

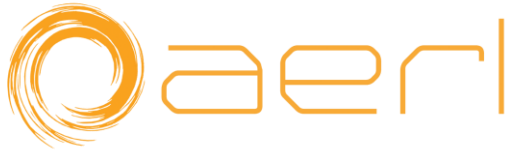
CoolMax SRX MV Charge Controller

Installation and Operation User Manual



Models

SRX MV 300/50
SRX MV 300/60



About Australian Energy Research Laboratories

Australian Energy Research Laboratories (AERL) was founded by Stuart Watkinson (BE Elec. Eng., Grad. M.I.E.A) in 1985 to commercialize the “Power Optimizer”, a revolutionary solution to a complex problem, developed while studying at the University of Queensland in Brisbane, Australia.

Unlike many inventors, Stuart possessed not only a great idea, but also the entrepreneurial skill to turn it in to a commercially viable product. The “Power Optimizer” would eventually come to be known as the AERL MAXIMIZER™, the world’s first truly Universal Maximum Power Point Tracker (MPPT).

Today, AERL manufactures a range of highly reliable and efficient specialised power electronic controllers for use in Solar, Micro Hydro, Micro Wind and Cathodic Protection applications.

Contact Information

Address: Unit 15, 1015 Nudgee Rd,
Banyo, QLD, 4078, Australia

Phone: [+61 07 3129 0330](tel:+610731290330)

Email: sales@aerl.com.au

Website: <https://www.aerl.com.au>

Disclaimer

UNLESS SPECIFICALLY AGREED TO IN WRITING, AUSTRALIAN ENERGY RESEARCH LABORATORIES:

(a) MAKES NO WARRANTY AS TO THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN ITS MANUALS OR OTHER DOCUMENTATION.

(b) ASSUMES NO RESPONSIBILITY OR LIABILITY FOR LOSS OR DAMAGE, WHETHER DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL, WHICH MIGHT ARISE OUT OF THE USE OF SUCH INFORMATION.

THE USE OF ANY SUCH INFORMATION WILL BE ENTIRELY AT THE USER’S RISK.

Notice of Copyright

CoolMax SRX Charge Controller Owner’s Manual © September 2020 by Australian Energy Research Laboratories Pty. Ltd. All Rights Reserved.

Trademark

AERL and the AERL logo are trademarks owned and used by Australian Energy Research Laboratories Pty. Ltd.

These trademarks may be registered in Australia and other countries.

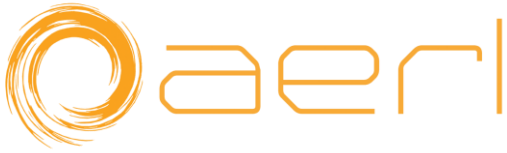
Effective Date

September 2020 (09/2020)



Table of Contents

Warranty Conditions	6
Specifications	7
Introduction	8
Features	8
Firmware	8
Installation	9
Standards & Requirements	9
Grounding	9
Ground Fault Detection & Interruption	10
Ground Fault Detection & Interruption Solutions	11
Mounting the Controller	12
Mounting Clearances	13
Wiring Information	14
Wire and Disconnect Sizing	14
CoolMax MV 300/50	14
CoolMax MV 300/60	14
Wiring Compartment	15
Wiring Polarity	16
Operation	17
Powering Up	17
Power Saving Mode	17
Programming the Device	18
Battery Charge Profile	19
Charge Profile Configuration	20
Setting the Battery Charge Profile	21
Enabling the Output	24
Setting the Time/Date	25
Auxiliary Functions	26
Battery Temperature Compensation	27
Connecting the Temperature Sensor	27
Temperature Sensor Location	27
Relay Alarms / GENSET Control	28
Remote On/Off Switch	28



Communications Protocols	29
Master/Slave Configuration	30
Troubleshooting	34
Error Codes	34
Frequently Asked Questions (FAQ)	36

Important Safety Information

This Installation Manual contains important safety information and installation instructions for the AERL COOLMAX SRX MPPT Solar Charge Controller.

The following symbols are used throughout this user manual to indicate ideal installation methods, potentially dangerous conditions and important operational information.



IMPORTANT

Indicates information that must be followed to ensure proper operation of the COOLMAX SRX.



CAUTION

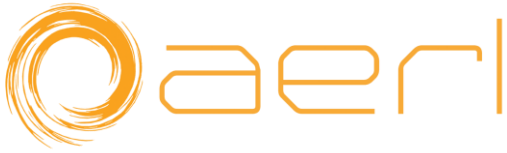
Indicates a critical procedure for the safe installation of the COOLMAX SRX. Use extreme caution when performing this task.

About this Manual



IMPORTANT

- This User Manual provides detailed installation and usage instructions for the COOLMAX SRX unit. It is recommended that all of the Instructions and Cautions in this User Manual be read before beginning installation.
- Only qualified electricians and technicians should install the COOLMAX SRX. This manual is intended for all installation technicians and the system owner.
- Do not disassemble or attempt to repair the COOLMAX SRX unless you are a qualified technician and have authority in writing from AERL to do so.
- AERL will not be held responsible in any way for the mishandling of this product or for installation of the product in a manner that does not follow the instructions in this manual or as advised by an AERL technician.



Warranty Conditions

¹ Warranty Duration from the Date of Purchase

Warranty Requirements	Total Warranty Duration
1. You are the original purchaser of the CoolMax SRX.	3 Years
2. You are the original purchaser and registered your warranty online within 60 days of installation.	5 Years

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

AERL will bear the cost of parts and labour to repair any manufacturing faults found within the terms and period of this warranty. For claims under warranty, the faulty product(s) must be returned to AERL’s facility at Unit 15, 1015 Nudgee Road, Brisbane, Australia, after contacting AERL and receiving the appropriate RMA documentation from AERL.

No allowance is made for labour or travelling time required to disconnect or reinstall faulty parts. AERL will pay the cost of freight to return the repaired charge controller to the customer within Australia or New Zealand only. The method of freight will be determined by AERL.

All installation and user conditions as set down in the instruction manual must be strictly adhered to as failure to do so may void your warranty. Any faults or like faults caused by lightning, water or moisture ingress, vermin infestation, improper voltage, faulty installation, use of the product in a manner for which it is not intended, alterations which affect the reliability or performance of the unit but are not attributable to faulty manufacture, failure to act on service warning from the AERL charge controller, or damage caused by other system components will not be covered under warranty.

The degradation or failure of consumable components (cooling fans and power capacitors reaching end of life) is not covered under this warranty. In the event of the product being out of service, AERL shall bear no responsibility for any consequential loss or expense. AERL will not be held responsible for any misleading or incorrect information conveyed by anyone not directly employed by AERL.

Visit <https://core.aerl.com.au/register-product/> and fill out the associated form to activate your full AERL warranty.

Note: Warranty conditions remain current until the next revision of this document is published. Proof of purchase is required when making a warranty claim.

Specifications

General Specifications	
Parameter	Typical
Weight	6.8 kg
Dimensions (L x W x H)	480 x 226 x 111 mm
Enclosure Type	Indoor Type 1 / IP20
Input / Output Power Connectors	Screw Terminals (8 mm ² -> 42mm ²)

Characteristics	SRX MV 300/50	SRX MV 300/60
Nominal Battery Voltage / Vdc Range	24 V 48 V / 20 - 60	24 V 48 V / 20 - 60
Maximum Charge Current	50 A	60 A
Nominal PV Power	2880 W @ 48 Vnom 1440 W @ 24 Vnom	2880 W @ 48 Vnom 1440 W @ 24 Vnom
Maximum PV Short Circuit Current	32 A	32 A
Maximum PV Voltage Open Circuit	300 Voc (Coldest)	300 Voc (Coldest)
Minimum PV MP Voltage	1.3 * Vnom	1.3 * Vnom
Maximum Conversion Efficiency	98.3%	98.3%
Overload Behavior	Operating Point Shift (Power Limitation)	Operating Point Shift (Power Limitation)
Battery Temperature Compensation	Yes	Yes
Remote Temperature Sensor Option	Yes	Yes
Ambient Operating Temperature Range <i>(Full Rated Output up to 80% Ambient °C)</i>	-20 to 60 °C	-20 to 60 °C
Storage Temperature	-30 to 70 °C	-30 to 70 °C
Self-Consumption (Idle)	100 mA @ 20 V	100 mA @ 20 V
Communications Protocols	CANbus & RS485	CANbus & RS485
Communications Ports	RJ45 & USB (Mini B)	RJ45 & USB (Mini B)
Required Cabinet Air Exchange Rate (Intake @ 40°C)	18 m ³ /hour	20 m ³ /hour
Heatsink Temperature @ Full Power	30°C Rise	35°C Rise
Sealed Inductors & Conformal Coating	Yes	Yes
Conforms to	IEC 62109-1 EN 61000.6.3:2012 EN 61000.6.4:2012	IEC 62109-1 EN 61000.6.3:2012 EN 61000.6.4:2012
Warranty	3 – 5 Years (Conditions Apply)	3 – 5 Years (Conditions Apply)



Introduction

Thanks for purchasing an Australian made CoolMax Series Charge Controller.

AERL charge controllers offer an efficient and reliable charging process that not only maintains battery efficiency and life but maximizes power generation by utilizing the full potential of your PV array.

