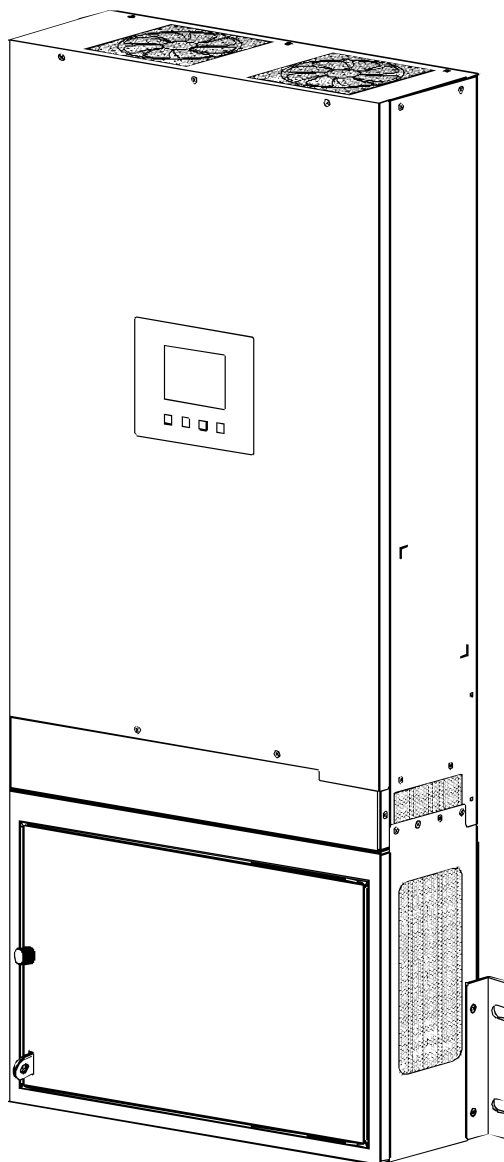


DARFON



INSTALLATION MANUAL

H5001 HYBRID INVERTER

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IMPORTANT SAFETY WARNINGS











Please read all instructions and cautionary markings on the unit and this manual before using the inverter. And, Store this user manual where it can be accessed easily.

This manual is for qualified personnel. The tasks described in this manual may be performed by qualified personnel only.

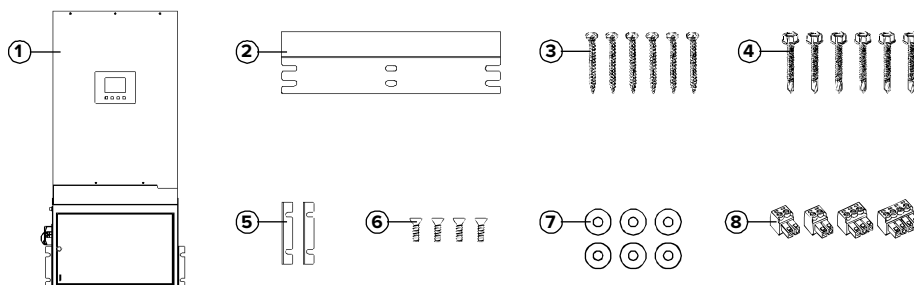
Safety Symbols

	WARNING. This indicates the risk of electric shock. The presence of high voltage levels may constitute a risk of injury or death to users and/or installers.
	CAUTION. This indicates information where failure to comply may result in safety hazards or cause damage to this product.

General Precautions

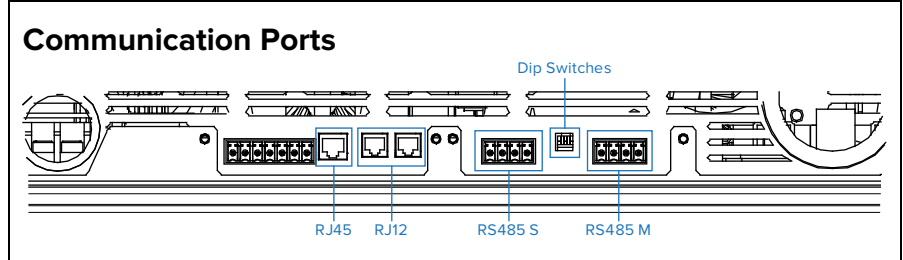
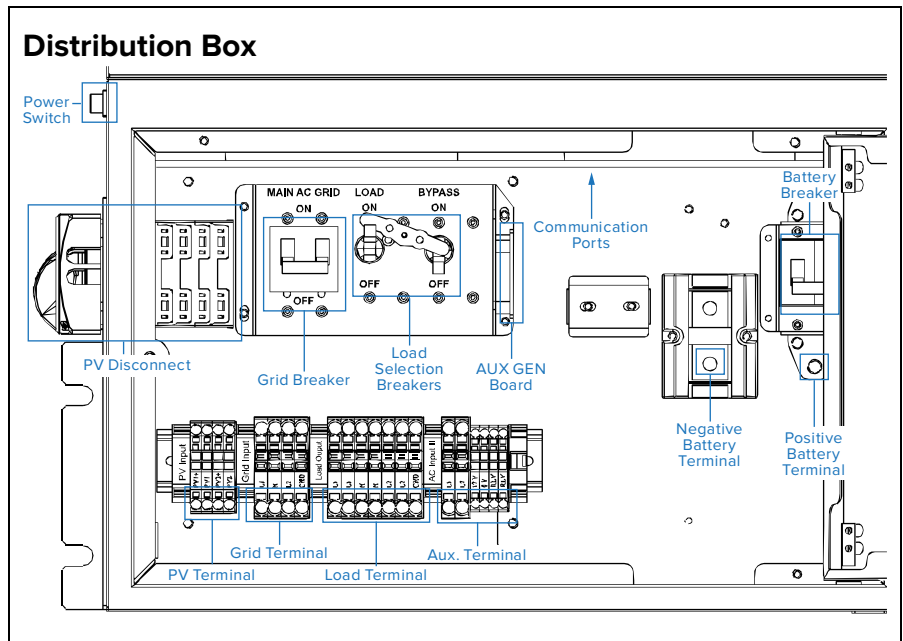
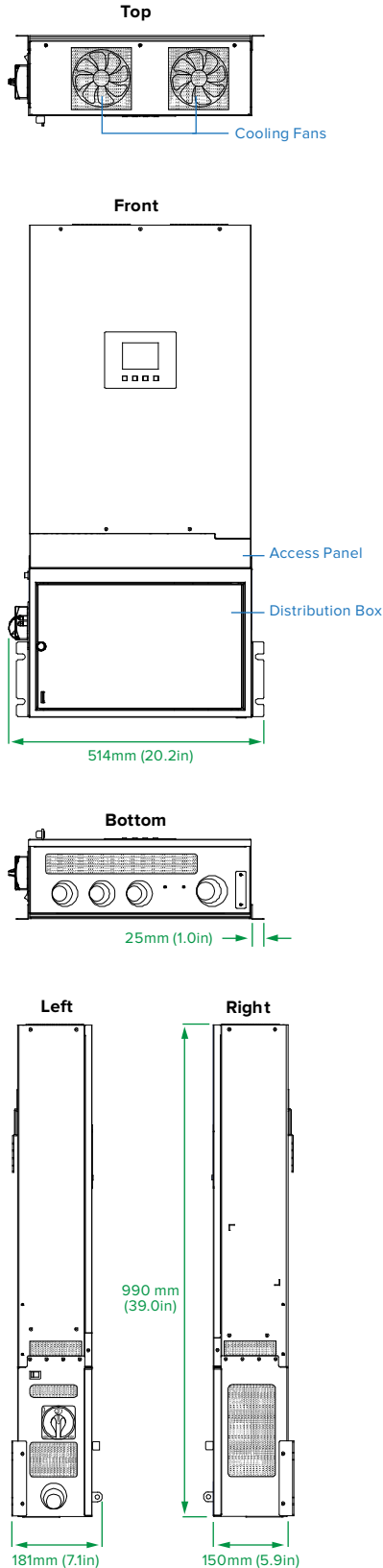
-  **CAUTION.** Before installing and using this inverter, read all instructions and cautionary markings on the inverter and all appropriate sections of this guide. Installing this inverter by licensed electricians only.
-  **CAUTION.** Normally grounded conductors may be ungrounded and energized when a ground fault is indicated.
-  **CAUTION.** This inverter is heavy. It should be lifted by at least two persons for the safety.
-  **WARNING.** Authorized service personnel should reduce the risk of electrical shock by disconnecting AC, DC and battery power from the inverter before attempting any maintenance or cleaning or working on any circuits connected to the inverter. Turning off controls will not reduce this risk. Internal capacitors can remain charged for 5 minutes after disconnecting all sources of power.
-  **WARNING.** Do not disassemble this inverter yourself. It contains no user-serviceable parts. Attempt to service this inverter yourself may cause a risk of electrical shock or fire and will void the warranty from the manufacturer.
-  **WARNING.** To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that the wire is not undersized. Do not operate the Inverter with damaged or substandard wiring.
-  **CAUTION.** To reduce risk of fire hazard, do not cover or obstruct the cooling fan.
-  **CAUTION.** Do not operate the Inverter if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the Inverter is damaged, call for an RMA (Return Material Authorization).
-  **CAUTION.** System design and installation must follow electrical specifications. Improper applications or misuse of the product may damage the product and void the warranty.
-  **CAUTION.** Damages or malfunctions due to misuse, abuse, negligence, power surges, fire, natural disasters, pests, direct exposure to sea water, force majeure, or other unforeseeable circumstances outside the range of influence of Darfon are not covered under warranty.

