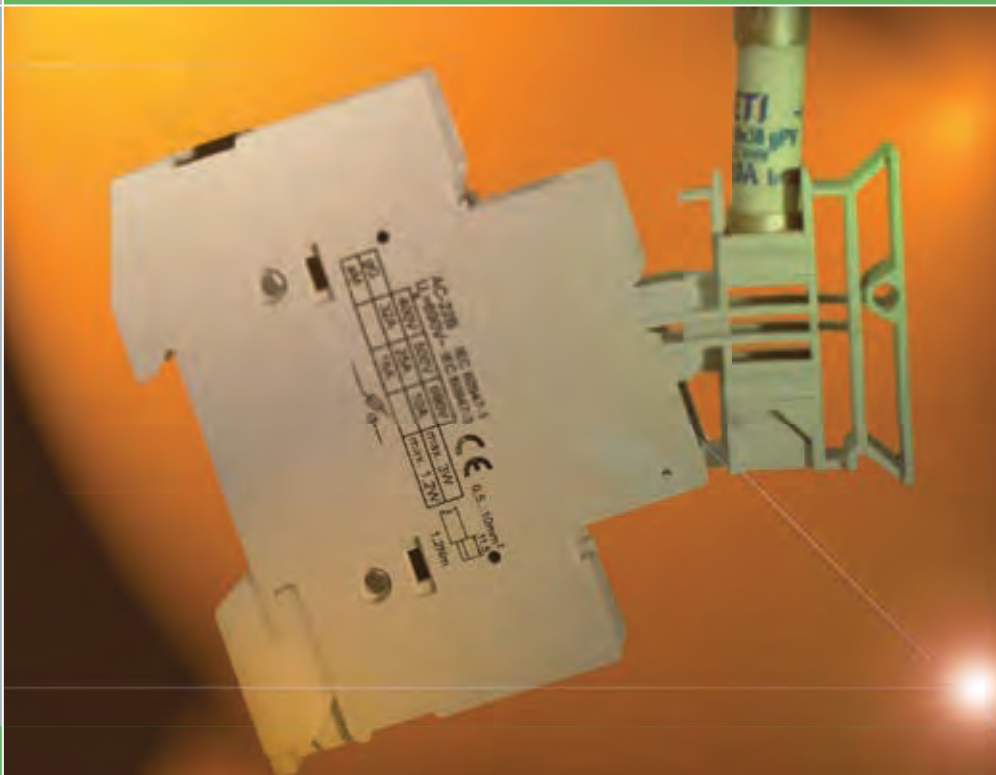


GREEN PROTECT

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PROTECTION OF PV SYSTEMS



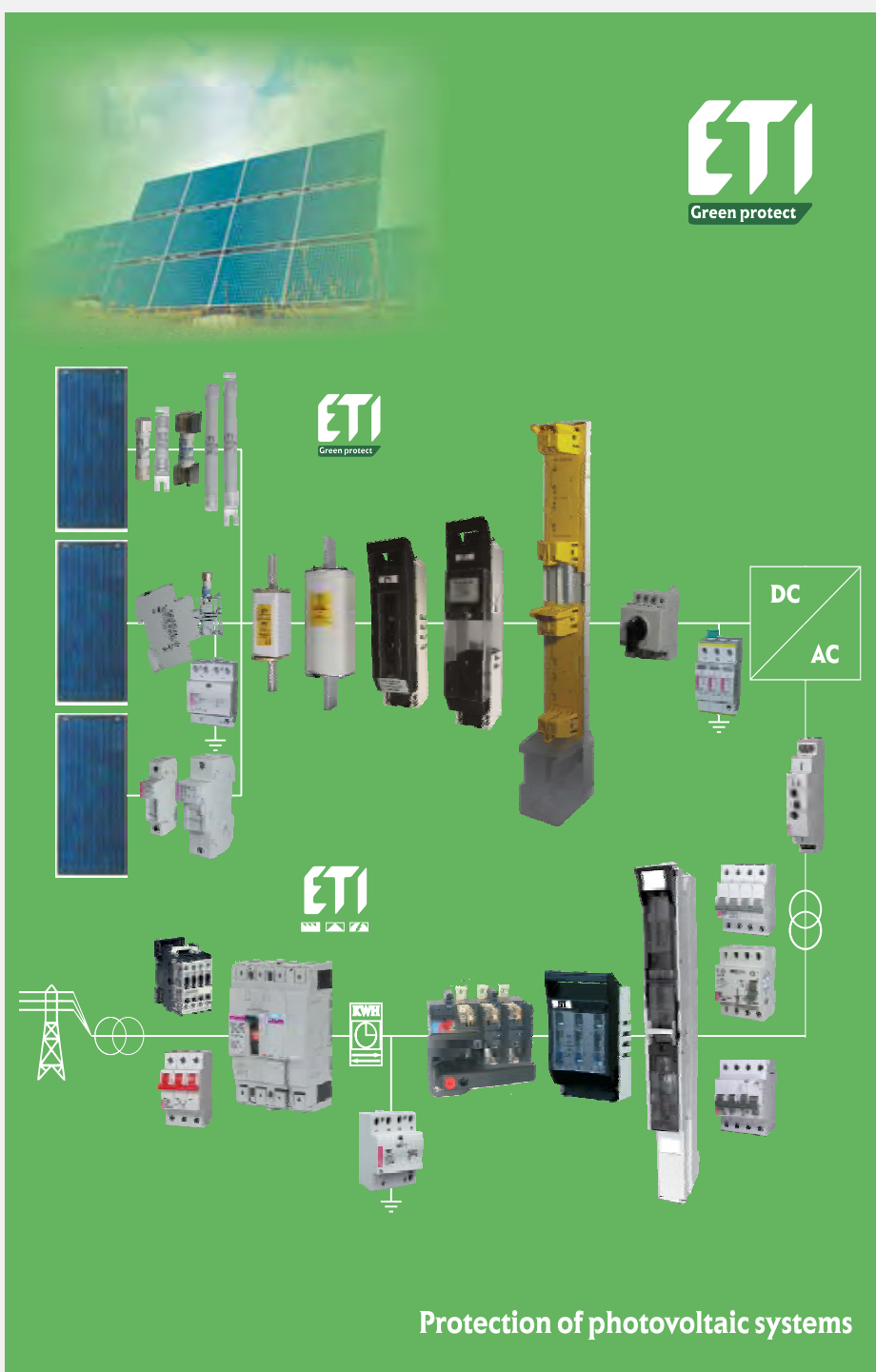
PROTECTION OF PHOTOVOLTAIC SYSTEMS

ETI provides high-quality solutions for the complete overcurrent and overvoltage protection of applications in the field of photovoltaic and other renewable energy sources.

Our products are designed for complete protection of:

- DC circuits (overvoltage protection and reverse current protection)
- circuits inside DC/AC inverters (semiconductor protection)
- AC circuits between the inverter and the power grid (overvoltage, overcurrent and anti-islanding protection).

The products are internationally certified and carry several quality marks.



Protection of photovoltaic systems

DC - distribution and protection components

Introduction

Photovoltaic systems are composed by photovoltaic panels, cables, fuses, switches, overvoltage arresters and power inverter. Photovoltaic panels utilise the power of sun light to convert photons to DC current.

Electricity generated by solar panels is then fed into a power inverter that converts DC current to AC current. gPV fuse has been developed to protect cable and panel against "reverse" over-current.

ETITEC B, C-PV series of over voltage surge protective devices has been developed to protect against direct and indirect lightning discharges and is intended to protect photovoltaic systems.

The circuit topology consists of two varistors stages each protected by a thermal disconnection device.

Overcurrent protection

■ PV module protection from »DC REVERSE« current on DC side
Array with three or more strings of panels:

PV systems that have three or more strings connected in parallel need to have each string protected by fuses.

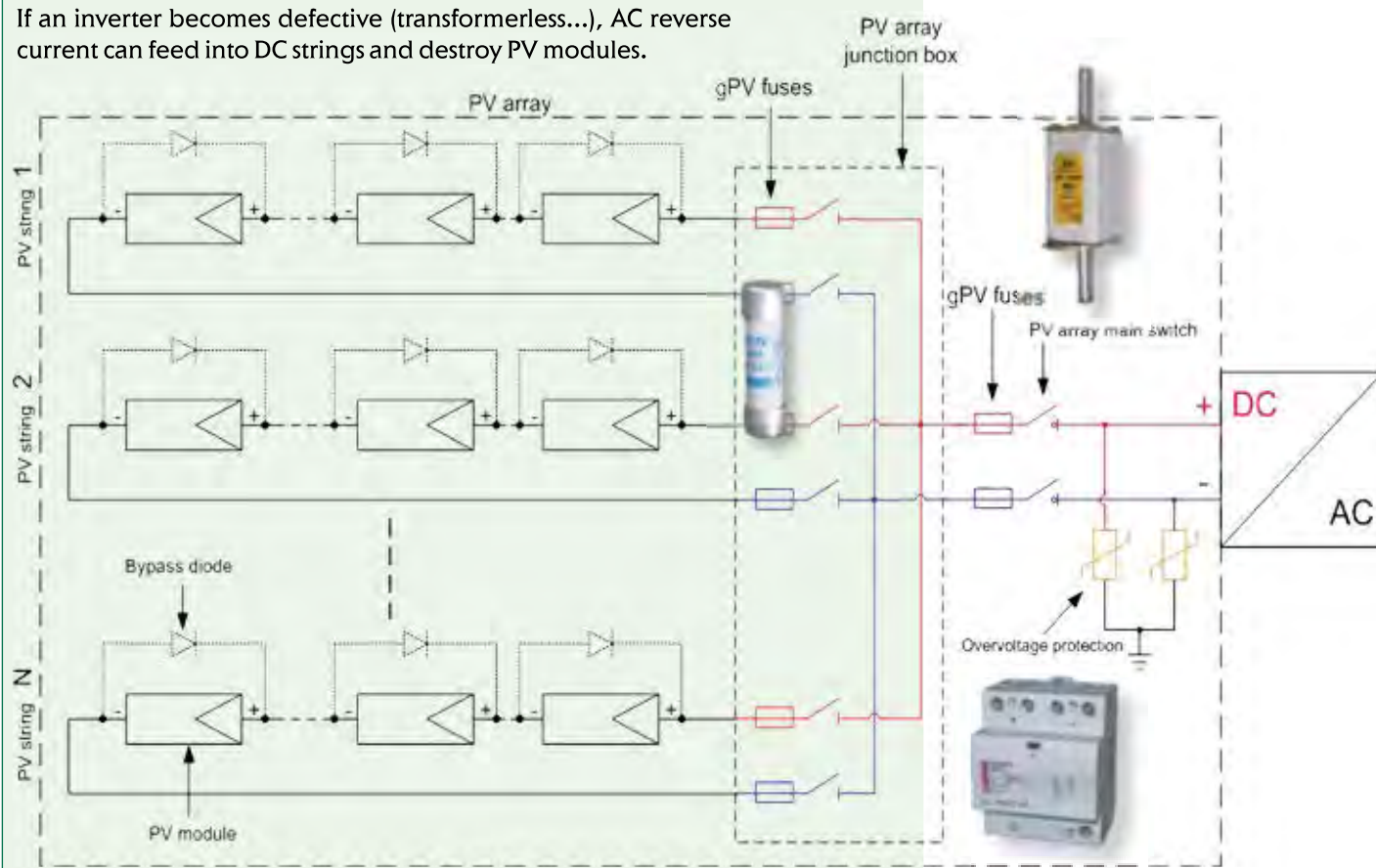
Systems that have less than three strings will not generate enough fault current to damage the conductors/solar panels.

Normally there are two gPV fuses connected on each string (+ and - pole), that protect conductors/solar panels from damage and eliminate any safety hazards.

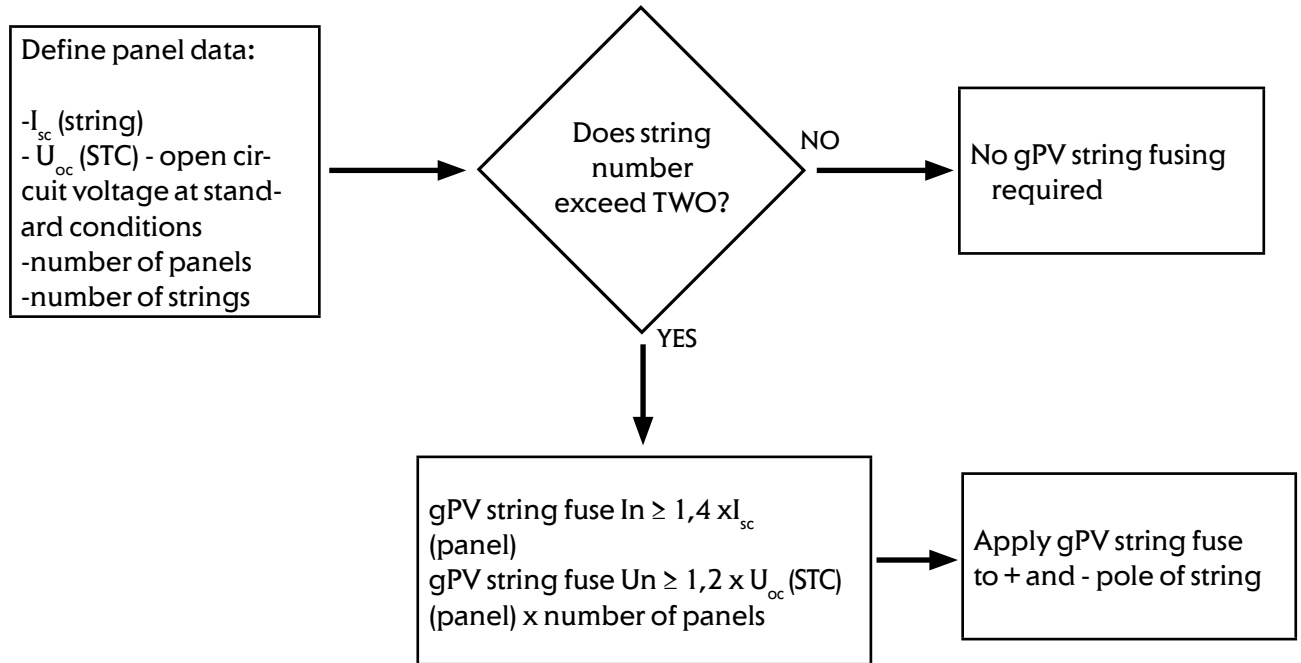
Fuses isolate the faulted string. The rest of PV system can continue to generate electricity.

■ PV module protection from »AC REVERSE« current caused by defective inverter

If an inverter becomes defective (transformerless...), AC reverse current can feed into DC strings and destroy PV modules.

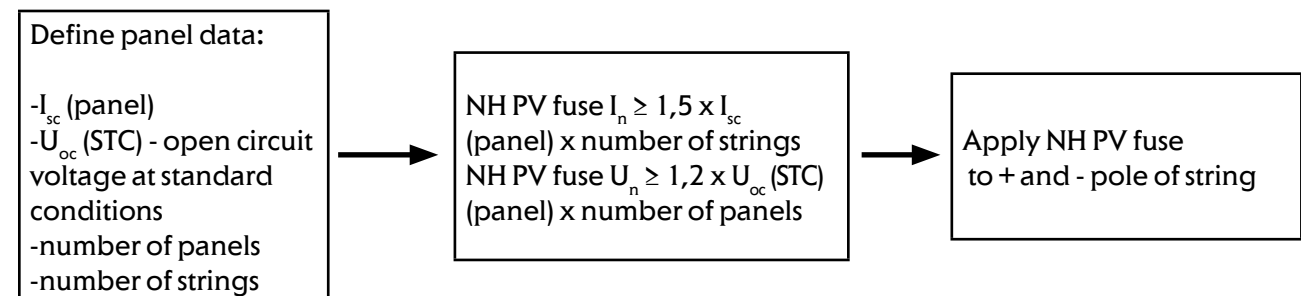


CH 10 gPV fuse selection



Derating factor 1,4 is defined for ambient temperature max. 45 °C .
Cable cross-section derating factor is not included!

NH gPV fuse selection



Derating factor 1,5 is defined for ambient temperature max. 45 °C
Cable cross-section derating factor is not included!

ETI as one of the most important European producer of overcurrent protection equipment and devices participating in many working groups for standards development at International Electrotechnical Commission (IEC). ETI is member of maintenance team MT9 belonging to the 32B group, working on the part 6 of the IEC 60269 dealing with supplementary requirements for fuse-links for the overcurrent protection of solar photovoltaic energy systems.

gPV fuse link must be selected acc. standard IEC 62548

CH 10 gPV - Fuse-links

General characteristics

UL file: E347771

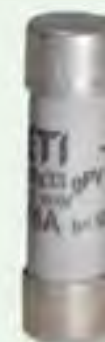
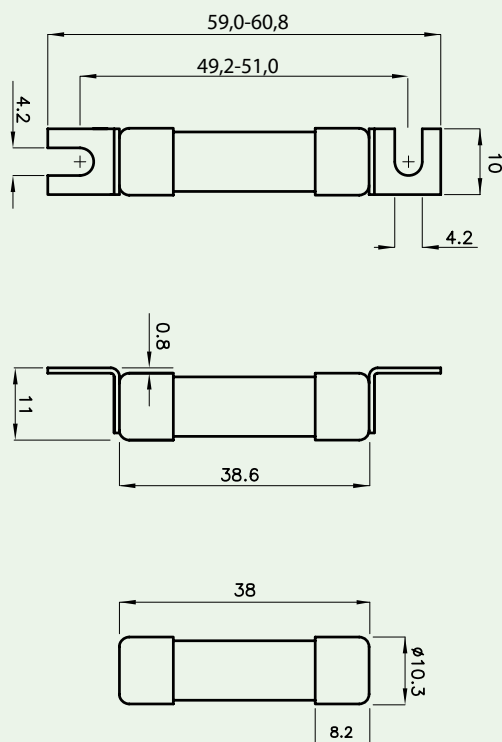
Rated voltage	1000V d.c. L/R=2ms
Breaking capacity	10kA d.c. / 30kA d.c.
Standards	UL 2579, UL 248-1
Application	For protection of photovoltaic modules.



CH 10x38 gPV

Size	I_n [A]	Code No. "standard contacts" 10kA UL	Code No. "standard contacts" 30kA IEC	Code No. "type SU contacts"	Pre-arcing Joule integral [A ² s] L/R=2ms	Operating Joule integral [A ² s] L/R=2ms	Power dissipation [0,7 x I_n] P_d [W]	Power dissipa- tion [I_n] P_d [W]	Weight [g]	Packaging [pcs]
10 x 38	0,5		002625134	002625131	0,016	0,068	0,2	0,52	10/12	10/500 SU:10/380
	1		002625138	002625129	1,5	3	0,42	1,0		
	2	002625101	002625065	002625115	1,7	2,3	0,47	1,12		
	3	002625100	002625067	002625113	2,8	5,4	0,65	1,6		
	3,5	002625135	002625068	002625127	2,5	7	0,57	1,4		
	4	002625102	002625069	002625116	3,9	11,7	0,52	1,25		
	5	002625111	002625070	002625124	8	21	0,63	1,49		
	6	002625103	002625071	002625117	10,6	34,6	0,73	1,75		
	7	002625110	002625072	002625114	16	60	0,74	1,74		
	8	002625104	002625073	002625118	17	65	0,8	1,9		
	10	002625105	002625075	002625119	8,3	33	0,97	2,4		
	12	002625106	002625077	002625120	22	73	0,8	1,9		
	13	002625137	002625078	002625128	21	70	1,0	2,3		
	14	002625136	002625079	002625126	28	92	1,3	3,0		
	15	002625112	002625080	002625125	49	145	1,0	2,2		
	16	002625107	002625081	002625121	48	147	1,1	2,6		
	20	002625108	002625085	002625122	86	245	1,3	3,2		
	25*		002625109	002625123	125	289	1,65	4,1		
	25		002625139	002625140	110	470	1,65	4,1		

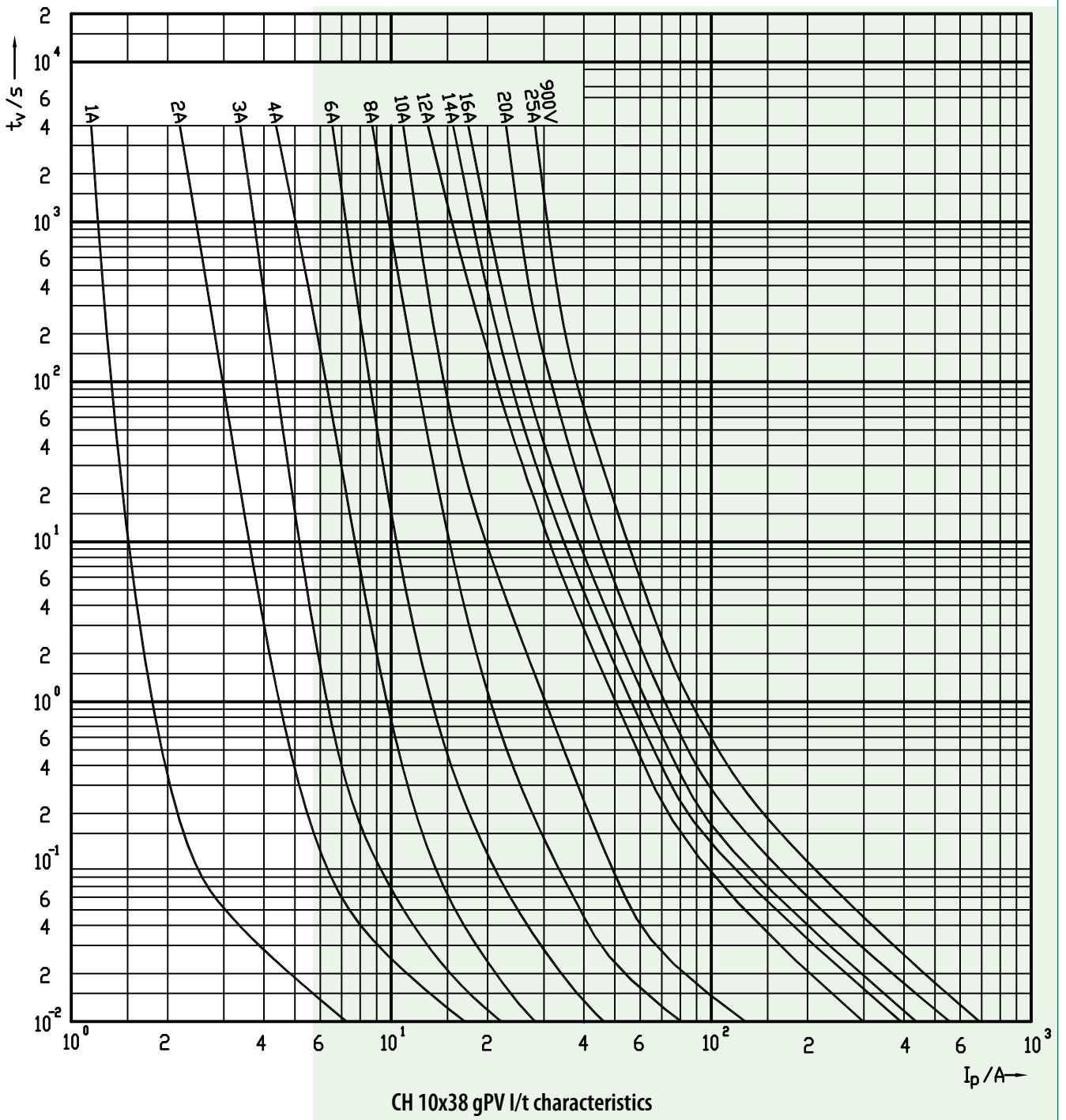
* 900V d.c.

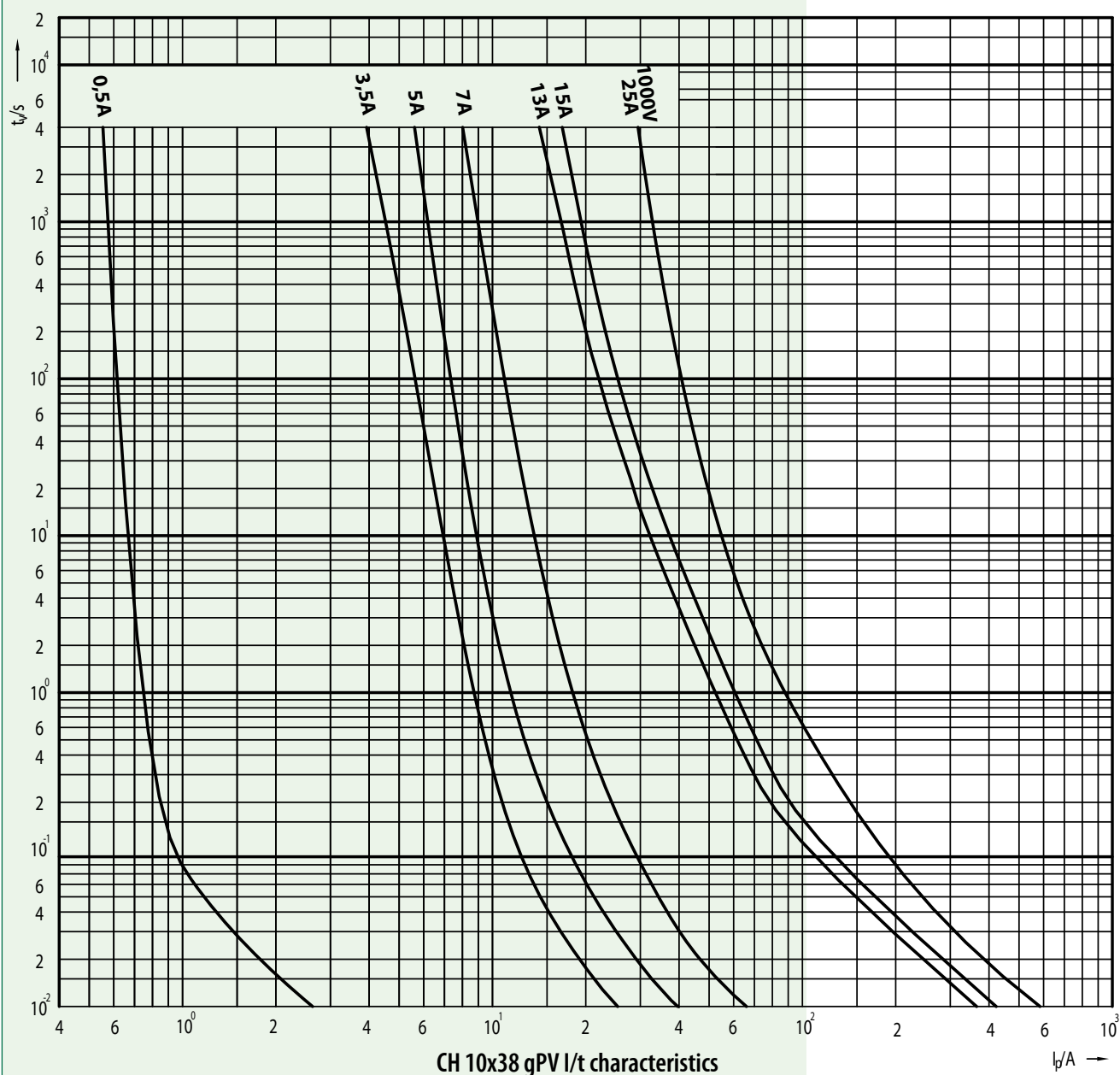


Standard
Contacts

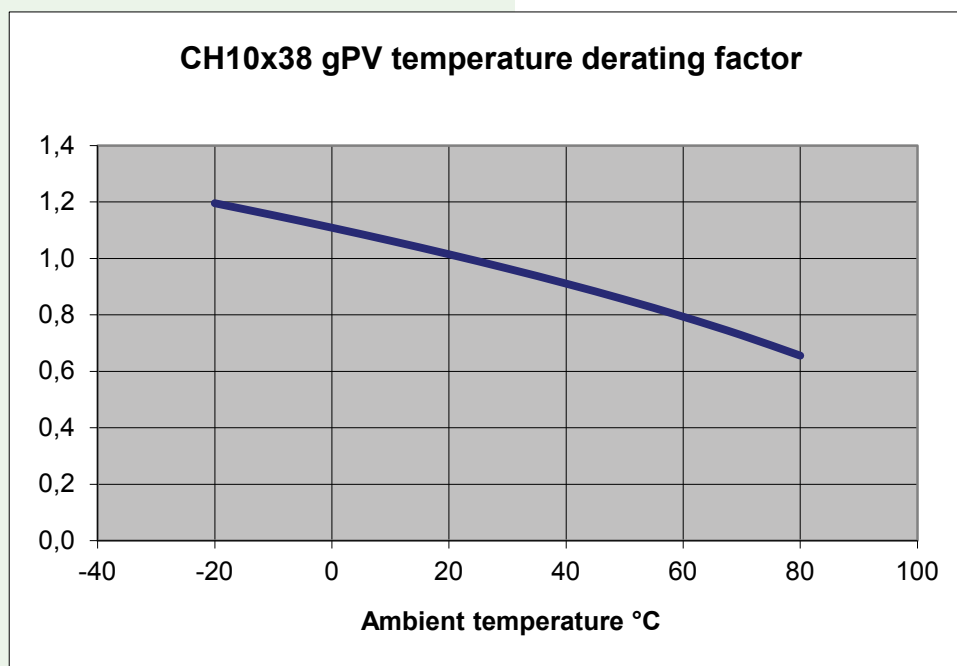


Type SU
Contacts





Tamb (°C)	A1
-20	1,196
-10	1,153
0	1,109
10	1,063
20	1,015
30	0,964
40	0,911
50	0,854
60	0,794
70	0,728
80	0,656



CH 10x85 gPV - Fuse-links



General characteristics

UL file: E347771

Rated voltage	1500V d.c. L/R=2ms
Breaking capacity	10kA d.c. / 30kA d.c.
Standards	UL 2579, UL 248-1
Application	For protection of photovoltaic modules.

CH 10x85 gPV

Size	I_n [A]	Code No. "standard contacts" 10kA UL	Code No. "standard contacts" 30kA IEC	Code No. "type SU contacts" 30kA IEC	Pre-arcing Joule integral [A ² s] L/R=1ms	Operating Joule integral [A ² s] L/R=1ms	Power dissipation [0,7 x I _n] P _d [W]	Power dissipa- tion [I _n] P _d [W]	Weight [g]	Packaging [pcs]
10 x 85	2		002625200	002625210	1,5	2,1	1,0	2,4	15/17	10/210 SU:10/160
	4	002625201	002625274	002625211	10,2	15,1	1,1	2,7		
	5	002625239	002625276	002625209	10,6	33,2	1,2	3,0		
	6	002625202	002625277	002625212	23,3	50,4	1,2	3,0		
	8	002625203	002625279	002625213	46	109	1,5	3,6		
	10	002625204	002625280	002625214	63	191	1,6	3,7		
	12	002625205	002625282	002625215	24	118	1,4	3,3		
	15	002625240	002625285	002625219	40,6	161	1,4	3,6		
	16	002625206	002625286	002625216	35	164	1,6	3,7		
	20*	002625207	002625287	002625217	39	209	1,7	4,0		
	25*	002625208	002625288	002625218	72	504	2,1	5,2		

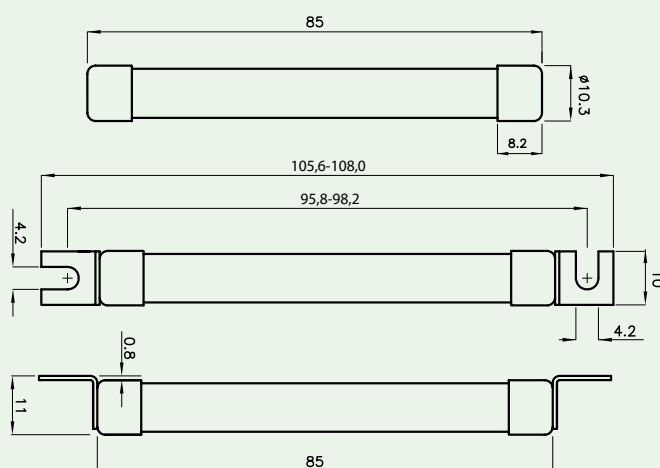
* 1200V d.c.

