Why Have Surge Protection?

Photovoltaic, wind and hydroelectric systems usually have long runs of exposed wire that can pick up surges from lightning, even if the lightning strike is not nearby. These power surges can damage sensitive electronic components in meters, charge controllers and inverters. Surges can also damage telephone, audio and video equipment connected to the power system. It is a good idea to install surge protection on all incoming wires in the system, including incoming PV, wind or hydroelectric power lines, AC generator lines, telephone and antenna leads. Proper grounding is absolutely necessary for lightning protection to be effective. In the event of a direct strike, damage may occur, even with surge protectors installed. Type 1 heavy duty surge protectors are recommended when a direct lightning strike is possible on the installation.

Delta

Lightning Arrestors

Delta lightning arrestors have a maximum current rating of 60,000 amps and 2,000 joules per line. Response time is 25 ns to clamp 50,000 amps. Mounts easily in a 1/2" knockout.

Install the DC version for surge protection on wires coming from a PV array, DC wind generator or DC hydroelectric turbine. Use the 600VDC unit for high-voltage grid-tie PV arrays. Lightning protection can be installed in a combiner box, DC load center or grid-tie inverter.

The AC versions can be mounted in your AC load center to protect 120/240 VAC equipment and on AC wiring running outside of the building, to generators, pumps or outbuildings. All units are waterproof.

Delta model	Description	Item code	Price
LA302DC	Arrestor for up to 300 VDC	**053-04115**	**$40**
LA602DC	Arrestor for up to 600 VDC	**053-04109**	**$44**
LA302R	Arrestor for up to 300 VAC	**053-04112**	**$40**
LA303R	Arrestor for up to 300 VAC 3-Phase	**053-04118**	**$50**
LA603R	Arrestor for up to 600 VAC 3-Phase	**053-04120**	**$72**
Mounting bracket for surge arrestors		**053-04138**	**$3**

Citel

Surge Protection Products

Citel PV surge protectors are DIN mount and are ideal for placement inside combiner boxes.

DS210DC off-grid surge arrestor

The Citel DS210DC series is designed to protect 12V, 24V, 48V and 150V DC power lines for an off-grid PV system. The surge protectors protect the charge controller and other system electronics. DS210DC automatically reset after each lightning surge or electrical transient. These surge arrestors clamp at much lower voltage than Delta surge arrestors at left so they offer much better protection for charge controllers and inverters in low-voltage DC systems.

DS50PV grid-tie surge arrestor

The DS50PV is designed to protect the solar array at the solar PV array combiner box for a utility-interactive PV system. The DS50PV is designed to withstand 40kA (8/20us) induced transient surges and is designed with replaceable modules. Use the DS50PV-600 for systems with inverters that have an upper limit of up to 600 volts.

DS60PV grid-tie surge arrestor

DS60PV are Type 1 heavy duty surge protectors, recommended when a direct lightning strike is possible on the installation. They are available in 500- and 1000-VDC operating voltages. The use of Type 1 surge protector is recommended at both ends of the DC power supply line (solar array side and inverter/converter side). The DS60PV is made with a monobloc enclosure and mounts on DIN rail.

DS240 AC surge arrestor

The DS240 is DIN rail compatible and is built with a plug-in module and a fixed base, which enables easy and fast maintenance.

Surge protection of 3-phase AC network is also possible by use of two DS240s.

Citel model	Nominal volts	Maximum volts	Discharge current	Width (mm)	Item code	Price
DS210-12DC	12	15 VDC	1 kA	0.7 (18)	**053-04201**	**$52**
DS210-24DC	24	30 VDC	1 kA	0.7 (18)	**053-04203**	**$52**
DS210-48DC	48	56 VDC	1 kA	0.7 (18)	**053-04205**	**$52**
DS210-95DC	95	100 VDC	2 kA	0.7 (18)	**053-04207**	**$52**
DS210-130DC	130	150 VDC	2 kA	0.7 (18)	**053-04209**	**$52**
DS50PV-600	600	690 VDC	20 kA	1.4 (36)	**053-04218**	**$128**
DS60PV-500	500	550 VDC	40 kA	2.8 (72)	**053-04224**	**$168**
DS60PV-1000	1000	1000 VDC	40 kA	2.8 (72)	**053-04226**	**$279**
DS240-120	120	150 VAC	20 kA	0.7 (18)	**053-04210**	**$98**
DS240-120R	Replacement module for above			0.7 (18)	**053-04210**	**$40**

Lay-in Lugs for Module Grounding

These tin-plated copper lugs have stainless steel set screws and come with stainless steel thread-forming screws and lock washers. They meet NEC requirements for connecting a continuous ground wire to all modules. Sold in packages of 10. UL Listed.

Description	Item code	Price
Bag of 10 lay-in lugs w/ screws	051-03414	$35

Unirac

Grounding Clip 1 (UGC-1)

For use with Unirac SolarMount mount rails. Slot allows the insertion of a T-bolt after the modules are in place. Order one grounding clip for every two top mounting clamps (end clamps and mid clamps) in your installation. Only one of the two rails in each row requires grounding clip. ETL listed.

Unirac #	Item code	Price
980000	051-04055	$1.80

Wiley Electronics

WEEB Grounding Products

WEEB stands for "washer, electrical equipment bonding." WEEB products are used to bond solar modules to aluminum solar mounting rails. The mounts are then grounded, grounding the entire assembly. This eliminates the need to use a lay-in lug and thread-forming screw on each module and it eliminates the need to run a continuous wire to each module.

This saves time and money and it meets the requirements of UL 467. Wire is only needed to connect a lay-in lug on each module rail to an equipment grounding terminal in the inverter or disconnect. ETL listed to UL standards.

