Solar Combiner Solutions

cETLus 1741 Listed (combiners and disconnects)
cETLus Listed to CSA Standard C22.2 No. 31 & No. 107.1
NEMA 4X (fiberglass and stainless steel)
NEMA 4 (powder coated steel)
NEMA 3R (painted steel)

Leading the Way in Solar Technology

Eaton's Crouse-Hinds solar combiner boxes and recombiner boxes for the grid-tied solar market integrate a comprehensive line of electrical products with expert support, industry insights, and local availability to improve safety and productivity in the most demanding industrial, commercial, and residential environments worldwide.

Solar Background Information

A grid-tied solar array may be one panel or many in series, and may range from a single 12 volt panel to high voltage multi-panel arrays for grid-tied systems. Grid-tied systems can go as high as 1000 VDC, while battery systems are typically 12, 24, or 48V.

Higher voltage systems (over 48V) have different NEC code requirements than those for low voltage battery systems, and the two types are NOT interchangeable.

Eaton's Crouse-Hinds Solar Combiners are designed for higher voltage circuits used in grid-tied applications. All meet NEC requirements, are made in accordance with UL 1741 standards, and are protected by Eaton's Bussmann DC fuses specifically designed for the protection and isolation of photovoltaic strings.

Typical Solar Grid System Diagram (CCBF04 Setup Shown)

Eaton's Crouse-Hinds Solar Protection for Fiberglass Enclosures

Eaton's Crouse-Hinds NEMA 4X solar combiner boxes are shipped with fiberglass enclosures. These enclosures contain a solar protection formula that provides the enclosure the strength and durability to provide long, dependable service even in the most demanding environmental conditions. They retain gloss and color even when exposed to harsh UV light and offer superior resistance to chemicals and are fire retardant.

A special UV absorber is added into this solar protection formula and works to absorb UV energy and release it without damaging the fiberglass enclosure, thus providing increased protection of the polyester material and increased resistance to the damaging effects of UV radiation. For additional information on Eaton's Crouse-Hinds Solar Protection, choose Fiberglass Enclosures from: http://www.crouse-hinds.com.

How to Size a Solar Combiner*:

1. Combiner Inputs:
a. Eaton's Crouse-Hinds provides a “Max. Short Circuit Current Rating per String” (Isc) for use as a direct comparison between the published Isc of the PV module. De-rating requirements per Article 690 of the NEC are applied and should be used to make a direct comparison with the PV module Isc ratings (i.e. CCBF12 has an Isc rating of 13.2A. PV modules with Isc ratings at or below 13.2A would be acceptable). For additional information, consult the electrical ratings table at the end of this section.

2. Ratings:
a. Voltage: (600 VDC / 1000 VDC systems) – Eaton's Crouse-Hinds provides the total system voltage ratings to be used in comparison with the sum of the maximum number of modules in series per string. Consult NEC, ANSI, and local codes when designing a system.

b. Current: Customer provided max. array current per string multiplied by number of combiner input circuits must be less than or equal to the max. current found in the electrical ratings table at the end of this section.

3. Hardware Sizing:
a. Integral Disconnect Switch Sizing: To determine the rating of the integral disconnect, simply multiply the number of input circuits by the max. current per string (as indicated above), and then round to the next (higher) disconnect size. In NO case can the maximum current exceed the amperage rating. Disconnect switches are rated for 100% continuous duty. Example: A 12 string combiner box with max. current of 12A per string x 12 strings = 144A, which equals the minimum rating for a switch of 250A.

*The information above is provided for reference and information only. All statements, technical information, and recommendations contained herein are based on information and tests we believe to be reliable. The accuracy or completeness thereof are not guaranteed. In accordance with Eaton's Crouse-Hinds' Terms and Conditions of Sale, and since conditions of use are outside our control, the purchaser should determine the suitability of the product for his/her intended use and assumes all risk and liability whatsoever in connection therewith.

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Solar Combiner Boxes

cETLus 1741 Listed
cETLus Listed to CSA Standard C22.2 No. 31 & No. 107.1
NEMA 4X (fiberglass and stainless steel)
NEMA 4 (powder coated steel)
NEMA 3R (painted steel)

Applications:

Eaton's Crouse-Hinds Solar Combiner Solutions are designed and built to minimize system costs by providing maximum flexibility. Solar Combiner Solutions offer a range of 1 to 48* input circuits, with standard durable non-metallic (NEMA 4X) enclosures, engineered and manufactured to perform in the harshest environmental conditions. ETL Listed to UL 1741 standards*, providing peace of mind and plenty of wiring room for ease of installation.

