

Altech Corp.®

Serving the Automation & Control Industry since 1984



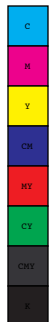
ISO 9001
CMI-SAI Global



1500V
Now Available



**Fuses for
Photovoltaic Protection**



Altech Corp.®

Since 1984, Altech Corporation has grown to become a leading supplier of automation and industrial control components. Headquartered in Flemington, NJ, Altech has an experienced staff of engineering, manufacturing and sales personnel to provide the highest quality products with superior service. This is the Altech Commitment!

With experienced Product Engineers and Customer Service personnel, Altech provides solutions to your most pressing application challenges. All with one thought in mind - to ensure that we solve your problem the first time!



Quality Commitment

Altech's control components meet diverse national and international standards such as UL, NEC, CSA, IEC, VDE and more. Altech provides superior customer service and delivery through Total Quality Management and Continuous Process Improvement. Altech is ISO 9001 approved. We perform these services with honesty and integrity and are committed to achieve these goals.



PV Protection



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INTRODUCTION



Altech Corp.® 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.



DC - DISTRIBUTION AND PROTECTION COMPONENTS

Photovoltaic systems are composed by photovoltaic panels, cables, fuses, switches, overvoltage arresters and power inverter. Photovoltaic panels utilise the power of sun light to converters 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" overcurrent.

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 the positive string protected by fuses. Systems that have less than three strings will not generate enough fault current to damage the conductors/solar panels. Normally in North America there is a gPV fuse connected on the positive string, 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.

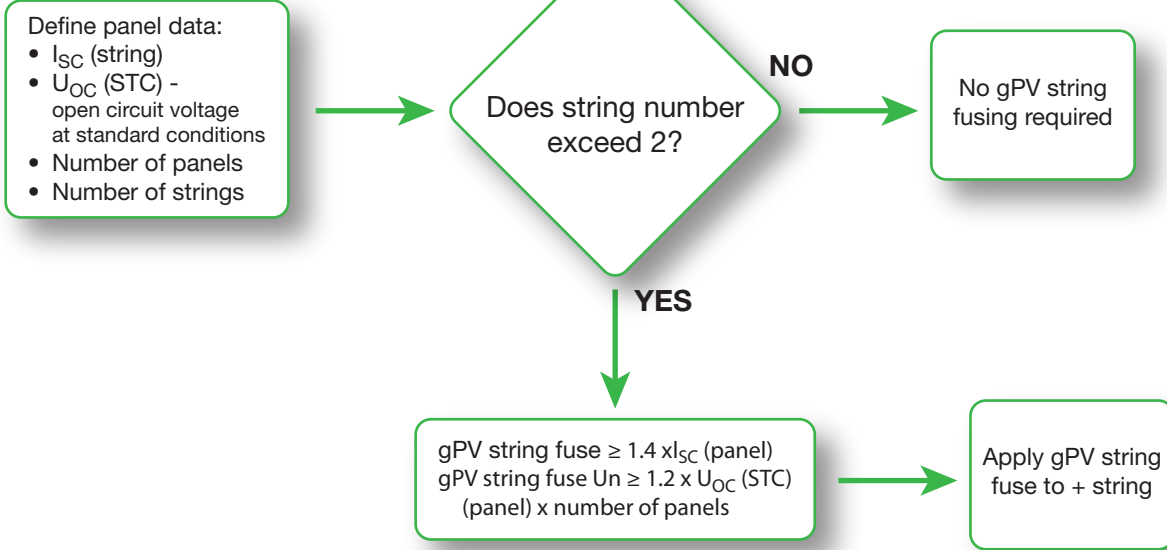
PV module protection from AC REVERSE current caused by defective inverter. If an inverter becomes defective (transformerless...), AC reverse current can feed into DC strings and destroy PV modules.

PV Protection



INTRODUCTION

CH 10 gPV Fuse Selection



Derating factor 1.4 is defined for ambient temperature maximum 45°C . Cable cross-section derating factor is not included!



PV Protection

CYLINDER FUSES



General Characteristics

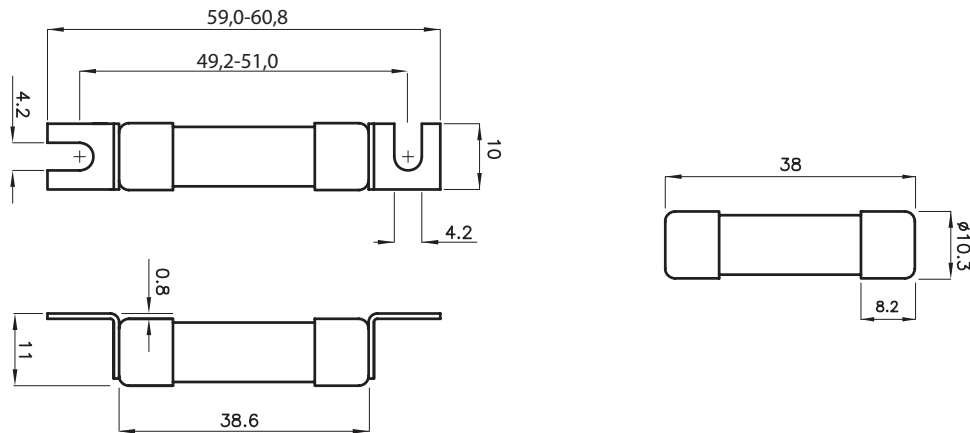
Rated Voltage 1000V DC L/R=2ms
 Breaking Capacity 10kA DC / 30kA DC
 Standards UL 2579, UL 248-1



CH 10x38 gPV

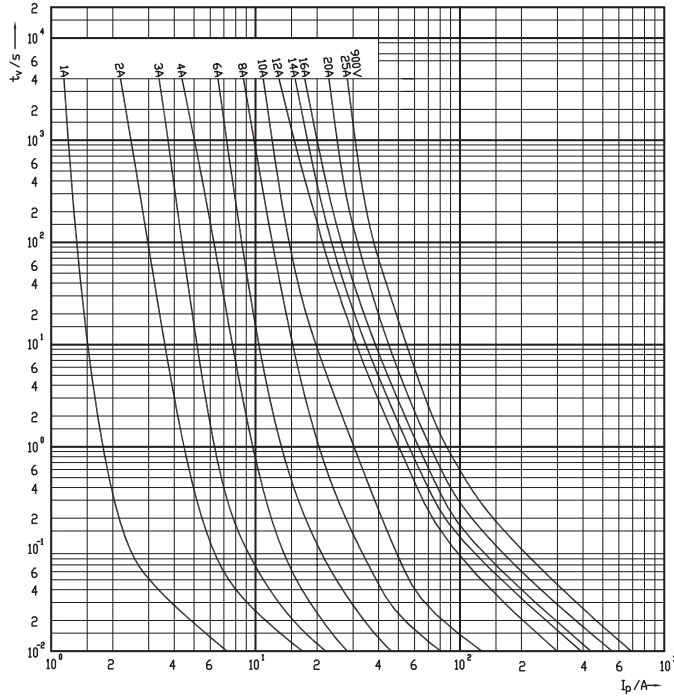
Size	I_n [A]	Code No. "standard contacts" 10kA UL	Code No. "standard contacts" 30kA IEC	Code No. "type SU contacts" 30kA IEC	Pre-arcing Joule integral [A ² s] L/R=2ms	Operating Joule integral [A ² s] L/R=2ms	Power dissipation [0,7 x I _n] ² P _d [W]	Power dissipation [I _n] ² P _d [W]	Weight [g]	Packaging [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.

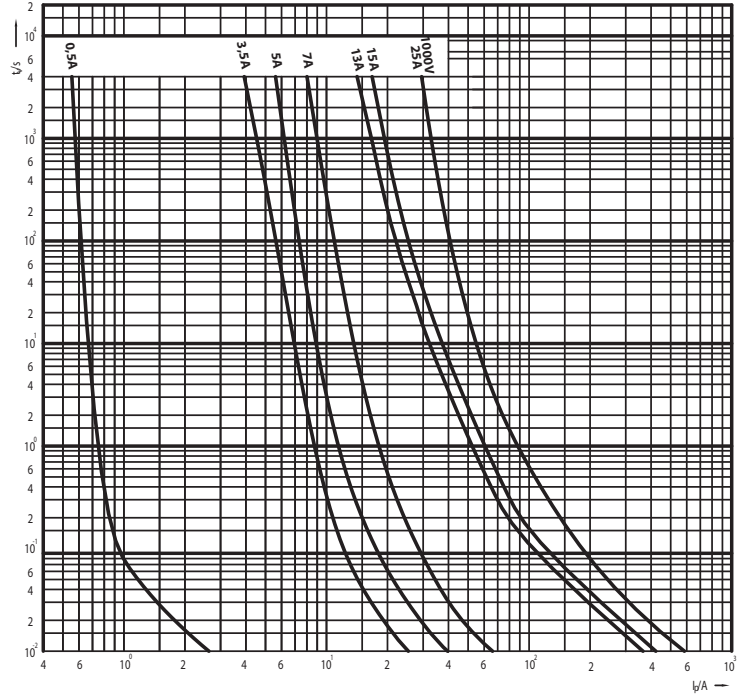


PV Protection

CYLINDER FUSES



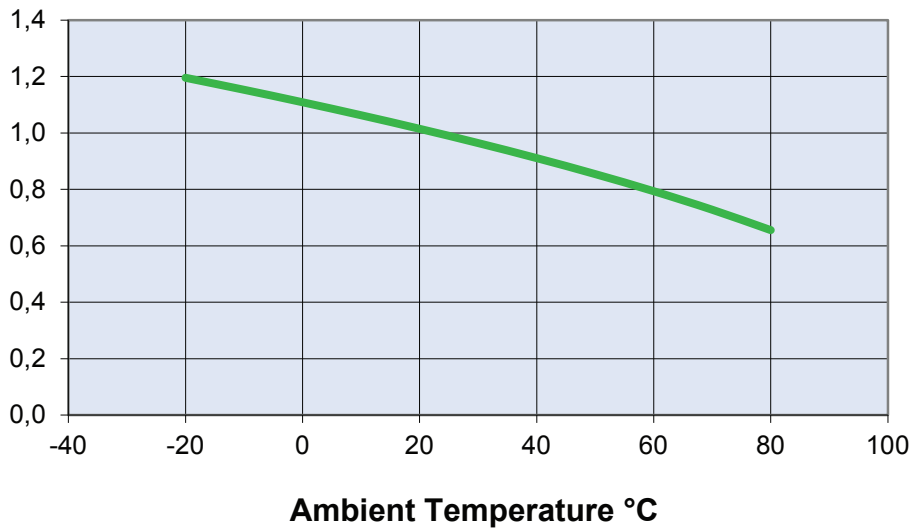
CH 10x38 gPV I/t characteristics



CH 10x38 gPV I/t characteristics

Tamb (°C)	A
-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 gPV Temperature Derating Factor



PV Protection

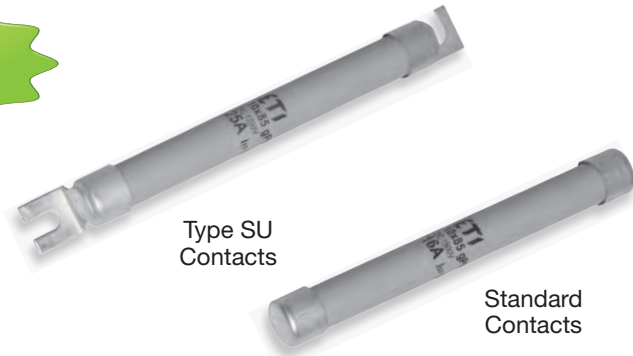
CYLINDER FUSES



1500V

General Characteristics

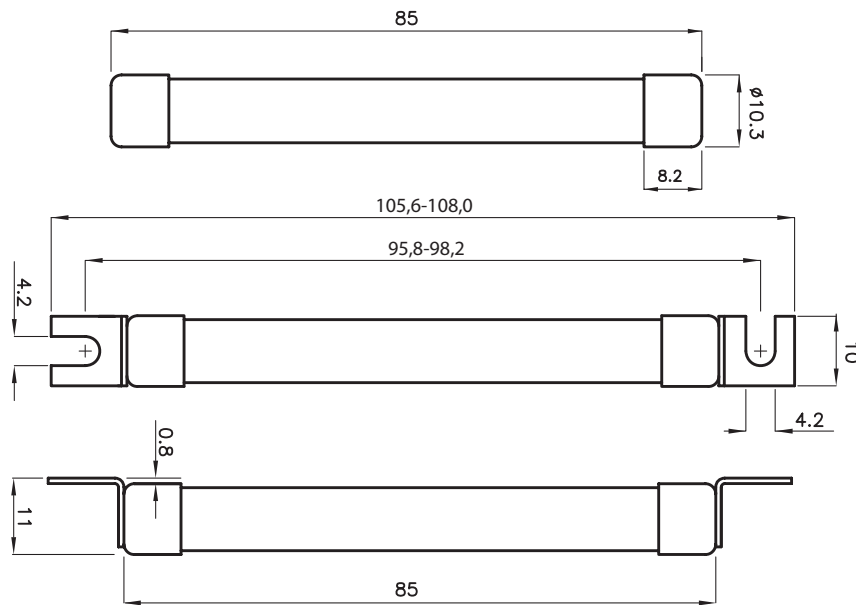
Rated Voltage 1500V DC L/R=2ms
 Breaking Capacity 10kA DC / 30kA DC
 Standards UL 2579, UL 248-1



