OutBack POWER™

member of The alpha Group™


# PRODUCT GUIDE

# Welcome

OutBack Power Technologies is proud to design solutions with you, the customer, in mind. OutBack maintains the philosophy that listening to our customers and innovating to meet their needs is paramount to our success.

We're excited to introduce the new OutBack Power Radian Series GS8048 Inverter/Charger. The Radian Series provides a comprehensive answer for Grid-interactive and Stand-alone power systems. Based upon a proven foundation of reliable technology, but engineered from the ground up to simplify the design, distribution, installation and implementation of energy storage, the standardized structure and integration with the GSLC load center make it easy to provide a successful solution to any power requirement, anywhere.

OutBack is continuing to expand its industry-leading level of customer service adding to our team of qualified technical and order service personnel and are available to assist via our direct dial line Technical Support line, (360) 618-4363, during our expanded hours of operations (6am to 5pm PST). We will continue to listen to, and learn from our customers, and continue to innovate.

We are confident that OutBack will continue to lead the way in bringing the solutions and services that people have come to depend on.

Thank you for your support as we continue *Powering the Planet*.

## History

2001 OutBack was started by a passionate group of engineers who wanted to bring power conversion electronics technology into the 21st century.

This small startup quickly grew by offering innovative and well-designed solutions to renewable energy problems. OutBack listened to their customers and made many of the changes that were suggested, creating a truly customer focused company in the power conversion electronics industry.

2002 OutBack introduces its first sealed sinewave inverter/charger, the FX2024 - with resounding success.

This single model changed the way people looked at system design by offering unprecedented flexibility in system design and expansion while the sealed construction allowed for uses which previously would have been considered too "extreme" for other inverter/chargers.

OutBack releases the MX60 solar MPPT Charge Controller which redefined performance and value, and quickly gained a reputation for getting the most power possible from a PV array - often making it more expensive to not use one.

2003 OutBack launches the first of the vented versions of the FX Series Inverter/Chargers. These VFX models were introduced in direct response to our customers' requests providing higher power at a similar price as the sealed counterpart.

OutBack launches the PS2, value priced system integration accessories. This line of accessories addressed the needs of our customers for competitively priced system integration accessories for smaller systems.

2004 OutBack releases the world's most efficient grid-interactive inverter/charger. These models raise the bar for performance and value for battery-connected grid-interactive inverter/charger systems.

OutBack introduces the PS1 fully integrated grid-interactive power system. This unique system sets a new standard for system integration, performance and ease of installation in grid-interactive applications.

2005 OutBack reaches milestones in product deliveries and product recognition. MX60 and FX Inverter production lines each ship 10,000th unit.

OutBack Power equipped teams sweep the top three places in the 2005 Solar Decathlon, an international competition between universities, to develop and build the most energy efficient home.

2006 OutBack Power launches FLEXware, a new line of balance of system components.

2007 OutBack Power expands product offerings to include the FLEXware Surge Protector, FLEXnet DC and FLEXmax 80.

2008 OutBack Power expands product offerings to include FLEXware PV.

2010 OutBack Power starts shipping FLEXpower pre-wired and factory tested systems.

OutBack Power becomes a member of The Alpha Group.

2011 The MATE3 system display and controller is unveiled by OutBack Power making system management even easier.

OutBack Power launches The Radian Series Inverter/Charger bringing a radical new feature to the world of renewable energy: Simplicity.

## Off-Grid

Solar. Wind. Hydro. Generator. No matter what your energy source OutBack's products are engineered to provide your home or business with reliable electricity day-in and day-out. The OutBack modular system architecture allows your system to grow along with your power needs up to 80,000 watts. Power-hungry appliances like washing machines, air conditioning and power tools are easily started by our inverter's substantial surge power capability. When not being used, the inverter enters a power save mode, which consumes as little as 3 watts, saving your battery power for when you need it the most. OutBack's innovative Maximum Power Point Tracking (MPPT) technology gets the most from your solar array or can also control hydro or wind turbine charging sources. Complete system status and control is easily monitored by a single control, instead of requiring the user to keep an eye on multiple displays and status indicators.

## Grid-Interactive

Grid-Interactive renewable energy systems enable you to demonstrate your personal commitment to a renewable energy future. With the OutBack grid-interactive system, backup AC power is made available 24 hours a day in the event of a utility outage, providing reliable power, peace of mind and the ability to sell power back to the grid when excess power is available. Unlike traditional grid-tie systems OutBack's grid-interactive systems allow you to continue to utilize your renewable energy source in the event of a power outage. At night, the inverter's automatic power save mode ensures that energy is not wasted by needlessly charging your batteries from the utility grid. An average conversion efficiency of 91% using the California Energy Commission (CEC) test protocol provides greater savings and a shorter time period for system payback. OutBack's grid-interactive technology provides you more than a typical solar inverter, we also have an unmatched ability to utilize solar, wind and hydropower sources. OutBack grid-interactive inverters for the U.S. and Canada are ETL certified to UL1741 specifications.

## Mobile and Marine

OutBack's Mobile and Marine inverter/charger models provide the high performance and reliability you need no matter where your travels take you. Our die-cast metal construction allows mounting in any position, even upside down. The required AC input neutral/ground switching is taken care of by a fully integrated 30 amp AC transfer switch for shore cord or generator hook-up. Three circuit boards and a simple design make field servicing the unit easy no matter where you are. Rigorous testing at the factory ensures that each inverter/charger works the first time as well as for many years to come. OutBack mobile and marine inverters are ETL certified to UL458.

## OutBack Inverter/Chargers

OutBack inverter/chargers are the next generation in advanced power management. Each is a DC to AC sinewave inverter, battery charger and AC transfer switch integrated into one chassis.

Just like the local utility grid, the inverter produces true-sinewave AC electricity for your standalone or back-up power needs. Computers, TVs and pumps are just some of the examples of modern electronics that last longer and run better when powered with true sinewave electricity from an OutBack inverter. Starting up your air conditioning, washing machine or well pump is worry-free because of our high surge power capability.

Batteries and generators are the costly consumables when using inverters to generate electricity. The integrated smart battery charger uses multiple stages to perform quick recharging while prolonging battery life, saving your batteries and generator from unnecessary wear. Automatic switching between AC power sources is seamless due to an AC transfer switch that reacts in less than 16 milliseconds.

Unique networked communication is built into all OutBack products providing complete integration. Expanding your system with your growing power needs is as simple as adding additional inverters with our modular system architecture. Further flexibility is provided with the ability to be connected at any time in either parallel, series or three-phase power configurations. Industry-leading OutBack reliability is achieved through simplified design and rugged construction.

# Product Guide








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# Radian™ Series
Inverter/Charger

## Radian Series Inverter/Charger

The new OutBack Power Technologies Radian Series GS8048 inverter/charger provides a comprehensive answer for grid-interactive and stand-alone power systems. Based upon a proven foundation of reliable technology, but engineered from the ground up to simplify the design, distribution, installation and implementation of energy storage, the standardized structure and integration with the GS Load Center make it easy to provide a successful solution to any power requirement, anywhere.

Complete system interface using the OutBack MATE3 and HUB Communications Manager enables the Radian Series GS8048 to be connected with other OutBack Power electronics providing industry leading integration and a robust, scalable power solution. Up to 10 units can be connected in parallel for systems up to 80kW continuous power output.

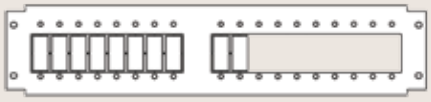
## Radian Series GS Load Center

The GSLC is a balance-of-systems enclosure designed to seamlessly integrate with the Radian Series inverter/chargers, FLEXmax Charge Controllers, and OutBack HUB Communications Manager. Three available models allow quick and easy installation of power systems of any size.

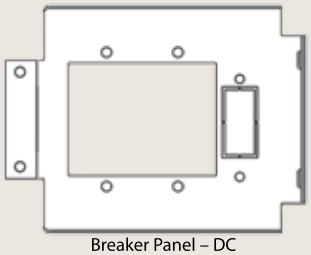
Additional features of the GSLC line include its powder-coated galvanneal chassis, ample knockout locations fitting 1/2" to 2" conduit, aesthetic stainless steel door and simple mounting to a Radian Series inverter/charger. It is listed to UL1741 and CSA C22.2 No. 107.1-01, is Type 1 indoor rated (IP30) and can also be used on its own as a separate breaker enclosure for use with other inverter models.

## Breaker Configuration Diagram

Holds up to eighteen 0.75" (19 mm) wide breakers, two 1.5" (39 mm) wide breakers and one FLEXnet DC. Support for optional AC Input-Output-Bypass Assembly. AC breakers are rated from 10-60 amps of AC current. New double pole 50 amp breaker is available to support 120/240V input and loads.

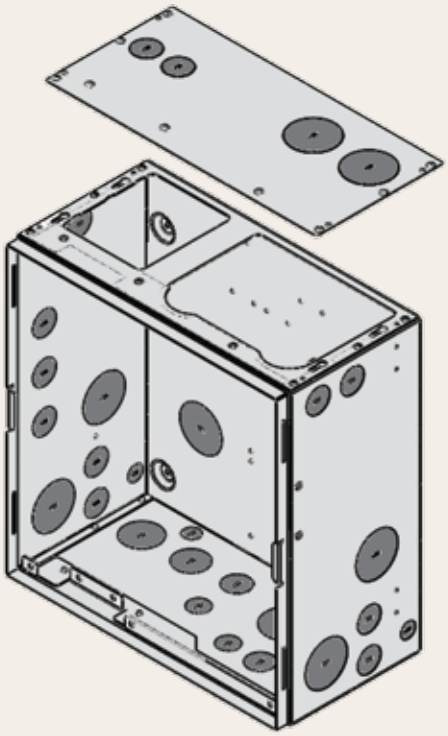


Breaker Panel



Breaker Panel – DC

## Knockout Location Diagram



Left Side
- (1) 1/2" knockout (0.875" diameter)
- (7) 1" knockout (1.375" diameter)
- (2) 2" knockout (2.468" diameter)

Back
- (1) 2" knockout (2.468" diameter)

Right Side
- (1) 1/2" knockout (0.875" diameter)
- (4) 1" knockout (1.375" diameter)
- (2) 2" knockout (2.468" diameter)

Bottom
- (2) 1/2" knockout (0.875" diameter)
- (2) 3/4" knockout (1.109" diameter)
- (2) 1" knockout (1.375" diameter)
- (2) 1-1/4" knockout (1.734" diameter)
- (1) 1-1/2" knockout (1.984" diameter)
- (2) 2" knockout (2.468" diameter)

Top (Not used with Radian Series inverter/chargers)
- (2) 1" knockout (1.375" diameter)
- (2) 2" knockout (2.468" diameter)

## Model GS8048 Specifications

**Electrical Specifications**

| | | |
|---|---|---|
| Nominal DC Input Voltage | | 48 Vdc |
| Continuous Output Power at 25°C | | 8000 VA |
| AC Output Voltage / Frequency | | 120/240 Vac / 60 Hz |
| Continuous AC Output Current at 25°C | | 33.3 Aac at 240 Vac |
| Idle Consumption - Invert mode, no load | | 30 W |
| CEC Weighted Efficiency | | 90% |
| Total Harmonic Distortion | Maximum total harmonic<br>Maximum single voltage harmonic | <5%<br><2% |
| Output Voltage Regulation | | ± 2% |
| Maximum Output Current | 1 ms peak<br>100 ms RMS | 100 Aac at 240 Vac, 200 Aac at 120 Vac<br>70.7 Aac at 240 Vac |
| Overload Capability | 100 ms surge<br>5 second<br>30 minute | 16.97 kVA<br>12 kVa<br>9 kVa |
| AC Input Voltage Range (Adjustable) | | (L1 or L2) 70 to 140 Vac |
| AC Input Frequency Range | | 54 – 66 Hz |
| Grid-Interactive Voltage Range (IEEE) | | (L1 or L2) 108 to 132 Vac |
| Grid-Interactive Frequency Range (IEEE) | | (L1 or L2) 59.3 to 60.5 Hz |
| Maximum AC Input Current | | 50 Aac at 240 Vac |
| Continuous Battery Charge Output | | 115 Adc |
| Temperature Range | Operating<br>Storage | 0°C to 50°C (power derated above 25°C)<br>-40°C to 60°C |
| DC Input Voltage Range | | 40 to 64 Vdc |
| Warranty | | Standard 5 year |

**Mechanical Specifications**

| | | |
|---|---|---|
| Dimensions (H x W x D) | Unit<br>Shipping | 28 x 16 x 8.7" (71.1 x 40.6 x 22.2 cm)<br>14.5 x 34.5 x 21" (36.8 x 87.6 x 53.3 cm) |
| Weight | Unit<br>Shipping | 125 lbs (56.8 kg)<br>140 lbs (63.6 kg) |
| Accessory Ports | | Remote Temperature Sensor and MATE3/HUB Communications |
| Non-volatile Memory | | Yes |
| Field Upgradable Firmware | | Yes |
| Chassis Type | | Vented |
| Certifications | | ETL Listed to UL1741<br>CSA C22.2 No. 107.1 |

• Specifications subject to change without notice.

## Radian GSLC Sample Bill of Materials -

Example of system with single Radian inverter/charger and dual FLEXmax charge controllers

| Part # | Description | Qty |
|---|---|---|
| GS8048 Inverter/Charger | 8000W 120/240Vac Grid-Interactive and Standalone Solution with dual AC inputs | 1 |
| GSLC175-PV-120/240 | Prewired GSLC with 175A inverter disconnects, GFDI and PV disconnects for two charge controllers, FLEXnet DC w/ 3 shunts, 120/240VAC inverter bypass and dual AC inputs | 1 |
| FLEXmax FM80-150Vdc | 80 Amp output @ 40C, 12 to 60Vdc battery, 150Vdc PV maximum | 2 |
| MATE3 | Universal version, Light gray square housing with Ethernet port | 1 |
| HUB4 | Four Port, Up to 4 devices and one MATE | 1 |
| FW-MB3 | Flat-mount MATE3 Mounting Plate for installation over standard electrical boxes | 1 |
| FW-CCB2 | Mounting bracket for two side mounted charge controllers on GSLC, FW500 and FW1000 DC enclosures | 1 |

Example of system with dual Radian inverter/charger for UPS or AC only applications

| Part # | Description | Qty |
|---|---|---|
| GS8048 Inverter/Charger | 8000W 120/240Vac Grid-Interactive and Standalone Solution with dual AC inputs | 2 |
| GSLC | GS Load Center for Radian Series. Includes inverter bus bars, ground bus bar, 500 Amp DC shunt assembly with negative TBB, neutral TBB and two STBB-RED bus bars. | 2 |
| PNL-175-DC | 175 Amp, 125Vdc, 3/8" stud terminals | 4 |
| PNL-50D-AC-120/240 | 50A 120/240VAC double pole panel mount breaker with 1/4" stud terminals. | 6 |
| MATE3 | Universal version, Light gray square housing with Ethernet port | 1 |
| HUB4 | Four Port, Up to 4 devices and one MATE | 1 |
| FW-MB3 | Flat-mount MATE3 Mounting Plate for installation over standard electrical boxes | 1 |
| FN-DC | FLEXnet DC monitors up to 3 Shunts for improved battery management | 1 |

# GS Load Center

**Model: GSLC***

**Description:** AC and DC enclosure for use with the Radian Series Inverter/Charger. Recommended for custom-built systems, and for multiple Radian inverter systems (one GSLC per inverter).

**Includes:** Ground bus bar, 500 amp DC shunt assembly, neutral bus bar, two PV (positive) bus bars, inverter power bus bars, FW-BBUS and enclosure mounting hardware
**Unit Weight** = 26 lbs (11.8 kg) **Shipping Weight** = 34 lbs (15.4 kg)

**Model: GSLC 175-120/240***

**Description:** GS Load Center factory prepared for AC Applications, with inverter DC overcurrent protection and disconnect, dual AC inputs, and 120/240 Vac maintenance bypass assembly. Recommended for systems which have a single Radian inverter and an AC source, but can be customized in other ways.

**Includes:** Ground bus bar, 500 amp DC shunt assembly, neutral bus bar, two PV (positive) bus bars, inverter power bus bars, FW-BBUS, two 175A panel mount breakers, four 50A 120/240VAC double pole panel mount breakers, sliding bypass interlock, AC wiring, and enclosure mounting hardware
**Unit Weight** = 37 lbs (16.8 kg) **Shipping Weight** = 45 lbs (20.4 kg)

**Model: GSLC 175-PV-120/240***

**Description:** GS Load Center factory prepared for PV and AC Applications, with inverter DC overcurrent protection and disconnect, dual AC inputs, 120/240 Vac maintenance bypass assembly, PV GFDI, and two PV array inputs, FLEXnet DC battery monitor and three shunts. "Plug and play" for systems which have a single Radian inverter and two charge controllers and need battery monitoring.

**Includes:** Ground bus bar, three 500 amp DC shunts and shunt bus bar, neutral bus bar, two PV (positive) bus bars, inverter power bus bars, FW-BBUS, two 175A panel mount breakers, four 50A 120/240VAC double pole panel mount breakers, sliding bypass interlock, two 80A array disconnects, dual pole GFDI and controller disconnects, FLEXnet DC, AC and DC wiring and enclosure mounting hardware
**Unit Weight** = 38 lbs (17.2 kg) **Shipping Weight** = 47 lbs (21.3 kg)

*For all GSLC models the Unit Dimensions (HxWxD) are 17" x 16" x 8.5" (43.2cm x 40.6cm x 12.6cm) and the Shipping Dimensions (HxWxL) are 23.25" x 20.5" x 13.25" (59.1cm x 52.1cm x 33.7cm).

# Additional Accessories

| Model | Description |
|---|---|
| GS-SBUS | Shunt bus to connect three shunts together within the GSLC |
| STBB-BLACK | Bus bar with black insulators and mounting screws |
| STBB-RED | Bus bar with red insulators and mounting screws |
| STBB-WHITE | Bus bar with white insulators and mounting screws |

| Panel Mount Breaker Model | Current Rating | Voltage Rating | Branch Circuit | Terminals | Width |
|---|---|---|---|---|---|
| PNL-50D-AC-120/240 | 50 amp (each of 2 poles) | 120/240VAC | 5k AIC | 1/4" stud | 1.5" (39 mm) |

**GS-IOB-120/240VAC Input-Output Bypass Assembly**

**Description:** Field-installable kit for bypassing the AC input to the AC output for inverter maintenance or installation. Also provides overcurrent protection. Intended for use with single inverter installations.

**Includes:** Four 50A 120/240VAC double pole panel mount breakers, sliding bypass interlock plate, three STBB-BLACK and three STBB-RED terminal bus bars, wire and hardware kit.

| System Rating | Bypass Breaker | Input Breakers | Output Breaker |
|---|---|---|---|
| 120/240 VAC @ 50 amps | Dual pole @ 50 amps | Two dual pole @ 50 amps | Dual pole @ 50 amps |

• Specifications subject to change without notice.

## FX Sealed Inverter/Chargers

The FX series is designed to survive in environments that would normally destroy other inverter/chargers. Protection for internal components is provided by our die-cast aluminum chassis with a powder coated finish to prevent corrosion. Internal and external cooling fins allow for heat transfer, enabling peak operating efficiencies as high as 93% and looking cool while doing it. Water and small particles are kept out through the generous use of gaskets and O-ring seals on all seams and openings. A protective conformal coating on all circuit boards provides the final line of defense against corrosion. The externally mounted "TURBO" cooling system improves performance in hot conditions.

