

E 90 range of fuse disconnectors for the North American Market Uncompromising performance

Designing simplicity

ABB competence serving the most demanding customers

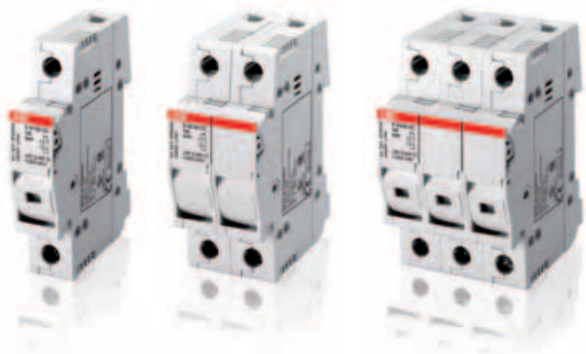


Suitability for disconnection and switching, effective heat dissipation and certified compliance with several international standards are mandatory requirements to meet the needs of the most demanding customers. ABB has dedicated its designers' passion, competence and creativity to the development of E 90 new range of disconnectors and fuseholders specifically thought to satisfy the needs of the North American markets. This results in a range of fuseholders that includes both PV use and combination with class CC fuses, certified according to the most outstanding marks and approvals of the North American's market.

The new ABB standard Certified according to the most important North American marks



A passport to the world.
International quality marks and UL certification make
E 90 the ideal range for designers and manufacturers
of switchboards and installations “without frontiers.”



E 90 range for the NAM

Designed by ABB for the most demanding customers



Industrial automation

E 90 fuse switch disconnectors

- One module per pole
- Versions 1, 1N, 2, 3, 3N, 4
- AC-22B according to IEC 60947-3
- Rated current 32 A
- Rated voltage 400 V AC-22B and 690 V AC-20B
- Can be equipped with 10.3 x 38 mm aM and gG fuses
- Designed for isolation and switching under load and for protection of secondary circuits of industrial plants
- All the versions are available with optical blown fuse indicator
- Compatible with ABB busbars of S 200 series and Unifix plug-in system
- cURus certification





Industrial automation E 930 fuse disconnectors

- Versions 1, 1N, 2, 3, 3N
- Certified according to IEC 60947-3
- Rated current 50 A and 125 A
- Rated voltage 690 V AC/DC according to IEC and 750V AC/DC according to UL
- Can be equipped with 14 x 51 mm and 22 x 58 mm aM and gG fuses
- Designed for protecting industrial circuits
- UR and CSA certification



E 90 range for the NAM

Designed by ABB for the most demanding customers

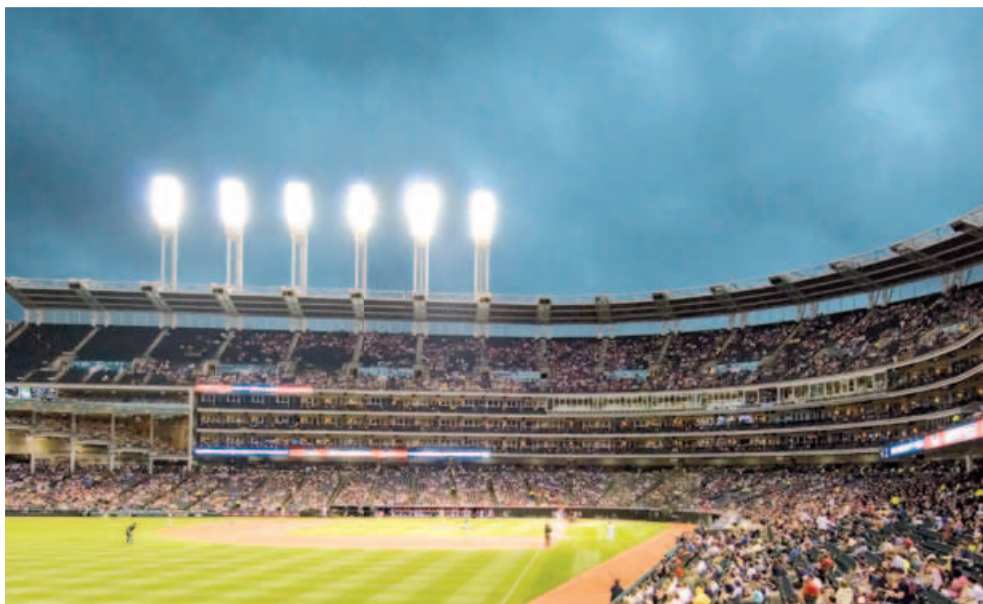


Photovoltaic installations

E 90 PV fuse disconnectors

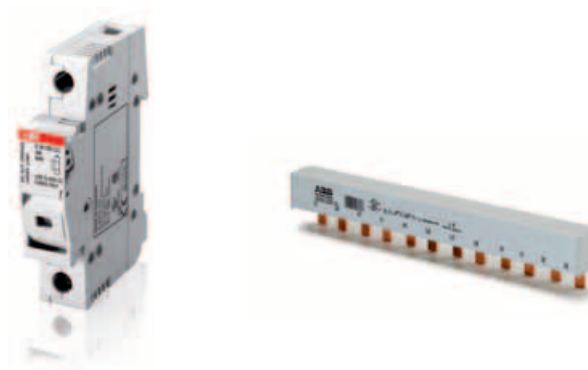
- One module per pole
- 1 and 2-pole versions
- DC-20B according to IEC 60947-3
- Rated current 32 A
- Rated voltage 1000 V DC
- Can be equipped with 10.3 x 38 mm gPV fuses
- Designed for isolation and protection of circuits in photovoltaic installations up to 1000 V DC
- All the versions are available with optical blown fuse indicator
- Certified according to UL 4248-18
- Compatible with UL-508 busbars





For the North American market E 90 CC fuseholders

- One module per pole
- Versions 1, 1N, 2, 3, 3N, 4 poles
- Rated current 30 A
- Rated voltage 600 V AC/DC
- Can be equipped with Class CC fuses
- Specifically designed for North American market
- All the versions are available with optical blown fuse indicator
- Certified according to UL 4248-4
- Compatible with UL-508 busbars
- Rejection member feature according to UL 4248-4



Choosing the best ABB experience sets a new leading-edge performance standard

Tip-top performance

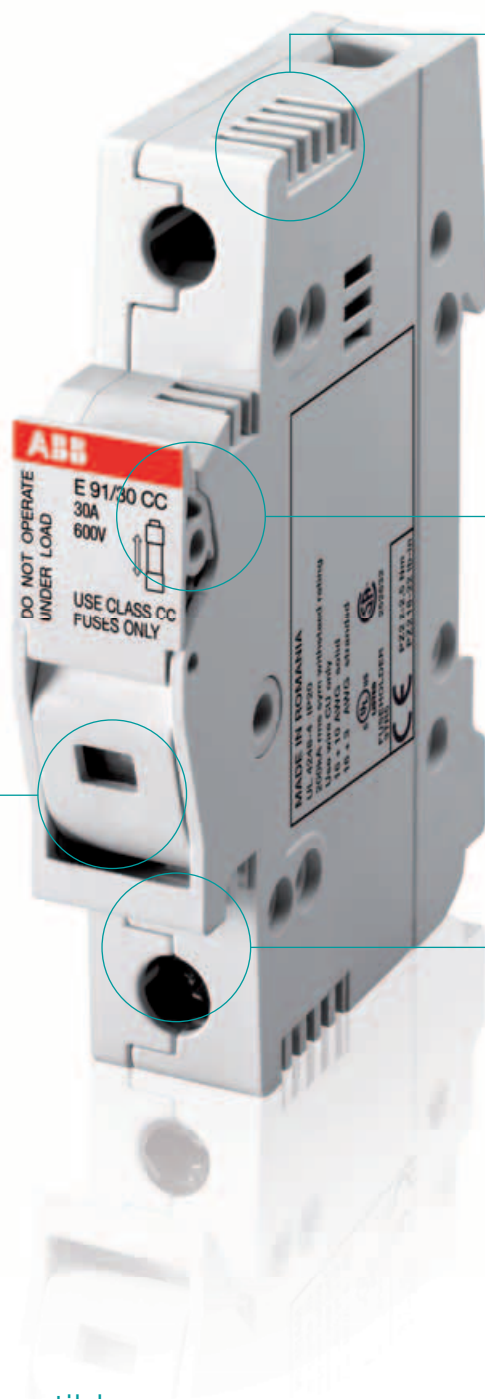
E 90 fuseholders can be used in any applications where you need to ensure electrical protection and isolation.

The technology solutions applied to reduce power dissipation help to minimize module heating.

Completeness

The fuse tripping can be easily displayed, thanks to the special blown fuse indicator light.

Ease of installation.
E 90 fuseholders are fully compatible with the Unifix-L wiring system



Reliability

Venting grooves and cooling chambers improve heat dissipation even in multiple-pole configurations. The reduced operating temperature inside fuseholders ensures durability and reliability of the devices over time.

Compactness

When open, the drawer projection is only 17 mm more than in the normal closed position.

The compact dimensions enable to close the switchboard door even when the fuseholder is open, thus ensuring total safety during maintenance. 1P+N versions in one module only and 3P+N in three modules only are available.

Universal use

Screw holes have increased diameter to accommodate insulated screwdrivers and electric screwdrivers. In addition, with the Pozidrive PZ2 screws tightening can be performed by exerting less torque than conventional screws, and the same electric screwdriver can be used for all terminals. Moreover, the PS connection busbars facilitate the connecting operations, making the wiring both simple and safe and providing complete integration with S 200 and SN 201 System pro M compact® circuit-breakers.

E 90 safe and smart range is designed for quick, flexible and error-proof installation, to ease the everyday use of devices. Thanks to its unique features, E 90 series sets a new safety standard.

Reliable connections

Wide terminals allow the use of cables with section up to 25 mm², whereas the antivibration knurling on the terminal cages ensures safe and reliable connections.

