

Solar Power Product Solutions

SOLUTIONS GUIDE

Comprehensive photovoltaic protection



merseN

SOLAR POWER MERSEN KEEPS IT SAFE & RELIABLE

A global leader with a century of experience, Mersen brings expertise and innovation to your company



Protect your solar power investment by using electrical components specifically designed for PV applications

Generating electricity from solar energy is an extremely reliable process – as long as it's properly protected! Mersen offers a trusted range of electrical protection solutions that help protect your solar power investment including fuses, fuseholders, heatsinks, wire management, disconnect switches, laminated bus bar, and surge protective devices.

With a dedicated range of products to disconnect, clip and isolate, Mersen is doing whatever it takes to shield the wiring between strings and protect system components. Thanks to our newly developed, innovative HelioProtection® product line, faulty circuits are safely isolated and system longevity and reliability are increased allowing for continuous generation of clean and efficient power.

Drawing on over a century of experience – and an ongoing commitment to critical research in electrical safety in both traditional and emerging markets – Mersen provides solar power designers, integrators, specifying engineering firms, solar power installers and solar power equipment manufacturers with innovative electrical protection products and unmatched technical support. For solar power circuit protection solutions you can rely on, contact Mersen at info.nby@mersen.com or 978.462.6662.



About Mersen's HelioProtection® Brand

The word helio, meaning sun, was derived from Greek mythology and the sun god, Helios. When combined with the safety and reliability of Mersen's electrical protection solutions, HelioProtection defines our commitment to the solar industry. Mersen's HelioProtection brand promises expertise in solar power applications and a premium offering designed for the PV industry.

Products marked with the HelioProtection brand name have been tested and certified to the latest industry standards for use in photovoltaic applications and guarantee the level of performance required by the PV industry. Not only is Mersen the industry benchmark when it comes to standards compliance, we voluntarily subject our products to strict quality monitoring backed by extensive electrical, mechanical and climatic tests.

Mersen is the PV Industry Benchmark

- 1st to market with UL 2579 Listed product
- Helped drive the new safety standard
- The only manufacturer serving the PV market with overcurrent, surge protection, laminated bus bar, and cooling solutions



HelioProtection® Brand Promise

- Expertise in solar power applications
- Premium offering for the PV industry
- Delivering safety & reliability

Photovoltaic Fuses



Photovoltaic Fuseholders



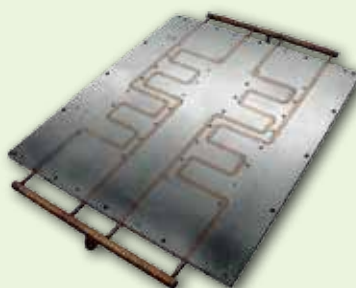
Surge Protective Devices



PV Safety Solutions



Power Electronics Solutions



Wire Management



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Codes & Standards for PV Applications



National Electrical Code® (NEC)

- **1 to 3 strings of modules: no fuse needed:** In this kind of system, the fault current is barely higher than operating current. Properly sizing the wiring between the strings of panels to withstand the maximum fault current is enough to avoid any fire hazard.
- **Installation with at least 4 strings of modules:** In this configuration the fault current can reach a level capable of heating and damaging the insulators. For this type of installation, ungrounded systems must be fused for both polarities, positive and negative, grounded systems only require fusing of the positive conductors.
- **Sizing Fuses per the National Electrical Code (Article 690.8):** As defined in Article 690.8, two multiplication factors must be applied when sizing overcurrent devices for photovoltaic application, the maximum PV source circuit current and the overcurrent device loading factor. The maximum photovoltaic source circuit current is equal to the module rated short circuit current (I_{sc}) multiplied by 125 percent. When determining the sizing of overcurrent device ampacity, the device shall be sized to carry not less than 125 percent the maximum current. Module I_{sc} ratings are required by code to be listed on the PV module nameplate. Typical I_{sc} ratings are 110-125% of the maximum power point current (I_{mpp}) value of the PV module.

$$\text{Nominal Fuse Rating} = I_{sc} (\text{Module Short Circuit Current}) \times 1.25 (\text{Max Current Multiplier}) \times 1.25 (\text{Overcurrent Device Sizing Multiplier})$$

↓

$$\text{Nominal Fuse Rating} = I_{sc} \times 1.56$$

If the calculated nominal fuse rating value is not available it is allowed to go to the next highest available fuse current rating.

Canadian Electrical Code (CEC)

Section 50 of the Canadian Electrical Code outlines the requirements for solar photovoltaic systems. Within Section 50 there are references to Section 14; specifically, to Rules 14-414 Connection to different circuits; 14-700 Restriction of use; 14-200, Fuses; and 14-300, Circuit Breakers. Within Section 50, Rule 50-020 also refers to Section 84, Interconnection of electric power production sources, where the grounding and bonding requirements may be found. Ultimately, NEC Article 690 should be used when determining requirements for PV systems (while supplementing with information from CEC Section 50 for Canadian applications).

Underwriters Laboratories (UL)

UL 2579 – Fuses for Photovoltaic Systems is a product standard written specifically for fuses intended to be used for photovoltaic circuit protection. Unlike UL standard 248, “Low Voltage Fuses”, fuses listed to UL standard 2579 are subject to additional testing, simulating the service environment conditions of photovoltaic installations. Additional testing includes, (1) Verification of Freedom from Unacceptable Levels of Thermally Induced Drift, (2) Verification of Functionality at Temperature Extremes and (3) Current Cycling. For more information regarding UL standard 2579 visit Mersen at ep-us.mersen.com > Resources > Articles and White Papers.

UL 4248-18 – Photovoltaic Fuseholders applies to fuseholders rated up to 1500VDC, intended for use with Photovoltaic Fuses as described in the Outline of Investigation for Fuses for Photovoltaic Systems, Subject 2579.

UL 98B – Enclosed and Dead-Front Switches for use in Photovoltaic Systems covers enclosed and dead-front switches rated up to 1000VDC, intended for use in DC photovoltaic (PV) systems and installed in accordance with Article 690 of the National Electrical Code.

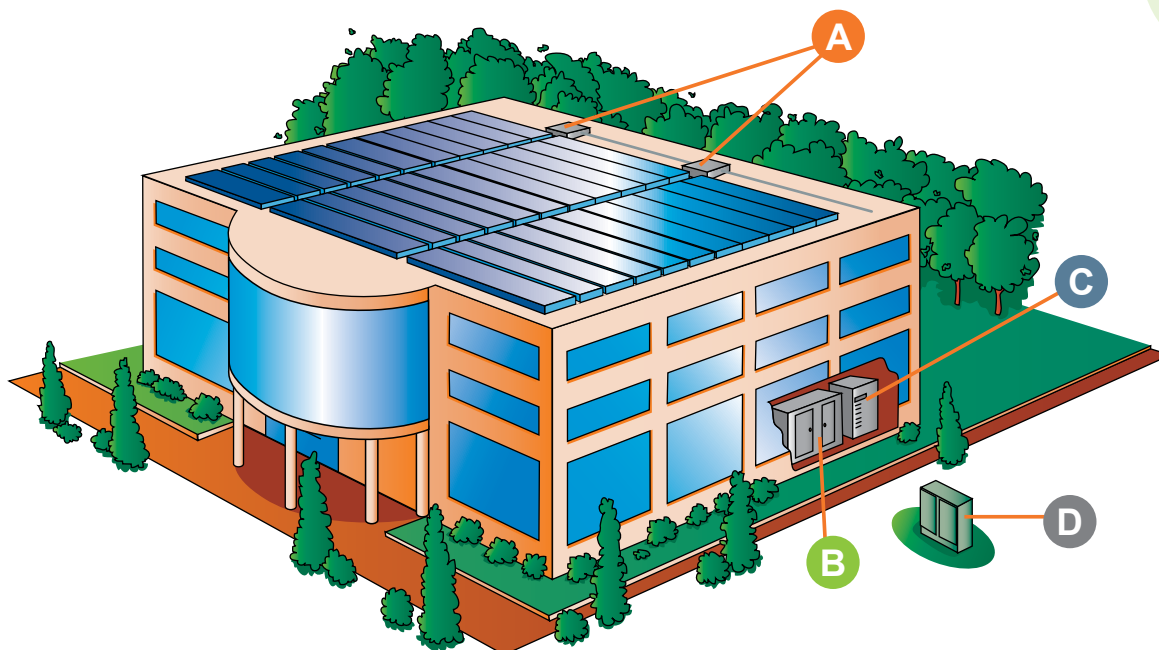
International Electrotechnical Commission (IEC)

IEC 60269-6 – Fuse-links for the Protection of Photovoltaic Energy Systems: IEC standard 60269-6, “Fuse-links for the Protection of Photovoltaic Energy Systems,” defines supplemental requirements applied to fuse-links for protecting PV strings and PV arrays in equipment for circuits of nominal voltages up to 1500VDC. Fuses complying with IEC standard 60269-6 shall be marked “gPV” indicating fuse-links with a full-range DC breaking capacity for photovoltaic energy systems.



Products By Application

Electrical protection components for solar power



A

String Combiner Box / Array Combiner Box

Fuses & fuseholders • Surge protection devices
Disconnect switches • Power distribution blocks
Monitoring • PV Safety System

B

Inverter

Fuses & fuseholders • Surge protection devices
Disconnect switches • Power distribution blocks
Thermal management • Contactors • Laminated bus bar

C

AC Electrical Panelboard

Fuses & fuseholders • Surge protective devices
Disconnect switches

D

Utility Distribution Network

Fuses • Cable limiters

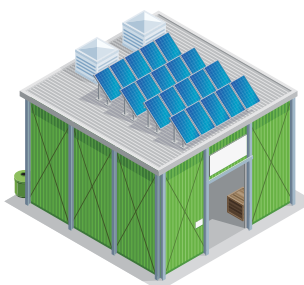
Residential 5 to 36kW

Mersen is a trusted partner of electrical equipment distributors and played a leadership role in solar power circuit protection long before the boom reached the residential market, i.e. for private homes, small apartment buildings and farm buildings.