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 dissipation [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		

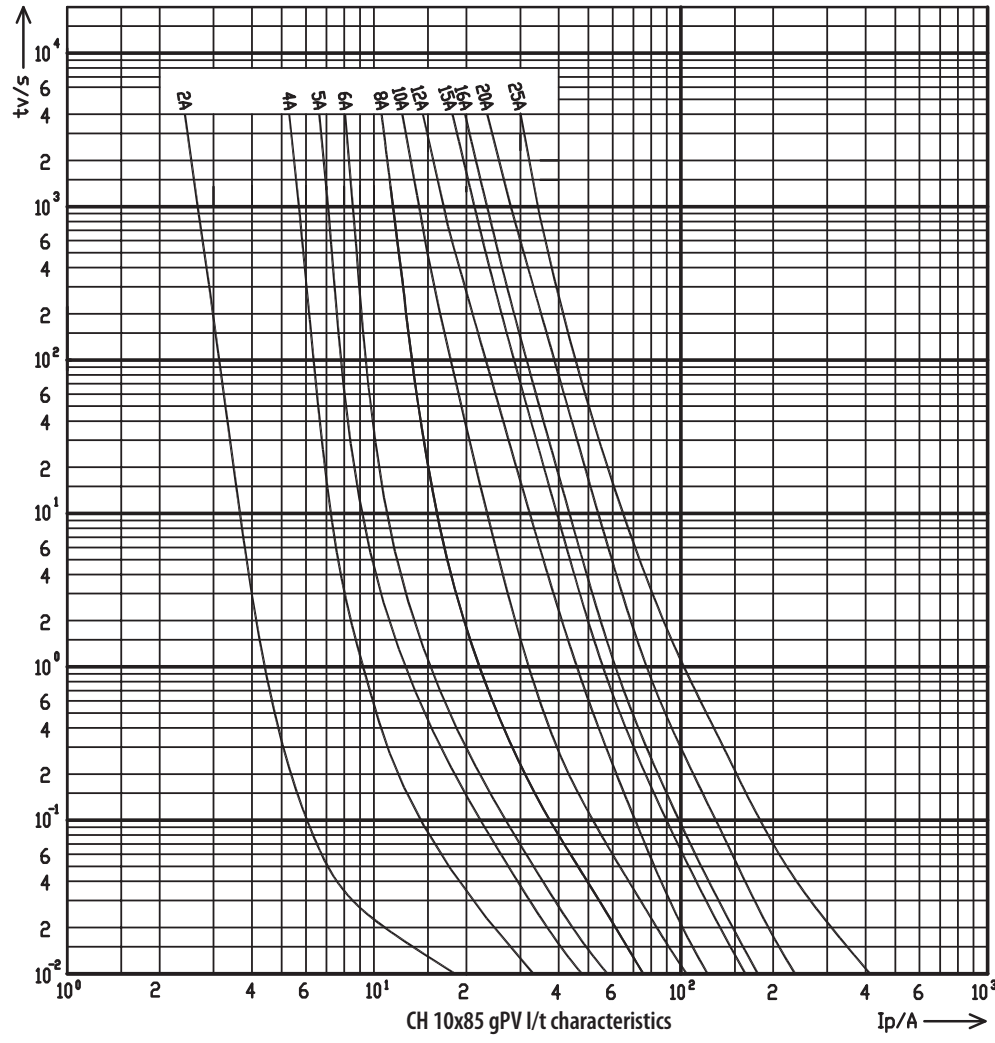
* 1200V d.c.



PV Protection

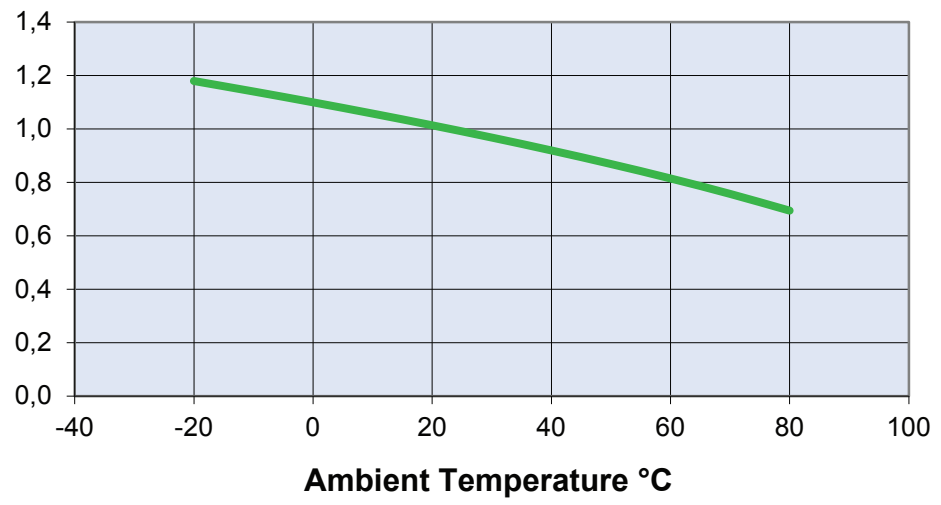


CYLINDER FUSES



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

CH10x85 gPV Temperature Derating Factor



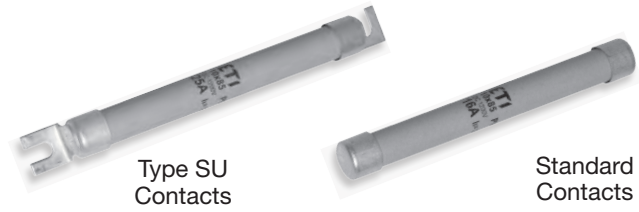
PV Protection

CYLINDER FUSES



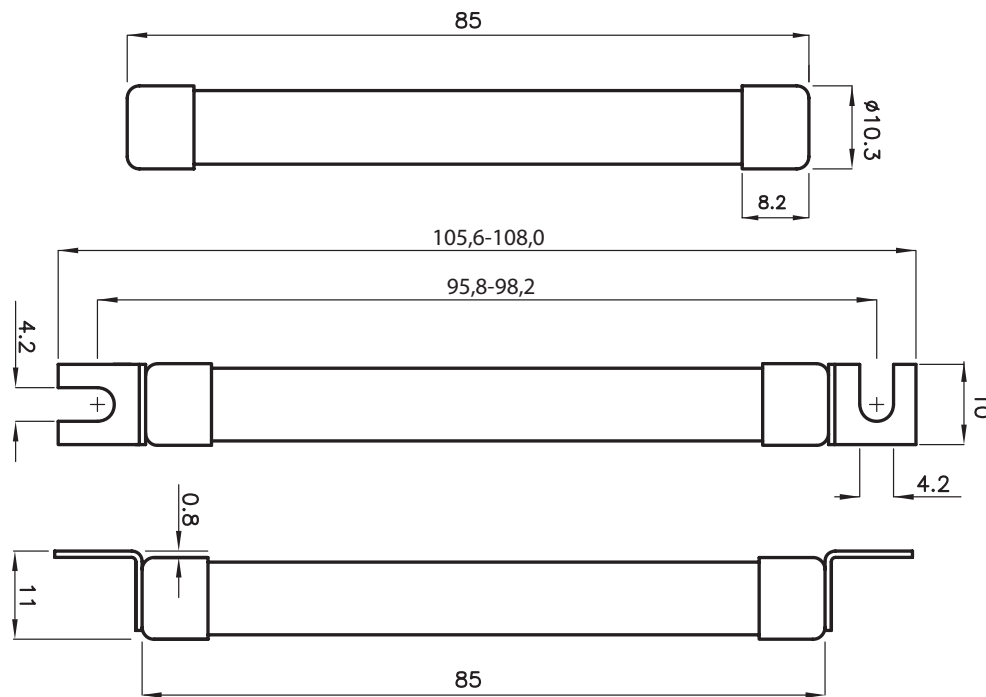
General Characteristics

Rated Voltage 1200V DC L/R=2ms
 Breaking Capacity 30kA DC
 Standards IEC 60269-4
 Characteristic gR



CH 10x85 PV

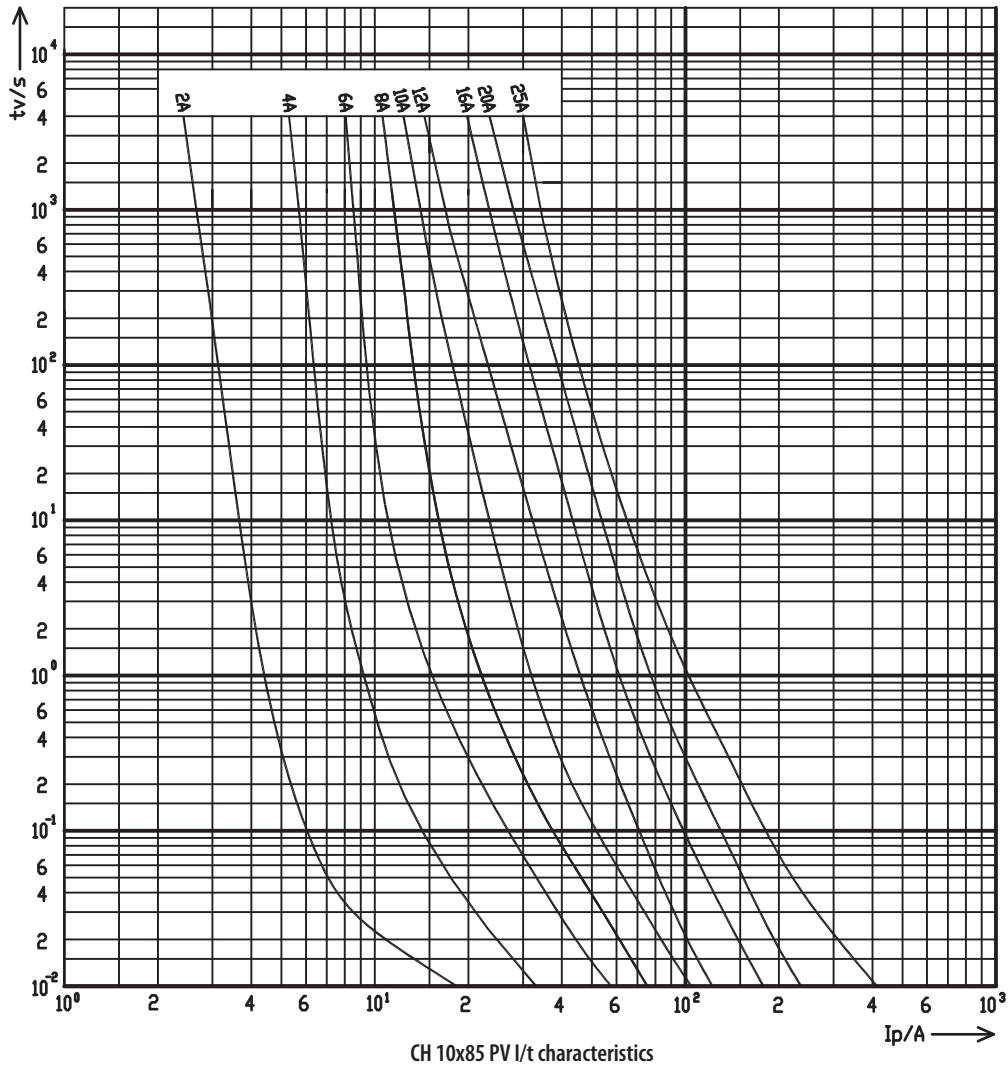
Size	I_n [A]	Code No. "standard contacts"	Code No. "type SU contacts"	Pre-arcing Joule integral [A ² s] L/R=1ms	Operating Joule integral [A ² s] L/R=1ms	Power dissipation [0,7 x I _n ²] P _d [W]	Power dissipation [I _n ²] P _d [W]	Weight [g]	Packaging [pcs]
10 x 85	2	002625220	002625230	1,6	1,7	1,13	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			



PV Protection



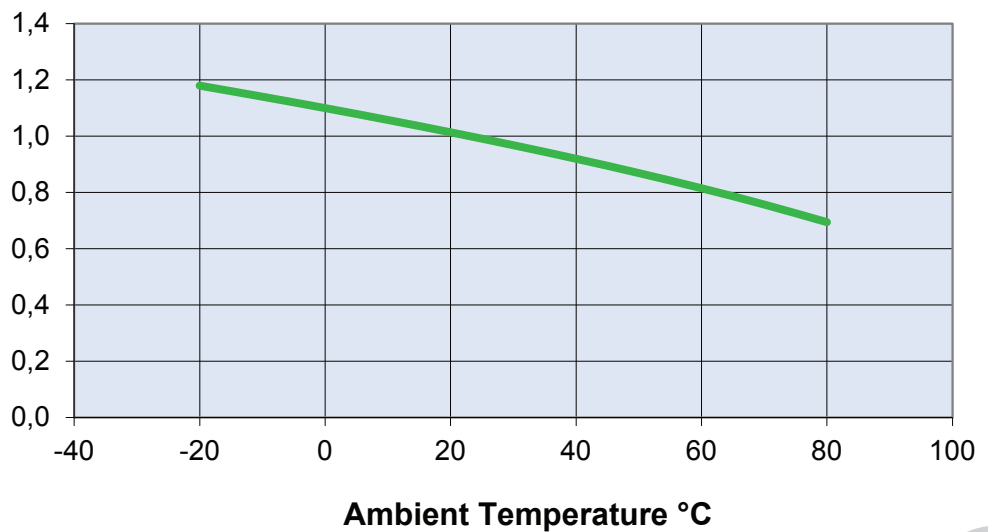
CYLINDER FUSES



CH 10x85 PV I/t characteristics

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

CH10x85 gPV Temperature Derating Factor



PV Protection

CYLINDER FUSES



General Characteristics

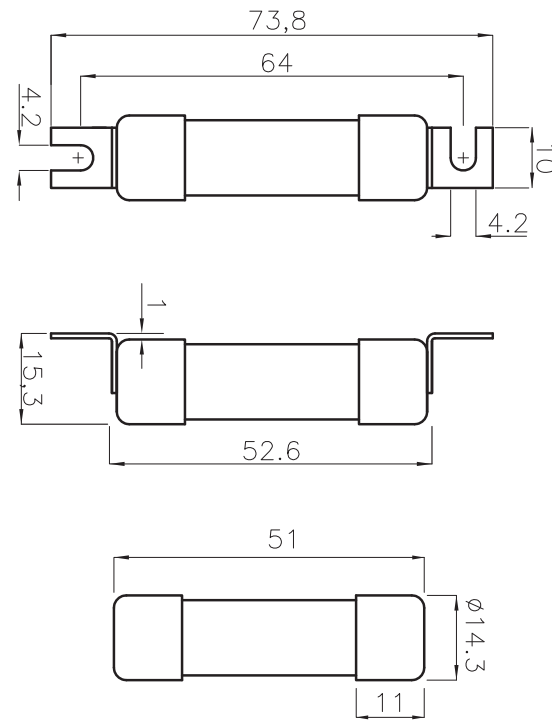
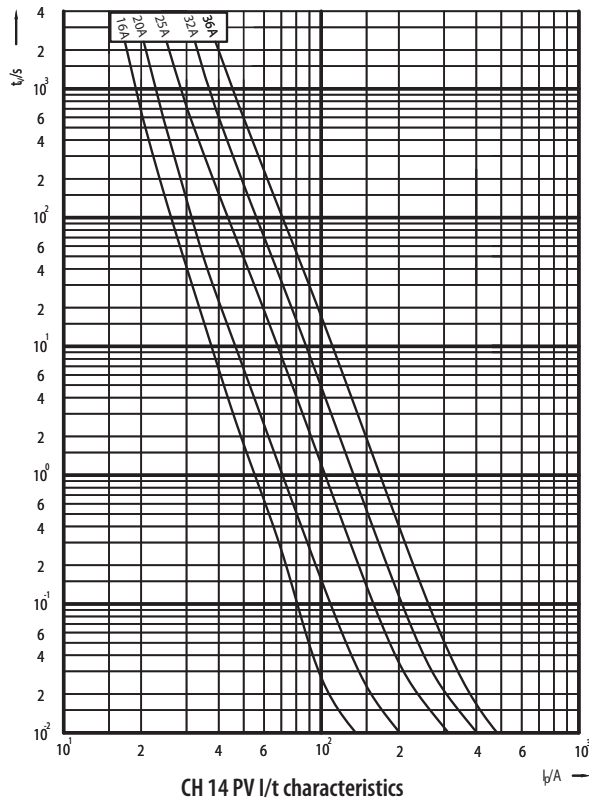
Rated Voltage 1000V DC L/R=2ms
 Breaking Capacity 10kA DC
 Standards IEC 60269-4 ed 1.0 (2010-9)



CH 14x51 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
	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	

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



PV Protection

Fuse Holders for Cylindrical Fuses

up to
1000V DC
600V AC

All plastic parts are made of material resistant to extremely high temperatures. Fuse carrier assures that a fuse link is isolated from the housing.



LED indicator is available for all sizes. The LED blinks after the fuse-link opens.



Space for finger to open fuse carrier



Complete protection against touch according to IP20.



All contact surfaces are silver plated



Possibility of sealing in ON or OFF positions. (Security sealer not included)



Modular Design. It is easy to assemble multi-pole versions.

More Industrial Fuse Holders & Fuses



CC & J Type



- Rejection member to allow only Class CC fuses
- Rated voltage: 600V AC/DC
- Rated current: 30A
- 1, 1N, 2, 3, 3N pole versions
- 200 kA SCR rating



Midget Type



- Rated voltage: 600V AC/DC
- Rated current: 30A
- 1, 1N, 2, 3, 3N pole versions
- 200 kA SCR rating
- Optional blown fuse indication



IEC Type



- Rated voltage: 600V AC/DC
- Rated current: up to 100A
- 1, 1N, 2, 3, 3N pole versions
- 200 kA SCR rating
- Optional blown fuse indication

up to
1600A AC
1500V DC



PV Protection



FUSE HOLDERS

General Characteristics

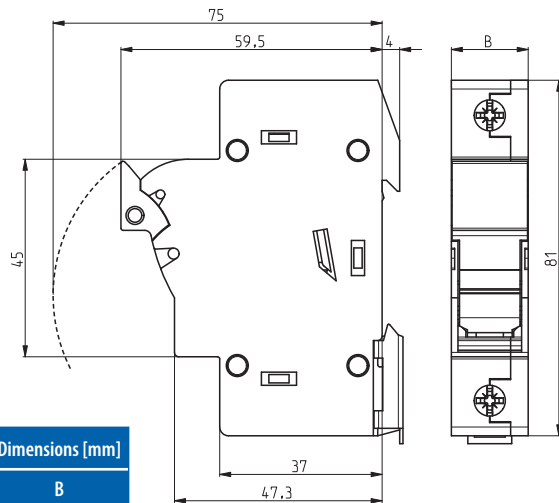
Rated voltage	1000V d.c.
Rated current	max. 25A; 50A
Max. fuse link power dissipation	3 W; 5 W
Cross section of connecting wire	1 mm ² - 25 mm ² ; 1.5 mm ² - 35 mm ²
Pole build-in width	17,5 mm; 27 mm
Mounting on the rail	EN 60715 - 35mm rail
Utilization category	DC-20B (Do not operate under load)
Rated torque	2Nm; 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

EFH 10 DC

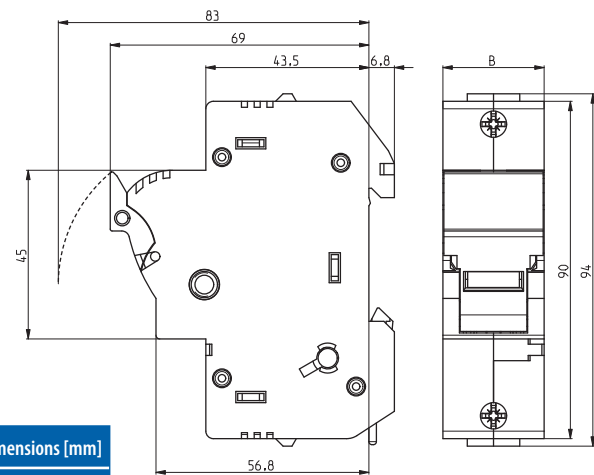
Number of poles	U _e /U _i [V]	I _{max} [A]	Code No.	Indicator	Adapter	Weight [g]	Packaging [pcs]	
1 pole	1000V d.c.	25A	002540201	-	-	63	12/108	
			002540211	LED	-	64		
			002540501	-	✓	68		
			002540511	LED	✓	69		
2 pole		25A	002540203	-	-	124		6/54
			002540213	LED	-	125		
			002540503	-	✓	134		
			002540513	LED	✓	135		
Spacer	-	-	002461130	-	-	50	24/192	

EFH 14 DC

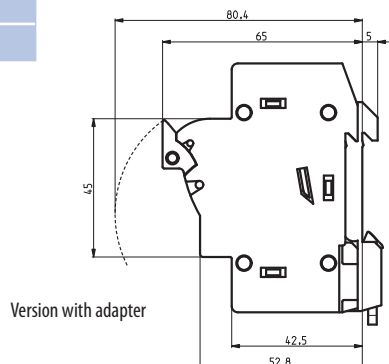
Number of poles	U _e /U _i [V]	I _{max} [A]	Code No.	Indicator	Weight [g]	Packaging [pcs]	
1 pole	1000V d.c.	50A	002560201	-	102	12/96	
			002560211	LED	103		
2 pole		50A	002560203	-	206	6/48	
			002560213	LED	208		
Spacer		-	-	002461130	-	50	24/192



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



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



PV Protection

FUSE HOLDERS



Technical data

Fuse type	EFH 10 DC		EFH 14 DC	
	CH 10x38 PV		CH 14x51 PV	
	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
Rated insulation voltage Ui	1000V		1000V	
Rated imp. withstand voltage Uimp	8kV		8kV	
Required insulation temperature rating	60°C		60°C	
Max power dissipation of the fuse-link (W)	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	
Operational performance (cycles without current)	2000		2000	
Inclined Plane Tracking (IPT)	60min at 1kV		60min at 1kV	
Humidity	90% at 20°C		90% at 20°C	
Operating ambient temperature	-5°C ... +40°C		-5°C ... +40°C	
Store ambient temperature	-25°C ... +55°C		-25°C ... +55°C	
Degree of protection (IEC 60529)	IP 20		IP 20	
Terminal capacity	1-25mm ²	AWG 18-8 solid&stranded Cu only	1,5-35mm ²	AWG 16-6 solid&stranded Cu only
Screw	PZ M5	PZ M5	PZ M5	PZ M5
Torque	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	UL 248-4 IEC/EN 60269-2
Standards - fuse holders	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		Int	
Certificates	UL Listed		UL Listed	

PV Protection



NH TYPE BLADE FUSES



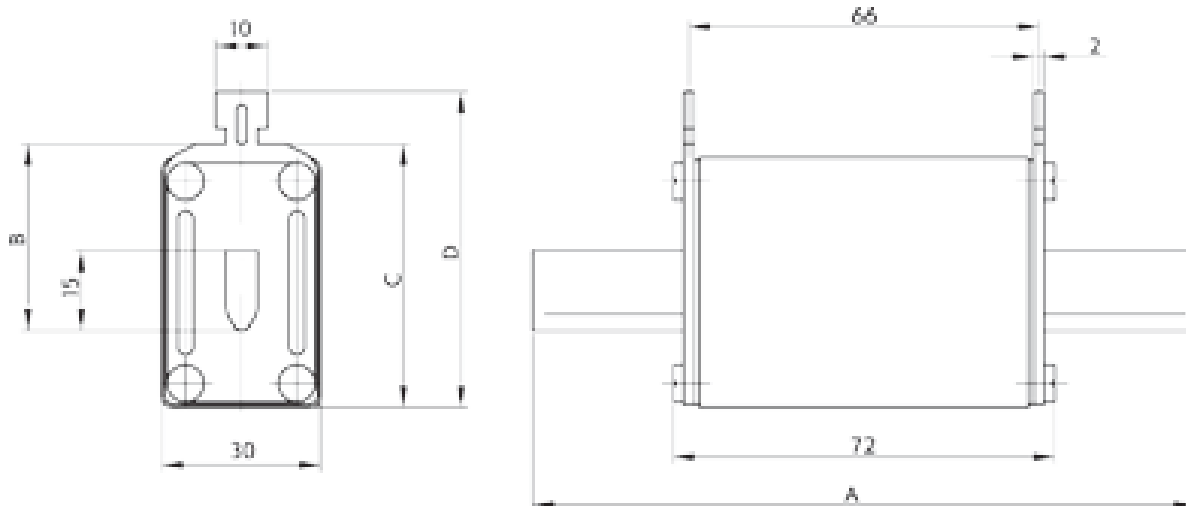
General Characteristics

Rated Voltage 1000V DC L/R=2ms
 Breaking Capacity 20kA
 Standards IEC 60269-6 ed 1.0 (2010-9), IEC 60269-4

DC 1000V

I _n [A]	gPV		PV (gR)		Power dissipation [W]	Pre-arcing Joule integral [Pt] (L/R = 2ms)	Operating Joule integral [Pt] (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		

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

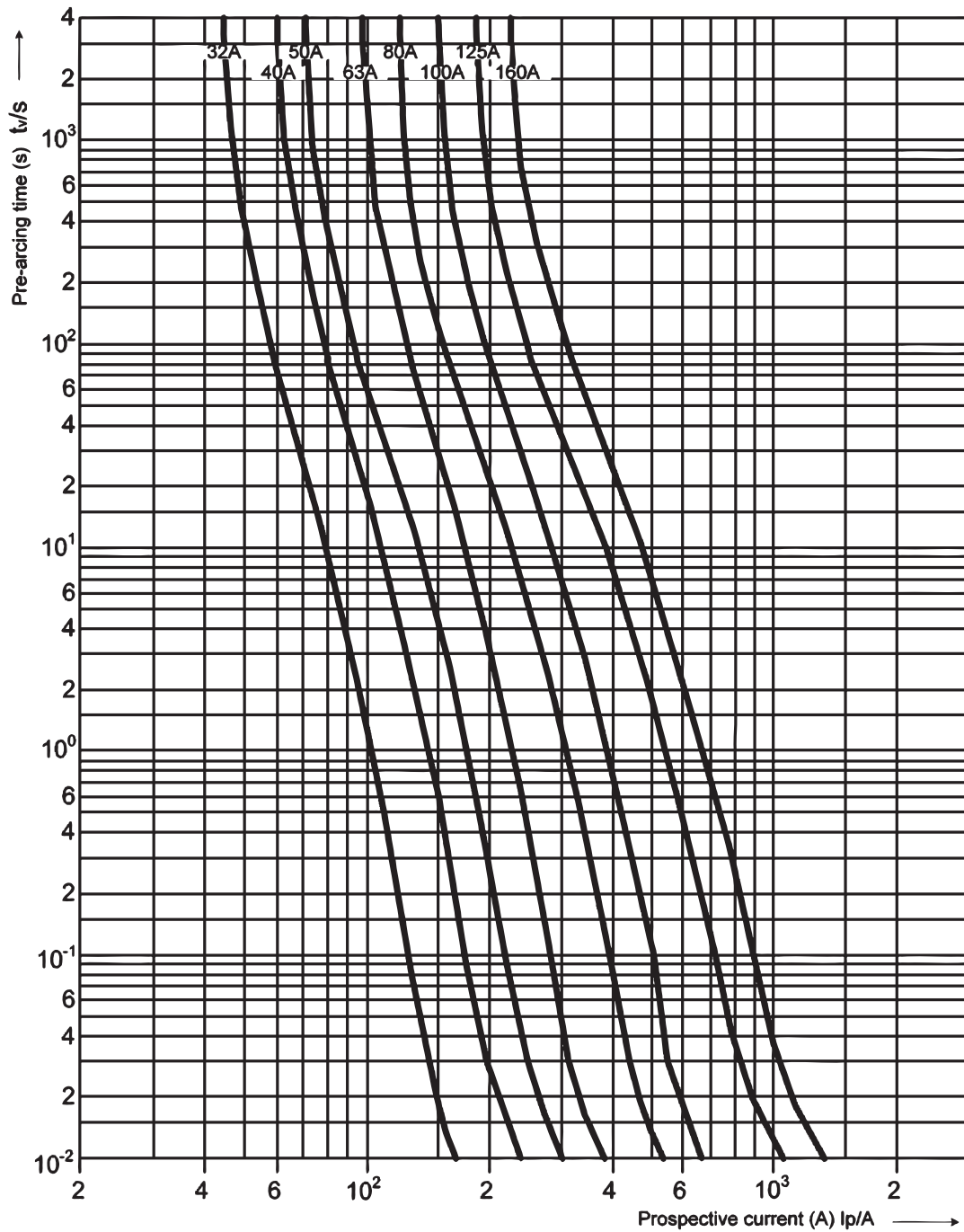


gPV, PV(gR) 750V, 1000V dimensions

PV Protection



NH TYPE BLADE FUSES



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

PV Protection



NH TYPE BLADE FUSES



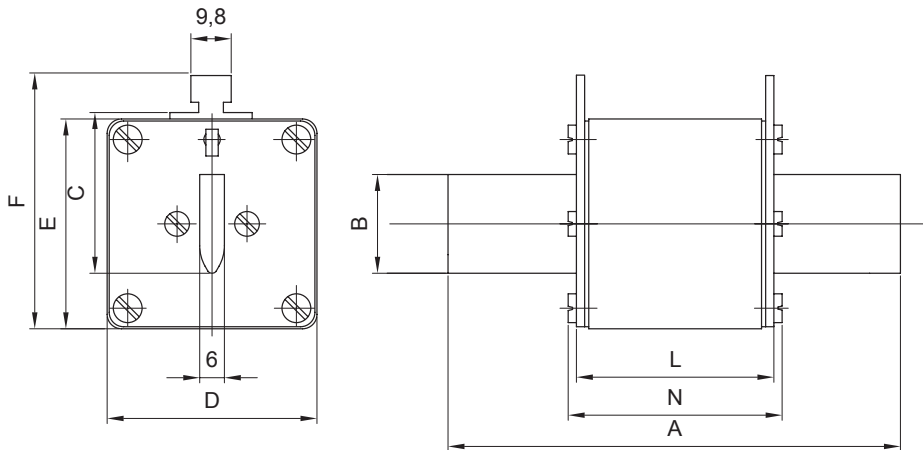
General Characteristics

Rated Voltage 1000V DC L/R=1ms
 Breaking Capacity 10k A DC
 Standards IEC 60269-6 ed 1.0

DC 1000V gPV

Size	I_n [A]	gPV Standard indicator Code No.	Power dissipation ($0,7 \times I_n$) [W]	Power dissipation [W]	Pre-arcing Joule integral [I^2t] (L/R = 1ms)	Operating Joule integral [I^2t] (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
	250	004110344	15	36	6.000	38.000		
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		

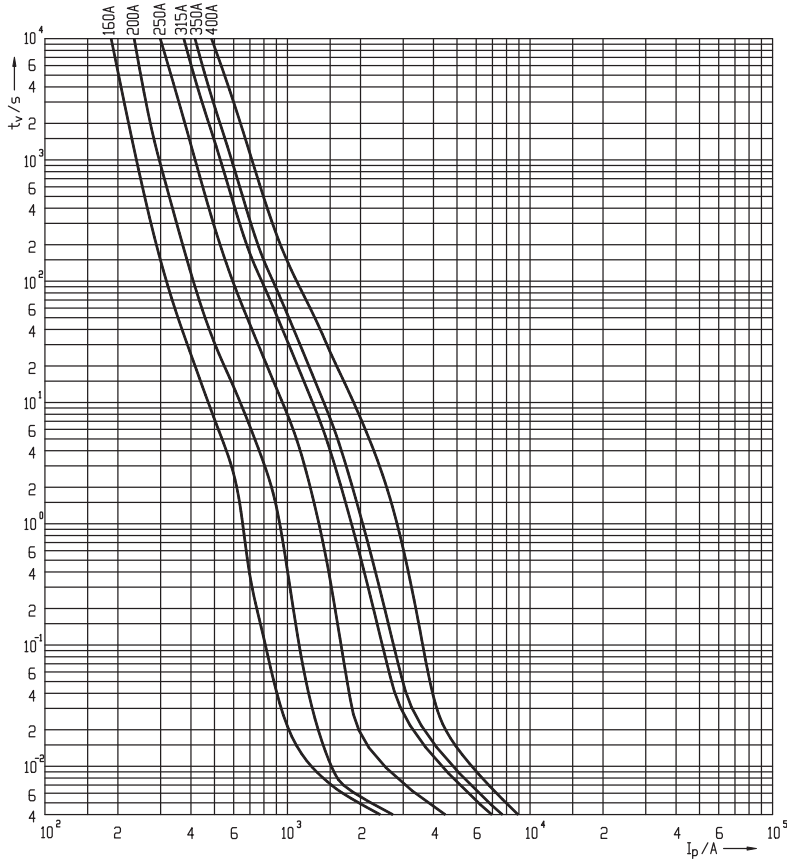
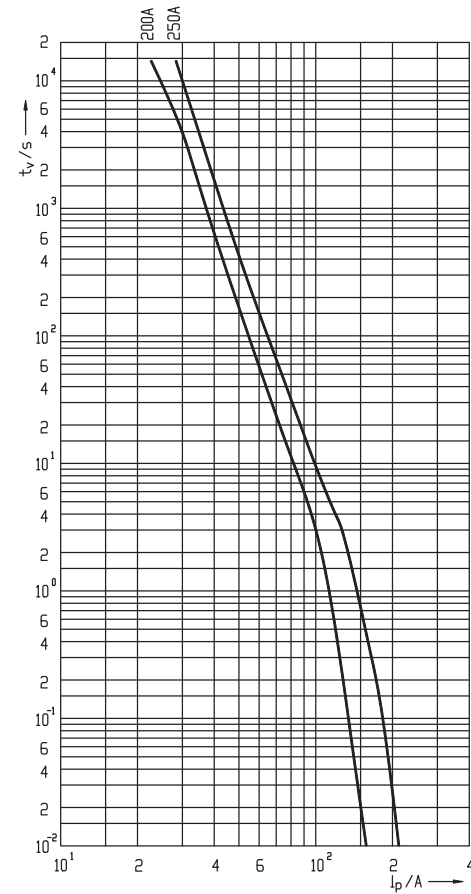
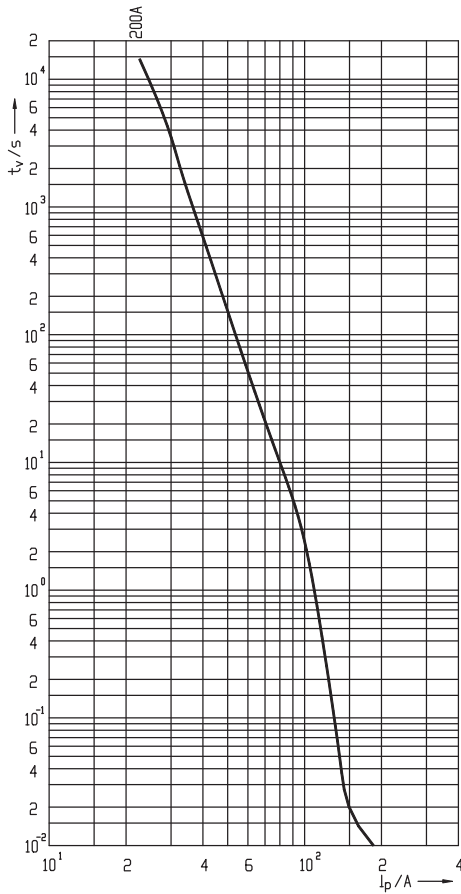
Size	A	B	C	D	E	F	L	N
1	135	24	42	51	51	67	70	74
2	150	30	48	61	61	71	70	74
3	150	37	60	73	73	87	70	74



PV Protection



NH TYPE BLADE FUSES



NH3 gPV 1000V t-I characteristics

PV Protection

NH TYPE BLADE FUSES



General Characteristics

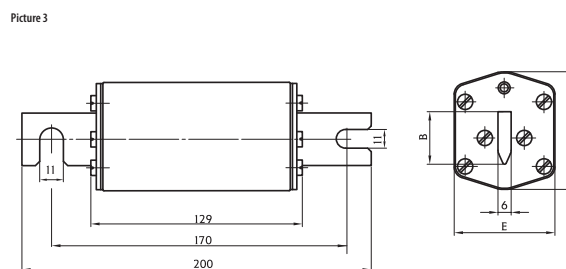
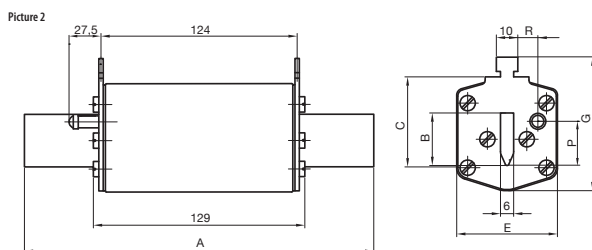
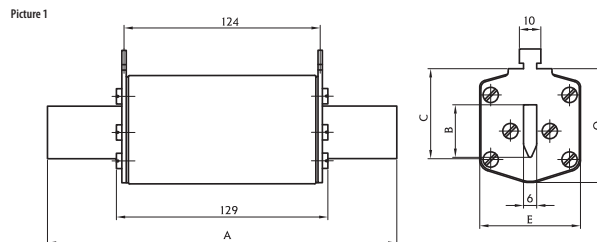
Rated Voltage 1100V DC L/R=5ms
 Breaking Capacity 10kA DC
 Standards IEC 60269-6 ed 1.0 (2010-9), IEC 60269-4

DC 1100V

Size	I _n [A]	gPV			PV (gR)		Power dissipation (0,7xI _n ²) P _d [W]	Power dissipation [W]	Pre-arcing Joule integral [I ² t] (L/R = 5ms)	Operating Joule integral [I ² t] (L/R = 5ms)	Weight [g]	Packaging [pcs]
		Standard indicator (pic.1)	Trip indicator - K (pic.2)	S ₁₇₀ screw contact (pic.3)	Standard indicator (pic.1)	Trip indicator - K (pic.2)						
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		

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

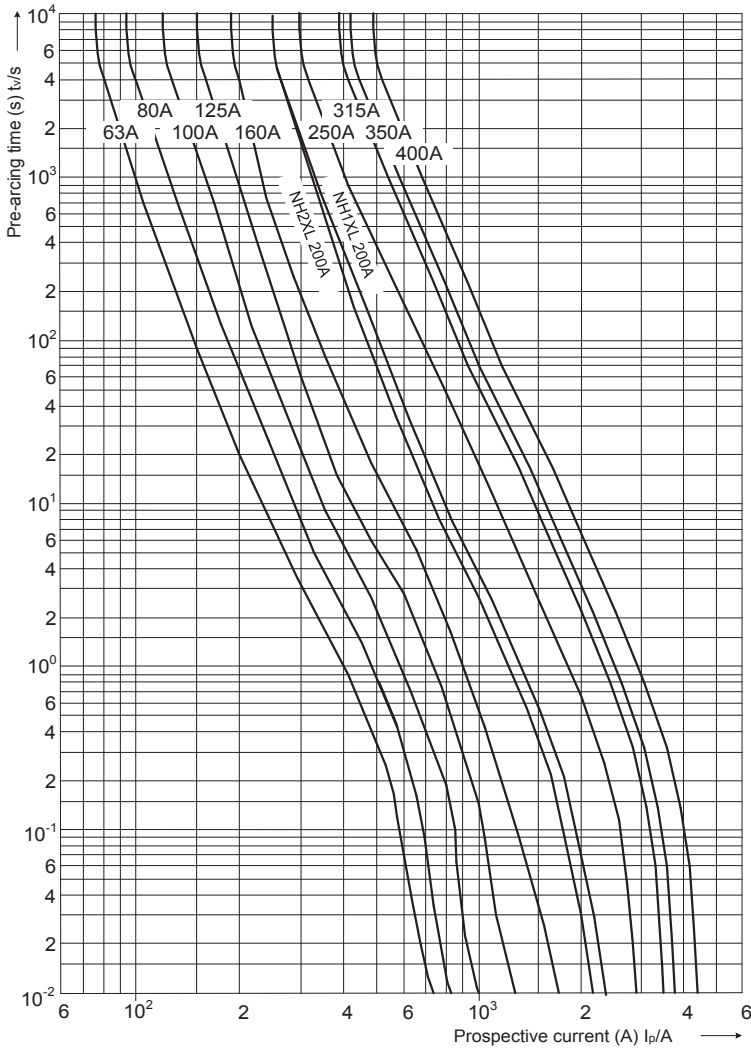
Size	Dimensions [mm]								
	A	B	C	E	G	P	R	M	O
1XL	194	24	40	46	61,5	20,5	13,7	50	52
2XL	209	30	48	54	71	27,3	16,2	59	61
*2XL (350A)	208	30	48	60	/	/	/	60	/
3L	209	37	60	64	82	35,6	17,0	70	74
*3L (450A, 500A, 630A)	209	37	60	73	/	/	/	73	77



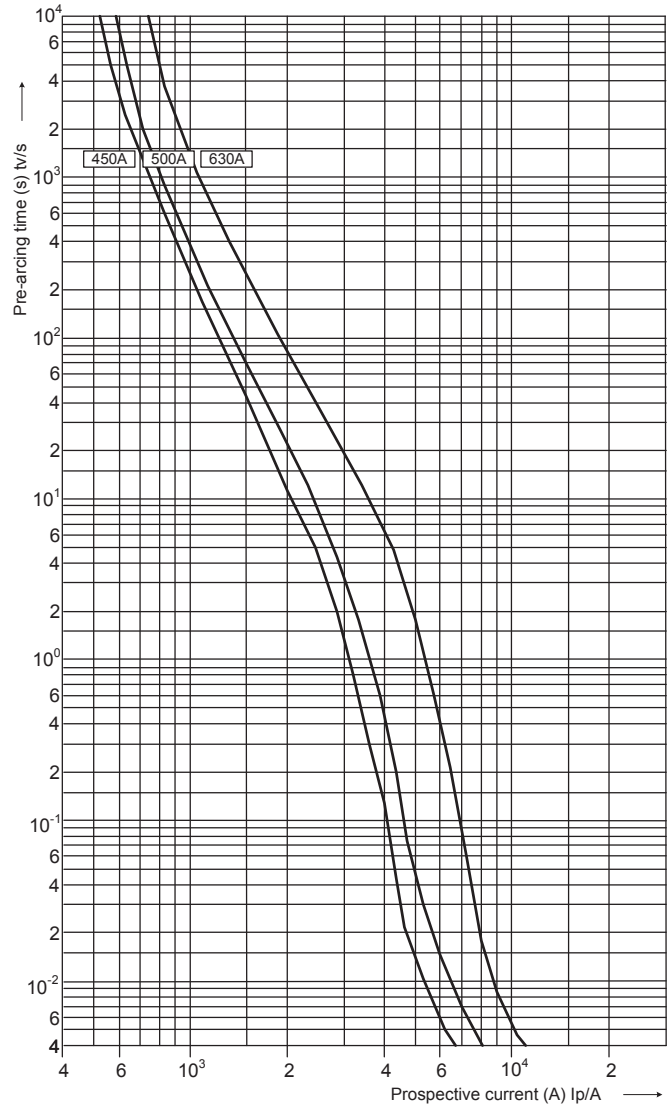
PV Protection



NH TYPE BLADE FUSES



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



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

PV Protection

NH TYPE BLADE FUSES



General Characteristics

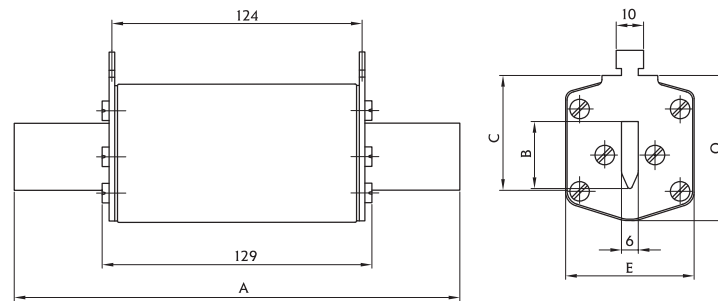
Rated Voltage 1100V DC L/R=2ms
 Breaking Capacity 10kA DC
 Standards UL 2579, UL 248-1

DC 1100V gPV

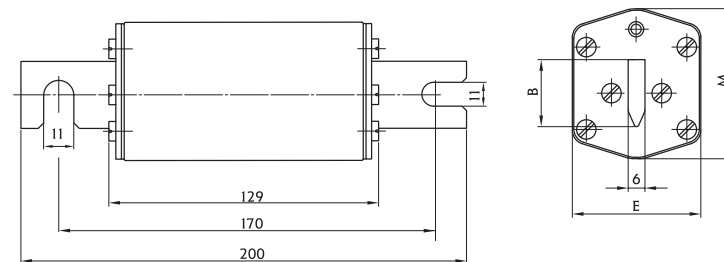
Size	I _n [A]	gPV			Power dissipation (0,7xI _n) P _d [W]	Power dissipation [W]	Pre-arcing Joule integral [I ² t] (L/R = 2ms)	Operating Joule integral [I ² t] (L/R = 2ms)	Weight [g]	Packaging [pcs]
		Standard indicator (pic.1)	S ₁₇₀ screw contact (pic.2)	U ₁₇₀ screw contact (pic.3)						
1XL	63	004110391	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		

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

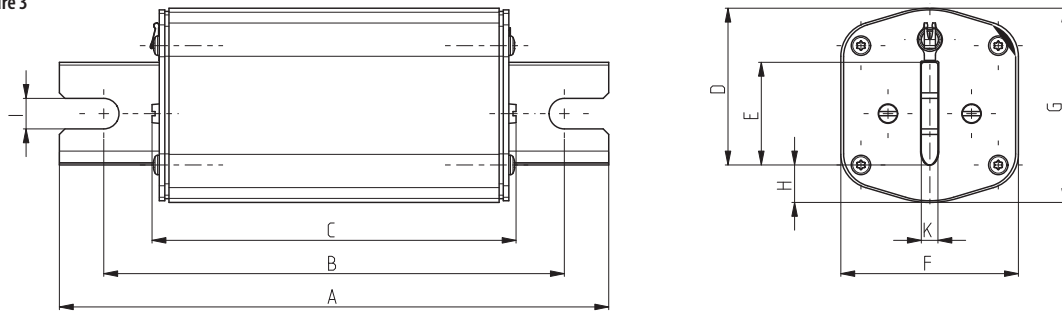


PV Protection

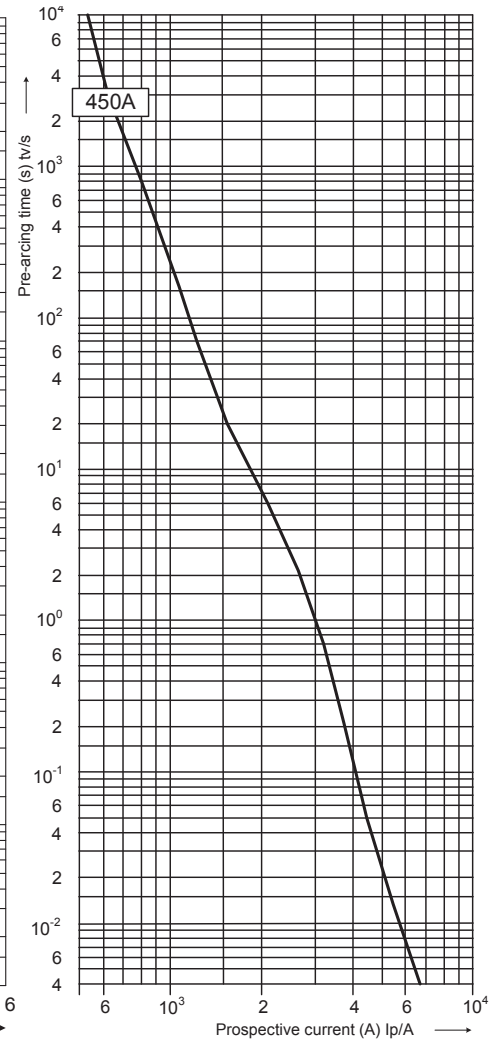
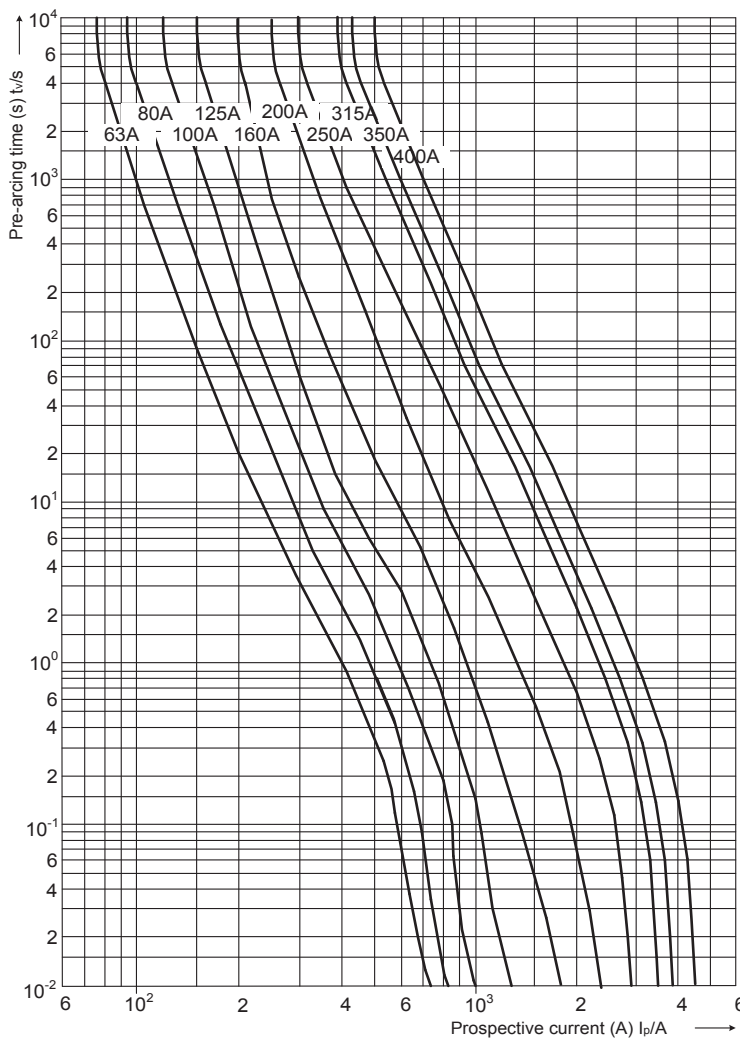
NH TYPE BLADE FUSES



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

PV Protection

NH TYPE BLADE FUSES

1500V



General Characteristics

Rated Voltage	1500V DC L/R=2ms
Breaking Capacity	10kA DC
Standards	IEC 60269-6 ed. 1.0, UL2579, UL248-1
Accessories	PK XL fuse base

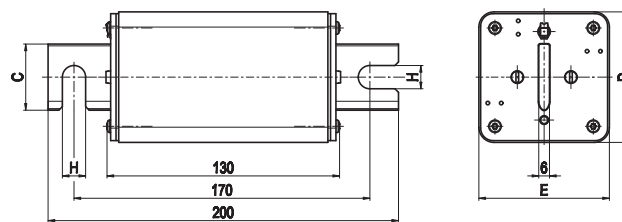


DC 1500V

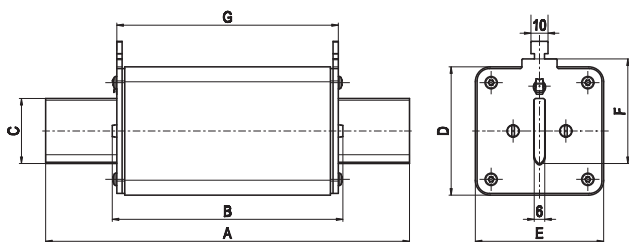
Size	I_n [A]	Standard indicator (pic.1)	S_{170} screw contact (pic.2)	U_{170} screw contact (pic.3)	Power dissipation ($0,7xI_n$) P_d [W]	Power dissipation [W]	Pre-arcing Joule integral [I^2t] (L/R = 2ms)	Operating Joule integral [I^2t] (L/R = 2ms)	Weight [g]	Packaging [pcs]
1XL	50	004110621	004110622	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		
3L	250	004110567	004110598	004110613	19,3	44	73.000	132.000	1970	1/9
	315	004110569	004110602	004110617	20,6	51	70.000	180.000		
	350	004110570	004110603	004110618	25,5	63	140.000	200.000		
	400	004110571	004110604	004110619	35	86	40.000	165.000		

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

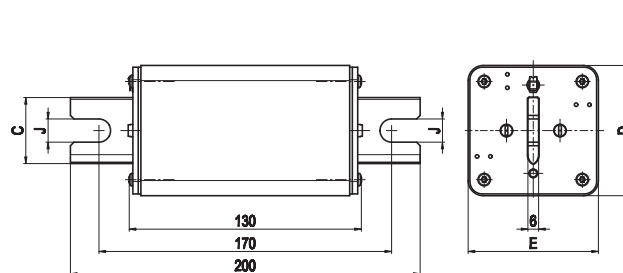
Picture 2



Picture 1



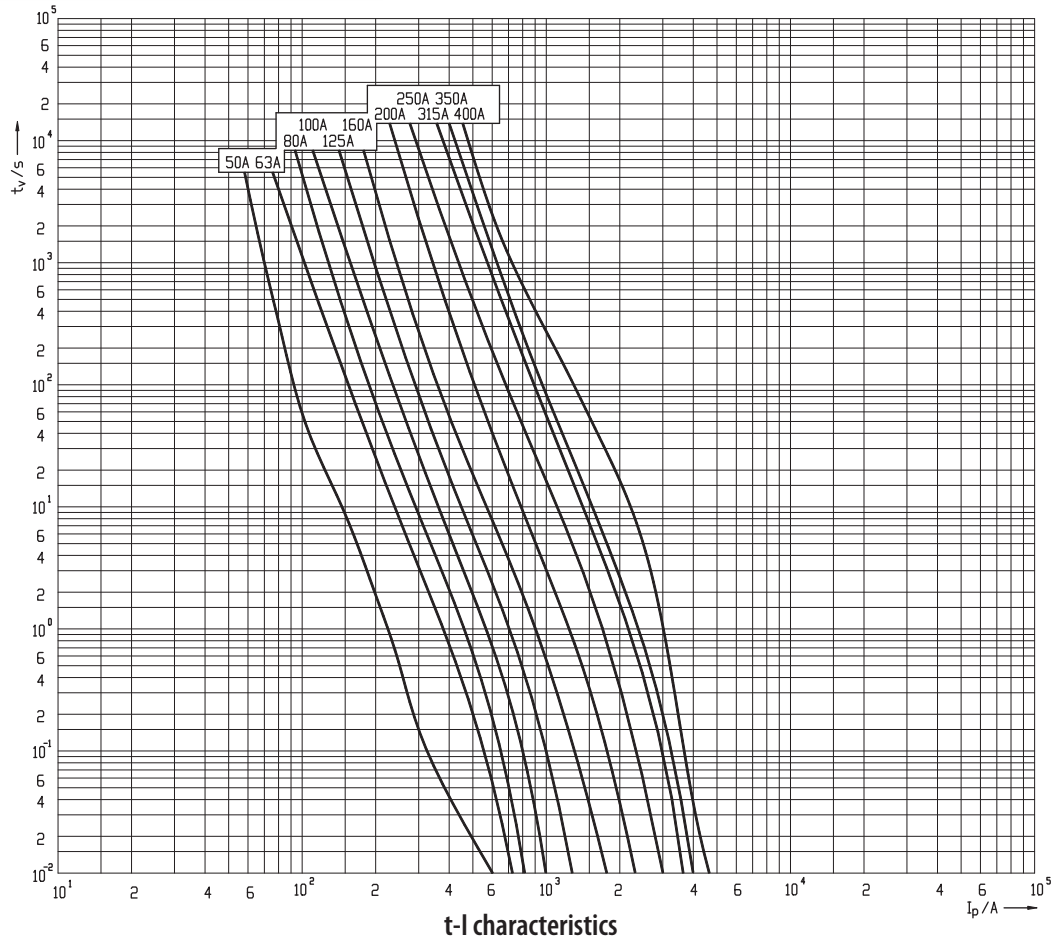
Picture 3



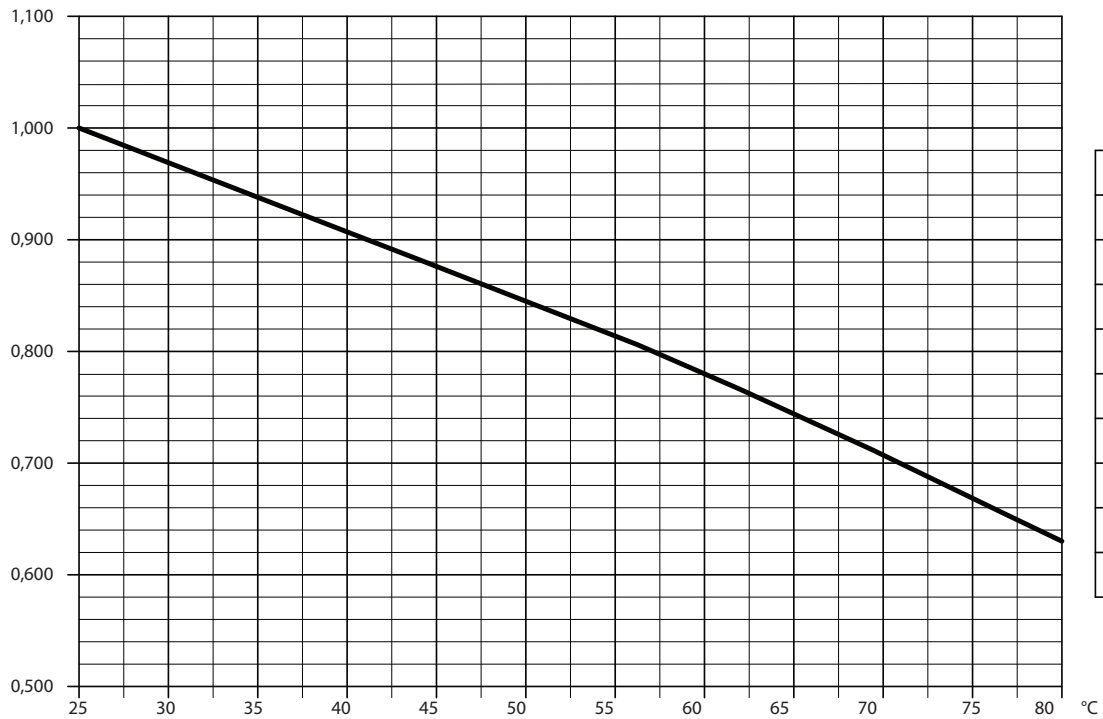
PV Protection



NH TYPE BLADE FUSES



A₁ Ambient temperature derating factor NH XL



PV Protection



FUSE BASES

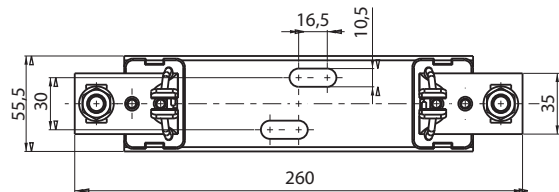
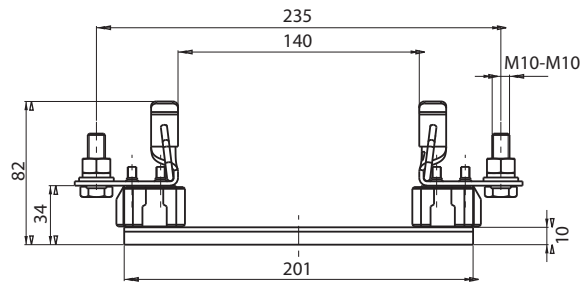
General Characteristics

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

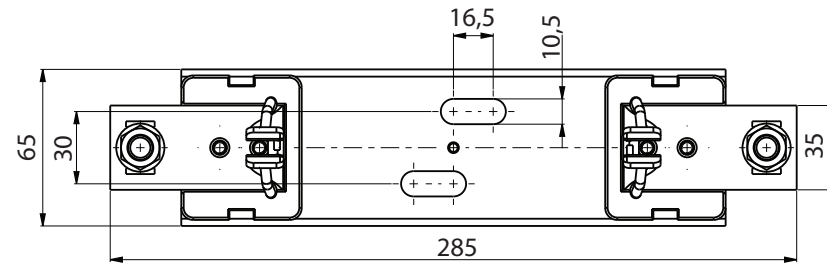
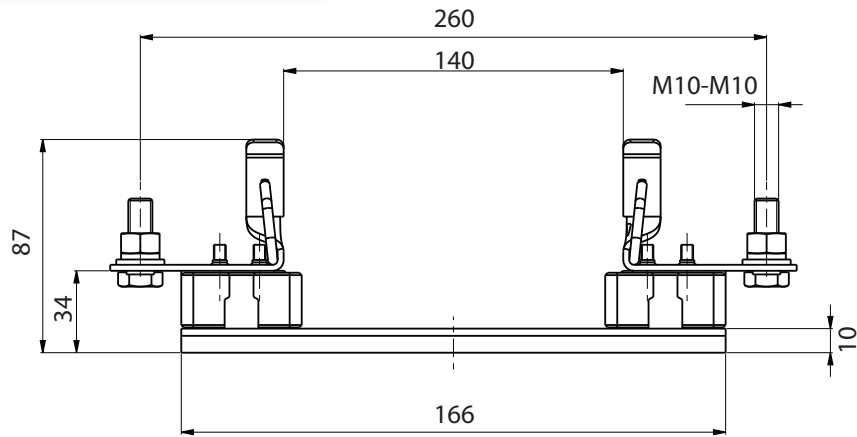


PK1XL

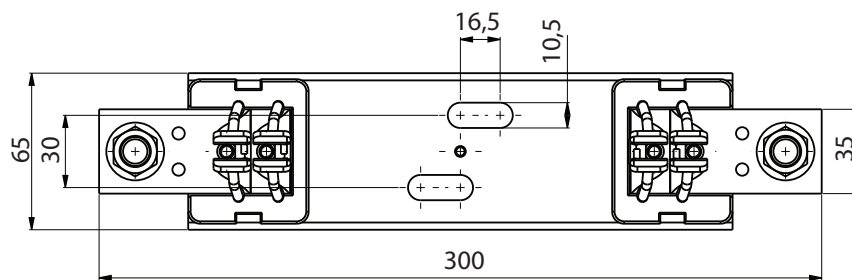
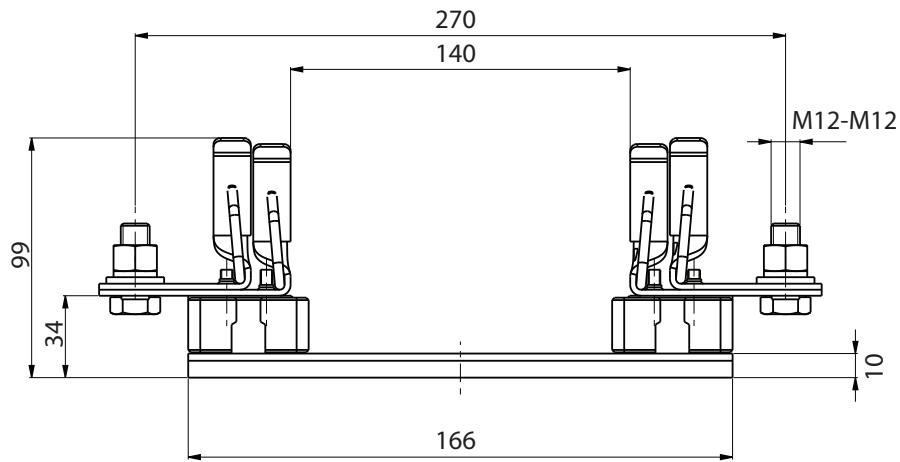
PV Protection



FUSE BASES



PK2XL



PK3L

PV Protection



FUSE BASES

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	M12
	Cable lug (DIN 46235)	mm ²	25-240	25-300
	Flat termination	mmxmm	30x10	40x10
	Rated torque	Nm	30-35	30-35
Cable terminal - Terminal				
	Cross-section	mm ²	KM2G	P32
	Rated torque	Nm		
Degree of protection - Front side, device fitted				
	Operating conditions	-	IP00	IP00
	Gripping lug cover A-U... (available separately) applied	-	IP2X	P2X
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	

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

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

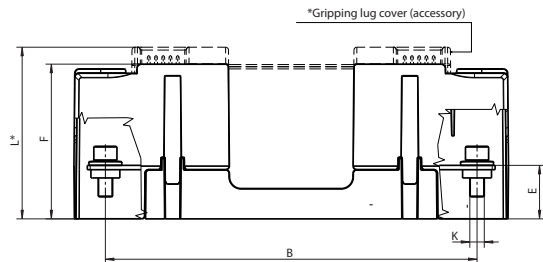
Fuse base U1...3/GZ/1500/H

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

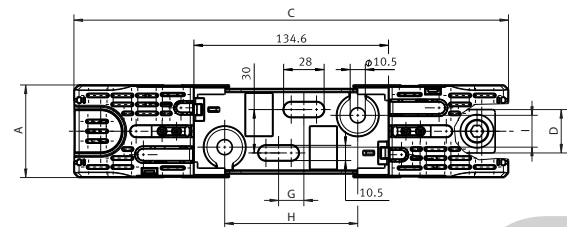


Accessories

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



PV Protection



FUSE BASES

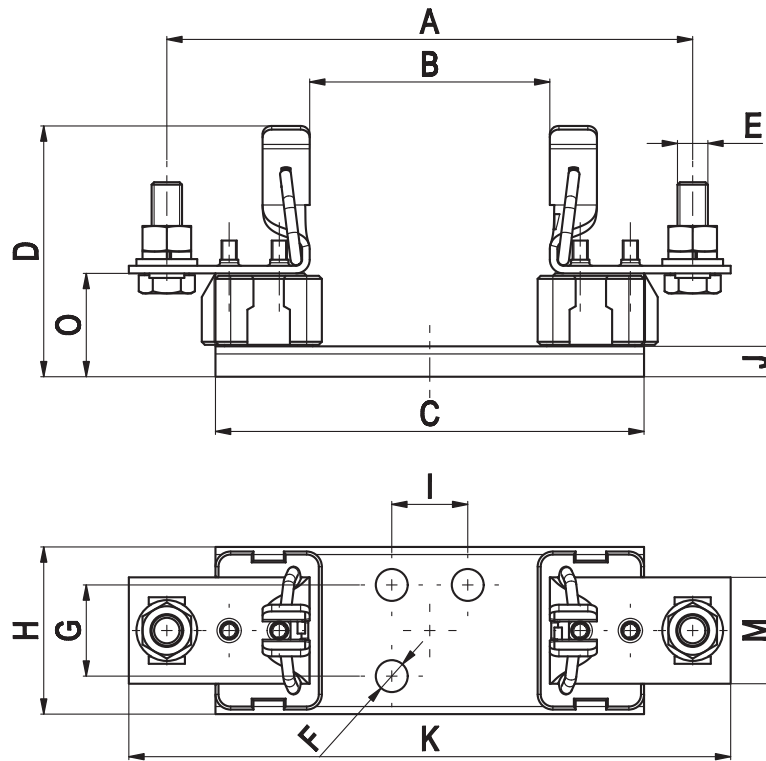
General Characteristics

Rated Voltage	1000V AC/DC
Rated Current	250kA, 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	UL 2579, UL 248-1



Fuse Base PK0, 1, 2, 3 DC

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

PV Protection



FUSE BASES

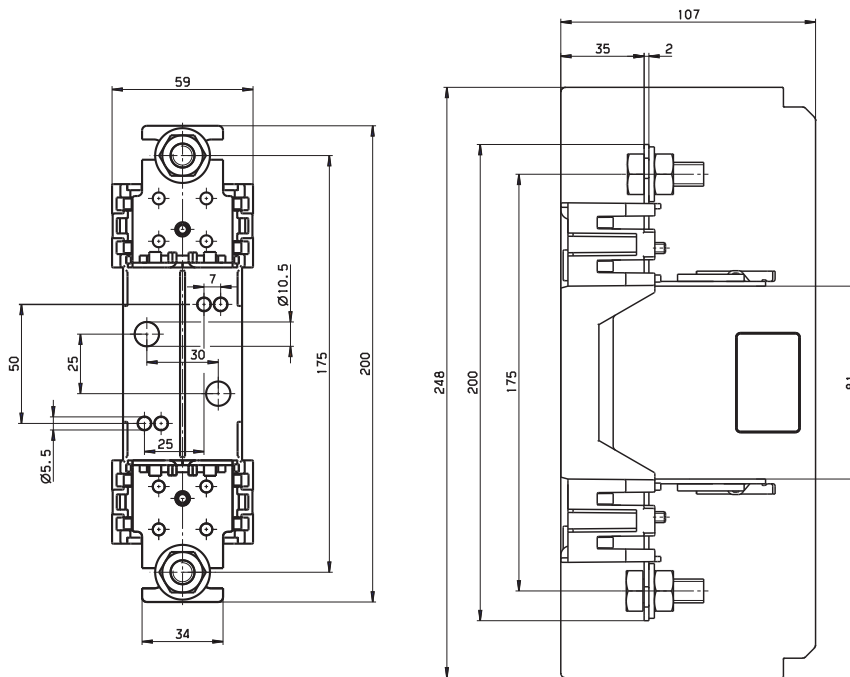
General Characteristics

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. Connec-tion (mm ²)	Weight [g]	Packaging [pcs]
U1-1/GZ/PV	160	004122035	150	387	1



PV Protection



FUSE DISCONNECTORS

General Characteristics

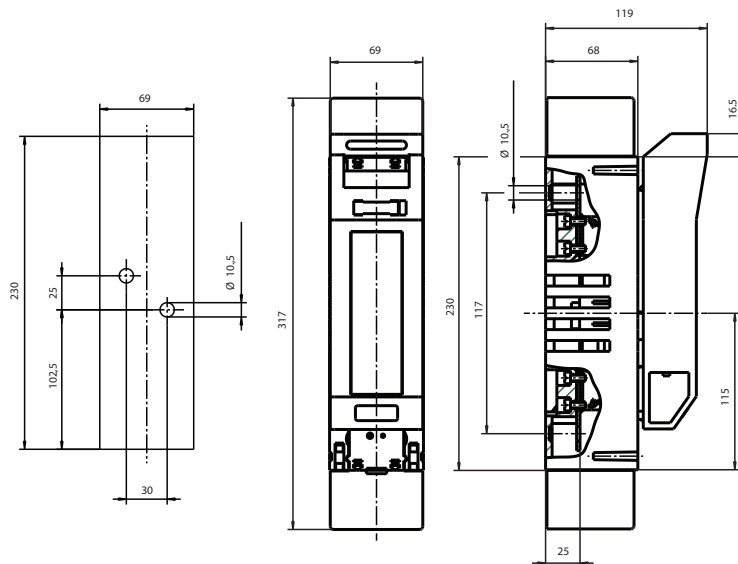
Number of poles		1
Rated voltage		1000V d.c.
Rated current		160A
Conv. free air thermal current with fuse-links		160A
Utilization category		DC-20B
Fuse-links	Size to DIN 43620	1C, 1
	Max. rated current (gL/gG)	160A
	Max. permis. power loss per fuse-link	25W
Cable terminal - Flat terminal	Screw	M10
	Cable lug (DIN 46235)	25-240 mm ²
	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



*350C normal temperature, 550C 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



PV Protection



FUSE DISCONNECTORS

General Characteristics

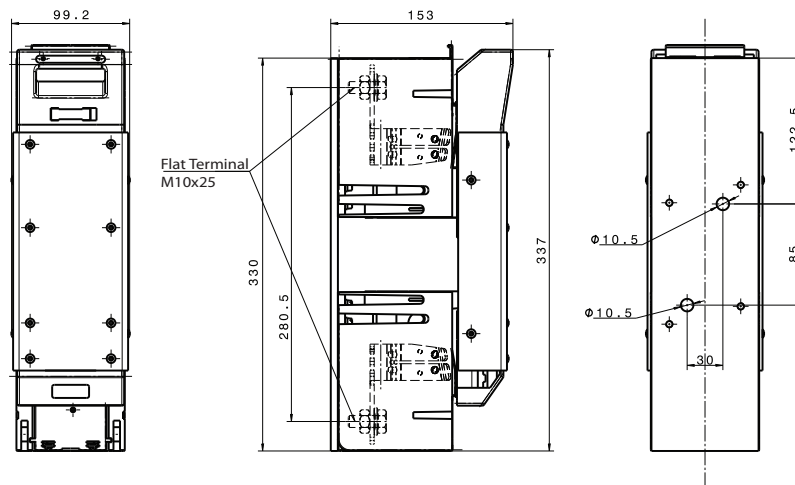
Type	TL1/1200V	TL3/1200V
For NH fuse-links/extended length/acc. to DIN VDE 0636-2	Size	
Rated voltage	1200V a.c. / 1000V d.c.	1200V a.c. / 1000V d.c.
Rated current	250A	630A
Fuse link size	1XL	2XL, 3L
Conv. free air thermal current with fuse-links	250A	630A
Conv. free air thermal current with solid links	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
	Flat bar	30x10 mm
	Rated torque	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



*350C normal temperature, 550C 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



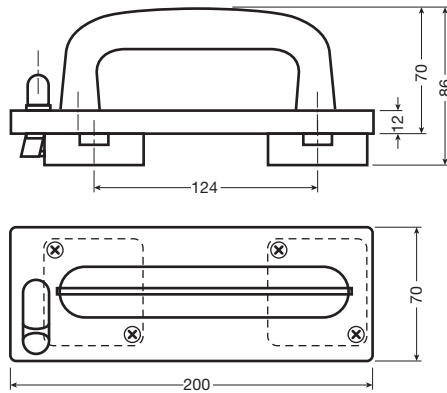
PV Protection



FUSE DISCONNECTORS

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

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



Relays for Photovoltaic Systems

RS35 and RS50

- Relays to control power in photovoltaic systems which generate electric energy
- Max. switching current: 35 A (version RS35); 50 A (version RS50)
- 5000 V / 10 mm reinforced insulation
- Contact gap > 1.75 mm • Holding power 0.1 W
- For PCB
- DC coils



RS35 DPST(2NO) DC coil. 35A

Part Number	Coil Voltage V DC	Coil resistance at 20 °C in Ω	Coil operating range		Coil data	Cover protection P40
			min. (at 20°C)	max. (at 55°C)		
RS35-3022-25-1012	12	300	9.00	24	DC	x
RS35-3022-25-1024	24	1200	18.00	48	DC	x
RS35-3022-25-1110	110	25000	82.50	220	DC	x

RS50 DPST(2NO) DC coil. 50A

Part Number	Coil Voltage V DC	Coil resistance at 20 °C in Ω	Coil operating range		Coil data	Cover protection P40
			min. (at 20°C)	max. (at 55°C)		
RS50-3022-25-1012	12	300	9.00	24	DC	x
RS50-3022-25-1024	24	1200	18.00	48	DC	x
RS50-3022-25-1110	110	25000	82.50	220	DC	x

Contact Altech for all of the specifications.

PV Protection



Cat. No.	Page	Cat. No.	Page	Cat. No.	Page	Cat. No.	Page	Cat. No.	Page
002461130	14	002625200	8	004110376	16	004110457	18	004110560	24
002461130	14	002625201	8	004110377	16	004110458	18	004110561	24
002540201	14	002625202	8	004110378	16	004110459	18	004110562	24
002540203	14	002625203	8	004110379	16	004110460	18	004110563	24
002540211	14	002625204	8	004110381	16	004110472	22	004110564	24
002540213	14	002625205	8	004110383	16	004110473	22	004110565	24
002540501	14	002625206	8	004110384	16	004110474	22	004110566	24
002540503	14	002625207	8	004110385	16	004110475	22	004110567	24
002540511	14	002625208	8	004110386	16	004110476	22	004110569	24
002540513	14	002625209	8	004110387	16	004110477	22	004110570	24
002560201	14	002625210	8	004110388	16	004110478	22	004110571	24
002560203	14	002625211	8	004110389	16	004110479	22	004110585	20
002560211	14	002625212	8	004110391	22	004110480	22	004110586	20
002560213	14	002625213	8	004110392	22	004110481	22	004110591	24
002625065	6	002625214	8	004110393	22	004110482	22	004110592	24
002625067	6	002625215	8	004110394	22	004110483	20	004110593	24
002625068	6	002625216	8	004110395	22	004110484	20	004110594	24
002625069	6	002625217	8	004110396	22	004110485	22	004110595	24
002625070	6	002625218	8	004110397	22	004110486	22	004110596	24
002625071	6	002625219	8	004110398	22	004110487	22	004110597	24
002625072	6	002625220	10	004110399	22	004110488	22	004110598	24
002625073	6	002625221	10	004110400	22	004110489	22	004110602	24
002625075	6	002625222	10	004110401	22	004110490	22	004110603	24
002625077	6	002625223	10	004110410	20	004110491	22	004110604	24
002625078	6	002625224	10	004110411	20	004110492	22	004110606	24
002625079	6	002625225	10	004110413	20	004110493	22	004110607	24
002625080	6	002625226	10	004110414	20	004110494	22	004110608	24
002625081	6	002625227	10	004110415	20	004110495	22	004110609	24
002625085	6	002625228	10	004110416	20	004110496	22	004110610	24
002625100	6	002625230	10	004110417	20	004110497	22	004110611	24
002625101	6	002625231	10	004110419	20	004110498	22	004110612	24
002625102	6	002625232	10	004110420	20	004110520	16	004110613	24
002625103	6	002625233	10	004110421	20	004110522	16	004110617	24
002625104	6	002625234	10	004110423	20	004110523	16	004110618	24
002625105	6	002625235	10	004110424	20	004110524	16	004110619	24
002625106	6	002625236	10	004110425	20	004110525	16	004110621	24
002625107	6	002625237	10	004110426	20	004110526	16	004110622	24
002625108	6	002625238	10	004110427	20	004110527	16	004110623	24
002625109	6	002625239	8	004110428	20	004110528	16	004122023	29
002625110	6	002625240	8	004110429	20	004110530	16	004122024	29
002625111	6	002625274	8	004110430	20	004110532	16	004122025	29
002625112	6	002625276	8	004110431	20	004110533	16	004122033	29
002625113	6	002625277	8	004110432	20	004110534	16	004122035	30
002625114	6	002625279	8	004110433	20	004110535	16	004122036	32
002625115	6	002625280	8	004110434	20	004110536	16	004122037	32
002625116	6	002625282	8	004110435	20	004110537	16	004122038	31
002625117	6	002625285	8	004110436	20	004110538	16	004122060	28
002625118	6	002625286	8	004110437	20	004110540	20	004122061	28
002625119	6	002625287	8	004110438	20	004110541	20	004122062	28
002625120	6	002625288	8	004110439	20	004110542	20	004122063	28
002625121	6	002637105	12	004110440	20	004110543	20	004122064	28
002625122	6	002637107	12	004110441	20	004110544	20	004122065	28
002625123	6	002637109	12	004110442	20	004110545	20	004132017	26
002625124	6	002637111	12	004110443	20	004110546	20	004132019	26
002625125	6	002637115	12	004110444	20	004110547	20	004132023	26
002625126	6	002637305	12	004110445	20	004110548	20	004941112	33
002625127	6	002637307	12	004110446	20	004110549	20	RS35-3022-25-1012	33
002625128	6	002637309	12	004110447	20	004110550	20	RS35-3022-25-1024	33
002625129	6	002637311	12	004110448	20	004110551	20	RS35-3022-25-1110	33
002625131	6	002637315	12	004110449	20	004110552	20	RS50-3022-25-1012	33
002625134	6	004110342	18	004110450	20	004110553	20	RS50-3022-25-1024	33
002625135	6	004110343	18	004110451	20	004110554	20	RS50-3022-25-1110	33
002625136	6	004110344	18	004110452	20	004110555	20		
002625137	6	004110371	16	004110453	20	004110556	20		
002625138	6	004110373	16	004110454	20	004110557	20		
002625139	6	004110374	16	004110455	18	004110558	20		
002625140	6	004110375	16	004110456	18	004110559	20		

Terms & Conditions

TITLE - Title to the products of ALTECH shall remain with ALTECH until payment is made in full by Customer. Such reservation of title is for the purpose of securing the purchase price and shall not relieve Customer of the duty to inspect the products upon receipt, to notify ALTECH of any deficiencies or defects, and to exercise due care in the use, installation, operation, and maintenance of the products when on the premise of the Customer or under the control of the Customer. Notwithstanding any reservation of title by ALTECH, risk of loss shall pass to customer at any time of shipment.

SHIPMENT AND DELIVERY - All orders for destination in the mainland United States (less Hawaii, Alaska and non-continental United States possessions) will be shipped F.O.B. Flemington, N.J. All destination, shipping and other charges shall be paid by the Customer in accordance with ALTECH's then current shipping and billing practices.

Delivery dates given in the acceptance of any order are approximate. ALTECH shall not be liable for delays in delivery or in performance due to causes beyond its reasonable control including acts of God, acts of Customer, acts of civil or military authority, fires, strikes or other labor disturbances, war, riot or delays in transportation. In the event of such delay, the date of delivery or performance shall be extended for a period equal to the time lost by reason of the delay.

PRICE - PRICES in any ALTECH publication are subject to change without prior notification. Catalog prices are based on prices published in the current price list. All written quotations are valid for thirty (30) days from the date of quotation. Customer shall pay all sales, use, excise or similar taxes whenever ALTECH must itself pay and/or collect such tax from Customer arising out of the sale.

PAYMENT - Customer agrees to make payment within thirty (30) days of date of the invoice from ALTECH. Customer agrees to pay a late payment charge of one and one-half percent (1.5% per month, or the maximum late payment charge permitted by applicable law, whichever is less, on any unpaid amount for each calendar month (or fraction thereof) that such payment is in default. Orders amounting to less than \$100.00 will be billed at \$100.00 plus freight. Full carton purchases are required. In the event of referral to an attorney for collection, reasonable attorney's fees for collection of the overdue amount shall be paid by Customer. In the event payment is not received within 30 days from the date of invoice, any discount shall be cancelled and the full list price will be due.

LIMITED WARRANTY - ALTECH warrants to Customer that the equipment purchases shall be free from defects in material and workmanship under normal use and service for a period of one year from shipment.

Written notice as an explanation of the circumstances of any claim that the equipment has proved defective in material or workmanship shall be given promptly by the Customer to ALTECH.

ALTECH will not be liable for any misuse, improper operations, improper installation, improper maintenance, alteration, modification, accident or unusual degradation of the equipment or parts due to an unsuitable installation environment.

No representation of other affirmation of facts, including but not limited to statements regarding capacity, suitability for use or performance of the equipment, shall be or be deemed to be a warranty or representation by ALTECH for any purpose, nor give rise to any liability or obligation of ALTECH whatsoever.

Customer's sole and exclusive remedy in the event of breach of warranty, as set forth herein, is expressly limited to (1) the correction of the defect by adjustment, repair, modification, or replacement, or (2) issuance of a credit or refund of the purchase price for the defective equipment at ALTECH's election and sole expense.

EXCEPT AS SPECIFICALLY PROVIDED IN THIS AGREEMENT, THERE ARE NO OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

THIS WARRANTY EXTENDS ONLY TO THE CUSTOMER FROM ALTECH OR ITS AUTHORIZED DISTRIBUTOR.

LIMITATION OF LIABILITY - IN NO EVENT, SHALL ALTECH BE LIABLE FOR LOSS OF PROFITS, INDIRECT, SPECIAL, CONSEQUENTIAL OR OTHER SIMILAR DAMAGES ARISING OUT OF ANY BREACH OF THIS AGREEMENT OR OBLIGATIONS UNDER THE AGREEMENT.

ALTECH SHALL NOT BE LIABLE FOR ANY DAMAGES CAUSED BY DELAY IN SHIPMENT, INSTALLATION OR FURNISHING OF EQUIPMENT OR SERVICES UNDER THIS AGREEMENT.

No action arising out of any claimed breach of this Agreement may be brought by either party more than two (2) years after the cause of action has accrued.

PATENT INDEMNITY - ALTECH shall defend or settle any suit or proceeding brought against Customer based on a claim that any equipment made to ALTECH design and furnished hereunder constitutes an infringement of any existing United States patent, provided (ALTECH) is notified promptly in writing and is given complete authorization and information required for the defense, and ALTECH shall pay all damages and costs awarded against Customer, but shall not be responsible for any costs, expense or compromise incurred or made by Customer without ALTECH's prior written consent. If any equipment is in ALTECH's opinion likely to or does become the subject of a claim for patent infringement, ALTECH may at its option and expense procure for Customer the right to continue using the device, modify it to become non-infringing, but in the event ALTECH is not reasonably able to modify, substitute, or otherwise procure for Customer the right to continue using it, ALTECH will remove such equipment and refund to Customer the amount paid in excess of a reasonable rental for past use.

ALTECH shall not be liable for any infringement or claim based upon use of the equipment in combination with other equipment not supplied by ALTECH or with modifications made by Customer.

The foregoing states the entire liability of ALTECH to Customer arising from patent infringement.

SELLER'S REMEDIES - Should Customer fail to make any payment within ten (10) days of its due date, or fail to perform any other of the Customer's obligation hereunder upon thirty (30) days written notice, or should Customer be or become insolvent or be a party to any bankruptcy receivership proceeding prior to full payment of all amounts payable hereunder, ALTECH may: (a) with or without demand or notice to customer declare the entire amount unpaid immediately due and payable; (b) enter upon the premises where the equipment may be found and remove it (Customer shall assemble the equipment and make it available to ALTECH at a place reasonably convenient to both parties and shall permit and assist ALTECH in effecting the retaking and removal of the equipment); and (c) sell any or all the equipment as permitted under applicable law, applying the proceeds of the sale to payment of the expenses of retaking, repairing and selling the equipment, reasonable attorney fees and to the satisfaction of all indebtedness then due and unpaid under this Agreement. Any surplus shall be paid to Customer and any deficiency shall be paid to ALTECH by Customer.

The remedies provided herein shall be cumulative and in addition to all other remedies provided by law or equity or under the Uniform Commercial Code.

GOVERNING LAW - This agreement will be governed by the Laws of the State of New Jersey.

GENERAL - This Agreement shall only become effective and binding when either (a) it has been accepted and executed by an authorized representative of ALTECH, or (b) the equipment has been shipped to Customer, with or without acceptance in writing hereon. Notice of acceptance is hereby waived by Customer. Customer hereby acknowledges receipt of a true and complete copy hereof.

No addition to or modification of any of the Terms and Conditions of Sale as they appear herein shall be binding upon ALTECH unless signed in writing by duly authorized representative of ALTECH in Flemington, N.J.

Typographical and clerical errors in quotations, orders and acknowledgments are subject to correction.

This Agreement is not assignable without the prior written consent of ALTECH. Any attempt to assign any of the rights, duties or obligations of this Agreement without such consent is void.

If any provision or provisions of this Agreement shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability, of the remaining provisions shall not in any way be affected or impaired thereby.

ALTECH is not responsible for failure to fulfill its obligation under this Agreement due to causes beyond its control, or except as agreed herein.

THE CUSTOMER ACKNOWLEDGES THAT HE HAS READ THE AGREEMENT, UNDERSTANDS IT, AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS. FURTHERMORE, THE CUSTOMER AGREES THAT IT IS THE COMPLETE AND EXCLUSIVE STATEMENT OF THE AGREEMENT BETWEEN THE PARTIES, WHICH SUPERSEDES ALL PROPOSALS OR PRIOR AGREEMENTS, ORAL OR WRITTEN, EXPRESSED OR IMPLIED, AND ALL OTHER COMMUNICATIONS BETWEEN THE PARTIES RELATING TO THE SUBJECT MATTER OF THIS AGREEMENT.

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