensive list of SMS commands for interacting with the Arctic Link Module. Each command allows for specific control and configuration to ensure optimal operation of your module and connected devices.

HEATER ON/OFF
- » **Command:** `ON` to activate, `OFF` to disable the heater.
- » **Function:** Control the heaters power or temerature.
- » **Answer:** `HEATER ON TEMP=TT` or `HEATER OFF TEMP=TT`

HEATER +/-
- » **Command:** `+` to increase the power or temperature of the heater, `-` to reduce.
- » **Function:** Adjusts the power of the heater by one step.
- » **Answer:** `HEATER +` or `HEATER -`

HEATER +/-5
- » **Command:** `+5` to increase heater power 5 steps, `-5` to decrease 5 steps.
- » **Function:** Adjusts the heater's power or temperature by five steps.
- » **Answer:** `HEATER +5` or `HEATER -5`

AUTO=XX
- » **Command:** `AUTO=XX` where `XX` is the desired temperature (5-30℃).
- » **Function:** Activates thermostat mode. Read more at
- » **Answer:** The setting is confirmed, e.g. `AUTO=20 H=Y`

H=X
- » **Command:** `H=X` where `X` is the hysteresis value (1-5℃).
- » **Function:** Sets hysteresis for AUTO mode. Read more on
- » **Answer:** Confirmation of hysteresis value, e.g. `H=2`

Command List

TIMER=XX
- » **Command:** `TIMER=XX` where **xx** is hours (1-99).
- » **Function:** Delayed start of the heater.
- » **Answer:** Confirmation of the set timer and current temp..

ADMIN=XXXXXXXX
- » **Command:** `ADMINy=XXXXXXXX` where **XX** is the phone number and y represents the admin position. `Y` shall be replaced with a number between 1-5 depending on what admin slot you want to set.
- » **Function:** Limits unauthorised devices from controlling Arctic link.
- » **Response:** If an administrator number is successfully set to slot 3, the device will confirm with `ADMIN3=XXXXXXXX` If locked to an admin number and another tries to control it, it responds with `ADMIN LOCKED` read more at

ALARM=XX
- » **Command:** `ALARM=XX` where xx represents the temperature threshold in degrees Celsius. Cancel the alarm with `/ALARM.`
- » **Function:** This command sets an alarm that notifies the user if the temperature falls below the set threshold. It is particularly useful as a frost guard, ensuring the user is alerted if temperatures approach the freezing point, thereby mitigating the risk of water pipes freezing
- » **Answer:** Confirmation of the set temperature.
- » **More info:** The mobile number that sets the alarm will receive notifications. If administrators are defined, all administrators will also receive these alerts. Notifications are sent each time the temperature drops below the set threshold. Additionally, as long as the temperature remains below this threshold, alarms will be sent out every 2 hours.

Relay commands

R1 ON / OFF / AUTO
- » **Command:** `R1` to turn on, `/R1` to power off, `R1*` to follow the heaters operation.
- » **Function:** Control relay 1.
- » **Answer:** `R1 ON,` `R1 OFF,` or `R1 AUTO`

R1=XX
- » **Command:** `R1=XX` is the duration in seconds (1-99).
- » **Function:** Sets Relay 1 for a specified duration. When `XX=100`, it indicates a constant relay closure.
- » **Application:** This setting is also effective in follow mode, keeping the relay closed as long as the diesel heater is operational. The relay closes the circuit when the diesel heater is turned on. (Preset value is 100)
- » **Answer:** `R1=XXs.`

R2 ON / OFF / AUTO
- » **Command:** `R2` to turn on, `/R2` to power off, `R2*` for follow mode.
- » **Function:** Control Relay 2.
- » **Answer:** `R2 ON,` `R2 OFF,` or `R2 AUTO`

R2=XX
- » **Command:** `R2=XX` where `XX` is the duration in seconds (1-99).
- » **Function:** Sets Relay 2 for a specified duration. When `XX=100`, it indicates a constant relay closure.
- » **Application:** This setting is also effective in follow mode, keeping the relay closed as long as the diesel heater is operational. The relay opens when the diesel heater is turned off. (Preset value is 100)

Other commands

ECO
- » **Command:** `ECO1` OR `ECO2`
- » **Function:** Activates the power saving mode. Both modes deactivate the LED indicator. In ECO2 mode, additionally, the response rate is reduced to decrease energy consumption further.Read more at
- » **Answer:** `MODE: ECO1` OR `MODE: ECO2`

/ECO
- » **Command:** `/ECO`
- » **Function:** Turns off ECO mode and resets the unit to normal operating mode. The LED is active and the device communicates according to the default settings.
- » **Answer:** `MODE: /ECO`

TEMP
- » **Command:** `TEMP`
- » **Function:** Request the current temperature.
- » **Answer:** Current temperature, e.g. `TEMP=21`

PING
- » **Command:** `PING`
- » **Function:** Tests communication with the device.
- » **Answer:** `PONG`

TYPE
- » **Command:** `TYPE`
- » **Function:** Request set heater type.
- » **Answer:** `TYPE: AIRDROME` or `TYPE: VEVOR`

VERSION
- » **Command:** `VERSION`
- » **Function:** Displays the version and compilation date of the software.
- » **Answer:** Version and compilation date, e.g. `2024.06.24`

Thermostat Function

Arctic Link's thermostat function provides an advanced control mechanism that operates in conjunction with the diesel heater's built-in thermostat. This feature enhances the heater's functionality by offering the ability to fully turn off the heater once the set temperature is reached, and reactivate it when the temperature falls below a specified lower threshold set by the hysteresis value.

