an EnerSys® company

External Maintenance

Bypass with Load Protection

Technical Guide: 9400025-J0

Effective: 12/2020

External Maintenance Bypass
Model: XMBS

NOTE:

Photographs contained in this manual are for illustrative purposes only. These photographs may not match your installation.

NOTE:

Operator is cautioned to review the drawings and illustrations contained in this manual before proceeding. If there are questions regarding the safe operation of this powering system, contact Alpha Technologies or your nearest Alpha® representative.

NOTE:

Alpha® shall not be held liable for any damage or injury involving its enclosures, power supplies, generators, batteries, or other hardware if used or operated in any manner or subject to any condition inconsistent with its intended purpose, or if installed or operated in an unapproved manner, or improperly maintained.

For technical support, contact Alpha Technologies:

Canada and USA: **1-888-462-7487**
International: **+1-604-436-5547**

Copyright

Table of Contents

1. Safety

SAVE THESE INSTRUCTIONS: This manual contains important safety instructions that must be followed during the installation, servicing, and maintenance of the product. Keep it in a safe place. Review the drawings and illustrations contained in this manual before proceeding. If there are any questions regarding the safe installation or operation of this product, contact Alpha Technologies or the nearest Alpha representative.

1.1 Safety Symbols

To reduce the risk of injury or death, and to ensure the continued safe operation of this product, the following symbols have been placed throughout this manual. Where these symbols appear, use extra care and attention.

The use of ATTENTION indicates specific regulatory/code requirements that may affect the placement of equipment and/or installation procedures.

NOTE:

A NOTE provides additional information to help complete a specific task or procedure. Notes are designated with a checkmark, the word NOTE, and a rule beneath which the information appears

CAUTION!

CAUTION indicates safety information intended to PREVENT DAMAGE to material or equipment. Cautions are designated with a yellow warning triangle, the word CAUTION, and a rule beneath which the information appears.

WARNING!

WARNING presents safety information to PREVENT INJURY OR DEATH to personnel. Warnings are indicated by a shock hazard icon, the word WARNING, and a rule beneath which the information appears.

HOT!

The use of HOT presents safety information to PREVENT BURNS to the technician or user.

1.2 General Warnings and Cautions

WARNING!

You must read and understand the following warnings before installing the enclosure and its component. Failure to do so could result in personal injury or death.

- Read and follow all instructions included in this manual.
- Only trained personnel are qualified to install or replace this equipment and its components.
- Use proper lifting techniques whenever handling equipment, parts, or batteries.

1.3 Electrical Safety

WARNING!

Hazardous voltages are present at the input of power systems. The DC output from rectifiers and batteries, though not dangerous in voltage, has a high short-circuit current capacity that may cause severe burns and electrical arcing.

Before working with any live battery or power system, follow these precautions:

a. Remove all metallic jewelry, such as watches, rings, metal rimmed glasses, or necklaces.
b. Wear safety glasses with side shields at all times during the installation.
c. Use OSHA approved insulated hand tools. Do not rest tools on top of batteries.

WARNING!

Lethal voltages are present within the power system. Always assume that an electrical connection or conductor is energized. Check the circuit with a voltmeter with respect to the grounded portion of the enclosure (both AC and DC) before performing any installation or removal procedure.

- Do not work alone under hazardous conditions.
- A licensed electrician is required to install permanently wired equipment. Input voltages can range up to 240 Vac. Ensure that the utility power is disconnected and locked out before performing any installation or removal procedure.
- Ensure that no liquids or wet clothes come into contact with internal components.
- Hazardous electrically live parts inside this unit are energized from the batteries even when the AC input power is disconnected.
- The enclosure which contains the DC or AC power system must remain locked at all times, except when authorized service personnel are present.
- Always assume electrical connections or conductors are live. Turn off all circuit breakers and double-check with a voltmeter before performing installation or maintenance.
- Place a warning label on the utility panel to warn emergency personnel that a reserve battery source is present which will power the loads in a power outage condition or if the AC disconnect breaker is turned off.
- At high ambient temperature conditions, the internal temperature can be hot so use caution when touching the equipment.

1.4 Battery Safety

- Never transport an enclosure with batteries installed. Batteries must ONLY be installed after the enclosure has been securely set in place at its permanent installation location. Transporting the unit with batteries installed may cause a short circuit, fire, explosion, and/or damage to the battery pack, enclosure and installed equipment.
- Servicing and connection of batteries must be performed by, or under the direct supervision of, personnel knowledgeable of batteries and the required safety precautions.
- Batteries contain or emit chemicals known to cause cancer and birth defects or other reproductive harm. Battery post terminals and related accessories contain lead and lead compounds. Wash your hands after handling batteries.

WARNING!

Follow battery manufacturer's safety recommendations when working around battery systems. Do not smoke or introduce an open flame when batteries (especially vented batteries) are charging. When charging, batteries vent hydrogen gas, which can explode.

- Batteries are hazardous to the environment and should be disposed at a recycling facility. Consult the battery manufacturer for recommended local authorized recyclers.

2. Introduction

2.1 Product Overview

The Alpha External Maintenance Bypass Switch with Advanced Load Protection (XMBS) is a 10 kAIC rated, make-before-break transfer switch with mechanisms to prevent dropped loads and unwanted transients. The XMBS checks for source voltage and phase and will only transfer if both are in phase — the operator only needs to move the handle to the desired source.

The XMBS can also act as a transfer switch, automatically connecting the critical load to the Utility Feed in case of inverter failure.

The XMBS offers the following two modes of operation:

Manual — allows user to manually select Utility or Inverter. This mode makes use of load protection and phase synchronization.

Auto — monitors the output and automatically switches to Utility source if a problem arises with Inverter source. Transfer takes approximately 1 second delay, momentarily disrupting power to the load.

The XMBS has a 2-step mechanical override that allows the user to override the load protection and phase synchronization mechanisms to release the switch.

The Alpha XMBS includes the following features:

- Auto transfer
- Load protection
- Synchronization
- Electromechanical manual override
- Lockout tool for maintenance
- Power metering
- CAN interface

Figure 1 — Front view of the XMBS - 100A (left), 250A (right)

3. Specifications

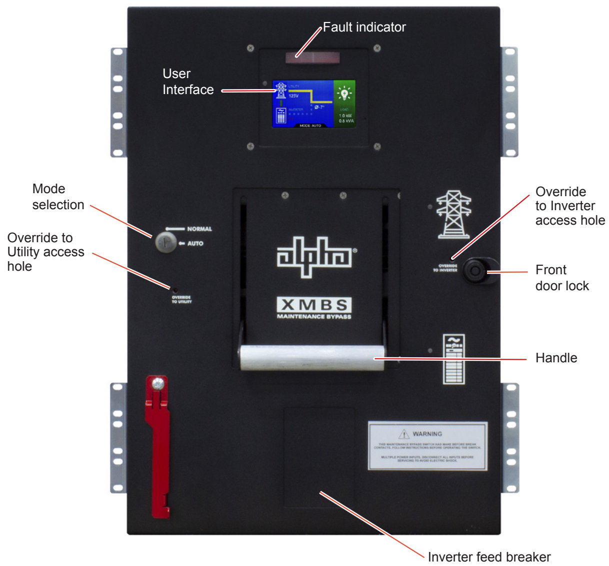
ELECTRICAL					
Model		**100A 2-Pole**	**100A 3-Pole**	**250A 2-Pole**	**250A 3-Pole**
System Input Voltage:		120 Single Phase (or) 120/208 VAC 2-Pole (or) 120/240 VAC Split-Phase	120/208 VAC 3-Phase	120/208 VAC 2-Pole (or) 120/240 VAC Split-Phase	120/208 VAC 3-Phase
Current Rating:		100A	100A	250A	250A
Short Circuit Current Rating:		10 kAIC			
Switches*:		L1 & L2	L1, L2 & L3	L1 & L2	L1, L2 & L3
Optional Inverter Feeder Breaker:**		100A 2-Pole	100A 3-Pole	250A 2-Pole	250A 3-Pole
Optional Redundant AC Bypass Feed:**		Available			
AUTO Transfer:		Selectable Auto Mode transfers from Inverter to Utility if Inverter Output fails			
MONITORING					
Electrical Interlock, Automated Sync request, Dry Contacts, Power Flow, Utility Voltage, Utility Current, Inverter Voltage, Output Current, and associated electrical parameters (Phase Angle, THD, Power) and CAN out interface to Cordex HP.***					
POWER METERING					
Voltage Accuracy:		±0.5%	±0.5%	±0.5%	±0.5%
Current Accuracy:		±2.5%	±2.5%	±2.5%	±2.5%
Power Accuracy:		±3%	±3%	±3%	±3%
MECHANICAL					
Dimensions:		**mm:** 622H x 441W x 193W (260W with Lever) **inches:** 24.5H x 17.37W x 7.60W (10.25W with Lever)		**mm:** 975H x 536W x 193W (260W with Lever) **inches:** 38.37H x 21.125W x 7.60W (10.25W with Lever)	
AC Feed:		Top		Top, Bottom, Rear or Side	
Wire Lug:	**Wire Capacity:**	2/0 - 14AWG	2/0 - 14AWG	350 kcmil – 6 AWG	350 kcmil – 6 AWG
	Connections per Lug:	1	1	2	2
Mounting:		Wall or 19" or 23" Rack		Wall or 23" Rack	
Aux Connections:		14-30AWG			
Weight:		31.75kg (70lbs)		59kg (130.1lbs)	
Temperature:		**Operating:** -25 to 50°C (-13 to 122°F) **Storage:** -40 to 75°C (-40 to 167°F)			
Relative Humidity:		Up to 95%, non-condensing			
Altitude:		**Operating:** Up to 3,858m (12,000ft) above sea level **Storage:** Up to 4,572m (15,000ft) above sea level			
Agency Compliance					
Safety:		UL/CUL 508A			

Selection Guide				
Model	**100A 2-Pole**	**100A 3-Pole**	**250A 2-Pole**	**250 3-Pole**
AMPS HP2 Medium 10K:	X			
AMPS HP2 Medium 20K:	X			
AMPS HP2 Medium 30K:		X		
AMPS HP2 Large 40K:			X	
AMPS HP2 Large 75K:				X

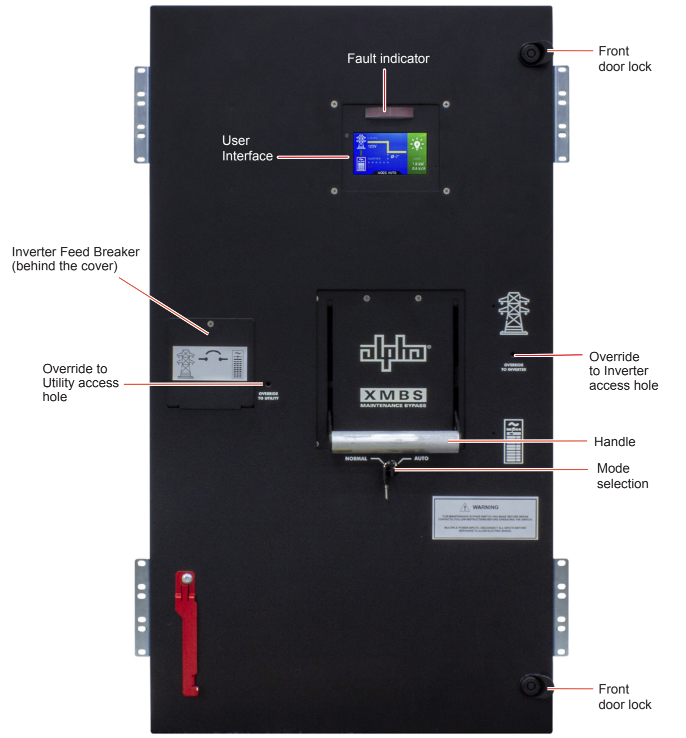
*Common Neutral
** Factory Installed Option Only
***For separate bypass and inverter feed version the inverter feed current is measured. For single feed version only the output current is measured).

4. Features

4.1 Front Panel



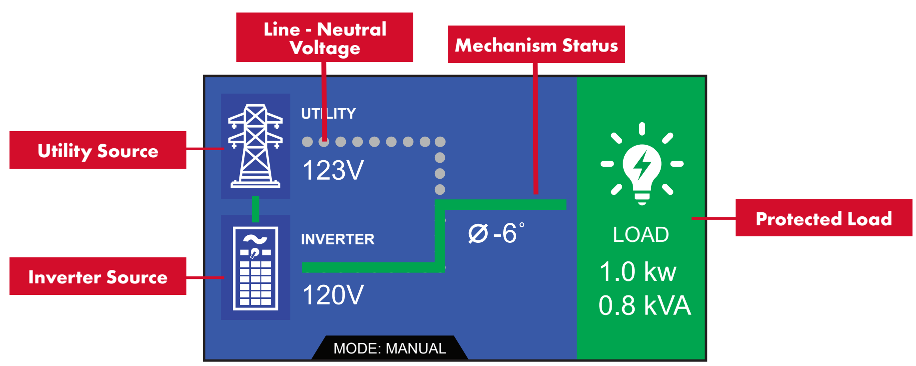
XMBS 100A



XMBS 250A

Graphical User Interface

Note: tap any labelled area of the screen for details about that element.



4.2 Auxiliary Contacts for Remote Monitoring and Control

The XMBS has two dry contact outputs for remote monitoring: fault, and bypass state. The fault signal is asserted if there is a problem with the XMBS internal mechanism (it does not indicate the status of input feeds or the output to the critical load). The bypass state is asserted whenever the switch is in Utility (bypass mode), specifically when the utility input is connected to the output.

Power Monitoring allows additional detailed information about the feeds and bypass through the CAN bus interface.

4.3 Load Protection

Load Protection ensures the AC source is valid before proceeding with transfer. The circuitry compares each line of the selected AC Source and prevents transfer if a load would be dropped on any phase. This feature allows the operator to select the desired source without the risk of a dropped load.

4.4 Phase Synchronization

The XMBS ensures there is no phase difference between the Utility and Inverter lines before switching sources.

The XMBS will perform a synchronized transfer without the operator having to perform time sequenced actions.