WHAT'S IN THE BOX



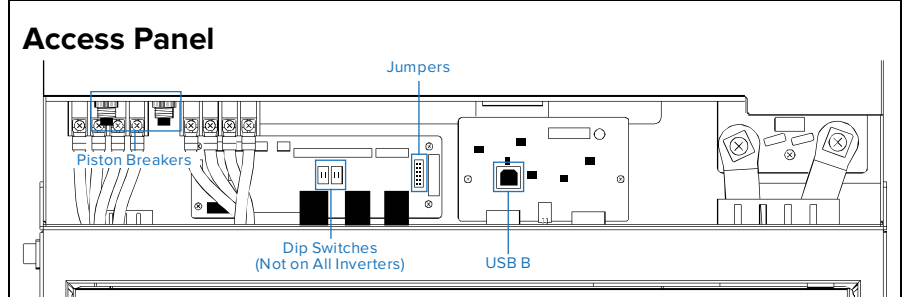
Parts Description	Qty
1. H5001 Inverter	1
2. Backplate	1
3. Wood Screws	6
4. Self-Drilling Screws	6
5. Brackets	2

PRODUCT OVERVIEW



PORT	FUNCTION
RJ45	For External Display
RJ12 (x2)	For Parallel (Stacking) Function
RS485 S	For Data Logger
Dip Switches	For Long Distance RS485 Communication
RS485 M	For Battery BMS

RS-485 PIN DEFINITIONS							
RS485 S				RS485 M			
1	2	3	4	1	2	3	4
D+	D-	D+	D-	D+	D-	D+	D-



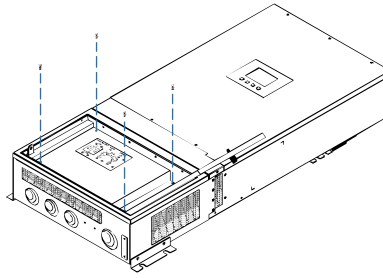
COMPONENT	FUNCTION
Piston Breakers	For Over Current Protection of Grid L1 & L2
Dip Switches	For Firmware Update
Jumpers	For Firmware Update
USB B	For Computer Connection

Dead-Front Cover

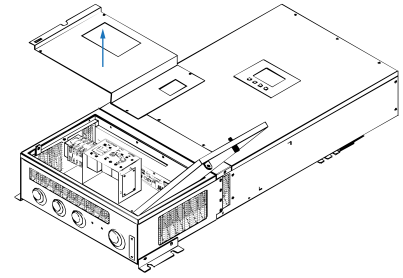
Notes

- The dead-front cover must be removed when making or modifying connections in the distribution box, and reinstalled when connections have been completed.
- To remove the dead-front cover, use the following steps.
- Reverse the steps to reinstall the dead-front cover.

1. Remove the screws from the dead-front cover.



2. Pull off the dead-front cover.



Mounting the Inverter

Notes

- The unit cannot be mounted on flammable construction materials.
- Allow 20cm (8in) of clearance to the sides and 50cm (20in) to the top and bottom of the unit for proper air circulation to dissipate heat.
- The unit has an IP20 protection rating and a PD2 Pollution Degree rating. The unit is for indoor applications only and must be mounted in a protected area that is dry, free of excessive dust and has adequate air flow.

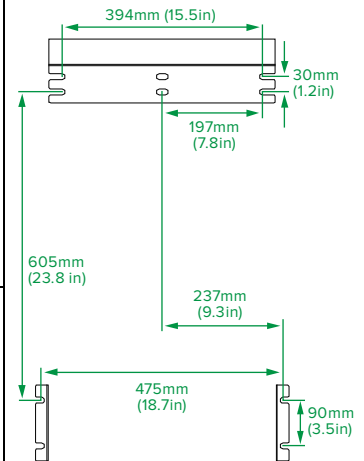


CAUTION. The inverter is heavy (87lb/40kg). Mounting should be handled by two people. Do not place any additional weight onto the inverter.

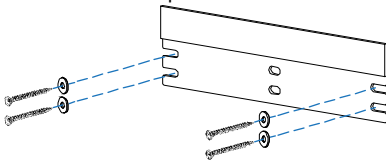
Wall Types

- Stud: The inverter will need to be mounted to the wall using Unistrut. The Unistrut must be secured to two studs in the wall. There should be two rows of Unistrut installed: one for the backplate and the other for the side brackets.
- Solid: Use the backplate and mounting dimensions to mark for screw locations.

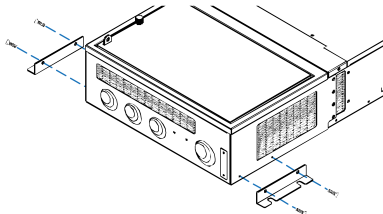
Mounting Dimensions



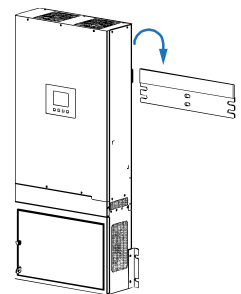
1. Mount the backplate onto the wall.



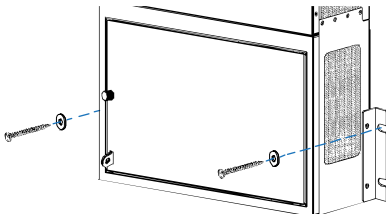
2. Install the brackets the inverter.



3. Hang the inverter onto the backplate.



4. Secure the brackets to the wall. Note: Screw can go into either top or bottom slot of the bracket.



OPERATIONAL MODES

Mode Definitions

There are eight modes of operation: Back-up, Residential, Back-up w/o Feed-in, Residential w/o Feed-in, TOU w/o Batt. Feed-in, TOU w/ Batt. Feed-in, string inverter and remote control. Each mode assumes a set of conditions and prioritizes the consumption of PV, Grid or batteries accordingly to optimize energy flow.

PRESET MODES		DESCRIPTION
1. Back-Up		Keep the battery full and discharge only in cases of power outages
2. Residential		Self-consume from PV and battery first before the Grid
3. Back-Up Without Feed-in		Same as Back-up mode except power will not feed back to the Grid
4. Residential Without Feed-in		Same as Residential mode except power will not feed back to the Grid
5. Time Of Use	Low electricity cost	Operate as Back-up mode
	High electricity cost	Operate as Residential mode
6. Time Of Use With Battery Feed-In	Low electricity cost	Operate as Back-up mode
	High electricity cost	Operate as Residential mode and will feed-in constant power back to the Grid
7. String Inverter		Works as string inverter. Battery is disable.
8. Remote Control		Output and input power can be controlled through communication.

Note: The default feed-in power for modes 5 and 6 is 3000W.

PRESET MODES	PV USE PRIORITY			LOAD PRIORITY			CHARGE FROM		FEED GRID FROM		BATTERY DOD		
	Load	Batt.	Grid	PV	Grid	Batt.	PV	Grid	PV	Batt. (No PV)	On-Grid*	Off-Grid	
1. Back-Up	2	1	3	1	2	3	Yes	Yes	Yes	No	40%	0%	
2. Residential	1	2	3	1	3	2	Yes	No	Yes	No	40%	0%	
3. Back-Up Without Feed-in	2	1	-	1	2	3	Yes	Yes	No	No	40%	0%	
4. Residential Without Feed-in	1	2	-	1	3	2	Yes	No	No	No	40%	0%	
5. Time Of Use	Low electricity cost	2	1	3	1	2	3	Yes	Yes	Yes	No	40%	0%
	High electricity cost	1	2	3	1	3	2	Yes	No	Yes	No	40%	0%
6. Time Of Use With Battery Feed-In	Low electricity cost	2	1	3	1	2	3	Yes	Yes	Yes	Yes	40%	0%
	High electricity cost	1	3	2	1	3	2	Yes	No	Yes	Yes	40%	0%
7. String Inverter	1	-	2	1	2	-	-	-	Yes	-	-	-	
8. Remote Control	Remote controlled						Yes	Yes	Yes	Yes	40%	0%	

*On-Grid Battery DOD listed are default values. Value can be change to be between 10 and 60%.

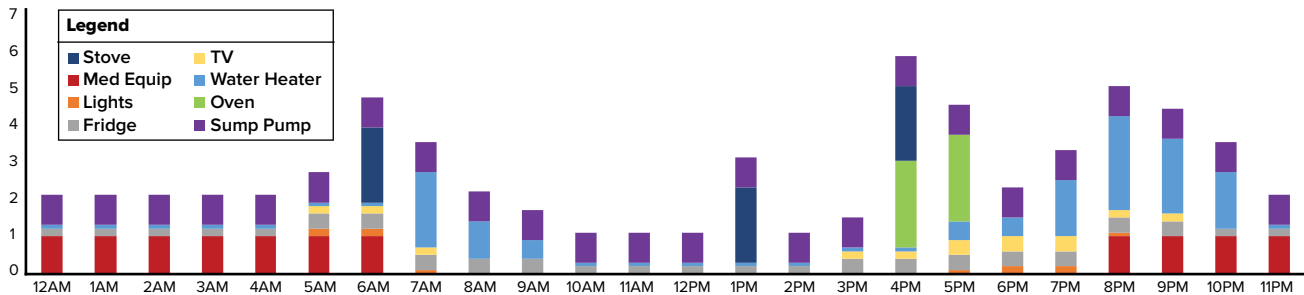
SYSTEM DESIGN

Load Restrictions

Determining which loads the inverter will support is tricky. Having a good understanding of the system owner’s load usage is key in configuring the load correctly. If the load is not configured correctly, it will constantly trip the inverter and produce an overload error. The system will display an overload error when:

1. The continuous power required by the load exceeds the inverter specifications. When the grid is present, the continuous load cannot exceed 7kW. When grid absent, the continuous load cannot exceed 5.5kW.