Rejection Member function

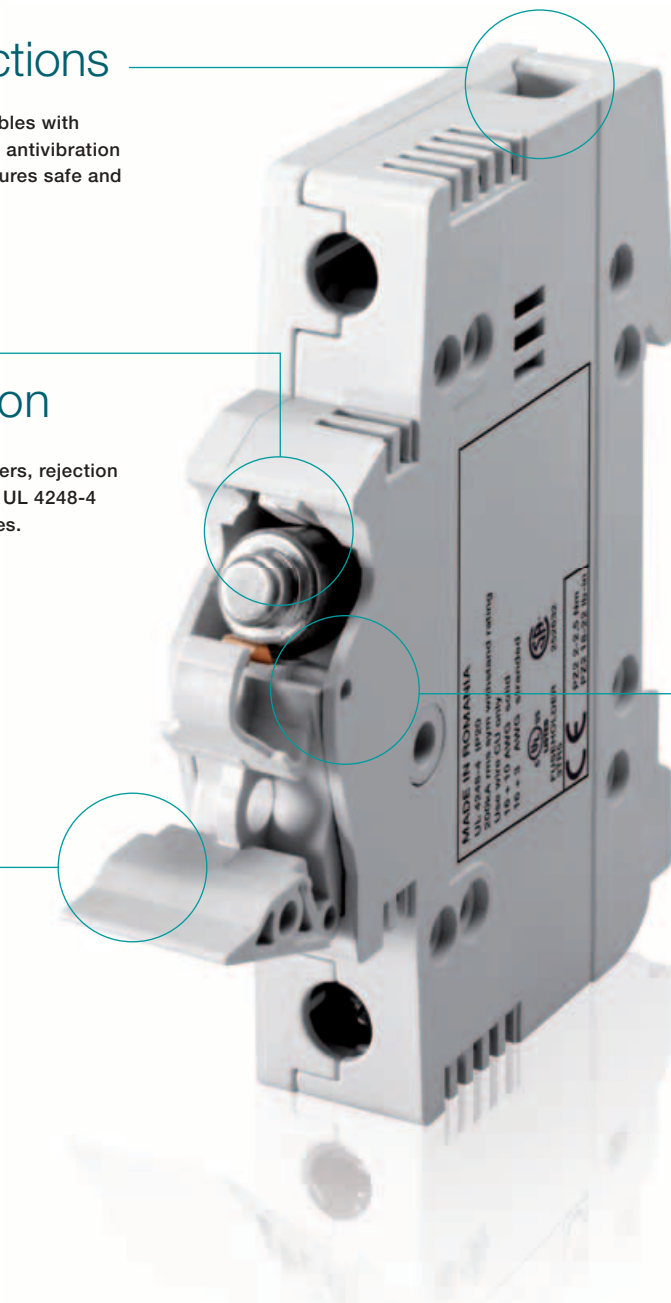
For E 90/30 CC range of fuseholders, rejection member functionality according to UL 4248-4 in order to insert just class CC fuses.

Ease of use

Fuseholder profile has been designed for maximum ease of use: the 90° flip hinge with ergonomic knob, makes the replacement of fuses easier even in small spaces or when wearing protective gloves.

Environmental protection.

The fuseholders are compliant with RoHS (Restriction of Hazardous Substances) European directive, which prohibits the use of hazardous substances in the manufacture of electrical and electronic equipment.



Safety

To ensure protection and safety during maintenance operations and avoid any accidental switching, fuseholders can be sealed in closed position, and padlocked in open position. The protection degree is IP20 when the unit is installed behind the switchboard slotting.

Smart protection for installations with E 90s

The first fuse disconnecter for photovoltaic installations with optical blown fuse indicator. It efficiently monitors DC installations up to 1000 V

Flexible:

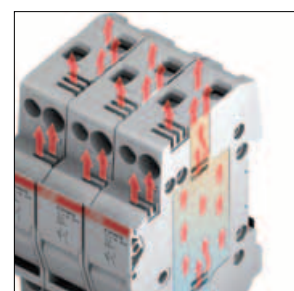
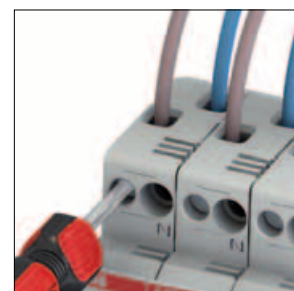
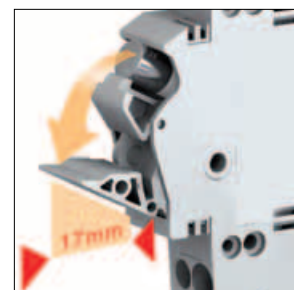
E 90 CC: 24 to 600 V operation in AC networks. Can be powered from both the load side and the supply side
E 90 PV: 24 to 1000 V operation in DC networks with upstream supply

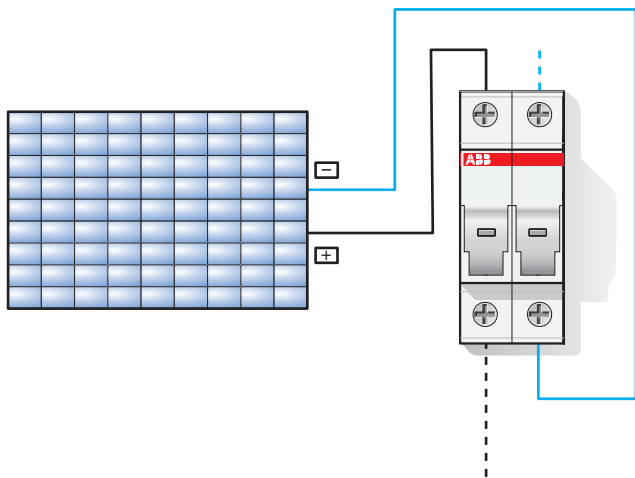
Simple:

No need for auxiliary supply or specific wiring

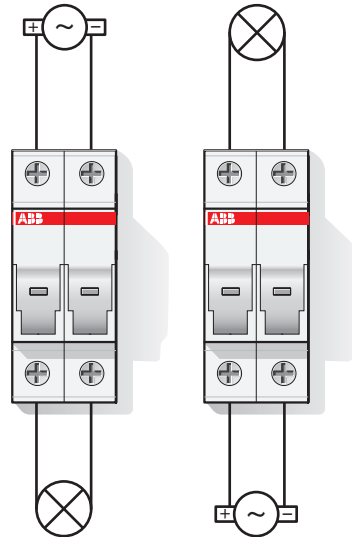
Effective:

Local fuse tripping signal
Allows the faulty phase to be immediately detected





Wiring diagram for DC networks



Wiring diagram for AC networks

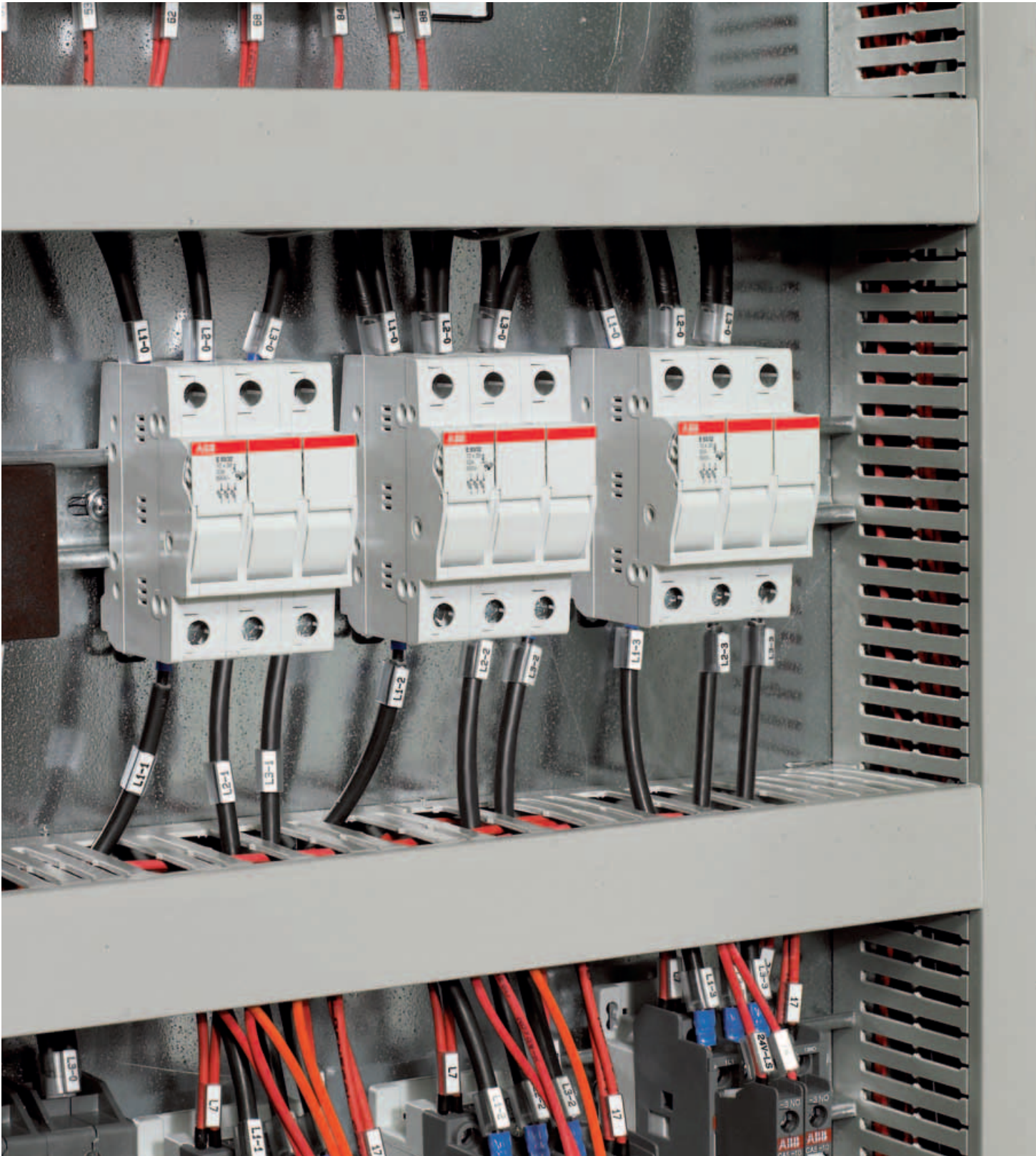
E 90 Wizard

E 90 Wizard is an APP to easily select fuse and fuse holder codes in few simple steps wherever you are.

E 90 Wizard helps you to select ABB codes for E 90 and E 9F series for all the applications: industrial, residential, photovoltaic and North American markets. In few taps E 90 Wizard can provide you the right code, listing you technical characteristics and documentation links. Available for Iphone and Android.