Features:

- Rated for 600 VDC or 1000 VDC - continuous duty
- Touch-Safe fuse holders
- Lexan shield covers all live components
- 90ºC output terminals
- Configured for positive, negative grounded arrays, and bipolar arrays (to 1000 VDC combined voltage)**
- Busbar design

Standard Materials and Finishes:

Fiberglass Enclosure:

- Hot compression molded fiberglass-reinforced thermoset polyester
- Non-conductive, impact-resistant, UV resistant, flame retardant
- Self extinguishing, non-halogenated material
- Poured polyurethane seamless gasket provides watertight, dust-tight environmental seal
- Stainless steel used on all external hardware

Certifications and Compliances:

- cETLus 1741 Listed*
- cETLus Listed to CSA Standard C22.2 No. 31 & No. 107.1
- NEMA 4X (fiberglass and stainless steel)
- NEMA 4 (powder coated steel)
- NEMA 3R (painted steel)

Options:

- Fuses (shipped uninstalled)
- Surge protection
- NEMA 4X stainless steel
- NEMA 4 powder coated steel
- NEMA 3R painted steel‡
- Solar cable whips (pre-assembled and installed)
- Compression output lugs
- Factory installed breather drain and desiccant
- Bipolar construction (to 1000 VDC combined voltage)
- Smart combiners available (DC string monitoring)
- Factory drilled entrance holes
- Factory installed conduit fittings/cable glands
- Dual output lugs
- Lockable enclosures
- Integral power supply, terminal blocks
- Custom options available - consult factory

CP

CATALOG NUMBERING SYSTEM

Use the table below to build a catalog number for a combiner configuration that matches your specific project requirement.

BASE SOLAR COMBINER		WITH OPTIONAL FACTORY SUPPLIED FUSES	W/OPTIONAL SURGE PROTECTION	DC MONITORING	VOLTAGE
CCBF	12	F15	SP	DCM	
Enclosure Type	**Number of Input Circuits**	**Fuse Amperage****	**Surge Protection**	**DC Monitoring**	**Voltage**
CCBF (Fiberglass N4X) **CCBS** (Painted Steel N3R) **CCBSS** (Stainless Steel N4X) **CCB4S** (Powder Coated Steel N4)	**01** (1 input circuit) **02** (2 input circuit) **03** (3 input circuit) **04** (4 input circuit) **05** (5 input circuit) **06** (6 input circuit) (Offered up to 48 circuits*)	**F08** (8A fuse) **F10** (10A fuse) **F12** (12A fuse) **F15** (15A fuse) (Offered up to 30A) **BLANK** (Fuses not provided by factory) • Eaton's Bussmann fuses recommended - PVM fuses for 600 VDC combiner boxes - PV fuses for 1000 VDC combiner boxes	**SP** (Surge Protection) • 30kA/600 VDC Interrupting Rating or 30kA/1000 VDC • IP20 finger-safe construction • Small size takes up minimal space in enclosure (only 2 inches wide) **BLANK** (No surge protection)	**DCM** Pre-installed DC current monitoring unit **BLANK** (No DC current monitoring)	**1000V** (1000V) **BLANK** (600V)

*Combiners with 37-48 input circuits are not third party certified, but are constructed to UL 1741 standards.
**Negative fused configurations available for positive grounded arrays. Replace F15 with NF15 in the catalog number.
‡Suitable for vertical mounting applications only.

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Solar Combiner Boxes with Integral DC Disconnect Switches

cETLus 1741 Listed
cETLus Listed to CSA Standard C22.2 No. 31 & No. 107.1
NEMA 4X (fiberglass and stainless steel)
NEMA 4 (powder coated steel)
NEMA 3R (painted steel)

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Application:

Eaton's Crouse-Hinds Solar Combiners with Integral DC Disconnect Switches provide all the strong and durable features of our standard Solar Combiner and are available with 1-48 input circuits*, save material costs, installation time, and labor by joining the combiner box and disconnect within one enclosure and eliminating the need for a disconnect switch in a separate enclosure. ETL Listed to UL 1741 standards*, providing peace of mind and plenty of wiring room for ease of installation.

Features:

- Rated for 600 VDC or 1000 VDC - continuous duty
- Integral Disconnects available in 100A, 250A, 400A, and 600A†
- Touch-Safe fuse holders
- Lexan shield covers all live components
- 90ºC output terminals
- Configured for positive and negative grounded arrays**

Standard Materials and Finishes:

Fiberglass Enclosure:

- Hot compression molded fiberglass-reinforced thermoset polyester
- Non-conductive, impact-resistant, UV resistant, flame retardant
- Poured polyurethane seamless gasket provides watertight, dust-tight environmental seal
- Stainless steel used on all external hardware

Integral Disconnect Rating:

To determine the rating of the integral disconnect, simply multiply the number of input circuits by the max. current per string, and then round to the next (higher) disconnect size. In NO case can the maximum current exceed the amperage rating. Disconnect switches are rated for 100% continuous duty. Example: A 12 string combiner box with max. current of 12A per string x 12 strings = 144A, which equals the minimum rating for a switch of 250A.

