

Arctic Link

USER MANUAL



ARCTIC LINK
ENDLESS CONNECTION

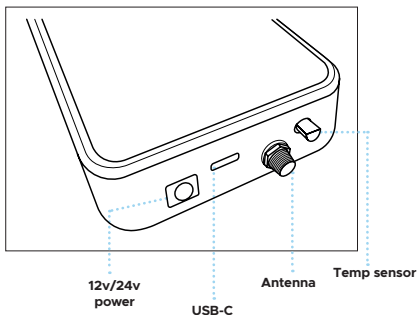
Scan the provided QR code to download the Arctic Link app and other relevant documents which facilitates setup and control of your module.



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.



Setting Up Your LTE Module

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 continues to show a green light for an extended period (more than 5 minutes), this may indicate reception issues or that the SIM card is not properly installed or compatible. Recheck the SIM card installation and ensure it is not protected by a PIN or PUK code.

8. Configure Communication with the Diesel Heater

- » [See page 6 to Initiate Pairing Mode](#)

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. [See page 5.](#)

Device Indicators and Operations



SOLID RED:

The module is turning on.



SOLID GREEN:

Searching for network connection.



SOLID BLUE:

Successfully connected to the network.

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:



- » **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 Heaters:

- » **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)



- » **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.

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 temperature.
 - » **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°C).
 - » **Function:** Activates thermostat mode. Read more at [page 11](#).
 - » **Answer:** The setting is confirmed, e.g. `AUTO=20 TO=YY H=Y`
-

H=X

- » **Command:** `H=X` where `X` is the hysteresis value (1-5°C).
- » **Function:** Sets hysteresis for AUTO mode. Read more on [page 11](#).
- » **Answer:** Confirmation of hysteresis value, e.g. `H=2`

TO=XXX

- » **Command:** `TO=XXX` where **xxx** is hours (1-168).
 - » **Function:** Sets a timeout for AUTO mode. Specifies how long AUTO mode can remain active before it automatically turns off. If no value is specified, or if the specified value is outside the allowed range, the timeout is automatically reset to the default value of 48 hours.
 - » **Answer:** `TO=XXX` with confirmation of the set value.
-

ONIN=XX

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

ADMIN=XXXXXXXX

- » **Command:** `ADMIN=XXXXXXXX` where **xx** is the phone number excluding the code.
- » **Function:** Delayed start of the heater (Timer).
- » **Response:** If an administrator number is successfully set, the device will confirm with `ADMIN=XXXXXXXX`. If not set, it responds with `ADMIN=0`. If locked to an admin number and another tries to control it, it responds with `ADMIN LOCKED` read more at [page 16](#).

Relay

R1 ON/OFF/AUTO

- » **Command:** `R1` to turn on, `/R1` to power off, `R1*` for thermostat mode.
 - » **Function:** Control relay 1.
 - » **Answer:** `R1 ON, R1 OFF,` or `R1 AUTO`
-

R1=XX

- » **Command:** `R1=XX` where XX is seconds (1-99).
 - » **Function:** Activates Relay 1 for a specified time.
 - » **Answer:** `R1 ON XXs`
-

R2 ON/OFF/AUTO

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

R2=XX

- » **Command:** `R2=XX` where XX is seconds (1-99).
- » **Function:** Activates Relay 2 for a specified time.
- » **Answer:** `R2 ON XXs`

Relay commands

ECO

- » **Command:** `ECO`
 - » **Function:** Activates the power saving mode. The LED turns off and the response rate is reduced, for lower energy consumption. Read more at [page 15](#).
 - » **Answer:** `MODE: ECO`
-

NORMAL

- » **Command:** `NORMAL`
 - » **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: NORMAL`
-

TEMP

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

MODE

- » **Command:** `MODE`
 - » **Function:** Request the current operating mode (ECO OR NORMAL) of the device.
 - » **Answer:** `MODE: ECO` or `MODE: NORMAL`
-

