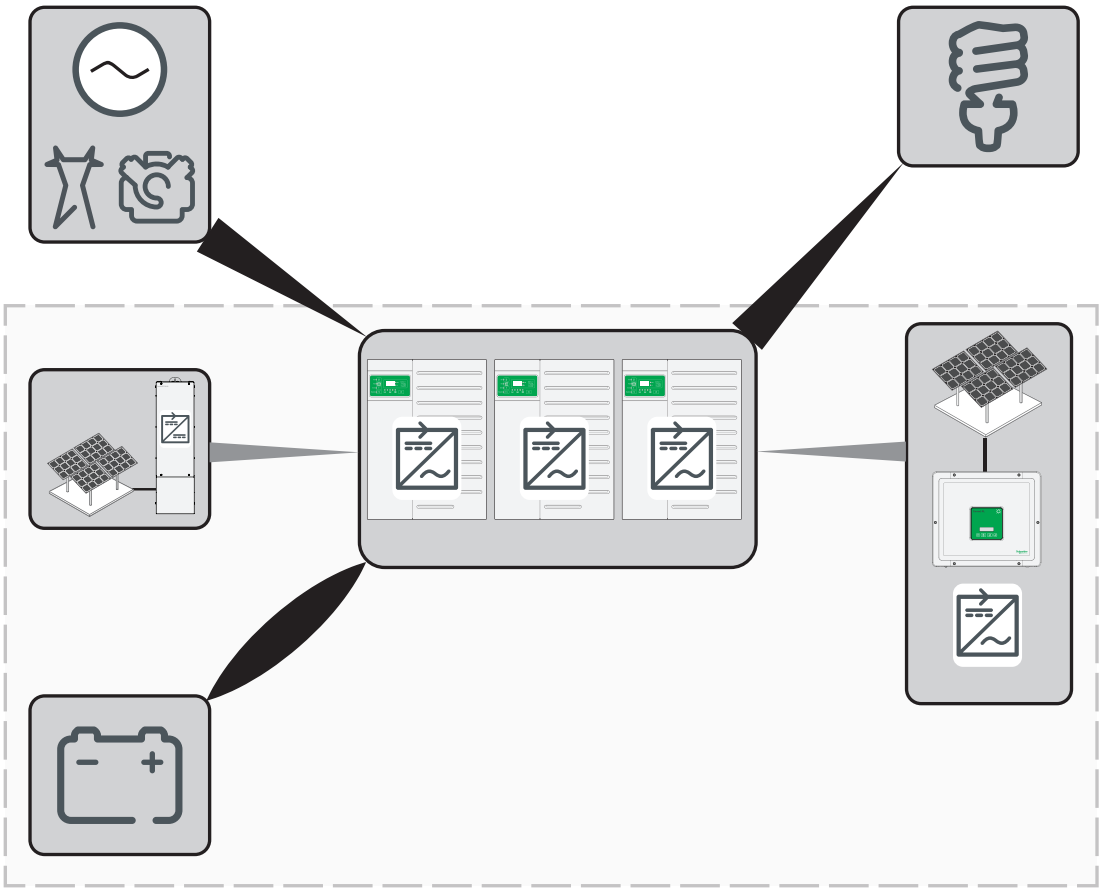
Conext™ XW+ Multi-Unit Power Systems

Design Guide

975-0739-01-01 Revision C
6-2016



http://solar.schneider-electric.com

Exclusion for Documentation

UNLESS SPECIFICALLY AGREED TO IN WRITING, SELLER

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

(B) ASSUMES NO RESPONSIBILITY OR LIABILITY FOR LOSSES, DAMAGES, COSTS OR EXPENSES, WHETHER SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL, WHICH MIGHT ARISE OUT OF THE USE OF SUCH INFORMATION. THE USE OF ANY SUCH INFORMATION WILL BE ENTIRELY AT THE USER'S RISK; AND

(C) REMINDS YOU THAT IF THIS MANUAL IS IN ANY LANGUAGE OTHER THAN ENGLISH, ALTHOUGH STEPS HAVE BEEN TAKEN TO MAINTAIN THE ACCURACY OF THE TRANSLATION, THE ACCURACY CANNOT BE GUARANTEED. APPROVED CONTENT IS CONTAINED WITH THE ENGLISH LANGUAGE VERSION WHICH IS POSTED AT SOLAR.SCHNEIDER-ELECTRIC.COM.

Document Number: 975-0739-01-01**Revision:** Revision C**Date:** 6-2016

Contact Information http://solar.schneider-electric.com

Please contact your local Schneider Electric Sales Representative or visit the Schneider Electric website at:

http://solar.schneider-electric.com/tech-support

About This Guide

Purpose

The purpose of this Design Guide is to provide general information on designing a Conext™ XW+ Multi-Unit Power System using two to nine Conext XW+ inverter/chargers in combination with other power devices like the Conext CL, Conext RL, Conext ComBox, MPPT Solar Charge Controllers and Balance of System (BOS) components.

Scope

The Guide outlines design considerations and contains supportive information on design concepts. It does not contain specific instructions on how to build a Multi-Unit Power System. However, in “Configurations Supported By Multi-Unit XW+ System” on page 2–7, the six sections of commissioning steps for each major configuration serve as definitive guidelines to follow when employing such configurations.

The information provided in this guide does not modify, replace, or waive any instruction or recommendations described in the product installation and owner’s guides including warranties of Schneider Electric products. Always consult the installation and owner’s guides of a Schneider Electric product when installing and using that product in an XW+ Multi-Unit Power System.

For help in designing a power system contact your Schneider Electric Sales Representative or visit the Schneider Electric website for more information at http://solar.schneider-electric.com.

Audience

The Guide is intended for system integrators or engineers who plan to design an XW+ Multi-Unit Power System using Schneider Electric equipment. The information in this manual is intended for qualified personnel. Qualified personnel have training, knowledge, and experience in:

- Analyzing application needs and designing PV-Hybrid Systems that include a generator.
- Installing electrical equipment and PV power systems (up to 1000 V).
- Applying all applicable compliance standards and installation codes.
- Analyzing and reducing the hazards involved in performing electrical work.

This Guide is focused on the performance and design of Multi-Unit Power Systems. It is expected that the reader has prior knowledge of performances and features of other Schneider Electric products which are installed and integrated into the system. All of this information are found in the following documents:

- *Conext XW+ Owner's Guide*: 975-0713-01-01 and 975-0240-01-01
- *Conext XW+ Installation Guide*: 975-0714-01-01 and 975-0239-01-01
- *MPPT Charge/Controller Owner's Guide*: 975-0400-01-01 and 975-0560-01-01
- *AGS Owner's Guide*: 975-0307-01-01
- *Battery Monitor Owner's Guide*: 975-0691-01-01
- *Xanbus Network Sizing Guide*: 975-0646-01-01
- *Multi-Cluster System Planning Guide*: 975-0648-01-01
- *AC Coupling Solution Guide*: 976-0240-01-01

Conventions Used

The following conventions are used in this guide.

DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, can result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, can result in moderate or minor injury.

NOTICE

NOTICE indicates important information that you need to read carefully.

Related Information

You can find more information about Schneider Electric as well as its products and services at http://solar.schneider-electric.com.

Contents

1 Introduction

Chapter 1 contains information about:

- Conext Multi-Unit Power System
- Applications of a Multi-Unit Power System
- Types and Power Ratings of XW+ Multi-Unit Power Systems
- Multi-Unit Inverter System Structure

Conext Multi-Unit Power System

A Multi-Unit Power System is a group of battery-based XW+ inverter/chargers and related devices which are physically assembled together, electrically connected together, and configured to operate as a single power source.

The objective of the grouping is to create a power system capable of supplying more power than what can be provided by a single inverter.

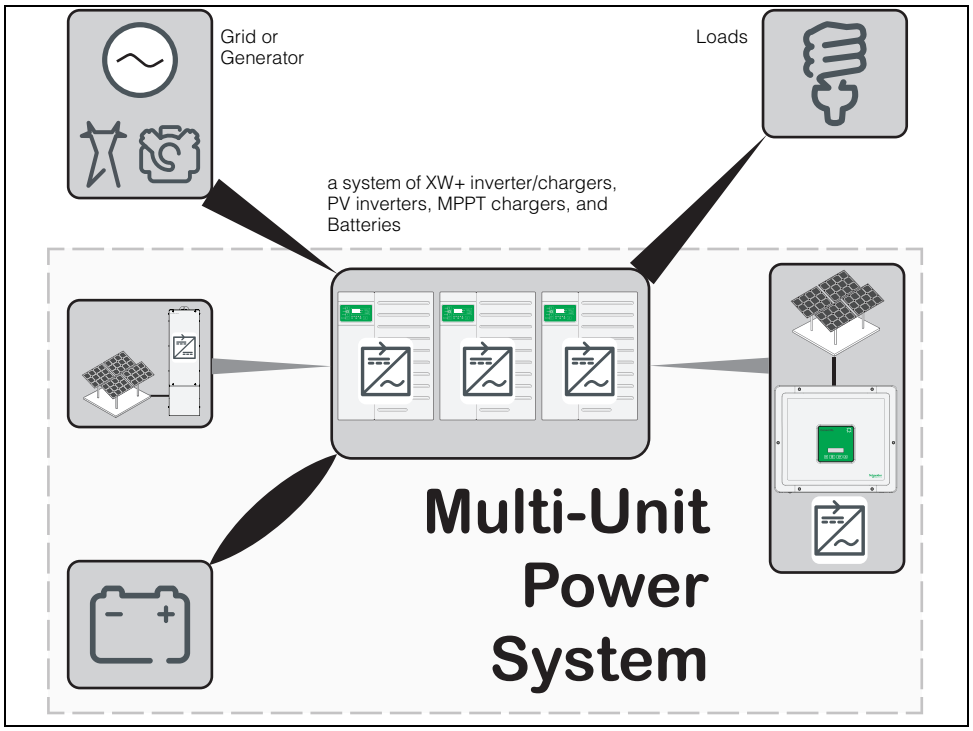


Figure 1-1 Example of a Multi-Unit Power System

Multi-Unit Power System can be used as a grid-tie power backup equipment or as primary power sources for off-grid sites. They may or may not have solar energy harvest capability or other alternate energy sources.

Electrically, all the power devices are connected to a common AC bus using appropriate circuit breakers, electrical panels, combiner boxes and/or power distribution panels (PDP).

A full function Multi-Unit Power System is able to harvest energy (store it, regulate it, and distribute it) through AC breaker panels. If the system is equipped with solar energy harvest capability, harvested energy that is not stored may be consumed on site, may be exported to the grid, or a combination of the two depending on the multi-unit configuration.

Multi-Unit Power Systems have different applications (see page 1–3), many types and power ratings (see page 1–3), and a structure that forms the system (see page 1–4).

Applications of a Multi-Unit Power System

A Multi-Unit Power System can do one or more of the following:

- provide power to off-grid residences, businesses, and communities
- reduce fuel consumption by minimizing the run time of a generator
- harvest solar energy to reduce diesel consumption
- provide backup power on unreliable grids
- offset utility grid power consumption during times of peak power tariff
- monitor the power system including its batteries for performance, maintenance and troubleshooting purposes

NOTE: The features and functionality offered by Multi-Unit Power Systems vary depending on the configuration. For more information on these configurations, see "Configurations Supported By Multi-Unit XW+ System" on page 2–7.

Types and Power Ratings of XW+ Multi-Unit Power Systems

1. **Multi-Unit Single-Phase Power System**

   A multiple inverter power system of XW+ inverters can consist of two to four battery-based inverters along with additional AC or DC-Coupled solar arrays or other "popup" sources.

2. **Multi-Unit AC-Coupled Power System**

   A multi-unit AC-Coupled system of XW+ battery-based inverters have AC-Coupled grid-tie PV inverters connected at its AC output. This system can either be single-phase or multi-phase.

   For more information on AC Coupling, see the *AC Coupling Solutions Guide* (document part number: 976-0240-01-01) available through your local Schneider Electric sales application engineer (SAE).

3. **Multi-Cluster Three-Phase Power System**

   A multi-cluster three-phase system consists of three to nine XW+ inverters (grouped into sets of three) physically connected and configured so that collectively they produce three-phase power. This system is technically referred to as a **Multi-Cluster**.

   For the design of Multi-Clusters, also refer to the *Conext™ Multi-Cluster Power System Planning Guide* (document part number: 975-0648-01-01) available through your local Schneider Electric sales application engineer (SAE).

Multi-Unit Inverter System Structure

Xanbus®

To enable multi-unit operation, each XW+ is equipped with a Xanbus network port (through which each XW+ identify and communicate with each other) and an AC Sync port (through which the XW+ units synchronize their AC outputs).

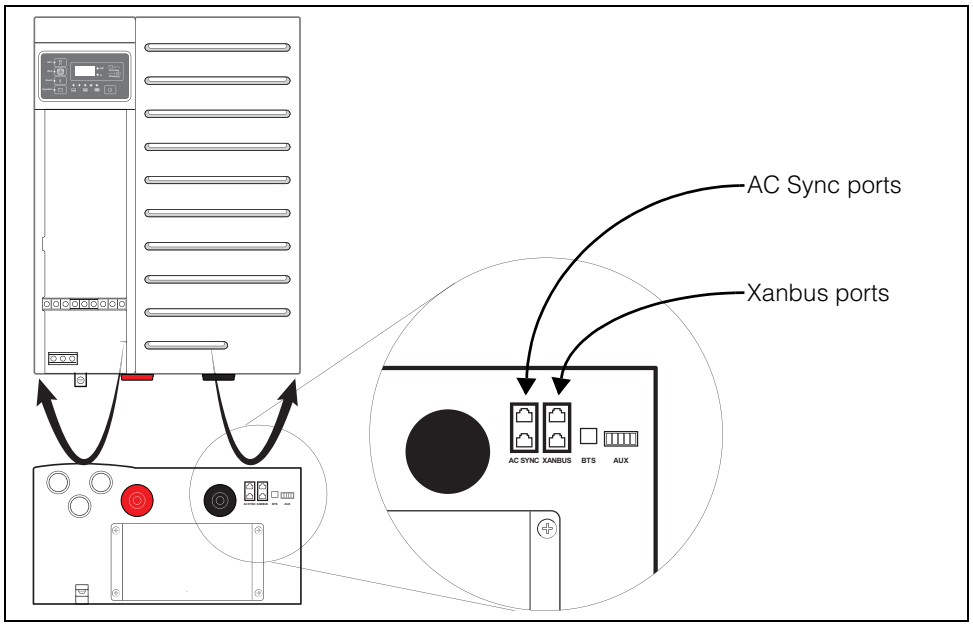


Figure 1-2 AC Sync and Xanbus Ports

Master / Slave

XW+ inverters use a Master/Slave device structure, where one inverter is designated as a Master unit and all other inverters which are parallel-connected to that Master are designated as Slave units.

2 XW+ Multi-Unit Power System

Chapter 2 contains information about:

- Electrical Architecture
- Configurations Supported By Multi-Unit XW+ System

Electrical Architecture

Limitations of the XW+

Like any system, the Conext XW+ is subject to technical limitations. For anyone willing to design a system using Conext XW+, it is important for the designer to have a clear understanding of what the Conext XW+ can and cannot do.

These limitations are:

- Output Power Rating Limit of the System
- Hardware Limitation: Maximum Current Rating of the Internal Relay
- Product Compatibility
- Xanbus Network Size

Output Power Rating Limit of the System

Table 2-1 Conext XW+ Multi-Unit Power System Ratings for IEC

XW+ 8548 model				XW+ 7048 model			
continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
@25 C	@40 C			@25 C	@40 C		
6.8	6.0	8.5	6.0	5.5	4.5	7.0	4.5

Table 2-2 Conext XW+ Multi-Unit Power System Ratings for UL

XW+ 6848 model				XW+ 5548 model			
continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
@25 C	@40 C			@25 C	@40 C		
6.8	6.0	8.5	6.0	5.5	4.5	7.0	4.5

Power limitations of the Conext XW+ are specified in Table 2-1 and Table 2-2. One very important thing to notice is that each power rating is specified for a period of time and a given ambient temperature. As a result, both ambient temperature and load profile should be considered when sizing the system.

When analyzing the 30-minute peak power rating, the load profile shown in Figure 2-1 on page 2–3 should be considered. It means that, when subjected to an ambient temperature of 25 °C, each XW+ 8548 unit can handle 8.5kVA of load for 30 minutes every 45 minutes (power varies according to the considered XW+ model as per given in Table 2-1 and Table 2-2). If the load profile is more aggressive than this, for example, the 8.5kVA of load is applied for 30 minutes every 10 minutes, then the internal temperature of the XW+ may rise above the authorized (specified) limit and the XW+ will trigger its overload protection warning first (**W63**) and then its overload fault detection (**F63**) in order to protect the unit from being damaged.

