

# Fortress Power Lithium Batteries Using Schneider Insight

Schneider XW Pro and Insight Home Facility or Gateway support operating Fortress Power batteries in closed loop communication mode. It is best practice to have the inverters programmed in the open loop settings before setting up closed loop communication. For any additional help, please contact <u>techsupport@fortresspower.com</u>

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## 1. Introduction

Battery Datasheets / Manuals: See "Downloads" section of individual product pages Email: <u>techsupport@fortresspower.com</u> Discord Support: <u>https://discord.gg/kxX6QMjKFw</u> Phone: (877) 497-6937 x 2 Hours: 9:00AM - 6:00PM EST – Use Discord for After Hours / Weekends Warranty Submittal: <u>https://www.fortresspower.com/warranty/</u>



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**Step 1 – Getting Started.** Turn each battery on individually while unpacking the batteries and note the voltage of each battery as well as the serial numbers. The batteries must be within +/- 0.5V of each other before commissioning. Turn off the batteries and install in parallel. Install the battery-to-battery communication cables and proceed with system commissioning.

**Pro tip:** If the battery voltages are significantly different, wire the batteries in parallel without communication cables and only turn on the lowest voltage battery. Use the inverter or external charger to charge the battery to the voltage of the 2<sup>nd</sup> lowest battery. Turn the 2<sup>nd</sup> battery on and charge the battery bank to the 3<sup>rd</sup> lowest battery voltage. Repeat until all batteries are at the same voltage. Keep total charging voltages under 15A per battery during this process.

**Pro tip:** If the batteries are just slightly outside the +/- 0.5V range, you can avoid using an inverter or an external charger to balance the batteries by only turning the lowest voltage batteries on (ONLY if within 0.5V relative to each other) and allowing those batteries to balance. Repeat this process with the highest voltage batteries. This brings the lowest and highest voltage battery towards to the middle of the group.

**Pro tip:** It is not usually necessary to apply a firmware update to Fortress batteries during system commissioning, but our installer firmware update tool can help speed up commissioning times.

### Step 2 – Update Schneider Firmware

Please refer to Schneider's step-by-step guide for the commissioning of a system with 1 XW Pro hybrid inverter, 1 MPPT charge controller, and a Gateway/InsightHome/InsightFacility. https://solar.schneider-electric.com/xw-pro-commissioning-guide/

The first step is to download the latest firmware of all your devices – it is strongly recommend doing so before heading to the site. Find your products in the table below and visit its product page to download the firmware. Scroll down to the Downloads section and click on Firmware. The firmware file is contained in a ZIP file. Unzip downloaded files and extract the .epkg or .xfo file into the root directory of a USB drive.



IMAGE 2.1: EXAMPLE OF COMPLETE HARDWARE SETUP BETWEEN 3 EFLEX 5.4kWH AND SCHNEIDER XW PRO. THE SAME CONFIGURATION APPLIES TO INSTALLATIONS OF 1 BATTERY TO 15 BATTERIES CONNECTED IN PARALLEL

\*\*\*Important! Before paralleling each battery, make sure the voltage difference between them is less than 0.5v from one another. Pairing batteries with voltages above 0.5v may damage parts of your battery due to over surge current. If the battery/ies have voltage differences use the inverter or charge controller to charge the battery/ies up to the desired voltage. Otherwise, place the terminator in one of the communication ports and the communication cable in another.

- While batteries are off, connect the communication cables from one battery to another (RS485 ports are common) and end communication with terminator on battery 3 as referred on *Image 2.1*. Insert the remaining cable from battery 1 to the Rj45 Pinout Converter to terminate the CAN communication from battery to battery.
- 2. Plug a Format B Ethernet Cable (*not included*) to the other side of the Rj45 Pinout Converter.
- 3. Cut and strip the end of the Format B cable and connect wire 7 (brown/white) to port 9 of the Insight Home (18 on the Gateway & Insight Facility) and wire 8 (brown) to port 11 of the Insight Home (20 on the Gateway) as described in *Image 2.2* & *Image 2.3*
- 4. Turn battery #1 first and wait 5 seconds, then proceed turning battery #2 on, wait 5 seconds, finalize turning battery #3 on.