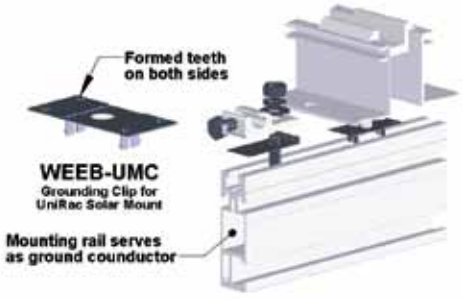
WEEB-9.5

WEEB-9.5

WEEB-9.5 NL

The WEEB-9.5 is used for bonding modules to mounting structures when the modules are directly bolted to the rails using 1/4" bolts through the mounting holes on the rear of the module frames. This type of mounting is typical on DP&W ground (pages 42-43) and pole mount systems (pages 47-49) and on Wattsun and Zomeworks trackers (page 50-52). The WEEB-9.5NL is used for bonding strong-back structure and legs to the rail where 3/8" bolts are used. Sold in packs of 10.

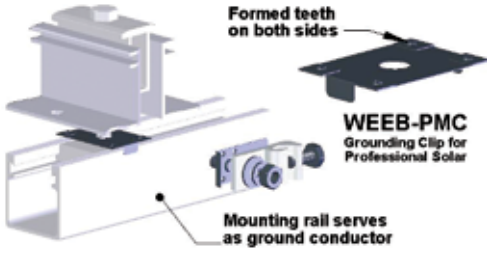
WEEB-UMC



WEEB-UMC grounding clips are used between modules and Unirac SolarMount Standard Rails when front mount clips are used to hold the module to the rails. One clip grounds the frame of 2 adjoining modules to one of the mounting rails. Two clips are required for each pair of modules so that the modules will be bonded to both rails. Sold in packs of 10.

We advise speaking to your building inspector before installing these products to see if they are acceptable in your area.

WEEB-PMC



WEEB-PMC grounding clips are used between modules and SnapNrack or ProSolar rails when front mount clips are used to hold the module to the rails. One clip grounds the frame of two adjoining modules to one of the mounting rails. Two clips are required for each pair of modules so that the modules will be bonded to both rails. Sold in packs of 10.

WEEB L-6.7

The WEEB L-6.7 provides a connection to the mounting system and has lay-in provision for an equipment ground conductor. The WEEB-6.7 kit includes the lay-in lug, matching WEEB washer, bolt, nut flat washer and lock washer. Two WEEB lugs and a short piece of bare wire can be used to connect across a rail splice, or a WEEB splice kit can be used.

WEEB Bonding Jumper

WEEB Bonding Jumper is used to electrically bond mounting rails together at a splice. Use one at every splice.

Wiley part #	Description	Item code	Price
WEEB-9.5	Bonding washer for 1/4" bolted connections - price each - order in multiples of 10	051-04007	$1.40
WEEB-9.5NL	Bonding washer for 3/8" bolted connections - price each - order in multiples of 10	051-04008	$1.40
WEEB-UMC	Clip for use with Unirac SolarMount Standard Rail and SolarMount Light Rail - price each - order in multiples of 10	051-04003	$1.80
WEEB-PMC	Clip for use with SnapNrack and ProSolar rails - price each - order in multiples of 10	051-04001	$1.80
WEEB-6.7	Lay-in lug with mounting hardware and WEEB washer - each	051-04015	$6
Bonding Jumper	Splice kit for rails - each	051-04019	$8

Suggested retail prices are subject to change; check with us for latest pricing.

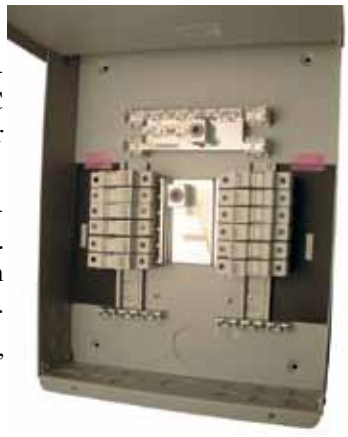
MidNite Solar

MNPV Combiners

These powder-coated aluminum, NEMA 3R rainproof array combiners will accept DIN-rail mounted fuse holders for 600VDC arrays, or 150VDC and 300VDC DIN-rail mounted breakers for low-voltage arrays. P

lastic cover provides a dead front for safety. Four sizes are available. ETL Listed. Negative busbar and ground bar are included. Aluminum NEMA 3R enclosure. Can be mounted at angles from 14 to 90 degrees. ETL Listed to UL 1741 for the U.S. and Canada.

Breakers and fuse holders not included. See page 166 for breakers, fuses and fuse holders.



MidNite model	PV source circuit options						Output circuits				Max output wire size	MNPV combiner dimensions (inches)	Weight (lbs)	Item code	Price
	Max 150 VDC with breakers		Max 300 VDC with breakers		Max 600 VDC with fuses			Max continuous output amps							
	# of input circuits	Max circuit amps	# of input circuits	Max circuit amps	# of input circuits	Max circuit amps	Max output circuits	150 VDC	300 VDC	600 VDC					
MNPV3	3	20	1	20	3	20	1	60	60	60	#14-1/0	10.5 x 5 x 3.5	2	**053-03017**	**$89**
MNPV6	6	20	3	20	4	20	2	120	60	80	#14-1/0	13 x 8 x 3.5	4	**053-03018**	**$109**
MNPV12	12	20			10	20	2	200		200	#14-2/0	14.7 x 12.4 x 3.5	6	**053-03015**	**$139**
MNPV16					16	15	1			240	250MCM	20.7 x 16.2 x 3.5	12	**053-03016**	**$499**

OutBack

FLEXware PV Combiners

The FLEXware PV8 and PV12 accommodate overcurrent protection requirements for off-grid and grid-connected applications. The DIN rail can be fitted with 150VDC circuit breakers for low-voltage PV arrays or 600VDC fuse holders for grid-tie arrays. These combiners replace the PSPV. Rated for NEMA 3R rainproof, the powder-coated aluminum chassis can be mounted on a wall, a sloped roof, or a pole. Dual output lugs allow connection for up to 2/0 AWG wire. An easily removable flame-retardant polycarbonate deadfront panel prevents accidental contact with live terminals. FWPV8 has one circuit and FWPV12 can be configured to have one or two circuits. Negative and ground terminal busbars are included.