Certifications and Compliances:

- cETLus 1741 Listed
- cETLus Listed to CSA Standard C22.2 No. 31 & No. 107.1
- NEMA 4X (fiberglass and stainless steel)
- NEMA 4 (powder coated steel)
- NEMA 3R (painted steel)

Options:

- Fuses (shipped uninstalled)
- Surge protection
- NEMA 4X stainless steel
- NEMA 4 powder coated steel
- NEMA 3R painted steel‡
- Solar cable whips (pre-assembled and installed)
- Compression output lugs
- Factory installed breather drain and desiccant
- Bipolar construction (to 1000 VDC combined voltage)
- Smart combiners available (DC string monitoring)
- Factory drilled entrance holes
- Factory installed conduit fittings/cable glands
- Dual output lugs
- Lockable enclosures
- Integral power supply, terminal blocks
- Custom options available - consult factory

CATALOG NUMBERING SYSTEM

Use the table below to build a catalog number for a combiner configuration that matches your specific project requirement.

BASE SOLAR COMBINER		WITH OPTIONAL FACTORY SUPPLIED FUSES	WITH OPTIONAL INTEGRAL DISCONNECT	W/OPTIONAL SURGE PROTECTION	DC MONITORING	VOLTAGE
CCBF	12	F15	DS250	SP	DCM	
Enclosure Type	**Number of Input Circuits**	**Fuse Amperage****	**Rating for Integral Disconnect**	**Surge Protection**	**DC Monitoring**	**Voltage**
CCBF (Fiberglass N4X) **CCBS** (Painted Steel N3R) **CCBSS** (Stainless Steel N4X) **CCB4S** (Powder Coated Steel N4)	**01** (1 input circuit) **02** (2 input circuit) **03** (3 input circuit) **04** (4 input circuit) **05** (5 input circuit) **06** (6 input circuit) (Offered up to 48 circuits*)	**F08** (8A fuse) **F10** (10A fuse) **F12** (12A fuse) **F15** (15A fuse) (Offered up to 30A) **BLANK** (Fuses not provided by factory) • Eaton's Bussmann fuses recommended - PVM fuses for 600 VDC combiner boxes - PV fuses for 1000 VDC combiner boxes	**DS** (Disconnect Switch for use with 1-48* input circuits) **DS100** (100A-Standard on combiners up to 6 circuits) **DS250** (250A-Standard on combiners from 6 to 24 circuits) **DS400** (400A-Available on combiners of 25 circuits and higher) **DS600** (600A-Consult Factory) **BLANK** (No integral disconnect)	**SP** (Surge Protection) • 30kA/600 VDC Interrupting Rating or 30kA/1000 VDC • IP20 finger-safe construction • Small size takes up minimal space in enclosure (only 2 inches wide) **BLANK** (No surge protection)	**DCM** Pre-installed DC current monitoring unit **BLANK** (No DC current monitoring)	**1000V** (1000V) **BLANK** (600V)

*Combiners with 37-48 input circuits are not third party certified, but are constructed to UL 1741 standards.
**Negative fused configurations available for positive grounded arrays. Replace F15 with NF15 in the catalog number.
†UL98B Listed Disconnect Switch 1000V.
‡Suitable for vertical mounting applications only.

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Compact (SL Series) Solar Combiners

Applications:

Eaton's Crouse-Hinds Compact Solar Combiner Boxes are designed and built to provide long, dependable service in a low-profile space-saving design. Compact combiners are third-party listed to UL1741 to provide long, dependable service and peace of mind. They are available from factory stock in either four or six circuits with or without fuses to meet tight job delivery requirements. Engineered, manufactured, and listed NEMA 4X, they can be mounted either vertically or horizontally and are designed to perform in the harshest environmental conditions. They are the ideal compact solution for commercial rooftop installations with tight space and NEMA 4X requirements offering maximum performance in a smaller physical footprint.

Features:

- Available in either 4 or 6 input circuit models to match the most common customer requirements for a compact combiner
- Continuous duty rated at 600 VDC
- NEMA 4X fiberglass 8 x 8 x 6 enclosures with captive stainless steel screws and formed-in-place polyurethane seamless gasket provided as standard
- Third-party certified to UL1741 and CSA Standard C22.2 No. 107.1
- Touch-Safe fuse holders and power distribution blocks for safe operation
- 90ºC output terminals
- Configured for positive and negative grounded arrays*
- Ground blocks included
- External mounting feet included for quick, easy installation
- Rated for continuous operation at 50°C
- 15A max. fuse size
- Eaton's Bussmann UL2579 fast-acting 600 VDC Midget fuses provided as standard with fused models

*Negative fused configurations available for positive grounded arrays. Replace F15 with NF15 in the catalog number.

Technical Specifications:

- 600 VDC
- 15A Max. Fuse Size (A)
- 9.6A Max. PV Module Short Circuit Current
- 50°C Ambient
- #14-#8 Input Conductors
- #2 AWG Output Conductors
- Dimensions (in.) 08 x 08 x 06
- NEMA 4X
- Suitable for vertical or horizontal mounting

Certifications and Compliances:

- cETLus 1741 Listed
- CSA Standard C22.2 No. 107.1
- NEMA 4X

Standard Materials and Finishes:

- Hot compression molded fiberglass-reinforced thermoset polyester
- Non-conductive, impact-resistant, UV resistant, flame retardant
- Poured polyurethane seamless gasket provides watertight, dust-tight environmental seal
- Stainless steel used on all external hardware

Ordering Information:

Cat. #	Number of Strings	Max Current (A)	Description
CCBF04SL	4	48	4 string compact combiner, N4X Fiberglass
CCBF04SL F15	4	48	4 string compact combiner, N4X Fiberglass, 15A Fuse
CCBF06SL	6	72	6 string compact combiner, N4X Fiberglass
CCBF06SL F15	6	72	6 string compact combiner, N4X Fiberglass, 15A Fuse

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Solar Recombiners

cETLus 1741 Listed
cETLus Listed to CSA Standard C22.2 No. 31 & No. 107.1
NEMA 4X (fiberglass and stainless steel)
NEMA 4 (powder coated steel)
NEMA 3R (painted steel)

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Application:

In large photovoltaic (PV) systems, multiple combiner boxes are often necessary, and the outputs of these combiner boxes may need to be combined again—recombined—before reaching a central inverter. Eaton's Crouse-Hinds Recombiner Boxes allow for ease of installation, saving time, labor, and most importantly, system costs. Solar Recombiners range from 2 to 12 input circuits, with a durable non-metallic (NEMA 4X) or metallic (NEMA 3R) painted steel enclosure.

Features:

- Rated for 600 VDC or 1000 VDC - continuous duty
- 2-12 input circuits with configurations up to 1200A
- Installed fuses included
- Lexan shield covers all live components
- 90ºC output terminals
- Configured for positive and negative grounded arrays
- Busbar design

Certifications and Compliances:

- cETLus 1741 Listed
- cETLus Listed to CSA Standard C22.2 No. 31 & No. 107.1
- NEMA 4X (fiberglass and stainless steel)
- NEMA 4 (powder coated steel)
- NEMA 3R (painted steel)

Options:

- NEMA 3R painted steel‡
- NEMA 4X fiberglass
- NEMA 4X stainless steel
- NEMA 4 powder coated steel
- Surge protection
- Smart recombiners available (DC string monitoring)
- Factory drilled entrance holes
- Factory installed conduit fittings
- Bipolar construction
- Factory installed breather drain and desiccant
- Integral power supply, flex I/O, terminal blocks
- Integral disconnects available in 100A, 250A, 400A, and 600A† - consult factory
- Custom options available - consult factory

CATALOG NUMBERING SYSTEM

Use the table below to build a catalog number for a recombiner configuration that matches your specific project requirement.

BASE SOLAR RECOMBINER		WITH OPTIONAL FACTORY SUPPLIED FUSES	WITH OPTIONAL SURGE PROTECTION	DC MONITORING	VOLTAGE
CRBF	02	F100			1000V
Enclosure Type	**Number of Input Circuits**	**Fuse Amperage**	**Surge Protection**	**DC Monitoring**	**Voltage**
CRBF (Fiberglass N4X) **CRBS** (Painted Steel N3R) **CRBSS** (Stainless Steel N4X) **CRB4S** (Powder Coated Steel N4)	**02** (2 input circuit) **03** (3 input circuit) **04** (4 input circuit) (Offered up to 12 circuits) Consult factory for available configurations greater than 4 input circuits (up to 12 circuits available)	**F60** (60A fuse) **F75** (75A fuse) **F100** (100A fuse) **F125** (125A fuse) **F150** (150A fuse) **F175** (175A fuse) **F200** (200A fuse) **F225** (250A fuse) **F250** (250A fuse) **F275** (250A fuse) **F300** (300A fuse) **F325** (300A fuse) **F350** (350A fuse) **F375** (350A fuse) **F400** (400A fuse) Consult factory for additional fuse size options • Eaton's Bussmann fuses recommended	**SP** (Surge Protection) • 30kA/600 VDC interrupting rating or 30kA/1000 VDC • IP20 finger-safe construction • Small size takes up minimal space in enclosure (only 2 inches wide) **BLANK** (No surge protection)	**DCM** Pre-installed DC current monitoring units **BLANK** (No DC current monitoring)	**1000V** (1000V) **BLANK** (600V)

†UL98B Listed Disconnect Switch 1000V.
‡Suitable for vertical mounting applications only.

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Disconnect Boxes

Application:

Eaton's Crouse-Hinds Solar Disconnect Enclosures are used as a disconnecting means prior to the inverter and rated for either 600 or 1000 VDC applications. Disconnect Enclosures range from 1 to 12 input circuits, with a wide range of disconnect sizes, configurations, and enclosure options for maximum customer flexibility.

Features:

- Rated for 600 VDC or 1000 VDC - continuous duty
- 1-12 input circuits
- 90ºC output terminals
- Includes Touch-Safe protective cover
- Configured for positive and negative grounded arrays

Certifications and Compliances:

- cETLus 1741 Listed
- cETLus Listed to CSA Standard C22.2 No. 31 & No. 107.1
- NEMA 4X (fiberglass and stainless steel)
- NEMA 4 (powder coated steel)
- NEMA 3R (painted steel)

Options:

- NEMA 3R painted steel‡
- NEMA 4X fiberglass
- NEMA 4X stainless steel
- NEMA 4 powder coated steel
- Factory drilled entrance holes
- Factory installed conduit fittings
- Smart boxes available (DC string monitoring) - consult factory
- Integral power supply, flex I/O, terminal blocks
- Integral disconnects available in 100A, 250A, 400A, and 600A
- Multiple disconnect options available - consult factory

CATALOG NUMBERING SYSTEM

Use the table below to build a catalog number for a disconnect box configuration that matches your specific project requirement.

