



Fortress Power

Energy Storage Systems

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TOPICS

Growth Opportunity with Us

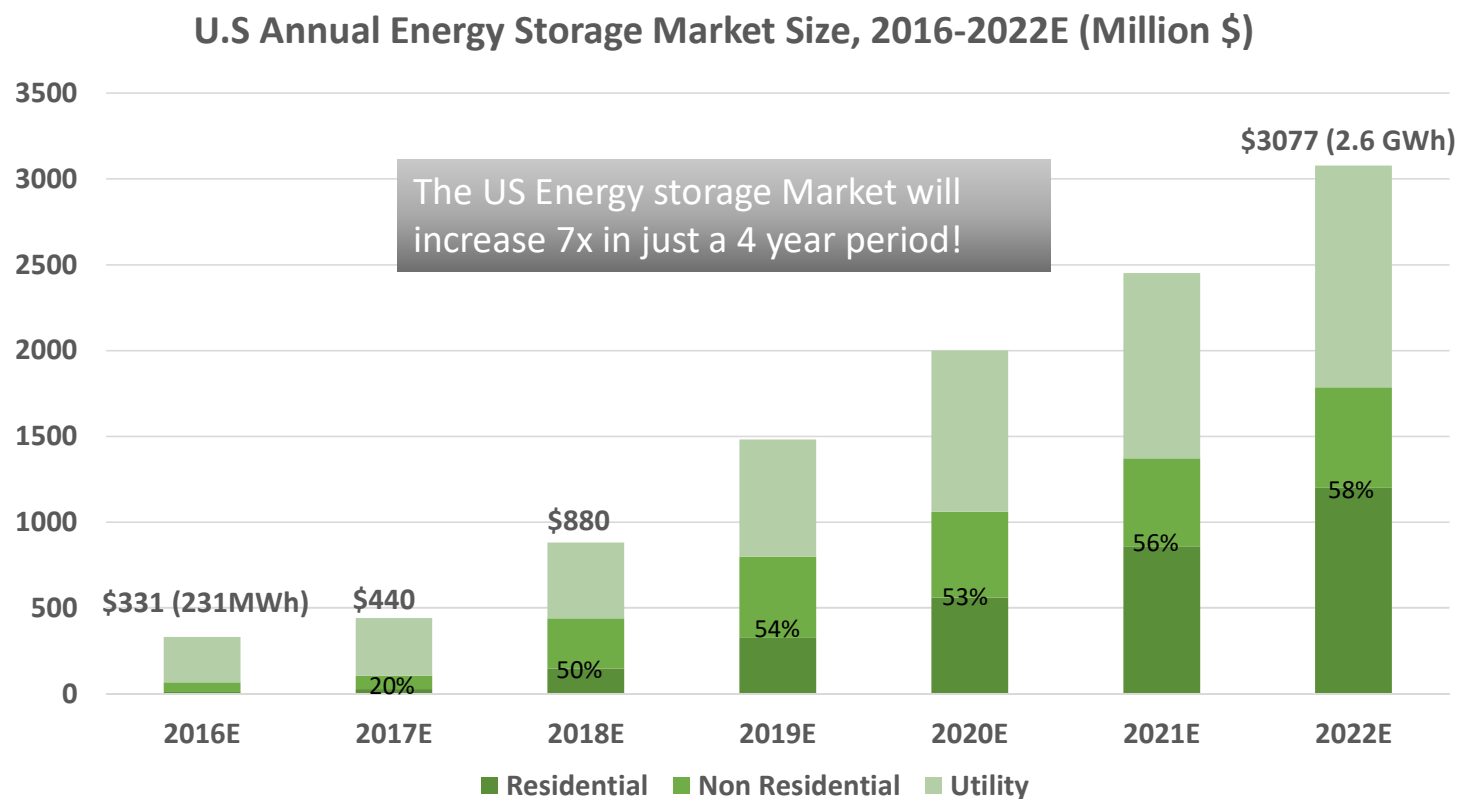
Fortress Energy Storage Sizing Tool

How to Install

GROWTH OPPORTUNITY WITH US

Growth Opportunity with Us

MARKET OPPORTUNITIES



Source: GTM Research

SELLING ENERGY STORAGE

- ❑ 74% of homeowners are interested in home energy storage
- ❑ Only 14% of homeowners received quotes for Solar+Storage;
This is due to:
 - Expensive equipment
 - Complicated installation
 - Lack of proper trainings
- ❑ 50% of those receiving quotes convert into buyers

Source: Energysage Report

COMPANY INTRODUCTION

Fortress Power – Lithium Battery

Headquarter: Southampton, PA
(30,000 sqf facility)

Manufacturing facility: China, since 2008

Darfon Authorized Distributor

Darfon – Power Electronics

Headquarter: Taiwan

US Headquarter: Mountain View, CA

Established: 1997

Parent Company: BenQ Group (> \$ 25 bn)



LITHIUM FERRO (IRON) PHOSPHATE TECHNOLOGY

We Use The Safest Lithium Technology – Lithium Ferro Phosphate

	FORTRESS	Other Lithium Ion (e.g. Tesla, LG Chem, Panasonic)
Chemistry	Lithium Ferro Phosphate (LFP)	Nickel- Manganese -Cobalt (NMC)
Safety	✓	X
Eco-friendly	✓	X
Operating Temperature	-4 – 140 °F	14 – 113 °F
Life Cycles	6000	< 3000
Peak Power Output	10 KW	7 KW
Rate of Capacity Loss	LFP < NMC	

Search LFP vs. NMC nail test videos on YouTube



Fortress LFP Battery

FORTRESS BATTERY SPECIFICATION

SAFE • AFFORDABLE • SLICK

Size	LFP- 10	LFP- 15
Total Energy (kWh)	10.24	15.36
Max. Charge Current (Continuous) [A]	100	100
Max. Discharge Current (Continuous) [A]	100	100
Max. Pulse Current (for 10 sec) [A]	200	200
Capacity [Ah]	200	300
Voltage [V]	48 (51.2)	48 (51.2)
Dimension [H xW x D, inch]	33 x 16.4 x 9.4	33 x 16.6 x 13.4
Weight [lbs]	286	429
Depth of Discharge	100%	
Warranty	10 years	
Life Cycles	90% @ 3000; 80% @ 6000	
Stack-ability	2 batteries in parallel to 1 inverter	

FortressPower Lithium Battery



FORTRESS
 **Power**
 SECURE YOUR ENERGY

FORTRESS NEW GENERATION BATTERY

DISPLAY • MORE COMPACT • MORE POWER

Size	G2LFP- 15
Total Energy (kWh)	15.36
Max. Charge Current (Continuous) [A]	100
Max. Discharge Current (Continuous) [A]	100
Max. Pulse Current (for 3 sec) [A]	150
Capacity [Ah]	300
Voltage [V]	48 (51.2V)
Dimension [H xW x D, inch]	39 x 22 x 11
Weight [lbs]	350
Depth of Discharge	100%
Warranty	10 years
Life Cycles	90% @ 3000; 80% @ 6000
Stack-ability	5 batteries in parallel to 1 inverter

First units available in Late September!

NEW GENERATION !



FORTRESS
 **Power**
 SECURE YOUR ENERGY

COMPATIBLE INVERTERS

FORTRESS BATTERIES CAN BE PAIRED WITH MOST 48V CHARGERS AND HYBRID INVERTERS!

Brand	Inverter/Charger Mode
Darfon	H5001; HB51 **
Outback	FLEX max charge controller (48V), FLEXpower series (48V); Radiance series (48V); FXR(A) and FXR (E) series (48V); GVFX and GVFX series (48V);
Schneider	Conext XW MPPT charge controller; Conext XW+ series; Conext SW;
Magnum	MS 4448PAE; MS 4048-20B
SMA	SUNNY ISLAND 4548-US/6048-US

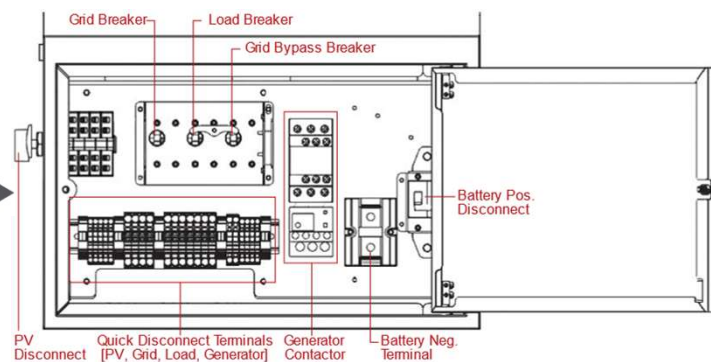
DARFON HYBRID INVERTER



Compact, Easy-to-install & Highly Efficient

It integrates PV inverter, charger inverter, control, communication, distribution box, and auto-transfer, all in one unit.