Also, it should be noted that these ratings are in Volt-Ampere (Apparent Power: **kVA**). This means that it corresponds to the RMS value of the voltage multiplied by the RMS value of the current. Power factor is not considered in this rating. If

XW+ units are used in an installation with a power factor lower than 1, then active power output capability (in Watts) of the multi-unit system should be evaluated accordingly by multiplying the expected power factor by the rated Volt-Ampere rating of the XW+.

For residential applications, the power factor is usually very close to unity, therefore, Watt and Volt-Ampere ratings are very close. However, for large commercial applications where several inductive loads are installed, power factor is decreased to a lower value (typically 0.75 – 0.85). As a result, the Volt-Ampere rating should be considered and not Watts.

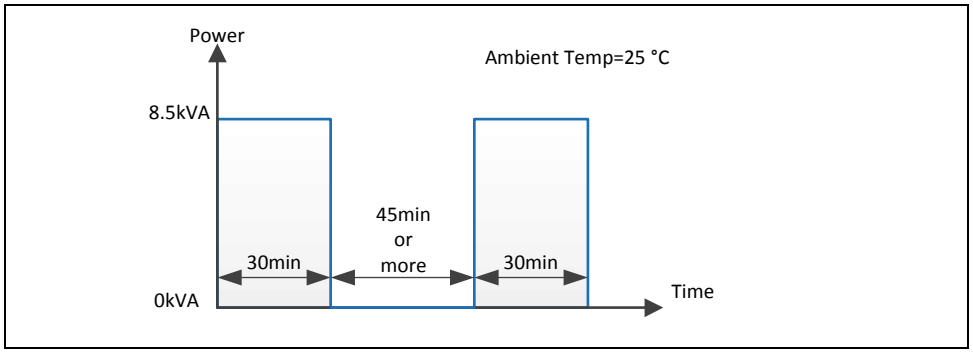


Figure 2-1 30-minute Peak Power Rating of XW+ 8548

Hardware Limitation: Maximum Current Rating of the Internal Relay

The Internal electrical structure of the XW+ is shown in Table 2-2. Two electric relays, rated at 60A each, are located at the inputs (**AC1** and **AC2**) of the XW+.

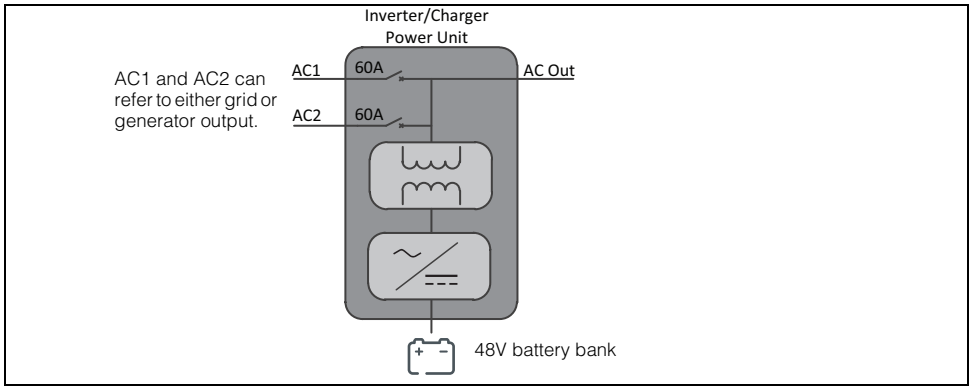


Figure 2-2 Electrical Architecture of XW+

Because of these 60A rated relays, the current flowing through the **AC1** and **AC2** ports of the XW+ is limited accordingly. When several units are placed in parallel and operating in AC pass-through mode, they will all be connected to the same AC source and share a fairly even amount of current to the load. However, when the AC source is disqualified, it is not possible to ensure that every relay will open at the exact same time (see Figure 2-4).

As a result, the last one to open will have to handle the overall load current. Over time this will result in accelerated aging and deterioration of the relay contact and potentially resulting to contacts fusing together (or welding together) which may cause a failure of the relay.

Because of this potential result, the maximum AC pass-through current rating allowed in a multi-unit configuration is limited to 60A. **If a higher current rating is needed then it is necessary to use either an external contactor or a transfer switch**. The use of these two devices will be described and explained later in "Configurations Supported By Multi-Unit XW+ System" section.

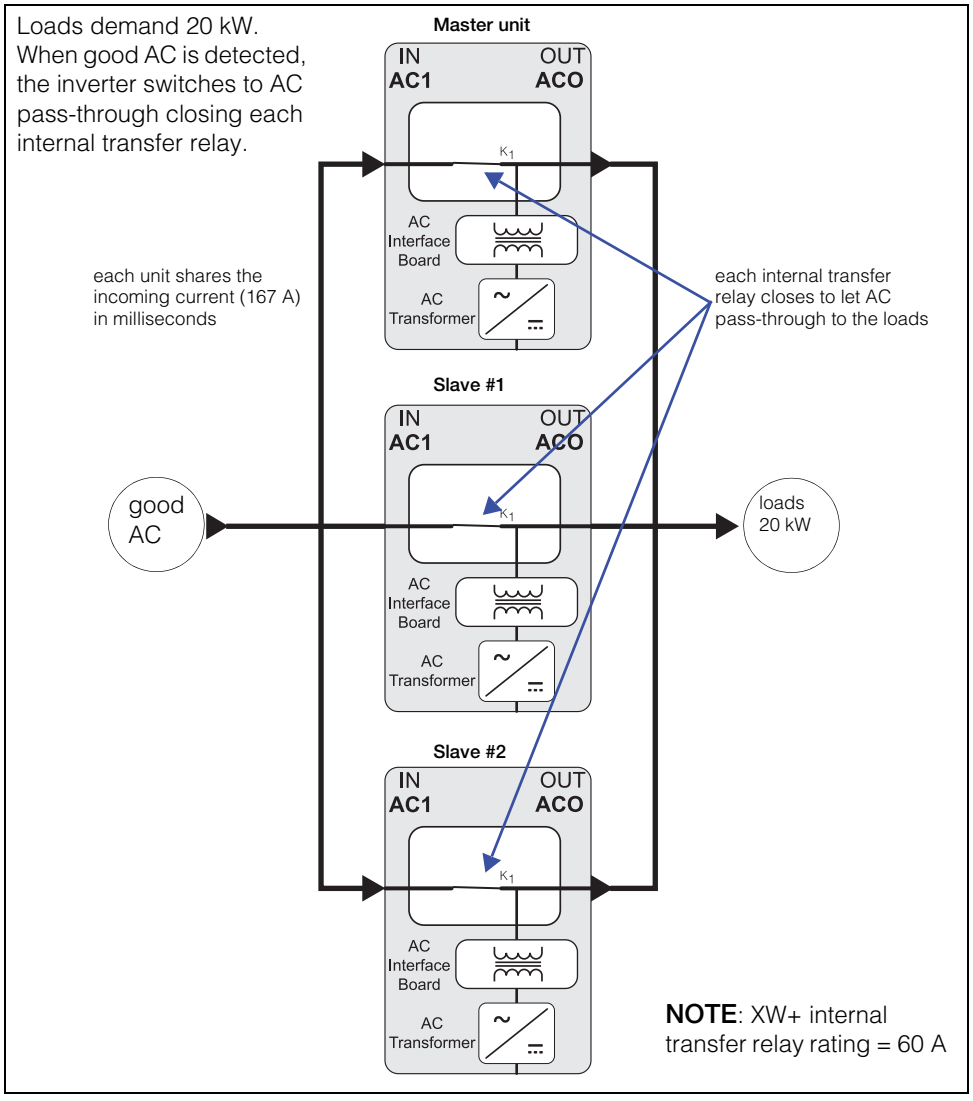


Figure 2-3 Internal Relay Behavior with Good AC

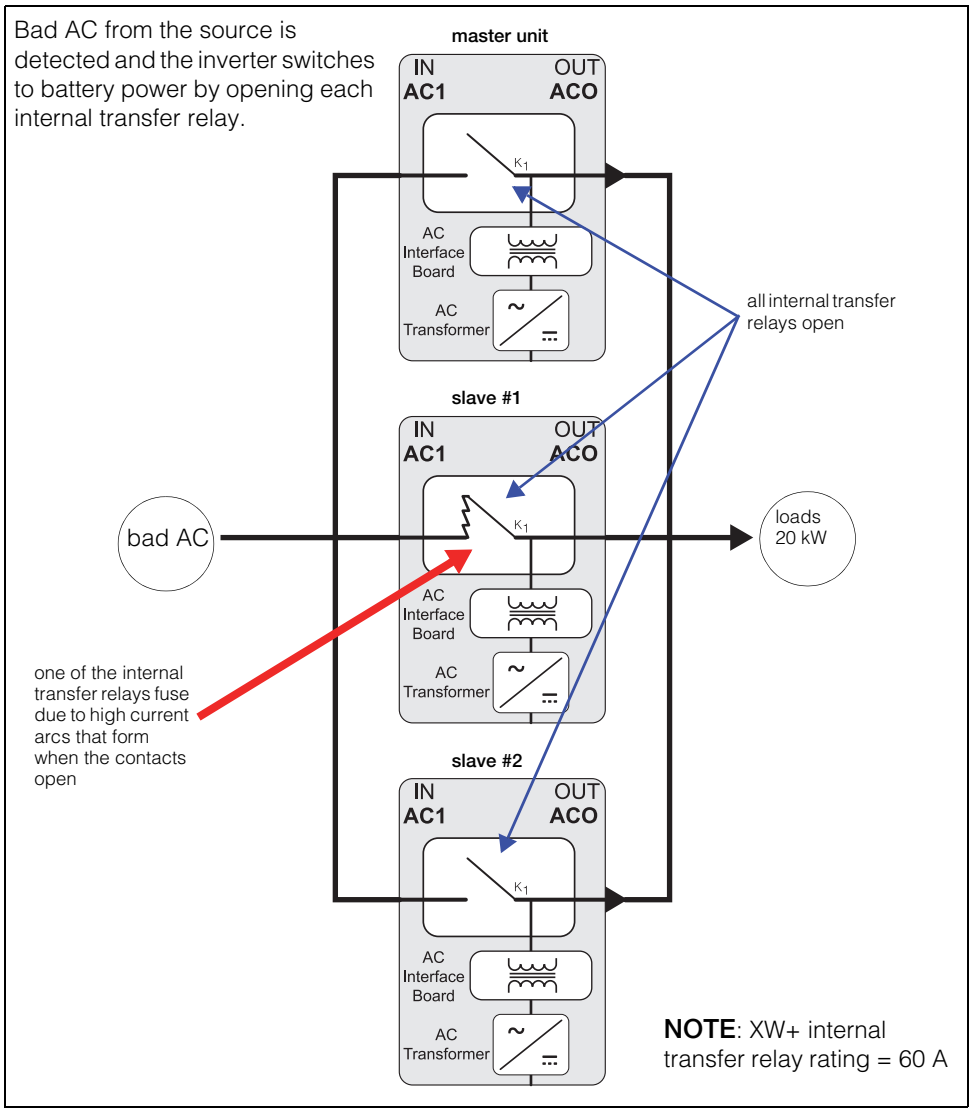


Figure 2-4 Internal Relay Behavior with Bad AC

Product Compatibility

NOTICE
EQUIPMENT DAMAGE Do not mix and match XW+ models in a multi-unit configuration. **Failure to follow these instructions can result in equipment damage.**

A Multi-Unit Power System requires all the units to be the same model and their firmware versions to be identical.

For example, when designing a ~21kVA multi-unit IEC system @ 40 C with an external transfer switch, do not combine a 2-unit XW+ 8548 with a 2-unit XW+ 7048. Instead, go for a 4-unit XW+ 8548 which will produce 24kVA @ 40 C. For more information about these configurations, see Table 2-3 on page 2–10 under "Configuration 1 (External Transfer Switch)".

Xanbus Network Size

The Xanbus network which is based on CAN bus communication protocols interconnects the various Conext and/or Xanbus-enabled devices. The Xanbus network allows communication between the devices but has limited bandwidth in regards to the amount of data that can be exchanged through it.

As a result, when designing a power system that is interconnected via a Xanbus network, always follow the guidelines recommended in the *Xanbus Network Sizing Guide* (document part number: 975-0646-01-01). Ignoring the recommendations may yield an unreliable system.

Accessories for a Multi-Cluster System

When used with a Multi-Cluster system, the SCP shall only be used to set the system in operating or standby modes. It shall not be used for device configurations. Use the Conext Config Tool and/or the Conext ComBox for commissioning and configuring the larger Multi-Cluster system.

Limitations

See Item 10, "Multi-Unit Power System Limitations and Behavior" on page 3–6 for information on these known issues.

Configurations Supported By Multi-Unit XW+ System

NOTICE

EQUIPMENT DAMAGE

Do not install a power system that is not based on any of the six configurations listed in this section.

Failure to follow these instructions may result in damage to equipment and a non-functioning of the system.

Multi-Unit Power Systems are based on the modularity offered by the XW+ platform. This modularity enables many configurations to be designed. However, they are all subject to the “Limitations of the XW+” as described in page 2–2. The following topics will introduce multi-unit XW+ configurations supported by Schneider Electric and their associated performances. All of them are summarized in the configuration tree in Figure 2-5.

Configuration Tree

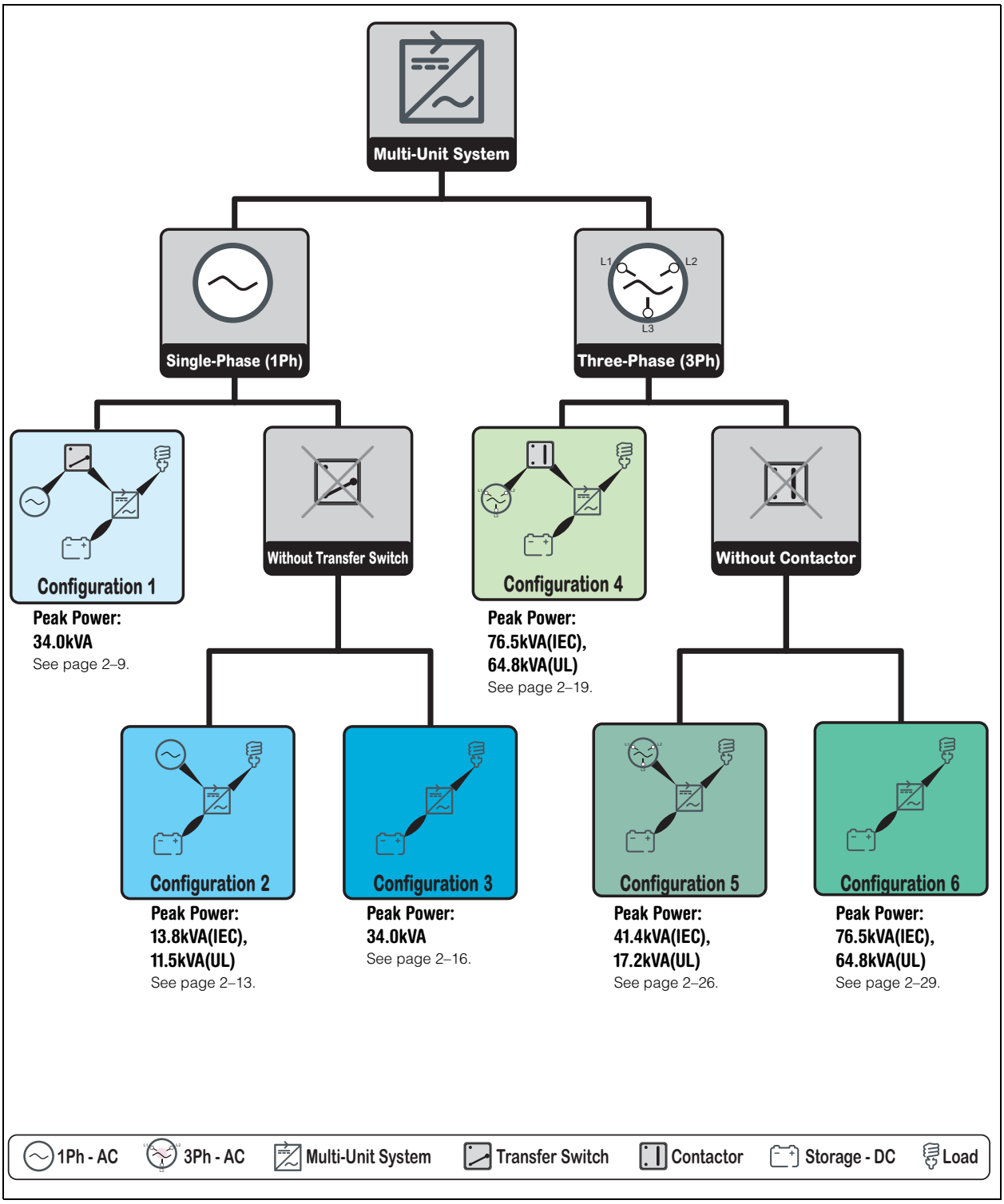
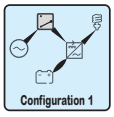


Figure 2-5 XW+ Multi-Unit Configuration Tree

Configuration 1 (External Transfer Switch)



Single-phase System -> With External Transfer Switch

NOTE: The AC current rating of the load determines when the external transfer switch is required. Regardless of the load's AC current rating, it is typically required to install an external transfer switch with three units and more.