Sealed Inverter/Chargers

## VFX Vented Inverter/Chargers

The VFX series is designed for more protected installations. By utilizing an efficient active cooling design, the VFX models are available with AC output up to 3.6 kilowatts. Our tough die-cast aluminum chassis physically protects the internal components while the air intake includes an easily cleaned filter, which allows for ventilation while also keeping bugs and other debris out. All circuit boards are conformal-coated to prevent corrosion from airborne moisture in humid conditions. The DC wiring cover (DCC) protects the DC terminals and battery cables from damage.

Vented Inverter/Chargers

## GTFX & GVFX Grid Interactive Inverter/Chargers

OutBack Power's true sinewave grid-interactive inverter/charger is a complete power solution. It incorporates a DC to AC sinewave inverter, battery charger and AC transfer switch housed within a die-cast aluminum chassis. The GTFX and GVFX Series Inverter/Chargers give you the ability to sell solar, wind or hydro power back to the utility grid while providing instantaneous back-up power in the event of a utility outage.

Our built-in transfer switch automatically disconnects your loads from the utility grid and powers them from the inverter in the event of an outage, allowing you to continue using your solar and battery back-up power, unlike traditional grid-tie systems. Intelligent multi-stage battery charging prolongs the life of your batteries and built-in networked communications enables you to stack up to two units while simultaneously communicating with other OutBack Power components. The exclusive modular system architecture means that increased power output is just an additional inverter/charger away. Our GTFX series uses a sealed chassis that can operate in the harshest environmental conditions such as high humidity and corrosive salt air while the GVFX series uses a vented chassis with "bug proof" screened openings that allow high output AC power in various operating conditions.

## Off-Grid Specifications

| | | *Sealed Models* | | | *Vented Models* | | |
|---|---|---|---|---|---|---|---|
| | | **FX2012T** | **FX2524T** | **FX3048T** | **VFX2812** | **VFX3524** | **VFX3648** |
| Nominal DC Input Voltage | | 12 VDC | 24 VDC | 48 VDC | 12 VDC | 24 VDC | 48 VDC |
| Continuous Power Rating at 25° C | | 2000 VA | 2500 VA | 3000 VA | 2800 VA | 3500 VA | 3600 VA |
| AC Voltage/Frequency | | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz |
| Continuous AC RMS Output at 25° C | | 16.7 amps AC | 20.8 amps AC | 25.0 amps AC | 23.3 amps AC | 29.2 amps AC | 30.0 amps AC |
| Idle Power | Full | ≈ 20 Watts | ≈ 20 Watts | ≈ 23 Watts | ≈ 20 Watts | ≈ 20 Watts | ≈ 23 Watts |
| | Search | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts |
| Typical Efficiency | | 90% | 92% | 93% | 90% | 92% | 93% |
| Total Harmonic Distortion | Typical (V) | 2% | 2% | 2% | 2% | 2% | 2% |
| | Maximum (V) | <5% | <5% | <5% | <5% | <5% | <5% |
| Output Voltage Regulation | | ± 2% | ± 2% | ± 2% | ± 2% | ± 2% | ± 2% |
| Maximum Output Current | Peak | 56 amps AC | 70 amps AC | 70 amps AC | 56 amps AC | 70 amps AC | 70 amps AC |
| | RMS | 40 amps AC | 50 amps AC | 50 amps AC | 40 amps AC | 50 amps AC | 50 amps AC |
| AC Overload Capability | Surge | 4800 VA | 6000 VA | 6000 VA | 4800 VA | 6000 VA | 6000 VA |
| | 5 Second | 4000 VA | 4800 VA | 4800 VA | 4000 VA | 5000 VA | 5000 VA |
| | 30 Minutes | 2500 VA | 3200 VA | 3200 VA | 3200 VA | 4000 VA | 4000 VA |
| AC Input Current Maximum | | 60 amps AC | 60 amps AC | 60 amps AC | 60 amps AC | 60 amps AC | 60 amps AC |
| AC Input Voltage Range (MATE Adjustable) | | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC |
| AC Input Frequency Range | | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz |
| DC Input Voltage Range | | 10.5 to 17.5 VDC | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC | 10.5 to 17.0 VDC | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC |
| Continuous Battery Charge Output | | 80 amps DC | 55 amps DC | 35 amps DC | 125 amps DC | 85 amps DC | 45 amps DC |
| Operating Temperature Range | | -40° C to 60° C (power derated above 25° C) | | | -40° C to 60° C (power derated above 25° C) | | |
| Warranty | | Standard 5 year | | | | | |
| Weight | Unit | 62 lbs (25 kg) | | | 61 lbs (25 kg) | | |
| | Shipping | 67 lbs (30 kg) | | | 64 lbs (28 kg) | | |
| Dimensions (H x W x L) | Unit | 13 x 8.25 x 16.25" (33 x 21 x 41 cm) | | | 12 x 8.25 x 16.25" (30 x 21 x 41 cm) | | |
| | Shipping | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | |
| Certifications | | ETL Listed to UL1741 (for non-sellback only) | | | ETL Listed to UL1741 (for non-sellback only) | | |

## Grid-Interactive Specifications

| | | *Sealed Models* | | *Vented Models* | |
|---|---|---|---|---|---|
| | | **GTFX2524** | **GTFX3048** | **GVFX3524** | **GVFX3648** |
| Nominal DC Input Voltage | | 24 VDC | 48 VDC | 24 VDC | 48 VDC |
| Continuous Power Rating at 25° C | | 2500 VA | 3000 VA | 3500 VA | 3600 VA |
| AC Voltage/Frequency | | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz |
| Continuous AC RMS Output at 25° C | | 20.8 amps AC | 25.0 amps AC | 29.2 amps AC | 30.0 amps AC |
| Idle Power | Full | ≈ 20 Watts | ≈ 23 Watts | ≈ 20 Watts | ≈ 23 Watts |
| | Search | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts |
| Typical Efficiency | | 92% | 93% | 92% | 93% |
| Total Harmonic Distortion | Inverting (V) | 2% | 2% | 2% | 2% |
| | Selling (A) | < 5% | < 5% | < 5% | < 5% |
| Output Voltage Regulation | | ± 2% | ± 2% | ± 2% | ± 2% |
| Maximum Output Current | Peak | 70 amps AC | 70 amps AC | 70 amps AC | 70 amps AC |
| | RMS | 50 amps AC | 50 amps AC | 50 amps AC | 50 amps AC |
| AC Overload Capability | Surge | 6000 VA | 6000 VA | 6000 VA | 6000 VA |
| | 5 Second | 4800 VA | 4800 VA | 5000 VA | 5000 VA |
| | 30 Minutes | 3200 VA | 3200 VA | 4000 VA | 4000 VA |
| AC Input Current Maximum | | 60 amps AC | 60 amps AC | 60 amps AC | 60 amps AC |
| Sell back Voltage Range | | 108 to 132 VAC | 108 to 132 VAC | 108 to 132 VAC | 108 to 132 VAC |
| AC Input Frequency Range | | 59.3 to 60.5 Hz | 59.3 to 60.5 Hz | 59.3 to 60.5 Hz | 59.3 to 60.5 Hz |
| DC Input Range | | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC |
| Continuous Battery Charge Output | | 55 amps DC | 35 amps DC | 85 amps DC | 45 amps DC |
| Operating Temperature Range | | -40° C to 60° C (power derated above 25° C) | | -40° C to 60° C (power derated above 25° C) | |
| Warranty | | Standard 5 year | | | |
| Weight | Unit | 62 lbs (25 kg) | | 61 lbs (25 kg) | |
| | Shipping | 67 lbs (30 kg) | | 64 lbs (28 kg) | |
| Dimensions (H x W x L) | Unit | 13 x 8.25 x 16.25" (33 x 21 x 41 cm) | | 12 x 8.25 x 16.25" (30 x 21 x 41 cm) | |
| | Shipping | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | 21.75 x 13 x 22" (55 x 33 x 56 cm) | |
| Certifications | | ETL Listed to UL1741, CSA C22.2 No. 107.1 | ETL Listed to UL1741, CSA C22.2 No. 107.1 Listed on CEC eligible equipment list | ETL Listed to UL1741, CSA C22.2 No. 107.1 | ETL Listed to UL1741, CSA C22.2 No. 107.1 Listed on CEC eligible equipment list |

• These products were designed to meet UL1741 specifications within the U.S. and Canada. Please check your local nominal power voltage ratings in areas where grid specifications might fluctuate.

• Specifications subject to change without notice.

## 50 Hz Off-Grid Specifications

| | | *Sealed Models* | | | *Vented Models* | | |
|---|---|---|---|---|---|---|---|
| | | **FX2012ET** | **FX2024ET** | **FX2348ET** | **VFX2612E** | **VFX3024E** | **VFX3048E** |
| Nominal DC Input Voltage | | 12 VDC | 24 VDC | 48 VDC | 12 VDC | 24 VDC | 48 VDC |
| Continuous Power Rating at 25° C | | 2000 VA | 2000 VA | 2300 VA | 2600 VA | 3000 VA | 3000 VA |
| AC Voltage/Frequency | | 230 VAC 50 Hz | 230 VAC 50 Hz | 230 VAC 50 Hz | 230 VAC 50 Hz | 230 VAC 50 Hz | 230 VAC 50 Hz |
| Continuous AC RMS Output at 25° C | | 8.7 amps AC | 8.7 amps AC | 10.0 amps AC | 11.3 amps AC | 13.0 amps AC | 13.0 amps AC |
| Idle Power | Full | ≈ 20 Watts | ≈ 20 Watts | ≈ 23 Watts | ≈ 20 Watts | ≈ 20 Watts | ≈ 23 Watts |
| | Search | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts |
| Typical Efficiency | | 90% | 92% | 93% | 90% | 92% | 93% |
| Total Harmonic Distortion | Typical (V) | 2% | 2% | 2% | 2% | 2% | 2% |
| | Maximum (V) | <5% | <5% | <5% | <5% | <5% | <5% |
| Output Voltage Regulation | | ± 2% | ± 2% | ± 2% | ± 2% | ± 2% | ± 2% |
| Maximum Output Current | Peak | 28 amps AC | 35 amps AC | 35 amps AC | 28 amps AC | 35 amps AC | 35 amps AC |
| | RMS | 20 amps AC | 25 amps AC | 25 amps AC | 20 amps AC | 25 amps AC | 25 amps AC |
| AC Overload Capability | Surge | 4600 VA | 5750 VA | 5750 VA | 4600 VA | 5750 VA | 5750 VA |
| | 5 Second | 4000 VA | 4800 VA | 4800 VA | 4000 VA | 4800 VA | 4800 VA |
| | 30 Minutes | 2500 VA | 3100 VA | 3100 VA | 3100 VA | 3300 VA | 3300 VA |
| AC Input Current Maximum | | 30 amps AC | 30 amps AC | 30 amps AC | 30 amps AC | 30 amps AC | 30 amps AC |
| AC Input Voltage Range (MATE Adjustable) | | 160 to 300 VAC | 160 to 300 VAC | 160 to 300 VAC | 160 to 300 VAC | 160 to 300 VAC | 160 to 300 VAC |
| AC Input Frequency Range | | 44 to 56 Hz | 44 to 56 Hz | 44 to 56 Hz | 44 to 56 Hz | 44 to 56 Hz | 44 to 56 Hz |
| DC Input Voltage Range | | 10.5 to 17.0 VDC | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC | 10.5 to 17.0 VDC | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC |
| Continuous Battery Charge Output | | 100 amps DC | 55 amps DC | 35 amps DC | 120 amps DC | 85 amps DC | 45 amps DC |
| Operating Temperature Range | | -40° C to 60° C (power derated above 25° C) | | | -40° C to 60° C (power derated above 25° C) | | |
| Warranty | | Standard 5 year | | | | | |
| Weight | Unit | 62 lbs (25 kg) | | | 61 lbs (25 kg) | | |
| | Shipping | 67 lbs (30 kg) | | | 64 lbs (28 kg) | | |
| Dimensions (H x W x L) | Unit | 13 x 8.25 x 16.25" (33 x 21 x 41 cm) | | | 12 x 8.25 x 16.25" (30 x 21 x 41 cm) | | |
| | Shipping | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | |

## 50 Hz Grid-Interactive Specifications

| | | **GTFX2024E** | **GTFX2348E** | **GVFX3024E** | **GVFX3048E** |
|---|---|---|---|---|---|
| Nominal DC Input Voltage | | 24 VDC | 48 VDC | 24 VDC | 48 VDC |
| Continuous Power Rating at 25° C | | 2000 VA | 2300 VA | 3000 VA | 3000 VA |
| AC Voltage/Frequency | | 230 VAC 50 Hz | 230 VAC 50 Hz | 230 VAC 50 Hz | 230 VAC 50 Hz |
| Continuous AC RMS Output at 25° C | | 8.7 amps AC | 10.0 amps AC | 13.0 amps AC | 13.0 amps AC |
| Idle Power | Full | ≈ 20 Watts | ≈ 23 Watts | ≈ 20 Watts | ≈ 23 Watts |
| | Search | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts |
| Typical Efficiency | | 92% | 92% | 92% | 93% |
| Total Harmonic Distortion | Inverting (V) | 2% | 2% | 2% | 2% |
| | Selling (A) | < 5% | < 5% | < 5% | < 5% |
| Output Voltage Regulation | | ± 2% | ± 2% | ± 2% | ± 2% |
| Maximum Output Current | Peak | 35 amps AC | 35 amps AC | 35 amps AC | 35 amps AC |
| | RMS | 25 amps AC | 25 amps AC | 25 amps AC | 25 amps AC |
| AC Overload Capability | Surge | 5750 VA | 5750 VA | 5750 VA | 5750 VA |
| | 5 Second | 4800 VA | 4800 VA | 4800 VA | 4800 VA |
| | 30 Minutes | 3100 VA | 3100 VA | 3300 VA | 3300 VA |
| AC Input Current Maximum | | 30 amps AC | 30 amps AC | 30 amps AC | 30 amps AC |
| Sell back Voltage Range | | 140 to 280 VAC | 140 to 280 VAC | 140 to 280 VAC | 140 to 280 VAC |
| AC Input Frequency Range | | 45 to 55 Hz | 45 to 55 Hz | 45 to 55 Hz | 45 to 55 Hz |
| DC Input Range | | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC |
| Continuous Battery Charge Output | | 50 amps DC | 30 amps DC | 80 amps DC | 40 amps DC |
| Operating Temperature Range | | -40° C to 60° C (power derated above 25° C) | | -40° C to 60° C (power derated above 25° C) | |
| Warranty | | Standard 5 year | | | |
| Weight | Unit | 62 lbs (25 kg) | | 61 lbs (25 kg) | |
| | Shipping | 67 lbs (30 kg) | | 64 lbs (28 kg) | |
| Dimensions (H x W x L) | Unit | 13 x 8.25 x 16.25" (33 x 21 x 41 cm) | | 12 x 8.25 x 16.25" (30 x 21 x 41 cm) | |
| | Shipping | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | 21.75 x 13 x 22" (55 x 33 x 56 cm) | |

• Specifications subject to change without notice.

## Mobile Specifications

*Sealed Models*

| | | FX2012MT | FX2524MT | FX2532MT | FX2536MT | FX3048MT |
|---|---|---|---|---|---|---|
| Nominal DC Input Voltage | | 12 VDC | 24 VDC | 32 VDC | 36 VDC | 48 VDC |
| Continuous Power Rating at 25° C | | 2000 VA | 2500 VA | 2500 VA | 2500 VA | 3000 VA |
| AC Voltage/Frequency | | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz |
| Continuous AC RMS Output at 25° C | | 17.0 amps AC | 20.8 amps AC | 20.8 amps AC | 20.8 amps AC | 25.0 amps AC |
| Idle Power | Full | ≈ 20 Watts | ≈ 20 Watts | ≈ 21 Watts | ≈ 21 Watts | ≈ 23 Watts |
| | Search | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts |
| Typical Efficiency | | 90% | 92% | 92% | 92% | 93% |
| Total Harmonic Distortion | Typical (V) | 2% | 2% | 2% | 2% | 2% |
| | Maximum (V) | <5% | <5% | <5% | <5% | <5% |
| Output Voltage Regulation | | ± 2% | ± 2% | ± 2% | ± 2% | ± 2% |
| Maximum Output Current | Peak | 56 amps AC | 70 amps AC | 56 amps AC | 56 amps AC | 70 amps AC |
| | RMS | 40 amps AC | 50 amps AC | 40 amps AC | 40 amps AC | 50 amps AC |
| AC Overload Capability | Surge | 4800 VA | 6000 VA | 4800 VA | 4800 VA | 6000 VA |
| | 5 Second | 4000 VA | 4800 VA | 4000 VA | 4000 VA | 4800 VA |
| | 30 Minutes | 2500 VA | 3200 VA | 2500 VA | 2500 VA | 3200 VA |
| AC Input Current Maximum | | 30 amps AC | 30 amps AC | 30 amps AC | 30 amps AC | 30 amps AC |
| AC Input Voltage Range (Adjustable) | | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC |
| AC Input Frequency Range | | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz |
| DC Input Range | | 10.5 to 17.0 VDC | 21.0 to 34.0 VDC | 28.0 to 45.3 VDC | 31.5 to 51.0 VDC | 42.0 to 68.0 VDC |
| Continuous Battery Charge Output | | 80 amps DC | 55 amps DC | 35 amps DC | 35 amps DC | 35 amps DC |
| Operating Temperature Range | | -40° C to 60° C (power derated above 25° C) | | | | |
| Warranty | | Standard 5 year | | | | |
| Weight | Unit | 62 lbs (25 kg) | | | | |
| | Shipping | 67 lbs (30 kg) | | | | |
| Dimensions (H x W x L) | Unit | 13 x 8.25 x 16.25" (33 x 21 x 41 cm) | | | | |
| | Shipping | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | | | |
| Certifications | | ETL Listed to UL458 | | | | |

## Mobile Specifications

*Vented Models*

| | | VFX2812M | VFX3524M | VFX3232M | VFX3236M | VFX3648M |
|---|---|---|---|---|---|---|
| Nominal DC Input Voltage | | 12 VDC | 24 VDC | 32 VDC | 36 VDC | 48 VDC |
| Continuous Power Rating at 25° C | | 2800 VA | 3500 VA | 3200 VA | 3200 VA | 3600 VA |
| AC Voltage/Frequency | | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz |
| Continuous AC RMS Output at 25° C | | 23.3 amps AC | 29.2 amps AC | 26.6 amps AC | 26.6 amps AC | 30.0 amps AC |
| Idle Power | Full | ≈ 20 Watts | ≈ 20 Watts | ≈ 21 Watts | ≈ 21 Watts | ≈ 23 Watts |
| | Search | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts |
| Typical Efficiency | | 90% | 92% | 92% | 92% | 93% |
| Total Harmonic Distortion | Typical (V) | 2% | 2% | 2% | 2% | 2% |
| | Maximum (V) | <5% | <5% | <5% | <5% | <5% |
| Output Voltage Regulation | | ± 2% | ± 2% | ± 2% | ± 2% | ± 2% |
| Maximum Output Current | Peak | 56 amps AC | 70 amps AC | 56 amps AC | 56 amps AC | 70 amps AC |
| | RMS | 40 amps AC | 50 amps AC | 40 amps AC | 40 amps AC | 50 amps AC |
| AC Overload Capability | Surge | 4800 VA | 6000 VA | 4800 VA | 4800 VA | 6000 VA |
| | 5 Second | 4000 VA | 5000 VA | 4000 VA | 4000 VA | 5000 VA |
| | 30 Minutes | 3200 VA | 4000 VA | 4000 VA | 4000 VA | 4000 VA |
| AC Input Current Maximum | | 30 amps AC | 30 amps AC | 30 amps AC | 30 amps AC | 30 amps AC |
| AC Input Voltage Range (Adjustable) | | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC |
| AC Input Frequency Range | | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz |
| DC Input Range | | 10.5 to 17.0 VDC | 21.0 to 34.0 VDC | 28.0 to 45.3 VDC | 31.5 to 51.0 VDC | 42.0 to 68.0 VDC |
| Continuous Battery Charge Output | | 125 amps DC | 85 amps DC | 45 amps DC | 45 amps DC | 45 amps DC |
| Operating Temperature Range | | -40° C to 60° C (power derated above 25° C) | | | | |
| Warranty | | Standard 5 year | | | | |
| Weight | Unit | 61 lbs (25 kg) | | | | |
| | Shipping | 64 lbs (28 kg) | | | | |
| Dimensions (H x W x L) | Unit | 12 x 8.25 x 16.25" (30 x 21 x 41 cm) | | | | |
| | Shipping | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | | | |
| Certifications | | ETL Listed to UL458 | | | | |

• Specifications subject to change without notice.