To ensure the load does not exceed the inverter’s continuous, analyze the system owner’s list of essential loads. Note which hours each load will be running and make sure the total power used per hour does not exceed the inverter limits (7kW with grid, 5.5kW without grid). Below is an example power usage during a 24-hour period.



Note: Loads should be configured in a way that the system owner can easily limit their load to 5.5kW when there are utility outages.

2. Equipment with large inrush current cause power surges that exceeds the inverter specifications. When the grid is present, the inverter can accept power surges up to 7.5kW for 30 seconds. When the grid is absent, the inverter can accept power surges up to 7.5kW, 6.5kW and 5.5kW for 1, 5 and 40 seconds, respectively.

It is important to know the inrush current of major appliances and equipment. Equipment with motors, such as water pumps, will have a large inrush upon startup. Soft start devices should be installed to limit the power surges of any equipment with large inrush currents.

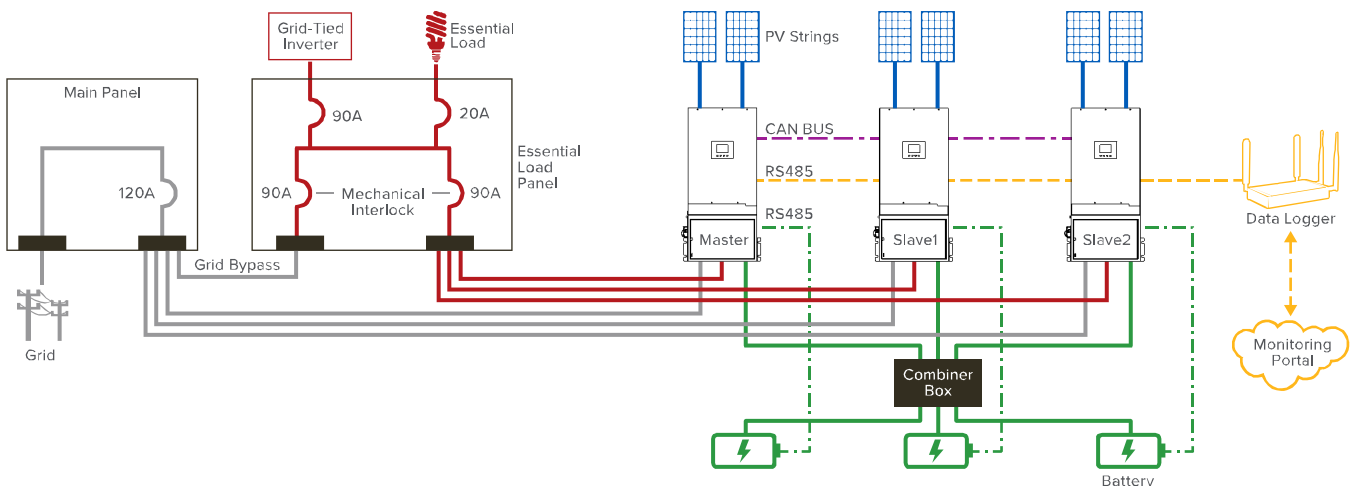
Parallel Operation

Up to 3 H5001 can be connected in parallel. Each H5001 has its own charging capability and can be controlled to work together, so you can incrementally add power and storage in parallel at the same time. This makes designing and configuring sites with larger demands easier.


Note: The installation of a parallel versus a single inverter system is different. To install a parallel system, refer to the H5001 Parallel Installation Guide.

	1x H5001	2x H5001	3x H5001
Max. AC Load Off-Grid	5.5kW	8.8kW	13.2kW
Max. AC Load On-Grid	7kW	14kW	21kW

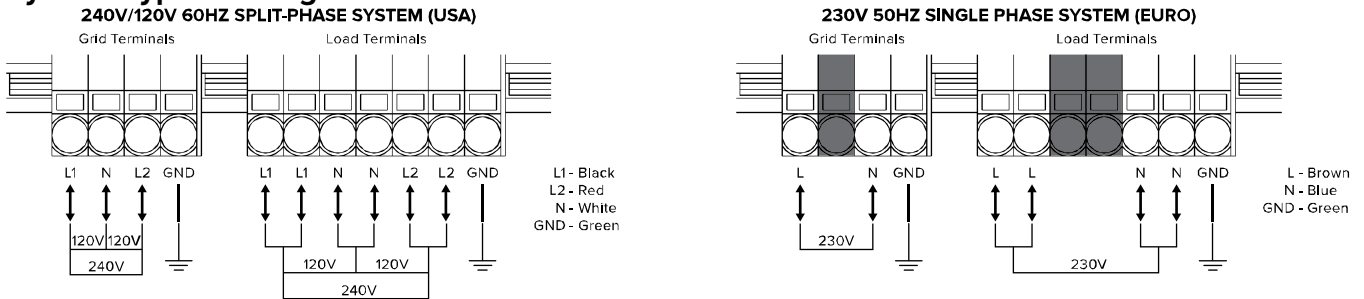
Note:
Battery Cont. Discharge Power > Max. AC Load Off-Grid



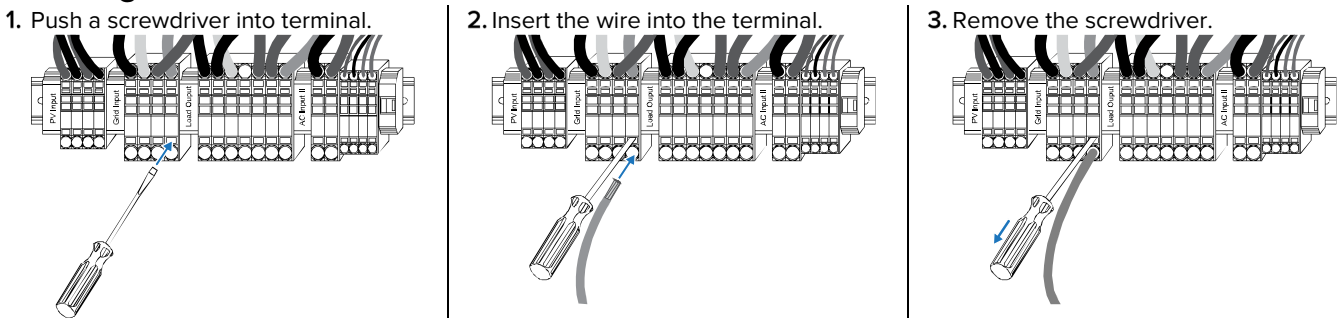
CONNECTIONS

<p>Notes</p> <ul style="list-style-type: none"> Order of wire connections should be Ground, N, L1, L2. Connect AC wires according to the labels on the terminal block or your system type. Connect PV wires into the inverter before connecting them to the PV panels. It is recommended to install surge protection between the modules and the inverter. This will reduce the risk of damage to the inverter due to surge. 	<p>Wire/Cable Requirements</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>PV</th> <th>GRID</th> <th>LOAD</th> <th>BATTERY</th> </tr> </thead> <tbody> <tr> <td>Size</td> <td>12 AWG</td> <td>8 AWG</td> <td>10 AWG</td> <td>3 AWG</td> </tr> <tr> <td>Temp.</td> <td></td> <td>> 105°C</td> <td>> 105°C</td> <td>> 105°C</td> </tr> <tr> <td>Length</td> <td>--</td> <td>--</td> <td>--</td> <td>< 3m</td> </tr> </tbody> </table> <p>Strip 15mm(0.6in) off wires/cables.</p>  <p>PV Restrictions</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>MAX POWER</th> <th>CURRENT</th> <th>MPPT</th> </tr> </thead> <tbody> <tr> <td>PV1</td> <td>3.25kW</td> <td>13A</td> <td>250 - 430VDC</td> </tr> <tr> <td>PV2</td> <td>3.25kW</td> <td>13A</td> <td>250 - 430VDC</td> </tr> </tbody> </table>		PV	GRID	LOAD	BATTERY	Size	12 AWG	8 AWG	10 AWG	3 AWG	Temp.		> 105°C	> 105°C	> 105°C	Length	--	--	--	< 3m		MAX POWER	CURRENT	MPPT	PV1	3.25kW	13A	250 - 430VDC	PV2	3.25kW	13A	250 - 430VDC
	PV	GRID	LOAD	BATTERY																													
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PV1	3.25kW	13A	250 - 430VDC																														
PV2	3.25kW	13A	250 - 430VDC																														
<p>⚠ WARNINGS</p> <ul style="list-style-type: none"> Make sure the circuit breaker is off before making or modifying any connections. To prevent the risk of electric shock, make sure the ground wire is properly earthed before operating this unit whether the grid is connected or not. To reduce the risk of injury, use the recommended wire/cable size. Only install monocrystalline or polycrystalline PV modules with Class A rating. Do not use PV modules with potential leakage current. (e.g., non-grounded PV modules can leak current to the inverter). Do not exceed the maximum PV input voltage, doing so can damage the inverter. Do not apply antioxidant substance on battery terminals connections are made. 																																	