OutBack model	# of breakers	# of fuse holders	Dimensions (inches)	Weight lbs	Item code	Price
FWPV8	8	6	15.2 x 12.7 x 3.9	4.4	**053-03012**	**$139**
FWPV12	12	8	15.2 x 9.2 x 3.9	5.9	**053-03014**	**$199**

DIN Rail Mount Fuses and Fuse Holders

Fuse holder and fuses below and breakers at right fit MidNite MNPV and OutBack FlexPV and other combiners. Use the fuses and fuse holder below for 600VDC array combiners. Fuses are KLKD for 600 VDC.

Amps	Description	Item code	Price
USM1 Fuse Holder - 600V 30A Max - DIN mount		**053-03040**	**$20**
1	1-amp 600 VDC KLKD fuse	**053-03155**	**$12**
2	2-amp 600 VDC KLKD fuse	**053-03052**	**$12**
4	4-amp 600 VDC KLKD fuse	**053-03051**	**$12**
6	6-amp 600 VDC KLKD fuse	**053-03050**	**$12**
8	8-amp 600 VDC KLKD fuse	**053-03048**	**$12**
10	10-amp 600 VDC KLKD fuse	**053-03046**	**$12**
12	12-amp 600 VDC KLKD fuse	**053-03044**	**$12**
15	15-amp 600 VDC KLKD fuse	**053-03043**	**$12**
20	20-amp 600 VDC KLKD fuse	**053-03042**	**$12**
30	30-amp 600 VDC KLKD fuse	**053-03041**	**$12**

DIN Rail Mount Combiner Breakers

These breakers fit MidNite MNPV and OutBack combiners. Use breakers for arrays with maximum voltage of 150 or less. Use 300 VDC breakers for 200 - 250 VDC charge controllers.

Amps	OutBack number	MidNite Solar #	Item code	Price
1	OBB-1-150VDC-DIN	MNEPV1	**053-03033**	**$13**
2	OBB-2-150VDC-DIN	MNEPV2	**053-03034**	**$13**
3	OBB-3-150VDC-DIN	MNEPV3	**053-03024**	**$13**
4	OBB-4-150VDC-DIN	MNEPV4	**053-03020**	**$13**
5	OBB-5-150VDC-DIN	MNEPV5	**053-03025**	**$13**
6	OBB-6-150VDC-DIN	MNEPV6	**053-03021**	**$13**
8	OBB-8-150VDC-DIN	MNEPV8	**053-03022**	**$13**
9	OBB-9-150VDC-DIN	MNEPV9	**053-03023**	**$13**
10	OBB-10-150VDC-DIN	MNEPV10	**053-03026**	**$13**
12	OBB-12-150VDC-DIN	MNEPV12	**053-03027**	**$13**
15	OBB-15-150VDC-DIN	MNEPV15	**053-03029**	**$13**
20	OBB-20-150VDC-DIN	MNEPV20	**053-03030**	**$13**
30	OBB-30-150VDC-DIN	MNEPV30	**053-03032**	**$13**
50	OBB-50-150VDC-DIN	MNEPV50	**053-03035**	**$13**
60	OBB-60-150VDC-DIN	MNEPV60	**053-03037**	**$13**
63	OBB-63-150VDC-DIN	MNEPV63	**053-03038**	**$13**

1" wide DIN rail mounted 300 VDC circuit breakers

Amps	Voltage	MidNite Solar #	Item code	Price
7	300 VDC	MNEPV7-300	**053-03107**	**$34**
10	300 VDC	MNEPV10-300	**053-03110**	**$34**
12	300 VDC	MNEPV12-300	**053-03112**	**$34**
15	300 VDC	MNEPV15-300	**053-03115**	**$34**
20	300 VDC	MNEPV20-300	**053-03120**	**$34**
30	300 VDC	MNEPV30-300	**053-03125**	**$34**
50	300 VDC	MNEPV50-300	**053-03130**	**$34**

Suggested retail prices are subject to change; check with us for latest pricing.

Pass-Thru Wiring Box

These ETL listed Pass-Thru Wiring Box are intended to provided a robust, secure, and code compliant method of transferring the Multi-Contact USE-2 type conductor coming from the PV array to THHN/THWN-2 type conductor. The PTWB also provides a convenient location to begin the necessary conduit run from the PV array to the power conditioning equipment. The NEMA 4 enclosure dimensions are 8" x 6" x 4". It has two cord grips for array wire entry and a hole on the opposite side for a 1/2" conduit fitting. There are two terminal blocks for positive and negative conductors and one for ground. It is designed to be mounted directly on the side of the module mounting rail.

Description	Item code	Price
Pass Thru Wiring Box	**053-00271**	**$172**

SolaDeck

PV Roof-Mount Enclosure/Combiner

This NEMA 3R enclosure is made from 18 gauge galvanized steel with a powder coated finish provides a professional look. It has dual ground lugs, a 6 inch universal DIN rail to mount fuse holders or terminal blocks, a wire strain relief clip and 1/2", 3/4" and 1" knockouts for running wires through the roof. It has built-in flashing to seal to roof. It is only 2.5" deep and can fit under the array. To make connections inside the Soladeck use one or two 2-String Pass-Thru Kits. It can be used with AWG 6-16 wire. This kit has 4 DIN mount terminals and hardware to hold them in place.

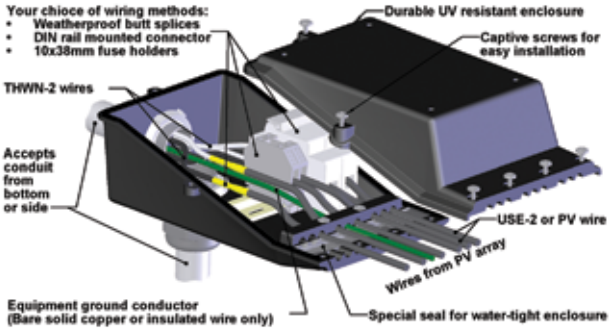
It is ETL listed to UL STD1741 for Photovoltaic Combiner Enclosures. Use up to four DIN mount fuse holders from previous page, a positive and negative busbar and a 2-string pass thru kit to combine up to 4 module strings. Order appropriate fuse.

