

Life Is On

**Schneider**  
Electric

# Schneider Electric Handbook for Solar Installers

## UL Standards

Solar products and tech  
notes for residential and  
commercial applications



[solar.schneider-electric.com](http://solar.schneider-electric.com)



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# Smarter investment in PV solutions for grid-tie, off-grid and backup power installations

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When it comes to grid-tie, off-grid and backup power residential and commercial solar systems, Schneider Electric has both the experience and the proven technology to help make your investment a success.

Schneider Electric solutions for residential and commercial installations are specially designed by keeping your needs in mind. Our balance-of-system solutions include everything you need to efficiently distribute and manage locally generated solar energy, from the DC output to the AC grid connection.

## Bankability, Connectivity, Service and Support

 <b>Commitment &amp; experience</b> <ul style="list-style-type: none"><li>• 181 year old company</li><li>• Commitment to solar as a megatrend in power generation</li><li>• Dedicated business unit for solar</li></ul>	 <b>Expert in power conversion</b> <ul style="list-style-type: none"><li>• Product lines spans UPS, drives, &amp; inverters for solar power</li><li>• Technology expertise and supply chain synergies</li></ul>	 <b>Customer focus</b> <ul style="list-style-type: none"><li>• Access to fast and efficient field services</li></ul>	 <b>Global scale</b> <ul style="list-style-type: none"><li>• A global business operating in over 100 countries</li><li>• We have the scale to support installation anywhere</li></ul>
 <b>Connectivity &amp; IoT ready</b> <ul style="list-style-type: none"><li>• Availability and efficiency maximized with connected offers and advisor software</li></ul>	 <b>Extensive product line</b> <ul style="list-style-type: none"><li>• CIB segments :<ul style="list-style-type: none"><li>• Commercial</li><li>• Residential &amp; off-grid</li><li>• IoT ready monitoring</li></ul></li></ul>	 <b>We think "local"</b> <ul style="list-style-type: none"><li>• Our reach is global, and our philosophy is to think local</li><li>• Our local service manager is only a phone call away</li></ul>	 <b>We offer more</b> <ul style="list-style-type: none"><li>• End to end solutions</li></ul>

## Why choose Schneider Electric's solar products and solutions?



Trusted brand for over 180 years



Designed for reliability



Flexibility



Schneider Electric's ecosystem of products and solutions



Long-term, trusted service partner



IoT enabled solutions for Smart Homes and Buildings

# Hybrid inverter systems for residential and commercial applications

## XW Pro, XW+ and SW inverters



Our inverter / chargers manage power conversion and battery charging. Conext™ XW Pro, XW+ and SW are suitable for grid-tie solar with storage, backup power, self-consumption, and off-grid power for homes, small businesses, and remote communities.

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### Residential applications



Residential grid-tie solar with battery backup



Residential self-consumption with storage



Residential off-grid



Residential backup power

### Commercial applications



Commercial rooftop solar for self-consumption with storage



Commercial backup power



Commercial off-grid



Microgrids




Telecom towers

## Hybrid inverter / charger systems

### Conext™ XW Pro

Adaptable and scalable, the Conext™ XW Pro provides the one solution you need for grid-tie solar with storage, backup power, self-consumption, and off-grid for homes, small businesses and remote communities.

Designed to the highest standards of reliability and quality while complying with evolving utility requirements such as California Rule 21 and UL 1741 SA, the Conext™ XW Pro can meet your needs for any number of residential, commercial, and industrial applications.


	Part number	Product name	Description
	<b>865-6848-21</b>	Conext™ XW Pro 120/240V	<ul style="list-style-type: none"> <li>• 6800 W output power (continuous) at 25°C</li> <li>• 12000 W overload 60 sec</li> <li>• 140 A maximum output charge current</li> <li>• 48 VDC nominal battery voltage</li> </ul>

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### Conext™ XW+

Conext™ XW+ is an adaptable single-phase and three-phase battery inverter / charger with grid-tie and off-grid functionality, as well as dual AC power inputs

From a single unit to clusters up to 76.5 kW, the Conext™ XW+ is a scalable system. The Schneider Electric Conext™ XW+ system is suitable for grid-interactive and off-grid, residential and commercial, solar and backup power applications.

	Part number	Product name	Description
	<b>865-6848-01</b>	Conext™ XW+ 6.8 kW 120/240V	<ul style="list-style-type: none"> <li>• Supports single-phase and stackable three-phase operations</li> <li>• 6800 W output power (continuous) at 25°C</li> <li>• 12000 W overload 60 sec</li> <li>• 140 A maximum output charge current</li> <li>• 48 VDC nominal battery voltage</li> </ul>


## Hybrid inverter / charger systems

### Conext™ SW

Conext™ SW is a pure sine wave, storage inverter / charger with switchable 50/60 Hz frequencies, providing power for every need.

The Conext™ SW is a proven inverter / charger for off-grid, backup power and self-consumption applications for homes and small businesses.

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	Part number	Product name	Description
	865-4024-21	Conext™ SW 4024 120/240V	<ul style="list-style-type: none"> <li>• 4000 W overload 30 min</li> <li>• 7000 W overload 5 sec</li> <li>• 90 A maximum output charge current</li> <li>• 24 VDC nominal battery voltage</li> </ul>
	865-4048-21	Conext™ SW 4048 120/240V	<ul style="list-style-type: none"> <li>• 4400 W overload 30 min</li> <li>• 7000 W overload 5 sec</li> <li>• 45 A maximum output charge current</li> <li>• 48 VDC nominal battery voltage</li> </ul>





## More resources are available online

Product information (datasheets, manuals, technical documents and firmware)

1. Visit [SEsolar.com](https://www.sesolar.com).
2. Look for your product under the Product menu.
3. The Downloads section offers product documentations.

## Installer Support

If you're an installer in the US, Puerto Rico or Canada, register yourself as an installer at [SEsolar.com/installer](https://www.sesolar.com/installer) for the dedicated support channel.

# Monitoring and control solutions for residential and commercial applications

## Local and remote monitoring



Introducing the powerful local and remote monitoring solution for battery-based and grid-tie solar systems. The Conext™ Gateway together with Conext™ Insight 2 will bring system monitoring and remote management to the cloud.

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### Residential applications



Residential grid-tie solar with battery backup



Residential self-consumption with storage



Residential off-grid



Residential backup power

### Commercial applications



Rooftop for feed-in-tariff / net metering



Commercial rooftop solar for self-consumption with storage



PV-Diesel hybridization



Commercial backup power



Commercial off-grid



Microgrids



Telecom towers

## Conext™ Insight 2 and Gateway

### Conext™ Insight 2

The Conext™ Insight 2 is a cloud-based platform for end users and installers to remain connected to and manage a portfolio of customer sites. It is a simple tool for users to track their system performance locally and remotely.