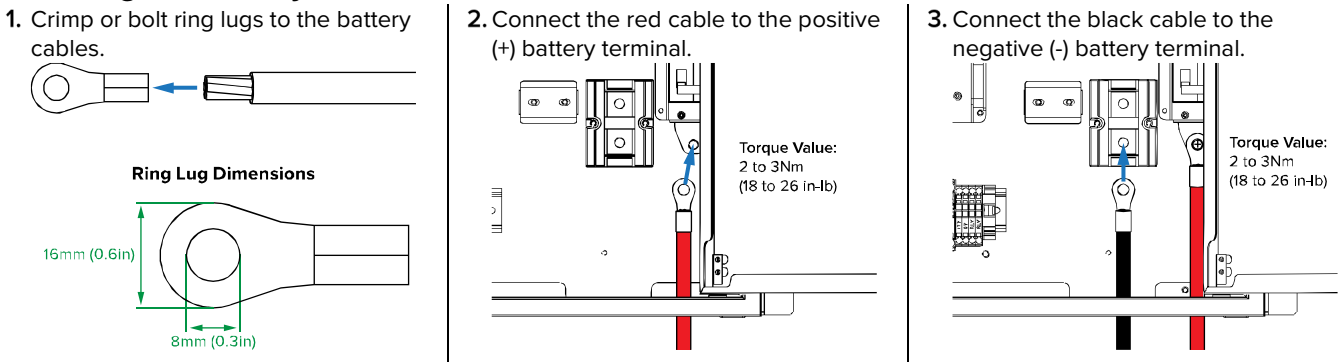
System Types: Wiring Connection



Installing Conductors into the Terminal Blocks



Installing the Battery Conductors



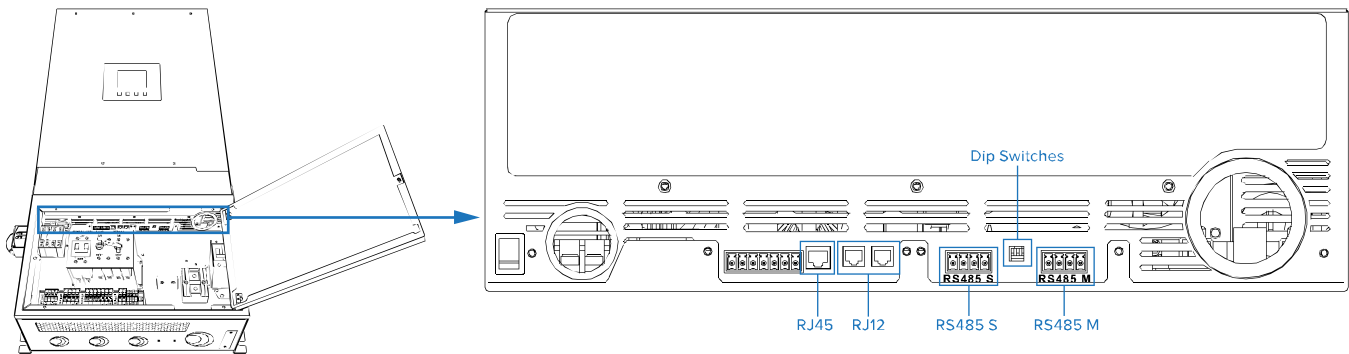
Battery Charging Requirements

The default charging parameters are shown below. Use this as a reference to make sure the battery selected is compatible with the inverter. It is recommended that you use a deep cycle battery when the mode of operation is not set as one of the two back-up modes.

PARAMETERS	LEAD-ACID BATTERY (DEFAULT VALUES)	LITHIUM BATTERIES (DEFAULT VALUES)
Max. Current	60A	60A
Float Voltage	54.4Vdc	N/A
Bulk Voltage	56.4Vdc	Darfon B05LM LMNC: 57.4Vdc Panasonic DCB-105ZK LMNC : 52Vdc Darfon B10LF/B12LF LFP: 54.75Vdc Darfon B09ULF/B14ULF LFP: 51.5Vdc
Charging process	First - charging voltage increases to 56.4V. Second- charging voltage will maintain at 56.4V until charging current is down to 2A. Third- goes to float voltage at 54.4V.	First – SOC voltage increases to bulk voltage. Second - charging voltage will maintain until SOC is 99%. Third- stop charging after 1 hour.

Communication Ports

The inverter has communication ports for data logger communication, battery communication, external display connection and parallel operation. The ports are located inside the distribution box, on the top bulkhead panel.

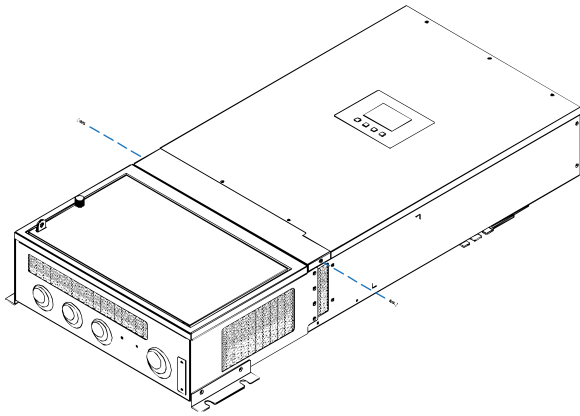


PORT	FUNCTION
RJ45	For External Display. The inverter can only connect to external displays provided by Darfon.
RJ12 (x2)	For Parallel (Stacking) Function. Only inverters of the same model can be installed in parallel.
RS485 S	For Data Logger. Check Darfon website for compatible data logger models.
Dip Switches	For Long Distance RS485 Communication. If the distance between the Data Logger and Hybrid inverter is greater than 50m, then the termination resistor switch on the Hybrid should be switched ON. If the distance between the Data Logger and Hybrid is less than 50m, then the termination resistor switch on Hybrid should be switched OFF.
RS485 M	For Battery BMS. The inverter can only communicate with lithium batteries listed in the “Battery Charging Requirements” section. If installing with Lead Acid or other lithium batteries not listed, the inverter will not be able to communicate with the battery and the battery type should be set as Lead Acid.

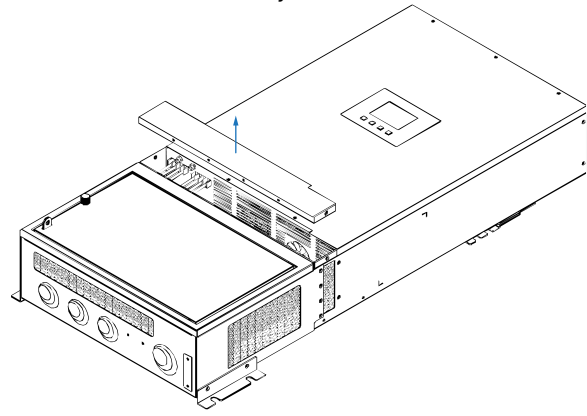
Access Panel

The access panel is used to manually update the inverter’s firmware. The inverter’s firmware can typically be updated via the internet and data logger.

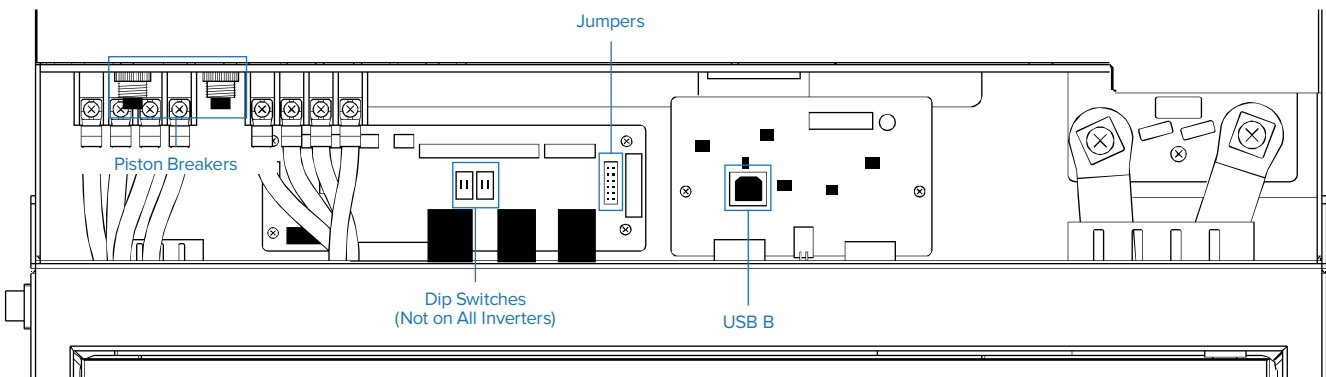
1. Remove the screws on either side of the Access Panel.



2. Lift the Access Panel away from the inverter.



3. Under the Access Panel there, note the locations of the piston breakers, Dip Switches, Jumpers, and USB B port.

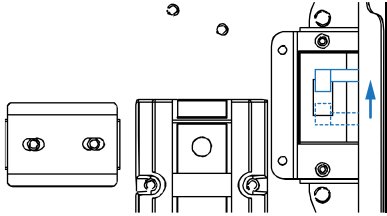


PORT	USAGE	NOTES
Piston Breakers	For Over Current Protection	There are three circuit breakers that protect the Grid path. One circuit breaker is in the distribution box and is rated at 40A. The piston breakers are for Grid L1 & L2 and are rated at 40A. If the Grid is properly connected and the inverter displays warning code 55 (Grid is disconnected), check all three circuit breakers.
Dip Switches	Update firmware	See Firmware SOP for more information.
Jumpers	Update firmware	See Firmware SOP for more information.
USB B Port	For Computer Connection	Connects to a computer to update firmware or AP registry. See Firmware SOP or AP Tool User Guide for more information.

TURNING THE SYSTEM ON/OFF

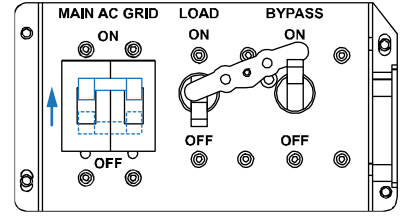
Turning On the System

1. Turn on the battery breaker if batteries are connected.

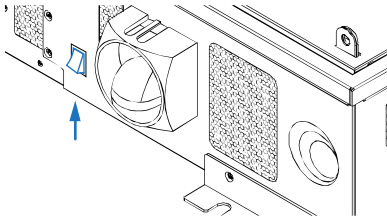


2. Turn on the battery. Refer to the battery's instruction manual.

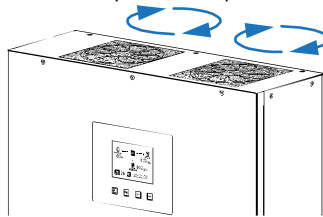
3. Turn on the grid breaker if grid is connected.