Model	Description	Item code	Price
SD-786-41	SolaDeck enclosure combiner	**053-00226**	**$85**
PASS-THRU	2-string pass-thru terminal kit	**053-00231**	**$8**
SD-784BB	Positive busbar for 4 fuse holders	**053-00227**	**$14**
SD-785BB	Negative busbar for 4 terminals	**053-00228**	**$8**

Wiley Electronics

Acme Conduit Entry

This transition box to go from MC cables to conduit is made from corrosion resistant anodized aluminum. It accepts conduit from the bottom or side and has a seal for entry of USE-2 or PV wire. The optional mounting bracket makes it easy to mount on any module mounting structure. ACE -PT is for pass-through and has no terminals or DIN rail. ACE-xP have two terminal blocks for each string. The ACE-2C combines two strings into one + and - out without fuses. The Ace-3C and -4C have 3 and 4 fuse holders respectively. Fuses are not included.



Model	Description	Item code	Price
ACE-PT	Pass through - MC cables to conduit	**053-00305**	**$108**
ACE-1P	Pass through - MC cables to conduit - 1 string	**053-00308**	**$151**
ACE-2P	Pass through - MC cables to conduit - 2 string	**053-00309**	**$157**
ACE-3P	Pass through - MC cables to conduit - 3 string	**053-00310**	**$175**
ACE-4P	Pass through - MC cables to conduit - 4 string	**053-00311**	**$181**
ACE-2C	Combiner - MC cables to conduit - 2 string	**053-00312**	**$151**
ACE-3C	Combiner - MC cables to conduit - 3 string	**053-00313**	**$227**
ACE-3C-1	Combiner - MC cables to conduit - 3 string w/o ground	**053-00315**	**$215**
ACE-4C	Combiner - MC cables to conduit - 4 string	**053-00314**	**$245**
ACE-4C-1	Combiner - MC cables to conduit - 4 string w/o ground	**053-00316**	**$233**

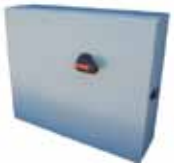
SolarBOS

Combiners

SolarBOS 600 VDC combiners are ETL listed to UL 1741 for 600-volt DC photovoltaic systems. They are designed to minimize installed costs by giving the system designer maximum flexibility. SolarBOS products are designed and manufactured with the system integrator in mind, using the highest quality components to ensure long-term field reliability. All products are assembled in their ETL certified facility in Livermore, California. SolarBOS combiners can be specified with 4 to 24 input circuits, single or dual 90C output terminals, and NEMA 3, 3R, 4 or 4X steel or fiberglass enclosures. All combiner enclosures offer complete gasketed seals for better protection from the elements as well as plenty of wiring room for ease of installation. Fuses are not included. All combiners listed below have single outputs.

	# of input circuits	# of output circuits	Dimensions (inches)	Item code	Price
NEMA 3R Steel	4	1	16 x 12 x 6	140-02004	$355
	6	1	16 x 12 x 6	140-02006	$375
	8	1	16 x 12 x 6	140-02008	$395
	10	1	16 x 12 x 6	140-02010	$415
	12	1	16 x 12 x 6	140-02012	$435
	14	1	16 x 16 x 6	140-02014	$560
	16	1	16 x 16 x 6	140-02016	$580
	18	1	20 x 20 x 6	140-02018	$600
	20	1	20 x 20 x 6	140-02020	$695
	22	1	20 x 20 x 6	140-02022	$715
	24	1	20 x 20 x 6	140-02024	$735
NEMA 4 Steel	4	1	16 x 12 x 6	140-02107	$405
	6	1	16 x 12 x 6	140-02108	$425
	8	1	16 x 12 x 6	140-02109	$445
	10	1	16 x 12 x 6	140-02110	$465
	12	1	16 x 12 x 6	140-02112	$485
	14	1	16 x 16 x 6	140-02114	$565
	16	1	16 x 16 x 6	140-02116	$585
	18	1	20 x 20 x 6	140-02118	$605
	20	1	20 x 20 x 6	140-02120	$745
	22	1	20 x 20 x 6	140-02122	$765
	24	1	20 x 20 x 6	140-02124	$785
NEMA 4X Fiberglass	4	1	16 x 12 x 6	140-04604	$410
	6	1	16 x 12 x 6	140-04606	$430
	8	1	16 x 12 x 6	140-04608	$450
	10	1	16 x 12 x 6	140-04610	$470
	12	1	16 x 12 x 6	140-04612	$490
	14	1	16 x 16 x 6	140-04614	$585
	16	1	16 x 16 x 6	140-04616	$605
	18	1	20 x 20 x 6	140-04618	$625
	20	1	20 x 20 x 6	140-04620	$795
	22	1	20 x 20 x 6	140-04622	$815
	24	1	20 x 20 x 6	140-04624	$835

Disconnect Combiners



SolarBOS now offers combiners with integrated load-break 600 VDC disconnects. This allows installers to further reduce system costs by merging the combiner box with the disconnect switch into one product. This is a good choice where a rooftop disconnect is required. They are available with 55, 75, 150 and 245 amp disconnects. Combiners are ETL listed to UL 1741 for 600 volt DC photovoltaic systems. These combiners have one output circuit and are NEMA 4 steel enclosures. Fuses are not included.