Features

CoolMax Charge Controllers utilize an advanced form of Maximum Power Point Tracking (MPPT) technology to extract the maximum power available from your PV array, efficiently charging your batteries and maximizing power generation.

AERL's Maximum Power Point Tracking (MPPT) algorithm has been proven to be highly robust, resistant to local extremes, and results in power losses of less than 0.5% over the whole operating temperature range of a PV Array.

- Superior Peak Power Efficiency > 98%
- Ultra-low heat Thermal Design
- Designed for Long Term Reliability
- Higher Input Voltages - Lower Install Costs
- Built-In Overload and Thermal Protection
- Common Positive Wiring Configuration
- Master/Slave Operational Mode
- Interactive Touch Screen Configuration
- Smart Multi-Stage Battery Charging

Firmware

This installation and operating manual covers CoolMax SRX Control Firmware Revisions v4.06 and Interface Firmware Revisions v4.0 and above.

Installation



IMPORTANT

The COOLMAX SRX must be installed in a clean, dry location away from direct sunlight.

Optimal cooling is achieved when the COOLMAX SRX is mounted vertically. A minimum of 15cm should be kept clear above the COOLMAX SRX to allow for air flow.



CAUTION – Equipment Damage

AERL COOLMAX Charge Controllers are not designed to be used in parallel with other Third-Party Charge Controllers and this will void your warranty.

Standards & Requirements

All installations must comply with national and local electrical standards and codes of practice. AERL recommends professional installation.

Grounding

AERL Charge Controllers are designed to be installed in floating systems but contain provisions for positive functional earthing for telecom applications if required.



CAUTION – Hazard

DO NOT FUNCTIONALLY EARTH THE ARRAY if a negative earth is used for the batteries, load or DC system.

CoolMax controllers can be wired into a positive-ground configuration from factory. Certain telecom applications may require this configuration. If it a positive ground configuration is required, please contact AERL at support@aerl.com.au or on +61 [07 3129 0330](tel:0731290330) prior to purchase.



IMPORTANT

The CoolMax Ground (located inside the enclosure) is marked with the following symbol:



CAUTION – Hazard

If damaged or malfunctioning, the AERL controller should only be disassembled and repaired by a qualified service centre. Please contact the local renewable energy dealer/installer for assistance.

Incorrect reassembly risks malfunction, electric shock, or fire.

Ground Fault Detection & Interruption



IMPORTANT

Effective *11th July 2015*, all solar PV installations in Australia and New Zealand require an external earth fault alarm to be installed on equipment classified as Power Conversion Equipment (PCE).

As Solar Charge Controllers (CoolMax SRX) fall under this classification, they will require an earth fault alarm to be installed.

(Refer to AS/NZS5033:2014 clause 3.4.3).

- a. In systems where the PV array is operating at LV, an earth fault alarm system shall be installed which, on an earth fault causes an action to be initiated to correct the earth fault.
- b. The alarm system is to continue repeating its operation at least at hourly intervals until the earth fault is corrected.
- c. The alarm system may be an audible signal or visual indicator placed in an area operational staff or system owners will be aware or another form of fault communication, for example fax, email, SMS or similar, shall be applied to inform to the system operator.
- d. A set of operational instructions shall be provided to the system owner that includes the actions to take when the alarm operates.

Operating Voltage < 120VDC

Equipment operated at ELV is not subject to AS/NZS5033:2014 clause 3.4.3 and exempt from requiring a Ground Fault Circuit or Remote Ground Fault Indicator.

Operating Voltage ≥ 120VDC

Installations where the operating voltage is greater than 120VDC an external Ground Fault Protection kit and Remote Ground Fault Alarm are required. Recommended solutions can be found on Page 11 of this user manual.

Multiple Unit Installations

When two or more Solar Charge Controllers are installed on the same battery bank, disable all but one Ground Protection Circuit and only a single Ground Fault Indicator is required.



Ground Fault Detection & Interruption Solutions

Recommended solutions can be found illustrated below.

	Negative Grounded	Positive Grounded	Floating
Ground Fault Protection Circuit	<p>AERL Optional GFDI Device</p> <p>Part No. AER-GFDI-N</p>	<p>AERL Optional GFDI Device</p> <p>Part No. AER-GFDI-P</p>	<p>AERL EarthGuard</p> <p>Part No. EG-300</p>
Remote Ground Fault Indication (Options)	<p>System Information/Alarms Screen</p> <p>CoolMax Modbus RTU & CAN bus Comms for connection to external devices.</p>	<p>System Information/Alarms Screen</p> <p>CoolMax Modbus RTU & CAN bus Comms for connection to external devices.</p>	<p>Alarm Indication Relay</p>

Refer to the installation and operating manuals for the respective equipment for detailed installation and programming instructions.

Mounting the Controller

The COOLMAX SRX should be fixed to a vertical surface using the M5 screws provided. The SRX has 8 wall mounting holes in the chassis flanges as demonstrated below in **Figure 2A**.

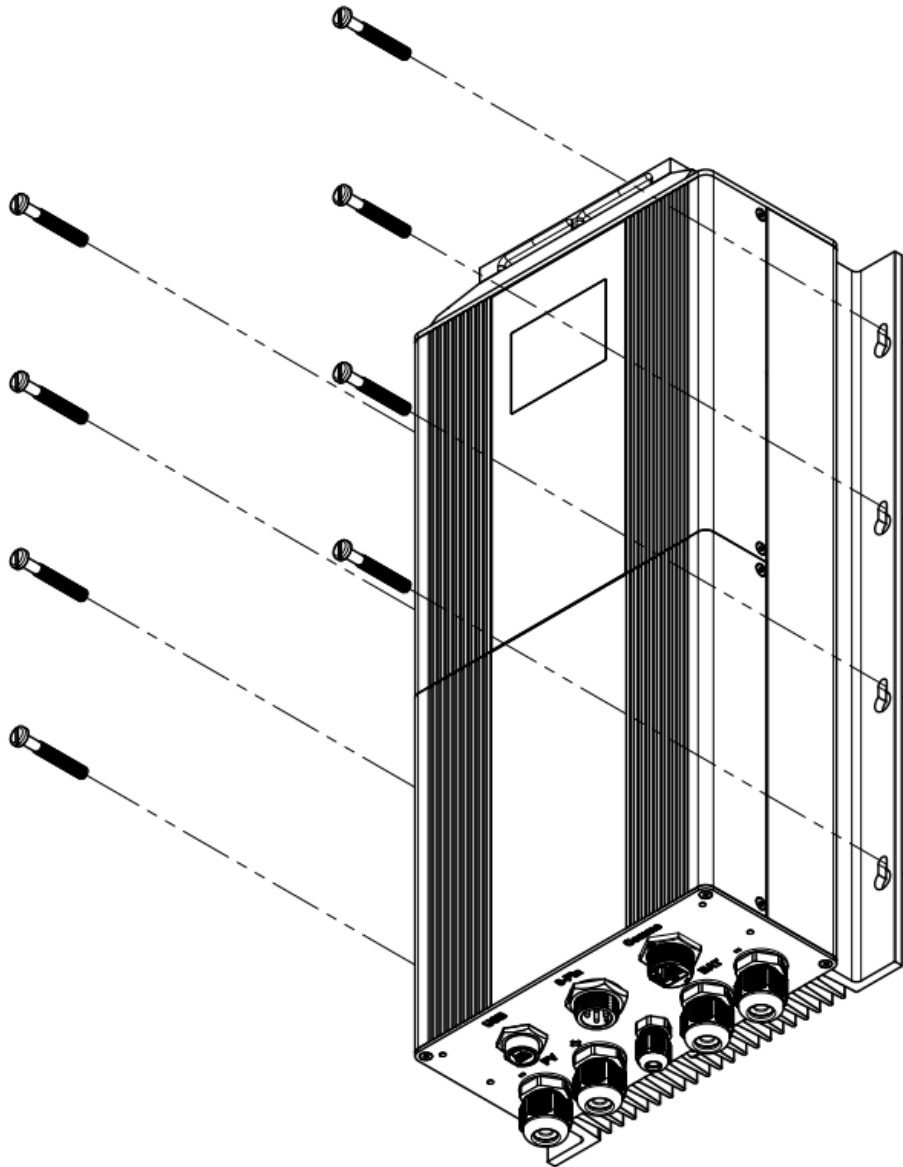


Figure 2A: SRX Mounting Hole Locations

Mounting Clearances

When mounting the SRX, a clearance zone around the device must be adhered to for optimal cooling of the controller under full load. Please refer to the **Figure 2B** below.

