

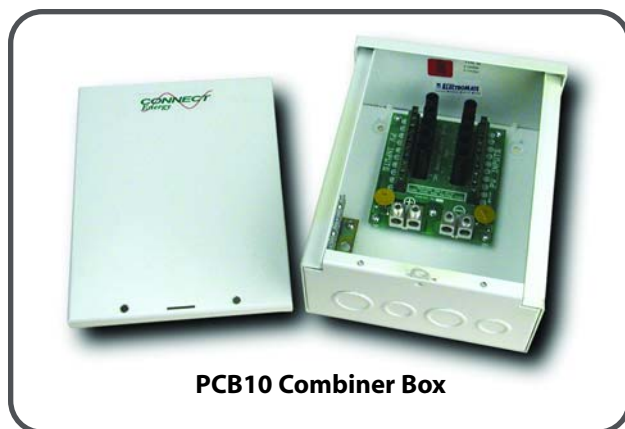
# SAFETY AND DISCONNECT EQUIPMENT

To have a safe code compliant photovoltaic system you need to install the appropriate disconnects, fuses and/or breakers throughout your system. The National Electrical Code (NEC) states that a disconnect is required for every piece of equipment (charge controllers, inverters, etc.) to isolate them from all sources of power (solar modules, batteries and generators). This might sound complicated, but it is really pretty easy. On the following pages you will find several disconnect and overcurrent protection options for your system. If you aren't sure which disconnects you should use and where, just give your KSI dealer a call and he can point you in the right direction.

## Connect Energy PV Combiner Box

The NEC requires that each series string of solar modules in an array must be paralleled together in a fused combiner box. Connect Energy offers their PCB10 combiner box to do just that. It will accept up to ten pairs (one + and one -) of #10 AWG wire and combines them together into a pair of dual #1/0 AWG lugs. The PCB10 is UL listed, housed inside an 8" x 10" x 4" NEMA-3R enclosure and includes a ground bar and MOV surge suppressors. Fuses must be ordered separately and vary in size depending on the amperage of the solar modules in your array. PCB10 shipping weight is 7 lbs. Use OBFH and OBF's for PCBHV and PCBHV4D.

Product Name and Description	Part Number	Price
PCB10 Combiner box	53072	\$229.00
ABC-6 (pack of 10-6A fuses)	36727	\$12.00
ABC-8 (pack of 10-8A fuses)	36728	\$12.00
ABC-10 (pack of 10-10A fuses)	36729	\$12.00
ABC-15 (pack of 10-15A fuses)	36730	\$12.00
PCBHV - 10 Circuit	33912	\$405.00
PCBHV4D	33911	\$349.00



PCB10 Combiner Box



## OutBack Power System PV Combiner (PSPV)

### PSPV

OutBack offers a PV array combiner which can be used with a wide variety of PV system designs and module configurations. It can be configured with DC breakers for low voltage systems (under 125 VDC) or touch safe type fuse holders for high voltage systems (up to 600 VDC). PSPV is designed to provide NEC code compliant overcurrent protection and interconnection of multiple PV panels or sub-arrays into one or more PV arrays for connection to charge controllers or inverter systems. The PSPV is easily field configured to match your PV system design and ampacity requirements.

The PSPV Power system PV Combiner provides series over-current protection of PV module circuits allowing NEC compliant installation. Includes space for up to twelve 125 VDC rated breakers or eight 600 VDC rated fuse holders. Includes two positive output bus bars with two #1/0 terminals for single or dual output circuits. The type 3R outdoor rainproof enclosure can be mounted vertically, or inclined to 14 degrees (3 in 12 pitch). Enclosure only without breakers or fuse holders.

Product Name and Description	Part Number	Price	Shipping Weight (lbs.)
PSPV	55252	\$139.00	5.0



PSPV Combiner

## PV Array Breakers

DIN rail snap-in mount with #2 AWG setscrew type compression terminals. UL listed for up to 125 VDC. Maximum of twelve breakers. Fits in the PSPV only.

Product Name and Description	Part Number	Price
OBPV-6	55240	\$12.00
OBPV-9	55241	\$12.00
OBPV-10	55242	\$12.00
OBPV-15	55243	\$12.00
OBPV-30	55244	\$12.00

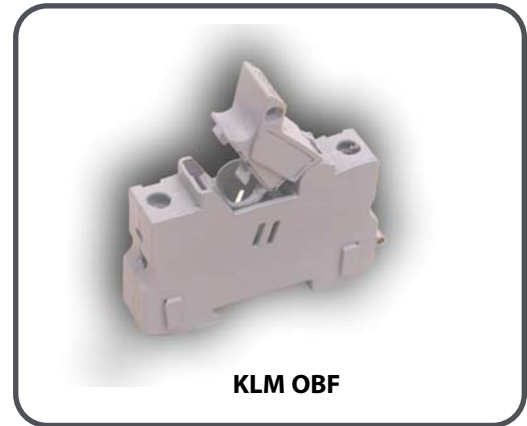


OBPV

## High Voltage PV Array Fuseholder

DIN rail snap-in mount with #8 AWG setscrew type compression terminals. Touch-safe design. Not rated for load make or load break usage. UL listed for up to 600 VDC. Maximum of seven fuseholders in one PSPV enclosure.