Results you can trust High performance of E 90 fuse disconnectors



E 90 protection and control

A range developed for automation and industry

Applications

- Automation switchboards
- On-board switchboards
- OEM

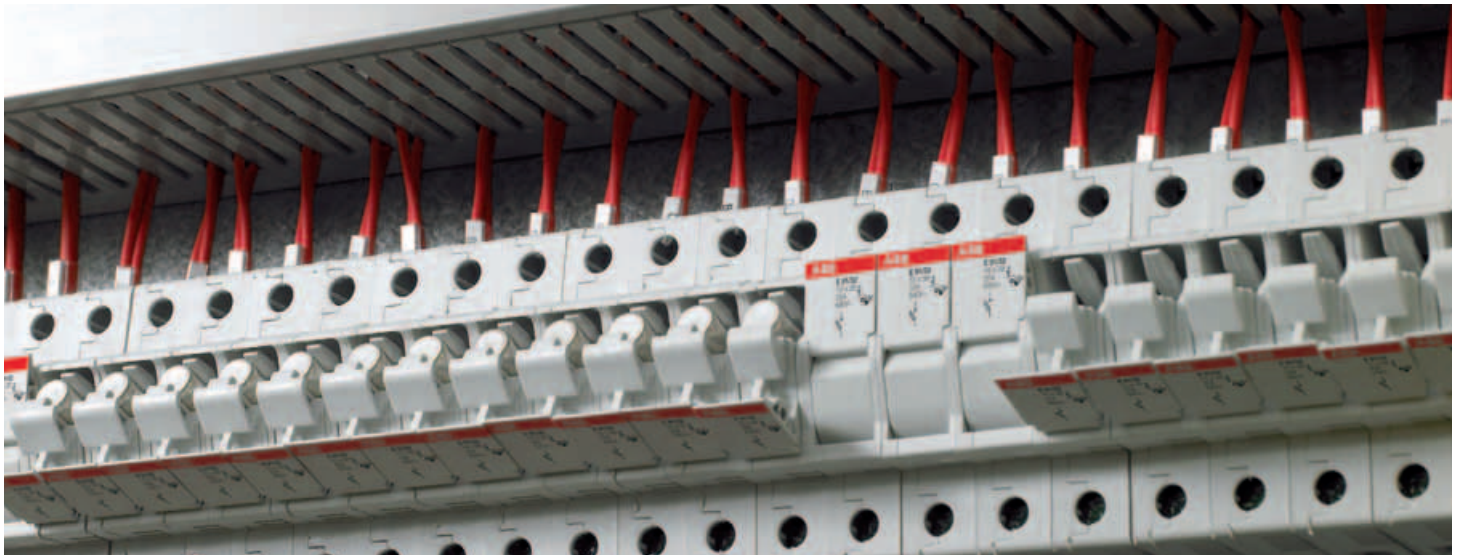
Main functions:

- Protection of terminal circuits
- Switching of loads, even inductive
- Selectivity



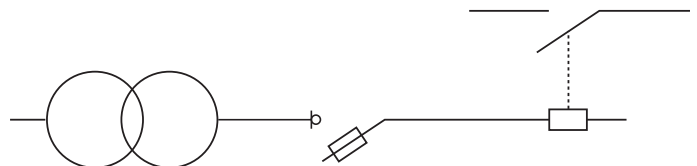
E 90 fuse disconnectors are designed for switching under load, ensuring isolation and protection against short circuit and overload, in compliance with the IEC 60947-3 Standard.

E 90 range is designed to comply with the strictest requirements of OEMs and panel builders. They are ideally installed in industrial automation switchboards to protect secondary circuits, primary and secondary of transformers, motors and other resistive or inductive loads. Due to the AC-22B utilization category, according to the IEC 60947-3 Standard, E 90 fuse disconnectors are convenient, simple and reliable devices for loads switching and protection. Fuse disconnectors ensure selectivity, if equipped with appropriate fuses. Since they are uURus type-approved, they can be installed in UL-certified machines designed for the American market.



Application example

Here you can find a typical industrial control application. According to IEC 60364-1 Standard, the secondary winding of a control transformer must be protected against short circuits and overload. The transformer provides dedicated 230 V AC power supply to a battery of industrial contactors.



E 90 PV fuse disconnectors for photovoltaic applications Designed for industry professionals



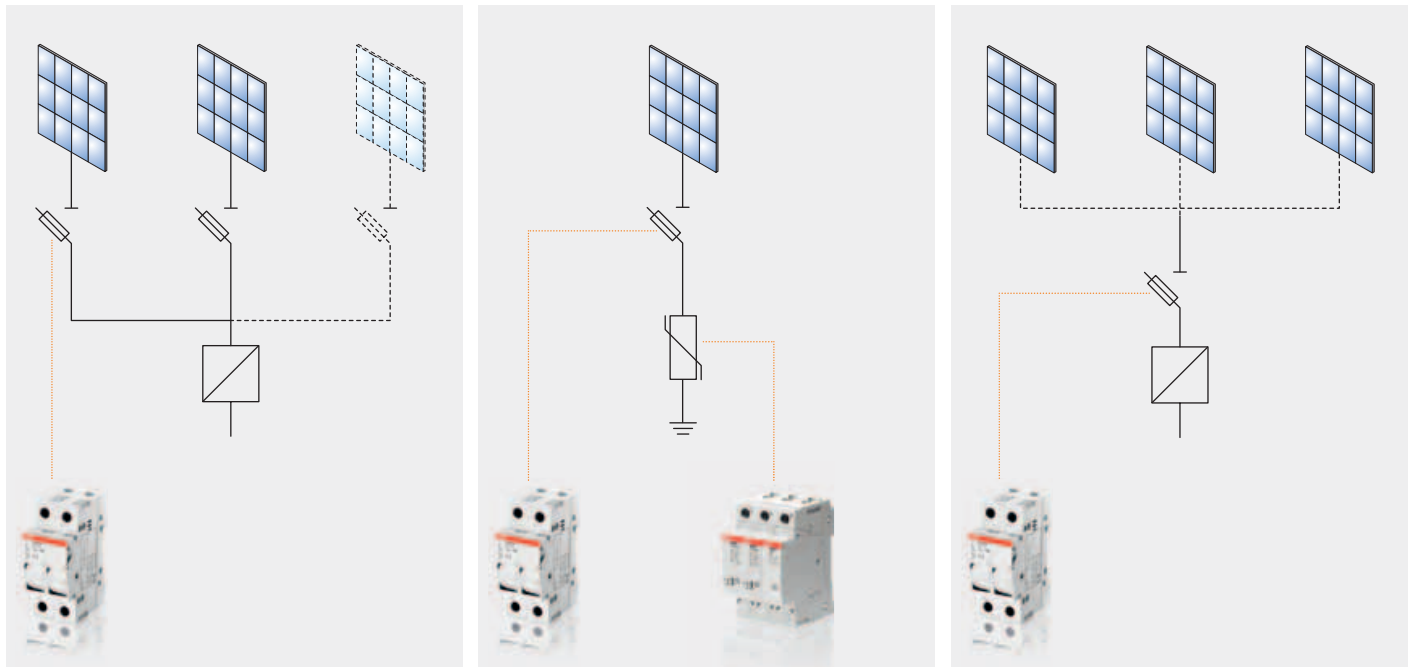
Features

- For 10.3 x 38 mm fuses
- Rated voltage 1000 V DC
- Rated current 32 A
- Reference standards:
UL 4248-18

E 90 PV fuse disconnectors have been specifically designed for photovoltaic applications. Thanks to their rated voltage up to 1000 V DC they are the ideal solution for protecting cells, inverters or surge arresters. In case of maintenance, they ensure isolation of circuits and strings up to 1000 V in direct current, in total safety.



Isolation and protection of strings up to 1000 V



Application examples

String protection

To prevent damage to the equipment in the direct current lines of photovoltaic installations and ensure that it remains **isolated** when maintenance work is performed, E 90 PV fuse disconnectors can be installed downstream of the inverter so as to protect each string. The fuses must be selected to suit the rated current of the line, up to 32 A.

Surge arrester back-up

When the Icc short-circuit current at the installation point exceeds 100 A DC, **OVR PV** surge arresters require back-up protection with a specific gR-type fuse.

DC side of the inverter

In small photovoltaic installations, E 90 PV fuse disconnectors can be used to protect the direct current side of the inverter. Fuse cartridges should be selected according to the inverter rated current.

Quality speaks American E 90 CC fuseholders, designed for the North American market

Features

- UL Listed according to UL 4248-1 and UL 4248-4
- Can be equipped only with Class CC fuses
- Rated voltage 600 V AC/DC
- Rated current 30 A
- Versions 1, 1N, 2, 3, 3N, 4 poles
- Rejection member to allow just the insertion of a class CC fuse



E 90 CC range has been designed to comply with North American market regulations and to enable worldwide manufacturers to sell their equipment in conformity with safety requirements also in these countries.

Class CC fuses have limiting characteristics dedicated to terminal protection of components and apparatuses against short-term overloads and to protect motor against short-circuit. Maximum rated current of a Class CC fuse is 30 A, whereas the maximum rated voltage is 600 V. The breaking capacity reaches 200 kA. The limiting properties of the Class CC fuses are particularly appreciated in the North American market, allowing suitable protection even of equipment with limited resistance to short-circuit. The use of Class CC fuses is continuously increasing in the American market, since the safety and reliability prescriptions of end users have become stricter and do not tolerate any permanent damage to motor starts.