Commercial and Industrial 36 to 250kW

The walls and roofs of buildings - office towers, factories, malls and warehouses - are among the preferred supports for solar power systems. Architects and developers have grasped the importance of this energy revolution, and more of them are recommending "green" solutions.



Utility and Solar Farm Over 250kW

In this type of application, the architecture is centered on an automatic monitoring and control system. Mersen caters to this critical market with electrical protection that safely & reliably protects the solar power investment.



Photovoltaic Fuses

HP6M (600VDC), HP10M (1000VDC), and HP15M (1500VDC) series for string protection

Enhanced Construction For Demanding PV Applications

Mersen's HeliProtection® HP6M and HP10M photovoltaic (PV) fuse series was engineered and designed specifically for the protection of photovoltaic strings. Its enhanced fuse construction is designed to withstand constant fluctuations in temperature and current cycling adding to system longevity. Low minimum breaking capacity of 1.35 times the fuse rated current value meets both IEC and UL standards, allowing for safe circuit interruption under typical low fault current conditions produced by PV strings. Typical applications include string combiner boxes and in-line fuse assemblies.



Catalog Numbers and Electrical Characteristics

| Voltage (VDC) | Amperage (A) | Catalog Number | Reference Number | Watts Loss @ 70% x In (W) | Watts Loss @ 80% x In (W) | Watts Loss @ 100% x In (W) | Interrupting Rating (kA) | Size (mm) |
|---------------|--------------|----------------|------------------|---------------------------|---------------------------|----------------------------|--------------------------|-----------|
| 600 | 1 | HP6M1 | L1018565 | 0.14 | 0.19 | 0.31 | 10 | 10x38 |
| | 2 | HP6M2 | M1018566 | 0.19 | 0.26 | 0.43 | | |
| | 3 | HP6M3 | N1018567 | 0.64 | 0.85 | 1.4 | | |
| | 4 | HP6M4 | Q1018569 | 0.58 | 0.77 | 1.3 | | |
| | 5 | HP6M5 | R1018570 | 0.65 | 0.87 | 1.4 | | |
| | 6 | HP6M6 | S1018571 | 0.69 | 0.92 | 1.5 | | |
| | 7 | HP6M7 | T1018572 | - | - | - | | |
| | 8 | HP6M8 | V1018573 | 0.92 | 1.23 | 2.0 | | |
| | 10 | HP6M10 | X1018575 | 0.96 | 1.28 | 2.1 | | |
| | 12 | HP6M12 | Y1018576 | 1.12 | 1.49 | 2.5 | | |
| | 15 | HP6M15 | Z1018577 | 0.99 | 1.32 | 2.2 | | |
| | 20 | HP6M20 | A1018578 | 1.25 | 1.67 | 2.8 | | |
| | 25 | HP6M25 | K1018610 | 1.38 | 1.84 | 3.1 | | |
| | 30 | HP6M30 | L1018611 | 1.50 | 2.00 | 3.3 | | |
| 1000 | 1 | HP10M1 | B1018579 | 0.125 | 0.175 | 0.25 | 10 | 10x38 |
| | 2 | HP10M2 | C1018580 | 0.16 | 0.25 | 0.32 | | |
| | 3 | HP10M3 | D1018581 | 0.66 | 0.87 | 1.36 | | |
| | 3.5 | HP10M3-1/2 | H1043977 | - | - | - | | |
| | 4 | HP10M4 | E1018582 | 0.69 | 0.80 | 1.25 | | |
| | 5 | HP10M5 | F1018583 | 0.59 | 0.73 | 1.12 | | |
| | 6 | HP10M6 | G1018584 | 0.42 | 0.67 | 1.05 | | |
| | 7 | HP10M7 | H1018585 | 0.40 | 0.64 | 1.00 | | |
| | 8 | HP10M8 | J1018586 | 0.77 | 0.88 | 1.48 | | |
| | 10 | HP10M10 | L1018588 | 0.67 | 0.9 | 1.5 | | |
| | 12 | HP10M12 | M1018589 | 0.72 | 1.0 | 1.8 | | |
| | 15 | HP10M15 | N1018590 | 0.9 | 1.3 | 2.2 | | |
| | 20 | HP10M20 | P1018591 | 1.1 | 1.5 | 2.8 | | |
| | 25 | HP10M25 | D1023825 | 1.3 | 1.8 | 3.0 | | |
| | 30 | HP10M30 | E1023826 | 1.5 | 1.9 | 3.7 | | |
| 1500 | 12 | HP15MGPV12 | - | 1.5 | | 3.7 | | 10x85 |
| | 16 | HP15MGPV16 | - | 2.3 | | 5.7 | | |

Catalog Numbers - Fuseholder

| Voltage (VDC) | Amperage (A) | Terminal Type | Visual Blown Fuse Indicator | Catalog Number |
|---------------|--------------|---------------|-----------------------------|----------------|
| 1000 | 32 | Screw | No | USM1HEL |
| | | | Yes | USM1IHEL |
| 1000 | 32 | Spring | No | USGM1HEL |
| | | | Yes | USGM1IHEL |

Approvals

- UL Listed to 2579, photovoltaic fuse, File E333668 (10x38 only)
- CSA Component Acceptance, Class 1422-30
- IEC 60269-6 Certified, gPV
- RoHS Compliant



For additional information about fuseholders for HP6M and HP10M see page 12. Fuse clips for HP10M (MR10RESSORTCI) are also available. For additional information about HP6M, HP10M, and HP15M photovoltaic fuses visit ep.mersen.com

Photovoltaic Fuses

HP6J (600VDC) series for array protection

Protect Your Off-grid or Grid-tied PV Systems

The HelioProtection® HP6J photovoltaic (PV) fuse series was engineered and designed specifically for the protection of photovoltaic arrays. Its enhanced fuse construction is designed to withstand constant fluctuations in temperature and current cycling adding to system longevity. Low minimum breaking capacity of 1.35 times the fuse rated current value meets UL standards, allowing for safe circuit interruption under typical low fault current conditions produced by PV arrays. Typical applications include re-combiner box, master combiner box and inverter inputs.



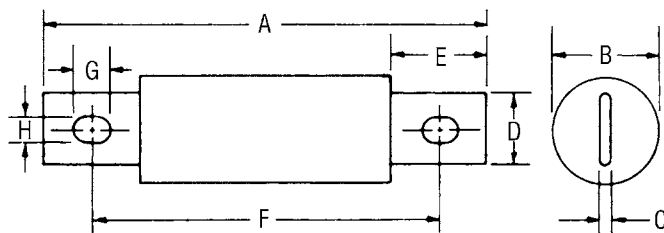
Catalog Numbers and Electrical Characteristics

| Voltage (VDC) | Amperage (A) | Catalog Number | Reference Number | Watts Loss @ 80% x In (W) | Watts Loss @ 100% x In (W) | Interrupting Rating (kA) | Size |
|---------------|--------------|----------------|------------------|---------------------------|----------------------------|--------------------------|---------|
| 600 | 70 | HP6J70 | K1023394 | 5.8 | 10 | 10 | Class J |
| | 80 | HP6J80 | L1023395 | 6.4 | 11 | | |
| | 90 | HP6J90 | M1023396 | 7.5 | 13 | | |
| | 100 | HP6J100 | N1023397 | 8.1 | 14 | | |
| | 110 | HP6J110 | P1023398 | 10.4 | 18 | | |
| | 125 | HP6J125 | Q1023399 | 11.0 | 19 | | |
| | 150 | HP6J150 | R1023400 | 12.8 | 22 | | |
| | 175 | HP6J175 | S1023401 | 13.9 | 24 | | |
| | 200 | HP6J200 | T1023402 | 15.1 | 26 | | |
| | 225 | HP6J225 | V1023403 | 17.4 | 30 | | |
| | 250 | HP6J250 | W1023404 | 20.9 | 36 | | |
| | 300 | HP6J300 | X1023405 | 22.0 | 38 | | |
| | 350 | HP6J350 | V1023380 | 23.2 | 40 | | |
| | 400 | HP6J400 | Y1023406 | 24.4 | 42 | | |
| | 450 | HP6J450 | V1026278 | 33.6 | 58 | | |
| | 500 | HP6J500 | W1026279 | 34.2 | 59 | | |
| | 600 | HP6J600 | X1026280 | 39.4 | 68 | | |

Dimensions

| Ampere Rating | A | | B | | C | | D | | E | | F | | G | | H | |
|-----------------------|-------|-----|--------|----|------|-----|-------|----|-------|----|-------|-----|-------|-----|-------|----|
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| HP6J (61-100) | 4-5/8 | 117 | 1-1/16 | 27 | 1/8 | 3.2 | 3/4 | 19 | 1 | 25 | 3-5/8 | 92 | 3/8 | 10 | 9/32 | 7 |
| HP10J (61-200) | 5-3/4 | 146 | 1-5/8 | 41 | 3/16 | 4.8 | 1-1/8 | 29 | 1-3/8 | 35 | 4-3/8 | 111 | 3/8* | 10* | 9/32* | 7* |
| HP6J (101-200) | | | | | | | | | | | | | | | | |
| HP6J, HP10J (201-400) | 7-1/8 | 181 | 2-1/8 | 54 | 1/4 | 6.3 | 1-5/8 | 41 | 1-7/8 | 48 | 5-1/4 | 133 | 17/32 | 14 | 13/32 | 10 |
| HP6J (401-600) | 8 | 203 | 2-1/2 | 64 | 3/8 | 9.5 | 2 | 51 | 2-1/8 | 54 | 6 | 152 | 11/16 | 18 | 17/32 | 13 |

* For HP10J, G = 17/32" (14mm) and H = 13/32" (10mm)



Catalog Numbers – Fuse Blocks

For recommended fuse blocks for HP6J and HP10J fuses see page 9.