Product Name and Description	Part Number	Price
OBFH	55230	\$18.00
KLM OBF-1	3899901	\$18.00
KLM OBF-5	3899905	\$18.00
KLM OBF-8	3899908	\$18.00
KLM OBF-10	3899913	\$18.00
KLM OBF-15	3899915	\$18.00
KLM OBF-25	3899925	\$18.00



KLM OBF



## OutBack Power System PV Segmenting Breaker

### PSSB

OutBack PV array disconnect is designed specifically to work with the SMA Sunny Boy line-tie inverter systems. It can also be used with other high voltage utility interactive PV inverters or other applications such as large inverter power systems or water pumping systems. It can also be used as a standard 600 VDC disconnect for a single high voltage PV array.

The PSSB is designed to provide NEC code compliant overcurrent protection and disconnect means of up to six separate low voltage PV sub-arrays into a single high voltage PV array for connection to a high voltage PV inverter. An optional AC breaker disconnect can also be installed inside the same enclosure to provide a local means of disconnect at the location of the inverter.

Additional space for an OBAC-15D (PN 55322) AC breaker disconnect - 2 pole 15 amp 208 and 240 VDC load break rated - 10K AIC or for an additional six pole segmenting breaker (OBSB-15) allowing connection of up to twelve low voltage PV sub-arrays.

Product Name and Description	Part Number	Price	Shipping Weight (lbs.)
PSSB	55289	\$249.00	7.0



PSSB

## Segmenting Breaker

Segmenting breaker only - 6 pole 15 amp 100 VDC per pole / 600 VDC total. Two can be installed in a single PSSB enclosure allowing connection of up to twelve low voltage PV sub-arrays.

Product Name and Description	Part Number	Price	Shipping Weight (lbs.)
OBSB-15	55233	\$110.00	2.0

## PSSB Sunny Boy Mounting Plate

Mounting plate for one PSSB and a Sunny Boy Inverter, or without an inverter, up to three PSSBs - 16 & 24 inch mounting holes. Grey powder-coated aluminum. Includes mounting hardware.

Product Name and Description	Part Number	Price	Shipping Weight (lbs.)
PSSB-MP	55232	\$99.00	8.6



OBSB-15 Segmenting Breaker

## PV Ground Fault Protection

### PVGFP xantrex

The NEC requires that you install a ground fault protection (GFP) device in your system if your solar array is mounted on the roof of a dwelling. To accomplish this, Xantrex has designed four different "PVGFP" units to handle 100-400 amps at 125 VDC max. Voc. This is actually a fire protection device designed to interrupt a fault current in excess of 1 amp by disconnecting the PV array from the rest of the system. Units from Xantrex are supplied without an enclosure, but it can be housed in a box with internal dimensions not less than 10.5"W x 12"H x 3.75"D.

Product Name and Description	Part Number	Price	Shipping Weight (lbs.)
PVGFP-1	54011	\$275.00	2.0
PVGFP-2	54013	\$325.00	3.0
PVGFP-3	54014	\$375.00	4.0
PVGFP-4	54015	\$425.00	5.0



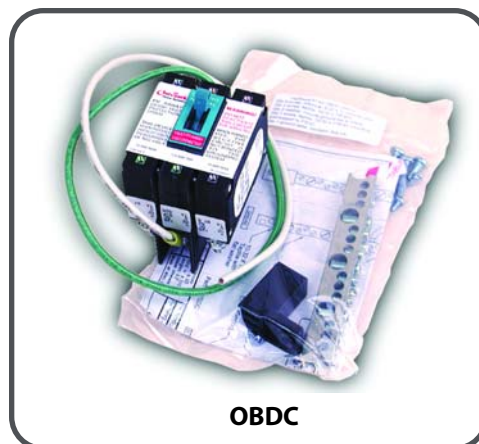
PVGFP-1

## OutBack DC Ground Fault Protection System



The OutBack Power systems GFP/2 is required for PV arrays mounted on dwelling roofs. A GFP/2 protects wiring and system components for one or two PV arrays: Dual 60 amp PV circuits 125 VDC max Voc. Requires three small breaker spaces. The GFP/2 has 1/4" stud terminals. The OBDC-GFP/2 system includes the GFP unit, a ground bus bar, neutral and ground connection wiring and mounting hardware. The PSR includes mounting for only one OBDC-GFP/2 along with two PV disconnects and one large battery breaker. For use in OutBack PSR and PSDC's.