## Additional Off-Grid Inverter Specifications

| | | FX2024JT | FX2024WT | FX2348WT | VFX3024J | VFX3024W | VFX3048W |
|---|---|---|---|---|---|---|---|
| Nominal DC Input Voltage | | 24 VDC | 24 VDC | 48 VDC | 24 VDC | 24 VDC | 48 VDC |
| Continuous Power Rating at 25° C | | 2000 VA | 2000 VA | 2300 VA | 3000 VA | 3000 VA | 3000 VA |
| AC Voltage/Frequency | | 120 VAC 50 Hz | 230 VAC 60 Hz | 230 VAC 60 Hz | 120 VAC 50 Hz | 230 VAC 60 Hz | 230 VAC 60 Hz |
| Continuous AC RMS Output at 25° C | | 16.7 amps AC | 8.7 amps AC | 10 amps AC | 25 amps AC | 13 amps AC | 13 amps AC |
| Idle Power | Full | ≈ 20 Watts | ≈ 20 Watts | ≈ 23 Watts | ≈ 20 Watts | ≈ 20 Watts | ≈ 23 Watts |
| | Search | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts |
| Typical Efficiency | | 92% | 92% | 93% | 92% | 92% | 93% |
| Total Harmonic Distortion | Typical (V) | 2% | 2% | 2% | 2% | 2% | 2% |
| | Maximum (V) | <5% | <5% | <5% | <5% | <5% | <5% |
| Output Voltage Regulation | | ± 2% | ± 2% | ± 2% | ± 2% | ± 2% | ± 2% |
| Maximum Output Current | Peak | 70 amps AC | 35 amps AC | 35 amps AC | 70 amps AC | 35 amps AC | 35 amps AC |
| | RMS | 50 amps AC | 25 amps AC | 25 amps AC | 50 amps AC | 25 amps AC | 25 amps AC |
| AC Overload Capability | Surge | 6000 VA | 5750 VA | 5750 VA | 6000 VA | 5750 VA | 5750 VA |
| | 5 Second | 4800 VA | 4800 VA | 4800 VA | 4800 VA | 4800 VA | 4800 VA |
| | 30 Minutes | 3100 VA | 3100 VA | 3100 VA | 3100 VA | 3100 VA | 3100 VA |
| AC Input Current Maximum | | 60 amps AC | 30 amps AC | 30 amps AC | 60 amps AC | 30 amps AC | 30 amps AC |
| AC Input Voltage Range (MATE Adjustable) | | 80 to 150 VAC | 160 to 300 VAC | 160 to 300 VAC | 80 to 150 VAC | 160 to 300 VAC | 160 to 300 VAC |
| AC Input Frequency Range | | 44 to 56 Hz | 54 to 66 Hz | 54 to 66 Hz | 44 to 56 Hz | 54 to 66 Hz | 54 to 66 Hz |
| DC Input Voltage Range | | 21.0 to 34.0 VDC | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC | 21.0 to 34.0 VDC | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC |
| Continuous Battery Charge Output | | 55 amps DC | 55 amps DC | 35 amps DC | 85 amps DC | 85 amps DC | 45 amps DC |
| Operating Temperature Range | | -40° C to 60° C (power derated above 25° C) | | | -40° C to 60° C (power derated above 25° C) | | |
| Warranty | | Standard 5 year | | | | | |
| Weight | Unit | 62 lbs (25 kg) | | | 61 lbs (25 kg) | | |
| | Shipping | 67 lbs (30 kg) | | | 67 lbs (30 kg) | | |
| Dimensions (H x W x L) | Unit | 13 x 8.25 x 16.25" (33 x 21 x 41 cm) | | | 12 x 8.25 x 16.25" (30 x 21 x 41 cm) | | |
| | Shipping | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | |

## Additional Grid-Interactive Model Specifications

| | | GTFX2524LA | GTFX3048LA | GVFX3524LA | GVFX3648LA |
|---|---|---|---|---|---|
| Nominal DC Input Voltage | | 24 VDC | 48 VDC | 24 VDC | 48 VDC |
| Continuous Power Rating at 25° C | | 2500 VA | 3000 VA | 3500 VA | 3600 VA |
| AC Voltage/Frequency | | 127 VAC 60 Hz | 127 VAC 60 Hz | 127 VAC 60 Hz | 127 VAC 60 Hz |
| Continuous AC RMS Output at 25° C | | 19.7 amps AC | 23.6 amps AC | 27.6 amps AC | 28.4 amps AC |
| Idle Power | Full | ≈ 20 Watts | ≈ 23 Watts | ≈ 20 Watts | ≈ 23 Watts |
| | Search | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts |
| Typical Efficiency | | 92% | 93% | 92% | 93% |
| Total Harmonic Distortion | Inverting (V) | 2% | 2% | 2% | 2% |
| | Selling (A) | <5% | <5% | <5% | <5% |
| Output Voltage Regulation | | ± 2% | ± 2% | ± 2% | ± 2% |
| Maximum Output Current | Peak | 70 amps AC | 70 amps AC | 70 amps AC | 70 amps AC |
| | RMS | 50 amps AC | 50 amps AC | 50 amps AC | 50 amps AC |
| AC Overload Capability | Surge | 6000 VA | 6000 VA | 6000 VA | 6000 VA |
| | 5 Second | 4800 VA | 4800 VA | 5000 VA | 5000 VA |
| | 30 Minutes | 3200 VA | 3200 VA | 4000 VA | 4000 VA |
| AC Input Current Maximum | | 60 amps AC | 60 amps AC | 60 amps AC | 60 amps AC |
| AC Input Voltage Range (MATE Adjustable) | | 100 to 140 VAC | 100 to 140 VAC | 100 to 140 VAC | 100 to 140 VAC |
| AC Input Frequency Range | | 58 to 62 Hz | 58 to 62 Hz | 58 to 62 Hz | 58 to 62 Hz |
| DC Input Voltage Range | | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC | 21.0 to 34.0 VDC | 42.0 to 68.0 VDC |
| Continuous Battery Charge Output | | 55 amps DC | 35 amps DC | 85 amps DC | 45 amps DC |
| Operating Temperature Range | | -40° C to 60° C (power derated above 25° C) | | -40° C to 60° C (power derated above 25° C) | |
| Warranty | | Standard 5 year | | | |
| Weight | Unit | 62 lbs (25 kg) | | 61 lbs (25 kg) | |
| | Shipping | 67 lbs (30 kg) | | 67 lbs (30 kg) | |
| Dimensions (H x W x L) | Unit | 13 x 8.25 x 16.25" (33 x 21 x 41 cm) | | 12 x 8.25 x 16.25" (30 x 21 x 41 cm) | |
| | Shipping | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | 21.75 x 13 x 22" (55 x 33 x 56 cm) | |

*** * * NOTE: THIS PRODUCT IS NOT ETL LISTED TO UL1741. NOT INTENDED FOR USE IN THE U.S. OR CANADA.* * ***

• Specifications subject to change without notice.

# Extreme Series
## Inverter/Charger

The OutBack Extreme Series Inverter/Charger is a highly reliable all-in-one power solution. Incorporating rugged components not available in regular commercial "off-the-shelf" inverter/chargers, the OutBack Extreme Series Inverter/Charger can survive harsh environmental conditions including extreme shaking and vibration.

Our true-sinewave inverter/charger uses intelligent battery charging and has an integrated AC transfer switch with automatic neutral-ground switching for mobile applications. The OutBack Extreme Series Inverter/Charger produces low-distortion AC power for all of your mobile electrical needs and industry-leading surge power starts multiple heavy loads simultaneously.

The OutBack Extreme Series Inverter/Charger is designed to meet your needs today, tomorrow and in the future. Our integrated building block architecture allows you to expand your system from 2 to 36 kW and user-defined settings allow your system to operate at 120 VAC, 120/240 VAC or 120Y208 VAC three-phase by stacking multiple inverter/chargers together.


### OutBack Extreme Inverter/Charger Model Specifications

| | | OBXIC2024S120/60* | OBXGIC2524P120/60 | OBXIC3524P120/60 | OBXIC2024P230/50 |
|---|---|---|---|---|---|
| Nominal DC Input Voltage | | 24 VDC | 24 VDC | 24 VDC | 24 VDC |
| Continuous Power Rating at 25° C | | 2000 VA | 2500 VA | 3500 VA | 2000 VA |
| AC Voltage/Frequency | | 120 VAC 60 Hz | 120 VAC 60 Hz | 120 VAC 60 Hz | 230 VAC 50 Hz |
| Continuous AC RMS Output at 25° C | | 16.7 amps AC | 20.8 amps AC | 29.2 amps AC | 8.7 amps AC |
| Idle Power | Full | ≈ 20 Watts | ≈ 20 Watts | ≈ 20 Watts | ≈ 20 Watts |
| | Search | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts |
| Typical Efficiency | | 92% | 92% | 92% | 92% |
| Total Harmonic Distortion | Typical (V) | 2% | 2% | 2% | 2% |
| | Maximum (V) | < 5% | < 5% | < 5% | < 5% |
| Output Voltage Regulation | | ± 2% | ± 2% | ± 2% | ± 2% |
| Maximum Output Current | Peak | 70 amps AC | 70 amps AC | 70 amps AC | 35 amps AC |
| | RMS | 50 amps AC | 50 amps AC | 50 amps AC | 25 amps AC |
| AC Overload Capability | Surge | 6000 VA | 6000 VA | 6000 VA | 5750 VA |
| | 5 Second | 4800 VA | 4800 VA | 5000 VA | 4800 VA |
| | 30 Minutes | 3200 VA | 3200 VA | 4000 VA | 3100 VA |
| AC Input Current Maximum | | 30 amps AC | 30 amps AC | 60 amps AC | 30 amps AC |
| AC Input Voltage Range (MATE Adjustable) | | 80 to 150 VAC | 80 to 150 VAC | 80 to 150 VAC | 160 to 300 VAC |
| AC Input Frequency Range | | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz | 44 to 56 Hz |
| DC Input Range | | 21.0 to 34.0 VDC | 21.0 to 34.0 VDC | 21.0 to 34.0 VDC | 21.0 to 34.0 VDC |
| Continuous Battery Charge Output | | 55 amps DC | 55 amps DC | 85 amps DC | 55 amps DC |
| Recommended Battery Cable | | #2/0 AWG | #2/0 AWG | #2/0 AWG | #2/0 AWG |
| Recommended Battery Types | | Flooded Lead Acid, AGM Gel | | | |
| Neutral Ground Switching | | Yes | Yes | No | No |
| Chassis | | Sealed/Fordable | Sealed | Vented | Sealed |
| Warranty | | Standard 1 year | Standard 1 year | Standard 1 year | Standard 1 year |
| Weight | Unit | 57.5 lbs (25 kg) | 62 lbs (25 kg) | 62 lbs (25 kg) | 62 lbs (25 kg) |
| | Shipping | 85 lbs (30 kg) | 67 lbs (30 kg) | 67 lbs (30 kg) | 67 lbs (30 kg) |
| Dimensions (H x W x L) | Unit | 13 x 8.25 x 16.25" (33 x 21 x 41 cm) | | 13 x 8.25 x 16.25" (33 x 21 x 41 cm) | |
| | Shipping | 21.75 x 13 x 22" (55 x 33 x 56 cm) | | 21.75 x 13 x 22" (55 x 33 x 56 cm) | |

* Optional AC wiring Kit (OBXIC2024S-KIT) available for OBXIC2024120/60 - (1EA) AC IN and AC OUT 6' Automotive Maxi-connectors, (1EA) HUB/RTS, 6' automotive Mini-connector with one connector and one raw end

• Specifications subject to change without notice.

# GFX International Series
## Inverter/Charger

The OutBack true sinewave GFX International Series Inverter/Charger is a competitive power solution designed for applications with lower power demands. Incorporating a DC-to-AC sinewave inverter, battery charger and AC transfer relay housed within a die-cast aluminum chassis, the International Series GFX Inverter/Chargers give you the ability to sell solar, wind or hydro power back to the utility grid while providing instantaneous back-up power in the event of a utility outage.


Sealed GFX

The GFX International Series built in transfer relay automatically disconnects your loads from the utility grid and powers them from the inverter in the event of an outage, allowing you to continue using your solar and battery back-up power, unlike traditional grid-tie systems. For areas that frequently experience power instability such as surges, spikes or brownouts, or where standard inverters have trouble syncing to the utility grid, the GFX International Series grid reconnect timers have been shortened to reduce overall sell-back downtime and improve system functionality.

Intelligent multi-stage battery charging prolongs the life of your batteries and built-in networked communications allow for simultaneous communications of up to ten OutBack Power components within the system. The exclusive modular system architecture means that increased power output is just an additional inverter/charger away. Our GFX International Series uses a sealed chassis that can operate in the harshest environmental conditions such as high humidity and corrosive salt air.

### GFX International Series

| | | GFX1312E | GFX1424E | GFX1448E | GFX1312 | GFX1424 | GFX1548 |
|---|---|---|---|---|---|---|---|
| Nominal DC Input Voltage | | 12 Vdc | 24 Vdc | 48 Vdc | 12 Vdc | 24 Vdc | 48 Vdc |
| Continuous Power Rating at 25° C (77° F) | | 1300 VA | 1400 VA | 1400 VA | 1300 VA | 1400 VA | 1500 VA |
| AC Voltage/Frequency | | 230 Vac 50 Hz | 230 Vac 50 Hz | 230 Vac 50 Hz | 120 Vac 60 Hz | 120 Vac 60 Hz | 120 Vac 60 Hz |
| Continuous AC RMS Output at 25° C (77° F) | | 5.7 Aac | 6.1 Aac | 6.1 Aac | 10.8 Aac | 11.7 Aac | 12.5 Aac |
| Idle Power | Full | ≈ 18 Watts | ≈ 18 Watts | ≈ 18 Watts | ≈ 18 Watts | ≈ 18 Watts | ≈ 18 Watts |
| | Search | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts | ≈ 6 Watts |
| Typical Efficiency | | 90% | 92% | 93% | 90% | 92% | 93% |
| Total Harmonic Distortion | Inverting (V) | 2% | 2% | 2% | 2% | 2% | 2% |
| | Selling (A) | <5% | <5% | <5% | <5% | <5% | <5% |
| Output Voltage Regulation | | ± 2% | ± 2% | ± 2% | ± 2% | ± 2% | ± 2% |
| Maximum Output Current | Peak | 28 Aac | 28 Aac | 28 Aac | 56 Aac | 56 Aac | 56 Aac |
| | RMS | 20 Aac | 20Aac | 20 amps AC | 40 Aac | 40 Aac | 40 Aac |
| AC Overload Capability | Surge | 4600 VA | 4600 VA | 4600 VA | 4600 VA | 4600 VA | 4600 VA |
| | 5 Second | 2900 VA | 2900 VA | 2900 VA | 2900 VA | 2900 VA | 2900 VA |
| | 30 Minutes | 1800 VA | 2000 VA | 2000 VA | 1800 VA | 2000 VA | 2000 VA |
| AC Input Current Maximum | | 30 Aac | 30 Aac | 30 Aac | 60Aac | 60Aac | 60Aac |
| AC Input Voltage Range (Adjustable) | | 140 to 280 Vac | 140 to 280 Vac | 140 to 280 Vac | 70 to 140 Vac | 70 to 140 Vac | 70 to 140 Vac |
| AC Input Frequency Range | | 45 to 55 Hz | 45 to 55 Hz | 45 to 55 Hz | 54 to 66 Hz | 54 to 66 Hz | 54 to 66 Hz |
| DC Input Voltage Range | | 10.5 to 17.0 Vdc | 21.0 to 34.0 Vdc | 42.0 to 68.0 Vdc | 10.5 to 17 Vdc | 21.0 to 34.0 Vdc | 42.0 to 68.0 Vdc |
| Continuous Battery Charger Output | | 70 Adc | 40 Adc | 20 Adc | 70 Adc | 40 Adc | 20 Adc |
| Max DC Current at Rated Power | | 130 Adc | 70 Adc | 35 Adc | 130 Adc | 70 Adc | 37.5 Adc |
| Warranty | | Standard 5 year | | | | | |
| Weight - kg/lb | Unit | 22.5 / 49.6 | | | | | |
| | Shipping | 25.6 / 56.4 | | | | | |
| Dimensions - H x W x L (cm/in) | Unit | 33 x 21 x 41 / 13 x 8.25 x 16.25 | | | | | |
| | Shipping | 55 x 33 x 56 / 21.75 x 13 x 22 | | | | | |

*** * * NOTE: THIS PRODUCT IS NOT ETL LISTED TO UL1741. NOT INTENDED FOR USE IN THE U.S. OR CANADA.* * ***

• Specifications subject to change without notice.

# FLEXmax™ Charge Controller


**FLEXmax 80**


**FLEXmax 60**

The FLEXmax family of charge controllers is the latest innovation in Maximum Power Point Tracking (MPPT) charge controllers from OutBack Power Technologies. The innovative FLEXmax MPPT software algorithm is both continuous and active, increasing your photovoltaic array power yield up to 30% compared to non-MPPT controllers. Thanks to active cooling and intelligent thermal management cooling, both FLEXmax charge controllers can operate at their full maximum current rating, 60 amps or 80 amps respectively, in ambient temperatures as high as 104°F (40°C).

Included in all of the FLEXmax Charge Controllers are the revolutionary features first developed by OutBack Power, including support for a wide range of nominal battery voltages and the ability to step-down a higher voltage solar array to recharge a lower voltage battery bank. A built-in, backlit 80-character display shows the current status and logged system performance data for the last 128 days at the touch of a button. The integrated OutBack network communications allows FLEXmax Series Charge Controllers to be remotely programmed and monitored via a MATE system display and provides unrivaled complete system integration.

FLEXmax MPPT Charge Controllers are the only choice when you demand a high-performance, efficient and versatile charge controller for your advanced power system.