Electrical Configuration and Power Ratings

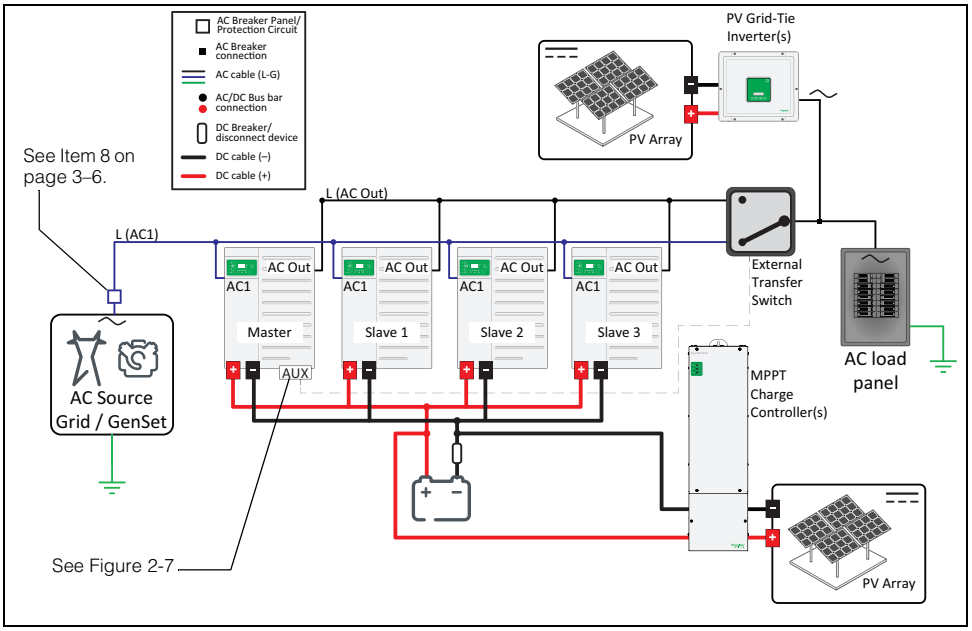


Figure 2-6 Single-phase-With External Transfer Switch Configuration

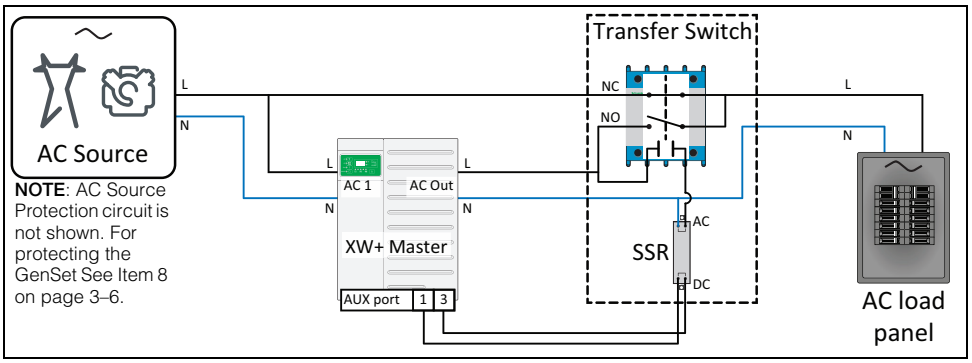


Figure 2-7 AUX Port to Solid State Relay (SSR)

When more power is needed than a single XW+ can provide, several units can be connected in parallel to create a multi-system with an increased power rating.

If the AC current rating of the load is higher than 60A and the multi-unit system needs to be connected to an AC source then an external transfer switch is required to bypass the units and power the load directly from the AC source. In the configuration shown in Figure 2-6, the XW+ Multi-Unit Power System and AC source will never power the load simultaneously. Power limitations of this configuration are specified in Table 2-3 and Table 2-4 below.

Table 2-3 Conext XW+ Multi-Unit Power System Ratings for IEC - With External Transfer Switch

XW+ Unit	XW+ 8548 model				XW+ 7048 model			
	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C			@25 C	@40 C		
2-unit	13.6	12.0	17.0	12.0	11.0	9.0	14.0	9.0
3-unit	20.4	18.0	25.5	18.0	16.5	13.5	21.0	13.5
4-unit	27.2	24.0	34.0	24.0	21.0	18.0	28.0	18.0

Table 2-4 Conext XW+ Multi-Unit Power System Ratings for NA - With External Transfer Switch

XW+ Unit	XW+ 6848 model				XW+ 5548 model			
	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C			@25 C	@40 C		
2-unit	13.6	12.0	17.0	12.0	11.0	9.0	14.0	9.0
3-unit	20.4	18.0	25.5	18.0	16.5	13.5	21.0	13.5
4-unit	27.2	24.0	34.0	24.0	22.0	18.0	28.0	18.0

Features[1] supported by Configuration 1 (External Transfer Switch)

a. Off-grid and grid-connected systems

b. Backup

c. Sell power back to grid (no load shaving)

d. AC PV-coupled configuration, only supported when single battery bank is used

e. AC PV-coupled configuration up to a power ratio of 1:1 (PV:XW+) maximum recommended

1.For Features that are Not Available in Configuration 1 (External Transfer Switch) and Configuration 4 (External Contactor), see page 3–7.

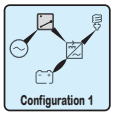
Commissioning of Configuration 1 (External Transfer Switch)

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- Each of the equipment must only be installed and serviced by qualified electrical personnel.
- Never operate any equipment energized with covers removed.
- Equipment may be energized from multiple sources. Before removing covers identify all sources, de-energize, lock-out, and tag-out and wait 2 minutes for circuits to discharge.
- Always use a properly rated voltage sensing device to confirm all circuits are de-energized.

Failure to follow these instructions will result in death or serious injury.



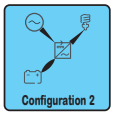
During the installation of a single-phase system with external transfer switch, the following steps should be followed.

1. Disconnect the system from any AC and DC sources (Grid and/or Generator and battery).
2. Verify that all the wiring has been properly done.
   - **AC1**/**AC2** connected to the AC source and external transfer switch
   - **AC Out** connected to the external transfer switch
   - **AUX port** of the Master unit connected to a solid state relay (SSR) as shown in Figure 2-7
   - External transfer switch connected to the load panel
   - All units (XW+, ComBox, SCP, Battery Monitor, MPPT Charge Controller, etc.) are connected through Xanbus in a daisy chain configuration and following requirements listed in *Xanbus Network Sizing Guide* (document part number: 975-0646-01-01)
   - All Sync Cables are connected between the XW+ units
3. Open all the AC breakers at the output of the XW+ (**AC Out**).
4. Close the DC breaker/s (that is, the battery) to power up the system.
5. Verify that the firmware version installed on each Schneider Electric product (XW+, ComBox, MPPT, AGS, SCP, etc) corresponds to the latest released version (available on http://solar.schneider-electric.com). If not, download latest firmware from the website and update each unit accordingly.
6. Configure one unit as single-phase Master and all the other ones as single-phase Slave units.
7. Assign proper battery association to match wiring of the system.
8. Configure XW+ settings according to desired operating mode (see the XW+ Owner's Guide).

9. Verify that the output voltage of each XW+ unit is within ±0.5VAC range. To do the verification, you will have to temporarily put the units in **Operating** mode.
   - If the units are not within the range, recalibrate the unit/s following the instructions in Appendix A.
   - Return the units to **Standby** mode.
10. Under a **No Load** condition, close every breaker at the output of the XW+.
11. Enable the **EXT_LOAD_SW** mode[1] of the Master unit using the Conext Config Tool or ComBox.
12. Put the units in **Operating** mode.
13. Verify that the voltage across **JU-1** and **JU-3** of the Master unit's **AUX port** is 12V.
14. Verify that the external transfer switch is connecting the XW+s to the load.
15. Turn on/connect the AC source to the system.
16. Verify that if the AC source voltage and frequency are within the accepted range of XW+s then check that the **AUX port** voltage becomes null once the AC source has been qualified by the XW+.
17. Verify that the AC source is then directly connected to the load.
18. Turn off the AC source and verify that the transfer switch automatically reconnects the load to the XW+ to provide backup power to the load.
19. The system is now ready to be configured according to the application case (such as battery type, advanced features, and others).

1.This feature controls an External Transfer Switch according to the status of the power source's AC voltage in AC1 (Grid). When this feature is Enabled the following occurs: • When voltage source is qualified at AC1 port then the AUX Port generates 0V (across JU-1 and JU-3); • When there is no voltage source qualified at AC1 port then AUX Port generates 12V (across JU-1 and JU-3).

Configuration 2 (With AC Source)



Single-phase System -> **Without External Transfer Switch** -> **Connected to an AC Source**

Electrical Configuration and Power Ratings

As mentioned in the introduction, each XW+ inverter has a built-in transfer relay rated at 60A. This internal transfer relay lets an AC source, such as utility grid AC, pass-through to the loads. When the flow of AC source is interrupted, the transfer relays open and the inverters enter inverting mode to supply power to the loads from the battery. In configurations such as the one represented in Figure 2-8 on page 2–13 where no external transfer switch is being used, the system is subject to the 60A limit of the internal relays. As a result, associated power ratings and supported features are listed in Table 2-5 and Table 2-6 on page 2–14.

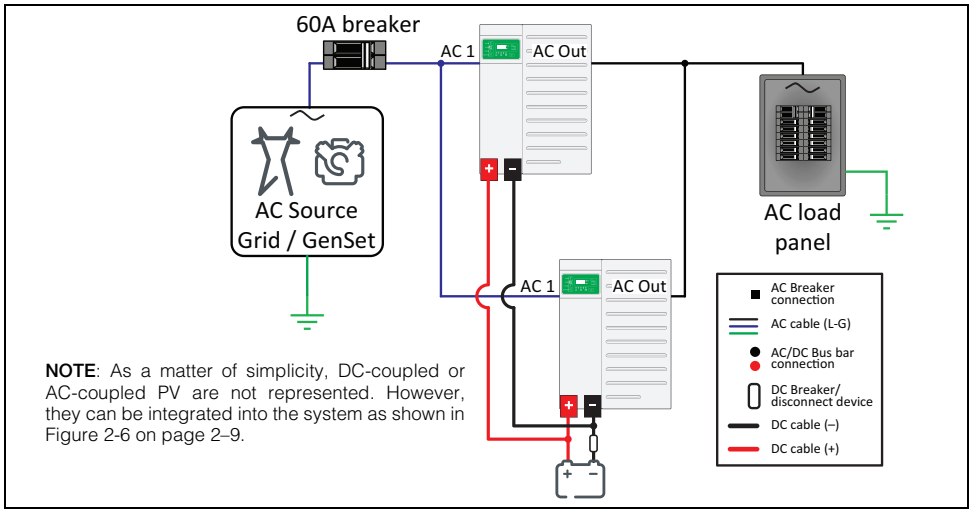


Figure 2-8 Single-phase-No External Transfer Switch-AC Source Configuration

Table 2-5 Conext XW+ Multi-Unit Power System Ratings for IEC - When Connected to an AC Source

XW+ Unit	XW+ 8548 model				XW+ 7048 model			
	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C			@25 C	@40 C		
2-unit	13.6	12.0	13.8	12.0	11.0	9.0	13.8	9.0
3-unit	13.8	13.8	13.8	18.0	13.8	13.5	13.8	13.5
4-unit	13.8	13.8	13.8	24.0	13.8	13.8	13.8	18.0

Table 2-6 Conext XW+ Multi-Unit Power System Ratings for NA - When Connected to an AC Source

XW+ Unit	XW+ 6848 model				XW+ 5548 model			
	continuous[a] (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous[a](kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C			@25 C	@40 C		
2-unit	11.5		14.4	11.5	11.0	9.0	14.0	9.0
3-unit			11.5	11.5	11.5		11.5	11.5
4-unit			11.5	11.5			11.5	11.5

a.Continuous and grid-sell power in a multi-cluster system for North American models are limited by the 80% breaker derating rule of NEC when using a 60A breaker necessary to be used with all XW+ models. Peak power is limited by the trip characteristics of 60A breaker.

Features supported by Configuration 2 (With AC Source)

a. Up to 13.8kVA of load for IEC units and 11.5kVA for UL units
b. All features supported by XW+ in single unit configuration
c. Grid Support
d. Generator Support, peak power shaving, backup, sell
e. AC PV-coupled configuration, only supported when single battery bank is used
f. AC PV-coupled configuration up to a power ratio of 1:1 (PV:XW+) maximum recommended

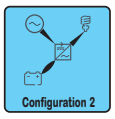
Commissioning of Configuration 2 (With AC Source)

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- Each of the equipment must only be installed and serviced by qualified electrical personnel.
- Never operate any equipment energized with covers removed.
- Equipment may be energized from multiple sources. Before removing covers identify all sources, de-energize, lock-out, and tag-out and wait 2 minutes for circuits to discharge.
- Always use a properly rated voltage sensing device to confirm all circuits are de-energized.

Failure to follow these instructions will result in death or serious injury.



During installation of a single-phase system with AC source and no external transfer switch, the following steps should be followed.

1. Disconnect the system from any AC source (Grid and/or Generator).
2. Verify that all the wiring has been properly done.
   - **AC1**/**AC2** connected to AC source

- **AC Out** connected to the load panel
- All units (XW+, ComBox, SCP, Battery Monitor, MPPT Charge Controller, etc.) are connected through Xanbus in a daisy chain configuration and following requirements listed in *Xanbus Network Sizing Guide* (document part number: 975-0646-01-01)
- All Sync Cables are connected between the XW+ units

3. Open all the breakers at the output of the XW+ (**AC Out**).
4. Close the DC breaker/s (that is, the battery) to power up the system.
5. Verify that the firmware version installed on each Schneider Electric product (XW+, ComBox, MPPT, AGS, SCP, etc) corresponds to the latest released version (available on http://solar.schneider-electric.com). If not, download latest firmware from the website and update each unit accordingly.
6. Configure one unit as single-phase Master and all the other ones as single-phase Slave units.
7. Assign proper battery association to match wiring of the system.
8. Configure XW+ settings according to desired operating mode (see the XW+ Owner's Guide).
9. Verify that the output voltage of each XW+ unit is within ±0.5VAC range. To do the verification, you will have to temporarily put the units in **Operating** mode.
    - If the units are not within the range, recalibrate the unit/s following the instructions in Appendix A.
    - Return the units to **Standby** mode.
10. Under a **No Load** condition, close every breaker at the output of the XW+.
11. Put the units in **Operating** mode.
12. Verify that the system is generating a stable AC output voltage (UL-240V / IEC-230V).
13. Load the system and verify that all the units are contributing to supply the load.
14. Turn on/connect the AC source to the system.
15. Verify that if the AC source voltage and frequency are within accepted range of XW+s, then XW+ will qualify it (Green LED flashing then ON).
16. Turn off the AC source and verify that the XW+s go into invert mode.
17. The system is now ready to be configured according to the application case (such as battery type, advanced features, and others).

Configuration 3 (Without AC Source)

Single-phase System -> Without External Transfer Switch -> Not Connected to an AC Source

Electrical Configuration and Power Ratings

NOTE: As a matter of simplicity, DC-coupled or AC-coupled PV are not represented. However, they can be integrated into the system as shown in Figure 2-6 on page 2–9.

