

XESS

XESS ONE

Installation and Operation User Manual



About XESS Energy

XESS was established to bring state-of-the-art storage technology together to deliver easy-to-install, maintain, and upgrade, power systems with high reliability to the global market.

XESS believes in power systems that can scale and grow to meet the customer's demands allowing long-lasting hassle-free solutions, that offer reliable operation, even in the event of an operational hiccup.

XESS brings together not only the technology but also, the customer support and the remote monitoring required, to offer the end consumer and the installer an exceptional experience.

We are a team of leading professionals who have a desire to set the industry standard for battery storage solutions.

XESS is backed by AERL the company that developed the world's very first Maximum Power Point Tracking technology that we take for granted today in all of our solar installations.

Without this invention, which innovated a staggering 30% efficiency gain in renewable conversion, renewables may not have had the ability to grow into the global energy player it is today.

AERL is our major manufacturing partner, who supplies our manufacturing and design services, out of their Brisbane Australia facility as well as utilizing our global manufacturing partners.

Contact Information

XESS Energy

📍 2/75 Bluestone Circuit, Seventeen Mile Rocks,
4073, Queensland, Australia.

✉ sales@xess.energy

🌐 www.xess.energy

Disclaimer

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Important Information

This Installation Manual contains important safety information and installation instructions for the XESS ONE standalone power system and its associated components.

The following symbols are used throughout this user manual to indicate ideal installation methods, potentially dangerous conditions, and important operational information.



IMPORTANT

Indicates information that must be followed to ensure proper operation of the XESS ONE



CAUTION

Indicates a critical procedure for the safe installation of the XESS ONE. Use extreme caution when performing this task.

About this Manual



- This manual provides detailed installation and usage instructions for the XESS ONE. All the instructions and cautions in this manual must be read before beginning installation.
- Only a suitably qualified person, with an understanding of electrical and electrical power systems should install the XESS ONE. This manual is intended for all installation technicians and the system owner.
- Do not disassemble or attempt to repair the XESS ONE unless you are qualified and or have authority in writing from XESS Energy to do so.
- XESS will not be held responsible in any way for the mishandling of this product or for the installation of the product in a manner that does not follow the instructions in this manual or as advised by an XESS technician.

Warranty Conditions

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

XESS will bear the cost of parts and labour to repair any manufacturing faults found within the terms and period of this warranty and pay the cost of freight to return the repaired XESS ONE Standalone System but the method of freight will be determined by AERL.

All installation and user conditions as set down in the instruction manual must be strictly adhered to as failure to do so may void your warranty. Any faults or like faults caused by lightning, water or moisture ingress, vermin infestation, improper voltage, faulty installation, use of the product in a manner for which it is not intended, alterations that affect the reliability or performance of the unit but are not attributable to faulty manufacture, or damage caused by other system components will not be covered under warranty.

In the event of the product being out of service, XESS shall bear no responsibility for any consequential loss or expense. XESS will not be held responsible for any misleading or incorrect information conveyed by anyone not directly employed by XESS.

For claims under warranty, the faulty product(s) must be returned to XESS's facility at 2/75 Bluestone Circuit, Seventeen Mile Rocks, 4073, QLD, Australia after contacting XESS and receiving the appropriate RMA documentation from XESS.

Note: Warranty conditions remain current until the next revision of this document or warranty document is published. Proof of purchase is required when making a warranty claim.

The XESS ONE Warranty document can be downloaded from our web page or sent to you upon request.

1. Introduction



Thank you for purchasing your **XESS ONE Standalone Power System**.

Designed and manufactured by seasoned professionals, the XESS ONE is tailored to meet the stringent requirements of industry experts, embodying our commitment to quality and innovation.

The XESS ONE is a next-generation hybrid modular power system, designed to provide an unmatched standalone power experience. It offers a versatile and robust solution for those seeking reliable off-grid power. With its modular design and plug-and-play expansion, the XESS ONE effortlessly adapts to evolving energy needs, ensuring scalability and ease of use.

As a standalone off-grid power system, the XESS ONE delivers reliable power in remote or isolated locations. Its integrated modular design facilitates easy expansion and customization, allowing the system to grow with your energy requirements. The plug-and-play technology simplifies installation and setup, reducing the time and effort on site during installation. Built-in system redundancy enhances reliability, ensuring continuous power supply even in challenging conditions.

The XESS ONE is engineered with a low mean time to install, repair, and upgrade, minimizing downtime and maintenance costs. Its black start capability with photovoltaic (PV) or generator power ensures that the system can restore power when it is needed most.

The XESS ONE Isolated output for load protection and uninterruptible power supply (UPS) safeguards sensitive equipment and ensures a steady power supply, while the ability to support high inrush loads accommodates sudden spikes in power demand without compromising performance.

Designed and manufactured by seasoned professionals, the XESS ONE meets the stringent requirements of industry experts. It embodies our commitment to quality and innovation, making it an ideal choice for those in need of a reliable and adaptable standalone power system for off-grid or UPS applications. Whether for industrial applications, remote locations, or emergency power needs, the XESS ONE stands as a testament to cutting-edge technology and superior engineering.

2. Glossary



MPPT	Maximum Power Point Tracker, an electrical device used for converting Solar energy to DC voltage for charging batteries, also referred to as Charge controller.
Charge Controller	An electrical device used for converting Solar energy to DC voltage for charging batteries, also referred to as a Maximum Power Point Tracker or MPPT.
SoC	State of Charge. A measure in percentage showing how much energy is available in the battery
AC	Alternating current
DC	Direct Current
PV	Photovoltaic – Solar Panels
AC Source	AC input for an AC generation source (Grid or Generator).

3. Safety



When installing, commissioning, operating, and maintaining the XESS ONE, strictly adhere to the safety requirements outlined in this manual. Incorrect operation or handling can result in damage to the XESS ONE and other property or cause injury or death to the operator or third parties.

When securing the XESS ONE with screws or other components, use the appropriate tools and apply the torque specified in the manual or on the product label. Failure to do so may result in instability or damage to the XESS ONE.

Ensure you are familiar with the correct use of various tools beforehand to prevent injury during installation. Please read this manual thoroughly before installation to ensure the correct and safe installation and use of the XESS ONE.

3.1. Warnings and Cautions

- Installation and operation must be performed by a suitably qualified person.
- Installers and users must familiarize themselves with this manual.
- Be cautious when handling power cables and plugs, as they carry voltage from the battery.
- Ensure a fire extinguisher is readily available before installation and use.
- Do not install or operate if the XESS ONE has been dropped, damaged, or is wet.
- The XESS ONE should not be used for life support.
- The XESS ONE, as part of normal operation, could start at any time. When working on the system, ensure all circuits, PV, AC, and battery circuit breakers are in the off position and no voltage is present at any terminals.

3.2. Transportation

The XESS ONE should be shipped in the manufacturer's original packaging firmly fastened to a pallet and protected from water. No items should be stacked on top of the XESS ONE and should be shipped as a top load only.

3.3. Handling

- Ensure correct lifting techniques are used during installation.
- Installers should exercise caution during installation to prevent damage to the XESS ONE. If the XESS ONE is damaged before installation, such as case damage or terminal port damage, do not install or operate it and contact your place of purchase or XESS after-sales support.
- Avoid subjecting the XESS ONE to external forces, such as dropping it, dragging it on the ground, or placing heavy objects on it.
- Do not allow foreign objects or liquids to enter the XESS ONE.
- Do not unplug any cables while the XESS ONE is in operation.

3.4. Storage

- The XESS ONE can be stored vertically or horizontally.
- The XESS ONE should be stored in the manufacturer's original packaging.
- Do not store the XESS ONE in direct sunlight or high humidity and keep away from water.
- The XESS ONE should be stored in an area where the ambient temperature range is between 0 to 50°C.

4. XESS ONE Product Information



The XESS ONE is the latest in standalone solutions, bringing together the best-in-class plug-and-play technology that can be expanded over time as the load on site increases with built-in redundancy. The Modular approach to design allows ease of installation and operation and is packed full of reliability features that give the installer and user peace of mind.

- Standalone Off-grid Power System and On-Grid Uninterruptible Power Supply (UPS).
- Integrated modular design for expandability allowing the system to grow with your load.
- Plug-and-play technology for easy installation.
- Built-in system redundancy, the XESS ONE keeps powering on even if one battery inverter goes offline.
- Hot swappable inverter technology
- Low Meantime to install, repair & upgrade. Installation is as easy as 1,2,3.
- Black start capability with PV or generator. The system automatically recovers from an excessive battery discharge.
- Maximises generator efficiency & reduces maintenance. The generator can be sized to match the XESS ONE charge capabilities.
- Isolated output for load protection and UPS. Clean, consistent power is always supplied by the XESS ONE protecting from voltage, frequency fluctuations, and brownouts.
- Supports high inrush loads to effortlessly start inductive loads.
- Remote monitoring for fleet and user system management.

The XESS ONE comprises 3 major components for easy assembly and upgrade.



01

XESSONE-CHASIS:

Main system wiring chassis and enclosure that houses the conversion equipment, AC and DC connections, and all local and remote communications.



02

XESSONE-INVT:

Isolated output multimode inverter with 2.7kW AC input and battery charge, and 2.4kW AC load output.



03

XESSONE-CHARGE:

Maximum power point tracker with 8kW DC PV input, 600V DC, and 4kW DC battery charge.

4.1. Specifications

4.1.1. XESS ONE Packages



Parameter	Packages (General Specifications)			
Part Number	XESSONE-1P2	XESSONE-1P3	XESSONE-2P3	XESSONE-2P4
Weight	42.8 kg	47.1 kg	53.3 kg	57.6 kg
Dimensions (H x W x D)	1312.51 x 660 x 122 mm			
Enclosure Type	Type 1 / IP 53			
Mounting Method	Wall Mount Bracket			
Cooling Method	Active			
Ambient Operating Temperature Range	-20 to +50 °C			
Self-Consumption Idle	6 W	9 W	21 W	24 W
Allowable Relative Humidity	Max 95% (non-condensing)			
Max Altitude	2000M			
Number of Upgradable PV Inputs (spare slots)	1	1	0	0
Number of Upgradable AC Output/Inputs (spare slots)	2	1	1	0
Number of Assignable Relay Outputs	2	2	2	2
Communications	RS485, Modbus, CAN Bus, Wi-Fi, Bluetooth (Coming soon 4G)			
Relay Outputs	2 x Assignable volt free relay outputs, 60VDC and 500mA maximum			
Monitoring	Cloud Portal & Mobile App			
AC Coupled Solar (Coming Soon)	1:2 Power Ratio Communication Controlled (0.1% Increments) (Coming Soon) SMA, FIMER, Fronius (Via ModBus (Sunspec)) (Coming Soon)			
Configurations	Single Phase Three Phase (Coming Soon) Parallel Stacking (4 per phase) (Coming Soon)			
Standards / Certifications	Inverters: EN60950, EN62040-1, UL1778, IEC62109/1, IEC62109/2, EN300386V1.6.1, EN61000-1-2-3-4, GR3108 class 2 outdoor MPPTS: IEC62109-1:2010, EN6100.6.3:2012, EN61000.6.4:2012			
Serviceability	Field Serviceable with a low MTTR (Mean Time to Repair)			
PV Input Upgrade Part Number	XESSONE-CHRG			
AC Input/Output Upgrade Part Number	XESSONE-INV			
Warranty	Refer Warranty documents for more details. 3+2 years when installed with 3rd party batteries (conditions apply) 5+5 years when installed with XESS ION batteries (conditions apply)			
Parameter	MPPT DC Specifications			
Nominal Battery Voltage / Vdc Range	48 V / 40 - 60 VDC			
Max Charge Current	70 A	70 A	140 A	140 A
Maximum Charge Power	4032 W	4032 W	8064 W	8064 W
Max PV Input Power	Nominal Charge Power x 1.50			
Number of PV Inputs	1	1	2	2
Max PV Input Voltage (Voc)	600 V DC			
MPP PV Voltage Range (Vmp)	170 - 500 V DC			
Min PV Operating Voltage	100 V DC			
Max PV Input Current (Imp)	14 A Per PV Input			
Max PV Short Circuit Current (Isc)	28 A Per PV Input			
PV Startup voltage	60 VDC			
Overload Behavior	Power Limitation			
PV Reverse Polarity Protection (PV and Battery)	Yes			
Earth Leakage Current Detection	Yes			
MPPT Overvoltage Category	DC II			
MPPT Safety Protection Class	I			
MPPT Pollution Degree (Int & Ext)	II			
MPPT Max Conversion Efficiency	96.2%			
Parameter	Battery Inverter AC Output Specifications			
AC Output Voltage	230 V AC / Single Phase			
AC Output Frequency	50 Hz 0.03%			
AC Output Power	4800 W	7200 W	7200 W	9600 W
AC Output Continuous Current	23.6 A	35.4 A	35.4 A	47.2 A
AC Output Surge Current	200% for 2 seconds 125% for 15 Seconds			
Grid Forming	Yes			
Isolation from Input	Yes (online UPS double conversion compliant to VFI-SS-111), no voltage interruption, no generator pass-through			
Efficiency AC to AC, / DC to AC / AC to DC	>96% / >93.7% / >93.7%			
Parameter	Battery Inverter AC Input Specifications			
AC Input voltage	230 V AC (150 - 293 V AC)			
AC Input Frequency	50 Hz (47 - 53 Hz)			
AC Charge Current	23.6 A	35.4 A	35.4 A	47.2 A
Parameter	Battery Inverter DC Charge Specifications			
Nominal Voltage (range)	53.5 Vdc (44 - 60 Vdc)			
Maximum Charger Power	4800 W	7200 W	7200 W	9600 W
Maximum Current at 48Vdc	100 A	150 A	150 A	200 A