E 930 fuse disconnectors

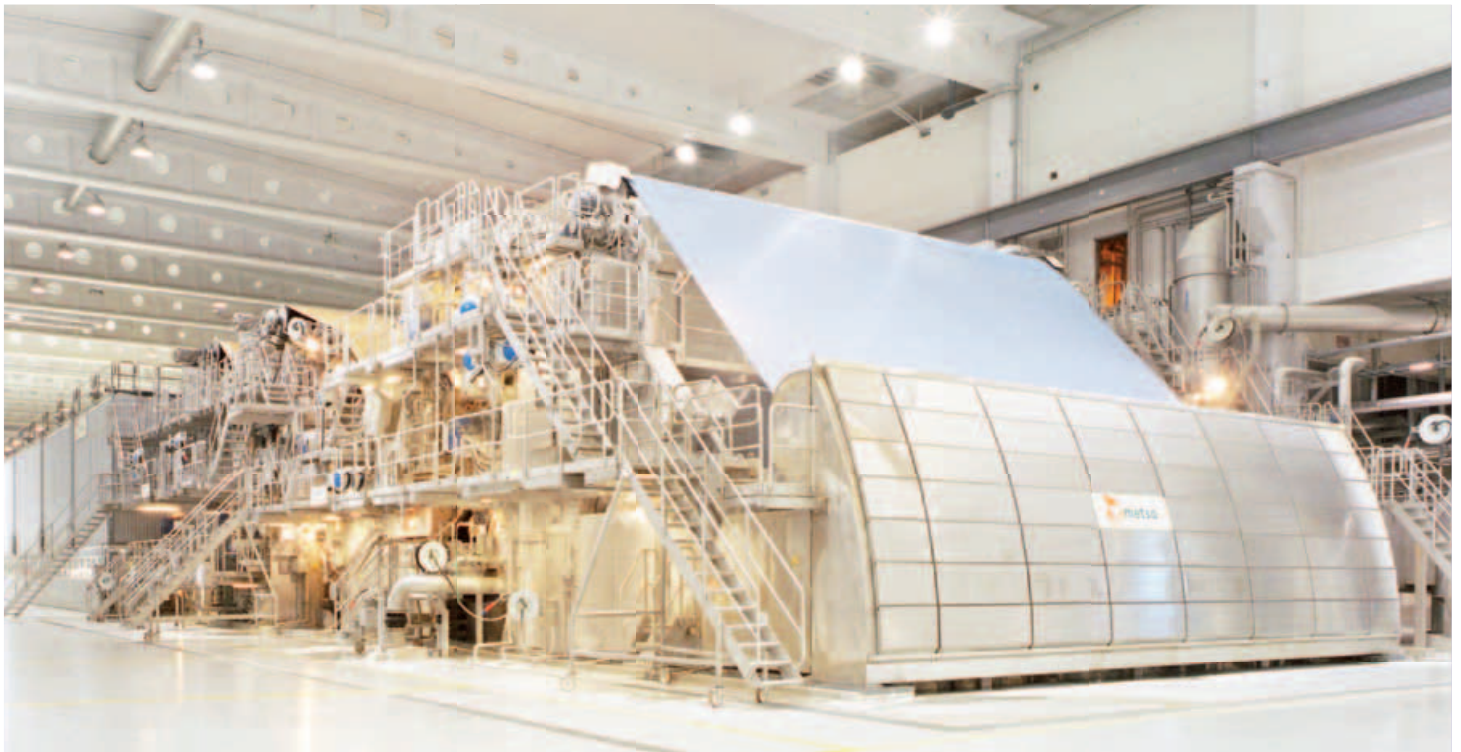
Protection for industrial circuits

Features

- For 14x51 and 22x58 mm fuses
- 690 V AC/DC according to IEC and 750V AC/DC according to UL
- UR and CSA type-approved

E 930 fuse disconnectors are specifically designed for protecting industrial circuits thanks to aM and gG cylindrical fuses with 50 A and 125 A ratings.

E 930 range can be padlocked in the open position to ensure safety for operators performing maintenance work. E 930 fuse disconnectors can be used up to 690 V AC/DC according to IEC and up to 750 V AC/DC according to UL, since they are UL recognized. Available versions: 1P, 1P+N, 2P, 3P and 3P+N.



Technical data

E 90 series for North American Market

Data according to IEC



Type		E 90/32	E 930/50	E 930/125
Rated current	A	32	50	125
Type of current		AC	AC/DC	
Fuse	mm	10 x 38	14 x 51	22 x 58
Max power dissipation accepted	W	3	5	9.5
Rated frequency	Hz	/ 50-60	= / 50-60	
Tightening torque	Nm	PZ2 2-2.5	PZ2 3.5	PZ2 4
Protection degree		IP20	IP20	
Terminals' section	mm ²	25	35	50
Cross section rigid copper conductors	mm ²	1.5 - 25	2.5 - 35	4 - 50
Cross section stranded copper conductors	mm ²	1.5 - 16	2.5 - 25	4 - 35
Padlockable (when open)		■		■
Sealable (when closed)		■		■
Altitude	m	2000		—
Voltage range for LED indicator light		24 - 1000 AC/DC (only s version)		
IEC 60947-3				
Utilization category		AC-22B	AC-20B	AC-20B / DC-20B
Rated voltage	V	400	690	690

Marks and approvals	E 90/32	E 930/50	E 930/125
IMQ	■ * 1)		
NF	■ ** 1)		
CCC - Cina	■ * 1)		
cURus	■ 2)		
UR			■
CSA			■
RINA	■ * 1)		
LLOYD	■ * 1)		
BV	■ 1)		■
GOST - Russia	■		■
GOST - Ukraina	■		■

*= without LED version

**= no neutral and without LED version

1) = certified AC-22B at 400V in compliance with IEC 60947-3

2) = certified at 600V in compliance with UL 4248-4

3) = certified at 1000V in compliance with UL 4248-18

Data according to UL normative

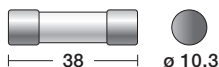
Type		E 90/30	E 90/32 PV
Rated current	A	30	32
Rated Voltage	V	600	1000
Type of current		a.c/d.c	d.c
Fuse		class CC	10x38
Breaking capacity	kA	200	50
Rated frequency	Hz	= / 60	=
Tightening torque	lb-in	PZ2 18-22	PZ2 18-22
	Nm	PZ2 2-2.5	PZ2 2-2.5
Protection degree		IP20	IP20
Terminals' section	mm ²	25	25
Cross section solid copper conductors	AWG	16÷10	n.a.
Cross section stranded copper conductors	AWG	16÷3	8÷3
Padlockable (when open)		■	■
Sealable (when closed)		■	■
Marks and approvals			
		E 90/30	E 90/32 PV
UL			■ ¹⁾
cULus		■	
CSA		■	■ ²⁾

1) = certified at 1000V in compliance with UL 4248-18

2) = on going certification

Order codes

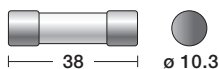
E 90 series for North American Market



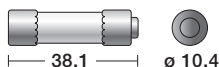
Poles	Rated current	Modules	Bbn 8012542 EAN	Type code	Order code	Piece weight kg	Pack unit pcs
E 90 fuse disconnectors for 10.3 x 38 mm fuses							
1	32	1	009238	E 91/32	2CSM200923R1801	0.061	6
1	32	1	024835	E 91/32s*	2CSM202483R1801	0.062	6
1+N	32	2	008934	E 91N/32	2CSM200893R1801	0.130	3
1+N	32	2	515036	E 91N/32s*	2CSM251503R1801	0.131	3
2	32	2	008835	E 92/32	2CSM200883R1801	0.122	3
2	32	2	514930	E 92/32s*	2CSM251493R1801	0.123	3
3	32	3	047537	E 93/32	2CSM204753R1801	0.183	2
3	32	3	020639	E 93/32s*	2CSM202063R1801	0.184	2
3+N	32	4	047339	E 93N/32	2CSM204733R1801	0.252	1
3+N	32	4	514831	E 93N/32s*	2CSM251483R1801	0.254	1
4	32	4	047230	E 94/32	2CSM204723R1801	0.244	1
4	32	4	020530	E 94/32s*	2CSM202053R1801	0.245	1

The most widely used codes are in green

*s: version with blown fuse indicator



E 90 PV fuse disconnectors for 10.3 x 38 mm fuses for DC							
1	32	1	047131	E 91/32 PV	2CSM204713R1801	0.061	6
1	32	1	046936	E 91/32 PVs*	2CSM204693R1801	0.062	6
2	32	2	047032	E 92/32 PV	2CSM204703R1801	0.122	3
2	32	2	569138	E 92/32 PVs*	2CSM256913R1801	0.122	3

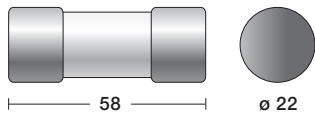
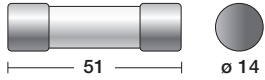


E 90 CC fuseholders for Class CC 10.4 x 38.1 mm fuses							
1	30	1	998723	E 91/30 CC	2CSM299872R1801	0.061	6
1	30	1	998822	E 91/30 CCs*	2CSM299882R1801	0.062	6
1+N	30	2	998921	E 91N/30 CC	2CSM299892R1801	0.130	3
1+N	30	2	999027	E 91N/30 CCs*	2CSM299902R1801	0.131	3
2	30	2	999126	E 92/30 CC	2CSM299912R1801	0.122	3
2	30	2	999225	E 92/30 CCs*	2CSM299922R1801	0.123	3
3	30	3	999324	E 93/30 CC	2CSM299932R1801	0.183	2
3	30	3	999423	E 93/30 CCs*	2CSM299942R1801	0.184	2
3+N	30	4	999522	E 93N/30 CC	2CSM299952R1801	0.252	1
3+N	30	4	999621	E 93N/30 CCs*	2CSM299962R1801	0.253	1
4	30	4	999720	E 94/30 CC	2CSM299972R1801	0.244	1
4	30	4	999829	E 94/30 CCs*	2CSM299982R1801	0.245	1

*s: version with blown fuse indication indicator

Order codes

E 930 series

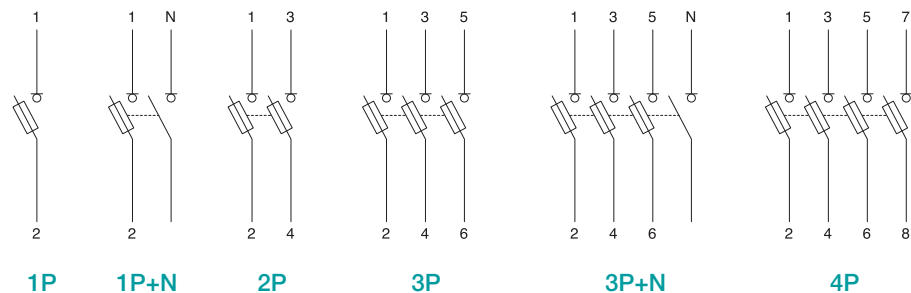


Poles	Rated current	Modules	Bbn 8012542 EAN	Type code	Order code	Piece weight kg	Pack unit pcs
E 930 fuse disconnectors for 14 x 51 mm fuses (AC-20B)							
1	50	1.5	446804	E 931/50	2CSM361610R1801	0.200	6
1+N	50	3	446903	E 931N/50	2CSM365610R1801	0.400	3
2	50	3	447009	E 932/50	2CSM362610R1801	0.400	3
3	50	4.5	447108	E 933/50	2CSM363610R1801	0.600	1
3+N	50	6	447207	E 933N/50	2CSM367610R1801	0.800	1
E 930 fuse disconnectors for 22 x 58 mm fuses (AC-20B)							
1	125	2	447504	E 931/125	2CSM371710R1801	0.200	6
1+N	125	4	447603	E 931N/125	2CSM375710R1801	0.400	3
2	125	4	447702	E 932/125	2CSM372710R1801	0.400	3
3	125	6	447801	E 933/125	2CSM373710R1801	0.600	1
3+N	125	8	447900	E 933N/125	2CSM377710R1801	0.800	1