## FLEXmax™ Specifications

| | | | | | |
|---|---|---|---|---|---|
| Nominal Battery Voltages | | | 12, 24, 36, 48, or 60 VDC (Single model - selectable via field programming at start-up) | | |
| Maximum Output Current | | | 60 amps @ 104º F (40ºC) with adjustable current limit / 80 amps @ 104º F (40ºC) with adjustable current limit | | |
| Maximum Solar Array STC Nameplate | | **FLEXmax 60** | 12 VDC systems 900 Watts / 24 VDC systems 1800 Watts / 48 VDC systems 3600 Watts / 60 VDC systems 4500 Watts | | |
| | | **FLEXmax 80** | 12 VDC systems 1250 Watts / 24 VDC systems 2500 Watts / 48 VDC systems 5000 Watts / 60 VDC systems 6250 Watts | | |
| NEC Recommended Solar Array STC Nameplate | | **FLEXmax 60** | 12 VDC systems 750 Watts / 24 VDC systems 1500 Watts / 48 VDC systems 3000 Watts / 60 VDC systems 3750 Watts | | |
| | | **FLEXmax 80** | 12 VDC systems 1000 Watts / 24 VDC systems 2000 Watts / 48 VDC systems 4000 Watts / 60 VDC systems 5000 Watts | | |
| PV Open Circuit Voltage (VOC) | | | 150 VDC absolute maximum coldest conditions / 145 VDC start-up and operating maximum | | |
| Standby Power Consumption | | | Less than 1 Watt typical | | |
| Power Conversion Efficiency - Typical | | **FLEXmax 60** | 98.1% @ 60 amps in a 48 VDC System | | |
| | | **FLEXmax 80** | 97.5% @ 80 amps in a 48 VDC System | | |
| Charging Regulation | | | Four Stages: Bulk, Absorption, Float, and Equalization | | |
| Voltage Regulation Set points | | | 10 to 80 VDC user adjustable with password protection | | |
| Equalization Charging | | | Programmable Voltage Setpoint and Duration - Automatic Termination when completed | | |
| Battery Temperature Compensation | | | Automatic with optional RTS installed / 5.0 mV per °C per 2V battery cell | | |
| Voltage Step-Down Capability | | | Can charge a lower voltage battery from a higher voltage PV array - Max 150 VDC input | | |
| Programmable Auxiliary Control Output | | | 12 VDC output signal which can be programmed for different control applications (Maximum of 0.2 amps DC) | | |
| Status Display | | | 3.1" (8 cm) backlit LCD screen - 4 lines with 80 alphanumeric characters total | | |
| Remote Display and Controller | | | Optional MATE, MATE2, or MATE3 | | |
| Network Cabling | | | Proprietary network system using RJ 45 Modular Connectors with CAT 5e Cable (8 wires) | | |
| Data Logging | | | Last 128 days of Operation - Amp Hours, Watt Hours, Time in Float , Peak Watts, Amps, Solar Array Voltage, Max Battery Voltage Min Battery Voltage and Absorb for each day along with total Accumulated Amp Hours, and kW Hours of production | | |
| Positive Ground Applications | | | Requires two Pole Breakers for switching both positive and Negative Conductors on both Solar Array and Battery Connections (HUB4 and HUB10 can not be used in positive ground applications) | | |
| Operating Temperature Range | | | Minimum -40° to maximum 60° C (Power capacity of the controller is automatically derated when operated above 40° C) | | |
| Environmental Rating | | | Indoor Type 1 (IP 30) | | |
| Conduit Knockouts | | | One 1" (35mm)on the back; One1" (35mm) on the left side; Two 1" (35mm) on the bottom | | |
| Warranty | | | Standard 5 year | | |
| Weight | Unit | **FLEXmax 80** | 12.20 lbs (5.56 kg) | **FLEXmax 60** | 11.65 lbs (5.3 kg) |
| | Shipping | | 15.5 lbs (7.03 kg) | | 14.9 lbs (6.7 kg) |
| Dimensions | Unit (H x W x D) | **FLEXmax 80** | 16.25" x 5.75" x 4.5" (41.3 x 14 x 10 cm) | **FLEXmax 60** | 13.75 x 5.75 x 4.5" (40 x 14 x 10 cm) |
| | Shipping | | 21" x 10.5" x 10.5" (53 x 27 x 27 cm) | | 18 x 11 x 8" (46 x 30 x 20 cm) |
| Options | | | Remote Temperature Sensor (RTS), HUB4, HUB10, MATE, MATE2, MATE3 | | |
| Menu Languages | | | English & Spanish | | |

• Specifications subject to change without notice. Use appropriate wire size in accordance with NEC.

# MATE Series
## System Display and Controllers

## MATE3


MATE3

The MATE3 System Display and Controller makes it easier than ever to program and monitor your complete OutBack Power system. An intuitive user interface and integrated system configuration wizard make system setup and programming quick and seamless. The ability to set unique multi-level user passwords allows you to secure critical system settings from unintended changes while still allowing open access to necessary functions. Through the use of a single MATE3 you can remotely manage and monitor multiple inverter/chargers, charge controllers and DC monitoring devices.

The MATE3 is packed full of features to make system management simple. The easy-to-read graphical LCD display is backlit for dark operating conditions. Improved tactile buttons and a user programmable "favorite" key give you immediate access to the features you want, while an intuitive scroll wheel interface allows for easy adjustment of system set points. Expandable SD card memory allows you to increase data logging capacity as well as upgrade units in the field.

A built-in clock and calendar function enables timer-based programming of inverter and charger operation. This permits you to set the system to work with time-of-day power rates or to limit a generator's run time to a specific time period of the day or week. All of your settings are stored in permanent memory to eliminate the need to reprogram in the event of a system shutdown or battery replacement. The MATE3 is an Internet enabled device — simply connecting to the Internet will allow full remote system monitoring via an easy-to-use web interface.

| MATE3 Specifications | |
|---|---|
| Display | 4.0 x 1.2" full graphical display |
| Quick System Access | 5 system operation hot keys, 1 user programmable hot key |
| Status Indicators | Nine LED Status Indicators |
| Navigational Controls | 5 navigational keys |
| Setpoint Adjustment | Touch sensitive scroll wheel |
| Communication Protocol | Proprietary OutBack Communications Protocol |
| Interconnection Cabling | Standard CAT 5 network cable with RJ45 modular jack - 6' (2 m) included |
| PC Computer Interface | Ethernet |
| Microprocessor | 80 MHz 32 bit processor |
| Setpoint and Data Memory | 8Mb RAM/ 64Mb of flash RAM |
| Clock / Calendar | On-board real time clock with battery backup |
| Environmental Rating | Indoor Type 1 (IP 30) |
| Maximum Cable Length | 300' (100 m) |
| Warranty | Standard 5 year |

## MATE & MATE2


MATE

The MATE system display and controllers are complete management tools for your OutBack Power system. Through the use of a single MATE you can remotely manage and monitor multiple inverter/chargers, charge controllers and monitoring devices.

The MATE and MATE2 are packed full of features to make system management simple. The easy-to-read 3.1" (8 cm) LCD is backlit for dark operating conditions. Four soft keys allow easy context-based navigation of menus and functions. Two hot keys give immediate access to AC and inverter functions.


MATE2

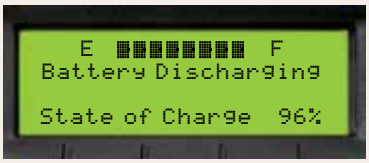
A built-in clock and calendar function enables timer-based programming of inverter and charger operation. This permits you to set the system to work with time-of-day power rates or to limit a generator's run time to a specific time period of the day or week. All of your settings are stored in permanent memory to eliminate the need to reprogram in the event of a system shutdown or battery replacement. The MATE and MATE2 include a RS232 port with DB9 jack for connection to the serial port of a PC computer. The MATE system display and controller is surface-mounted while the MATE2 is flush-mountable in a wall cut-out.

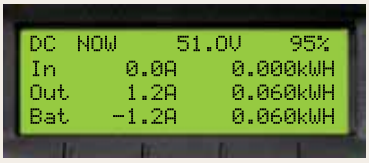
| MATE & MATE2 Specifications | | |
|---|---|---|
| MATE | Grey | Surface-mount |
| MATE_B | Black | Surface-mount |
| MATE2 | Black | Flush mount |
| Interface Display | | 3.1" (8 cm) backlit LCD - four line, 80 alpha numeric characters |
| Control Keypad | | 6 backlit silicone keys - dedicated inverter and AC input keys |
| Status Indicators | | Two LED Status Indicators - AC input (yellow), inverting (green) |
| Communication Protocol | | Proprietary OutBack Multi-drop using an OutBack HUB4 or HUB10 |
| Interconnection Cabling | | Standard CAT 5 network cable with RJ45 modular jack - 10' (5 m) included |
| PC Computer Interface | | RS232 opto-isolated DB9 jack 9600 baud serial communication |
| Microprocessor | | 16 MHz low power consumption version |
| Set point and Data Memory | | 32K non-volatile flash RAM |
| Clock / Calendar | | On-board real time clock with battery backup |
| Environmental Rating | | Indoor Type 1 (IP 30) |
| Maximum Cable Length | | 1000' (300 m) |
| Warranty | | Standard 5 year |
| Weight | Shipping | 1 lb (.5 kg) |
| Dimensions (H x W x L) | Shipping | 5.75 x 4.25 x 2" (15 x 11 x 5 cm) |

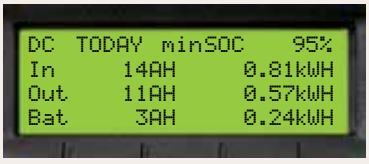
• Specifications subject to change without notice.

# FLEXnet™ DC
## System Monitoring Device

The OutBack Power Technologies FLEXnet™ DC is the ultimate in DC System monitoring devices. Our integrated networked communications make valuable, usable data available from your system, viewable on an OutBack MATE communications device (screens seen below), providing you with the answers you need concerning your system's health, performance and efficiency. The FLEXnet DC provides real state-of-charge (S.O.C.) information about the life and state of your battery bank.





**Battery Status Screen**-Easily see your system's current condition with this at-a-glance display. This screen shows an easy-to-interpret "fuel gauge" style status bar, current state of charge and whether you are currently charging or discharging your batteries. This is useful for those system owners who want a way to quickly understand the current state of their battery bank.

**Now Summary Screen**-Monitor the amount of power your system is currently producing and consuming as well as the amount of power going IN and OUT of your battery bank. This screen also displays your battery bank's voltage and current state of charge, providing you with real-time production monitoring of DC sources, such as a solar array or small wind turbine, as well as consumption by loads.

**Today Summary Screen**-Monitor the cumulative energy your system has produced and consumed as well as the total amount of energy that has gone to charging your batteries today. This screen also displays today's lowest state of charge and allows you to see how your overall system production compares to system consumption.

**History Summary Screen**-Review historical energy production/consumption data for the most recent 128 days, including the minimum battery state of charge reached for each day. This screen can be used to watch power system production and consumption trends.

### FN-DC Specifications

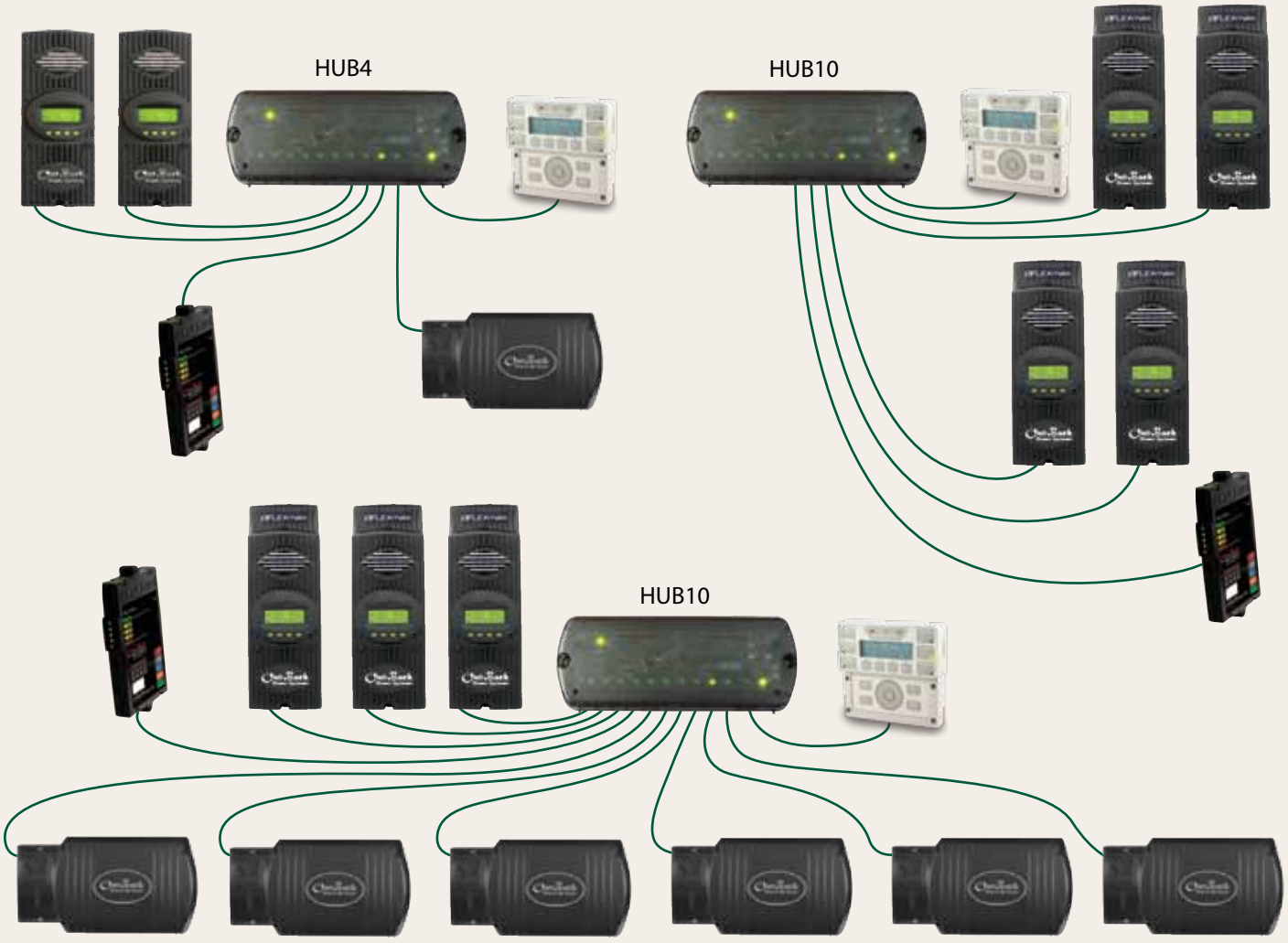
| | | | |
|---|---|---|---|
| Battery Voltage Input Range | | | 8.0 to 80.0 Volts DC |
| Battery Voltage Resolution | | | 0.1 Volts DC |
| Number of Current Channels | | | One to Three (each can be a Source or Load) |
| Current Range (Each Channel) | | | -1000.0 amps to +1000.0 amps DC |
| Current Resolution | | | 0.1 amps DC |
| State of Charge Display | | | 0 to 100% (1% increments) |
| Aux Relay Configuration | | | SPST, Magnetic Latching Relay |
| Aux Relay Max Rating | | | 5 amps @ 30 Volts DC |
| Current Shunt Type (order separately) | | | 500 Amp / 50mv |
| Display | | Primary | OutBack Power MATE or MATE2 4 x 20 LCD, or MATE3 graphical display |
| | | Secondary | Five LED Indicators on front of FLEXnet DC |
| Battery AH Capacity Range | | | 100 to 10,000 amp Hours |
| Data Logging Memory | | | Most recent 128 Days |
| Programmable AUX Relay Settings | | Battery Volts | Adjustable from 8.0 to 80.0 VDC |
| | | State of Charge | Adjustable from 0 to 100% |
| | | Time Delay | Adjustable from 0 to 240 Minutes |
| Accuracy | | 0.5% of Reading +/- 2 Least Significant Digits per channel | |
| Operating Temperature Range | | 0 - 50°C | |
| Mounting | | 3/4" Panel Mount Breaker Slot or Surface Mount | |
| Warranty | | Standard 5 year | |
| Weight | Unit | 5 oz. (.14kg) | |
| | Shipping | 2 lbs. (.90kg) | |
| Dimensions (H x W x L) | Unit | 0.74 x 3.72 x 6.60" (1.88 x 9.45 x 16.75 cm) | |
| | Shipping | 2.13 x 9 x 11.5" (5.4 x 22.86 x 29.21 cm) | |

* Specifications subject to change without notice.

# HUB
## Communications Manager

The HUB system communications managers are the backbone of your networked OutBack power conversion system. The OutBack HUB communicates stacking, load share and power save off/on signals. Interconnection cabling is standard Ethernet CAT5 with RJ45 modular jacks. Through the use of a HUB, your system is completely coordinated and managed by the MATE.

| HUB Specifications | | HUB4 | HUB10 |
|---|---|---|---|
| Number of Ports | | 4 Plus MATE | 10 Plus MATE |
| Warranty | | Standard 5 year | Standard 5 year |
| Weight | Unit | 1 lb (.5 kg) | 1 lb (.5 kg) |
| | Shipping | 3 lbs (1.4 kg) | 3 lbs (1.4 kg) |
| Dimensions (H x W x L) | Unit | 10.5 x 6.25 x 1.27" (27 x 16 x 3 cm) | 10.5 x 6.25 x 1.27" (27 x 16 x 3 cm) |
| | Shipping | 12 x 6 x 5" (31 x 15 x 13 cm) | 12 x 6 x 5" (31 x 15 x 13 cm) |



# Remote Temperature Sensor

## RTS

The OutBack Remote Temperature Sensor (RTS) is a necessary tool for proper battery charging. All OutBack products with integrated battery charging have a temperature compensation system built in which benefits from the installation of the RTS (included with inverter/chargers). The RTS ensures that your OutBack system knows the precise battery temperature so that it can recharge your batteries safely and efficiently. Systems with multiple OutBack products connected to one HUB4 or HUB10 require only a single RTS to be installed.

*15' (5 m) cable*

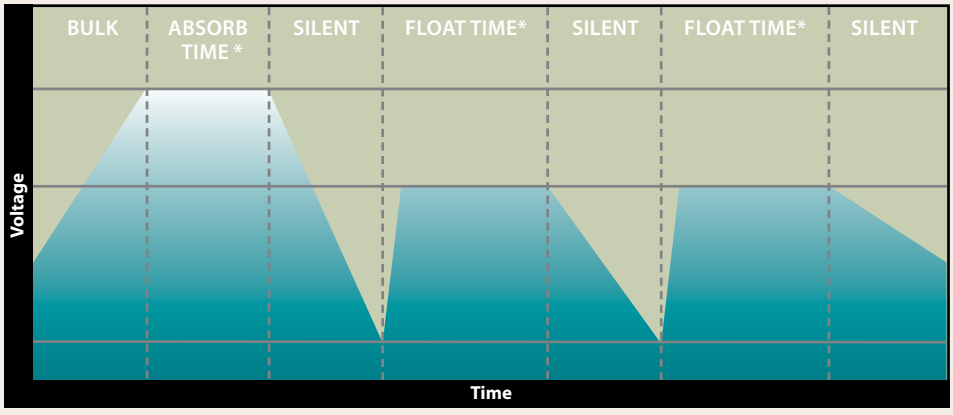
## Multi-Stage Battery Charging

Batteries are a key component in backup and off-grid systems, often serving as the only energy storage device. To guarantee that they function properly it is important that your batteries are maintained. A chief part of this maintenance is proper charging. Your batteries should always be maintained above a 50% level of charge and receive a regular recharges once a month to ensure operation at peak performance. Prolonged use of the battery below a 50% state of charge will adversely affect the long-term health of the battery and can result in premature failure.