4.1.2. XESSONE-INVT Specification

Parameter	General Specifications
Part Number	XESSONE-INVRT
Cooling / Audible noise	Fan forced cooling / <65dB @ 1metre
MTBF	240,000 hrs (MIL-217-F) at 30°C ambient and 80% load
Operating T° / Relative Humidity (RH) non-condensing	Tested according to ETS300-019-2-2 Class 3.1 -20°C to 65°C, power derating from 40°C to 65°C / Max RH 95% for 96hrs per year
Altitude above sea without power derating	<1500 m / derating > 1500 m – 0.8 % per 100 m / max 4000 m
Safety	EN60950-EN62040-1-UL1778-IEC62109/1-IEC62109/2
EMC	EN300386V1.6.1 / EN61000-1-2-3-4
Environment	GR3108 class 2 for outdoor
Parameter	AC Input Specifications
Nominal voltage & current	230 Vac / 11.8 A, 240 Vac / 11.0 A and 277 Vac / 9.5 A
Charge power	2.7 kW
Voltage range	150 - 293 Vac (derating from 195 to 150 Vac)
Power factor / THD	> 0.99 / < 3%
Frequency (Synchronization range)	50 Hz (47 - 53 Hz) or 60 Hz (57 - 63 Hz)
Parameter	DC Input Specifications
Nominal voltage range	48 Vdc (32 - 63 Vdc), derating starts @44 Vdc
Nominal current	54.4 A
Reverse polarity protection	Yes
Parameter	AC Output Specifications
Efficiency AC to AC (EPC) / DC to AC / AC to DC	> 96% / > 93.7% / > 93.7%
Nominal voltage / Current	230V / 13.1 A
Frequency / frequency accuracy	50 or 60 Hz / 0.03%
Nominal Output power	3 kVA / 2.4 kW @ 230 Vac
Surge	200% for 2 seconds 125% for 15 Seconds
Power factor	Full power rating from 0 inductive to 0 capacitive
Total harmonic distortion	<3%
Load impact recovery time (10% - 90%)	≤ 0.4 ms
AC output voltage stability	±1% from 10% to 100% load
Grid forming	Yes
Isolation from Input	Yes (online double conversion), no voltage interruption, no AC input pass-through
Parameter	Battery Inverter DC Charge Specifications
Nominal Voltage (range)	53.5 Vdc (44 - 60 Vdc)
Maximum Charge Power	2700 W
Maximum Current at 48 Vdc	50 A

4.1.2.1. XESSONE-INVT Overview

The XESSONE-INVT's ECI technology has AC to DC, DC to AC, and DC to DC converters to provide constant and disturbance-free output power regardless of the input source.

The power flows either from AC or DC source under the control of the DSP controller. Thanks to the module's internal energy buffering, transferring the load between two input sources is achieved in 0ms, ECI can detect short circuit conditions at the AC output level and start the BOOST mode function. This mode will provide 8x of the nominal current to clear the fault within 20ms, thus keeping other critical loads in operation.

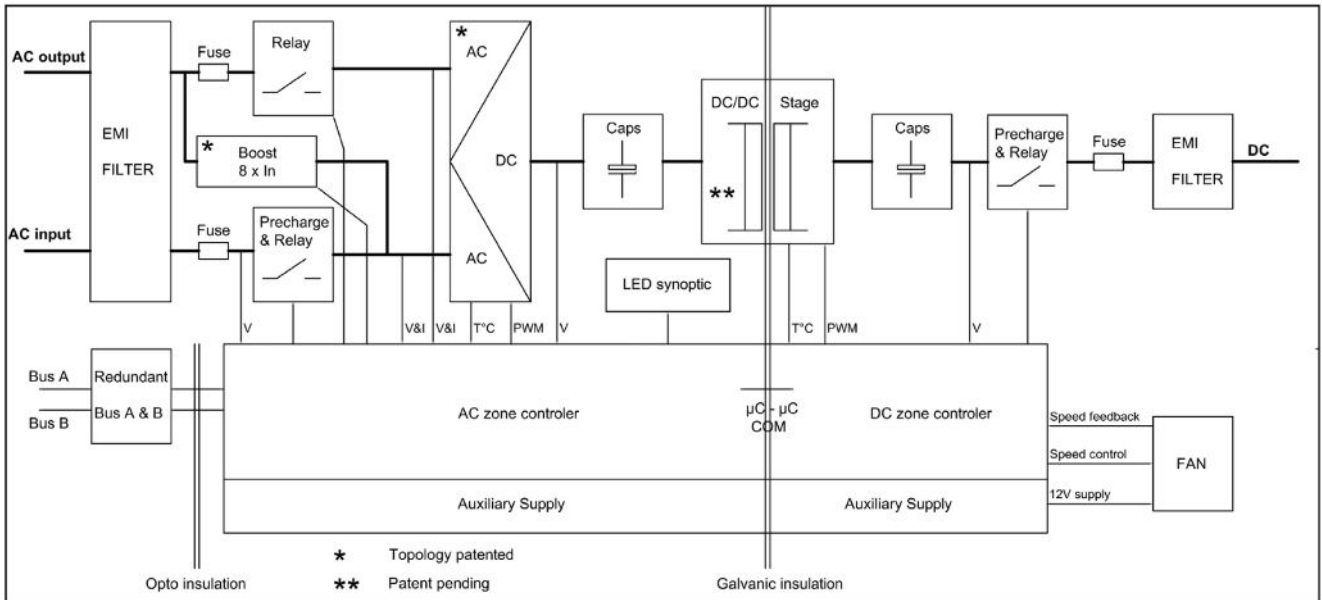
The XESSONE-INVT module works on True Redundant Structure (TRS) that features decentralized, independent logic, and redundant communication bus.



Each XESSONE-INVT module has three levels of protection, and it will help to isolate it from other modules in case of any fault in the corresponding module. Due to this functionality in each module, it provides no single point of failure in modular systems like the XESS ONE.

The XESSONE-INVT modular systems provide quality output power with higher efficiency.

The below diagram gives an explicit description of its topology.



4.1.2.2. XESSONE-INVT Operation Overview

The XESS ONE allows customization of the priority of the AC Source, battery energy, and solar PV, however when programmed accordingly, the AC Source is the primary source and the Battery DC source works as a backup. When an AC Source is present, the XESSONE-INVT module takes energy from the AC source and feeds to the AC Load via a double conversion to provide a pure sine wave.

The total output power of a module is shared between the AC load and charging the battery based on the requirement.

If the AC source is not present, the module seamlessly switches to battery energy to feed the AC loads without impacting the critical loads and resumes to enhanced power conversion mode once AC source returns. The transfer time between AC to DC and DC to AC is 0ms.



4.1.3. XESSONE-CHARGE Specification

Parameter	General Specifications
Part Number	XESSONE-CHARGE
Weight	6.2k kg
Dimensions (L*W*H)	432*192*78 mm
Enclosure Type	Indoor IP20
Mounting Method	2RU Rack
Input / Output Power Connectors	Backplane Connector
Standard / Certifications	IEC62109-1:2010, EN61000.6.3:2012, EN61000.6.4:2012
Parameter	Specifications
Nominal DC Voltage Range	48 V / 40 – 60 V DC
Max Charge Current	70 A
Nominal Charge Power	4032 W
Max PV Input Power	Nominal charge Power x 2.0 (200% oversize)
Max PV Input Voltage (VOC)	600 V DC
Max PV Input Current (IMP)	16 A
Max PV Short Circuit Current (ISC)	28 A
Startup Voltage	60 V DC
MPP Voltage Range	170 - 500 V DC
Overload Behavior	Power Limitation
PV Reverse Polarity Protection	Yes
Earth Leakage Current Protection	Yes
Overvoltage Category	DC II
Safety Protection Class	I
Pollution Degree (Int & Ext)	II
Max Conversion Efficiency	96.2%
Ambient Operating Temperature Range (Full Rating up to 80% Ambient ° C)	-20°C to +50°C
Storage Temperature	-30°C to +70°C
Self-Consumption @ Idle	3.5 W
Allowable Relative Humidity	4 – 95% (non-Condensing)
Cooling Method	Active (User Serviceable)
Display	Indication LED Strip
Required Cabinet Air Exchange Rate (Intake @ 40°C)	25 m3 /hour
Communications	RD485 / CAN Bus / USB

4.1.3.1. XESSONE-CHARGE Overview

The XESSONE-CHARGE maximum power point charge controllers provide an efficient and reliable charging process that not only maintains battery efficiency and longevity but also maximizes power generation by harnessing the full potential of your PV array. These controllers use an advanced form of Maximum Power Point Tracking (MPPT) technology to extract the maximum available power from your PV array, ensuring optimal battery charging and peak power generation.



Key Features and Benefits of XESSONE-CHARGE:

Advanced MPPT Technology: Utilizes a sophisticated Maximum Power Point Tracking algorithm that is highly robust, resistant to local extremes, and ensures power losses of less than 0.5% across the entire operating temperature range of a PV array.

High Input Voltage: Simplifies installation and allows for greater flexibility in system design.

On-Board Ground Fault Detection: Enhances system safety by detecting ground faults and protecting the system from potential hazards.

PV Array Oversizing Support (+100%): Allows for oversized PV arrays, ensuring maximum energy harvest even under varying conditions.

Superior Peak Power Efficiency: Delivers exceptional efficiency in power conversion, ensuring that the maximum amount of generated power is utilized.

Built-In Overload and Thermal Protection: Protects the system from overload and overheating, ensuring safe and reliable operation.

Reverse Polarity and Current Protection: Prevents damage due to incorrect wiring or current flow, enhancing system reliability.

Long-Term Reliability: Designed for durability and long-term performance, ensuring consistent and reliable operation over the system's lifespan.

Australian Made: Manufactured in Australia, ensuring high-quality standards and supporting local industry.

The XESSONE-CHARGE charge controllers are an ideal solution for optimizing the performance of your PV system, providing robust protection and efficiency enhancements that ensure your energy storage system operates peak performance.

5. Installation



The XESS ONE system is designed for quick and easy installation. However, it is crucial to understand all installation requirements to ensure the system is installed safely and operates correctly. This manual should be read in conjunction with local installation standards and guidelines applicable to your jurisdiction.

5.1. Grounding



DO NOT FUNCTIONALLY EARTH THE PV ARRAY if a negative earth is used for the batteries, load, or DC system.



The Chassis Ground (located inside the enclosure) is marked with the following symbol:



- If damaged or malfunctioning, the XESS ONE and associated components should only be disassembled and repaired by XESS Energy, or an approved service centre. Please contact XESS or your local authorized distributor for assistance.
- Incorrect reassembly risks malfunction, electric shock, or fire.

5.2. Preparation

While every effort has been made to pack the XESS ONE securely, damage during transit can still occur. Please inspect the packaging and the XESS ONE for any signs of damage. Report any damage or missing parts to your supplier or XESS Energy immediately. Retain the original packaging for the safest and most effective repackaging if necessary.

The XESS ONE should be installed by a suitably qualified person with the necessary training in electrical systems. Electrical systems can pose a safety risk and have the potential for electrocution if handled incorrectly. It is the responsibility of the installer to ensure that the installation is carried out following all relevant standards and guidelines required in the jurisdiction of installation. The installer must follow all instructions and considerations in this manual and ensure the XESS ONE is installed and operated according to the specified guidelines.

5.2.1. Location and Environment

- **Ventilation:** The XESS ONE requires ventilation for cooling and draws air through the side vents. Cool air is drawn from the right-hand side vents, and warm air is expelled through the left-hand side vents. When installed in enclosed areas, ensure these areas are free from obstructions and allow adequate ventilation. If the XESS ONE is installed in an area with restricted airflow, ensure that warm air can be expelled and cool air replenished.
- **Fixed Installation:** The XESS ONE can be installed in fixed applications.
- **Mobile Installations:** The XESS ONE should not be installed in mobile applications where high vibrations are common.
- **Excluded mobile installation include:**
 - Recreation vehicles.
 - Caravans.
 - Land-bearing vehicles.
- Some mobile applications are acceptable and can be considered for installations.
Included mobile applications include:
 - Tiny Homes.
 - Containerized power systems.
 - Houseboats.
 - Mobile site offices.
- **Gases:** The XESS ONE should not be installed in areas where there may be explosive gases. As an electrical device, the XESS ONE may cause arcing.
- **Installation Surface:** The XESS ONE should be installed on a fire-retardant surface. If you are unsure of the mounting surfaces required, please consult your industry standards or guidelines.
- **Water and Dust Ingress:** The XESS ONE is designed for outdoor installation and is rated to IP53, providing protection from water sprayed at an angle up to 60°. All efforts should be made to ensure the XESS ONE is:
 - Installed in an area where the potential for water ingress is avoided.
 - All external wiring connections made to the XESS ONE are sealed to the same or greater IP rating (failure to do so may void the warranty).
 - The XESS ONE has partial protection against dust and similar particles and should be installed in a dust-free environment whenever possible.
- **Sunlight:** The XESS ONE should be mounted in the shade, and under no circumstances should direct sunlight come in contact with the unit.
- **Temperature and Humidity:** The XESS ONE has an ambient operating temperature range of -20 to 50°C and should not exceed these figures.