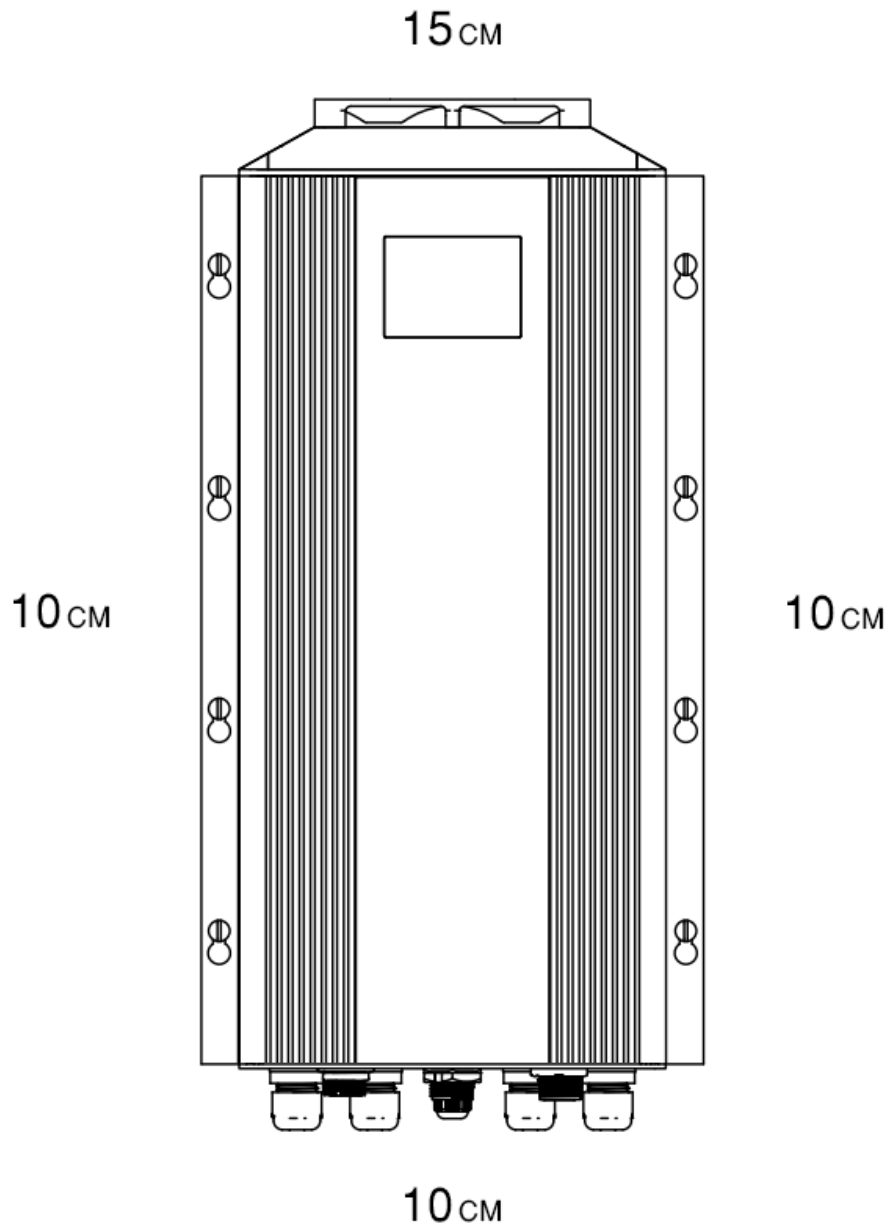


Figure 2B: SRX Mounting Clearances

Wiring Information

This section will provide information and instructions for safely wiring up the CoolMax SRX.

Wire and Disconnect Sizing



IMPORTANT

- Wire sizes must comply with local and national standards. Input conductors and circuit breakers must be rated at 1.56 times the short-circuit current of the PV array.
- Copper wiring must be rated at 75°C or higher.

CoolMax MV 300/50

- The output current limit of the CoolMax 300/50 is 50 amps.
- Use a minimum of #6 AWG (16 mm²) wire for the output between the CoolMax and the battery bus bar or termination.
- Use a **63A** Non-Polarized DC **Circuit Breaker** between the controller output and load.
 - **Recommended Option:** NoArk Ex9BP 63A 2-Pole 300Vdc Circuit Breaker
- Use an appropriately sized insulated crimp ferrule when terminating both the input and output connections.
- Torque all CoolMax wire and ground terminals to 1.7 Nm (15 in-lb).

CoolMax MV 300/60

- The output current limit of the CoolMax 300/60 is 60 amps.
- Use a minimum of #6 AWG (16 mm²) wire for the output between the CoolMax and the battery bus bar or termination.
- Use a **63A** Non-Polarized DC **Circuit Breaker** between the controller output and load.
 - **Recommended Option:** NoArk Ex9BP 63A 2-Pole 300Vdc Circuit Breaker
- Use an appropriately sized insulated crimp ferrule when terminating both the input and output connections.
- Torque all CoolMax wire and ground terminals to 1.7 Nm (15 in-lb).

Please refer to the relevant IEC or AS/NZS electrical code for recommendations on PV array cable sizing, length and ampacity.

Wiring Compartment



CAUTION – Hazard

All CoolMax SRX wiring must enter the unit through the correctly labelled cable glands in the base plate or the rear entry ports inside the enclosure.

Under absolutely **no circumstances** should holes be drilled anywhere into the unit to make other cable entry points. Doing so can cause metal swarf or fillings to enter the internal electronics and damage the unit once powered up.

Drilling of any holes into the unit will void all product warranty.

To install cabling, the access panel of the COOLMAX SRX must be removed. This is done by removing the two M4 countersunk Philips screws on the bottom of the enclosure and the two M3 countersunk Philips screws on either side of the access panel. **Refer to Figure 2C below.**

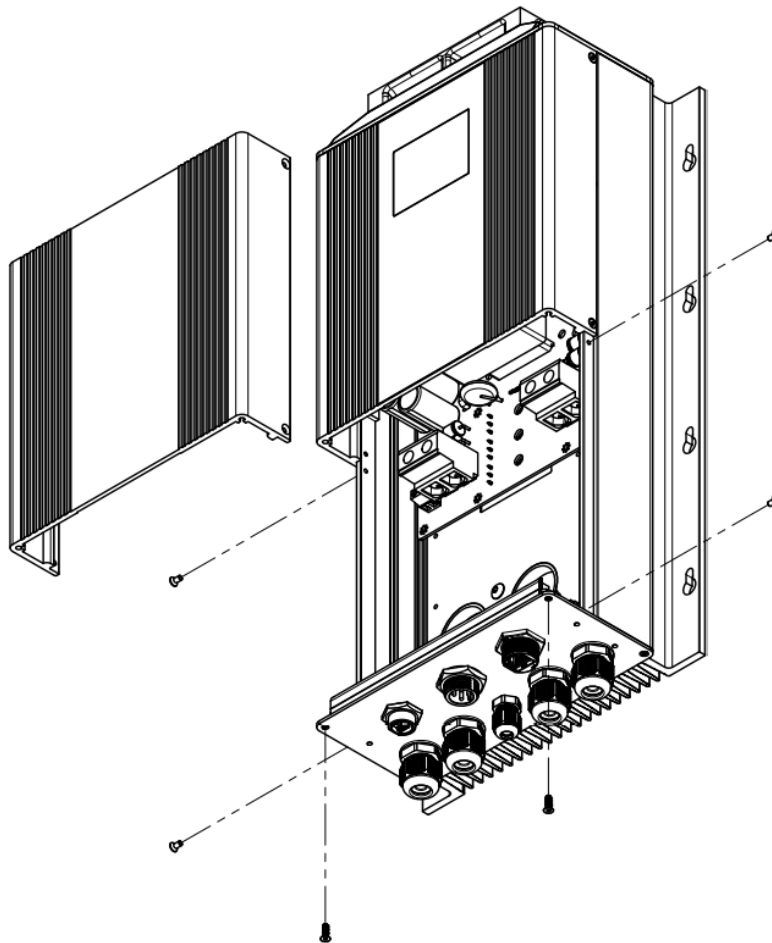


Figure 2C: SRX Access Panel Screw Locations

Wiring Polarity



CAUTION – Equipment Damage

Reversing the polarity of either the input or output may damage the CoolMax SRX and void product warranty.

Confirm polarity with a DVM prior to closing the I/O breakers.

With the access cover removed, the internal I/O terminals will be visible. *Refer to Figure 3 below.*

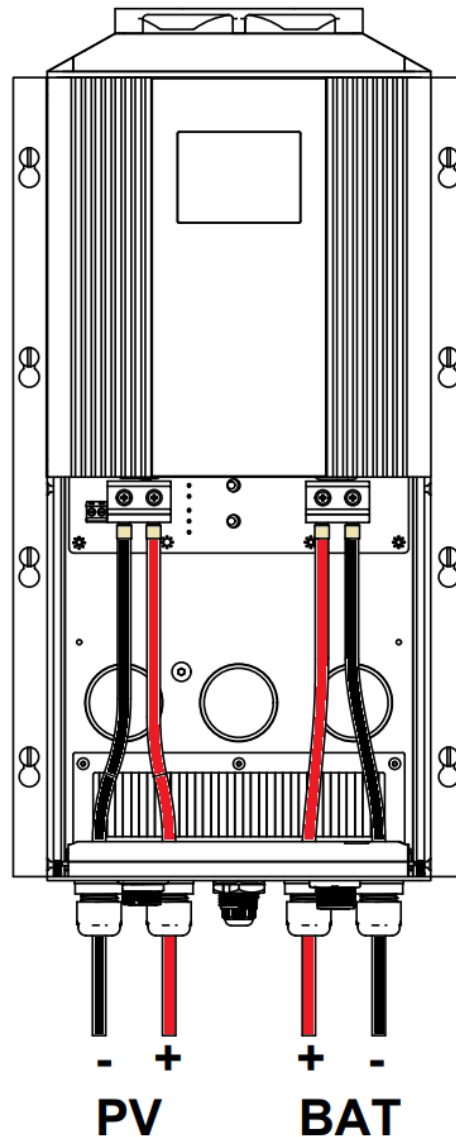


Figure 3: SRX Access Cover Removed

Operation

Powering Up

The CoolMax SRX will power up when a PV or Battery voltage is applied.