Input Circuits	Disconnect amps	Dimensions (in)	Item code	Price
4	55	12 x 10 x 6	140-05041	$750
4	75	20 x 20 x 6	140-05042	$900
6	55	12 x 10 x 6	140-05061	$770
6	75	20 x 20 x 6	140-05062	$920
6	150	20 x 20 x 6	140-05063	$1,080
8	75	20 x 20 x 6	140-05082	$940
8	150	20 x 20 x 6	140-05083	$1,100
8	245	24 x 24 x 6	140-05084	$1,830
10	75	20 x 20 x 6	140-05102	$960
10	150	20 x 20 x 6	140-05103	$1,120
10	245	24 x 24 x 6	140-05104	$1,850
12	75	20 x 20 x 6	140-05122	$980
12	150	20 x 20 x 6	140-05123	$1,140
12	245	24 x 24 x 6	140-05124	$1,870
16	75	20 x 20 x 6	140-05162	$1,020
16	150	20 x 20 x 6	140-05163	$1,180
16	245	24 x 24 x 6	140-05164	$1,870
20	150	20 x 20 x 6	140-05203	$1,350
20	245	24 x 24 x 6	140-05204	$1,950
24	150	20 x 20 x 6	140-05243	$1,390
24	245	24 x 24 x 6	140-05244	$1,990

Waterproof Strain Reliefs

Use the 1/2" NPT threaded connectors to provide a waterproof entrance or exit for wiring on PV module junction boxes and outdoor combiner boxes. Use the 3/4" NPT connector for cables up to 5/8" dia. Made of Nylon with Buna-N seals. Resistant to salt water, weak acids, weak alkalis, alcohol, ether, esters, ketones, and mineral, animal and vegetable oils. Non-corrosive, suitable for direct burial installations. The oval-hole 1/2" strain relief works for 2-conductor TC cable used for module interconnects, PV outputs or UF cable. The 2-hole 1/2" connector is designed for use with two #10 or #12 type USE conductors. UL Listed. Suitable for use in NEMA 4, 6 and 12 applications.

Strain relief description	Fits cable size	Item code	Price
1/2" thread w/ 1 round hole	USE #12 & #10	054-03243	$3.75
1/2" thread w/ 2 round holes	USE #12 & #10	054-03252	$4.80
1/2" thread w/ 1 round hole	0.25" to 0.5" dia. wire	054-03241	$2.60
1/2" thread w/ 1 oval hole	14/2,12/2,10/2 TC	054-03257	$4.40
3/4" thread w/ 1 round hole	0.4" to 0.7" dia. cable	054-03246	$3.90
Steel lock nut 1/2"		054-03238	$0.18
Steel lock nut 3/4"		054-03244	$0.20

Suggested retail prices are subject to change; check with us for latest pricing.

Square-D

240V and 600V NEMA 3R Safety Switch Disconnects

The National Electric Code, section 690.15, PV requires arrays to have a disconnecting means to isolate the inverter from the PV power source. Utility grid-tie inverters that utilize PV arrays with voltages above 250VDC require a disconnect rated for 600VDC to perform this function. The Square-D 600VDC 30-amp 3-pole safety switches are UL Listed to handle 13A at 600VDC per pole. They can be used for disconnecting up to 3 PV arrays for 3 grid-tie inverters. Its wiring lugs are rated to accept two #14 to #10 wires each. This allows the disconnect switch to also act as a string combiner in systems that utilize 2 strings of PV modules per inverter. The 600VDC 60A and 100A 3-pole safety switches are UL Listed to handle rated current on each pole at 600VDC. All larger Square-D 600VDC disconnects are rated for disconnecting one string at full rated power using 2 poles in series.

Many utilities require an AC disconnect between a grid-tie inverter and the AC load center, close to the AC service entrance, with a visible and lockable handle. A 30A 240V disconnect is good for up to 5kW at 240 VAC and the 60A disconnect is good for up to 11kW. For connection of multiple inverters to a disconnect, use an AC load center with a circuit breaker for each inverter installed, as an AC combiner box between the inverters and the disconnect switch. The breakers can be back-fed with the inverter outputs and the load center main lugs will handle the combined outputs to be connected to the AC disconnect.

Use Class R fuses of the proper voltage and amperage for fused disconnects. 600V fuses will not fit into 240V disconnects, and 250VAC/125VDC fuses will not fit into 600V disconnects. See next page for Class R fuses

Amps	AC /DC	Fused	Poles	Neutral kit	Ground kit	Dimensions (inches) H x W x D	Weight (lbs)	Square-D model	Item code	Price
600-volt AC or DC 3-Pole NEMA 3R heavy duty switches										
30	Yes	No	3*	SN03	GTK03	14.88 x 6.63 x 4.88	9.3	HU361RB	**053-02312**	**$175**
30	Yes	Yes	3*	SN03	GTK03	14.88 x 6.63 x 4.88	9.8	H361RB	**053-02313**	**$270**
60	Yes	No	3*	SN0610	GTK0610	17.50 x 9 x 6.38	16	HU362RB	**053-02339**	**$380**
60	Yes	Yes	3*	SN0610	GTK0610	17.50 x 9 x 6.38	16	H362RB	**053-02341**	**$480**
100	Yes	No	3*	SN0610	GTK0610	21.25 x 8.50 x 6.38	24	HU363RB	**053-02357**	**$530**
100	Yes	Yes	3*	SN0610	GTK0610	21.25 x 8.50 x 6.38	24	H363RB	**053-02355**	**$750**
200	Yes	No	3**	SN20A	PKOGTA2	29.25 x 17.25 x 8.50	44	HU364RB	**053-02364**	**$640**
200	Yes	Yes	3**	SN20A	PKOGTA2	29.25 x 17.25 x 8.50		H364NRB	**053-02366**	**$1,605**
400	Yes	Yes	3**	Included	PKOGTA2	50.31 x 27.88 x 10.13		H365NR	**053-02407**	**$3,843**
800	Yes	Yes	3**	Included	PKOGTA7	69.13 x 36.62 x 17.75		H367NR	**053-02408**	**$11,470**
1200	Yes	Yes	3**	Included	PKOGTA8	69.13 x 36.62 x 17.75		H368NR	**053-02409**	**$13,995**
* Uses 2 poles in series for 600VDC, except as a PV disconnect, where all 3 poles may be used for 600VDC . ** Uses 2 poles (and 2 fuses) in series for 600VDC.										
240-Volt AC / 125-Volt DC* NEMA 3R heavy duty switches**										
30	Yes	Yes	3	included	GTK03	14.88 x 6.63 x 4.88	9.8	H321NRB	**053-02315**	**$314**
60	Yes	Yes	3	included	GTK03	14.88 x 6.63 x 4.88	10	H322NRB	**053-02336**	**$503**
100	Yes	Yes	3	included	GTK0610	21.25 x 8.50 x 6.38	19	H323NRB	**053-02351**	**$722**
200	Yes	Yes	3	included	PKOGTA2	29.25 x 17.25 x 8.50	43	H324NRB	**053-02363**	**$988**
*** Switches are rated for 250VDC but available fuses are only rated for 125VDC.										
240-Volt AC Only NEMA 3R general duty switches										
30	AC only	No	2	SN03	PK3GTA1	9.63 x 7.25 x 3.75	4.4	DU221RB	**053-02318**	**$83**
30	AC only	Yes	2	included	PK3GTA1	9.63 x 7.25 x 3.75	4.5	D221NRB	**053-02326**	**$90**
30	AC only	No	3	SN03	PK3GTA1	9.63 x 7.25 x 3.75	4.7	DU321RB	**053-02319**	**$139**
30	AC only	Yes	3	included	PK3GTA1	9.63 x 7.25 x 3.75	5.1	D321NRB	**053-02329**	**$139**
60	AC only	Yes	2	included	GTK03	14.88 x 6.63 x 4.88	9.7	D222NRB	**053-02334**	**$141**
60	AC only	No	3	SN03	PK3GTA1	9.63 x 7.25 x 3.75	5	DU322RB	**053-02342**	**$222**
60	AC only	Yes	3	included	GTK03	14.88 x 6.63 x 4.88	9.8	D322NRB	**053-02343**	**$210**
100	AC only	Yes	2	included	GTK0610	17.50 x 8.50 x 6.50	16	D223NRB	**053-02358**	**$227**
100	AC only	No	3	SN0610	GTK0610	17.50 x 8.50 x 6.50	15	DU323RB	**053-02359**	**$386**
100	AC only	Yes	3	included	GTK0610	17.50 x 8.50 x 6.50	16	D323NRB	**053-02361**	**$386**
200	AC only	Yes	2	included	PKOGTA2	29.25 x 17.25 x 8.25	29	D224NRB	**053-02371**	**$513**
200	AC only	Yes	3	included	PKOGTA2	29.25 x 17.25 x 8.25	30	D324NRB	**053-02372**	**$853**