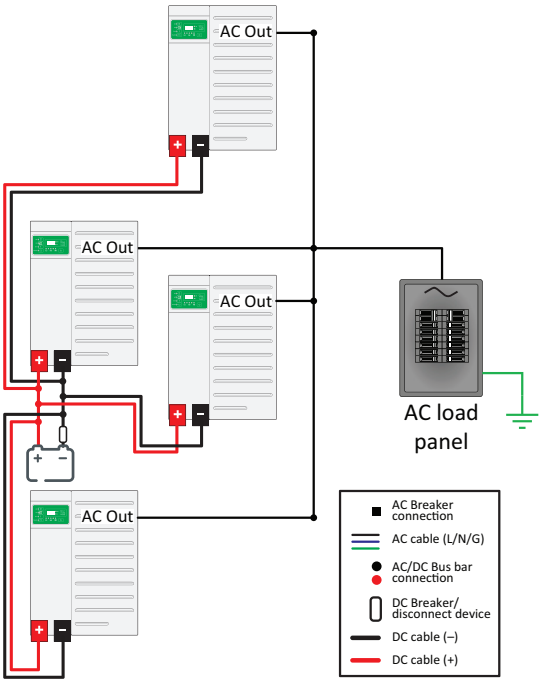


Figure 2-9 Single-phase-Without External Transfer Switch-No AC Source Configuration

In the configuration shown in Figure 2-9, the system is not connected to any AC source. As a result, no current will ever be circulating through the internal relays of the XW+. Hence, only power rating limitations are given by power rating of the XW+. They are listed in Table 2-7 and Table 2-8 on page 2–17:

Table 2-7 Conext XW+ Multi-Unit Power System Ratings for IEC - No AC Source Connected

XW+ Unit	XW+ 8548 model				XW+ 7048 model			
	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C			@25 C	@40 C		
2-unit	13.6	12.0	17.0	n/a	11.0	9.0	14.0	n/a
3-unit	20.4	18.0	25.5	n/a	16.5	13.5	21.0	n/a
4-unit	27.2	24.0	34.0	n/a	21.0	18.0	28.0	n/a

Table 2-8 Conext XW+ Multi-Unit Power System Ratings for NA - No AC Source Connected

XW+ Unit	XW+ 6848 model				XW+ 5548 model			
	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C			@25 C	@40 C		
2-unit	13.6	12.0	17.0	n/a	11.0	9.0	14.0	n/a
3-unit	20.4	18.0	25.5	n/a	16.5	13.5	21.0	n/a
4-unit	27.2	24.0	34.0	n/a	21.0	18.0	28.0	n/a

Features supported by Configuration 3 (Without AC Source)

a. Off-grid system only

b. All features supported by XW+ in single unit configuration

c. AC PV-coupled configuration, only supported when single battery bank is used

d. AC PV-coupled configuration up to a power ratio of 1:1 (PV:XW+) maximum recommended

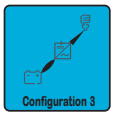
Commissioning of Configuration 3 (Without AC Source)

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- Each of the equipment must only be installed and serviced by qualified electrical personnel.
- Never operate any equipment energized with covers removed.
- Equipment may be energized from multiple sources. Before removing covers identify all sources, de-energize, lock-out, and tag-out and wait 2 minutes for circuits to discharge.
- Always use a properly rated voltage sensing device to confirm all circuits are de-energized.

Failure to follow these instructions will result in death or serious injury.

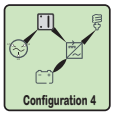


During installation of a single-phase system without an external transfer switch and not connected to an AC source, the following steps should be followed.

1. Verify that all the wiring has been properly done.
   - **AC Out** connected to load panel
   - All units (XW+, ComBox, SCP, Battery Monitor, MPPT Charge Controller, etc.) are connected through Xanbus in a daisy chain configuration and following requirements listed in *Xanbus Network Sizing Guide* (document part number: 975-0646-01-01)
   - All Sync Cables are connected between the XW+ units

2. Open all the breakers at the output of the XW+ (**AC Out**).
3. Close the DC breaker/s (that is, the battery) to power up the system.
4. Verify that the firmware version installed on each Schneider Electric product (XW+, ComBox, MPPT, AGS, SCP, etc) corresponds to the latest released version (available on http://solar.schneider-electric.com). If not, download latest firmware from the website and update each unit accordingly.
5. Configure one unit as single-phase Master and all the other ones as single-phase Slave units.
6. Assign proper battery association to match wiring of the system.
7. Configure XW+ settings according to desired operating mode (see the XW+ Owner's Guide).
8. Verify that the output voltage of each XW+ unit is within ±0.5VAC range. To do the verification, you will have to temporarily put the units in **Operating** mode.
   - If the units are not within the range, recalibrate the unit/s following the instructions in Appendix A.
   - Return the units to **Standby** mode.
9. Under a **No Load** condition, close every breaker at the output of the XW+.
10. Put the units in **Operating** mode.
11. Verify that the system is generating a stable AC output voltage (UL-240V / IEC-230V).
12. The system is now ready to be configured according to the application case (such as battery type, advanced features, and others).
13. Load the system and verify that all the units are contributing to supply the load.

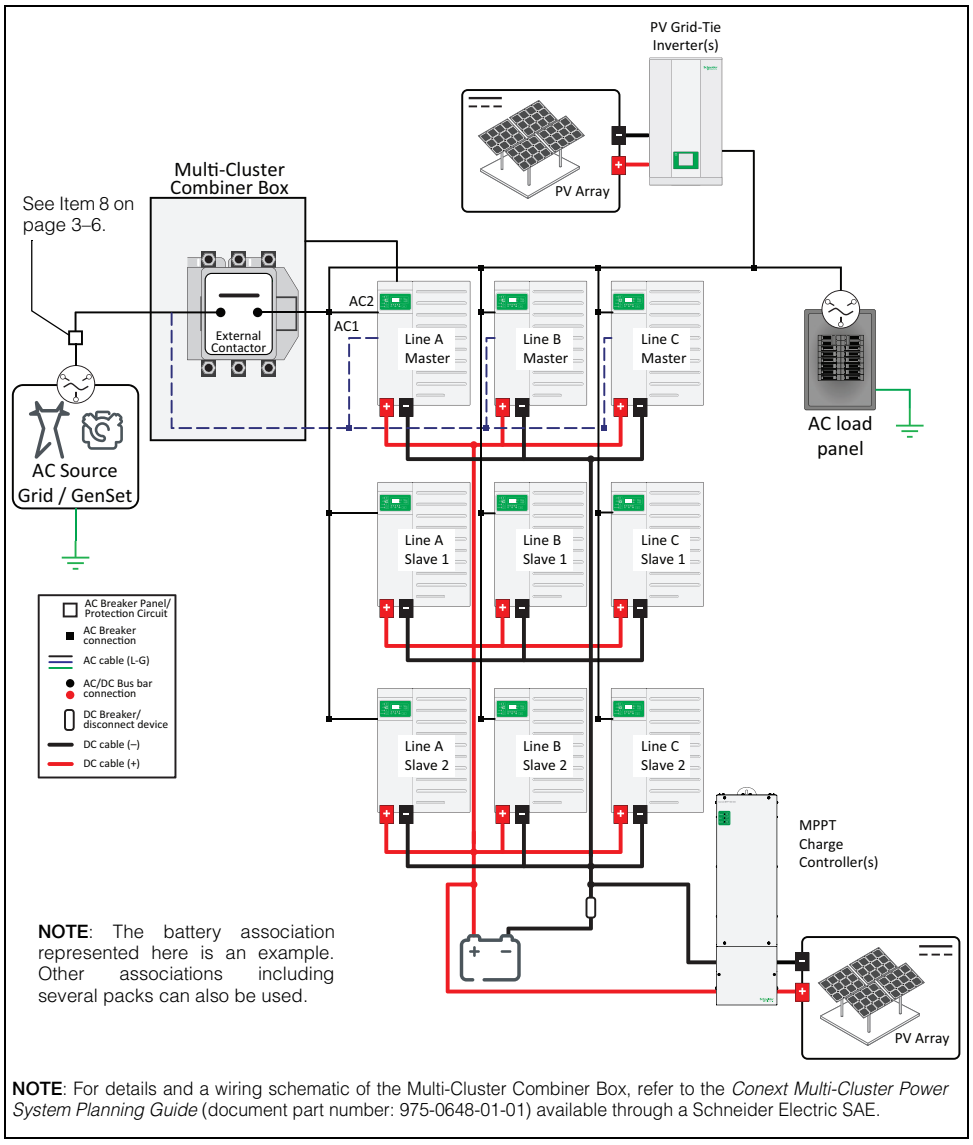
Configuration 4 (External Contactor)



Three-phase Multi-Cluster -> With an External Contactor

NOTE: The external contactor is required when there are two units per phase or more as shown below.

Electrical Configuration and Power Ratings



NOTE: For details and a wiring schematic of the Multi-Cluster Combiner Box, refer to the *Conext Multi-Cluster Power System Planning Guide* (document part number: 975-0648-01-01) available through a Schneider Electric SAE.

Figure 2-10 Three-phase Multi-Cluster System with External Contactor

XW+ enables three-phase configuration when at least three units are used and configured accordingly. Each phase of the system will be formed by at least one XW+. In addition, each phase can be made of several units in parallel.

In three-phase power systems, each of the three-phases in the AC power circuit [Line 1 (**L1**), Line 2 (**L2**), and Line 3 (**L3**)] has their own Master unit and potentially up to two Slave units. The **L1** Master of a three-phase multi-cluster system is designated as the Master unit for the whole multi-cluster system.

It is possible to use more than one battery bank in this configuration. When using several battery banks, it is typical to connect one battery bank for a set of three XW+ units. Of course, each XW+ unit is connected to a different phase. When configured like this, a phase imbalance which happens eventually will not cause the battery bank to discharge unevenly.

For applications where more than 41.4kVA (IEC) or 17.2kVA (UL) of power is needed, it is possible to increase the system power rating by connecting the XW+ in parallel to the AC source, and hence not being subject to the 60A/phase limitation any more. This is because when the loads are powered from the grid, no current is circulating through the XW+ as shown in Figure 2-11. In addition, an external contactor is required to connect/disconnect the Multi-Unit Power System from the AC source. In order to ensure proper AC voltage synchronization between XW+ and AC source, this external contactor is driven by the XW+ Phase 1 Master. Electrical configuration of this mode of operation is represented in Figure 2-10. A more detailed schematic of the wiring is given in Figure 2-12 on page 2–21.

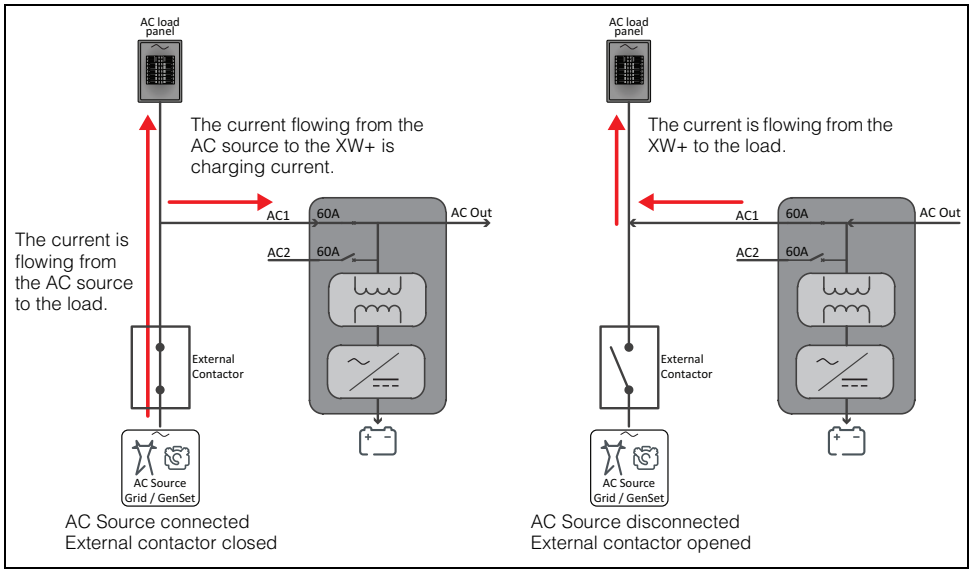


Figure 2-11 Parallel Connection of XW+ to AC line

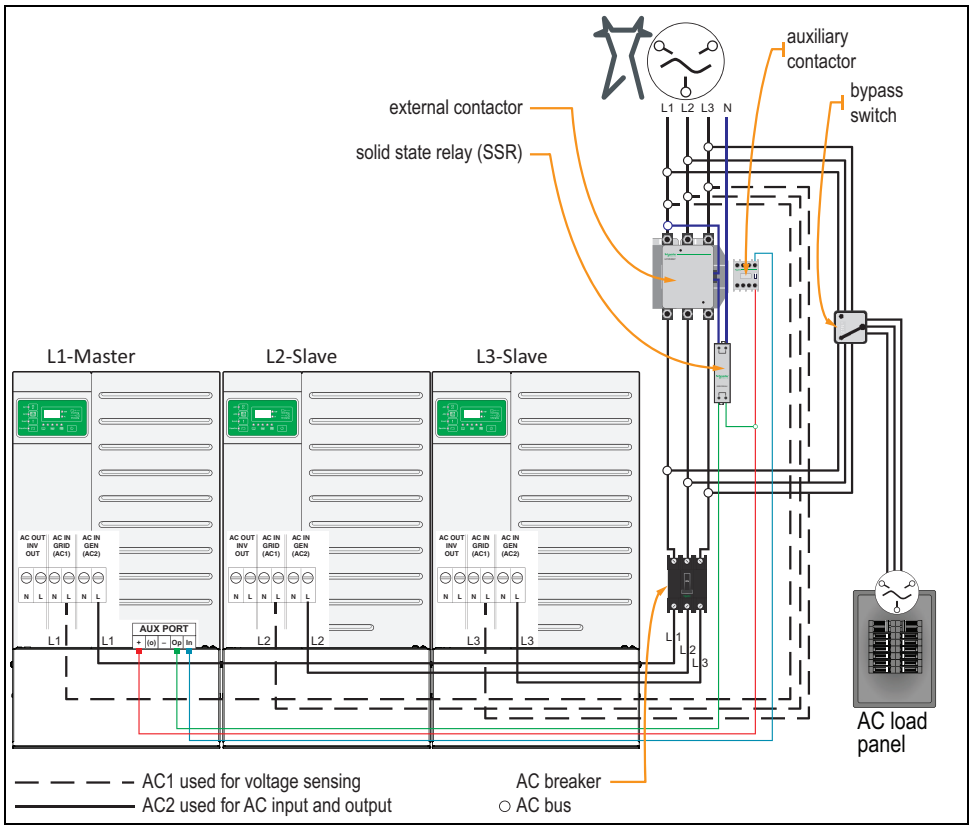


Figure 2-12 Integration of External Contactor in 3Ph Multi-Cluster System

External Contactor Control (AC Contactor) in Three-phase Multi-Cluster

At any time before the XW+ inverters close the AC contactor, they must first qualify the incoming AC by measuring the AC source voltage. This measurement is made through the inverter's **AC1** input terminal. After measurement, when the Phase 1 Master XW+ determines that the AC is good, it signals the solid state relay (SSR) to close the contactor (see Figure 2-12).

For monitoring purposes an auxiliary sense contact is connected to the main contactor to serve as a redundant fail safe mechanism to verify that the main contactor has switched states.

The Phase 1 Master XW+ inverter is responsible for controlling the main contactor via the Auxiliary (**AUX**) port to the SSR. The XW+ imposes a 30-second delay prior to contact activation from the time it detects that good AC is available to ensure that the AC is stable. This time delay can be adjusted in the inverter settings (via Config Tool or ComBox).

For more information on AC contactor operation in larger multi-cluster systems refer to the *Conext™ Multi-Cluster Power System Planning Guide* (document part number: 975-0648-01-01) available through your Schneider Electric SAE.

Power ratings of the multi-cluster power system with external AC contactor are listed in Table 2-9 and Table 2-10 on page 2–22.

Table 2-9 Conext XW+ Multi-Cluster Power System Ratings for IEC - 3Ph - With External Contactor

XW+ Unit	XW+ 8548 model			
	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C		
3-unit	20.4	18.0	25.5	18.0
6-unit	40.8	36.0	51.0	36.0
9-unit	61.2	54.0	76.5	54.0

Table 2-10 Conext XW+ Multi-Cluster Power System Ratings for NA - 3Ph - With External Contactor

XW+ Unit	XW+ 6848 240V model			
	continuous[a] (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C		
3-unit	17.2		21.6	17.2
6-unit	34.5		43.2	34.5
9-unit	51.8		64.8	51.8

a.Continuous and grid-sell power in a three-phase multi-cluster system for North American models are limited by the 80% breaker derating rule of NEC when using a 60A breaker necessary to be used with all XW+ models. Peak power is limited by the trip characteristics of a 3-phase 60A breaker.

Features[1] supported by Configuration 4 (External Contactor)

a. Off-grid and grid-connected systems
b. Backup
c. Sell
d. AC and DC PV-coupled configurations
e. AC PV-coupled configuration up to a power ratio of 1:1 (PV:XW+) maximum recommended
f. Multiple battery bank configuration
g. Battery bank energy balancing when used with a Schneider Electric Battery Monitor

1.For Features that are Not Available in Configuration 1 (External Transfer Switch) and Configuration 4 (External Contactor), see page 3–7.

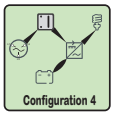
Commissioning of Configuration 4 (External Contactor)

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- Each of the equipment must only be installed and serviced by qualified electrical personnel.
- Never operate any equipment energized with covers removed.
- Equipment may be energized from multiple sources. Before removing covers identify all sources, de-energize, lock-out, and tag-out and wait 2 minutes for circuits to discharge.
- Always use a properly rated voltage sensing device to confirm all circuits are de-energized.