BASE SOLAR DISCONNECT		NUMBER OF FUSES (OPTIONAL)	FUSE AMPERAGE (OPTIONAL)	DISCONNECTS	INTEGRAL DISCONNECT	SURGE PROTECTION	VOLTAGE
CDBS	04			4	DS250		1000V
Enclosure Type	**Number of Input Circuit**	**Fuses**	**Fuse Amperage**	**Number of Disconnects**	**Rating for Integral Disconnect**	**Surge Protection**	**Voltage**
CDBF (Fiberglass N4X) **CDBS** (Painted Steel N3R) **CDBSS** (Stainless Steel N4X) **CDB4S** (Powder Coated Steel N4)	**01** (1 input circuit) **02** (2 input circuit) **03** (3 input circuit) **04** (4 input circuit) **05** (5 input circuit) **06** (6 input circuit) (Offered up to 12 circuits*)	**1** (1 fuse) **2** (2 fuse) **3** (3 fuse) **4** (4 fuse) **5** (5 fuse) **6** (6 fuse) (Offered up to 12 fuses*)	**BLANK** (non-fused) **F100** (100A fuse) **F125** (125A fuse) **F150** (150A fuse) **F175** (175A fuse) **F200** (200A fuse) **F225** (250A fuse) **F250** (250A fuse) **F275** (250A fuse) **F300** (300A fuse) **F325** (300A fuse) **F350** (350A fuse) **F375** (350A fuse) **F400** (400A fuse) (Offered up to 400A fuses*)	**BLANK** (1 disconnect switch) **2** (2 disconnects switches) **3** (3 disconnects switches) **4** (4 disconnects switches) (Up to 12 disconnects allowed)	**DS** (Disconnect switch for use with 1 - 12* input circuits) **DS100** (100A) **DS250** (250A) **DS400** (400A) **DS600** (600A)	**SP** (Surge protection) **BLANK** (No surge protection)	**1000V** (1000V) **BLANK** (600V)

*For additional disconnect sizes and fuse requirements in the same enclosure, repeat number of fuses through integral disconnect selection steps.
‡Suitable for vertical mounting applications only.

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Solar Cable Assemblies

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Applications:

A comprehensive offering of solar cable assemblies are available utilizing all of the standard connector types including MC4, H4, SolarLok, and Gesis. Configurations are structured to utilize photovoltaic wire listed to UL4703 and USE-2 requirement. Conductor sizes of 8 AWG, 10 AWG, and 12 AWG are available dependent on system requirements. Each harness is produced to customer specific requirements. Options include in-line fusing, custom I.D. marking, bundling, spooling, color markers, and custom lengths.

Homerun Assemblies:

Sunnector Homerun Harnesses are designed for high current connection and power delivery to combiner boxes, sub-combiners, or inverters used with mono-crystalline and poly-crystalline modules. Fully tested pre-engineered Sunnector Homerun Harnesses arrive terminated, bundled, and spooled, replacing on-site long wire runs, bundling, attachment, and connector termination.

Parallel Array Assemblies:

Sunnector Parallel Circuit Array Harness Assemblies feature a proprietary junction system that allows multiple arrays to be connected in parallel, providing labor savings and improving connection quality by eliminating multiple adapters and double terminations.

Parallel Circuit Harnesses are ideal for Thin Film type modules, where low current can be electrically paralleled to optimize, but can be utilized for crystalline modules when system current ratings are met.

- Ideal for installations where modules are electrically paralleled with multiple arrays integrating to one combiner box or inverter
- The X-Mold junction conveniently merges module arrays while allowing multiple connection points on each leg
- Harnesses made with T-Mold junctions provide a quick and easy way to connect module arrays to a combiner box

*MC4 is a trademark of Multi-Contact. H4 is a trademark of Amphenol. SolarLok is a trademark of Tyco Electronics. Gesis is a trademark of Wieland, Inc.

Certifications and Compliances:

Connectors:

- UL Certified to UL6703 and UL1703
- TUV Certified
- IP67 or IP68 rated

Wire/Cable:

- UL Certified to UL4703/UL854
- Available in standard or custom cable lengths, with or without an in-line fuse

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Solar Pass Through Boxes

Applications:

Eaton's Crouse-Hinds Solar Pass Through Boxes (sometimes referred to as “transition boxes”) are used in residential applications to provide a low profile, cost-effective way to group input wires/circuits from several arrays and/or solar panels and transition from solar (PV) cable to regular building wire. The Pass Through Box was designed for PV applications where overcurrent protection is not necessary due to the low power rating of the PV string.