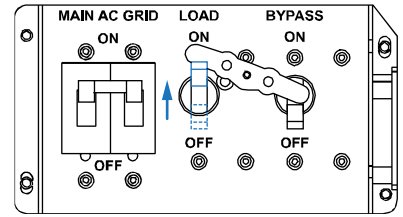
4. Turn on the Power Switch.



5. Wait for system bootup, and the fans to turn on plus 3 beeps.

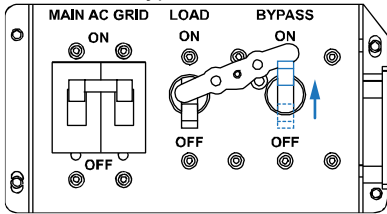


6. Turn on the Load Breaker.

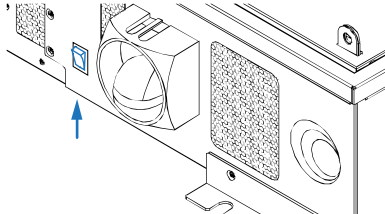


Turning Off the System

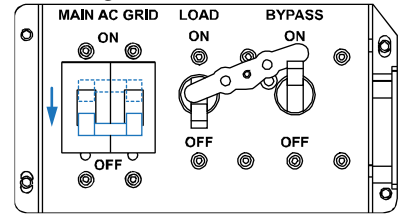
1. Turn on the bypass breaker.



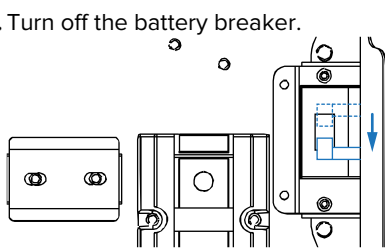
2. Turn off the Power Switch.



3. Turn off grid breakers.



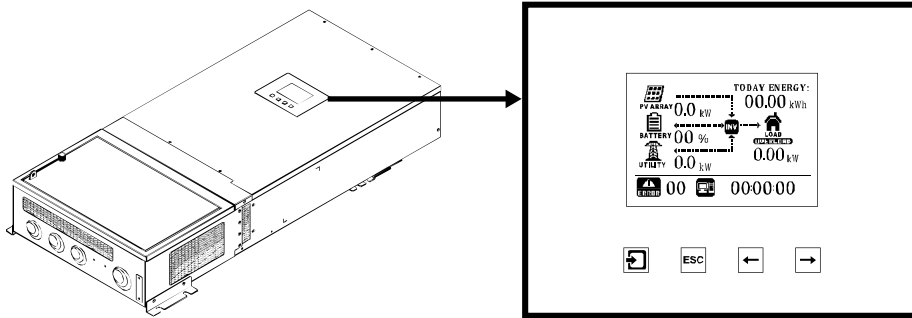
4. Turn off the battery. Refer to the battery's instruction manual.



5. Turn off the battery breaker.

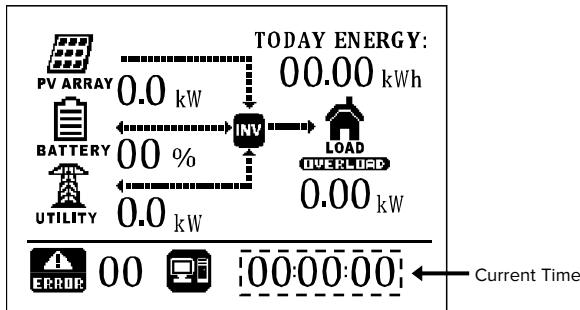
OPERATION AND DISPLAY PANEL

Display Overview



KEY	FUNCTION
	Enters System Settings page or confirms selection.
ESC	Exits setting mode.
	Previous page, previous item or decrease number.
	Next page, next item or increase number.

POWER FLOWS PAGE



POWER INFORMATION PAGE

POWER1 0.00 kW	VOLTAGE 00.0 V
VOLTAGE1 000 V	CURRENT 000.0 A
POWER2 0.00 kW	POWER 0.00 kW
VOLTAGE2 000 V	VOLTAGE 240 V

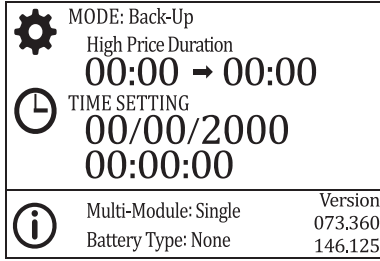
SYSTEM SETTINGS PAGE

	MODE: Back-Up High Price Duration 00:00 → 00:00
	TIME SETTING 00/00/2000 00:00:00
	Multi-Module: Single Version Battery Type: None 073.360 146.125

ICON	DESCRIPTION
	Represents the PV Array
	Represents the Battery Pack
	Represents the Utility
	Represents the Load
	Represents the Hybrid Inverter
	Indicates the Connection to a PC
	Indicates the Error and error codes
	Indicates an overload has occurred
	Represents the System Mode Setting
	Represents the System Time Setting
	Represents the System Information

Changing the Mode of Operation

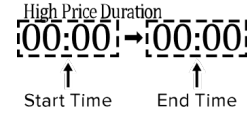
1. In System Setting page, press the key twice.



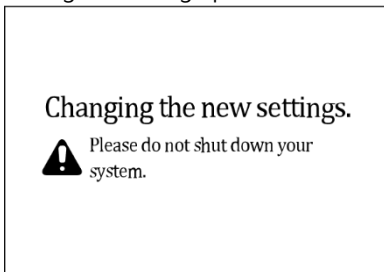
2. Use the ← or → keys to toggle between modes and to select.

MODES OF OPERATION
Back-Up
Residential
Back-Up Without Feed-In
Residential Without Feed-In
Time Of Use
Time Of Use With Battery Feed In
String Inverter
Remote Control

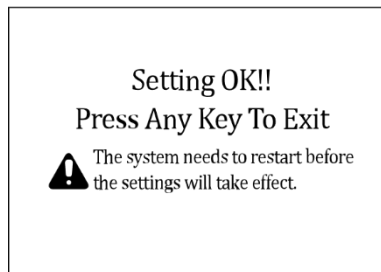
3. (TOU Modes) Enter “High Price Duration” in 24-hour notation. Use the ← or → keys to adjust each digit, and use the key to set it.



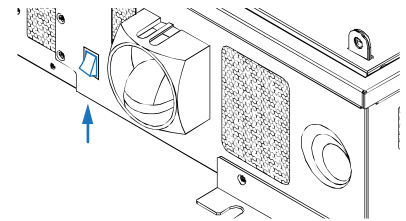
4. When done, press the key. You will see a message stating the settings are being updated.



5. When you see “Setting OK!!” message, press any key.

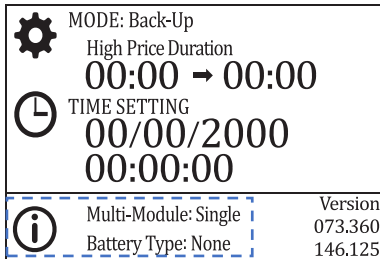


6. Manually restart the inverter using the Power Switch.

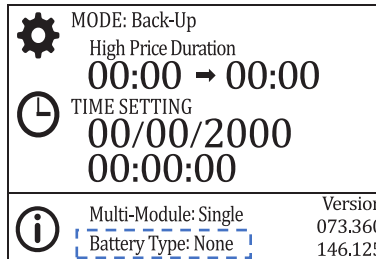


Setting the Battery Type

1. In the System Setting Page, press the to enter the page and select to select Battery Type.



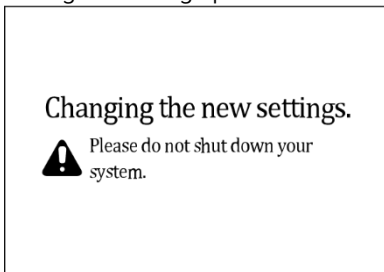
2. Use the ← or → keys to select Battery Type and to select it.



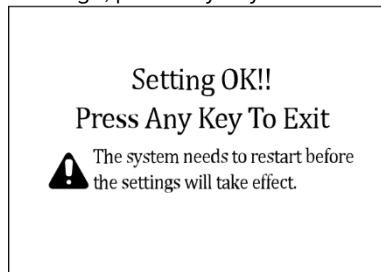
3. Use the ← or → keys to toggle between the battery types and press to select it.

BATTERY TYPE
None
Lead-Acid
GC
Darfon LNMC
Panasonic
Darfon LFP

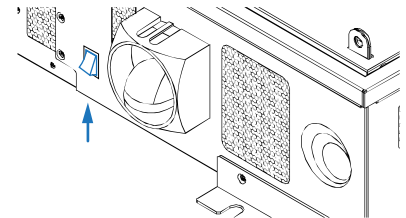
4. You will see a message stating the settings are being updated.