It should be installed in a location that does not:

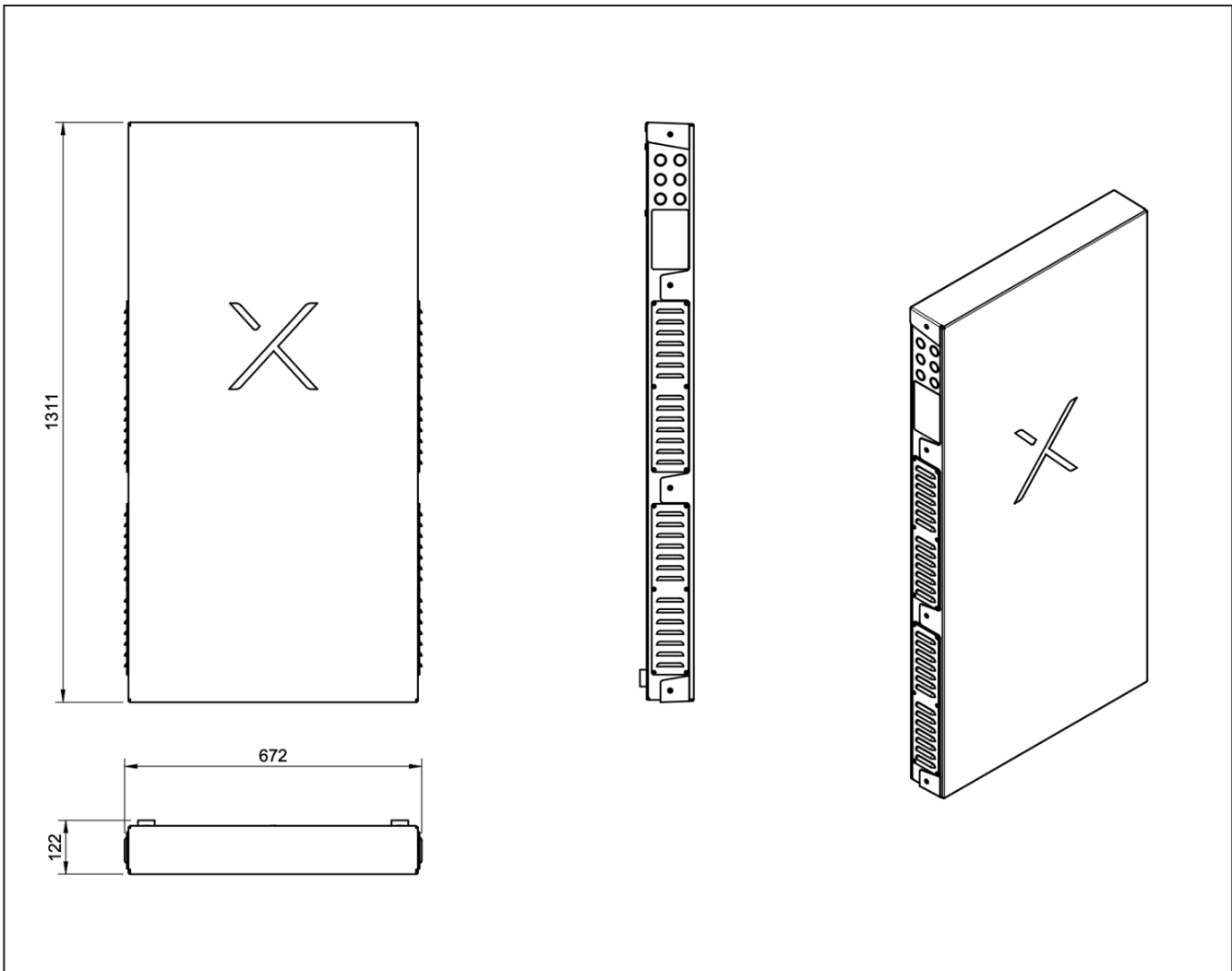
- o Allows the XESS ONE to exceed an operating temperature range of -20 to 50°C
- o The location does not exceed 95% humidity and is non-condensing.

In areas with high humidity or unregulated temperature, it is recommended to install climate and humidity control devices (e.g., a split system).

- **Pest Control:** The selected location must be free from possible infestations of insects, rodents, or nesting animals. If this is not possible, processes must be put in place to mitigate risks, or regular inspections should be implemented.
- **Altitude:** Altitude without de-rating is less than 1500m, if installed greater than 1500m, output de-rates at 0.8% every 100m. The XESS ONE should not be installed above 4000m.

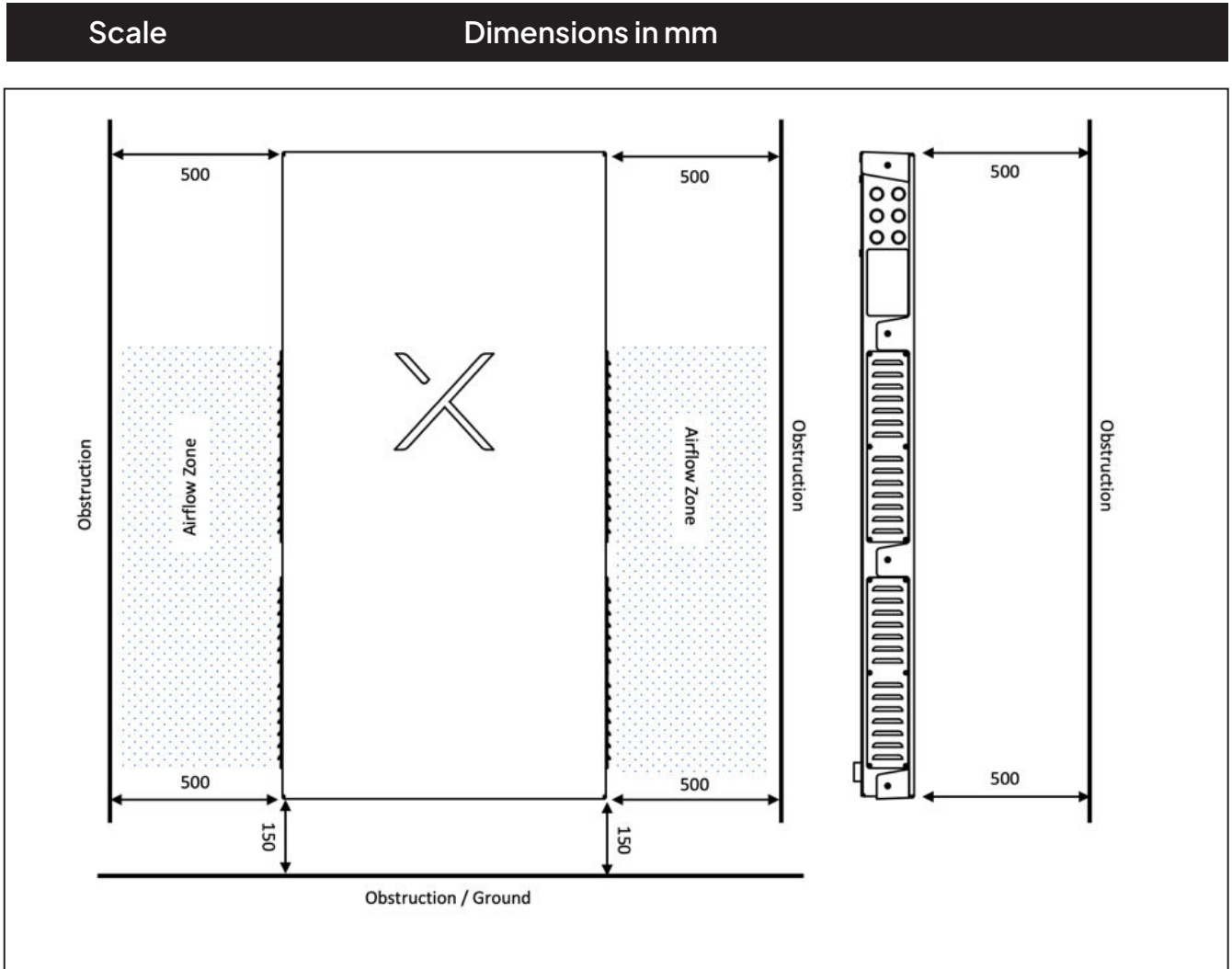
5.3. XESS ONE Dimension

Scale	Dimensions in mm
Depth x Width x Height	122 x 672 x 1311



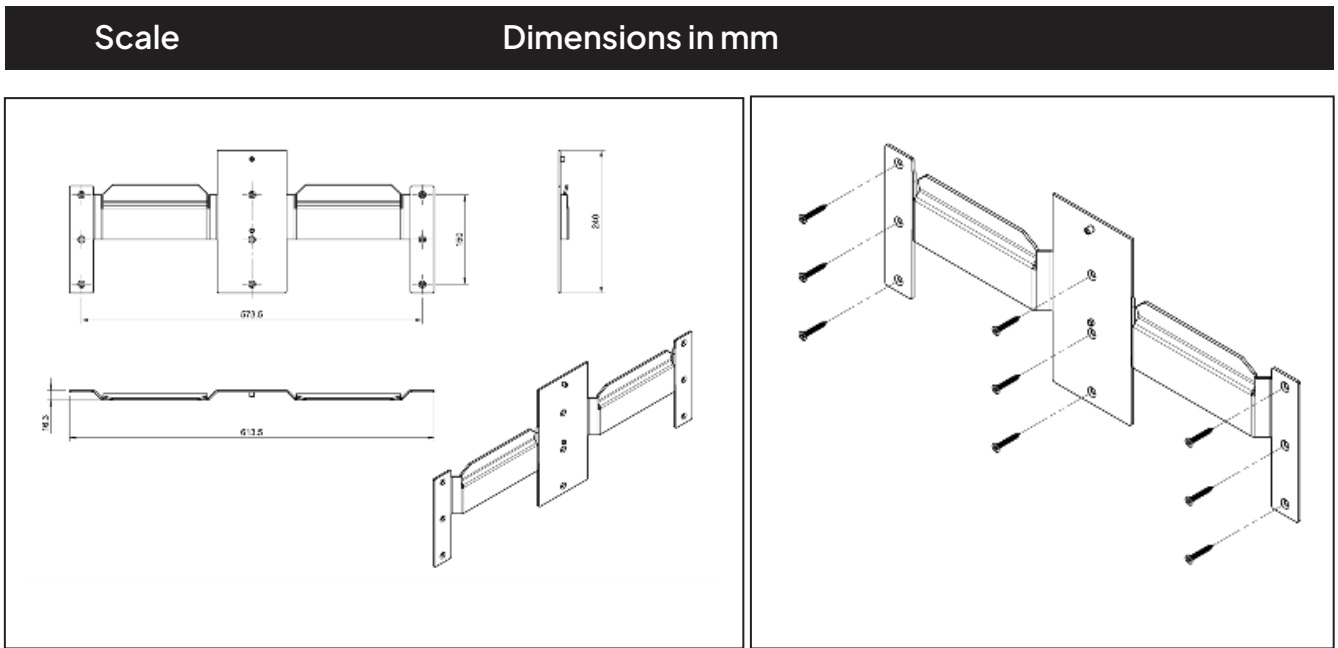
5.4. Clearances

It is important that clearances are adhered to, to ensure adequate airflow and cooling of the XESS ONE. Failure to do so may void your warranty.