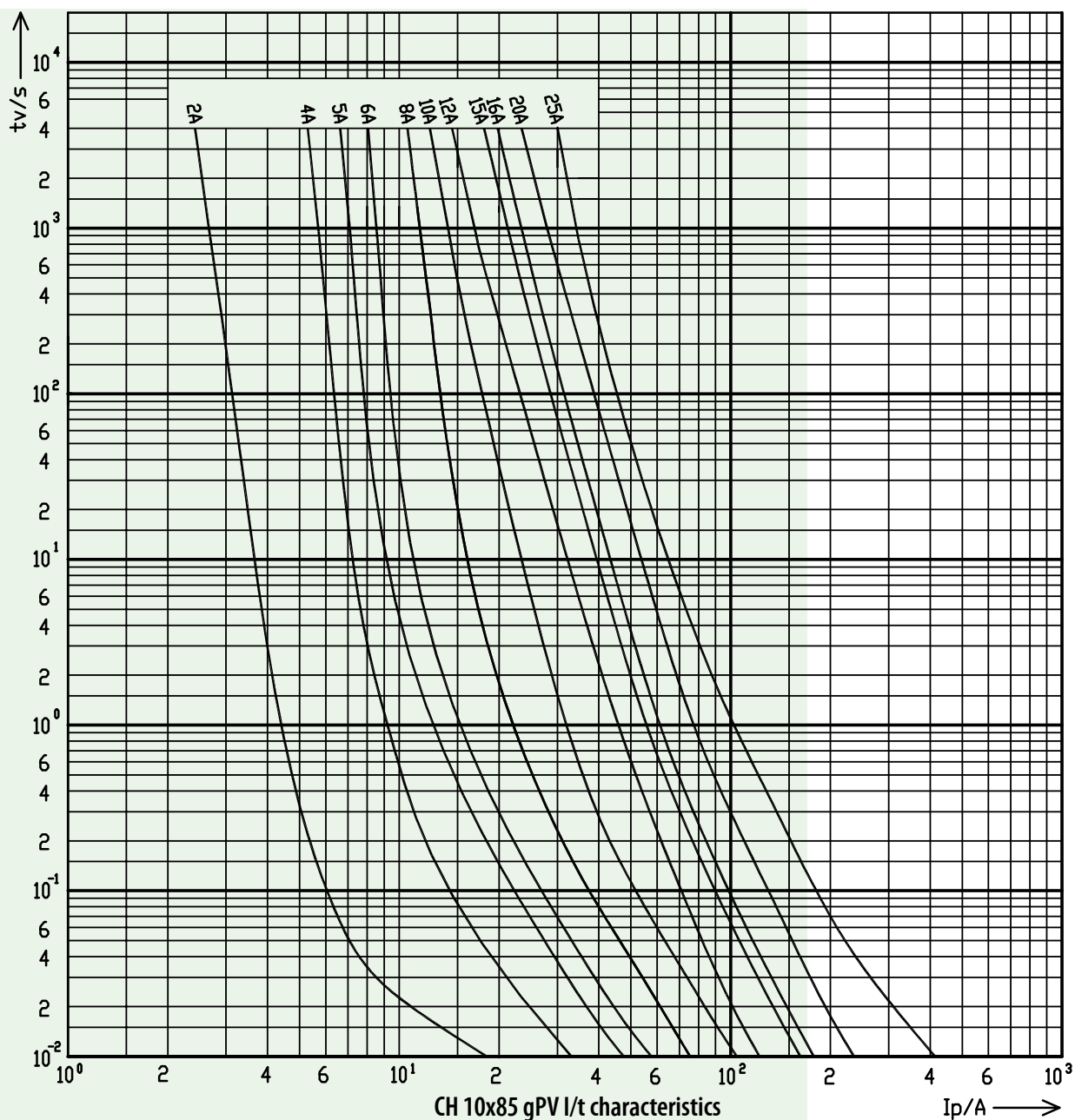


Type SU
Contacts

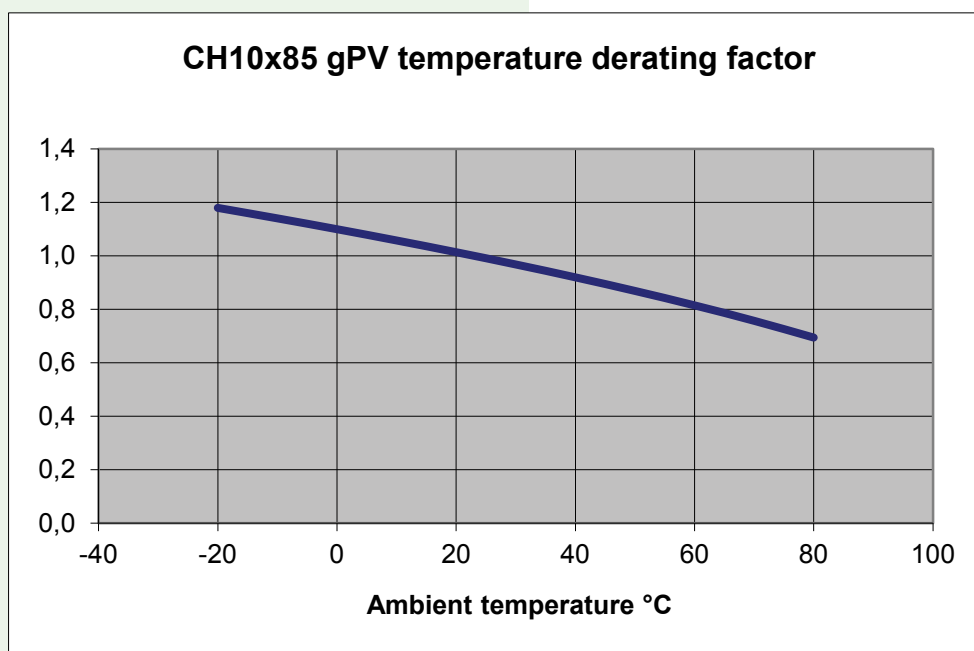


Standard
Contacts





Tamb (°C)	A1
-20	1,179
-10	1,140
0	1,100
10	1,057
20	1,014
30	0,968
40	0,919
50	0,869
60	0,815
70	0,757
80	0,694



CH 10 PV - Fuse-links



General characteristics

Rated voltage	700V a.c./d.c. L/R=2ms
Breaking capacity	30kA a.c./d.c.
Standards	IEC 60269-4
Characteristic	gR

CH 10 PV

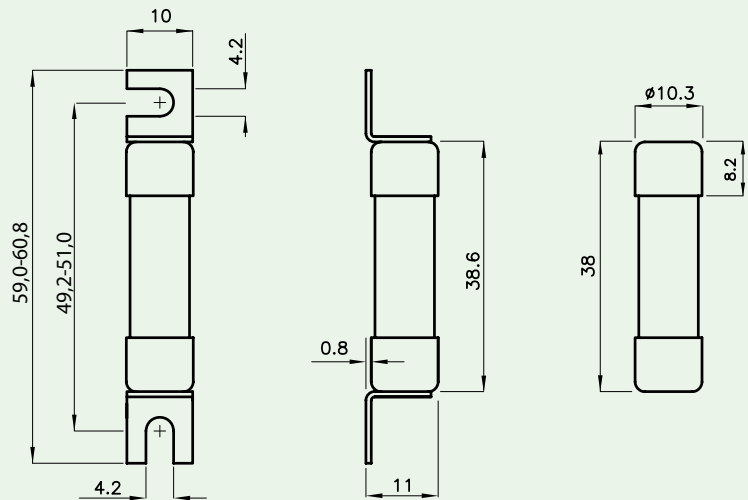
Size	I_n [A]	Code No. "standard contacts"	Code No. "type SU contacts"	Pre-arcing Joule integral [A ² s] L/R=2ms	Operating Joule integral [A ² s] L/R=2ms	Power dissipation [0,7 x I _n] P _d [W]	Power dissipa- tion [I _n] P _d [W]	Weight [g]	Packaging [pcs]
10 x 38	2	002625017	002625300	1,2	1,41	0,44	1,10	10/12	10/500 SU:10/380
	4	002625018	002625301	7,6	28	0,55	1,30		
	6	002625019	002625302	14	63	0,73	1,70		
	8	002625020	002625303	30	98	0,70	1,62		
	10	002625021	002625304	20	73	0,98	2,44		
	12	002625022	002625305	48	122	0,82	1,85		
	16	002625023	002625306	97	182	1,06	2,61		
	20	002625024	002625307	164	301	1,27	3,00		
	25	002625025	002625308	246	434	1,61	4,00		



Type SU
Contacts

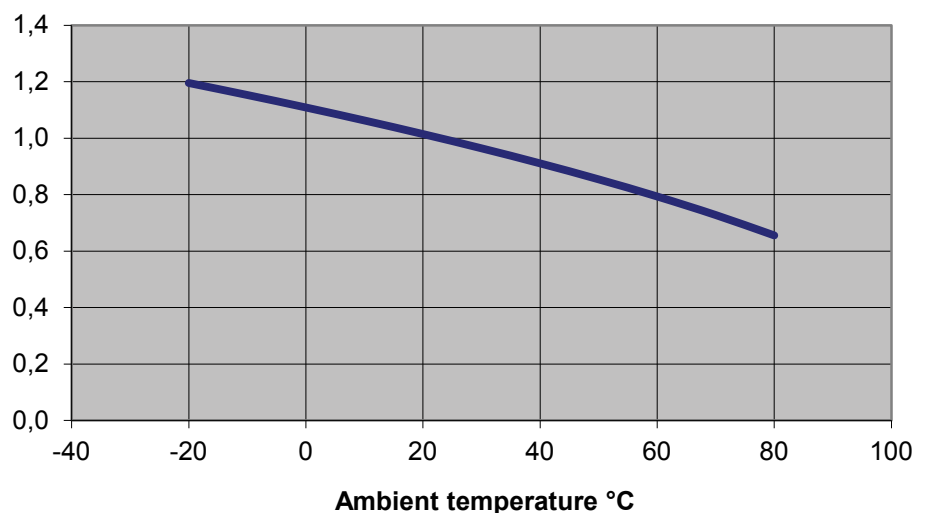


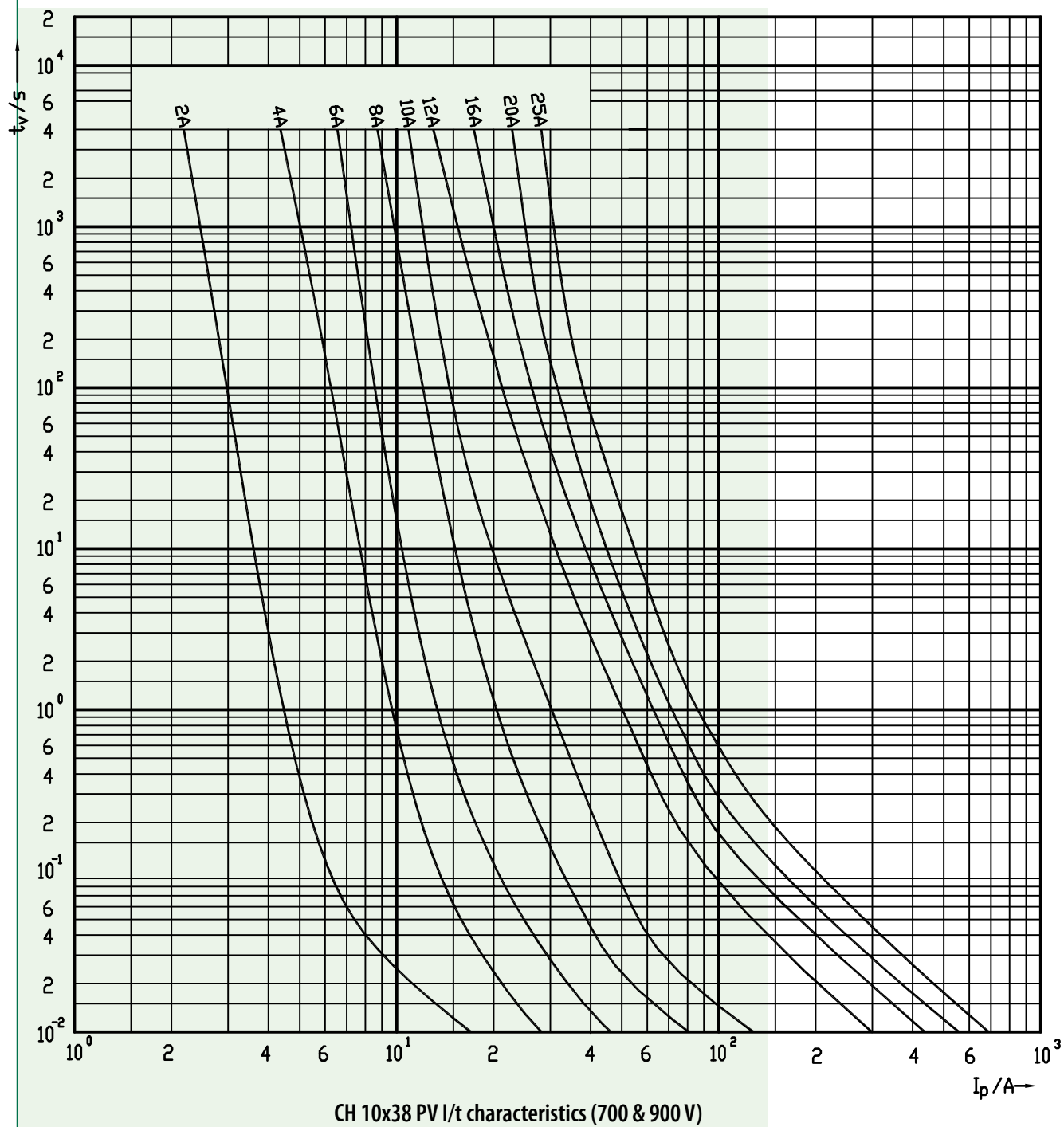
Standard
Contacts



Tamb (°C)	A1
-20	1,196
-10	1,153
0	1,109
10	1,063
20	1,015
30	0,964
40	0,911
50	0,854
60	0,794
70	0,728
80	0,656

CH10x38 PV temperature derating factor





CH 10 PV - Fuse-links



General characteristics

Rated voltage	900V a.c./d.c. L/R=2ms
Breaking capacity	30kA a.c./d.c.
Standards	IEC 60269-4
Characteristic	gR

CH 10 PV

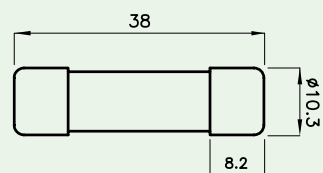
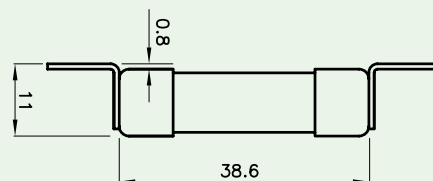
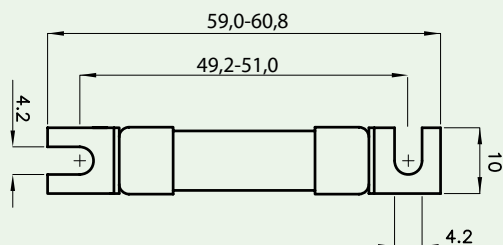
Size	I_n [A]	Code No. "standard contacts"	Code No. "type SU contacts"	Pre-arcing Joule integral [A ² s] L/R=2ms	Operating Joule integral [A ² s] L/R=2ms	Power dissipation [0,7 x I_n] P_d [W]	Power dissipa- tion [I_n] P_d [W]	Weight [g]	Packaging [pcs]
10 x 38	2	002625027	002625310	1,2	1,89	0,44	1,10	10/12	10/500 SU:10/380
	4	002625028	002625311	7,6	37	0,55	1,30		
	6	002625029	002625312	14	81	0,73	1,70		
	8	002625030	002625313	30	126	0,70	1,62		
	10	002625031	002625314	20	94	0,98	2,44		
	12	002625032	002625315	48	157	0,82	1,85		
	16	002625033	002625316	97	234	1,06	2,61		
	20	002625034	002625317	164	387	1,27	3,00		
	25	002625035	002625318	246	558	1,61	4,00		



Type SU
Contacts



Standard
Contacts



CH 10x85 PV - Fuse-links

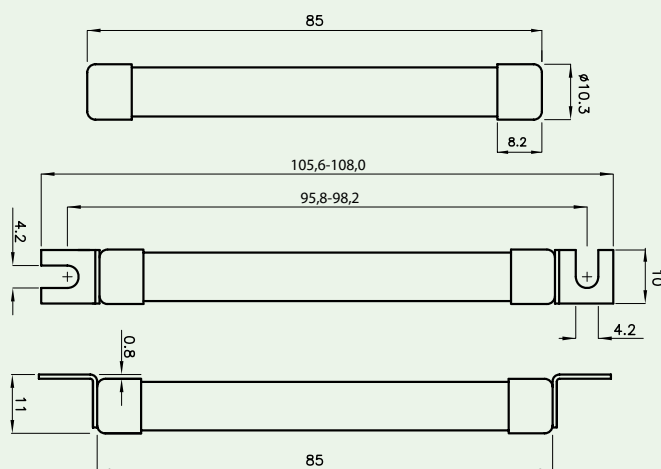
General characteristics

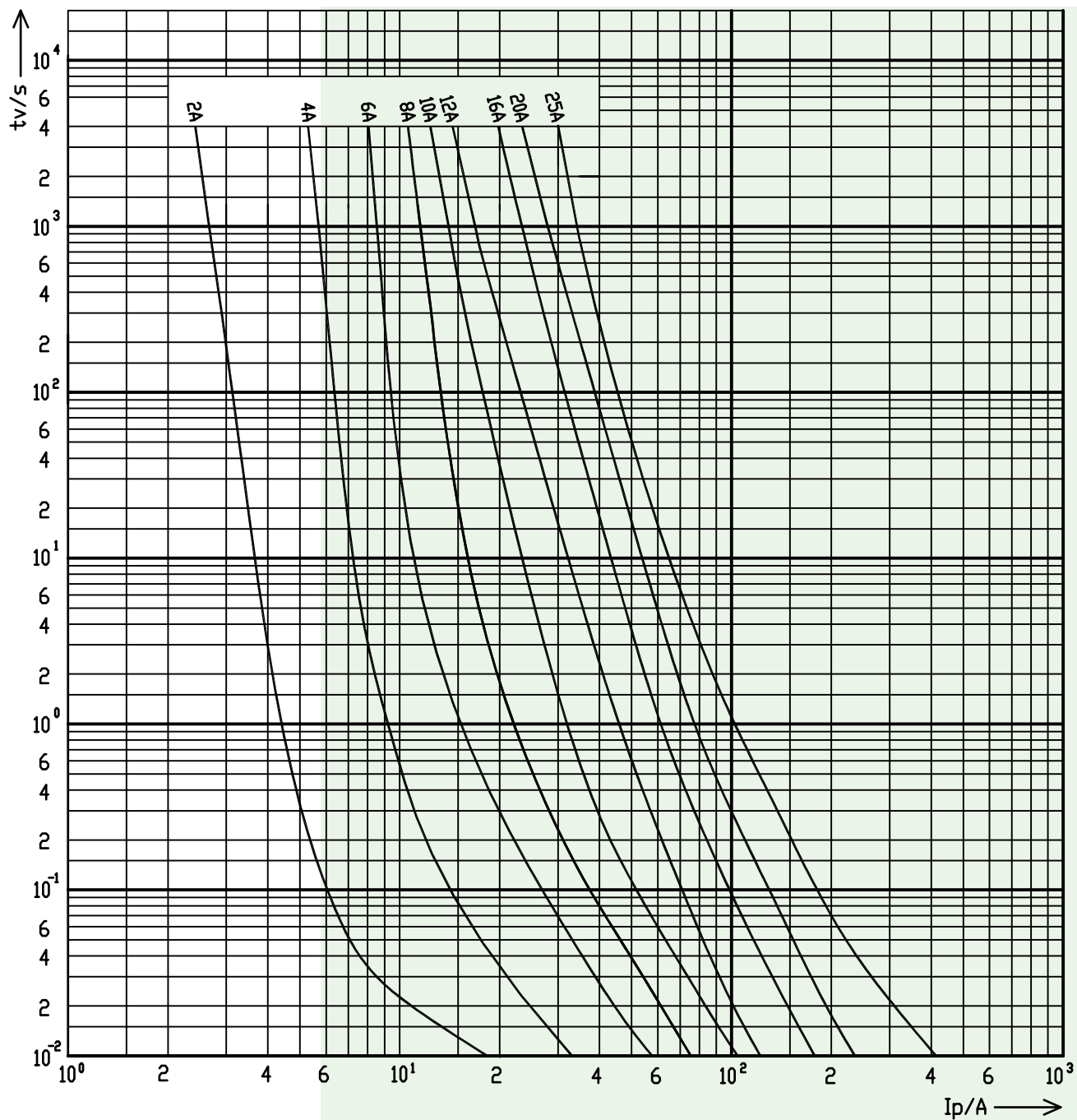
Rated voltage	1200V d.c. L/R=2ms
Breaking capacity	30kA d.c.
Standards	IEC 60269-4
Characteristic	gR



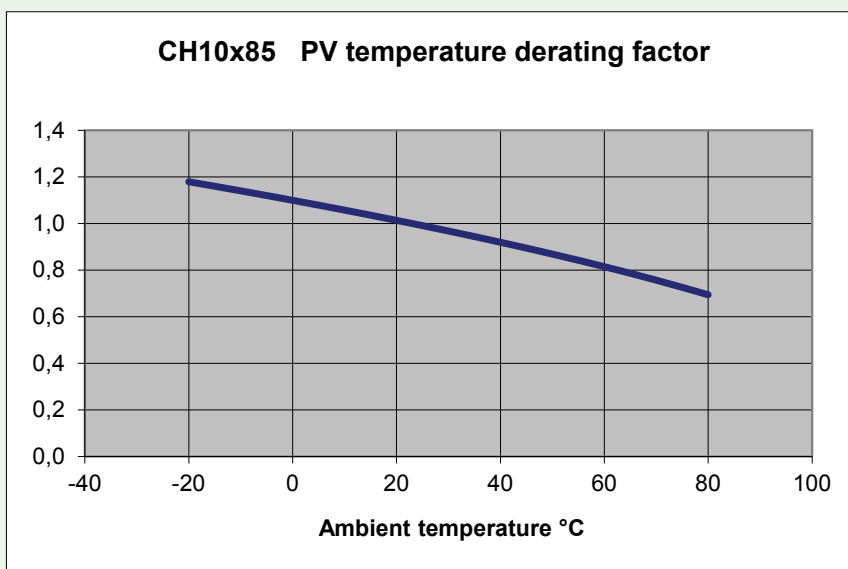
CH 10x85 PV

Size	I_n [A]	Code No. "standard contacts"	Code No. "type SU contacts"	Pre-arcing Joule integral [A ² s] L/R=1ms	Operating Joule integral [A ² s] L/R=1ms	Power dissipation [0,7 x I_n] P_d [W]	Power dissipa- tion [I_n] P_d [W]	Weight [g]	Packaging [pcs]
10 x 85	2	002625220	002625230	1,6	1,7	1,13	2,74	15/17	10/210 SU:10/160
	4	002625221	002625231	12,5	13	1,19	2,96		
	6	002625222	002625232	21	28	1,33	3,20		
	8	002625223	002625233	22	61	1,60	4,19		
	10	002625224	002625234	53	91	1,63	4,20		
	12	002625225	002625235	41	63	1,31	3,47		
	16	002625226	002625236	141	177	1,57	3,65		
	20	002625227	002625237	212	314	1,68	3,85		
	25	002625228	002625238	273	438	2,17	5,00		





Tamb (°C)	A1
-20	1,179
-10	1,140
0	1,100
10	1,057
20	1,014
30	0,968
40	0,919
50	0,869
60	0,815
70	0,757
80	0,694



CH 14x51 gPV - Fuse-links

General characteristics

Rated voltage	1000V d.c. L/R=2ms (1100V d.c. for 002637185)
Breaking capacity	10kA d.c. (30kA d.c. for 002637185)
Standards	IEC 60269-6 ed 1.0 (2010-9)
Application	For protection of photovoltaic modules



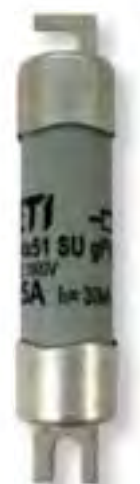
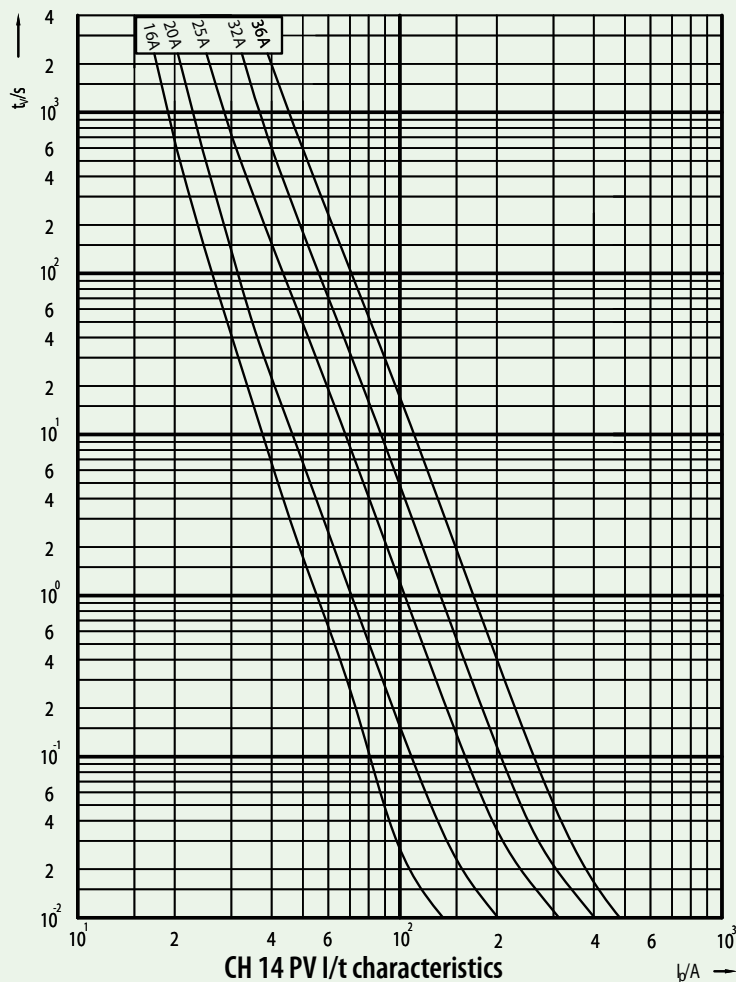
CH 14 gPV

Size	I_n [A]	Code No. "standard contacts"	Code No. "type SU contacts"	Pre-arcing Joule integral [A ² s] L/R=2ms	Operating Joule integral [A ² s] L/R=2ms	Power dissipation [0,7 x I_n] P_d [W]	Power dissipation [I_n] P_d [W]	Weight [g]	Packaging [pcs]
14x51	16	002637105		55	155	1,4	3,1	18,6	10/200
	16		002637305	55	155	1,4	3,1	20,6	10/260
	16	002637185*		55	220	1,4	3,1	18,6	10/200
	20	002637107		130	330	1,5	3,2	18,7	10/200
	20		002637307	130	330	1,5	3,2	20,7	10/260
	25	002637109		180	360	2	4	18,7	10/200
	25		002637309	180	360	2	4	20,7	10/260
	32	002637111		297	1290	2,1	5,1	18,9	10/200
	32		002637311	297	1290	2,1	5,1	20,9	10/260
	36	002637115		450	1190	2,3	5,6	18,9	10/200
	36		002637315	450	1190	2,3	5,6	20,9	10/260

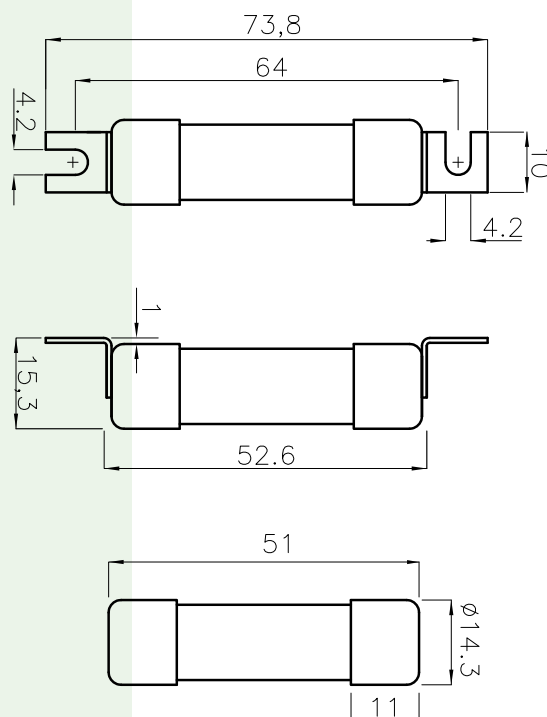
*Rated voltage: 1100V d.c. L/R=2ms

Breaking capacity: 30kA d.c.

Power dissipation is measured on an open fuse base, according to the requirements of IEC 60269-6.



Type SU Contacts



NEW EFH fuse holder

Advantages of cylindrical fuse holder EFH

→ Compliance with IEC 60947-1, IEC 60947-3, UL 4248-1, UL 4248-18, and UL 486E



→ More space for finger to open fuse carrier



→ Complete protection against touch according to IP20



→ All plastic parts are made of material resistant to extremely high temperatures. Fuse carrier assures that a fuse link is not in touch with a housing

→ For both sizes a **version with electronic indicator** is available. Marked with **L (LED)**, the EFH has a built-in LED diode which blinks after the fuse-link operates. Operating voltage ranges from 50V to 1000V d.c.