5. When you see “Setting OK!!” message, press any key.



6. Manually restart the inverter using the Power Switch.



APPENDIX A: MAINTENANCE

Cleaning

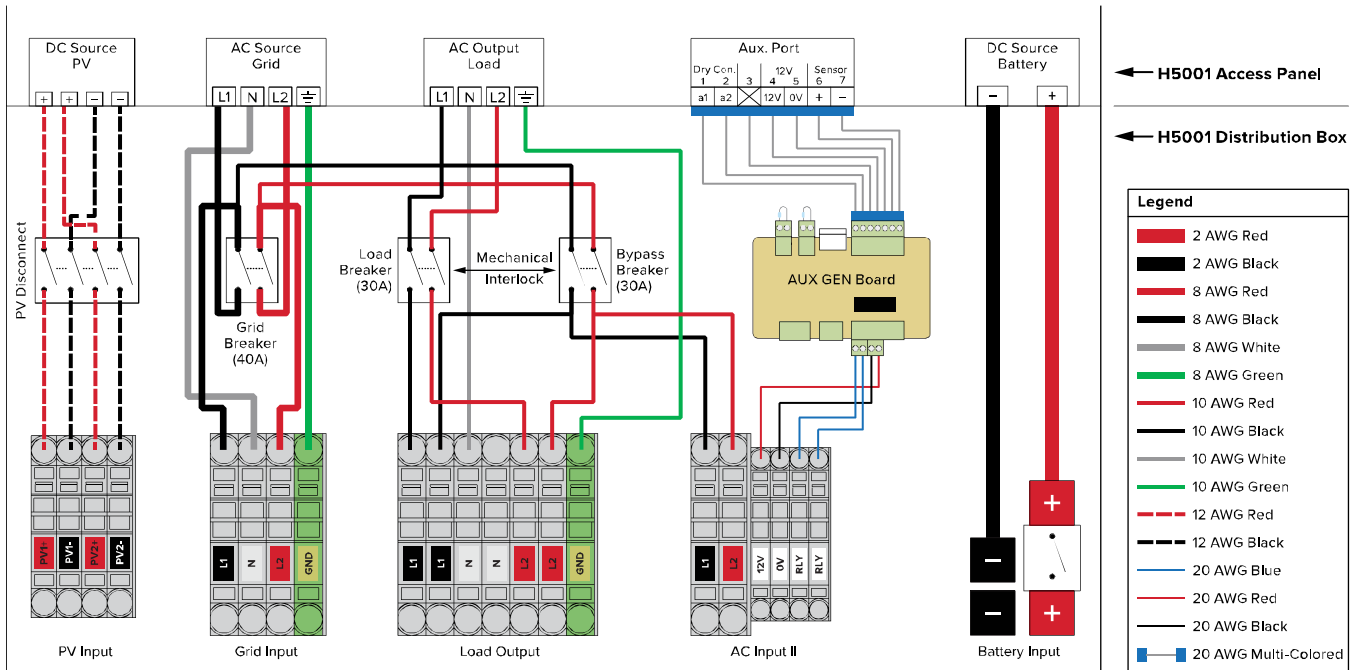
Perform the following maintenance annually or more often if the site requires it to ensure proper operation.

- Clean this inverter, during the cool time of the day, whenever it is visibly dirty.
- Before cleaning this inverter, make sure to turn off all the breakers (AC, battery and PV).
- Ensure all connectors of this inverter are clean.
- Periodically inspect the system to make sure that all wires and supports are securely fastened in place.

⚠ CAUTION. There are no user-replaceable parts inside the inverter. Do not attempt to service the unit yourself.

Distribution Box Wiring Diagram

When replacing breakers or wires in the distribution box the following rules must be observed: (1) all AC breakers must be sized for 40A or less, and (2) all wiring must be sized for 40A or more. The following diagram shows how the distribution box is electrically connected to the hybrid inverter.



NOTES:


- The H5001 has L1 and L2 connections for two AC input sources, although it can only accept one source at a time. The H5001 has separate neutral connections for grid input, generator input and output. These are electrically common. The distribution box is both an input conduit box and an AC load center.
- The distribution box also contains maintenance transfer switches (load selection breaker). Maintenance transfer switching assemblies allows for the inverter to be taken offline if necessary without shutting the entire system down. These assemblies include an interlock mechanism that isolates the AC Lines from each other.
- Generator function is optional, if need please contact your Darfon representative to buy generator kits. Generator application schematic please refer to generator user manual.



















Error and Warning Definition

On the Power Flows Page, the **ERROR** icon will flash when there is an error. Below are the error codes and their solutions.

CODE	FAULT EVENT	ALARM	ICON	SOLUTION
01	DC bus voltage exceeds the upper threshold	None	ERROR	<ol style="list-style-type: none"> 1. Turn off the inverter. 2. Make sure the PV terminal are not used, and DC Disconnect is off. 3. If Grid is absent, disconnect any grid-tied inverter from to the load terminal. 4. Turn on the inverter. If the error remains, contact your installer.
02	Arc occurs on PV	None	ERROR	Reboot the inverter. If the error remains, contact your installer.
03	DC bus voltage falls below the lower threshold	None	ERROR	<ol style="list-style-type: none"> 1. Turn off the inverter. 2. Measure the voltage at the battery and at the cabling above and below the battery disconnect to make sure voltage is within 44 to 58Vdc. 3. If the voltages are in range, check if the battery went into protection mode. 4. Turn on the inverter. If the error remains, contact your installer.
04	Parallel setting is not correct	None	ERROR	<ol style="list-style-type: none"> 1. Check the parallel setting and mode setting. 2. Check the communication cable between stacking system. 3. Reboot the inverter. If the error remains, contact your installer.
05	Battery discharging current exceeds the upper threshold	On: 1s Off: 1s	ERROR	<ol style="list-style-type: none"> 1. Turn off the inverter. 2. Make sure the Grid, Load and Battery terminals are wired properly.
06	Battery charging current exceeds the upper threshold	On: 1s Off: 1s	ERROR	<ol style="list-style-type: none"> 3. Turn on the inverter. If the error remains, contact your installer.
07	Short circuit on PV1 input	None	ERROR	Reboot the inverter. If the error remains, have your installer check the PV array for short circuits.
08	Short circuit on PV2 input	None	ERROR	
09	Short circuit on AC output	Continuous	ERROR	<ol style="list-style-type: none"> 1. Turn off the inverter. 2. Turn off the load breaker. 3. Make sure L1, L2 and N on the load circuit are not shorted. 4. Turn on the inverter. If the error remains, contact your installer.
10	Leakage current CT fault	None	ERROR	<ol style="list-style-type: none"> 1. Turn off the inverter. 2. If DC Disconnect is on, turn it off. Then turn on the inverter. If the error remains, turn off the inverter again. 3. Turn off the battery breaker. Check the battery and the battery cabling for leaking current. If found, contact your installer. 4. Turn off the load breaker. Check all appliances on the essential load for leaking current. If found, unplug the appliance safely. Then turn on the inverter. 5. If the error remains, turn off the Utility and the inverter's Grid breaker. Then measure the Grid and make sure the impedance of L1, L2 and N relative to ground and to each other should be an open circuit. 6. Reboot the inverter. If the error remains, contact your installer.
11	DC/DC Current Sensor fault	None	ERROR	Reboot the inverter. If the error remains, contact your installer.
14	EEPROM read failure	None	ERROR	
15	Communication with main & secondary controllers are interrupted	None	ERROR	
16	Over temperature fault [The internal temperature is too high]	On: 1s Off: 1s	ERROR	<ol style="list-style-type: none"> 1. Make sure the inverter is properly ventilated by removing any obstruction around the vents. 2. Make sure the fans are working. 3. Turn off the inverter, let it cool down for 10 minutes, then turn it back on. 4. If the error remains, contact your installer.
17	PV input voltage exceeds the upper threshold	None	ERROR	<ol style="list-style-type: none"> 1. If the PV V_{OC} is higher than 500VDC, contact your installer. 2. If the PV V_{OC} is less than 500VDC, turn off the inverter and restart it after 5 seconds. If the error remains, contact your installer.
18	Over power protection [The Grid/ Load power has been over 7.5kW for 30s.]	On: 0.25s Off: 0.75s	ERROR	<ol style="list-style-type: none"> 1. Turn off the inverter. 2. Make sure the load is lower than 5kW 3. Turn on the inverter. If the error remains, contact your installer.
19	PV insulation resistance is too low	None	ERROR	<ol style="list-style-type: none"> 1. Turn off the DC Disconnect. 2. Check if the impedance between positive and negative poles to the ground is greater than 1MΩ. 3. If the impedance is lower than 1MΩ, contact your installer.
20	Battery charging voltage is too high	None	ERROR	<ol style="list-style-type: none"> 1. Turn off the inverter. 2. Make sure the connection between battery and inverter has firm and solid contact. 3. Make sure the battery voltage is within manufacturer's specifications. 4. Turn on the inverter. If the error remains, contact your installer.
21	Fan fault	None	ERROR	<ol style="list-style-type: none"> 1. Reboot the inverter. 2. Make sure the fans are working. If the error remains, contact your installer.
22	Overload [The load exceeds available output power. This error will disappear once load is in an acceptable range.]	On: 0.25s Off: 0.75s	ERROR OVERLOAD	<ol style="list-style-type: none"> 1. If an overload occurs for more than 40 seconds, the inverter will turn off the load output for 30 seconds. If the inverter turns off the load output 3 times within a 5-minute interval, the load output will be turned off indefinitely. 2. To turn the load output back on, reboot the inverter. 3. If overload error appears constantly, decrease the load.
23	PV input over power	None	ERROR	<ol style="list-style-type: none"> 1. Make sure your total PV does not exceed 6.5kW, and each string does not exceed 3.25kW. 2. Reboot the inverter. If the error remains, contact your installer.