Note: Minimum voltage required for initial start-up is 40 Vdc.

When the COOLMAX SRX is first powered the on, the Real Time Screen (**Figure 4A**) is the first screen to appear. This Real Time Screen displays live telemetry information relevant to the COOLMAX SRX and is the starting point from which the COOLMAX SRX configuration can be performed.

This screen not only displays the real time input and output telemetry, but also your Daily Charge (and total Charge), PV Voc, real time PV Power.

If battery temperature compensation is being utilized, a (B) will appear next to “Temperature” and the battery temperature will be displayed. If RTS compensation is not being used, a (I) will appear next to “Temperature”, and the CoolMax’s internal core inductor temperature will be displayed.

30/05/2018		MV	SRX	V2.3	Bulk	13:10
PV	165.31V	Battery	45.09V			
Amps In	12.56A	Amps Out	43.2A			
Charge:	(0289.1)	35.94 Ah				
PV Voc			178.6 V			
PV Power:			2075.1 W			
Temperature (I) :			+29.15 C			
Menu		ON/OFF		Alarms		

Figure 4A: CoolMax Real Time Telemetry Screen

Power Saving Mode

When the CoolMax SRX touch screen has been idle for 30 minutes, the screen will switch to power saving mode. When the unit is in power saving mode, the screen will be dimmed. To revert to full brightness, simply tap the screen.

Programming the Device

The CoolMax SRX is programmed and controlled via the touch screen display located on the front of the device. **The location of the touch screen can be seen in Figure 4B below.**

The screen allows the user to view real time telemetry, edit the charge profile and view alarms, alerts and system information.

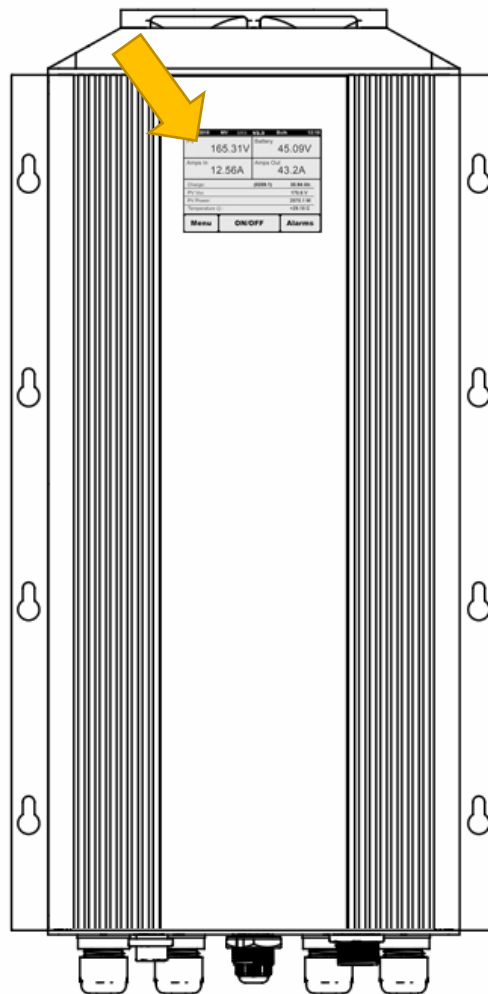


Figure 4B: CoolMax Touch Screen Location

Battery Charge Profile



IMPORTANT

The CoolMax SRX default charge profiles are intended for Lead Acid (PbA) battery solutions.

AERL does support some other battery chemistries such as Lithium options that **do not** require external BMS communications. I.e. GenZ, PPE, Simpliphi, etc.

AERL is working with various battery manufacturers to expand out of the box comms support for Lithium batteries that require communication with the Charge Controller.

Please contact AERL support to confirm compatibility prior to installation. Additional battery support will be rolled out via firmware updates which can be downloaded from AERL's website.

The CoolMax SRX charge output will not automatically activate for safety reasons. Prior to activating the charge output, the charge profile must be configured for the relevant battery solution being utilized.

The SRX operates using an advanced three-stage charging process and has pre-set charge voltage profiles for each supported nominal battery voltage. That said, AERL always recommends referring to the battery manufactures specifications regarding charge voltages for optimal battery life and performance.

These voltages can be adjusted in the charge profile settings. Refer to **Page 20** for instructions.

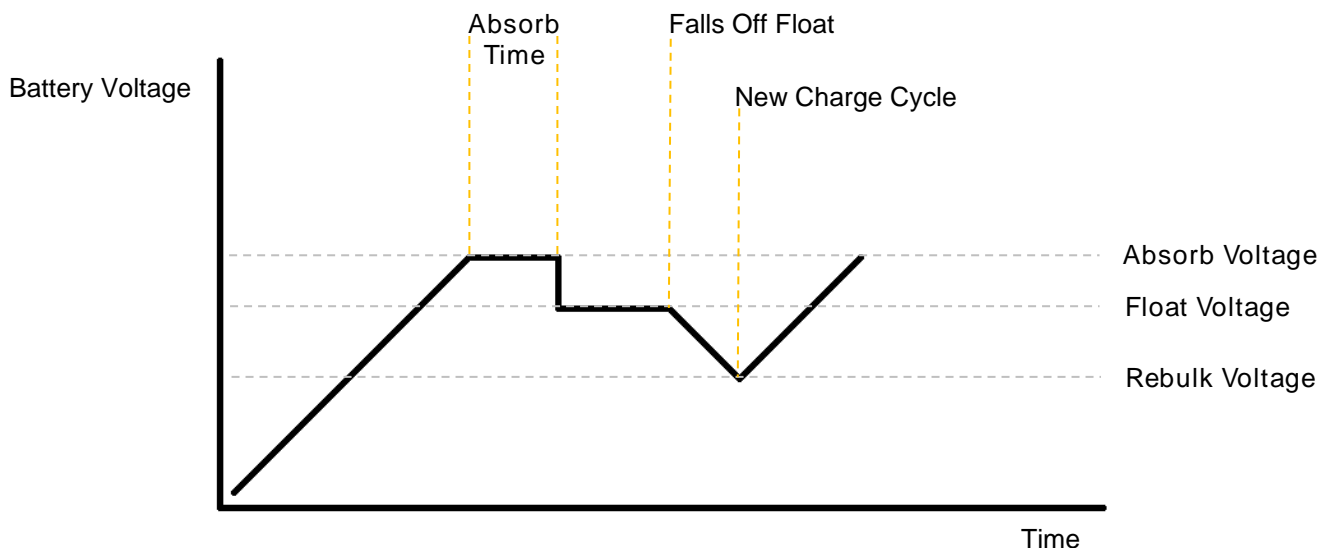


Figure 5: Battery Charge Profile Illustrated

Charge Profile Configuration

The CoolMax SRX allows for extensive flexibility when it comes to charge profile parameters to suit numerous different modern battery chemistries and manufacturers requirements.

Our charge profile allows for the configuration of the Battery Charge Rate, and the Absorb, Float and Re-Bulk voltage points. We do not currently support Equalization as this is no longer required for most applications.



IMPORTANT

An Equalization charge is not currently supported on the SRX range. This is only normally required for Flooded Lead-Acid cells that experience sulfation as a result of poor charging practices over the lifetime of said cell.

Equalization is **not required, nor recommended** for LiFePo4 or other lithium-based battery solutions and will likely cause damage unless otherwise advised by the battery manufacturer.

The default charge profile is suitable for most applications but to determine the optimal charge profile for your application, please refer to your battery manufacturer’s user manual or datasheet.

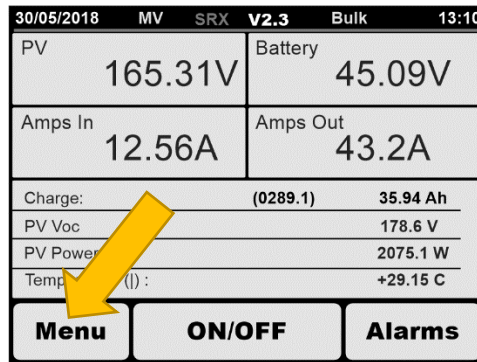
The **CoolMax SRX MV** default charge profile is as follows:

	48V (Nominal)
Battery Capacity	10 kWh
Charge Rate	1 C
Absorb Voltage	57.6 V
Absorb Duration	120 Minutes
Float Voltage	55.2 V
Re-Bulk Voltage	52 V

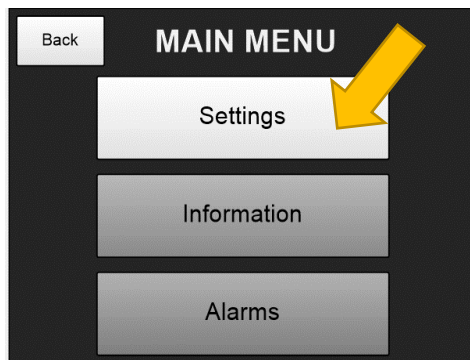
Setting the Battery Charge Profile

Setting the battery charge profile can be done by following the steps below.