When an operator selects a new source, the XMBS will send a signal to the inverter system requesting it to synchronize the inverter phases to the utility phases. It then monitors the phases and automatically transfers when they are synchronized.

For third party inverters the operator initiates transfer on Bypass, and when the inverter is set to synchronizes, transfer will occur.

4.5 Auto Transfer

The automatic transfer feature works in Inverter mode to minimize downtime in the event that the inverter output fails. When enabled, the XMBS monitors the critical load voltage and if any phase becomes invalid, it switches to Utility source (Bypass Mode). The XMBS detection and transfer takes approximately 1 second delay, momentarily disrupting power to the load.

4.6 Manual Override

The XMBS includes a 2-step mechanical override which allows the operator to override load protection and synchronization mechanisms. The operator **takes responsibility** for ensuring conditions are suitable for transfer and it is expected only to be used during installation, or in the unlikely event that the controller malfunctions. Lockout tool can be used for manual override. Remove the access screw and use the tool to press the lever and retighten access screw. See figure Figure 2.

4.7 Lockout with Padlock

When servicing the XMBS or any components connected to its outputs, electrical lockout safety procedures must be followed. The inverter input breaker can be locked out using a standard lockout device, while a lockout bar is used to lock the switch itself. With the lockout bar installed both the external handle and the internal mechanism are disabled. Use a standard padlock with a 5/8" or smaller shackle. See figure Figure 3.

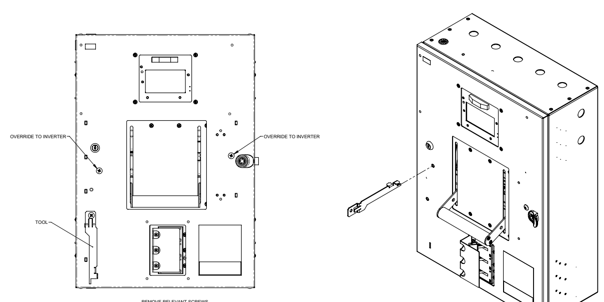


Figure 2 — Manual Override Steps

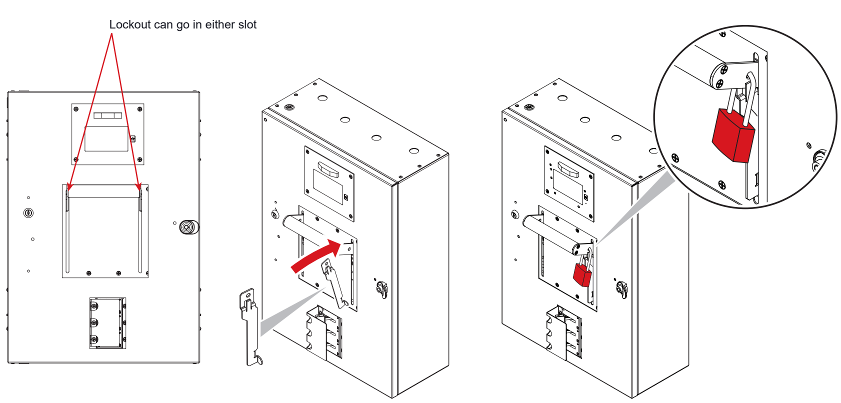


Figure 3 — XMBS Lockout Procedure

4.8 XMBS Feed Options

The Alpha XMBS is available with three feed options, each of which is targeted for a specific application. The naming convention for each feed option is based on the number of breakers and number of feeds.

1. **XMBS with Single Feed (Two Breaker Configuration)** uses two breakers in the XMBS to connect the two sources to the critical load, with only one on at a time with a make before breaker switching action.

   - Recommended for highest reliability if two upstream panel breakers are available.

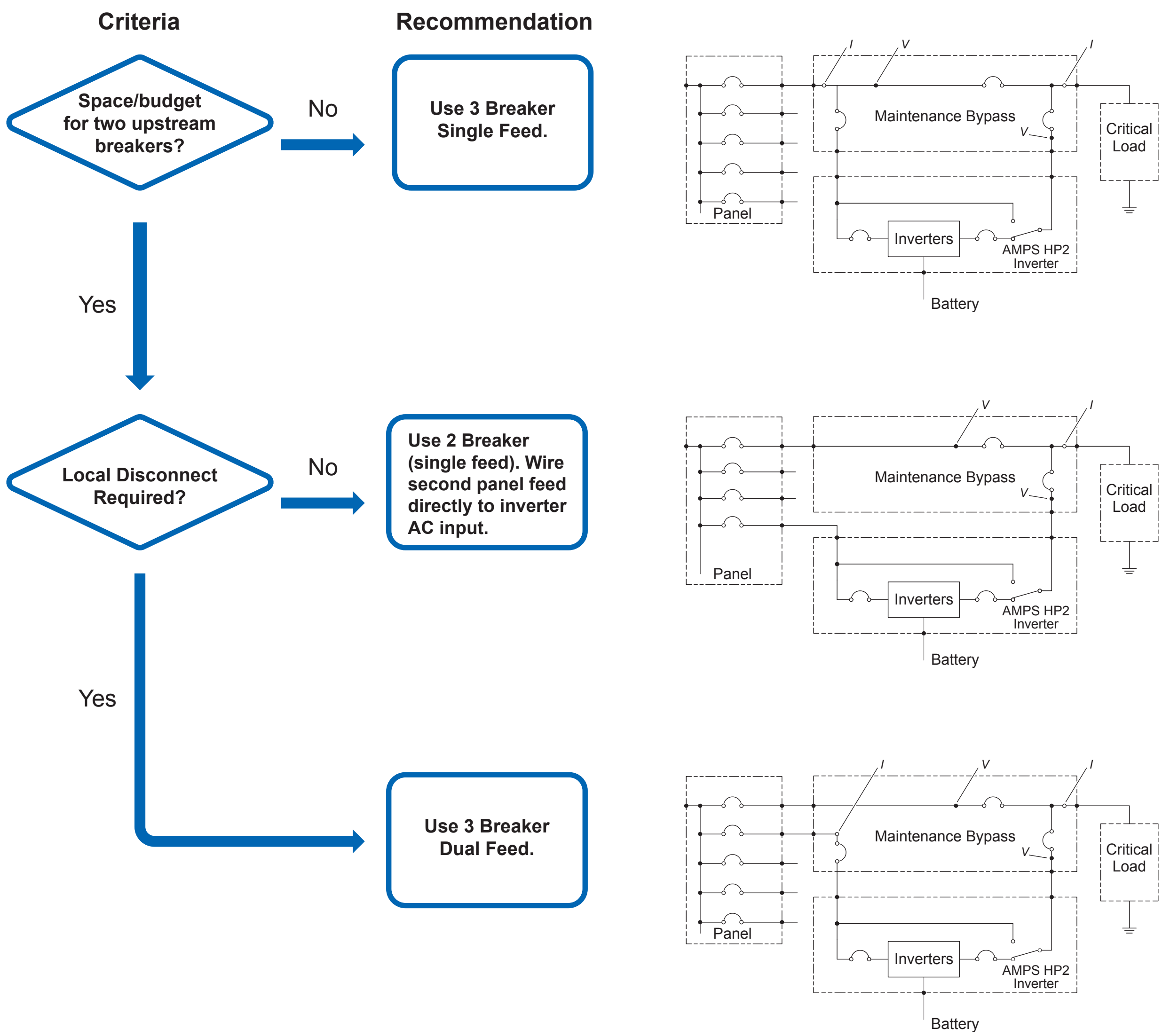
2. **XMBS with Single Feed and Inverter Feed Breaker (Three Breaker Configuration)** adds a third breaker to the XMBS, which is separate from the switching action and simply provides a disconnect for the AC input to the inverter system.

   - Recommended if only one upstream panel breaker is available; provides local disconnect for servicing inverter system.

3. **XMBS with Dual Feed and Inverter Feed Breaker (Three Breaker Configuration)** adds a third breaker to the XMBS, using redundant feeds from either the upstream AC panel or the same AC input as the XMBS (becomes option #2).

   - Recommended if two upstream panel breakers are available and a local disconnect is required for the inverter input.

Use the following decision flowchart to select the ideal configuration or contact Alpha for specific advice for your application.



V and ***I*** indicate voltage and current measurement locations if the Power Metering option is included.

5. Inspection

5.1 Packing Materials

Alpha is committed to providing products and services that meet our customers' needs and expectations in a sustainable manner, while complying with all relevant regulatory requirements. As such Alpha strives to follow our quality and environmental objectives from product supply and development through to the packaging for our products.

Rectifiers and batteries are shipped on individual pallets and are packaged according to the manufacturer's guidelines.

Almost all of Alpha's packaging material is from sustainable resources and/or is recyclable. See the following table for the material and its environmental codes.

5.1.1 Returns for Service

20 PAP/PCB	01 PET	04 PE-LD	06 PS	40 FE	41 ALU	50 NW
Cardboard	**Polyethylene Terephthalate**	**Low Density Polyethylene**	**Polystyrene**	**Steel**	**Aluminum**	**Wood**
Packing boxes Caps	Flexible film Packaging	Bubble wrap Shrink wrap Plastic bags	Foam	Strapping on pallets	Strapping on pallets	Pallets Lumber

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is unavailable, make sure that the product is packed with at least three inches of shock-absorbing material to prevent shipping damage.

Alpha Technologies is not responsible for damage caused by improper packaging of returned products.

5.2 Check for Damage

Before unpacking the product, note any damage to the shipping container. Unpack the product and inspect the exterior for damage. If any damage is observed, contact the carrier immediately.

Continue the inspection for any internal damage. In the unlikely event of internal damage, inform the carrier and contact Alpha Technologies for advice on the impact of any damage.

5.3 General Receipt of Shipment

The inventory included with your shipment depends on the options you have ordered. The options are clearly marked on the shipping container labels and bill of materials.

Call Alpha Technologies if you have any questions before you proceed: 1 888 462-7487.

6. Installation

Only qualified personnel should install and connect the power components within the Alpha power system. Please refer to customer connection drawing and schematic at the end of the manual.

6.1 Safety Precautions

Refer to the Safety section near the front of this manual.

6.2 Tools Required

Various insulated tools are essential for the installation. Use this list as a guide:

- Electric drill with hammer action, 1/2" capacity.
- Various crimping tools and dies to match lugs used in installation.
- Load bank of sufficient capacity to load largest rectifier to its current limit.
- Digital voltmeter equipped with test leads.
- Cable cutters.
- Cutters and wire strippers (#14 to #22 AWG) [2.5 to 0.34 mm^2].
- Torque wrench: 1/4" drive, 0 - 150 in-lb.
- Torque wrench: 3/8" drive, 0 - 100 ft-lb.
- Insulating canvases as required (2' x 2', 1' x 1', 3' x 3', etc.).
- Various insulated hand tools including:
    - Combination wrenches.
    - Ratchet and socket set.

6.3 XMBS Assembly and Mounting

Consult local electrical codes to determine a suitable location for mounting the XMBS. XMBS can be installed on a wall or rack (19/23” for 100A and 23” for 250A).

6.3.1 Wall Mount

Use the dimensions in the drawings to wall mount the XMBS with adequate clearance from the adjoining wall. Based on conduit size, use a hole punch tool such as a GREENLEE® tool for wiring the UPS IN, UPS source and the critical load.

GREENLEE is the registered trademark of Greenlee Tools, Inc.

CAUTION!

Make sure that the internal mechanism is covered before using punch tool and enclosure is free from all metal debris BEFORE wiring.

XMBS with Input Breaker - 250A

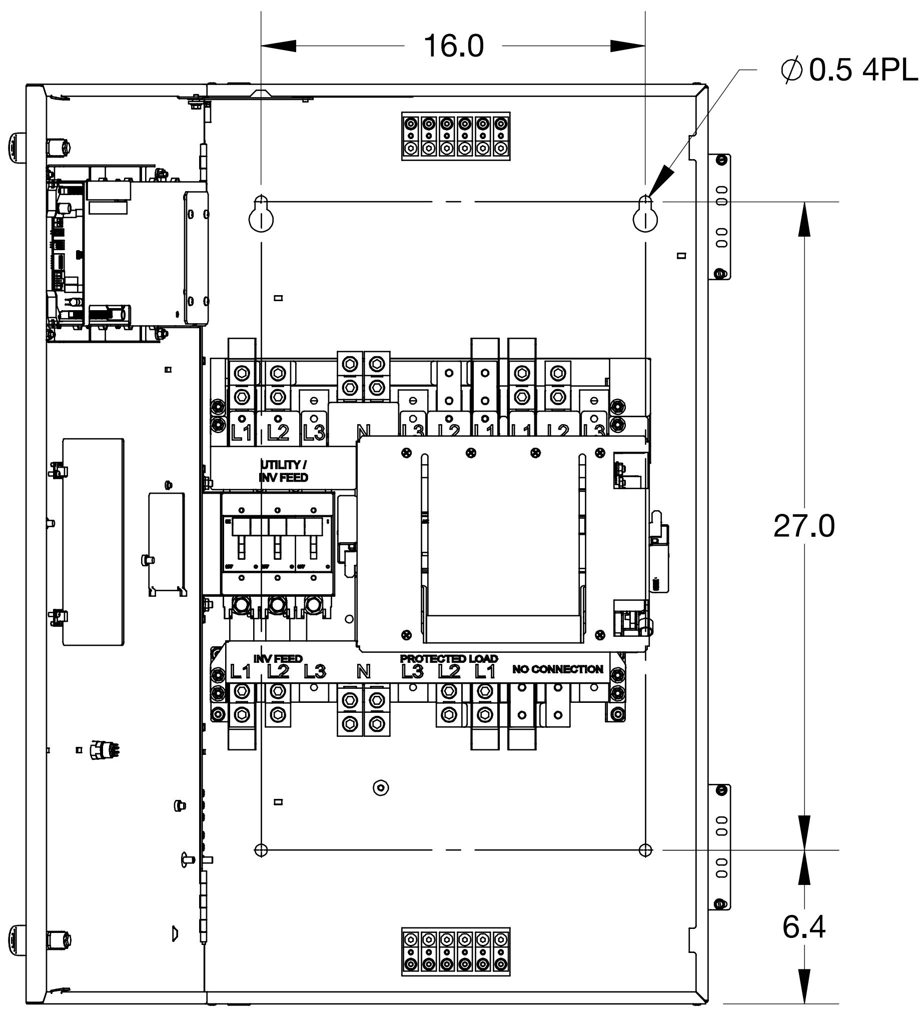


Figure 4 — XMBS with Input Breaker (250A shown)