The multistage charging process (5 stages) uses several regulation stages to allow fast recharging of the battery energy storage system while ensuring a long battery life, high performance and efficient operation of the overall system. The charging process begins with the **BULK** stage, where maximum current is sent to the batteries until the target "absorb" voltage is reached and the absorb stage of the charge begins. During **ABSORB**, the charger provides the batteries with the just enough current to hold at the set voltage for a preset amount of time. Following this cycle, the charging system changes between available OutBack charging products. Using a FLEXmax Series Charge Controller, the batteries enter the **FLOAT** stage where they are given a maintenance charge until there is no excess renewable energy. The FX or VFX inverter/charger will go into **SILENT** mode where the charger turns off until the battery voltage drops to the "re-float" setting. At this point the inverter/charger initiates the maintenance float charge. This method reduces fuel and utility consumption.

It should be noted that the temperature of your batteries has an impact on the charging process. The OutBack RTS should be used to monitor this. In higher ambient temperatures, the battery charging regulation settings will be automatically reduced to prevent overcharging of the batteries. Conversely, in lower ambient temperature conditions, the regulation settings will be increased to ensure complete recharging of the batteries.

Batteries are composed of a group of individual cells. Through normal use, the charge of each individual cell will not be equal to the other cells. To address this, your batteries should be **EQUALIZED** either once each month or once every few months depending on usage. During the equalization charge the electrolyte in the battery is stirred up by gas bubbles, which help to create an equal mixture of water and acid. Simultaneously the full cells are overcharged which allows the low cells to "catch up" and all of the active material in the battery to be reconverted to its charged state. Depending on usage, the hardened battery plate material that is no longer active in the battery-sulfation can also be reduced by an equalization charge.




** MATE Adjustable*

# FLEXware™ Surge Protector


The OutBack Power Technologies FLEXware Surge Protector is a seamlessly integrated balance-of-system component for the FX Series Inverter/Charger. The FLEXware Surge Protector was designed by OutBack engineers specifically for OutBack FX Series Inverter/Chargers, and provides multiple levels of protection for the vital electrical components of the Inverter/Charger in the event of an electrical surge. The sophisticated design allows for both AC and DC protection on multiple circuits (two AC and one DC) via thermally fused Metal Oxide Varistors (MOVs). LED visual indicators provide at-a-glance status monitoring allowing system users to determine FLEXware Surge Protector operational status in real-time. The FLEXware Surge Protector is designed to operate between 120 to 240 VAC at 50/60 Hz and 12 to 48 VDC. Its multiple mounting configurations allow it to be incorporated into any OutBack system. The FW-SP-ACA mounts inside the FW-ACA for FLEXware 500 and 1000 systems, while the FW-SP-250 is designed to mount inside the FLEXware 250 AC Side Breaker Enclosure allowing for quick installations that keep your system protected and looking great.

The OutBack Power Technologies FLEXware Surge Protector is the only choice when you want to protect your FX Series Inverter/Charger from the harmful effects of transient power surges. Ease of installation and seamless integration make it the obvious addition to your OutBack system.

## FLEXware™ Surge Protector Specifications

| | | FW-SP-ACA | FW-SP-250 | FW-SP-R |
|---|---|---|---|---|
| Nominal Voltage | | 120-240VAC/12-48VDC | 120-240VAC/12-48VDC | 120-240VAC/12-48VDC |
| Voltage Protection Level | | 390VAC/150VDC | 390VAC/150VDC | 390VAC/150VDC |
| AC or DC | | AC/DC | AC/DC | AC/DC |
| Maximum Surge Current (8/20 µs) | | 30kA per circuit | 30kA per circuit | 30kA per circuit |
| Energy Rating | | 2500 joules | 2500 joules | 2500 joules |
| Frequency | | 50/60 Hz | 50/60 Hz | 50/60 Hz |
| Protection Type | | Thermally Fused MOV | Thermally Fused MOV | Thermally Fused MOV |
| Number of Protected Circuits | | Two AC & One DC | Two AC & One DC | Two AC & One DC |
| Mounting | | FW-ACA | FW-250 | Replacement Board (FW-SP-ACA, FW-SP-250) |
| Weight | Unit | 1 lbs 4 oz (.57 kg) | 1 lbs 2.5 oz (.52 kg) | 7.5 oz (.21 kg) |
| | Shipping | 2 lbs 2 oz (.96 kg) | 2 lbs (.91 kg) | 1 lb 2.2 oz (.516 kg) |
| Dimensions (H x W x L) | Unit | 8.5 x 6.75 x 2.5" (21.59 x 17.15 x 6.35 cm) | 5.5 x 6.5 x 7.5" (13.97 x 16.51 x 19.05 cm) | 7.75 x 5.5 x 1.5" (19.69 x 13.97 x 3.81 cm) |
| | Shipping | 10.13 x 9.13 x 5.75" (25.72 x 23.2 x 14.6 cm) | 10 x 7.25 x 6" (25.4 x 18.42 x 15.24 cm) | 9.38 x 7.25 x 2.5" (23.81 x 18.42 x 6.35 cm) |

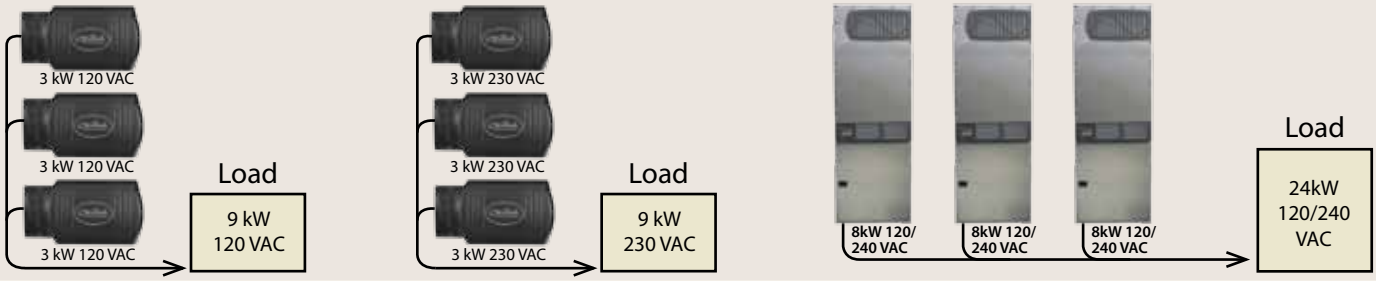
# Stacking

At OutBack, we adhere to a philosophy that a power system should be fully customizable to address your specific needs. Therefore we set out to create the world's first group of inverter/chargers that use a truly modular architecture. This modular architecture uses the next generation of a technique referred to as "stacking" to enable you to tailor your system for higher output power, increased charging capabilities and/or three-phase power configuration.

Whether stacked in parallel, classic series, series/parallel or three-phase there is always an inverter/charger which performs the task of Master. The Master talks to the other units through the HUB system communications manager while performing three major roles, keeping all inverter/chargers properly phased, controlling inverter and charger output levels, as well as putting unused inverters into Power Save mode to improve system efficiency at low AC load levels.

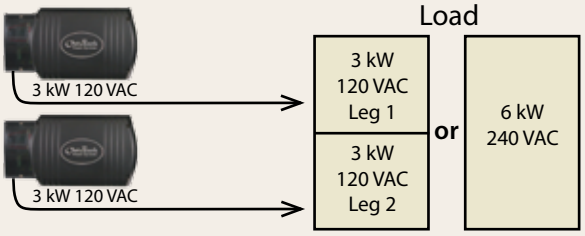
## Parallel Stacking - More power at same output voltage

When the inverter/chargers are stacked in parallel all inverter and charger outputs are combined. This means that each inverter's AC output is added up to equal your total system AC output, up to 36,000 watts, in phase at the same 120 VAC/60 Hz or 230 VAC/50 Hz output voltage, or 80,000 watts at 120/240 VAC/60 Hz with the Radian Series.



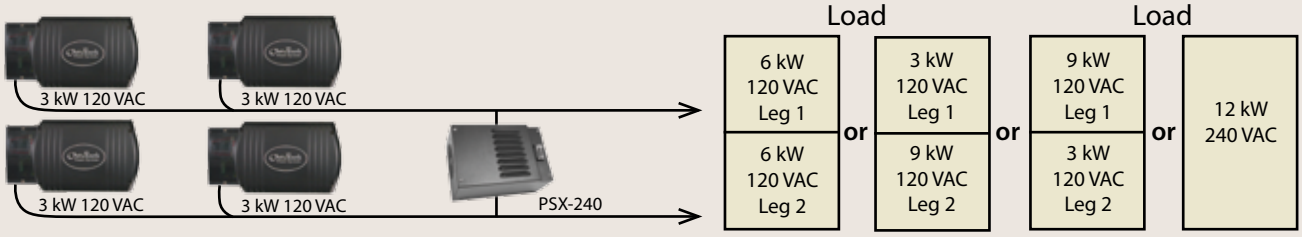

## Classic Series Stacking - More power at higher output voltage

Stacking inverter/chargers in classic series provides a system with split phase 120/240VAC. This method does not allow balancing between separate legs on a system and is can only be used in dual inverter/charger systems without the X-240 Auto Transformer.



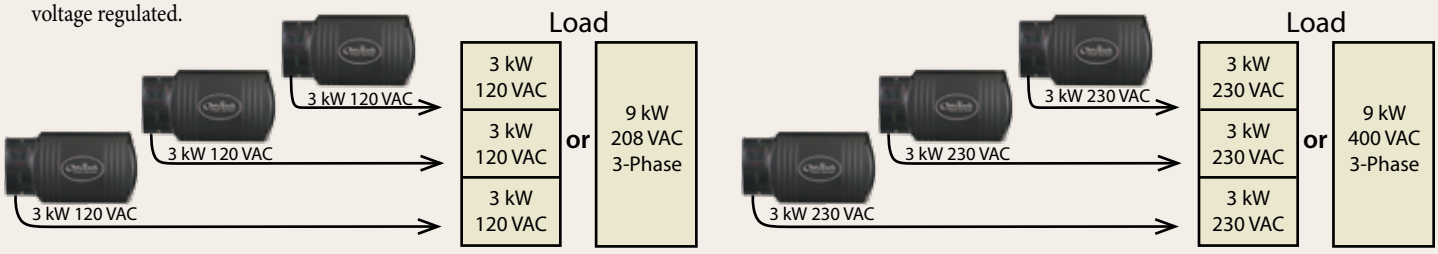

## OutBack Series/Parallel Stacking - More power at all output voltages

Series/Parallel stacking or OutBack (OB) stacking is unique to OutBack inverter/chargers. Never before has it been possible to have inverter/chargers balancing loads intelligently between two legs of AC power while seamlessly changing between series and parallel. OB Stacking uses the X-240 auto transformer to balance the loads between the two separate series legs of a system. The X-240 allows AC loads on leg 1 and leg 2 to be powered by any combination of inverter/chargers within your system. Even if there are only two inverter/chargers, connected in series, they can function as if connected in parallel. This allows larger AC loads to be operated by a system without risking overloading one of the 120 VAC outputs.




## 3-Phase Stacking - More power for three-phase loads

Three inverter/chargers can be configured to provide 120/208 VAC or 230/400VAC four wire "WYE/Star" three-phase AC Power. An inverter/charger is used to power each of the three legs for 3-phase AC power. The loads on each of the inverters do not need to be kept balanced – each phase is independently voltage regulated.



# Auto Transformer

The OutBack PSX-240 (6 kVA) auto transformer can be used for step-up, step-down, generator and split-phase output balancing or as a series stacked inverter to load balancing autoformer. Incorporating a transformer with 120 volt/30 amp primary and secondary side, a temperature activated cooling fan and a 25 amp dual breaker in a steal enclosure, the PSX-240 is ready to install in your custom application. Use for 120 or 240 VAC 60 Hz systems only.

Powering 240 volt items like deep well pumps with a single 120 volt inverter is possible thanks to the PSX-240's step-up capability. Its step-down feature allows you to charge your batteries with a 240 volt generator through a single 120 volt inverter. The PSX-240's ability to balance the output of series stacked inverter/chargers makes it a critical item when using the OutBack stacking 120/240 VAC configuration.

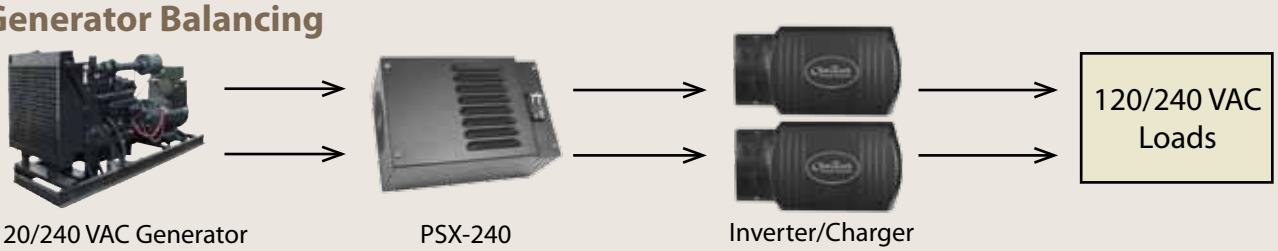
*The FW-X240 (4 kVA) is also available without the enclosure, for installation inside the FW500-AC or FW1000-AC enclosures.*

| **Specifications** | | **PSX-240** | **FW-X240** |
|---|---|---|---|
| Weight | Unit | 37.7 lb (17.1 kg) | 28.4 lb (12.9 kg) |
| | Shipping | 39.5 lbs (17.9 kg) | 32.5 lbs (14.7 kg) |
| Dimensions (H x W x L) | Unit | 6.25 x 8 x 12.5″ (15.9 x 20.3 x 31.75 cm) | 5.25 x 6 x 6.5″ (27 x 16 x 3 cm) |
| | Shipping | 10.25 x 12.25 x 16.25″ (26 x 31.1 x 33 cm) | 10.75 x 10.75 x 10.75″ (27 x 27 x 27 cm) |

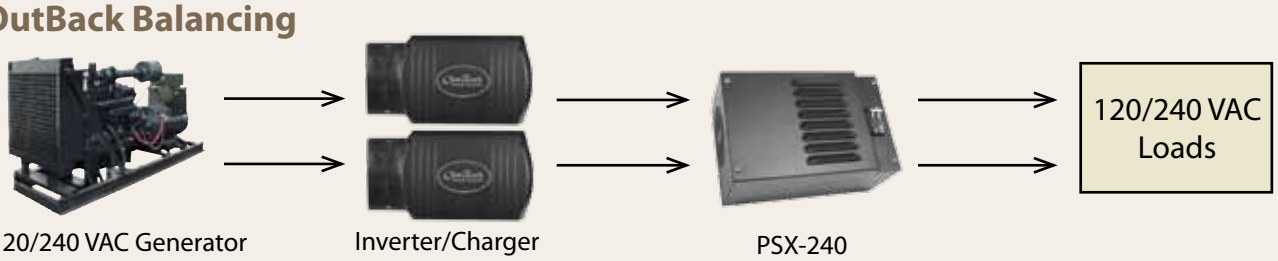
## Step-Up


## Step-Down


## Generator Balancing




## OutBack Balancing



# FLEXpower™ ONE

**Fully Pre-Wired Single Inverter System**

The FLEXpower ONE System accommodates all of the essential protective devices in the smallest possible space at the lowest installed cost making it ideal for applications with modest power requirements such as cabins, chalets, homes, remote communication sites and back-up power systems. Utilizing an extremely compact design and an easy-to-install mounting bracket, the fully pre-wired and factory-tested FLEXpower ONE System is designed for a quick installation, saving both time and money.

FLEXpower ONE includes a single inverter, AC and DC wiring boxes, a single FLEXmax Charge Controller, MATE, HUB, FLEXnet DC and Surge Protector while maintaining a small system footprint. The FLEXpower ONE System is also equipped with battery and PV array breakers, a PV GFDI breaker, an Input-Output-Bypass Assembly, mounting locations for both AC GFCI Type B and EU Type F style outlets and additional AC breakers. FLEXpower ONE components carry all of the necessary ETL certifications allowing for a code-compliant installation that saves both time and money while still looking great.

The OutBack Power FLEXpower ONE System is the only choice when you need a fully integrated, true-sinewave, reliable power system.

## FLEXpower ONE Specifications

**For 120Vac/60Hz applications**

| Pre-wired Systems* | Description |
|---|---|
| FP1-1 | VFX3524 3.5kW FLEXpower ONE, Pre-wired AC and DC boxes with 120Vac Bypass, Type B Outlet, 250A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80, FLEXnet DC and surge protector |
| FP1-2 | VFX3648 3.6kW FLEXpower ONE, Pre-wired AC and DC boxes with 120Vac Bypass, Type B Outlet, 175A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80, FLEXnet DC and surge protector |
| FP1-3 | GVFX3524 3.5kW FLEXpower ONE, Pre-wired AC and DC boxes with 120Vac Bypass, Type B Outlet, 250A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80, FLEXnet DC and surge protector |
| FP1-4 | GVFX3648 3.6kW FLEXpower ONE, Pre-wired AC and DC boxes with 120Vac Bypass, Type B Outlet, 175A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80, FLEXnet DC and surge protector |
| FP1-25 | GTFX3048 3kW FLEXpower ONE, Pre-wired AC and DC boxes with 120Vac Bypass, Type B Outlet, 175A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80 and surge protector (FN-DC not included) |
| FP1-26 | FX3048T 3kW FLEXpower ONE, Pre-wired AC and DC boxes with 120Vac Bypass, Type B Outlet, 175A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80, FLEXnet DC and surge protector |
| FP1-27 | FX2524T 2.5kW FLEXpower ONE, Pre-wired AC and DC boxes with 120Vac Bypass, Type B Outlet, 175A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80, FLEXnet DC and surge protector |
| **Additional Models- For 120Vac/60Hz applications** | |
| FP1-36 | GTFX2524-HI 2.5kW FLEXpower ONE for Hawaii market, Pre-wired AC and DC boxes with 120Vac Bypass, Type B Outlet, 250A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80 and surge protector (FN-DC not included) |
| FP1-37 | GTFX3048-HI 3kW FLEXpower ONE for Hawaii market, Pre-wired AC and DC boxes with 120Vac Bypass, Type B Outlet, 175A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80 and surge protector (FN-DC not included) |
| **For 230Vac/50Hz applications** | |
| FP1-5 | VFX3024E 3kW FLEXpower ONE, Pre-wired AC and DC boxes with 230Vac Bypass, European Outlet, 250A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80, FLEXnet DC and surge protector |
| FP1-6 | VFX3048E 3kW FLEXpower ONE, Pre-wired AC and DC boxes with 230Vac Bypass, European Outlet, 175A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80, FLEXnet DC and surge protector |
| FP1-34 | GVFX3024E 3kW FLEXpower ONE, Pre-wired AC and DC boxes with 230Vac Bypass, European Outlet, 250A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80, FLEXnet DC and surge protector |
| FP1-35 | GVFX3048E 3kW FLEXpower ONE, Pre-wired AC and DC boxes with 230Vac Bypass, European Outlet, 175A DC breaker, GFDI, 80 Amp charge controller breaker, MATE2, HUB4, RTS, FLEXmax 80, FLEXnet DC and surge protector |

| | | |
|---|---|---|
| Weight | Unit | 98 lbs (44.5 kgs) |
| | Shipping | 109 lbs (49.4 kgs) |
| Dimensions (H x W x L) | Unit | 12.88 x 19.69 x 33.44" (32.72 x 50.01 x 84.94 cm) |
| | Shipping | 17 x 22.75 x 38" (43.18 x 57.79 x 96.52 cm) |

** Individual FLEXpower ONE components carry all necessary ETL certifications*
** Specifications subject to change without notice*
** Additional configurations available*

### Easily Mounts On To Bracket

The FLEXpower ONE system was designed with ease of installation in mind. The hanging bracket can be quickly installed allowing the entire system to be hung with minimal effort.