Approvals

- UL Listed to 2579, photovoltaic fuse, File E333668
- CSA Component Acceptance, Class 1422-30
- RoHS Compliant

For additional information about HP6J photovoltaic fuses visit ep.mersen.com



Photovoltaic Fuses

HP10J (1000VDC) series for array protection

The industry's most efficient 1000VDC fuses

The HelioProtection® HP10J photovoltaic (PV) fuse series was engineered and designed specifically for the protection of photovoltaic arrays. Its enhanced fuse construction is designed to withstand constant fluctuations in temperature and current cycling adding to system longevity. Low minimum breaking capacity of 1.35 times the fuse rated current value meets UL standards, allowing for safe circuit interruption under typical low fault current conditions produced by PV arrays. Typical applications include re-combiner box, master combiner box and inverter inputs.



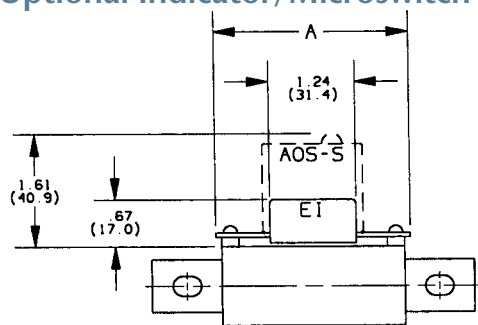
Catalog Numbers and Electrical Characteristics

| Voltage (VDC) | Amperage (A) | Catalog Number | Reference Number | Watts Loss @ 80% x In (W) | Watts Loss @ 100% x In (W) | Interrupting Rating (kA) | Size | Frame Size |
|---------------|--------------|----------------|------------------|---------------------------|----------------------------|--------------------------|---------|------------|
| 1000 | 70 | HP10J70 | Z1040749 | 5 | 10 | 10 | Class J | 1 |
| | 80 | HP10J80 | A1040750 | 5 | 10 | | | |
| | 100 | HP10J100 | B1040751 | 7 | 15 | | | |
| | 125 | HP10J125 | C1040752 | 7 | 14 | | | |
| | 160 | HP10J160 | D1040753 | 8 | 16 | | | |
| | 200 | HP10J200 | E1040754 | 15 | 27 | | | 2 |
| | 250 | HP10J250 | F1040755 | 18 | 34 | | | |
| | 300 | HP10J300 | G1040756 | 22 | 37 | | | |
| | 350 | HP10J350 | H1040757 | 24 | 45 | | | |
| | 400 | HP10J400 | J1040758 | 27 | 52 | | | |
| | 450 | HP10J450 | K1040759 | 27 | 56 | | | 3 |
| | 500 | HP10J500 | K1047107 | 31 | 58 | | | |
| | 600 | HP10J600 | L1047108 | 43 | 82 | | | |

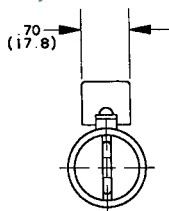
Dimensions

For dimensions for HP10J fuses see page 8

Optional Indicator/Microswitch Mount Dimensions



Note: Fuses with the EI option are designed to work with the AOS-S or AOS-Q add-on switch, which is ordered separately.



| Catalog Number | A |
|------------------|-------------|
| HP10J(70-200)EI | 3.22 (81.8) |
| HP10J(250-400)EI | 3.24 (82.2) |

Catalog Numbers – Fuse Blocks

| Voltage (VDC) | Amperage (A) | Terminal Type | Wire Range | Catalog Number |
|---------------|-----------------------|---------------|-------------------|----------------|
| 1000 | HP6J (61-100) | Box-Box | 2/0 - #6 | 61036HPJ |
| | HP10J (61-200) | Box-Box | 350kcmil - #6 | 62001HPJ |
| | HP6J (101-200) | Box-Box | (2) 350kcmil - #6 | 64031HPJ |
| | HP6J, HP10J (201-400) | Box-Box | (2) 500kcmil - #4 | 6631HPJ |
| | HP6J (401-600) | Box-Box | (2) 500kcmil - #4 | 6631HPJ |

For additional information about fuse blocks for HP6J and HP10J see page 14

For additional information about HP10J photovoltaic fuses visit ep.mersen.com

Approvals

- UL Listed to 2579, photovoltaic fuse, File E333668
- CSA Component Acceptance, Class 1422-30
- RoHS Compliant



Photovoltaic Fuses

HP10NH (1000VDC) series for array protection

About the HP10NH Fuse

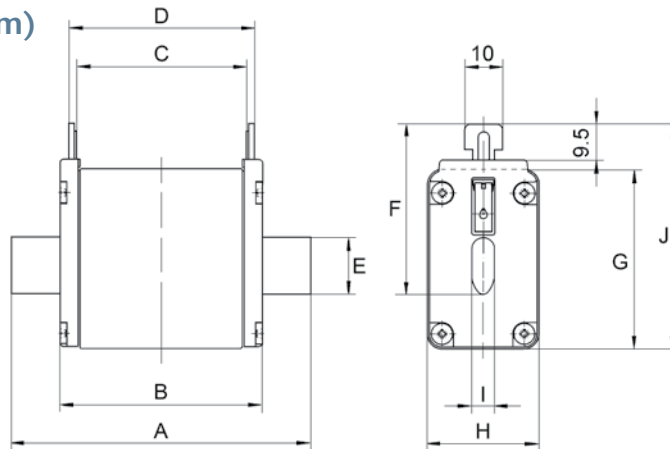
The HelioProtection® HP10NH photovoltaic (PV) fuse series was engineered and designed specifically for the protection of photovoltaic arrays. Its enhanced fuse construction is designed to withstand constant fluctuations in temperature and current cycling adding to system longevity. Low minimum breaking capacity of 1.35 times the fuse rated current value meets IEC and UL standards, allowing for safe circuit interruption under typical low fault current conditions produced by PV arrays. Typical applications include re-combiner box, master combiner box and inverter inputs.



Catalog Numbers and Electrical Characteristics

| Voltage (VDC) | Amperage (A) | Catalog Number | Reference Number | Watts Loss @ 70% x In (W) | Watts Loss @ 100% x In (W) | Interrupting Rating (kA) | Size |
|---------------|--------------|----------------|------------------|---------------------------|----------------------------|--------------------------|------|
| 1000 | 50 | HP10NH1GPV50 | Z1028283 | 4.6 | 11 | 50 | NH1 |
| | 63 | HP10NH1GPV63 | A1028284 | 5.4 | 13 | | |
| | 80 | HP10NH1GPV80 | B1028285 | 6.1 | 15 | | |
| | 100 | HP10NH1GPV100 | C1028286 | 7.2 | 17 | | |
| | 125 | HP10NH1GPV125 | D1028287 | 7.4 | 18 | | |
| | 160 | HP10NH1GPV160 | E1028288 | 9.6 | 23 | | |
| 1000 | 200 | HP10NH2GPV200 | X1037619 | 12.0 | 29 | 50 | NH2 |
| | 250 | HP10NH2GPV250 | Y1037620 | 14.0 | 34 | | |

Dimensions (mm)



| Size | A | B | C | D | E | F | G | H | I | J |
|------|-----|------|----|----|----|------|------|------|---|------|
| NH1 | 135 | 70.8 | 63 | 68 | 20 | 40 | 52.5 | 39.5 | 6 | 64.5 |
| NH2 | 150 | 68 | 63 | 68 | 26 | 48.5 | 60 | 51 | 6 | 72 |

Catalog Numbers – Fuse Blocks

| For use with | Voltage (VDC) | Amperage (A) | Terminal Type | Protective Cover | Catalog Number |
|--------------|---------------|--------------|---------------|------------------|----------------|
| NH1 | 1000 | 250 max | Stud-Stud | No | HPBB11PPR |
| | | | | Yes | HPBB11PPRFS |
| NH2 | 1000 | 315 max | Stud-Stud | No | HPBB21PPR |
| | | | | Yes | HPBB21PPRFS |

For additional information about fuse blocks for HP10NH see page 15

Approvals:

- UL Listed to 2579, photovoltaic fuse, File E358319
- IEC 60269-6 Certified, gPV
- RoHS Compliant



For additional information about HP10NH photovoltaic fuses visit ep.mersen.com

Photovoltaic Fuses

HP12NH (1250VDC) series for array protection

About the HP12NH Fuse

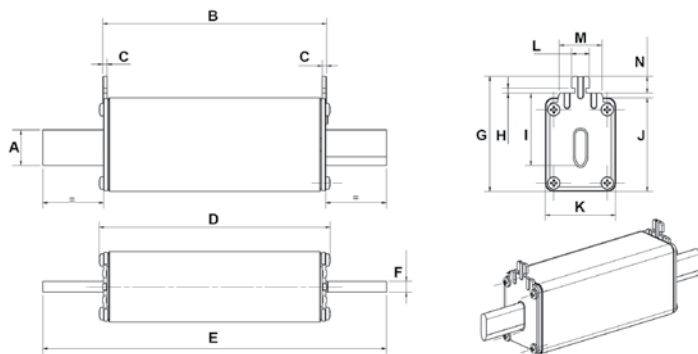
Mersen's HP12NH photovoltaic (PV) fuse series was engineered and designed specifically for the protection of photovoltaic systems. Helio-Protection® HP12NH fuse links are designed for the protection of cables in a PV group of chains when a short circuit occurs in a panel (main fuse category). This HelioProtection main fuse range enlarges our PV fuse links offering on a size having a worldwide acceptance. They are of the gPV type and comply with both IEC 60269-6 and UL 2579 PV standards.