IMAGE 2.3: CONNECTION WITH THE MODIFIED CABLE AND INSERTED TO THE PINOUTS 9 & 11 OF THE INSIGHT HOME



IMAGE 2.4: EXAMPLE OF COMPLETE HARDWARE SETUP BETWEEN 2 EVAULT CLASSIC 18.5kWH AND SCHNEIDER XW PRO.

\*\*\*Closed loop is only compatible for up to 2 batteries connected in parallel. Make sure that each battery are updated to firmware version 7.7. Important! Before paralleling each battery, make sure the voltage difference between them is less than 0.5v from one another. Pairing batteries with voltages above 0.5v may damage parts of your battery due to over surge current. If the battery/ies have voltage differences use the inverter or charge controller to charge the battery/ies up to the desired voltage. Otherwise, place the terminator in one of the communication ports (Both TX and RX are common ports) and the communication cable in the other. Set Battery to Master 1.

- 1. To pair both batteries, turn them on pressing the pushbutton for about 10 seconds and set both batteries to Slave with Parallel Number 2. Turn them off. While batteries are off, connect the communication cables from one battery to another (RS485 ports are common) and end communication with a terminator to the battery that you will choose to be the Slave.
- 2. Turn Both batteries on. Set one of the batteries to Master. Note: The Master battery will communicate directly with the inverter. If paralleling is successful, you should hear a clicking sound on both batteries after this step. Insert the remaining Format B Ethernet cable from the Master battery to the Gateway/Insight Home/Insight Facility.
- 3. Cut and strip the end of the Format B cable and connect wire 3 (green/white) to port 9 of the Insight Home (18 on the Gateway & Insight Facility) and wire 5 (blue/white) to port 11 of the Insight Home (20 on the Gateway) as described in *Image 2.4*.



#### IMAGE 2.5: EXAMPLE OF COMPLETE HARDWARE SETUP BETWEEN 3 EVAULT MAX 18.5kWH AND SCHNEIDER XW PRO.

\*\*\*Closed loop is compatible for up to 20 batteries connected in parallel. Make sure that each batteries are updated to the latest firmware version. Important! Before paralleling each battery, make sure the voltage difference between them is less than 0.5v from one another. Pairing batteries with voltages above 0.5v may damage parts of your battery due to over surge current. If the battery/ies have voltage differences use the inverter or charge controller to charge the battery/ies up to the desired voltage.

If using only one battery, set the battery ID to 0, Protocol to 5. Turn the terminator switch to 1200hms and place the communication cable into the RS485 port. Turn the battery off then on and confirm Battery ID 0, Protocol 5.

- 1. For multiple batteries: turn off or open eVault MAX breaker. Turn on the battery: record voltage, set the battery ID and protocol as described below. If the battery voltages are not within 0.5V, the battery that is not in the range should be charged or discharged.
- 2. When paralleling multiple batteries, you need to choose which battery will be the master and which will be the slaves. You do this by Setting the Master battery ID to 1 and set the rest in chronological order as describes in **Image 2.5**. If the install is only a single eVault set battery ID to 0.
- 3. Set the protocol ID to 5 on all batteries. This identifies the Schneider communication protocol.
- 4. Turn off all batteries. Take note to identify which battery is Master Battery 1  $\,$



- 5. Place the communication cable on the Comm Parallel ports between each battery. The first and last battery in the communication string need to have the termination set to 120 ohms, the other batteries termination is set off.
- 6. Turn on all batteries except master Battery 1. Batteries should have green run light on and red BMS light blinking.
- 7. Turn on Master Battery 1. Batteries should parallel within 5 minutes. To confirm that each battery is properly commissioned, each battery's status light must be solid green.
- 8. The batteries are ready to supply power to the inverter(s). For a single eVault Battery install the power on sequence is different from multiple batteries. For a single evault the last step is to turn on the battery to take advantage of the pre-charge resistor. So for a single battery install with the battery off make (turn on) the battery connection all the way to the inverter including the inverter breaker then turn on the battery. For multiple batteries the last connection made is the inverter battery breaker.
- 9. Cut and strip the end of the Format B cable and connect wire 3 (green/white) to port 9 of the Insight Home (18 on the Gateway & Insight Facility) and wire 5 (blue/white) to port 11 of the Insight Home (20 on the Gateway & Insight Facility) as described in *Image 2.5.*
- 10. Connect the other end of the Format B Ethernet Cable onto the eVault MAX Identified as ID 1, Rs485 port.

