OutBack Power Systems™

OutBack Extreme INVERTER/CHARGER

OBX -IC2524P-120/60

Installation Manual

Includes Mounting, Installation, and Product Registration

Warranty Summary

Dear OutBack Customer,
Thank you for your purchase of OutBack products. We make every effort to assure our power conversion products will give you long and reliable service for your renewable energy system.

As with any manufactured device, repairs might be needed due to damage, inappropriate use, or unintentional defect. Please note the following guidelines regarding warranty service of OutBack products:

- Any and all warranty repairs must conform to the terms of the warranty.
- All OutBack equipment must be installed according to their accompanying instructions and manuals with specified over-current protection in order to maintain their warranties.
- The customer must return the component(s) to OutBack, securely packaged, properly addressed, and shipping paid. We recommend insuring your package when shipping. Packages that are not securely packaged can sustain additional damage not covered by the warranty or can void warranty repairs.
- There is no allowance or reimbursement for an installer's or user's labor or travel time required to disconnect, service, or reinstall the damaged component(s).
- OutBack will ship the repaired or replacement component(s) prepaid to addresses in the continental United States, where applicable. Shipments outside the U.S. will be sent freight collect.
- In the event of a product malfunction, OutBack cannot bear any responsibility for consequential losses, expenses, or damage to other components.
- Please read the full warranty at the end of this manual for more information.

About OutBack Power Systems

OutBack Power Systems is a leader in advanced energy conversion technology. Our products include true sine wave inverter/chargers, maximum power point charge controllers, system communication components, as well as breaker panels, breakers, accessories, and assembled systems.

Notice of Copyright

Disclaimer

UNLESS SPECIFICALLY AGREED TO IN WRITING, OUTBACK POWER SYSTEMS:
(a) MAKES NO WARRANTY AS TO THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN ITS MANUALS OR OTHER DOCUMENTATION.
(b) ASSUMES NO RESPONSIBILITY OR LIABILITY FOR LOSS OR DAMAGE, WHETHER DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL, WHICH MIGHT ARISE OUT OF THE USE OF SUCH INFORMATION. THE USE OF ANY SUCH INFORMATION WILL BE ENTIRELY AT THE USER'S RISK.

Contact Information

OutBack Power Systems
19009 62nd Ave. NE
Arlington, WA 98223 Phone (360) 435-6030 • Fax (360) 435-6019 www.outbackpower.com

Date and Revision • February 2008 REV A

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Welcome to the OutBack Power Systems OutBack Extreme Series Inverter/Charger (OBX-IC) System

The OutBack Extreme Series Inverter/Charger offers a complete power conversion system—DC to AC, battery charging, and an AC transfer switch—and can be used in a stand-alone or mobile back-up application. It is designed for use in enclosed locations.

OutBack Power Systems does everything possible to assure the components you purchase will function properly and safely when installed as instructed according to local and national electrical codes. Please read all of the following instructions and the instructions that come with any other OutBack components that make up your power system. Further instructions on individual OutBack Extreme set-ups as well as systems assemblies are included with the FLEXware manuals.

The *OutBack Extreme Series Inverter/Charger Installation Manual* covers the following information:

- Safety
- OBX-IC parts, standard and optional
- Initial inspection of the component
- Preparing the mounting surface
- Fastening the OBX-IC to the mounting surface
- General electrical information

OutBack Extreme Series Inverter/Charger Model

OBX -IC2524P-120/60:

- 2500VA/24VDC
- 120VAC/60Hz
- 30 amp AC transfer switch with neutral/ground switching
- Environmentally protected unit

Each model inverter/charger has a single phase output marked with this symbol: Ø
Each inverter puts out a sine wave waveform marked with this symbol: ∿

Parts Included

- One OutBack Extreme Series Inverter/Charger (OBX-IC)
- One "WARNING ELECTRICAL SHOCK" sticker to place on the exterior of the OBX-IC mounting location
- One packet of silicone grease to protect CAT 5e communication cable connections
- One installation manual
- One Turbo Kit

NOTE: Due to the variety of installation options available to a user, mounting hardware is not included. Any chosen fasteners must be adequate to support the weight of the OBX-IC and no fewer than four fasterners, one per corner, should be used for a safe installation.

Dimensions

- Each OBX-IC measures 8.25" x 16.25" x 13" (20.95 cm x 41.27 cm x 33.02 cm)
- Depending on the model, an inverter/charger weighs between 56 (25.4 kg) and 62.6 lbs (28.39 kg).

Required Conductors

- Each installation differs, including distances between the OBX-IC and the AC and DC components it connects to. For this reason, we do not supply conductors.
- Use 2/0 AWG (.3648" or 9.26 mm), 4/0 AWG (.4600" or 11.7 mm), or larger approved cables rated 75^0 C or higher for DC wiring
- Use #10 AWG (.1019" or 2.60 mm) or larger approved cables rated 75^0 C or higher for AC wiring

Environmental Concerns

In the event an OutBack Extreme Inverter/Charger needs to be disposed of, its aluminum casing is easily recyclable as are any stripped out internal metal and plastic parts. All circuit boards and electronic components should be disposed or recycled in accordance with local environmental laws.

Maintenance

- Periodically check that the battery cable lugs are tight and secure according to the recommended torque settings (60-inch pounds/6.77 Nm).
- Brush off excessive dust from the inverter/charger as needed.
- Check that fasterners securing the inverter/charger to its mounting surface are tight.

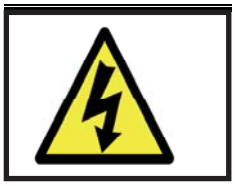
If the OBX-IC is not inverting:

- Verify the DC battery voltage at the inverter/charger terminals
- Verify a lack of AC output
- Call OutBack Technical Support for further assistance.

Storage

Store each inverter/charger unit in a cool, dry area.

READ FIRST!



IMPORTANT SAFETY INSTRUCTIONS/SAVE THESE INSTRUCTIONS

Read all instructions and cautionary markings on the inverter/charger, the batteries and all appropriate sections of this installation and user manual as well as other component manuals before using the system.

Be cautious around electricity, electrical components, and batteries. Shocks, burns, injury, and even death can occur if an installer comes in contact with electricity.

Install all components and wiring according to national and local electrical and building codes. This includes:

- Submitting a plan to the local building department
- Passing inspection

OutBack Power Systems cannot be responsible for system failure, damages, or injury resulting from improper installation of their products.

Use only the recommended DC and AC wire sizes or greater. Be sure all wires are in good condition.

Install the inverter/charger in a dry location, preferably indoors.

- Install the inverter/charger in a shaded area out of direct sun light for best operation.
- For installations where the inverter/charger may be exposed to water spray, a sealed inverter/charger must be used and mounted either with the base down (shelf mounting) or with the AC wiring compartment facing down (wall mounting).
- If mounted with the base down, water cannot be allowed to accumulate around the inverter/charger's base. There is a drainage system on the base of the inverter/charger to dispel condensation.
- If submerged, water can enter this drain and cause failure.

INITIAL INSPECTION

Your inverter/charger is stoutly packaged for secure shipping. Please inspect the packaging and component for damage or exposure to water prior to intallation. Never power up a damaged OBX-IC.

WARNING: WORKING NEAR LEAD ACID BATTERIES CAN BE DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL OPERATION.

Design the battery enclosure to prevent accumulation and concentration of hydrogen gas in "pockets" at the top of the enclosure. Vent the battery compartment from the highest point to the outside. A sloped lid can also be used to direct the flow of hydrogen to the vent opening.

CAUTION

To reduce risk of injury, charge only deep-cycle lead acid, lead antimony, lead calcium, gel cell or absorbed glass mat type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage. Never charge a frozen battery.

PERSONAL PRECAUTIONS

- Someone should be within range of your voice to come to your aid if needed.
- Keep plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
- Wear complete eye protection. Avoid touching eyes while working near batteries. Wash your hands with soap and warm water when done.
- If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters an eye, flood the eye with cool running water at once for at least 15 minutes and get medical attention immediately following.
- Baking soda neutralizes lead acid battery electrolyte. Keep a supply on hand in the battery area.
- NEVER smoke or allow a spark or flame in vicinity of a battery or generator.
- Be extra cautious to reduce the risk of dropping a metal tool onto batteries. It could short-circuit the batteries or other electrical parts and can result in fire or explosion.
- Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery or other electrical current. A battery can produce a short circuit current high enough to weld a ring or the like to metal, causing severe burns.

SYSTEM PROTECTION

An OutBack Extreme Series Inverter/Charger is part of an electrical system that protects:

- You
- The wires
- The components
- The devices served by the electrical system

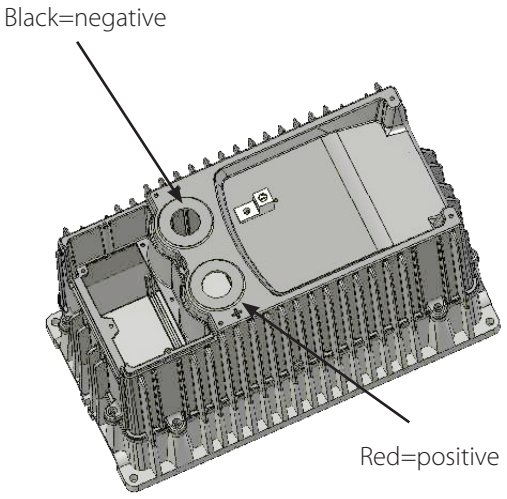
Each OBX-IC must be part of a permanently grounded electrical system (see page 8). Grounding protects people and equipment from electrical shock. Grounding must be done according to local and national electrical codes.