Failure to follow these instructions will result in death or serious injury.



List of equipment required:

- Conext **Config**uration **Tool** (see “Commissioning and Configuration Device” on page 3–10)
- Conext ComBox (see “Monitoring and Communication Devices” on page 3–9)

During installation of a three-phase multi-cluster with external contactor, the following steps should be followed.

1. Verify that no AC and DC source is connected to the units.
2. Verify that **AC1** of the Masters are connected to the AC source (between output of the AC source and input of external contactor).
3. Verify that **AC2** of the masters are connected to the main AC bus (at the output of the external contactor).
4. Verify that the **AC1** of the Slave units are connected to the main AC bus (at the output of the external contactor).
5. Verify that the **AC2** of the Slave units are not connected to anything.
6. Verify that the **AC Out** of every unit (Master and Slave) are not connected to anything.
7. Verify that the **AUX port JU-1**, **JU-4** and **JU-5** of Master unit of phase A are connected to the combiner box as described in *Multi-Cluster Power System Planning Guide* (document part number: 975-0648-01-01).
8. Note which unit is wired as Master and as a Slave. Note which phase of the AC source each unit is connected to.

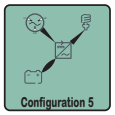
9. Verify that the rest of the wiring has been done properly:
   - All units (XW+, ComBox, SCP, Battery Monitor, MPPT Charge Controller, etc.) are connected through Xanbus in a daisy chain configuration and following requirements listed in *Xanbus Network Sizing Guide* (document part number: 975-0646-01-01)
   - All Sync Cables are connected between the XW+ units
10. Open all the breakers at the output of the XW+ (**AC Out**).
11. Close the DC breaker/s (that is, the battery) to power up the system.
12. Verify that all the units are in **Standby** mode.
13. Use the **Conext Config Tool** (or **Conext ComBox**) to assign each unit number as follows:

XW+	Master L1	Master L2	Master L3	Slave 1 L1	Slave 1 L2	Slave 1 L3	Slave 2 L1	Slave 2 L2	Slave 2 L3
Associated number	1	2	3	4	5	6	7	8	9

14. Verify that the firmware version installed on each Schneider Electric product (XW+, ComBox, MPPT, AGS, SCP, etc) corresponds to the latest released version (available on http://solar.schneider-electric.com). If not, download the latest firmware from the website and update each unit accordingly.
15. Using the **Conext Config Tool**, run the **Multi-Cluster Configuration Wizard**.
16. Define **Battery Bank**, **AC1**, and **AC Out** associations when asked by the wizard. All **AC Out** shall be defined as **AC Load 1**. All **AC1** shall be set the same.
17. Assign one unit as Master and all the other ones as Slave units per phase, when asked by the wizard. Verify that the phase association is in line with the three-phase AC source. Supported associations: ABC, CAB, BCA.
18. Select an External Transfer Switch location in **Advanced Features**. Enable **AC Coupling** only if your system includes a grid-tie PV inverter and would like to use the AC Frequency Shift Curtailment feature.
    NOTE: Battery energy balancing only works with battery banks that are connected and properly associated to a Conext Battery Monitor.
19. Configure XW+ settings accordingly to desired settings (see the XW+ Owner's Guide).
    NOTE: The wizard will ask for all required settings to configure the system such as **Battery Association**, **Battery Type**, and grid support mode (**Sell**).
20. Verify that the output voltage of each XW+ unit is within ±0.5VAC range. To do the verification, you will have to temporarily put the units in **Operating** mode.
    - If the units are not within the range, recalibrate the unit/s following the instructions in Appendix A.
    - Return the units to **Standby** mode.
21. Under a **No Load** condition, close every breaker at the output of the XW+.
22. Put the units in **Operating** mode.
23. Verify that the system is generating a stable AC output voltage (UL-240V / IEC-230V).
24. Load the system and verify that all the units are contributing to supply the load.

25. Turn on the AC source. Verify that if the AC source voltage and frequency is within specified range, then the green LED blink on the Master units.
26. Verify that after the LED starts blinking, the **AUX port** of XW+ Master of Phase 1 generates a 12V output which will close the external contactor and connect the XW+ to the AC source.
27. Verify that once the Master units have qualified the AC source, then the Slave units do the same.

Configuration 5 (3Ph AC Source)



Three-Phase System -> Without External Contactor -> Connected to an AC Source

Electrical Configuration and Power Ratings

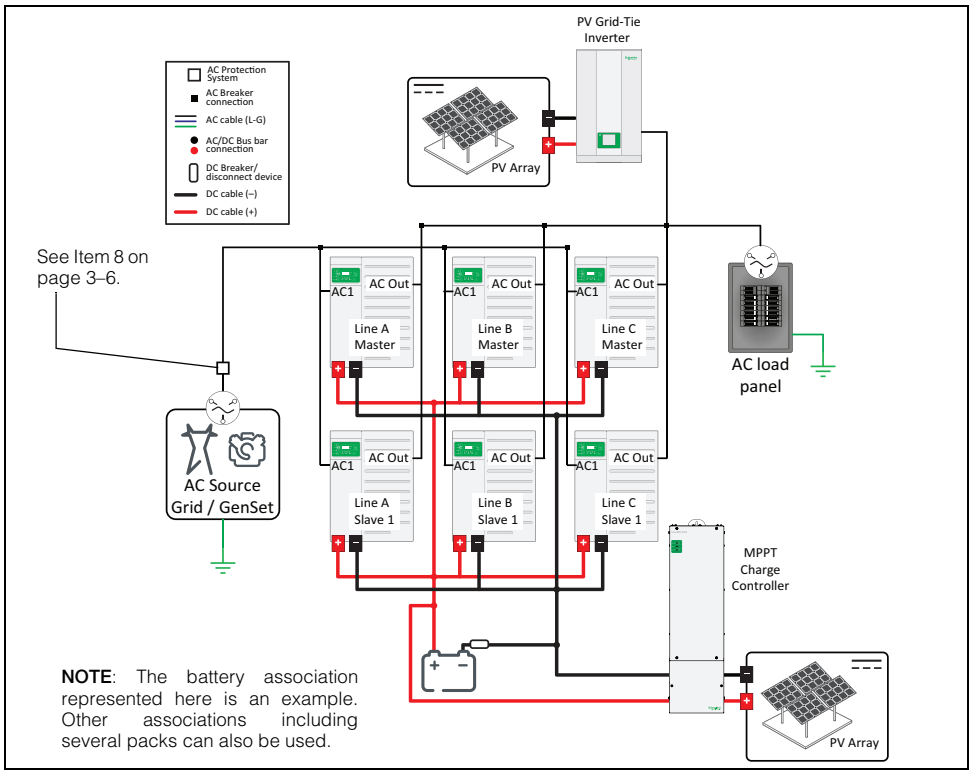


Figure 2-13 Three-phase-Without External Contactor-AC Source Configuration

In configurations similar to the one displayed in Figure 2-13 where no external contactor is being used, the system is subject to the 60A limit of the internal relay. As a result, associated power ratings and the supported feature are listed in Table 2-11 and Table 2-12 on page 2–27.

Table 2-11 Conext XW+ Multi-Unit Power System Ratings for IEC - 3Ph - Without External Contactor

XW+ Unit	XW+ 8548 model				XW+ 7048 model			
	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C			@25 C	@40 C		
3-unit	20.4	18.0	25.5	18.0	16.5	13.5	21.0	13.5
6-unit	40.8	36.0	41.4	36.0	33.0	27.0	41.4	27.0
9-unit	41.4	41.4	41.4	54.0	41.4	41.4	41.4	40.5

Table 2-12 Conext XW+ Multi-Unit Power System Ratings for NA - 3Ph - Without External Contactor

XW+ Unit	XW+ 6848				XW+ 5548			
	continuous[a] (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous[a] (kVA		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C			@25 C	@40 C		
3-unit	17.2			17.2	16.5	13.5	17.2	13.6
6-unit	17.2			34.5	17.2	17.2	17.2	27.0
9-unit	17.2			51.8	17.2	17.2	17.2	40.5

a.Continuous and grid-sell power in a three-phase multi-cluster system for North American models are limited by the 80% breaker derating rule of NEC when using a 60A breaker necessary to be used with all XW+ models. Peak power is limited by the trip characteristics of a 3-phase 60A breaker.

Features supported by Configuration 5 (3Ph AC Source)

a. Off-grid and grid-connected systems
b. All features supported by XW+ in single unit configuration
c. AC and DC PV-coupled configurations
d. AC PV-coupled configuration up to a power ratio of 1:1 (PV:XW+) maximum recommended
e. Multiple battery bank configuration
f. Battery bank energy balancing when used with a Schneider Electric Battery Monitor

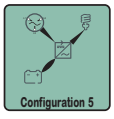
Commissioning of Configuration 5 (3Ph AC Source)

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- Each of the equipment must only be installed and serviced by qualified electrical personnel.
- Never operate any equipment energized with covers removed.
- Equipment may be energized from multiple sources. Before removing covers identify all sources, de-energize, lock-out, and tag-out and wait 2 minutes for circuits to discharge.
- Always use a properly rated voltage sensing device to confirm all circuits are de-energized.

Failure to follow these instructions will result in death or serious injury.



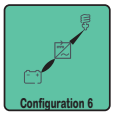
During installation of a three-phase system without an external contactor and three-phase AC source, the following steps should be followed.

1. Verify that no AC and DC source is connected to the units.
2. Verify that all the wiring has been properly done.

- **AC Out** connected to load panel
- **AC1** connected to the AC source. Note which unit is connected to which phase of the AC source
- All units (XW+, ComBox, SCP, Battery Monitor, MPPT Charge Controller, etc.) are connected through Xanbus in a daisy chain configuration and following requirements listed in *Xanbus Network Sizing Guide* (document part number: 975-0646-01-01)
- All Sync Cables are connected between the XW+ units

3. Open all the breakers at the output of the XW+ (**AC Out**).
4. Close the DC breaker/s (that is, the battery) to power up the system.
5. Verify that all the units are in **Standby** mode.
6. Verify that the firmware version installed on each Schneider Electric product (XW+, ComBox, MPPT, AGS, SCP, etc) corresponds to the latest released version (available on http://solar.schneider-electric.com). If not, download the latest firmware from the website and update each unit accordingly.
7. Configure one unit as Master and all the other ones as Slave units per phase. Verify that phase association is in line with the three-phase AC source. Supported associations: ABC, CAB, BCA.
8. Assign proper battery association to match wiring of the system.
9. Configure XW+ settings according to the desired operating mode (see the XW+ Owner's Guide).
10. Verify that the output voltage of each XW+ unit is within ±0.5VAC range. To do the verification, you will have to temporarily put the units in **Operating** mode.
    - If the units are not within the range, recalibrate the unit/s following the instructions in Appendix A.
    - Return the units to **Standby** mode.
11. Under a **No Load** condition, close every breaker at the output of the XW+.
12. Put the units in **Operating** mode.
13. Verify that the system is generating a stable AC output voltage (UL-240V / IEC-230V).
14. Load the system and verify that all the units are contributing to supply the load.
15. Turn On the AC source. Verify that if the AC source voltage and frequency is within the specified range, then the green LED blinks and then remains ON.

Configuration 6 (Without 3Ph AC Source)



Three-Phase System -> **Without External Contactor** -> **Not Connected to an AC Source**

Electrical Configuration and Power Ratings

If no AC source is connected at the input of the XW+, then the internal relay current limitation is no longer in place for the system. As a result, associated power ratings and the supported feature by configuration in Figure 2-14 are listed in Table 2-13 and Table 2-14 on page 2–30.

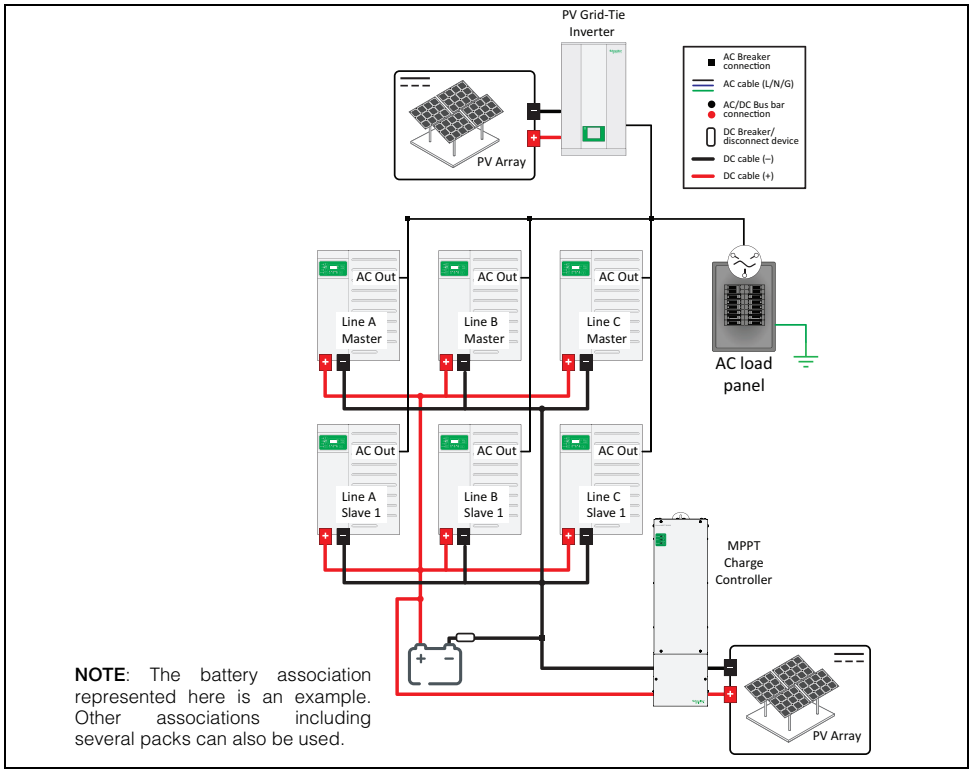


Figure 2-14 Three-phase-Without External Contactor-No AC Source Configuration

Table 2-13 Conext XW+ Multi-Unit Power System Ratings for IEC - 3Ph - Without External Contactor

XW+ Unit	XW+ 8548 model				XW+ 7048 model			
	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C			@25 C	@40 C		
3-unit	20.4	18.0	25.5	18.0	16.5	13.5	21.0	13.5
6-unit	40.8	36.0	51.0	36.0	33.0	27.0	42.0	27.0
9-unit	61.2	54.0	76.5	54.0	49.5	40.5	63.0	40.5

Table 2-14 Conext XW+ Multi-Unit Power System Ratings for NA - 3Ph - Without External Contactor

XW+ Unit	XW+ 6848 120V model				XW+ 5548 120V model			
	continuous[a] (kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)	continuous[a](kVA)		peak (kVA) @25 C (30-min)	Grid-Sell (kVA)
	@25 C	@40 C			@25 C	@40 C		
3-unit	17.2		21.6	17.2	16.5	13.5	21.0	13.5
6-unit	34.5		43.2	34.5	33.0	27.0	42.0	27.0
9-unit	51.8		64.8	51.8	49.5	40.5	63.0	40.5

a.Continuous and grid-sell power in a three-phase multi-cluster system for North American models are limited by the 80% breaker derating rule of NEC when using a 60A breaker necessary to be used with all XW+ models. Peak power is limited by the trip characteristics of a 3-phase 60A breaker.

Features supported by Configuration 6 (Without 3Ph AC Source)

a. Off-grid systems
b. All features supported by XW+ in single unit configuration
c. AC and DC PV-coupled configurations
d. AC PV-coupled configuration up to a power ratio of 1:1 (PV:XW+) maximum recommended
e. Multiple battery bank configuration
f. Battery bank energy balancing when used with a Schneider Electric Battery Monitor

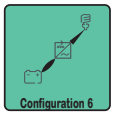
Commissioning of Configuration 6 (Without 3Ph AC Source)

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- Each of the equipment must only be installed and serviced by qualified electrical personnel.
- Never operate any equipment energized with covers removed.
- Equipment may be energized from multiple sources. Before removing covers identify all sources, de-energize, lock-out, and tag-out and wait 2 minutes for circuits to discharge.
- Always use a properly rated voltage sensing device to confirm all circuits are de-energized.

Failure to follow these instructions will result in death or serious injury.



During installation of a three-phase system without an external contactor and no three-phase AC source, the following steps should be followed.