CODE	FAULT EVENT	ALARM	ICON	SOLUTION
24	Battery type is wrong	None	ERROR	<ol style="list-style-type: none"> 1. Set the correct battery type according to the battery installed to the system. 2. Reboot the inverter. If the error remains, contact your installer. <p>Note: For third-party lithium batteries, battery type should be set as Lead Acid.</p>
25	RCMU test fault	None	ERROR	Reboot the inverter. If the error remains, contact your installer.
26	Model setting fault	None	ERROR	Reboot the inverter. If the error remains, contact your installer.
27	Battery Voltage Drop [Battery voltage dropped below 30V]	None	ERROR	<ol style="list-style-type: none"> 1. Check the battery BMS errors and the wiring. 2. Reboot the inverter. If the error remains, contact your installer.
28	Battery wake up fault [The system tried to wake up the battery but failed.]	None	ERROR	<ol style="list-style-type: none"> 1. Turn off the inverter. 2. Check the battery voltage. 3. Check the battery breaker and wiring. 4. Check the battery communication cable. 5. Turn on the inverter. If the error remains, contact your installer.

On the Power Flows Page, the  icon will flash when there is a warning. Below are warning codes and their solutions.

CODE	WARNING	ICON	SOLUTION
53	Stacking Canbus communication error		<ol style="list-style-type: none"> 1. Turn off the inverter. 2. Check the canbus communication cables. 3. Turn on the inverter. If error remains, contact your installer.
54	Power island		<ol style="list-style-type: none"> 1. For warning 55. If the Utility is down, wait for it to come back on. 2. Reboot the inverter.
55	Grid is disconnected		<ol style="list-style-type: none"> 3. The inverter will wait for 5 minutes before attempting to connect to the Grid.
56	Grid voltage exceeds the upper threshold		<ol style="list-style-type: none"> 4. If the warning remains, contact your installer.
57	Grid voltage falls below the lower threshold		
58	Grid frequency exceeds the upper threshold		
59	Grid frequency falls below the lower threshold		
61	Battery voltage is too low [Battery voltage is less than 44V (lead-acid) or SOC is lower than 10% (Lithium)]		<p>Wait for the Grid or PV to charge the battery. Warning code will change to 62 once the battery voltage is above 44V or the SOC is above 10%.</p> <p>Note: Battery cannot be discharged, and system output can only come from the Grid.</p>
62	Low battery SOC level [The battery SOC is less than the battery reserve]		<p>Wait for the Grid or PV to charge the battery. Once the SOC reaches 20% above the battery reserve, the warning will be cleared.</p> <p>Notes: If the Grid is absent, the battery can be discharged. If the Grid is present, the battery can be discharged if SOC is above the battery reserve.</p>
63	Battery is not detected		<ol style="list-style-type: none"> 1. Turn off the inverter. 2. Make sure the battery is on. 3. Check battery connection for any loose wiring. 4. Turn on the inverter. If error message remains, contact your installer.
64	Inverter output OCP		<ol style="list-style-type: none"> 1. Inverter output current exceeds the upper threshold. 2. Reboot the inverter. If error remains, contact your installer. <p>Alarm – On: 1s, Off: 1s</p>
65	RS485 communication error		<ol style="list-style-type: none"> 1. Turn off the inverter and check all communication wires. 2. Turn on the inverter. If error remains, contact your installer.
66	Output derated [When system temperature is too high, the output power has been derated.]		<ol style="list-style-type: none"> 1. Make sure the inverter is properly ventilated and the fans are free of debris. 2. If possible, lower the load or ambient temperature. <p>Notes: System output lowered to 60% when the system temperature is higher than 85°C. System output lowered to 80% when the system temperature is higher than 80°C. System output restored to 100% when the system temperature is lower than 70°C.</p>
67	Off Grid Operation		Grid is present, but system is in off-grid mode via remote command.
68	Peak Shaving Over Power		Grid power usage has reached the Peak Shaving Power threshold.
69	Generator mode		The grid is not present, and the inverter is receiving power from the generator.
70	Generator Reverse Feed		Power is feeding back to the generator. If the inverter is setup to have remote control over the generator, the inverter will turn off the generator.
71	Battery voltage Inconsistent		Battery voltage measured by the inverter is not consistent with the BMS value.

APPENDIX B: SPECIFICATIONS

SOLAR DC INPUT		
Nominal Power	6500W	
Operation / MPPT Voltage Range	120 to 500VDC / 250 to 430VDC	
Minimum Start Voltage	150VDC	
Maximum Input Current	13A / 13A (two string input)	
AC OUTPUT TO LOAD	WITH GRID ABSENT	WITH GRID PRESENT
Output Power (Continuous) @ 25°C	5500W	7000W
Overload 40/20/5/1 sec @ 25°C and 240V	5500/--/6500/7500W	--/7500/--/--W
Overload 40/5/1 sec @ 25°C and 120V	2750/3250/3750W	NA
Rated Output Current (RMS)	23A (@120V and 240V)	29A (@120V and 240V)
Output Frequency (Auto Sensing)	50/60Hz	
Output Voltage and Accuracy	L-N: 120V ± 3%; L-L: 240V ± 3%	
Output Voltage Limits	L-L: 180 to 280V (240V Nominal)	
Total Harmonic Distortion (THD)	< 5% at rated power	
Power Factor	>99%	
AC INPUT FROM GRID		
Automatic Transfer Power Rating / Typical Transfer Time	7000W / 20ms	
Input Voltage Limits (Bypass)	L-L: 180 to 280V (240V nominal)	
Input Frequency Range (Bypass)	45 to 54.9Hz / 55 to 65 Hz	
AC OUTPUT TO GRID (GRID SUPPORT)		
Output Power (Continuous) @ 25°C	5000W	
Grid Sell Current Range (Depending On Operation Mode)	0 to 24A (@240V)	
Grid Sell Voltage Range	L-L: 211 to 264V ± 3.0V	
Grid Sell Frequency Range	49.3 to 50.5Hz / 59.3 to 60.5Hz ± 0.05Hz	
EFFICIENCY		
Peak PV to Grid	96%	
CEC weighted PV to Grid	95.5%	
System Standby Power	20W	
System Idle Power	< 8W	
DC BATTERY CHARGER		
Maximum Charge/Discharge Current	60A/150A	
Output Voltage Range	44 to 58V (48V Nominal)	
Compatible Battery Types	AGM, Gel, Li-ion, LiFePO4, Custom	
Battery Bank Range	200 to 600Ah (Suggested)	
GENERAL SPECIFICATIONS		
Product weight	39.4 kg (86.8lb)	
Product dimensions (H x W x D)	990x 448 x 150mm (39 x 17.6 x 5.9in)	
Protection Rating	NEMA Type 1 Indoor/IP20	
Temperature	Operating: -20 to 50°C (-4 to 122°F), power derated > 40°C (104°F) Min Startup: 0°C (32°F) Storage: -25 to 70°C(-13 to 158°F)	
Compliances	UL1741SA, CSA CS22.2, IEEE 1547A, IEEE 1547I, FCC Class B, HECO	

APPENDIX C: CURRENT SENSOR [SOLD SEPARATELY]

Notes

- Reversing the direction of the polarity will give an incorrect reading.
- CT1 must connect to L1 and CT2 must connect to L2. Mismatching the connections will give an incorrect reading.



WARNING. To prevent the risk of electric shock, do not clamp CT sensors onto L1 nor L2 before connecting the 4-pin terminal block in the inverter's AUX GEN board.

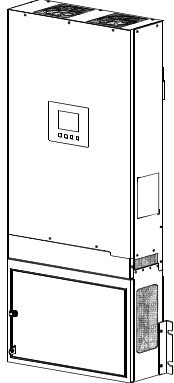
CT Sensor Rating

Choose the correct CT sensor rating based on the rating of the site's main panel.

Main Panel Rating	CT Sensor Rating	CT Sensor Part No.
≤ 300A	300A	JQ.Q3C31.D01
> 300A	600A	JQ.Q3C31.D03

Wiring the Current Sensor

1. Make sure inverter's hardware version is 2 or above. CTs cannot be installed with inverter hardware version 1.



Product Label

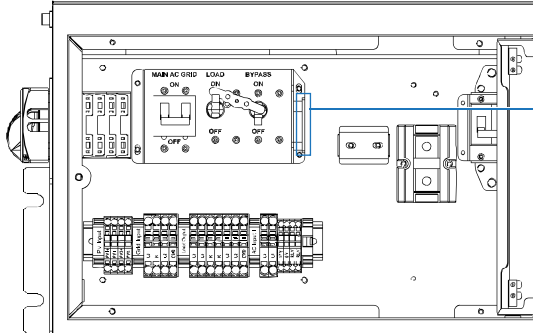


Serial Number

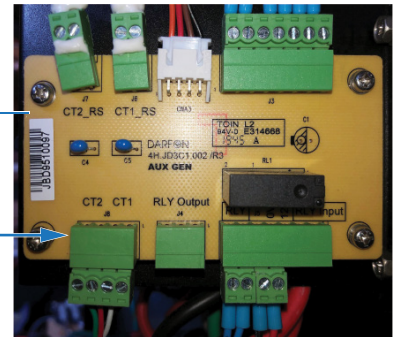
JKQ3C31D020220360067

Hardware Version

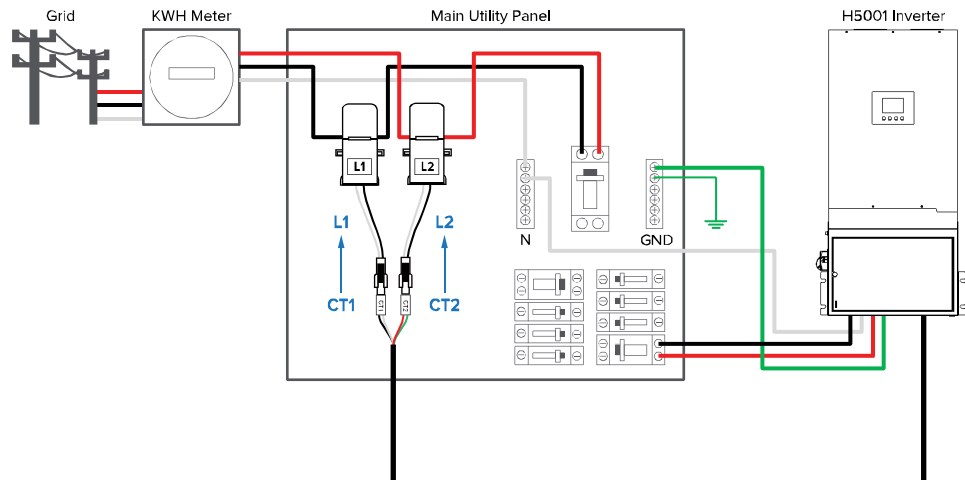
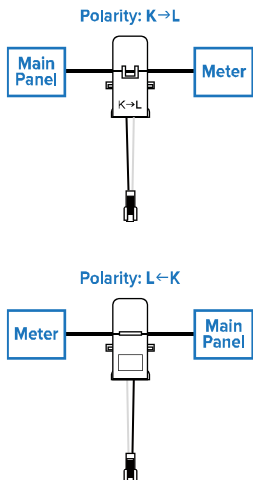
2. Connect the 4-pin terminal block into the inverter's AUX GEN board.