Catalog Numbers and Electrical Characteristics

| Voltage (VDC) | Amperage (A) | Catalog Number | Reference Number | Watts Loss @ 70% x In (W) | Watts Loss @ 100% x In (W) | Interrupting Rating (kA) | Size |
|---------------|--------------|-----------------|------------------|---------------------------|----------------------------|--------------------------|------|
| 1250 | 125 | HP12NH1XLGPV125 | G1039744 | 11.5 | 29 | | NH1 |
| 1250 | 160 | HP12NH1XLGPV160 | H1039745 | 14.5 | 36 | | NH1 |
| 1250 | 200 | HP12NH2XLGPV200 | J1039746 | 16 | 40 | | NH2 |
| 1250 | 250 | HP12NH2XLGPV250 | K1039747 | 18 | 44 | | NH2 |
| 1250 | 250 | HP12NH3LGPV250 | Z1033389 | 18 | 46 | | NH3 |
| 1250 | 315 | HP12NH3LGPV315 | A1033390 | 22 | 53 | | NH3 |
| 1250 | 350 | HP12NH3LGPV350 | B1033391 | 23 | 55 | | NH3 |
| 1250 | 400 | HP12BH3LGPV400 | C1033392 | 29 | 73 | | NH3 |

Dimensions (mm)



Approvals:

- UL Listed to 2579, photovoltaic fuse, File E358319
- IEC 60269-6 Certified, gPV
- RoHS Compliant



| Size | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|------|----|-------|-----|-------|-------|---|------|------|------|------|------|----|----|-----|
| NH1 | 20 | 125.5 | 2.5 | 129.6 | 192.5 | 6 | 64.5 | 2.75 | 40.5 | 52.5 | 39.5 | 10 | 24 | 9.5 |
| NH2 | 26 | 123 | 2.5 | 127 | 205 | 6 | 72 | 2.75 | | 60 | 51 | 10 | 24 | 9.5 |
| NH3 | 33 | 123 | 2.5 | | 127.8 | | 84.5 | 2.75 | 60 | 74 | 70 | 10 | 25 | 9.5 |

Catalog Numbers – Open Fuse Bases and Fuse-Bases with Touch Protection

| For use with | Voltage (VDC) | Amperage (A) | Design | Catalog Number |
|--|---------------|--------------|--|----------------|
| NH fuse-links NH1XL and gPV fuse-link size 121 with blade contacts | 1500 | 250 A | Open design, screw mounting | SP36121 |
| NH fuse-links NH2XL and NH3L and gPV fuse-link size 122-123 with blade contacts | 1500 | 630 A | Open design, screw mounting | SP36122-123 |
| NH fuse-links NH1XL (can accept Mersen gPV fuse-links size 121 and NH2XL rated 250A with derating) | 1500 | 250 A | With touch protection, screw mounting (M10, M = 8-10Nm) | HPBB1XL1PPFS |
| NH fuse-links NH2XL and NH3L | 1500 | 500 A | With touch protection, screw mounting (M10, M = 8-10Nm) | HPBB2XL3L1PPFS |
| NH fuse-links NH2XL and NH3L (can accept NH3L fuse-links up to 630 A with derating) | 1500 | 500 A | With touch protection, screw mounting (M10, M = 8-10Nm) and busbar output (1x40x10 or 2x40x10) | HPBB2XL3L1PBFS |

For additional information about HP12NH photovoltaic fuses visit ep.mersen.com

HP15NH (1500VDC) series for array protection



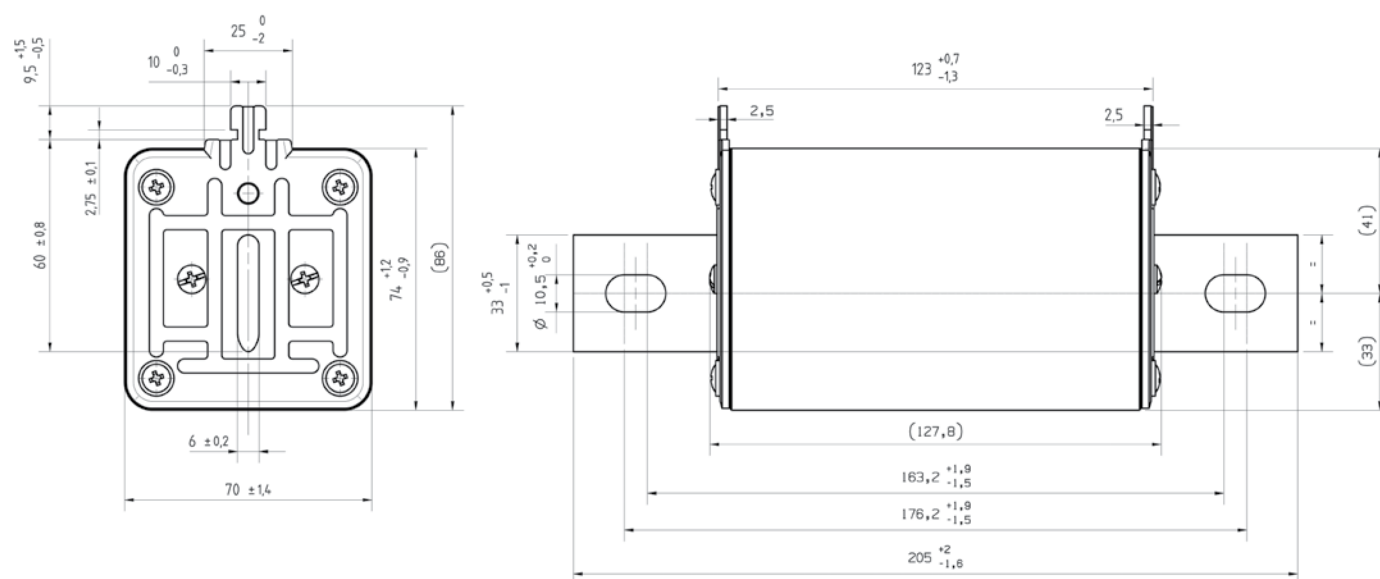
1500VDC for Future Trends and Higher Efficiencies

Mersen's HeliProtection HP15NH photovoltaic (PV) fuse series is designed specifically for protection of photovoltaic arrays. Low minimum breaking capacity of 1.35 times the fuse rated current value meets both IEC and UL (pending) standards, allowing for safe circuit interruption under typical low fault current conditions produced by PV arrays. Typical applications include re-combiner box, master combiner box and inverter inputs.

Catalog Numbers and Electrical Characteristics

| Voltage (VDC) | Amperage (A) | Catalog Number | Reference Number | Watts Loss @ 70% x In (W) | Watts Loss @ 100% x In (W) | Interrupting Rating (kA) | Size |
|---------------|--------------|-----------------|------------------|---------------------------|----------------------------|--------------------------|------|
| 1500 | 160 | HP15NH3LGPV160B | T1048679 | 15 | 35 | 50 | NH3L |
| | 200 | HP15NH3LGPV200B | V1048680 | 17 | 40 | | |
| | 250 | HP15NH3LGPV250B | W1048681 | 19 | 45 | | |
| | 315 | HP15NH3LGPV315B | X1048682 | 21 | 52 | | |
| | 350 | HP15NH3LGPV350B | Y1048683 | 23 | 56 | | |
| | 400 | HP15NH3LGPV400B | Z1048684 | 24 | 59 | | |

Dimensions



Catalog Numbers – Fuse Blocks

| For use with | Voltage (VDC) | Amperage (A) | Terminal Type | Protective Cover | Catalog Number |
|--------------|---------------|--------------|---------------|------------------|----------------|
| NH3L | 1500 | 500 max | Stud-Box | Yes | HPBB2XL3L1PBFS |
| | | | Stud-Stud | Yes | HPBB2XL3L1PPFS |

For additional information about fuse blocks for HP15NH photovoltaic fuses see page 15

Approvals:

- UL listed to 2579
- IEC 60269-6 Certified, gPV
- RoHS Compliant



For additional information about HP15NH photovoltaic fuses visit ep.mersen.com

PV Fuseholders and Blocks

UltraSafe™ for string combiner box applications

A Tool-free and Touch-safe Design Increases User Safety

Mersen's line of UltraSafe fuseholders deliver the function, safety and level of circuit protection demanded by PV applications. Designed with enhanced materials and insulation properties providing the level of reliability and system longevity needed for high ambient conditions commonly seen at PV sites. The touch-safe design and tool-free fuse change-outs increase user safety. The unique spring terminal option is immune to vibration, corrosion and temperature making it the ideal choice for PV installation. Combine with Mersen's HelioProtection HP6M or HP10M fuses for industry leading PV circuit protection.



Catalog Numbers and Electrical Characteristics

| For use with | Voltage (VDC) | Amperage (A) | Terminal Type | Visual Blown Fuse Indicator | Catalog Number | Reference Number |
|------------------|---------------|--------------|---------------|-----------------------------|----------------|------------------|
| Midget (10x38mm) | 1000 | 32 max | Screw | No | USM1HEL | L1028363 |
| | | | | Yes | USM1IHEL | M1028364 |
| Midget (10x38mm) | 1000 | 32 max | Spring* | No | USGM1HEL | P1022294 |
| | | | | Yes | USGM1IHEL | N1022293 |

Additional Specifications

Connector Type: Screw or CAGE CLAMP® spring

Suggested Screw Torque: 14.75 in-lbs

Wire Range : 14 to 6 AWG (2.5 to 16mm²) single conductor
: 14 to 10 AWG (2.5 to 5mm²) dual conductor

Wire Type: 60/75/90°C solid/stranded copper

Load Break Disconnect: No

Max Power Losses: 3W

Blown Fuse Indicator Operating Voltage: 350-1000VDC

Flammability: UL94V0

Recommended Fuse Usage: HP6M and HP10M

Approvals:

- UL Listed to 4248-18, File E347822
- CSA Component Acceptance, Class 6225-01
- IEC 60269-2-1 and 60947-3 Certified
- RoHS Compliant



*Mersen Spring Terminal Technology

Wire surrounded on all four sides



Wire retention spring reinforces high contact pressure

"S" bend provides defined contact area

Higher Reliability

- Immune to vibration, corrosion and temperature
- Maintenance-free, eliminates the need to re-torque
- Superior connection every time independent of operator skill

Increased Ease-of-Use

- No tools required for installation or maintenance

Lower Total System Cost

- Reduce installation time by 75%

Accessories – USBB series Comb Bus Bar (for use with screw type only)

Comb Bus Bar

| Voltage (VDC) | Amperage (A) | Phase | Poles | Catalog Number | Cross Section | Pitch | Material |
|---------------|-------------------|-------|-------|----------------|-------------------|--------|----------|
| 1000 | 100 (End Feed) | 1 | 4 | USBB1PH25K4 | 25mm ² | 17.8mm | Copper |
| | 200 (Center Feed) | | 6 | USBB1PH25K6 | | | |
| | | | 8 | USBB1PH25K8 | | | |
| | | | 12 | USBB1PH25K12 | | | |

Power Feeder Terminal

| Voltage (VDC) | Amperage (A) | Phase | Wire Range | Catalog Number |
|---------------|--------------|-------|--------------|----------------|
| 1000 | 115 | 1 | 10 - 1/0 AWG | USBBC1 |
| | | | 14 - 1 AWG | USBBSB1 |

For additional information about UltraSafe photovoltaic fuseholders visit ep.mersen.com

PV Fuseholders and Blocks

GPM Series panel mount fuseholders for inverter applications

Mersen GPM panel mount fuseholders accommodate midjet class (10x38mm) HP6M and HP10M fuses. All 30A holders have glass-filled thermoplastic insulators for extra dependability and trouble-free installation. Patented design allows the same body to accept a screw or bayonet knob. Flange design allows for front or rear mounting.



Catalog Numbers & Descriptions

| Catalog No. | Fig. | Cap Type | Amps | Volts | Fuse Type | Terminal Type |
|-------------|------|------------------------|------|-------|-----------------|--|
| GPM-S | 1 | Screw Knob | 30 | 600 | 1-1/2" x 13/32" | 1/4" Quick-connect/ Solder |
| GPM-S90 | 2 | Screw Knob | 30 | 600 | 1-1/2" x 13/32" | 1/4" Quick-connect/ Solder, Right Angle |
| GPM-B | 1 | 1/4 Turn Bayonet Knob | 30 | 600 | 1-1/2" x 13/32" | 1/4" Quick-connect/ Solder |
| GPM-B90 | 2 | 1/4 Turn Bayonet Knob | 30 | 600 | 1-1/2" x 13/32" | 1/4" Quick-connect/ Solder, Right Angle |
| GPM-WT | 1 | Water-tight Screw Knob | 30 | 600 | 1-1/2" x 13/32" | 1/4" Quick-connect/ Solder |
| GPM-WT90 | 2 | Water-tight Screw Knob | 30 | 600 | 1-1/2" x 13/32" | 1/4" Quick-connect/ Solder, Right Angle |

Ratings:

Volts : 600VDC
: 1000VDC Self-Certified
Amps : 30A Maximum
SCCR : 100kA

Approvals:

- UL Recognized to 4248, File E52283
- CSA Certified, class 6225-01



FEB Series in-line fuseholders for string cable harness applications

Mersen's line of single pole in-line fuseholders accommodate (10x38mm) midjet HP6M and HP10M fuses. The fuseholders are designed for quick installation. Three internal O-rings per pole seal the fuseholder providing a water-resistant compartment for the fuse. The captive O-rings are colored blue for quick detection.

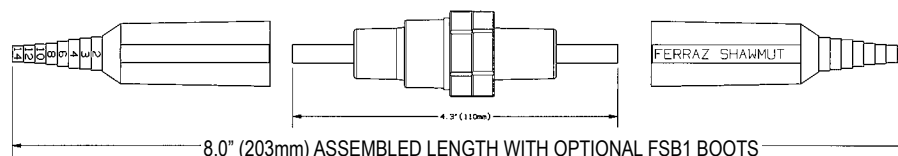


Catalog Numbers

| | | | |
|-----------|-----------|-----------|-----------|
| FEB-11-11 | FEB-11-21 | FEB-21-11 | FEB-21-21 |
|-----------|-----------|-----------|-----------|

| Terminal End View | Load or Line Terminal Type | | | | | |
|-------------------|----------------------------|----------|---------|---------|-------|----------|
| | Terminal | Type | Wire | No. Per | Solid | Stranded |
| | 11 | Cu Crimp | #8-#12 | 1 | Yes | Yes |
| | | | #12-#14 | 2 | Yes | Yes |
| | 21 | Cu Crimp | #10 | 2 | Yes | Yes |
| | | | #6 | 1 | Yes | Yes |
| | | | #4 | 1 | Yes | No |

FSB1 = Single conductor boot (used to cover all crimp type & single set screw terminals)



For additional information about panel mount and in-line fuseholders visit ep.mersen.com

Ratings:

Volts : 600VDC
: 1000VDC Self-certified
Amps : 30A Maximum
SCCR : 100kA
Temperature Rating 155° C

Approvals:

- UL Recognized to 4248, File E52283
- CSA Certified, class 6225-01



PV Fuseholders and Blocks

HPJ series for re-combiner and inverter input applications

For use with HP6J and HP10J series fuses

Designed for Mersen's HP6J (600VDC) and HP10J (1000VDC) series of photovoltaic fuses, these fuse blocks are certified for use with 90°C temperature rated conductors, an industry first. Blocks are available with box connectors, stud connectors or combination of the two. Insulators are either molded glass-filled polycarbonate or phenolic with verified dielectric strength in excess of 2500V. All fuse clips are made of high conductivity tin-plated copper.



All fuse blocks are equipped with fuse clips

Catalog Numbers and Electrical Characteristics (Box to Box Configuration)

| For use with | Voltage (VDC) | Amperage (A) | Terminal Type | Wire Range (AL/ CU) | Stud Type | Catalog Number |
|-----------------------|---------------|--------------|---------------|---------------------|-----------|----------------|
| HP6J (61-100) | 1000 | 100 | Box-Box | 2/0 - #6 | - | 61006HPJ |
| HP10J (61-200) | | 200 | Box-Box | 350kcmil - #6 | - | 62001HPJ |
| HP6J (101-200) | | 400 | Box-Box | (2) 350kcmil - #6 | - | 64031HPJ |
| HP6J, HP10J (201-400) | | 600 | Box-Box | (2) 500kcmil - #4 | - | 6631HPJ |
| HP6J (401-600) | | | | | | |

Catalog Numbers and Electrical Characteristics (Box to Stud Configuration)

| For use with | Voltage (VDC) | Amperage (A) | Terminal Type | Wire Range (AL/ CU) | Stud Type | Catalog Number |
|-----------------------|---------------|--------------|---------------|---------------------|-----------|----------------|
| HP6J (61-100) | 1000 | 100 | Box-Stud | 2/0 - #6 | 1/4-20 | 61041HPJ |
| HP10J (61-200) | | 200 | Box-Stud | 350kcmil - #6 | 5/16-18 | 62041HPJ |
| HP6J (101-200) | | 400 | Box-Stud | (2) 350kcmil - #6 | 3/8-16 | 64041HPJ |
| HP6J, HP10J (201-400) | | 600 | Box-Stud | (2) 500kcmil - #4 | 1/2-13 | 6641HPJ |
| HP6J (401-600) | | | | | | |

Catalog Numbers and Electrical Characteristics (Stud to Stud Configuration)

| For use with | Voltage (VDC) | Amperage (A) | Terminal Type | Wire Range (AL/ CU) | Stud Type | Catalog Number |
|-----------------------|---------------|--------------|---------------|---------------------|-----------|----------------|
| HP6J (61-100) | 1000 | 100 | Stud-Stud | - | 1/4-20 | 61016HPJ |
| HP10J (61-200) | | 200 | Stud-Stud | - | 5/16-18 | 62011HPJ |
| HP6J (101-200) | | 400 | Stud-Stud | - | 3/8-16 | 64011HPJ |
| HP6J, HP10J (201-400) | | 600 | Stud-Stud | - | 1/2-13 | 6611HPJ |
| HP6J (401-600) | | | | | | |

Approvals:

- UL Listed to 4248-18, File E347822
- RoHS Compliant



Accessories – DFC series dead-front fuse covers

Clip-on covers, covering exposed live clips and terminals, reduce accidental contact by personnel. They are sized to fit Mersen HP6J and HP10J class J PV fuses. All DFC dead-front fuse covers are reusable when a fuse is replaced. Optional visual blown fuse indicator models illuminate to indicate an open fuse.

| For use with Fuse | For use with Fuse Block | Voltage (VDC) | Amperage (A) | Visual Blown Fuse Indicator | Catalog Number | Reference Number |
|-------------------|-------------------------|---------------|--------------|-----------------------------|----------------|------------------|
| HP6J | 610xxHPJ | 600 | 61-100 | Yes | DFC-3I | X205065 |
| HP6J | 610xxHPJ | 1000 | 61-100 | No | DFC-3 | G201647 |
| HP6J | 620xxHPJ | 600 | 101-200 | Yes | DFC-12I | - |
| HP6J, HP10J | 620xxHPJ | 1000 | 101-200 | No | DFC-12 | - |



For additional information about HPJ photovoltaic fuse blocks visit ep.mersen.com

PV Fuseholders and Blocks

HPBB series for re-combiner and inverter input applications

For use with Mersen size NH Photovoltaic Fuses

Designed for Mersen's HP10NH (1000VDC) and HP15NH (1500VDC) series of photovoltaic fuses. Blocks are available with screw mount tongues or stud terminals. Choose between open-style or touch-safe options.

All fuse blocks are equipped with fuse clips



Catalog Numbers and Electrical Characteristics

| For use with | Voltage (VDC) | Amperage (A) | Terminal Type | Wire Range (AL/CU) | Stud Type | Touch-Safe | Catalog Number | Reference Number |
|--------------|---------------|--------------|---------------|--------------------|-----------|------------|----------------|------------------|
| NH1 | 1000 | 250 max | Stud-Stud | - | M10 | No | HPBB11PPR | A1030607 |
| | | | Stud-Stud | - | M10 | Yes | HPBB11PPRFS | K1032916 |
| NH2 | 1000 | 315 max | Stud-Stud | - | M10 | No | HPBB21PPR | C1037509 |
| | | | Stud-Stud | - | M10 | Yes | HPBB21PPRFS | D1037510 |
| NH1XL | 1500 | 250 max | Stud-Stud | - | M10 | Yes | HPBB1XL1PPFS | Y1039598 |
| NH2XL, NH3L | 1500 | 500 max | Stud-Stud | - | M12 | Yes | HPBB2XL3L1PPFS | Z1039599 |
| | | | Stud-Bus | - | M12 | Yes | HPBB2XL3L1PBFS | A1039600 |

Approvals

- UL Listed to 4248-18, File E362644 (Size NH1 and NH2)
- IEC 60269-2-1 Certification
- RoHS Compliant



Accessories – Fuse Handles

| For use with Fuse | Catalog Number | Reference Number |
|--------------------|----------------|------------------|
| NH1, NH2 | NHHANDLE | P215592E |
| NH1XL, NH2XL, NH3L | POIGNEEPM12 | Y210402 |

For additional information about HPBB photovoltaic fuse blocks visit ep.mersen.com

Surge Protective Devices

Surge-Trap® for photovoltaic applications

The Surge-Trap PV series of devices provide advanced overvoltage protection to photovoltaic systems by utilizing Mersen's optimized dynamic thermal disconnection system, which does not require additional overcurrent protection (back-up fuse) due to its high short-circuit withstand. These surge protective devices are suitable for all PV applications; large-scale, rooftop and stand-alone (off-grid) DC installations.



Catalog Numbers & Descriptions

| Product Series | Catalog Number | Reference Number | No. of Poles | U_{cpv} | I_{scpv} | I_{max} (8/20 μ s) | I_n (8/20 μ s) | U_p @ I_n | Remote Indicator | Replacement Cartridge |
|-------------------------|---------------------|------------------|--------------|-----------|------------|--------------------------|----------------------|---------------|------------------|-----------------------|
| ST (Modular Type) | ST600PV | Y1007421 | 2 | 600VDC | 10kA | 40kA | 20kA | $\leq 2.0kV$ | No | - |
| | ST600PVM | T1007578 | 2 | 600VDC | 10kA | 40kA | 20kA | $\leq 2.0kV$ | Yes | - |
| | ST1000PV | N1004353 | 3 | 1000VDC | 10kA | 40kA | 20kA | $\leq 3.0kV$ | No | - |
| | ST1000PVM | X1007581 | 3 | 1000VDC | 10kA | 40kA | 20kA | $\leq 3.0kV$ | Yes | - |
| STP (Pluggable Type) | STPT2-40K600V-UPV | - | 2 | 600VDC | 10kA | 40kA | 20kA | $\leq 2.0kV$ | No | SP2-40K600V-UPV |
| | STPT2-40K600V-UPVM | - | 2 | 600VDC | 10kA | 40kA | 20kA | $\leq 2.0kV$ | Yes | SP2-40K600V-UPV |
| | STPT2-40K1000V-YPV | 83020140 | 3 | 1000VDC | 10kA | 40kA | 20kA | $\leq 3.0kV$ | No | SP2-40K1000V-PV |
| | STPT2-40K1000V-YPVM | 83020141 | 3 | 1000VDC | 10kA | 40kA | 20kA | $\leq 3.0kV$ | Yes | SP2-40K1000V-PV |
| | STPT2-40K1500V-YPV | 83020158 | 3 | 1500VDC | 10kA | 40kA | 20kA | $\leq 5.0kV$ | No | SP2-40K1500V-PV |
| | STPT2-40K1500V-YPVM | 83020159 | 3 | 1500VDC | 10kA | 40kA | 20kA | $\leq 5.0kV$ | Yes | SP2-40K1500V-PV |

Additional Specifications

Operating and Storage Temperature: -40°C to +85°C

Connector Type: Screw Cage

Suggested Screw Torque: 4 Nm

Wire Range: 14 to 6 AWG (6 to 25mm²) single conductor

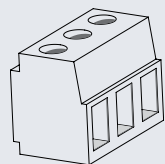
Wire Type: 60/75°C solid/stranded copper

Approvals

- UL 1449 Type 2CA, File E210793, E468946
- EN50539-11, PV Type 2
- IEC 61643-1, Class II
- UTE C 61-740-51



Microswitch (M) — Remote Indication



Signal Wire Range: #14 to #30 AWG (0.05 to 2.5mm²)

- Terminal Torque 0.27 Nm
- Cont. between Comm + NO = Product offline, not protected
- Cont. between Comm + NC = Product online, protected

Auxiliary Micro-Switch Installation (optional)

Remote signaling is available on all Surge-Trap products that specify a remote indicator.

Wire Management Solutions

FSPDB series for combiner box applications

Achieve a new level of ease and safety

Mersen FSPDBs introduce a new level of safety and ease for installing power distribution blocks. An IP20 level of finger-safe protection is achieved using FSPDBs, eliminating the need for special covers or custom Plexiglass sheets to protect your panels. FSPDBs (sizes 1 to 4) simply snap onto 35mm DIN-rail to provide the quickest installation. Modular design also allows for multi pole applications by use of assembly pins. FSPDBs provide a safe, convenient way of collecting PV string circuits.



Catalog Numbers and Electrical Characteristics

| Voltage (VDC) | Amperage (A) | | LINE | | | LOAD | | | Catalog Number | |
|-------------------------------|--------------|-----|----------|----------------------------|--|----------|---------------|-------------------------|----------------|---------|
| | AL* | CU* | Openings | Wire Range | | Openings | Wire Range | | AL* | CU* |
| 1500 UL | 135 | 175 | 1+ | 2/0 - #14 | 70 - 2.5mm ² | 1+ | 2/0 - #14 | 70 - 2.5mm ² | FSPBD1A | FSPDB1C |
| | 135 | 175 | 1+ | 2/0 - #14 | 70 - 2.5mm ² | 4+ | #2 - #14 | 35 - 2.5mm ² | FSPBD2A | FSPDB2C |
| | 250 | 310 | 1 | 350kcmil - #6 2/0 - #14 | 185 - 16mm ² 70 - 2.5mm ² | 8 | #8 - #14 | 8 - 2.5mm ² | FSPBD3A | FSPDB3C |
| 600 UL 1000 Self Certified | 270 | 335 | 1 | 400kcmil - #6 | 185 - 16mm ² | 1 | 400kcmil - #6 | 185 - 16mm ² | FSPBD4A | FSPDB4C |
| | 680 | 840 | 2 | 600kcmil - #4 | 300 - 25mm ² | 2 | 600kcmil - #4 | 300 - 25mm ² | FSPBD5A | FSPDB5C |

* AL (Aluminum) power distribution blocks are rated for 60 / 75 / 90°C, copper or aluminum conductors

* CU (Copper) power distribution blocks are rated for 60 / 75°C, copper conductors only

+ Openings are approved for multiple conductors per opening, for additional info visit ep.mersen.com

Approvals

- UL Recognized to 1059, File E73571
- CSA Component Acceptance, Class 6228-01



MPDB series for combiner box applications

The Next Generation Power Distribution Block (PDB)

Mersen MPDB series open-style power distribution blocks provide a safe and easy method of splicing cables, splitting primary power into secondary circuits and fulfilling requirements for fixed junction tap-off points. All blocks are UL and CSA approved while meeting spacing requirements for feeder and branch circuits in conjunction with UL508A and the National Electrical Code®.



Catalog Numbers and Electrical Characteristics

| Voltage (VDC) | Amperage (A) | | LINE | | | LOAD | | | Catalog Number | |
|---------------|--------------|-----|----------|---------------|-------------------------|----------|---------------|--------------------------|----------------|-----------|
| | AL* | CU* | Openings | Wire Range | | Openings | Wire Range | | AL* | CU* |
| 1000 UL | 310 | 380 | 1 | 500kcmil - #4 | 250 - 25mm ² | 1 | 500kcmil - #4 | 250 - 25mm ² | MPDB67401 | MPDB66401 |
| | 310 | 380 | 1 | 500kcmil - #4 | 250 - 25mm ² | 4 | 2/0 - #14 | 70 - 2.5mm ² | MPDB67411 | MPDB66411 |
| | 310 | 380 | 1 | 500kcmil - #4 | 250 - 25mm ² | 6 | #2 - #14 | 35 - 2.5mm ² | MPDB67461 | MPDB66461 |
| | 135 | 175 | 1 | 2/0 - #14 | 70 - 2.5mm ² | 8 | #2 - #14 | 35 - 2.5mm ² | MPDB67581 | MPDB66581 |
| | 135 | 175 | 1 | 2/0 - #14 | 70 - 2.5mm ² | 12 | #10 - #14 | 5.5 - 2.5mm ² | MPDB67111 | MPDB66111 |
| | 250 | 310 | 1 | 350kcmil - #6 | 185 - 16mm ² | 15 | #10 - #14 | 5.5 - 2.5mm ² | MPDB67621 | MPDB66621 |
| | 310 | 380 | 1 | 500kcmil - #4 | 250 - 25mm ² | 18 | #10 - #14 | 5.5 - 2.5mm ² | MPDB67491 | MPDB66491 |

Mersen has over 500 configurations of MPDB series power distribution blocks.

For information on additional configurations visit ep.mersen.com

Approvals

- UL Listed to 1953, File E352417
- CSA Component Acceptance, Class 6228-01



For additional information about FSPDB and MPDB series power distribution blocks visit ep.mersen.com

PV-Rated Disconnect Switches

For combiner and re-combiner box applications

UL 98 and IEC-Rated DC Switches

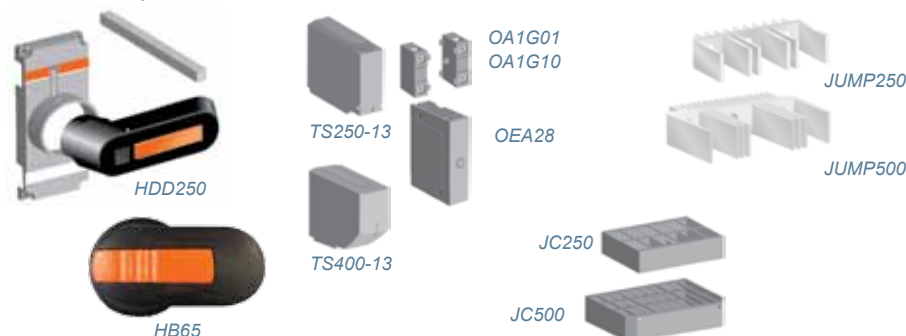
Mersen offers a range of DC disconnect switches especially designed for PV applications, in 2 poles and 2x2 poles configurations for double circuit applications. The technology inside the switch and the visible contacts allow a quick, safe, and reliable DC breaking power at all current levels up to 1500VDC. The product is ready and simple to install independently of the polarity, with very limited power losses, and with a 40% smaller footprint than competition. The 1000V versions have 2 switching modules (poles) and the new 1500V versions have 3 modules.

Catalog Numbers

| Part # | Description | Ref # |
|---|-------------------------------|----------|
| UL 98B 1000VDC-rated Non-Fused switches | | |
| MD100U11 | DC Switch 100A UL 2p | X1043231 |
| MD180U22 | DC Switch 180A UL 4p | Y1043232 |
| MD200U11 | DC Switch 200A UL 2p | Z1043233 |
| MD250U11 | DC Switch 250A UL 2p | A1043234 |
| MD250U22 | DC Switch 250A UL 4p | B1043235 |
| MD320U11 | DC Switch 320A UL 2p | C1043236 |
| MD320U22 | DC Switch 320A UL 4p | D1043237 |
| MD400U11 | DC Switch 400A UL 2p | E1043238 |
| MD400U22 | DC Switch 400A UL 4p | F1043239 |
| IEC 1000 VDC-rated Non-Fused switches | | |
| MD100E11 | DC Switch 100A IEC 1000V 2p | G1043217 |
| MD160E11 | DC Switch 160A IEC 1000V 2p | H1043218 |
| MD200E11 | DC Switch 200A IEC 1000V 2p | J1043219 |
| MD250E11 | DC Switch 250A IEC 1000V 2p | K1043220 |
| MD100E22 | DC Switch 100A IEC 2x1000V 4p | L1043221 |
| MD160E22 | DC Switch 160A IEC 2x1000V 4p | M1043222 |
| MD200E22 | DC Switch 200A IEC 2x1000V 4p | N1043223 |
| MD250E22 | DC Switch 250A IEC 2x1000V 4p | P1043224 |
| MD315E11 | DC Switch 315A IEC 1000V 2p | Q1043225 |
| MD400E11 | DC Switch 400A IEC 1000V 2p | R1043226 |
| MD500E11 | DC Switch 500A IEC 1000V 2p | S1043227 |
| MD315E22 | DC Switch 315A IEC 2x1000V 4p | T1043228 |
| MD400E22 | DC Switch 400A IEC 2x1000V 4p | V1043229 |
| MD500E22 | DC Switch 500A IEC 2x1000V 4p | W1043230 |
| 1500 VDC Ratings - Please consult factory. | | |

Accessories – Handles and Shafts

Please visit ep.mersen.com for our extensive list of handles, shafts, and accessories.



1000VDC version

Highlights:

- IEC version and UL version
- Visible contacts
- 40% smaller footprint than competition
- Direct installation for floating polarity configuration
- Jumper bar available for grounded configuration

Applications:

- Medium and large power photovoltaic installations up to 1500VDC
- “Make and break” on load and provide safety isolation at string combiner box level

Approvals:

- UL98B File #E466972 WHVA
- IEC 60947-3 CE



Ratings:

Volts : 1000VDC and 1500VDC
Amps : IEC: 100 to 500A
 : UL98: 100 to 400A
SCCR : 5 to 10kA for higher ratings

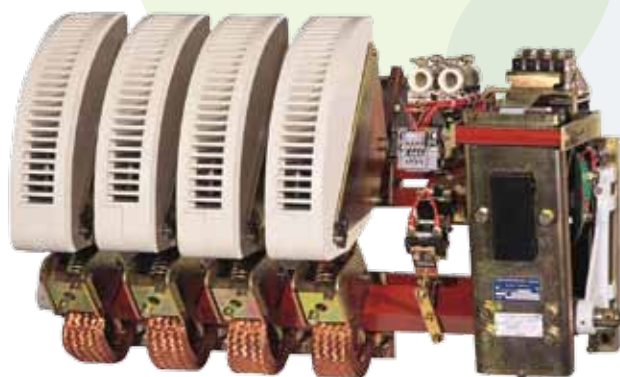
For additional information about PV-rated disconnect switches visit ep.mersen.com

Disconnect Switches

DC contactors for inverter applications

High Power Switches for Inverters in PV Systems

When you need to safely and reliably interrupt the electrical current during shutdown of central inverters in grid connected solar power farms, turn to Mersen's rugged DC Contactors. Our high quality contactor reliably extinguishes electrical arcing at high voltages and is ideal for solar power systems.



CBFC 75 series (400 to 1000A)

| | Maximum Switch-off Voltage | | | | |
|--------|----------------------------|----------|----------|----------|----------|
| | 400A | 500A | 630A | 800A | 1000A |
| 1-Pole | 500 VDC | 500 VDC | 500 VDC | 500 VDC | 500 VDC |
| 2-Pole | 1000 VDC | 1000 VDC | 1000 VDC | 1000 VDC | 1000 VDC |
| 3-Pole | 2000 VDC | 2000 VDC | 2000 VDC | 2000 VDC | 2000 VDC |

CBC 57 series (80 to 200A)

| | Maximum Switch-off Voltage | | |
|--------|----------------------------|----------|----------|
| | 1250A | 1600A | 2000A |
| 1-Pole | 600 VDC | 600 VDC | 600 VDC |
| 2-Pole | 1500 VDC | 1500 VDC | 1500 VDC |
| 3-Pole | 2000 VDC | 2000 VDC | 2000 VDC |
| 4-Pole | 3000 VDC | 3000 VDC | 3000 VDC |



Disconnectors and changeover switches for inverter applications

| | FA10 Disconnecter Series | FA12 Changeover Series |
|---|--------------------------|------------------------|
| Ampere rating range | 500-8000 | 500-8000 |
| Configuration | 1-0 Open and closed | 1-2 Change over |
| Number of poles | 2 | 2 |
| Operation (1) | Manual | Manual |
| Qty of Microswitches per position | 2 | 2 |
| Operating voltage | 3000 V | 3000 V |
| Dielectric withstand voltage | 20kV - 50Hz - 1mn | 20kV - 50Hz - 1mn |
| Maximum SCCR range for one pole | 75-150kA | 75-150kA |
| Mechanical endurance (1 cycle = 1 open + 1 close) | 5000 cycles | 5000 cycles |



For additional information about DC Contactors, Disconnectors and Changeover Switches visit ep.mersen.com

Electronic Systems for Energy Management

PV String Monitoring Cards for string combiner box applications

Guarantee the long term power efficiency of PV installations

In mid- and large-scale photovoltaic (PV) installations, it is *mandatory* to properly monitor the string level production over time to guarantee long term power performance by maximizing energy production, optimizing facility management, and decreasing operations and maintenance costs.

Mersen, a worldwide leader in electrical protection solutions, is proud to deliver a string monitoring solution to be installed in the string combiner box.

Catalog Numbers

| Catalog Number | Reference Number | Description |
|----------------|------------------|---|
| HMMC6A | T1034626 | 6-String Main Card |
| HMAC6A | A1034632 | 6-String Auxiliary Card (add up to 4 Aux Cards for each Main Card) |
| HMPC8A | B1034633 | Probe Card (monitor up to 8 external sensors for each probe card) |
| HMKCNA | C1034634 | Connection Kit: Convert RS-485/DB9 to RS-485 line output |
| HMKCGA | D1034635 | Configuration Kit: Includes configuration software and USB connection cable |
| HM2RS485COMA | D1039304 | WebCom energy data logger |



WebCom Energy Data Logger

Highlights:

- **Efficient Built-in Power Supply** – Take power directly from the PV string, eliminating the need to purchase and install a separate power supply to power the device
- **Accuracy** – 0.5% precision compared to 5% from competitors
- **Voltage and Current Measurement** – Additional voltage measurement provides a greater level of detail and is required in many cases
- **Flexible 6-String Device** – Allows for greater flexibility (can be configured for 6, 12, 18, 24 or 30 string boxes)
- **Integrated Bus Bar** – Combines strings into 1 or 2 outputs based on ampere rating. Eliminates the need for separate comb bus bar
- **Higher Amp Rating** – Designed for string inputs up to 25A. Compare to competitor products with 15A or 20A inputs per string
- **Increased Functionality** – Option to connect up to 8 external sensors (anemometer, thermometer, sun sensor, etc...)