#### Description

- Easily analyze your energy use and production
- Optimize your operations with powerful remote troubleshooting
- Minimize truck rolls and reduce installers travel expenses
- Configure your key operating parameters to extend equipment life
- Monitor and analyze a single site or your complete portfolio of sites
- Drill-down from a multi-sites overview to the detailed diagnosis of specific equipment on site
- Manage data of all key installed devices from a single login

3

### Conext™ Gateway

The new Conext™ Gateway provides local system configuration and management as well as live system monitoring for the residential and commercial solar and battery applications.

The Conext™ Gateway together with Conext™ Insight 2 will bring system monitoring and remote management to the cloud.



Part number

**865-0329**

Product name

Conext™ Gateway

Description

- Compatible with XW Pro, XW+, SW and Conext™ accessories
- Supports Xanbus, Canbus, and Modbus for connectivity to range of SE solar products
- Supports Wi-Fi and Ethernet for easy connectivity

### Compatible with our hybrid inverter systems



Our monitoring solutions are compatible with the following inverter / chargers:

- ✓ Conext™ XW Pro inverter / charger
- ✓ Conext™ XW+ inverter / charger
- ✓ Conext™ SW inverter / charger

# Broad range of balance of systems for residential and commercial applications

## Power Distribution Panels, Charge Controllers and Accessories

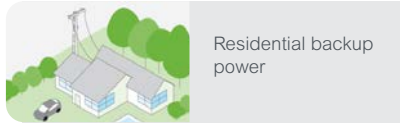
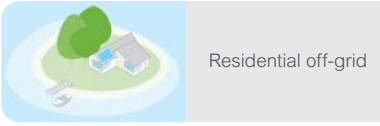


We offer broad range of balance of systems that are compatible with our storage inverter / chargers and monitoring solutions.

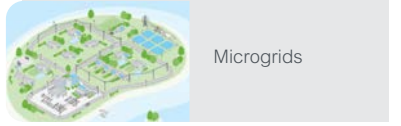
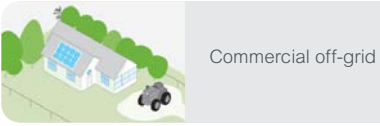
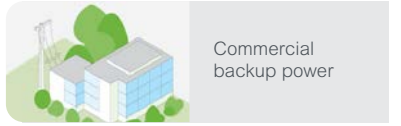
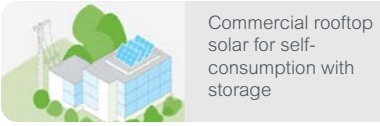
Leverage Schneider Electric's ecosystem of products and solutions.

### Residential applications

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### Commercial applications



## Power Distribution Panels (PDP)

### PDP and PDP accessories for XW Pro and XW+ systems


The Conext™ XW PDP and Mini PDP are factory-wired and labeled to support the integration of multiple XW Pro or XW+ inverter / chargers and MPPT solar charge controllers with a single battery bank.

	Part number	Product name	Description
	<b>865-1013-01</b>	Conext™ XW Mini PDP	<ul style="list-style-type: none"> <li>Power distribution panel accessory for single XW+ / XW Pro inverter systems</li> <li>Includes three AC breakers</li> <li>250 A DC breaker for inverter/charger connection to battery</li> </ul>
	<b>865-1015-01</b>	Conext™ XW PDP	<ul style="list-style-type: none"> <li>Power distribution panel accessory for single, 2 or 3 unit XW+ / XW Pro inverter systems</li> <li>Includes three AC breakers</li> <li>250 A DC breaker for inverter/charger connection to battery</li> </ul>
	<b>865-1020-02</b>	Conext™ XW Inverter Connection Kit	<ul style="list-style-type: none"> <li>Connection kit for connecting a second or third XW inverter to the XW PDP</li> <li>Includes a conduit box, a 250 A DC breaker, and wiring</li> </ul>
	<b>865-1025-01</b>	Conext™ XW Conduit Box	<ul style="list-style-type: none"> <li>PDP accessory for connecting to XW series inverter / chargers and PDP</li> <li>Wiring accessories not included</li> </ul>
	<b>865-1215-01</b>	120/240Vac Breaker Kit for Conext™ XW PDP	<ul style="list-style-type: none"> <li>XW PDP accessory for additional XW inverters, single-phase/split-phase</li> <li>Includes three 60A, 120/240 Vac AC breakers</li> </ul>
	<b>865-1315-01</b>	3 Phase Breaker Kit for Conext™ XW PDP	<ul style="list-style-type: none"> <li>XW PDP accessory for additional XW inverters, three-phase</li> <li>Three 60A, 120/208 Vac AC breakers</li> </ul>
	<b>865-1065</b>	250A, 160 Vdc Breaker Master Pack (6 units)	<ul style="list-style-type: none"> <li>XW / SW PDP accessory for inverter/charger connection to battery</li> </ul>
	<b>865-1070</b>	80A, 125 Vdc Breaker Master Pack (12 units)	<ul style="list-style-type: none"> <li>XW / SW PDP accessory for MPPT 60 150 output, battery side</li> </ul>
	<b>865-1075</b>	60A, 160 Vdc Breaker Master Pack (48 units)	<ul style="list-style-type: none"> <li>XW / SW PDP accessory for MPPT 60 150 input, PV array side</li> </ul>
	<b>865-1080</b>	100A, 125VDC Breaker Master Pack (12 units)	<ul style="list-style-type: none"> <li>XW / SW PDP accessory for MPPT 80 600 output, battery side</li> </ul>

## Power Distribution Panels (PDP)

### Battery fuse combiner box for XW+ systems

The Conext™ Battery Fuse Combiner Box combines XW+ inverter / chargers with one battery bank using a single battery pole disconnect method and provides fuse protection for cables, batteries and inverter / chargers.



	Part number	Product name	Description
	<b>865-1031-01</b>	Conext™ Battery Fuse Disconnect Box for 250A DC Fuses	Combines up to three XW+ inverter / chargers with one battery bank
	<b>865-1030-01</b>	Conext™ Battery Fuse Disconnect Box for 160 A DC Fuses	Combines up to three XW+ inverter / chargers with one battery bank

### PDP and PDP accessories for SW systems

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The Conext™ SW Power Distribution Panels are pre-wired out of the box and labeled to support the integration of SW inverter / chargers with a MPPT Solar Charge Controller, battery bank and load centers. Designed to save installers significant time, effort and costs on every installation, the Distribution Panels offer excellent value when compared to customized options.

The solution set includes a DC distribution panel complete with a pre-installed 250 A DC breaker and additional breaker slots for integrating multiple DC power sources.