#### Step 2: Software Integration

\*\*\*Follow these steps to successfully integrate the battery's BMS to the XW PRO.

InsightLoca	Version: v1.15   Build nun	nber: 17			2021/11/16 12:48
Dashboard	Devices	Events	Setup	About	
Power Flow					
Battery Summary					
Battery Compariso	n				
Energy					
Energy Compariso	яп.		·	52.2V	
InsightLocal Versi	on: v1.15   Build number: 17			2021/11/16 12:48   💭	Admin   Disclaimer   Logout Life Is On Schneider
InsightLocal Version:	v1.14   Build number: 488			20	21/11/04 19:44   OAdmin   Disclaimer   Logout Life Is On Scheelder
Dashboard	Devices Events	Setup About			
Configuration	Site Settings				>
Network	Time setup				>
Manage Passwords	Import & export settings				>
Device Detection					
Smart Energy Manager	Units				>
BMS Setup	Modbus settings		$\sim$		~
			Serial Port A Baud rate 19200 Parity none Stop bits 1 Error Limit 3 Timeout (ms) 1000		Apply Cancel

\*\*\*Note: Choose a 19200 BAUD Rate for the eVault Max. Otherwise use a 9600 BAUD Rate for the eFlex and the eVault Classic.



Dashboard De	vices Events	Setup	About				
etwork Pri anage Passwords R evice Detection mart Energy Manager	tect devices S-485-1 1 0 2 0 2 0 1 0 1 0 1 0 1 0 1 0 1 0 1	)				•	Detect
MS Setup   ☐ New tab - → C	X 🖉 Schne	ider Electric - HMI A //192.168.100.1/#	pplica × + /gateway/detection				
Dashboard	ersion: v1.15   Build number	: 17   Events	Device det	ection		2024/4	AME 43:49
Configuration Network Manage Passwords Device Detection	Port R RS-485-1 1 RS-485-2	to 2	Detection completed s	uccessfully. Devices found: 1		্	ose
Smart Energy Manager BMS Setup sightLocal Ver	sion: v1.15   Build number:	17				2021/11/16	12:49   🤤
Dashboard	2 devices Display	Events	Setup	About			
nverter/Chargers Other Devices	XW6848-210 Operating Mode Inverter Status Charger Status Unit Configuration Split AC Load Active Power AC Load Voltage AC Load Frequency AC1 Input Power (W) AC1 Voltage AC1 Frequency AC2 Active Power AC2 Frequency AC2 Frequency DC Power	Operating APS Only Qualifying AC Phase Master 0 W 0 V 0 Hz 0 W 0 Hz 0 W 0 Hz 0 W 0 Hz 0 W	Online	SEMB_BMS 0 Device Name Device Association Ho Current Voltage Temperature State of Charge State of Health	BMS buse Battery Bank 1 -0.5 A 52.199 V 82.40 °F 26 % 100 %	Online	
505 Keystone R	d, Southampton, I	PA 18966 . (	877) 497 6937. <u>s</u>	ales@fortresspower	<u>.com</u> . Fortres	spower.	com







## 1. Mode Settings

\*\*Note: Follow each diagram for parameter settings according to End User's desired application. For each setting, please input the following closed and open loop settings in case the battery loses communication with the inverter. To view all features, click on Advanced rather than Basic