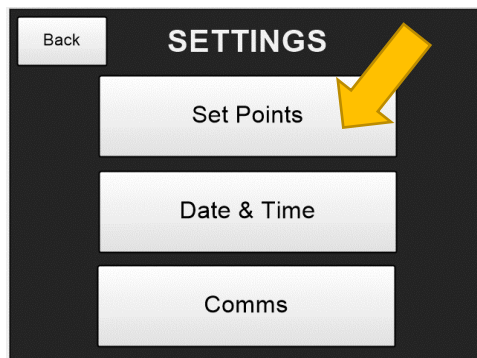
Step 1 – Tap the MENU button located in the left-hand corner of the live telemetry screen.



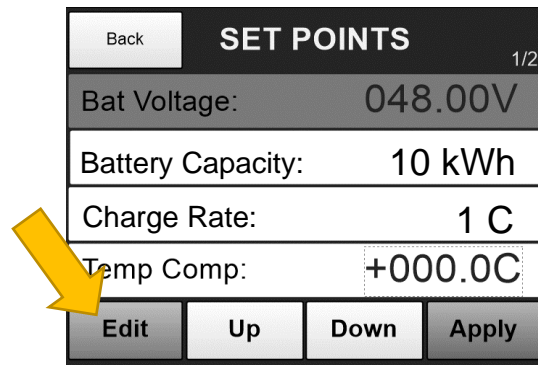
Step 2 – Tap the SETTINGS button located at the top of the MAIN MENU.



Step 3 – Tap the SET POINTS button located at the top of the SETTINGS MENU.



Step 4 – You are now on the SET POINTS screen. The setting currently selected will be highlighted in orange. Tap **EDIT** to edit the selected option or **UP/DOWN** to move between settings.



IMPORTANT

There are **two pages** (1/2, 2/2) of charge profile settings.

Selecting the Nominal Battery voltage and tapping “**Next**” will automatically fill the second page with a default configuration for that selected voltage.

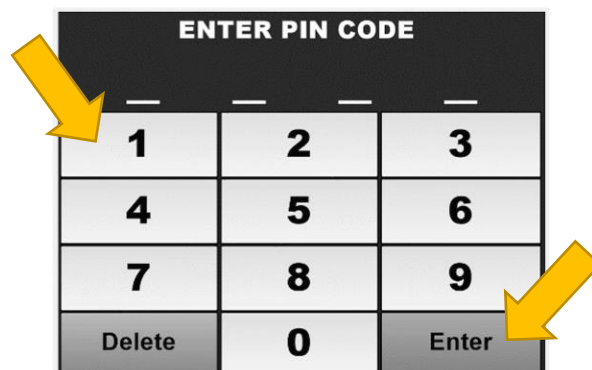


CAUTION – Equipment Damage

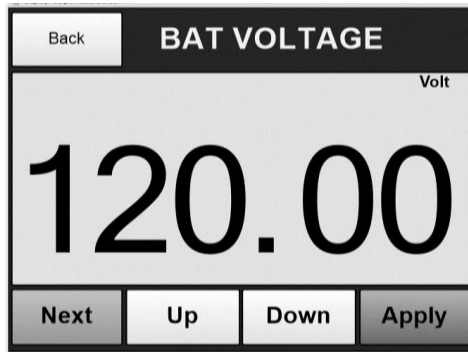
AERL recommends referring to the battery manufactures recommendations as to the appropriate charge profile. **The default profile may not be suitable for the battery system being utilized.**

Failure to do so may cause damage to or reduce the life of the battery system.

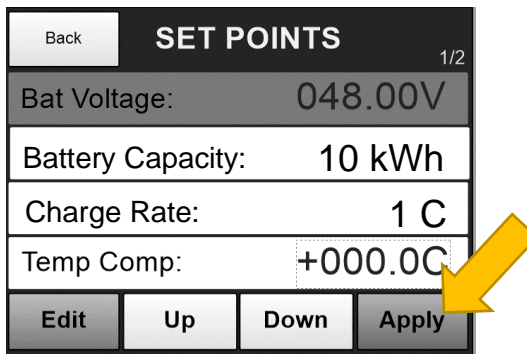
Step 5 – **Input** the security pin code to edit the chosen setting. (**Default: 1111**)



Step 6 – Adjust the setting using the **UP** and **DOWN** buttons until the desired voltage is specified and then tap **Apply**.



Step 7 – Finally, save your charge profile by tapping **Apply**. The CoolMax will save your settings and proceed to reset/reboot.



IMPORTANT

If any of the set point inputs are above the allowable system parameters, a warning message will be displayed and the CoolMax will not allow the charge profile to be saved.

Please refer to **Page 19** for information on setting the correct charge profile settings.



IMPORTANT

If you do not tap **“Apply”** after you have finished entering the settings, the CoolMax SRX will not load the new charge profile into memory and you will have to repeat the process.

Enabling the Output

To activate output battery charge, press the ON/OFF button located at the bottom of the CoolMax Real Time Telemetry screen (**Figure 4A**).

This will take you to the **OUTPUT CONTROL** screen which will allow you to enable the output (**Figure 6**).

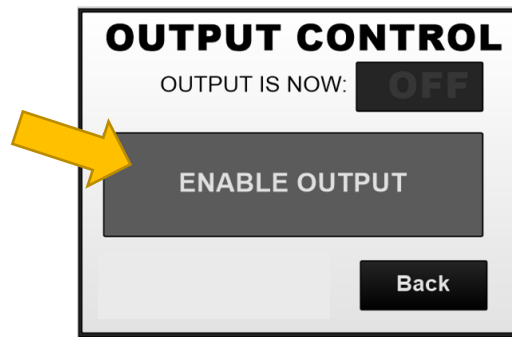


Figure 6: CoolMax Output Control (Output OFF)



IMPORTANT

Once the output is initially enabled (after setup), the CoolMax will remember its output state even if power is lost.

Once enabled, the **OUTPUT CONTROL** screen will show that the **OUTPUT IS NOW ON** (Figure 6A) after a few seconds.



Figure 6A: CoolMax Output Control (Output ON)

Setting the Time/Date

From the Real Time Telemetry Screen (Figure 5), select the Menu button at the bottom left of the page to take you to the MAIN MENU screen page (Figure 7).

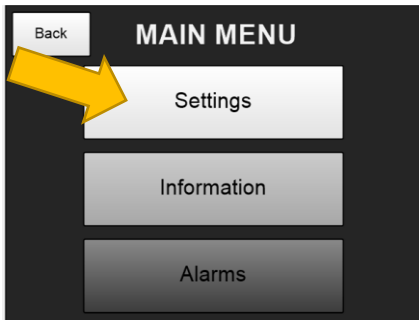


Figure 7: Main Menu Screen

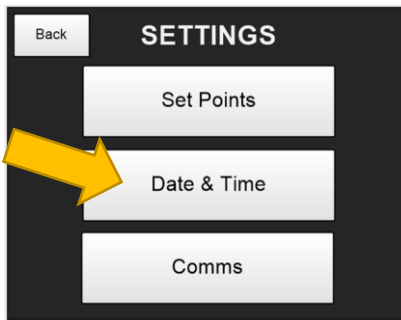


Figure 8: Settings Screen

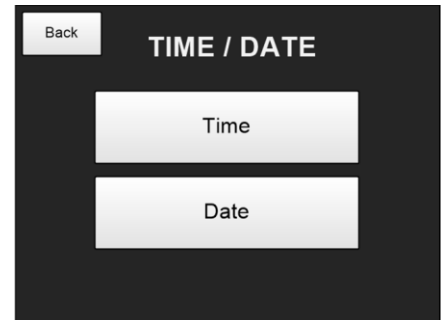


Figure 9: Time / Date Screen

Then press the **SETTINGS** button on the MAIN MENU screen page and this will take you to the SETTINGS Screen (Figure 8). On the SETTINGS Screen page (Figure 8) press the TIME / DATE button and this will take you to the TIME / DATE Screen page (Figure 9).

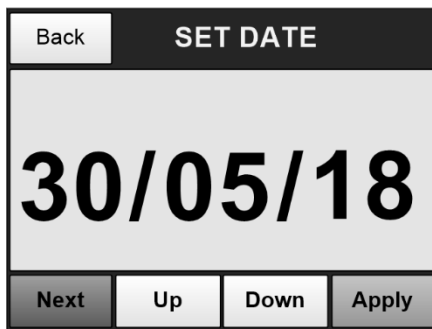


Figure 10A: Date Edit Screen



Figure 10B: Time Edit Screen

To set the Time, press the **TIME** button on the TIME/ DATE screen and this will take you to the SET TIME Screen (Figure 10B). When you reach the SET TIME screen (Figure 10B), use the “Next” button at the bottom left of the page to move between the various digits and the “Up” and “Down” buttons to edit the digits.

Once you have the correct Time setting, press the “Apply” button to lock in the new setting. This will also take you back to the TIME / DATE screen (Figure 9) from which you can now set the Date.