TYPE

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

PING

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

VERSION

- » **Command:** `VERSION`
- » **Function:** Displays the version and compilation date of the software.
- » **Answer:** Version and compilation date, e.g. `2024.02.05`

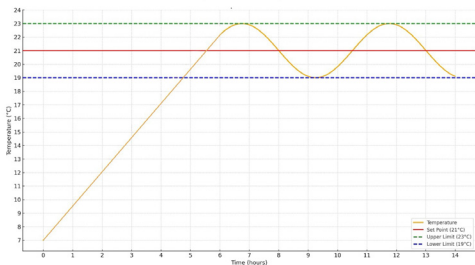
Thermostat Function

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 or turn on the heater based on the set temperature. When the ambient temperature exceeds the desired threshold, Arctic Link can completely shut off the heater. Conversely, it can reactivate the heater when the temperature dips below a preset threshold.

- 1. Setting the Desired Temperature:** Users can specify a particular temperature they wish to maintain.
- 2. Activation and Shutdown:** Beyond the capacity of the heater's built-in thermostat to modulate power, Arctic Link can fully deactivate the diesel heater once the set temperature is exceeded and reactivate it when the temperature falls below a certain threshold.
- 3. Hysteresis Setting:** To prevent the system from frequently toggling on and off, the hysteresis setting allows users to define a temperature margin(1-5°C) within which no changes are made. This ensures stable and efficient temperature regulation.
- 4. Maximum Duration Setting:** Is a safety feature designed to prevent prolonged unintended operation in case the thermostat function is left active inadvertently. The default preset value is 48 hours. After the set duration, the thermostat function will automatically disengage and leave the heater turned OFF to ensure that unexpected heating does not continue indefinitely. Users is allowed to set a maximum operating time for the thermostat of 1 week.

Thermostat hysteresis illustration

This diagram illustrates the temperature trajectory when the Arctic Link thermostat is set to maintain 21°C, employing a hysteresis of 4°C. The blue line indicates the activation ('turn ON'), while the green line delineates the deactivation ('turn OFF') point for the diesel heater unit.



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 `ONIN=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 `ONIN=24`.
- 3. Confirmation:** Arctic Link will confirm the timer setting once the command is sent. Make sure to receive this confirmation to verify that the timer has been set correctly.

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=TT`, where `TT` 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 module 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.

Here are the key details regarding the ECO Mode function:

- » **Purpose:** The ECO Mode is intended to lower energy usage by modifying the behavior of the device's communication and indicator systems.
- » **Behavior Changes:**
LED Indicator is turned off to save power.
SMS Communication is delayed, with updates occurring every 20 minutes instead of in real-time.
- » **Ideal Usage:** Suitable for long-term monitoring where frequent updates are unnecessary, thus conserving battery life or power consumption.



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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.

Setting the Administrator Number

» **Command:** ADMIN1=XXXXXXXXXX

Replace 1 with the administrator spot you would like to configure (1-5), replace [XXXXXXXXXX] 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.

Memory Storage

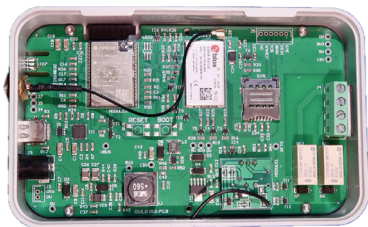
» **Non-Volatile Memory:**

The administrator number is stored in non-volatile memory, meaning it will be retained even if the device is powered off.

Relay Connection on Arctic Link

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.



Commands

Relay 1

- » R1 to turn on (close the circuit)
 - » /R1 to power off (open the circuit)
 - » R1* for thermostat mode
 - » R1=XX where XX is seconds (1-99). **Sets the closing time**
-

Relay 2

- » R2 to turn on (close circuit)
- » /R2 to power off (open circuit)
- » R2* for thermostat mode
- » R2=XX where XX is seconds (1-99). **Sets the closing time**

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.

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