Features:

- Rated 600 VDC continuous duty
- Constructed in accordance with UL1741 standards, providing spacious wiring room for quick, easy wire termination
- Factory installed multi-hole solar cord grip provides dependable, secure wire termination to enclosure and saves field installation – eliminating the need for enclosure drilling – saving time and labor
- Fiberglass enclosures with captive stainless steel screws and formed-in-place polyurethane seamless gasket provided as standard
- Available in N3R sheet steel enclosures – consult factory
- Lightweight design offers easy mounting capabilities; optional mounting feet are available for increased customer flexibility
- Rated for continuous operation at 60°C

Certifications and Compliances:

- cETLus 1741 Listed
- cETLus 1741 Listed to CSA Standard C22.2 No. 31 & No. 107.1
- NEMA 4X

Standard Materials and Finishes:

- Hot compression molded fiberglass-reinforced thermoset polyester
- Non-conductive, impact-resistant, UV-resistant, flame retardant
- Poured polyurethane seamless gasket provides water-tight, dust-tight environmental seal
- Stainless steel used on all external hardware

Ordering Information:

Cat. #	Description
CPBF03	3 Circuit Pass Through Box
CPBF04	4 Circuit Pass Through Box
CPBF05	5 Circuit Pass Through Box
CPBF06	6 Circuit Pass Through Box
CPBF07	7 Circuit Pass Through Box
CPBF08	8 Circuit Pass Through Box
CPBF09	9 Circuit Pass Through Box
CPBF10	10 Circuit Pass Through Box
CPBF11	11 Circuit Pass Through Box
CPBF12	12 Circuit Pass Through Box
CPBF13	13 Circuit Pass Through Box
CPBF14	14 Circuit Pass Through Box
CPBF15	15 Circuit Pass Through Box
CPBF16	16 Circuit Pass Through Box
CPBF17	17 Circuit Pass Through Box
CPBF18	18 Circuit Pass Through Box
CPBF19	19 Circuit Pass Through Box

Cat. #	Description
CPBF20	20 Circuit Pass Through Box
CPBF21	21 Circuit Pass Through Box
CPBF22	22 Circuit Pass Through Box
CPBF23	23 Circuit Pass Through Box
CPBF24	24 Circuit Pass Through Box
CPBF25	25 Circuit Pass Through Box
CPBF26	26 Circuit Pass Through Box
CPBF27	27 Circuit Pass Through Box
CPBF28	28 Circuit Pass Through Box
CPBF29	29 Circuit Pass Through Box
CPBF30	30 Circuit Pass Through Box
CPBF31	31 Circuit Pass Through Box
CPBF32	32 Circuit Pass Through Box
CPBF33	33 Circuit Pass Through Box
CPBF34	34 Circuit Pass Through Box
CPBF35	35 Circuit Pass Through Box
CPBF36	36 Circuit Pass Through Box

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Solar Accessories

Cable Tie and Cable Clip Applications:

Eaton's Crouse-Hinds Solar Cable Clips and Ties provide cable management options for bundling and harnessing PV solar wire anywhere between the panels to the inverter.

Cable Tie Features:

- Equipped with a UV protected vinyl jacket which prevents damage to installation cable insulation and ensures durability
- Tin plated with a copper crimp sleeve which allows for easy field installation
- Constructed from commercial aircraft grade stainless wire for long, dependable service

Standard Materials and Finishes:

- UV resistant vinyl jacketing, tin plated copper crimp sleeve, commercial aircraft grade stainless wire

Cable Tie Ordering Information:

		Part Specification			Part Dimensions			
		Min. Tensile Strength		Max. Bundle Dia.	Length	Cable Dia.		
Cat. #	Description	Lbs.	N	in.	in.	in.	Unit Qty	Wt. Lbs. Per 100
SCBLTIE8	Solar Cable Tie 8"	100	440	2.3	8	0.06	100	1
SCBLTIE10	Solar Cable Tie 10"			2.92	10		100	1
SCBLTIE12	Solar Cable Tie 12"			3.88	12		100	1
SCBLTIE14	Solar Cable Tie 14"			4.2	14		100	1

Cable Clip Features:

- Manufactured out of corrosion-resistant 304 stainless steel
- Double compression design which can accommodate (2) 12 gauge USE-2 wire or (2) 10 gauge PV-1000 wires
- Smooth clip edges which prevent damage to cable insulation
- Screwdriver designed slot which allows for easy removal or movement of the clip when necessary

Standard Materials:

- Corrosion-resistant 304 stainless steel

Cable Clip Ordering Information:

		Panel Thickness Clamping Range						
		Minimum	Maximum	Wire Dia. Range	Foot Print	Overall Height		
Cat. #	Description	in.	in.	Max. (2) Wires	in.	in.	Unit Qty	Wt. Lbs. Per 100
SCLP1	Solar PV Cable Clip	0.06	0.125	.20" (5.0 mm) - .30" (7.6 mm) each cable	1	0.39	100	1

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Cord And Cable Connectors

Solar Non-Metallic Cord Grips

Applications:

Eaton's Crouse-Hinds Solar Cord Grips are used in both commercial and residential grid-tied PV solar applications and are designed to accommodate the entry of multiple PV wires coming into a combiner or pass through box. The Solar Cord Grips provide mechanical strain relief as well as a liquidtight seal around the solar panel wires.

Photo shown with steel locknut
(locknuts must be ordered separately)

Features:

- Multi-hole cord grip to allow for entry of multiple PV wires
- Solar cord grips offer customer flexibility by allowing the termination from 1 to 31 PV wires in a single connector
- Skinned over glands provide a durable, liquidtight seal around the wires
- No disassembly required for installation
- 5MM offering accommodates USE-2, 12AWG, and 10AWG wire
- 7MM offering accommodates 1000V PV cable, 12AWG, and 10AWG wire
- Temperature rating: -22°F (-30°C) to 212°F (100°C) to meet the most demanding environmental conditions

Certifications and Compliances:

- UL/cUL Listed
- IP68
- Flammability rating: 94-V2

Standard Materials:

- 6/6 nylon with TPE/Buna N sealing glands

Ordering Information:

Cat. #	Trade Size	No. of Holes	Hole Cable Diam.	Wire Type	Size
NCGS25*	3/4"	5 Holes	5MM	USE-2	12AWG, 10AWG
NCGS237	3/4"	3 Holes	7MM	1000V PV Cable	12AWG, 10AWG
NCGS39*	1"	9 Holes	5MM	USE-2	12AWG, 10AWG
NCGS357	1"	5 Holes	7MM	1000V PV Cable	12AWG, 10AWG
NCGS413*	1 1/4"	13 Holes	5MM	USE-2	12AWG, 10AWG
NCGS497	1 1/4"	9 Holes	7MM	1000V PV Cable	12AWG, 10AWG
NCGS631*	2"	31 Holes	5MM	USE-2	12AWG, 10AWG
NCGS6197	2"	19 Holes	7MM	1000V PV Cable	12AWG, 10AWG

*UL recognized, but not listed. Consult factory for additional information.

Locknut Ordering Information:

Material	Cat. #	Trade Size
Steel	**12**	3/4"
	13	1"
	14	1 1/4"
	16	2"
Aluminum	**12 SA**	3/4"
	13 SA	1"
	14 SA	1 1/4"
	16 SA	2"
Non-metallic	**12N**	3/4"
	13N	1"
Zinc	**12DC**	3/4"
	13DC	1"
	14DC	1 1/4"
	16DC	2"

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Solar Lay-In Grounding Lug

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Applications:

Solar Lay-In Grounding Lugs are the ideal choice for the quick installation of one continuous grounding conductor or as a jumper to multiple locations. Just unscrew the set screw, lay in the cable, and re-tighten, making it easy to retrofit or repair.

Features:

- Tin plated copper for additional corrosion resistance
- For use with #4-14 cable
- Stainless steel slotted screw
- Suitable for direct burial and outdoor use
- Ideal for continuous grounding of solar PV panels
- Suitable for use with copper conductors only, solid or stranded

Standard Materials and Finishes:

- Body - copper, tin plated
- Screw - stainless steel, natural

Certifications and Compliances:

- cULus Listed
- UL File No. E-6225

Ordering Information:

Cat. #	Description	Cable	Unit Qty.	Wt. Lbs. Per 100
SLL414T	Solar Grounding Lug	#4-14	100	5

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Combiner Technical Information:

Solar Combiner CCB Series Technical Information

Standard Design:			Tech Spec									Mechanical Spec*	
1.0 CCB Series		Description	Voltage†	Max Current	Max Fuse Size	Max PV Module Short Circuit Current*	Ambient	Input Conductors (Cu Only)		Output Conductors (Cu/Al)‡		Dimensions	NEMA Rating
			(VDC)	(A)	(A)	(A)	(°C)	Wire Gauge	Torque (in-lbs)	Wire Gauge	Torque (in-lbs)	(in)	Type
1.1	CCB_06	6 String Combiner Box (01-06 Strings)	600/1000	99	30	13.2/ 8.8	50	#14-#8	25	250MCM	250	16 x 14 x 06	4X/ 4/ 3R
1.2	CCB_12	12 String Combiner Box (07-12 Strings)	600/1000	198	30	13.2/ 8.8	50	#12-#8	25	250MCM	250	16 x 14 x 06	4X/ 4/ 3R
1.7	CCB_18	18 String Combiner Box (13-18 Strings)	600/1000	231	30	8.8/ 8.8	50	#12-#8	25	350MCM	250	18 x 16 x 08	4X/ 4/ 3R
1.3	CCB_24	24 String Combiner Box (13-24 Strings)	600/1000	264	30	8.8/ 8.8	50	#12-#8	25	350MCM	250	20 x 16 x 08	4X/ 4/ 3R
1.4	CCB_36	36 String Combiner Box (25-36 Strings)	600/1000	342	30	7.6/ 6.4	50	#10-#8	25	(2) 600MCM	250	30 x 24 x 07	4X/ 4/ 3R
1.5	CCB_06 DS	6 String Combiner Box w/ Integral Disconnect Switch (01-06 Strings)	600/1000	100	30	13.2/ 8.8	50	#14-#8	25	250MCM	250	18 x 16 x 08	4X/ 4/ 3R
1.6	CCB_12 DS	12 String Combiner Box w/ Integral Disconnect Switch (07-12 Strings)	600/1000	200	30	13.2/ 8.8	50	#12-#8	25	250MCM	250	18 x 16 x 08	4X/ 4/ 3R
1.7	CCB_18 DS	18 String Combiner Box w/ Integral Disconnect Switch (13-18 Strings)	600/1000	225	30	8.8/ 8.8	50	#12-#8	25	350MCM	250	20 x 16 x 08	4X/ 4/ 3R
1.7	CCB_24 DS	24 String Combiner Box w/ Integral Disconnect Switch (13-24 Strings)	600/1000	250	30	8.8/ 8.8	50	#12-#8	25	350MCM	250	24 x 20 x 08	4X/ 4/ 3R
1.8	CCB_36 DS	36 String Combiner Box w/ Integral Disconnect Switch (25-36 Strings)	600/1000	400	30	7.6/ 6.4	50	#10-#8	25	(2) 600MCM	250	36 x 30 x 08	4X/ 4/ 3R
1.9	CCB_04 SL	4 String Small Line Combiner Box (01-04 Strings)	600	48	15	9.6	50	#14-#8	25	#2 AWG	250	08 x 08 x 06	4X/ 4/ 3R

Solar Recombiner CRB Series Technical Information

Standard Design:			Tech Spec									Mechanical Spec*	
2.0 CRB Series		Description	Voltage†	Max Current	Max Fuse Size	Max PV Module Short Circuit Current	Ambient	Input Conductors (Cu/Al)		Output Conductors (Cu/Al)‡		Dimensions	NEMA Rating
			(VDC)	(A)	(A)	(A)	(°C)	Wire Gauge (Cu/Al)	Torque (in-lbs)	Wire Gauge	Torque (in-lbs)	(in)	Type
2.1	CRB_03	3 Array Recombiner Box (01 - 03 Strings)	600/1000	1200	400	256.4	50	#4 - 500MCM	450	#2 - (2)600MCM	150-450	48 x 36 x 12	4X/ 4/ 3R
2.2	CRB_06	6 Array Recombiner Box (01 - 06 Strings)	600/1000	1200	200	128.2	50	#6 - 250MCM	275-375	#2 - (2)600MCM	150-450	48 x 36 x 12	4X/ 4/ 3R
2.3	CRB_12	12 Array Recombiner Box (01 - 12 Strings)	600/1000	1200	100	64.1	50	1/0 - 8	100	#2 - (2)600MCM	150-450	48 x 36 x 12	4X/ 4/ 3R
2.4	CRB_03 DS	3 Array Recombiner Box w/ Integral Disconnect Switch (01 - 03 Strings)	600/1000	1200	400	256.4	50	#4 - 500MCM	450	#2 - (2)600MCM	150-450	60 x 36 x 12	4X/ 4/ 3R
2.5	CRB_06 2DS	6 Array Recombiner Box w/ Integral Disconnect Switch (04 - 06 Strings)	600/1000	1200	200	128.2	50	#6 - 250MCM	275-375	#2 - (2)600MCM	150-450	60 x 36 x 12	4X/ 4/ 3R
2.6	CRB_12 2DS	12 Array Recombiner Box w/ Integral Disconnect Switch (07 - 12 Strings)	600/1000	1200	100	64.1	50	1/0 - 8	100	#2 - (2)600MCM	150-450	60 x 36 x 12	4X/ 4/ 3R

* For Fiberglass Only, Consult Factory for additional information
† Dual ratings indicate 600V Rating Followed by 1000V Rating.
Consult Factory for special ouput conductor requirements. CSA for 600VDC only.

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Combiner Technical Information:

Overcurrent Protection - PV Fuse-Links

	Energy Inegrals (A2s)		Power Loss (watts)	
Current Rating	Pre-Arcing	Total at 1000V	0.8 In.	In.
8A	3	32	0.5	2.0
10A	7	50	0.6	2.1
12A	10	100	1.3	2.6
15A	20	200	1.8	3.0

Solar Combiner Fiberglass Enclosure Dimensional Information

Enclosure Cat. #	Enclosure Size	Overall Dimensions Inches (HxWxD)	Inside Dimensions Inches (HxWxD)	Mounting Dimensions Inches (HxWxD)	Approximate Weight (lbs.)
FJHP161406	16x14x06	17.53x15.46x6.23	15.63x13.60x5.94	16.75x12.00	12 LBS
FJHP201608	20x16x08	22.00x17.68x8.83	19.72x15.72x8.45	21.25x10.00	20 LBS
F4WMSHL242008	24x20x08	27.00x21.24x9.90	24.05x20.39x9.25	25.75x14.00	31 LBS
F4WMSHL302407	30x24x07	33.41x26.32x8.81	30.46x25.47x7.12	32.25x18.50	45 LBS
F4WMSHL363008	36x30x08	39.31x32.50x10.05	36.31x31.69x9.36	38.13x23.88	58 LBS

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