To set the Date, press the **DATE** button on the TIME/ DATE screen and this will take you to the SET DATE Screen (Figure 10A). When you reach the DATE EDIT screen (Figure 10A), use the “Next” button at the bottom left of the page to move between the various digits and the “Up” and “Down” buttons to edit the digits.

Once you have the correct Date setting, press the “Accept” button to lock in the new setting and take you back to the TIME / DATE screen.

Auxiliary Functions

The CoolMax SRX offers several auxiliary functions via the 8-Pin connection on the bottom of the device. The pin-out for this connector is demonstrated in **Figure 11** below. The corresponding female version of the 8-Pin connector is available from AERL (Part Number: **AUX-8-PIN-F**).

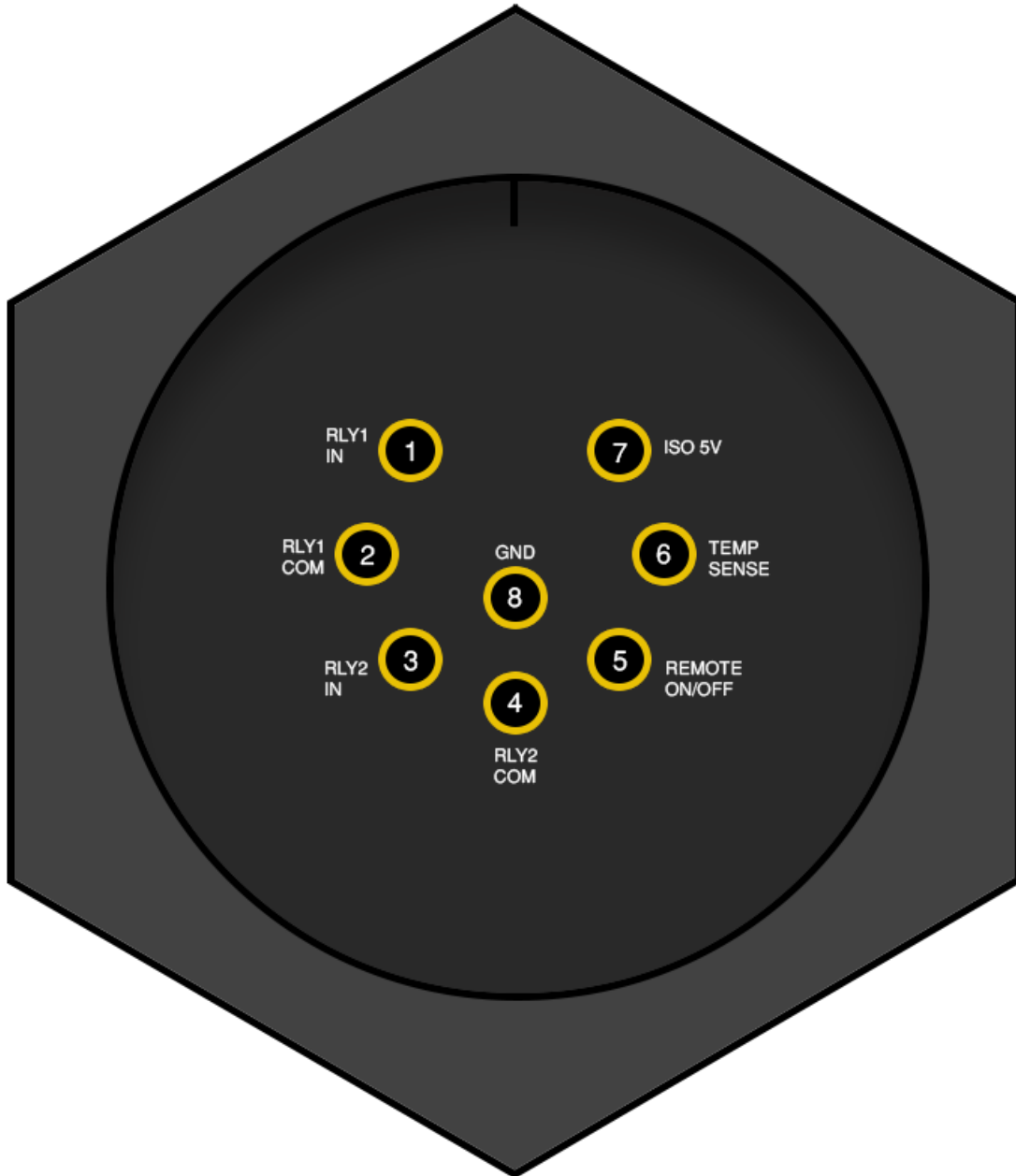


Figure 11: AUX (8-PIN) Connector Pin-Out

Battery Temperature Compensation



IMPORTANT

To utilize the CoolMax SRX battery temperature compensation functionality, an AERL CoolMax SRX Remote Temperature Sensor will be required.

Part Number: SRX-RTS

Temperature compensation measures the temperature of the batteries and adjusts the float and absorb voltage set points to the ideal voltage for batteries at that temperature.

Using the temperature of the batteries, the COOLMAX SRX adjusts voltages by a user specified factor in millivolts per °C. The temperature compensation factor can be set using the COOLMAX SRX front panel LCD display. The compensation factor is per bank, not per cell.

Please refer to **Page 21** of this User Manual for instructions on how to edit this setting in the charge profile.

Connecting the Temperature Sensor



IMPORTANT

A temperature compensation value must be set in the charge profile before the CoolMax SRX will begin to utilize the remote temperature sensor.

To connect your remote temperature sensor to the CoolMax SRX, locate and remove the protective cap from the 8-Pin connector on the bottom of the CoolMax Charge Controller.

Insert the remote temperature sensor connector into the 8-Pin connection (Make sure the orientation is correct and do not force the connection).

Once the connector is inserted, lock it in place by turning the outer ring until the connector is secured.

Temperature Sensor Location

The CoolMax SRX remote temperature sensor must be located in close proximity to the battery cells for accurate results. Securing the temperature sensor in a central location near the top of the bank is recommended.



CAUTION – Equipment Damage

Do not place the RTS in a location where it may be exposed to water, moisture, direct sunlight or chemical material.



Relay Alarms / GENSET Control

The CoolMax SRX features two built-in 12V/1A relays for alarm and indication purposes.

Relay 1 (RLY 1) is utilized as a float indication relay and will activate when the battery bank reaches float. This relay can be used to alert the associated battery inverter to the battery's state of charge.

Relay 2 (RLY 2) is utilized as a Low Battery Voltage Alarm which is commonly used to trigger a generator start with programmable parameters that can be adjusted in the **CoolMax Utility Software**.

The relays are located on Pins 1 to 4 of the AUX 8-Pin connector demonstrated in **Figure 11** (Page 26).

When a relay is activated, the relay contact will be connected inside the CoolMax SRX. When the relay deactivates, the relay pins will be completely disconnected from each other.

As such, an external alarm or GENSET control circuit can be used to sense whether the relay is open or closed.

Remote On/Off Switch

The remote ON/OFF control can be implemented with a single switch connected between the **Remote On/Off Pin** (Pin 5) and **GND Pin** (Pin 8) - see **Figure 11** [Page 26].

The CoolMax SRX will sense that the On/Off Pin has been connected to GND when the switch closes and this will disable the output of the unit. The output of the unit will re-enable once the connection is broken.

Communications Protocols

The CoolMax SRX features both Controller Area Network (**CAN bus**) and ModBus RTU (**RS485**) capabilities for remote monitoring and control functionality. The relevant protocol registry maps for integration are available from AERL on request.

Both networking protocols can be accessed via the RJ45 connector located on the bottom of the CoolMax SRX.

The pin-out for this connection is demonstrated in **Figure 12** below.