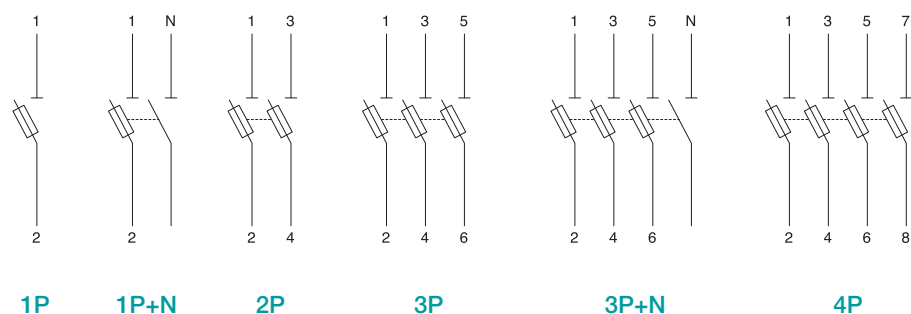
The most widely used codes are in green
 *s: version with blown fuse indicator

Wiring diagrams and overall dimensions E 90 series for North American Market

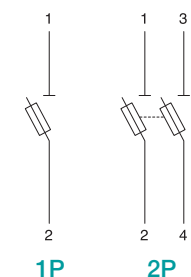
E 90 wiring diagrams



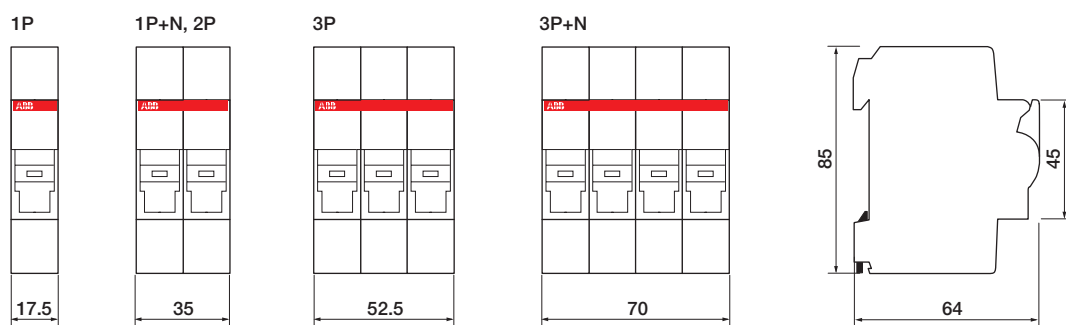
E 90 Class CC wiring diagrams



E 90 PV wiring diagrams

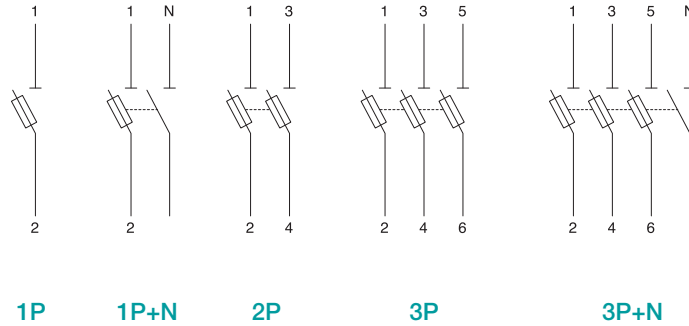


Overall dimensions

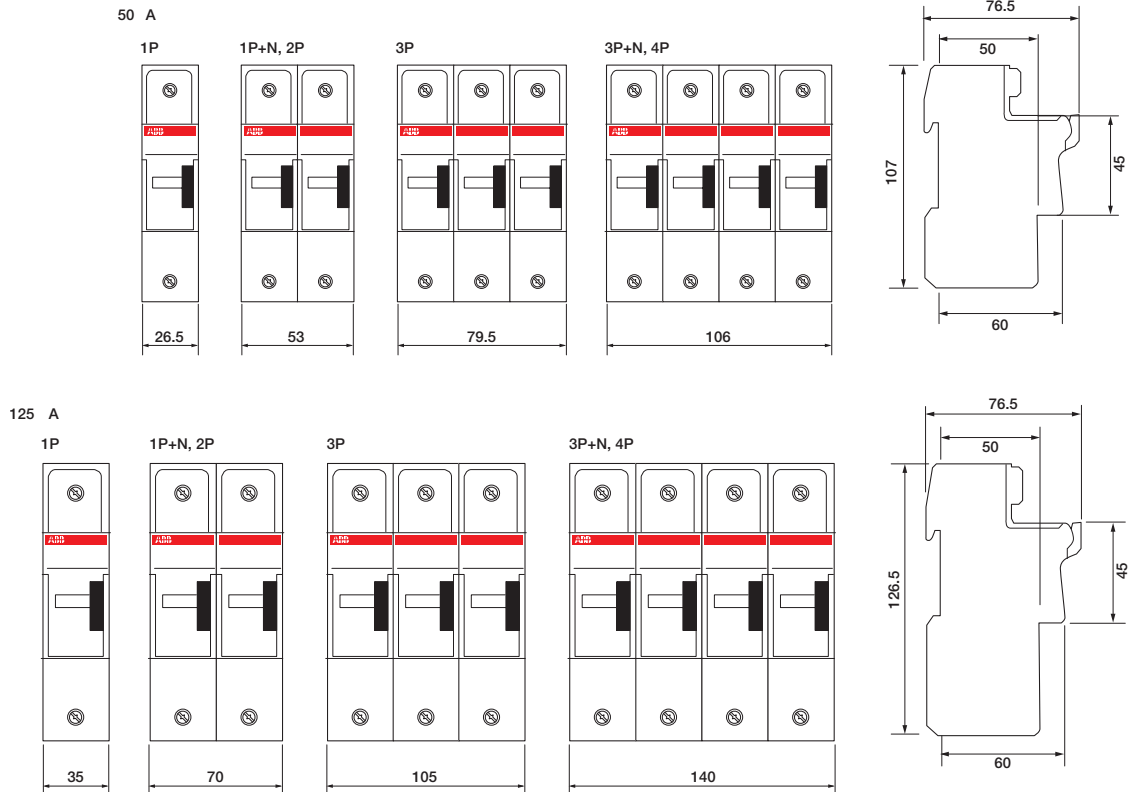


Wiring diagrams and overall dimensions E 930 series

Wiring diagrams



Overall dimensions:

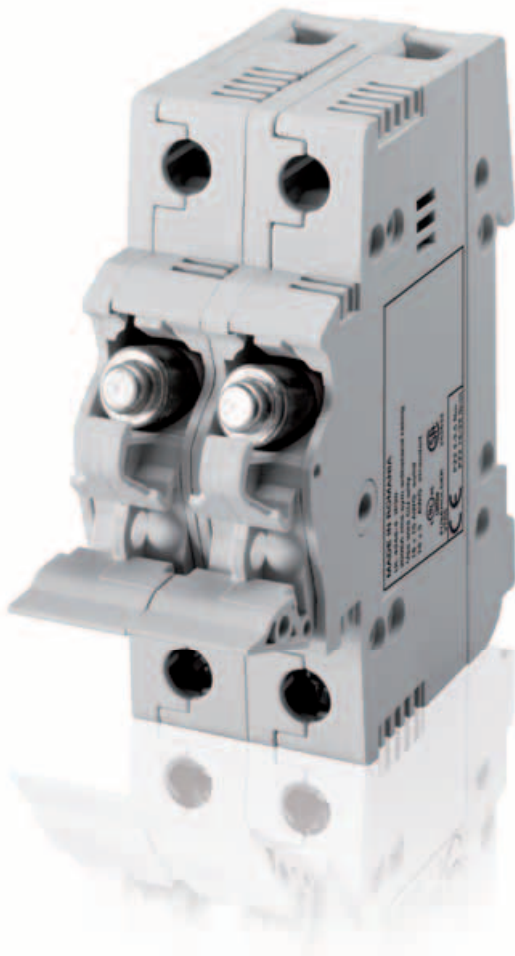


How to choose the protection system

When choosing the protection system, a very important feature is the power dissipation of the system "fuse + fuseholder." Indeed, It is important to make sure that the power dissipated by the fuse does not exceed the limit imposed by the fuseholder in which it is installed.

Moreover, other external factors should be taken into consideration:

- The Current derating depends on the number of poles in the installation
- The Current derating depends on the climatic conditions



Derating values for E 90 fuseholders

Depending on the rated current, the number of poles installed side by side or the temperature and relative humidity, the derating parameters in the table must be considered if several poles are installed side by side or if the equipment is installed in unusual climatic conditions.

Installation of single poles side by side				
E 90				
Poles	Maximum current			
1...4	In			
5...7	0.8 x In			
more than 7	0.7 x In			

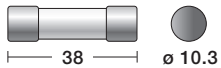
Climatic conditions				
Maximum temperature	20 °C	30 °C	40 °C	50 °C
Maximum humidity	95 %	90 %	80 %	50 %
Maximum current	In	In x 0.95	In x 0.9	In x 0.8

E 9F gG cylindrical fuses

The fastest protection for industrial automation switchboards

E 9F gG series fuses are the best way to protect against overloads and short-circuits together with series fuse E 90 and E 930. They feature a fast tripping curve that is ideal for protecting electronic devices, transformers and electric cables. The E 9F gG series is available for all the main sizes (10.3 x 38 mm, 14 x 51 mm e 22 x 58 mm) and with a wide range of rated current values (from 1 A to 125 A and up to 690 V AC).

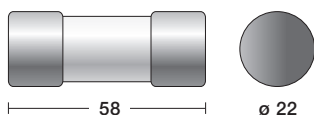
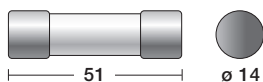
All the E 9F series fuses conform to the RoHS directive and are type-approved in accordance with the most important international naval marks.