AUX GEN Board



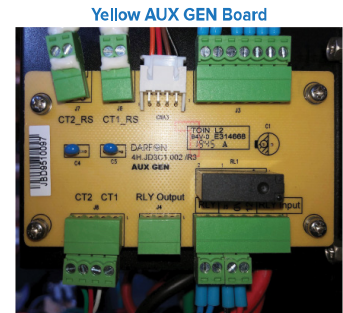
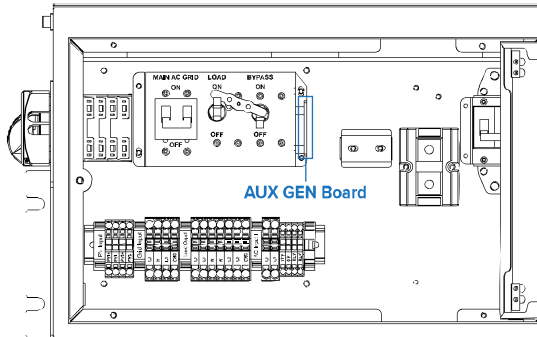
3. Clamp CT1 onto L1 and CT2 onto L2. Make sure the polarity is in the correct direction. The arrow should always point towards the source.



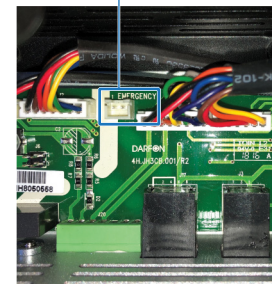
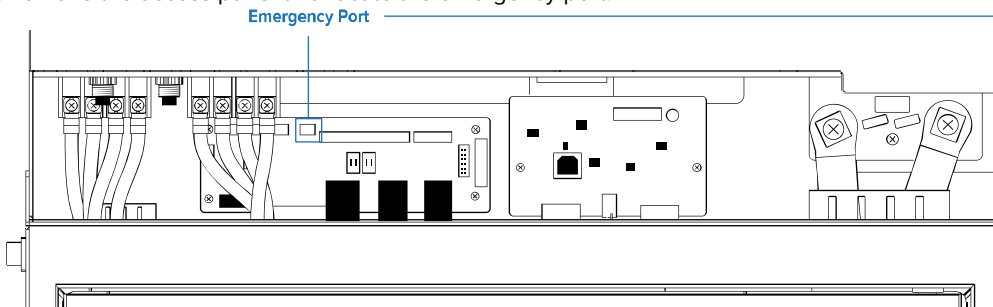
APPENDIX D: EMERGENCY SHUTDOWN BUTTON [SOLD SEPARATELY]

Wiring the Emergency Shutdown Button to the Inverter

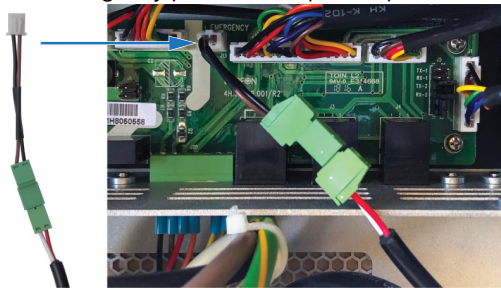
1. Turn off the system.
2. Check the AUX GEN board version. The board will either be green or yellow. If it is yellow, skip to step 5.



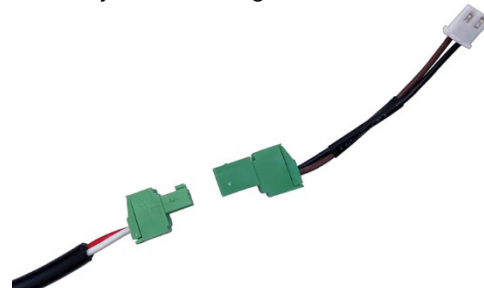
3. Remove the access panel and locate the emergency port.



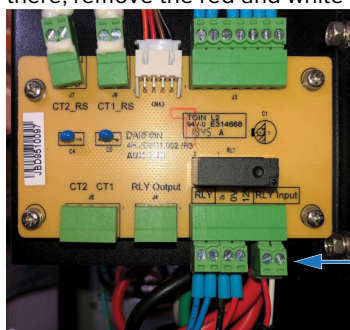
4. Insert the 2-pin connector from the emergency button into the emergency port, then skip to step 7.



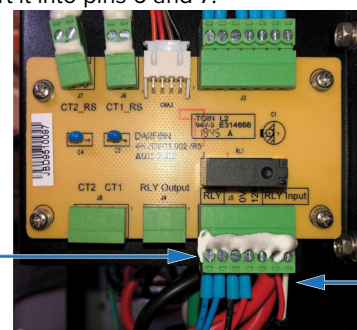
5. Remove the white 2-pin connector from the emergency button by disconnecting the terminal blocks.



6. On the yellow AUX GEN board, connect the terminal block into RLY Input (pins 6 and 7). If a 7-pin terminal block is already there, remove the red and white wire from the 2-pin terminal block and insert it into pins 6 and 7.



Existing 7-pin Terminal Block

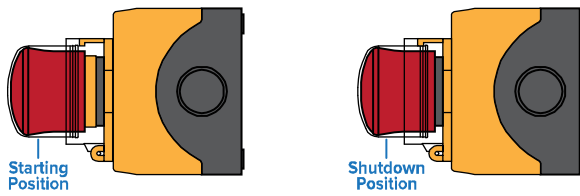


Pins 6 & 7

7. Test the emergency shutdown button.

Testing the Emergency Button

1. Turn on the system and wait for it to bootup.
2. Press the emergency shutdown button. The inverter will immediately shut down.

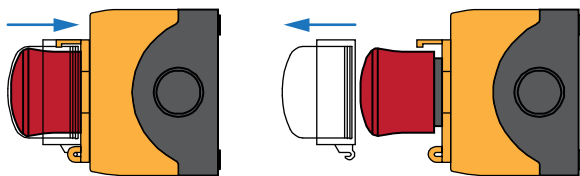


Note: If the inverter did not shutdown. Check the wiring and make sure the connectors are seated properly. Check for conductor continuity as well.

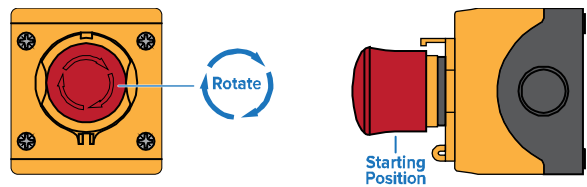
3. Reset the emergency button.

Resetting the Emergency Button

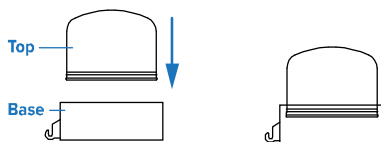
1. Remove the safety cover. While pressing the button down, pull the safety cover away.



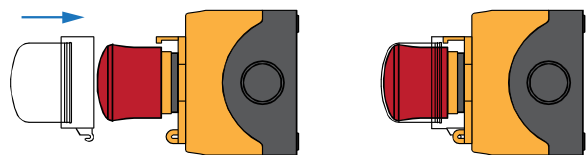
2. Reset the emergency button. Rotate button clockwise. The button will pop back to the starting position.



3. Reset the safety cover. Push the top section of the safety cover onto the base until it clicks into place.



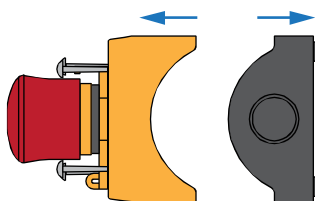
4. Put the safety cover back over the button. Be careful not accidentally press the button.



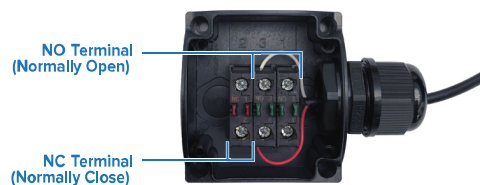
Troubleshooting

If the inverter shuts down immediately after it is turned on, the emergency button may have been set incorrectly. Open the emergency button and check the wiring.

1. Unscrew the four screws and pull the base apart.



2. Confirm the wires are connected to a terminal labelled "NO". Rewire to a "NO" terminal if the wiring is incorrect.





Manufactured by

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