Distribution Box



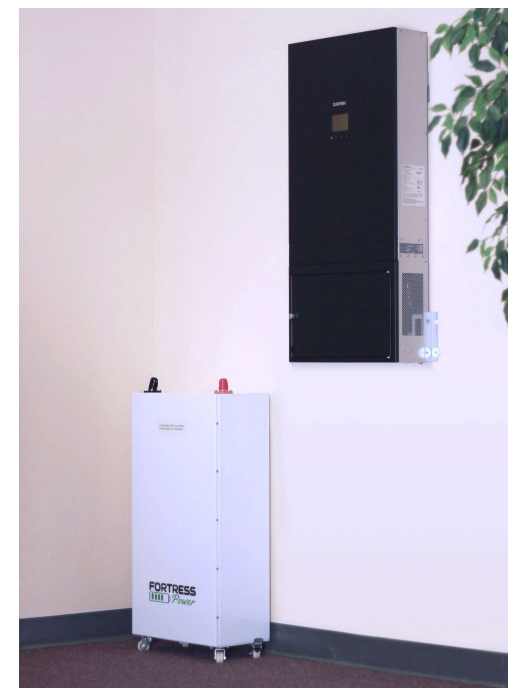
FORTRESS
 *Power*
 SECURE YOUR ENERGY

DARFON

SPECIFICATIONS

	Technical Specification
Inverter AC output	5.5 KW*
Surge power at backup	5.5/6.5/7.5 kW (40/5/1 second)
Transfer Switch	48 amps auto-transfer relay at 20ms
AC Grid Voltage	120/240 volts
AC Output	23 amps
Battery Input Voltage	40-58.4 volts (48V)
Battery Life Cycles	Up to 6,000
Battery Capacity	10 or 15 kWh (Scalable to 75 kWh)
PV Array	Up-to 6.5 KW

**The inverters are allowed to be stacked up-to 16.5 kW soon!*

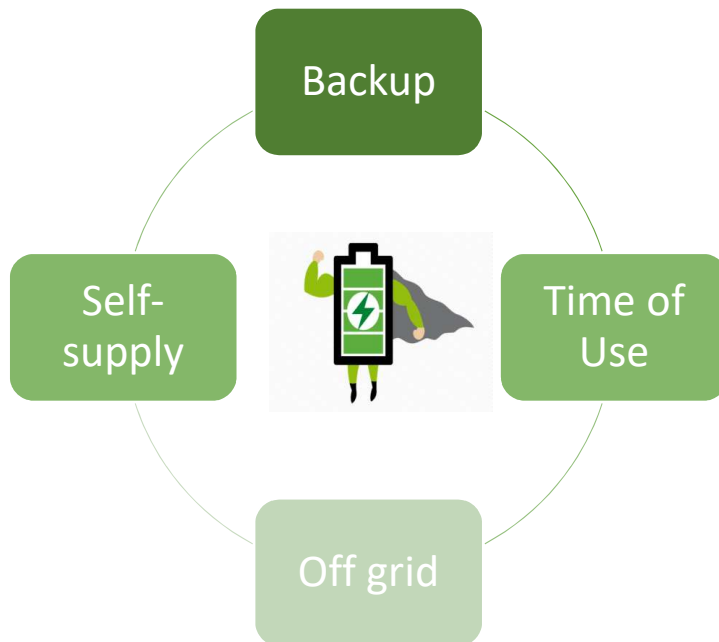


5 kW/10 kWh ESS



APPLICATIONS

ALL IN ONE SOLUTION



DC coupled solution:
✓ One inverter manages PV & Storage
✓ Higher efficiency

BACKUP OPTIONS

	Fortress Lithium	Lead Acid	Generator
Applications	Backup power, time of use, self-use & off grid	Backup power	Backup power
Depth of discharge	100%	50%	N/A
Potential Harm	Safest technology	Risk of harmful gases	Environmental pollution
Life Cycles	6,000	500-1,000	N/A
Warranty	10 years	2 years	2 years
Fuel Cost	\$0	\$0	\$ 50-100/day
Maintenance	No	Every 6 months	Yes
Incentives	Yes	Yes	No

COST ANALYSIS

	Fortress Power + Darfon	Lead Acid	Generator (20 KW)
Total Installed Cost	\$12,000	\$13,600	\$10,000
SGIP Incentive	\$3,150	\$3,150	N/A
30% ITC	\$2,655 (\$3,600 w/o SGIP)	\$3,315 (\$4,080 w/o SGIP)	N/A
Net Out-of-Pocket	\$6,195 (\$8,400 w/o SGIP)	7,135 (\$9,520 w/o SGIP)	\$10,000
Cost per Cycle	\$1 (\$1.4 w/o SGIP)	\$ 14.3 (\$19 w/o SGIP)	N/A
Fuel Cost	\$0	\$0	\$ 50-100/day

• Fortress system: 5kW inverter + 10 kWh battery (9 kWh usage power)

• Lead Acid system: Outback GS 4048a + 18 kWh lead acid battery (9 kWh usage power)



COMPARISON CHART

	Fortress Power+Darfon	Tesla	Solaredge + LG Chem	Pika Energy	Sonnen
Configuration	DC coupling	AC coupling	DC coupling	DC coupling	AC coupling
Battery Chemistry	LFP	NMC	NMC	NMC	LFP
Battery Cycles	6,000	2,800	2,500	2,800	10,000
Price level	Low	Low	Medium	High	High
Cost per Cycle	Lowest	Medium	High	Highest	Medium
Maintenance	Easy	Hard	Easy	Easy	Hard

•AC coupling requires an additional PV inverter and has at least 5% more power loss

COMPETITIVE ADVANTAGE

✓ **SAFE**

✓ **COMPETITIVE PRICED**

✓ **LOWEST COST PER CYCLE**



✓ **ALL IN ONE SOLUTION**

✓ **MORE EFFICIENT**

✓ **EASY INSTALL/MAINTENANCE**

FORTRESS
 *Power*
SECURE YOUR ENERGY

DARFON

FORTRESS ENERGY STORAGE SIZING TOOL

FORTRESS ENERGY STORAGE SIZING TOOL



FORTRESS ENERGY STORAGE SIZING TOOL

How to size the Energy Storage System For Backup

1. Sizing PV array
2. Estimate average daily PV production
3. Selecting critical load circuits
4. Calculating daily usage of critical load panel
5. Selecting battery bank size

Available for our authorized dealer



PV ARRAY SIZING

Solar PV Array- System Sizing

String	Solar Module Specifications						Module String Specifications		
	Module Watts	Voc	Vmppt	Quantity	Temperature Coefficient of Voc %/°C	Record-low temperature °C	String Voc	String Vmppt	PV array size
String 1	310	40.3	32.9	9	-0.29	-20	410.0	296.1	2790
String 2	310	40.3	32.9	8	-0.29	-20	364.5	263.2	2480
Total Modules				17			Total PV System Size(Watts)		5270

Darfon H5000 Specifications		
String VOC	String VMPPT	PV System
120 - 460V	250 - 430 V	Up to 6.5 kW

2 independent MPPTs allow different module layout in each string.