	Part number	Product name	Description
	<b>865-1016</b>	Conext™ SW DC Breaker Panel	<ul style="list-style-type: none"> <li>• DC Breaker panel accessory for SW series inverters</li> <li>• 250 A DC Breaker for inverter/charger connection to battery</li> </ul>
	<b>865-1017</b>	Conext™ SW AC Breaker Panel 120/240 V	<ul style="list-style-type: none"> <li>• AC breaker panel accessory for SW series inverters</li> <li>• Includes two 30 A AC breakers and one 60 A AC breaker</li> </ul>
	<b>865-1065</b>	250A, 160 Vdc Breaker Master Pack (6 units)	• XW / SW PDP accessory for inverter/charger connection to battery
	<b>865-1070</b>	80A, 125 Vdc Breaker Master Pack (12 units)	• XW / SW PDP accessory for MPPT 60 150 output, battery side
	<b>865-1075</b>	60A, 160 Vdc Breaker Master Pack (48 units)	• XW / SW PDP accessory for MPPT 60 150 input, PV array side
	<b>865-1080</b>	100A, 125VDC Breaker Master Pack (12 units)	• XW / SW PDP accessory for MPPT 80 600 output, battery side

## Charge Controller Solutions

### Conext™ MPPT charge controller solutions



Conext™ MPPT charge controllers are used for DC Coupled systems.

The Conext™ MPPT charge controllers provide maximum power point tracking of PV arrays to optimize solar energy harvest while regulating the battery charge. When combined with the Conext™ XW and SW series inverters, surplus power is used to power AC loads. The MPPT 80 600 is rated for 600 V PV strings, helping to reduce balance of system costs.

	Part number	Product name	Description
	<b>865-1030-1</b>	Conext™ MPPT 60 150 Charge Controller	<ul style="list-style-type: none"> <li>• 3500 W maximum output power (at nominal 48 V)</li> <li>• 12, 24, 36, 48, 60 V nominal battery voltage</li> <li>• 150 V max. PV array open circuit voltage including temperature correction factor</li> <li>• Compatible with XW Pro, XW+ and SW</li> </ul>
	<b>865-1032</b>	Conext™ MPPT 80 600 Charge Controller	<ul style="list-style-type: none"> <li>• 4800 W maximum output power (at nominal 48 V)</li> <li>• 24 and 48 V (nominal battery voltage (default is 48 V)</li> <li>• 600 V max. PV array open circuit voltage including temperature correction factor</li> <li>• Compatible with XW Pro, XW+ and SW</li> </ul>
	<b>865-1036</b>	MPPT Disconnect RS	<ul style="list-style-type: none"> <li>• Accessory for MPPT 60/80 charge controllers for NEC 2017 compliance</li> <li>• PV disconnect, rapid shutdown transmitter, and arc fault detection (UL1699B)</li> </ul>
	<b>865-1039</b>	RS Initiator Switch	<ul style="list-style-type: none"> <li>• Outdoor rated initiator switch for the MPPT Disconnect RS</li> </ul>

# Accessories

## Accessories for XW Pro, XW+ and SW systems

	Part number	Product name	Description
	<b>865-1155-01</b>	Conext™ Configuration Tool	<ul style="list-style-type: none"> <li>• PC-based software tool to simplify system configuration and reduce installation time</li> <li>• Compatible with XW Pro, XW+, and SW, as well as MPPT charge controllers</li> </ul>
	<b>865-1050-01</b>	Conext™ System Control Panel (SCP)	<ul style="list-style-type: none"> <li>• Control panel to set up and monitor the Conext inverter charger system,</li> <li>• Compatible with XW Pro, XW+, and SW, as well as MPPT charge controllers</li> </ul>
	<b>865-1060-01</b>	Conext™ Automatic Generator Start (AGS)	<ul style="list-style-type: none"> <li>• Automatically activate or stop a generator in response to changing power requirements.</li> <li>• Compatible with XW Pro, XW+, and SW, as well as MPPT charge controllers</li> </ul>
	<b>865-1080-01</b>	Conext™ Battery Monitor	<ul style="list-style-type: none"> <li>• Indicates hours of battery based runtime and determines battery bank state of charge.</li> <li>• Compatible with XW Pro, XW+ and SW, as well as MPPT charge controllers</li> </ul>

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# Tech Notes



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## Benefits of Conext™ SW / XW+ / XW Pro Enhanced Grid Support feature

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Summary: Schneider Electric's Conext™ SW / XW+ / XW Pro Battery Inverter products are designed for maximum flexibility and can be integrated with PV generators on the or AC output (Load side) or DC side (Battery side). These two methods of connecting PV generators and storage inverters are commonly referred to as AC and DC coupling respectively. Conext™ battery inverters support both methods of PV integration. For more on this application, see our Tech note on AC & DC Coupling.

Enhanced Grid Support is Schneider Electric's proprietary control algorithm for energy management and is based on Schneider's patent US8076907B2.

This feature is designed to maximize energy storage when DC coupling is used with Schneider Electric's Conext™ products family of battery inverters and charge controllers. The feature requires communication between the battery inverter and DC charge controller and therefore only works with Schneider's Conext™ range of products.

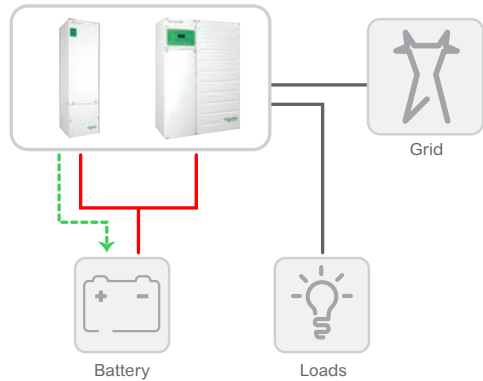
Enhanced Grid Support (EGS) applies to grid connected systems, for applications where the battery inverter is used for back-up or to maximize self-consumption. When EGS is active, the battery inverter and charge controller interact continuously during Bulk, Absorption and Float stages of charging. Through the charging stages, the system intelligently exports the excess PV power not stored by the battery, while adjusting to the charge voltage settings of the charge controller.

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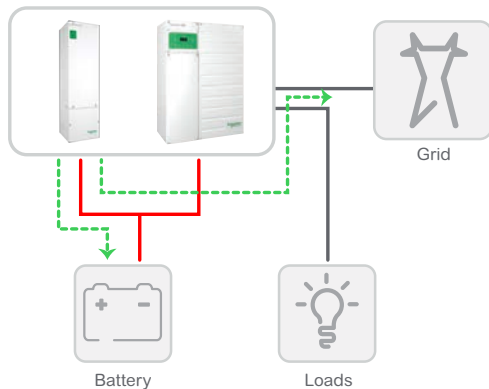
Why is unique about this?