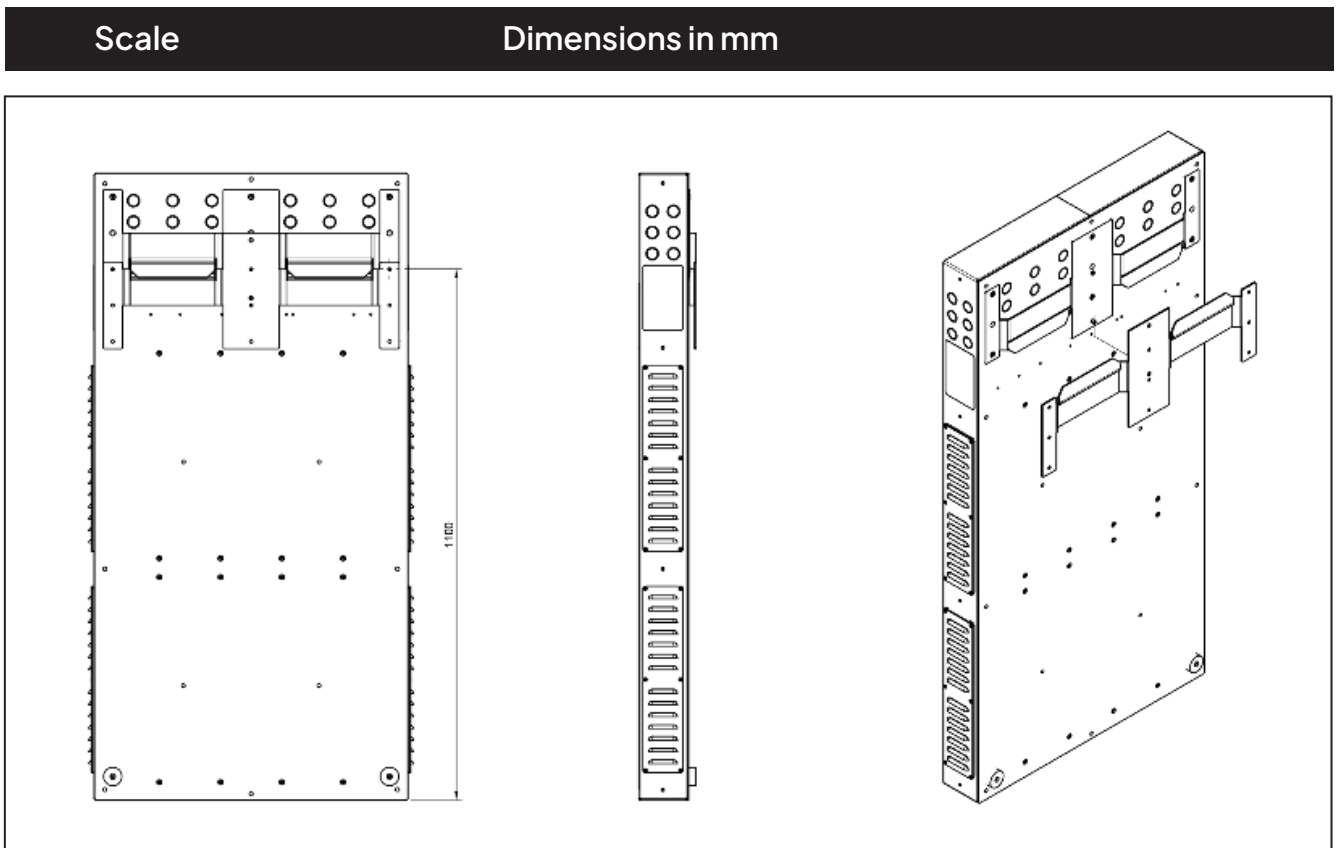
5.5. Mounting

5.5.1. Mounting Bracket Dimensions



5.5.2. Mounting the XESS ONE Bracket

The bracket should be mounted at a height that will allow the XESS ONE to be a minimum of 150mm from the ground or out of possible flood overlays or splashing water.

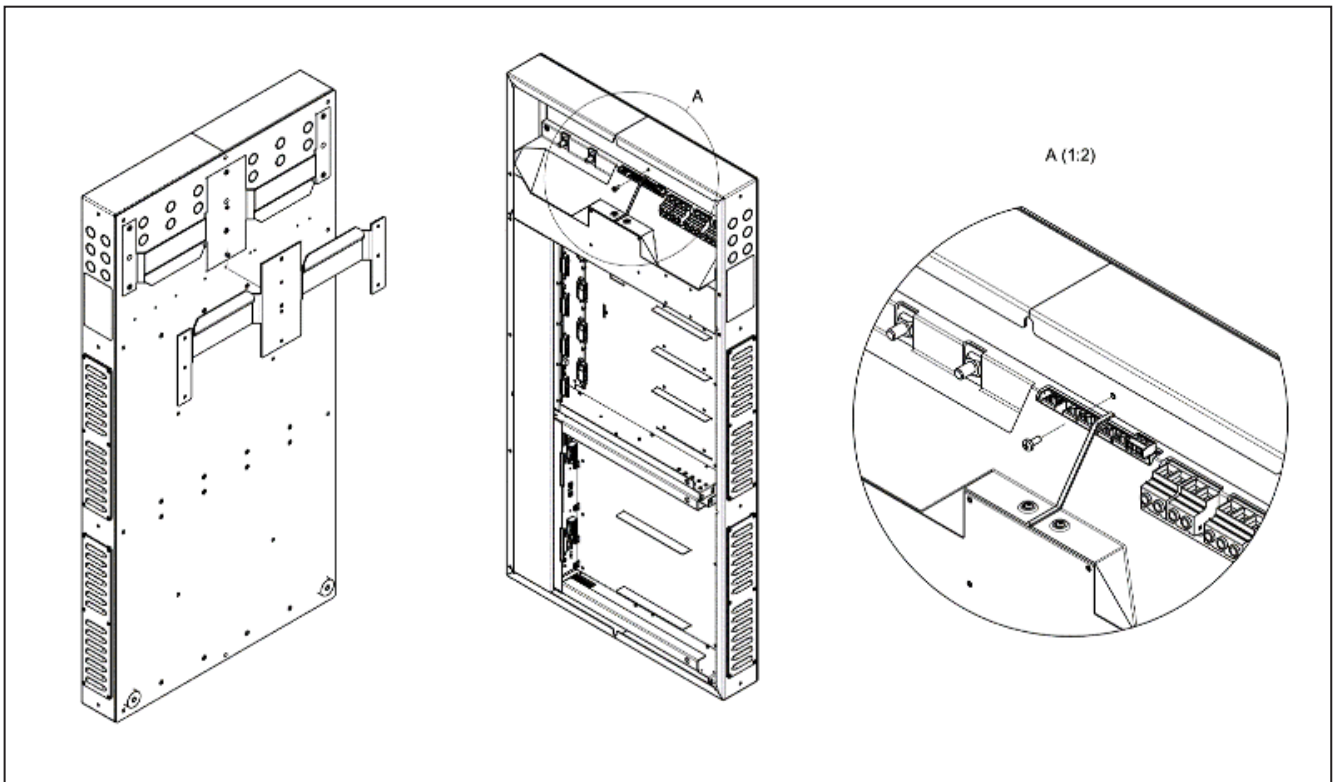
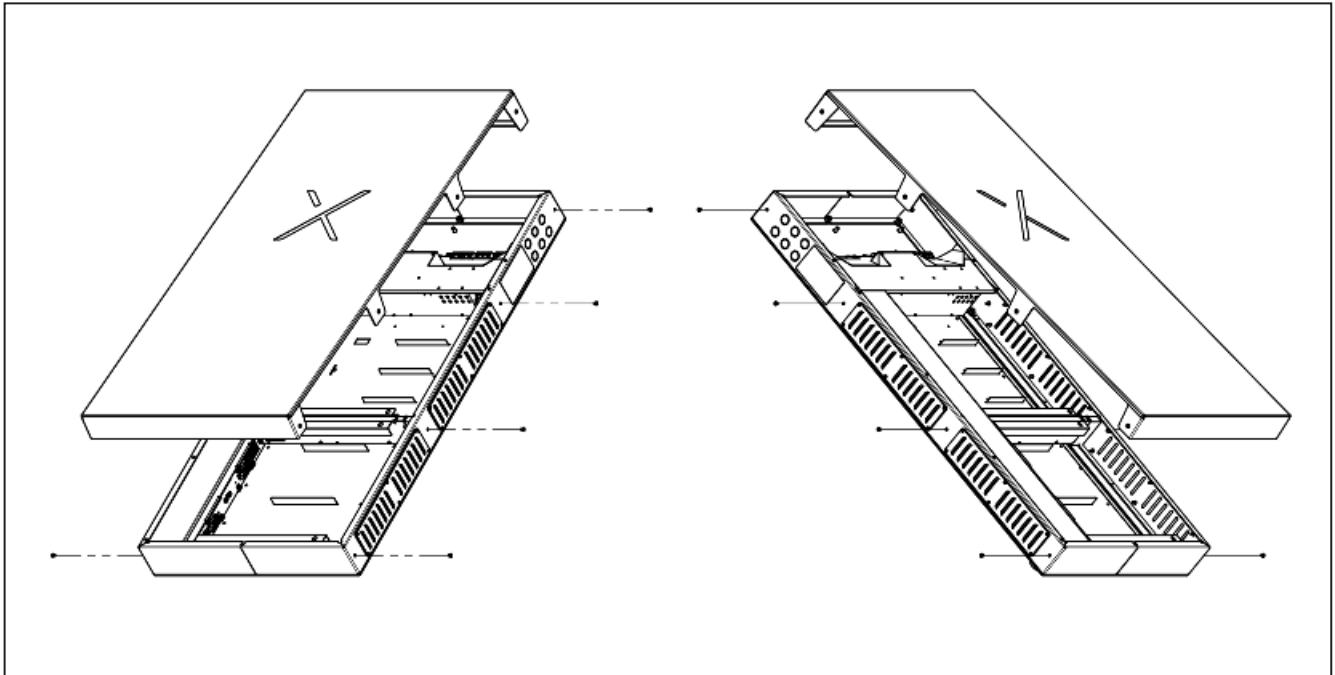


5.6. Mounting the XESS ONE Chassis

Lift the XESS ONE up on the wall bracket and remove the 8 screws (4 per side) to allow the front cover to be removed. Be careful not to damage the weather seals.

Carefully put the front cover to the side for re-installation later.

The XESS ONE, once mounted needs to be secured to the wall bracket with the locking screw.



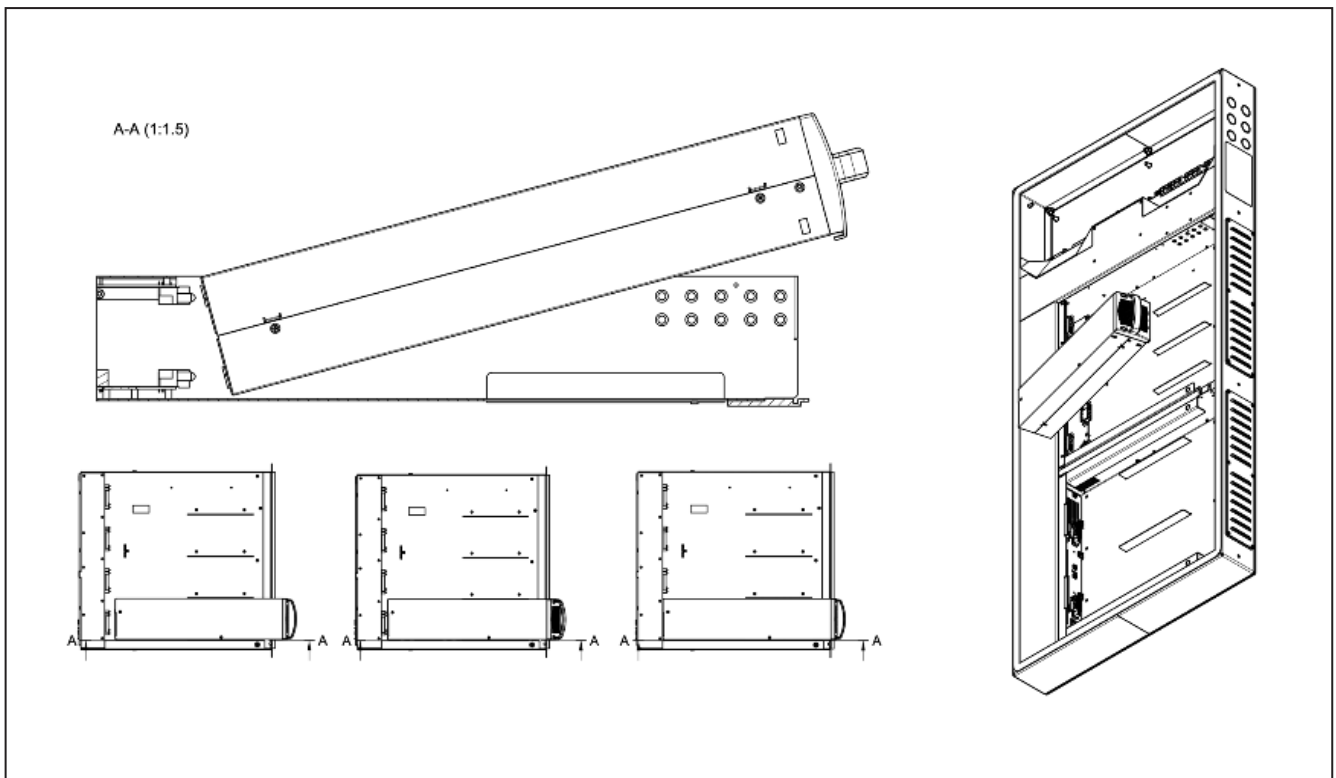
5.7. Inserting XESSONE-INVT

Inserting the XESSONE-INVT into the XESSONE-CHASSIS is straightforward.

Up to 4 XESSONE-INVT modules can be inserted into the XESSONE-CHASSIS.

Inserting into position:

1. When inserting the inverter modules, start from the bottom of the inverter section and insert the first inverter.
2. The rear connectors must line up and click into place.
3. Push firmly until the unit is properly connected.
4. When inserting the inverter modules, start from the bottom of the inverter section and insert the first inverter.
5. Continue inserting XESSONE-INVT modules in the section above the first, until the desired number of XESSONE-INVT modules are installed following steps 1 through 3.