XMBS with Input Breaker - 100A

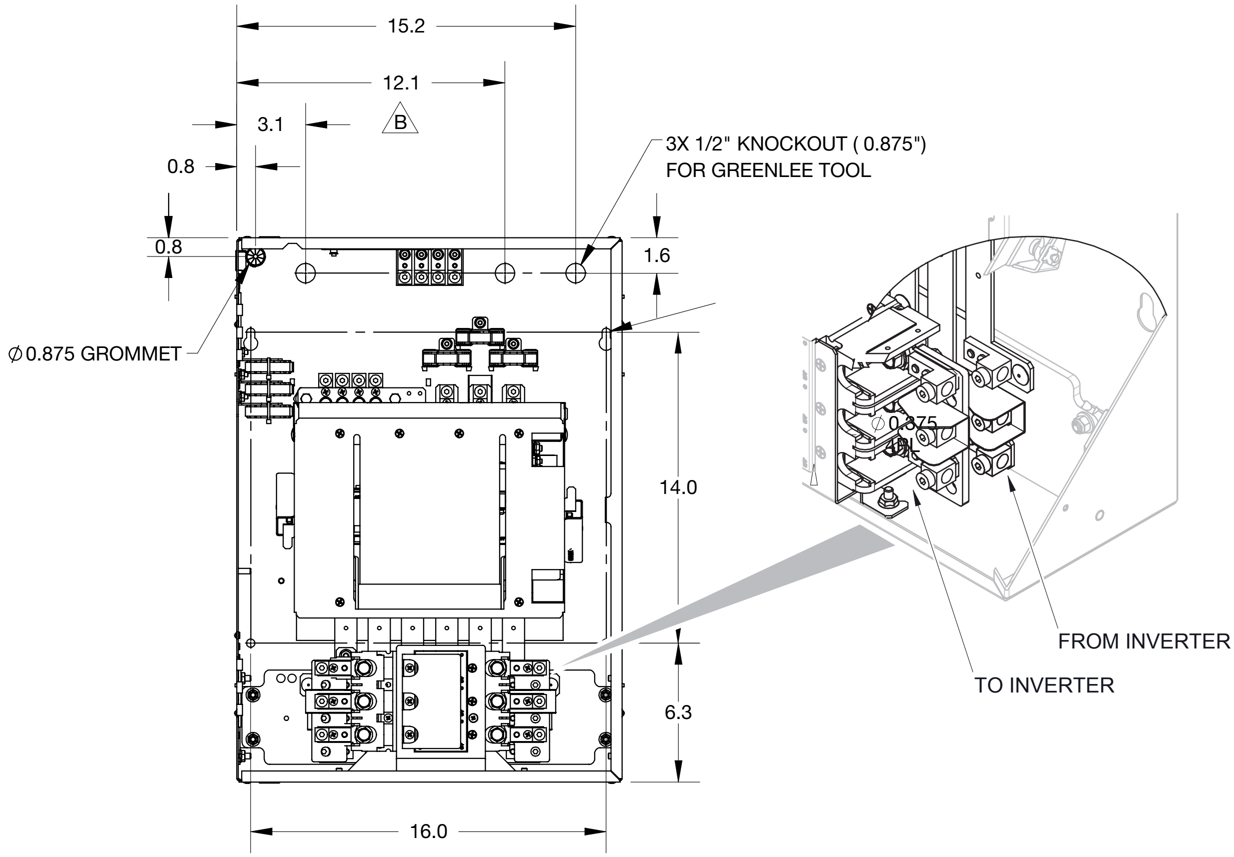


Figure 5 — XMBS with Input Breaker (100A shown)

6.3.2 Rack Mount Illustration

XMBS can be installed in relay racks with rack adapters provided with the units as shown in figure 6 below.

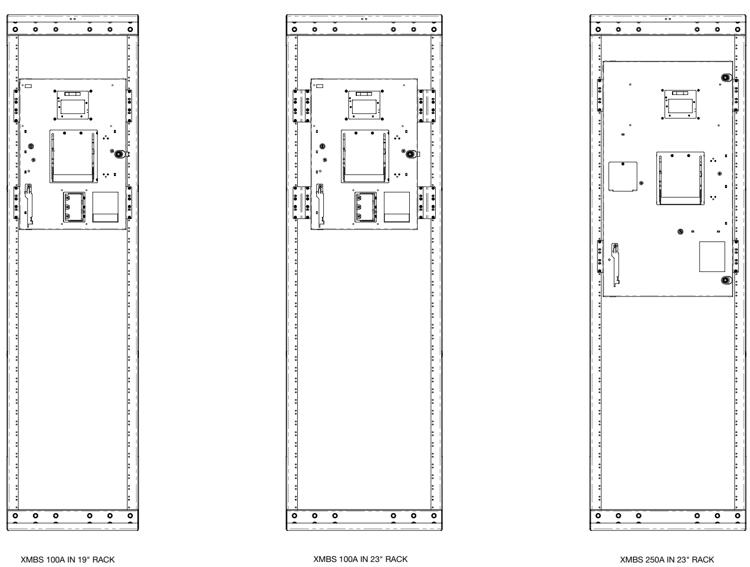


Figure 6 — XMBS in Relay Rack

7. Wiring

This chapter provides cabling details and notes on cable sizing. Please refer to customer connection drawing and schematic at the end of the manual.

WARNING!

Ensure that the power is switched off by switching off utility input breaker and inverter output breaker before attempting work on the wiring. Use a voltmeter to verify the absence of a voltage. Clearly mark the correct phases of the AC wiring leads before starting work on AC connections.

7.1 Installation Notes

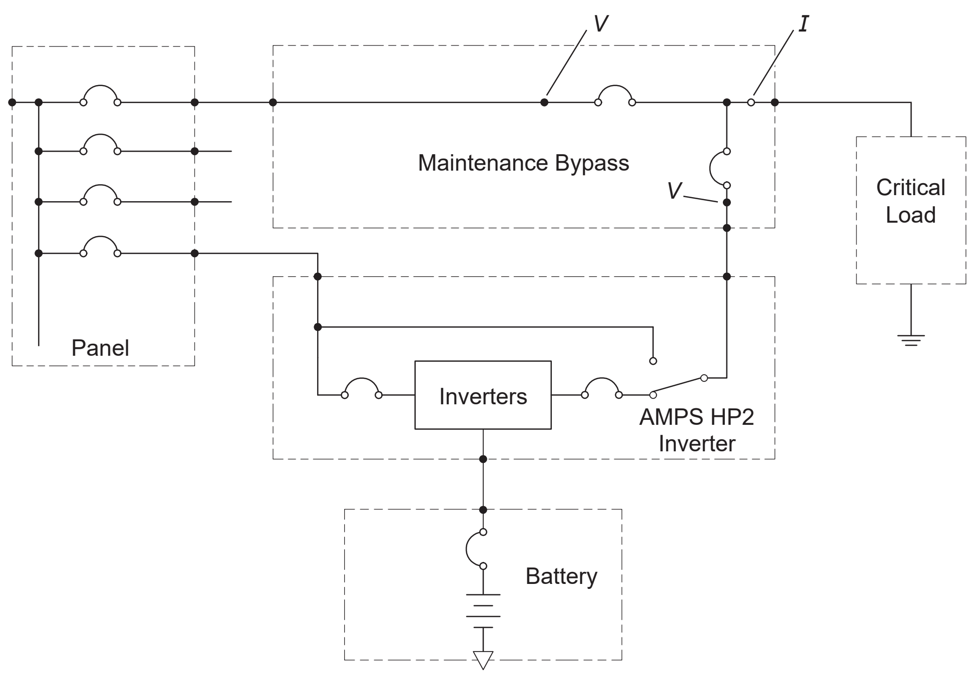
Refer to the Installation section for safety precautions and tools required.

7.2 Wiring Configurations for XMBS

The following diagrams outline the wiring configurations for the XMBS. For detailed information see the wiring schematics at the rear of the manual.

All wiring must be in accordance with all applicable electrical codes.

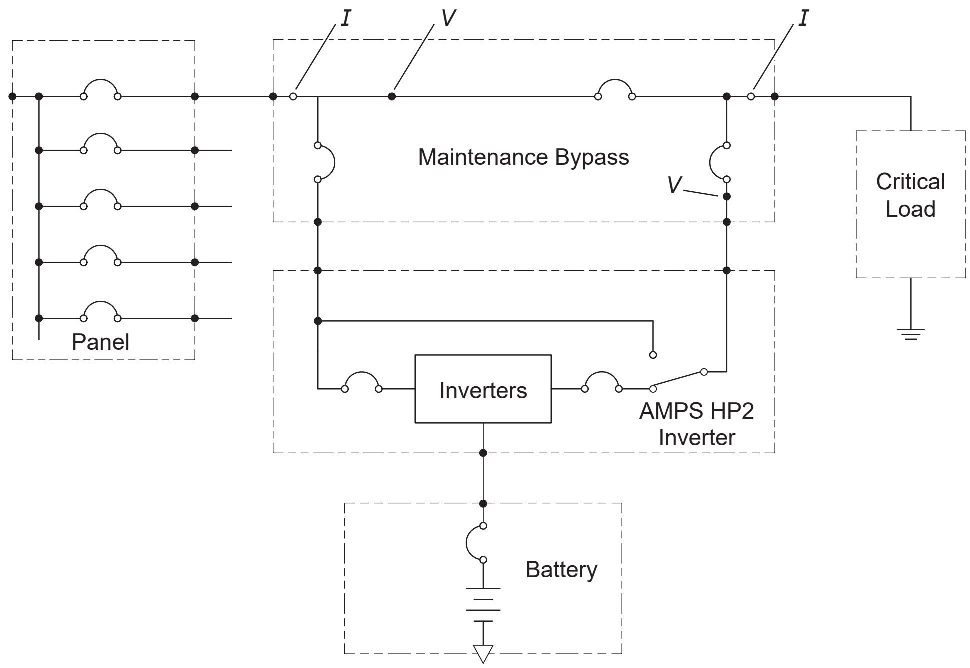
7.2.1 XMBS with Single Feed (Two Breaker Configuration)



V and ***I*** indicate voltage and current measurement locations if the Power Metering option is included.

Figure 7 — XMBS with Two Breaker Feed Configuration

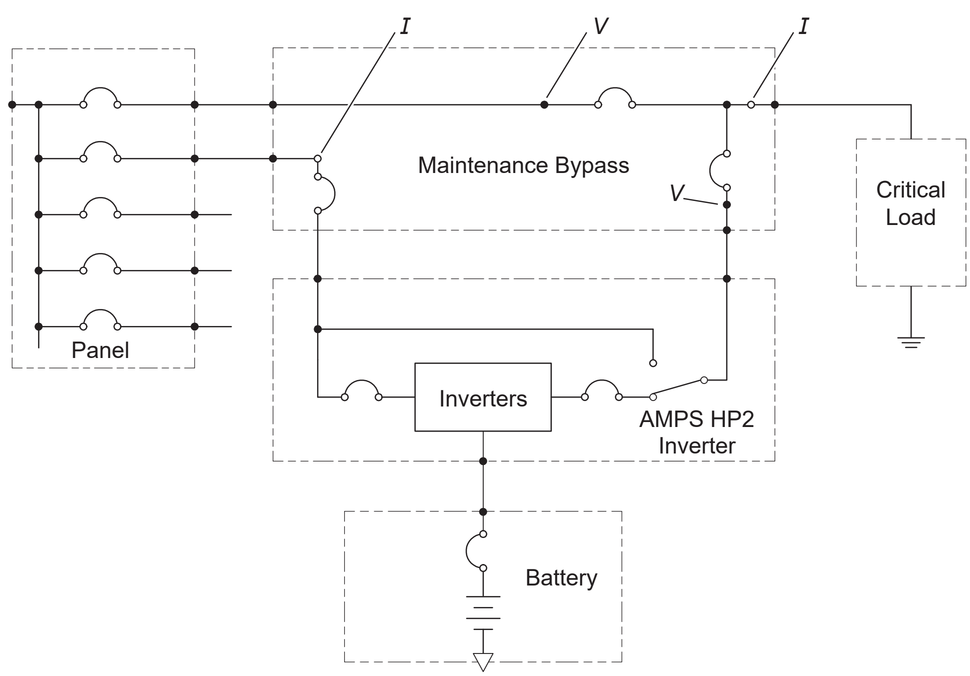
7.2.2 XMBS with Single Feed and Inverter Feed Breaker (Three Breaker Configuration)



V and ***I*** indicate voltage and current measurement locations if the Power Metering option is included.

Figure 8 — XMBS with Three Breaker Single Feed Configuration

7.2.3 XMBS with Dual Feed and Inverter Feed Breaker (Three Breaker Configuration)



V and ***I*** indicate voltage and current measurement locations if the Power Metering option is included.

Figure 9 — XMBS with Three Breaker Dual Feed Configuration

7.3 Connecting the XMBS with AMPS HP2

7.3.1 Signal Wiring Installation for the XMBS to the AMPS HP2

NOTE:

All of the outputs are dry contact type, suitable for low current (<50mA), low voltage (<60V) signals only. It is the responsibility of the system integrator to provide current limiting and/or fusing necessary to make the connection safe and reliable. Most of the outputs are Form-C type, making available Common, Normally Open, and Normally Closed connections for wired-AND or wired-OR connections as desired. Only the Interlock signal provides Normally Open connections alone.

The signals are connected to the XMBS controller on the inside of the door. The wiring should be routed into the cabinet through the grommet protected holes provided in the top and left panel near the top-left corner of the cabinet. The wires should be routed and retained along then entry side and to the connection's points with care so that these wires are not loose in the cabinet and cannot come into contact with AC wiring. Please refer to customer connection drawing and schematic at the end of the manual.

7.3.1.1 Connecting and Configuring the XMBS

The key characteristic of the XMBS is reliability and the controller design enhance this. Core functions are implemented in fail-safe hardware while other features, such as power metering, use state-of-the-art microprocessor and metering technologies. This section describes how to connect and configure the XMBS in the optimal way for each application. Before getting to the details of wiring, background is provided to help the installer understand the options available.