→ Mounting on standard DIN 35 mm rail (DIN EN60715)

→ All contact surfaces are silver plated



→ Possibility of sealing in ON or OFF positions



→ Modular design – it is possible to assemble multi-pole versions at the building site

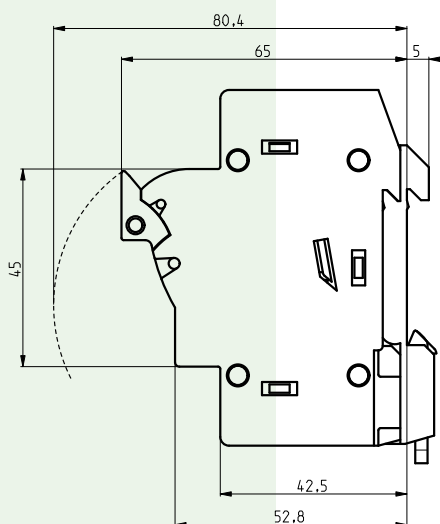
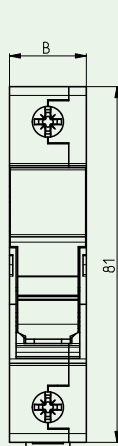
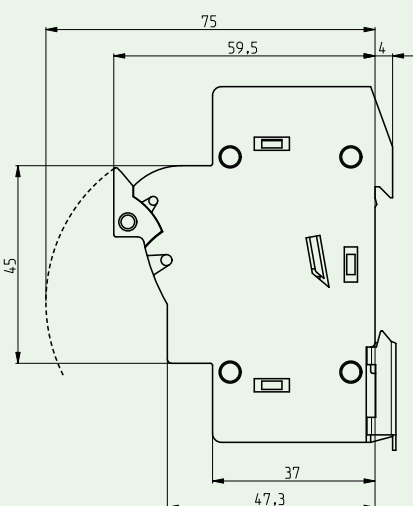
EFH 10 DC - Fuse holder

General characteristics

Rated voltage	1000V d.c.
Rated current	max. 25A
Max. fuse link power dissipation	3 W
Cross section of connecting wire	1 mm ² - 25 mm ²
Pole build-in width	17,5 mm
Mounting on the rail	EN 60715 - 35mm rail
Utilization category	DC-20B (Do not operate under load)
Rated torque	2Nm
Standards Fuse-links	IEC/EN 60269-2, IEC/EN 60269-6, UL 284-4
Standards - Fuse holder	IEC 60947-1, IEC 60947-3, UL 4248-1, UL 4248-18, UL 486E, CSA C22.2 No.65

EFH 10 DC

Number of poles	U _e /U _i [V]	I _{max.} [A]	Code No.	Indicator	Adapter	Weight [g]	Packaging [pcs]
1 pole	1000V d.c.	25A	002540201	-	-	63	12/108
			002540211	LED	-	64	
			002540501	-	✓	68	
			002540511	LED	✓	69	
2 pole		25A	002540203	-	-	124	6/54
			002540213	LED	-	125	
			002540503	-	✓	134	
			002540513	LED	✓	135	



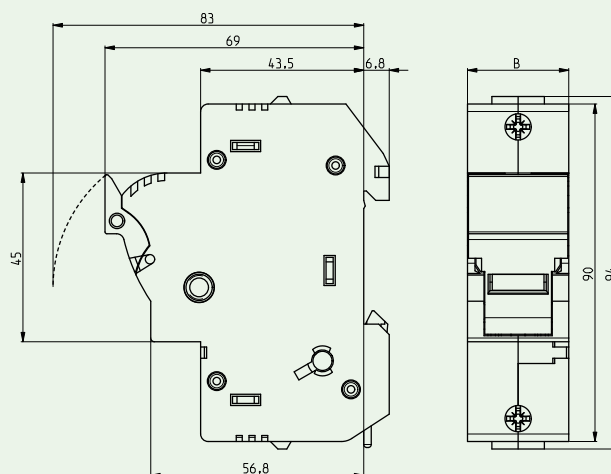
Version with adapter

Type	Dimensions [mm]
	B
1 pole	17,5
2 pole	35



Rated voltage	1000V d.c., 1100V d.c.
Rated current	max. 50A
Max. fuse link power dissipation	5 W
Cross section of connecting wire	1,5 mm ² - 35 mm ²
Pole build-in width	27 mm
Mouting on the rail	EN 60715 - 35mm rail
Utilization category	DC-20B (Do not operate under load)
Rated torque	2,5 - 3Nm
Standards Fuse-links	IEC/EN 60269-2, IEC/EN 60269-6, UL 284-4
Standards - Fuse holder	IEC 60947-1, IEC 60947-3, UL 4248-1, UL 4248-18, UL 486E, CSA C22.2 No.65

Number of poles	U _e /U _i [V]	I _{max} [A]	Code No.	Indicator	Weight [g]	Packaging [pcs]
1 pole	1000V d.c.	50A	002560201	-	102	12/96
			002560211	LED	103	
2 pole	1000V d.c.	50A	002560203	-	206	6/48
			002560213	LED	208	
1 pole	1100V d.c.	50A	002560206*	-	102	12/96
			002560214*	LED	103	
2 pole			50A	002560207*	-	206
	002560215*	LED		208		

[illegible]

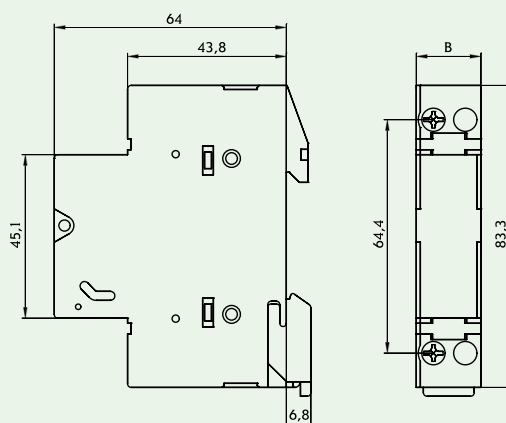
Type	Dimensions [mm]
	B
1 pole	27
2 pole	54

PCF 10 DC - Fuse holder

General characteristics		UL file: E356295
Rated voltage	1000V d.c.	
Rated current	max. 25A	
Max. fuse link power dissipation	3 W	
Cross section of connecting wire	0,5 mm ² - 10 mm ² (AWG 8-20 solid)	
Pole build-in width	18 mm	
Mouting on the rail	EN 60715	
Utilization category	DC-20B (Do not operate under load)	
Rated torque	1,2Nm	
Standards Fuse-links	IEC 60269-2, UL 284-4	
Standards - Fuse holder	IEC 60947-1 Ed. 4.0 EN 60947-1 IEC 60947-3 Ed. 2.1 EN 60947-3	



PCF 10 DC						
Number of poles	U _e /U _i [V]	I _{max.} [A]	Code No.	Indicator	Weight [g]	Packaging [pcs]
1P	1000	25	002550201	-	58	12/108
2P	1000	25	002550203	-	120	6/54
1P	1000	25	002550211	LED	58	12/108
2P	1000	25	002550213	LED	120	6/54



Type	Dimensions [mm]
	B
1 pole	17,8
2 pole	35,6

Technical specifications for CH fuse holders

Technical data						
	PCF 10 DC		EFH 10 DC		EFH 14 DC	
Fuse type	CH 10x38 PV		CH 10x38 PV		CH 14x51 PV	
	IEC	UL	IEC	UL	IEC	UL
Versions	Without indicator, LED indicator					
Number of poles	1p, 2p					
Rated operational voltage Ue	1000V d.c.					
Rated operational current Ie	25A			50A		
Rated conditional short-circuit current	30kA	10kA	30kA	10kA	30kA	10kA
Rated insulation voltage Ui	1000V		1000V		1000V	
Rated imp. withstand voltage Uimp	4kV		8kV		8kV	
Required insulation temperature rating		60°C		60°C		60°C
Max power dissipation of the fuse-link (W)	3W		3W		5W	
Derating factor of current In for different ambient temperatures	20°		1			
	30°		0,95			
	40°		0,9			
	50°		0,8			
	60°		0,7			
	70°		0,5			
Derating factor of current In for side by side mounting fuse holders (nr. of poles)	1-4		1			
	5-6		0,8			
	7-9		0,7			
	≥10		0,6			
LED indicator operating range	80V-1000V d.c.					
Utilization category	DC-20B (Do not operate under load)					
Operational performance (cycles with current)	0		0		0	
Operational performance (cycles without current)	2000		2000		2000	
Inclined Plane Tracking (IPT)				60min at 1kV		60min at 1kV
Humidity	90% at 20°C		90% at 20°C		90% at 20°C	
Operating ambient temperature	-5°C ... +40°C		-5°C ... +40°C		-5°C ... +40°C	
Store ambient temperature	-25°C ... +55°C		-25°C ... +55°C		-25°C ... +55°C	
Degree of protection (IEC 60529)	IP 20		IP 20		IP 20	
Terminal capacity	0,5-10mm ² Double connection	AWG 20-10 stranded Cu only	1-25mm ²	AWG 18-8 solid&stranded Cu only	1,5-35mm ²	AWG 16-6 solid&stranded Cu only
Screw	PZ M4	PZ M4	PZ M5	PZ M5	PZ M5	PZ M5
Torque	1,2Nm	1,2Nm	2Nm	2Nm 17,7 lb-in	2,5-3Nm	2Nm 17,7 lb-in
Mounting on EN 60715 rail	35mm rail					
Sealing possibility	ON and OFF					
Standards - fuse links	IEC/EN 60269-2 IEC/EN 60269-6 UL 284-4	IEC/EN 60269-2 IEC/EN 60269-6 UL 284-4	IEC/EN 60269-2 IEC/EN 60269-6 UL 284-4	IEC/EN 60269-2 IEC/EN 60269-6 UL 284-4	IEC/EN 60269-2 IEC/EN 60269-6 UL 284-4	UL 248-4 IEC/EN 60269-2
Standards - fuse holders	IEC 60947-1 IEC 60947-3	UL 4248-1 UL 4248-18	IEC 60947-1 IEC 60947-3	UL 4248-1 UL 4248-18 UL 486E CSA C22.2 No.65	IEC 60947-1 IEC 60947-3	UL 4248-1 UL 4248-18 UL 486E CSA C22.2 No.65
Test reports	Int	UL	Int	UL	Int	UL
Certificates		UR		UL Listed		UL Listed

Section rail

PCF 10 DC, EFH 10 DC

Type	Description	Code No.	Cross section (mm ²)	Length (m)	Weight [g]	Packaging [pcs]
IZS10/1F/54	10 mm ² , 1 pole, 54 mod	002921101	10	1	150	40
IZS16/1F/54	16mm ² , 1 pole, 54 mod	002921111	16	1	220	40

For use with PCF10 DC, EFH10 DC



EFH 14 DC

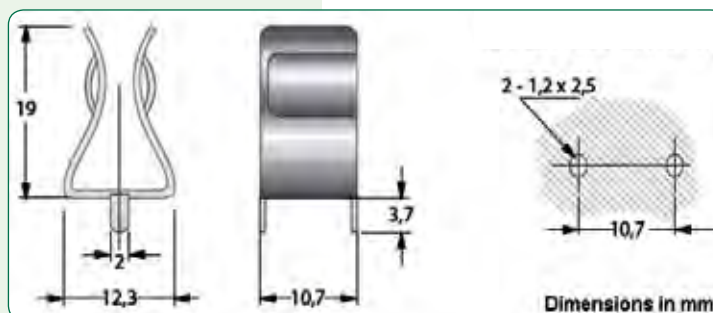
Type	Description	Code No.	Cross section (mm ²)	Length (m)	Weight [g]	Packaging [pcs]
IZS16/1F/36	16mm ² , 1 pole, 36 mod	002921121	16	1	280	40

For use with EFH14 DC

Fuseholder for CH fuse links

Fuseholders for CH10 fuse links

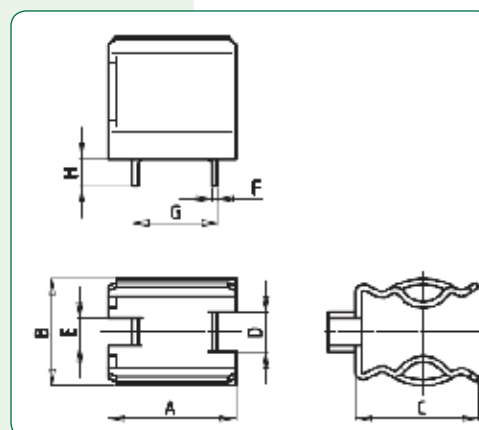
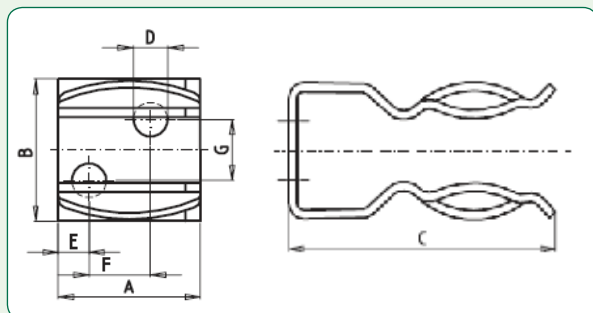
Code	Type	Weight(g)	Packaging [pcs]
006710335	HK10383	1	250



Type	Dimensions [mm]							
	A	B	C	D	E	F	G	H
HK10383	12,3	9,8	19,0	2,0	2,0	0,75	11,0	4,0

Fuseholders for CH14 fuse links

Code	Type	Weight(g)	Packaging [pcs]
006710340	CH14-PCB	5	100
006710341	CH14-SCR	5	100



Type	Dimensions [mm]						
	A	B	C	D	E	F	G
CH14-SCR	16	16	23	4,2	6,5	0	0

Type	Dimensions [mm]							
	A	B	C	D	E	F	G	H
CH14-PCB	16	14	15,5	5	3,5	0,75	10,7	3,5

NH DC 750V - Fuse-links



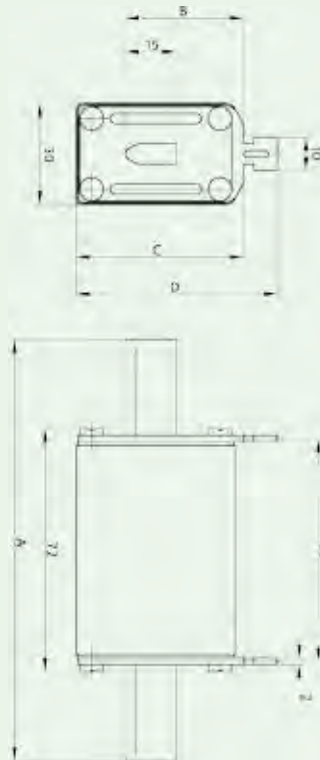
General characteristics

Rated voltage	750V d.c. (L/R = 15ms)
Breaking capacity	20 kA d.c.
Standards	IEC 60269-6 ed 1.0 (2010-9), IEC 60269-4
Application	Fuse-link for DC application. Applied in fuse base PK0 and PK1 DC.

DC 750 V

In [A]	gPV		PV (gR)		Power dissipation [W]	Pre-arcing Joule integral [I²t] (L/R = 15ms)	Operating Joule integral [I²t] (L/R = 15ms)	Weight [g]	Packaging [pcs]
	Code No. Size 0	Code No. Size 1C	Code No. Size 0	Code No. Size 1C					
32	004110308	004110300	004110500	004110510	7,6	70	370	280/0 300/1C	3/24
40	004110310	004110301	004110502	004110512	8,8	135	650		
50	004110311	004110302	004110503	004110513	11,0	250	1.000		
63	004110312	004110303	004110504	004110514	13,5	520	1.790		
80	004110313	004110304	004110505	004110515	17,0	1.050	3.000		
100	004110314	004110305	004110506	004110516	21,0	2.580	6.140		
125	004110315	004110306	004110507	004110517	22	6.300	14.090		
160	004110316	004110307	004110508	004110518	32	13.060	27.220		

Size	A	B	C	D
0	125	35	50	60
1C	135	40	55	65



gPV, PV(gR) 750V, 1000V dimensions

NH DC 1000V - Fuse-links

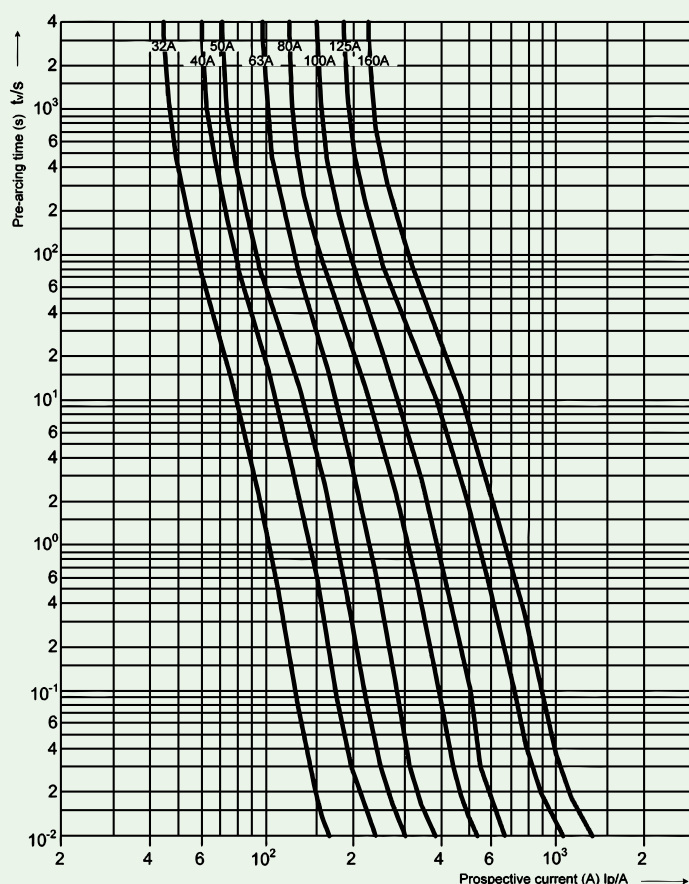
General characteristics

Rated voltage	1000V d.c. (L/R = 2ms)
Breaking capacity	20 kA d.c.
Standards Fuse-links	IEC 60269-6 ed 1.0 (2010-9), IEC 60269-4
Application	Fuse-link for DC application. Applied in fuse base PK0 and PK1 DC.



DC 1000 V

I_n [A]	gPV		PV (gR)		Power dissipation [W]	Pre-arcing Joule integral [I ² t] (L/R = 2ms)	Operating Joule integral [I ² t] (L/R = 2ms)	Weight [g]	Packaging [pcs]
	Code No. Size 0	Code No. Size 1C	Code No. Size 0	Code No. Size 1C					
32	004110381	004110371	004110520	004110530	7,6	52	430	280/0 300/1C	3/24
40	004110383	004110373	004110522	004110532	8,8	96	730		
50	004110384	004110374	004110523	004110533	11,0	155	920		
63	004110385	004110375	004110524	004110534	13,5	290	1.760		
80	004110386	004110376	004110525	004110535	17,0	520	3.160		
100	004110387	004110377	004110526	004110536	21,0	1.110	5.280		
125	004110388	004110378	004110527	004110537	22	2.800	11.340		
160	004110389	004110379	004110528	004110538	32	5.950	20.750		



gPV, PV(gR) 750V, 1000V t-I characteristics



NH DC 1000V - Fuse-links

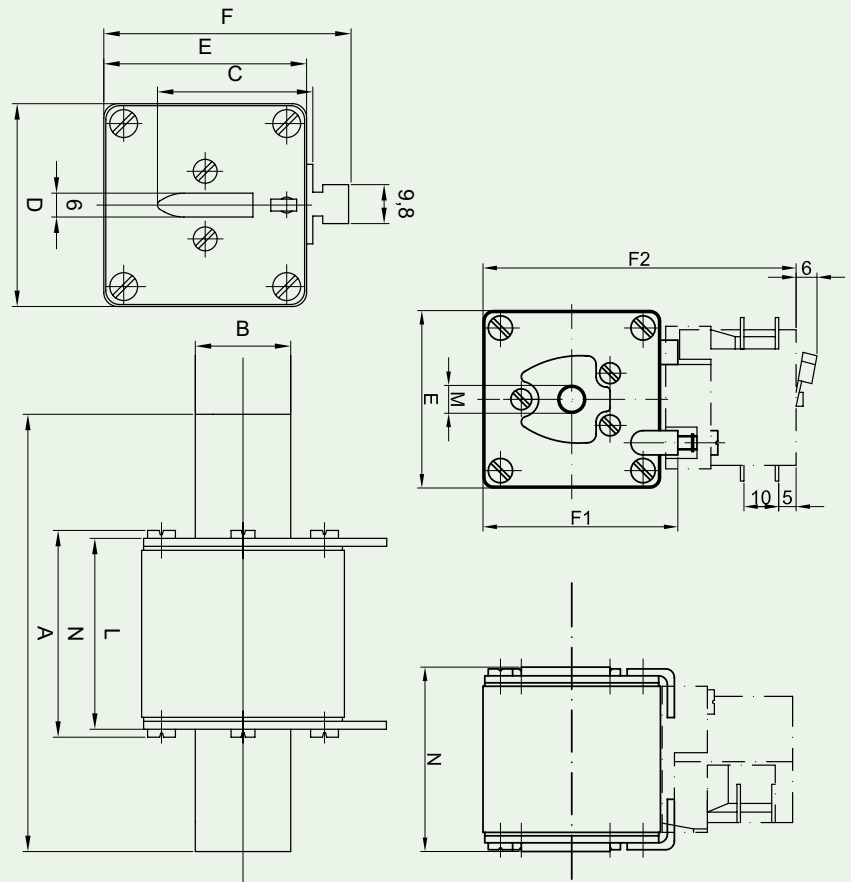


General characteristics

Rated voltage	1000V d.c. (L/R=1ms)
Breaking capacity	10kA d.c.
Standards	IEC 60269-6 ed. 1.0
Application	Fuse link for DC application. Applied in fuse base PK1, 2, 3 1000V d.c..

DC 1000V gPV

Size	I _n [A]	gPV Standard indicator Code No.	gPV Visual indicator Code No.	Power dissipation (0,7 x I _n) [W]	Power dissipation [W]	Pre-arcing Joule integral [I²t] (L/R = 1ms)	Operating Joule integral [I²t] (L/R = 1ms)	Weight [g]	Packaging [pcs]
1	200	004110342		11	27	4.400	29.000	500	3/24
2	200	004110343		11	26	4.400	29.000	650	1/16
	200		004110346	11	26	4.400	29.000		2/16
	250	004110344		15	36	6.000	38.000		1/16
	250		004110347	15	36	6.000	38.000		2/16
3	160	004110456		15	38	5.000	10.000	1200	3/15
	200	004110455		18	45	10.000	20.000		
	250	004110458		18	44	20.000	40.000		
	315	004110460		24	54	40.000	80.000		
	350	004110459		25	55	45.000	90.000		
	400	004110457		24	58	46.000	138.000		

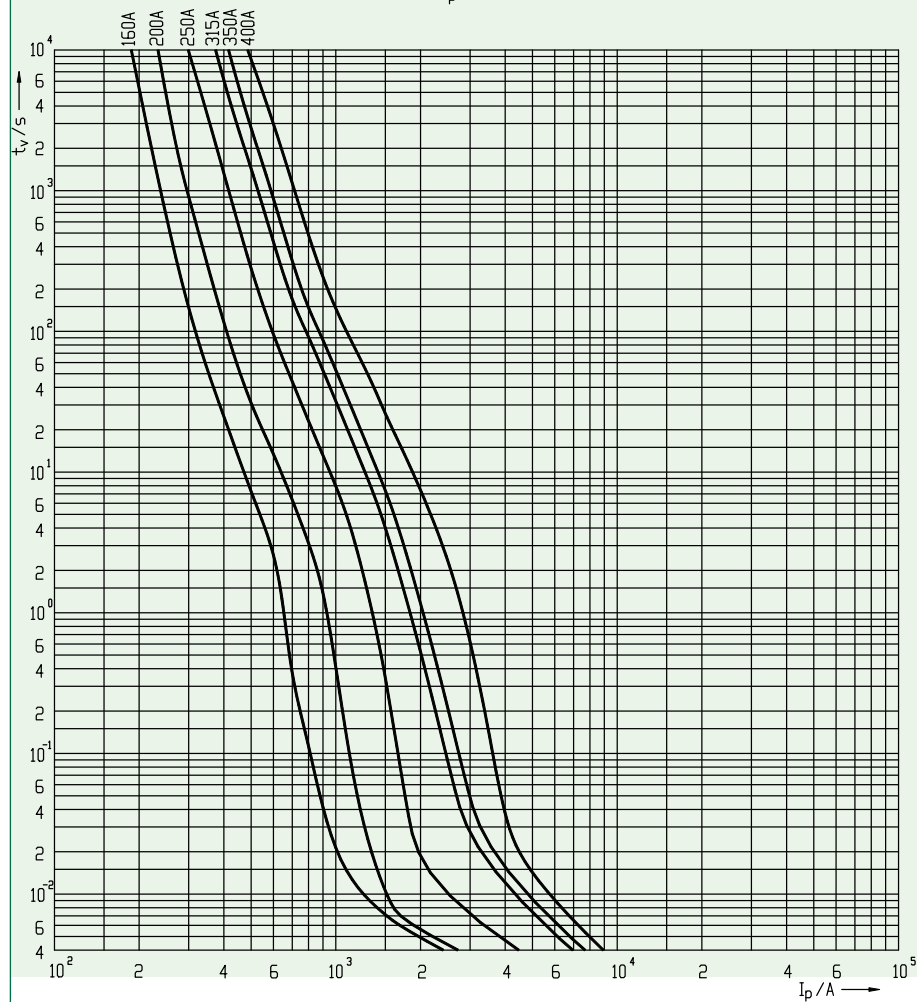
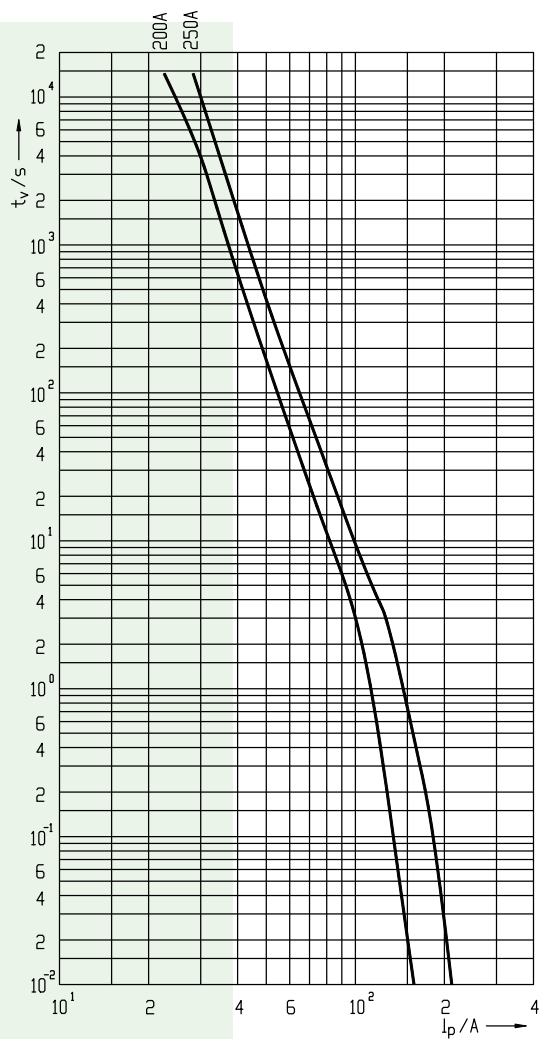
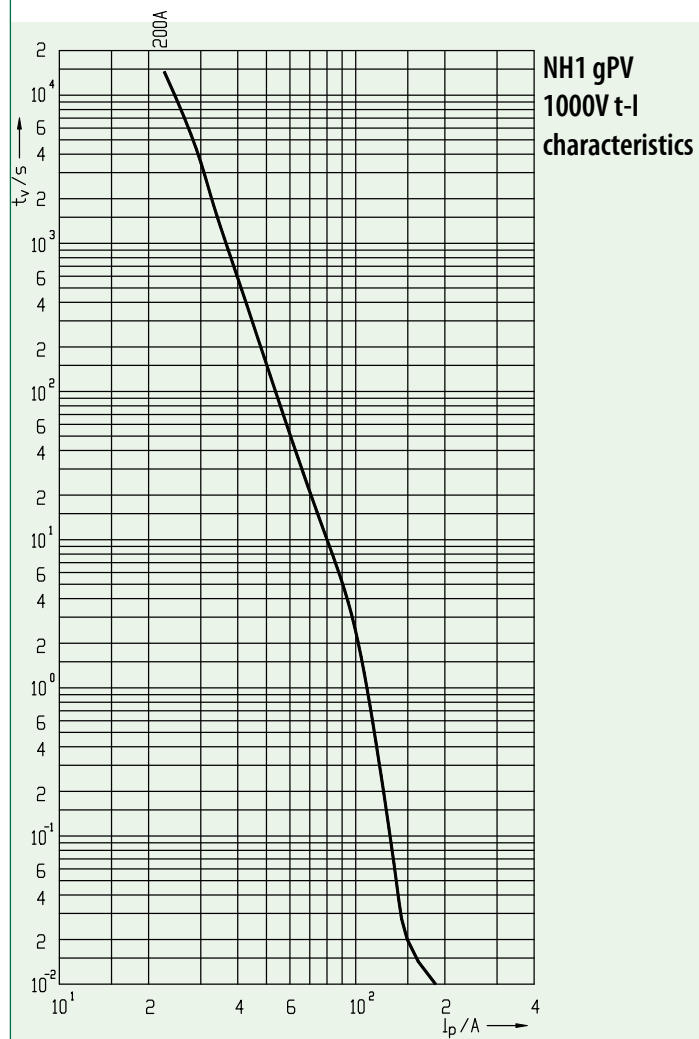


Standard indicator

Visual indicator

Size	A	B	C	D	E	F	L	N
1	135	24	42	51	51	67	70	74
2	150	30	48	61	61	71	70	74
3	150	37	60	73	73	87	70	74

Size	D	E	F1	F2	M	N
2	60	60	65	99	M10	75



NH3 gPV 1000V t-I characteristics

NH DC 1100V - Fuse-links



General characteristics

Rated voltage	1100V d.c. (L/R = 5ms)
Breaking capacity	10 kA d.c.
Standards	IEC 60269-6 ed 1.0 (2010-9), IEC 60269-4
Application	Fuse-link for DC application. Applied in fuse base PK XL 1500V.

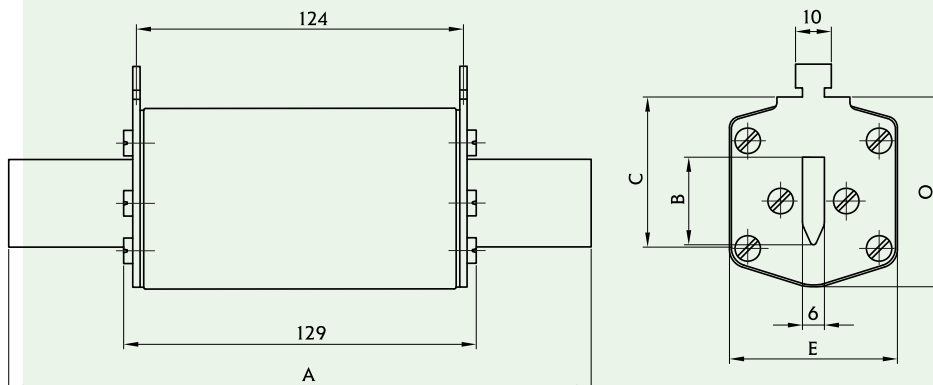
DC 1100V

Size	I _n [A]	Standard indicator (pic.1)	Trip indica- tor - K (pic.2)	S ₁₇₀ screw contact (pic.3)	PV (gR) Standard indicator (pic.1)	Trip indica- tor - K (pic.2)	Power dis- sipation (0,7xI _n) P _d [W]	Power dissipation [W]	Pre-arcing Joule integral [I²t] (L/R = 5ms)	Operating Joule integral [I²t] (L/R = 5ms)	Weight [g]	Packaging [pcs]
1XL	63	004110426	004110431	004110435	004110540	004110550	6,2	15,0	2.720	3.520	750	1/17
	80	004110427	004110432	004110436	004110541	004110551	7	17,0	4.000	5.500		
	100	004110428	004110433	004110437	004110542	004110552	8,2	20,0	6.500	9.000		
	125	004110429	004110434	004110438	004110543	004110553	9,6	23,0	11.000	15.000		
	160	004110410	004110414	004110420	004110544	004110554	14,6	35,0	19.400	28.640		
	200	004110411	004110416	004110439	004110585	004110586	13,9	32,6	42.600	83.400		
2XL	200	004110430	004110415	004110421	004110545	004110555	17,8	42,0	40.000	60.000	1050	1/15
	250	004110413	004110417	004110423	004110546	004110556	17,9	46,0	85.260	117.400		
	350*	004110483	/	/	/	/	27	65,5	40.000	130.000		
3L	200	004110451	/	/	/	/	17	41	40.000	59.000	1360	1/10
	224	004110452	/	/	/	/	17,5	44	60.000	88.000		
	250	004110453	/	/	/	/	17,7	45	85.000	115.000		
	300	004110454	/	/	/	/	25	53,5	166.000	220.000		
	315	004110425	004110419	004110424	004110547	004110557	25,2	54,0	166.800	221.900		
	350	004110440	004110442	004110444	004110548	004110558	28,2	60,5	175.000	260.000		
	400	004110441	004110443	004110445	004110549	004110559	28,8	67,0	235.000	345.000		
	450*	004110448	/	004110450	/	/	40	98	110.000	280.000		
	500*	004110446	/	004110447	/	/	42	112	150.000	370.000		
	630*	004110449	/	004110484	/	/	46	119	180.000	450.000		

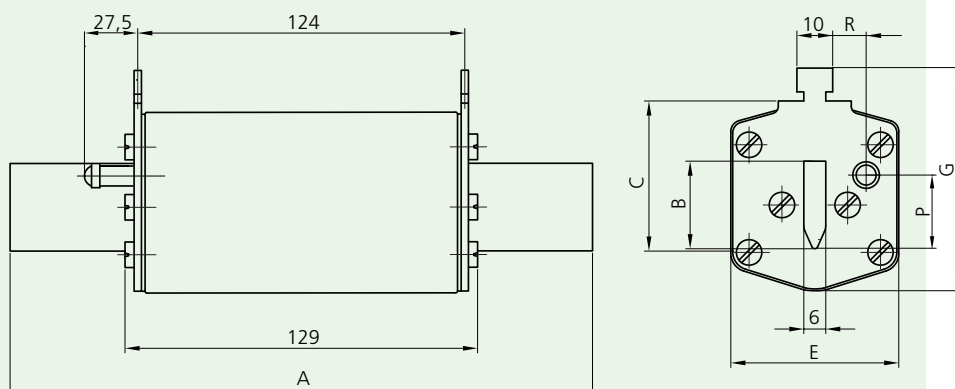
*L/R=2ms, 30kA d.c.; special dimensions (see next page)



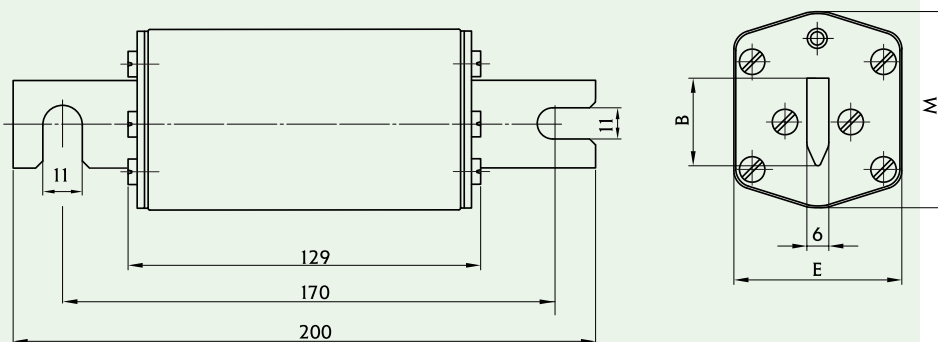
Picture 1



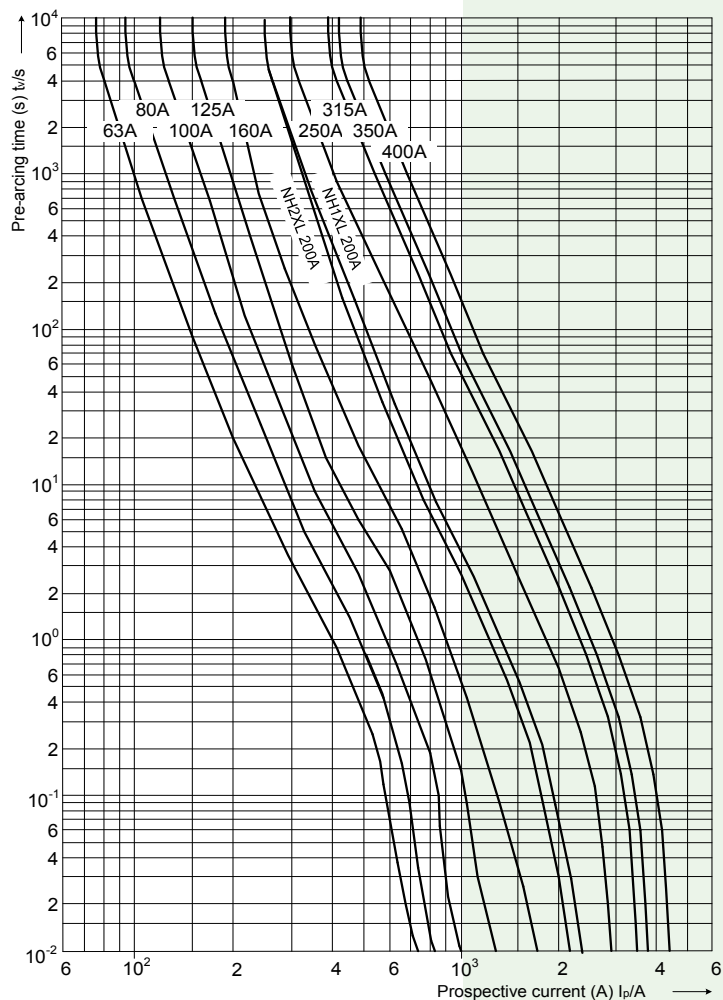
Picture 2



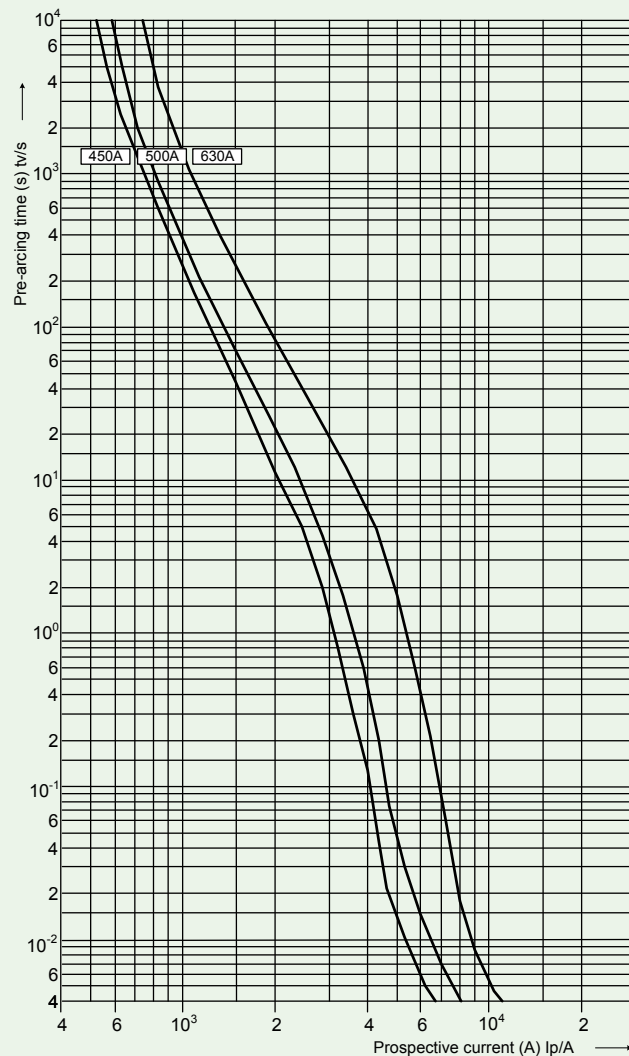
Picture 3



Size	Dimensions [mm]								
	A	B	C	E	G	P	R	M	O
1XL	194	24	40	46	61,5	20,5	13,7	50	52
2XL	209	30	48	54	71	27,3	16,2	59	61
*2XL (350A)	208	30	48	60	/	/	/	60	/
3L	209	37	60	64	82	35,6	17,0	70	74
*3L (450A, 500A, 630A)	209	37	60	73	/	/	/	73	77



gPV, PV(gR) 1100V t-l characteristics



gPV, PV(gR) 1100V t-l characteristics

NH DC 1100V - Fuse-links

NEW!



General characteristics

UL file: E347771

Rated voltage	1100V d.c. (L/R = 2ms)
Breaking capacity	10 kA d.c.
Standards	UL 2579, UL 248-1
Application	Fuse link for DC application. Applied in fuse base PK XL 1500V.

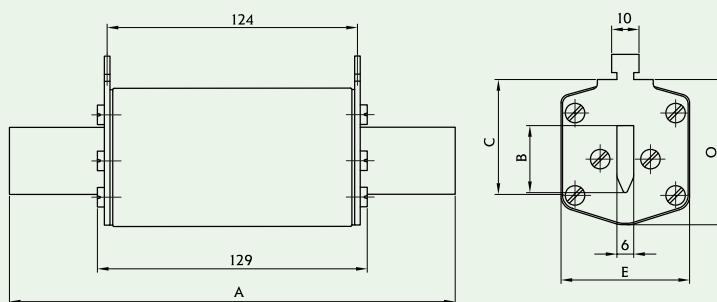
DC 1100V gPV

Size	I_n [A]	Standard indicator (pic.1)	S_{170} screw contact (pic.2)	U_{170} screw contact (pic.3)	Power dis- sipation ($0,7 \times I_n$) P_d [W]	Power dissipation [W]	Pre-arcing Joule integral [I ² t] (L/R = 2ms)	Operating Joule integral [I ² t] (L/R = 2ms)	Weight [g]	Packaging [pcs]
1XL	63	004110391	004110472	004110487	7	15,7	2.800	3.500	750	1/17
	80	004110392	004110473	004110488	7	16	4.500	5.500		
	100	004110393	004110474	004110489	8,3	19	7.500	9.000		
	125	004110394	004110475	004110490	9,7	22	13.000	15.000		
	160	004110395	004110476	004110491	13,2	30	25.000	30.000		
	200	004110396	004110477	004110492	15	34,8	39.000	80.000		
2XL	200	004110397	004110478	004110493	15,9	36	55.000	75.000	1050	1/15
	250	004110398	004110479	004110494	19,3	44	90.000	120.000		
3L	315	004110399	004110480	004110495	23	53,6	170.000	230.000	1360	1/10
	350	004110400	004110481	004110496	26	58	195.000	260.000		
	400	004110401	004110482	004110497	28	64,8	250.000	350.000		
	450	004110485	004110486	004110498	34	85	130.000	250.000		
	500*	004110629	004110628	004110627	37	98	150.000	370.000		

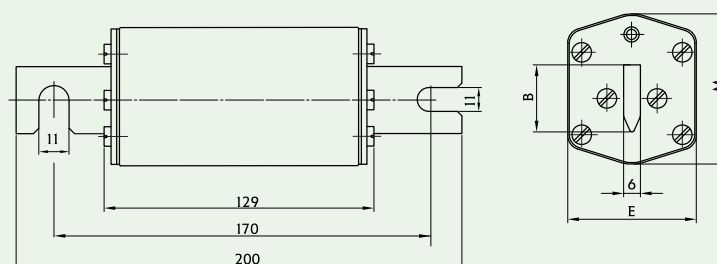
*size 73x73; dimensions on page 34 (3L).

Size	Dimensions [mm]								
	A	B	C	E	G	P	R	M	O
1XL	194	24	40	46	61,5	20,5	13,7	50	52
2XL	209	30	48	54	71	27,3	16,2	59	61
3L	209	37	60	64	82	35,6	17,0	70	74

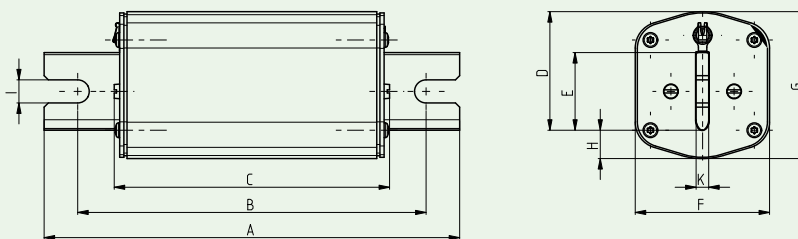
Picture 1



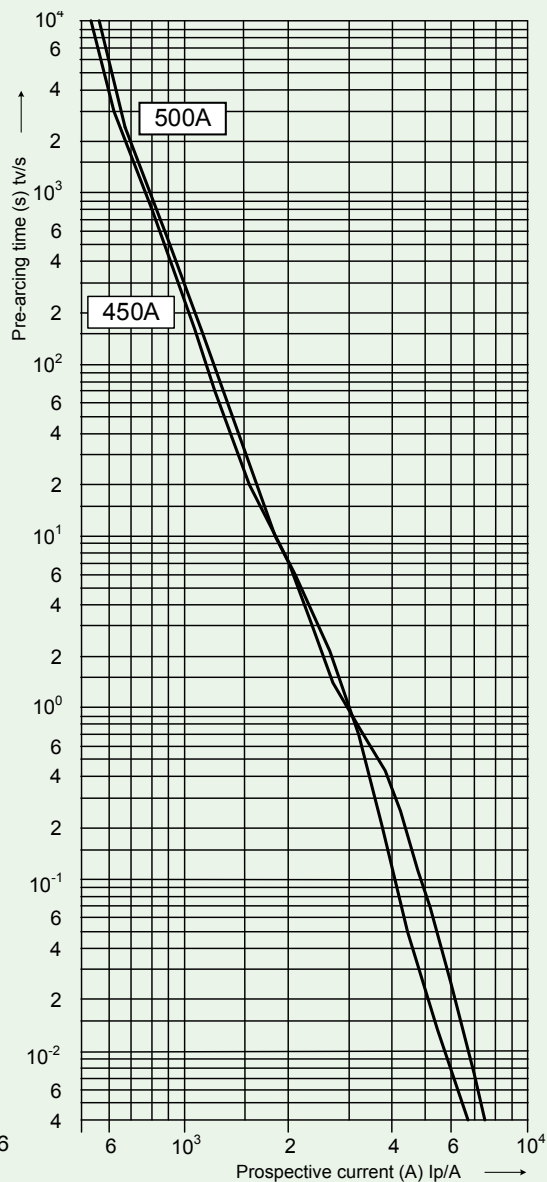
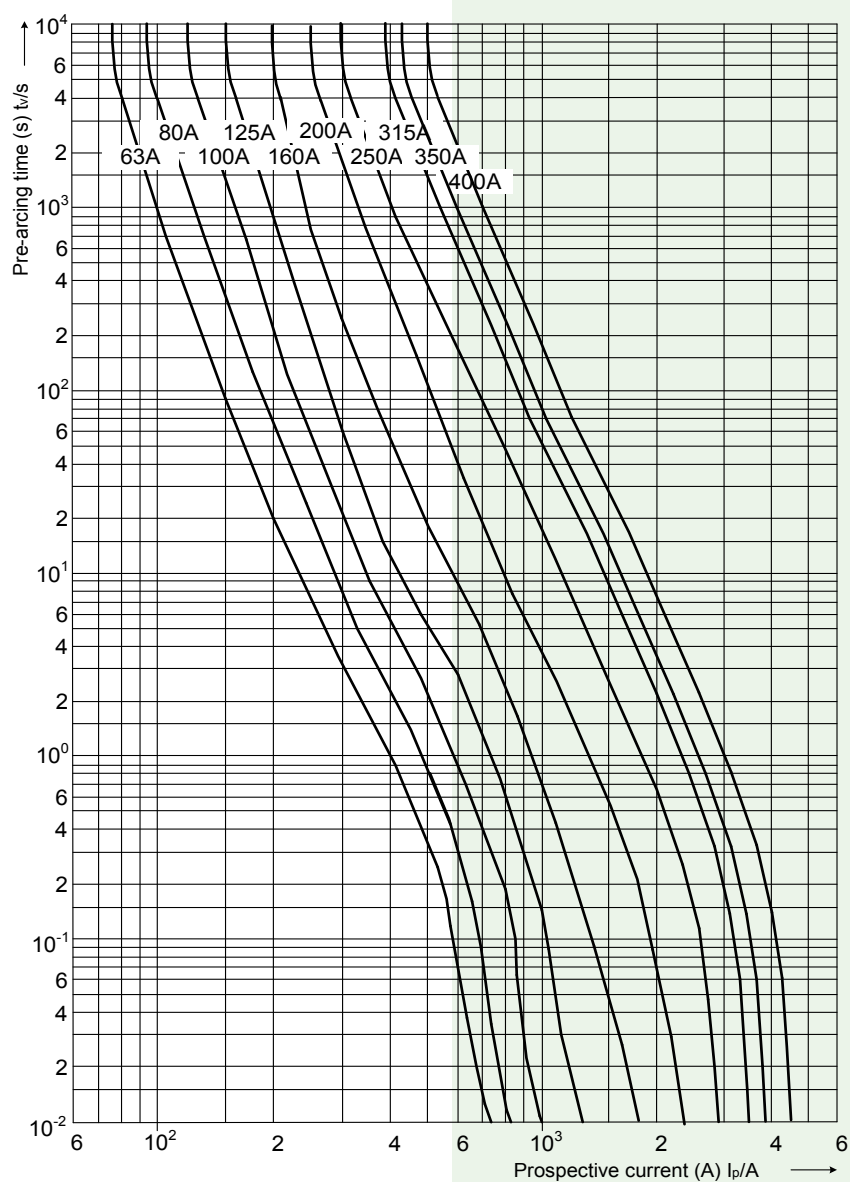
Picture 2



Picture 3



Size	Dimensions [mm]									
	A	B	C	D	E	F	G	H	K	I
1XL	197	170	133	40	24	46	50	16	6	11
2XL	200	170	130	48	30	54	59	18	6	13
3L	200	170	130	60	37	64	70	23	6	13



gPV 1100V t-I characteristics

NH DC 1500V-fuse links

NEW!



Approved by



General characteristics		UL file E347771*
Rated voltage	1500V d.c. (L/R=2ms)	
Breaking capacity	30kA d.c.	
Standards	IEC 60269-6 ed. 1.0, UL2579, UL248-1	
Application	Fuse link for DC application. Applied in fuse base PK XL 1500V.	

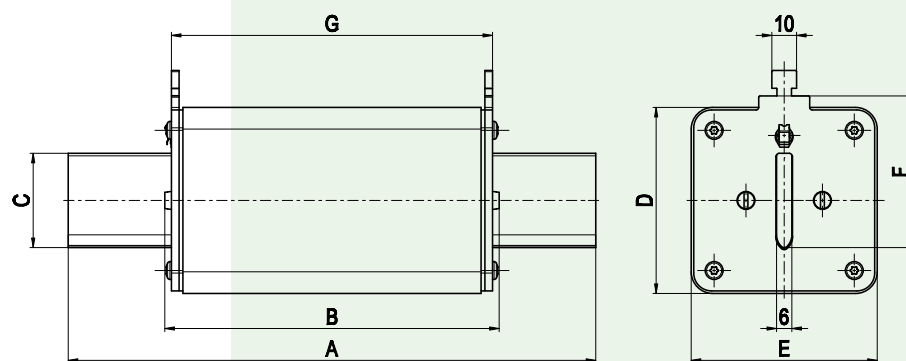
*UL pending for size 3L

DC 1500V

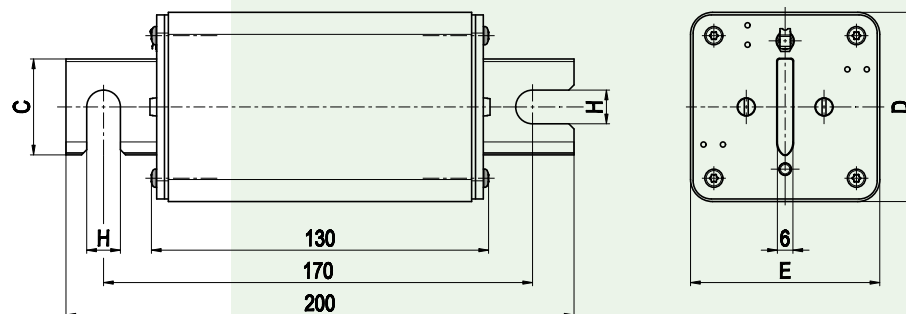
Size	I _n [A]	Standard indicator (pic.1)	gPV S ₁₇₀ screw contact (pic.2)	U ₁₇₀ screw contact (pic.3)	Power dis- sipation (0,7xI _n) P _d [W]	Power dissipation [W]	Pre-arcing Joule integral [I ² t] (L/R = 2ms)	Operating Joule integral [I ² t] (L/R = 2ms)	Weight [g]	Packaging [pcs]
1XL	50	004110621	004110622	004110623	6	14	800	3500	950	1/15
	63	004110560	004110591	004110606	6,2	14	1.500	6.000		
	80	004110561	004110592	004110607	7	16	5.000	15.000		
	100	004110562	004110593	004110608	8,3	19	10.000	26.000		
	125	004110563	004110594	004110609	9,7	22	15.000	37.000		
	160	004110564	004110595	004110610	13,2	30	19.000	48.000		
2XL	200	004110565	004110596	004110611	13,7	32,5	22.000	75.000	1350	1/9
	200	004110566	004110597	004110612	15,9	36	42.000	75.000		
	250	004110567	004110598	004110613	19,3	44	73.000	132.000		
3L	315	004110569	004110602	004110617	20,6	51	70.000	180.000	1970	1/9
	350	004110570	004110603	004110618	25,5	63	140.000	200.000		
	400	004110571	004110604	004110619	35	86	40.000	165.000		



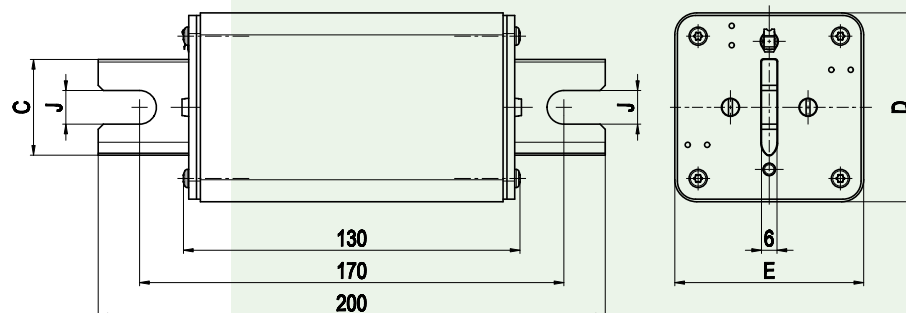
Picture 1



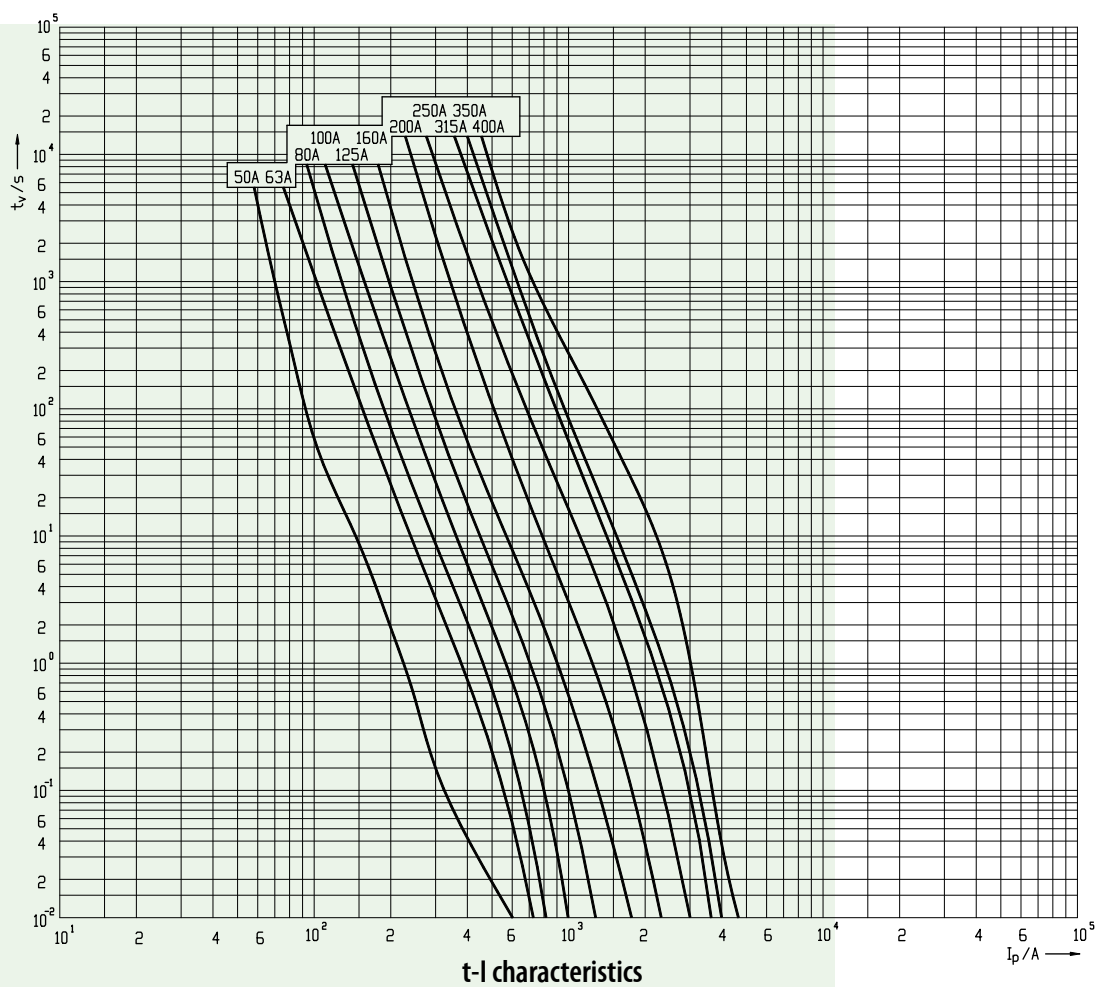
Picture 2



Picture 3

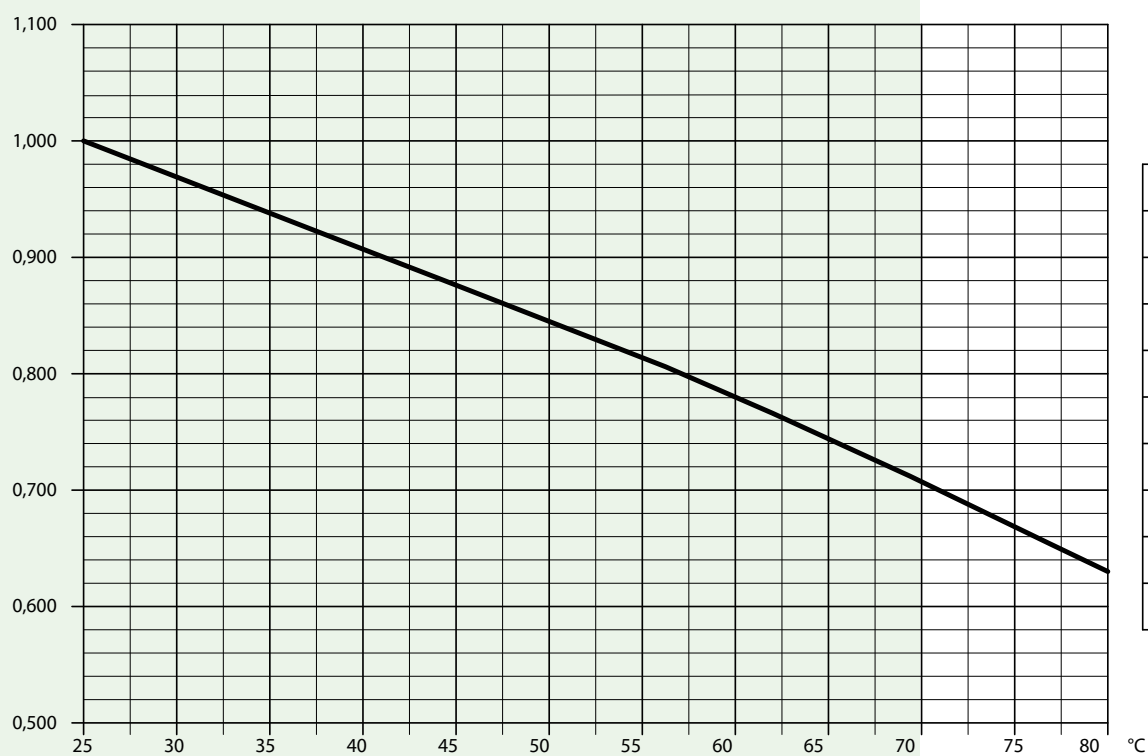


Size	Dimensions [mm]								
	A	B	C	D	E	F	G	H	J
1XL	193	130	24	51	51	41	126	11	11
2XL	208	130	30	60	60	48	126	11	13
3L	208	130	37	73	73	60	126	11	13



Ambient temperature derating factor NH XL

A_1



t_a (°C)	A_1
40	0,91
45	0,88
50	0,84
55	0,81
60	0,78
65	0,74
70	0,71
75	0,67
80	0,63

Fuse base PK XL

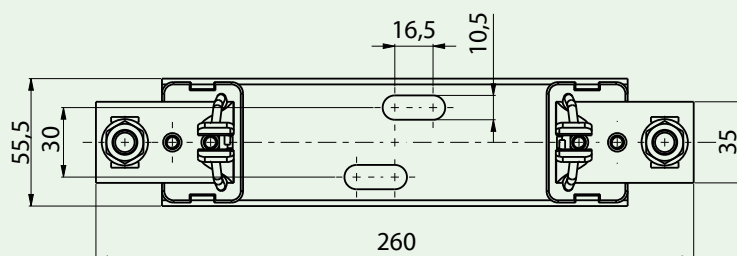
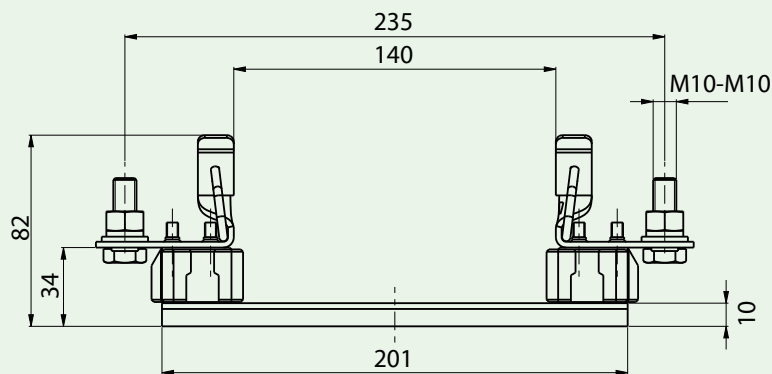
NEW!

General characteristics

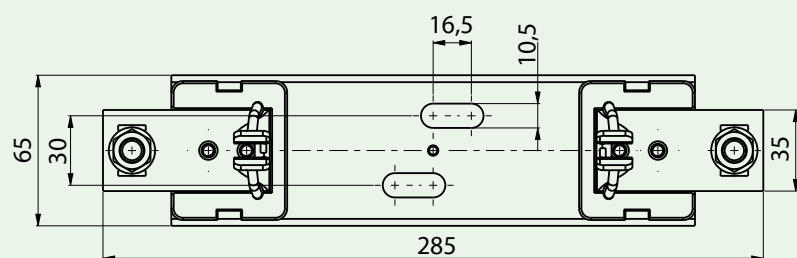
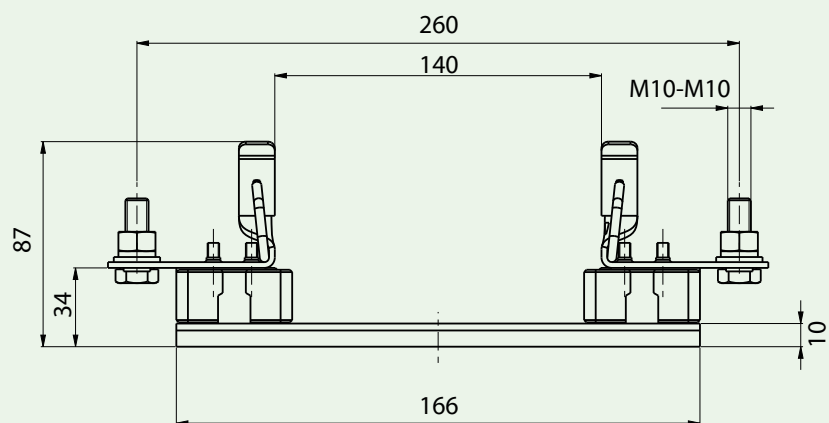
Rated voltage	1500V a.c./d.c.
Rated current	250A, 400A, 630A
Insulation class	C-VDE 0110
Rated torque-contact (size 1XL,2XL,3L)	32Nm
Rated torque (mounting plate)	12Nm
Degree of protection	IP00
Standards	EN 60269, IEC60269, DIN VDE 0636, DIN 43620, DIN 43623

Fuse base PK XL

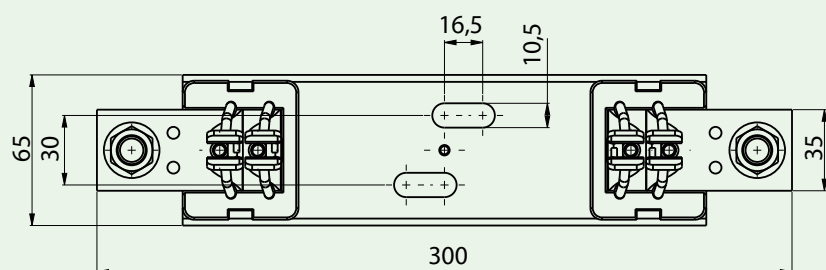
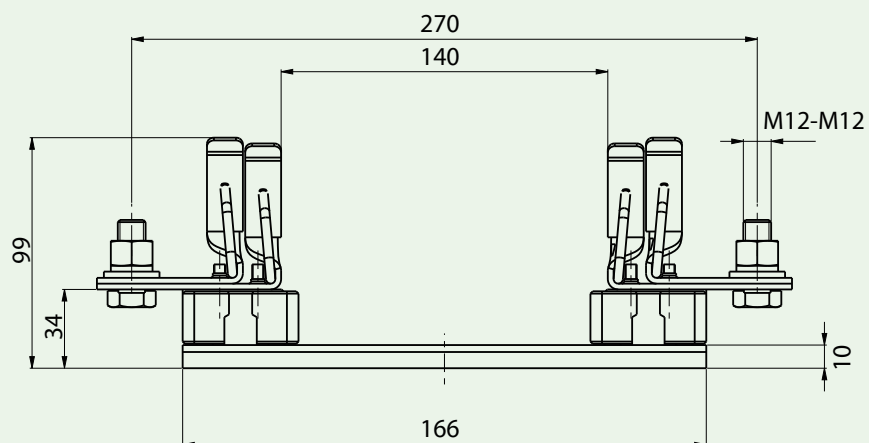
Type	I _n [A]	Cable lugs according to DIN 46235 [mm ²]	Code No.	Weight [g]	Packaging [pcs]
PK1XL M10-M10 1500V 1p	250	25-150	004132017	675	3
PK2XL M10-M10 1500V 1p	400	25-240	004132019	921	1
PK3L M12-M12 1500V 1p	630	25-300	004132023	1184	1



PK1XL



PK2XL



PK3L



Fuse base U1...3 /GZ/1500/H

General characteristics					
Type			U1XL-1IGZ/1500/H	U2XL-1IGZ/1500/H	U3L-1IGZ/1500/H
Size			NH1XL	NH2XL	NH3L
Rated voltage	V		1500	1500	1500
Rated current	A		250	400	630
Conv. free air thermal current with fuse links	A		200	315	630
Conv. free air thermal current with solid links	A		325	400	1000
Rated frequency	Hz		40-60	40-60	40-60
Max. permis. power dissipation per fuse-link	W		35	35*	70
Cable terminal - Flat terminal	Screw	–	M10	M10	M12
	Cable lug (DIN 46235)	mm ²	25-240	25-240	25-300
	Flat termination	mmxmm	30x10	30x10	40x10
	Rated torque	Nm	30-35	30-35	30-35
Cable terminal - Terminal	Cross-section	mm ²	KM2G	KM2G	P32
	Rated torque	Nm			
Degree of protection - Front side, device fitted	Operating conditions	–	IP00	IP00	IP00
	Gripping lug cover A-U... (available separately) applied	–	IP2X	IP2X	IP2X
Operating conditions	Ambient temperature**	°C	-25 ... +55		
	Rated operating mode	–	Uninterrupted duty		
	Actuation	–	–		
	Mounting position	–	Vertical, horizontal		
	Altitude	m	< 2000		
	Pollution degree	–	3		
	Overvoltage category	–	III		

NEW!

* with application of gPV fuse-links max. 250A: 46W

** 35°C normal temperature, at 55°C with reduced operating current



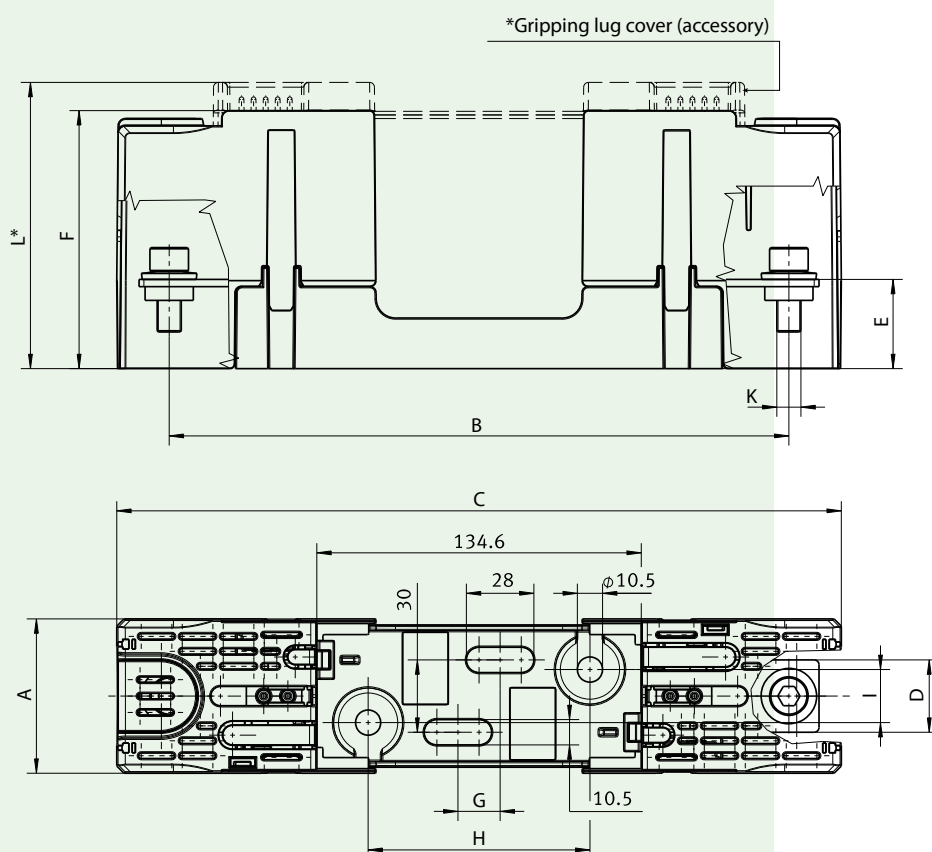
Fuse base U1...3/GZ/1500/H

Type	I _n [A]	Code No.	Max. Connection (mm ²)	Weight [g]	Packaging [pcs]
U1XL-1IGZ/1500/H	250	004122060	240	600	1
U2XL-1IGZ/1500/H	400	004122061	240	600	1
U3L-1IGZ/1500/H	630	004122062	300	1000	1

Accessories

Type	Code No.	Description	Weight [g]	Packaging [pcs]
K-U1XL-3L	004122063	Mechanical fuse monitoring	9	1
A-U1XL-2XL	004122064	Gripping lug cover	13	1
A-U3L	004122065	Gripping lug cover	32	1

Size	Dimensions [mm]										
	A	B	C	D	E	F	G	H	I	K	L*
U1XL-1IGZ/1500/H	59	257	300,5	30	37	102,5	175	92	22	M10	111
U2XL-1IGZ/1500/H	64	257	300,5	30	37	107	175	92	22	M10	119
U3L-1IGZ/1500/H	80	270	328	40	38	122,5	25	96	26	M12	1.345



Fuse base PK0, 1, 2, 3 DC

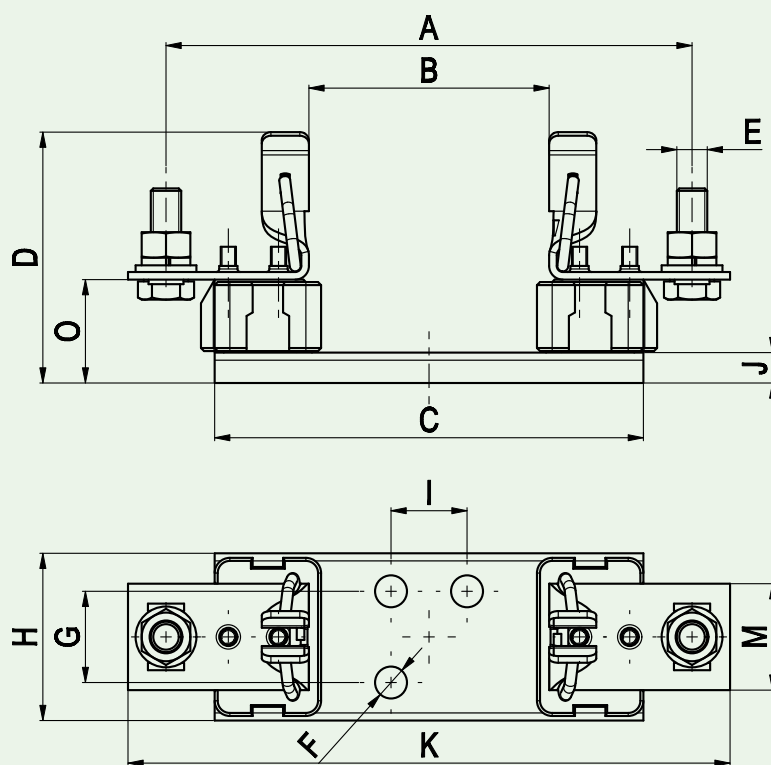
NEW!

General characteristics

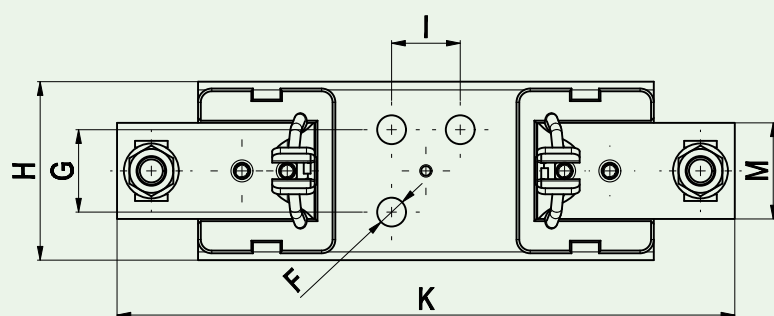
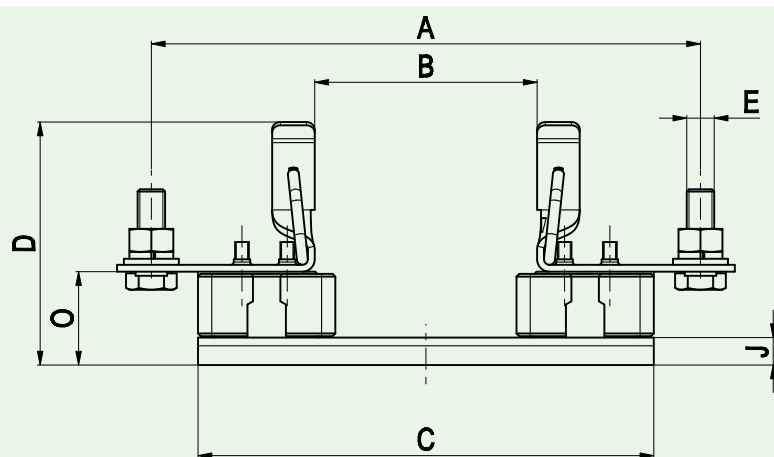
Rated voltage	1000V a.c./d.c.
Rated current	160A, 250A, 400A, 630A
Terminal torque	32 Nm
Cable lugs according to DIN 46235	25-150mm ² , 25-240mm ² , 25-300mm ²
Insulation class	C-VDE 0110
Degree of protection	IP00
Standards	EN 60269, IEC 60269, DIN VDE 0636, DIN 43620, DIN 43623

Fuse base PK

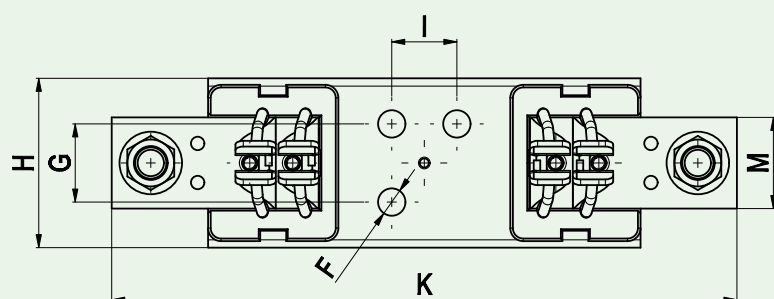
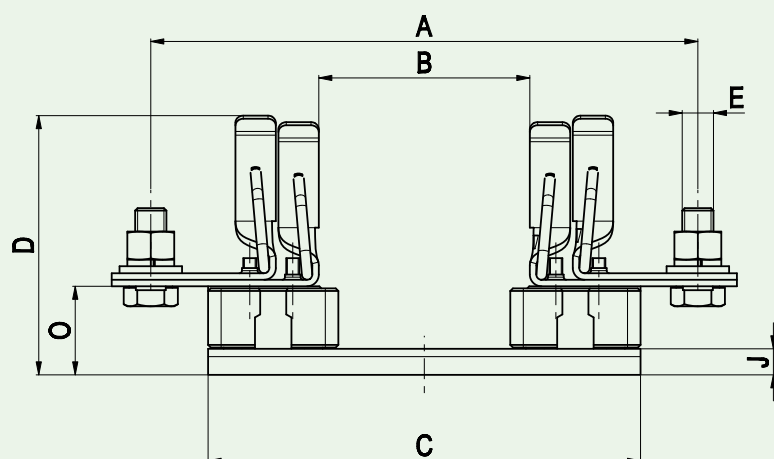
Type	I _n [A]	Cable lugs according to DIN 46235 [mm ²]	Code No.	Weight [g]	Packaging [pcs]
PK0 DC	160		004122033	258	3/90
PK 1 M10-M10 DC 1000V 1p	250	25-150	004122025	605	3/18
PK 2 M10-M10 DC 1000V 1p	400	25-240	004122024	845	3/15
PK 3 M12-M12 DC 1000V 1p	630	25-300	004122023	1110	3/12



PK0, 1 DC



PK2 DC



PK3 DC



Type	Dimensions [mm]												
	A	B	C	D	E	F	G	H	I	J	K	M	O
PK0 DC	150	74	130	60	M8-M8	Ø7,5	-	33	25	4,5	170	20	25
PK1 DC	175	80	141	82	M10-M10	Ø10,5	30	55,5	25	10	200	35	35
PK2 DC	200	80	166	87	M10-M10	Ø10,5	30	65	25	10	225	35	35
PK3 DC	210	80	166	99	M12-M12	Ø10,5	30	65	25	10	240	35	35

Fuse base U1-1 /GZ/PV

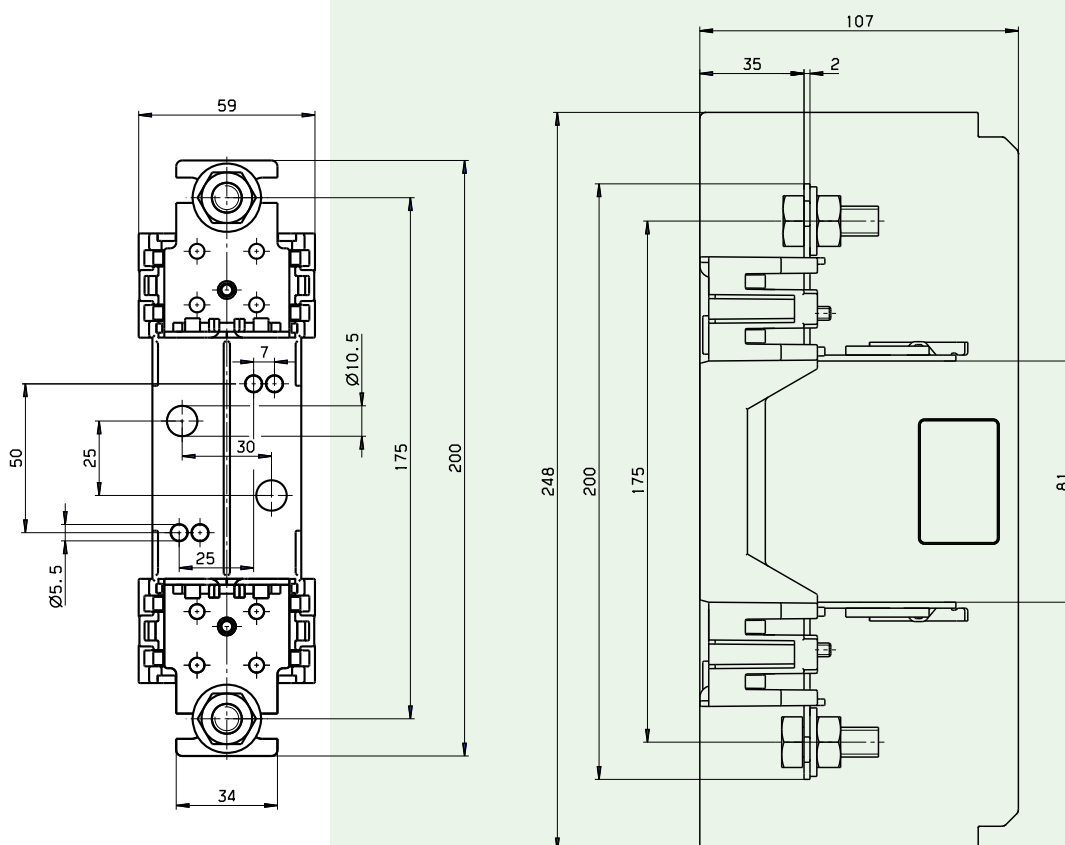


General characteristics

Rated voltage	1000V d.c.
Rated current	160A
Fuse link size	1C, 1
Conv. free air thermal current with fuse-links	160A
Conv. free air thermal current with solid links	325A
Max. permis. power dissipation per fuse-link	31W
Cable terminal - Flat terminal	Screw
	M10
	Cable lug (DIN 46235)
	25-150 mm ²
	Flat termination
	30x10 mmx-mm
	Rated torque
	30-35 Nm

Fuse base U1-1/GZ/PV

Type	I _n [A]	Code No.	Max. Connection (mm ²)	Weight [g]	Packaging [pcs]
U1-1/GZ/PV	160	004122035	150	387	1



Fuse disconnecter TL1-1 /9/ 1000V/PV

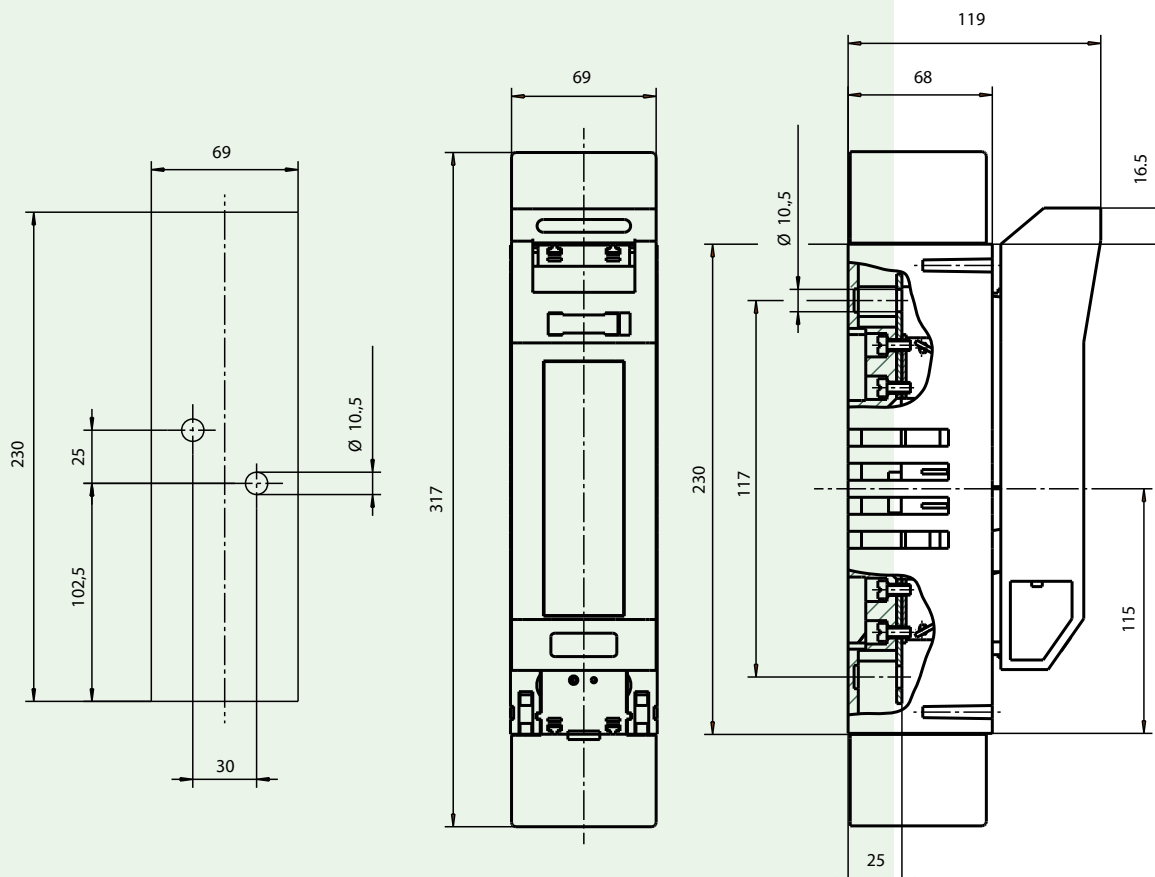
General characteristics

Number of poles		1
Rated voltage		1000V d.c.
Rated current		160A
Conv. free air thermal current with fuse-links		160A
Utilization category		DC-20B
Fuse-links	Size to DIN 43620	1C, 1
	Max. rated current (gL/gG)	160A
	Max. permis. power loss per fuse-link	25W
Cable terminal - Flat terminal	Screw	M10
	Cable lug (DIN 46235)	25-240 mm²
	Flat termination	30x10 mm
	Rated torque	30-35 Nm
Type of protection - front side, device fitted		IP20, IP10
Operating conditions	Ambient temperature*	-25 to +55
	Rated operating mode	Cont. operation
	Actuation	Dependent manual actuation
	Mounting position	Vertical, horizontal
	Altitude	up to 2000 m
	Pollution degree	3
	Overvoltage category	III

*35°C normal temperature, 55°C with reduced operating current

Fuse disconnecter TL1-1/9/1000V/PV

Type	I _n [A]	Code No.	Max. Connection (mm ²)	Terminal	Weight [g]	Packaging [pcs]
TL1-1/9/1000V/PV	160	004122038	150	M10	1070	1



Fuse disconnecter TL1,3-1 /9/1200V

General characteristics			
Type		TL1/1200V	TL3/1200V
For NH fuse-links/extended length/acc. to DIN VDE 0636-2	Size	a1=194mm, a4=124mm	a1=209mm, a4=124mm
Rated voltage		1200V a.c. / 1000V d.c.	1200V a.c. / 1000V d.c.
Rated current		250A	630A
fuse link size		1XL	2XL, 3L
Conv. free air thermal current with fuse-links		250A	630A
Conv. free air thermal current with solid links		325A	1000A
Rated frequency		40-60 Hz	40-60Hz
Utilization category		AC-20B, DC-20B	AC-20B, DC-20B
Max. permis. power loss per fuse-link		25W	70W
Cable terminal - Flat terminal	Bolt diameter	M10	M12
	Cable lug (DIN 46235)	25-150 mm ²	25-300 mm ²
	Flat bar	30x10 mm	40x10 mm
	Rated torque	30-35 Nm	30-35 Nm
Type of protection - front side, device fitted	Switching cover close	IP20	IP20
	Switching cover open	IP10	IP10
Operating conditions	Ambient temperature*	-25 to +55	
	Rated operating mode	Cont. operation	
	Actuation	Dependent manual operation	
	Mounting position	Vertical, horizontal	
	Altitude	up to 2000 m	
	Pollution degree	3	
	Overvoltage category	III	

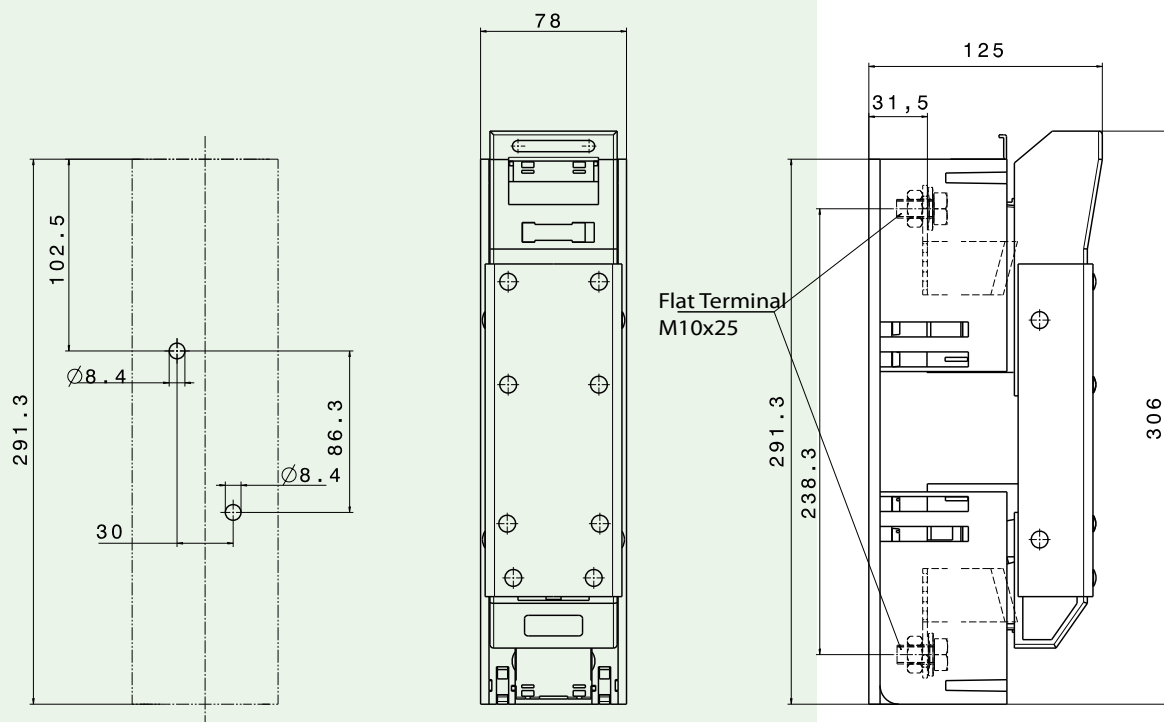
*35°C normal temperature, 55°C with reduced operating current



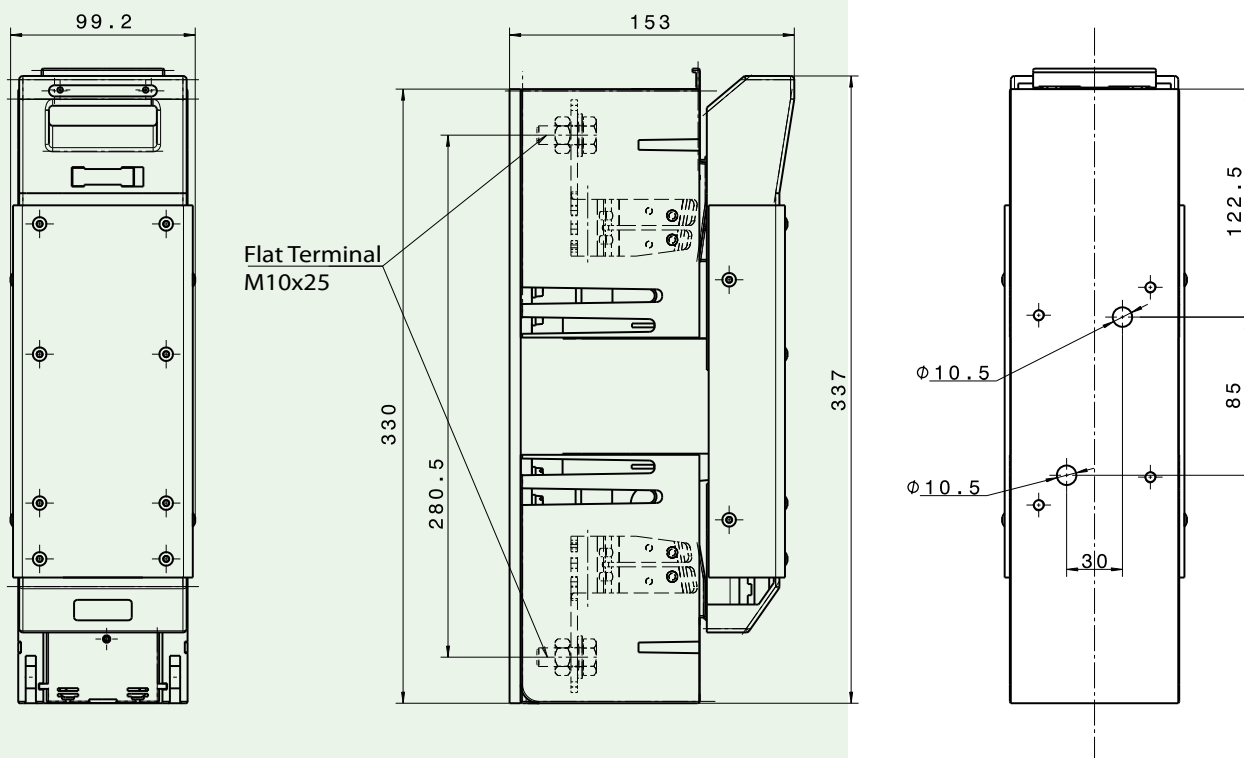
Fuse disconnecter TL1,3-1/9/1200V

Type	I _n [A]	Code No.	Max. Connection (mm ²)	Terminal	Weight [g]	Packaging [pcs]
TL1-1/9/1200V	250	004122036	150	M10	1485	1
TL3-1/9/1200V	630	004122037	300	M12	2535	1

TL1-1/9/1200V



TL3-1/9/1200V



NH strip-fuseways L2,3-2 / 1200V

General characteristics

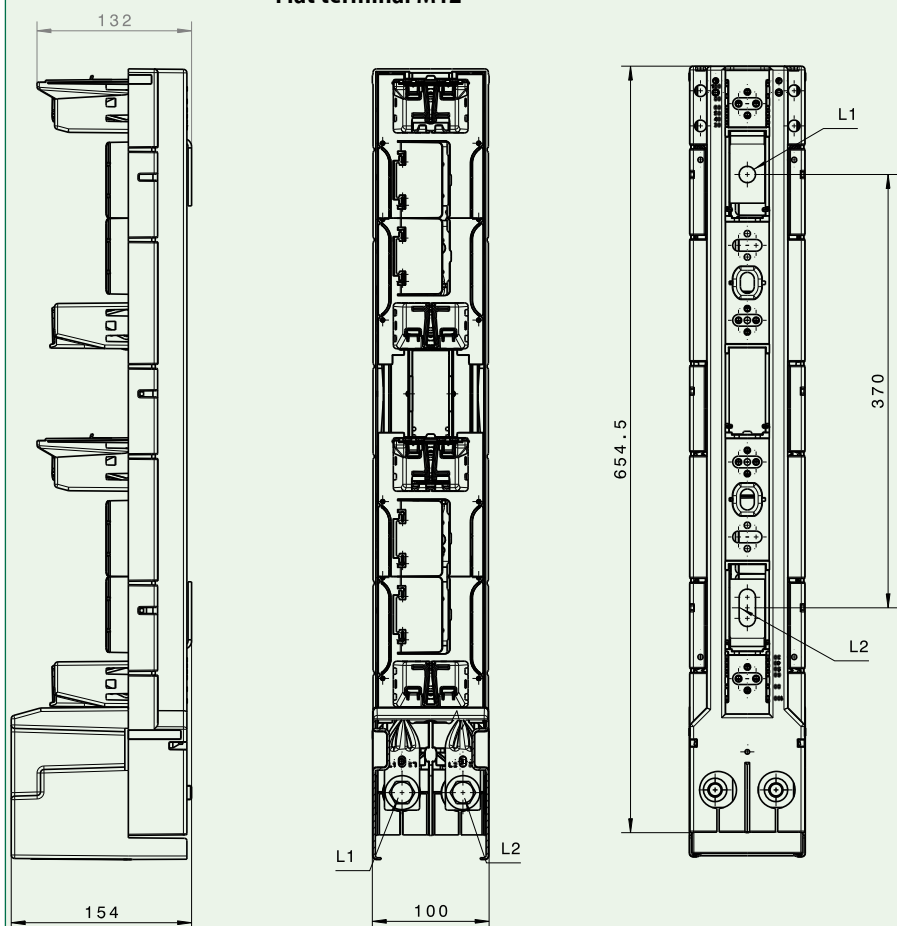
Type			L2	L3
For NH fuse-links acc. to IEC 60269-6		Size	2 (extended body)	3 (extended body)
Rated voltage			1200V d.c.	1200V d.c.
Rated current			250A	400A
fuse link size			1XL, 2XL	3L
Conv. free air thermal current with fuse-links			250A	400A
Rated insulation voltage			1200V d.c.	1200V d.c.
Max. permis. power loss per fuse-link			46W	75W
Cable terminal	Flat terminal	Bolt diameter	M12	M12
		Cable lug (DIN 46235)	1 x 25-240 mm²	1 x 25-240 mm²
		Flat bar	30x10 mm	30x10 mm
		Tightening torque	35-40 Nm	35-40 Nm
	Clamp KM2G	Clamping cross-section	25-150mm²/185-300mm²	25-150mm²/185-300mm²
		Tightening torque	32 Nm	32 Nm
	Clamp KM2G-F	Clamping cross-section	25-240 mm²	25-240 mm²
		Tightening torque	32 Nm	32 Nm
Type of protection - front side, device fitted - with front side strip cover			IP10	IP10
Operating conditions		Ambient temperature*	-25 to +55	
		Rated operating mode	Cont. operation	
		Actuation	Dependent manual operation	
		Mounting position	Vertical	
		Altitude	up to 2000 m	
		Pollution degree	3	
		Overvoltage category	III	

*35°C normal temperature, 55°C with reduced operating current

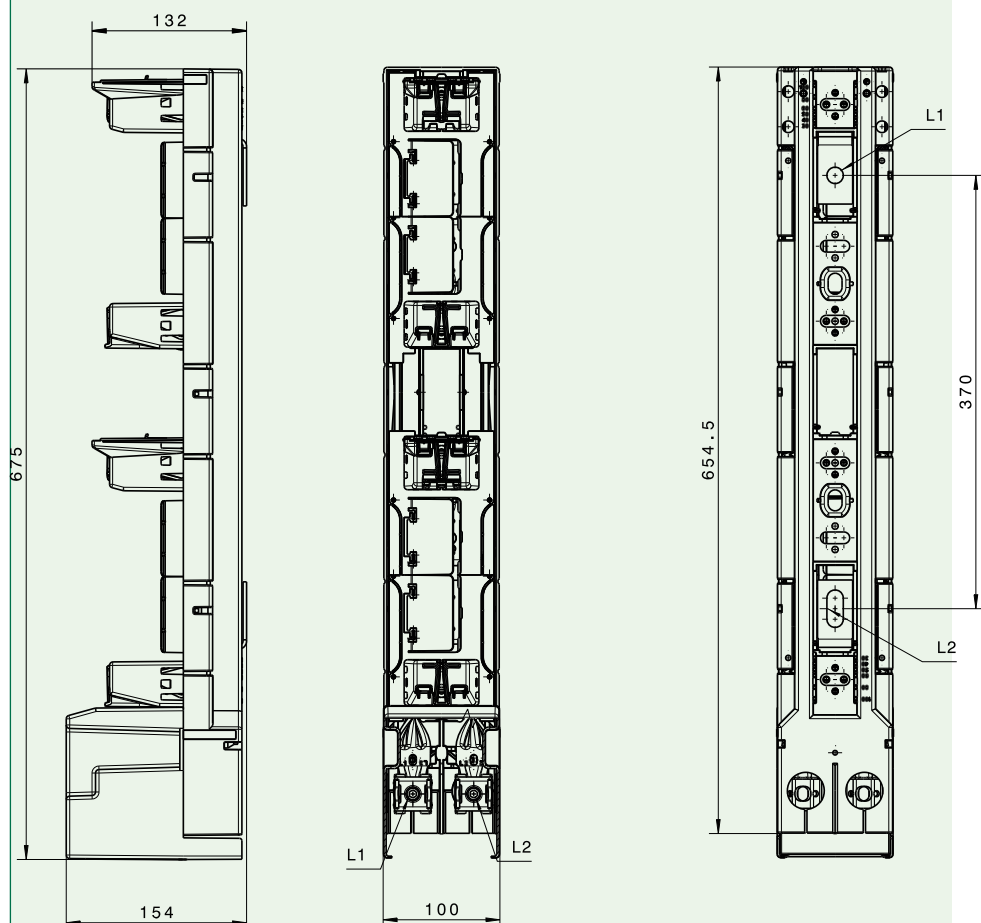
NH strip-fuseways L2,3-2/1200V

Type	I _n [A]	Code No.	Max. Connec- tion (mm ²)	Terminal	Weight [g]	Packaging [pcs]
L2-2/1200/3A/HA/PV	250	004122039	25-240	Flat terminal M12	3500	1
L2-2/1200/9/KM2G-F/HA/PV	250	004122040	25-240	Steel-frame clamp KM2G-F	3650	1
L3-2/1200/3A/HA/PV	400	004122041	25-240	Flat terminal M12	4110	1
L3-2/1200/9/KM2G-F/HA/PV	400	004122042	25-240	Steel-frame clamp KM2G-F	4260	1

Flat terminal M12



Steel-frame clamp KM2G-F

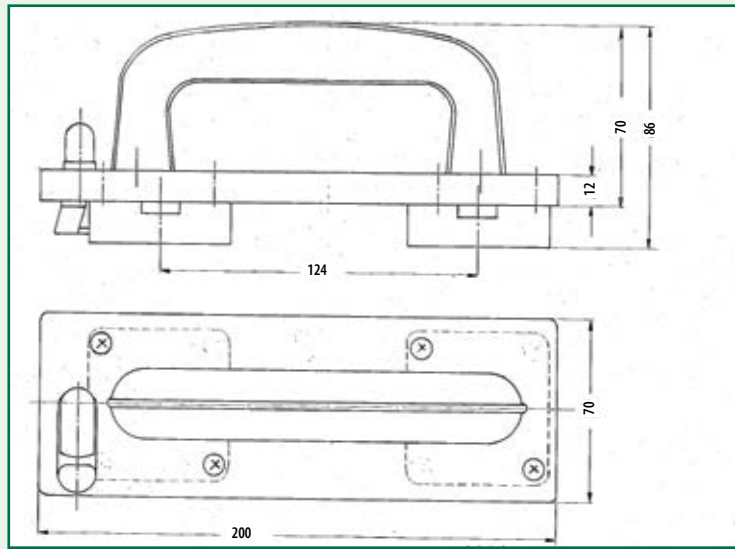


NH handle



NH handle for fuse link DC 1100V and DC 1500V

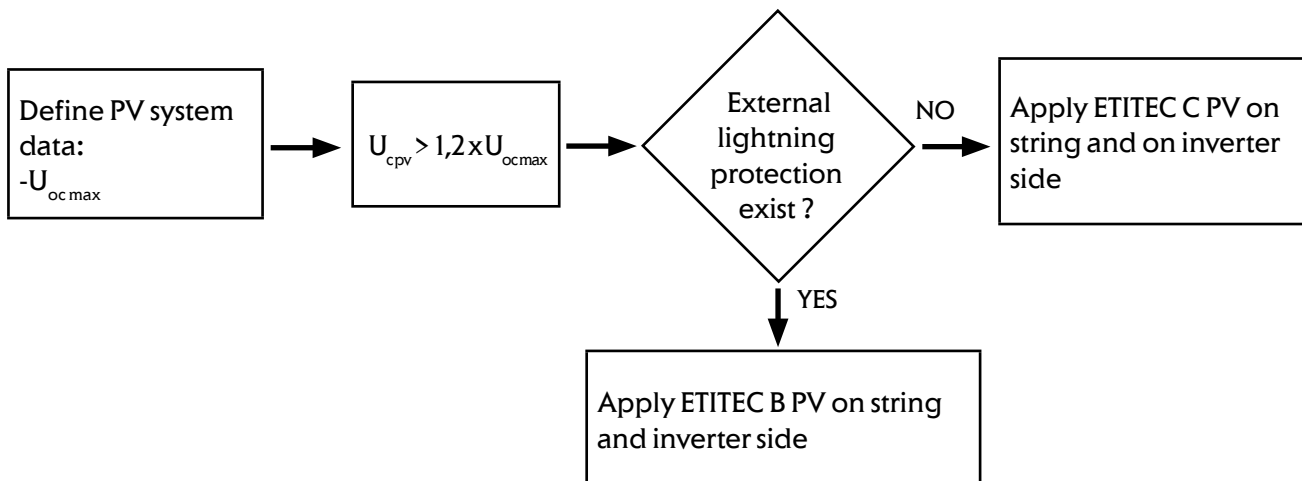
Code	Type	Weight [g]	Packaging [pcs]
004941112	GP 1200	400g	1



ETITEC - Lightning and Surge Arresters

Overvoltage protection selection

ETITEC PV selection



NEW! acc. to EN 50539-11:2013

ETITEC B T12 PV series of overvoltage surge protective devices has been developed to protect against direct and indirect discharges and is intended to protect photovoltaic systems. The circuit topology consist of three varistors stages each protected by a thermal disconnection device.

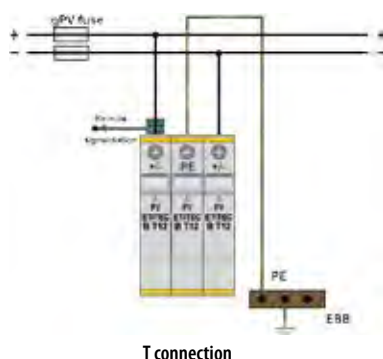
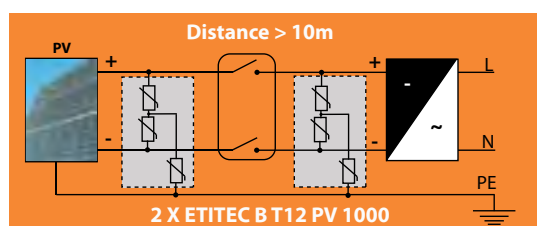
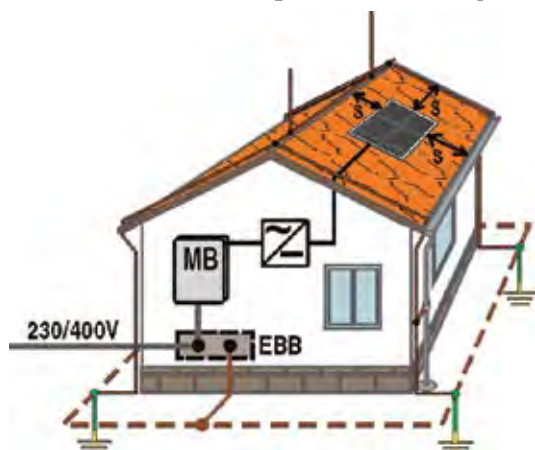
Advantages:

- optical indication of faulty device (green ok, red false)
- remote signalisation (RC version only)
- DIN rail mounting (EN 60715)
- high discharge currents and high degree of protection
- MOV varistor is the protective element
- metal snapper, new way of mounting on DIN rail (easier, quicker)
- modular design
- EN 50539-11: 2013
- RoHS compliant
- connection up to 35mm²

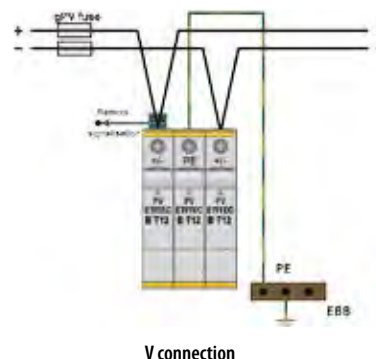


ETITEC B T12 PV 1000/20 RC

ETITEC B T12 PV for photovoltaic system on a building with External Lightning Protection



T connection

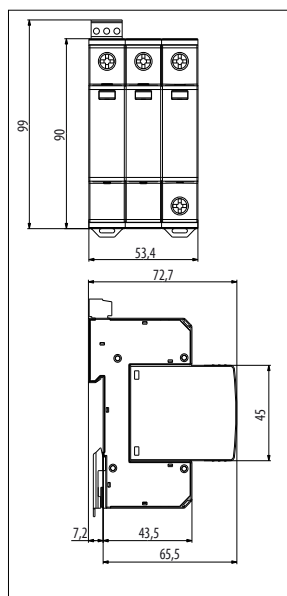


V connection

Note: If distance between string and inverter is less than 10 m, then you need only one ETITEC B T12 PV.



ETITEC B T12 PV 1000/20 RC



General characteristics

Category IEC/EN/VDE Class I, II/Type 1,2/B+C	High surge discharge ratings: $I_{imp}=5kA$ (10/350), $I_n=15kA$ /per pole, $I_{max} = 40kA$ /per pole
Location of use: Branch sub-distribution boards	Internal protection and safety: Thermal disconnecter for each MOV block
Protective element: High Energy MOVs	Status indication: Mechanical flag + remote signalization contacts (RC)

ETITEC B T12 PV

Type	Code No.	Max. PV voltage U_{cpv} [V DC]	I_{imp} [kA]	I_n/I_{max} (8/20) [kA]	Weight [kg]	Packaging [pcs]
ETITEC B T12 PV 1000/20	002440425	1000	5	15/40	0,4	1/5
ETITEC B T12 PV RC 1000/20 RC	002440427	1000	5	15/40	0,4	1/5

Note: max. PV voltage U_{cpv} may be higher than U_{ocsc} (open circuit voltage of a PV module under standard test conditions). Safety factor 1,2 is recommended.

Technical data

Type	ETITEC B T12 PV 1000/20 (8/20)
	1000 V
In accordance with	EN 50539-11:2013
Max. continuous operating voltage U_{cpv} (DC)	1000 V
I_{imp} (10/350)	5 kA
Nominal discharge current I_n (8/20)	15 kA
Max. discharge current I_{max} (8/20)	40 kA
Protection level U_p at I_n (8/20)	<3,5 kV
Follow current I_f	No
Response time t_A	< 25 ns
Current source generator	1mA
U_n min (MOV)	1288V
U_n max (MOV)	1574V
Thermal protection	yes
I_{scpv}	300 A
Operating temperature	-40°C ... +70°C
Storage temperature	-40°C ... +80°C
Humidity range	5% ... 95%
Terminal cross section	35 mm ² (solid) / 25 mm ² (stranded)
Terminal screw torque	Max. 3,0 Nm
Mounting EN 60715	35 mm top-hat rail
Degree of protection	IP20
Housing material	Thermoplastic, extinguishing degree UI 94 V-0
Dimensions DIN 43880	3 TE
Remote contacts - type ...RC	
Contacts ratings	AC 250 V / 0,5 A; 125 V / 3 A
Terminal cross section	Max. 1,5 mm ²
Terminal screw torque	0,25 Nm
Packaging dimensions	108 mm x 79 mm x 76 mm

ETITEC C T2 PV series of overvoltage surge protective devices has been developed to protect against indirect discharges and is intended to protect photovoltaic systems. The circuit topology consist of two (three) varistors stages each protected by a thermal disconnection device.

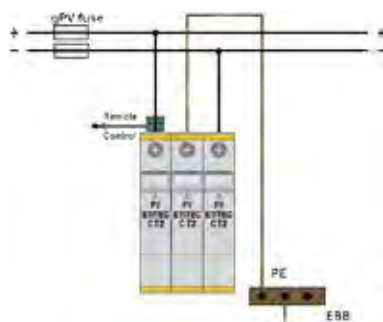
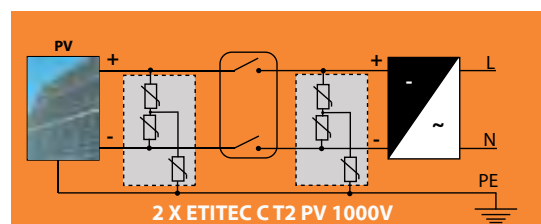
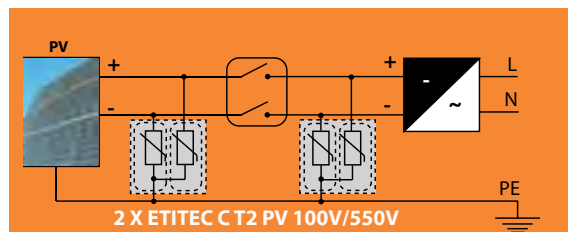
Advantages:

- optical indication of faulty device (green ok, red false)
- remote signalisation (RC version only)
- DIN rail mounting (EN 60715)
- high discharge currents and high degree of protection
- MOV varistor is the protective element
- metal snapper, new way of mounting on DINrail (easier, quicker)
- modular design
- EN 50539-11:2013
- RoHS compliant
- connection up to 35mm²

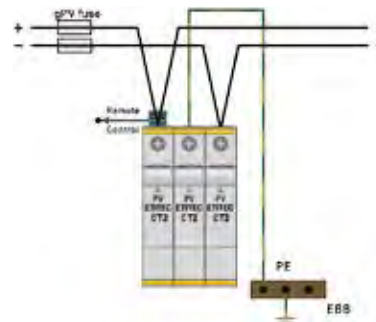


ETITEC CT2 PV 100, 550/20 RC

ETITEC C T2 PV for photovoltaic system on a building without External Lightning Protection



T connection ETITEC C T2 PV



V connection ETITEC C T2 PV

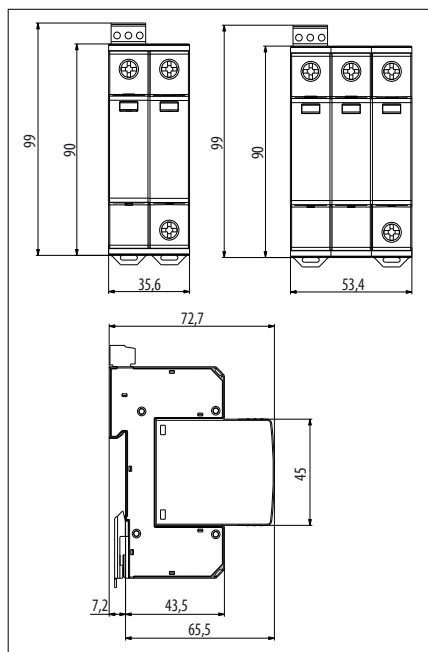
Note: If distance between string and inverter is less than 10 m, then you need only one ETITEC (C) T2 PV.



ETITEC C T2 PV 100, 550/20 RC



ETITEC C T2 PV 1000/20 RC



General characteristics

Category IEC/EN/VDE Class II/Type 2/C	High surge discharge ratings: $I_n = 20\text{kA}/\text{per pole}$, $I_{\text{max}} = 40\text{kA}/\text{per pole}$
Location of use: Branch sub-distribution boards	Internal protection and safety: Thermal disconnecter for each MOV block
Protective element: High Energy MOVs	Status indication: Mechanical flag + remote signalization contacts (RC)

ETITEC C T2 PV

Type	Code No.	Max. PV voltage U_{cpv} [V DC]	I_n/I_{max} (8/20) [kA]	Weight [kg]	Packaging [pcs]
ETITEC C T2 PV 100/20	002440428	100	20/40	0,35	1/7
ETITEC C T2 PV 550/20	002440429	550		0,35	1/7
ETITEC C T2 PV 1000/20	002440430	1000		0,5	1/5
ETITEC C T2 PV 100/20 RC	002440431	100		0,35	1/7
ETITEC C T2 PV 550/20 RC	002440432	550		0,35	1/7
ETITEC C T2 PV 1000/20 RC	002440433	1000		0,5	1/5
MOD.ETITEC C T2 PV 100/20	002440434	100		0,65	12
MOD.ETITEC C T2 PV 550/20	002440435	550		0,65	12
MOD.ETITEC C T2 PV 1000/20	002440436	1000		0,65	12

Note: max. PV voltage U_{cpv} may be higher than U_{ocsc} (open circuit voltage of a PV module under standard test conditions). Safety factor 1,2 is recommended.

Technical data

Type	ETITEC C T2 PV 1000/20 (8/20)		
	100 V	550 V	1000 V
In accordance with	EN 50539-11:2013		
Max. continuous operating voltage U_{cpv} (DC)	100 V	550 V	1000 V
Nominal discharge current I_n (8/20)	20 kA	20 kA	20 kA
Max. discharge current I_{max} (8/20)	40 kA	40 kA	40 kA
Protection level U_p at I_n (8/20)	< 0,7 kV	< 2,1 kV	< 4,0 kV
Follow current I_f	No		
Response time t_A	< 25 ns		
Residual current at U_{cpv}	< 1,5 μA		
Current source generator	1mA		
$U_{\text{n min}}$ (MOV)	108 V	644 V	1288 V
$U_{\text{n max}}$ (MOV)	132 V	787 V	1574 V
Thermal protection	yes		
I_{scpv}	100 A		
Operating temperature	-40°C ... +70°C		
Storage temperature	-40°C ... +80°C		
Humidity range	5% ... 95%		
Terminal cross section	35 mm ² (solid) / 25 mm ² (stranded)		
Terminal screw torque	Max. 3,0 Nm		
Mounting EN 60715	35 mm top-hat rail		
Degree of protection	IP20		
Housing material	Thermoplastic, extinguishing degree UI 94 V-0		
Dimensions DIN 43880	2 TE	2 TE	3 TE
Remote contacts - type ...RC			
Contacts ratings	AC 250 V / 0,5 A; 125 V / 3 A		
Terminal cross section	Max. 1,5 mm ²		
Terminal screw torque	0,25 Nm		
Packaging dimensions	108 mm x 79 mm x 76 mm		

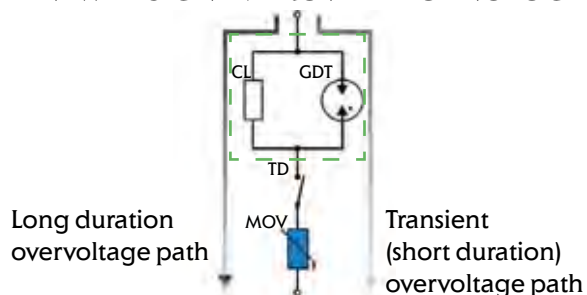


Advantages:

- Current limiting for long duration; overvoltage path through MOV – no degradation, long life guaranteed
- Improved thermal disconnection mechanism - rotating barrier, secure arcing shutdown, no risk of fire

5 YEAR WARRANTY!

NEW DESIGN-IMPROVED TECHNOLOGY



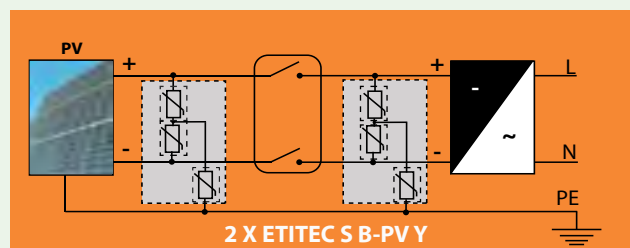
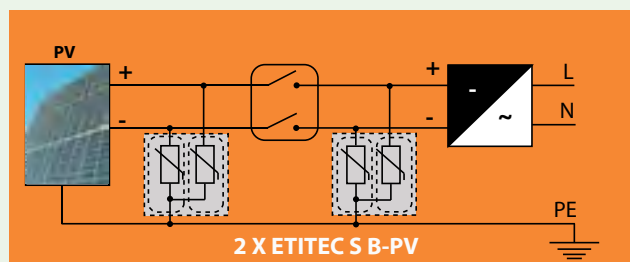
- Gas Discharge Tube - GDT
- Current Limiter - CL
- Thermal Disconnect - TD
- Metal Oxide Varistor - MOV



ETITEC S B-PV (IEC/EN/VDE: I, II/1,2/B+C) with $I_{imp} = 12,5 \text{ kA/pole}$

ETITEC S B-PV series of overvoltage surge protective devices has been developed to protect against direct and indirect lightning discharges and is intended to protect photovoltaic systems. The circuit topology consist of two(V configuration) or three(Y configuration) varistor stages each protected by a thermal disconnection device.

ETITEC S B-PV for photovoltaic system on a building with External Lightning Protection



Note: If distance between string and inverter is less than 10 m, then you need only one SPD

General characteristics

Category IEC/EN/VDE Class I, II/Type 1,2/B+C	High surge discharge ratings: $I_{imp} = 12,5 \text{ kA/pole}$ $I_{max} = 40 \text{ kA/pole}$
Location of use: PV systems	Internal protection and safety: Current limiter, GDT and thermal disconnector with arc cutter for each MOV block
Protective element : High Energy MOVs	Status indication: Mechanical flag + remote signalization contacts (RC)



ETITEC S B - PV

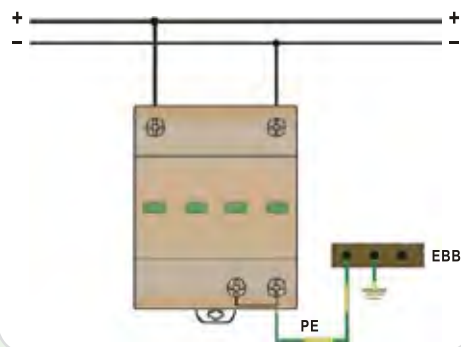
Type	Code No.	U_{ovp} [V DC]	I_{imp} [kA]	I_n/I_{max} [kA]	Weight [g]	Packaging [pcs]
ETITEC S B-PV 300/12,5	002440258	300	12,5	20/40	147	3
ETITEC S B-PV 300/12,5 RC	002440259	300			149	3
ETITEC S B-PV 600/12,5	002440260	600			154	3
ETITEC S B-PV 600/12,5 RC	002440261	600			155	3
ETITEC S B-PV 600/12,5 Y	002440262	600			295	2
ETITEC S B-PV 600/12,5 Y RC	002440263	600			300	2
ETITEC S B-PV 1000/12,5	002440264	1000			267	3
ETITEC S B-PV 1000/12,5 RC	002440265	1000			269	3
ETITEC S B-PV 1000/12,5 Y	002440266	1000			315	2
ETITEC S B-PV 1000/12,5 Y RC	002440267	1000			320	2
ETITEC S B-PV 1200/12,5 Y	002440268	1200			550	2
ETITEC S B-PV 1200/12,5 Y RC	002440269	1200			555	2
ETITEC S B-PV 1500/12,5 Y	002440270	1500			580	2
ETITEC S B-PV 1500/12,5 Y RC	002440271	1500			585	2

*RC - Remote signalization contacts

$U_c > 1,2 \times U_{ocstc}$ (open circuit voltage under standard test conditions)

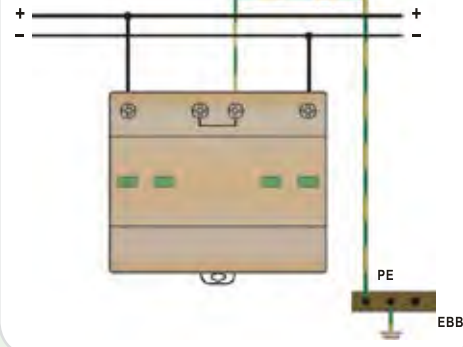
LF - Leakage free version available upon request

Network connection



V configuration
ETITEC S B-PV U/I_{imp}

Network connection



Y configuration
ETITEC S B-PV $U/I_{imp} Y$

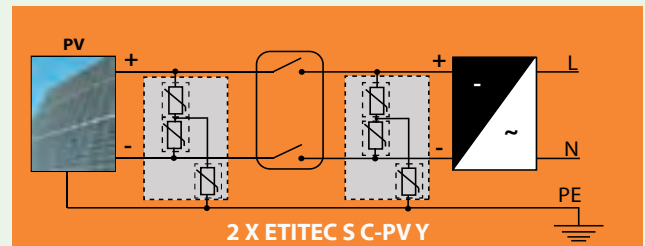
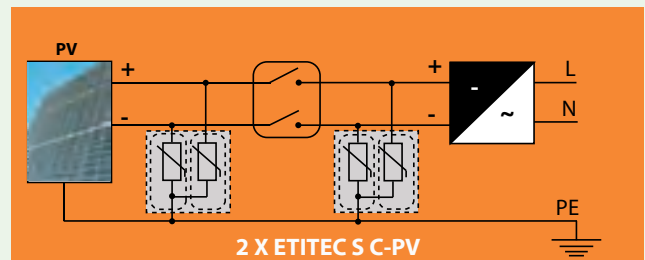
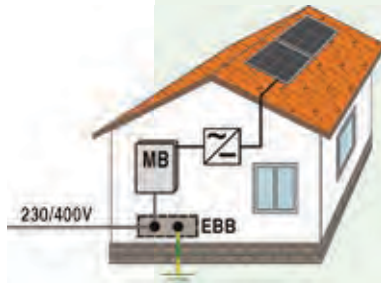
Technical data

Type	ETITEC S B-PV U / I _{imp}			ETITEC S B-PV U / I _{imp} Y			
	300	600	1000	600	1000	1200	1500
Electrical characteristics							
Max. continous operating voltage U _{cpv} (DC)	300V	600V	1000V	600V	1000V	1200V	1500V
Nominal discharge current I _n (8/20)	20kA			20kA			
Max. discharge current I _{max} (8/20)	40kA			40kA			
Impulse current I _{imp} (10/350)	12,5kA			12,5kA			
Short circuit withstand I _{scpv}	200A						
Protection level U _p	< 1.5kV	< 2.2kV	< 2.8kV	< 3.0kV	< 3.3kV	< 3.8kV	< 4.5kV
Residual voltage at I _{imp} U _{res}	< 1.3kV	< 2.0kV	< 2.6kV	< 3.0kV	< 3.3kV	< 3.8kV	< 4.5kV
Follow current I _f	NO						
Response time t _A	< 25ns						
Thermal protection	YES						
Mechanical characteristics							
Temperature range	- 40°C+ 80°C						
Terminal screw torque	max. 4.5Nm						
Terminal cross section	35mm ² (solid)/25mm ² (stranded)						
Mounting EN 60715	35mm top-hat rail						
Degree of protection	IP 20						
Housing material	Thermoplastic; extinguishing degree UL 94 V-0						
Remote contacts	YES						
Contact ratings	AC: 250V/0.5A; 125V/3A						
Terminal cross section	max. 1.5mm ²						
Remote terminal torque	0.25Nm						

ETITEC S C-PV (EN/IEC/VDE: T2, II, C) with $I_n=20\text{kA/pole}$

ETITEC S C-PV series of overvoltage surge protective devices has been developed to protect against indirect discharges and is intended to protect photovoltaic systems. The circuit topology consist of two (V configuration) or three (Y configuration) varistor modules, each protected by a thermal disconnection device. For additional protection, modules have built in current limiter, high performance GDT, thermal control function and mechanical arc prevention (cutter).

ETITEC S C-PV for photovoltaic system on a building without External Lightning Protection



Note: If distance between string and inverter is less than 10 m, then you need only one SPD

Technical data							
Type	ETITEC S C-PV xxxx/20				ETITEC S C-PV XXXX/20 Y		
	75	300	600	1000	1000	1200	1500
In accordance with	EN 50539-11						
Max. continuous operating voltage U_{cpv} (DC)	75V	300V	600V	1000 V	1000 V	1200 V	1500 V
Nominal discharge current I_n (8/20)	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Max. discharge current I_{max} (8/20)	40 kA	40 kA	40 kA	40 kA	40 kA	40 kA	40 kA
Protection level U_p at I_n (8/20)	< 0,6 kV	< 1,6 kV	< 2,2 kV	< 2,8 kV	< 4,0 kV	< 4,4 kV	< 4,8kV
Short circuit withstand I_{scpv}	200A						
Follow current I_f	No						
Response time t_A	< 25 ns						
Thermal protection	yes						
Temperature range	-40°C ... +80°C						
Terminal cross section	35 mm ² (solid) / 25 mm ² (stranded)						
Terminal screw torque	Max. 3,0 Nm						
Mounting EN 60715	35 mm top-hat rail						
Degree of protection	IP20						
Housing material	Thermoplastic, extinguishing degree UI 94 V-0						
Dimensions DIN 43880	2 TE	2 TE	2 TE	2 TE	3 TE	3 TE	3 TE
Remote contacts - type ...RC							
Contacts ratings	AC 250 V / 0,5 A; 125 V / 3 A						
Terminal cross section	Max. 1,5 mm ²						
Terminal screw torque	0,25 Nm						
Packaging dimensions (WxHxL)	76,5 mm x 41,5 mm x 109 mm				76,5 mm x 60 mm x 109 mm		

I_n/I_{max} value can be changed according to standard demands

General characteristics

Category IEC/EN/VDE Class II/Type 2/C	High surge discharge ratings: $I_n = 20\text{kA}/\text{per pole}$, $I_{\text{max}} = 40\text{kA}/\text{per pole}$
Location of use: PV systems	Internal protection and safety: Current limiter, GDT and thermal disconnecter with arc cutter for each MOV block
Protective element : High Energy MOVs	Status indication: Mechanical flag + remote signalization contacts (RC)

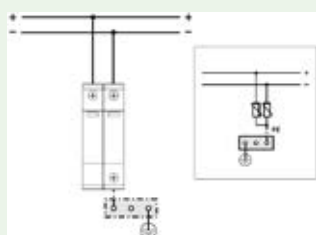
ETITEC S C - PV

Type	Code No.	U _{OPV} [V DC]	I _n /I _{max} [kA]	Weight Estimated [g]	Packaging [pcs]
ETITEC S C-PV 75/20 RC	002445301	75	20/40	132	1
ETITEC S C-PV 75/20	002445302	75		130	1
ETITEC S C-PV 300/20 RC	002445303	300		202	1
ETITEC S C-PV 300/20	002445304	300		200	1
ETITEC S C-PV 600/20 RC	002445305	600		280	1
ETITEC S C-PV 600/20	002445306	600		278	1
ETITEC S C-PV 1000/20 RC	002445300	1000		290	1
ETITEC S C-PV 1000/20 Y RC	002445307	1000		398	1
ETITEC S C-PV 1000/20	002445308	1000		288	1
ETITEC S C-PV 1000/20 Y	002445309	1000		396	1
ETITEC S C-PV 1200/20 Y RC	002445310	1200		386	1
ETITEC S C-PV 1200/20 Y	002445311	1200		388	1
ETITEC S C-PV 1500/20 Y RC	002445312	1500		402	1
ETITEC S C-PV 1500/20 Y	002445313	1500		400	1
MODULES					
MOD.ETITEC S C-PV 75/20	002445320	75		78	12
MOD.ETITEC S C-PV 300/20	002445321	300		78	12
MOD.ETITEC S C-PV 600/20	002445322	600		78	12
MOD.ETITEC S C-PV 1000/20	002445323	1000		78	12
MOD.ETITEC S C-PV 1000/20 Y	002445324	1000		78	12
MOD.ETITEC S C-PV 1200/20 Y	002445325	1200		78	12
MOD.ETITEC S C-PV 1500/20 Y	002445326	1500		78	12

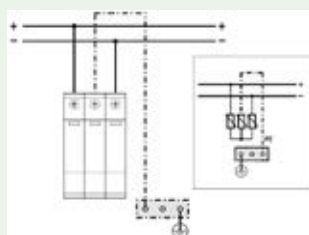
*RC - Remote signalization contacts

$U_c > 1,2 \times U_{\text{ocstc}}$ (open circuit voltage under standard test conditions)

For signal, control lines and communication SPD protection (Ethernet, RS485) check our catalogue Building and industry(1+2) under program group ETITEC



ETITEC S C-PV 75...1000/20
V configuration



ETITEC S C-PV 1000...1500/20 Y
Y configuration

PV switch disconnecter

The construction of the switch ensures reliable switching up to 58A with 1000V in the category DC 21B. The construction of the contacts and the material selection guarantee that no oxidation (small switching frequency develops, and is thus prevented inadmissible heating-up). The switch disconnecter has 2, 4 or 4+2 contacts, by serial / parallel wiring of the contacts the contact rating will be increased. The switching speed at the manually operated handle does not have an effect on the switching attitude of the contacts.



General characteristics

Rated voltage	Up to 1000V d.c.
Rated current	Up to 58A d.c.
Standards	IEC 60364-7-712
Application	For interrupting the DC/AC inverter from the solar panels

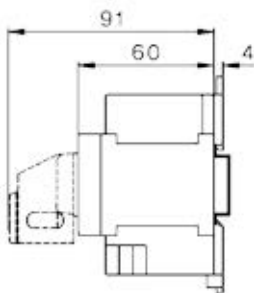
PV switch disconnecter for photovoltaic

Code	Type		Weight [g]	Packaging [pcs]
004660060	LS16 SMA A2	2-pole	150	1
004660061	LS25 SMA A2			
004660062	LS32 SMA A2			
004660063	LS16 SMA A4	4-pole	430	1
004660064	LS25 SMA A4			
004660065	LS32 SMA A4			
004660066	LS32 SMA A4+2	4+2 pole	430	100
004660067*	LSV-B1	-	6,6	

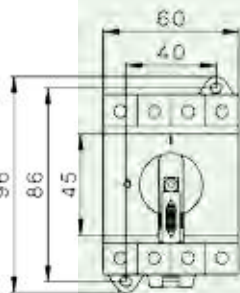
Switch disconnectors "LS.." are switch gears for interrupting DC/AC-inverter from the solar-panels.

Photovoltaic-installations have to be equipped with DC-isolators according to IEC 60364-7-712.

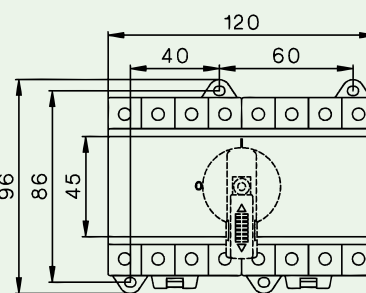
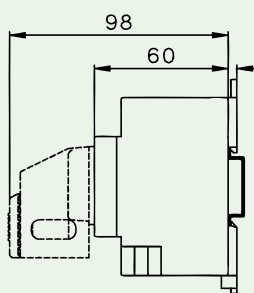
*Insulated Jumper



LS16, 25, 32



LS32 A4+2



Switch disconnectors and load switches for DC applications

Technical data according to IEC 60947-3, VDE0660			DC 21B				DC 22B			
			500V	600V	800V	1000V	500V	600V	800V	1000V
LS16 ..		2 poles in series	16A	16A	16A	9A	7A	5,5A	2A	1A
		4 poles in series	16A	16A	16A	16A	16A	16A	11,5A	8A
LS25 ..		2 poles in series	25A	25A	20A	11A	8A	6A	2,5A	1,5A
		4 poles in series	25A	25A	25A	25A	25A	25A	12A	9A
LS32 ..		2 poles in series	32A	32A	23A	13A	9A	6,5A	3A	2A
		4 poles in series	32A	32A	32A	32A	32A	27,5A	12,5A	10A
LS32..A4+2		4 poles in series +2 poles parallel	58A	58A	58A	58A	/	/	/	/

Because of very high breaking point capacity, switch disconnectors "LS.." are suitable for many different operating conditions.

IP65 Wall mounted distribution boards ECH

Available in 4, 8, 12, 24, 36 modules

Applications:

Watertight wall-mounted distribution boards apply in domestic and industry architecture for mounting modular equipment for protection (IP65) against wet, dust and another dirtiness

Structure:

Enclosure is made of high thermal stability material - ASA (Acrylonitrile-Acrylic-Styrene), plastic with good dielectrical and mechanical attributes, UV resistant (colour stability)

Advantages: Aesthetic and attractive look, easy and quick montage

Main elements:

- Bottom cover with DIN rail, PE and N bars and holes for PG cable inlets properly marked
- Top cover with seal of the door
- Transparent door made of polycarbonate (PC) with plastic lock (in standard) or metal lock with key (in option)



Protection class	IP65
Isolation class	II
Impact kit	IK07
Nominal voltage	400V AC
Temperature range	-25 °C do +60 °C
IEC compatibility	IEC- 60670-24

Accessories

Type $\longrightarrow$ **E C H ...G** $\longleftarrow$ Vertical door opening (4 or 8 modules)

...PT $\longleftarrow$ Horizontal door opening (12, 24 or 36 modules)

$\uparrow$

Modules (4, 8, 12, 24, 36)

12 modules PV distribution boards 1,2 inputs

General characteristics

Rated voltage	500V, 1000V d.c.
Rated current	13A, 25A d.c.
Standards	IEC 60364-7-712:2005, EN 60439-1, Type test ICEM-TC Maribor
Protection class	IP54
Category (switch)	DC 21B
Isolation class	II 
Temperature range	-25 °C to +60 °C
Application	As PV distribution board in photovoltaic power plant



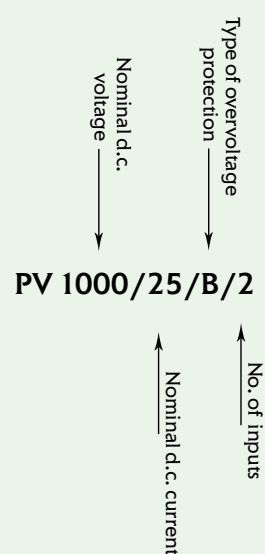
	Voltage	Overvoltage protection	Inputs	13 A d.c.		25A d.c.		Weight (g)	Pack.
12 modules (318 x 258 x 142mm)	500V d.c.	B	1	001103001	PV500/13/B/1	001103017	PV500/25/B/1	1860	1
			2	001103002	PV500/13/B/2	001103018	PV500/25/B/2	1980	
		C	1	001103005	PV500/13/C/1	001103021	PV500/25/C/1	1860	
			2	001103006	PV500/13/C/2	001103022	PV500/25/C/2	1980	
	1000V d.c.	B	1	001103009	PV1000/13/B/1	001103025	PV1000/25/B/1	1860	
			2	001103010	PV1000/13/B/2	001103026	PV1000/25/B/2	1980	
		C	1	001103013	PV1000/13/C/1	001103029	PV1000/25/C/1	1860	
			2	001103014	PV1000/13/C/2	001103030	PV1000/25/C/2	1980	

Overvoltage protection	Ground cable
Type B	16mm ²
Type C	6mm ²

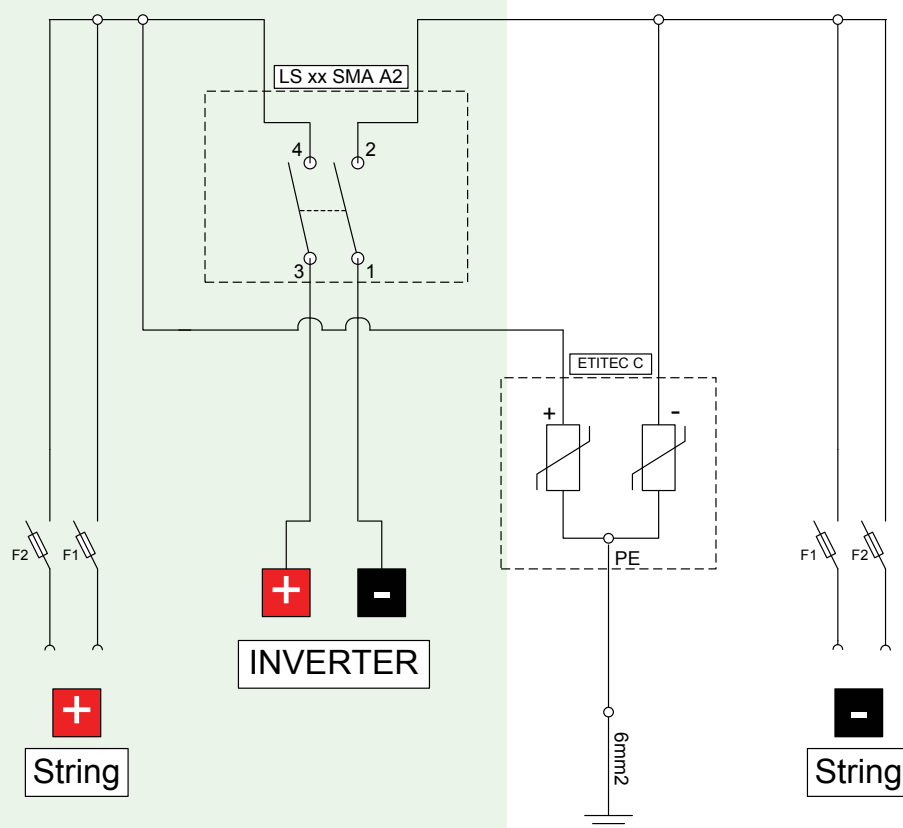
Important!

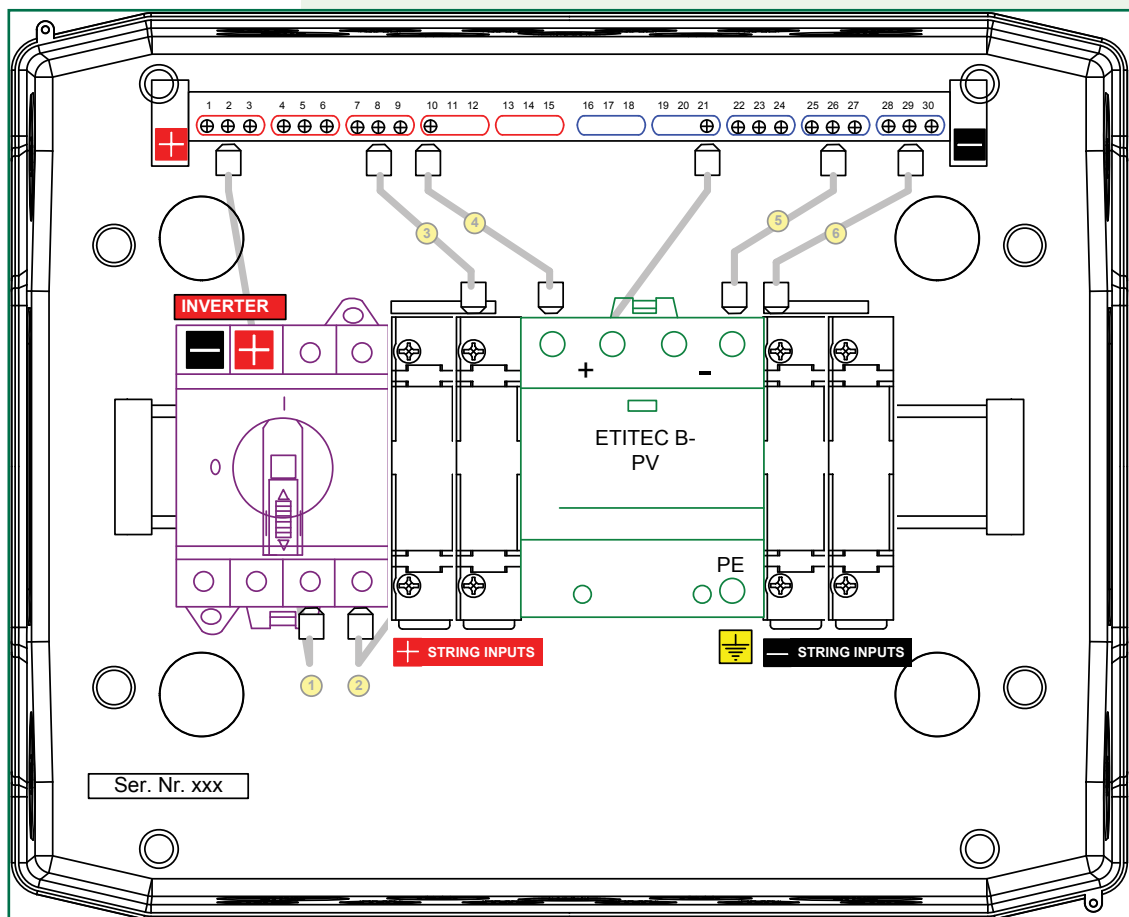
CH 10 gPV fuse-links are not included in the distribution board package and need to be ordered separately.

Type designation:

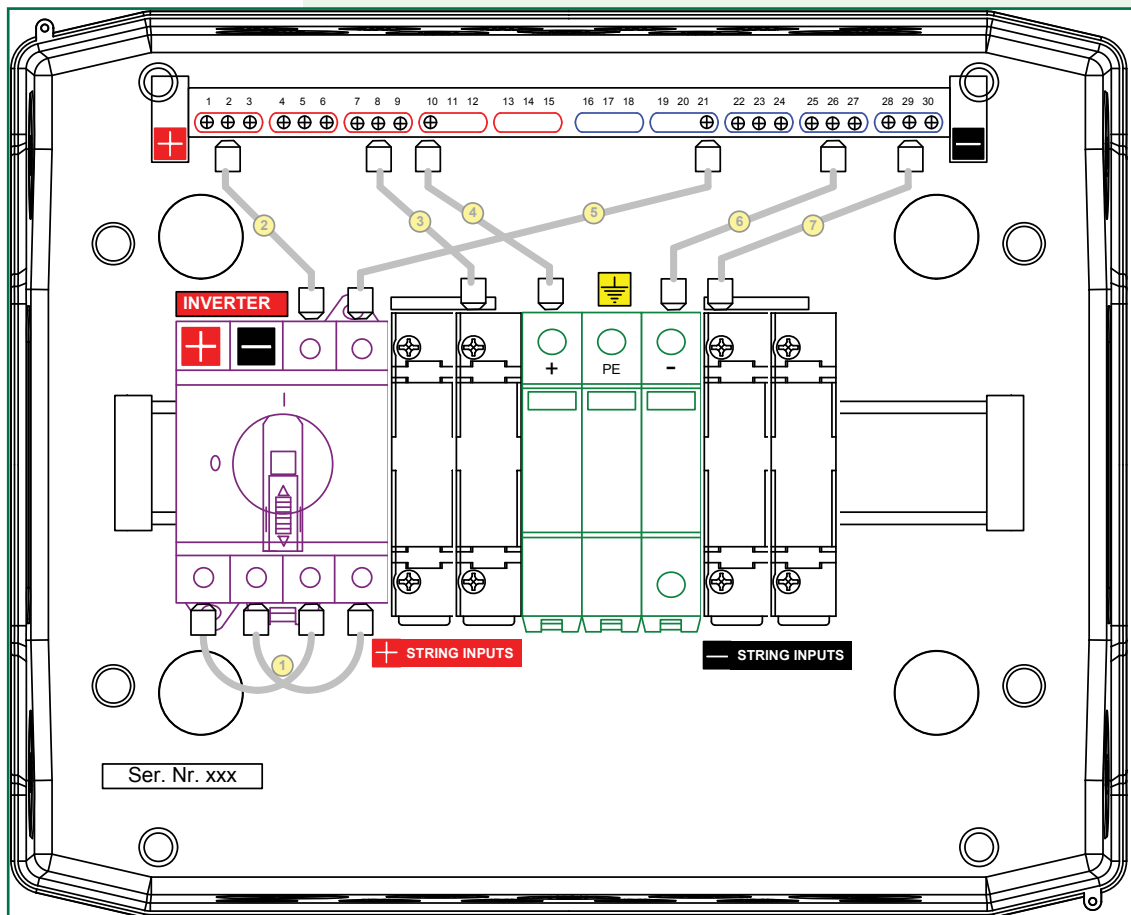


Electric scheme:





PV500/B/25/2



PV1000/C/25/2

24 modules PV distribution boards (3,4,5,6 inputs)

General characteristics

Rated voltage	500V, 1000V d.c.
Rated current	13A, 25A d.c.
Standards	IEC 60364-7-712:2005, EN 60439-1, Type test ICEM-TC Maribor
Protection class	IP54
Category (switch)	DC 21B
Isolation class	II 
Temperature range	-25 °C to +60°C
Application	As PV distribution board in photovoltaic power plant

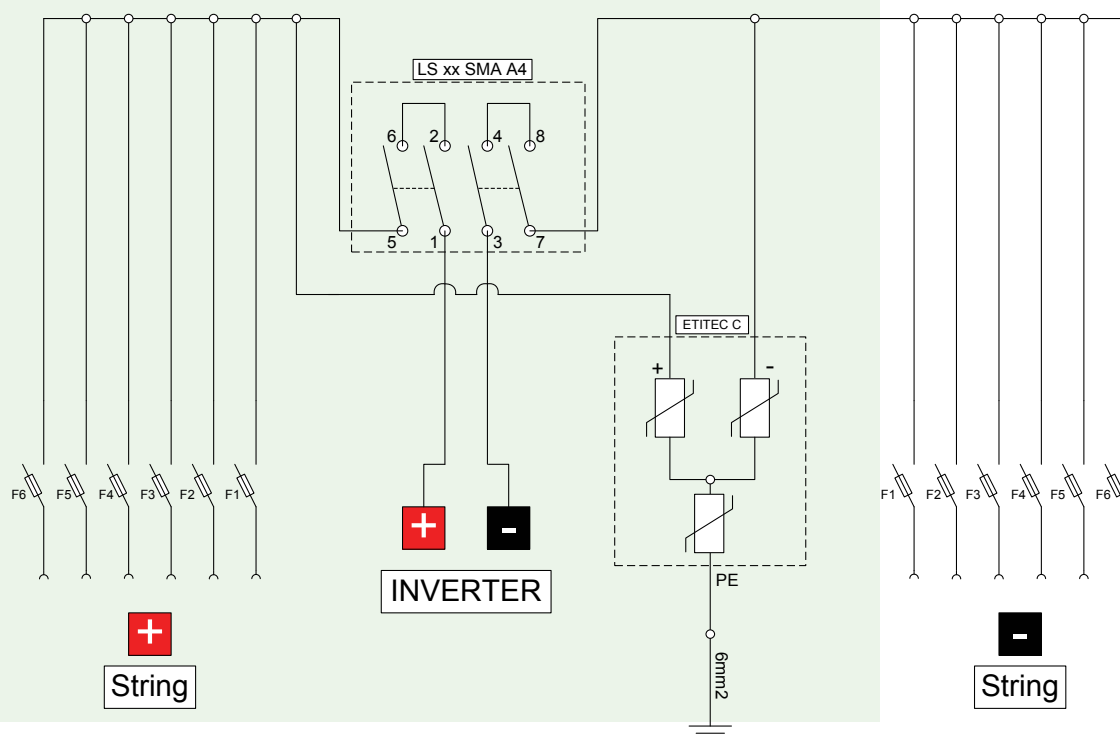


Important!

CH 10 gPV fuse-links are not included in the distribution board package and need to be ordered separately.

	Voltage	Overvoltage protection	Inputs	13 A d.c.		25A d.c.		Weight (g)	Pack.
24 modules (318 x 383 x 142mm)	500V d.c.	B	3	001103065	PV500/13/B/3	001103033	PV500/25/B/3	2560	1
			4	001103066	PV500/13/B/4	001103034	PV500/25/B/4	2680	
			5	001103067	PV500/13/B/5	001103035	PV500/25/B/5	2800	
			6	001103068	PV500/13/B/6	001103036	PV500/25/B/6	2920	
		C	3	001103073	PV500/13/C/3	001103041	PV500/25/C/3	2560	
			4	001103074	PV500/13/C/4	001103042	PV500/25/C/4	2680	
			5	001103075	PV500/13/C/5	001103043	PV500/25/C/5	2800	
			6	001103076	PV500/13/C/6	001103044	PV500/25/C/6	2920	
	1000V d.c.	B	3	001103081	PV1000/13/B/3	001103049	PV1000/25/B/3	2560	
			4	001103082	PV1000/13/B/4	001103050	PV1000/25/B/4	2680	
			5	001103083	PV1000/13/B/5	001103051	PV1000/25/B/5	2800	
			6	001103084	PV1000/13/B/6	001103052	PV1000/25/B/6	2920	
		C	3	001103089	PV1000/13/C/3	001103057	PV1000/25/C/3	2560	
			4	001103090	PV1000/13/C/4	001103058	PV1000/25/C/4	2680	
			5	001103091	PV1000/13/C/5	001103059	PV1000/25/C/5	2800	
			6	001103092	PV1000/13/C/6	001103060	PV1000/25/C/6	2920	

Electric scheme:

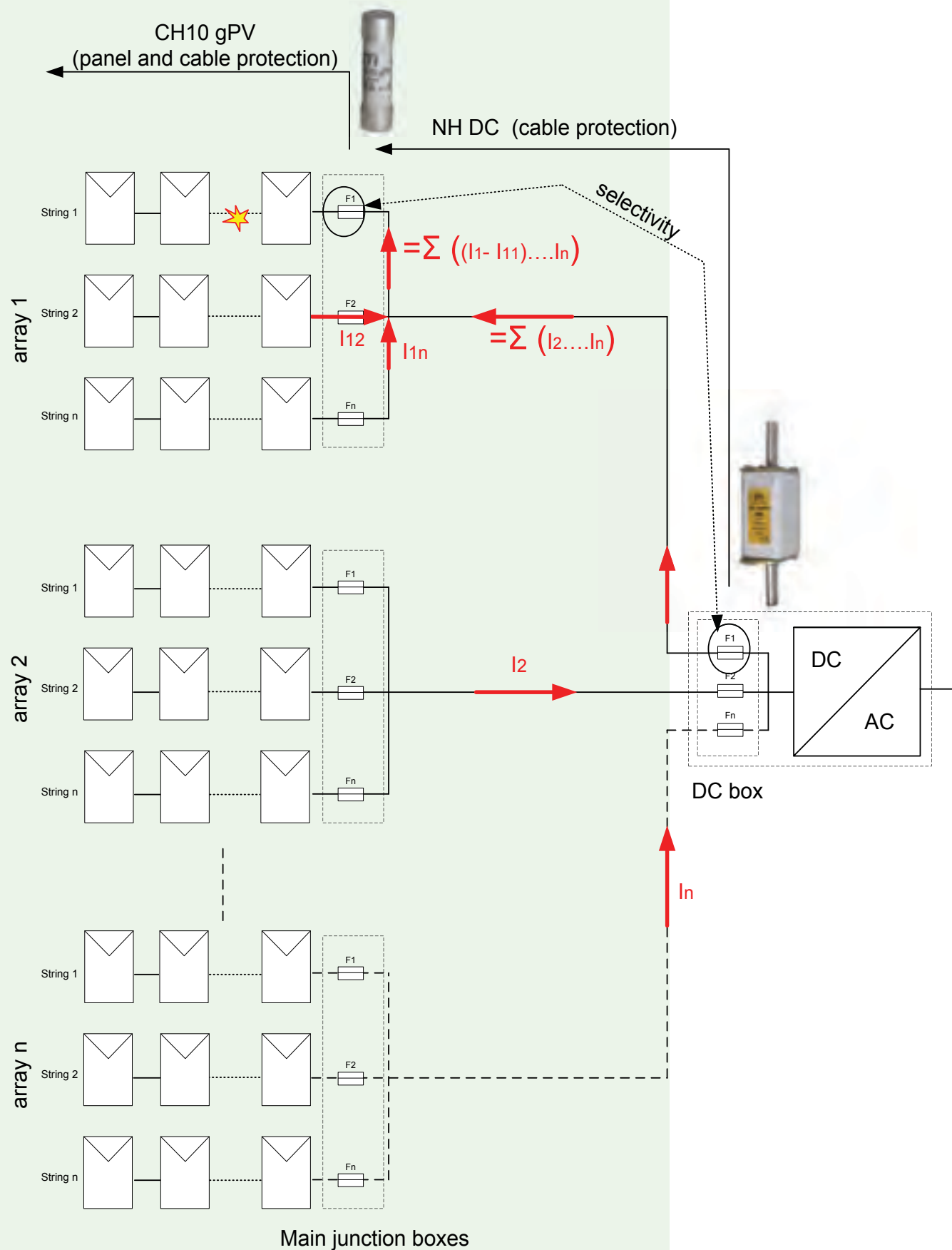


Overvoltage protection	Ground cable
Type B	16mm ²
Type C	6mm ²

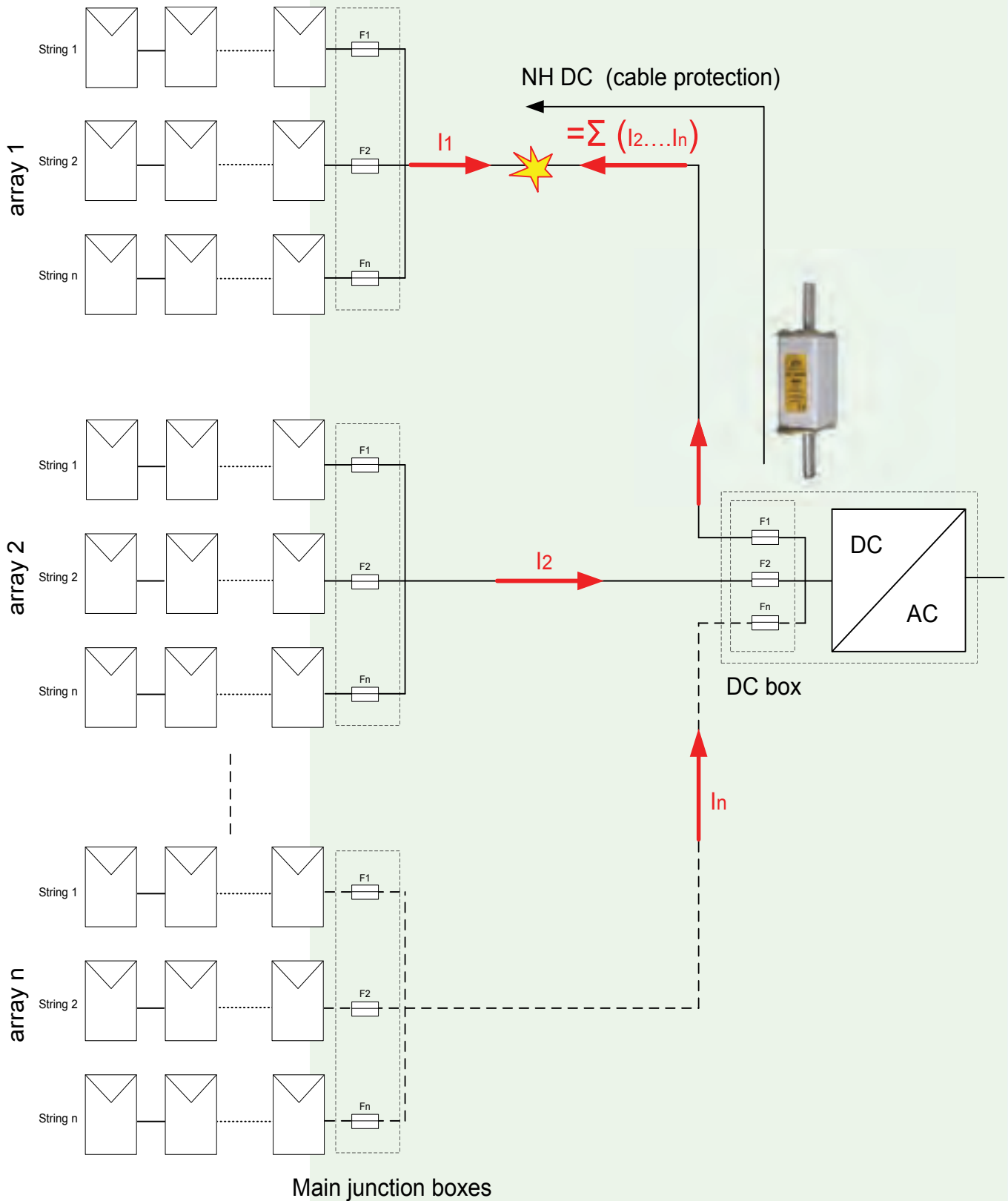


Enclosures

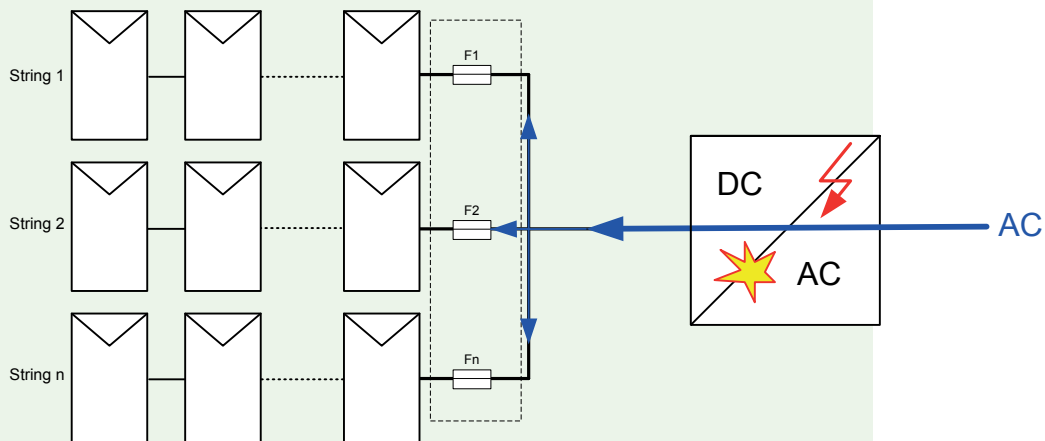
Protection of PV modules on REVERSE current by CH gPV fuse link



Protection of the wiring between ARRAYS from short-circuit

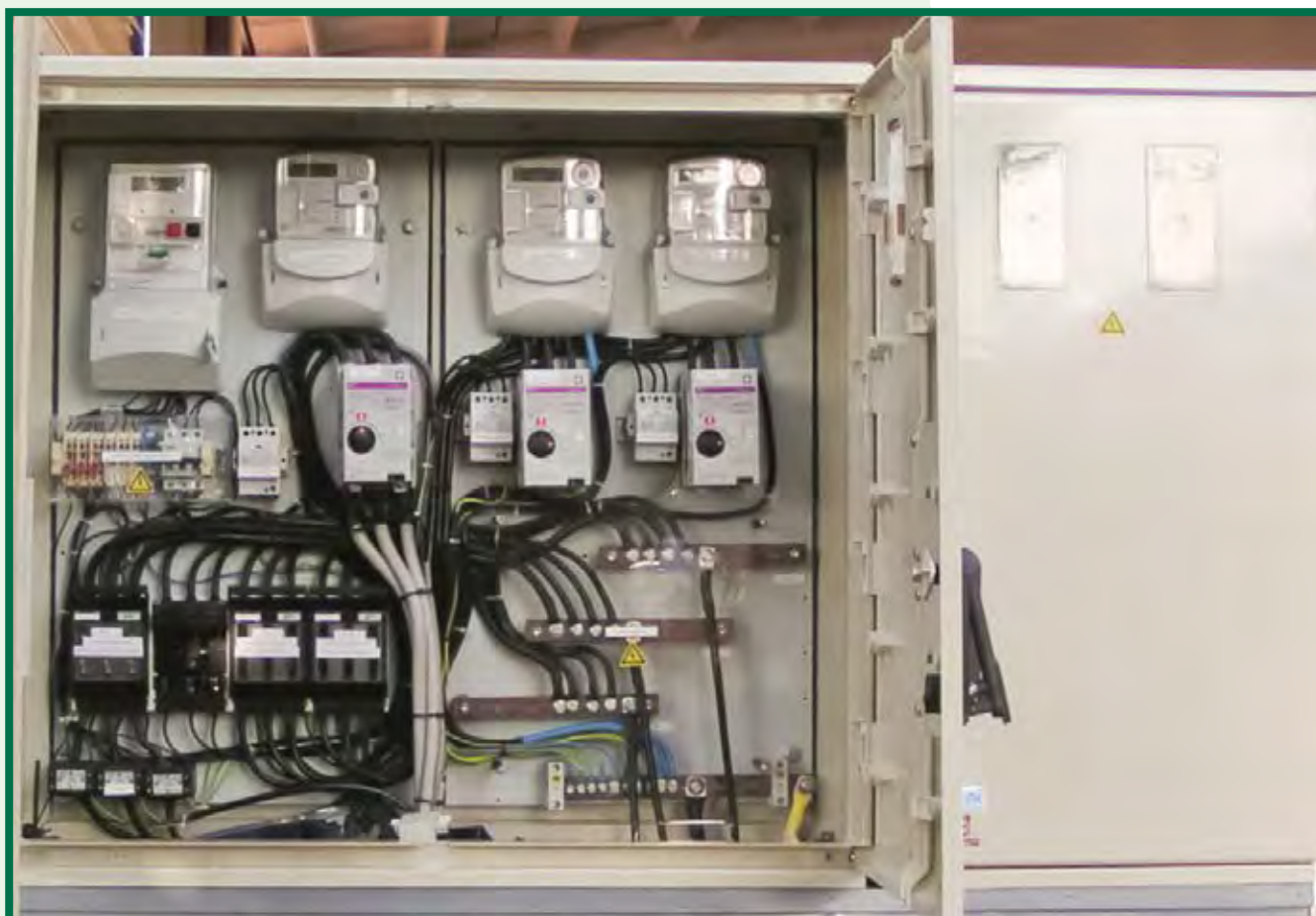


Protection from »AC REVERSE current« (transformerless inverter)



AC - distribution and protection components

This part of the catalogue is only for informational purposes. All required commercial and technical information on the following products is available in our **General catalogue Building, Industry and Energy** and in leaflet **Special purpose fuses**.



ASTI - Miniature circuit breakers and residual current devices

High breaking capacity MCB ETIMAT P10



→ Supply possibility:

top

bottom

→ Double connection possibility

→ Every product is marked with EAN Code



→ New method of mounting on the DIN rail and simple replacement



→ Terminal cover

→ "ON/OFF" mark on the switch button

→ Sealing possibility in ON and OFF position

→ Locking device



→ Indication of contacts' state



→ Better protection of terminals against touching the parts under voltage

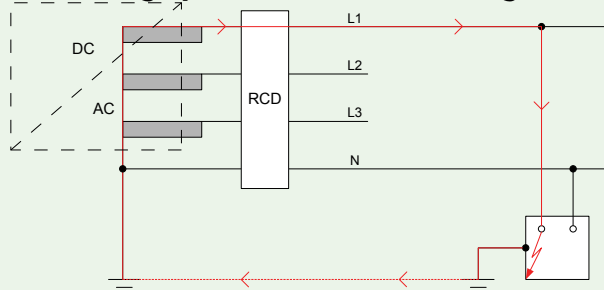


Residual current circuit breakers RCCBs EFI type B, B+

Application:

For PV power plant IEC 60364-4-41:2005 (Protection against electrical shock) and IEC 60364-7-712:2002 (Requirements for solar photovoltaic (PV) power supply systems) standards are used. EFI is used as protection against FIRE and as protection against indirect touch of live parts

Disconnecting by EFI in case of fault in TT grid:



EFI type A can be used in DC/AC inverters with transformers or in DC/AC inverters for which the producer excludes the possibility of DC leakage currents on AC side.

EFI 4 (4M)		Type B			Type B+		
		Inst.	K	S	Inst.	K	S
	For alternating residual current	✓	✓	✓	✓	✓	✓
	For alternating and pulsating direct residual current	✓	✓	✓	✓	✓	✓
	For alternating, pulsating direct and smooth DC residual current (up to 1kHz)	✓	✓	✓	✓	✓	✓
	For alternating, pulsating direct and smooth DC residual current (up to 20kHz)				✓	✓	✓
	Short-circuit capacity with back-up fuse	✓	✓	✓	✓	✓	✓
	Lower temperature limit of application -25°C	✓	✓	✓	✓	✓	✓
	VDE 0664, part 1 (up to 80 A)	✓		✓	✓		✓
	Short time delayed (10 - 40 ms)		✓			✓	
	Selective (time delayed 40 -150 ms)			✓			✓

APPLICATION

- Fault protection (protection against indirect contact of live parts)
- Additional protection (protection in case of direct contact of live parts, $I_{\Delta n} \leq 30\text{mA}$)
- Fire Protection (for locations exposed to fire hazard)

Residual current sensitivity – UNIVERSAL

AC pure sinus residual current, 50/60Hz

A sinus and pulsating direct current, 50/60Hz

B AC + A + smooth direct current + high frequency (1 kHz)

B+ AC + A + smooth direct current + high frequency (20kHz)

Basic types

according to rated values:

4p B $I_n = 25\text{A}, 40\text{A}, 63\text{A}, I_{\Delta n} = 30\text{mA}, 100\text{mA}, 300\text{mA}$

4p B+ $I_n = 25\text{A}, 40\text{A}, 63\text{A}, I_{\Delta n} = 30\text{mA}, 100\text{mA}, 300\text{mA}$

according to breaking times:

4p B, B+ instantaneous, short time delayed, selective

according to the number of poles:

4p, 2p

Standards

IEC/EN 61008-1

basic standard for RCCB's AC and A type

IEC/EN 62423

additional requirements for type B

VDE 0664-400 B+

VDE standard for B+ requirements (20kHz)





Mode of operation

Pure a.c. and pulsating d.c. type residual current sensitivity, A voltage independent
 Smooth d.c. current sensitivity: B, B+ voltage dependent
 Minimum operating voltage: 50V

Typical applications

Which are vulnerable to smooth d.c. residual currents:

- Frequency converters,
- Photovoltaic systems, a.c side,
- Charging stations for electric vehicles,
- Variable speed machine tools,
- UPS, computer data centres
- Elevator controls,
- Cranes of all kinds
- Electronic equipment on construction sites,
- Test set-ups in laboratories,
- Installation in general where we can expect d.c. smooth direct residual currents, etc.

EVE - Modular devices



Utility grid monitoring relays HRN-54 and HRN-54N serves to monitor voltage, phase failure and phase sequence and perform anti-islanding protection together with ETI multifunction time relays CRM-91H and CRM-93H.

- HRN-54
- HRN-54N
- CRM-91H
- CRM-93H

Application:

Anti-islanding protection for photovoltaic systems.



Build-in switch is used as a main switch in distribution boxes in houses or as a switch for individual electric circuits. With a build-in switch we can completely replace the cam switch. Build-in switch can be sealed either in ON or OFF position.

Available in 1-, 2-, 3- and 4-pole versions.

ETISWITCH - Switch disconnectors



ETISWITCH Switch disconnectors series LAS and built-in switches series SV serves as control switches, load break switches and disconnecting devices in AC distribution/protection cabinets.

- LAS16 up to LAS125 (3,4-pole, from 16 to 125A)
- SV1100 up to SV4100 (1, 2, 3, and 4-pole; 100A)

ETICON - motor contactors and ETIBREAK - MCCBs

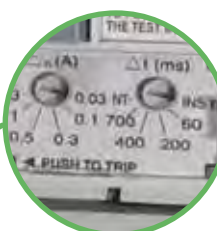
ETICON power contactors are used as separation device actuated on anti-islanding protection signal between photovoltaic inverter and AC utility grid. For the same purpose ETIBREAK moulded case circuit breakers series EB2 assembled with motor operators enabling remote controlled operations can be used. EB2R moulded case circuit breakers with integrated residual current protection provides combined protection against overloads, short-circuits and residual currents.

- CEM 9 up to CEM300 (AC3 9 up to 300A)
- ETIBREAK EB2 (from 20 up to 630A)
- ETIBREAK EB2R (from 20 up to 250A)



Low voltage moulded case circuit breakers with residual current protection EB2R

Breaking capacities as
on MCCBs



Adjustable residual current tripping thresholds between 30mA and 3A. Adjustable time delay for residual current protection between 60ms and 700ms including INST (instantaneous) and NT (No Trip).



Voltage Presence LED Indicator and Trip Indicator (the yellow button pops up to indicate tripping due to residual current)



Type A: Tripping is ensured for residual sinusoidal AC in the presence of residual pulsating DC.



Test Button (to test the residual current detection and tripping system)



Dielectric test device plug (to allow dielectric testing with the EB2R closed - ON)



Adjustable overload protection I_R can be set between 63% and 100% of I_n

ETITEC - surge arresters



ETITEC surge arresters protect photovoltaic system AC components against direct and indirect lightning discharges and utility grid operating overvoltages.

- ETITEC class T1+T2: ETITEC B, B-F and ETITEC WENT
- ETITEC class T2: ETITEC C

NV/NH - low voltage knife blade fuses and disconnectors



ETI offers a new generation of low-voltage fuse-links from size NV00C up to to NV3 with new, dual indication of fuse-link operation, called KOMBI. The indicator is easily visible on the top and centre of the fuse-link, whether it is situated in a standard fuse base or vertical fuse rail or in fuse-switch disconnecter.

Fuse links with gG characteristic with rated voltages 400 V a.c., 500 V a.c., 690 V a.c. and 1000 V a.c are available in versions with and without striker pin, with rated current from 2 A to 1600 A, depending on the selected product.

We also offer:

- NV fuse-rails sizes 00, 1, 2, 3 with accessories
- NV disconnectors with fuses sizes 00, 1, 2, 3, 4a.

ETI can also design and produce special non-standard fuse-links on customers' request.



KVR - Free-standing cable distribution cabinets

Application:

- DC collector (connecting the DC cabling for PV inverters)
- AC collector (connecting the AC cabling for PV inverters)
- AC cabinets
- DC cabinets



DC collector

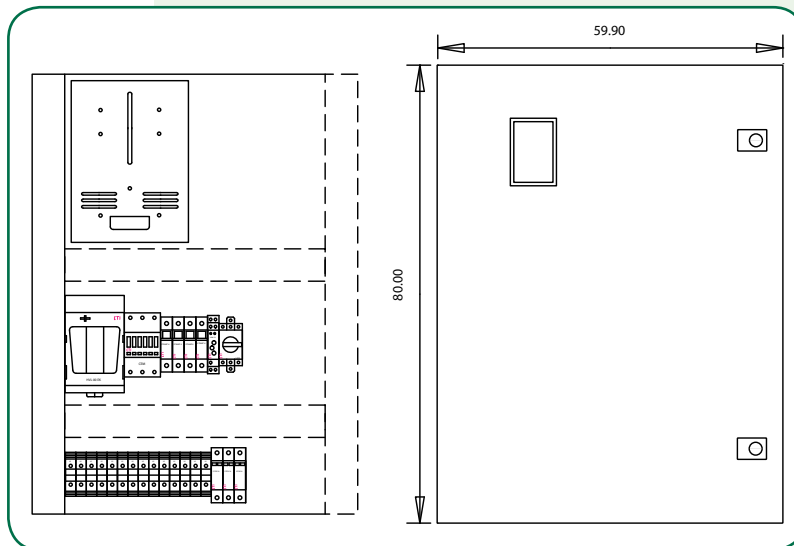
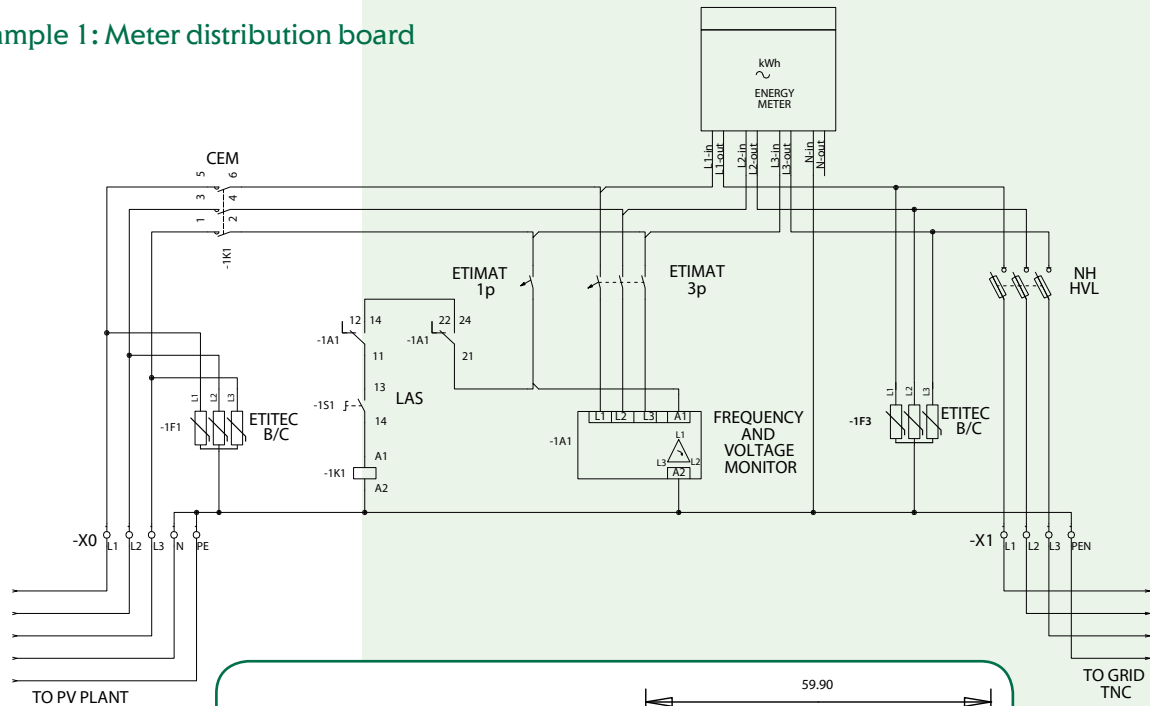


AC collector



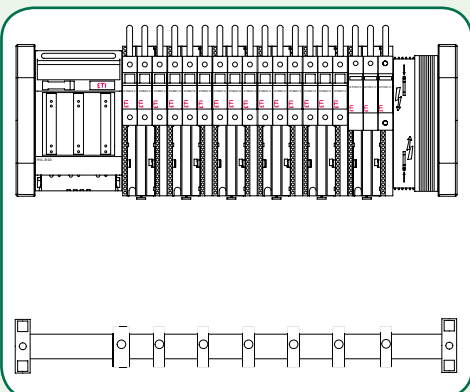
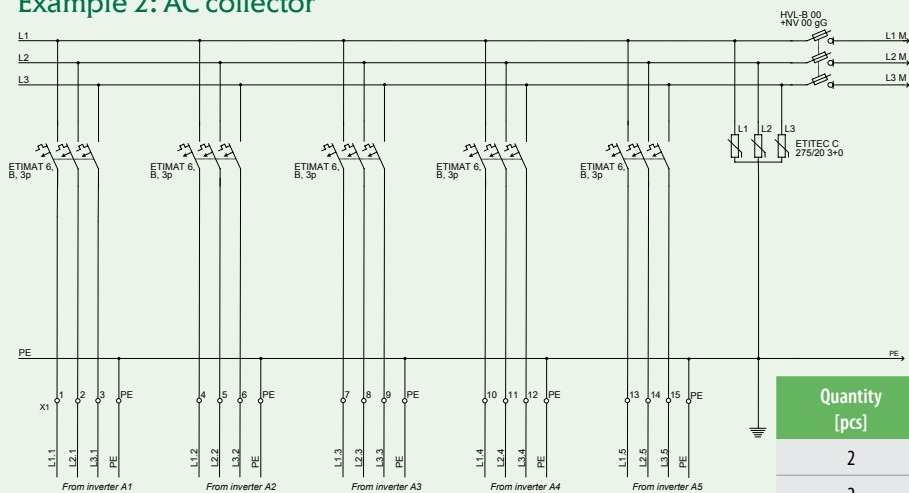
Solutions

Example 1: Meter distribution board



Quantity [pcs]	Code No.	Description
1	001102133	GT 80-60-25
1	002440141	ETITEC B-F 320/12,5 F 3+0
1	004648103	ETICON CEM 50.00 230V
1	002115512	ETIMAT 6, B, 6A, 3P
1	00211512	ETIMAT 6, B, 6A, 1P
1	001701250	HVL EK 00, 3p
3	004181213	NH 00 C KOMBI 80 A, gG 500 V
1	004660011	ETISWITCH LAS 1
2	002911001	35 mm TH rail NVS35/7,5 1m
1	001117002	3F, VP0
1	002471416	HRN-54
10	003901157	VS 35 PA
2	003901539	VS 35 PE
2	003901158	VS 35 PAN
6	003901000	VS 2,5 PA
3	003901911	IKP S 6060

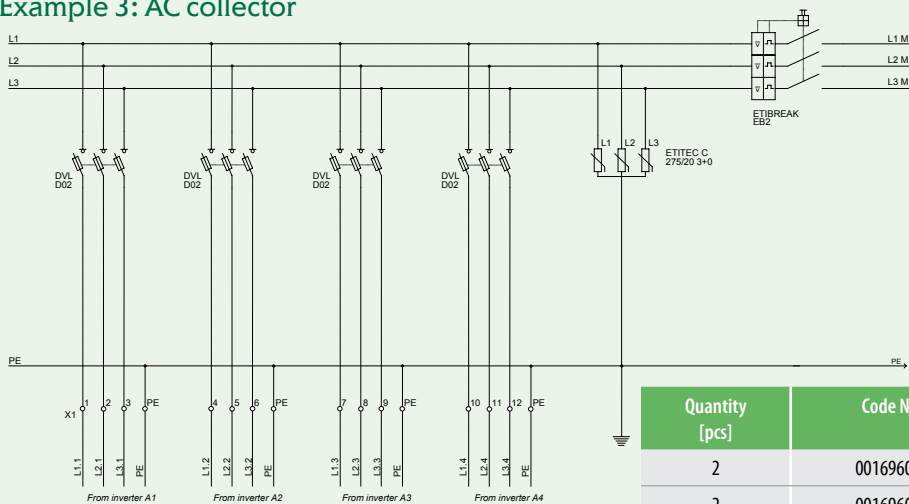
Example 2: AC collector



Quantity [pcs]	Code No.	Description
2	001696001	BBS-60/3
2	001696006	L-BBS-60/3
1	001696009	BBC-60/3
6	001696083	DA-60/32/72/1
1	001696042	HVL-B 00 3p M8
5	002111516	ETIMAT 6, B, 3p
1	002441522	ETITEC C 275/20 3+0
3	004183214	NH 00, 100A, gG
2	001696000	BBS-60/1
6	001696019	CT-5/16
1	001696021	CT-5/50

* see general catalogue about 60mm busbar system

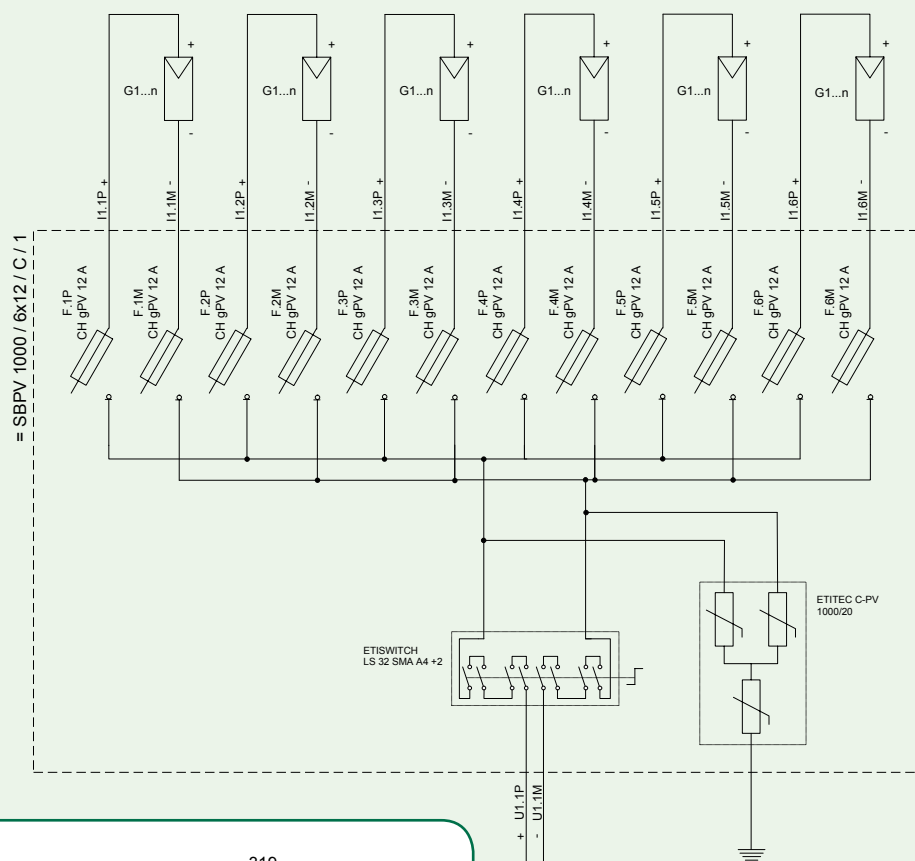
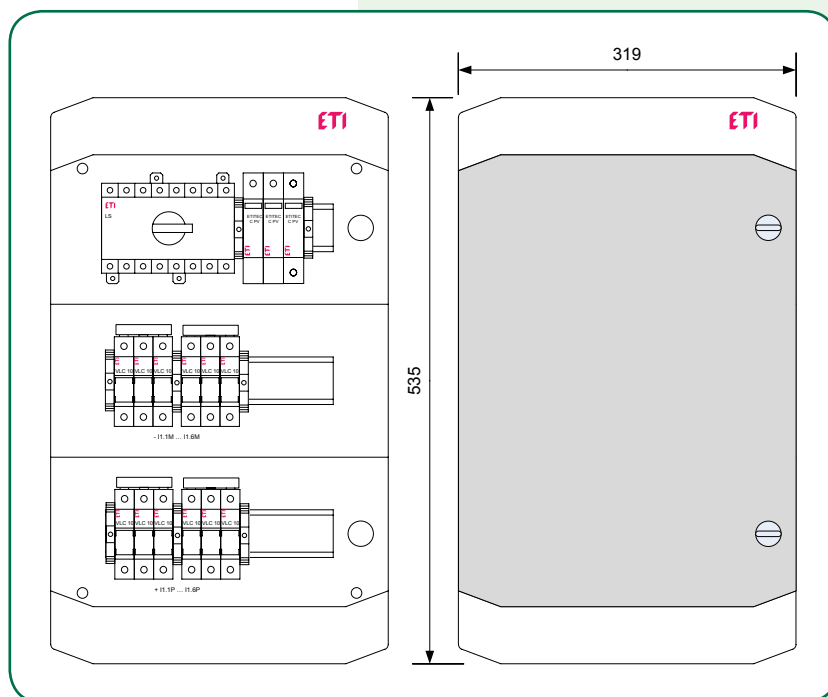
Example 3: AC collector



Quantity [pcs]	Code No.	Description
2	001696001	BBS-60/3
2	001696006	L-BBS-60/3
3	001696009	BBC-60/3
1	001696083	DA-60/32/72/1
4	001696050	DVL-60/183
12	002212006	D02, 32A
1	002441522	ETITEC C 275/20 3+0
1		universal MCCB adapter, frame 125
1	004671046	ETIBREAK EB2 125/3S 125A 3p
2	001696000	BBS-60/1
5	001696019	CT-5/16
1	001696021	CT-5/50

* see general catalogue about 60mm busbar system

Example 4: DC junction box



Quantity [pcs]	Code No.	Description
1	001101064	ECH-36PT
12	002540201	EFH 10 1p DC 1000V
0,25	002921101	IZS10/1F/54
12	002625106	CH10 gPV 1000V 12A
1	002445208	ETITEC C-PV 1000/20
1	004660066	LS32 SMA A4+2
8	003901016	PKPA 35 end bracket

Design on customer's request

DC junction box (NH gPV fuses)



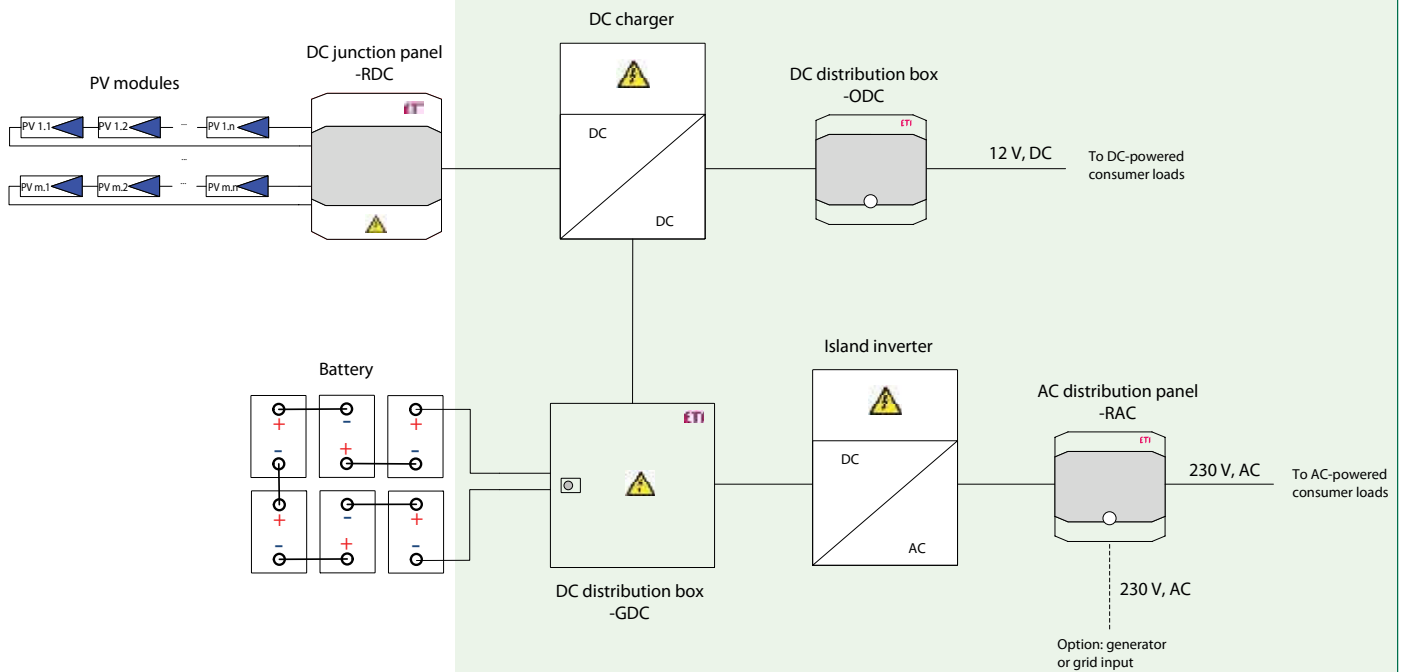
DC junction box (CH gPV fuses)



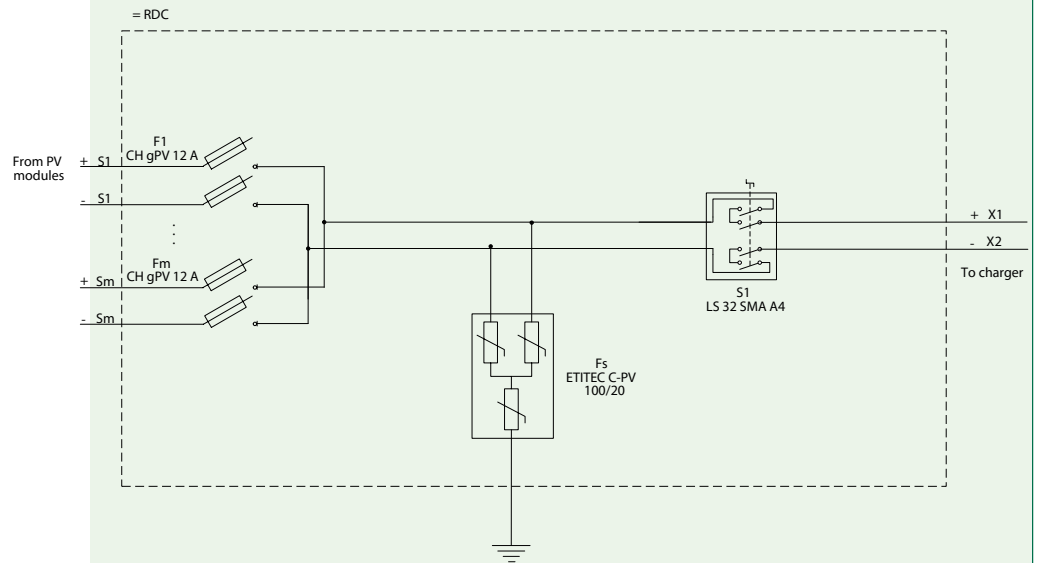
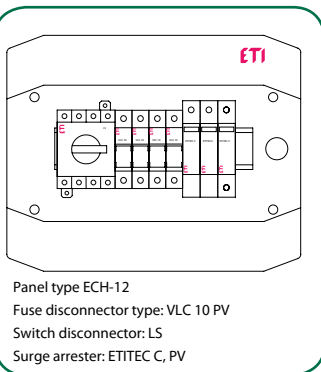
Meter distribution cabinet



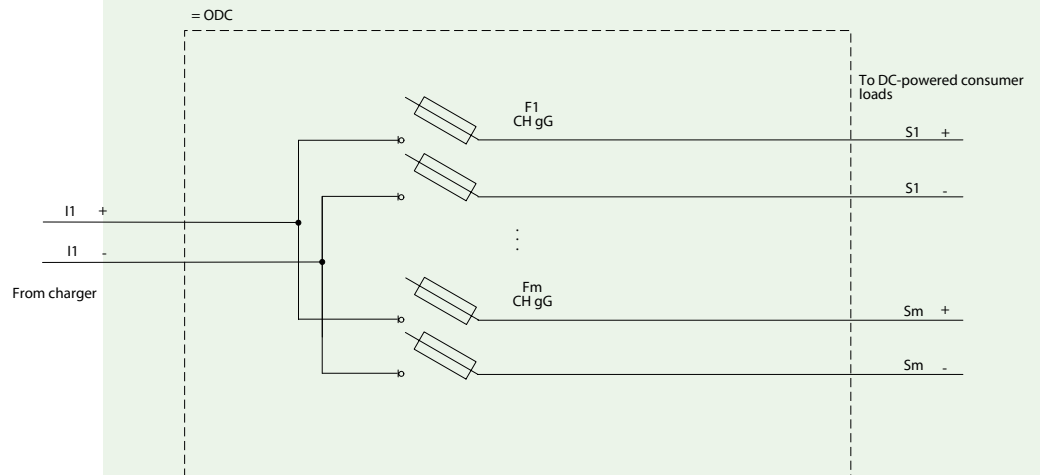
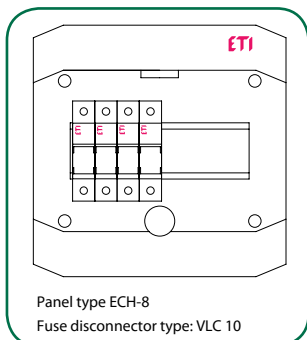
PV off-grid system protection



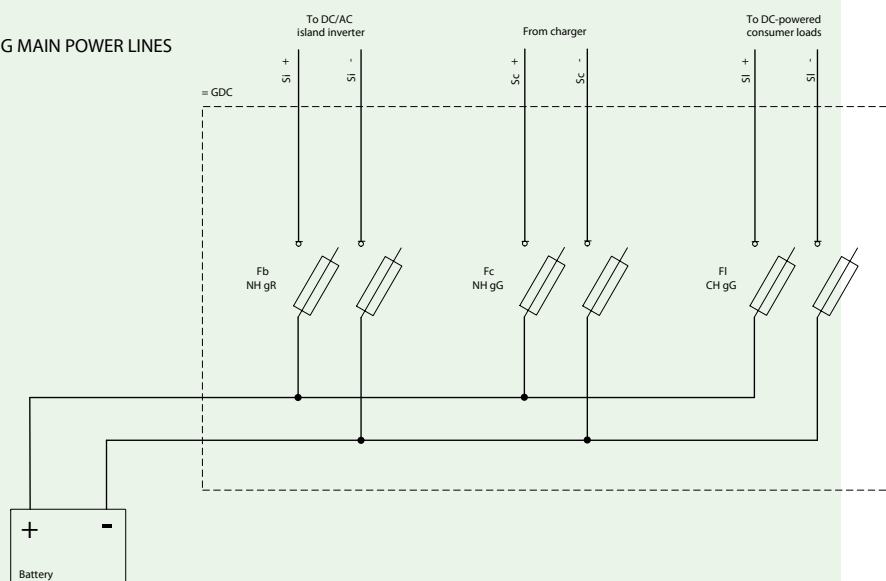
PROTECTING DC SIDE OF ISLAND PV PLANT.



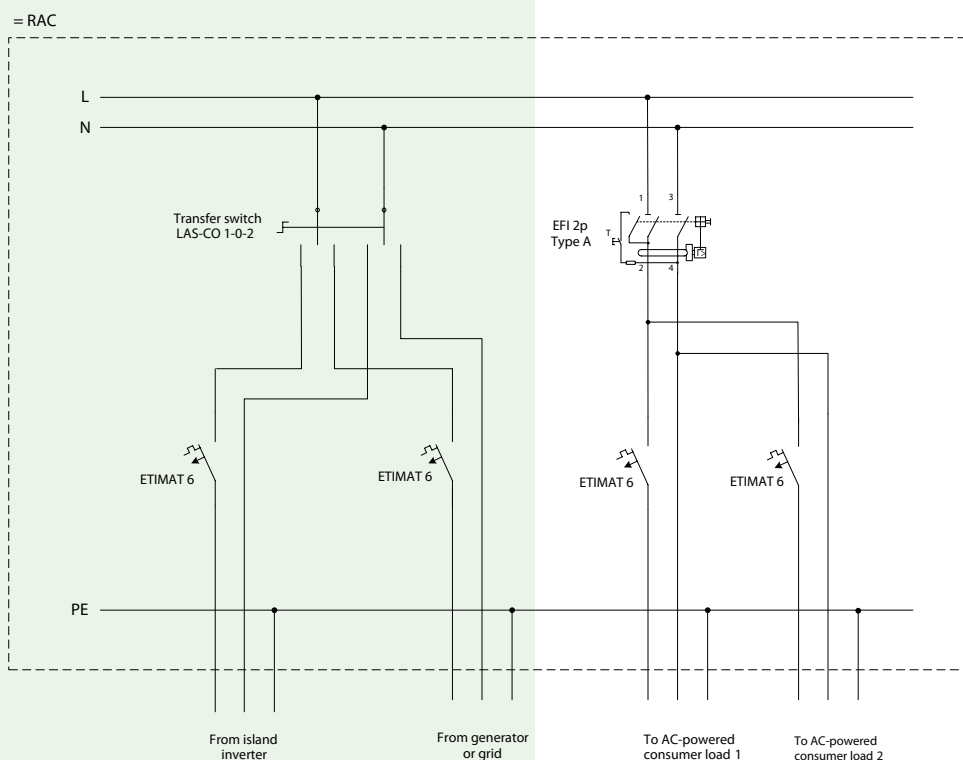
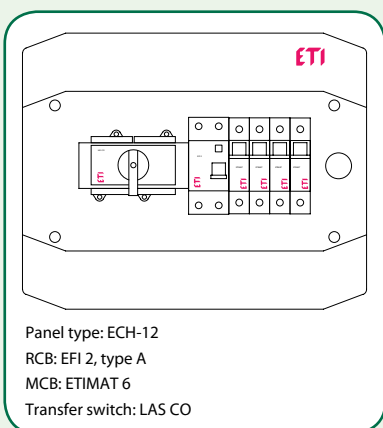
PROTECTING DC-POWERED CONSUMER LOADS DIRECTLY FROM CHARGES.



PROTECTING MAIN POWER LINES



AC DISTRIBUTION BOX



Overcurrent and Overvoltage Protection for Wind Power Generation

NEW!

* ETITEC S WT series,
designed for wind
applications - available
upon request

aR/gR NH



gS NH



gR
CH



Surge
Arresters WT*



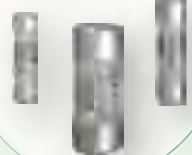
EFD/PCF
Disconnectors



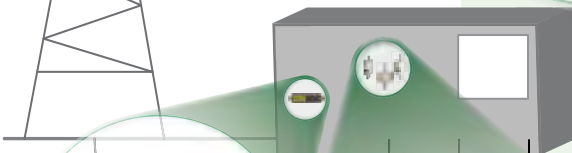
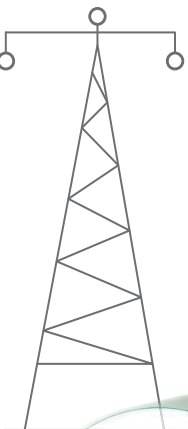
gGNH



gG CH



VVMV



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