1. **Setting the Desired Temperature:** Users can specify a particular temperature they wish to maintain.

2. **Activation and Shutdown:** Arctic Link fully deactivates the diesel heater once the set temperature is reached. It reactivates the heater when the ambient temperature falls to the lower limit defined by the hysteresis setting.

3. **Hysteresis Setting:** To prevent the system from toggling on and off around the set temperature, the hysteresis setting defines a lower threshold, below which the heater restarts. The preset hysteresis value is 2°C, and users can adjust this value up to a maximum of 5°C. For example, with AUTO=21 and H=2, the heater turns off at 21°C and restarts at 19°C.

Thermostat hysteresis illustration

This diagram illustrates the temperature trajectory when the Arctic Link thermostat is set to maintain a maximum of 21℃, employing a hysteresis of 2℃. The green line indicates the deactivation ('turn OFF') point for the diesel heater unit at 21℃, and the blue line delineates the reactivation ('turn ON') point at 19℃. This example uses a temperature set to 21C and a hysteresis of 2 **(AUTO=21 & H=2)**
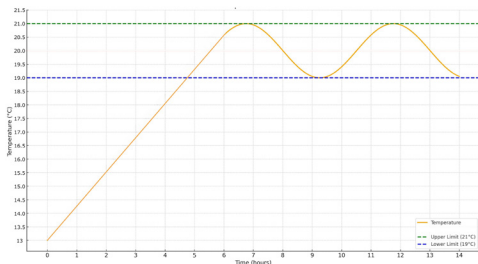
Timer Function

The timer function allows users to set a delayed start for the diesel heater. This feature is invaluable for scheduling the operation of the heater to ensure a space is comfortably warmed at the desired time without the need for manual activation.

How to Set the Timer Function

1. **Determine Start Time:** Decide how many hours from the current moment you wish the heater to begin operating. This can be set for any duration from 1 to 99 hours.

2. **Send Command:** To set the timer, issue the command `TIMER=XX` to Arctic Link, where `XX` is the number of hours until the scheduled start time. For example, to set the heater to start in 24 hours, send `TIMER=24`.

3. **Answer:** `HEATER TIMER 24H, TEMP=xx`

Example Uses

» **Preheating:** Program the heater to start before you arrive at your caravan, or cabin, ensuring the area is warm and inviting.

Important Considerations

» **Limitations:** Note that the delayed start can only be specified in hours, not minutes or seconds.

» **Changing or Canceling:** If you need to modify or cancel a preset timer, send a new command with the updated time or cancel the timer through an OFF command.

» **Power Supply:** Verify that Arctic Link maintains a continuous power supply and is correctly connected to the diesel heater throughout the set period to ensure the timer operates as expected.

Temperature Reading Function

The temperature reading function allows users to obtain current temperature data from the environment where the device is located. This feature is particularly useful for monitoring and adjusting the heating based on actual temperature conditions.

How to Use the Temperature Reading Function

1. **Send Command:** To request the current temperature, send the command `TEMP` to Arctic Link.

2. **Receive Response:** Arctic Link will respond with the current temperature in the format `TEMP=XX`, where `XX` represents the temperature in degrees Celsius. For instance, if the current temperature is 21 degrees Celsius, the response will be `TEMP=21`

Examples of Use

» **Heating Adjustment:** Using the received temperature data, you can adjust the settings of your diesel heater to increase or decrease the heating as needed.

Important to Keep in Mind

» **Location of Arctic Link:** For accurate temperature readings, ensure that Arctic Link is positioned in a suitable location that truly reflects the ambient temperature. Avoid placing the device in areas subjected to direct sunlight, drafts, or any other factors that might affect the temperature reading.

ECO Mode

Eco mode is designed to reduce energy consumption by turning off the LED indicator and increasing the interval for SMS downloads to every 20 minutes. This mode is particularly useful for conserving energy and is ideal for scenarios where immediate response times are not necessary.

Eco Mode 1:
LED Indicator: This mode deactivates the LED indicator to conserve energy,

Eco Mode 2:
LED Indicator: Similar to Eco Mode 1, the LED is turned off.
SMS Communication: The frequency of SMS updates is reduced, with communications sent every 20 minutes.