Rated current	Bbn 8012542 EAN	Type code	Order code	Piece weight kg	Pack unit pcs
E 9F 10 gG 10.3 x 38 mm cylindrical fuses					
0.5	773337	E 9F10 GG05	2CSM277333R1801	0.007	10
1	771135	E 9F10 GG1	2CSM277113R1801	0.007	10
2	587231	E 9F10 GG2	2CSM258723R1801	0.007	10
4	575436	E 9F10 GG4	2CSM257543R1801	0.007	10
6	563631	E 9F10 GG6	2CSM256363R1801	0.007	10
8	586333	E 9F10 GG8	2CSM258633R1801	0.007	10
10	574538	E 9F10 GG10	2CSM257453R1801	0.007	10
12	562733	E 9F10 GG12	2CSM256273R1801	0.007	10
16	775430	E 9F10 GG16	2CSM277543R1801	0.007	10
20	773238	E 9F10 GG20	2CSM277323R1801	0.007	10
25	771036	E 9F10 GG25	2CSM277103R1801	0.007	10
32	587132	E 9F10 GG32	2CSM258713R1801	0.007	10

E 9F gG cylindrical fuses

The fastest protection for industrial automation switchboards



Rated current	Bbn 8012542 EAN	Type code	Order code	Piece weight kg	Pack unit pcs
E 9F 14 gG 14 x 51 mm cylindrical fuses					
2	775232	E 9F14 GG2	2CSM277523R1801	0.018	10
4	773030	E 9F14 GG4	2CSM277303R1801	0.018	10
6	770831	E 9F14 GG6	2CSM277083R1801	0.018	10
8	910039	E 9F14 GG8	2CSM291003R1801	0.018	10
10	909835	E 9F14 GG10	2CSM290983R1801	0.018	10
12	909637	E 9F14 GG12	2CSM290963R1801	0.018	10
16	587835	E 9F14 GG16	2CSM258783R1801	0.018	10
20	576037	E 9F14 GG20	2CSM257603R1801	0.018	10
25	564232	E 9F14 GG25	2CSM256423R1801	0.018	10
32	586937	E 9F14 GG32	2CSM258693R1801	0.018	10
40	575139	E 9F14 GG40	2CSM257513R1801	0.018	10
50	563334	E 9F14 GG50	2CSM256333R1801	0.018	10
E 9F 22 gG 22 x 58 mm cylindrical fuses					
4	571834	E 9F22 GG4	2CSM257183R1801	0.048	10
6	592839	E 9F22 GG6	2CSM259283R1801	0.048	10
8	581031	E 9F22 GG8	2CSM258103R1801	0.048	10
10	569237	E 9F22 GG10	2CSM256923R1801	0.048	10
12	594031	E 9F22 GG12	2CSM259403R1801	0.048	10
16	582236	E 9F22 GG16	2CSM258223R1801	0.048	10
20	570431	E 9F22 GG20	2CSM257043R1801	0.048	10
25	595335	E 9F22 GG25	2CSM259533R1801	0.048	10
32	583530	E 9F22 GG32	2CSM258353R1801	0.048	10
40	571735	E 9F22 GG40	2CSM257173R1801	0.048	10
50	593935	E 9F22 GG50	2CSM259393R1801	0.048	10
63	582137	E 9F22 GG63	2CSM258213R1801	0.048	10
80	570332	E 9F22 GG80	2CSM257033R1801	0.048	10
100	595236	E 9F22 GG100	2CSM259523R1801	0.048	10
125	583431	E 9F22 GG125	2CSM258343R1801	0.048	10

Technical specifications

Rated voltage	[V]	500, 690 a.c.
Rated current	[A]	0.5...125
Breaking capacity	[kA]	80, 120
Overall dimensions	[mm]	10.3 x 38, 14 x 51, 22 x 58
Weight	[g]	7, 18, 48
Marks		LLOYD, BV
Standards		IEC 60269-2; ROHS 2002/98/CE

E 9F gG cylindrical fuses

The fastest protection for industrial automation switchboards

E 9F 10 gG 10.3 x 38 mm cylindrical fuses

Type	Rated current [A]	Rated voltage [V AC]	Breaking capacity [kA]
E 9F10 GG05	0.5	500	120
E 9F10 GG1	1	500	120
E 9F10 GG2	2	500	120
E 9F10 GG4	4	500	120
E 9F10 GG6	6	500	120
E 9F10 GG8	8	500	120
E 9F10 GG10	10	500	120
E 9F10 GG12	12	500	120
E 9F10 GG16	16	500	120
E 9F10 GG20	20	500	120
E 9F10 GG25	25	500	120
E 9F10 GG32	32	400	120

E 9F 14 gG 14 x 51 mm cylindrical fuses

Type	Rated current [A]	Rated voltage [V AC]	Breaking capacity [kA]
E 9F14 GG2	2	690	80
E 9F14 GG4	4	690	80
E 9F14 GG6	6	690	80
E 9F14 GG8	8	690	80
E 9F14 GG10	10	690	80
E 9F14 GG12	12	690	80
E 9F14 GG16	16	690	80
E 9F14 GG20	20	690	80
E 9F14 GG25	25	690	80
E 9F14 GG32	32	500	120
E 9F14 GG40	40	500	120
E 9F14 GG50	50	400	120

E 9F 22 gG 22 x 58 mm cylindrical fuses

Type	Rated current [A]	Rated voltage [V AC]	Breaking capacity [kA]
E 9F22 GG4	4	690	80
E 9F22 GG6	6	690	80
E 9F22 GG8	8	690	80
E 9F22 GG10	10	690	80
E 9F22 GG12	12	690	80
E 9F22 GG16	16	690	80
E 9F22 GG20	20	690	80
E 9F22 GG25	25	690	80
E 9F22 GG32	32	690	80
E 9F22 GG40	40	690	80
E 9F22 GG50	50	690	80
E 9F22 GG63	63	690	80
E 9F22 GG80	80	690	80
E 9F22 GG100	100	500	120
E 9F22 GG125	125	400	120

E 9F gG cylindrical fuses

The fastest protection for industrial automation switchboards

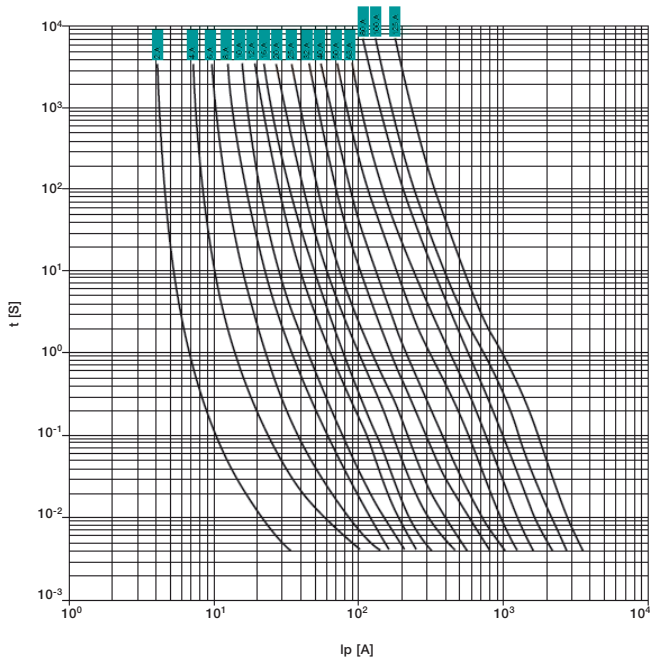
Power dissipation [W]			
In [A]	Size mm		
	10.3 x 38	14 x 51	22 x 58
0.5	2		
1	2.5	3.4	
2	0.70	1	1.20
4	0.80	1.10	1.30
6	0.90	1.20	1.40
8	1.10	1.50	1.65
10	1.35	1.80	2
12	1.55	2.10	2.40
16	1.90	2.55	3
20	2.30	3	3.40
25	2.80	3.50	3.80
32	3	3.80	4.30
40		4.40	5.10
50		4.70	5.50
63			6.70
80			8
100			9
125			12.5

It is important to make sure that the power dissipated by the fuse does not exceed the limit imposed by the fuseholder in which it is installed. The maximum power dissipation values, in accordance with the specifications of the E 90 and E 930 series fuseholders, are highlighted in green.