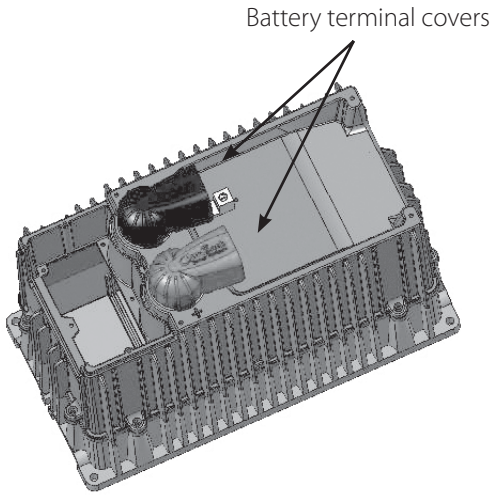
OutBack circuit breakers protect wiring by limiting the amount of current entering a system. All wired electrical systems require circuit breakers or fuses for protection.

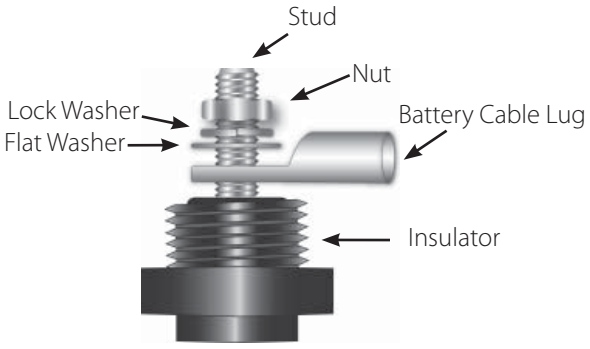
OutBack offers both breakers and fuses for over-current protection. If they are provided by other vendors, they must be properly rated.

DC WIRING ORIGINATION

DC brass battery terminals with 8M x 1.00 stainless steel threaded studs



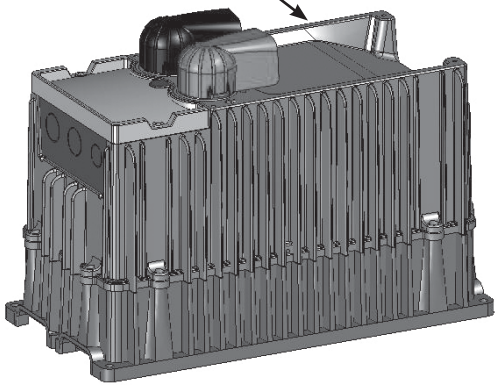




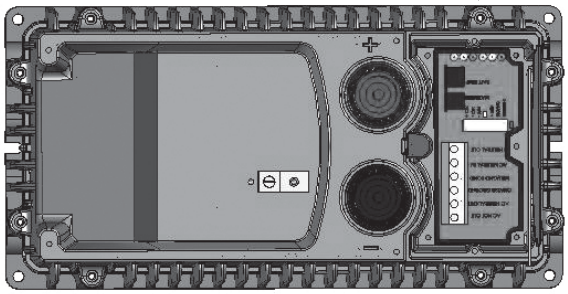
- Never install extra washers between the terminal mounting surface and the battery cable lug—the connection must be direct and secure.
- Always install breakers or fuses within the positive battery cable.
- Torque 2/0, 4/0, or larger NEC approved cables rated 75^0C or higher to 60-inch pounds/6.77Nm.

AC WIRING ORIGINATION

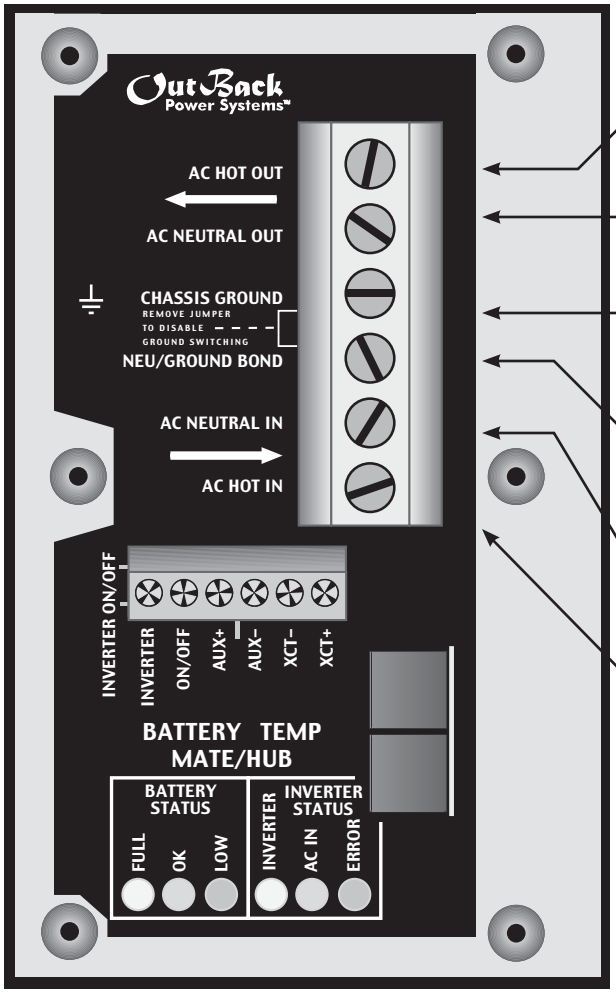
Lexan cover protects AC Wiring Compartment Board



AC Wiring Compartment



AC WIRING COMPARTMENT BOARD



AC Terminal Block—secures AC connections to the OBX-IC using set screws

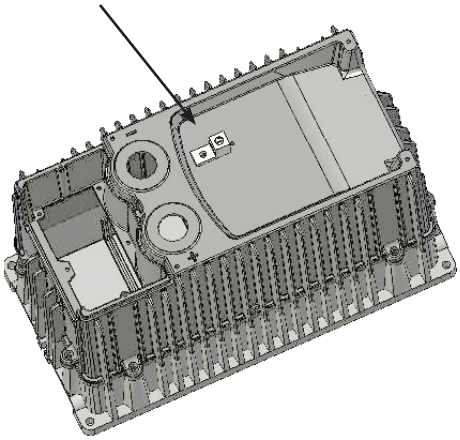
- **AC HOT OUT** supplies power to the loads.
- **AC NEUTRAL OUT** acts as neutral leg for loads supplied by the OBX-IC and is common with the AC NEUTRAL IN.
- **CHASSIS GROUND** connections are common and act as grounds for both the incoming and outgoing AC circuits.
- **(AC) NEUTRAL/GROUND BOND** is connected to the chassis ground terminal with a removable jumper.
- **AC NEUTRAL IN** acts as the neutral leg for AC power supplied by either the grid or a generator to the OBX-IC.
- **AC HOT IN** connects incoming AC from the grid or a generator to the OBX-IC. This AC is used to run loads and recharge batteries.

AC AND DC GROUNDING REQUIREMENTS

- Connect only to a grounded, permanent wiring system. Ensure there is only one AC and DC neutral-ground connection in the system at any time.
- If the system has a generator, disconnect its neutral-ground connection if present.
- For all installations, the negative battery conductor should be bonded to the grounding system at one (and only one) point in the system.
- The OBX-IC should never be positive grounded.

The equipment ground on each is marked with this symbol: ⏚

Box lug for grounding the FX chassis



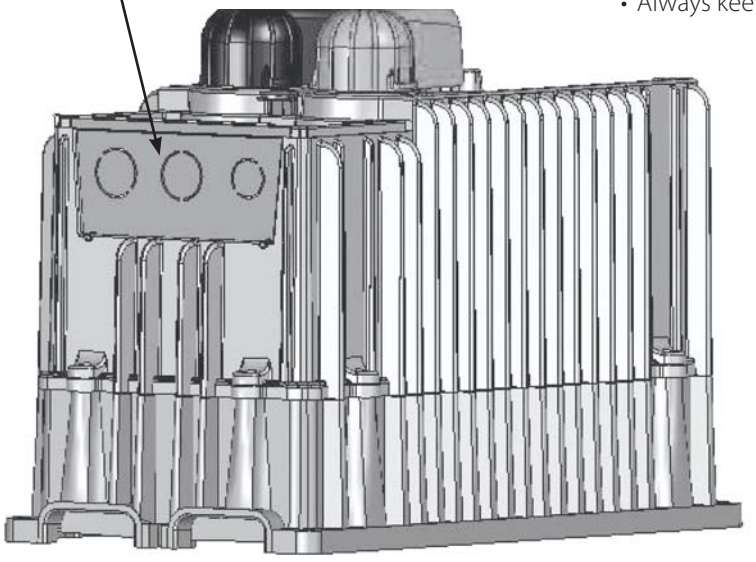
PARTS AND ACCESSORIES

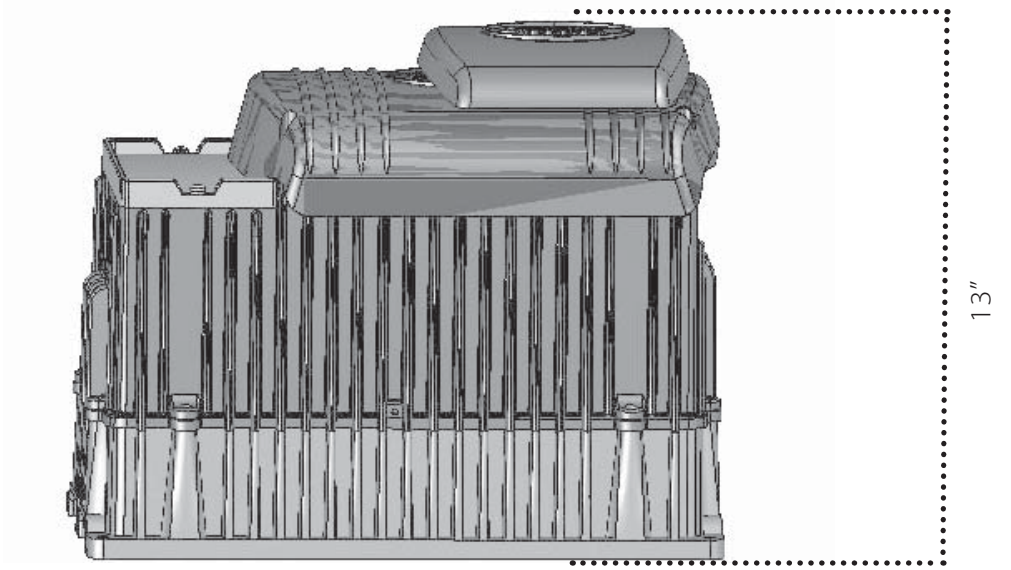
AC CONDUIT PLATE*

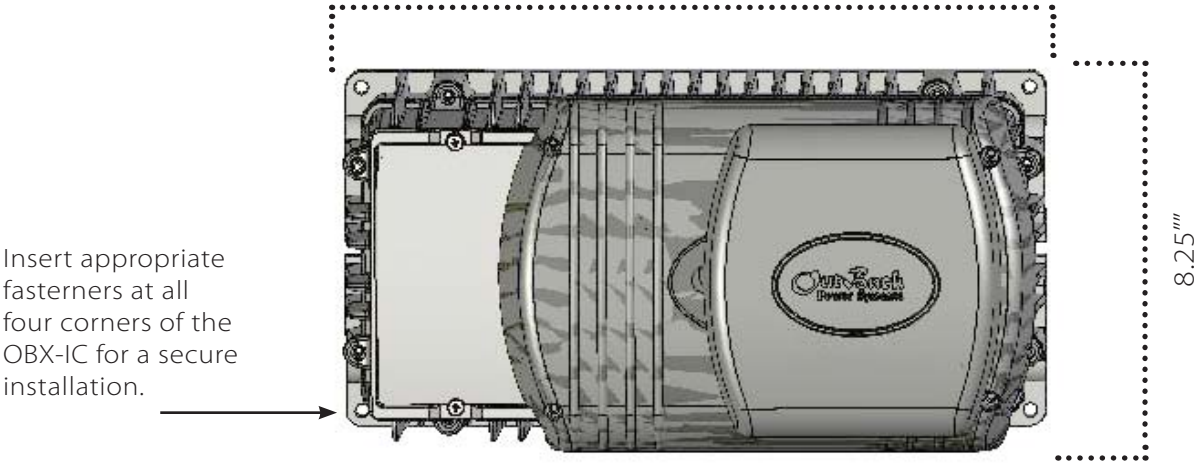
- AC conduit connects to the AC Conduit Plate for installations which do not utilize an ACA.

BATTERY TERMINAL COVERS

- The caps are made of stiff plastic with a snap-on design; remove them carefully using a flat-blade screwdriver inserted into the slots on the sides of each cover.
- Always keep the battery terminal covers installed.



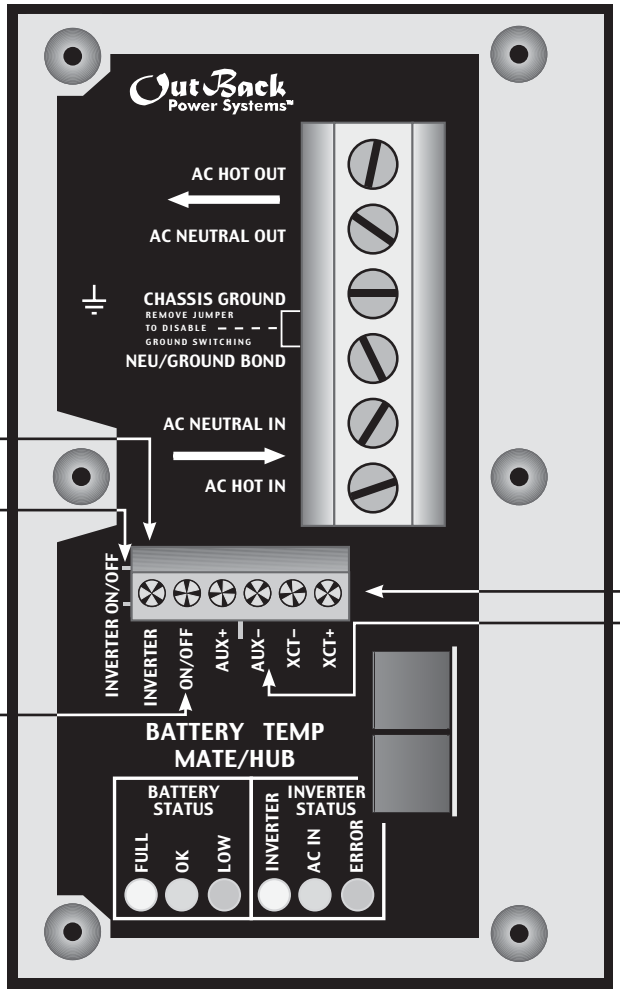




MOUNTING

- The OutBack Extreme Series Inverter/Charger is approved for indoor or enclosed protected mounting only.
- An OBX-IC weighs approximately 62 lbs (28.2 kg) and must be secured with appropriate fasteners to a sturdy mounting surface capable of supporting its weight. It is easier for two people to install due to the OBX-IC's weight.
- The OBX-IC can be mounted in any position, but they perform better in locations offering plenty of air circulation.
- Due to the variance in other mounting methods, OutBack only endorses the use of FLEXware or previous versions of its mounting plate for installing the OBX-IC and associated system components using M6 X 20mm machine screws, one per corner. Follow the instruction manual that comes with each mounting system.
- If mounting the OBX-IC on other surfaces such as plywood, wall studs, or masonry, use appropriate fasteners to support approximately its weight. OutBack cannot be responsible for damage to the inverter/charger if it is attached with inadequate fasteners.
- Install and secure each OBX before attaching any wiring.

LOW VOLTAGE TERMINALS



Control Terminal Wiring Block

Jumper

INVERTER ON/OFF: Allows for manual or remote switch to control the OBX-IC (default operation is "ON"); controlled by the MATE when the installed jumper connecting these terminals is present.

NOTE: Keep Control Wiring Terminal Block screws tight and the block itself secured tightly to AC Board. Otherwise, the OBX-IC can malfunction. The Terminal Block can be unplugged for easier wire installation and removal/reinstallation of the OBX-IC.

AUX OUTPUT (AUX+/AUX-): 12VDC at 0.7 amps (8.4 watts) maximum is available at these terminals; the AUX outputs default mode is to drive cooling fans or the Turbo Fan.

XCT+/XCT- are non-operational terminals (do not connect).

WIRE CONNECTIONS

NOTE: A system's individual voltage requirements (120 single phase, 120/240 split phase, or 3-phase) as well as how each OBX-IC is to function all determine how the OBX-ICs are wired. Each OBX-IC must be wired to the logical leg or phase of the system. Each OBX-IC must be programmed or "stacked" according to this phase. Please see the *FX and VFX Series Inverter/Charger Programming Manual* before connecting any wires to or from the OBX-IC.

AC

Follow these steps to wire the OBX-IC to your system:

1. Shut all AC breakers off or remove any fuses before connecting any wiring.
2. Shut off all DC breakers, including, if present, any PV breakers.
3. With all power off, run lengths of 10 AWG (.1019" or 2.60 mm diameter) wire between the AC Wiring Compartment Board AC out terminals and a 30 amp over current protection circuit breaker depending on the OBX-IC model. The breaker should be installed inside of a metal enclosure, such as OutBack's FLEXware series or an existing panel.
4. With the over current protection connected, run lengths of 10 AWG (.1019" or 2.60 mm diameter) wire between the AC Wiring Compartment Board AC IN terminals and the AC input breaker. The breaker should be installed inside of a metal enclosure, such as the FLEXware series or an existing panel. The AC input hot conductor must be supplied through a 30 amp maximum AC branch rated circuit breaker.

DC

- Use crimped and sealed copper ring terminal lugs with 5/16" (8 mm) hole or compression-type lug to connect battery cables to DC terminals. Soldered cable lugs are also acceptable.
- Use recommended cable sizes (see page 29) to reduce losses and ensure high performance of OBX (smaller cables can reduce performance and possibly damage the unit).
- Keep cables together (e.g., using a tie-wrap) as much as possible.
- Ensure cables pass through the same knockout and conduit fittings to allow inductive currents to cancel.

TORQUE REQUIREMENTS

CONNECTION	TORQUE IN POUND MEASURES
AC and PV breakers	to 22 inch-lbs/2.48 Nm
DC shunt	to 15 foot-lbs/20.4 Nm
DC battery connections	to 10 foot-lbs/13.6 Nm
OBX-IC's DC Terminals	to 5 foot-lbs/5.8 Nm
OBX-IC's AC Terminals	to 30 inch-lbs/3.38 Nm

Table 1 Torque Values for Installation

AC WIRING NOTES FOR THE OBX-IC

AC HOT OUT

- Supplies the AC hot output conductors through a 30 amp maximum AC branch rated circuit breaker using 10 AWG (.1019" or 2.60 mm diameter) wire and connector to the AC.

AC NEUTRAL OUT/AC NEUTRAL IN

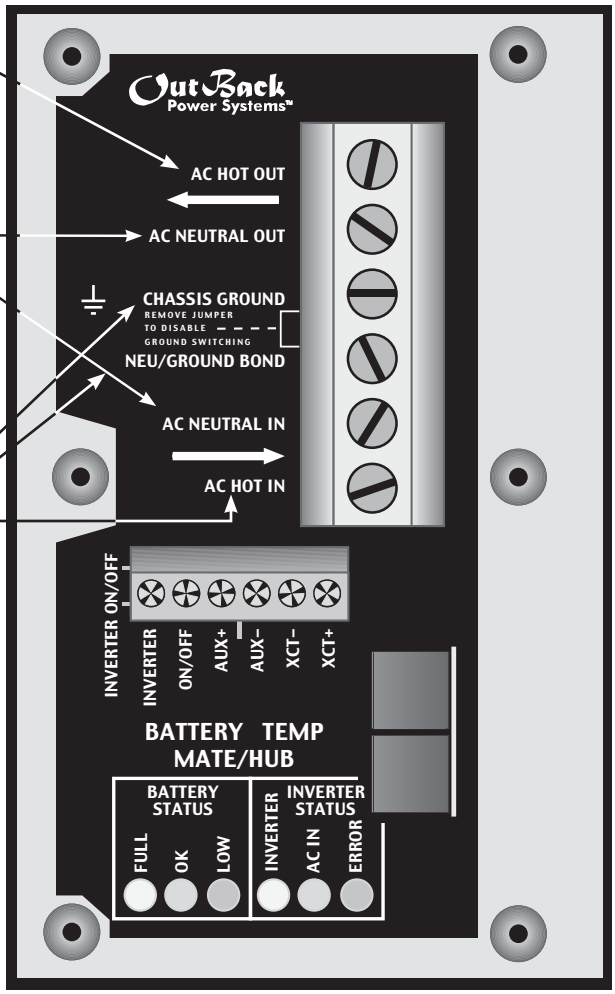
- Connects the AC neutral input conductor to the AC NEUTRAL IN terminal.
- Connects the AC neutral output conductor to the AC NEUTRAL OUT terminal.
- Do not assume these terminals are common in the OBX-IC.
- The NEUTRAL IN and NEUTRAL OUT conductors should not be common (connected in any way) prior to connection with an OBX-IC.

NEUTRAL/GROUND SWITCHING SYSTEM

- Connects AC output neutral conductors to the CHASSIS GROUND and NEU/GROUND BOND terminals while it's inverting.
- If there is only one OBX-IC in the system, leave the copper bus jumper (provided) installed between the CHASSIS GROUND and NEU/GROUND BOND terminals. If there is more than one OBX-IC in a system, remove the copper bus from every Slave OBX-IC.

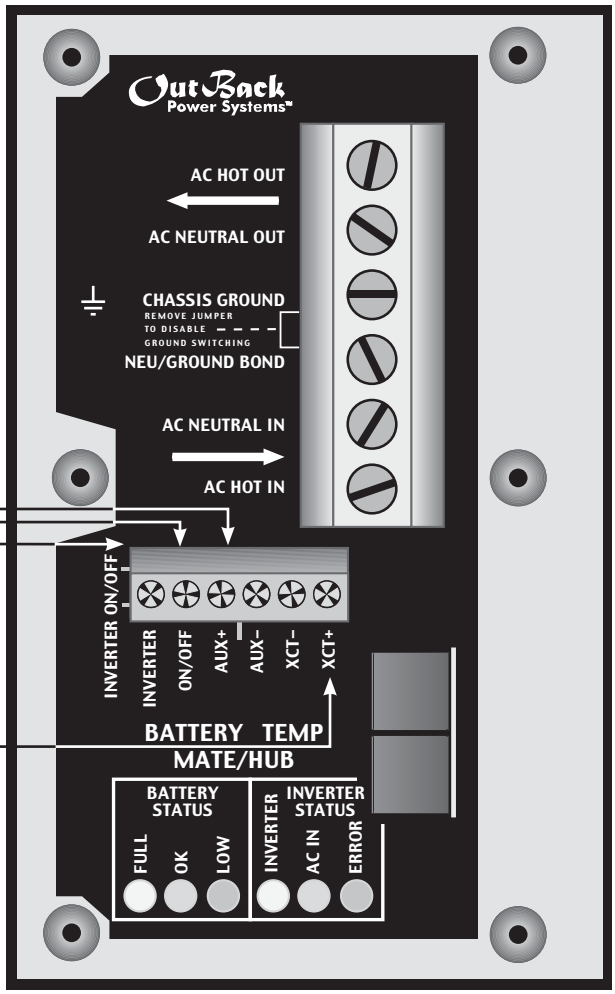
AC HOT IN

- The AC hot input conductor (black) must be supplied through a 30 amp maximum AC branch rated circuit breaker and connected to the AC HOT IN.
- 10 AWG (.1019" or 2.60 mm diameter) wire is required for the OBX-IC's AC transfer switch.



LOW-VOLTAGE WIRING

The six-position terminal block can be unplugged to make wiring easier and to simplify the removal and reinstallation of an OBX-IC. It must be securely and completely plugged in for proper OBX-IC functioning. Otherwise, operational errors can occur.



12 VDC at 0.7 amps (8.4 w) is available at the AUX+/AUX- terminals

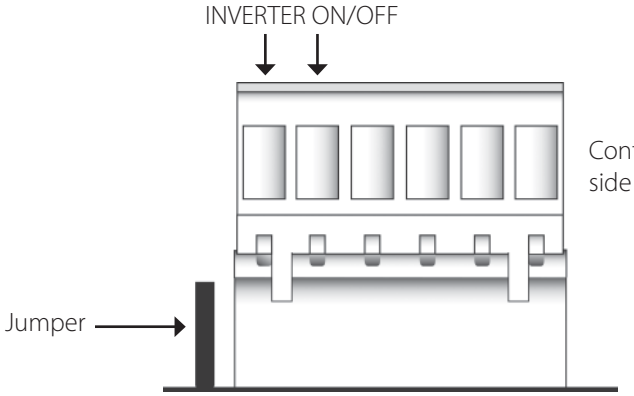
A switch can be wired to the INVERTER and ON/OFF terminals to manually control the OBX-IC

Control Wiring Terminal Block

XCT+/XCT- are not operational

INVERTER and ON/OFF

- Replacing the pre-installed jumper (connecting the ON/OFF terminals) with a switch allows manual control of the OBX-IC.
- When a jumper is installed in either location, the inverter will be ON or controlled by the optional MATE System Controller and Display.
- When a switch is installed, the inverter is ON when the switch is closed and OFF when the switch is open.



Control Wiring Terminal Block, side view

Prior to installing an ON/OFF switch, if the OBX-IC's AC output is off, check that the jumper is present and well-connected before installing a switch. You want to confirm the system is in good working order.

Should you decide to install an OutBack MATE at a later date, bear in mind the installed switch overrides the control provided by the MATE if the switch is set to OFF. If the switch is set to ON, the MATE will function normally and control the inverter(s).

- When a system is ordered with a MATE, the MATE handles all OBX-IC ON/OFF functions (unless an optional ON/OFF switch is installed).

AUXILIARY OUTPUT (AUX + / AUX -)

The Auxiliary output system uses the AUX + and AUX – terminals. It is programmed through the MATE to do a variety of tasks:

- The default use for these terminals drives the OutBack Turbo for external cooling.

NOTE: These terminals should not be connected to any type of DC load greater than 0.7 amps.

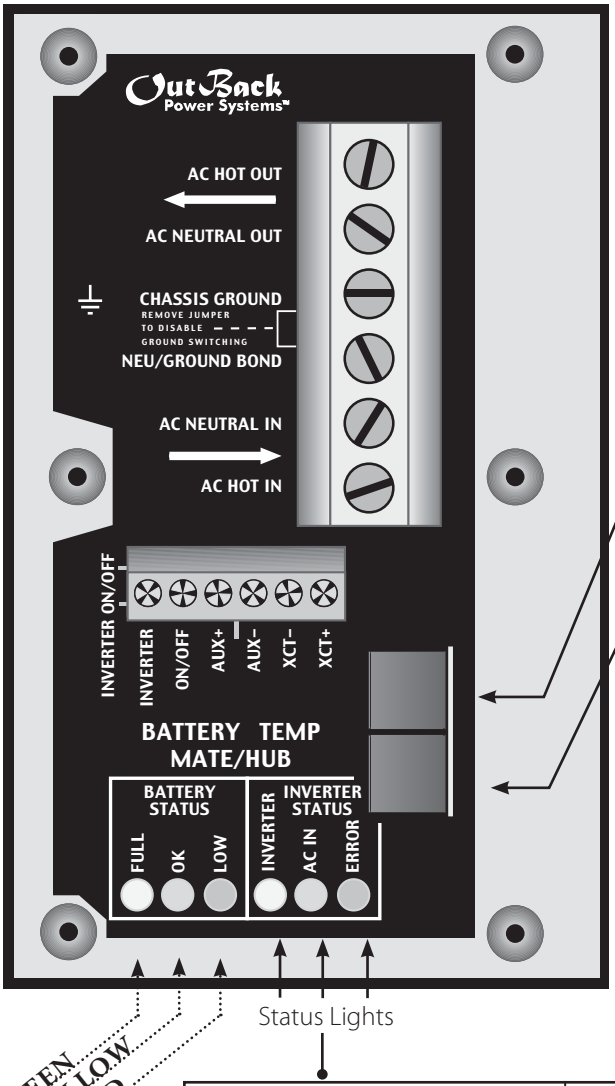
- The OBX-IC includes internal electronic over-current protection for the AUX 12VDC output circuit which auto resets if it is short-circuited. No additional fuses are required.
- For automatic or advanced generator start functions, the Auxiliary Output can drive a 12V relay coil for the two-wire starting circuitry of a generator. OutBack recommends a good quality gold-plated relay.

NOTE: OutBack Power Systems does not support three-wire start generators; however, a three-wire to two-wire conversion kit is available from an electronic control manufacturer such as Atkinson Electronics (www.atkinsonelectronics.com).

XCT + / XCT -

These terminals are not operational at this time.

RTS, MATE/HUB WIRING



RJ-11 modular jack connects RTS, the optional external battery temperature sensor.*

RJ-45 jack connects the MATE System Controller and Display or the HUB Communication Manager to the OBX-IC using CAT5 cable.**

* When a HUB is used, plug the RTS into the Master OBX-IC, which should be plugged into HUB's Port 01. The RTS cable is folded and routed under the AC Wiring Compartment's Lexan cover, fitting into a small indentation in the aluminum casting between the battery terminals. ONLY USE THE OUTBACK RTS; OTHER BRANDS WILL YIELD INCORRECT READINGS.

** If the system has multiple OBX-ICs and/or OutBack Charge Controllers, a HUB is required.

Status Lights

GREEN
YELLOW
RED

Battery Lights

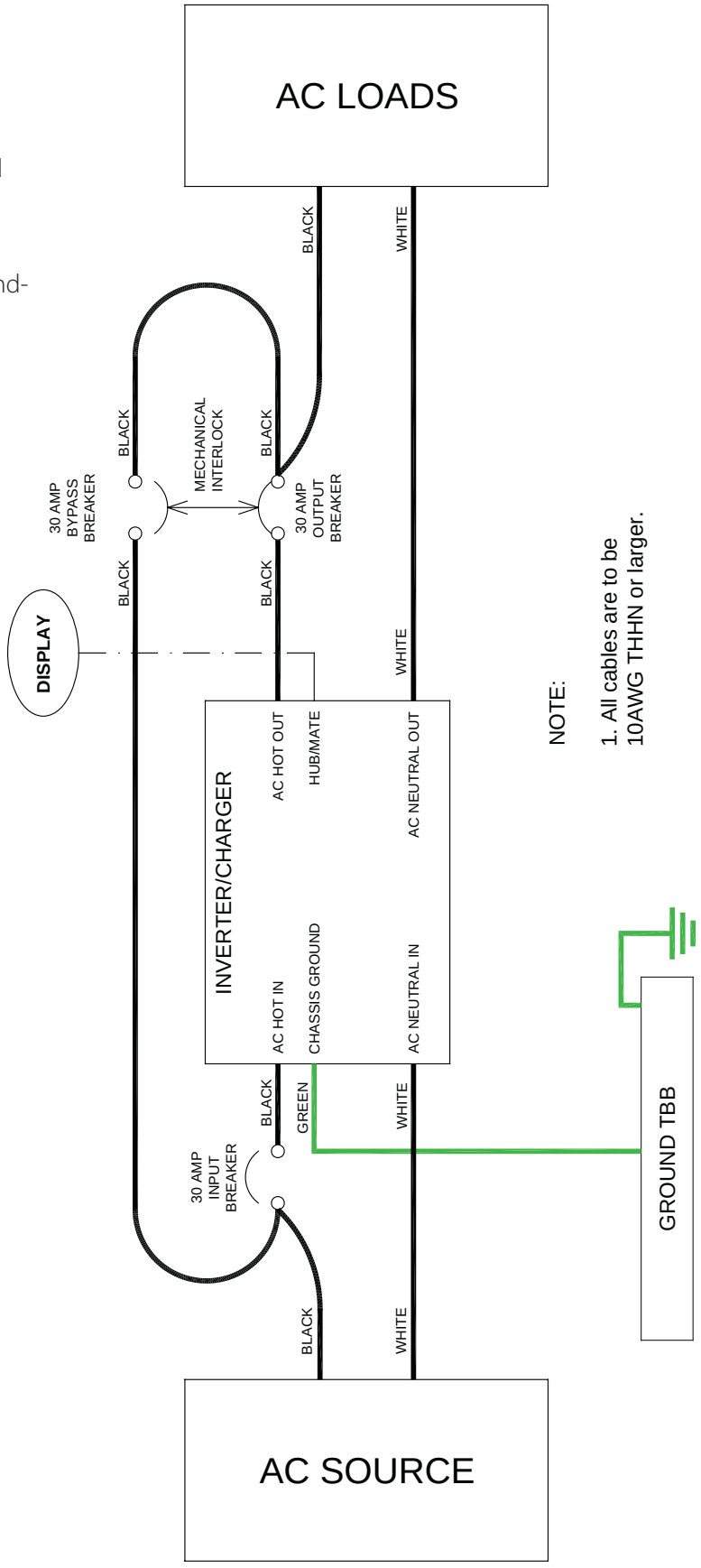
LED Color		*LED Action*	*LED Indicates*
Green	O	Solid GREEN →	Inverter ON
		Flashing GREEN →	Search Mode or Slave Power
		Off →	Inverter OFF
Yellow	O	Solid YELLOW →	AC Source is Connected
		Flashing YELLOW →	AC Input Live—Waiting to Connect to the OBX-IC
		Off →	No AC Input Present
Red	O	Solid RED →	Error—An Error Message will be automatically displayed on the MATE
		Flashing RED →	Warning—A non-critical fault happened to the OBX-IC; the MATE can access this info.

LED Color			*12 VDC*	*24 VDC*	*48 VDC*
Green	O	(FULL)	12.5 or higher	25.0 or higher	50.0 or higher
Yellow	O	(OK)	11.5 to 12.5	23.0 to 24.8	46.0 to 49.6
Red	O	(LOW)	11.5 or lower	<23.0	<46.0

SAMPLE INSTALLATIONS

Single OBX-IC System:

- A 30A input breaker must be used with an OBX-IC
- A single OBX-IC can continuously power up to 2.5kW of loads depending on the ambient temperature.



SERIES DUAL OBX-IC CONFIGURATION

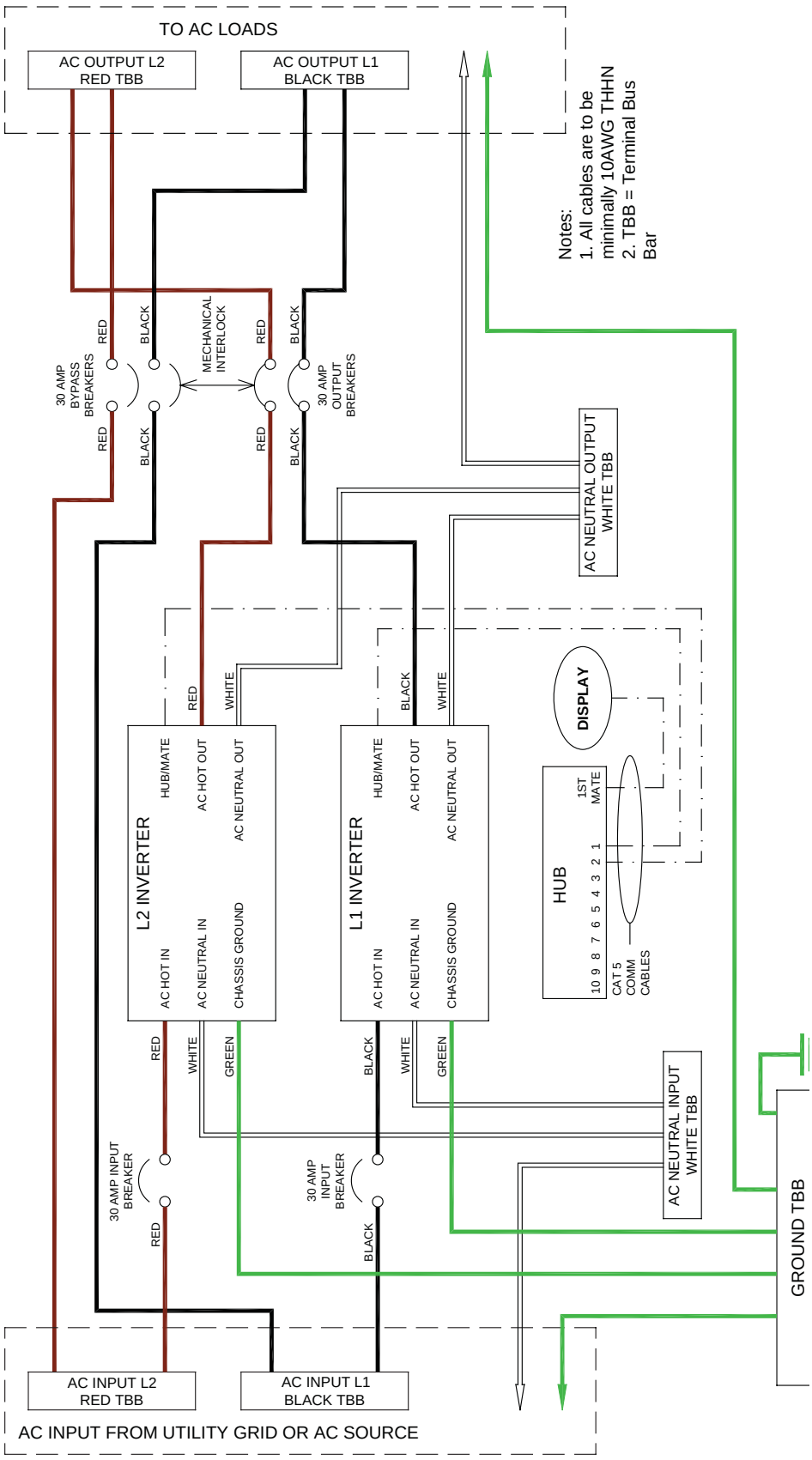
- This system can continuously power up to 5kW of AC loads depending on the ambient temperature.
- A dual OBX-IC system requires 30A two-pole AC input breakers.

NOTE:

- Stacking two OBX-ICs in series means there are OBX-ICs directly connected to two separate 120VAC output legs. These legs produce 240VAC between them (the series portion) as the two inverters are "out of phase" with respect to each other. This allows all of the OBX-ICs to power either of the 120VAC output legs (the parallel portion).

- When the OBX-ICs are connected in series for 120/240VAC:
  - The FW-X240 Auto Transformer can be connected to the AC output; both OBX-ICs power capacity is then available on either 120VAC output circuit.
  - This allows higher efficiency and better performance as heavy 120VAC loads are powered by both OBX-ICs.
  - The FW-X240 Auto Transformer also allows the Master OBX-IC to power loads on either 120VAC output circuit with the Slave OBX-IC off, reducing idle power consumption and improving system efficiency.

- The Slave OBX-IC must be programmed through the MATE as a "Classic Slave"' (series stacking, no FW-X240 Auto Transformer) or as "OB Slave L2" (series/parallel stacking, FW-X240 included). The OBX-IC connected to Port 01 of the HUB is always the Master (1-2ph MASTER)

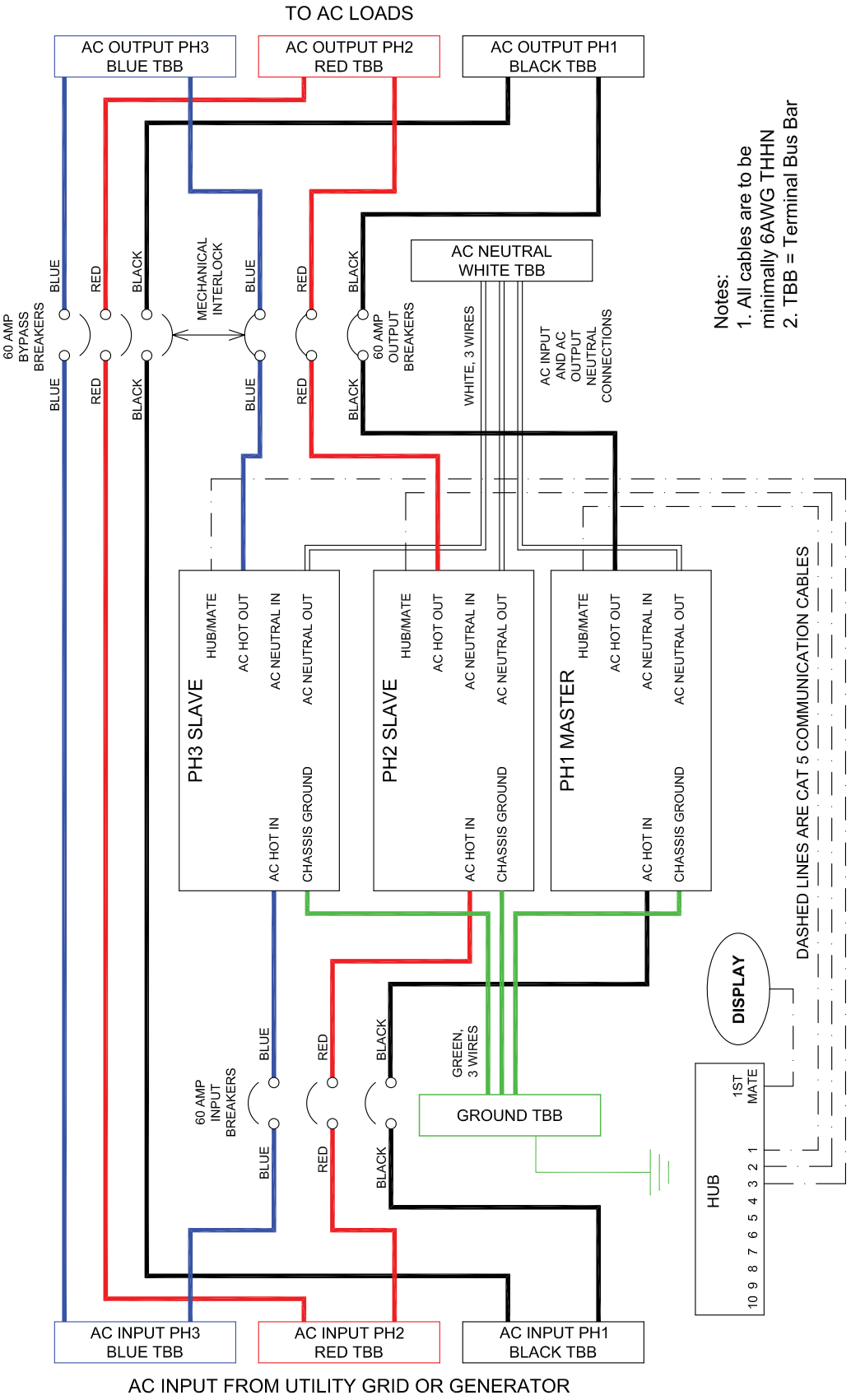


Series/Parallel Using Two OBX-ICs for 120/240VAC applications (shown without an installed optional FW-X240 Auto Transformer)

3-PHASE FX SYSTEM

- This system produces 120VAC per phase and 208VAC from phase to phase. There can only be one OBX-IC per phase on a 3-phase system.
- The OBX-IC AC wiring from the AC source and to the AC loads must handle 30 amps AC.
- This system can power continuously up to 7.5kW of loads depending on which model is used.
- Connecting more power than the continuous rating of the OBX-IC may cause breakers to trip or the OBX-IC to shut off its AC output.
- The jumper in the HUB must be moved for 3-phase configuration (please see the HUB Installation and User Guide).

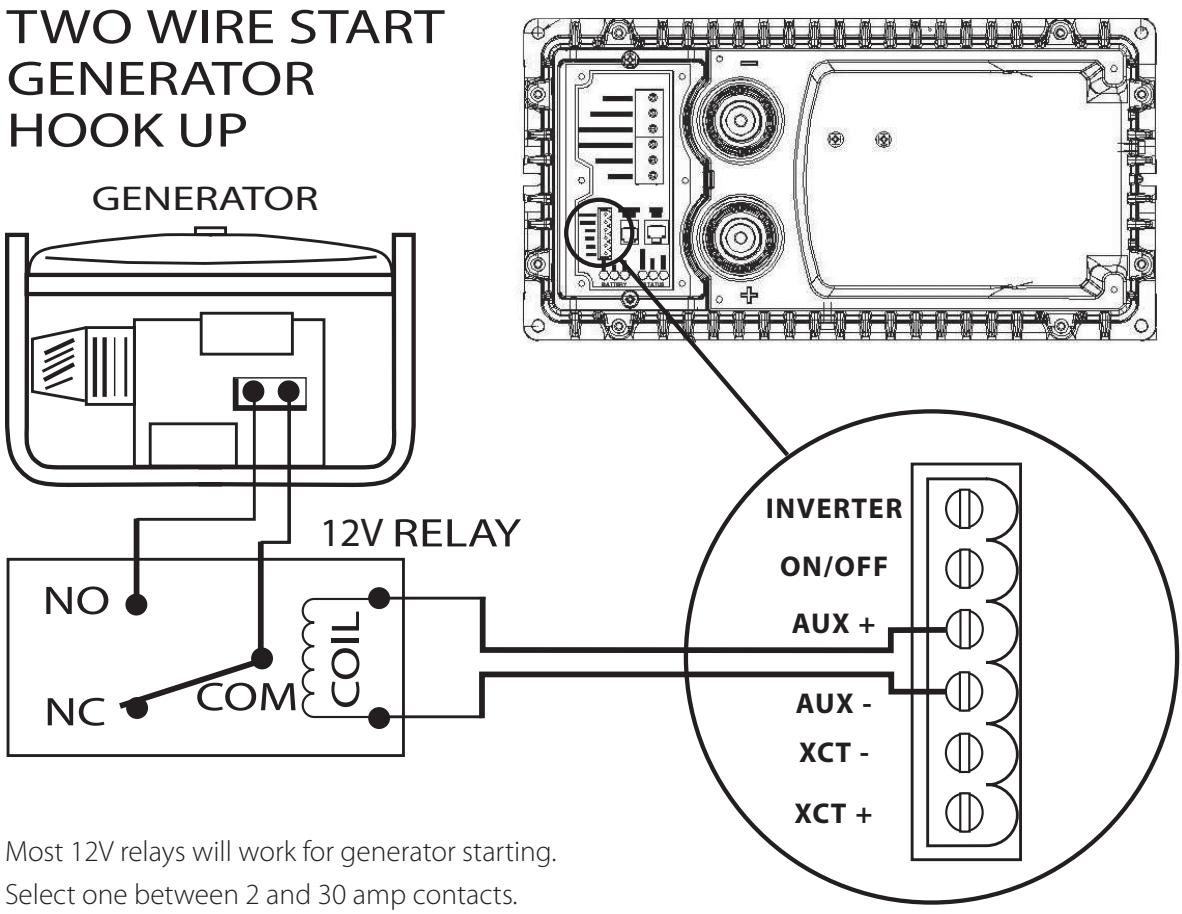
NOTE: Program the bottom OBX-IC as Master (3ph MASTER) and the two lower OBX-ICs as 3-phase Slaves (3ph SLAVE). Keep the phases in order: phase one is connected to the OBX-IC programmed L1; phase two is connected to L2; and phase three to L3 (or phases A, B, and C to inverters A, B, and C).



Three-Phase System

GENERATOR AUTO START

The following schematic shows how to hook up a relay that interfaces with the two-wire start generator. As noted previously, three-wire start generators require an adapter like the Atkinson GSCM available at www.atkinsonelectronics.com.

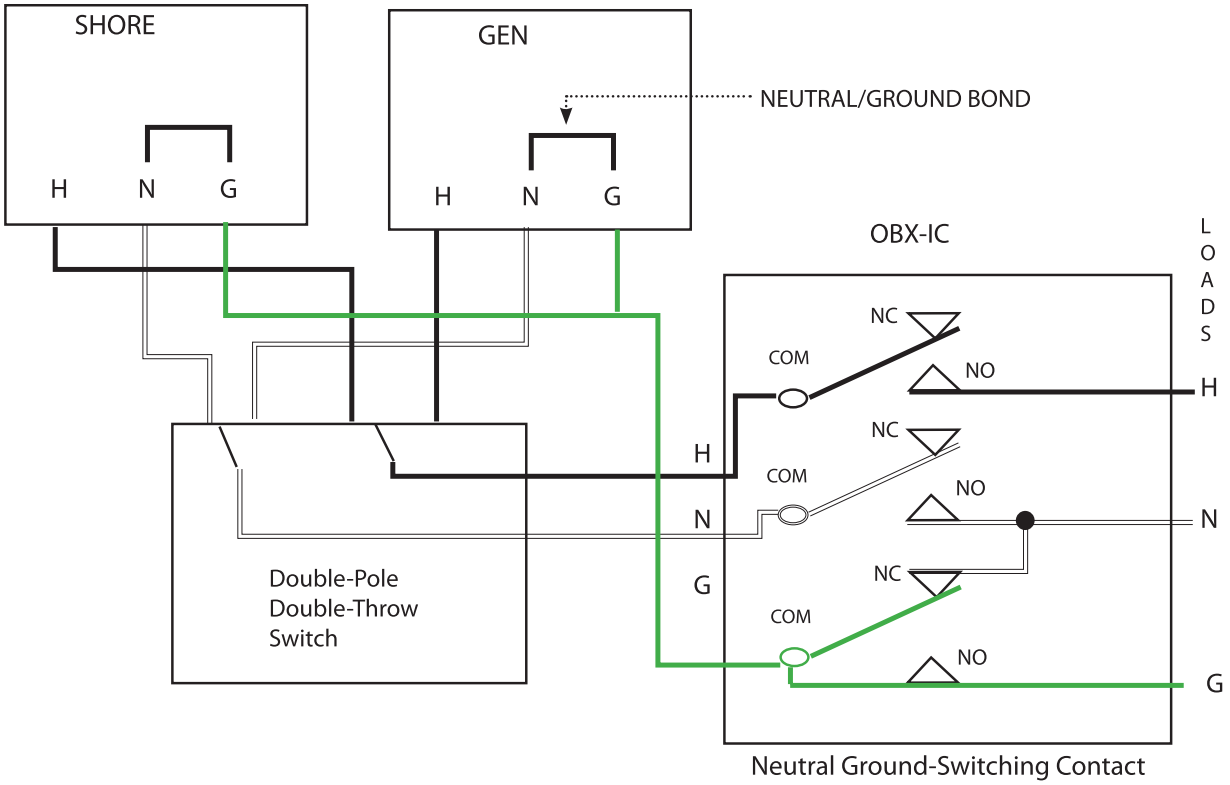


Most 12V relays will work for generator starting.
Select one between 2 and 30 amp contacts.
OutBack suggests using a 10 amp gold contact relay.

Using Generator or Utility Power

When an OBX-IC system has the option of using either an onboard generator or the utility grid or shore power (see next diagram) as their AC input:

- Both the AC "Hot" and AC "Neutral" lines must be connected to the appropriate source.
- A connection can be made using a double-pole, double-throw switch (currently unavailable from OutBack, but available from electrical component suppliers) which has one connection each for AC hot and AC neutral.
- This switch must be rated to handle the system's maximum AC voltage and AC current.



The OBX-IC's AC input consists of a Hot (H), Neutral (N) and Neu/Ground Bond (G). The OBX-IC has an internal "Ground-Switching Contact" that will open when it connects to an AC input.

INSTALLATION CHECK LIST ***ITEM***	***YES***	***NO***
All manuals read and reviewed?		
▶ OBX-IC		
▶ FX Programming Manual		
System mounted with the recommended number and sized fasteners?		
System installed according to National Electrical Code (NEC) and/or local codes?		
System inspected?		
System permanently grounded?		
Did the installer use OutBack recommended wire type and gauge adjusted for temperature ratings and length?		
▶ All AC wiring rated for 75° C or higher?		
▶ Battery cables rated 75° C or higher?		
▶ 10 AWG (.116" or 2.59 mm diameter) or larger wire used for AC HOT OUT?		
▶ 10 AWG (.116" or 2.59 mm diameter) wire or larger used for OBX-IC AC Input Hot?		
OBX-IC connected to AC circuit with 30 amp maximum branch-circuit over-current protection?		
▶ All cables torqued to OutBack specifications?		
▶ AC and PV breakers to 22 inch-lbs/2.48 Nm?		
▶ All DC connections to 10 foot-lbs/13.55 Nm?		
▶ OBX-IC AC terminals to 30 inch-lbs/3.38 Nm?		
▶ OBX-IC battery breaker to 45 inch-lbs/5.08 Nm?		
▶ All terminal block screws torqued to 2.5 foot-lbs/3.38 Nm?		

APPENDIX

RATINGS

OBX-IC2524P-120/60 Inverter/Charger

2.5 KWAC 24VDC 120 VAC 60 HZ

Nominal AC Output Ratings for Multiple OBX-IC Systems

Single Phase	One OBX-IC	120VAC/60 Hz	2.5kWAC	20.8 Amps
Split Phase	Dual OBX-ICs	120/240VAC/ 60 Hz	5.0kWAC	20.8 Amps per leg
Three Phase	Three OBXs	120Y208VAC/ 60Hz	7.5kWAC	20.8 Amps per phase

Nominal DC Input Voltage Range	24VDC
Nominal AC Voltage / Frequency	120VAC / 60 HZ
Continuous Power Rating at 25C Ambient	2500VA
Continuous AC RMS Output at 25°C	20.8 Amps AC
Idle Power - Full AC Output	≈ 20 Watts DC
Idle Power - Search Mode	2.6 Watts DC
Typical Efficiency	92%
Total Harmonic Distortion - Typical	2%
Output Voltage Regulation	± 2%
Maximum Output Current – Peak (1 mSec)	70 amps AC
Maximum Output Current - RMS (100 mSec)	50 amps AC
AC Overload Capability - Surge	6000VA
AC Overload Capability - 5 Second	4800VA
AC Overload Capability - 30 Minutes	3200VA
AC Input Current Maximum	30 Amps AC
AC Input Voltage Range	80 to 150VAC
AC Input Frequency Range	54.0 to 66.0 Hz
DC Input Range	21.0 to 34.0 VDC
DC Input Current – Rated Power	95 Amps DC
Maximum DC Input Current	300 Amps DC
Continuous Battery Charger Output	55 amps DC

NOTES

RATINGS

NOMINAL AC OUTPUT VOLTAGE OF AN OUTBACK EXTREME INVERTER/CHARGER SYSTEM

Single Phase (one OBX-IC)	120VAC at 60 Hz (30 amps)
Series Stacked (two OBX-ICs)	120VAC at 60 Hz per AC output leg / 240VAC at 60Hz between the AC output legs

NOMINAL DC INPUT VOLTAGE: 24 VDC

CONTINUOUS POWER RATING AT 25^{0}C: 2500 VA

RECOMMENDED OBX DC VOLTAGE RANGE

24V Systems	21 – 34VDC

MAXIMUM DC INPUT CURRENT

NOTE: This is the maximum DC current the OBX-IC will draw from the battery when starting very large AC loads. It is not used for sizing the DC disconnect or selecting DC cable gauge. It is used to select the minimum reasonable battery capacity.

OBX-IC2524P– 120/60	300ADC per OBX-IC

RATED DC INPUT CURRENT

NOTE: This is the maximum continuous DC current that the OBX-IC will draw from the batteries when inverting.

OBX-IC2524P– 120/60	95ADC

AC INPUT OPERATING VOLTAGE RANGE

NOTE: This is the recommended AC input voltage range to be supplied to the OBX-IC. Voltages outside of this range may damage AC loads connected to the OBX-IC's AC output terminals.

All OutBack Extreme Series Inverter/Chargers	80 – 150VAC (VAC = volts AC)

MAXIMUM AC INPUT CURRENT

An AC input source connected to the OBX-IC supplies power for two separate internal AC circuits – the AC transfer switch and the battery charging system. The AC transfer switch transfers the AC input power to the AC loads. The OBX-IC's battery charger will "back off" if the total AC loads—including the charger—exceed the AC input current limit (default setting is 28AAC). This "Input Limit" can be adjusted using the MATE to avoid overloading a generator or trip a circuit breaker. If your generator cannot produce 28AAC or you are connecting to an AC input source that has a breaker that is rated for less than 30AAC, please refer to the *FX and VFX Series Inverter/Charger Programming Manual* to change this setting.

All OBX-ICs	30AAC per OBX-IC (AAC = Amps AC)

MAXIMUM CURRENT FOR BATTERY CHARGER

Due to heat restraints, the OBX-IC limits incoming AC current to recharge the battery. Please refer to the *FX and VFX Series Inverter/Charger Programming Manual* to adjust this setting. The battery charger has an efficiency of 90%. Other factors, such as cable losses, might reduce this efficiency.

MAXIMUM AND DEFAULT AC INPUT AND DC (bulk stage) OUTPUT VALUES

OBX-IC2524P– 120/60	AC Max = 14AAC (Default = 12AAC)	DC Max = 55ADC

AC INPUT FREQUENCY RANGE

NOTE: If the AC input source is out of the range noted below, the OBX-IC will not connect or stay connected.

All OBX-IC Models	54-66 Hz

MAXIMUM AC OUTPUT CURRENT

This is the amount of surge current that the OBX-IC will quickly supply for a split second. Depending on the size of the surge, the OBX-IC can be overloaded for a minimum time of 5 seconds to a maximum time of 30 minutes.

OBX-IC2524P– 120/60	70AAC per OBX for 1 millisecond

MAXIMUM CONTINUOUS OUTPUT POWER

An OutBack Extreme Series Inverter/Charger's model number indicates its maximum continuous output power by changing the last two digits to zeros. For instance, an OBX-IC2524P-120/60 has a maximum continuous output power of 2000VA (volt-amps).

OBX-IC2524P– 120/60	2000VA

MAXIMUM OVERCURRENT PROTECTION AMPACITY

This rating specifies the proper overcurrent protection ampacity.

- OBB breakers are panel-mount circuit breakers.
- Bolt-in type class T DC fuses and should always be used in conjuncture with a disconnect mechanism.
- OBX-ICs used in fixed installations should use properly sized DC circuit breakers.
- A DC breaker includes both overcurrent protection and disconnect capability.
- OutBack Power Systems recommends Class T fuses for mobile installations where a DC disconnect is not required.

MODEL	***AMPACITY***	***DC BREAKER***	***DC FUSE***
OBX-IC2524P– 120/60	175 amps	OBB-175-125VCD-PNL	Class T-300 (Mobile Only)

FX Default Values (subject to change with FX upgrades)

24 VDC System	DEFAULT	MINIMUM	MAXIMUM
Float Voltage	27.2V	24V	30V
Absorb Voltage	28.8V	26V	32V
EQ Voltage	28.8 V	28V	34V
ReFloat	25V	22V	26V
LBCO	21V	18V	24V
LBCI	25V	20V	28V
Sell RE	26V	20V	30V
Gen Alert			
Off Set Point	28V	24V	36V
On Set Point	22V	20V	28V
Load Shed Off Set Point	22V	20V	28V
Vent Fan ON Set Point	26V	20V	32V
Diversion ON Set Point	29.2V	24V	32V
Absorb Time	**1.0 hours**	**0.0 hours**	**24.0 hours**
EQ Time	1.0 hours	0.0 hours	24.0 hours
Float Time	1.0 hours	0.0 hours	24.0 hours
AC2/Gen Transfer Delay (Cycles for AC)	60 cycles* (*20 for Grid-Tie)	0 cycles	240 cycles
Search	6	0	50
Grid Lower Limit	108V	40V	115V
Grid Upper Limit	140	80V	220V
Grid Upper Limit	140V	130V	150V
Grid Connect Delay	.5 min	.2 min	15.0 min
DROP or USE	USE	N/A	N/A
Charger OFF/AUTO/ON	AUTO		
AUX Output Option	COOL FAN		
Gen Alert ON Delay	4 min	0 min	240 min
Gen Alert OFF Delay	9 min	0 min	240 min
Vent Fan OFF Delay	5 min	0 min	30 min
Gen Window Lower Limit	108V	40V	115V
Gen Upper Window Limit	140V	130V	150V
AC1/Grid Transfer Delay	6 Cycles of AC	0 Cycles of AC	240 Cycles of AC
Set AUX Control	AUTO		
Search Pulses	8	2	20
Search Pulse Spacing	60 Cycles Ac	4 Cycles AC	120 Cycles AC
Stacking Phase	1 or 2 phase		
InPut Select	Master Gen		
Charge Rates			
Vented 24 & 48 VDC	9 AAC	0 AAC	10 AAC
Vented 12 VDC	6 AAC	0 AAC	7 AAC
Sealed 24 & 48 VDC	5 AAC	0 AAC	7 AAC
Sealed 12 VDC	5 AAC	0 AAC	6 AAC
Grid Input Settings			
Set AC Input Size			
Mobile/OBX-IC	28 Amp	5 Amp	30 Amp
Non-Mobile U.S.	48 Amp	5	
Grid-Tie	50 Amp		
Gen Input Settings			
Mobile/OBX-IC	28 Amp	2Amp	30 Amp
Non-Mobile U.S.	48 Amp	2 Amp	60 Amp
Grid-Tie	50 Amp		
Set VAC	120V	115V	125V

WIRE SIZES

The following chart contains information on wire sizes, the DC resistance of the wires and the corresponding diameters and areas of these wires. This information can be used to calculate the voltage drop of the wires or to find an equivalent wire size.

SIZE	DC (AWG) Resistance in Ohms (1000 feet)	CROSS-SECTIONAL AREA	
		INCHES	MILLIMETERS
14	3.14	.0032	2.08
12	1.98	.0051	3.31
10	1.24	.0082	5.26
8	0.78	.0130	8.37
6	0.50	.0206	13.30
4	0.31	.0328	21.15
2	0.19	.0521	33.62
1	0.15	.0657	42.41
1/0	0.12	.0829	53.50
2/0	0.10	.1045	67.43
3/0	0.08	.1318	85.01
4/0	0.06	.1662	107.20

MAINTENANCE

If damaged or malfunctioning, the OBX-IC should be repaired by a qualified user, installer, or service center following OutBack Power Systems' instructions and guidelines. Please contact your energy dealer for assistance. Incorrect repairs and/or reassembly risks malfunction, electric shock or fire.

For routine, user-approved maintenance:

- Disconnect all circuit breakers and related electrical connections before doing any cleaning or adjustments.
- Solar modules may produce hazardous voltages when exposed to light; cover them with opaque material before servicing any connected equipment or service at night.
- If a remote or automatic generator start system is used, disable the automatic starting circuit and/or disconnect the generator from its starting battery while servicing it to prevent starting while servicing.

1-Year Limited Warranty

OutBack Extreme Inverter/Chargers

OutBack Power Systems, Inc. ("OutBack") provides a one year (1) limited warranty ("Warranty") against defects in materials and workmanship for its OutBack Extreme Inverter/Charger ("Product") if installed in a permanently mounted installation. The Warranty term begins ninety (90) days from the date of initial invoice.

This Warranty applies to the original OutBack Product purchaser, and is transferable only if the Product remains installed in the original use location. The warranty does not apply to any Product or Product part that has been modified or damaged by the following:

- Installation or Removal;
- Alteration or Disassembly;
- Normal Wear and Tear;
- Accident or Abuse;
- Corrosion;
- Lightning;
- Repair or service provided by an unauthorized repair facility;
- Operation contrary to manufacturer product instructions;
- Fire, Floods or Acts of God;
- Shipping or Transportation;
- Incidental or consequential damage caused by other components of the power system;
- Any product whose serial number has been altered, defaced or removed; or
- Any other event not foreseeable by OutBack.

OutBack's liability for any defective Product, or any Product part, shall be limited to the repair or replacement of the Product, at OutBack's discretion. OutBack does not warrant or guarantee workmanship performed by any person or firm installing its Products. This Warranty does not cover the costs of installation, removal, shipping (except as described below), or reinstallation of Products.

To request warranty service, you must contact OutBack Technical Services at (360) 435-6030 or support@outbackpower.com within the effective warranty period. If warranty service is required, OutBack will issue a Return Material Authorization (RMA) number. A request for an RMA number requires all of the following information:

2008-01-07

1. Proof-of-purchase in the form of a copy of the original Product purchase invoice or receipt confirming the Product model number and serial number;
2. Description of the problem; and
3. Shipping address for the repaired or replacement equipment.

After receiving the RMA number, pack the Product(s) authorized for return, along with a copy of the original purchase invoice and warranty certificate, in the original Product shipping container(s) or packaging providing equivalent protection and mark the outside clearly with the RMA number. The sender must prepay all shipping charges, and insure the shipment, or accept the risk of loss or damage during shipment. OutBack is not responsible for shipping damage caused by improperly packaged Products, the repairs this damage might require, or the costs of these repairs. If, upon receipt of the Product, OutBack determines the Product is defective and that the defect is covered under the terms of this Warranty, OutBack will then and only then ship a repaired or replacement Product to the purchaser freight prepaid, non-expedited, using a carrier of OutBack's choice within the continental United States, where applicable.

Shipments to other locations will be made freight collect. The warranty period of any repaired or replacement Product is ninety (90) days from the date of shipment from OutBack, or the remainder of the initial warranty term, which ever is greater.

THIS LIMITED WARRANTY IS THE EXCLUSIVE WARRANTY APPLICABLE TO OUTBACK PRODUCTS. OUTBACK EXPRESSLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTIES OF ITS PRODUCTS, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. OUTBACK ALSO EXPRESSLY LIMITS ITS LIABILITY IN THE EVENT OF A PRODUCT DEFECT TO REPAIR OR REPLACEMENT IN ACCORDANCE WITH THE TERMS OF THIS LIMITED WARRANTY AND EXCLUDES ALL LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION ANY LIABILITY FOR PRODUCTS NOT BEING AVAILABLE FOR USE OR LOST REVENUES OR PROFITS, EVEN IF IT IS MADE AWARE OF SUCH POTENTIAL DAMAGES. SOME STATES (OR JURISDICTIONS) MAY NOT ALLOW THE EXCLUSION OR LIMITATION OF WARRANTIES OR DAMAGES, SO THE ABOVE EXCLUSIONS OR LIMITATIONS MAY NOT APPLY TO YOU.

2008-01-07

OUTBACK EXTREME INVERTER/CHARGER
LIMITED WARRANTY REGISTRATION

Complete this form and return it to:

Outback Power Systems Inc.
19009 62nd Ave. NE • Arlington, WA 98223

EXTREME LIMITED WARRANTY REGISTRATION

Equipment Owner:

Name/Rank: _____

Organization/Branch of Service: _____

Address: _____ City, State, Zip Code: _____

Country: _____ Telephone Number: _____

E-mail: _____

Address for warranty certificate:

Name/Rank: _____

Organization/Branch of Service: _____

Address: _____ City, State, Zip Code: _____

Country: _____ Telephone Number: _____

E-mail: _____

Product Model Number: _____ Product Serial Number(s): _____

Sold by: _____ Purchase Date: _____

Product Install/Commission Date: _____ System PV Array Nominal Voltage: _____

System Battery Bank Size (Amp Hours): _____ Type of Batteries: _____

General Description of Application: _____

_____

_____

2008-01-07

Corporate Headquarters
19009 62nd Avenue NE
Arlington, WA 98223 USA
Phone: (+1) 360.435.6030

European Sales Office
C/ Castelló, 17
08830 - Sant Boi de Llobregat
BARCELONA, España
Phone: +34.93.654.9568

www.outbackpower.com

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