#### **Standard Settings**

Battery Type ?	Li-I	on	~	Maximum Discharge Current	60A per eFlex 170A per eVAult, 170A p	er eVault Max	А
Charge Cycle 😗	Ext	ternal BMS	~	Maximum Discharge	0	8	s
SOC Control Enable 🕜		Enabled		Low Battery Cut Out		48	V
Battery Bank ? Capacity	• 105 360	6AH per eFlex 0AH per eVAult	Ah	Low Battery Cut Out Delay	0	10	s
Maximum Charge Rate	Recommended charge maximum inverter DC	e per battery C charge) = x 100	%	Low Battery Cut Out	•	2	V
Maximum Bulk Charge Current	55A per eFlex 100A per eVAult, 1	40A per eVault Max	A	High Battery Cut Out	-0	61	V
Maximum Absorption Charge Current	55A per eFlex 100A per eVAult, 140	A per eVault Max	A	Charge Cycle ? Timeout		1440	mii
Maximum Float Charge Current	55A per eFlex 100A per eVAult, 140	)A per eVault Max	A	High SOC Cut Out ?		98	%
Default Battery ?	Wa	ırm	~	High SOC Cut Out (? Delay	0	2	S
Absorption Time	•••	3600	s	Low SOC Cut Out ?	0	10	%
Bulk/Boost Voltage Set Point		56.2	] V	Low SOC Cut Out 🛛 😗 Delay	0	60	S
Absorption Voltage Set Point	•	56	) v				
					Apply	Reset	
ry Management System Settings		Warning	~	Charge Overcurrent Offset 2	-0	10	7
iggers Fault or Warning				Charge Overcurrent Trip Time 😗		-• 900	
me				Discharge Overcurrent Offset ?	-0	20	
OC Communication Loss (?) iggers Fault or Warning		Warning	~	Discharge Overcurrent Trip Time 🖓		900	
OC Communication Loss Trip Time	••	7	s	Overvoltage Offset 😯	-0	2	
omms Lost Battery Charge 🛛 😗 oltage Limit	•	54.4	v	Overvoltage Trip Time 🕐	-0	5	
omms Lost Battery Discharge 🛛 🧿		51.4	v	Undervoltage Offset?	-0	1	2
omms Lost Battery Charge 🛛 😮	-0	30	Α	undervoltage Trip Time 🦦		10	
	•						



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attery Type	Custom	~	Battery Bank Capacity	•	360	Ah
Nominal Battery Voltage	48	~	Battery Temperature Coefficient	•	0	mV/ °C

### Ac Coupling & Back up Settings

		Co	ntrols		
Operating Mode	Ope	rating ~	Force Charger State	Selec	et an option 🗸
		Apply			Apply
Reset 🕜	Reboot	~	Charger		Enabled
		Apply			Apply
Clear	- Select	an option	Auxiliary Output Control	Selec	t an option ╺
		Apply			Apply
Backup Mode		Enabled			
		Apply			
		Config	gurations		
Sell Enable/Disable	$\bigcirc$		_		
	$\bigcirc$	Disabled			
				Apply	Reset
Note: If DC Coupled, o	disable AC Cou	pling			
ckup Mode Settings					
AC Coupling		Enabled	Maximum Search Watts	-0	50
AC PV Charge SOC 🥝 Limit		90 %	Search Delay	•••	2 5
Search Mode Enable	$\bigcirc$	Disabled			
				Apply	Reset
				Арру	Reset



arger Settings			
Recharge Voltage 😮	53 V	/ Charge Block Start 😯	<b>^ ^</b>
Recharge SOC 🕜		6	12 : 00 AM
Recharge SOC Delay	-0 60 5	5	
		Charge Block Stop 😲	▲ ▲ 12 : 00 AM
			Apply Reset

### \*\*\* Note: Disable Grid Selling since Pv is directly connected to meter in AC Coupling settings.

#### **Grid-Tied Export**

Controls			*
	Con	trols	
Operating Mode	Operating ~	Force Charger State	Apply
Reset 🕜	Reboot ~ Apply	Charger	Enabled Apply
Clear	Apply	Auxillary Output Control	Apply
Backup Mode	Enabled Apply		
	Config	urations	
Sell Enable/Disable	Enabled		Apply Reset
Charger Settings			~
Recharge Voltage 🕢		Charge Block Start 🕖	^ ^
Recharge SOC 🕐	20 %		12 : 00 AM
Recharge SOC Delay	- <b>0</b> 60_s	Charge Block Stop 🕢	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲
			Apply Reset