ESTIMATE AVERAGE DAILY PV PRODUCTION

Monthly PV Production of A 5.27 KW PV Array in NH

	Solar Radiation	AC Energy	Energy Per Day (watts)
January	2.92	410	13,226
February	3.8	484	17,286
March	4.54	625	20,161
April	5.27	668	22,267
May	5.84	735	23,710
June	6.07	722	24,067
July	6.12	746	24,065
August	5.69	694	22,387
September	4.73	571	19,033
October	3.53	462	14,903
November	2.57	337	11,233
December	2.23	313	10,097

ESTIMATE AVERAGE DAILY PV PRODUCTION

	Category	Item	Quantity	Starting Watts	Running Watts	Hours/Day	Watthours/Day
1	Essential	Refrigerator/Freezer-Energy Star	1	1200	200	8	1600
2	Essential	LED Light Bulb-60 Watt Equivalent	6	48	48	6	1728
3	Essential	Incandescent Light Bulb-60 Watt	4	240	240	6	5760
4	Essential	Sump Pump-1/3 HP	1	1300	800	0	0
5	Essential	Water Well Pump-1/3 HP	1	1400	750	3	2250
6	Kitchen	Microwave Oven-650 Watts	1	1000	1000	0	0
7	Kitchen	Coffee Maker-4 cup	1	600	600	0	0
8	Personal Electronics	Cell Phone Charger	2	50	50	1	100
9	Personal Electronics	Computer-Laptop	1	250	250	2	500
10	Personal Electronics	TV-Flat Screen-46"	1	190	190	3	570
Totals				6278	4128		12508
Inverter Type		Watthours/Day		Surge Power		Running Watts	
Darfon H5001		12508 Watts		222 Watts Available		872 Watts Available	

SELECT BATTERY BANK SIZE

Critical Load Consumption Report

Item	Watthours/Day
Refrigerator/Freezer-Energy Star	1600
LED Light Bulb-60 Watt Equivalent	1728
Incandescent Light Bulb-60 Watt	5760
Sump Pump-1/3 HP	0
Water Well Pump-1/3 HP	2250
Microwave Oven-650 Watts	0
Coffee Maker-4 cup	0
Cell Phone Charger	100
Computer-Laptop	500
TV-Flat Screen-46"	570
	12,508 Wh/Day

Select Battery Bank Size

Fortress Power Battery	LFP -15
System Size:	15,360 Wh
Battery Quantity	1
Depth of Discharge:	90%
Available Power:	<u>13,824 Wh</u>

WHAT TO EXPECT

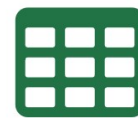
Available power in Battery at 90% DoD	13,824 Wh	1.1 Days
Lowest average daily available PV Power:	10,097 Wh	
Highest average daily available PV Power:	24,067 Wh	

TIME-OF-USE APPLICATION

Provide us one of the following stats along with a monthly electric bill and we will run the financial return for you!



Monthly Electric Bills



Spreadsheet Interval Data



Green Button Data



Import UtilityAPI Data

HOW TO INSTALL

How to Install

Bryan Whitton – Product Manager at Darfon





First Step

Your H5001 will come in a cardboard box. On the box will be a label with a description and the serial number. You should note both to make sure it is the right part and that you have the serial number for warranty purposes. The inverter Model is the H5000 and that is used for the permit and plans.





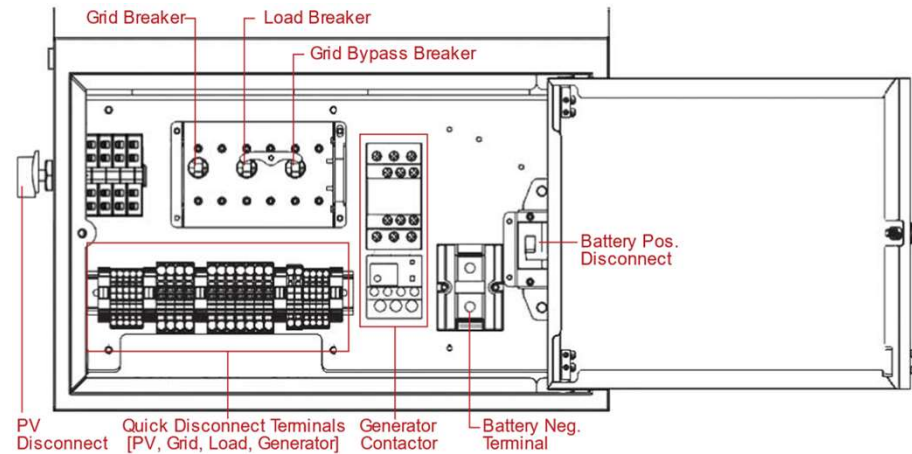
Removing the H5001

- Remove the accessories.
- Remove cardboard inserts and the H5001 from the plastic bag.
- Inspect for any possible damages.





H5001 Distribution Box



All the I/O happens here. Plenty of room to work with, easy to install and configure.

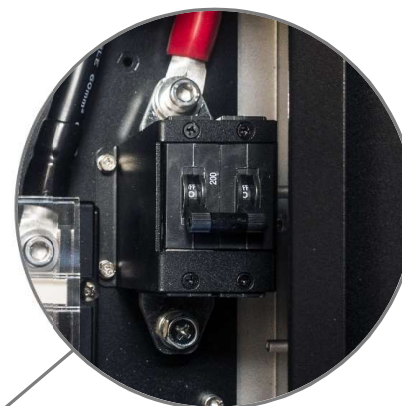


System Switches

Inverter On/Off



Battery Disconnect



PV Disconnect



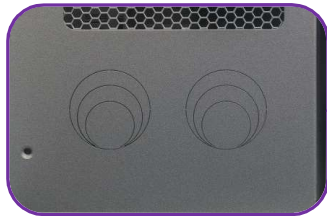


Concentric Knockouts

Located along the right, left and bottom of the distribution box

Clean install!

Typically for PV Connections



Right Side Access



Typically for
AC & Generator
Connections

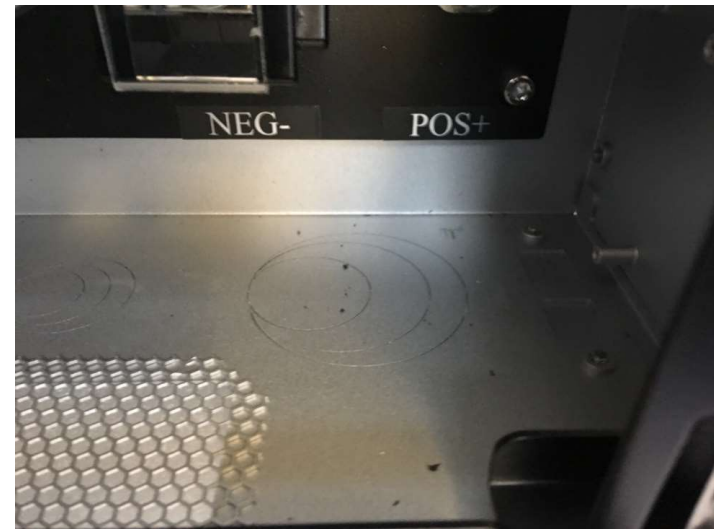




Concentric Knockouts

Battery Connection

Right below the battery terminals and shutoff switch is a concentric knockout for 1", 1.25" and 1.5" connectors. You will need 2/0 conductors for the battery.





How it mounts



- I use Unistrut on the top and bottom. The H5001 simply hangs on the bracket. Be sure to bolt directly into studs.