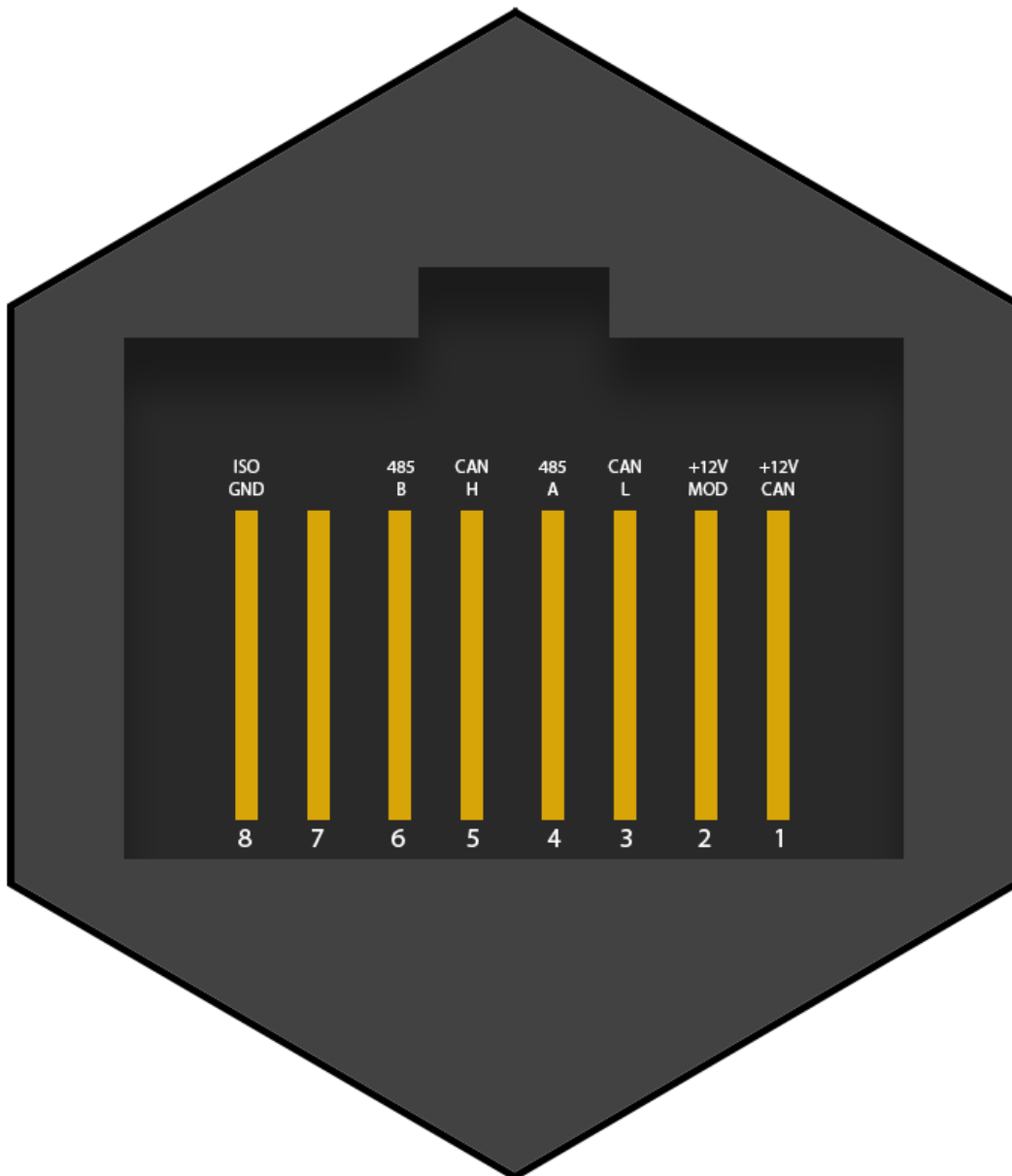


Figure 12: Comms (RJ45) Connector Pin-Out

Master/Slave Configuration

To utilize the Master/Slave functionality of the CoolMax SRX, an **RJ45 ethernet cable**, a **USB Mini B cable** and the **CoolMax Utility Software** are required to link the units over the CAN bus network and configure the relevant comms settings.



IMPORTANT

The **CoolMax Utility Software** is available from the **Downloads** section of the AERL website.

Visit www.aerl.com.au/downloads/ to download the latest version.

With the controllers initially powered down, follow the steps below configure parallel CoolMax SRX controllers as Master/Slave.



IMPORTANT

To configure a Master/Slave installation with more than two SRX units, please contact AERL for further instructions.

1. Remove the **+12V Comms Power Jumper (J2)** from the Comms Module with Needle Nose pliers.

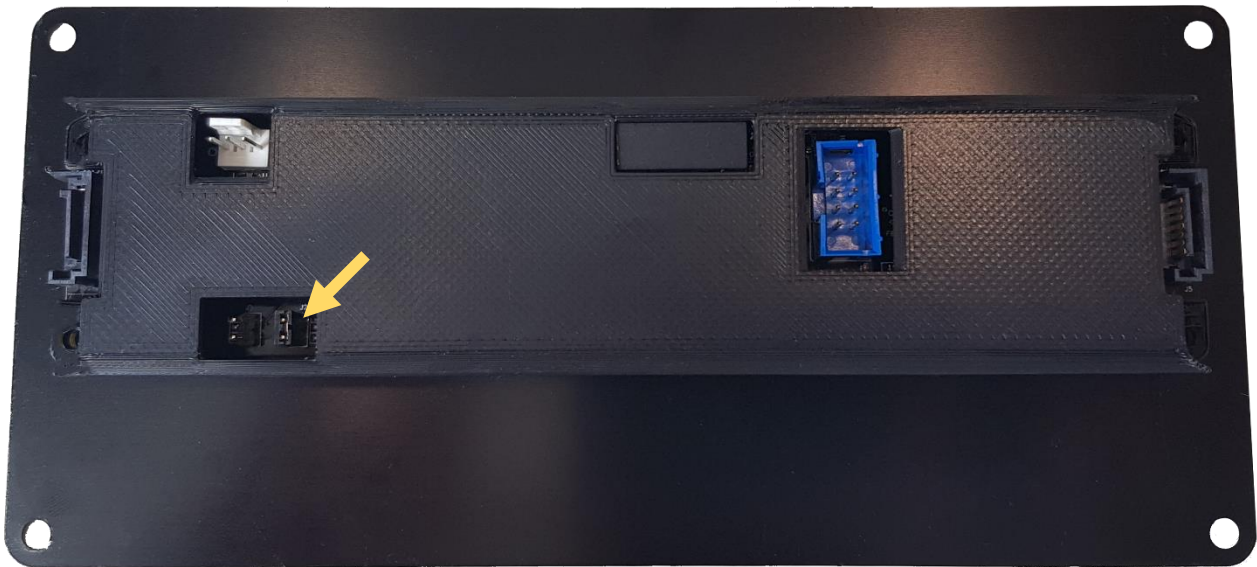


Figure 13: Comms Module Power Jumper (J2) Location

2. Link the two controllers via an **RJ45 Ethernet (CAT 5/6)** cable as demonstrated in **Figure 14** below.

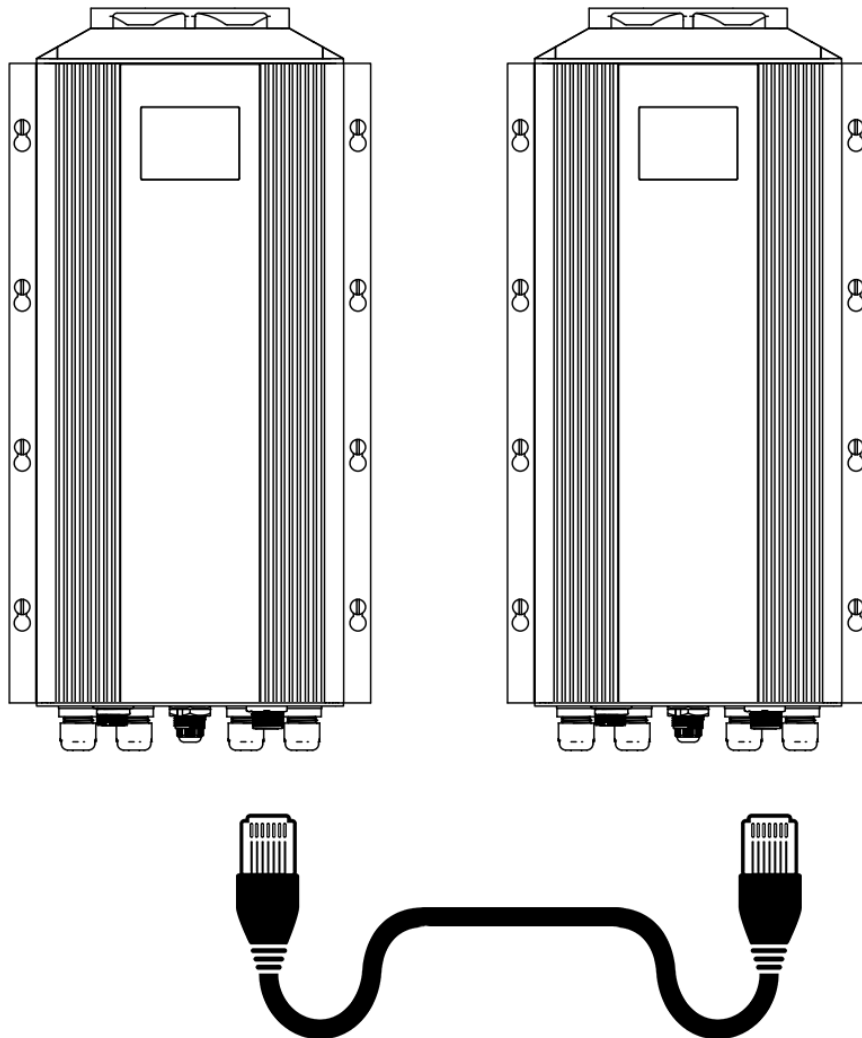


Figure 14: Connecting the SRX Comms for Master/Slave over CAN bus.

3. You can now power on controllers and configure the **Master’s** Charge Profile via the LCD.
 - a. Refer to **Pages 19, 20** and **21** for instructions on configuring the charge profile for your relevant application.

4. After configuring the **Master’s** Charge Profile, input the same settings into the **Slave’s** Charge Profile.
 - a. The settings on the slave device will be used to verify commands from the Master, and as a backup configuration in the event of comms loss.

5. Once both the Master and Slave’s charge profiles are configured, plug the Mini B USB cable into the bottom of the Slave SRX and the other end into your laptop or portable Windows device.