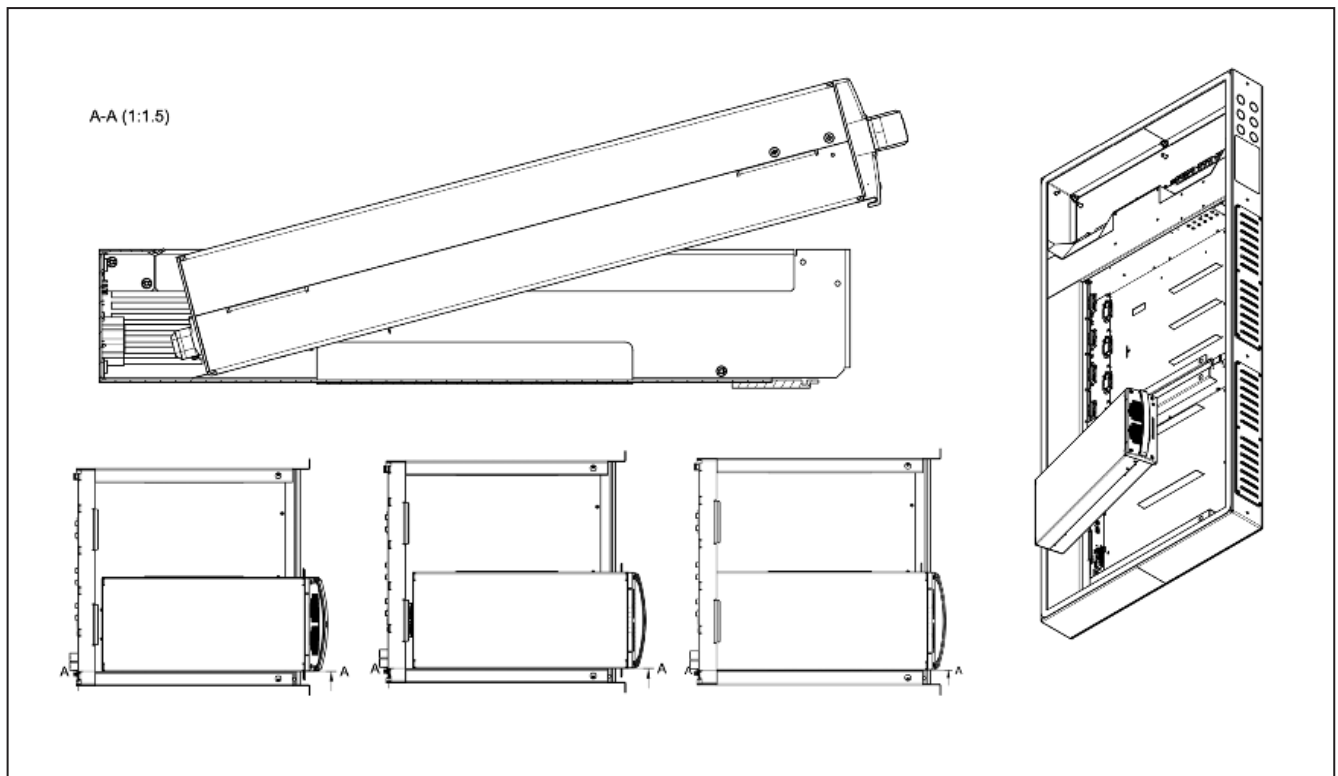
5.8. Inserting XESSONE-CHARGE

Inserting the XESSONE-CHARGE into the XESSONE-CHASSIS is straightforward.

Up to 4 XESSONE-CHARGE modules can be inserted into the XESSONE-CHASSIS.

When inserting into position:

1. When inserting the inverter modules, start from the bottom of the MPPT section and insert the first XESSONE-CHARGE.
2. It is important that the rear connector line up and click into place.
3. Push firmly until the unit is properly connected.
4. Continue inserting XESSONE-CHARGE modules in the MPPT section above the first, until the desired number of XESSONE-CHARGE modules are installed following steps 1 through 3.
5. ERL COOLMAX SRX Charge Controllers can be added to the system for adding additional PV. Please Refer applicable XESS Tech Note and AERL documentation for integration guide.



5.9. Wiring and Protection

- The XESS ONE is a UPS-style product with galvanic separation from the incoming AC Source and the AC Output. For system redundancy, it is recommended that a manual or automatic change-over switch is installed to allow connection of the loads to the AC Source during times of system servicing or system interruption.
- Cable sizing and fusing should be carefully considered and understood.
- This manual recommends cable and protection; however, local laws, guidelines, standards, and safety requirements should be followed.
- Any swarf from removing cable knockouts should be removed from inside the XESS ONE.
- When routing cables to the XESS ONE, IP53 or greater integrity of the XESS ONE must be upheld by using appropriate IP-rated cable glands.

HAZARD

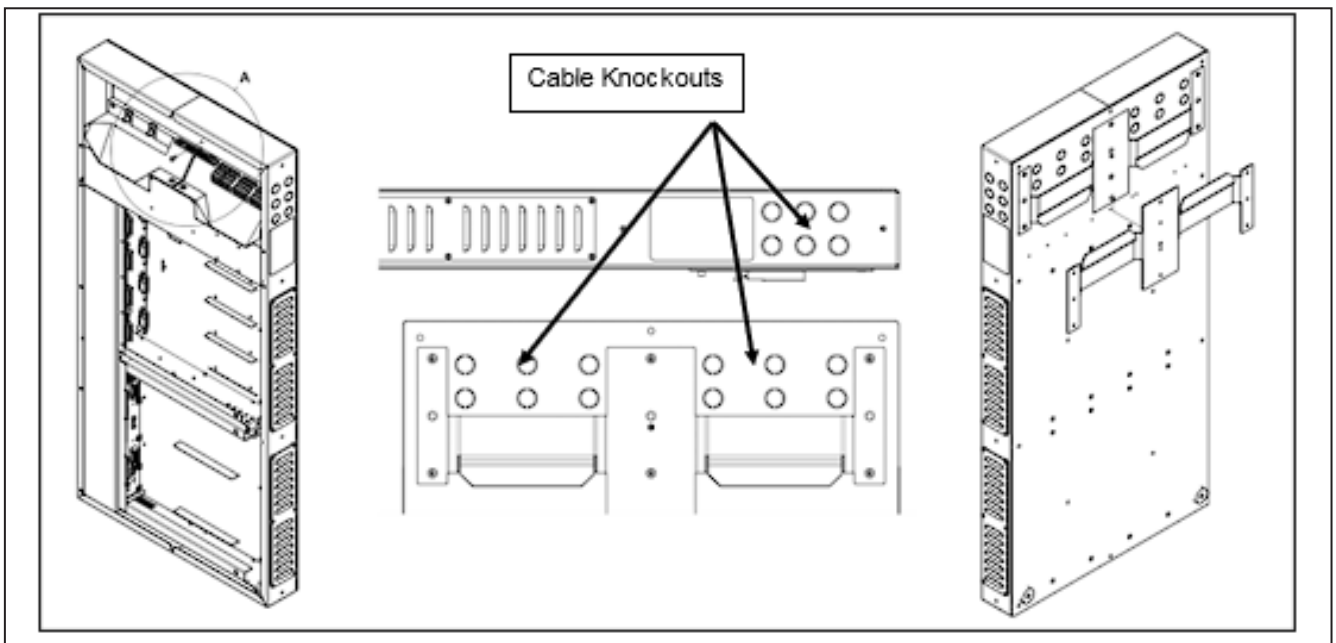
o AC and DC wiring is a hazard, and all precautions should be taken to ensure all electrical generation sources are turned off or isolated before installation. Under no circumstances should you work any part of the system installation when AC or DC voltage is present.

5.9.1. Cable Routing and Penetrations

The XESS ONE's main wiring area is conveniently located in the top section of the XESSONE-CHASSIS which houses all the AC, Battery, PV, local and remote Communication, and Relay connection points.

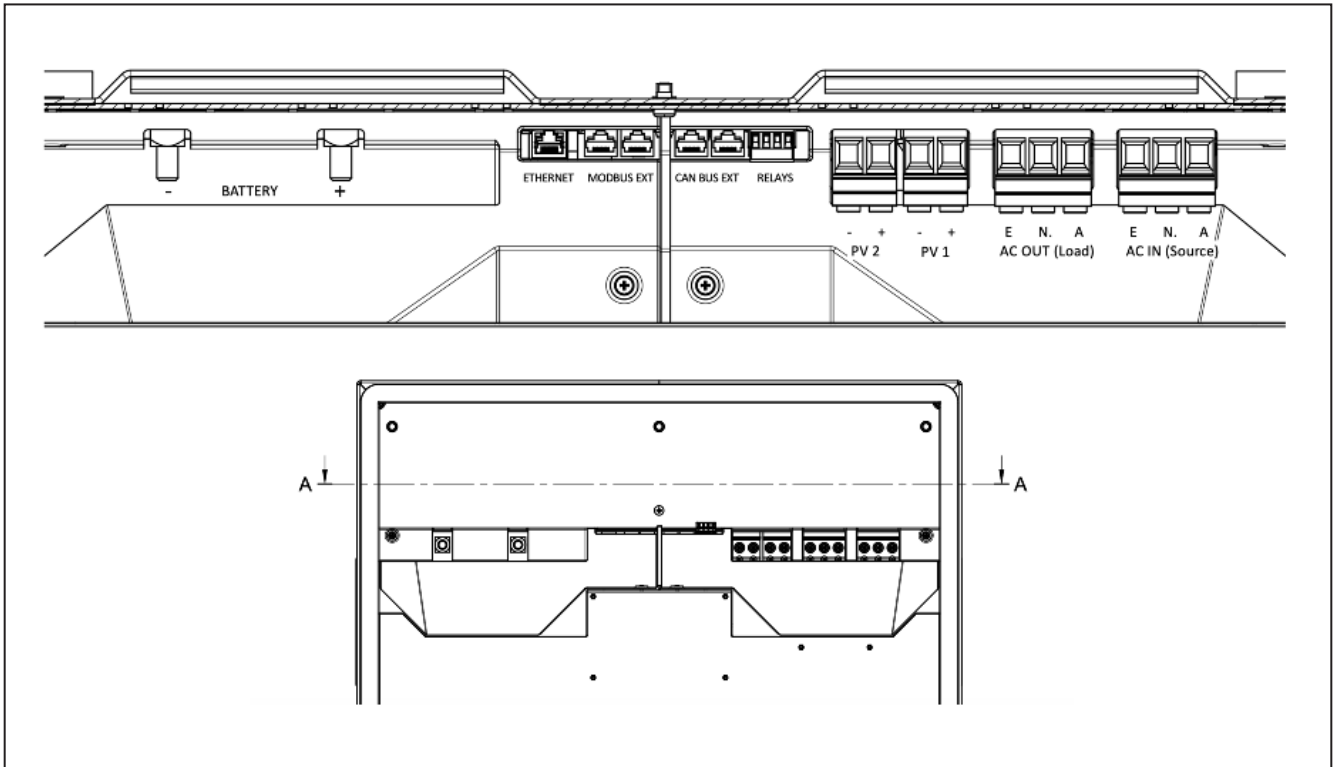
There are 3 main entry locations (top left side, top right side, and top rear entry) for cables to enter the XESS ONE. One or all three can be used, offering installation flexibility.

When routing cables to the XESS ONE, IP53 or greater integrity of the XESS ONE must be upheld by using appropriate IP-rated cable glands, any swarf from removing provided cable knockouts should be removed from the XESS ONE.



5.9.2. Cable Termination Points

The XESS ONE's main wiring area is conveniently located in the top section of the XESS ONE which houses all the AC, Battery, PV Communication, and Relay connection points.

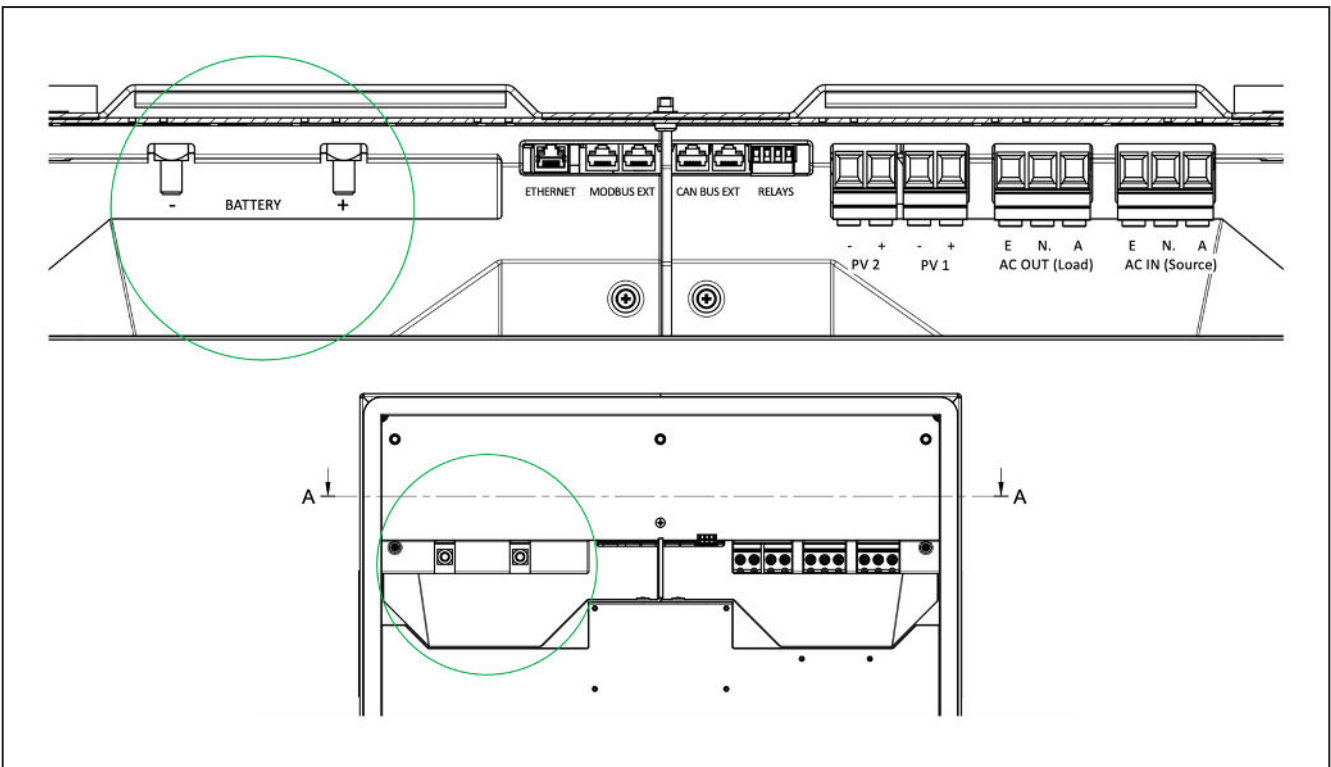


5.9.3. Battery DC Termination

The XESS ONE allows the connection of one centralized XESS ION battery bank.