# FLEXpower™TWO
**Fully Pre-Wired Dual Inverter System**

The FLEXpower TWO System accommodates all of the essential protective devices in an easy-to-install, fully pre-wired and factory-tested dual-inverter system. The FLEXpower TWO is ideal for applications with medium-sized power requirements such as homes, light commercial or larger back-up power systems. Utilizing a compact design and an easy-to-install mounting plate, the FLEXpower TWO System can be mounted in either a horizontal or vertical orientation to allow installation in more space-limited locations and is designed for a quick installation, saving both time and money.

FLEXpower TWO includes two inverter/chargers, AC and DC wiring boxes, a MATE2, HUB, and Surge Protector* with optional kits for charge controllers and DC system monitoring, while maintaining a small system footprint. The FLEXpower TWO System is also equipped with battery breakers, an Input-Output-Bypass Assembly, mounting locations for GFCI Type B style AC outlets and locations for additional AC breakers. FLEXpower TWO components carry all of the necessary ETL certifications allowing for a code compliant installation that saves both time and money while still looking great.

The OutBack Power FLEXpower TWO System is the only choice when you need a fully integrated, true-sinewave, reliable power system.

** 120 VAC / 60 Hz Models*

## FLEXpower TWO Specifications

**For 120/240Vac/60Hz applications**

| Pre-wired Systems* | Description |
|---|---|
| FP2-10 | Dual VFX3648 7.2kW FLEXpower TWO, Pre-wired AC and DC boxes with AC Bypass, two 175A DC breakers, MATE2, HUB10, RTS, X-240 and surge protector |
| FP2-12 | Dual VFX3524 7kW FLEXpower TWO, Pre-wired AC and DC boxes with AC Bypass, two 250A DC breakers, MATE2, HUB10, RTS, X-240 and surge protector |
| FP2-25 | Dual GTFX3048 6kW FLEXpower TWO, Pre-wired AC and DC boxes with AC Bypass, two 175A DC breakers, MATE2, HUB10, RTS, and surge protector |
| FP2-28 | Dual GVFX3524 7kW FLEXpower TWO, Pre-wired AC and DC boxes with AC Bypass, two 250A DC breakers, MATE2, HUB10, RTS, and surge protector |
| FP2-29 | Dual GVFX3648 7.2kW FLEXpower TWO, Pre-wired AC and DC boxes with AC Bypass, two 175A DC breakers, MATE2, HUB10, RTS, and surge protector |
| FP2-31 | Dual FX3048T 6kW FLEXpower TWO, Pre-wired AC and DC boxes with AC Bypass, two 175A DC breakers, MATE2, HUB10, RTS, X-240 and surge protector |
| FP2-32 | Dual FX2524T 5kW FLEXpower TWO, Pre-wired AC and DC boxes with AC Bypass, two 250A DC breakers, MATE2, HUB10, RTS, X-240 and surge protector |

**Additional Models- For 120/240Vac/60Hz applications**

| | |
|---|---|
| FP2-30 | Dual GTFX3048-HI 6kW FLEXpower TWO for Hawaii, Pre-wired AC and DC boxes with AC Bypass, two 175A DC breakers, MATE2, HUB10, RTS, and surge protector |
| FP2-33 | Dual GTFX2524-HI 6kW FLEXpower TWO for Hawaii, Pre-wired AC and DC boxes with AC Bypass, two 250A DC breakers, MATE2, HUB10, RTS, and surge protector |

**For 230Vac/50Hz applications**

| | | |
|---|---|---|
| FP2-22 | Dual VFX3048E 6kW FLEXpower TWO, Pre-wired AC and DC boxes with 230Vac Bypass, two 175ADC breakers, MATE2, HUB10 and RTS | |
| FP2-24 | Dual VFX3024E 6kW FLEXpower TWO, Pre-wired AC and DC boxes with 230Vac Bypass, two 250ADC breakers, MATE2, HUB10 and RTS | |
| Weight | Unit | 232 lbs (105 kgs) |
| | Shipping | 282 lbs (127 kgs) |
| Dimensions (H x W x D) | Unit | 20.25 x 46.5 x 13 (51.4 x 118.1 x 33 cm) |
| | Shipping | 21.5 x 47.5 x 20.5" (54.6 x 120.7 x 52.1 cm) |

** Individual FLEXpower TWO components carry all necessary ETL certifications*
** Specifications subject to change without notice*
** Additional configurations available*

**For applications with modest power requirements such as cabins, chalets, homes, remote communication sites and back-up power systems.** The FLEXware 250 accommodates all of the essential protective devices in the smallest possible space at the lowest installed cost. Utilizing an extremely compact design and unique mounting features, **one or two** FLEXware 250 enclosures can be mounted on each end of a single FX Series Inverter/Charger. The FLEXware 250 enclosure is constructed of powder-coated aluminum is ETL listed. It provides breaker spaces for battery, PV array or PV GFDI breakers and mounting locations for AC GFCI outlet, AC breakers and an Input-Output-Bypass Assembly. In keeping with the philosophy of FLEXware, the FLEXware 250's flexibility is evident in the generous number of knock-outs allowing the installation of conduit, cable glands, and other installation accessories.

## Breaker Configuration Diagram

### AC Side

Holds up to four 0.75″ (19 mm) wide AC rated panel mount breakers (not included with bare chassis) rated for 1-60 amps of AC current. Provision for optional AC Input-Output-Bypass Assembly. Holds one 120 V U.S. outlet receptacle and one 230 V European outlet receptacle.

***New feature includes:***
*Terminal busbar to accommodate an isolated neutral bus in AC applications.*

### DC Side

Holds up to four 0.75″ (19 mm) wide DC rated panel mount breakers (not included with bare chassis) rated for 1-80 amps of DC current. Holds one 1.5″ (39 mm) wide 175 or 250 amp breaker, or one 1.02″ (26 mm) wide 100 or 125 amp breaker. Includes large DC breaker handle guard.

***New feature includes:***
*DC negative bus for DC applications.*

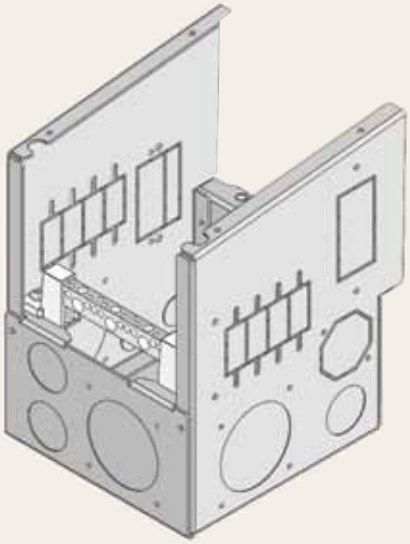
## Knockout Location Diagram

AC Side
- (1) 2″ knockout (2.468″ diameter)
- (1) 1″ knockout (1.359″ diameter)

DC side
- (1) 2″ knockout (2.468″ diameter)
- (2) ½″ knockout (0.875″ diameter)

Front
- (1) 2″ knockout (2.468″ diameter)
- (2) 1″ knockout (1.359″ diameter)

Bottom
- (1) 1/2″ knockout (.875″ diameter)



# FLEXware 250

**Model: FW250**
**Description:** DC and/or AC breaker enclosure for one FX Series Inverter/Charger
**Includes:** Ground bus bar, DC breaker handle guard, breaker mounting hardware and enclosure mounting hardware

| Unit Dimensions (H x W x D) | Shipping Dimensions (H x W x L) | Shipping Weight | Enclosure Type |
|---|---|---|---|
| 7.5 x 6.5 x 8.6" (19.1 x 16.5 x 21.8 cm) | 9.75 x 8.4 x 11.6" (24.8 x 21.3 x 29.5 cm) | 5 lbs. (2.3 kg) | Type-1 indoor (IP30) |

Holds up to eight 1 to 80 amp, one 175 or 250 amp panel mount breaker and a GFCI AC outlet (not included).
- Does not use the DCA or FW-ACA for connection to an FX Series Inverter/Charger.
- DC current shunt not included

# FLEXware 250 AC Input-Output-Bypass Assemblies

Field-installable kit for by-passing the AC input to the AC output for inverter maintenance, testing or installation. Also provides over-current protection for AC input and output.

**Model: FW-IOBS-120VAC**
**Includes:** Three 60A 120VAC single pole PANEL mount breakers, sliding bypass interlock plate, wire and hardware kit

| System Rating | Bypass Breaker | Input Breaker | Output Breaker |
|---|---|---|---|
| Single-Phase 120VAC 60 amp 7.2 kW | One Pole @ 60 amps 7.2 kW | One Pole @ 60 amps 7.2 kW | One Pole @ 60 amps 7.2 kW |

**Model: FW-IOBS-230VAC**
**Includes:** Three 30A 230VAC single pole PANEL mount breakers, sliding bypass interlock plate, wire and hardware kit

| System Rating | Bypass Breaker | Input Breaker | Output Breaker |
|---|---|---|---|
| Single-Phase 230VAC 30 Amp 6.9 kW | One Pole @ 30 amps 6.9 kW | One Pole @ 30 amps 6.9 kW | One Pole @ 30 amps 6.9 kW |

# Sample Bill of Materials

**FW250 With FW-IOBS-120VAC** - Example of system with one VFX3524 OutBack Power Inverter/Charger

| Part # | Description | Qty |
|---|---|---|
| VFX3524 Inverter/Charger | 3500 W, 24 VDC, 85 Amp charger, 60 Amp AC input | 1 |
| FW250 | DC and/or AC breaker enclosure – secures directly to either end of an FX Series Inverter/Charger. | 2 |
| PNL-175-DC | 175 Amp, 125VDC, 3/8" stud terminals | 1 |
| FW-IOBS-120VAC | Single inverter Input-Output-Bypass for FW250 only | 1 |
| MATE | System Display and Controller | 1 |
| HUB4 | Four Port, Up to 4 devices and one MATE | 1 |
| FW-SHUNT250 | 500 Amp 50mV DC current shunt with attached terminal bus bar for mounting on top of a FX Series Inverter/Charger | 1 |
| FW-Cable175-15R | 175 Amp 2/0 AWG DC cable 15 inches (380 mm) long with ring terminals on both ends with red heat shrink | 1 |

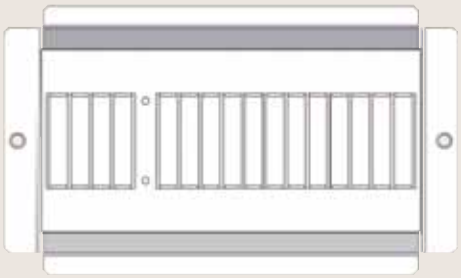
**FW250 With FW-IOBS-230VAC** - Example of system with one VFX3024E OutBack Power Inverter/Charger

| Part# | Description | Qty |
|---|---|---|
| VFX3024E | 3000 W, 24VDC, 85 Amps DC charger, 30 Amps AC input | 1 |
| FW250 | DC and/or AC breaker enclosure - secures directly to either end of an FX series | 2 |
| PNL-250-DC | 250 Amp, 125VDC, 3/8" stud terminals | 1 |
| FW-IOBS-230VAC | Single inverter Input-Output-Bypass for FW250 only | 1 |
| MATE | System display and Controller | 1 |
| HUB4 | Four Port, up to 4 devices and one MATE | 1 |
| FW-SHUNT250 | 500 Amp 50mV DC current shunt with attached terminal bus bar for mounting on top of a FX Series Inverter/Charger | 1 |
| FW-Cable250-15R | 250 Amp 4/0 AWG DC cable 15 inches (380 mm) long with ring terminals on both ends with red heat shrink | 1 |

For applications with medium power requirements such as homes, light commercial or larger back-up power systems. The FLEXware 500 system architecture can support up to two OutBack FX Series Inverter/Chargers, up to two OutBack charge controllers and all the associated AC and DC components. Thanks to a very compact design, FLEXware 500 AC and DC enclosures mount with a FLEXware MP in either a horizontal or vertical orientation to allow installation in more space-limited locations for a fast and professional-looking wall-mounted installation. The FLEXware 500 accommodates all of the essential protective devices in two enclosures. The FLEXware 500 enclosure is constructed of powder-coated aluminum and has been ETL listed.

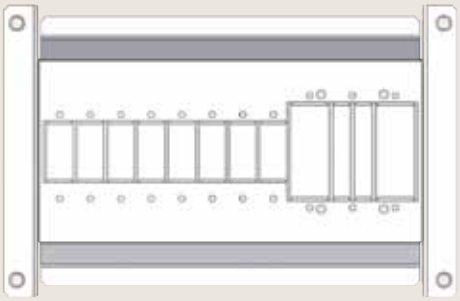
## Breaker Configuration Diagram

### AC Side



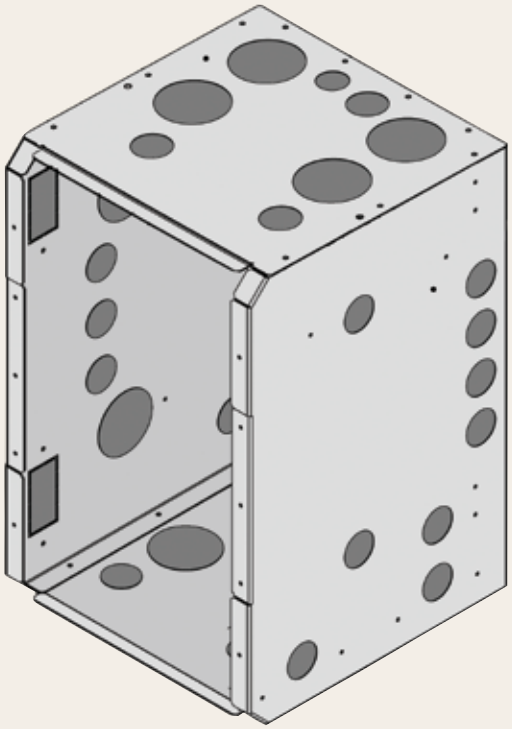
Holds up to sixteen DIN mount AC breakers (not included). Support for optional AC Input-Output-Bypass Assembly. AC breakers are rated from 10-60 amps of AC current.

### DC Side



Holds up to eight 0.75" (19 mm) wide breakers rated for 1-80 amps of DC current, three 1" (26 mm) wide breakers rated for 100 or 125 amps of DC current, or two 1.5" (32 mm) wide breakers rated for 175 or 250 amps of DC current.

## Knockout Location Diagram



Back
- (2) 2" knockout (2.468" diameter)

Left
- (5) 1" knockout (1.359" diameter)
- (2) 2" knockout (2.468" diameter)
- (2) Duplex GFCI Outlet knockout

Right
- (9) 1" knockout (1.357" diameter)

Top
- (3) 1" knockout (1.359" diameter)
- (1) ¾" knockout (1.093" diameter)
- (4) 2" knockout (2.468" diameter)

Bottom
- (3) 1" knockout (1.359" diameter)
- (1) ¾" knockout (1.093" diameter)
- (4) 2" knockout (2.468" diameter)

# FLEXware 500

**Model: FW500-DC**

**Description:** DC enclosure which mounts at the DC side of one or two FX Series Inverter/Chargers. Supports up to six terminal bus bars (not including GBB) and up to three shunt assemblies depending on configuration
**Includes:** Ground bus bar, 500 amp DC shunt assembly, positive bus, breaker mounting hardware, FW-BBUS and enclosure mounting hardware

| Unit Dimensions (H x W x D) | Shipping Dimensions (H x W x L) | Shipping Weight | Enclosure Type |
|---|---|---|---|
| 18.2 x 11.4 x 12.1" (46.2 x 29 x 30.7 cm) | 14.5 x 13.4 x 20.3" (36.8 x 34.1 x 51.6 cm) | 15 lbs. (6.8 kg) | Type-1 indoor (IP30) |

**Model: FW500-AC**

**Description:** AC enclosure which mounts at the AC side of one or two FX Series Inverter/Chargers. Supports six terminal bus bars and one FW-X240

**Includes:** Ground bus bar, DIN mounting bracket, communication cable conduit and enclosure mounting hardware

| Unit Dimensions (H x W x D) | Shipping Dimensions (H x W x L) | Shipping Weight | Enclosure Type |
|---|---|---|---|
| 18.2 x 11.4 x 12.1" (46.2 x 29 x 30.7 cm) | 14.5 x 13.4 x 20.3" (36.8 x 34.1 x 51.6 cm) | 15 lbs. (6.8 kg) | Type-1 indoor (IP30) |

- The FW500 system utilizes one FW-MP (mounting plate) and a set of the DCA and FW-ACA conduit adapters for each inverter/charger.
- DC and AC breakers, Input-Output-Bypass Assemblies and all other additional components sold separately.

# FLEXware 500 AC Input-Output-Bypass Assemblies

Field-installable kit for bypassing the AC input to the AC output for inverter maintenance or installation. Also provides over-current protection.