Square-D Disconnect Accessories

Use the hubs listed in the ordering table at the top of the page to connect conduit or a kWh meter socket to the top of the disconnect. Disconnects are raintight (NEMA 3R) for outdoor use. Order a neutral busbar and ground busbar if you need to land these conductors in the disconnect switch box. See table below to determine which neutral and ground to use.

Neutral and ground accessories	Item code	Price
SN03 Neutral busbar	053-02389	$52
SN0610 Neutral busbar	053-02381	$71
SN20A Neutral busbar	053-02383	$133
GTK03 Ground busbar	053-02387	$8
PK3GTA1 Ground busbar	053-02395	$8
GTK0610 Ground busbar	053-02386	$13
PKOGTA2 Ground busbar	053-02388	$38
PKOGTA7 Ground busbar	053-02385	call
PKOGTA8 Ground busbar	053-02384	call
Conduit hubs	**Item code**	**Price**
Top mount hub 3/4"	053-02305	$22
Top mount hub 1"	053-02306	$22
Top mount hub 1-1/4"	053-02307	$22
Top mount hub 1-1/2"	053-02308	$22
Top mount hub 2"	053-02309	$40

Class R Fuses

These Class R fuses can be used in AC circuits up to 250V or DC circuits up to 125V. They have the high amp interrupting capacity (AIC) required for fusing circuits powered by batteries and for protecting Square-D brand circuit breakers. They can be used to protect wiring to small inverters (100-700 watts) and wiring from charging sources. Use these fuses in fused safety disconnect switches. UL Listed.

Amps	250VAC/125VDC		600VAC/VDC	
	Item code	Price	Item code	Price
10	053-02441	$5	053-02442	$11
15	053-02444	$5	053-02447	$11
20	053-02450	$5	053-02453	$11
30	053-02456	$5	053-02459	$11
40	053-02462	$8	053-02463	$24
50	053-02465	$8	053-02466	$24
60	053-02468	$8	053-02471	$24
70	053-02469	$18	053-02470	$46
80	053-02475	$18	053-02472	$46
90	053-02476	$18	053-02473	$46
100	053-02474	$18	053-02477	$46
125	053-02478	$48	053-02481	$80
150	053-02479	$48	053-02482	$80
200	053-02480	$48	053-02483	$80




Class R Fuse Blocks

Use these fuse blocks with the Class R 250-volt fuses. Bare wire ends fit into the screw terminals on each end of the fuse block. The small fuse block holds 10-30A fuses and accepts up to #2 wire. The medium size block holds 40-60A fuses and accepts up to #2 wire also. The large size block holds a 100A fuse and accepts up to #1/0 wire. Small and medium size blocks are available in one-pole and two-pole versions.

Description	Item code	Price
Class R fuse block 0.1-30A, 1-pole	053-02423	$5
Class R fuse block 0.1-30A, 2-pole	053-02426	$12
Class R fuse block 31-60A, 1-pole	053-02429	$9
Class R fuse block 31-60A, 2-pole	053-02432	$16
Class R fuse block 61-100A, 1-pole	053-02435	$25

Class T Fuse Blocks with Fuses

Use these single-pole fuse blocks to fuse inverters or other large loads. Holders with set screw lugs accept up to 2/0 wire in the 110A and 200A sizes and up to 4/0 wire in the 300A and 400A sizes. On stud mount holders, a 5/16" bolt at each end of the fuse allows connection of a cable with a ring lug terminal end. To connect an inverter, order two cables with lugs on both ends: one to go from the battery to the fuse and one to go from the fuse to the inverter. Class T fuses exceed the 10,000-amp interrupting capacity (AIC) required to protect Square-D brand circuit breakers in DC load centers. They are UL Listed for up to 160VDC and NEC approved for inverter use. A fuse comes installed in the block. Order spare fuses separately.