1. Verify that no AC and DC source is connected to the units.
2. Verify that all the wiring has been properly done.

- **AC Out** connected to load panel
- **AC1** connected to AC source. Note which unit is connected to which phase of the AC source
- All units (XW+, ComBox, SCP, Battery Monitor, MPPT Charge Controller, etc.) are connected through Xanbus in a daisy chain configuration and following requirements listed in *Xanbus Network Sizing Guide* (document part number: 975-0646-01-01)
- All Sync Cables are connected between the XW+ units

3. Open all the breakers at the output of the XW+ (**AC Out**).
4. Close the DC breaker/s (that is, the battery) to power up the system.
5. Verify that all the units are in **Standby** mode.
6. Verify that the firmware version installed on each Schneider Electric product (XW+, ComBox, MPPT, AGS, SCP, etc) corresponds to the latest released version (available on http://solar.schneider-electric.com). If not, download latest firmware from the website and update each unit accordingly.
7. Configure one unit as Master and all the other ones as Slave units per phase. Verify that phase association is in line with the three-phase AC source. Supported associations: ABC, CAB, BCA.
8. Assign proper battery association to match wiring of the system.
9. Configure XW+ setting accordingly to desired operating mode (see the XW+ Owner's Guide).
10. Verify that the output voltage of each XW+ unit is within ±0.5VAC range. To do the verification, you will have to temporarily put the units in **Operating** mode.
    - If the units are not within the range, recalibrate the unit/s following the instructions in Appendix A.
    - Return the units to **Standby** mode.
11. Under a **No Load** condition, close every breaker at the output of the XW+.
12. Put the units in **Operating** mode.
13. Verify that the system is generating a stable AC output voltage (UL-240V / IEC-230V).
14. Load the system and verify that all the units are contributing to supply the load.

•THIS PAGE INTENTIONALLY BLANK•

3 Design of Multi-Unit Power Systems

Chapter 3 contains information about:

- How To Identify Multi-Unit Power System Project Needs
- Components of a Modular XW+ Multi-Unit Power System

How To Identify Multi-Unit Power System Project Needs

As described previously in the beginning, there are several electrical configurations which are possible for the Multi-Unit Power System and each of them offers different performances in terms of power rating and features.

This section will help you to understand how to select the proper system for your project.

1. **Identify what are the functionalities expected for the system.**

   Verify which configuration can potentially meet your expectations in terms of features. For instance, if the system aims to provide advanced features such as load shaving or grid voltage support, then configurations using an external contactor or transfer switch will not correspond to the project.

2. **Define the load profile of the system.**

   The main functionality of the system is to provide electrical power to an installation. In order to size the system properly, it is necessary to know the load or loads to be powered. Before designing the system, it is strongly recommended to monitor the installation using a power meter when possible. Information to be logged is:

   - load profile (VA or Watt)
   - Power factor if monitored load is in Watt

   If only the total load in Watt is available, Volt-Ampere (VA) power can be determined by dividing the Watt power by the power factor:

   $$Pva = \frac{Pwatt}{PowerFactor}$$

   Once the load profile in VA is defined, you need to define the following parameters:

   - What is the peak load of the system?
   - What is the highest load that is running for more than 30-minute?
   - What is the average load?
   - What is the continuous load?

   Once you have determined these parameters, you can then compare them to the power rating tables given in the document and define a suitable configuration.

Example:

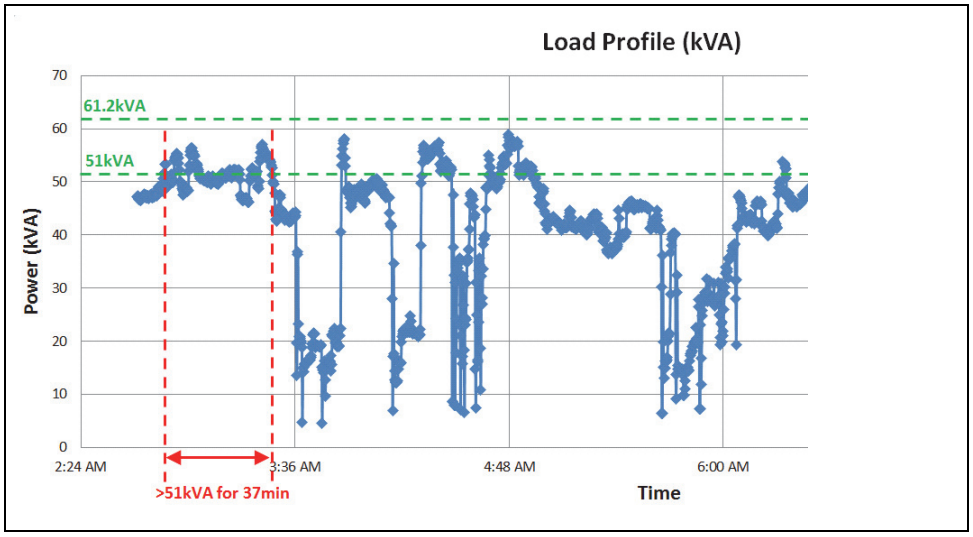


Figure 3-1 Load Profile Graph

	Measured Load	Theoretical Rating of Multi-Clusters	
		6 XW+ 8548 units – no external contactor	**9 XW+ 8548 units – with external contactor**
Avg. Power (kVA)	36	40.8 (continuous @ 25 °C)	61.2 (continuous @ 25 °C)
Peak Power - 30-minute (kVA)	>51kW for 37min	51 (@ 25 °C)	76.5 (30-minute peak @ 25 °C)

A load profile monitored in a commercial building is shown in Figure 3-1. It can be seen that this load profile is fairly uneven and presents many large load steps of several dozens of VA. In this case, it is difficult to identify a clear pattern for the load profile. Hence, in order to proceed to the design, it is required to identify what is the worst loading sequence for the system. A method of validating a design is to benchmark actual capabilities of the system with the measured load profile. In the given example here, we can see that the six-unit multi-cluster is able to supply the average power demand. However, we can identify a sequence where the load is above the peak rating of the cluster. As a result, six units are not appropriate to this load profile and a good solution is to select a multi-cluster with nine units which will be able to sustain the peak load demand.

Sometimes, it is not possible to get the measured load profile from the site. In this case, it is still recommended to get as much information as possible regarding it. This can be done by putting together a list of loads and manually adding their power ratings together to estimate the peak power of the installation.

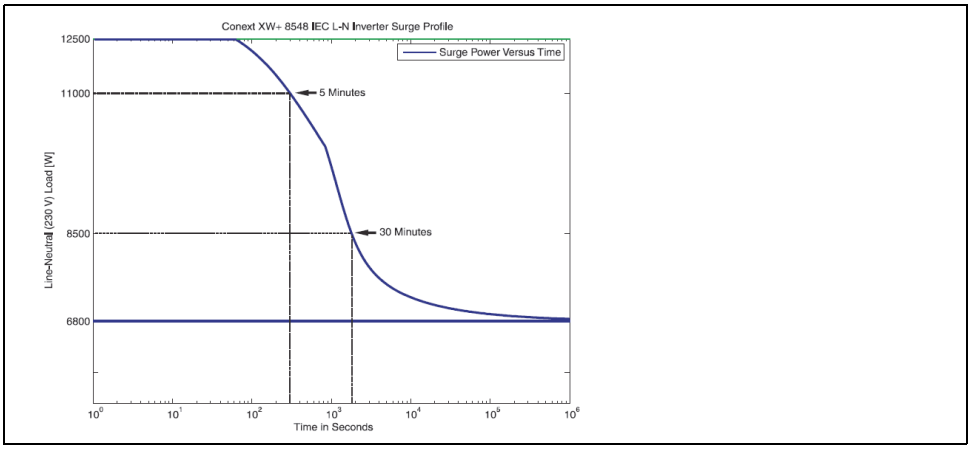


Figure 3-2 Conext XW+ AC Load Capability Graph

3. Define the surge rating of the system.

If the installation includes a large electrical machine, it is likely that the system will be subjected to large inrush currents. Verify the LRA (Locked Rotor Ampere) values of the electrical machines to be started. The maximum inrush current of each load shall not be more than the maximum ratings specified in Table 3-1, and this is regardless of the number of XW+ units comprising the cluster. If installation is subjected to this type of load, then it is recommended to install a **soft start** or **VFD** (variable frequency drives) system at the input of the electrical machine. This will reduce the inrush current and associated stress on the XW+ units. You may contact your Schneider Electric SAE to receive information and support regarding soft starts and VFD devices.

The table below shows the maximum recommended motor load ratings without the use of means of reducing inrush current.

Table 3-1 Single Load Maximum Ratings

	Single-phase motor		Three-phase motor		Inrush current per load A_{RMS}
	kVA	HP	kVA	HP	
Maximum supported rating for Conext XW+ 8548 and 6848 models	2.4	3.2	4.0	5.6	53
Maximum supported rating for Conext XW+ 7048 and 5548 models	2.0	2.6	3.2	4.3	41

NOTICE

EQUIPMENT DAMAGE

Follow the recommendations above to avoid the accelerated aging and subsequent failure of the components.

Failure to follow these instructions may result in equipment damage.

4. **Know the maximum ambient temperature at which the system will operate.**

   Power rating is temperature dependent. As a result, it is important to define the ambient temperature in order to offer a proper design of the system. If the temperature is too high (that is, 40 °C) and the power demand is too high then you can consider installing an additional air cooling (such as, fan or air conditioner) system into the room.

5. **What about if I cannot identify a suitable solution for the project?**

   It is possible that project requirements will overpass capabilities of offered solutions. In this case, it is often possible to work within (and around) the installation and make it compliant with the power rating of the Conext XW+ Multi-Unit Power System. Some of those solutions have already been mentioned in the previous points (for example, extra cooling system, VFD).

   In addition to these, you can also explore the following three options. The first one consists of splitting the load and installing several smaller systems instead of one large system. Another way is to define a critical load panel that will be disconnected from the system during backup mode. A third option is to install a load management system that will shut down some predefined loads, if power demand becomes too high.

6. **How to size a generator for a Multi-Unit Power System.**

   When selecting a generator, you should consider the total power demand that potentially will be applied at the AC output of the generator. This total power includes the load of the installation and the total charging current requested by the battery bank(s). Considering this total power ensures that the system would be capable of meeting the battery bank(s) requirement of providing charging current while supplying the load. Please remember that the maximum charging current per XW+ unit is configurable through the Conext Config Tool (or Conext ComBox) and can be reduced to meet system requirements.

7. **AC-coupled System**

   A hybrid system should be sized in such a way that there is no more than a ratio of 1:1 between the total AC-coupled-installed PV power and the total power of the XW+.

   All configurations introduced in this document can be AC-coupled with a grid-tie PV inverter. If the **AC Coupling** mode is **Enabled** (see XW+ Advanced Features) then the AC output frequency will increase as soon as the battery voltage reaches **V_{bulk}–1V** and **Charging Current > 2A**. Some PV inverters are able to curtail their output power based on their output frequency. Therefore, interaction with the XW+ will protect the battery from being overcharged by the AC-coupled PV. As a result, please verify the power curtailing capability of the PV inverter you are planning to use. In addition, if you are using a battery pack which is very sensitive to over voltage and/or over current, it is recommended to install another level of protection including an AC Disconnect device.

   Consequently, for systems wherein the ratio of load to PV power is small, it is also recommended to install an AC Disconnect device or to shut down the system. Shutting down means to completely stop PV power from being harvested if the battery bank becomes overcharged. This additional safety

system can be triggered based on battery bank voltage via the XW+ AUX port. More details regarding AC Coupling can be found in the *AC Coupling Solutions Guide* (document part number: 976-0240-01-01).

8. **Always install a disconnect system to protect the generator from power backfeeding.**

   With installations where the generator can eventually be AC-coupled with a PV inverter (such as “Configuration 1 (External Transfer Switch)” on page 2–9 and “Configuration 4 (External Contactor)” on page 2–19), PV power can also backfeed into the generator and cause significant damage to it. Therefore, you should always install a protection system to avoid this possible scenario.

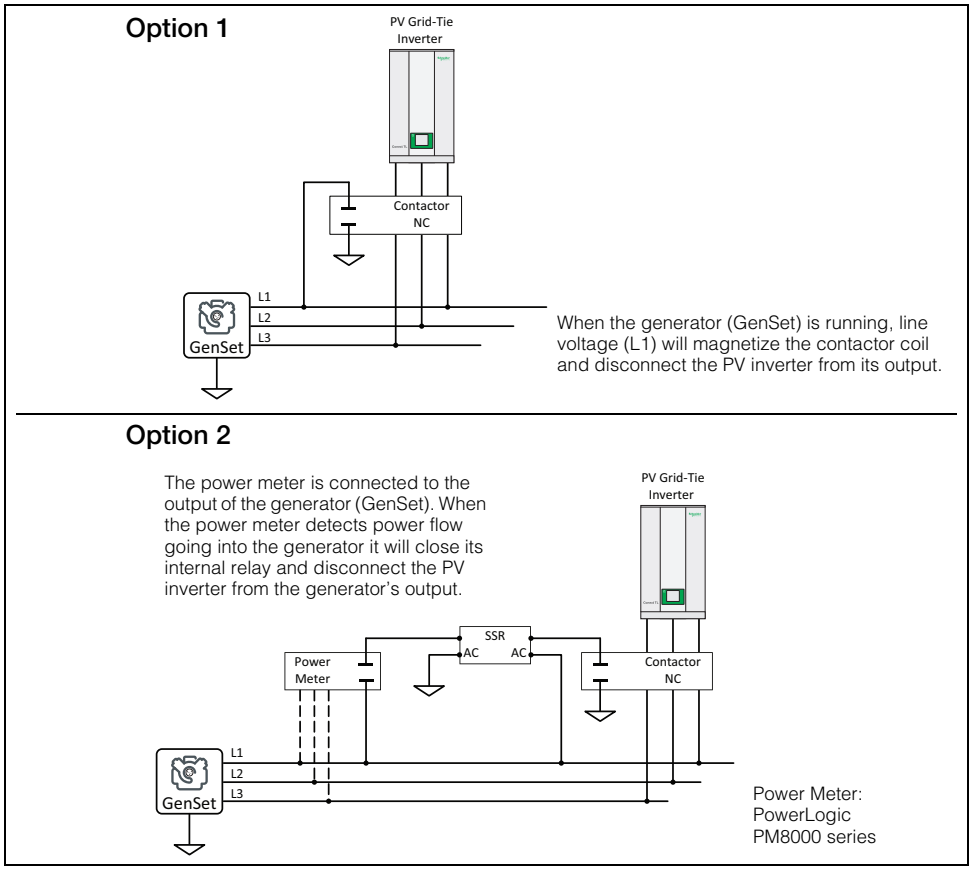


Figure 3-3 Options for Generator Protection During AC Coupling

9. **Installation of 12 units in Multi-Cluster Configuration**

   Under specific circumstances, Configuration 4 (see page 2–19) and Configuration 6 (see page 2–29) can be designed with up to 12 units to reach a peak power rating of 102 kVA when operating under 25 °C.

   IMPORTANT: The design and installation of such a system requires that you contact a Schneider Electric sales application engineer (SAE). Schneider Electric cannot support a 12-unit Multi-Cluster Configuration that has not been pre-validated by your local SAE during the design and installation phases.

10. **Multi-Unit Power System Limitations and Behavior**

    These SCP settings are affected when the SCP and several XW+ units are connected in the same Xanbus network.

    - **Cascading** - this System Setting in the SCP does not apply in Multi-Cluster Configuration with different DC Associations, meaning each cluster has its own battery bank while the XW+ units are connected under a single Xanbus network. Set **Cascading** = **Disabled**.
    - **Copy From** - this XW+ Advanced Setting does not apply in a Xanbus network with more than three XW+ units.

11. **Features that are Not Available in Configuration 1 (External Transfer Switch) and Configuration 4 (External Contactor)**

    The following **XW+ features** are not available.

    - **Grid Support** for Self-Consumption Only (Net Zero)
      NOTE: The XW+ system can still sell or export energy to the grid, but it cannot self-limit for “self-consumption only” operation
    - **Load Shave**
    - **Search Mode**
    - **Gen Support**

    The following **AGS features** are not available.

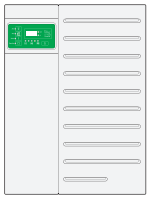
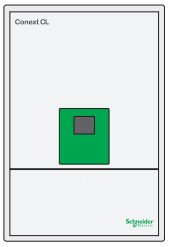
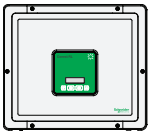
    - **Load** - this AGS setting enables and disables the Load Start and Load Stop triggers. This mode of operation is not supported by the AGS connected to a multi-cluster with an external contactor. To prevent the generator from nuisance cycling when the multi-cluster XW+ units are installed with an external contactor (that is, the generator starts and stops in a loop) set **Load** = **Disabled** under the **Cfg Trigger** menu. Any other features involving state-of-charge (SoC) or battery voltage as a trigger source are supported by AGS.
    - **Gen Cool Down** under **Cfg Gen** menu
    - The two configurations (1 and 4) can only be connected to a single AC source (Generator or Grid). However, both can be connected in the system using an automatic transfer switch. In this case, the AGS will not exercise the Generator.