1. The Charge controller(s) are able to execute a full two or three stage charge cycle, to optimally charge the battery. This allows the battery to be charged at a charging voltage associated with each charge stage (Bulk, Absorption, Float) and efficiently returns the battery to a full state of charge. For flooded batteries, the elevated battery voltage during Absorption stage promotes agitation of electrolyte which reduces stratification of the acid.
2. In most other DC coupled systems, a fixed voltage is used to regulate battery charging and excess PV export. The fixed charging voltage is likely to result in partial state of charge of the battery and could degrade battery performance over time

Bulk stage



Absorption stage



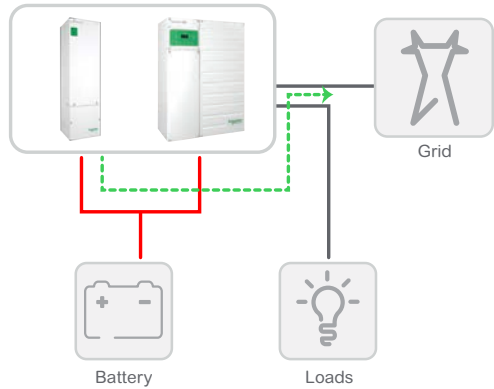
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Just like Smart Charge for AC Coupled systems, Enhanced Grid Support is designed to maximize and prioritize storage loads. The value of this feature is that the stored energy can be used later when rates are higher (Time-of-Use). Or in applications where the grid is intermittent, EGS prioritizes storage of your PV production to maximize readiness for potential grid outage.

NOTE: Enhanced Grid Support is not compatible with lithium-ion batteries with BMS integration due to the need for closed loop control communication with BMS in the lithium-based battery. To achieve Enhanced Grid Support functionally with BMS integration, a Conext™ Gateway needs to be installed in the system.

For more information on enhanced grid support feature, refer to respective product manuals.

Float stage



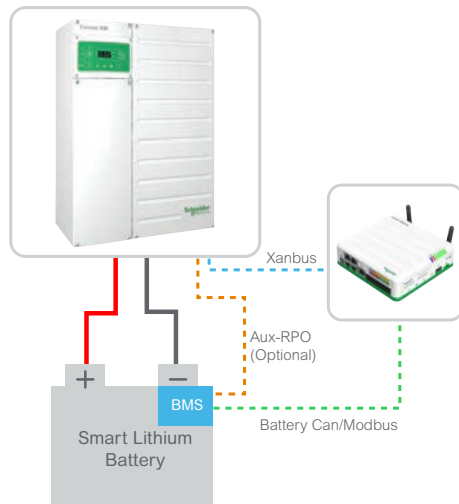
## Using Lithium-ion & Advanced Batteries with Conext™ Series of Inverter / Chargers & Charge Controllers

**Summary:** Lithium-ion batteries continue to increase in popularity due to improved affordability, superior cycle life and longevity compared to traditional lead acid batteries. However, Lithium batteries require controlled charging and discharging for optimal and safe operation which necessitates changes to traditional battery charging algorithms to adapt to the chemistry's sensitivities. Conext™ inverter / chargers now support operation with lithium batteries to increase your options for storage technology.

The Conext™ XW, SW and MPPT charge controller family of products can be used with Smart Lithium-ion Batteries. Smart batteries have an internal Battery Management System (BMS) that monitors critical internal parameters and determines safe charging or discharging parameters.

The Conext™ Gateway retrieves the relevant charging and discharging parameters from the battery BMS and intelligently controls operation of the Conext™ inverter and charge controller system accordingly. This type of control is known as closed loop control and allows the Conext™ system to adapt to battery BMS operating limits, warnings and in real time. It is also possible to use your Conext™ product with Lithium batteries that do not rely on communication with the inverter. Such lithium batteries are referred to as Lead Acid replacements.

For information on supported lithium battery models, please contact your battery manufacturer or Schneider Electric application engineers.



Lithium-ion battery with closed loop control

## Benefits of Conext™ SW Smart Charge Feature

**Summary:** As utilities struggle with excess generation from distributed PV, a phenomenon commonly known as the “duck curve”, storage is becoming a key component of a long-term solution. Through incentive programs, end users are being encouraged to add storage and store excess PV during peak generation mid-day) periods, for use during peak demand hours (early evening), e.g. Time-of-Use rates. For existing PV installations, this means adding storage as a retrofit. Smart charge facilitates easy time of use by automatically storing excess generation from your existing PV inverter system.

Smart Charge is Schneider Electric’s proprietary control algorithm and is based on Schneider Electric’s patent US9917446B2.

This feature is designed to maximize energy storage in AC coupled systems. The feature does not require any communication between the battery inverter and PV Inverter, and thus works with any brand of PV Inverter.

For the feature to work, the PV inverter must be installed downstream of the Conext™ battery inverter, or to the AC Output port of the inverter which would typically also connect to a critical load panel. This feature is used for grid connected systems, where the storage inverter is used for back-up or to maximize self-consumption.

When smart charge is active, the battery inverter monitors the flow of excess PV power produced by the PV inverter flowing in through the AC Load terminal and out to the grid port. The battery inverter intelligently captures the excess PV power and re-directs it to charge the battery. As the battery approaches full charge, excess PV power that cannot be stored by the battery is allowed to flow out to

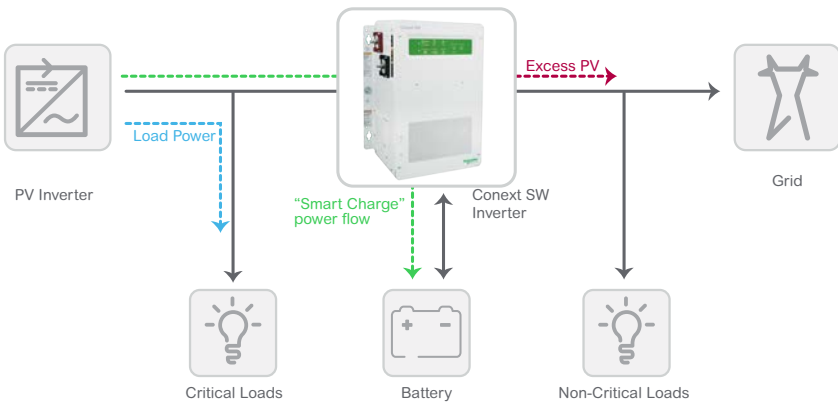


Conext™ SW inverter / charger

the inverter grid input port and support other loads in the home or for eventual export to the grid where allowed.

Just like Enhanced Grid Support for DC coupled systems, Smart Charge is intended to maximize and prioritize storage over non-critical loads in AC coupled systems. The added value of this feature is that the stored energy can be used later when rates are higher (Time-of-Use). In applications where the grid is intermittent, Smart Charge prioritizes storage of your excess PV production to maximize readiness for potential grid outage.