Xantrex model	Description	Item code	Price
TFB110C	110A fuse and holder w/screw lug	053-02515	$53
TFB200C	200A fuse and holder w/screw lug	053-02532	$53
TFB300C	300A fuse and holder w/screw lug	053-02550	$75
TFB400C	400A fuse and holder w/screw lug	053-02562	$75
TFB110	110A fuse and holder w/studs	053-02512	$53
TFB200	200A fuse and holder w/studs	053-02526	$53
TFB300	300A fuse and holder w/studs	053-02544	$75
TFB400	400A fuse and holder w/studs	053-02559	$75

Class T Fuses - JJN Series

These Class T fuses are rated for These Class T fuses are rated for 160 VDC and 300 VAC as protection for circuit breakers, load centers and inverters where high available short circuit currents are possible. These fuses fit the fuse blocks described above and the inline holder shown here.

Model	Description	Item code	Price
TF110	110A replacement fuse	053-02509	$18
TF200	200A replacement fuse	053-02520	$18
TF300	300A replacement fuse	053-02538	$38
TF400	400A replacement fuse	053-02556	$38

Suggested retail prices are subject to change; check with us for latest pricing.

Square-D

QO Load Centers

Square-D brand load centers can be used for multiple purposes, for wiring that meets the National Electric Code (NEC). All of these can be used as AC load centers or subpanels. Panels using QO plug in breakers are rated up to 50 VDC for use as 12V or 24V DC load centers. They can also be used to combine the AC output from multiple inverters feeding the grid. When used as DC load centers they should be protected by a high interrupt capacity fuse or circuit breaker between the load center and the battery. Use one of the Class T or Class R fuses, or the DC breakers used in the OutBack and Xantrex DC power centers.

When used to combine the AC output of multiple grid-tie inverters, and meet the requirements of NEC 690.64(B)(2) the bus amp rating for the load center must be larger than the sum of all of the overcurrent devices feeding it, from both the utility and all inverters.

The 277/480V load centers can be used to combine the output from multiple inverters to feed a 277Y/480VAC grid interconnection. One 30A continuous duty breaker is used for each inverter that is set up for 277V hot to neutral.

Load centers are not supplied with any breakers – order conduit hubs for outdoor load centers, and breakers, separately.

Spaces (single)	Bus amp rating	Outdoor	Cover	Max wire in main lug	Ground kit for this unit	Dimensions (inches) H" x W" x D"	Weight (lbs)	Square-D model	Item code	Price
120/240-volt AC Single-Phase Main Lug Load Centers										
2	70	Yes	INCL.	# 4	PK4GTA	9.38 x 4.88 x 4	5.0	QO24L70RB	**053-02141**	**$60**
2	70	No	INCL.	# 4	PK4GTA	9.30 x 4.81 x 3.19	3.8	QO24L70S	**053-02144**	**$50**
6	100	Yes	INCL.	# 1	PK7GTA	12.62 x 8.88 x 4.27	9.7	QO612L100RB	**053-02147**	**$54**
6	100	No	INCL.	# 1	PK7GTA	12.57 x 8.88 x 3.8	8.3	QO612L100DS	**053-02153**	**$46**
12	125	Yes	INCL.	# 2/0	INCL.	19 x 14.25 x 4.5	23	QO112L125GRB	**053-02163**	**$190**
12	125	No	Add	# 2/0	INCL.	18 x 14.25 x 3.75	15	QO112L125G	**053-02162**	**$85**
12	200	Yes	INCL.	250 kcmil	INCL.	26.25 x 14.25 x 4.5	27	QO112L200GRB	**053-02165**	**$320**
12	200	No	Add	250 kcmil	PK15GTA	29.86 X 14.25 X 3.75	18	QO112L200G	**053-02164**	**$177**
Uses QO plug-in breakers										
120/208-volt AC Three-Phase Main Lug Load Centers										
12	125	Yes	INCL.	# 2/0	INCL.	19 x 14.25 x 4.52	22	QO312L125GRB	**053-02181**	**$323**
12	125	No	Add	# 2/0	INCL.	19 x 14.25 x 3.75	11	QO312L125G	**053-02183**	**$221**
18	200	Yes	INCL.	250 kcmil	INCL.	30 x 14.25 x 4.52	31	QO318L200GRB	**053-02185**	**$412**
18	200	No	Add	250 kcmil	INCL.	30 x 14.25 x 3.75	17	QO318L200G	**053-02187**	**$295**
Uses QO plug-in breakers										

Safety Labels for PV Installations

These labels are manufactured using ultraviolet (UV) resistant ink, permanent acrylic adhesive and base material designed to withstand environmental elements. A laminate is added to further add protection against prolonged UV exposure. They are recommended for use in identification of DC disconnects and inverters. For use on both painted smooth metal and textured metal surfaces. All labels are 4.12" wide. Labels are sold in packs of 10 labels.

Label description	Item code	Price
DC Disconnect warning 2-piece label - 10 pack	**053-00013**	**$30**
Solar Disconnect warning 2-piece label - 10 pack	**053-00015**	**$28**
Warning - Dual Power Sources - 10 pack	**053-00017**	**$13**
Warning - Electric Shock Hazard - 10 pack	**053-00019**	**$13**

QO Circuit Breakers

QO circuit breakers snap into QO load centers. They are UL Listed for DC branch circuits up to 48VDC (not for use in 48V systems). They can also be used for 120VAC (1-pole) or 120/240VAC (2-pole) circuits. Circuit breakers in 10A to 30A sizes can handle one or two #14 to #10 wires or one #8 wire. Circuit breakers 40A to 70A will handle #8 to #2 wire sizes.

QOU circuit breakers are designed for surface or DIN rail mounting and are used in the Xantrex T-240 and in SW Plus AC conduit boxes.