»   **Purpose:** The ECO Mode is intended to lower energy usage by modifying the behavior of the device's communication and indicator systems.

»   **Ideal Usage:** Suitable for long-term monitoring where frequent updates are unnecessary, thus conserving battery life or power consumption.

ADMIN Function & configuration

Overview
The ADMIN function allows you to set a specific mobile number as the administrator of the device. This number will have exclusive control over the device operations. The administrator number is stored in non-volatile memory, meaning it will be retained even if the device is powered off.

Setting the Administrator Number

» **Command:** `ADMIN1=XXXXXXXXX`

  Replace 1 with the administrator spot you would like to configure (1-5), replace `XXXXXXXXX` with the mobile number you wish to designate as the administrator. Example: `ADMIN3=0701234567`

» **Activation:**

  The ADMIN function is disabled during the first 10 minutes after the arctic link unit is powered on. This safety feature allows for an emergency override in case of a problematic situation, providing users the opportunity to deactivate the current admin or set a new administrator during the initial 10-minute window after the unit is powered on.

  Once activated, the device will only accept commands from the administrators numbers.

Disabling the Administrator Function

» **Command:** `ADMIN=0`

  This command removes any set administrator number, allowing any mobile number to control the device again. This command can only be executed by an admin or during the 10-minute safety period..

» **Admin Locked Scenario:**

  If the device is locked to an administrator number and receives a command from a different number, it will respond with `ADMIN LOCKED`

» **Check Current Admin Number:**

  To verify the current administrator numbers, send the command `ADMIN.` The device will respond with the current administrator number, or `ADMIN=0` if no administrator is set.

Relay Connection

To connect and utilize the relays, follow these steps to ensure a proper installation:

1. **Power Off the Unit:** Before starting, make sure the power to the unit is turned off to avoid any risk of electric shock.

2. **Remove the Back Cover:** Access the screw terminals for the relays by carefully removing the back cover of the Arctic Link. This is typically done by unscrewing or releasing the fastening screw that hold the cover in place.

3. **Locate the Screw Terminals:** Once the back is removed, locate the green screw terminals intended for the relay connections.

4. **Connect the Relays:** Attach your wires to the respective terminals for relay 1 and relay 2. Ensure the connections are secure and the wires are firmly fastened.

5. **Reassemble the Back Cover:** After the relays are properly connected, reattach the back cover by putting it back in place and securing it with screw.

Relay 2
Relay 1

Relay Commands

Relay 1

- » **R1** to turn on relay 1 - this closes the relay circuit

- » **/R1** to power off relay 1 - this opens the relay circuit

- » **R1*** activates thermostat mode. This option can either close the relay for a specific period each time the temperature reaches the temperature threshold, or maintain the relay closed continuously while the diesel heater is operating.e

    R1=XX sets Relay 1 for a specified closure duration, with XX ranging from 1 to 99 seconds. When set to **R1=100**, it maintains a permanent closure of the relay, ensuring continuous operation as long as the diesel heater is active. This setting is also operational in 'follow mode', which keeps the relay closed for the duration of the heater's activity. The relay will reopen once the diesel heater is switched off. If the relay time is set to less than 100 while in follow mode, the relay will activate the circuit each time the temperature crosses the predefined threshold. (Factory preset value is 100)

Relay 2

- » **R2** to turn on relay 2 - this closes the relay circuit

- » **/R2** to power off relay 2 - this opens the relay circuit

- » **R2*** activates thermostat mode. This option can either close the relay for a specific period each time the temperature reaches the temperature threshold, or maintain the relay closed continuously while the diesel heater is operating.

    R2=XX sets Relay 2 for a specified closure duration, with XX ranging from 1 to 99 seconds. Relay 2 has all of the functions relay 1 has.

Package Contents

1. **GSM Module:** The main unit that enables remote communication and control functionalities.
2. **Antenna:** Enhances signal reception and transmission, crucial for reliable connectivity.
3. **Power Cable:** For connecting the module to a 12v or 24v power source.

Please note that the USB power cabling for alternative power supply via USB-C is not included.

Technical Specifications and Warranty

2-Year Warranty on Arctic Link PCBs

Arctic Link stands behind the quality and performance of our printed circuit boards (PCBs) with a comprehensive 2-year warranty from the date of purchase.

What the Warranty Covers:

» **Materials and Workmanship:** Ensures that the PCBs are free from defects in materials and workmanship under normal use conditions.

» **Repair or Replacement:** Arctic Link will repair or replace, at its discretion, any circuit boards that prove to be defective during the warranty period.

What the Warranty Does Not Cover:

» **Damage from External Causes:** Including, but not limited to, accidents, misuse, abuse, modifications or repairs not performed by authorized service technicians, normal wear and tear, and damage from environmental conditions like corrosion, electrical interference, or overvoltage.

» **Consequential Damages:** Arctic Link is not liable for indirect, incidental, or consequential damages arising from the use of the product.