**Model: FW-IOBD-120/240VAC**

**Includes:** Six 60A 120VAC single pole DIN mount breakers, sliding bypass interlock plate, wire and hardware kit

| System Rating | Bypass Breaker | Input Breaker | Output Breaker |
|---|---|---|---|
| Split Phase 120/240 VAC 60 amps 14.4 kW | Two Poles @ 60 amps 14.4 kW | Two Poles @ 60 amps 14.4 kW | Two Poles @ 60 amps 14.4 kW |

**Model: FW-IOBD-120VAC**
**Includes:** Four 60A 120VAC single pole DIN mount breakers, one 60A 120VAC dual pole DIN mount breaker, sliding bypass interlock plate, wire and hardware kit

| System Rating | Bypass Breaker | Input Breaker | Output Breaker |
|---|---|---|---|
| Single-Phase 120 VAC 120 amps 14.4 kW | Two Poles @ 60 amps 14.4 kW | Two Poles @ 60 amps 14.4 kW | Two Poles @ 60 amps 14.4 kW |

**Model: FW-IOBD-230VAC**

**Includes:** Six 30A 230VAC single pole DIN mount breakers, sliding bypass interlock plate, wire and hardware kit

| System Rating | Bypass Breaker | Input Breaker | Output Breaker |
|---|---|---|---|
| Single-Phase 230 VAC 60 amps 13.8 kW | Two Poles @ 30 amps 13.8 kW | Two Poles @ 30 amps 13.8 kW | Two Poles @ 30 amps 13.8 kW |

## **FW500 With FW-IOBD-120VAC** - Example of system with one VFX3648 Outback Power Inverter/Charger

| Part # | Description | Qty |
|---|---|---|
| VFX3648 Inverter/Charger | 3600 W, 48 VDC, 45 Amp charger, 60 Amp AC input | 1 |
| FW-ACA | AC Conduit Adapter for all FX Series Inverter/Chargers to AC enclosure. | 1 |
| DCA | DC Conduit Adapter for all FX Series Inverter/Chargers to DC enclosure. | 1 |
| FW500-DC | DC breaker enclosure – fits at the DC side of one or two FX Series Inverter/Chargers | 1 |
| PNL-175-DC | 175 Amp, 125VDC breaker with 3/8" stud terminals | 1 |
| FW500-AC | AC breaker enclosure – fits at the AC side of one or two FX Series Inverter/Chargers | 1 |
| FW-IOBD-120VAC | Dual inverter Input-Output-Bypass for FW500 | 1 |
| FW-MP | Mounting Plate for FW500 or FW1000 system | 1 |
| MATE | System Display and Controller | 1 |
| HUB4 | Four Port, Up to 4 devices and one MATE | 1 |
| FW-Cable175-36R | 175 Amp 2/0 AWG DC cable 36 inches (915 mm) long with ring terminals on both ends with red heat shrink | 1 |
| FW-Cable175-36W | 175 Amp 2/0 AWG DC cable 36 inches (915 mm) long with ring terminals on both ends with white heat shrink | 1 |

## **FW500 With FW-IOBD-120/240VAC** - Example of system with dual VFX3648 Outback Power Inverter/Chargers in Series

| Part # | Description | Qty |
|---|---|---|
| VFX3648 Inverter/Charger | 3600 W, 48 VDC, 45 amp charger, 60 amp AC input | 2 |
| FW-ACA | AC Conduit Adapter for all FX Series Inverter/Chargers to AC enclosure. | 2 |
| DCA | DC Conduit Adapter for all FX Series Inverter/Chargers to DC enclosure. | 2 |
| FW500-DC | DC breaker enclosure – fits at the DC side of one or two FX Series Inverter/Chargers | 1 |
| PNL-175-DC | 175 amp, 125VDC breaker with 3/8" stud terminals | 2 |
| FW500-AC | AC breaker enclosure – fits at the AC side of one or two FX Series Inverter/Chargers | 1 |
| FW-IOBD-120/240VAC | Dual inverter Input-Output-Bypass for FW500 | 1 |
| FW-MP | Mounting Plate for FW500 or FW1000 system | 1 |
| MATE | System Display and Controller | 1 |
| HUB4 | Four Port, Up to 4 devices and one MATE | 1 |
| FW-X240 | Autotransformer 4 kVA 120/240VAC 60Hz | 1 |
| FW-Cable175-36R | 175 amp 2/0 AWG DC cable 36 inches (915 mm) long with ring terminals on both ends with red heat shrink | 2 |
| FW-Cable175-36W | 175 amp 2/0 AWG DC cable 36 inches (915 mm) long with ring terminals on both ends with white heat shrink | 2 |

## **FW500 With FW-IOBD-230VAC** - Example of system with dual VFX3024E OutBack Power Inverter/Charger in Parallel

| Part# | Description | Qty |
|---|---|---|
| VFX3024E | 3000 W, 24VDC, 85 amps DC charger, 30 amps AC input | 2 |
| FW-ACA | AC Conduit adapter for all FX Series Inverter/Chargers to AC enclosure | 2 |
| DCA | DC Conduit adapter for all FX Series Inverter/Chargers to DC enclosure | 2 |
| FW500-DC | DC breaker enclosure - fits at the DC side of one or two FX Series Inverter/Chargers | 1 |
| PNL-250-DC | 250 amp, 125VDC, 3/8" stud terminals | 2 |
| FW500-AC | AC breaker enclosure - fits at the AC side of one or two FX Series Inverter/Chargers | 1 |
| FW-IOBD-230VAC | Dual inverter Input-Output-Bypass for FW500 | 1 |
| FW-MP | Mounting Plate for FW500 or FW1000 System | 1 |
| MATE | System display and Controller | 1 |
| HUB4 | Four Port, up to 4 devices and one MATE | 1 |
| FW-Cable175-36R | 175 amp 2/0 AWG DC cable 36 inches (915 mm) long with ring terminals on both ends with red heat shrink | 2 |
| FW-Cable175-36W | 175 amp 2/0 AWG DC cable 36 inches (915 mm) long with ring terminals on both ends with white heat shrink | 2 |



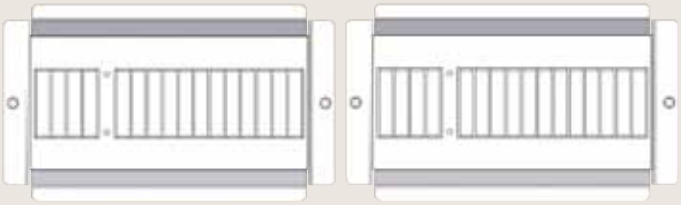
This information is a sample only – additional system configurations and components are available.

# FLEXware™ 1000
Integration Hardware

For applications with large power requirements such as large residential, commercial or village power systems. The FLEXware 1000 system architecture is capable of supporting up to four OutBack FX Series Inverter/Chargers, four OutBack charge controllers, and all the required AC and DC components and wiring. Utilizing a compact design, FLEXware 1000 AC and DC enclosures accommodate all of the essential protective devices with lots of room for additional breakers and large cable connections and can be mounted either vertically or horizontally.

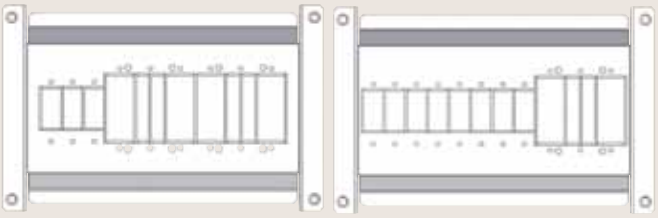
## Breaker Configuration Diagram

### AC Side



Holds up to thirty-two DIN mount AC breakers (not included). Support for optional AC Input-Output-Bypass Assembly. AC breakers are rated from 10-60 amps of AC current.

### DC Side



Holds up to eleven 0.75" (19 mm) wide breakers rated for 1-80 amps of DC current, nine 1" (26 mm) wide breakers rated for 100 or 125 amps of DC current or six 1.5" (32 mm) wide breakers rated for 175 or 250 amps of DC current.

## Knockout Location Diagram

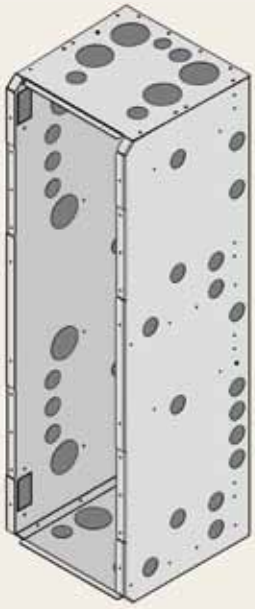
Left
- (4) 2" knockout (2.468" diameter)
- (9) 1" knockout (1.359" diameter)
- (2) Duplex GFCI Outlet knockout

Back
- (2) 2" knockout (2.468" diameter)
- (2) 1" knockout (1.359" diameter)

Right
- (17) 1" knockout (1.359" diameter)

Top
- (3) 1" knockout (1.359" diameter)
- (1) ¾" knockout (1.093" diameter)
- (4) 2" knockout (2.468" diameter)

Bottom
- (3) 1" knockout (1.359" diameter)
- (1) ¾" knockout (1.093" diameter)
- (4) 2" knockout (2.468" diameter)



This information is a sample only – additional system configurations and components are available.

# FLEXware 1000

**Model: FW1000-DC**

**Description:** DC enclosure which mounts at the DC side of three or four FX Series Inverter/Chargers. Supports up to eight terminal bus bars (not including GBB) and up to three shunt assemblies depending on configuration

**Includes:** Ground bus bar, 1000 amp DC shunt assembly, positive bus, breaker mounting hardware, enclosure mounting hardware, two FW-SBUSs and one FLEXware 1000 breaker bus

| Unit Dimensions (H x W x D) | Shipping Dimensions (H x W x L) | Shipping Weight | Enclosure Type |
|---|---|---|---|
| 38.5 x 11.4 x 12.1" (97.8 x 29.0 x 30.7 cm) | 14.5 x 13.6 x 40.6" (36.8 x 34.5 x 103.1 cm) | 21 lbs. (9.5 kg) | Type-1 indoor (IP30) |

**Model: FW1000-AC**

**Description:** AC enclosure which mounts at the AC side of three or four FX Series Inverter/Chargers. Supports eight terminal bus bars and one FW-X240

**Includes:** Ground bus bar, two DIN mounting brackets and FLEXware 1000 wiring raceway

| Unit Dimensions (H x W x D) | Shipping Dimensions (H x W x L) | Shipping Weight | Enclosure Type |
|---|---|---|---|
| 38.5 x 11.4 x 12.1" (97.8 x 29.0 x 30.7 cm) | 14.5 x 13.6 x 40.6" (36.8 x 34.5 x 103.1 cm) | 21 lbs. (9.5 kg) | Type-1 indoor (IP30) |

- The FW1000 system utilizes two FW-MPs (mounting plates) and a set of the DCA and FW-ACA conduit adapters for each inverter/charger.
- DC and AC breakers, Input-Output-Bypass Assemblies and all other additional components sold separately.

# FLEXware 1000 AC Input-Output-Bypass Assemblies

Field installable kit for bypassing the AC input to the AC output for inverter maintenance or installation. Also provides over-current protection.

**Model: FW-IOBT-120/208VAC**

**Includes:** Nine 60A 120VAC single pole DIN mount breakers, sliding bypass interlock plate, wire and hardware kit

| System Rating | Bypass Breaker | Input Breaker | Output Breaker |
|---|---|---|---|
| Three-Phase 120/208 VAC 60 amps 21.6 kW | Three Poles @ 60 amps 21.6 kW | Three Poles @ 60 amps 21.6 kW | Three Poles @ 60 amps 21.6 kW |

**Model: FW-IOBT-230/400VAC**

**Includes:** Nine 30A 230VAC single pole DIN mount breakers, sliding bypass interlock plate, wire and hardware kit

| System Rating | Bypass Breaker | Input Breaker | Output Breaker |
|---|---|---|---|
| Three-Phase 230/400 VAC 30 amps 20.7 kW | Three Poles @ 30 amps 20.7 kW | Three Poles @ 30 amps 20.7 kW | Three Poles @ 30 amps 20.7 kW |

**Model: FW-IOBQ-120/240VAC**

**Includes:** Eight 60A 120VAC single pole DIN mount breakers, two 60A 120VAC dual pole DIN mount breakers , sliding bypass interlock plate, wire and hardware kit

| System Rating | Bypass Breaker | Input Breaker | Output Breaker |
|---|---|---|---|
| Split Phase 120/240 VAC 120 amps 28.8 kW | Four Poles @ 60 amps 28.8 kW | Four Poles @ 60 amps 28.8 kW | Four Poles @ 60 amps 28.8 kW |

**Model: FW-IOBQ-230VAC**

**Includes:** Twelve 30A 230VAC single pole DIN mount breakers, sliding bypass interlock plate, wire and hardware kit

| System Rating | Bypass Breaker | Input Breaker | Output Breaker |
|---|---|---|---|
| Single-Phase 230 VAC 120 amps 27.6 kW | Four Poles @ 30 amps 27.6 kW | Four Poles @ 30 amps 27.6 kW | Four Poles @ 30 amps 27.6 kW |

**FW1000 With FW-IOBD-120VAC** - Example of system with two VFX3648 Outback Power Inverter/Chargers in Parallel

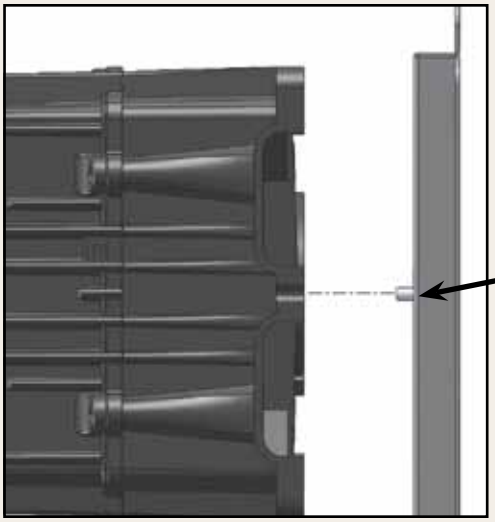
| Part # | Description | Qty |
|---|---|---|
| VFX3648 Inverter/Charger | 3600 W, 48 VDC, 45 Amp charger, 60 Amp AC input | 2 |
| FW-ACA | AC Conduit Adapter for all FX Series Inverter/Chargers to AC enclosure. | 2 |
| DCA | DC Conduit Adapter for all FX Series Inverter/Chargers to DC enclosure. | 2 |
| FW1000-DC | DC breaker enclosure – fits at the DC side of up to four FX Series Inverter/Chargers | 1 |
| PNL-175-DC | 175 Amp, 125VDC breaker with 3/8" stud terminals | 2 |
| FW1000-AC | AC breaker enclosure – fits at the AC side of up to four FX Series Inverter/Chargers | 1 |
| FW-IOBD-120VAC | Quad inverter Input-Output-Bypass for FW1000 | 1 |
| FW-MP | Mounting Plate for FW500 or FW1000 system | 2 |
| MATE | System Display and Controller | 1 |
| HUB10 | Ten Port, Up to 10 devices and one MATE | 1 |
| FW-Cable175-36R | 175 Amp 2/0 AWG DC cable 36 inches (915 mm) long with ring terminals on both ends with red heat shrink | 2 |
| FW-Cable175-36W | 175 Amp 2/0 AWG DC cable 36 inches (915 mm) long with ring terminals on both ends with white heat shrink | 2 |

**FW1000 With FW-IOBD-120/240VAC** - Example of system with two VFX3648 Outback Power Inverter/Chargers in Series

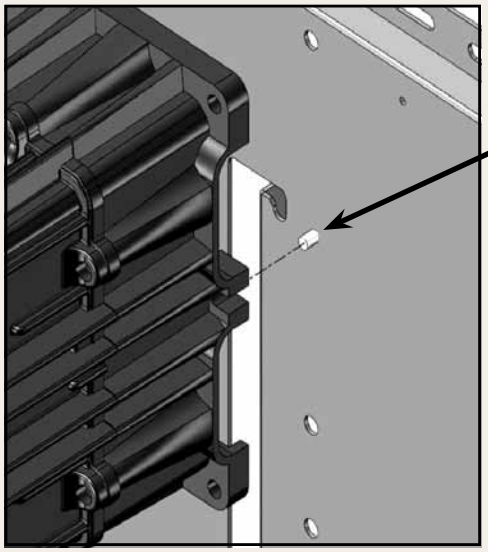
| Part # | Description | Qty |
|---|---|---|
| VFX3648 Inverter/Charger | 3600 W, 48 VDC, 45 Amp charger, 60 Amp AC input | 2 |
| FW-ACA | AC Conduit Adapter for all FX Series Inverter/Chargers to AC enclosure. | 2 |
| DCA | DC Conduit Adapter for all FX Series Inverter/Chargers to DC enclosure. | 2 |
| FW1000-DC | DC breaker enclosure – fits at the DC side of up to four FX Series Inverter/Chargers | 1 |
| PNL-175-DC | 175 Amp, 125VDC breaker with 3/8" stud terminals | 2 |
| FW1000-AC | AC breaker enclosure – fits at the AC side of up to four FX Series Inverter/Chargers | 1 |
| FW-IOBD-120/240VAC | Quad inverter Input-Output-Bypass for FW1000 | 1 |
| FW-MP | Mounting Plate for FW500 or FW1000 system | 2 |
| MATE | System Display and Controller | 1 |
| HUB10 | Ten Port, Up to 10 devices and one MATE | 1 |
| FW-X240 | Autotransformer 4 kVA 120/240VAC 60Hz | 1 |
| FW-Cable175-36R | 175 Amp 2/0 AWG DC cable 36 inches (915 mm) long with ring terminals on both ends with red heat shrink | 2 |
| FW-Cable175-36W | 175 Amp 2/0 AWG DC cable 36 inches (915 mm) long with ring terminals on both ends with white heat shrink | 2 |

# FLEXware™ MP
## Mounting Plate

The FLEXware MP is a one-piece, powder-coated aluminum mounting plate for FLEXware 500 and FLEXware 1000 enclosures. Utilizing stainless steel mounting hardware, the integrated locating bolts make installation quick and easy by providing guides to line up enclosures and inverter/chargers. A single FLEXware MP is designed to accommodate a FLEXware 500 while two FLEXware MPs are utilized in a FLEXware 1000 configuration.

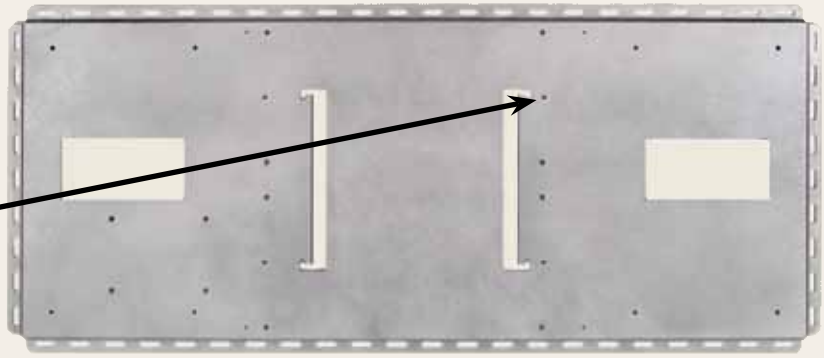


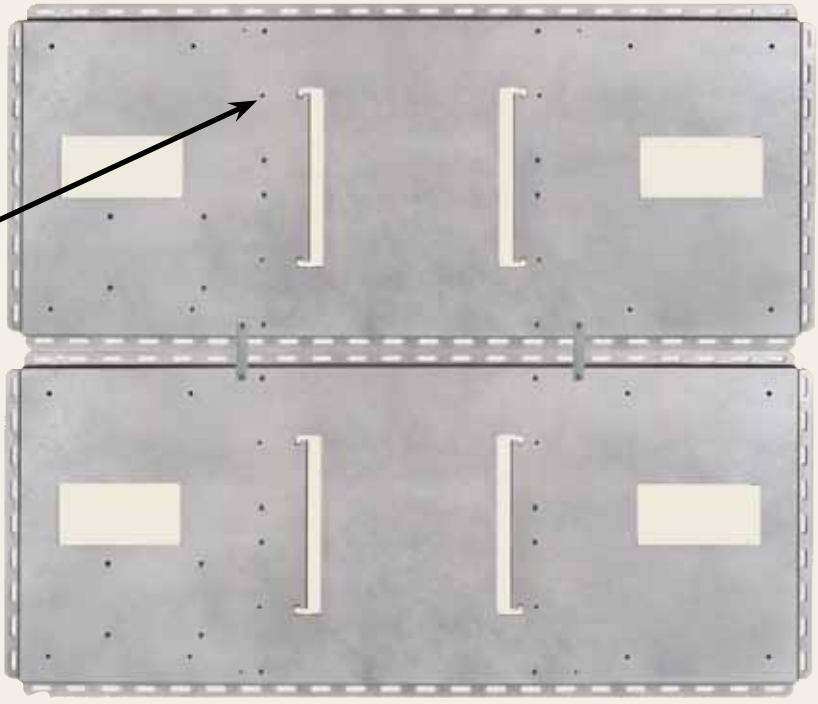
Side View of Integrated Locating Bolts



Angled View of Integrated Locating Bolts

Single MP Configuration for FLEXware 500





**Model:** FW-MP

**Description:** FLEXware system mounting plate

| Unit Dimensions (H x W x D) | Shipping Dimensions (H x W x L) | Shipping Weight |
|---|---|---|
| 20.3 x 46.3 x .8" (51.6 x 117.6 x 2.1 cm) | 1.15 x 22.9 x 48.4" (2.9 x 58.2 x 123 cm) | 14 lbs. (6.4 kg) |

## OutBack DIN Mount Breakers

DIN rail mountable, hydraulic-magnetic type breakers that can be used for input, output or load circuits.