Detail	Technical
Main DC Cable Size	50mm ²
Main DC Cable Length	<3m Recommended (<5m max)
Main DC Cable Termination Type	M10 Lug (SCxxx-10)
Main DC Cable Torque Setting	xxx Nm
Main DC MCCB / Fuse Size	200A

- Failure to follow the recommended cable size may reduce the performance and reliability of the operation of the XESS ONE.
- MCCB and or fuse KA rating should be rated to the maximum (or greater) short circuit current of the total Installed battery capacity.



5.9.4. PV Input Termination ❗

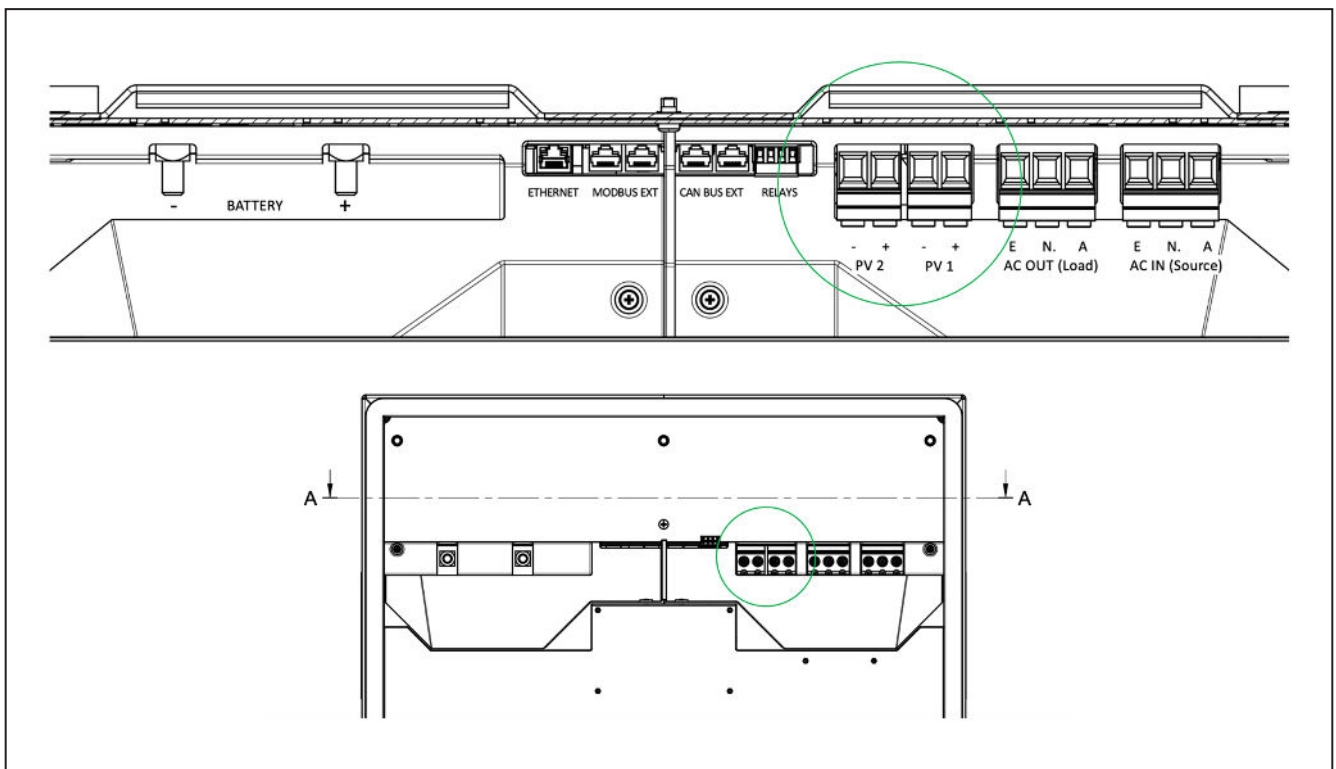
o Wire sizes must comply with local and national standards. Input conductors and circuit breakers must be rated at 1.56 times the short-circuit current of the PV array.

The XESS ONE can have up to two XESSONE-CHRG MPPT controllers installed and configured. Each MPPT has one PV input. Each Input should be protected between the array and the PV input terminals of the XESS ONE.

PV INPUT 1: Corresponds with the connection of the first MPPT inserted (bottom)

PV INPUT 2: Corresponds with the connection of the second MPPT inserted (top)

Detail	Technical
DC Circuit Breaker Size (Recommended)	125A
DC Circuit Breaker KA rating (Recommended)	1.56 x short circuit current of PV Array
Cable Terminal Size	xxxmm
Cable Strip Length	xxxmm
Cable Torque Setting	xxxmm



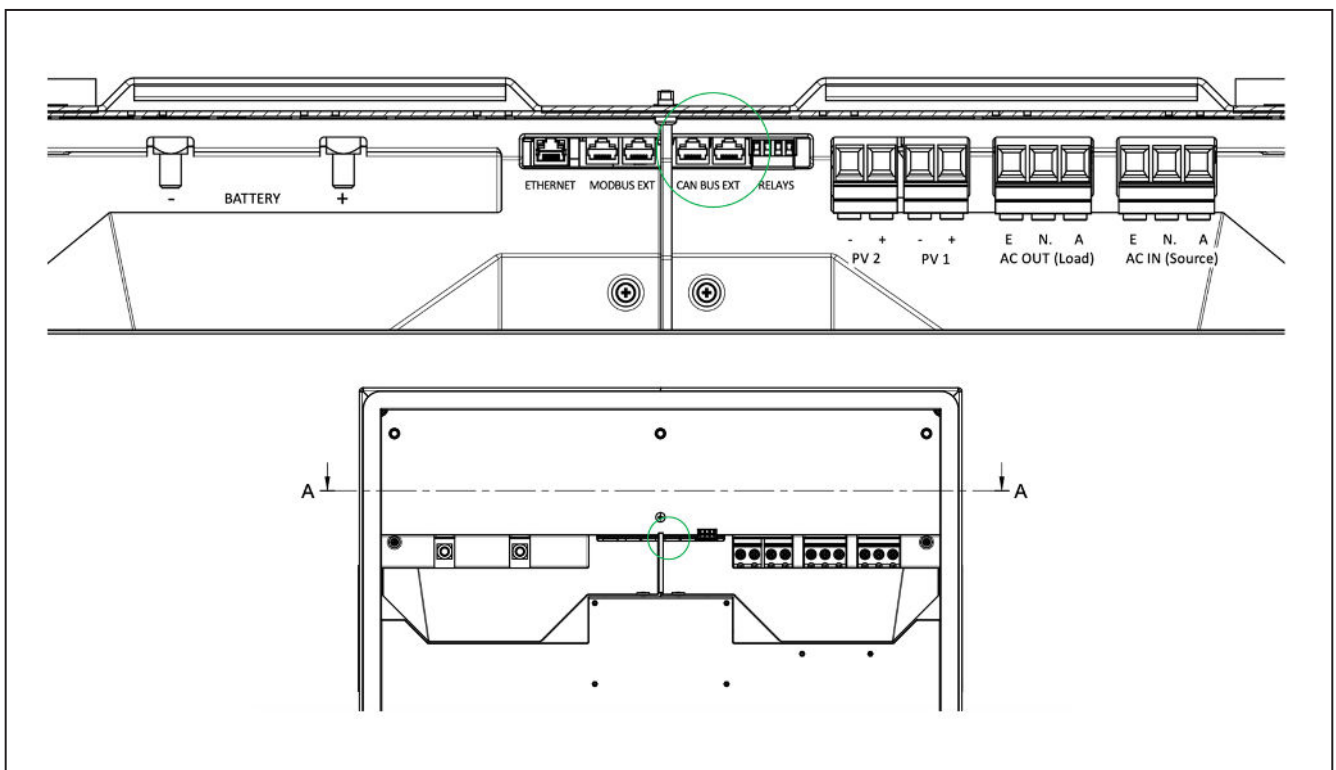
5.9.5. CAN bus Communication Termination

The XESS ONE features Controller Area Network (CAN bus) compatible protocols for control functionality.

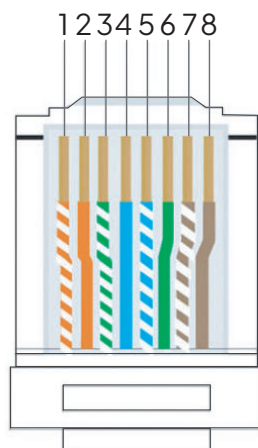
This connection is used for communicating and control between connected system devices. The XESS ONE via CAN bus can communicate with XESS ION batteries and AERL COOL MAX MPPT's

The XESS ONE has 2 x CAN Bus input. Either input can be used.

Detail	Technical
Communication Cable Type	Cat5 shielded cable
Communication Cable Terminal	RJ45



**XESS ONE CAN Bus
Commination Pin
Connection**



PIN No.	Definition
1	NC
2	NC
3	NC
4	CAN_H
5	CAN_L
6	CAN_GND
7	NC
8	NC

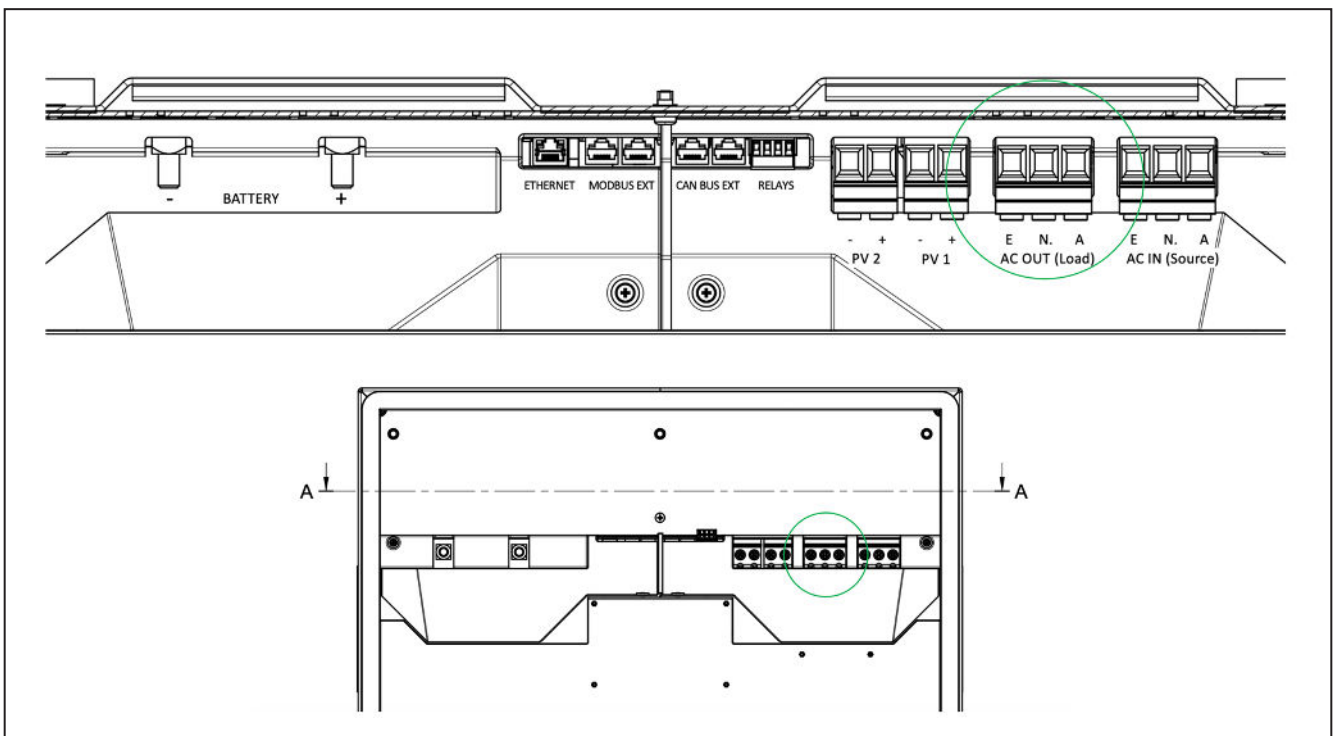
5.9.6. AC Output and Termination

- All protective Earth connections made within the XESS ONE must use the protective earth terminal.
- The XESS ONE must be connected to the installation Earth system.
- The XESS ONE is suitable for multiple Earth-neutral systems

Detail	Technical
AC Output Circuit breaker Rating (Maximum)	50A, 6kA, C Curve
Cable Terminal Size	xxxmm
Cable Strip Length	xxxmm
Minimum Earth cable size	6mm ²
Cable Torque Setting	xxxmm
Residual Current devices	Standard AC Type

The XESS ONE produces a low-distortion sinewave output and is suitable for use with standard-type AC Residual Current Devices (RCD's). Other **RCD** types can also be used.