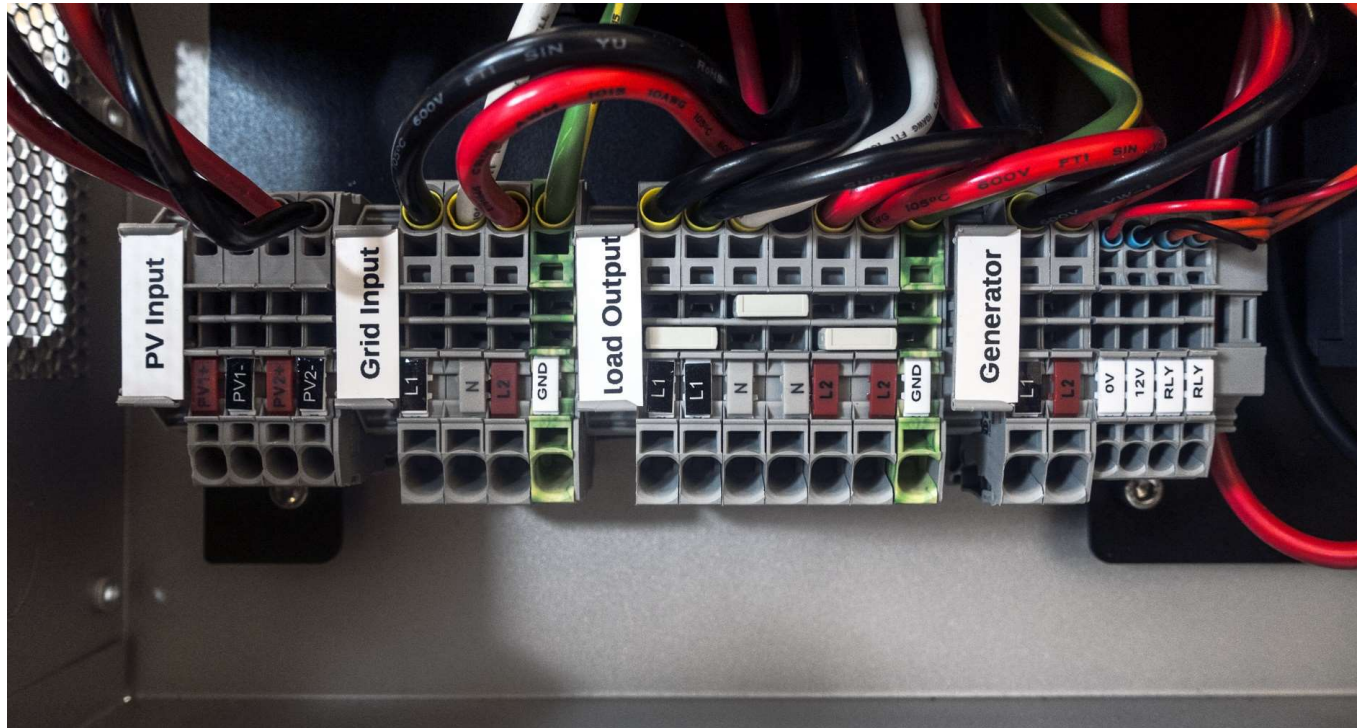
- The hanger bracket it is designed to bolt to the wall and hang inverter.



The bottom inverter bracket bolts directly to the Unistrut.



Quick Disconnect Terminals

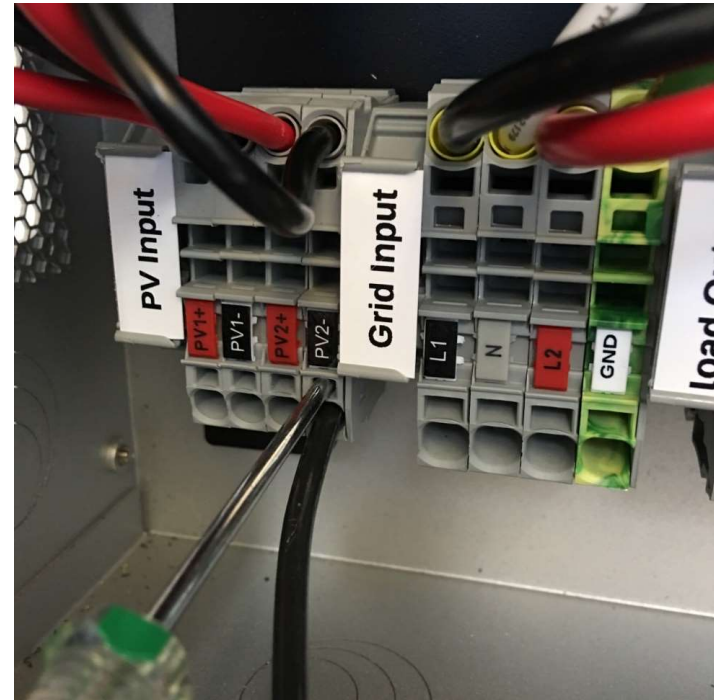




Installing/Removing Conductors

- Installing Conductors
- Push a small screwdriver into the release access.
- Insert the wire and remove the screwdriver.
- Removing Conductors
- Push the screwdriver into the release access and pull the wire out.

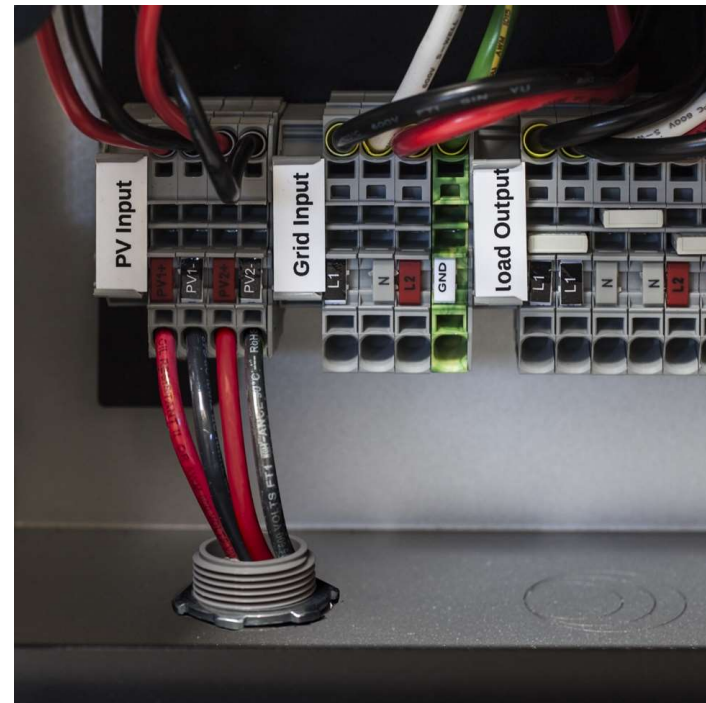
Note: Terminals use high tension springs that require a strong push to get the contact to open.





PV Conductors

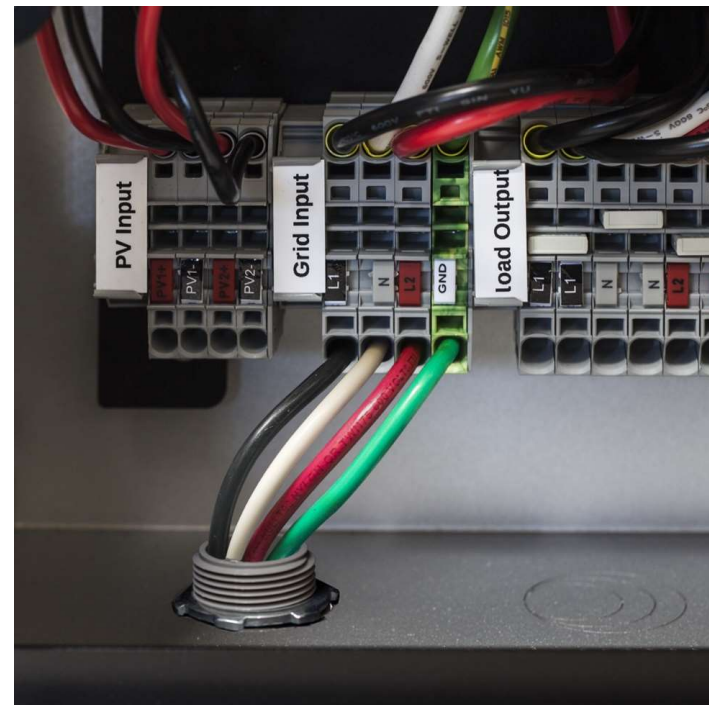
- Two MPPTs in the PV inverter (It doesn't matter which string inputs you use if you only have one string)
- Maximum wire size is #10 AWG.
- *Now is a good time to check the PV voltage and polarity*





AC Grid-Tie Conductors

- Make sure the grid is powered down when you are connecting the wires
- We can handle #8 AWG wire in these connectors
- It takes 2 minutes to do.
- There is a fair amount of room in the distribution box to work with so leave a little extra wire length to make it even easier.