Product Name and Description	Part Number	Price	Shipping Weight (lbs.)
OBDC-GFP/2	55270	\$129.00	2.0



OBDC

## General Electric Fused Safety Switches

### Indoor NEMA 1 Enclosure

Product Name and Description	Part Number	Price	Shipping Weight (lbs.)
TG3221 - 2 pole 30A	36600	\$60.00	6.0
TG4321 - 3 pole 30A	36641	\$89.00	6.0
TG3222 - 2 pole 60A	36621	\$99.00	11.0
TG4322 - 3 pole 60A	36643	\$145.00	16.0
TG3223 - 2 pole 100A	36630	\$195.00	17.0

General Electric 2 and 3-pole fused safety switches are typically used for single and 3-phase AC circuits, but can be used for 12-125 VDC circuits as well. Class-R fuses are required with these switches, but are not included. See the [Class-R fuse and block section](#).



Indoor Enclosure

### Outdoor NEMA 3R Enclosure

Product Name and Description	Part Number	Price	Shipping Weight (lbs.)
TG3221R - 2 pole 30A	36620	\$91.00	6.0
TG4321R - 3 pole 30A	36642	\$135.00	6.0
TG3222R - 2 pole 60A	36625	\$159.00	11.0
TG4322R - 3 pole 60A	36644	\$196.00	16.0
TG3223R - 2 pole 100A	36631	\$219.00	17.0

## Class R Fuses and Fuse Blocks

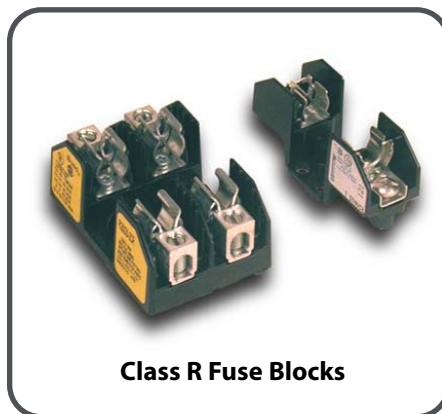
### Class R Fuses

Class-R fuses are current limiting fuses with a high amp interrupting capacity (AIC) that can be used in DC or AC circuits. These fuses can be used in the GE safety switches or the single or double pole fuse blocks.

Product Name and Description	Part Number	Price
FRN-R15 - 15A	36699	\$4.00
FRN-R20 - 20A	36702	\$4.00
FRN-R30 - 30A	36700	\$4.00
FRN-R40 - 40A	36704	\$8.00
FRN-R50 - 50A	36720	\$8.00
FRN-R60 - 60A	36706	\$8.00
FRN-R80 - 80A	36707	\$18.00
FRN-R100 - 100A	36710	\$20.00

### Class R Fuse Blocks

Use these fuse holders for a low-cost means of protecting small to medium sized inverters or other DC circuits. These blocks should be mounted inside an enclosure for safety.



Class R Fuse Blocks



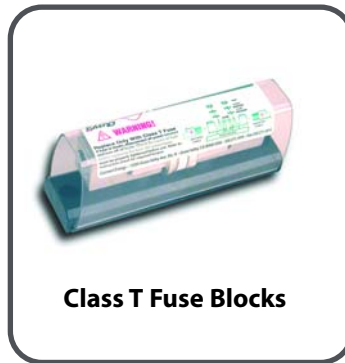
Class R Fuses

Product Name and Description	Part Number	Max. Wire Size	Number of poles	Price
FB-30-1	36961	2AWG	1	\$7.00
FB-30-2	36962	2AWG	2	\$15.00
FB-60-1	36963	2AWG	1	\$12.00
FB-60-2	36964	2AWG	2	\$29.00
FB-100-1	36966	1/0	1	\$26.00
FB-100-2	36967	1/0	2	\$36.00

## Class T Fuses and Fuse Blocks

### Class T Fuse Blocks

Class-T fuses are also current limiting like the Class-R, but have an even higher AIC and are available in amperages from 110 to 400 Amps. These fuse blocks are typically used in between the battery bank and inverter. Consult the inverter overcurrent protection chart in Appendix D to determine which fuse block is right for your particular inverter. The PFB fuse blocks come with set-screw lugs for cut cables. Shipping weight, 2 lbs.