6. Open the **CoolMax Utility Software (Run as Administrator)** and hit “**Connect**” in the top left-hand corner of the program as demonstrated in **Figure 15** below.
 - a. If the program doesn’t successfully connect, you may need to try an alternative Comms Port as selected by the drop down next to the “**Connect**” button.
 - b. Upon successful connection, you will start to receive real time device telemetry provided the device is powered.

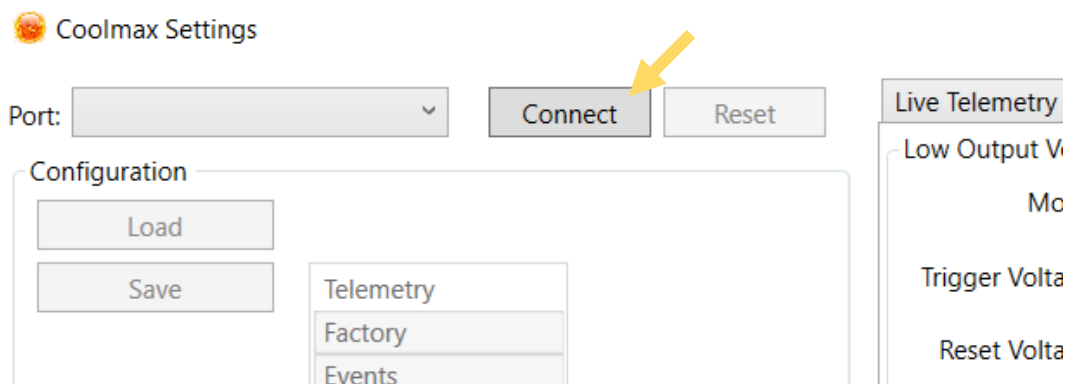


Figure 15: Location of the Connect button on the CoolMax Utility Software.

7. Navigate to the “**User Settings**” tab on the top right-hand side of the program and change the “**Is Slave**” from FALSE to **TRUE** using the drop-down menu as demonstrated below in **Figure 16**.

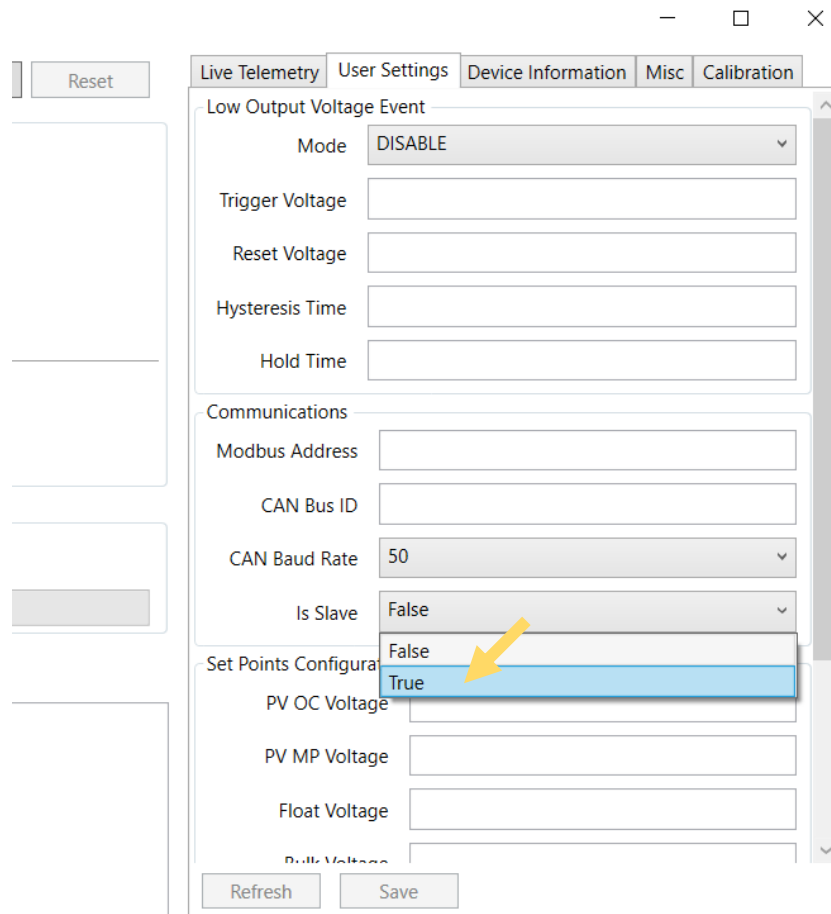
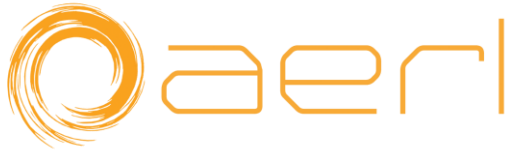


Figure 16: Putting the SRX controller into Slave Mode.

8. Change the CAN Bus ID to 1424 and hit “**Save**” and then subsequently “**Reset**” which is located next to the “Connect/Disconnect” button.
9. The Master/Slave configuration is complete, and you may now **Enable** the output on the **Master** controller via the LCD screen to begin charging.
 - a. Enabling charging on the Master controller should also enable the Slave shortly thereafter if the configuration has been successful.



Troubleshooting

If the COOLMAX SRX detects a warning or error, an alarm will be triggered in the ALARMS tab on the Real Time Telemetry screen.

Error Codes

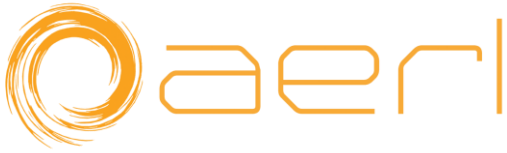
Please refer to the table below for Warning Codes starting with “W” and the table located on *Pg. 29/30* for Fault Codes starting with “F”.

Warning Code	Warning	Warning Description
W001	Low Input Voltage Detected	The PV input voltage is not adequate for the selected battery voltage.
W002	Temperature Sensor Not Detected	The temperature sensor is either unplugged from the Auxiliary 8-Pin port at the base of the device or the temperature sensor is faulty.
W003	Low Genset Voltage Detected	Low voltage detected on the Genset line.
W004	Datalog Full	Internal system datalog is full and can no longer log data.
W005	PV Array Not Detected	The PV array is not detected.
W006	Set Points Out of Bounds	Set Point configuration is outside limits and may be dangerous for selected nominal battery voltage.



Please refer to the table below for Fault Codes.

Fault Code	Error	Error Description
F001	Low Output Voltage Detected	Low output voltage has been detected. <i>Confirm the battery is connected to the controller.</i>
F002	High Output Voltage Detected	High output voltage has been detected.
F003	High Output Current Detected	High output current has been detected.
F004	Reserved	Reserved
F005	High Discharge Current Detected	The battery bank has been detected discharging at an abnormally high rate.
F006	High Battery Temperature Detected	The battery temperature sensor has detected high battery temperature. Operating the battery at a high temperature will greatly reduce its lifespan.
F007	Input Breaker Open	PV Input breaker has been detected as open.
F008	Output Breaker Open	Battery Output breaker has been detected as open.
F009	System Power Overload	
F010	Negative PV Current Detected Safety Shutdown	Negative PV current has been detected. The device has shutdown to prevent system damage.
F011	High PV Current Critical Safety Shutdown	High PV input current has been detected. The device has shutdown to prevent system damage.



Fault Code	Error	Error Description
F012	High PV Voltage Critical Safety Shutdown	High PV Voltage has been detected. The device has shutdown to prevent system damage.
F013	High Output Current Critical Safety Shutdown	High output current has been detected. The device has shutdown to prevent system damage.
F014	Output Voltage Out of Range	<p>The detected battery voltage is outside of the allowable operating range for the selected nominal battery voltage.</p> <p>Please check the nominal voltage set point is correct.</p> <p>Upper Limit = Absorb Voltage + 3V.</p> <p>Lower Limit = Absorb Voltage / 1.4.</p>
F015	Active Cooling Failure	The device has detected a fault with the active cooling system. Please contact AERL for assistance and/or a replacement fan module.
F016	Internal Core Temperature Critical - Safety Shutdown	The device’s internal systems have reached a critical temperature and shutdown to prevent system damage.

Frequently Asked Questions (FAQ)

My CoolMax’s Temperature (I) reading seems high, is this normal?

The (I) internal core temperature reading displayed on the real time telemetry screen is taken from the heart of the transformer core inside the CoolMax. It is perfectly normal for this to reach temperatures of up to 50 degrees or more above ambient.

The CoolMax has active temperature safety monitoring and will reduce the throughput power or shut down temporarily if temperatures are too extreme.



USER MANUAL

COOLMAX SRX MV – Wall Mount
Australian Energy Research Labs
AER07.004 – G3 Rev 8
28th September 2020

Note: The CoolMax troubleshooting guide and documentation is being improved regularly. In the event that the relevant situation is not documented, please contact AERL at either support@aerl.com.au or on [07 3129 0330](tel:0731290330), we're happy to help assist with any queries you may have.



This page has intentionally been left blank.



USER MANUAL

COOLMAX SRX MV – Wall Mount
Australian Energy Research Labs
AER07.004 – G3 Rev 8
28th September 2020

This page has intentionally been left blank.