Description	QO Breakers		
	Part #	Item code	Price
10-amp 1 pole	QO110	**053-02063**	**$12**
15-amp 1 pole	QO115	**053-02065**	**$12**
20-amp 1 pole	QO120	**053-02071**	**$12**
30-amp 1 pole	QO130	**053-02075**	**$12**
40-amp 1 pole	QO140	**053-02080**	**$12**
50-amp 1 pole	QO150	**053-02083**	**$12**
60-amp 1 pole	QO160	**053-02086**	**$12**
70-amp 1 pole	QO170	**053-02090**	**$28**
15-amp 2 pole	QO215	**053-02067**	**$22**
20-amp 2 pole	QO220	**053-02073**	**$22**
25-amp 2 pole	QO225	**053-02021**	**$22**
30-amp 2 pole	QO230	**053-02077**	**$22**
40-amp 2 pole	QO240	**053-02081**	**$22**
50-amp 2 pole	QO250	**053-02084**	**$22**
60-amp 2 pole	QO260	**053-02088**	**$22**

Barrel Connectors

These UL Listed connectors are tin-plated high strength aluminum alloy. They can be used with copper or aluminum wire. Set screw holds wire in terminal. Single-and double-barrel connectors.

Type	Wire size (AWG)	Hole size	Item code	Price
Single	14 to 2	1/4"	**051-03319**	**$1.84**
Single	14 to 2/0	1/4"	**051-03327**	**$2.69**
Double	14 to 2/0	1/4"	**051-03324**	**$6.50**
Single	6 to 4/0	3/8"	**051-03334**	**$8.25**
Double	6 to 4/0	3/8"	**051-03330**	**$20**

Insulated Cable Connector Blocks

This insulated connector is molded for precise fit and supplied with removable access plugs over the hex screws. Available with 2- to 4-wire entry ports on one side for 4 to 14 AWG wire. This can be used to transition from Multi-Contact cables to conduit wiring on roof to PV arrays or for any parallel wiring connection. UL Listed for 600 volts.

Number of poles	Wire range AWG	Item code	Price
2	4 -14	**054-01142**	**$14**
3	4 - 14	**054-01143**	**$20**
4	4 - 14	**054-01144**	**$26**

Power Distribution Blocks

Use these blocks to split primary power into secondary circuits, or join cables from a solar array to a power lead-in cable. Install cables and tighten set screws. Terminal blocks are made of zinc-plated aluminum for use with aluminum or copper conductors. 2 poles. Primary side accepts one large cable; secondary side accepts 6 smaller cables. UL Recognized for up to 600 volts.

Primary		Secondary		Amp rating	Item code	Price
Wire size	Taps	Wire size	Taps			
2/0 - 8	1	#14 to #6	6	175	**054-01024**	**$72**
6/0 - 6	1	#14 to #4	6	350	**054-01027**	**$60**
500mcm - 4	1	2/0 - 14	4	380	**054-01025**	**$94**
350mcm - 8	1	4 - 14	12	310	**054-01023**	**$190**

Splicer Blocks

Use these blocks to splice wires of up to #2/0 gauge. They are UL Recognized and CSA certified for up to 600 volts. The terminal blocks are made of zinc-plated aluminum, for use with aluminum or copper conductors. 2 pole and 3-pole blocks. One connection on each side.

Wire size (AWG)	Poles	Amp rating	Item code	Price
#8 to 2/0	2	175	**054-01030**	**$20**
#8 to 2/0	3	175	**054-01033**	**$25**

Suggested retail prices are subject to change; check with us for latest pricing.

IOTA

Automatic Transfer Switches

Safely connect an inverter and an AC generator to the same house wiring. These automatic transfer switches can be used with inverters that don't have built-in transfer switch capability. If the generator is not running, then the inverter is connected to the house wiring. When the generator is started, the house wiring is automatically disconnected from the inverter and connected to the generator. A time delay feature allows the generator to warm up before the transfer takes place.

These transfer switches are particularly useful in RV and marine installations where both the hot and neutral terminals must be switched. They can be used between an inverter and a generator, between an inverter and shore power, or a generator and shore power. Two transfer switches can be used if switching between all three power sources is desired.

Indoor-rated housings have conduit knockouts on all four sides. 30A and 50A units have a plastic housing and 100A units have a metal housing. ETL Listed to UL1008.

Model	AC volts	Max amps	Generator max kW	Dimensions (inches)	Weight (lbs)	Item code	Price
ITS-30R	120	30A	4kW	7.5 H x 8.5 H x 4 D	2	**053-08041**	**$80**
ITS-50R	120/240	50A	12kW	7.5 H x 8.5 H x 4 D	3	**053-08053**	**$180**
ITS-100R	120/240	100A	24kW	10 H x 12 W x 4 D	15	**053-08056**	**$798**

MidNite Solar

Manual Transfer Switch

120/240 VAC manual transfer switches have a neutral busbar and ground box lug terminal. Dimensions are 9 x 5 x 4 inches. Can be used with up to 6AWG wire. These can be used to connect utility power and a generator to inverters with one AC input.

Description	Weight (lbs)	Item code	Price
30 Amp 240 VAC Transfer Switch	4	**053-07851**	**$129**
60 Amp 240 VAC Transfer Switch	4	**053-07853**	**$129**

Inverter Bypass Switch

Wired between any 120VAC inverter/charger, generator and load center, this unit allows you to bypass the inverter in the event of an inverter failure. After the bypass switch is thrown, the generator is connected directly to the load center. The inverter can than be removed for repair. This is designed for inverters with built-in transfer switches. Maximum current is 60 amps. Dimensions: 13.5" x 6.25" x 3.5"

Description	Weight	Item code	Price
Inverter bypass switch	7 lbs	**053-07819**	**$110**

Perko

Battery Selector Switch

This high current switch is designed for battery switching in boats but can be used in land-based units. It permits selection between one of two batteries or the connection of both batteries in parallel. The "off" position also acts as a battery disconnect. Many people are using these to choose between two banks of batteries or between a main battery and a backup battery. The switch surface mounts with a slot for wires to enter from the bottom. Wires connect to 5/16" brass bolts. Capacity is 250 amps continuous and 360 amps intermittent. For use on 6-, 12-, 24- or 32-volt systems. UL Listed for marine use.

Description	Item code	Price
Battery E-series switch 48V	**053-08268**	**$63**