For more on Smart Charge feature, refer to the respective product manual.



Smart Charge automatic power flow

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## Getting the most out of Conext™ XW+ / XW Pro Auxiliary Control Port

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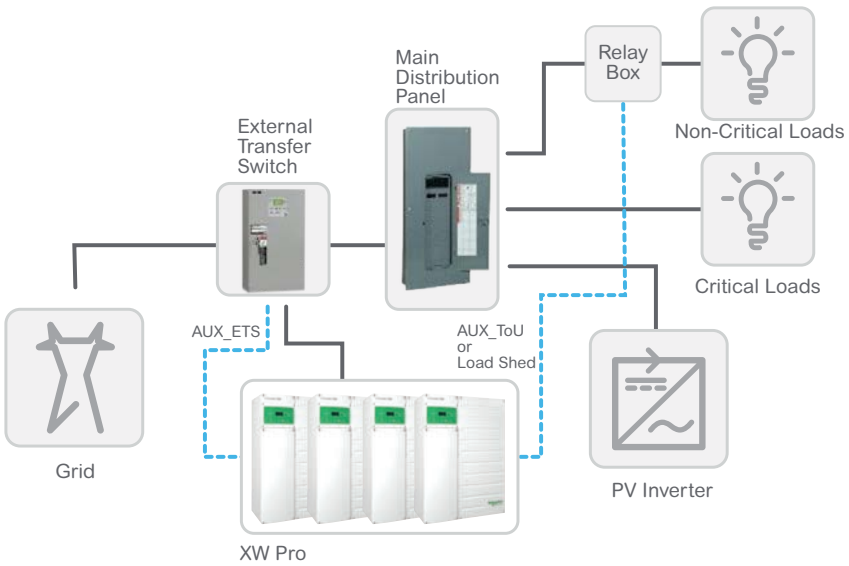
Summary: Schneider Electric's Conext™ XW product line is designed for maximum flexibility. A useful feature is the Auxiliary port (Aux Port). This is a 5-position terminal block located at the lower right side of the inverter and is software configurable to perform several functions.

The Aux port can be used to control other devices based on certain conditions in the system. Some uses include the following applications.

1. Large installations using multiple inverters.
  - For large three phase systems with 3 or more inverters, the Aux port is used to control an external transfer or disconnect switch to switch the loads between the XW systems and an alternate AC source (grid or generator).
  - For stacked single phase systems, the port can be used to control an external load switch when loads in the system exceed 60A. This avoids damage to XW's internal transfer relays when used with large loads in a stacked system.
2. Load shedding: Can be used to disconnect a non-critical load based on battery state of charge to prolong autonomy in back-up mode. An external relay is required.
3. Simple AGS control: Can be used to start/stop a two-wire generator based on battery voltage or State of Charge.
4. Battery Cabinet venting: Can be used to control a fan in a battery cabinet. Programmable to start the fan at a specific battery voltage or charge stage (e.g. bulk exit) and stop at completion of Absorption Phase.
5. Outdoor cabinet cooling fan: Can be used to activate a cabinet cooling fan based on internal temperature of the XW. This can be used if the XW is installed in a cabinet that is exposed to high ambient temperature but has a cabinet cooling fan.
6. Time of Use Load shedding: Can be used to disconnect non-critical loads in the home during a high tariff period (e.g. ToU).



Note: In each of the above applications, an appropriately rated external relay must be used to switch each respective load.



Example: External transfer and load shedding applications using XW Pro Aux in a system.

# AC Coupling vs DC Coupling

Summary: AC or DC coupling refers to how power from Solar panels connects or couples with power from a battery inverter. It can connect on the battery inverter's AC output terminals (AC coupling) or to the battery side (DC coupling).

The question of which of the two approaches is better has been debated at length among solar installers and system integrators. Each approach has its advantages and disadvantages which depend on the needs of an application. One analogy is that of vehicle propulsion options, front vs rear drive vs all-wheel drive. The choice depends on use case, e.g. whether for city driving or racing or off-road driving.

Here are some pros and cons of each approach:

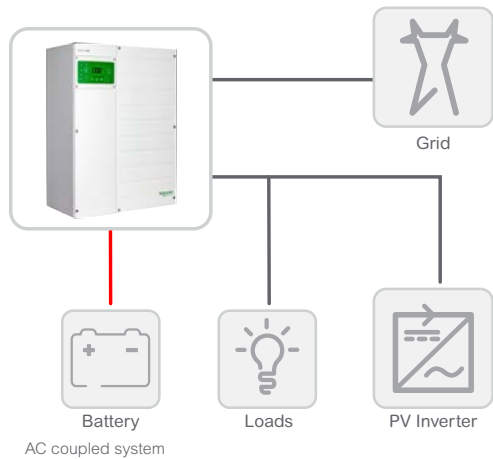
## AC Coupling

Pros:

- More efficient if loads coincide with PV generation (e.g. commercial building, offices).
- Easier to retrofit storage.

Cons:

- Lacks black start capability. (If battery inverter shuts down due to discharged battery and no PV, system will not recover when PV returns).
- There are constraints on AC coupled PV system sizing in comparison to the power rating of the battery inverters.

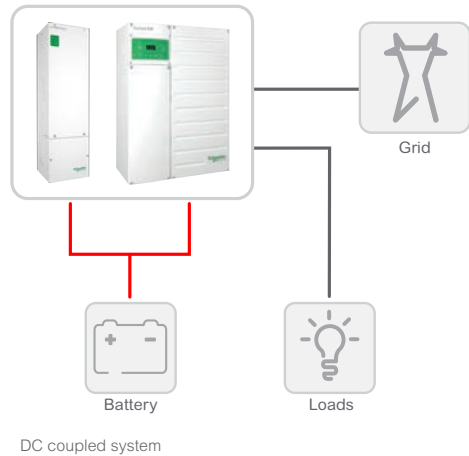


6

## DC Coupling

Pros:

- More efficient if prioritizing storage of PV for later use (e.g. residential, off-grid communities)
- Battery inverter is sized to match the load.
- Supports black start. If the battery inverter shuts down due to discharged battery and no PV, the system automatically recovers through DC charging when PV returns).



Cons:

- PV inverter must be replaced with charge controller for retrofit systems.
- Less efficient if loads are coincident with PV generation.

## Five Steps to Sizing The Solution You Need

When sizing any solar and storage system it is important to always work backwards – understand the load you want to run. Understand when you want to run it (day or night) and for how long. Based on this, the design engineer can select the inverters, the PV array sizing and size the battery bank (or storage).

Step

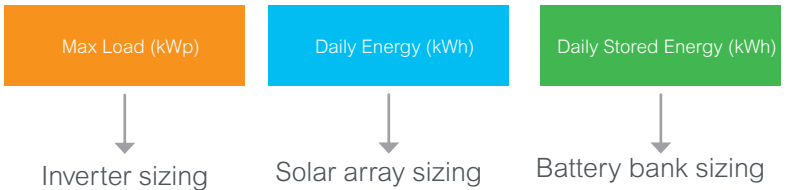
1

### Load Profile

Always start here. Understand how much power your system needs to provide at its highest point in demand and also understand how many kWh of power needs to be produced on a daily basis.

Also determine how much energy needs to be stored in kWh for night time usage daily.

Three things to determine:



Step

2

### Inverter Sizing

Once the maximum instantaneous power of a given site is determined, we know what the peak power rating of our inverters should be.

It is also important to make sure that all the critical loads can be run for enough time. Be aware of the inverters capabilities over time and at different temperature ranges.

Step

3

### Solar Array Sizing

It is sized based on daily kWh and whether grid export is allowed. Decide AC coupling or DC coupling or both.

1. Size the array that will fulfill your daytime consumption requirements. For larger systems this will typically be installed on grid tied inverters (AC Coupled).
2. Size the array that will charge your batteries for night time usage. For most systems this will be installed on charge controllers (DC Coupled).

Step

4

### Battery Bank Sizing

Depending on the weather conditions where your installation is taking place, nighttime consumption of your system and the storage technology suited for you site, it is recommended that the battery bank be sized with a reasonable oversizing factor to ensure uninterrupted supply of power.

Battery bank sizing should take into account the system use case such as self-consumption or time-of-use rate optimization. It may also consider the household critical loads and desired number of hours of autonomy in case of a grid failure.

Step

5

### Back-up Power Sources

If you are installing a system in an area with extended periods of bad weather or very heavy loads that only run occasionally you may need to install a backup generator or get a grid connection to ensure that you have the excess power available.

Work closely with your installer to understand this, simply installing a generator for emergency or exceptional conditions can drastically reduce what you need to spend on your overall system.

6

## Using Two Generators with The Conext™ XW+ / XW Pro

**Summary:** The Conext™ XW+ and XW Pro multi-mode inverters offer a broad flexibility to accommodate your application needs. Some off-grid installations (e.g. remote hospitals, resorts, etc), use multiple energy sources to increase autonomy and maximize resiliency. One solution is the use of two generators to add redundancy.

The Conext™ XW is a perfect solution for redundant generator application. The two AC inputs on the XW can be used to manage the two AC sources. Two Conext™ AGSs will also have to be installed in the system to control the generators. To setup the system, stagger the following configuration settings:

- Select a primary generator and configure the start/stop triggers on the associated Conext™ AGS as appropriate.
- On the back up AGS, set the start/stop configuration settings slightly lower than on chosen for the primary AGS.

6

Once installed and configured, simply select the primary running generator by configuring the “AC source priority” parameter on the Master in the XW System. The primary generator will always start first since trigger settings are higher. If the primary generator does not start for any reason (e.g. out of fuel) the battery voltage or battery State of Charge (SoC) will continue to drop. Eventually the trigger conditions for the second AGS will be met and the back-up generator will start.



Conext™ XW Pro inverter / charger

# Li-ion Compatibility



# Blue Planet Energy

## Integration with Schneider Electric

Blue Planet Energy has megawatt-hours of fielded energy storage systems coupled with Schneider Electric Conext™ series inverter / chargers and solar charge controllers. These systems power grid-independent residences in off-grid and non-export energy markets, as well as commercial installations that provide business continuity, resilience, and financial savings. As part of an American Red Cross resilience project, Blue Planet Energy and Schneider Electric power more than 100 emergency shelters in schools located throughout Puerto Rico.

Blue Ion 2.0 integrates seamlessly with Schneider Electric power conversion equipment. The open-loop communication configuration requires a single voltage setpoint. Blue Ion's high-power BMU optimizes battery charging down to the cell-pack level, while providing best-in-class online system performance monitoring. Together, Schneider Electric and Blue Planet Energy offer integrators a field-proven solution for durable, high-performance solar energy storage projects

## Product Highlights

Blue Ion 2.0 is precisely engineered to offer simple, fast, and repeatable design and installation. It offers the safety of Lithium Ferrous Phosphate (LFP), the confidence of a 15-year performance warranty, and the durability of 100% depth of discharge with no impact on cycle life. Every Blue Ion system you install is backed by the coolest and most experienced team in energy storage.

Listed to UL 9540, Blue Ion 2.0 is available with configurable energy capacities of 8 kWh, 12 kWh, and 16 kWh. Integrators can parallel units for a maximum system capacity of 448 kWh. Blue ion 2.0 has a continuous power rating of 8 kW and surges to 10 kW for 30 minutes and 17 kW for one second. It supports AC- and DC-coupled system topologies as well as seamless integration with 3-phase services.



Designed, assembled, and tested in Hawaii by Blue Planet Energy, Blue Ion is a best-in-class energy storage system that provides unparalleled safety, reliability, and performance. Our company, design process, and craftsmanship are guided by Aloha, a Hawaiian principle that encompasses love, patience, attention, kindness, respect, and a connection to nature.

### Website

[BluePlanetenergy.com](http://BluePlanetenergy.com)

### Contact

[Sales@BluePlanetEnergy.com](mailto:Sales@BluePlanetEnergy.com)

866.957.2246



# Discover AES LiFePO<sub>4</sub> Batteries

## Integration with Schneider Electric

Discover AES LiFePO<sub>4</sub> batteries are built for demanding off-grid, whole home backup and microgrid applications. Discover AES batteries offer 1C continuous charge / discharge capabilities for the fastest recharge possible and support 3C peak output to handle in-rush and starting loads. They are field serviceable and have a 10-year replacement warranty. Each battery has an independent Battery Management System (BMS) that can be networked with up to 20 Discover AES batteries in parallel (133 kWh) and will communicate directly with the world's leading hybrid inverter systems.

Discover AES batteries are Xanbus devices for easy, plug-and-play integration with Schneider Electric Conext™ series inverter / chargers or direct connection with the Conext™ Gateway. Closed-loop communication provides real-time battery data/status reporting over the Xanbus network and enables the internal BMS to automatically set, optimize and dynamically manage the charge and discharge configuration of Conext™ inverter / chargers. Dynamic charge control offers up to 25% improvement in 0% to 100% SoC recharge time compared to open loop control.

## Product Highlights

### Discover AES LiFePO<sub>4</sub> 6.65 kWh

- p/n 42-48-6650
- Useful 6.65 kWh (130 Ah) 100% DoD
- Nominal: 51.2 V
- Continuous Discharge / Charge: 130 A (each)
- Peak Current: 300 A (each)
- Communication: Xanbus, CAN, Modbus TCP / IP
- Parallel: Up to 20 batteries per network string
- IEC 62133, UL 1973, UN 38.3

### Discover AES LiFePO<sub>4</sub> 2.8 kWh

- p/n 44-24-2800
- Useful 2.8 kWh (110 Ah) 100% DoD
- Nominal: 25.6 V
- Continuous Discharge / Charge: 110 A (each)
- Peak Current: 300 A (each)
- Communication: Xanbus, CAN, Modbus TCP / IP
- Parallel: Up to 20 batteries per network string
- IEC 62133, UL 1973, UN 38.3

**Discover**<sup>®</sup>  
Innovative Battery Solutions

Discover Battery is a leader in energy storage innovation for solar, transportation and motive applications. Our battery brands include AES LiFePO<sub>4</sub>, Advanced Tubular, MIXTECH, Gel Cell and Dry Cell.

Discover Battery is a Canadian company headquartered in Vancouver, BC with offices and distribution around the world and multiple manufacturing facilities located in Asia.

## Website

[discoverbattery.com/solar](http://discoverbattery.com/solar)

## Contact

[solarsales@discoverbattery.com](mailto:solarsales@discoverbattery.com)

This page in no way constitutes an endorsement, express or implied, of any product, service, or company.

# Fortress Power

## Integration with Schneider Electric

Fortress Power deploys self-managed Battery Management System (BMS) which can be easily integrated into Schneider Electric equipment. Using open loop control, the installer simply configures the battery charging and discharging parameters (high and low cut off voltage, max. charging and discharging current, etc.) via Conext™ System Control Panel.

The Fortress eVault 18.5 has CAN and RS 485 ports for communication.

## Product Highlights

eVault 18.5: 48V, 360AH, total energy 18.5kWh, max. 12 units in parallel for 222kWh; CAN/RS 485 communication

LFP-10: 48V, 100AH, total energy 10 kWh, max 2 in parallel; no communication

LFP-5K-48V: 48V, 100AH, total energy 5kWh, max 2 in parallel; no communication

LFP-5K-24V: 24V, 200AH, total energy 5kWh, max 2 in parallel; no communication



Fortress Power is a Pennsylvania-based global leader in lithium battery manufacturing that focuses on helping solar installers use the safest and most reliable energy storage for their projects.

Fortress Lithium Iron Phosphate Battery has industry-leading technology with a Battery Management System that integrates multilevel safety concepts for best reliability.

The High-Performance Fortress Lithium Battery is easy to install, safe, long lasting and super-efficient. It provides a low lifetime energy cost for both new solar customers and retrofit customers.

## Website

[www.fortresspower.com](http://www.fortresspower.com)

## Contact

[sales@fortresspower.com](mailto:sales@fortresspower.com)

Tel: +1 (877) 497 6937

Fax: +1 (267) 988 4219

# Pylontech

Compatibility  
expected in Q4 2019



## Integration with Schneider Electric

Pylontech batteries are set up for BMS communication with Schneider Electric's Conext™ XW Pro and Conext™ Gateway. The Pylontech batteries operate with closed-loop control with the XW Pro inverter, using the Conext™ Gateway as the CAN interface with the BMS.

Compatible Conext™ Gateway and Conext™ XW Pro firmware is expected in Q4 2019.

## Product Highlights

### US2000:

- 48V nominal
- 50Ah, 2.4 kWh
- Up to 8 battery packs in parallel, expandable with LV-Hub
- CAN, RS485 communication



### US3000:

- 48 V nominal
- 74 Ah, 3.552 kWh
- Up to 12 battery packs in parallel, expandable with LV-Hub
- CAN, RS485 communication



### LV-Hub

- Connect up to 5 battery piles
- Each battery pile can configure maximum 8 pcs US2000 or 12 pcs US3000



Pylontech is a unique manufacturer of lithium batteries with vertical integration from cell to module integration with its own BMS for different ESS application. With self-developed key technologies and dedication to ESS applications, Pylontech has delivered over 1.6GWh of batteries for the global ESS market since 2013.

Pylontech is proudly contributing our strength in changing the way people generating, transferring and using the electricity.

## Website

[www.pylontech.com.cn](http://www.pylontech.com.cn)

## Contact

Commercial: [Rita.ping@pylontech.com.cn](mailto:Rita.ping@pylontech.com.cn)

Technical: [Spenser.cheung@pylontech.com.cn](mailto:Spenser.cheung@pylontech.com.cn)

# SimpliPhi Power

## Integration with Schneider Electric



SimpliPhi's entire line of non-hazardous LFP PHI batteries have been successfully integrated with Schneider Electric inverters worldwide for nearly a decade in a diverse range of on- and off-grid residential, commercial and microgrid applications.

SimpliPhi also offers its all-in-one AccESS Energy Storage System featuring 3 or 4 PHI 3.8 kWh batteries with the Conext™ XW Pro 6848, with both AC Coupled or DC Coupled options, prewired in a NEMA-3R-rated cabinet. The Rule 21 compliant AccESS with Schneider Electric is ideal for backup power, TOU, peak-shaving, and self-consumption of solar, and UPS functions.



### 7

## PHI Battery Product Features

- Up to 100% DoD and 98% efficiency
- 10-year, 10,000-cycle warranty
- LFP battery chemistry free of cobalt hazards — no risk of overheating, fire, fumes or off-gassing
- No thermal monitoring, fire suppression, cooling or ventilation equipment required
- Indoor and outdoor use in all climates
- Modular and scalable
- Can install in small or unique spaces
- Full range of capacity and voltage options



SimpliPhi Power designs and manufactures efficient, non-toxic and enduring energy storage and management systems that utilize lithium ferro phosphate (LFP) battery chemistry. Based in Oxnard, California, SimpliPhi combines the nonhazardous LFP chemistry with its proprietary cell and battery architecture, power electronics, Battery Management System (BMS) and manufacturing processes to create safe, reliable, durable and highly scalable on-demand power solutions for residential, commercial and emergency response applications. Integral to all SimpliPhi solutions is a proprietary management system that further optimizes the lifecycle, efficiency, overall performance and durability of its batteries. SimpliPhi storage system components are UL certified and have been rigorously tested and passed requirements by the U.S. Army and Marine Corps.

### Website

[simpliphipower.com/](http://simpliphipower.com/)

### Contact

[sales@simpliphipower.com](mailto:sales@simpliphipower.com)

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Register Schneider Electric  
solar products at  
[SEsolar.com/registration](https://SEsolar.com/registration)  
for free extended warranty

# NEC 2017 Compliance

Schneider Electric's hybrid solar and storage solutions now offer enhanced flexibility to meet NEC 2017 requirements with both DC coupled and AC coupled PV arrays. For DC coupled arrays with the Conext™ MPPT 60 150 or MPPT 80 600 charge controllers, Schneider Electric offers the MPPT Disconnect RS accessory, providing an easy to install solution for rapid shutdown PV arrays and NEC 2017 compliance. Schneider Electric inverter / chargers can also be AC coupled with string inverters or micro-inverters from third parties.

## DC Coupling using MPPT Disconnect RS and Charge Controllers

The MPPT Disconnect RS pairs with the Conext™ MPPT 60 150 and MPPT 80 600 charge controllers, providing a rapid shutdown transmitter, arc fault detection, and a PV disconnect.

## Simplified NEC 2017 Compliance with the MPPT Disconnect RS

- Integrated Rapid Shutdown transmitter using power line communication (PLC)
- Tested and certified with Tigo TS4-F Fire Safety receivers
- Arc fault detection certified to UL1699B
- Compatible with Conext™ MPPT80 600 and MPPT60 150 charge controllers



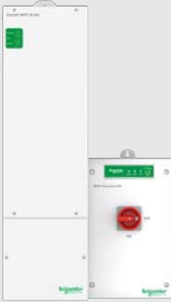
## Integrated PV Disconnect

- 2 leg disconnect, compliant with NEC 2017
- LOTO capability
- 2 input channels with up to 2 strings per channel

## Flexible Installation

- Each MPPT Disconnect RS can pair with up to two MPPT 80 or one MPPT 60
- Single Rapid Shutdown Initiator Switch for larger systems
- Side or bottom cable entry
- Mount on either side of the Conext™ MPPT 80 600 or MPPT 60 150 charge controllers

### Charge Controller Configurations with the MPPT Disconnect RS



MPPT 80 600 with MPPT Disconnect RS

2 Strings



Qty 2 MPPT 80 600 with MPPT Disconnect RS

2 Strings x 2 Channels



MPPT 60 150 with MPPT Disconnect RS

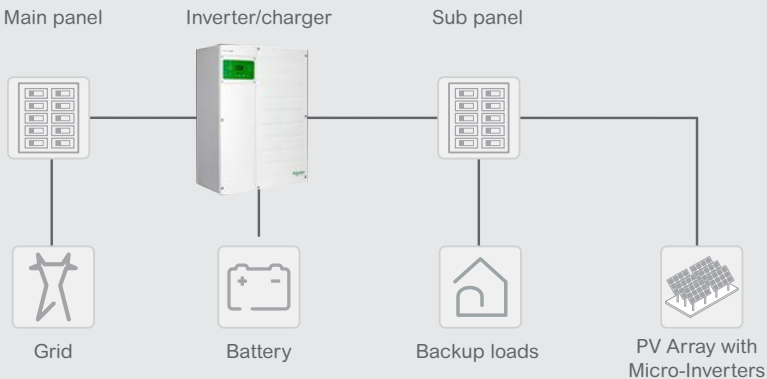
4 Strings  
(2 Strings per Channel)

### AC Coupling


The Conext™ XW and SW series inverters can be used in AC coupled configurations with various 3rd party string inverters and micro-inverters. This gives installers maximum flexibility to select AC coupled or DC coupled architectures. For NEC 2017 compliant AC coupled PV arrays, micro-inverters can be used, as well as string inverters with a certified rapid shutdown system.

Refer to the AC Coupled Solutions Guide (976-0240-01-01) for more information on AC coupled inverter compatibility and system sizing guidelines.

### Example AC coupled architecture with micro-inverters



# Customer Success Stories



“The village is now able to access to electricity 24 hours from our Minigrid - where they used to have only 4 hours per day.

I would like to thank Schneider Electric for their supports and commitments throughout the project.”

— Barani Aung, Managing Director of Techno-Hill Engineering

Learn more at [SEsolar.com/myanmar](https://SEsolar.com/myanmar)



# North and South America

● Commercial application ● Residential application



California, USA  
Off-grid solar



Ontario, Canada  
Off-grid solar



Hawaii, USA



Vermont, USA  
Residential off-grid  
Homeowner in VT gains energy independence from the grid

Solution: multi-cluster off-grid system including XW+ inverter / chargers, MPPT 80 600 charge controllers and compatible batteries



Puerto Rico  
Microgrids  
100 schools are powered by Microgrids through Red Cross's community resiliency project  
Solution: microgrids using XW+ inverter / chargers, MPPT 60/80 charge controllers and other communication devices.

Learn more at  
[SEsolar.com/red-cross](http://SEsolar.com/red-cross)



Argentina  
Microgrid

# Europe, Middle East and Africa

● Commercial application ● Residential application



**Germany**  
Commercial rooftop



**Finland**  
Commercial rooftop



**Finland**  
Commercial rooftop



**UK**  
Commercial rooftop



**France**  
Commercial rooftop



**Spain**  
Off-grid solar



**Ukraine**  
Commercial rooftop



**Egypt**  
PV plant



**Nigeria**  
Commercial off-grid  
170 schools and 11 healthcare centers throughout Lagos State powered by solar  
Solution: XW+ inverter / chargers with the online monitoring solution

Learn more at [SEsolar.com/nigeria](http://SEsolar.com/nigeria)



**Nigeria**  
Microgrids



**South Africa**  
Residential off-grid  
One Everton - A South African flagship for community energy independence  
Solution: centralized storage solution using nine XW+ inverters

Learn more at [SEsolar.com/one-everton](http://SEsolar.com/one-everton)

# Asia Pacific

● Commercial application ● Residential application



## Myanmar Microgrids

Powering a remote fishing and farming village in Kenti island

Solution: microgrid solution using six XW+ inverter / chargers with 14 MPPT 60 charge controllers that are connected to 288,000 Ah battery bank.

Learn more at [SEsolar.com/myanmar](http://SEsolar.com/myanmar)



## Indonesia Off-grid solar



## Philippines Telecom Tower



## Australia Battery storage solution



## Indonesia Off-grid DC-coupled systems

Electrification of 60 remote villages across Indonesian islands

Solution: off-grid DC-coupled solar systems range in capacity from 15kW to 75kW, using XW+ inverters and MPPT 60 charge controllers.

Learn more at [SEsolar.com/indonesia](http://SEsolar.com/indonesia)



## New Zealand Residential off-grid

Portable all-in-one energy supply alternatives in New Zealand

Solution: solar battery system using three XW+ inverters, four MPPT 80 charge controllers, and the monitoring solution. The battery bank was composed of eight Li-ion batteries.

Learn more at [SEsolar.com/new-zealand](http://SEsolar.com/new-zealand)

Life Is On



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