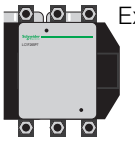
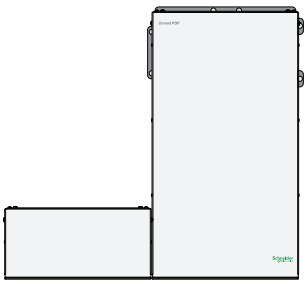
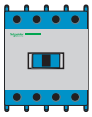
The following **ComBox / Insight features** are not available.

- Grid input power or energy metering and reporting
- Grid export power or energy metering and reporting
- Generator input power or energy metering and reporting
- Load output power or energy metering and reporting

Components of a Modular XW+ Multi-Unit Power System

These are Schneider Electric power devices which can be used as components of the Conext XW+ Multi-Unit Power System.

Building Blocks	Description	Product Number
Power Conversion Devices		
 Conext XW+ Inverter/Charger North America (NA) and IEC	Conext XW+ 7048 E	865-7048-61
	Conext XW+ 8548 E	865-8548-61
	Conext XW+ 5548 NA	865-5548-01
	Conext XW+ 6848 NA	865-6848-01
 Conext CL 3-Ph PV Inverter	Conext CL 20000 E	PVSCL20E100
	Conext CL 25000 E	PVSCL25E100
	Conext CL 18000 NA	PVSCL18NA100
	Conext CL 25000 NA	PVSCL25NA100
 Conext RL 1-Ph PV Inverter	Conext RL 3000 E	PVSNVC3000
	Conext RL 4000 E	PVSNVC4000
	Conext RL 5000 E	PVSNVC5000
 MPPT 80 600 Solar Charge Controller	Conext MPPT 60 150	865-1030-1
	Conext MPPT 80 600	865-1032
 MPPT 60 150 Solar Charge Controller		
Monitoring and Communication Devices		
 ComBox	Conext ComBox	865-1058
 Battery Monitor	Conext Battery Monitor	865-1080-01
	Conext SCP	865-1050-01
 SCP	Conext AGS	865-1060-01
 AGS		

Building Blocks	Description	Product Number
Balance of Systems (BOS)		
 External Contactor  Auxiliary Contactor  Solid State Relay	TeSys F External Contactor 🔗	LC1F400FE7
	TeSys K Auxiliary Contactor 🔗	LADN22
	Solid State Relay (SSR) 🔗	SSRDCDS20A1
 PDP	Conext XW+ Power Distribution Panel (PDP) 🔗	865-1015-01
 External Transfer Switch for Single-phase configuration Transfer Switch  Solid State Relay	TeSys LC1 4P Contactor 🔗 External transfer switch	LC1D80008M5 LC1D80008U6 LC1D80008P7 LC1D80008M5 LC1D80008G6
	Solid State Relay (SSR) 🔗	SSRDCDS20A1
Commissioning and Configuration Device		
Conext Config Tool	Configuration device and program	865-1155-01

NOTE: The above listing of devices does not include all the components which can be a part of a Multi-Unit Power System. For information on additional devices which may be required, please visit http://solar.schneider-electric.com or connect with a Schneider Electric SAE who will be able to provide further guidance.

A

XW+/XW Inverter/ Charger Multi-Unit AC Output Voltage Configuration and Calibration

Appendix A contains instructions on how to configure the AC Output Voltage settings of multi-unit Conext XW+/XW Inverter/Chargers. It contains information about:

- Audience
- Prerequisites
- Procedure

Audience

This procedure is intended for experienced installers of the XW+ Multi-Unit Power System in a multi-unit setup including multi-clusters.

Prerequisites

- Applicable only to multi-unit setups including multi-clustered XW+/XW power systems.
- USB-CAN adapter
- Config Tool AI software (contact your Sales Representative or email schneiderconextxw@gmail.com.)
- Professional calibrated voltmeter

Procedure

Calibration without Load

Important! This calibration procedure must be performed without loads and with battery power only. Disengage from grid power, if the XW+/XW units are grid connected.

1. Install the Conext Configuration Tool drivers and Configuration Tool AI software according to instructions included in the software package in a Windows-based PC (Win XP, Vista, Windows 7, Windows 10 operating systems).

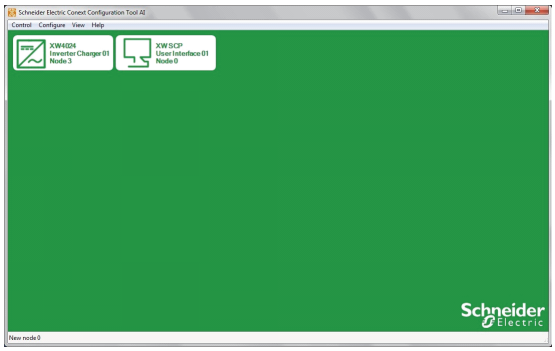
   NOTE: For Win XP, be sure it has been updated to SP2 or SP3.

2. Disable the **Search** mode on all inverters.
3. Verify that all AC output breakers are opened (switched off).
4. Measure the **L1**-to-**L2** voltage (for 120/240 V systems) or the **L** voltage (for 230 V systems) at the **AC LOAD** terminals of each inverter using a voltmeter.

   Observe that the measurements are likely off by more than ±0.6 V between each unit. If the units are measuring exactly the same, double check that they are not accidentally still paralleled.
5. Turn Off all the XW+/XW inverter/chargers to start the calibration process.
6. Turn On only the XW+/XW inverter/charger that needs to be calibrated.

Important! **NOTE**: If the XW+/XW is a Master unit, then proceed to the next step. If it is a Slave unit, then configure it to Master first before proceeding to the next step. To change the Inverter Mode go to: **Advanced Settings -> Multi-Unit Config -> Inverter Mode**

7. Open the Configuration Tool AI by launching the application in your PC. The Configuration Tool AI main screen appears.



NOTE: Only the XW+/XW unit to be calibrated (in step 6) should appear here. If other XW+/XW units are appearing, then these units must be turned off. Repeat step 5 for these units. Other devices need not be turned off.

Figure A-1 Configuration Tool AI Main Screen

8. From the Configuration Tool AI main screen, assign the unit to be calibrated as a **Master**.

   On 120/240 V units, Master is **SplitPhaseMaster**. On 230 V units, Master is **StandAloneMaster**.

9. Click the XW+ Multi-Unit Power System device icon.

   The XW+/XW Device screen appears.

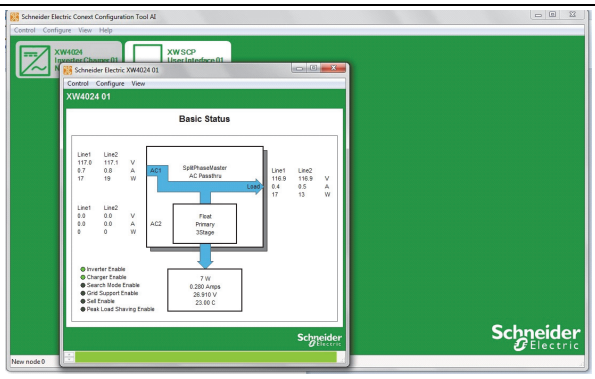


Figure A-2 Device Screen

10. Go to **Configure -> Inverter -> Inverter Output**.

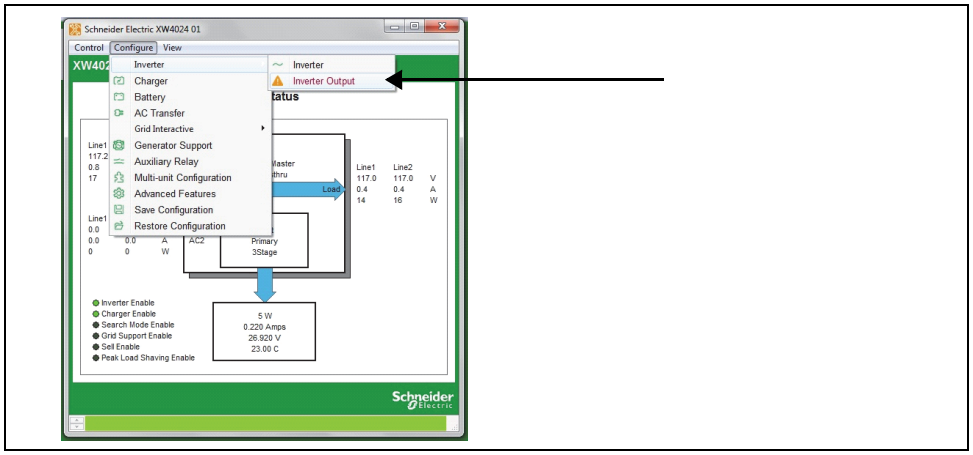


Figure A-3 Configuration Tool AI Main Screen

A **WARNING** message appears.

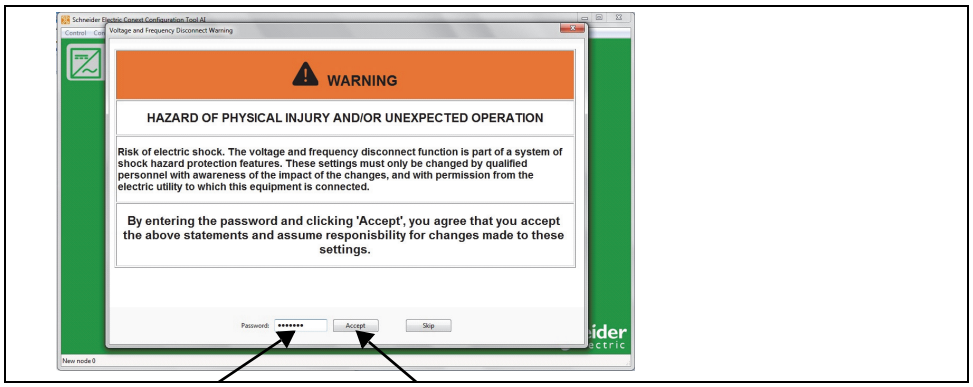


Figure A-4 Warning Message Screen

11. Enter the password and click **Accept**.

    NOTE: Hitting **Enter** does not work. You must click **Accept**.

    The Inverter Output Settings screen appears.

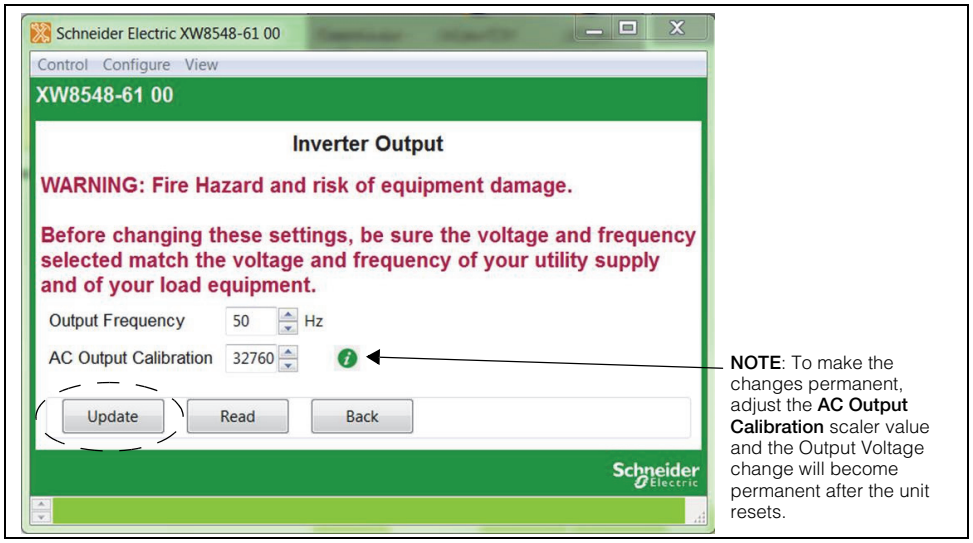


Figure A-5 Inverter Output Settings Screen

12. Adjust the **AC Output Calibration** number by setting the output voltage within ±0.6 V of the desired value (for example: 229.4 – 230.6 volts for a 230V configuration). Use the voltmeter to measure the voltage.

System	Starting calibration count	increase count by	corresponding increase in voltage value
120 V	34000	140, 280	0.5 V, 1.0 V
120/240 V	33000	75, 140	0.5 V, 1.0 V
230 V	32650	75, 140	0.5 V, 1.0 V

13. Set the value by clicking the **Update** button.
14. Put the unit in **Standby**.

Important!

NOTE: If the XW+/XW is a Master unit, then proceed to the next step. If it is a Slave unit which got changed to Master from Step 6, then reconfigure it back to Slave first before proceeding to the next step. To change the Inverter Mode go to: **Advanced Settings -> Multi-Unit Config -> Inverter Mode**

15. Turn On the next XW+/XW unit to be calibrated and follow steps 5 through 14 for that unit.
16. Once all units have been calibrated, close all the AC output voltage breakers.
17. System is now calibrated.

Calibration with Load (Power Sharing/Balancing)

Important! This calibration procedure must be performed with loads connected and with battery power only. Disengage from grid power, if the XW+/XW units are grid connected.

1. Perform the previous section, “Calibration without Load” on page A–2.
2. After Step 16 of the previous section, turn On the load.

Important! In a 120 V (or 230 V) single-phase setup, a load can be shared equally (within < 10% differential) by all paralleled XW+/XW units.

In a 120/240 V split-phase setup, a load can be shared equally (within < 10% differential) by all paralleled XW+/XW units.

In a three-phase setup, a load can be shared equally (within < 10% differential) by one phase.

3. Observe the power consumption of the load on the front panel display for all the XW+/XW units (within the same phase).

Perform on Slave unit/s only If the Slave unit provides less power than the Master unit, meaning the power sharing is uneven, then increase the **AC Output Calibration** count number on the Slave unit only by 50 counts. For example, from **34000** to **34050**.

If the Master unit provides less power than the Slave unit, then decrease the **AC Output Calibration** count number on the Slave unit only by 50 counts. For example, from **34000** to **33950**.

4. Repeat Step 3 until load sharing is balanced between the units within < 10% differential.

B AC Combiner Box

Appendix B contains information and schematics for:

- AC Combiner Box Control Schematic
- AC Combiner Box - 9 for North America
- AC Combiner Box - 9 for IEC

Introduction

The AC Combiner Box for a Conext XW+ Multi-Cluster system is a basic low voltage switchgear electrical panel. It provides an interface for the XW+ inverters, loads, AC sources, and/or PV inverters.

Based on the kind of application and the use-case scenario, the AC Combiner Box can be configured as a simple combiner box for the outputs of the XW+ inverters which are connected to the loads in a DC-Coupled system with no diesel generator or PV inverter sources. A more elaborate use-case for the AC Combiner Box is a hybrid-coupled off grid system which requires a diesel generator that is interfaced with an AC contactor and a PV inverter which is interfaced through a separate AC contactor that protects against backfeeding to the generator. In addition, a manual bypass may be added to this AC Combiner Box as a safeguard to isolate the entire system and to run it on diesel generator during maintenance.

Therefore, the best approach to custom build an AC Combiner Box for your project is to provide an electrical architecture design reference to one of the Schneider Electric panel builders within your geographical area. Use the link below to find the authorized Schneider Electric panel builder in your location[1].

Schneider Electric Alliance Partner Locator

You may also consult the Sales Applications Engineer in your region who can provide you with further support and details on the AC Combiner Box.

On the following pages, a schematic of two AC Combiner Boxes is presented showing their key components and wiring.