A suitably rated RCD should be selected following your local wiring rules, guidelines, or standards



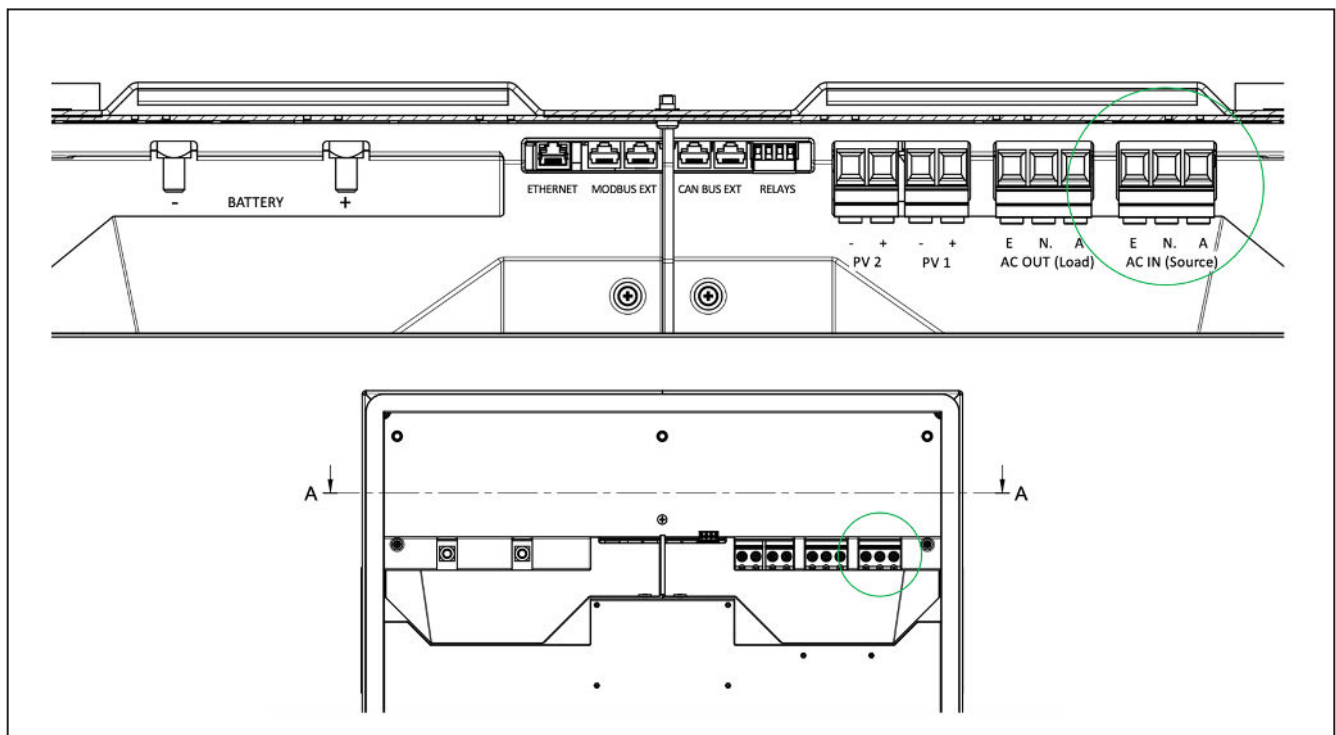
5.9.7. AC Input Termination

The XESS ONE can be connected to an incoming AC source to allow the charging of the connected XESS ION batteries.

- In a grid-connected (UPS) application the XESS ONE will be connected to a mains grid connection.
- In an off-grid application, the XESS ONE will be connected to a generator either manual or automatic start.
- The XESS ONE can remotely start an automatic start generator for a seamless automated system operation.

Refer **5.9.9 Relay Output Termination** for generator start outputs

Detail	Technical
Cable Terminal Size	xxxmm
Cable Strip Length	xxxmm
Minimum Earth cable size	6mm ²
Cable Torque Setting	xxxmm

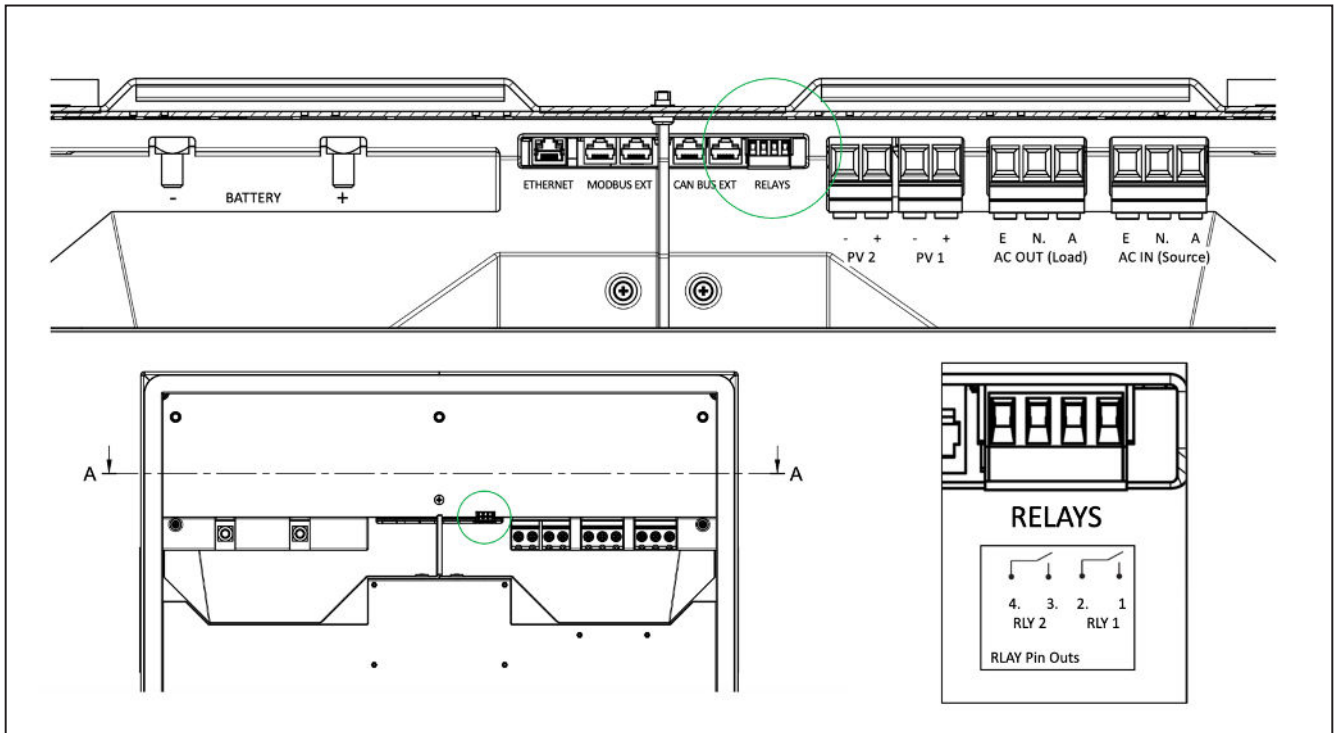


5.9.8. Relay Output Termination

The XESS ONE has two assignable voltage-free relay contacts rated to 60VDC and a maximum of 500mA. The Relay outputs can be used for a variety of functions to enhance your system functionality, maximize energy use and generation or start and stop generators.

Detail	Technical
Max Input Voltage	600 VDC
Max Input Current	500 mA
Cable Size	xxmm ²
Cable Terminal Size	xxxmm
Cable Strip Length	xxxmm
Cable Torque Setting	xxx Nm

Detail	Assign
Relay Output 1 (Normally Open)	xxxmm
Relay Output 2 (Normally Open)	xxxmm
Assignable Function	6mm ²



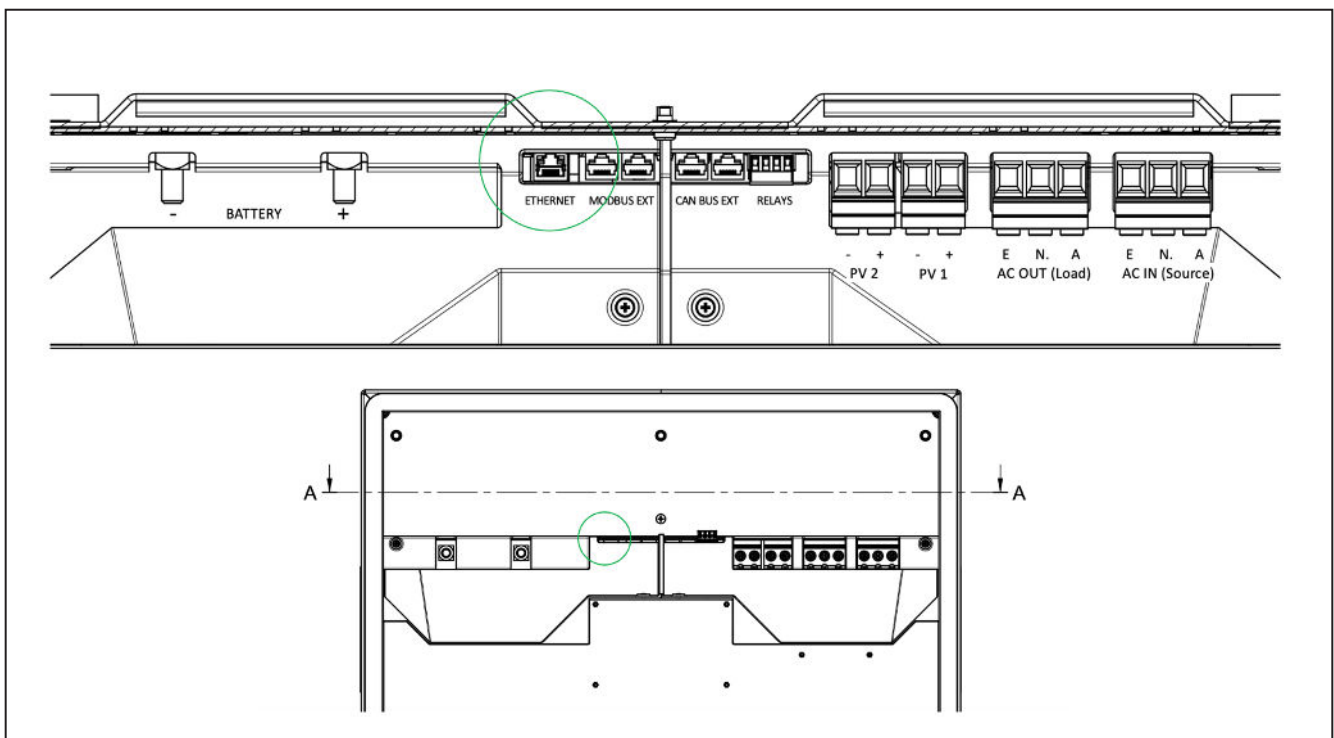
5.9.9. Monitoring Connection

The XESS ONE is equipped with three ways of connecting to the system for remote or local visualization of system performance and important system management data.

It is preferred that the XESS ONE is connected to the internet to allow installers and system professionals the ability to remotely support the consumer in times of need.

- Ethernet connection is the preferred and supported method of long-term connection to the XESS ONE for remote monitoring.
- Remote monitoring for installers is via the XESS MONITOR cloud portal and consumers via the XESS VIEW app.
- Wi-Fi is provided for installation where hardwiring may not be possible, however, XESS does not support the configuration of the local on-site modem.
- Bluetooth connection is provided for local connection for installation commissioning and configuration by system installers, integrators, and technicians and can also be used by consumers for local monitoring via the XESS VIEW app.

Detail	Technical
Ethernet (Recommended connection option)	Cat5 shielded cable
Ethernet Terminal	RJ45
Wi-Fi	Standard 100 BASE-T (2.4 GHz and 5.0 GHz)
Bluetooth	Range. Approx.30 metres line of site



5.9.10. Ground Fault Detection



- The XESSONE-CHARGE features onboard PV and Battery system ground fault detection, with all connected electrical poles checked for insulation degradation during the device's start-up routine.
- The XESSONE chassis must be connected to the same earth as the PV array for the ground fault detection to function.

5.10. Commissioning

Now that the XESS ONE has been installed, it is important to cross-check that the system has been installed correctly before the initial start-up.

Completing this step thoroughly ensures that the system has been installed correctly and allows cross-checking of other people's work.

The table below can be used as a great way to check the full system is installed, commissioned, and handed over to the client correctly.