7.3.1.2 Phase Synchronization

One big advantage of the XMBS is that the operator can make a safe transfer at the XMBS without having to do or check anything with the Inverter. The XMBS will check that the selected source voltage is sufficient, but equally importantly, that the original and selected sources are in phase. This avoids a sudden phase jump which might damage a critical load. Depending on the installation, the way the sources are synchronized may be in one of three ways:

1. The inverter might keep its output synchronized and equal to the utility. This is the case for inverters that do not rely on maintaining a phase shift between their output and the utility input for back-feed detection.
2. The inverter output phase might be unsynchronized with the utility phase. This might be by design, or it might be because the utility input is for some reason disconnected from the inverter input. In this case, due to tiny but unavoidable differences between the frequency of the two sources, the inverter and utility sources will drift in and out of phase.
3. The inverter might keep its output synchronized but shifted (offset) from the utility. This is the case for Inverter systems, including AMPs which use the phase difference between input and output to detect a back-feed fault if it should occur. In this case a synchronize request signal is sent from the XMBS to the Inverter.

For situations 1 and 2, the XMBS uses a feature called "Opportunistic Transfer" -- essentially it constantly monitors the phase difference as it drifts and when it falls below a safe threshold (~2 degrees) it transfers. For systems which match situation 1 above, this happens immediately upon the transfer being requested. For systems of type 2, it will usually happen within 1 minute of the handle being moved. If the inverter is synchronized to the utility but does not accommodate a "synchronize request" signal per type 3, then the operator has the option of opening the inverter feed breaker so that it will lose the utility reference and automatically drift. Of course, this should only be done if the battery is present and inverter is functioning to ensure load is not dropped.

7.3.1.3 Synchronization Request

Of the methods above the preferred one is architecture 3 because it provides the most robust back-feed protection mechanism while still enabling a synchronized transfer. To facilitate this, the XMBS generates a “Synchronization Request” signal to the inverter, triggering it to temporarily synchronize the inverter output to the utility. For safety reasons, inverters monitoring phase for back-feed protection can only operate in phase for ~10 seconds but this is fine for the XMBS. It continuously monitors the phase and transfers immediately when conditions are right and then de-energize the synchronization request relay.

The Synchronization Request signal itself is generated both as a CAN message on the CXCHP to XMBS CAN Bus, and through a hardware (dry contact) output on the XMBS controller itself. Third party Inverters with programmable digital inputs can be connected to the isolated hardware signal and work automatically with the XMBS device. Customer with AMPS Inverter systems have the option of using the CAN connection, hardware connection, or both. For most AMPS customers using the CAN will be the most convenient approach since it is already connected for remote monitoring, although some may choose to add the wired connection as a redundant signal in case the CAN cabling fails. Note that both approaches do rely on the CXCHP controller being present because it must receive the signal and then generate the appropriate commands to the T2S controllers which control functionality of the inverter modules in real-time.

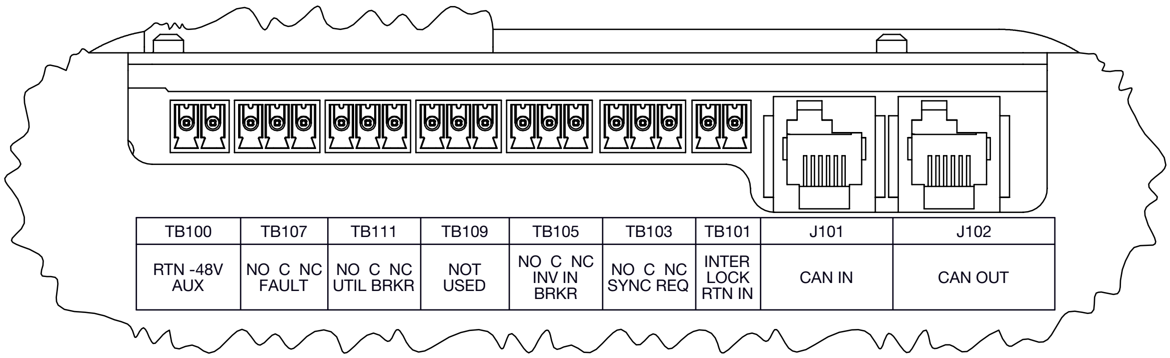
Finally, it should be noted that as a final option a XMBS transfer can be forced using the “Over-ride” feature described in section 4.6 in this manual.

NOTE:

Please refer to AMPS HP2 and Cordex HP manual for XMBS configuration.

7.3.2.4 Control Wiring:

The recommended control wiring to connect the XMBS to both AMPS and 3rd Party inverter systems is given in the table below. Note that for AMPS systems CAN bus can be used to replace all other hardware connections except the auxiliary power input. The hardware connections are available as desired, and can provide redundancy to the AMPS system, connections to dedicate monitoring devices, or connection to 3rd party Inverter systems.

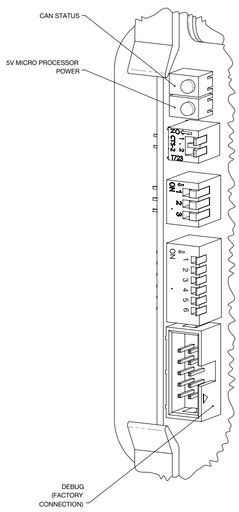


Signal	Hardware (see customer connection drawing for details)	Terminal Designation	AMPS System (using CAN)	Other Inverter System (or AMPS system not connected via CAN to XMBS)	Explanation
CXCHP (Proprietary) CAN OUT	CAN	J102	Recommended	Incompatible	Typically, CAN termination dongle is installed in this connector. Alternatively, other CAN devices can be connected.
CXCHP (Proprietary) CAN IN	CAN	J101	Recommended	Incompatible	The CAN bus protocol used by the CXCHP is based on CANopen but with proprietary features. It is suitable only for use with purpose build (Alpha/ Enersys) devices.
Auxiliary Power	48VDC	TB100	Recommended	Recommended	The XMBS controller uses both AC input sources for power, but the auxiliary power input is useful for both installation/service and remote diagnostics when both sources are disconnected.
Sync Request	Dry contact output	TB103	Redundant	Recommended	See explanation in section 7.3.2.3
Fault	Dry contact output	TB107	Redundant	Recommended See note 3	The fault signal is activated when a problem exists with the XMBS. Example of faults include mechanism malfunction, microcontroller failure, power failure and mechanism malfunction.

Inverter Internal Bypass State	Voltage detection input	TB101	Redundant	Recommended See notes 3, 4.	The XMBS display shows the Inverter source as Green when the inverter internal bypass is in the Inverter position, and yellow when it is in Bypass mode. This alerts the operator in case they forget to set the internal bypass to inverter. See note 2.
Inverter Feed Breaker	Dry contact output	TB105	Redundant	Recommended	Dry contact is closed when optional Inverter Feed Breaker is installed and is closed.
XMBS Bypass State (Bypass Alarm)	Dry contact output	TB111	Redundant	Recommended	Dry contact which is closed when the XMBS switch is in Bypass mode. Typically, it is monitored to ensure the switch is not left in bypass mode when service leaves the site.

NOTE:

1. **Signals marked Redundant for the AMPS system are those already communicated on the CAN bus. They can be wired separately for redundancy and the CXCHP controller will monitor them through the LADIO device. If there is a discrepancy between the CAN messages and the wired signal, the asserted or active level will be assumed.**
2. **It is highly recommended that when an XMBS is installed the operator locks the inverter internal bypass into inverter position and doesn't use it. Because an internal bypass does not have the fail-safe protection mechanisms of the XMBS, the system reliability is reduced when the internal bypass is used.**
3. **For third party inverter systems consult the inverter manufacturers documentation to determine if an isolated output is available and that the ratings are compatible with the XMBS inputs/outputs. The XMBS signal levels and limits can be found on customer connection drawing included at the end of this manual.**
4. **Typical internal bypass switches have suitable dry contact outputs which are available for connection.**
5. **The hardware Synchronization Request signal is only supported in AMPS HP2 controller version 6.20 and higher. The CAN Synchronization Request signal and XMBS Dry Contact monitoring via CAN(without dry contact wiring) is only supported in AMPS HP2 controller version 7.01 and higher**
6. **If this feature is desired, upgrade the AMP HP2 controller software before commissioning the XMBS. For older AMPS systems using the CXCi controller, it is recommended to install the upgrade kit to convert it to the AMPS HP2 controller.**
7. **SW400 and SW601 are added in hardware manufactured after January 1st, 2021.**



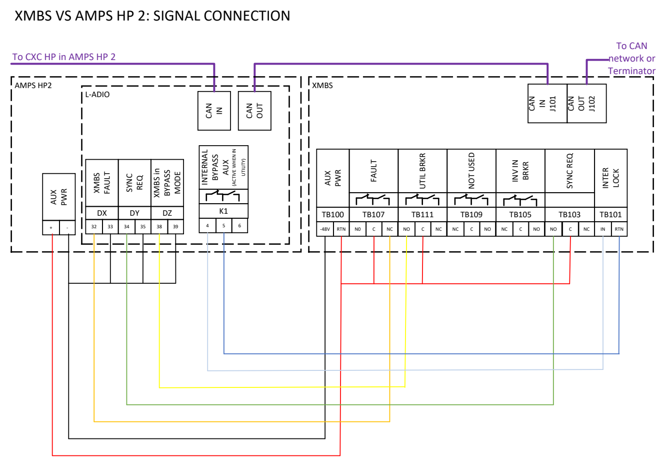


Figure 10 — XMBS Wiring Diagram

7.4 Configuring XMBS:

The XMBS is configured using several dip switches located at the visible edge of the control board when it is installed. These configuration options do not change the core function of the XMBS transfer switch itself, however they do change the way information is displayed on the LCD and communicated on the CAN, and the delay timing of some advanced features.

7.4.1 Phase configuration:

These switches control the way the controller monitors and interprets the signals from the current and voltage sensors. The dip switches must match the actual AC source and the appropriate current sensors must be installed for proper monitoring. However, it is possible to use a system designed for a higher number of phases to be used with fewer phase by changing these settings. (For example, a two-phase system can be used for a single phase by turning SW1 on.

PHASE CONFIGURATION FOR POWER METERING (DISPLAYS)			
SW400	**PHASES MONITORED**	**SW1**	**SW2**
3 PHASE	L1, L2 & L3	OFF	OFF
2 PHASE	L1 & L2	OFF	ON
1 PHASE	L1	ON	ON

NOTE:

Phase configuration effects monitoring and display only. The hardware compares all phases on a phase-to-phase basis to prevent dropped loads and trigger auto-transfer

For example, an XMBS with 3 pole breakers can also be used as a 2 or 1 pole system, and an XMBS with 2 pole breakers can be used as a 1 poles system. Simply wire the desired number of poles starting at L1 (L1 for 1 pole, L1 and L2 for 2 pole) and set the appropriate dip switches on the controller board. Instructions for adjusting the dip switches can be found on the Customer Configuration Drawing located at the end of this manual

7.4.2 Current Configuration:

The XMBS is available in two sizes: medium which can support up to 250A and small which can support up to 100A. The medium system uses soft flexibly mounted Rogowski coils and the small system uses hard fixed mount Rogowski coils. According to which type of coils are installed the control board can be configured appropriately using SW601. The setting of the switch is used by the microprocessor to use the correct gain and calibration curve for the power metering functions.

NOTE:

The 400A setting is not currently used and is for future expansion possibility only.

SW601	SYSTEM CURRENT SELECTED
SW1	100A
SW2	250A
SW3	400A

NOTE:

The system current selection determines which calibration values are used for the current sensors.

7.4.3 Transfer holdoff timer

The transfer holdoff timer is described in detail in the auto-transfer section 7.5 in this manual. The operator should adjust the transfer holdoff time to be slightly (but reliably) longer than the time it takes for the inverter system to generate output when in an unpowered state after the AC returns. When in Auto transfer mode, and after a complete power loss, the XMBS will hold off on transferring from Inverter to Utility for the period set by SW600. This delay will be the cumulative sum of the delay times for each dip switch that is on according to the following table. Default from the factory is 1 minute.

AUTO-TRANSFER HOLD-OFF TIME	
SW600	TIME ADDED WHEN ON
NONE	1 SECOND
SW1	15 SECONDS
SW2	30 SECONDS
SW3	1 MINUTE
SW4	2 MINUTES
SW5	4 MINUTES
SW6	8 MINUTES

NOTE:

1. **The XMBS will delay automatically transferring to utility after a complete power failure (utility off and battery depleted) to allow the inverter time to startup.**
2. **The delay is set by the SW1 and it is the total time of all switches in the position (15s to 15 minutes 45 seconds)**
3. **If all the switches are off the auto transfer delay is disabled and the transfer will occur within 1 second (the verification time of the detection circuit)**
4. **This does not effect the auto transfer to utility when the inverter output fails and utility is present**
5. **If all switches are off the delay time will be ~1 second, the detection period of the auto-transfer circuit**

7.5 XMBS Auto Mode

The XMBS Semi-Automatic Transfer Function provides similar functionality as an Automatic Transfer Switch (ATS) with three key differences:

- The XMBS automatic transfer is only from Inverter Source to the Utility Source.
- The XMBS transfer function must be manually re-set for each transfer (semi-automatic).
- The XMBS detection and transfer takes approximately 1 second delay, momentarily disrupting load power.

While these differences prevent it from being a true ATS, the architecture does provide the same key advantage of increased availability without additional components that themselves may fail. Combined with power metering, remote monitoring, and other diagnostic features, this makes the XMBS by far the most reliable maintenance transfer switch available.

7.5.1 XMBS Automatic Transfer Operator use

First the switch is set into Inverter position as described is Section 8. (Note: transfer from Utility to Inverter is not affected by the mode switch.) Once the switch is in Inverter position the operator turns the mode to Auto then pushes the handle to the Utility position. In this position the Utility LED is yellow (indicating "Pending") and the Inverter LED is green. Although optional it is recommended that next the operation installs the handle lockout tool and removes the mode key to prevent inadvertent disabling of the Auto feature.

Further detailed instructions can be found in Section 8 of the manual and in the XMBS QuickStart Guide.

7.5.2 XMBS Automatic Transfer Explained

In normal operation the operator moves the XMBS handle to the desired source and then transfer occurs if (or when) the selected AC source is *better than or equal* to the original source. In automatic operation when the handle is moved from Inverter to Utility the transfer occurs only when the selected AC source *is better* than the original source. (Note: although written using the same language, in the case of an automatic transfer the selected source is always the Utility and the original source is always the Inverter). According to these simple rules, the XMBS switch will stay connected to the Inverter with the handle in Utility position until (and if) the Inverter output fails.

7.5.3 XMBS Delayed Transfer Feature

There is a unique yet quite possible situation in which the Automatic Transfer will be delayed. Consider a system operating normally and then the Utility power fails so the system continues operating but using battery power. Now imagine the utility failure is long enough (and there is no backup generator) so eventually the batteries completely discharge, and the load is dropped. When the utility returns the utility source will be better than the inverter output until the inverter completes its startup sequence and comes online. In this situation it is preferable to wait for the inverter rather than immediately switching to utility, simply because the latter would require a subsequent site visit to return the system to the inverter source and reset the automatic transfer function. For this reason, the XMBS has a Transfer Hold-off timer.

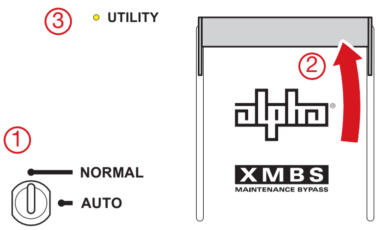
The Transfer Hold-off Timer operates only in Auto mode and is configurable using hardware dipswitches on the XMBS controller board. The time is adjustable between 15 seconds and 15 minutes 45 seconds in 15 second increments. The installer should set the time according to the maximum anticipated startup time of the Inverter system after AC returns with enough margin to prevent false trips, but not so long as to leave the load unpowered for an unnecessarily long period if the Inverter did fail. Refer to the Customer Connection Drawing (0213250-08) for a succinct summary of the settings along with the following notes:

- The total Hold-off time will be the sum of the individual times for all of the switches which are set to on. For example, if SW5 and SW3 are on the total time will be 4 + 1 = 5 minutes.
- Each switch has a different individual time as per table SW600.
- With no switches on the delay is essentially disabled (will be governed by 1 second detection period)
- Remember the delay only occurs in Auto-mode after complete power failure, it does not cause a delay when the Inverter fails if the Utility is present, or when in Manual mode.

8. Operation

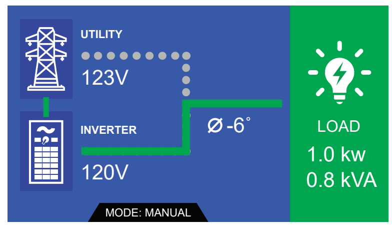
8.1 Normal Operation – Inverter to Utility

Operator Initiates Transfer



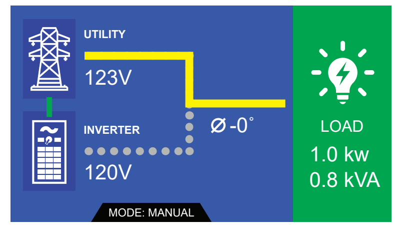
1. Turn the Mode switch to **NORMAL**.
2. Move the handle to the **UTILITY** position.
3. The UTILITY LED turns on yellow. The INVERTER LED remains green.

Load Protection and Phase Synchronization



4. The External Bypass checks the source and requests synchronization.

Switch Transfer Complete

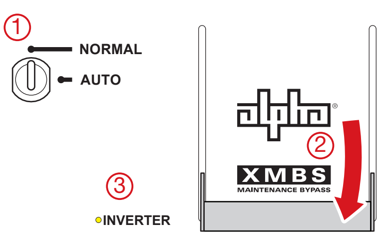


5. External Bypass releases transfer mechanism when sources are in phase.
Transfer complete. LCD shows **UTILITY** supporting the critical load.

8.2 Normal Operation – Utility to Inverter

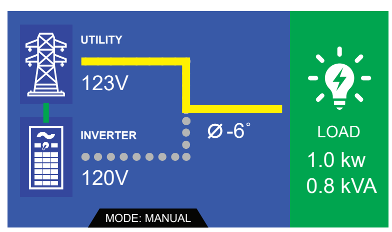
NOTE: UPS internal bypass <u>must</u> be in inverter mode.

Operator Initiates Transfer



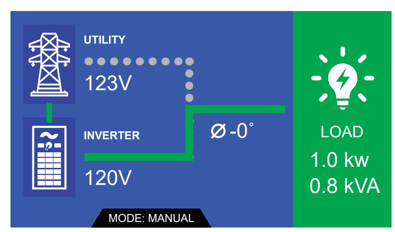
1. Turn the Mode Switch to **NORMAL**.
2. Move the handle to the **INVERTER** position.
3. The INVERTER LED turns on yellow. The UTILITY LED remains green.

Load Protection and Phase Synchronization



4. The External Bypass checks the source and requests synchronization.

Switch Transfer Complete



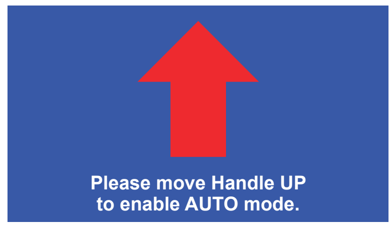
5. External Bypass releases transfer mechanism when sources are in phase. LCD indicator shows **INVERTER** supporting the critical load.
Transfer is complete.

8.3 Auto Transfer Operation

Operator Energizes Transfer

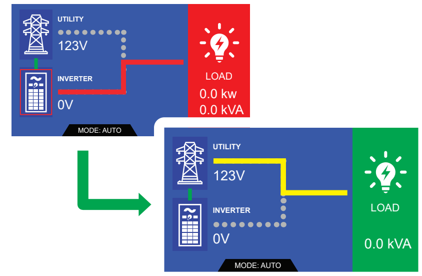
1. Start with External Bypass in Inverter position. **Note:** Verify both handle position and LED.
2. Turn the Mode Switch to **AUTO**.

Load Monitoring



3. Move the handle to the **UTILITY** position.
4. The UTILITY yellow LED turns on. The INVERTER LED remains green.
5. The External Bypass continuously monitors the output voltage and will only transfer if output fails.

Load Recovery

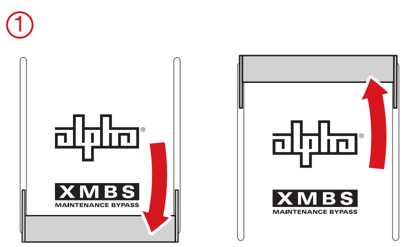


6. If inverter output voltage fails, the transfer mechanism automatically releases to **UTILITY** position.

8.4 Override Operation

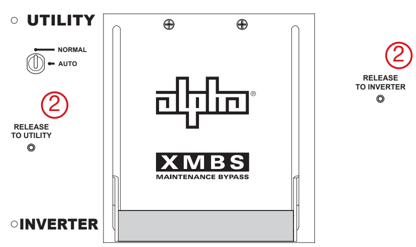
WARNING!: Operator must ensure load will not be dropped during transfer.

Choose Utility or Inverter



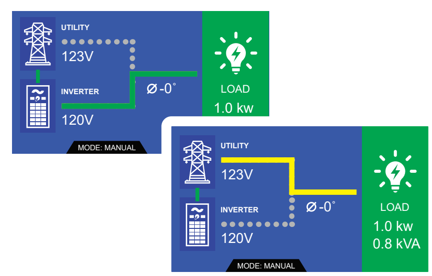
1. Move the handle the desired position.

Override Button



2. Remove the screw to open the override access hole.
3. Insert the end of the lockout into the override access hole to engage override.

Verify Switch Position



4. Verify switch position.
5. Reinstall override access hole screw.

NOTE:

A line appears between the Utility Icon and the Inverter Icon on the LCD display when an Inverter Feed Breaker is installed. This line is RED if the Inverter Feed Breaker is off or has tripped, or if the Utility is off. The line is Green if the Inverter Feed Breaker is on and the Utility Source is present.

8.5 Micro-Controller Test

If the controller fails to illuminate the LCD display the most likely reason is that it is not powered up. The controller can draw power from L1 of the Utility, L1 of the Inverter, or the 48V auxiliary supply input. Check that these sources are available, a simple way is just to verify that at least some of the LED indicators are illuminated.

If the controller appears to have power, next attempt to reset the controller. Note that the XMBS microprocessor is for monitoring and does not have control of the XMBS operation so there is no operation risk to resetting the controller. To do so, simply insert a pin through the small access hole provided in the controller front panel located as shown on Figure 11 below.

If resetting the controller does not resolve the problem, the next check is to verify that the power sources are actually reaching the control board.

- For DC connection (AUX supply) simply check the auxiliary input connector located in the customer connection area.
- Checking AC connections should only be done by a technician qualified for working on AC systems because the sense leads are connected to high current sources. The qualified technician can check the AC power at the input connections and at the board connector after removing the protective cover. Refer to the customer connection drawing and the XMBS schematic for locations to check.

If none of the above steps resolves the controller function the Controller should be replaced.

NOTE:

That even if the LCD display is not showing the status, it is quite likely that the controller is still functioning normally and will still perform all functions including fail-safe synchronized transfer and auto-transfer on failed Inverter output. It is therefore advised to order a new control board and swap it in at the earliest convenience.

NOTE:

Swapping the board is a fairly straightforward procedure which can be performed safely on a live system without interrupting operation. The AC connections do not need to be touched during the procedure, only the low voltage factory and customer connections need to be moved. Detailed instructions are provided with the controller replacement kit.

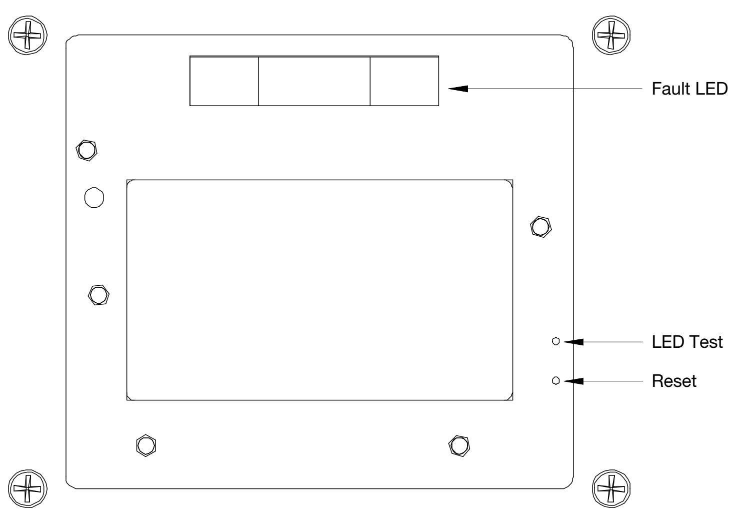


Figure 11 — XMBS Micro Reset, LED Test and Fault LED

8.6 LED Indicator Test Procedure

To verify that all LED indicators are functionally operational an LED Test button is provided on the controller. This test function does not rely upon, but is monitored by, the microprocessor so the button action can also be verified. To test the LED indicators simply insert a pin through the small access hole provided in the controller front panel located as shown on Figure 11.

8.7 Fault LED:

The FAULT LED Indicator signifies a mechanical failure of the XMBS switch. Although unlikely, it is possible that the system could back-feed the Inverter Output to the Utility connected wires in the case. It is important to test the indicator periodically and prior to doing any service on the Utility connections, to ensure the potential back-feed condition is being properly monitored. When the LED Test button is pressed the Fault LED will illuminate RED. If it does not illuminate RED call for service prior as soon as possible, and definitely prior to performing any service on the XMBS AC connections.

8.8 Handle Indicator LEDs Test:

When the LED test button is the Pending (Orange) and Position (Green) LEDs for each handle position will be illuminated. Use the following table to interpret the LED functional condition:

ILLUMINATION	INTERPRETATION
None	The connection to the board may be faulty. Check connection at both the indicator board and the controller ends. Alternately, both Green and Orange LEDs have failed, and the indicator board should be replaced.
Green	The Orange indicator LED is not working. Check cabling/connections and replace indicator board if necessary.
Orange	The Green indicator LED is not working. Check cabling/connections and replace indicator board if necessary.
Bright Combination Orange/Green	The system is functioning properly

Figure 12 — Handle Position LEDs

NOTE:

All information shown by the LED indicators is also represented in the graphical user interface. As an additional troubleshooting technique, compare the status indicated on the LCD display with the LED illumination. They should be the same, otherwise an LED or LED cabling fault may be indicated.

Refer to the XMBS Generic Schematic, contained at the end of this document, for details on the LED indicator board connections and other cabling/connection details.

9. Warranty Statement and Service Information

9.1 Technical Support

In Canada and the USA, call toll free 1-888-462-7487.

Customers outside Canada and the USA, call +1-604-436-5547.

9.2 Warranty Statement

For full information details review Alpha's online Warranty Statement at www.alpha.ca/support.

9.3 Product Warranty

Alpha warrants that for a period of two (2) years from the date of shipment its products shall be free from defects under normal authorized use consistent with the product specifications and Alpha's instructions, the terms of the manual will take precedence.

The warranty provides for repairing, replacing or issuing credit (at Alpha's discretion) for any equipment manufactured by it and returned by the customer to the factory or other authorized location during the warranty period.

There are limitations to this warranty coverage. The warranty does not provide to the customer or other parties any remedies other than the above. It does not provide coverage for any loss of profits, loss of use, costs for removal or installation of defective equipment, damages or consequential damages based upon equipment failure during or after the warranty period. No other obligations are expressed or implied. Warranty also does not cover damage or equipment failure due to cause(s) external to the unit including, but not limited to, environmental conditions, water damage, power surges or any other external influence.

The customer is responsible for all shipping and handling charges. Where products are covered under warranty Alpha will pay the cost of shipping the repaired or replacement unit back to the customer.

9.4 Warranty Claims

Any claim under this Limited Warranty must be made in writing to Alpha BEFORE sending material back. Alpha will provide Product return instructions upon approval of return request. A Service Repair Order (SRO) and / or Return Authorization (RA) number will be issued ensuring that your service needs are handled promptly and efficiently.

Claims must be made online at: www.alpha.ca.

9.5 Service Information

For a list of international service centers, refer to the Alpha website: www.alpha.ca

10. Acronyms and Definitions

AC	Alternating current
ANSI	American National Standards Institute
AWG	American Wire Gauge
BTU	British thermal unit
CAN	Controller area network
CEC	Canadian Electrical Code
CSA	Canadian Standards Association
CX	Cordex® series; e.g., CXC for Cordex® System Controller
DC	Direct current
DHCP	Dynamic Host Configuration Protocol
EIA	Electronic Industries Alliance
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
ERM	Electromagnetic Compatibility and Radio Spectrum Matters
ESD	Electrostatic Discharge
FCC	Federal Communications Commission (for the USA)
GSM	Group Speciale Mobile (global system for mobile communications)
HVSD	High voltage shutdown
IEC	International Electrotechnical Commission
IEEE®	Institute of Electrical and Electronics Engineers®
IP	Internet Protocol
kAIC	Kilo Ampere
LED	Light emitting diode
LVD	Low voltage disconnect
MIL	One thousandth of an inch; used in expressing wire cross sectional area
MOV	Metal oxide varistor
MTBF	Mean time between failures
NC	Normally closed
NEC®	National Electrical Code® (for the USA)
NO	Normally open
OSHA	Occupational Safety & Health Administration
OVP	Over voltage protection
RAM	Random access memory
RU	Rack unit (1.75”)
TCP/IP	Transmission Control Protocol / Internet Protocol
THD	Total harmonic distortion
UL®	Underwriters Laboratories®
VRLA	Valve regulated lead acid

About CSA and NRTL

CSA (Canadian Standards Association also known as CSA International) was established in 1919 as an independent testing laboratory in Canada. CSA received its recognition as an NRTL (Nationally Recognized Testing Laboratory) in 1992 from OSHA (Occupational Safety and Health Administration) in the United States of America (Docket No. NRTL-2-92). This was expanded and renewed in 1997, 1999, and 2001. The specific notifications were posted on OSHA's official website as follows:

- Federal Register #: 59:40602 - 40609 [08/09/1994]
- Federal Register #: 64:60240 - 60241 [11/04/1999]
- Federal Register #: 66:35271 - 35278 [07/03/2001]

When these marks appear with the indicator "C and US" or "NRTL/C" it means that the product is certified for both the US and Canadian markets, to the applicable US and Canadian standards. (1)

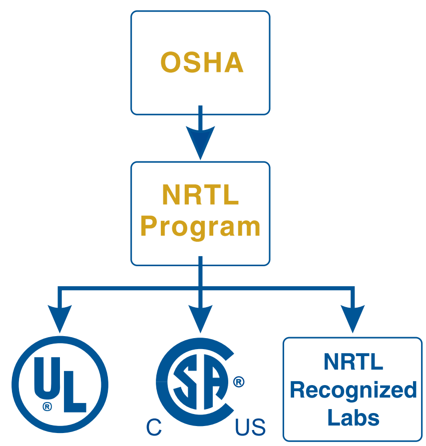
Alpha rectifier and power system products, bearing the aforementioned CSA marks, are certified to CSA C22.2 No. 60950-01 and UL 60950-01. Alpha UPS products, bearing the aforementioned CSA marks, are certified to CSA C22.2 No. 107.3 and UL 1778.

As part of the reciprocal, US/Canada agreement regarding testing laboratories, the Standards Council of Canada (Canada's national accreditation body) granted Underwriters Laboratories (UL) authority to certify products for sale in Canada. (2)

Only Underwriters Laboratories Inc. may grant a licence for the use of this mark, which indicates compliance with both Canadian and US requirements. (3)

NRTLs capabilities

NRTLs are third party organizations recognized by OSHA, US Department of Labor, under the NRTL program.



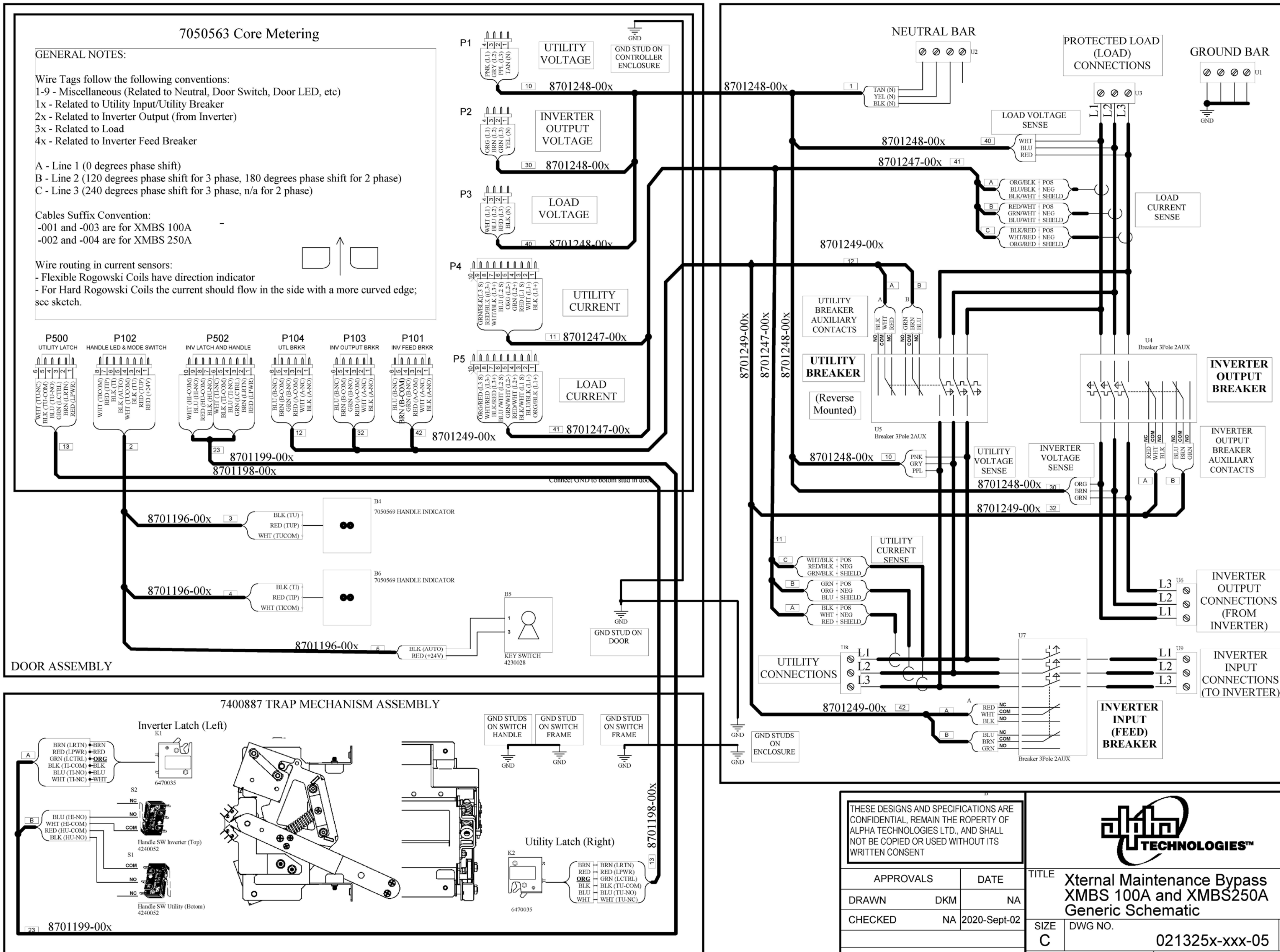
The testing and certifications are based on product safety standards developed by US based standards developing organizations and are often issued by the American National Standards Institute (ANSI). (4)

The NRTL determines that a product meets the requirements of an appropriate consensus-based product safety standard either by successfully testing the product itself, or by verifying that a contract laboratory has done so, and the NRTL certifies that the product meets the requirements of the product safety standard. (4)

Governance of NRTL

The NRTL Program is both national and international in scope with foreign labs permitted.

(1)www.csagroup.org
(2) www.scc.ca
(3) www.ulc.ca
(4) www.osha.gov



GENERAL NOTES:

Wire Tags follow the following conventions:
1-9 - Miscellaneous (Related to Neutral, Door Switch, Door LED, etc)
1x - Related to Utility Input/Utility Breaker
2x - Related to Inverter Output (from Inverter)
3x - Related to Load
4x - Related to Inverter Feed Breaker

A - Line 1 (0 degrees phase shift)
B - Line 2 (120 degrees phase shift for 3 phase, 180 degrees phase shift for 2 phase)
C - Line 3 (240 degrees phase shift for 3 phase, n/a for 2 phase)

Cables Suffix Convention:
-001 and -003 are for XMBS 100A
-002 and -004 are for XMBS 250A

Wire routing in current sensors:
- Flexible Rogowski Coils have direction indicator
- For Hard Rogowski Coils the current should flow in the side with a more curved edge; see sketch.

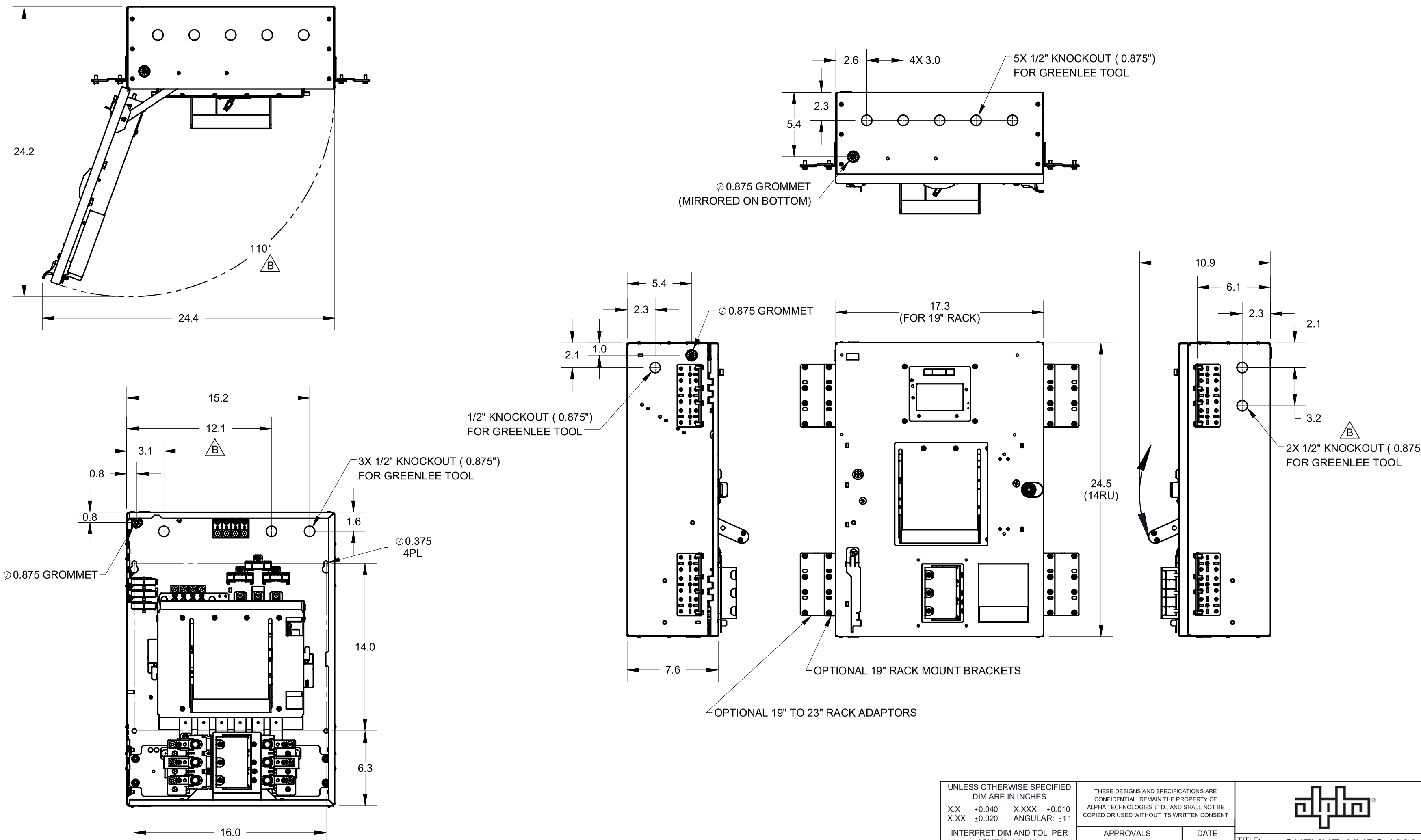
REVISIONS				
LTR	DESCRIPTION	DRW	DATE	CHK

APPROVALS		DATE
DRAWN	DKM	NA
CHECKED	NA	2020-Sept-02

TITLE Xternal Maintenance Bypass XMBS 100A and XMBS250A Generic Schematic

SIZE	DWG NO.	Rev
C	021325x-xxx-05	A
SCALE NTS	SHEET	1 of 1

REVISIONS				
LTR	DESCRIPTION	DWN	DATE	CHK
B	2X KNOCKOUTS ADDED, MAX DOOR ANGLE CHANGED TO 110°	JMAR	18-NOV-20	DM



UNLESS OTHERWISE SPECIFIED
DIM ARE IN INCHES
X.X ±0.040 X.XXX ±0.010
X.XX ±0.020 ANGULAR: ±1°
INTERPRET DIM AND TOL PER ASME Y14.5-1994
DO NOT SCALE DRAWING
THIRD ANGLE PROJECTION

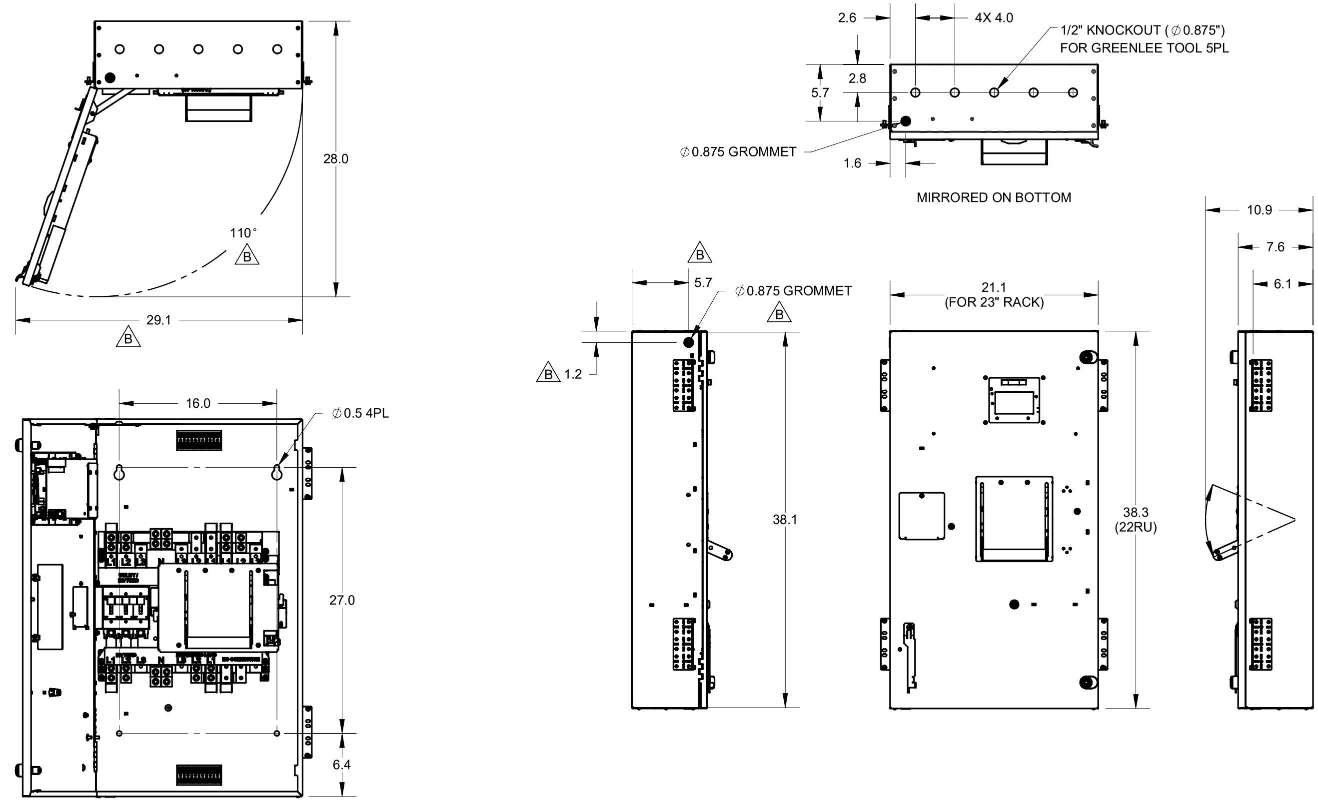
APPROVALS		DATE
DRAWN	JMAR	15-SEP-20
CHECKED	DM	15-SEP-20

TITLE: OUTLINE, XMBS 100A

SIZE: B | DWG NO. 0213250-06 | REV: B

SCALE: 1:8 | SHEET 1 OF 1

REVISIONS				
LTR	DESCRIPTION	DWN	DATE	CHK
B	DOOR OPEN ANGLE CHANGED, ADDED LEFT SIDE VIEW	JMAR	23-NOV-20	DM



NOTES UNLESS OTHERWISE SPECIFIED:

1. PRODUCT TO BE FABRICATED ACCORDING TO ATL PRODUCTION STANDARD 0700001.

UNLESS OTHERWISE SPECIFIED
DIM ARE IN INCHES
X.X ±0.040 X.XXX ±0.010
X.XX ±0.020 ANGULAR: ±1°
INTERPRET DIM AND TOL PER ASME Y14.5-1994
DO NOT SCALE DRAWING
THIRD ANGLE PROJECTION

THESE DESIGNS AND SPECIFICATIONS ARE CONFIDENTIAL, REMAIN THE PROPERTY OF ALPHA TECHNOLOGIES LTD., AND SHALL NOT BE COPIED OR USED WITHOUT ITS WRITTEN CONSENT

APPROVALS		DATE
DRAWN	JMAR	15-SEP-20
CHECKED	DM	15-SEP-20

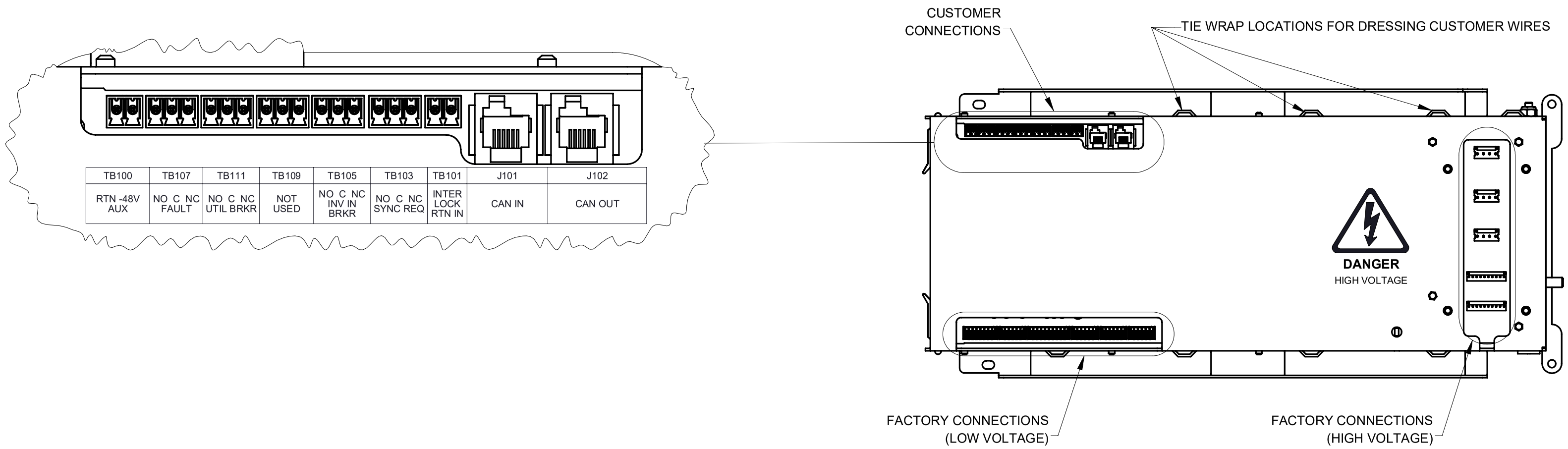
TITLE: OUTLINE, XMBS 250

SIZE	DWG NO.	REV
B	0213251-06	B

SCALE: 1:12 SHEET 1 OF 1

CONTROL CONNECTIONS 100A / 250A

REVISIONS				
LTR	DESCRIPTION	DWN	DATE	CHK
B	ADDED SHEET 2, COMBINED BOTH SYSTEM OUTLINES INTO ONE DRAWING	JMAR	04-DEC-20	DM
C	UPDATED LABELS	JMAR	04-DEC-20	DM



CONTROL SIGNAL SPECIFICATIONS

CONNECTOR	CONNECTION NAME	CONNECTOR TYPE	I/O	PIN	PIN NAME	NOTES
TB100	AUXILIARY POWER	4	INPUT	1	RETURN (+)	CONTROLLER POWER FOR LOCAL (GUI) AND REMOTE (CAN) STATUS AND ERROR REPORTING IN CASE AC NOT PRESENT. NOT REQUIRED FOR SWITCH OPERATION.
				2	-48V POWER	
TB107	FAULT ALARM	1	OUTPUT	1	NO	ENERGIZED WHEN MECHANISM OPERATING NORMALLY. CONTACT SERVICE IMMEDIATELY IF DE-ENERGIZED.
				2	C	
				3	NC	
TB111	BYPASS ALARM	1	OUTPUT	1	NO	ACTIVE WHEN SWITCH IN BYPASS POSITION (PROTECTED LOAD IS CONNECTED TO UTILITY AND ISOLATED FROM INVERTER).
				2	C	
				3	NC	
TB105	INVERTER FEED BREAKER ALARM	2	OUTPUT	1	NO	ACTIVE WHEN (OPTIONAL) INVERTER FEED BREAKER IS ON (UTILITY IS CONNECTED TO INVERTER FEED).
				2	C	
				3	NC	
TB103	SYNCHRONIZATION REQUEST	1	OUTPUT	1	NO	ACTIVE WHEN XMBS IS REQUESTING INVERTER TO PHASE SYCHONIZE WITH THE UTILTIY. OCCURS IN MANUAL MODE WHEN A NEW SOURCE IS SELECTED IF THAT SOURCE IS VALID. WHEN THE PHASES ARE SYCHRONIZED THE TRANSFER WILL COMPLETE AND THE SIGNAL WILL BE DEACIVATED.
				2	C	
				3	NC	
TB101	INVERTER INTERNAL BYPASS STATUS INPUT	3	INPUT	1	RTN	WHEN ACTIVE THE INVERTER INPUT IS DISPLAYED IN YELLOW; DOES NOT EFFECT SWITCH OPERATION. (KEEP INTERNAL BYPASS IN INVERTER POSITION FOR MAXIMUM BENEFIT FROM XMBS ADVANCED LOAD PROTECTION.)
				2	IN	
J101	CAN BUS INPUT	CAN	INPUT / OUTPUT	N/A	N/A	PROPRIETARY CAN CONNECTION TO CXCHP CONTROLLER.
J102	CAN BUS OUTPUT	CAN	INPUT / OUTPUT	N/A	N/A	PROPRIETARY CAN CONNECTION TO OTHER ALPHA DEVICES, INSTALL CAN TERMINATOR WHEN NO OTHER DEVICES CONNECTED.

SIGNAL CONNECTIONS SPECIFICATIONS

CONNECTOR TYPE	DESCRIPTION	RATINGS	GUAGE	STRIP LENGTH	SCREW TYPE
1	DRY CONTACTS (RELAY OUTPUT)	+/- 60Vdc, 2A	28-14 AWG	6-7mm	M2-SLOTTED
2	BREAKER AUXILLIARY CONTACT	+/- 60Vdc, 1A			
3	POWERED	5V PROVIDED THROUGH 10K RESISTOR, CONNECT DRY CONTACT INPUT ONLY (SHORT TO ASSERT)			
4	AUXILLIARY POWER	-48Vdc NOMINAL, -60Vdc MAX, 10A FUSED EXTERNALLY			

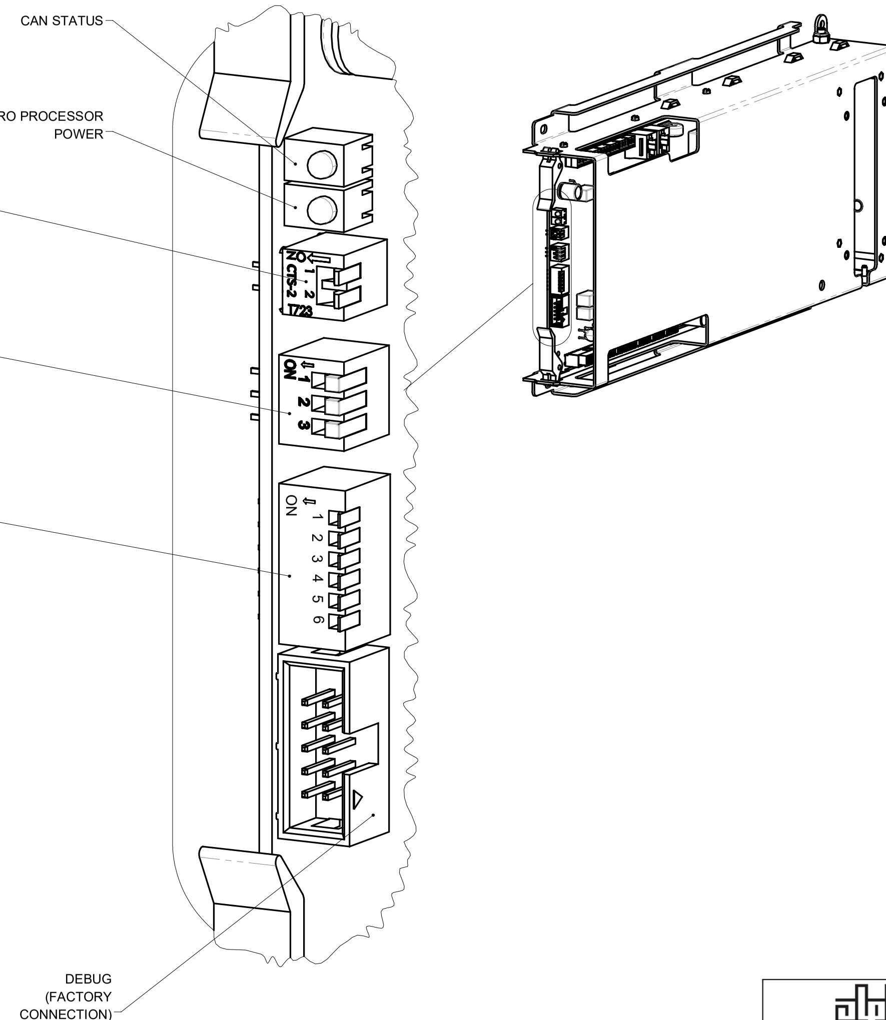
APPROVALS		DATE
DRAWN	JMAR	14-SEP-20
CHECKED	DM	14-SEP-20

TITLE: CUSTOMER CONNECTIONS, XMBS 100A

SIZE: B | DWG NO. 021325X-08 | REV: C

SCALE: 1:3 | SHEET 1 OF 5

CONFIGURATION 100A / 250A



SW400: PHASE CONFIGURATION FOR POWER METERING

SW400	PHASES MONITORED	SW1	SW2
3 PHASE	L1, L2 & L3	OFF	OFF
2 PHASE	L1 & L2	OFF	ON
1 PHASE	L1	ON	ON

SW601: CURRENT SENSOR CONFIGURATION

SW601	SYSTEM CURRENT SELECTED
SW1	100A
SW2	250A
SW3	FUTURE USE

SW600: AUTO-TRANSFER HOLD-OFF TIME

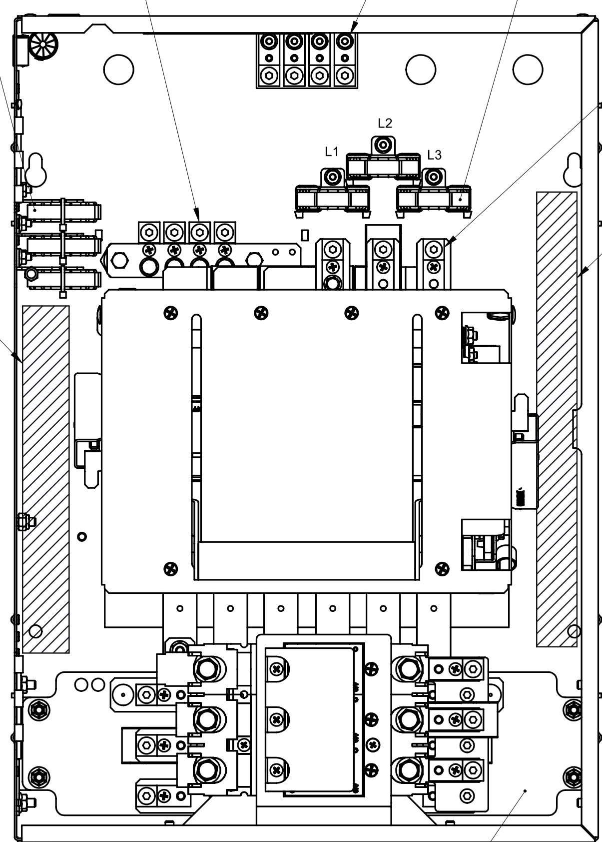
SW600	TIME ADDED WHEN ON
NONE	1 SECOND
SW1	15 SECONDS
SW2	30 SECONDS
SW3	1 MINUTE
SW4	2 MINUTES
SW5	4 MINUTES
SW6	8 MINUTES

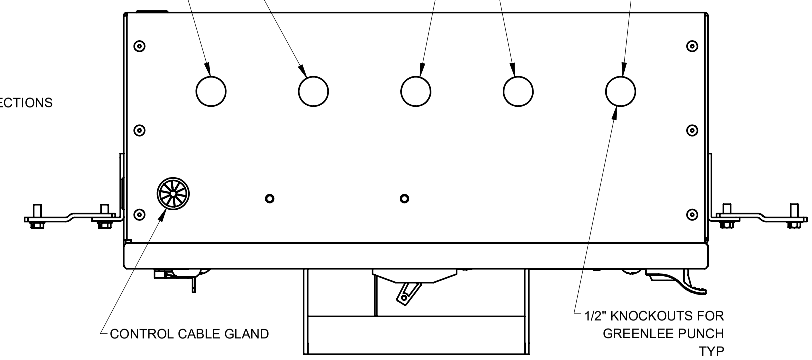
DELAY BEFORE TRANSFERRING WHEN UTILITY RETURNS AFTER COMPLETE POWER FAILURE. ALLOWS TIME FOR INVERTER TO START. TIME IS TOTAL OF SWITCHES SET TO ON.

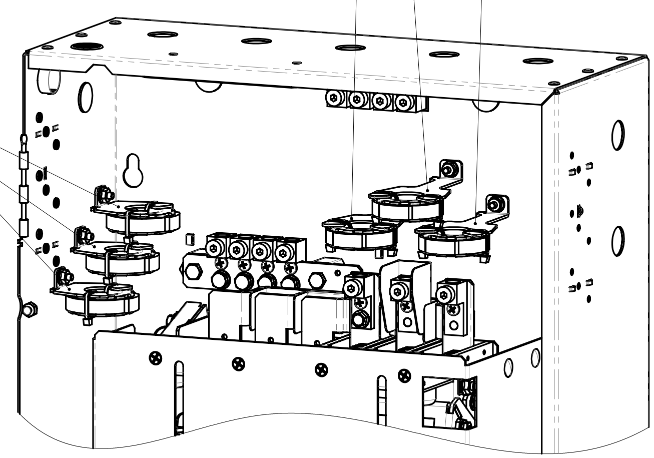
NOTE:

REFER TO OPERATORS MANUAL (9400025-J0) FOR FURTHER DETAILS ABOUT SYSTEM CONFIGURATION.

TITLE:	CUSTOMER CONNECTIONS, XMBS 100A
SIZE	B
DWG NO.	021325X-08
REV	C
SCALE:	1:3
SHEET	2 OF 5





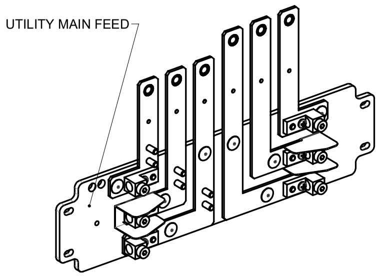


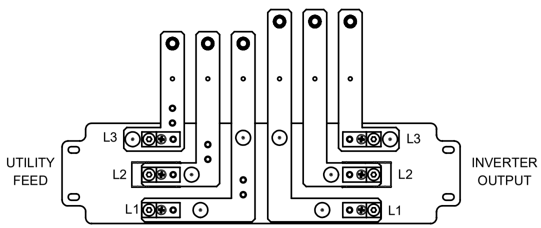
AC CONNECTIONS 100A

TOP CONNECTIONS

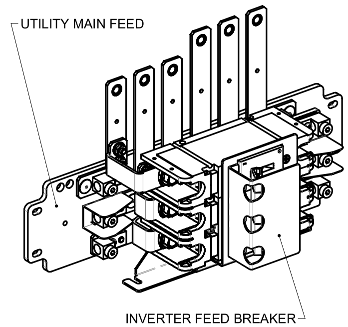
TITLE: CUSTOMER CONNECTIONS, XMBS 100A		
SIZE B	DWG NO. 021325X-08	REV C
SCALE: 1:3.5	SHEET 3 OF 5	

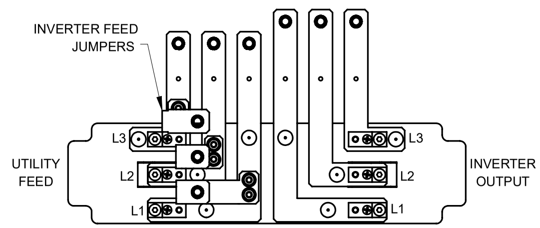
SINGLE FEED CONFIGURATION
(TWO BREAKER)

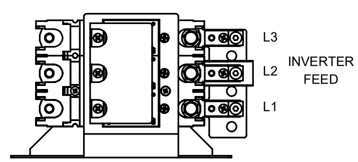




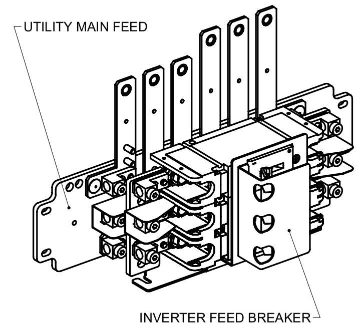
SINGLE FEED CONFIGURATION
(THREE BREAKER)

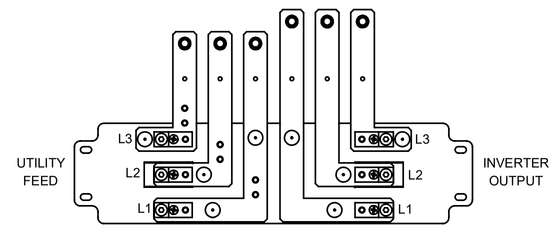


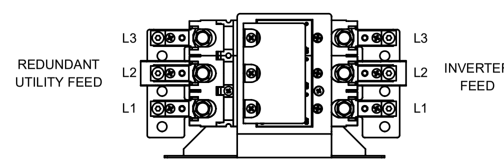




DUAL FEED CONFIGURATION
(THREE BREAKER)



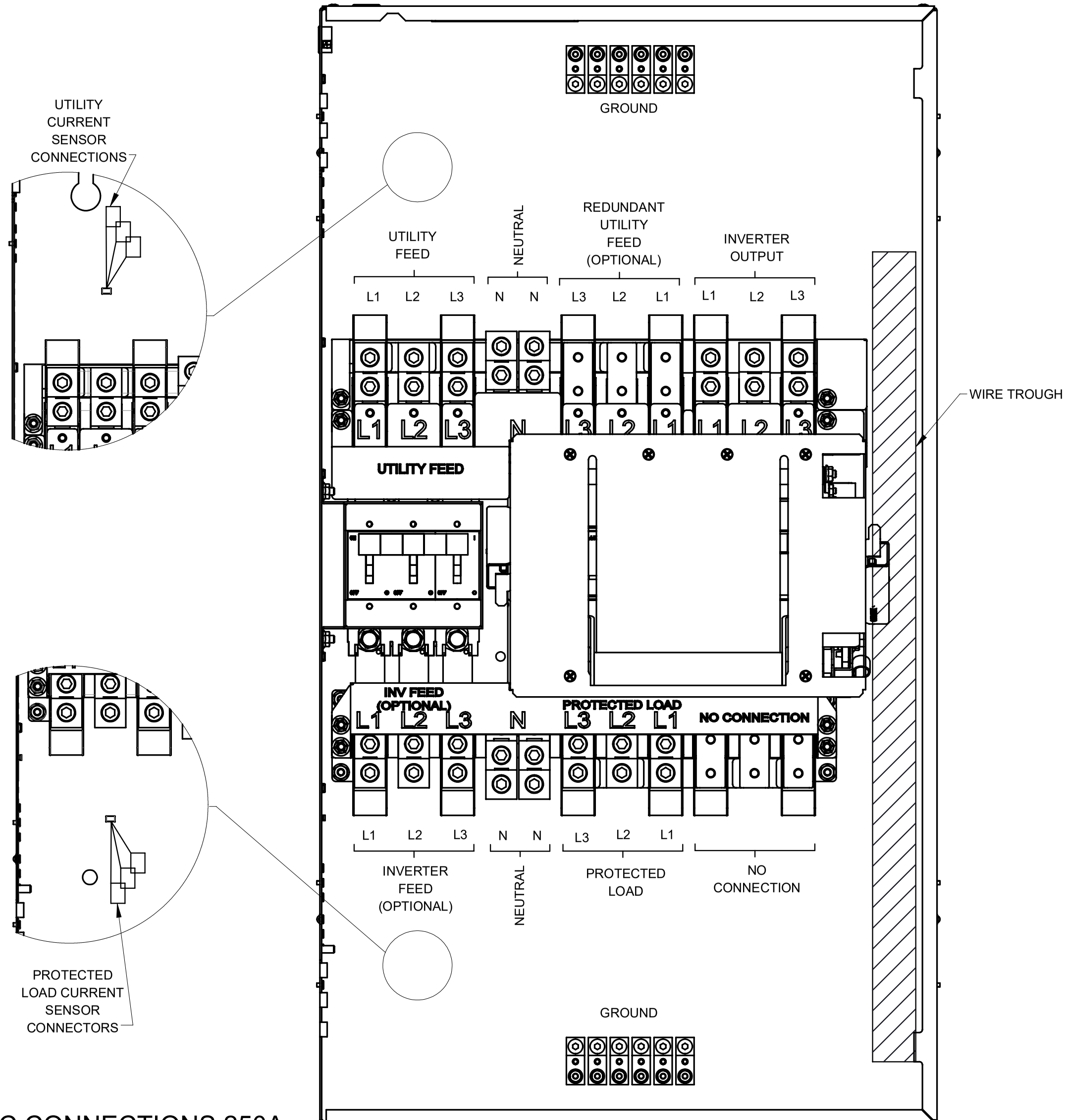




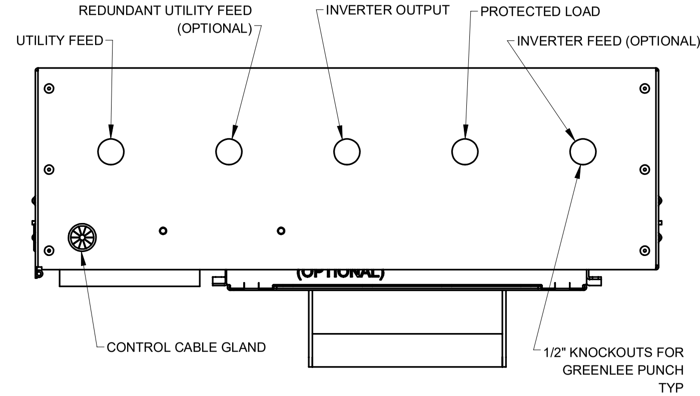
100A LUG SPECIFICATIONS	
WIRE CAPACITY	2/0 - 14AWG
CONNECTIONS PER LUG	1
HOLE SIZE	∅0.437"
SCREW TYPE	3/16" HEX SOCKET SCREW
TEMPERATURE RATING	75C
TORQUES	120 IN-LB

AC CONNECTIONS 100A
BOTTOM CONNECTIONS

TITLE: CUSTOMER CONNECTIONS, XMBS 100A
SIZE: B | DWG NO. 021325X-08 | REV: C
SCALE: 1:5 | SHEET 4 OF 5



AC CONNECTIONS 250A



TOP VIEW

250A LUG SPECIFICATIONS & CONNECTIONS		
WIRE CAPACITY	2/0 - 14 AWG	350 kcmil -6 AWG
CONNECTIONS PER LUG	1	2
HOLE SIZE	∅0.437"	∅0.718"
SCREW TYPE	3/16" HEX SOCKET SCREW	5/16" HEX SOCKET SCREW
TEMPERATURE RATING	75C	90C
TORQUES	120 IN-LB	
CONNECTIONS	GND	L1,L2,L3,N

TITLE:	CUSTOMER CONNECTIONS, XMBS 100A
SIZE	B
DWG NO.	021325X-08
REV	C
SCALE:	1:3
SHEET	5 OF 5

www.alpha.com
#9400025-J0 (12/2020)