NOTICE

EQUIPMENT SELECTION RISK

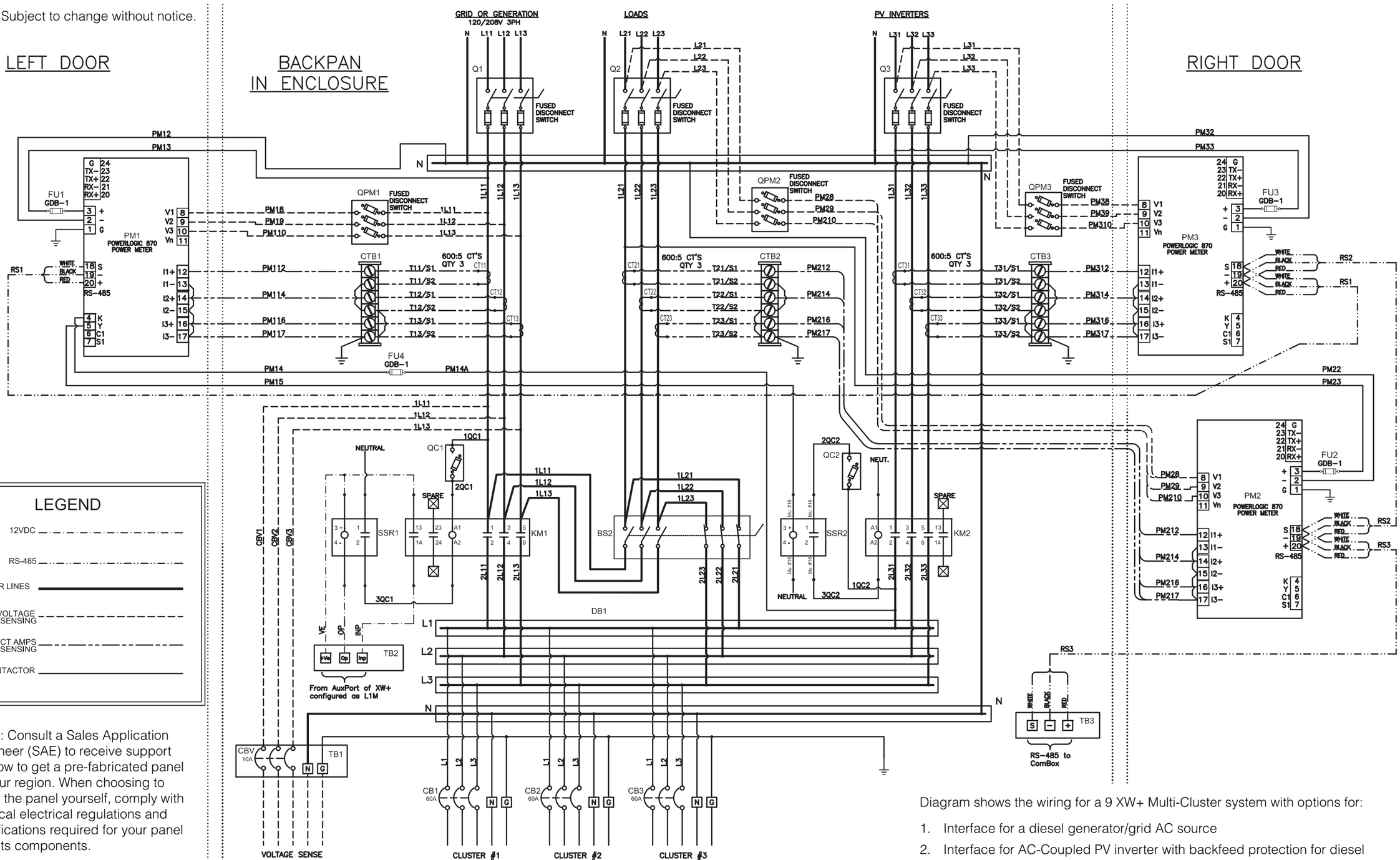
For reliable operation of the system, certain components of the AC Combiner Box must be used specifically, according to the designated make and model highlighted in the List of Components from Schneider Electric to Build the AC Combiner Box on page B–6.

Failure to follow these instructions can result in damage to equipment.

1. http://www2.schneider-electric.com/sites/corporate/en/customers/alliance/alliance-partner.page

AC Combiner Box Control Schematic

Note: Subject to change without notice.



LEGEND

- 12VDC
- RS-485
- POWER LINES
- VOLTAGE SENSING
- CT AMPS SENSING
- CONTACTOR

Note: Consult a Sales Application Engineer (SAE) to receive support on how to get a pre-fabricated panel in your region. When choosing to build the panel yourself, comply with all local electrical regulations and certifications required for your panel and its components.

Diagram shows the wiring for a 9 XW+ Multi-Cluster system with options for:

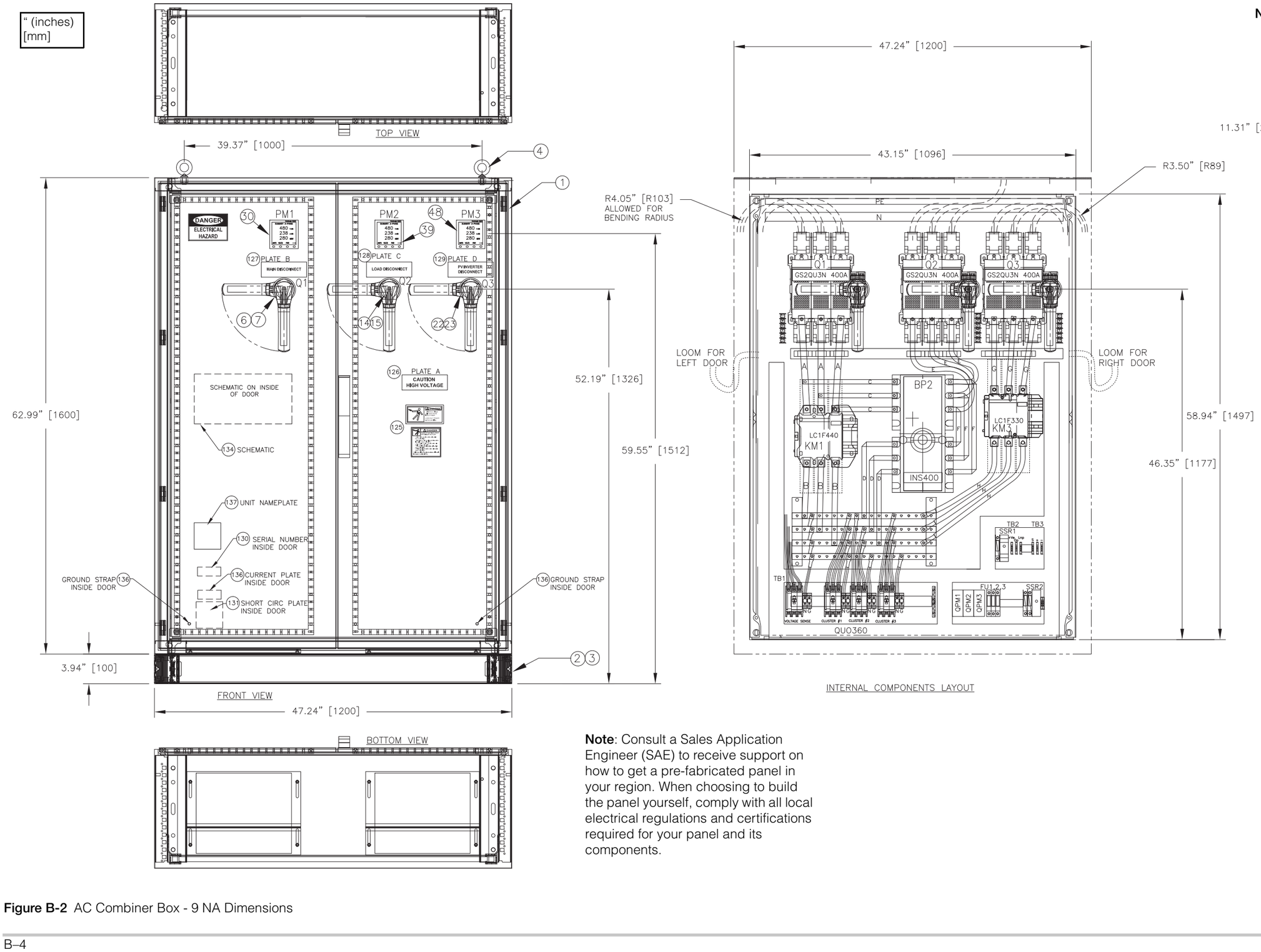
1. Interface for a diesel generator/grid AC source
2. Interface for AC-Coupled PV inverter with backfeed protection for diesel generator
3. Manual bypass/source changeover switch

Figure B-1 AC Combiner Box - 9 Control Schematics

AC Combiner Box - 9 for North America

" (inches)
[mm]

Note: Subject to change without notice.



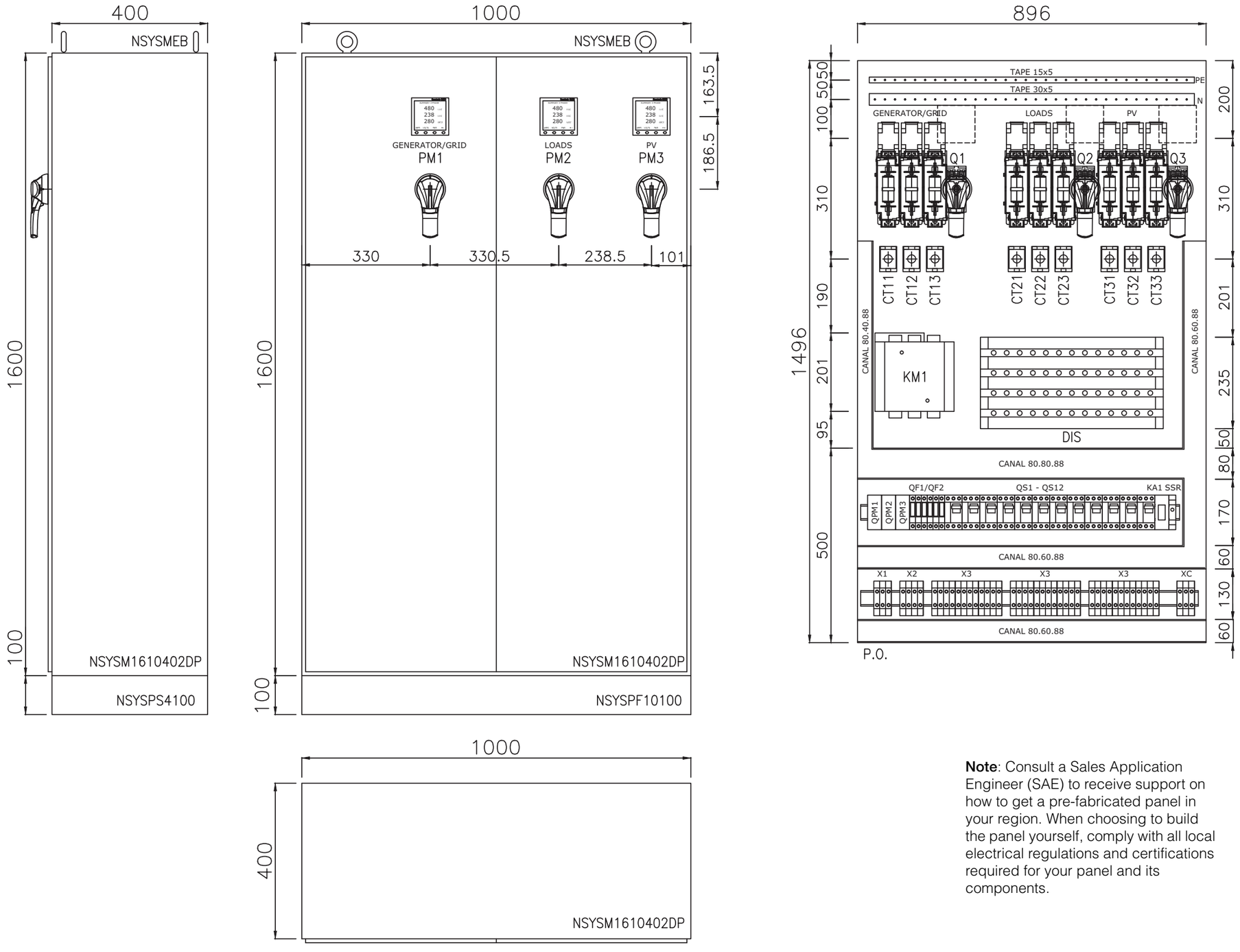
Note: Consult a Sales Application Engineer (SAE) to receive support on how to get a pre-fabricated panel in your region. When choosing to build the panel yourself, comply with all local electrical regulations and certifications required for your panel and its components.

Figure B-2 AC Combiner Box - 9 NA Dimensions

AC Combiner Box - 9 for IEC

in mm

Note: Subject to change without notice.



Note: Consult a Sales Application Engineer (SAE) to receive support on how to get a pre-fabricated panel in your region. When choosing to build the panel yourself, comply with all local electrical regulations and certifications required for your panel and its components.

Figure B-3 AC Combiner Box - 9 IEC Dimensions

List of Components from Schneider Electric to Build the AC Combiner Box

Component	Item Description	Model	Certification
Enclosure	Enclosure Option 1 - 1600x1200x400 mm, 2-door w/ mounting plate	NSYSM1612402DP	UL / IEC / CSA
	Base Front Option 1 - 100x1200 mm	NSYSPF12100	UL / IEC / CSA
	Base Side Option 1 - 100x400 mm	NSYSPS4100	UL / IEC / CSA
	Enclosure Option 2 - 1600x1000x400 mm, 2-door w/ mounting plate	NSYSM1610402DP	UL / IEC / CSA
	Base Front Option 2 - 100x1200 mm	NSYSPF10100	UL / IEC / CSA
	Base Side Option 2 - 100x400 mm	NSYSPS4100	UL / IEC / CSA
	Enclosure Option 3 - 1600x1000x400 mm, 2-door w/ mounting plate	NSYSM14640P	UL / IEC / CSA
	Base Front Option 3 - 100x600 mm	NSYSPF6100	UL / IEC / CSA
	Base Side Option 3 - 100x400 mm	NSYSPS4100	UL / IEC / CSA
	Transport Lugs	NSYSMEB	UL / IEC / CSA
Over Current Protection	Fuse AC Disconnects - 400A	GS2QQ3	IEC
		GS2AH530	IEC
	Fuse AC Disconnects - 250A	GS2N3	IEC
		GS2AH530	IEC
	Fuse AC Disconnects - 160A	GS2LL3	IEC
		GS2AH530	IEC
	Fuse AC Disconnects - 400A - UL	GS2QU3N	UL / IEC / CSA
		GS2AH430	UL / IEC / CSA
	300A Circuit Breaker UL	LAL36300	UL / IEC / CSA
	400A Circuit Breaker UL	LAL36400	UL / IEC / CSA
	400A NSX Circuit Breaker IEC	LV432676	UL / IEC / CSA
	320A NSX Circuit Breaker IEC	LV432750	UL / IEC / CSA
	160A NSX Circuit Breaker IEC	LV430830	UL / IEC / CSA
	Inverter Circuit Breaker - 60A - D-curve	MG17474 MG24546	UL / IEC / CSA
	Inverter Circuit Breaker - 15A - D-curve	17471	UL / IEC / CSA
	Inverter Circuit Breaker - 35A - D-curve	60199	UL / IEC / CSA
	Control Power Fuse Disconnect w/ LED_Blown Fuse -2P	DF102V	UL / IEC / CSA
	Control Power Fuse Disconnect w/ LED_Blown Fuse - 3P	DF103V	UL / IEC / CSA
Switchgear and Contactors	Power Contactor - 330A 230V coil	LC1F330P7	UL / IEC / CSA
	Power Contactor - 265A 230V coil	LC1F265P7	UL / IEC / CSA
	Power Contactor - 185A 230V coil	LC1F185P7	UL / IEC / CSA
	Power Contactor - 400A 120V coil	LC1F400G7	UL / IEC / CSA
	Power Contactor - 300A 120V coil	LC1F330G7	UL / IEC / CSA
	SSR - DIN - input 4-32 V DC, output 24-280 V AC, 20A	SSRDCDS20A1	UL / IEC / CSA
	SSR - DIN - input 90-280 V AC, output 24-280 V AC, 30A	SSRDP8S30A1	UL / IEC / CSA
	Auxiliary Contact Block 2NO, 2NC	LADN22	UL / IEC / CSA
	Bypass Switch/Manual Source ChangeOver Double Throw - INS - 400A	31150	IEC
	Bypass Switch/Manual Source ChangeOver Double Throw - INS - 250A	31146	IEC
	Bypass Switch/Manual Source ChangeOver Double Throw - INS - 160A	31144	IEC
	Bypass Switch/Manual Source ChangeOver Double Throw - SquareD - 400A	82345	UL
	Bypass Switch/Manual Source ChangeOver Double Throw - SquareD - 200A	82344	UL
	Downstream bar Bypass 100..250 for IEC	29358	IEC
	Downstream bar Bypass 400..630	32619	IEC
Power Measurement	Power Meters - PM8000 Series	PM8000	UL / IEC / CSA
	Power Meter Add-on I/O	PM8M22	UL / IEC / CSA
	CT DIN mount 250A:5A Cable DIA 21mm	METSECT5CC025	IEC
	CT DIN mount 500A:5A Cable DIA 35mm	METSECT5MF050	IEC
	CT 250A:5A (mountable screw leads)	64R-251	UL
	CT 500A:5A (mountable screw leads)	64R-501	UL
	CT 250A:5A (fly leads)	54R-251	UL
	CT 500A:5A (fly leads)	54R-501	UL
Internal Wiring	4P MULTISTAGE BUSBAR BLOCK 250A	04053	IEC
	4P MULTISTAGE BUSBAR BLOCK 400A	04054	IEC

Note: The highlighted items are not substitutable with any equivalent make/model. Doing so will risk the reliable operation of the system affecting transfer time, fault protection, and could lead to equipment damage. Other components such as enclosure, over current protection can be substituted if necessary to comply with local code and application need.

Schneider Electric

http://solar.schneider-electric.com

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this publication.

975-0739-01-01 Revision C

Printed in: