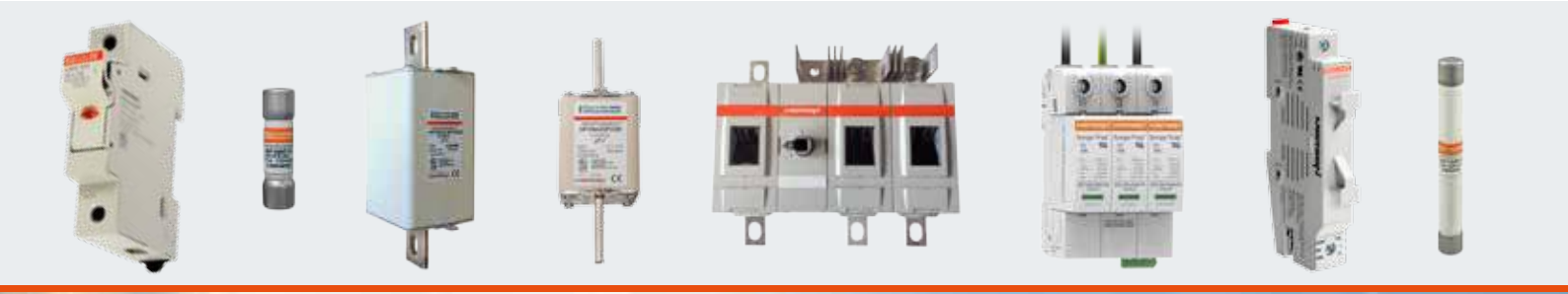
Expertise, our source of energy

HELIOPROTECTION®
PROGRAM

SOLUTIONS FOR PHOTOVOLTAIC (ISSUE 11)



THE COMMITMENT OF MERSEN IN SAFER AND MORE RELIABLE SOLAR PHOTOVOLTAIC INSTALLATIONS

In the solar market Mersen is a driving force in the development of safer and more reliable solar photovoltaic power installations.
To participate in implementing such installations, Mersen has developed a special program of solutions branded HelioProtection®.

HelioProtection®

HelioProtection® is a brand of Mersen

HelioProtection® Program is the name of the platform of overcurrent and surge protection solutions fully designed for the solar photovoltaic applications.

It is a mix of:

- **Dedication** – the solutions have been specifically designed for protecting PV power systems.
- **Innovation** – the solutions in this program are all on the technological edge and have been tested in our specialized power labs.
- **Expertise** – this program is backed up in the marketplace by a tema of experts capable of supporting you from choice to after sales.

GOING EVEN FURTHER TOGETHER

To support all those we work with - developers, designers, engineering consultants, purchasers, quality managers, qualification inspectors, insurance companies, rating and listing agencies - in their efforts to specify, design, build, test and run solar power systems, Mersen has invested in the necessary resources:

- a qualified design department to help with the most complex and arduous projects and get involved in co-design or co-development initiatives;
- a technical support department with attentive engineering staff listening to other professionals and helping them match protection components or solutions to their equipment;
- a hotline at **+33 4 26 29 29 29.**

Three labs dedicated to quality

The proof of that quest for continual improvement: a total of more than a million tests in 25 years! Mersen has three test labs: one in Newburyport, Massachusetts, one in Terrassa, Spain and one in Saint Bonnet de Mure in France. The three are complementary, in terms of the available resources, to be able to offer the widest possible range of a.c. and d.c. tests to UL-CSA, NFC and IEC standards.

An innovative PV installation for product test and validation with a total power of 35KW and an exclusive modular architecture to configure the installation: 6 strings of 24 PV modules or 12 strings of 12 PV modules.

Newburyport:

- a specialized d.c. lab - obviously an asset in designing fuses for photovoltaic applications;
- a low power test lab;
- fusion tests at 0 to 6000A constant current;
- simulations of equipment starting up and stopping from 0 to 3000A;
- a low voltage test bench for surge protective devices;
- temperature tests, etc.

Terrassa:

- **Bringing together the experience** of the principal international **manufacturing and test standards** for SPDs (IEC and UL)
- **Unique expertise in the combination of SPD and fuse technology,** one of the hot topics in the SPD industry
- **Innovative ranges combining surge protection and ground monitoring** to provide full safety and continuity of service
- **World-class surge test platform,** with laboratories holding accreditations for both IEC/EN 61643-11 (Terrassa) and UL 1449 3rd ed (Newburyport)
- **Global manufacturing footprint** of a comprehensive range of solutions covering both IEC and UL markets
- **Leadership in POP (TOV)** (Power-frequency Overvoltage Protection) and combined **SPD+POP** devices. EN 50550.
- Wide range of solutions targeting **industrial, commercial and residential applications**

Saint-Bonnet-de-Mure: Types of Tests

Measurement of short-circuit characteristics of electrical protection gear, certification tests, tests on monitoring systems and inverters, tests of **faults (to ground, between panels, between strings of panels)** and their impact on equipment.

All other usual tests on actual systems.

Testing Equipment

- 144 panels of polycrystalline silicon at 240Wp (30 to 37V, 8A, 18 kg) for a total of approx. 35 kW with two possible configurations:
- 400VDC wiring, 12 parallel strings of 12 panels in series;
- 800VDC wiring, 6 parallel strings of 24 panels in series.

Mersen welcomes customers to run test campaigns focused on critical points in their own bills of requirements.

STANDARDIZATION COMPONENTS, SYSTEMS AND INSTALLATIONS

Photovoltaic equipement and systems are governed by international general standards. IEC and UL standards provide the rules to apply to implement state-of-the-art PV installations.

Besides that international or more local standards relay and complete the general standards.
They concern more precise fields such as: complete systems and installations, components incorporated in the systems and connection to the grid.

General Standards

IEC 62548 Edition 1
Installation and safety requirements for photovoltaic (PV) generators

Standards, Guidelines, Recommendations

PV Installations
PV Systems
IEC 60364-7-712
Low Voltage Installations – PV Installations.

DIN V VDE V0126-5
Junction boxes for photovoltaic modules.

IEC 61439-1
Low voltage switchgear and controlgear assemblies

Surge Protective Devices (SPDs)EN 50539-11
Low voltage surge protective devices – Surge protective devices for specific application including D.C. – Part 11: Requirements and tests for SPDs in photovoltaic applications

Fuses for Photovoltaic Systems
UL 2579
IEC 60269-6
Low voltage fuses – Part 6: Supplementary requirements for fuse-links for the protection of solar PV energy systems.

Photovoltaic Fuseholders
UL 4248
IEC 60269-1

Switches for use in Photovoltaic Systems
UL 98B
IEC60947-3

PV Power Converters And Grid Connection
IEC 61727
Photovoltaic (PV) systems – Characteristics of the utility interface.

PHOTOVOLTAIC EQUIPMENT PROTECTION BY gPV FUSES

1 - Necessary data required for calculations of photovoltaic protection:

M = number of modules in series in a string (a chain)

N = number of strings (chains) in parallel

For the used module:

IRM = maximum reverse current of a module

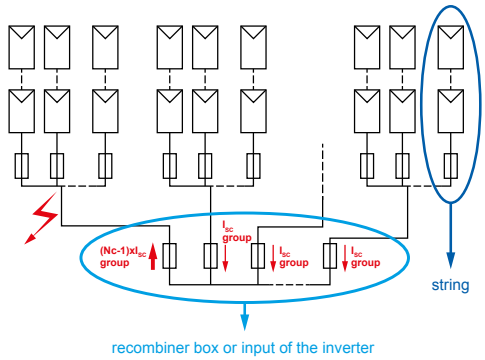
Nota: the module is tested according to the standard **61730-2** at a value equal to:

135% x IRM during **2 hours:**
the module has to withstand this condition

Voc STC = **o**pen **c**ircuit voltage

Isc STC = **s**hort **c**ircuit current

STC = **S**tandard **T**est **C**onditions = irradiance 1 000 W/m², Air Mass 1.5, Cell temperature 25°C



2 - Presence of fuses at the string level:

a) **One** or **two** strings in parallel: **fuses are not necessary**

b) **Three or more** strings in parallel: the maximum number of strings in parallel **without electrical protection** is given according to the following formula:

$$N \leq (1 + IRM / ISC\ STC)$$

3 - Location of fuses in the strings:

Usually, the usage is to put a fuse on each polarity (positive and negative) of each string in floating circuit configuration, and one otherwise.

4 - Rated voltage required for gPV fuses:

The annex BB of the IEC 60269-6 standard gives information to determine the rated voltage of the gPV fuse-link to be selected.

This voltage has to take into account the **Voc STC of the string** at the lowest application temperature.

Voc STC of the string = M x Voc STC of one module

At -25 °C the open circuit voltage rises to 1.2 times **Voc STC**

Consequently the **fuse-link rated voltage has to be**

≥ 1.2 × Voc STC of the string

≥ 1.2 × M x Voc STC of one module

Nota: the table 104 of the IEC 60269-6 requires breaking tests carried out at a mean value of recovery voltage fixed at 100 (0->+5) % of the fuse rated voltage.
These conditions are the same as those of UL standards **UL 248-19** or **UL 2579.**
So, the coefficient **1.2** is applicable with both IEC and UL fuses.

5 - Rated current required for gPV fuses:

The annex BB of the IEC 60269-6 standard gives information to determine the rated current of the gPV fuse-link to be selected. The same calculation has to be applied to the gPV fuses at the string level and to the gPV fuses at the recombination level or at the input of the inverter.

With **an ambient temperature inside the box lower or equal to 45°C, the fuse rating has to be higher than or equal to 1.4 x Isc STC according to IEC 60269-6.**

As in practice ambient temperature in the boxes can rise up to 65°C or more, a further derating is needed.

Nota: NEC recommends **1.56 x Isc STC** for ambient temperature lower than **50°C** inside the boxes.

6 - Modules protection against reverse currents:

6a) The corrigendum 1 of the IEC 60269-6 specifies that the tests for the verification of the conventional fusing currents "are deemed to give satisfactory results for operation at **1.35 In** within **two hours".**

The time-current characteristics of Mersen gPV fuses are in concordance with the following gates:

"non melting current = 1.13 x In fuse" and "melting current = 1.35 x In fuse" and so, Mersen gPV fuses meet the gates requirements of the UL and IEC standards.

6b) On another side, we have seen in paragraph 1 that the modules are tested according to the standard **61730-2** at a value equal to 135% x IRM during two hours

6c) Conclusion for the modules protection:

Conclusion: to protect modules against reverse current, we have to check **1.35 x In fuse** lower or equal **to 1.35 x IRM**

- **1.35 x IRM** → Certain withstanding of the module
- **1.35 x In fuse** → Certain melting of the fuse

END USER HAS ONLY TO CHECK:

In (fuse rating) has to be lower or equal to **IRM** (maximum reverse current of the modules)

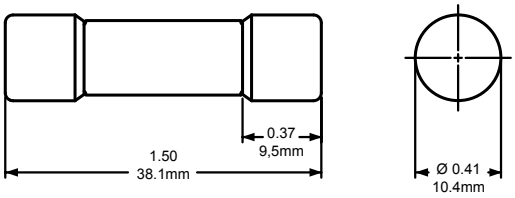
7 - Fuses gPV at the recombination level:

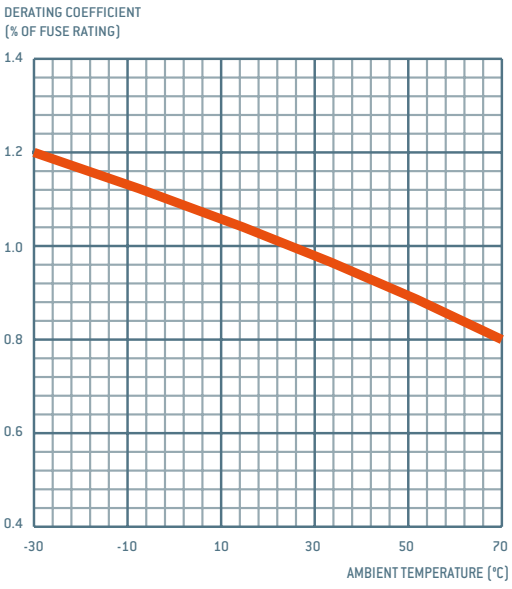
We apply the rules seen in paragraphs 4 & 5 for the determination of the rated voltage of the gPV fuses and for the determination of their ratings: the end user has to check that the calculated ratings are such that the overload protection of the cables is ensured.

HelioProtection® Fuse gPV
HP6M – 600VDC

Mersen's HP6M photovoltaic (PV) fuse series is designed specifically to protect the PV modules against the reverse currents. These HP6M fuses, designed for low minimum breaking capacity capabilitiesof 1.35 times the fuse rated current value, allows for safe circuit interruption under typical low fault current conditions produced by PV arrays.

MINIMUM BREAKING CAPACITY = 1.35IN MAXIMUM BREAKING CAPACITY = 10KA				
MAX.OPERATING VOLTAGE = RATED VOLTAGE	RATED CURRENT	CATALOG NUMBER	REFERENCE NUMBER	PACKAGING
600VDC UL Listed CSA Certified IEC 60269-6 Approved (gPV)	1	**HP6M1**	L1018565	10
	2	**HP6M2**	M1018566	
	3	**HP6M3**	N1018567	
	4	**HP6M4**	Q1018569	
	5	**HP6M5**	R1018570	
	6	**HP6M6**	S1018571	
	7	**HP6M7**	T1018572	
	8	**HP6M8**	V1018573	
	10	**HP6M10**	X1018575	
	12	**HP6M12**	Y1018576	
	15	**HP6M15**	Z1018577	
	20	**HP6M20**	A1018578	
	25	**HP6M25**	K1018610	
	30	**HP6M30**	L1018611	





Fuse holders

NB OF POLES	CATALOG NUMBER	REFERENCE NUMBER	NB OF MODULES (17.5MM)	PACKAGING	INDICATOR
1	US101HEL	D1009979	1	12	No
1	US101IHEL	Q1009461	1	12	Yes
1	USGM1HEL	P1022294	1	12	No
1	USGM1IHEL	N1022293	1	12	Yes

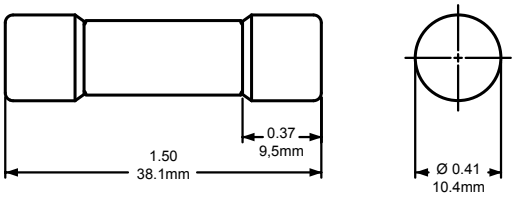
Electrical Characteristics

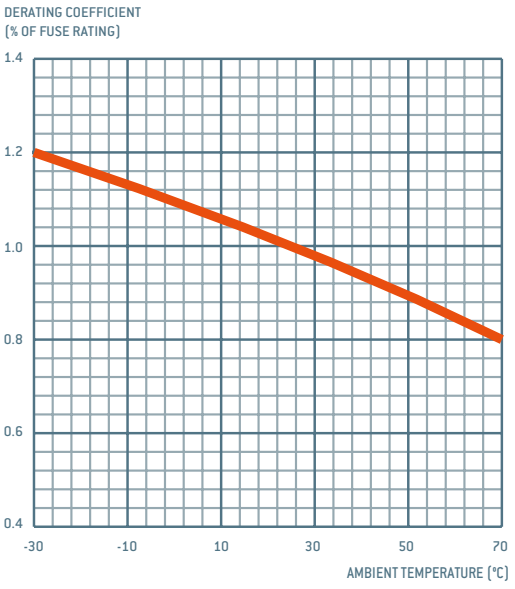
RATED VOLTAGE (V)	NOMINAL CURRENT (A)	CATALOG NUMBER	70% AMP RATING (W)	80% AMP RATING (W)	100% AMP RATING (W)
600	1	**HP6M1**	0.14	0.19	0.31
600	2	**HP6M2**	0.19	0.26	0.43
600	3	**HP6M3**	0.64	0.85	1.4
600	4	**HP6M4**	0.58	0.77	1.3
600	5	**HP6M5**	0.65	0.87	1.4
600	6	**HP6M6**	0.69	0.92	1.5
600	7	**HP6M7**	-	-	-
600	8	**HP6M8**	0.92	1.23	2.0
600	10	**HP6M10**	0.96	1.28	2.1
600	12	**HP6M12**	1.12	1.49	2.5
600	15	**HP6M15**	0.99	1.32	2.2
600	20	**HP6M20**	1.25	1.67	2.8
600	25	**HP6M25**	1.38	1.84	3.1
600	30	**HP6M30**	1.5	2.0	3.3

HelioProtection® Fuse gPV
HP10M – 1 000 VDC

Mersen's HP10M photovoltaic (PV) fuse series is designed specifically to protect the PV modules against the reverse currents. These HP10M fuses, designed for low minimum breaking capacity capabilities of 1.35 times the fuse rated current value, allows for safe circuit interruption under typical low fault current conditions produced by PV arrays.

MINIMUM BREAKING CAPACITY = 1.35IN MAXIMUM BREAKING CAPACITY = 10KA				
MAX.OPERATING VOLTAGE = RATED VOLTAGE	RATED CURRENT	CATALOG NUMBER	REFERENCE NUMBER	PACKAGING
1000VDC UL Listed CSA Certified IEC 60269-6 Approved (gPV)	1	**HP10M1**	B1018579	10
	2	**HP10M2**	C1018580	
	3	**HP10M3**	D1018581	
	4	**HP10M4**	E1018582	
	5	**HP10M5**	F1018583	
	6	**HP10M6**	G1018584	
	7	**HP10M7**	H1018585	
	8	**HP10M8**	J1018586	
	10	**HP10M10**	L1018588	
	12	**HP10M12**	M1018589	
	15	**HP10M15**	N1018590	
	20	**HP10M20**	P1018591	
	25	**HP10M25**	D1023825	
	30	**HP10M30**	E1023826	





Fuse holders

NB OF POLES	CATALOG NUMBER	REFERENCE NUMBER	NB OF MODULES (17.5MM)	PACKAGING	INDICATOR
1	US101HEL	D1009979	1	12	No
1	US101IHEL	Q1009461	1	12	Yes
1	USGM1HEL	P1022294	1	12	No
1	USGM1IHEL	N1022293	1	12	Yes

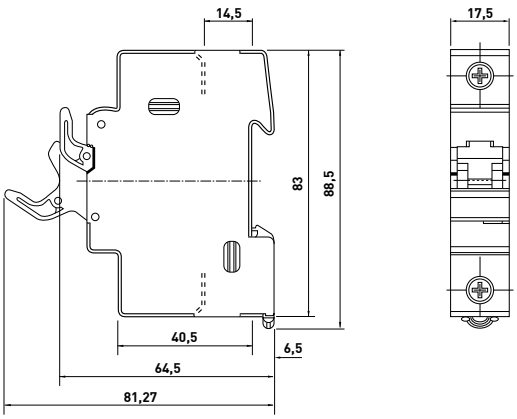
Electrical Characteristics

RATED VOLTAGE (V)	NOMINAL CURRENT (A)	CATALOG NUMBER	70% AMP RATING (W)	80% AMP RATING (W)	100% AMP RATING (W)
1000	1	**HP10M1**	0.125	0.175	0.250
1000	2	**HP10M2**	0.160	0.250	0.320
1000	3	**HP10M3**	0.66	0.87	1.36
1000	4	**HP10M4**	0.69	0.8	1.25
1000	5	**HP10M5**	0.59	0.73	1.12
1000	6	**HP10M6**	0.42	0.67	1.05
1000	7	**HP10M7**	0.40	0.64	1.0
1000	8	**HP10M8**	0.77	0.88	1.48
1000	10	**HP10M10**	0.67	0.90	1.5
1000	12	**HP10M12**	0.72	1.0	1.8
1000	15	**HP10M15**	0.9	1.3	2.2
1000	20	**HP10M20**	1.1	1.5	2.8
1000	25	**HP10M25**	1.3	1.8	3.0
1000	30	**HP10M30**	1.5	1.9	3.7

Modulostar® HelioProtection®

The Modulostar HelioProtection® fuse holders from Mersen are very well known in the power low voltage distribution application market. HelioProtection® Fuse gPV were specially designed for PV, and DC more generally speaking, applications.

They comply with both UL512 and IEC 60269-1 standards and RoHS as well.
The plastic parts of our Modulostar HelioProtection® are UL94 V0 to V2 (Yellow Card).Two models are available: one with and one without blown fuse indication via an indicator light which is on when the fuse is blown (open circuit). The blown fuse indication operates from 350VDC up to 1000VDC.



Characteristics

- **Wiring:** rigid wire = 1 - 16mm² (18-6AWG), flexible wire = 0.75 - 10mm² (18-8AWG) use 75°C wire CO only.
- **Screw driver heads: Mersen** recommends use of PZ 2 or flat 5.5x1mm heads (maximum diameter 6mm).
- **Maximum tightening torque:** 2.2Nm
- DC20B-IP2X.

Recommendations

- Do not operate under load.
- **Non insulated conductive parts:** preferably the equipment should be laid out keeping the + and - polarities separate.
- **Mounting with SPD:** check that the SPD' Up is compatible with the US10's IU imp=6kV (see UTE C15-712).

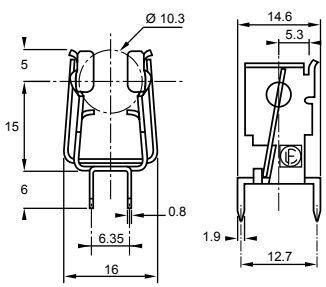
NB OF POLES	CATALOG NUMBER	REFERENCE NUMBER	NB OF MODULES (17.5MM)	PACKAGING	INDICATOR
1	US101HEL	D1009979	1	12	Without Ind.
1	US101IHEL	Q1009461	1	12	With Ind.

NOMINAL VOLTAGE Ui DC	VOLTAGE ISOLATION Uimp	NOMINAL CURRENT	MAX. POWER LOSSES IN THE FUSE LINKS	FUSE LINKS RATING	CABLE WIRE SECTION (mm²) RECOMMENDED
1000VDC Pollution Degree 2	6kV	32A	3W	≤12	2.5
	6kV	32A	3W	16	2.5
	6kV	32A	3W	20	2.5
	6kV	32A	3W	25	4
	6kV	32A	3W	30	6

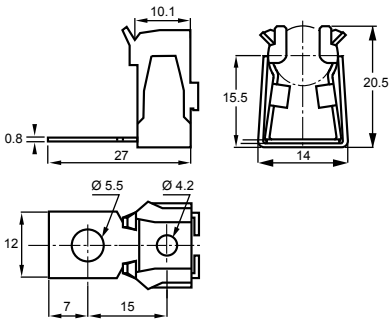
Fuse clips

CAT. NUMBER	DESIGNATION	WEIGHT (G)	PACKAGING
MR10RESSORTCI	MR10 CI	4.5	200
MR10RESSORT	MR10	7.0	20
MR10RESSORTSP	MR10 without compressor	5.7	20

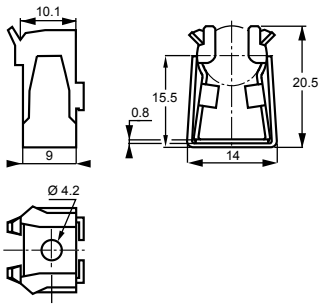
MR10 CI



MR10



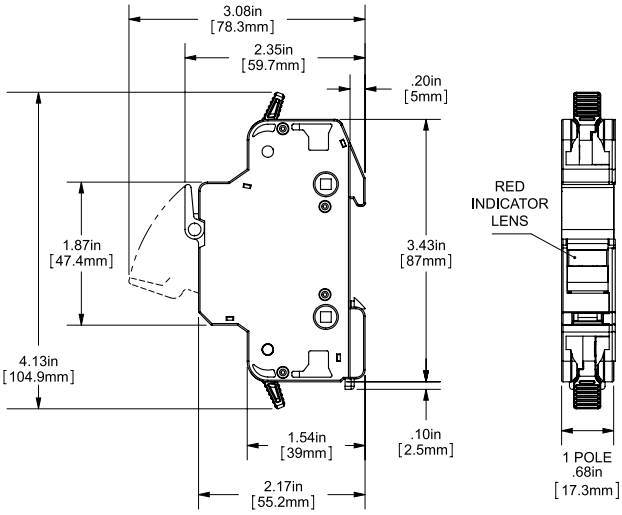
MR10 without compressor



USGM1HEL
UltraSafe™ Fuseholders

Innovative UltraSafe™ midget fuseholders with screw-less, spring pressure, wire termination technology

Mersen's new USGM series fuseholders deliver the ultimate ease-of-use, time (labor) saving and reliable solution available in the marketplace. Mersen is the first manufacturer to offer screw-less, spring pressure, wire termination technology into a power fuseholder, delivering the best of both technologies to its customers. They comply with UL4248-18 standard and IEC 60947-3. Now you can experience the combined benefits of safety, ease-of-use, labor savings and reliability of UltraSafe™ fuseholders and spring pressure technology.



Recommended Fuse Usage:

- USGM1HEL use with Photovoltaic Fuses: HP6M, HP10M.

Additional Specifications:

- **Screw-less, spring pressure terminals:** WAGO CAGE CLAMP®.
- **Wire Range:** #14 to 6 AWG (2.5 to 16mm²) Single Conductor; #14 to 10 AWG (2.5 to 5.0mm²) Dual Conductor.
- **Wire Type:** 60/75/90°C Solid/Stranded Copper.

Ratings:

- **Volts:** 1000VDC maximum
- **Amps :** 30A maximum
- **SCCR :** 200kA AC, 100kA DC

FUSE TYPE	NO. OF POLES	VOLTAGE RATING	AMPERE RATING	VISUAL INDICATION	CATALOG NUMBER	REF. NUMBER	PACKAGING
Photovoltaic	1	1000VDC	30	No	USGM1HEL	P1022294	12
				Yes	USGM1IHEL	N1022293	12

HelioProtection® Fuse gPV
10x85 - 1200VDC

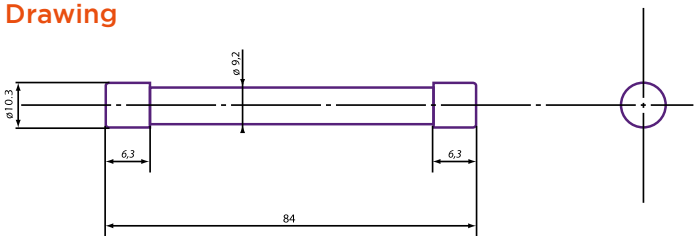
Mersen's 10x85 photovoltaic (PV) fuse series is designed specifically to protect the PV modules against the reverse currents. These 10x85 fuses, designed for low minimum breaking capacity capabilities of 1.35 times the fuse rated current value, allows for safe circuit interruption under typical low fault current conditions produced by PV arrays. They are rated 1200V and meet the trend for increasing the maximum open circuit voltage across the PV modules.

DC HelioProtection® Fuse complies with new IEC 60269-1 and with the new 60269-6 introducing the gPV type of fuse.

Basics characteristics

SIZE	MAXIMUM OPERATING VOLTAGE FOR L/R ≤ 0,5ms	RATED CURRENT	OPERATION	BREAKING CAPACITY @ Un	POWER LOSSES END CONTACTS		CATALOG NUMBER	REFERENCE NUMBER	PACKAGING
					0.7In	0.8In			
mm	V	A		kA	W	W			
D10xL85	1 200	8	gPV type	10	1,3	1,7	DC10HEL12C8	D1014188	45
		10			1,3	1,7	DC10HEL12C10	T1012017	45
		12,5			1,3	1,9	DC10HEL12C12,5	X1008754	45
		16			1,5	2,1	DC10HEL12C16	Y1008755	45
		20			1,8	2,5	DC10HEL12C20	Z1008756	45
	900	25			2,2	3	DC10HEL9C25	A1008757	45

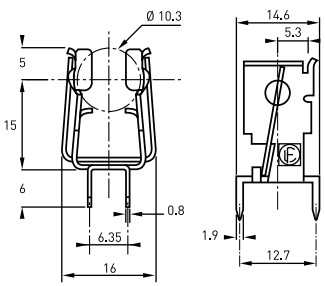
Drawing



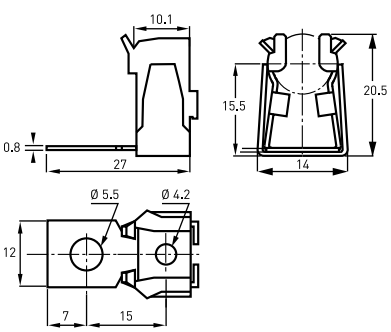
Fuse clips

CATALOG NUMBER	REFERENCE NUMBER	DESIGNATION	WEIGHT (G)	PACKAGING
MR10RESSORTCI	Y098507	MR10 CI	4.5	200
MR10RESSORTCI	Y098507	MR10CI	4.5	1000

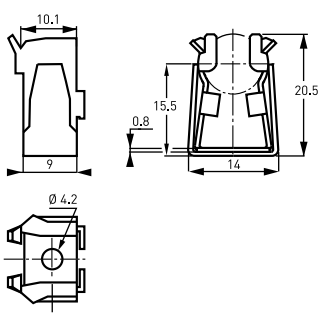
MR10 CI



MR10



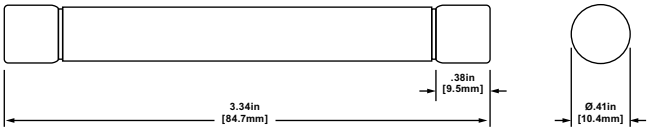
MR10 without compressor



HP15M
1500VDC Midget (10x85mm)

Engineered to protect photovoltaic applications

Mersen's HP15M photovoltaic (PV) fuse series was engineered and designed specifically for the protection of photovoltaic systems. Its enhanced fuse construction makes it ideal for continuous temperature and current cycling withstand adding to system longevity. The 1500VDC rated HP15M, designed for low minimum breaking capacity capabilities of 1.35 times the fuse rated current value, allows for safe circuit interruption under typical low fault current conditions produced by PV arrays. Protect your off-grid or grid tied PV system from unexpected ground faults and line faults using Mersen's Helio Protection fuse line.



Features/Benefits:

- Low fault current interrupting capability
- Durable construction for enhanced system longevity
- Temperature cycle withstand capability
- Guaranteed operation at temperature extremes
- Globally accepted
- Recommended Fuse holder: US15M1HEL

Applications:

- All photovoltaic applications
- PV string/array level protection
- Combiner box applications
- In-line PV module protection
- Inverters
- Battery charge controllers

CATALOG NUMBER	REFERENCE NUMBER	RATED CURRENT In (Amps)	POWER DISSIPATION AT 0.7xIn (Watts)	POWER DISSIPATION AT 0.8xIn (Watts)	POWER DISSIPATION AT 1.0xIn (Watts)	PACKAGING
HP15M5	X1055053	5	0.84	1.16	1.97	5
HP15M6	Q1053667	6	0.97	1.37	2.42	5
HP15M7	R1053668	7	0.97	1.37	2.43	5
HP15M8	S1053669	8	1.04	1.50	2.60	5
HP15M10	T1053670	10	1.23	1.77	3.09	5
HP15M12	V1053671	12	1.15	1.70	2.89	5
HP15M15	W1053672	15	1.39	1.91	3.48	5
HP15M20	X1053673	20	1.71	2.47	4.28	5
HP15M25	Y1053674	25	2.13	3.08	5.35	5
HP15M30	Z1053675	30	2.56	3.61	6.40	5

Ratings:

- **Volts:** 1500VDC
- **Amps:** 5A - 30A
- **SCCR:** 50kA

Approvals:

- UL Listed to Standard UL2579
- CSA Component
- IEC 60269-6

HP15G types also exist from 2.5 to 5A, gPV 1500VDC, in 10mmx57mm size, to be associated with MR10 fuse clips.

US15M1HEL

UltraSafe™ Fuseholders for PV Applications

Touch-safe design increases user safety

Mersen UltraSafe™ modular fuse holders introduce the next level of safety for Photovolatic applications for 10x85mm fuses. UltraSafe™ fuseholders are finger safe up to an IP20 grade of protection, and the 10x85mm features a p ull out, pivoting fuse carrier.

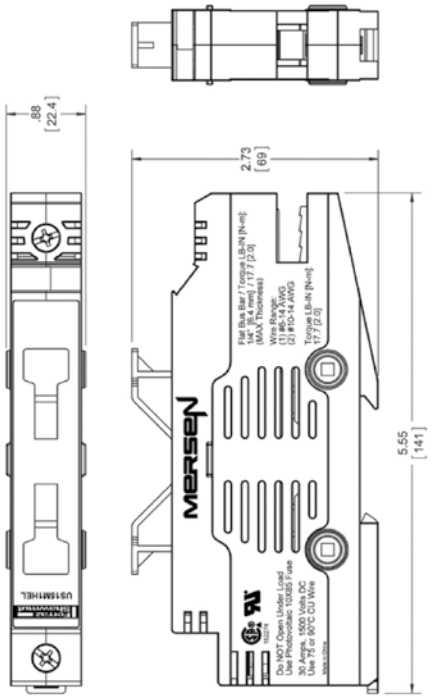
The US15M1HEL is designed with terminals to accept standard stock busbar eliminating the need for custom combed busbar, saving cost, time and simplifying installation. The body features industry leading UL94V0 material, providing superior flammability rating with exceptional durability.

Features/Benefits:

- Bus bar termination clamp
- UL94V0 Material Flammability Rating
- Wire terminal for use with 90°C wire
- Wire range: 6-18 stranded, 10-18 solid. Copper wire only.
- IP20 Finger Safe
- Din Rail Mounting
- Recommended fuse usage: HP15M

Applications:

- All photovoltaic applications
- Combiner box applications



Ratings:

- **Volts:** 1500VDC Maximum
- **Amps :** 30A Maximum
- **SCCR:** 50kA

Approvals:

- UL Recognized Component, evaluated to UL 4248-18
- Evaluated to IEC60269-1

4248-18

PV-Rated Disconnect Switches

NEW LINE

Mersen launches a global line of premium compact low voltage switchgear

PV-rated Switches
100A to 500A Up to 1000VDC

Mersen's HP15M photovoltaic (PV) fuse series was engineered and designed specifically for the protection of photovoltaic systems. Its enhanced fuse construction makes it ideal for continuous temperature and current cycling withstand adding to system longevity. The 1500VDC rated HP15M, designed for low minimum breaking capacity capabilities of 1.35 times the fuse rated current value, allows for safe circuit interruption under typical low fault current conditions produced by PV arrays. Protect your off-grid or grid tied PV system from unexpected ground faults and line faults using Mersen's Helio Protection fuse line.

Function
Standard switch-disconnect provides the load break switching function: making, carrying, breaking current plus isolation.

Applications:
2-pole PV-rated switches disconnect individual strings, individual arrays and PV inverter from the DC side.

Features
- **Safety:** Robust design, visible contacts, user-independent operation
- **Performance:** Specifically designed for DC applications: dual magnetic breaking
- **Size**: 40% to 57% smaller footprint = greatly reduced installation area
- **Flexibility in installation:** Symmetrical power-pole design independent of polarity
- **Flexibility in logistics:** Ordering process and stock control is more fluent due to reduced part numbers
- **Environmental impact:** No harmful material

Versions and accessories
- Extended shaft
- Pistol type handle
- Direct mounting type handle
- Auxiliary contact
- Module for auxiliary contact
- Mechanical and electrical interlock
- Terminal clamp
- Short-circuit link
- Terminal shroud

PV-Rated Disconnect Switches
IEC-Rated DC Switches


MD100E11

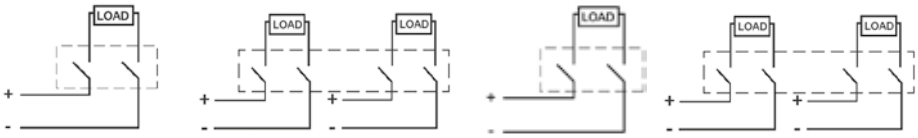

MD100E22


MD400E11


MD400E22


MD400EV12


MD315EV33



Switch Body

AMPERE RATING	100	160	200	250	315	400	500
1000VDC 2-pole Configuration	MD100E11	MD160E11	MD200E11	MD250E11	MD315E11	MD400E11	MD500E11
1000VDC 2x2-pole Configuration	MD100E22	MD160E22	MD200E22	MD250E22	MD315E22	MD400E22	MD500E22
1500VDC 3-pole Configuration					MD315EV12	MD400EV12	MD500EV12
1500VDC 2x3-pole Configuration					MD315EV33	MD400EV33	MD500EV33

Handles and Shafts


HDD250


HB65

DIRECT FRONT OPERATION							
	HDD250	HDD250	HDD250	HDD250	HDD400	HDD400	HDD400

EXTERNAL PISTOL STYLE		
NEMA Type 1, 3R, 12	HB65, HB80	HB125, HB145
NEMA Type 4, 4X	HB65X, HB80X	HB125X, HB125X

B=Black. Substitute 'R' for 'B' if a red handle is desired. Ex. HR65

SHAFTS		
Shaft—SPAxxx (xxx = length in mm)	SPA130, SPA210, SPA290, SPA360, SPA430	SFB185, SFB280, SFB325, SFB395, SFB535

Accessories


OA1G01
OA1G10


OEA28

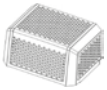

JUMP250


JC250


JUMP500


JC500


JUMP500-2


JC500-2

AUXILIARY CONTACTS*							
NO Right side mounting	OA1G10	OA1G10	OA1G10	OA1G10	OA1G10	OA1G10	OA1G10
NC left side mounting	OA3G01	OA3G01	OA3G01	OA3G01	OA3G01	OA3G01	OA3G01
Module for SF aux. contacts	OEA28	OEA28	OEA28	OEA28	OEA28	OEA28	OEA28

**Rated 2A max continous @690VAC*

SHORT CIRCUIT LINK							
For MDxxxE22 and EV33					JUMP500-2	JUMP500-2	JUMP500-2
For MDxxxE11, E22, EV12**	JUMP250	JUMP250	JUMP250	JUMP250	JUMP500	JUMP500	JUMP500

***Shipped with one link per circuit*

TERMINAL SHROUD FOR SHORT CIRCUIT LINK							
For JUMP500-2					JC500-2	JC500-2	JC500-2
For JUMP250, JUMP500	JC250	JC250	JC250	JC250	JC500	JC500	JC500

TERMINAL SHROUDS FOR LUGS							
Kit of 4 Terminal Shrouds	TS250-14	TS250-14	TS250-14	TS250-14			
1 Terminal Shroud					TDS400	TDS400	TDS400

A shorter version is available for DC Switches up to 250A. 1 piece per package: TDS250S

PV-Rated Disconnect Switches

UL98B Listed DC Switches

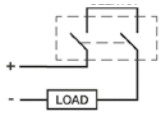
MD100U11

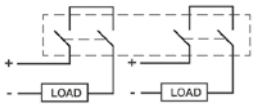
MD100U22

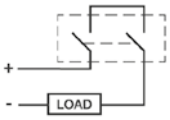
MD250UV12

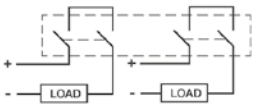
MD400U11

MD400U22









Switch Body

AMPERE RATING	100	200	250	320	400
1000VDC 2-pole Configuration	MD100U11	MD200U11	MD250U11	MD320U11	MD400U11
1000VDC 2x2-pole Configuration	MD180U22	MD180U22	MD180U22	MD320U22	MD400U22
1500VDC 2-pole Configuration			MD250UV12	MD320UV12	MD400UV12

Handles and Shafts

HDD400

HB125

DIRECT FRONT OPERATION					
1000VDC	HDD250	HDD250	HDD250	HDD400	HDD400
1500VDC			HDD400	HDD400	HDD400

EXTERNAL PISTOL STYLE		
NEMA Type 1, 3R, 12	HB65, HB80	HB125, HB145
NEMA Type 4, 4X	HB65X, HB80X	HB125X, HB145X

B=Black. Substitute 'R' for 'B' if a red handle is desired. Ex. HR65

SHAFTS		
Shaft—SPAxxx (xxx = length in mm), SFBxxx (xxx = length in mm)	SPA130, SPA210, SPA290, SPA360, SPA430	SFB185, SFB280, SFB325, SFB395, SFB535

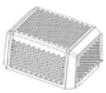
Accessories

OA1G01
OA1G10

OEA28

JC250

JC500



JC500-2

AUXILIARY CONTACTS*					
NO Right side mounting	OA1G10	OA1G10	OA1G10	OA1G10	OA1G10
NC left side mounting	OA3G01	OA3G01	OA3G01	OA3G01	OA3G01
Module for SF aux. contacts	OEA28	OEA28	OEA28	OEA28	OEA28

**Rated 2A max continous @690VAC*

TERMINAL SHROUD FOR SHORT CIRCUIT LINK					
For MDxxxU11, UV12	JC250	JC250	JC500	JC500	JC500
For MDxxxU22	JC500-2	JC500-2	JC500-2	JC500-2	JC500-2

TERMINAL SHROUD FOR LUGS					
Kit of 4 Terminal Shrouds					
1 Terminal Shroud	TDS400	TDS400	TDS400	TDS400	TDS400

A shorter version is available for DC switches up to 250A. 1 piece per package: TDS250S.

PV-Rated Disconnect Switches

UL 98B DC-rated Non-Fused switches

PART #	DESCRIPTION	REF #
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
MD250UV12	DC Switch 250A UL 1500V 3p	L1050926
MD320UV12	DC Switch 320A UL 1500V 3p	M1050927
MD400UV12	DC Switch 400A UL 1500V 3p	N1050928

IEC DC-rated Non-Fused switches

PART #	DESCRIPTION	REF #
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
MD315EV12	DC Switch 315A IEC 1500V 3p	C1050918
MD400EV12	DC Switch 400A IEC 1500V 3p	D1050919
MD500EV12	DC Switch 500A IEC 1500V 3p	E1050920
MD315EV33	DC Switch 315A IEC 2x1500V 6p	F1050921
MD400EV33	DC Switch 400A IEC 2x1500V 6p	G1050922
MD500EV33	DC Switch 500A IEC 2x1500V 6p	J1050924

Handles

PART #	DESCRIPTION	REF #
HB65	Handle black65mm IP65 NEMA 3R	W1043368
HB65X	Handle black 65mm IP65 NEMA 4X	X1043369
HB95	Handle black 95mm IP65 NEMA 3R	N1043913
HB95X	Handle black 95mm IP65 NEMA 4X	P1043914
HB125	Handle black 125mm IP65 NEMA 3R	A1043372
HB125X	Handle black 125mm IP65 NEMA 4X	B1043373
HR65	Handle red 65mm IP65 NEMA 3R	G1043378
HR65X	Handle red 65mm IP65 NEMA 4X	H1043379
HR95	Handle red 95mm IP65 NEMA 3R	S1043917
HR95X	Handle red 95mm IP65 NEMA 4X	T1043918
HR125	Handle red 125mm IP65 NEMA 3R	K1043381
HR125X	Handle red125mm IP65 NEMA 4X	L1043382
HDD250	Handle direct MD100-250	G1047794
HDD400	Handle direct MD315-500	H1047795

Shafts

PART #	DESCRIPTION	REF #
SFB280	Shaft SwitchFuse 12x12x280mm	F1043423
SFB325	Shaft SwitchFuse 12x12x325mm	G1043424
SFB395	Shaft SwitchFuse 12x12x395mm	H1043425
SPA130	Shaft pistol handle 6x6x130mm	V1043919
SPA210	Shaft pistol handle 6x6x210mm	P1043431
SPA290	Shaft pistol handle 6x6x290mm	Q1043432
SPA360	Shaft pistol handle 6x6x360mm	W1043920
SPA430	Shaft pistol handle 6x6x430mm	X1043921

Terminal Shrouds

PART #	DESCRIPTION	REF #
TS250-14	Term.shrd 250A switch 1p L/4	A1043464
TDS400	Term.shrd MD250-500 1p L/1	A1045534
TDS250S	Term.shrd MD100-250 1p S /1	Z1045533

Jumpers

PART #	DESCRIPTION	REF #
JUMP250	Jumper bar for 250A DC switch	F1043469
JUMP500	Jumper bar for 500A DC switch	G1043470
JUMP500-2	Jumper bar for 1500V E33	S1051300
JC250	Jumper cover for JUMP250	H1043471
JC500	Jumper cover for JUMP500	J1043472
JC500-2	Jumper cover for JUMP500-2	V1051302

HelioProtection® Fuse
HP10NH 1000VDC

Mersen HP10NH photovoltaic (PV) fuse series was engineered and designed specifically for the protection of photovoltaic systems. HelioProtection® HP10NH 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.

Features/Benefits:
- Global acceptance
- Low fault current interrupting capability
- Temperature cycle withstand capability
- Durable construction for enhanced system longevity
- High efficiency with low power losses
- Small footprint

Applications:
- All photovoltaic applications
- Inverter DC input protection
- Re-combiner applications (sub combiner, array combiner, master combiner)

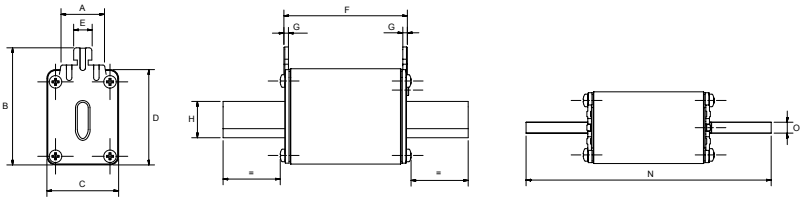
Ratings:
- 1000VDC
- IR = 50kA (L/R = 1ms)

Approvals:
- IEC 60269-6
- UL 2579
- RoHS compliance

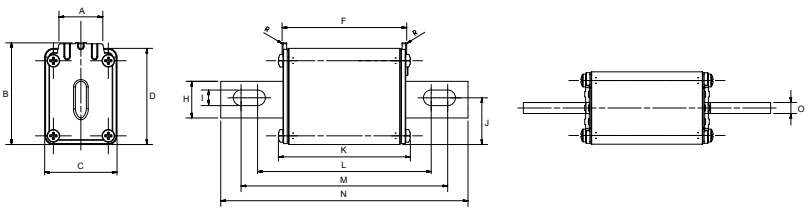
NEW

SIZE	RATED VOLTAGE (V)	NOMINAL CURRENT (A)	CLASS	PLAIN BLADE			DIRECT MOUNTING		POWER DISSIPATION AT In	POWER DISSIPATION AT 0,7xIn	PACKAGE
				CATALOG NUMBER	REFERENCE NUMBER	WEIGHT (KG)	CATALOG NUMBER	REFERENCE NUMBER			
NH1	1000VDC	50	gPV	HP10NH1GPV50	Z1028283	0.4	HP10NH1GPV50B	B1048663	11	4.6	3
		63		HP10NH1GPV63	A1028284	0.4	HP10NH1GPV63B	C1048664	13	5.4	3
		80		HP10NH1GPV80	B1028285	0.4	HP10NH1GPV80B	D1048665	15	6.1	3
		100		HP10NH1GPV100	C1028286	0.4	HP10NH1GPV100B	E1048666	17	7.2	3
		125		HP10NH1GPV125	D1028287	0.4	HP10NH1GPV125B	F1048667	18	7.4	3
		160		HP10NH1GPV160	E1028288	0.4	HP10NH1GPV160B	G1048668	23	9.6	3
NH2		200		HP10NH2GPV200	X1037619	0.63	HP10NH2GPV200B	H1048669	29	12	3
		250		HP10NH2GPV250	Y1037620	0.63	HP10NH2GPV250B	J1048670	34	14	3

Plain blade dimensions (mm)



Direct mounting dimensions (mm)



		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
PLAIN BLADE	NH1	24	64.5	39.5	52.5	10	68	2.5	20	-	-	-	-	-	135	6
DIRECT MOUNTING	NH2	24	55.5	39.5	52.5	10	68	2.5	20	8.5	25.5	72	94.8	112.8	135	6

HelioProtection® Fuse
HP12NH – 1250VDC

Mersen HP12NH photovoltaic (PV) fuse series was engineered and designed specifically for the protection of photovoltaic systems.

HelioProtection® 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.

Features/Benefits:
- Global acceptance
- Low fault current interrupting capability
- Temperature cycle withstand capability
- Durable construction for enhanced system longevity
- High efficiency with low power losses

Applications:
- All photovoltaic applications
- Inverter DC input protection
- Re-combiner applications (sub combiner, array combiner, master combiner)

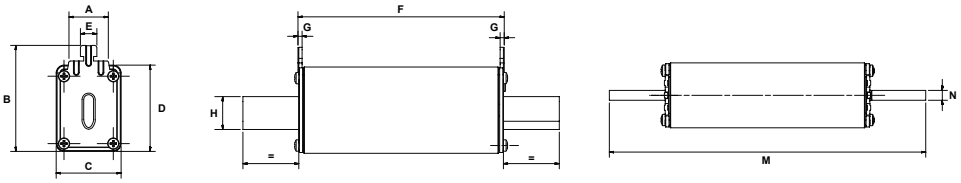
Ratings:
- 1250VDC
- IR = 50kA (L/R = 1ms)

Approvals:
- CEI 60269-6
- UL 2579 Conformité RoHS

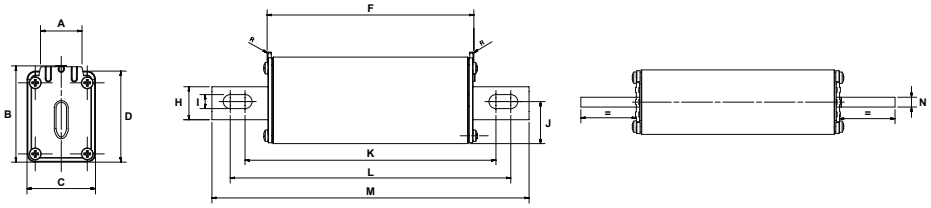
NEW

SIZE	RATED VOLTAGE (V)	NOMINAL CURRENT (A)	CLASS	PLAIN BLADE			DIRECT MOUNTING		POWER DISSIPATION AT 0,7xIn	POWER DISSIPATION AT In	PACKAGE
				CATALOG NUMBER	REFERENCE NUMBER	WEIGHT (KG)	CATALOG NUMBER	REFERENCE NUMBER			
NH1XL	1250VDC	125	gPV	HP12NH1XLGPV125	G1039744	0.435	HP12NH1LGPV125B	K1048671	12	29	1
		160		HP12NH1XLGPV160	H1039745	0.698	HP12NH1LGPV160B	L1048672	14	34	1
NH2XL		200		HP12NH2XLGPV200	J1039746	1.054	HP12NH2LGPV200B	M1048673	16	42	1
		250		HP12NH2XLGPV250	K1039747	1.054	HP12NH2LGPV250B	N1048674	17	45	1
NH3L		250		HP12NH3LGPV250	Z1033389	1.66	HP12NH3LGPV250B	P1048675	18	46	1
		315		HP12NH3LGPV315	A1033390	1.66	HP12NH3LGPV315B	Q1048676	22	53	1
		350		HP12NH3LGPV350	B1033391	1.66	HP12NH3LGPV350B	R1048677	23	55	1
		400		HP12NH3LGPV400	C1033392	1.66	HP12NH3LGPV400B	S1048678	29	73	1

Plain blade dimensions (mm)



Direct mounting dimensions (mm)



		A	B	C	D	E	F	G	H	I	J	K	L	M	N
PLAIN BLADE	NH1XL	24	64.5	39.5	52.5	10	125.5	2.5	20	-	-	-	-	192.5	6
	NH2XL	24	72	51	60	10	123	2.5	26	-	-	-	-	205	6
	NH3L	25	84.5	70	74	10	123	2.5	33	-	-	-	-	205	6
DIRECT MOUNTING	NH1XL	24	55.5	39.5	52.5	-	125.5	-	20	8.5	25.5	152.3	192.5	170.3	6
	NH2XL	24	63	51	60	-	123	-	26	10.5	27	154.8	172.8	205	6
	NH3L	25	76	70	74	-	123	-	33	10.5	33	163,2	176.2	205	6

HelioProtection® Fuse
HP15NH – 1500VDC

Mersen HP15NH photovoltaic (PV) fuse series was engineered and designed specifically for the protection of photovoltaic systems. HelioProtection® HP15NH 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

Features/Benefits:
- Global acceptance
- Low fault current interrupting capability
- Temperature cycle withstand capability
- Durable construction for enhanced system longevity
- High efficiency with low power losses

Applications:
- All photovoltaic applications
- Inverter DC input protection
- Re-combiner applications (sub combiner, array combiner, master combiner)

HelioProtection®

RoHS

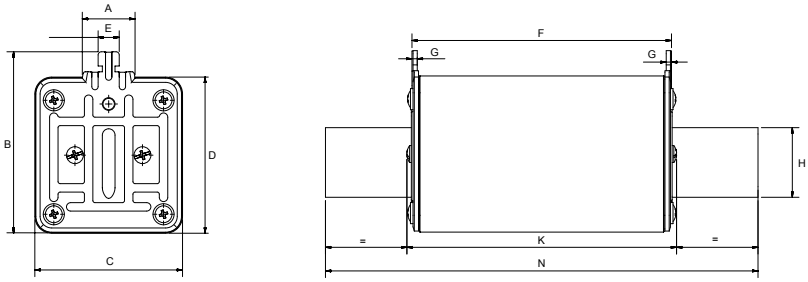
CE

Approvals:
- IEC 60269-6
- UL 2579
- RoHS compliance

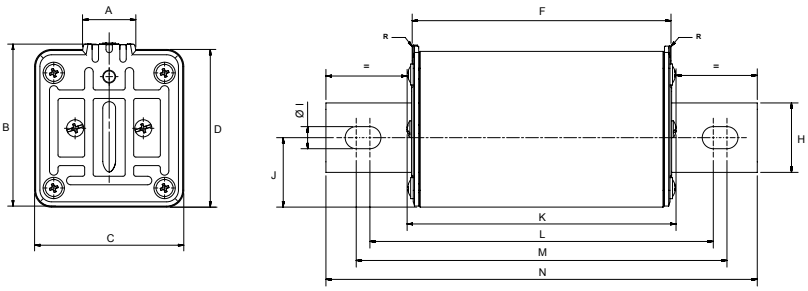
NEW

SIZE	RATED VOLTAGE (V)	NOMINAL CURRENT (A)	CLASS	PLAIN BLADE			DIRECT MOUNTING		POWER DISSIPATION AT 0,7xIn	POWER DISSIPATION AT In	PACKAGE
				CATALOG NUMBER	REFERENCE NUMBER	WEIGHT (KG)	CATALOG NUMBER	REFERENCE NUMBER			
NH3L	1500VDC	160	gPV	HP15NH3LGPV160	H1037859	1.66	HP15NH3LGPV160B	T1048679	15	36	1
		200		HP15NH3LGPV200	J1037860	1.66	HP15NH3LGPV200B	V1048680	18	44	1
		250		HP15NH3LGPV250	K1037861	1.66	HP15NH3LGPV250B	W1048681	20	50	1
		315		HP15NH3LGPV315	L1037862	1.66	HP15NH3LGPV315B	X1048682	23	57	1
		350		HP15NH3LGPV350	M1037863	1.66	HP15NH3LGPV350B	Y1048683	25	63	1
		400		HP15NH3LGPV400	N1037864	1.66	HP15NH3LGPV400B	Z1048684	28	71	1

Plain blade dimensions (mm)



Direct mounting dimensions (mm)



		A	B	C	D	E	F	G	H	I	J	K	L	M	N
PLAIN BLADE	NH3L	25	60	70	74	10	123	2.5	33	-	-	127.8	-	-	205
Direct Mounting	NH3L	25	77	70	74	-	123	-	33	10.5	33	127.8	163	176.2	205

Photovoltaic Fuse-holders
1000VDC

HPBB11PPR

NH fuse-bases for NH fuse-links gPV 1000VDC, size 1, 250A, single pole

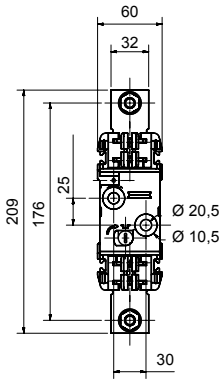
CATALOG NUMBER	REFERENCE NUMBER	POWER ACCEPTANCE	RATED IMPULSE WITHSTAND VOLTAGE Uimp	DESIGN	PACKAGE
HPBB11PPR	A1030607	32 W	8 kV	open design, for DIN-rail or screw mounting, for NH fuse links size 1	3
HPBB11PPRFS	K1032916	32 W	8 kV	with touch protection, for DIN-rail or screw mounting, for NH fuse links size 1	3

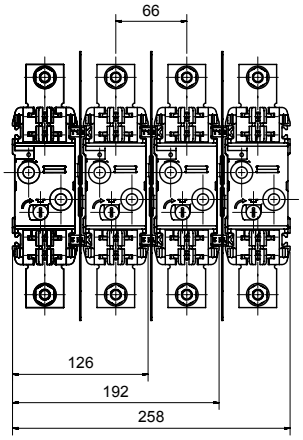
HPBB21PPR

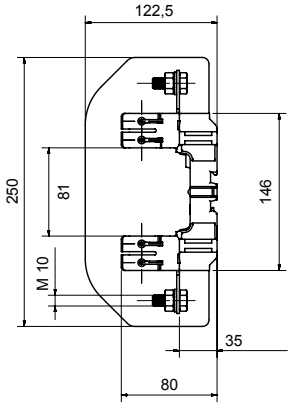
NH fuse-bases for NH fuse-links gPV 1000VDC, size 2, 315A, single pole

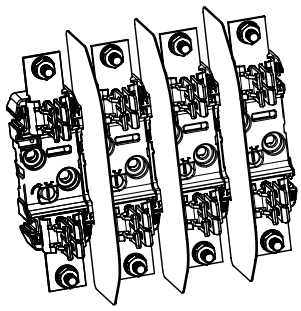
CATALOG NUMBER	REFERENCE NUMBER	POWER ACCEPTANCE	RATED IMPULSE WITHSTAND VOLTAGE Uimp	DESIGN	PACKAGE
HPBB21PPR	C1037509	45 W	8 kV	open design, for DIN-rail or screw mounting, for NH fuse links size 1 and 2	3
HPBB21PPRFS	D1037510	45 W	8 kV	with touch protection, for DIN-rail or screw mounting, for NH fuse links size 1 and 2	3

NH fuse-base for short NH fuse-links gPV, sizes 1, type PP, open design (dimensions in mm)



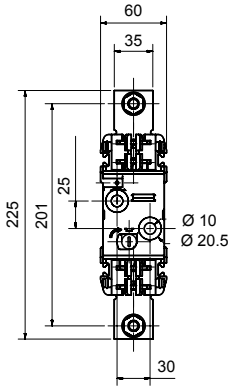


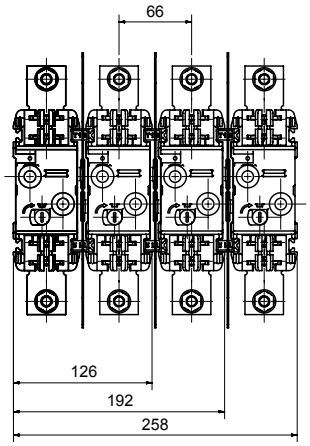


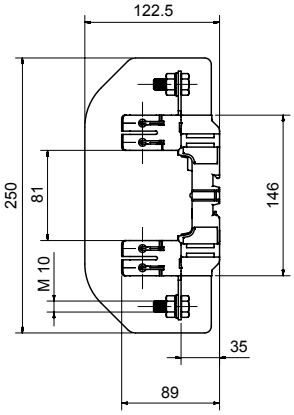


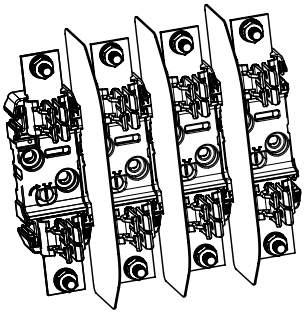
In case of multipole units in parallel without barriers a distance of 8mm must be considered between the live parts of the fuses.

NH fuse-base for short NH fuse-links gPV, sizes 2, type PP, open design (dimensions in mm)



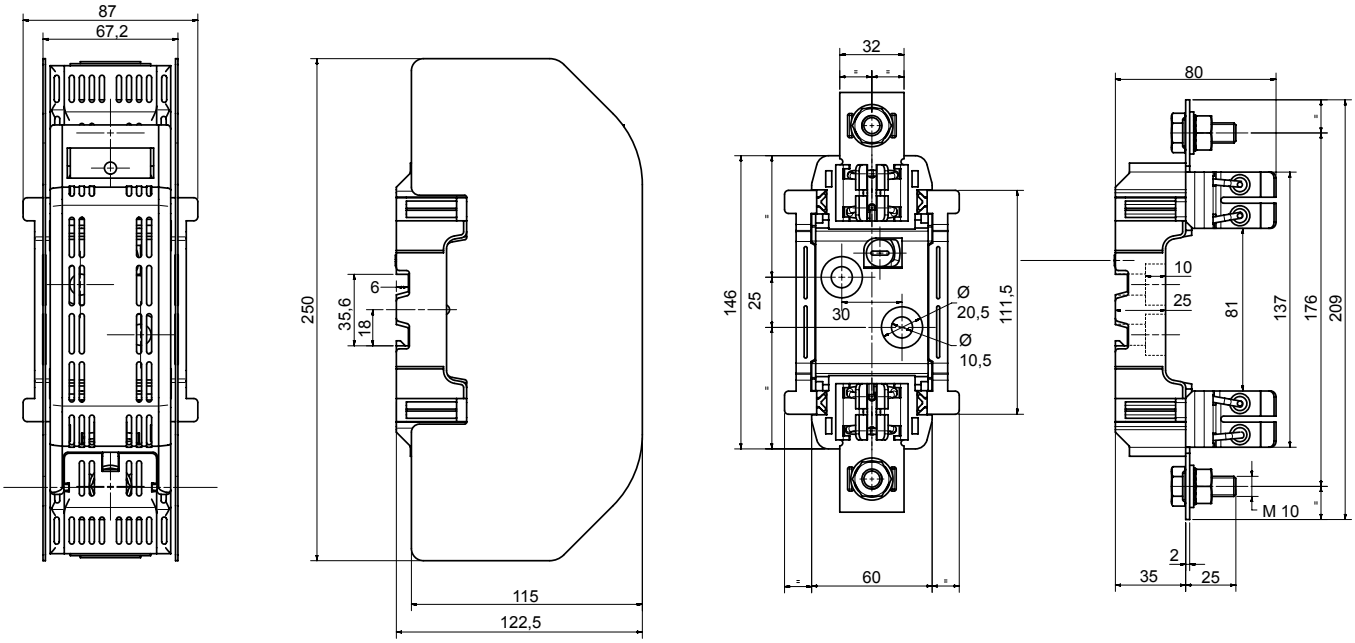




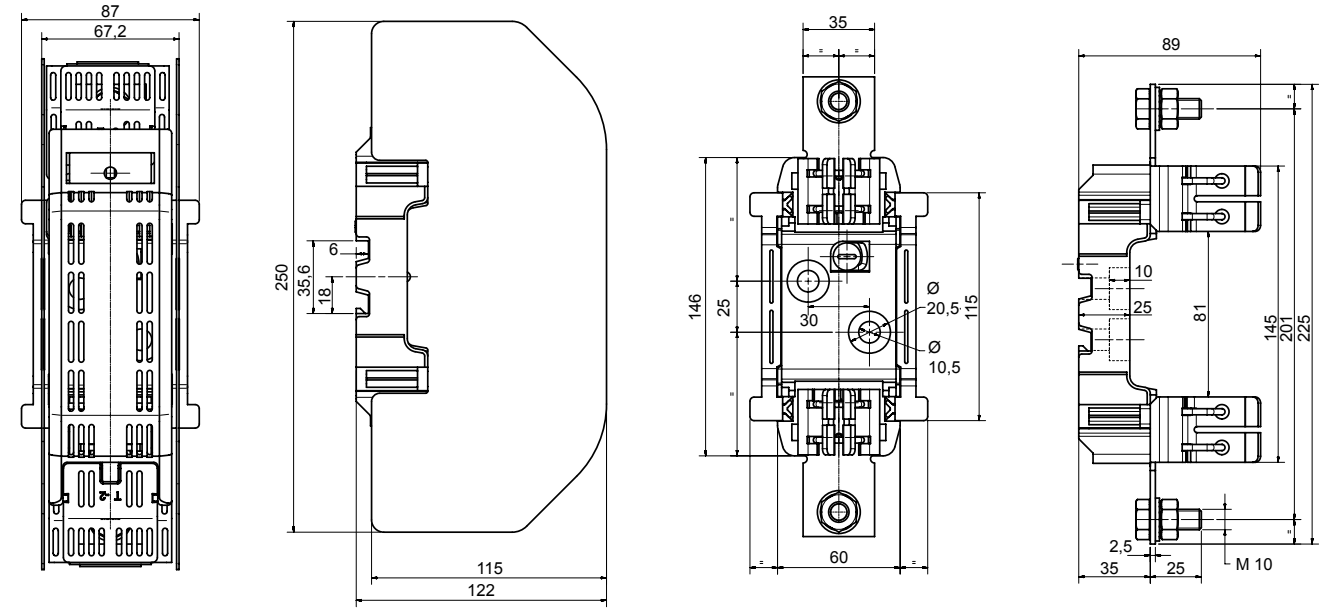


In case of multipole units in parallel without barriers a distance of 8mm must be considered between the live parts of the fuses

NH fuse-base for short NH fuse-links gPV, sizes 1, type PP with touch protection (dimensions in mm)



NH fuse-base for short NH fuse-links gPV, sizes 2, type PP with touch protection (dimensions in mm)



NH Fuse handle for NH fuse links size 00-4

NHHANDLE *08024.000000*

CATALOG NUMBER	REFERENCE NUMBER	SIZE	DESIGN	WEIGHT	PACKAGE
NHHANDLE	P215592	00 to 4	without arm protection to DIN VDE 0636-2, DIN VDE 608-4	279 g	5
08024.000000	X216105	00 to 4	with fire proof arm protection to DIN VDE 0636-2, DIN VDE 608-4	627 g	1

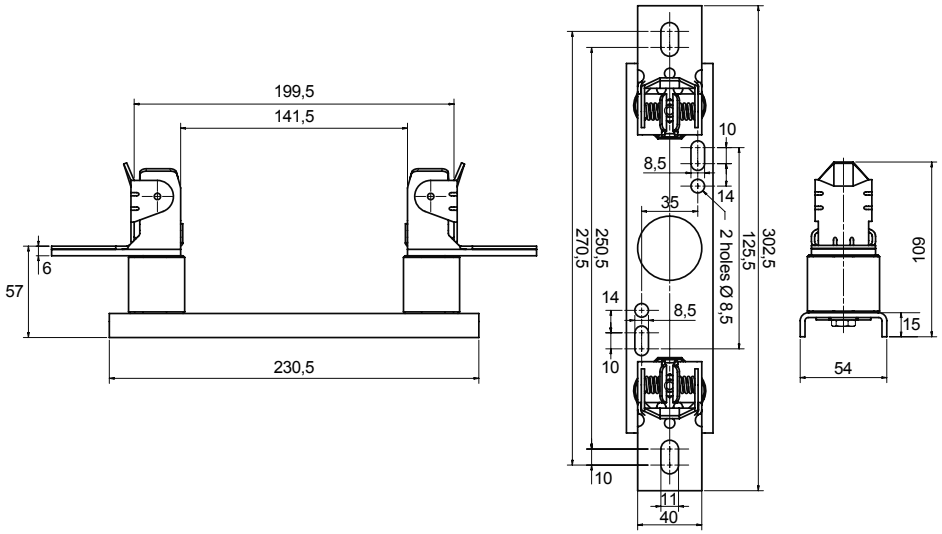
Photovoltaic Fuse-holders

1500VDC - open version

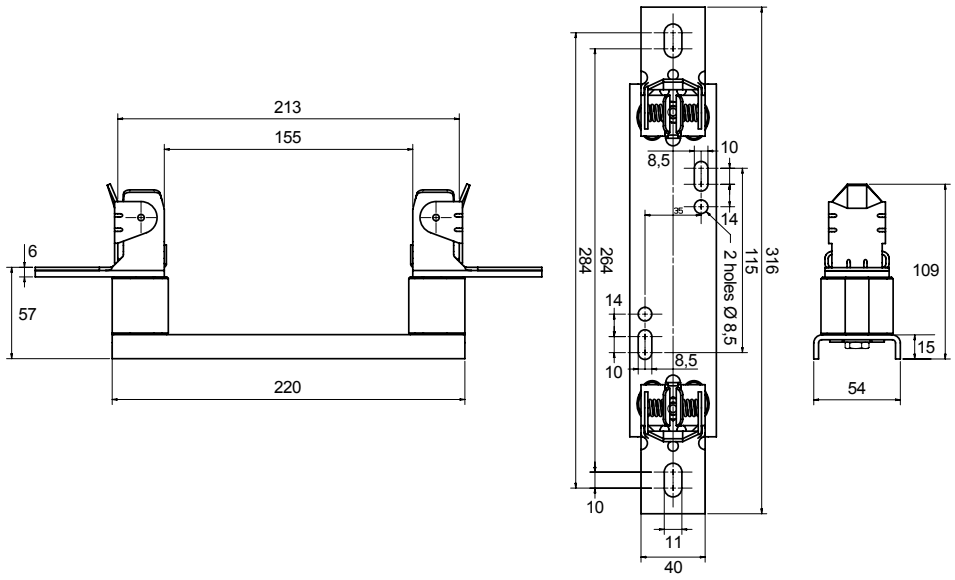
Open Fuse bases for NH long fuse-links gPV up to 1500VDC, 1 pole, SCCR 50kA

CATALOG NUMBER	REFERENCE NUMBER	POWER ACCEPTANCE	RATED IMPULSE WITHSTAND VOLTAGE Uimp	RATING	DESIGN	PACKAGE
SP36121	B1026353	59	8kV	250	open design, screw mounting, for NH1XI fuse link	1
SP36122-123	P1025054	95	8kV	630	open design screw mounting, for NH2XI and NH3L fuse links	1

Dimensions SP36121

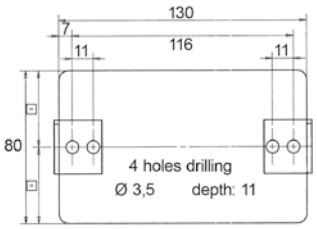


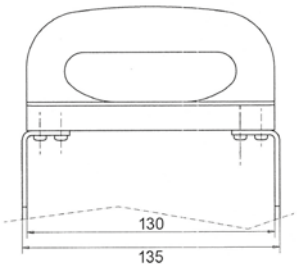
Dimensions SP36122-123

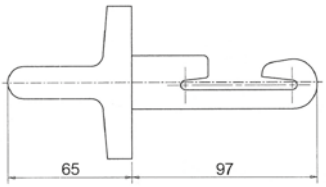


NH Fusehandle for long fuses

CATALOG NUMBER	REFERENCE NUMBER
POIGNEEPM12	Y210402A







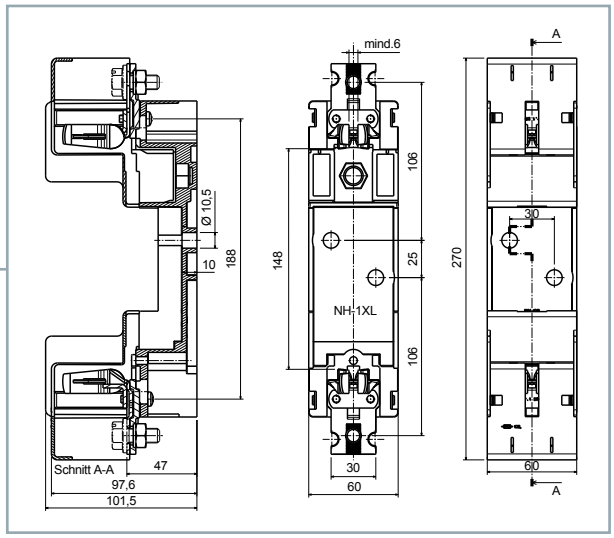
Photovoltaic Fuse-holders
1500VDC - protected version

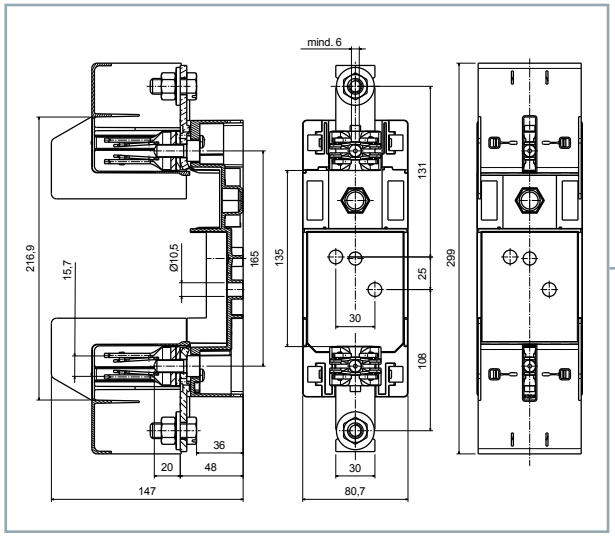
Protected fuse-bases for NH long fuse-links gPV up to 1500VDC, one pole, SCCR 15kA

CATALOG NUMBER	REFERENCE NUMBER	POWER ACCEPTANCE	RATED IMPULSE WITHSTAND VOLTAGE Uimp	RATING	DESIGN	PACKAGE
HPBB1XL1PPFS	Y1039598	40	8kV	250A	With touch protection, screwmounting, for NH1XL fuse-links*	3
HPBB2XL3L1PPFS	Z1039599	70	8kV	500A	With touch protection, screwmounting, for NH2XL and NH3L fuselinks**	3
HPBB2XL3L1PBFS	A1039600	70	8kV	500A	With touch protection, screwmounting, busbar output, for NH2XL and NH3L fuselinks	3

** can accept Mersen gPV fuse-links size 121 and NH2XL rated 250A with derating.*
*** can accept NH3L fuses up to 630A with derating.*

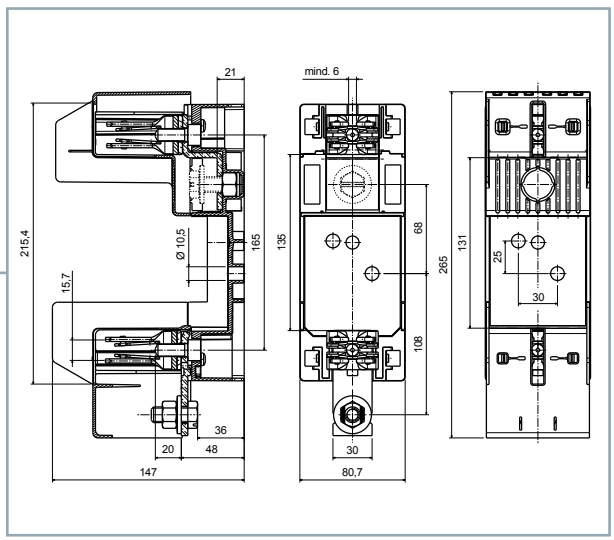
HPBB1XL1PPFS





HPBB2XL3LPPFS

HPBB2XL3LPBFS



SURGE-TRAP® PHOTOVOLTAIC SPD

1500 VDC READY

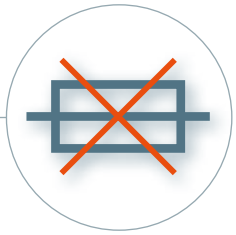
Solutions For

- Large-scale PV plant
- Rooftop / self-consumption
- Combiner boxes/ String boxes
- Inverters
- Ad-hoc requirements

Ucpv [VDC]
65
80
660
720
1060
1500

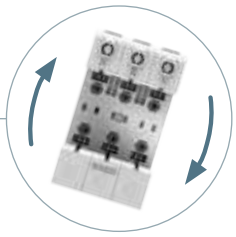
Wide range

- Ucpv up to 1500VDC



No back-up fuse required

- Mersen has developed an optimised dynamic thermal disconnection system, which does not require back-up fuse



Reversible installation

- Reversible chassis to allow cable entry from above or below

Approvals/standards

- UL 1449
- EN-50539-11

STP T2 40 PV

STP T2 40 PV is the series of devices for discharging voltage surges in PV systems. This series provides advanced overvoltage protection by utilizing Mersen's optimized dynamic thermal disconnection system. This system does not require additional overcurrent protection (back-up fuse) due to its high short-circuit withstand rating.

Imax 40kA

No back-up fuse required

Ratings and features

- Maximum discharge current (8/20µs): 40kA
- Nominal discharge current (8/20µs): 20kA
- Ucpv: 65, 80, 660, 1060 Vdc and 1500Vdc
- Iscpv: 10kA (EN 50539-11), no back-up fuse required
- SCCR: 50-100kA (UL 1449 3rd Ed)
- DIN-rail mountable, plug-in format
- Visual and remote end of life indicators
- Reversible chassis to allow cable entry from above or below
- Mechanically coded cartridges to avoid cartridge replacement errors

Approvals/Standards

- EN 50539-11
- UL 1449 3rd Ed recognized, File No. E468946

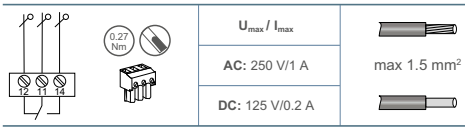
Catalog numbers / Reference numbers

		Network								Cartridge Id.
REFERENCE NUMBER	CATALOG NUMBER	SYSTEM TYPE	ELECTRICAL DIAGRAM	UCPV [VDC]	ISCPV [A]	IMAX (8/20) [KA]	IN (8/20) [KA]	UP@IN (8/20) [KV]	REMOTE INDICATION (M)	L
Y PV. LARGE-SCALE AND ROOFTOP PV										
83020138	**STPT2-40K600V-YPV**	"Y" PV	A	660	10 000	40	20	≤2.6		C01
83020139	**STPT2-40K600V-YPVM**	"Y" PV	A	660	10 000	40	20	≤2.6	√	C01
83020140	**STPT2-40K1000V-YPV**	"Y" PV	A	1060	10 000	40	20	≤4		C02
83020141	**STPT2-40K1000V-YPVM**	"Y" PV	A	1060	10 000	40	20	≤4	√	C02
83020158	**STPT2-40K1500V-YPV**	"Y" PV	A	1500	10 000	40	15	≤5		C03
83020159	**STPT2-40K1500V-YPVM**	"Y" PV	A	1500	10 000	40	15	≤5	√	C03
U PV. SELF-CONSUMPTION										
83020128	**STPT2-40K60V-2P**	TNS (1Ph+N); PV	B	65	1000	40	20	≤0.7		Consult
83020129	**STPT2-40K60V-2PM**	TNS (1Ph+N); PV	B	65	1000	40	20	≤0.7	√	Consult
83020130	**STPT2-40K75V-2P**	TNS (1Ph+N); PV	B	80	1000	40	20	≤0.8		Consult
83020131	**STPT2-40K75V-2PM**	TNS (1Ph+N); PV	B	80	1000	40	20	≤0.8	√	Consult

Replacement cartridges

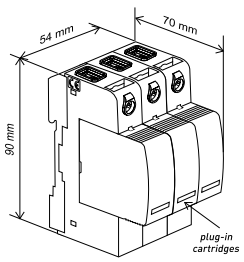
REF. NUMBER	CATALOG NUMBER	NETWORK	UCPV [VDC]	IMAX (8/20) [KA]	IN (8/20) @UP [KA]	UP@IN (8/20) [KV]	CARTRIDGE ID.
83020005	**SP2-40K600V-PV**	PV	330	40	20	≤1.3	C01
83020006	**SP2-40K1000V-PV**	PV	530	40	20	≤2	C02
83020010	**SP2-40K1500V-PV**	PV	750	40	10	≤2,5	C03

Microswitch diagram

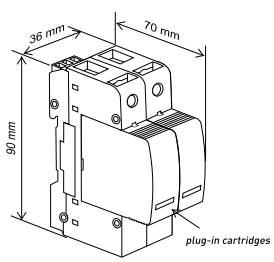


Dimensions

Y PV

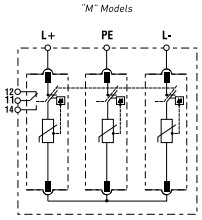


U PV

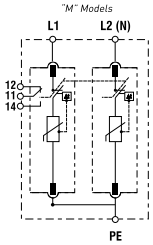


Electrical diagram

A Y PV



B U PV



STP T2 40

STP T2 40 is the series of type 2 /class II devices for discharging voltages surges, in accordance with IEC/EN 61643-11 and UL 1449. Suitable for the AC side protection in photovoltaic systems that provides power to the grid. Also suited for first or second stage of protection in commercial or residential applications.

Imax
40kA

Ratings and features

- Maximum discharge current (8/20µs): 40kA per phase
- Nominal discharge current (8/20µs): 20kA per phase
- TNS, TNC, TT and IT networks
- Un(L-N/L-L): 48V, 60V, 120/208V, 230/400V, 277/480V, 400/690V & higher
- DIN-rail mountable, plug-in format
- Visual and remote end of life indicators
- Reversible chassis to allow cable entry from above or below
- Mechanically coded cartridges to avoid cartridge replacement errors

Approvals/Standards

- IEC/EN 61643-11
- UL 1449 4th Ed recognized, File No. E468946
- CE

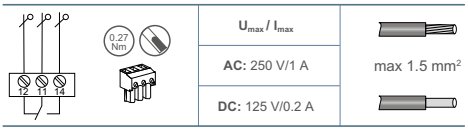
Catalog numbers / Reference numbers

		Network								Cartridge Id.
REFERENCE NUMBER	CATALOG NUMBER	SYSTEM TYPE	ELECTRICAL DIAGRAM	UN [VAC]	UC [V]	IMAX (8/20) [KA]	IN (8/20) [KA]	UP@IN (8/20) [KV]	REMOTE INDICATION (M)	L
83020134	**STPT2-40K275V-3P**	TNC (3Ph)	D	-/400	275	40	20	≤1.3		C06
83020135	**STPT2-40K275V-3PM**	TNC (3Ph)	D	-/400	275	40	20	≤1.3	√	C06
83020136	**STPT2-40K320V-3P**	TNC (3Ph)	D	-/480	320	40	20	≤1.4		C07
83020137	**STPT2-40K320V-3PM**	TNC (3Ph)	D	-/480	320	40	20	≤1.4	√	C07
83020102	**STPT2-30K750V-3P**	TNC (3Ph)	D	-/690; -/1000	750	30	15	≤3		C08
83020103	**STPT2-30K750V-3PM**	TNC (3Ph)	D	-/690; -/1000	750	30	15	≤3	√	C08
83020100	**STPT2-30K750V-1P**	L-N (1Ph)	C	690	750	30	15	≤3		C08
83020101	**STPT2-30K750V-1PM**	L-N (1Ph)	C	690	750	30	15	≤3	√	C08

Replacement cartridges

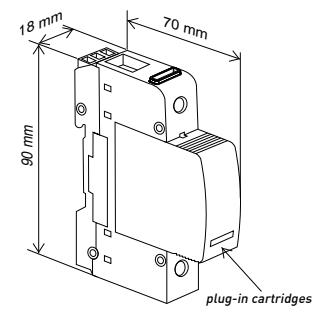
REF. NUMBER	CATALOG NUMBER	NETWORK	UN [VAC]	UC [V]	IMAX (8/20) [KA]	IN (8/20) [KA]	UP@IN (8/20) [KV]	CARTRIDGE ID.
83020002	**SP2-40K275V**	L-N (1Ph)	230	275	40	20	≤1.3	C06
83020003	**SP2-40K320V**	L-N (1Ph)	277	320	40	20	≤1.4	C07
83020007	**SP2-30K750V**	L-N (1Ph)	690	750	30	15	≤3	C08

Microswitch diagram

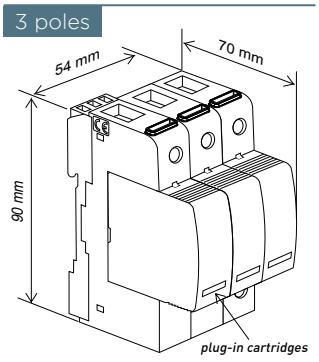


Dimensions

1 pole

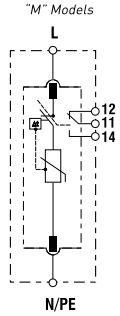


3 poles

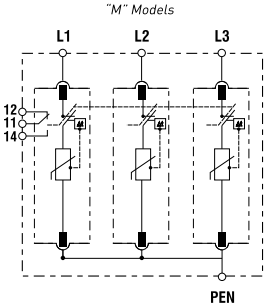


Electrical diagram

C



D



SURGE-TRAP® SIGNAL LINE SPD FOR PHOTOVOLTAIC

STS 485

STS 485 is the new series of type D1 and C2 surge protection devices for signal lines in accordance with IEC/EN 61643-21. Especially designed for protecting RS485/RS232 communication lines used in PV applications against induced overvoltages. Suitable as a dedicated protection for special equipment connected to communication lines (i.e. string monitor), providing extremely fine voltage protection level and an optimal discharge capacity.

Imax
10kA

Ratings and features

- Maximum discharge current (8/20): 10kA (Imax)
- Type D1 maximum discharge current (10/350µs): 2,5kA (Iimp)
- Type C2 nominal discharge current (8/20µs): 5kA (In)
- Models with end of life indication
- Multiple voltage options for different protocols (6, 12, 24V)
- Operational bandwitdh (fg) up to 10MHz
- Extremely fine voltage protection level
- DIN rail mountable, monobloc format

Approvals/Standards

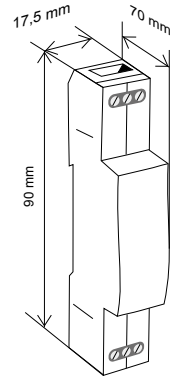
- IEC/EN 61643-21
- CE

Catalog numbers / Reference numbers

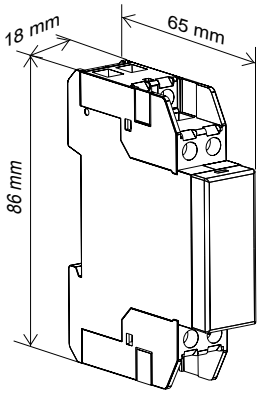
REFERENCE NUMBER	CATALOG NUMBER	ELECTRICAL DIAGRAM	Un [V]	D1 (10/350) [KA]	IMAX (8/20)	C2 (8/20)	UP@IN (8/20) [V]	fg [MHz]	PROTECTED WIRES	EOL INDICATION
83040111	**STS485-7V-2W**	E	6	2,5	10	5	10	1	2	
83040112	**STS485-16V-2W**	E	12	2,5	10	5	20	1,2	2	
83040113	**STS485-27V-2W**	E	24	2,5	10	5	40	4	2	
83040110	**STS485-15V-3WI**	F	12	2,5	10	5	45	10	2+GND	√

Dimensions

1 pole (2w)

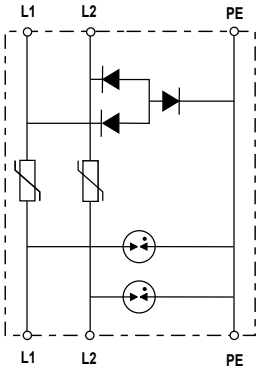


1 pole (3w)



Electrical diagram

E



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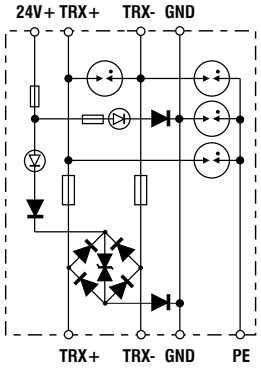

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