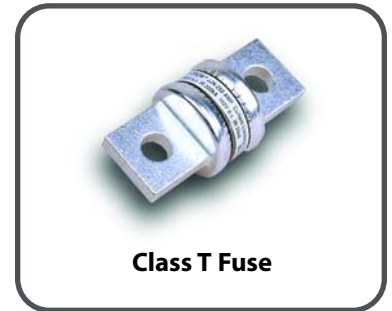


Class T Fuse Blocks

Product Name and Description	Part Number	Max. Wire Size	Amperage	Price
PFB110T	36735	3/0	110A	\$53.00
PFB175T	36745	3/0	175A	\$69.00
PFB200T	36740	250MCM	200A	\$62.00
PFB250T	36747	250MCM	250A	\$79.00
PFB300T	36750	250MCM	300A	\$79.00
PFB400T	36741	250MCM	400A	\$79.00

### Class T Fuses

Product Name and Description	Part Number	Price
JJN-110	36767	\$20.00
JJN-175	36746	\$20.00
JJN-200	36739	\$20.00
JJN-250	36748	\$39.00
JJN-300	36751	\$39.00
JJN-400	36742	\$39.00



Class T Fuse

## xantrex

The Xantrex DC175 / DC250 disconnect offers the ultimate in terms of overcurrent protection and a disconnect means for your inverter all in one enclosure. It also interfaces very nicely with the Xantrex SW, PS & DR series inverters. These disconnects can also serve as a central wiring point for your system by housing a DC bonding block and/or shunt. Each disconnect comes with one main 175A or 250A breaker with space for adding a second breaker. Four smaller knockouts on the side can each house a 15-60A DC breaker for solar input or DC load output. Size 21" x 10.5" x 4.8".

Product Name and Description	Part Number	Price	Shipping Weight (lbs.)
DC250 - 250 Amp breaker and enclosure (for #4/0 cables).	53039	\$329.00	16.0
DC175 - 175 Amp breaker and enclosure (for #2/0 cables).	53043	\$329.00	16.0
GJ250 - Additional 250 Amp breaker	53044	\$195.00	3.0
GJ175 - Additional 175 Amp breaker	53045	\$195.00	3.0
CD60DC - 60 Amp circuit breaker	53047	\$39.00	1.0
CD15 - 15 Amp circuit breaker	53041	\$29.00	1.0
CD20 - 20 Amp circuit breaker	53053	\$29.00	1.0
DCBB - Negative / ground block handles up to four #4/0 cables	53046	\$50.00	1.0

## Xantrex Disconnect



DC250  
Breaker / Enclosure



CD15 Circuit Breaker

## Inverter AC Disconnect - Bypass Breaker Enclosure

For 120 VAC inverters, UL listed, provides overcurrent protection and disconnection means for inverter AC output and back-up generator or utility AC input to inverter. Can be connected in a bypass mode for pass-through generated power directly to AC loads, bypassing the inverter in the event of down time. 60A models supplied with one and two pole QO circuit breakers, mechanical interlock, lockable enclosure and #6 AWG wire. For 240 VAC applications, use two assemblies. Shipping weight, 11 lbs.

Product Name and Description	Part Number	Price
BPE-60, Bypass Enclosure 60A-indoor	55126	\$112.00
BPE-60R, Bypass Enclosure 60A-outdoor 3R	55125	\$279.00



BPE-60



## OutBack DC / AC Fuses

### DC Overcurrent Protection

These 125 VDC rated breakers are for DC inputs / loads and power inverters. The Amps Interrupt Capacity, AIC, rating is in accordance with UL489.

Product Name and Description	Part Number	Amperage	Stud Terminal Size	Price	Shipping Weight (lbs.)
OBDC-250	55261	250	3/8"	\$119.00	3.0
OBDC-175	55262	175	3/8"	\$119.00	3.0
OBDC-100	55263	100	5/16"	\$59.00	1.0
OBDC-60	55264	60	1/4"	\$29.00	1.0
OBDC-50	55307	50	1/4"	\$29.00	1.0
OBDC-40	55265	40	1/4"	\$29.00	1.0
OBDC-30	55266	30	1/4"	\$25.00	1.0
OBDC-20	55310	20	1/4"	\$25.00	1.0
OBDC-15	55267	15	1/4"	\$25.00	1.0
OBDC-10	55268	10	1/4"	\$25.00	1.0
OBDC-1	55269	1	1/4"	\$25.00	1.0



DC Overcurrent Protection

### AC Overcurrent Protection

All AC breakers are DIN rail snap-in mount and can be used for AC input or load circuits. All breakers accept #2 to 14 AWG wire. OutBack AC breakers are hydraulic magnetic type which are not sensitive to ambient temperature like other breakers in the market.

Product Name and Description	Part Number	Amperage	Panel Space Width	Price
AC-60	55208	60	3/4"	\$25.00
AC-60D	55209	60	1 1/2"	\$25.00
AC-30	55210	30	3/4"	\$25.00
AC-30D	55211	30	1 1/2"	\$25.00
OBAC-25D	55214	25	1"	\$25.00
OBAC-20	55213	20	1/2"	\$15.00
OBAC-15	55212	15	1/2"	\$15.00



AC Overcurrent Protection