Ratings:

Volts : 1000VDC maximum

Amps : 25A maximum per string

Number of Strings

: 6, 12, 18, 24, 30

Operating Temperature

: -30°C to +70°C

Degree of Protection

: IP20

Approvals:

- UL Recognized to 1741, File E356648
- SunSpec Alliance Certified
- EMC (electromagnetic compatibility): EN 61000-6-2, EN 61000-6-3
- Security: EN 61010-1
- Installation : IEC 61439-3, 62103



For additional information about PV String Monitoring Cards visit ep.mersen.com

Electronic Systems for Energy Management

Safety system for PV installations

Meet NEC690.12 requirements by disconnecting at the PV module level for absolute protection

Mersen is extending its HelioProtection offering with an electronic protection system to safeguard against potential electrocution hazards of PV installations. The Mersen PV safety solution provides an individual, remotely controlled shutdown feature per PV module, thanks to an electronic card called Greeneye. Greeneye can be installed either in the junction box on the back of each PV module or as an add-on, field installable junction box. In case there is a need for urgent shutdown, when activated, the Greeneye module brings the output current and voltage of the individual PV module(s) to zero. The PV installation therefore becomes fully disconnected and safe for construction, maintenance, or even in the case of fire, avoiding any risk of electrocution to personnel or firefighters.

A Highly Secure Safety System

Mersen's PV safety solution is comprised of two components, the Greeneye smart PV switch, installed at the PV module level and the Greenbrain control unit, installed in the string combiner box. The safety solution is a failsafe system. Under normal operating conditions the Greeneye modules are in the ON state, and solar power energy production is ongoing. When activated by the Greenbrain control unit, the Greeneye smart PV switch turns OFF, reducing the output of the PV module(s) to **zero volts (0V)** and **zero amperes (0A)**.

Emergency Operating Sequence

In case of emergency shutdown, the Greenbrain control unit creates an **electro-mechanical disconnection** between the inverter and string combiner box to isolate the inverter from the PV strings. Then each Greeneye smart PV switch is individually shut-down. **DC current and voltage falls to zero on all DC wires** from the PV modules to the string combiner boxes and inverters. A safety light coupled to the emergency button indicates a DC string voltage higher than 40 volts. When the safety light goes OFF the PV installation is fully safe. The PV installation can only be re-activated manually at each string combiner box as an added level of safety.

Automatic shutdown

Each Greeneye smart PV switch is equipped with a temperature sensor. If the temperature exceeds 115°C, the Greeneye smart PV switch is automatically switched to the OFF position.

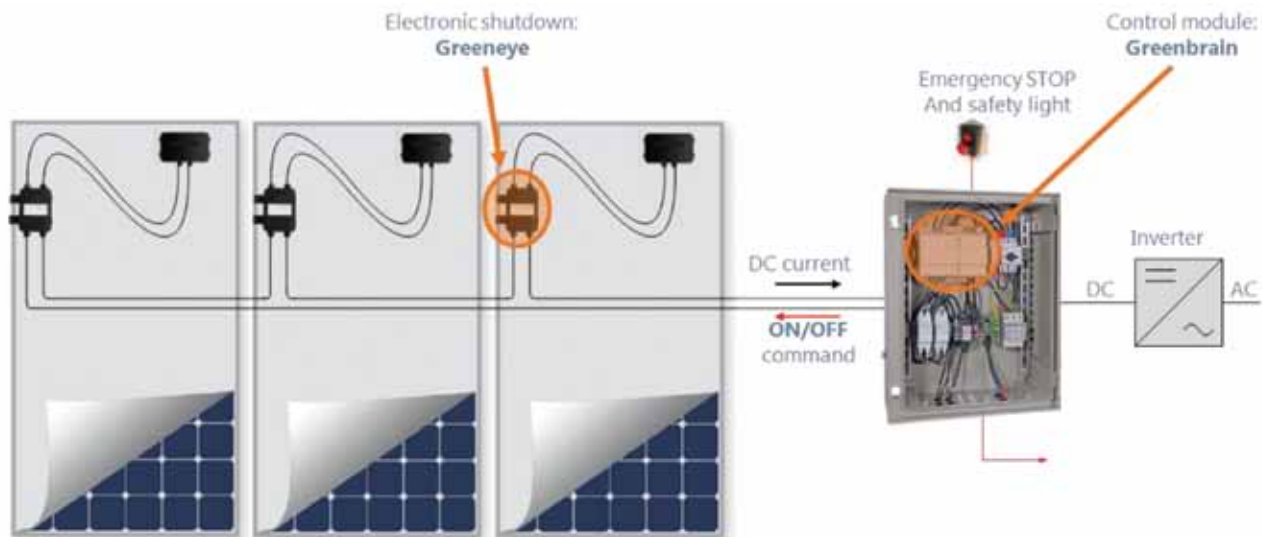


Diagram of the Mersen PV safety system

For additional information about Mersen's PV Safety Solution visit ep.mersen.com

Power Electronics Solutions

Cooling devices for inverter applications

Bring Us Your Toughest PV Cooling Challenge

Mersen integrates its extensive cooling expertise and patented heatsink technology into photovoltaic applications to make them more efficient, reliable and profitable. Mersen's engineering team will help you find innovative solutions and can also simulate your application. Our unique knowledge of air, phase change and liquid cooled heatsinks enables Mersen to help you find the right thermal protection solution for your application.



Fabfin® heatsink

Air Cooling Solutions

Mersen's air cooled Fabfin® heatsink stands out from ordinary extruded heatsinks because of its higher fins, giving it excellent performances. Using a swaging process means a variety of its higher fins and increased height-to-space ratio types of fins can be used. The Hollowfin heatsink uses the same technology but the fins are processed further to increase their density on the baseplate. Mersen offers a comprehensive range of high performance air cooled solutions, which are also available in mixed metal, dual baseplate, integrated and extrusion models.



Dual baseplate



Mixed metals



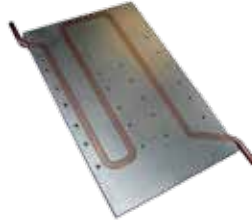
Copper

Liquid Cooling Solutions

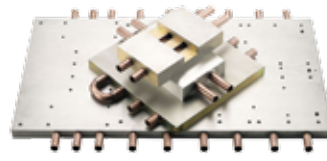
The liquid cooled Aquamax® employs an aluminum body and copper tubes. These tubes are embedded in the aluminum body using a mandreling process that expands the copper tube into intimate contact with the aluminum body creating a very robust construction. Mersen offers numerous liquid cooling options designed for tight spaces while providing lasting performance.



Aquamax®



Aquasurf®



Aquasink®

Heat pipes for instantaneous cooling action

The high heat losses from press-pack or IGBT power devices can easily be conveyed outward via heat pipe cooling units. A unit consists of aluminum evaporator and condenser sections with copper heat pipes. Working fluids are chosen to suit the application (methanol, water). This heatsink offers high thermal performance, homogeneity of temperature under components, and easy maintenance.



Power Electronics Solutions

Laminated bus bar for inverter applications

Eldre is now Mersen

Eldre is now part of the Mersen family. Mersen is known worldwide for providing expertise to customers for safety and reliability of electrical power. With the addition of Eldre to the Mersen family, Mersen adds laminated bus bar to its extensive portfolio of products, creating a powerful bundled product offering for the protection of power electronics.

What is laminated bus bar?

Laminated bus bar is an engineered component consisting of layers of fabricated copper separated by thin dielectric materials, laminated into a unified structure. Sizes and applications range from surface-mounted bus bars the size of a fingertip to multilayer bus bars that exceed 20 feet in length. Laminated bus bar solutions are routinely used for low volumes up through tens of thousands per week.

Why choose laminated bus bar?

Bus bars reduce system costs, improve reliability, increase capacitance, and eliminate wiring errors. They also lower inductance and lower impedance. Plus, the physical structure of bus bars offers unique features in mechanical design. For example, complete power distribution subsystems can also act as structural members of a total system. Multilayer bus bars offer a structural integrity that wiring methods just can't match.

A reputation for quality

Mersen's reputation for outstanding technical expertise, product quality, and engineered safety is the result of over a century of design and manufacturing knowledge, coupled with state-of-the-art equipment in three ISO-9001 registered facilities. Each facility manufactures single and multilayer bus bars, as well as fully integrated solutions in which the laminated bus bar also serves as a platform for a multitude of discreet components:

- In Europe, our 5,000 m² plant in Angers is a center of excellence for laminated bus bar solutions
- In North America, our 110,000 ft² plant in Rochester, New York is a vertically integrated center of excellence for all power distribution solutions, plus AS9100C registered
- In Asia, a brand-new 6,500 m² facility in Shanghai, China offers full manufacturing capability of all power and bus bar solutions



Our commitment to quality is clearly evident from the very beginning of the design process, right through to the production of the last part. Our Quality System is designed with defect prevention in mind and is certified to AS9100. Our staff of professional engineers and experienced designers develops the tooling and manufacturing methods, procedures and process parameters to meet our customers' specifications.

With over sixty years of experience in designing laminated bus bars, and complete in-house manufacturing capability, we have the flexibility and expertise to respond to our customers' requirements through:

- quality control and quality assurance
- engineering & design
- chemical milling
- electroplating
- assembly
- epoxy encapsulation
- tool and die design and build
- metal fabrication
- metal joining
- die cutting
- laminating
- electrostatic powder coating



A WORLD LEADER
in the safety & reliability
of Solar Power.

A GLOBAL PLAYER

A global expert in materials and solutions for extreme environments as well as in the safety and reliability of electrical equipment, Mersen designs innovative solutions to address its

clients' specific needs to enable them to optimize their manufacturing process in sectors such as energy, transportation, electronics, chemical, pharmaceutical, and process industries.

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