Section	Check Item	Status	Comments
Pre-Commissioning	Documentation Review: o Verify all installation manuals and documentation are on-site.		
	Documentation Review: o Ensure all permits and approvals are in place.		
	Visual Inspection: o Inspect all components for physical damage or defects.		
	Visual Inspection: o Confirm all equipment is installed as per design specifications.		
Solar Panels	Mounting and Orientation: o Ensure panels are securely mounted and properly aligned.		
	Mounting and Orientation: o Check tilt angle and orientation for optimal sunlight exposure.		
	Connections: o Verify all solar panel connections are tight and corrosion-free.		
	Connections: o Ensure correct polarity in all DC connections.		

Section	Check Item	Status	Comments
	Wiring: o Confirm all wiring is properly rated and protected from physical damage.		
	Wiring: o Ensure conduit and cable management are correctly implemented.		
Batteries	Installation: o Ensure batteries are securely mounted in a well-ventilated area.		
	Installation: o Verify spacing between batteries for adequate cooling.		
	Safety: o Ensure battery terminals are covered and protected.		
	Safety: o Verify that appropriate safety labels and warnings are in place.		
Inverters	Mounting: o Confirm the inverter is securely mounted and adequately ventilated.		
	Mounting: o Check for appropriate environmental protection (e.g., weatherproofing if outdoors).		
	Connections: o Verify all AC and DC connections are tight and correctly installed.		
	Connections: o Ensure communication cables (if applicable) are properly connected and functional.		
Circuit Breakers & Fuses	DC Circuit Breakers and Fusing: o Check that all DC circuit breakers and fuses are correctly rated and installed.		
	DC Circuit Breakers and Fusing: o Verify proper operation of DC circuit breakers.		
	AC Circuit Breakers and Fusing: o Confirm all AC circuit breakers and fuses are correctly rated and installed.		
	AC Circuit Breakers and Fusing: o Test AC circuit breakers for correct operation.		

Section	Check Item	Status	Comments
System Tests -	Voltage and Polarity: o Measure and verify correct DC voltage from the solar panels and batteries.		
	Voltage and Polarity: o Check for correct polarity throughout the system.		
	Inverter Operation: o Power on the inverter and check for correct start-up sequence.		
	Inverter Operation: o Verify inverter output voltage and frequency.		
	Load Testing: o Connect and power up loads to ensure the system can handle the designed load.		
	Load Testing: o Monitor system performance and verify stability under load.		
	Safety Features: o Test all safety disconnects and emergency shutdown procedures.		
	Safety Features: o Verify the operation of any integrated alarm systems.		
Final Checks	Mounting: o Ensure all testing and commissioning records are completed and signed.		
	Mounting: o Provide a copy of the final installation and commissioning report to the customer.		
	Connections: o Conduct a walkthrough with the customer, explaining system operation and maintenance.		
	Connections: o Provide contact information for technical support and service.		
Sign-Off	Obtain signatures from the installer, system integrator, and customer confirming successful commissioning.		

5.9.11. XESS ONE Programming (XESS VIEW)

The XESS ONE has been developed as a plug-and-play product that allows easy and simple installation.

The final stage of commissioning is carried out using the XESS VIEW App via a smart device or phone and connected to the XESS ONE via Bluetooth. Please refer XESS VIEW Manual for full details or download the App and follow the prompts.

The XESS VIEW Application can be downloaded from the google play or Apple App stores.

6. System Operation



The XESS ONE and XESS ION battery storage systems are designed for effortless operation. This section specifically addresses the operation of the XESS ONE. Please ensure you read and understand the XESS ION manual as well as all other integrated product manuals. Your installation company should provide you with comprehensive instructions on how to operate and maintain your entire power system, including Startup and Shutdown.

6.1. System Startup

Ensure that you have read and understood the manuals of all components and devices installed in your battery storage power system.

6.1.2. Pre-system Startup Check

1. Ensure the system is installed correctly and that there is no sign of possible external hazards
2. Ensure the Main AC Input and Output Breakers of the XESS ONE are in the Off position
3. Ensure all AC Load breakers are in the Off position
4. Ensure all PV breakers are in the Off position
5. Ensure all Battery Breakers are in the Off position

6.1.3. Turning on the System

The XESS ONE will automatically produce an AC output voltage at its AC Output terminals when the battery or AC power is connected. Please ensure that the “Pre-system Startup Check” has been carried out, that all Breakers are in the OFF position, and that all incoming energy sources are turned OFF or isolated.

1. Turn ON batteries following the XESS ION start-up procedure.
2. Turn ON the main battery isolator if installed
3. XESS ONE will power up (you will hear the fans ramp up and a click for each inverter installed)
4. LED 1 will illuminate Green indicating battery power is applied
5. Close PV Breakers to allow battery charging
6. Turn ON AC Input/Output and Load breakers

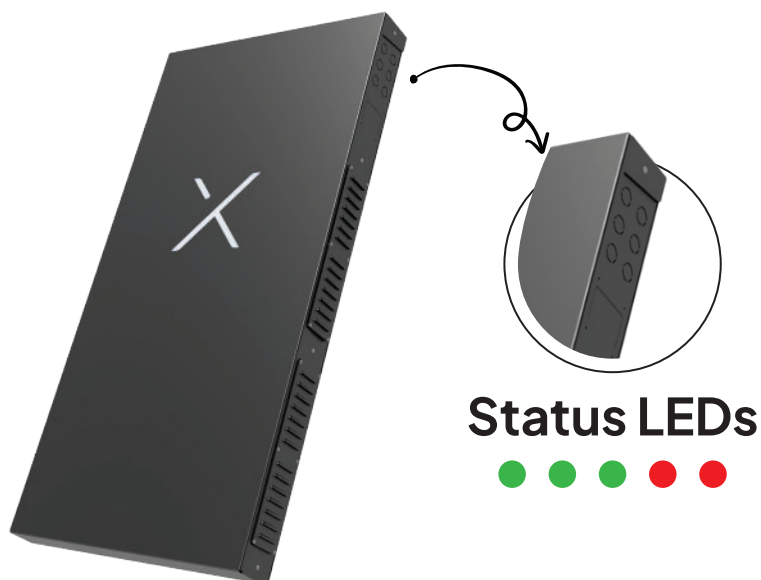
6.2. System Shutdown

1. Turn OFF all AC Load breakers, ensuring the load is isolated from the system
2. Turn OFF XESS ONE main AC Input and Output breakers
3. Turn off XESS ONE PV Input breakers
4. Turn off the Main battery isolator if installed
5. Turn off batteries following the XESS ION shutdown procedure

7. Fault Finding and Remote Monitoring

7.1. XESS ONE LED's

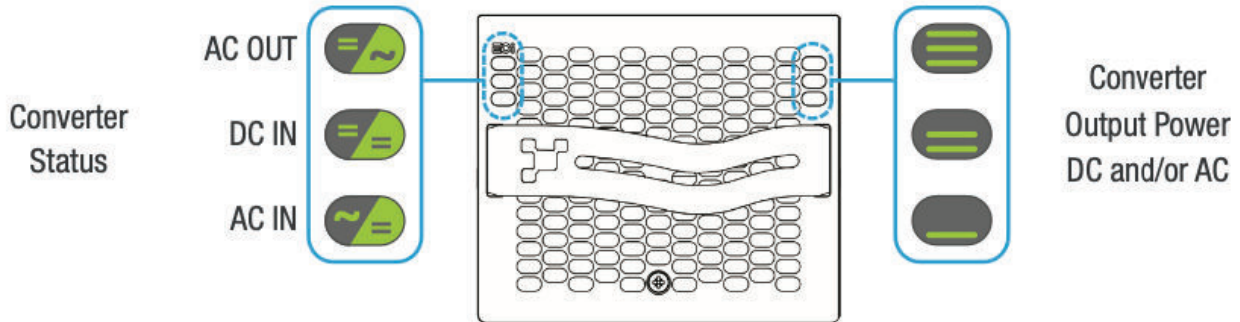
The XESS ONE has an external status LED display for a quick glance understanding of the system's operation. These LEDs are complimentary to XESS VIEW and XESS MONITOR where more detailed information can be sourced.



LED Colour	Description	Remedial action
● LED 1 Green	Battery power applied	None
● LED 2 Green	AC Load detected at load terminals	None
● LED 3 Green	Internet connection is Active	None
● LED 4 Red	System or XESS ONE fault	Check XESS Monitor
● LED 5 Red	Battery energy is low	Check XESS Monitor

7.2. XESSONE-INV T LED's

Each of the XESSONE-INV T modules has status LED to assist with understanding the operation of each device. These LEDs can be used as a quick glance during commissioning and fault finding to determine the operation or fault condition of each unit.



Converter Status LED	Description	Remedial action
OFF	No input power or forced stop	Check environment
Permanent green	Operation	
Blinking green	Converter OK but working conditions are not fulfilled to operate properly	
Blinking green/ orange alternatively	Recovery mode after boost (10 In short circuit condition)	
Permanent orange	Starting mode	
Blinking orange	Modules cannot start	Check Inview
Blinking red	Recoverable fault	
Permanent red	Non recoverable fault	Send module back for repair

7.3. XESSONE-CHRG E LED's

Each of the XESSONE-INV T modules has status LED to assist with understanding the operation of each device. These LEDs can be used as a quick glance during commissioning and fault finding to determine the operation or fault condition of each unit.

LED Colour	Description	Remedial action
Green	Things are OK	None
Blue	Start-up or sleeping	None
Orange	Charger Disabled or Setup Required	None
Red	Fault	Check XESS Monitor



7.3.1. XESSONE-CHARGE LED's Flash Rates and Fault Codes

The XESSONE-CHARGE is equipped with detailed LED flash rates to allow a more detailed understanding of the operation.

Warning Code	LED Code	Warning	Description	Recommended Action
-26	Flashing Yellow/Green	Device Not Configured	The initial setup process has not been completed and the device will not begin charging.	Configure
-1303	Solid Yellow/Green	Charger Disabled	The charger has been disabled via the Settings in XESS Monitor	Enable Charger Via XESS Monitor
-1153	Solid Blue	Low Input Voltage Detected (Sleep Mode)	The PV Voltage is below the minimum allowed PV Voltage or not adequate to charge the connected battery.	Confirm PV String Configuration is appropriate for the device and the sun is shining. Note - This code may be shown during sunrise and sunset conditions.
-1301	Flashing Yellow/Green	CAN Master Lost	The device has not received information from the Master within the allowed time-out window.	Confirm your RJ45 connection has not been interrupted and the Master device is still active.
-1160	Flashing Yellow/Green	Configuration Out of Range	Set Point configuration is outside limits and may be dangerous for detected nominal battery voltage.	Confirm the Charge Profile is appropriate for the battery being charged. Refer to the Battery Manufacturer's recommendations
-1 to 100	Solid Red	Generic Hardware Fault	A hardware fault has been detected.	Please contact your distributor to organize a warranty replacement.
-350	1 Flash - Red	No Output Detected	No output has been detected.	Power cycle the device and contact AERL if it reoccurs.
-1100	Solid Red	Internal Temperature Critical	The device's internal systems have reached a critical temperature and shutdown to prevent system damage	The device will automatically restart when it's safe to do so.
-1159	2 Flashes - Red	Low Output Voltage	Low output voltage has been detected.	Confirm the battery is connected to the controller.
-1154	3 Flashes - Red	High Output Voltage	High output voltage has been detected.	Battery may be being charged from a secondary source. Confirm all system battery charge parameters.

Warning Code	LED Code	Warning	Description	Recommended Action
-1157	4 Flashes - Red	High Output Current	High output current has been detected.	Confirm no short circuit is present on the output of the controller.
-1152	5 Flashes - Red	High PV Voltage	High PV Voltage has been detected. The device has shutdown to prevent system damage.	Confirm PV String Configuration is appropriate for the device.
-1156	6 Flashes - Red	High PV Current	High PV input current has been detected	Confirm PV String configuration is appropriate for the device
-1051 -1052	Solid Red	Active Cooling Degraded	Degraded active cooling capability has been detected.	Replace Fan Module
-1102	8 Flashes - Red	High Battery Temperature Detected	The battery temperature sensor has detected a high battery temperature. Operating the battery at a high temperature will greatly reduce its lifespan.	Consider increasing the battery temperature compensation factor with the AERL Link Software or reducing the ambient environment temperature.
-1103	9 Flashes - Red	Low Battery Temperature Detected	The battery temperature sensor has detected a low battery temperature. Operating the battery at a low temperature may greatly reduce its lifespan.	Consider a temperature-controlled battery environment if the battery regularly experiences low temperatures.
-1401 -1402 -1403	10 Flashes - Red	Earth Fault Detected	An Earth Fault has been detected.	Disconnect the device, confirm the fault with a Megger, and repair the system.

Thank you for choosing XESS.

Your decision to trust our product means a lot to us.

At XESS, our focus is on technical excellence. Our batteries are the result of rigorous engineering and precise craftsmanship, and we have invested heavily in ensuring that each battery delivers outstanding performance and reliability.

We recognize the importance of dependable power in standalone applications, and we are committed to providing you with top-tier products that get the job done.

If you have any questions or need support,
our team is always ready to assist.

Sincerely,

Craig, Peter & the XESS Team



2/75 Bluestone Circuit, Seventeen Mile Rocks, QLD
+611800 950 865 | sales@xess.energy

www.xess.energy