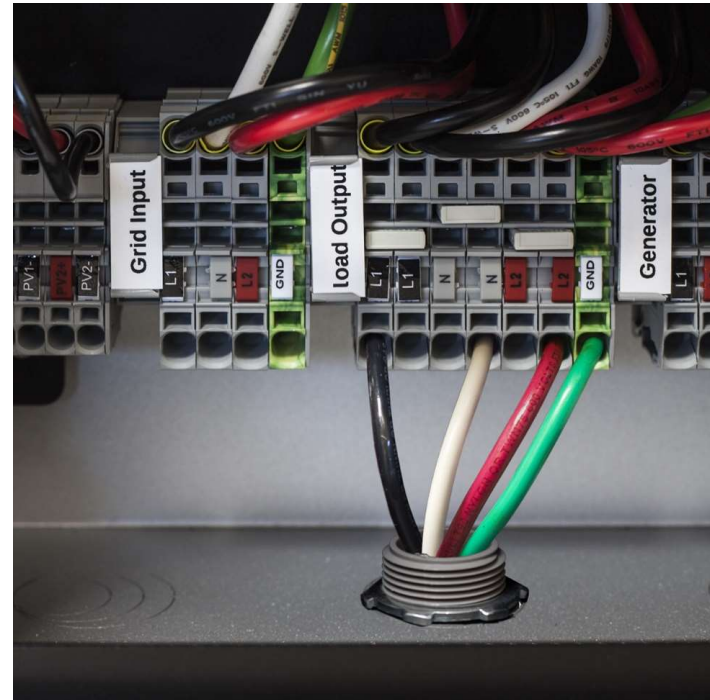


Now is a good time to check the AC voltages



Critical Load Panel

- Same as the Grid-Tie but an extra set of inputs.
- Double the inputs. Again, it gives you flexibility. Occasionally you may want to split the loads such as lights and receptacles or something along those lines. This simply gives flexibility.

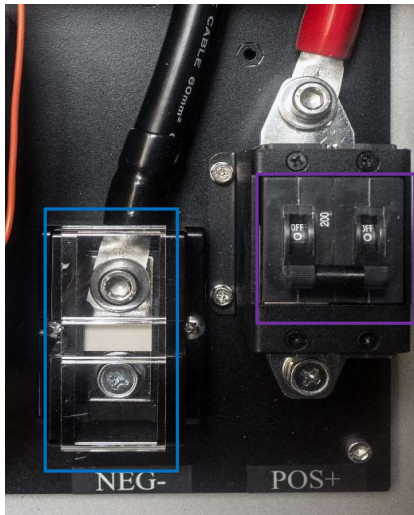




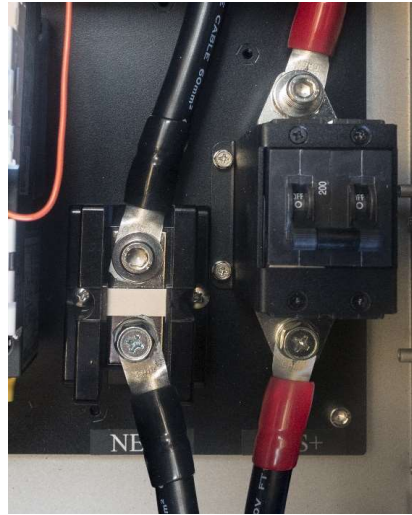
Landing the Battery Conductors

Step 1. Switch off the Battery.

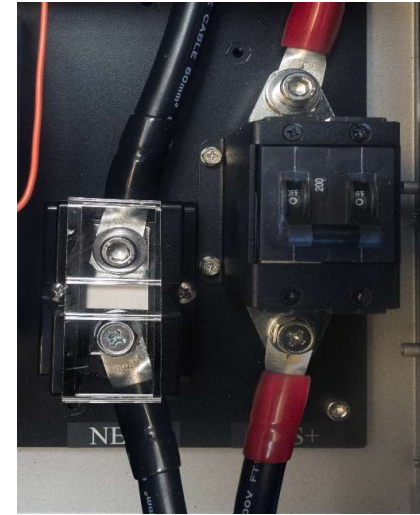
Step 2. Pull the clear finger shield off from the negative connector.



Step 3. Attach the negative cable to the negative connector and the positive cable to the positive connector. Use a 5/16" lug.






Step 4. Clip the finger guard back over the negative connector for safety.



Note: Keep the cables as short as possible.

Display Panel

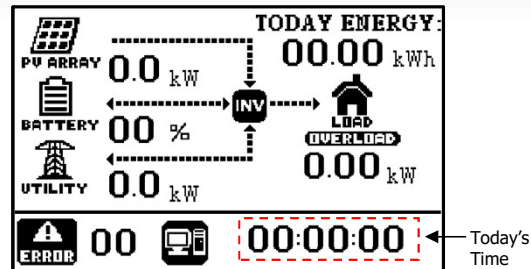


ICON	FUNCTION	DESCRIPTION
	Enter	Confirm the selection in setting mode or enter setting mode.
ESC	Exit	Exits setting mode.
	Left	Go to previous page, move or decreasing all Number.
	Right	Go to next page; move; to increase all Number.

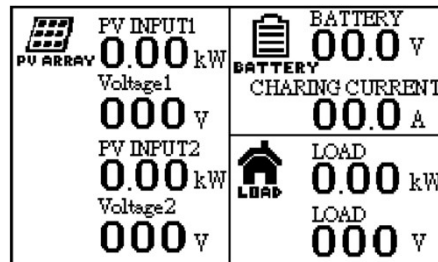


Display Icons

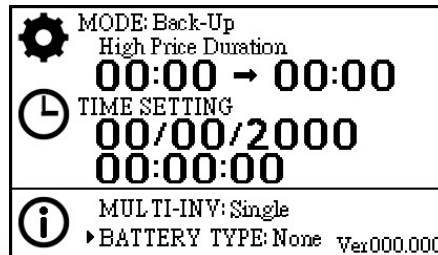
POWER FLOWS PAGE



POWER INFORMATION PAGE



SYSTEM SETTINGS PAGE



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



Operational Modes

PRESET MODES		DESCRIPTION
1. Back-up (default)		Keep the battery full and discharge only in cases power outages
2. Residential		Self-consume from PV and battery first before the Grid
3. Back-up w/o Feed-in		Back-up mode but will not feed-in power back to the Grid
4. Residential w/o Feed-in		Residential mode but will not feed-in power back to the Grid
5. TOU w/o Batt. Feed-in	Low electricity cost	Back-up mode
	High electricity cost	Residential mode
6. TOU w/ Batt. Feed-in	Low electricity cost	Back-up mode
	High electricity cost	Residential mode and will feed-in at a constant level power back to the Grid

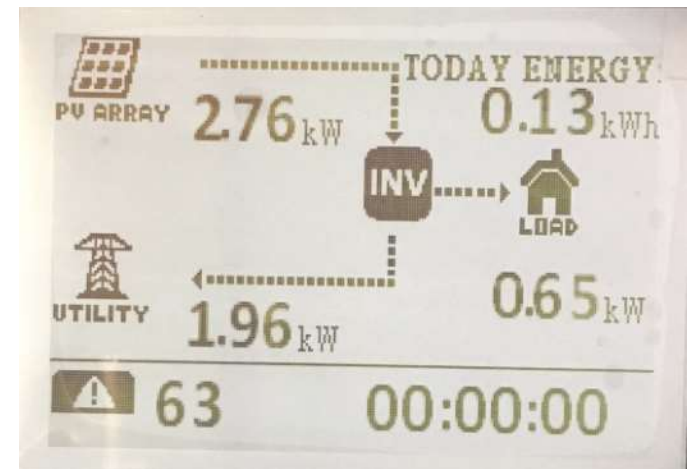
PRESET MODES		PV USE PRIORITY			LOAD PRIORITY			CHARGE FROM		FEED GRID FROM		BATTERY DOD	
		Load	Batt.	Grid	PV	Grid	Batt.	PV	Grid	PV	Batt. (No PV)	On-Grid	Off-Grid
1. Back-up (default)		2	1	3	1	2	3	Yes	Yes	Yes	No	40%	0%
2. Residential		1	2	3	1	3	2	Yes	No	Yes	No	40%	0%
3. Back-up w/o Feed-in		2	1	X	1	2	3	Yes	Yes	No	No	40%	0%
4. Residential w/o Feed-in		1	2	X	1	3	2	Yes	No	No	No	40%	0%
5. TOU w/o Batt. Feed-in	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. TOU w/ Batt. 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%



Battery Type

Always set the battery type before turning on the battery so the battery and inverter can communicate.