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Grid Energy Management (Grid Support)			
Grid Support		Enabled	
Grid Support Voltage	0	64	۷
Grid Support SOC		99	%
Grid Support SOC Exit Delay	-0	60	s
Maximum Export (Sell) Sell Amps	PV arra 240V ÷	ay size ÷ total inverters.	A

\*\*\*Note: Enabling Enhanced Grid Support (64V, 99%) will allow the charge controllers to fully charge the batteries and then export the excess power to the Grid. Export Block, Grid Peak load shave can be left disabled (Default)

#### Settings for MPPT chargers

Equalize Voltage Set Point	•••	56 V	Absorption Time	60 n
Equalize Support	$\bigcirc$	Equalization Not	Charge Cycle	3 Stage ~
		Allowed	Maximum Charge Rate	Recommended charge per battery /maximu
Bulk/Boost Voltage Set Point	- 0	56 V	Equalize Now	charge) = x 100 Disabled
Float Voltage Set Point		<b>56</b> V	Charge Mode	Primary ~
Recharge Voltage	0	53 ] V	Default Battery	Warm
Absorption Voltage Set Point	0	<b>56</b> V	Temperature	

### Self-Consumption (Zero Grid Export)

Controls		*
	Controls	
Operating Mode	Operating         Force Charger State           Apply         Force Charger State	Apply
Reset 🕜	Reboot     Charger       Apply	Enabled Apply
Clear	Auxiliary Output Control	Apply
Backup Mode	Enabled Apply	
	Configurations	
Sell Enable/Disable	Enabled	
		Apply Reset



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Recharge Voltage 😯		51.3 V	Charge Block Start?	^ ^
Recharge SOC 🕐	-0	20 %		12 : 00 AM
Recharge SOC Delay	-0	60 s		* *
			Charge Block Stop ?	~ ~
				12 : 00 AM
				Apply Reset
Grid Support		Enabled		
Grid Support Voltage	•	51.7 V		
Grid Support SOC	•	25 %		
Grid Support SOC Exit Delay	•	60 s		
/laximum Export (Sell) Sell Amps	0	0 A		
Sell Delay 40 Sec		Disabled		

#### Settings for MPPT chargers

Equalize Voltage Set Point	•	56 V	Absorption Time	•••	60
Equalize Support	$\bigcirc$	Equalization Not	Charge Cycle	3 Stag	ge 🚬
		Allowed	Maximum Charge Rate	Recommended charge p charge	er battery /maximum ) =x 100
Bulk/Boost Voltage Set Point	- 0	56 V	Equalize Now	$\bigcirc$	Disabled
Float Voltage Set Point	•	56 v	Charge Mode	Prima	ary ~
Recharge Voltage	- 0	53 ] V	Default Battery	Warm	n ~
Absorption Voltage Set Point	0	56 V	Temperature	· · · · · ·	•



Reset

Apply

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**Off-Grid** 

		Cor	ntrols			
Operating Mode	Op	erating ~	For	ce Charger State	Sele	ect an option 🗸
		Apply				Apply
Reset	Reboot	~	Cha	arger	$\bigcirc$	Enabled
		Apply				Apply
Clear	Selec	t an option – 🗸 🗸	Aux	kiliary Output Control	- Sele	ect an option 🗸
		Apply				Apply
Backup Mode		Enabled				
		Apply				
		Config	uration	•		
Sell Enable/Disable		Coning		5		
	$\bigcirc$	Disabled				
					Apply	Reset
ger Settings						~
techarge Voltage 😗	•	53 V	Charge	e Block Start 🕜		^ ^
Recharge SOC ?		85 %	_			12 : 00 AM
Recharge SOC Delay	•	60 s	Charge	e Block Stop 🕜		<u> </u>
						12 : 00 AM
					Aj	oply Reset
Ings for MPPT chargers	<b>i</b>					
Equalize Voltage Set Point	•••	56	V	Absorption Time	•••	60
Equalize Support	$\bigcirc$	Equalization Not		Charge Cycle		2 Stage (No Float)
Bulk/Boost Voltage Set		Allowed	V	Maximum Charge Rate	Recommended	charge per battery /maximu charge) = x 100
Point		56	v	Equalize Now	$\bigcirc$	Disabled
Float Voltage Set Point	- 0	56	V	Charge Mode		Primary
Recharge Voltage		53	V	Default Battery		Warm
				Temperature		- 701111

\*\*\*Note: Disable Grid Support, Export Block, Grid Peak load shave.