| Model | Current Rating | Voltage Rating | Branch Circuit | Variation | Width |
|---|---|---|---|---|---|
| DIN-15-AC | 15 amp | 120VAC 50/60Hz | 10k AIC | Single pole | 0.50″ (13 mm |
| DIN-15D-AC | 15 amp | 120/240VAC 50/60Hz | 10k AIC | Dual pole | 1.0″ (26 mm) |
| DIN-20-AC | 20 amp | 120VAC 50/60Hz | 10k AIC | Single pole | 0.50″ (13 mm) |
| DIN-20D-AC | 20 amp | 120/240VAC 50/60Hz | 10k AIC | Dual pole | 1.0″ (26 mm) |
| DIN-25D-AC | 25 amp | 120/240VAC 50/60Hz | 10k AIC | Dual pole | 1.0″ (26 mm) |
| DIN-10-AC-277 | 10 amp | 277VAC 50/60Hz | N/A | Single pole | 0.5″ (13 mm) |
| DIN-15-AC-277 | 15 amp | 277VAC 50/60HZ | N/A | Single pole | 0.5″ (13 mm) |
| DIN-30-AC-277 | 30 amp | 277VAC 50/60Hz | N/A | Single pole | 0.5″ (13 mm) |
| DIN-30D-AC-480 | 30 amp | 277/480VAC 50/60Hz | N/A | Dual pole | 1.0″ (26 mm) |
| DIN-30T-AC-480 | 30 amp | 277/480VAC 50/60Hz | N/A | Three pole | 1.5″ (39 mm) |
| DIN-50-AC-277 | 50 amp | 277VAC 50/60Hz | N/A | Single pole | 0.5″ (13 mm) |
| DIN-50D-AC-480 | 50 amp | 277/480VAC 50/60Hz | N/A | Dual pole | 1.0″ (26 mm) |
| DIN-50T-AC-480 | 50 amp | 277/480VAC 50/60Hz | N/A | Three pole | 1.5″ (39 mm) |
| DIN-60-AC-277 | 60 amp | 277VAC 50/60Hz | N/A | Single pole | 0.5″ (13 mm) |
| DIN-60D-AC-480 | 60 amp | 277/480VAC 50/60Hz | N/A | Dual pole | 1.0″ (26 mm) |

- #14 to 2 AWG clamp terminals

## OutBack Panel Mount Breakers

Panel mounted hydraulic-magnetic type breakers that can be used for DC sources, inverters or load circuits.

| Model | Current Rating | Voltage Rating | Branch Circuit | Terminals | Width |
|---|---|---|---|---|---|
| PNL-1-AC/DC | 1 amp | 150VDC 120VAC | 10k AIC | 1/4″ stud | 0.75″ (19 mm) |
| PNL-5-AC/DC | 5 amp | 150VDC 120VAC | 10k AIC | 1/4″ stud | 0.75″ (19 mm) |
| PNL-10-AC/DC | 10 amp | 150VDC 120VAC | 10k AIC | 1/4″ stud | 0.75″ (19 mm) |
| PNL-15-AC/DC | 15 amp | 150VDC 120VAC | 10k AIC | 1/4″ stud | 0.75″ (19 mm) |
| PNL-20-AC/DC | 20 amp | 150VDC 120VAC | 10k AIC | 1/4″ stud | 0.75″ (19 mm) |
| PNL-30-AC/DC | 30 amp | 150VDC 120VAC | 10k AIC | 1/4″ stud | 0.75″ (19 mm) |
| PNL-30-AC | 30 amp | 250VAC | NA | 1/4″ stud | 0.75″ (19 mm) |
| PNL-40-AC/DC | 40 amp | 150VDC 120VAC | 10k AIC | 1/4″ stud | 0.75″ (19 mm) |
| PNL-50-AC/DC | 50 amp | 150VDC 120VAC | 10k AIC | 1/4″ stud | 0.75″ (19 mm) |
| PNL-60-AC/DC | 60 amp | 150VDC 120VAC | 10k AIC | 1/4″ stud | 0.75″ (19 mm) |
| PNL-80-DC | 80 amp | 150VDC | N/A | 1/4″ stud | 0.75″ (19 mm) |
| PNL-100-DC | 100 amp | 125VDC | N/A | 5/16″ stud | 1.0″ (26 mm) |
| PNL-125-DC | 125 amp | 125VDC | N/A | 5/16″ stud | 1.0″ (26 mm) |
| PNL-175-DC | 175 amp | 125VDC | N/A | 3/8″ stud | 1.5″ (39 mm) |
| PNL-250-DC | 250 amp | 125VDC | N/A | 3/8″ stud | 1.5″ (39 mm) |
| PNL-50D-AC-120/240 | 50 amp (ea. of 2 poles) | 120/240VAC | 5k AIC | 1/4″ stud | 1.5″ (39 mm) |

- ETL Listed for 15O VDC max open circuit. For PV applications.

## OutBack PV Ground-Fault Detection and Interruption System

Ground fault detection and interruption is required by US National Electric Code for PV arrays mounted on or within a specified vicinity of residential dwelling roofs as a safety precaution. The OutBack PV Ground-Fault Detection and Interruption System protects wiring and system components for one, two or four PV arrays when used in a GSLC, FLEXware 250, FLEXware 500 or FLEXware 1000.

| Model | Description | Terminals | Width |
|---|---|---|---|
| PNL-GFDI-80 | PV Ground-Fault Detector Interrupter 80 amp 150VDC single pole panel mount | 1/4" stud | 1.515" (38.5 mm) |
| PNL-GFDI-80D | PV Ground-Fault Detector Interrupter 80 amp 150VDC two pole panel mount | 1/4" stud | 2.265" (57.3 mm) |
| PNL-GFDI-80Q | PV Ground-Fault Detector Interrupter 80 amp 150VDC four pole panel mount | 1/4" stud | 2.775" (95.9mm) |

Uses two, three or five 3/4" wide panel mount breaker spaces

## FW-X240 Auto-transformer

Designed to be housed within the FLEXware 500 or FLEXware 1000 AC enclosures. The FW-X240 Auto-transformer with a 120 volt/30 amp primary and secondary winding can be used for step-up, step-down, generator and split-phase output balancing for series stacked inverters. It can transfer 2kW from one 120 VAC leg of a generator or the total rating of an OutBack stacked series/parallel 120/240 VAC inverter/charger configuration.

| Model | Description | Includes |
|---|---|---|
| FW-X240 | Auto-transformer 4 kVA 120/240VAC 60Hz with 25 amp dual pole breaker for mounting inside of FLEXware 500-AC or FLEXware 1000-AC | Auto-transformer , 25 amp dual pole breaker and mounting hardware |

## DC Bus Bars

OutBack DC bus bars are designed to enable the most complex of code compliant DC cable connections.

FW1000 BUS FW-BBUS FW-SBUS FW-CBUS-12 FW-CBUS-8

| Model | Description | Includes |
|---|---|---|
| FW-BBUS | Breaker Bus allows connection of two 175-250 amp, three 100-125 amp, four 1-80 amp DC breakers or three 500 amp DC current shunts | Plated copper plate rated for 500 amps and two 5/16 inch bolts for mounting |
| FW-CBUS-8 | Combiner Bus connects up to eight DIN mounted breakers or six DIN mounted fuse holders | Two 2/0 AWG box lug terminals - plated copper plate rated for 200 amps |
| FW-CBUS-12 | Combiner Bus connects up to twelve DIN mounted breakers or eight DIN mounted fuse holders | Two 2/0 AWG box lug terminals - plated copper plate rated for 200 amps |
| FW-SBUS | Shunt Bus allows up to four high current cable connections on same side of DC shunt | Two 3/8 inch bolts solid brass rated for 1000 amps |

## DC Current Shunts

When used with an amp hour meter, OutBack Power Technologies DC current shunt kits can provide valuable insight into the status of your batteries or DC power source. One shunt kit is included standard on FLEXware 500 and FLEXware 1000 DC enclosures.

FW-SHUNT500

| Model | Description | Includes |
|---|---|---|
| FW-SHUNT250 | 500 amp DC current shunt with terminal bus bar for mounting on top of a FX Series Inverter/Charger | Shunt, mounting hardware and terminal bus bar for connection to FX Inverter's DC negative terminal |
| FW-SHUNT500 | 500 amp DC current shunt with terminal bus bar | Shunt, terminal bus bar and one white insulator and mounting screws |

## Conduit Adapters

Allows connection of the FX and VFX Series Inverter/Chargers to FLEXware 500 and FLEXware 1000 enclosures, one FW-ACA and DCA required per FX Series Inverter/Charger.

| Model | Description | Includes |
|---|---|---|
| FW-ACA | Adapter for AC end of FX Series Inverter/Charger | FW-ACA and mounting hardware |
| DCA | Adapter for DC end of FX Series Inverter/Charger | DCA, bushing and mounting hardware |

## Mounting Brackets

FW-CCB and FW-CCB2 mounting brackets allow OutBack Power Technologies charge controllers to be mounted on the side of FW500-DC or FW1000-DC enclosures. FW-CCB2-T mounting bracket allows OutBack Power Technologies charge controllers to be mounted on the top of FW500-DC or FW1000-DC enclosures. FW-MB1 mounting bracket allows mounting OutBack Power charge controllers and MATE system displays to FLEXware 500, FLEXware 1000 and Radian enclosures.






| Model | Description |
|---|---|
| FW-CCB | Bracket for mounting a single FLEXmax Series Charge Controller on the side of FW500 and FW1000 enclosures |
| FW-CCB2 | Bracket for mounting two FLEXmax Series Charge Controllers on the side of FW500 and FW1000 enclosures |
| FW-CCB2-T | Bracket for top mounting two FLEXmax Series Charge Controllers on the top of FW500 and FW1000 enclosures |
| FW-MB1 | Bracket for mounting a MATE System Display on the side of FW500 and FW1000 enclosures |
| FW-MB2 | Bracket for mounting a MATE2 System Display on the side of FW500 and FW1000 enclosures |
| FW-MB3 | Bracket for mounting a MATE3 System Display on the side of Radian, GSLC, FW500 and FW1000 DC enclosures |
| FW-MB3-F | Flat-mount MATE3 Mounting Plate for installation over standard electrical boxes |
| FW-MB3-S | Surface-mount MATE3 Mounting Bracket |

## DIN Rail End Clamp

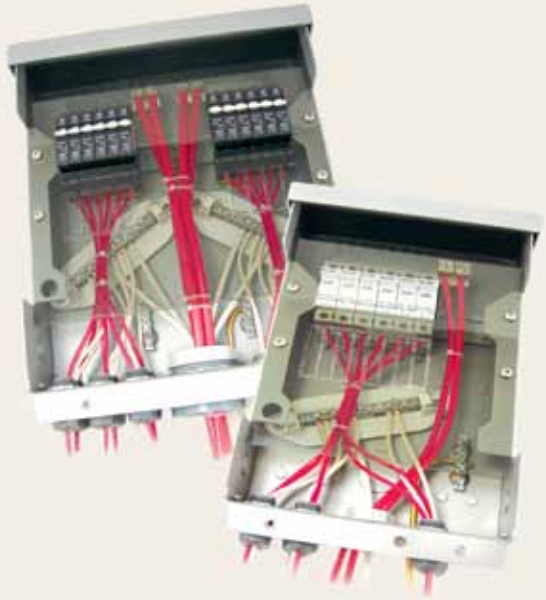
| Model | Description | Width |
|---|---|---|
| FW-EC-DIN | DIN rail mountable securing device for DIN rail mountable fuses or breakers. | .4" (10 mm) |

## DC Cable Assemblies

DC interconnect cable assemblies for wiring between inverter/chargers and breakers or DC shunts. Can also be used as battery interconnects. The THW type cable assemblies are UL listed and NEC compliant with a maximum voltage rating of 1000VDC and a temperature rating of 105°C.

| Model | Description | Hole to hole length |
|---|---|---|
| FW-CABLE250-15R | 250 amp 4/0 AWG (11.7 mm) DC cable 15 inches (380 mm) long with ring terminals on both ends and red heat shrink. For connection from 250 amp DC breaker to inverter positive terminal. | 19" (483 mm) |
| FW-CABLE175-15R | 175 amp 2/0 AWG (9.26 mm) DC cable 15 inches (380 mm) long with ring terminals on both ends and red heat shrink. For connection from 175 amp DC breaker to inverter positive terminal. | 19" (483 mm) |
| FW-CABLE250-36R | 250 amp 4/0 AWG (11.7 mm) DC cable 36 inches (915 mm) long with ring terminals on both ends and red heat shrink. For connection from 250 amp DC breaker to inverter positive terminal. | 40" (1016 mm) |
| FW-CABLE175-36R | 175 amp 2/0 AWG (9.26 mm) DC cable 36 inches (915 mm) long with ring terminals on both ends and red heat shrink. For connection from 175 amp DC breaker to inverter positive terminal. | 40" (1016 mm) |
| FW-CABLE250-36W | 250 amp 4/0 AWG (11.7 mm) DC cable 36 inches (915 mm) long with ring terminals on both ends and white heat shrink. For connection from DC current shunt to inverter negative terminal. | 40" (1016 mm) |
| FW-CABLE175-36W | 175 amp 2/0 AWG (9.26 mm) DC cable 36 inches (915 mm) long with ring terminals on both ends and white heat shrink. For connection from DC current shunt to inverter negative terminal. | 40" (1016 mm) |

- All ring lugs have 3/8" (9.53 mm) diameter hole.



The OutBack Power Technologies FLEXware PV combiner series sets the new standard for PV balance-of-system hardware. Ideal for both small or large systems, the FLEXware PV8 and FLEXware PV12 accommodates the overcurrent protection requirements of your application. From 150VDC breakers for low voltage PV systems, to 600VDC fuse holders for high voltage PV systems, the FLEXware PV Combiner series handles it all.

Designed to survive in outdoor environments, the rainproof, type 3R powder coated aluminum chassis can be mounted on a wall, sloped roof or pole. The unique angled negative terminal bus bar design makes wiring fast and easy without the larger output conductors blocking access to the smaller input terminals. Dual output lug terminals are included for up to 2/0 AWG conductors. The tinted flame-retardant polycarbonate deadfront panel creates a clean appearance while preventing accidental contact with the live terminals and is easily removable during installation.

The FLEXware PV Combiner makes it easy to take your installation to the next level.

## FLEXware™ PV Specifications

| | | FWPV-8 | FWPV-12 |
|---|---|---|---|
| **Enclosure Material** | | Powder coated aluminum with stainless steel hardware | Powder coated aluminum with stainless steel hardware |
| **Mounting Options** | | Vertical wall mount, pole mount or sloped roof mount to 14 degrees incline (3 in 12 roof pitch) | Vertical wall mount, pole mount or sloped roof mount to 14 degrees incline (3 in 12 roof pitch) |
| **Enclosure Rating** | | Outdoor Rainproof, UL Type 3R | Outdoor Rainproof, UL Type 3R |
| **Enclosure Security** | | Padlock hole in chassis and cover for up to 3/8 inch pad lock | Padlock hole in chassis and cover for up to 3/8 inch pad lock |
| **Output Terminals** | | #14 - 2/0 AWG (2.08 - 67.43 $mm^2$) Two box lug terminals included | #14 - 2/0 AWG (2.08 - 67.43 $mm^2$) Four box lug terminals included |
| **Number of separate circuits** | | One Circuit | One or Two Circuits |
| **Number of 150VDC breakers** | | up to 8 | up to 12 (two groups of six) |
| **Number of 600VDC fuse holders** | | up to 6 | up to 8 (two groups of four) |
| **Input Terminal** | | 150VDC Breakers / #14 - 6 AWG (2.08 - 13.3 $mm^2$) 600VDC Fuse / #14 - 10 AWG (2.08 - 5.26 $mm^2$) | 150VDC Breakers / #14 - 6 AWG (2.08 - 13.3 $mm^2$) 600VDC Fuse / #14 - 10 AWG (2.08 - 5.26 $mm^2$) |
| **Dimensions** | Unit (H x W x D) Shipping (H x W x L) | 15.2 x 9.2 x 3.9" (38.7 x 23.3 x 9.9 cm) 4.3 x 9.5 x 19" (10.9 x 24.1 x 48.3 cm) | 15.2 x 12.7 x 3.9" (38.7 x 32.2 x 9.9 cm) 4.3 x 13 x 19" (10.9 x 33 x 48.3 cm) |
| **Weight** | Unit Shipping | 4.4 lbs (2.0 kg) 5.5 lbs (2.5 kg) | 5.9 lbs (2.7 kg) 7.4 lbs (3.3 kg) |

* Specifications subject to change without notice. Use appropriate wire size in accordance with NEC.

## OutBack DC DIN Mount Breakers

DIN rail mount breakers are hydraulic-magnetic type and are not affected by high ambient temperatures.

| Model | Current Rating | Voltage Rating* | Terminals | Width |
|---|---|---|---|---|
| DIN-1-DC | 1 amp | 125VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-2-DC | 2 amp | 150VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-3-DC | 3 amp | 150VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-4-DC | 4 amp | 150VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-5-DC | 5 amp | 150VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-6-DC | 6 amp | 150VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-8-DC | 8 amp | 150VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-9-DC | 9 amp | 150VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-10-DC | 10 amp | 150VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-15-DC | 15 amp | 150VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-20-DC | 20 amp | 125VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-30-DC | 30 amp | 125VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-50-DC | 50 amp | 125VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |
| DIN-60-DC | 60 amp | 125VDC | #14 to 2 AWG clamp terminals | 0.5″ (13 mm) |

* Approved for maximum VOC of 15O VDC by ETL for PV array applications only.

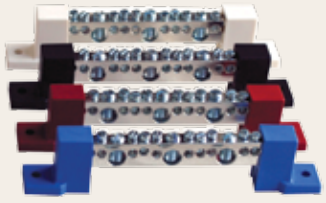
## OutBack High Voltage DIN Mount Fuse Holders and Fuses

Fuse holders are DIN rail mount with #8 AWG set-screw type compression terminals. Touch-safe design and not rated for load make or load break usage.

| Model | Description | Current Rating | Voltage Rating | Width |
|---|---|---|---|---|
| OBF-6-600VDC | Fuse | 6 amp | 600VDC | N/A |
| OBF-10-600VDC | Fuse | 10 amp | 600VDC | N/A |
| OBF-15-600VDC | Fuse | 15 amp | 600VDC | N/A |
| OBFH-30-600VDC-DIN | Fuse Holder | 30 amp | 600VDC | 0.7 " (18 mm) |

## Terminal Bus Bars

Used for adding more wire terminations or for isolating multiple positive/negative circuits. All TBB models have three #1/0 to 14 AWG and eight #6 to 14 AWG screw type compression terminals, which means no ring lugs are required. Available with black, white, red, blue and brown insulators. All required TBBs are included with the AC Input-Output-Bypass Assemblies. TBBs rated for a maximum of180 amps AC/DC.



| Model | Description | Terminals |
|---|---|---|
| TBB-GROUND | Ground/Neutral terminal bus bar and mounting screws (no insulators) | Three #1/0 to 14 AWG and Eight #6 to 14 AWG screw type compression |
| TBB-BLACK | Bus bar with black insulators and mounting screws | Three #1/0 to 14 AWG and Eight #6 to 14 AWG screw type compression terminals |
| TBB-BLUE | Bus bar with blue insulators and mounting screws | Three #1/0 to 14 AWG and Eight #6 to 14 AWG screw type compression terminals |
| TBB-RED | Bus bar with red insulators and mounting screws | Three #1/0 to 14 AWG and Eight #6 to 14 AWG screw type compression terminals |
| TBB-WHITE | Bus bar with white insulators and mounting screws | Three #1/0 to 14 AWG and Eight #6 to 14 AWG screw type compression terminals |
| TBB-BROWN | Bus bar with brown insulators and mounting screws | Three #1/0 to 14 AWG and Eight #6 to 14 AWG screw type compression terminals |

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