- Turn on all power switches EXCEPT the battery
- Turn on inverter switch
- Wait to hear 3 beeps from the inverter, this indicates the system is now running
- The inverter will show error 63. It is simply stating the battery is not connected.



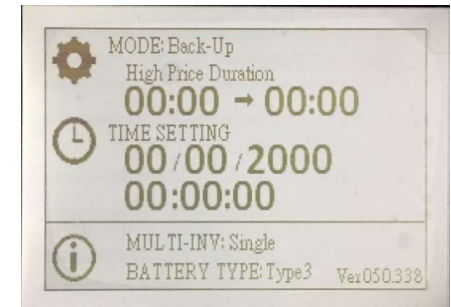
Values will vary from site to site.



Selecting the Battery Type

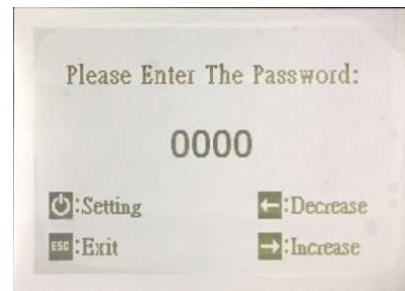
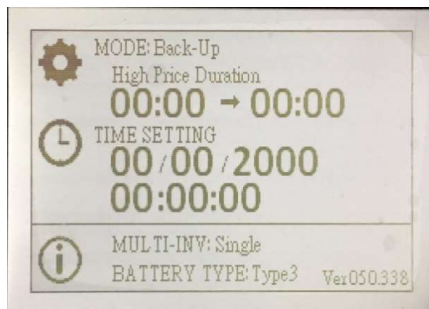
- Use the → button (twice) to get to the System Settings Page
- The default mode is Back-up
- High Price Duration is to define the hours for TOU Arbitrage
- Time Setting is for setting the date and time
- MULTI-INV is for stacking inverters
- There are 4 pre-defined battery types:

0 None	no battery expected
1 Lead/Acid	Used with ALL batteries without direct communications
3 Darfon B05	Darfon 5 kWh battery
4 Panasonic	DCB-105ZK H200 ESS only



Selecting the Battery Type (cont.)

- Use the ←→ keys to select the ⓘ section
- Use the ↵ key to and you will be prompted to enter the password
 - Use the right arrow and enter keys to type the password “1111”

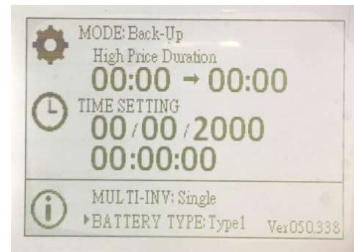
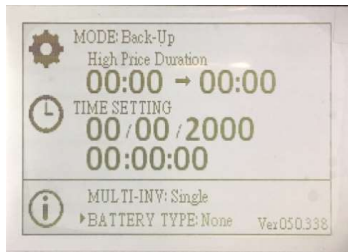


- Use the ←→ keys to select Battery Type and hit ↵.
- Use the ←→ keys to change the type and ↵ to save.

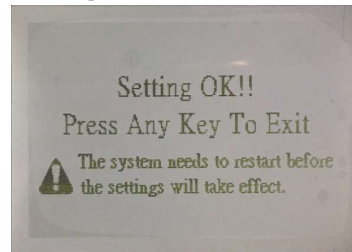
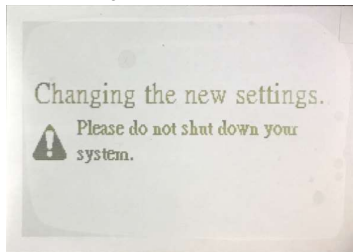


Saving the Battery Type

- The default battery type should be none. In this case Type 1 for the Fortress LFP battery.



- After saving the new battery type, the display will show “Changing the new Settings”. If everything is OK you will see the “Setting OK”



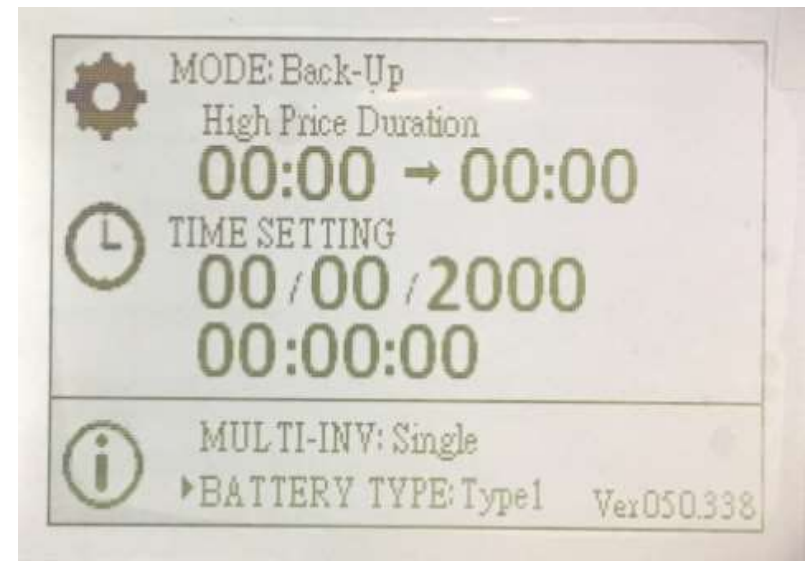
- Press any key to get back to the Systems Setting Display. Then turn off power with the rocker switch; the system will NOT restart on its own.
- Turn on the battery, turn on the H5001 with the rocker switch.



Battery Type Updated

You now have changed the battery type from 3, Darfon B05 to 1 for the Fortress LFP battery!

Changing the date/time and mode of operation follows a similar process. The only significant difference is for MODE and TIME SETTING sections, the password is 9999.





Nuts and Bolts

So far we have covered:

- Installing the hardware
- Configuring the hardware to the site
- Setting the battery type, operational modes and date/time

Now we go through advanced configuration

- Download Hybrid AP application
- Install the software on your computer
- Connect your computer to the inverter
- Read your AP registers
- Learn about the AP registers and how to use them to your advantage



Downloading the software

From the Darfon Solar website download the file “H5000/H5001 Application Software”. You can follow the link below.

- http://www.darfonsolar.com/downloads/?product_id=14&download_type_id=8

DARFON

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Downloads

General Downloads

This section contains white papers, application notes and case studies.

Document	Type	File Size	Download
How to use H5000 as Emergency Power in Puerto Rico	App Notes	2.36 MB	
Inverter Comparison for G320	White Paper	0.51 MB	
Advantages of 1P T-Cables	White Paper	0.12 MB	
Surge Supression For MIC300	White Paper	0.17 MB	

Product Specific Downloads

This section contains product brochures, manuals, warranties and certification documents.

Filter By:











H5000 Hybrid Inverter ▾

Software ▾

Document	File Size	Download
H5000/H5001 Application Software	0.42 MB	

Adding the Software to your Computer

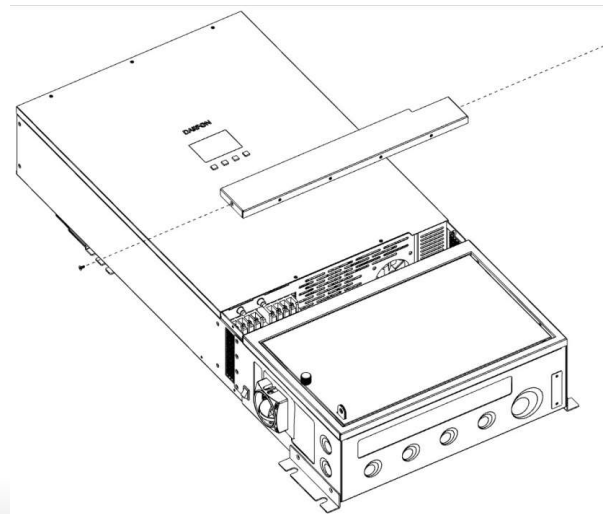
- Create a working directory for the software
- Unzip the download file in your working directory and you are done.
- Your folder contents should look like the one below.

Name	Date modified	Type	Size
 en-US	6/21/2018 11:51 AM	File folder	
 zh-TW	6/21/2018 11:51 AM	File folder	
 CaliDefault	10/17/2017 3:37 PM	Text Document	1 KB
 Darfon HyBrid AP Tool	6/21/2018 12:09 PM	Application	517 KB
 Darfon HyBrid AP Tool.pdb	6/21/2018 12:09 PM	PDB File	420 KB
 DebugLog	6/21/2018 12:09 PM	Text Document	0 KB
 ModbusDefinition	6/18/2015 2:31 PM	Text Document	2 KB
 Parameter	7/16/2015 3:48 PM	Text Document	1 KB
 README	6/11/2018 11:25 AM	Text Document	1 KB
 Setting	6/21/2018 12:09 PM	Configuration sett...	1 KB



Talking to the Inverter

- You will need a USB-A to USB-B cable on hand before you start.
- Remove the access cover that is held in place by 2 philips screws



◈ Talking to the Inverter (cont.)

- Connect the USB cable to the inverter as shown below.
- Connect the other end of the cable to a USB port on your laptop.





Talking to the Inverter (cont.)

Launch the Darfon Hybrid AP Tool

Name	Date modified	Type	Size
en-US	6/21/2018 11:51 AM	File folder	
zh-TW	6/21/2018 11:51 AM	File folder	
CaliDefault	10/17/2017 3:37 PM	Text Document	1 KB
Darfon HyBrid AP Tool	6/21/2018 12:09 PM	Application	517 KB
Darfon HyBrid AP Tool.pdb	6/21/2018 12:09 PM	PDB File	420 KB
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ModbusDefinition	6/18/2015 2:31 PM	Text Document	2 KB
Parameter	7/16/2015 3:48 PM	Text Document	1 KB
README	6/11/2018 11:25 AM	Text Document	1 KB
Setting	6/21/2018 12:09 PM	Configuration sett...	1 KB

◀ Talking to the Inverter (cont.)

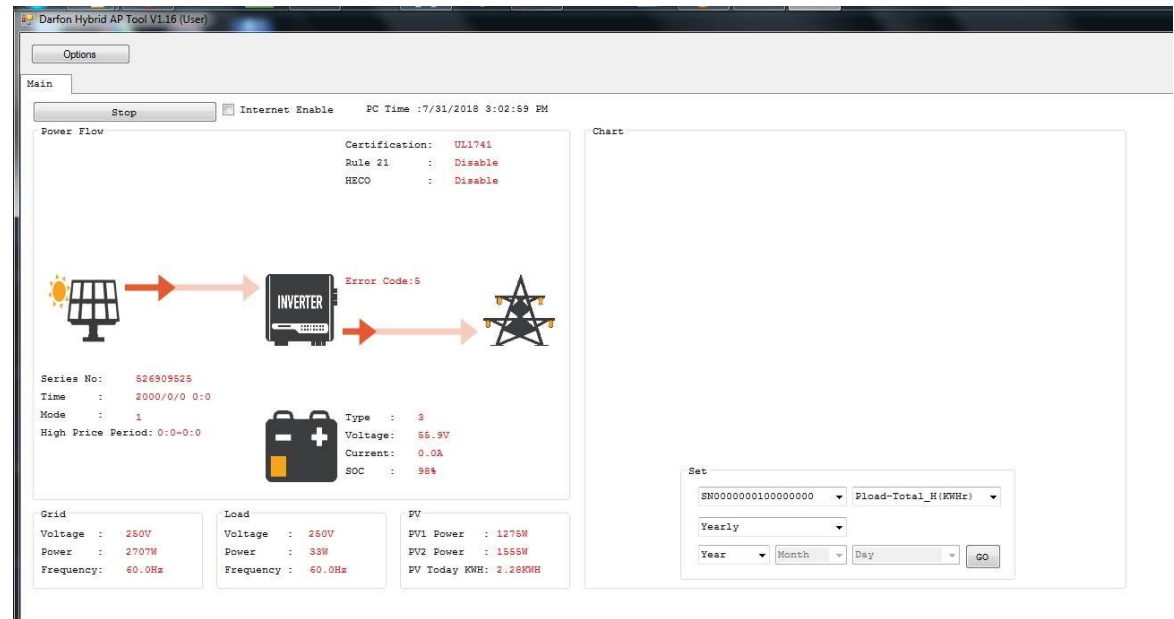
A user level login requires no password.

You can see a nice amount of what is happening with your inverter very easily. Nothing can be changed from this login level.



◈ Talking to the Inverter (cont.)

You must set the Serial COM Port. The Baudrate is 9600 and the computer will assign the COM port. In this case, my computer allocated COM15. Click on OK.



This is the default screen for the User login.

◈ Talking to the Inverter (cont.)

- An installer level login requires the password “Installer1234”. The password is case sensitive. Also, please note that we do NOT publish this password in the manual.
- You will also need to set the COM port for this login as you did with the User login.



- From this login you can make substantial changes to the way the H5000 works.

Caution: You can make the system perform better or a lot worse depending on what you do here.



Talking to the Inverter (cont.)

Darfon Hybrid AP Tool V1.16 (Installer)

Options

Main System Parameter Setting

Read All Parameter

Device
0x01-0x0A

Grid Voltage: Produce Mon: Rule 21 Enable: ☐ AC Coupling: ☐
Model: Produce Day: PV Parallel: ☐ Fre Control: ☐
Serial Number1: DSP1 Ver: PV Off Grid: ☐
Serial Number0: DSP2 Ver: Heco 1: ☐
Produce Year: EEPROM Ver: Heco 2: ☐

Read
Write

Remote Setting
0x90-0x9E

Operation Mode: Max Battery Charging Current: Feed-in Power:
High Price Period Start Hour: Battery Shutdown Voltage:
High Price Period Star Min: Battery Floating Charging Voltage:
High Price Period End Hour: Battery Reserve Percent:
High Price Period End Min: Volt/VAr Q(V):
Multi-module: Start Frequency:
Battery Type: End Frequency:

Read
Write

Remote Real-time Setting Info
0xA0-0xAF

Charge/Discharge Setting:
Charge Power:
Discharge Power:
Ramp Rate Percentage:
Degree:

Read
Write

RTC
07/31/2018 15:05:08 ☐ CurrentTime
Second: Day:



Talking to the Inverter (cont.)

Clicking on “Read All Parameters” will collect the current register contents from the inverter.

Darfon Hybrid AP Tool V1.16 (Installer)

Options

Main System Parameter Setting

Read All Parameter

Device

0x01-0x0A

Grid Voltage: 240V Produce Mon: 3 Rule 21 Enable: ☐ AC Coupling: ☐

Model: H5001 Produce Day: 27 PV Parallel: ☐ Fre Control: ☐

Serial Number1: 8040 DSP1 Ver: 50 PV Off Grid: ☐

Serial Number0: 85 DSP2 Ver: 338 Reco 1: ☐

Produce Year: 2018 EEPROM Ver: 16 Reco 2: ☐

Read

Write

Remote Setting

0x90-0x9E

Operation Mode: Residential Max Battery Charging Current: 60 Feed-in Power: 0

High Price Period Start Hour: 0 Battery Shutdown Voltage: 440

High Price Period Star Min: 0 Battery Floating Charging Voltage: 564

High Price Period End Hour: 0 Battery Reserve Percent: 40

High Price Period End Min: 0 Volt/VAr Q(V): Specified Power factor

Multi-module: Single Start Frequency: [Redacted]

Battery Type: Darfon End Frequency: [Redacted]

Read

Write

Remote Real-time Setting Info

0xA0-0xAF

Charge/Discharge Setting: Charge

Charge Power: 0

Discharge Power: 0

Ramp Rate Percentage: 0

Degree: Disable 0

Read

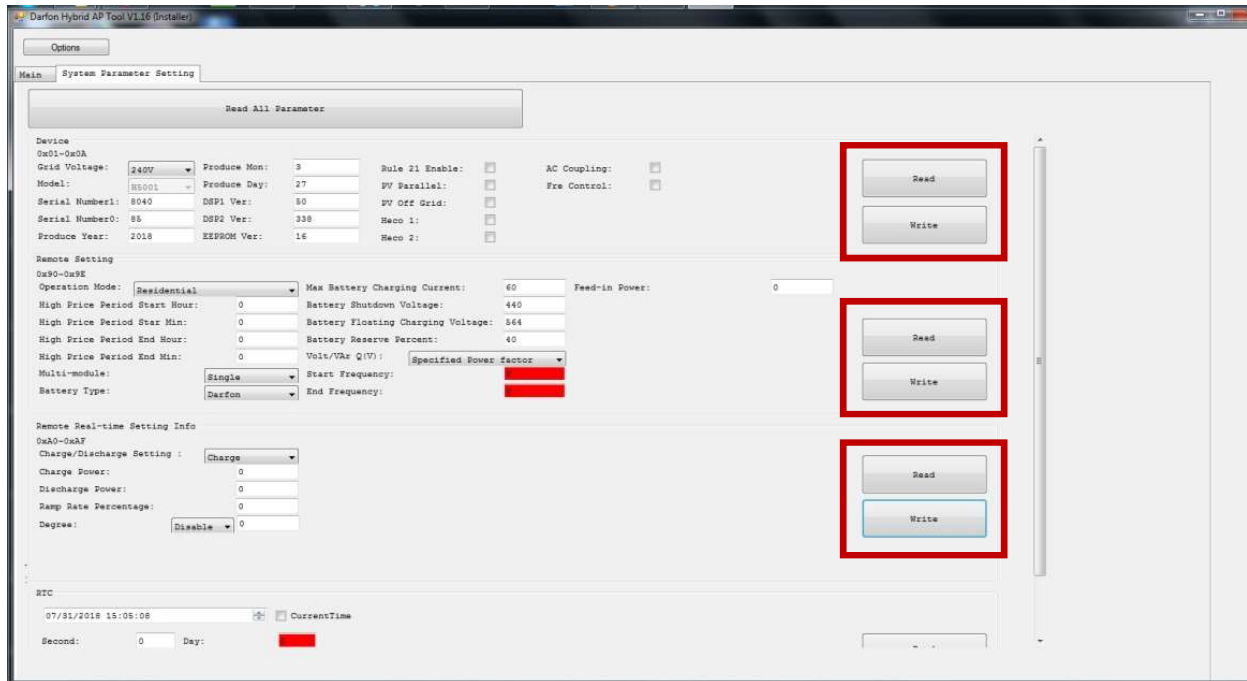
Write

ETC

07/31/2018 15:05:08 ☐ CurrentTime

Second: 0 Day: [Redacted]

Talking to the Inverter (cont.)



Read and write registers by sections to reduce the potential of changing a register you didn't mean to.

- Press “Read” to get the current values from the inverter.
- Make your changes.
- Then Press “Write” to implement the changes.
- Turn off the inverter with the rocker switch. Wait for 15 seconds before turning the system back on.
- Press “Read” to confirm the new values are set in the EEPROM.



Talking to the Inverter(cont.)

Options

Main System Parameter Setting

Read All Parameter

Device

Grid Voltage: 240V Produce Mon: 3 Rule 21 Enable: ☒ AC Coupling: ☐ Read

Model: H5001 Produce Day: 27 PV Protection: ☐ Write

Serial Number1: 8040 DSP1 Ver: 30 PV Off Grid: ☐ Read

Serial Number0: 86 DSP2 Ver: 338 Heco 1: ☐ Write

Produce Year: 2018 EEPROM Ver: 16 Heco 2: ☐ Read

Remote Setting

Operation Mode: Residential Max Battery Charging Current: 40 Feed-in Power: 0 Read

High Price Period Start Hour: 0 Battery Shutdown Voltage: 440 Write

High Price Period Start Min: 0 Battery Floating Charging Voltage: 564 Read

High Price Period End Hour: 0 Battery Reserve Percent: 40 Write

High Price Period End Min: 0 Volt/Var Q(V): Specified Power factor Read

Multi-module: Single Start Frequency: 50 Write

Battery Type: Darfon End Frequency: 50 Read

Remote Real-time Setting Info

Charge/Discharge Setting: Charge Charge Power: 0 Read

Discharge Power: 0 Write

Ramp Rate Percentage: 0 Read

Degree: Disable 0 Write

RTC

07/31/2018 15:05:08 CurrentTime

Second: 0 Day: 31

- For Rule 21, you will need to know what the local utility values are.
- Check “Rule 21 Enable”
- Set the Volt/Var, Start Frequency and End Frequency values.
- Press “Write”, then restart the inverter.



Talking to the Inverter(cont.)

The screenshot shows the 'Darfon Hybrid AP Tool V1.16 (Installer)' window. The 'System Parameter Setting' tab is selected. A red box highlights the 'Remote Setting' section, which includes the following parameters:

Parameter	Value
Max Battery Charging Current	60
Battery Shutdown Voltage	440
Battery Floating Charging Voltage	564
Battery Reserve Percent	40

Other visible parameters include:

- Grid Voltage: 240V
- Model: HS001
- Produce Year: 2018
- Max Battery Charging Current: 60
- Battery Shutdown Voltage: 440
- Battery Floating Charging Voltage: 564
- Battery Reserve Percent: 40
- Charge/Discharge Setting: Charge
- Charge Power: 0
- Discharge Power: 0
- Ramp Rate Percentage: 0
- Degree: Disable

The most common fields that need to be adjusted are

- Max Battery Charging current
- Battery Shutdown Voltage
- Battery Floating Charging Voltage

These define how the battery is charged and the lowest and highest voltage that the battery can work with for charging and discharging.

You need these parameters from the supplier of the battery.

Note: Voltage values are read as if there is a decimal point between the two rightmost digits. So 446 is 44.6V and 564 is 56.4V.



Finished!

You have successfully installed and configured the H5001 inverter. You have done all the things that a typical installation would need to have done to it. Off-Grid is handled, Rule 21 is handled. Date, Time, Battery and mode of operation all handled. Total time to do all of this on a real site is measured in minutes if you know what to do. None of it can be done at the factory and so it is up to the installers to know what to do and how to do it.

DEALER BENEFITS

Dealer Benefits

Sales & Marketing Support

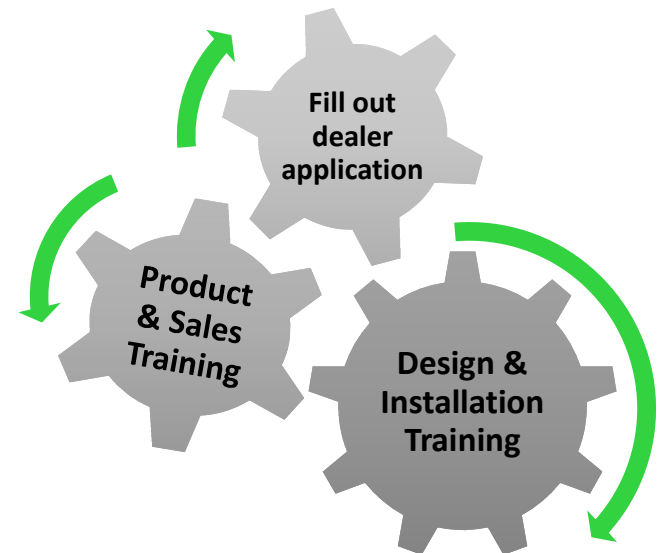
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Logistic Support



How to Become an Authorized Dealer



DARFON

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