Absorption Voltage Set

Point

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56 🗌 🔻



## 2. Open Loop Settings

\*\*\*All Open Loop Settings are programmable with a SCP, Insight Local or/and Insight Cloud. Disregard the communication cable that would go from battery to inverter.

Settings for Fortress Batteries with Schneider Inverters

Charger Setting > Custom Setting			
	80% DoD, 6000 cycles		
Battery Type	Custom		
Charge Cycle	2StgNoFloat		
Bulk Voltage	54.4 V		
Max Bulk Current	eFlex:55A per battery eVault:100A per battery eVault MAX 150 per battery LFP-10: 70A per battery		
Max Discharge Current	eFlex: 60A per battery eVault: 160A per battery eVault MAX: LFP-10: 100A per battery		
Battery Capacity	eFlex: 105AH per battery eVault: 360AH per battery eVault MAX: 360AH per battery LFP-10: 200AH per battery		
Max Charge Rate Percentage (%)	eFlex:55A per battery eVault:100A per battery eVault MAX 150 per battery LFP-10: 70A per battery Divided by Total Inverter DC Amperage		
Default Battery Temperature	Warm		
Recharge Volts	51.3		
Grid Support Volts**	53		
Absorb Volts	54.4		
Absorb Time	1 Hour		
Charge Block Start	Default		
Charge Block Stop	Default		
Advanced Settings > Inverter Settings			
Low Battery Cut Out Voltage	48V (50V if allowed)		
LBCO Hysteresis	2.0V		
LBCO Delay	5 Sec		
High Battery Cut Out Voltage	61V (58V if allowed)		
Search Watts	Default		





Search Delay	Default			
Settings with Schneider Charge Controllers	,			
***Parameter Setting for Fortress Batteries with S	chneider XW+ & XW Pro MPPT 60/80			
Advanced Setting > Charger Setting				
Battery Type	Custom			
Custom Setting				
	80% DoD, 6000 cycles			
Charge Mode	3 Stage			
Eqlz Support	Disabled			
Bulk Voltage	54.4 V			
Absorb Voltage	54.4 V			
Absorb Time	60 minutes			
Float Voltage	54.4 V			
Battery Temperature Compensation	0mV/C			
Battery Capacity	eFlex: 105AH per battery			
	eVault: 360AH per battery			
	eVault MAX: 360AH per battery			
May Ohanna Data Danaanta wat	LFP-10: 200AH per battery			
Max Charge Rate Percentage"	eFiex:55A per battery			
	evault MAX: 150A per batten/			
	EP 10: 704 per battery			
	LFF-10. TOA per ballery			
	Divide by total CC amp output			
Charge Cycle	Warm			
Recharge Volts	53 V			
Absorb Time	1 Hour			
Default Battery Temperature	Warm			
Battery Voltage (Auto-detected)	48V			

Note: The charge controllers can be set to a 3-stage charging cycle, but the inverter should be kept in a 2 stage charging cycle. Doing so, as well as setting the charge controller recharge voltage to be greater than that of the inverter recharge voltage, will prioritize charge controller charging over the inverter charging. Inverter charging is a grid/generator charge which has a lower priority than solar charge controller charging.

## 3. Additional Options

Generator Settings (Applicable to all Mode Settings) 20% state of charge is approximately 51.0V. 95% charge is approximately 53.7V. A 100% charge 54.4V.



NOTE: Voltages are open circuit resting measurement. The settings that would discharge the battery down to 49V, is too low for Fortress batteries. Fortress batteries should only be intentionally discharged down to 20% SoC or 51.4V and then be recharged by available charging sources.