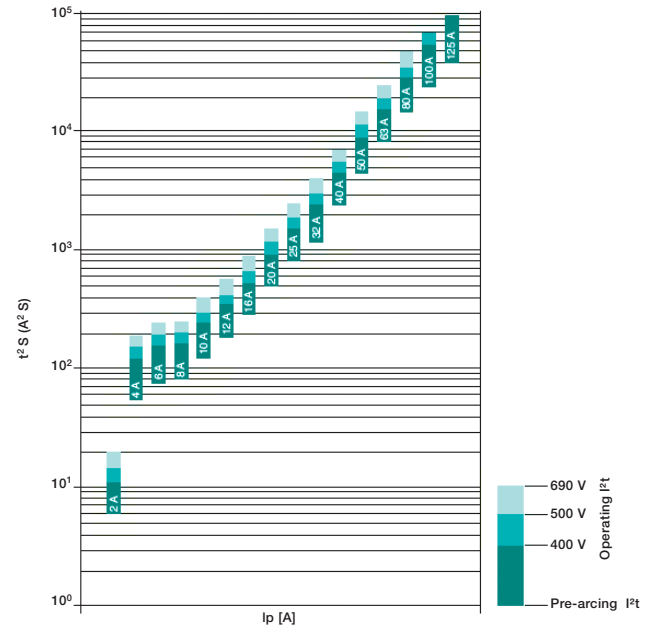
E 9F gG cylindrical fuses

The fastest protection for industrial automation switchboards

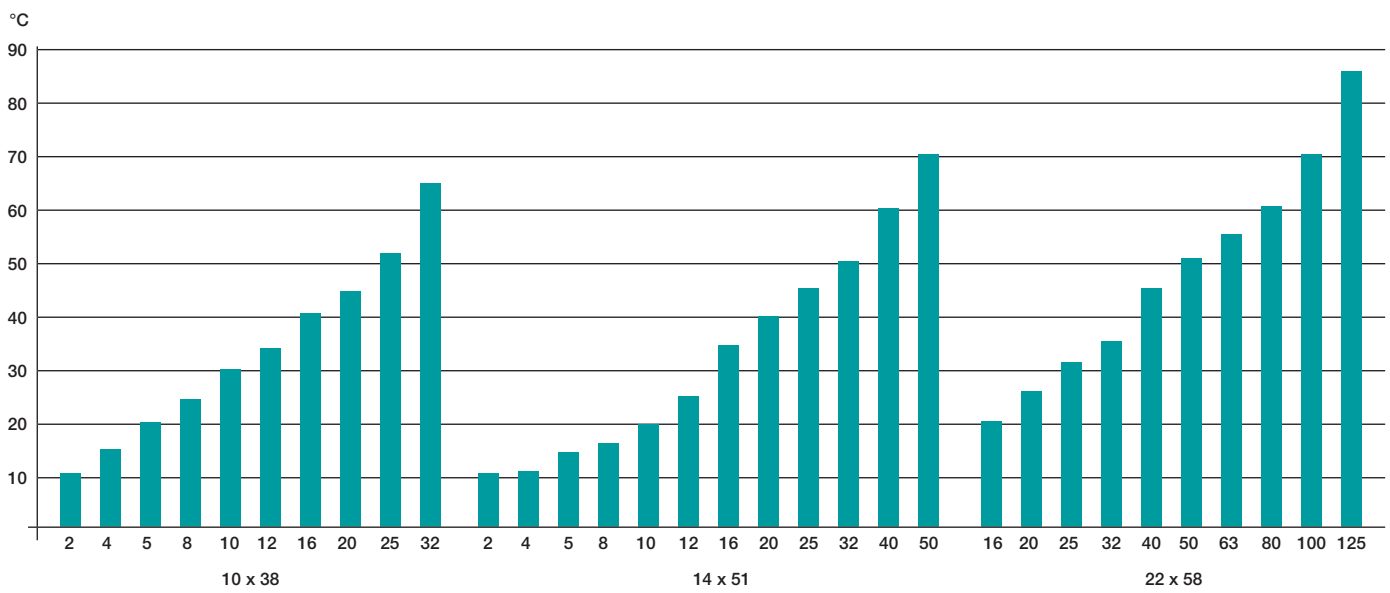
Characteristic tI



Characteristic I²t



Temperature increase



E 9F gG cylindrical fuses

The fastest protection for industrial automation switchboards

Maximum length [m] of the copper conductors										
Copper conductor section (mm ²)	Rated current In (A) of gG fuses									
	16	20	25	32	40	50	63	80	100	125
1.5	99/113	86/87	40/59	21/29	13/16	7/9				
2.5		134	110/122	67/84	41/51	25/33	13/20	8/11		
4			183	139	108/119	67/84	46/58	24/32	14/17	7.3/10
6				214	165	139	94/113	55/70	33/41	20/27
10					275	226	172	130	90/108	57/70
16							283	217	168	128
25								336	257	197
35									367	283
50										379

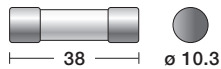
Use this table to find the cable length, in meters, that is protected by a fuse.

Just cross the rated current of the fuse (in the columns) with the section of the conductor (on the lines). The resulting number corresponds to the protected length of the conductor: for example, a 32 A fuse can protect up to 214 meters of 6 mm² section cable. When there are two values, it means that the maximum length of the cable is between the two numbers given in the table.

E 9F aM cylindrical fuses

Delayed protection for motor starts

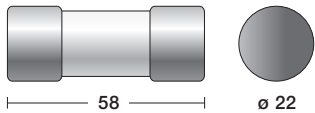
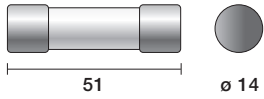
E 9F aM series fuses are the best way to protect against overloads and short-circuits together with series fuse E 90 and E 930. They feature a delayed tripping curve and are therefore ideal for protecting industrial motors that require high inrush current during the starting phase. The E 9F aM series is available for all the main sizes (10.3 x 38 mm, 14 x 51 mm e 22 x 58 mm) and with a wide range of rated current values (from 1 A to 125 A and up to 690 V AC). All the E 9F series fuses conform to the RoHS directive and are type-approved in accordance with the most important international naval marks.



Rated current	Bbn 8012542 EAN	Type code	Order code	Piece weight kg	Pack unit pcs
E 9F 10 aM 10.3 x 38 mm cylindrical fuses					
0.5	574736	E 9F10 AM05	2CSM257473R1801	0.007	10
1	562931	E 9F10 AM1	2CSM256293R1801	0.007	10
2	775638	E 9F10 AM2	2CSM277563R1801	0.007	10
4	773436	E 9F10 AM4	2CSM277343R1801	0.007	10
6	771234	E 9F10 AM6	2CSM277123R1801	0.007	10
8	587330	E 9F10 AM8	2CSM258733R1801	0.007	10
10	575535	E 9F10 AM10	2CSM257553R1801	0.007	10
12	563730	E 9F10 AM12	2CSM256373R1801	0.007	10
16	586432	E 9F10 AM16	2CSM258643R1801	0.007	10
20	574637	E 9F10 AM20	2CSM257463R1801	0.007	10
25	562832	E 9F10 AM25	2CSM256283R1801	0.007	10
32	775539	E 9F10 AM32	2CSM277553R1801	0.007	10

E 9F aM cylindrical fuses

Delayed protection for motor starts



Rated current	Bbn 8012542 EAN	Type code	Order code	Piece weight kg	Pack unit pcs
E 9F 14 aM 14 x 51 mm cylindrical fuses					
1	575337	E 9F14 AM1	2CSM257533R1801	0.018	10
2	563532	E 9F14 AM2	2CSM256353R1801	0.018	10
4	586234	E 9F14 AM4	2CSM258623R1801	0.018	10
6	574439	E 9F14 AM6	2CSM257443R1801	0.018	10
8	562634	E 9F14 AM8	2CSM256263R1801	0.018	10
10	775331	E 9F14 AM10	2CSM277533R1801	0.018	10
12	773139	E 9F14 AM12	2CSM277313R1801	0.018	10
16	770930	E 9F14 AM16	2CSM277093R1801	0.018	10
20	587033	E 9F14 AM20	2CSM258703R1801	0.018	10
25	575238	E 9F14 AM25	2CSM257523R1801	0.018	10
32	563433	E 9F14 AM32	2CSM256343R1801	0.018	10
40	586135	E 9F14 AM40	2CSM258613R1801	0.018	10
45	574330	E 9F14 AM45	2CSM257433R1801	0.018	10
50	562535	E 9F14 AM50	2CSM256253R1801	0.018	10
E 9F 22 aM 22 x 58 mm cylindrical fuses					
6	586036	E 9F22 AM6	2CSM258603R1801	0.048	10
8	574231	E 9F22 AM8	2CSM257423R1801	0.048	10
10	562436	E 9F22 AM10	2CSM256243R1801	0.048	10
12	775133	E 9F22 AM12	2CSM277513R1801	0.048	10
16	772934	E 9F22 AM16	2CSM277293R1801	0.048	10
20	770732	E 9F22 AM20	2CSM277073R1801	0.048	10
25	774938	E 9F22 AM25	2CSM277493R1801	0.048	10
32	772736	E 9F22 AM32	2CSM277273R1801	0.048	10
40	770534	E 9F22 AM40	2CSM277053R1801	0.048	10
50	594130	E 9F22 AM50	2CSM259413R1801	0.048	10
63	582335	E 9F22 AM63	2CSM258233R1801	0.048	10
80	570530	E 9F22 AM80	2CSM257053R1801	0.048	10
100	595434	E 9F22 AM100	2CSM259543R1801	0.048	10
125	583639	E 9F22 AM125	2CSM258363R1801	0.048	10

Technical specifications

Rated voltage	[V]	500, 690 AC
Rated current	[A]	0.5...125
Breaking capacity	[kA]	80, 120
Overall dimensions	[mm]	10.3 x 38, 14 x 51, 22 x 58
Weight	[g]	18, 48
Marks		LLOYD, BV
Standards		IEC 60269-2; ROHS 2002/98/CE

E 9F 10 aM 10.3 x 38 mm cylindrical fuses

Type	Rated current [A]	Rated voltage [V AC]	Breaking capacity [kA]
E 9F10 AM05	0.5	500	120
E 9F10 AM1	1	500	120
E 9F10 AM2	2	500	120
E 9F10 AM4	4	500	120
E 9F10 AM6	6	500	120
E 9F10 AM8	8	500	120
E 9F10 AM10	10	500	120
E 9F10 AM12	12	500	120
E 9F10 AM16	16	500	120
E 9F10 AM20	20	500	120
E 9F10 AM25	25	400	120
E 9F10 AM32	32	400	120

E 9F 14 aM 14 x 51 mm cylindrical fuses

Type	Rated current [A]	Rated voltage [V AC]	Breaking capacity [kA]
E 9F14 AM1	1	690	80
E 9F14 AM2	2	690	80
E 9F14 AM4	4	690	80
E 9F14 AM6	6	690	80
E 9F14 AM8	8	690	80
E 9F14 AM10	10	690	80
E 9F14 AM12	12	690	80
E 9F14 AM16	16	690	80
E 9F14 AM20	20	690	80
E 9F14 AM25	25	690	80
E 9F14 AM32	32	500	120
E 9F14 AM40	40	500	120
E 9F14 AM50	50	400	120

E 9F 22 aM 22 x 58 mm cylindrical fuses

Type	Rated current [A]	Rated voltage [V AC]	Breaking capacity [kA]
E 9F22 AM6	6	690	80
E 9F22 AM8	8	690	80
E 9F22 AM10	10	690	80
E 9F22 AM12	12	690	80
E 9F22 AM16	16	690	80
E 9F22 AM20	20	690	80
E 9F22 AM25	25	690	80
E 9F22 AM32	32	690	80
E 9F22 AM40	40	690	80
E 9F22 AM50	50	690	80
E 9F22 AM63	63	690	80
E 9F22 AM80	80	690	80
E 9F22 AM100	100	500	120
E 9F22 AM125	125	400	120

E 9F aM cylindrical fuses

Delayed protection for motor starts

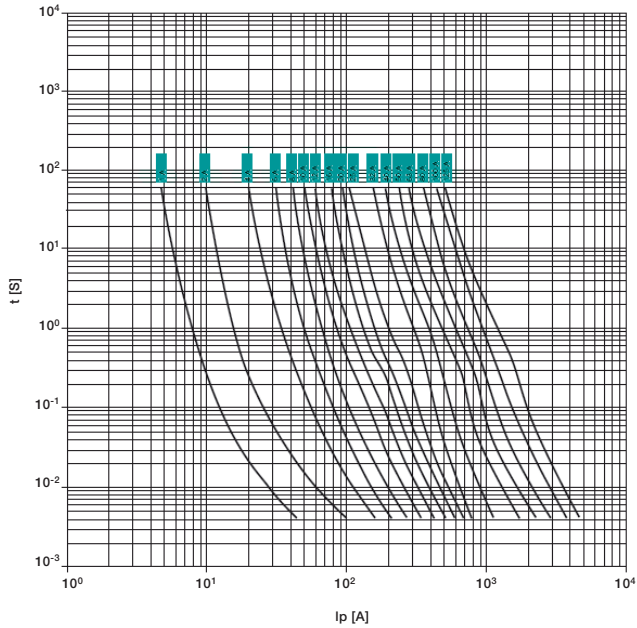
It is important to make sure that the power dissipated by the fuse does not exceed the limit imposed by the fuseholder in which it is installed. The maximum power dissipation values, in accordance with the specifications of the E 90 and E 930 series fuseholders, are highlighted in green.

Power dissipation [W]			
In [A]	Size mm		
	10.3 x 38	14 x 51	22 x 58
0.5	0.50	0.75	
1	0.13	0.18	0.20
2	0.20	0.25	0.30
4	0.30	0.40	0.50
6	0.45	0.55	0.65
8	0.55	0.65	0.75
10	0.65	0.75	0.85
12	0.75	0.85	1
16	0.90	1.20	1.40
20	1.10	1.50	1.70
25	1.40	1.80	2
32	2	2.10	2.60
40		2.60	3.20
45		2.80	
50		2.90	3.90
63			4.60
80			5.60
100			6.50
125			9.50

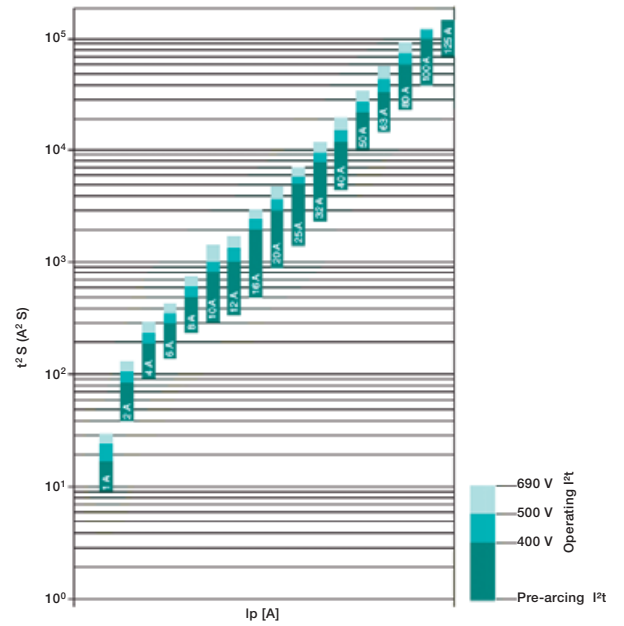
E 9F aM cylindrical fuses

Delayed protection for motor starts

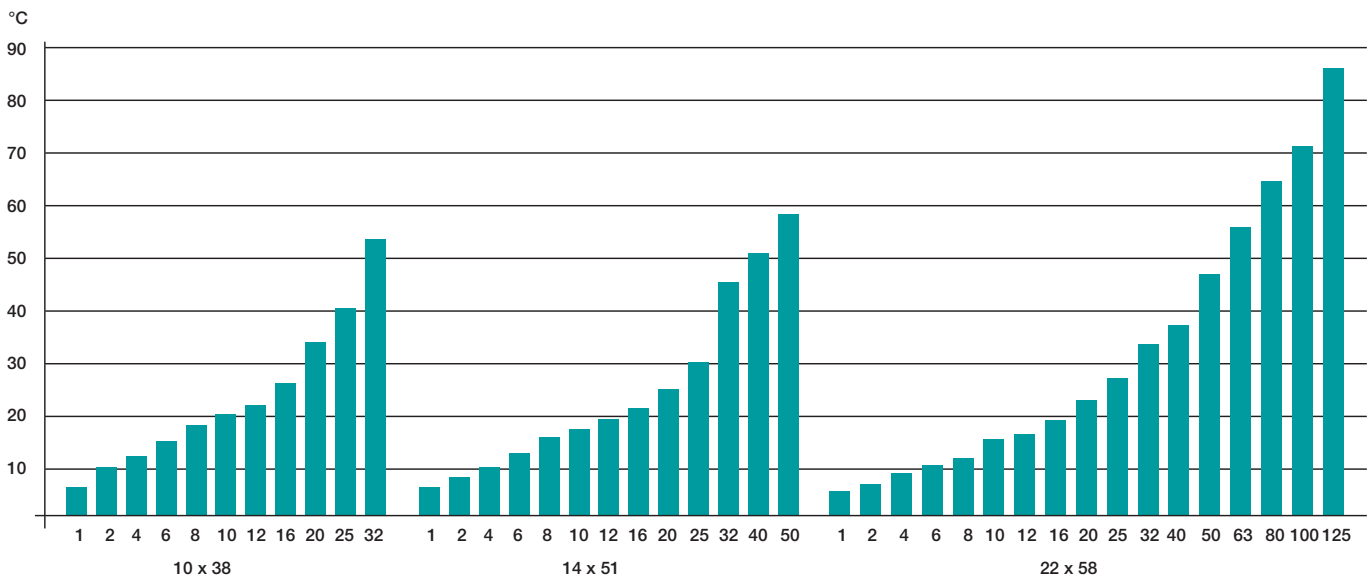
Characteristic tI



Characteristic I²t



Temperature increase



E 9F aM cylindrical fuses

Delayed protection for motor starts

Maximum cable length according to the rated current and section of the conductor

Copper conductor section (mm ²)	Rated current In (A) of aM fuses									
	16	20	25	32	40	50	63	80	100	125
1.5	55/64	37-45	25/30	15/20						
2.5	116	84/94	58/68	40/49	26/32	17/20				
4	181	147	118	84/95	58/68	42/48	28/33	18/23		
6	273	223	178	139	105/117	79/89	55/64	37/42	26/31	14/20
10				227	181	147	113/125	80/94	57/69	40/47
16						236	189	151	120	83/97
25								231	185	147
35									262	210

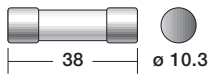
Use this table to find the cable length, in meters, that is protected by a fuse.

Just cross the rated current of the fuse (in the columns) with the section of the conductor (on the lines). The resulting number corresponds to the protected length of the conductor: for example, a 32 A fuse can protect up to 214 meters of 6 mm² section cable. When there are two values, it means that the maximum length of the cable is between the two numbers given in the table.

E 9F gPV cylindrical fuses

The best protection for direct current photovoltaic installations

The E 9F gPV series of cylindrical fuses has been specifically designed for protecting direct current circuits up to 1000 V. Available in the 10.3 x 38 mm size for up to 30 A rated current values, they are the best way to protect the strings, inverters and surge arresters in photovoltaic installations according to UL 4248-18.



Rated current	Bbn 8012542 EAN	Type code	Order code	Piece weight kg	Pack unit pcs
E 9F gPV 10.3 x 38 mm cylindrical fuses					
1	134565	E 9F1PV	2CSM213456R1801	0.007	10
2	134664	E 9F2PV	2CSM213466R1801	0.007	10
3	134763	E 9F3PV	2CSM213476R1801	0.007	10
4	134862	E 9F4PV	2CSM213486R1801	0.007	10
5	134961	E 9F5PV	2CSM213496R1801	0.007	10
6	135067	E 9F6PV	2CSM213506R1801	0.007	10
7	135166	E 9F7PV	2CSM213516R1801	0.007	10
8	135265	E 9F8PV	2CSM213526R1801	0.007	10
10	135364	E 9F10PV	2CSM213536R1801	0.007	10
12	135463	E 9F12PV	2CSM213546R1801	0.007	10
15	135562	E 9F15PV	2CSM213556R1801	0.007	10
20	135661	E 9F20PV	2CSM213566R1801	0.007	10
25	135760	E 9F25PV	2CSM213576R1801	0.007	10
30	135869	E 9F30PV	2CSM213586R1801	0.007	10

Technical specifications		
Rated voltage	V	1000 DC
Rated current	A	1...30
Breaking capacity	kA	10
Minimum breaking capability		from 1A to 7A = 1.3 x I _n from 8A to 30A = 2.0 x I _n
Operating ambient Temperature	°C	- 30 to + 70
Storage Temperature	°C	- 40 to + 80
Dimensions	mm	10.3 x 38
Weight	g	7
Standards		UL 4248-1; UL 4248-18

E 9F gPV cylindrical fuses

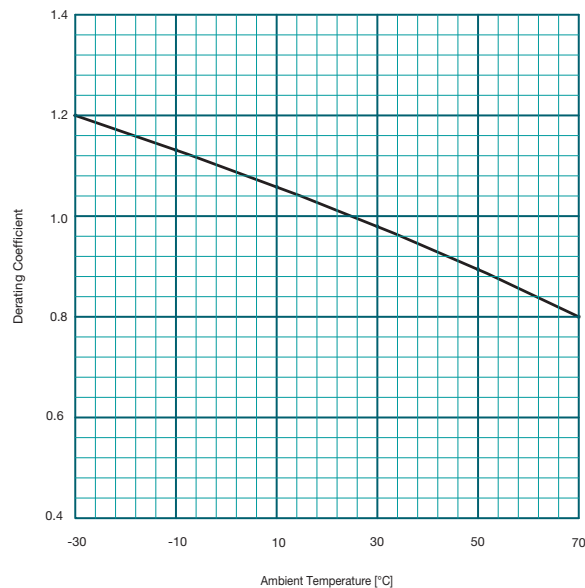
The best protection for direct current photovoltaic installations

E 9F gPV 10.3 x 38 mm cylindrical fuses

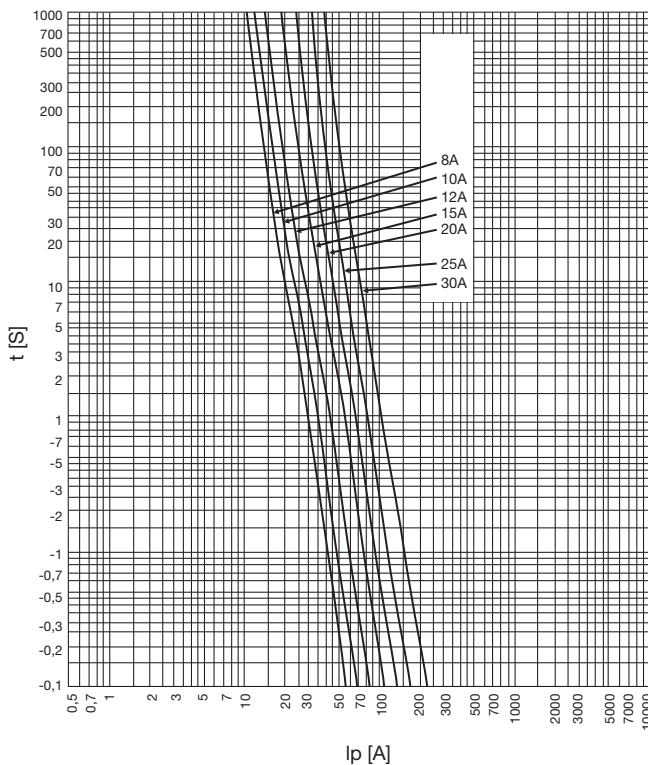
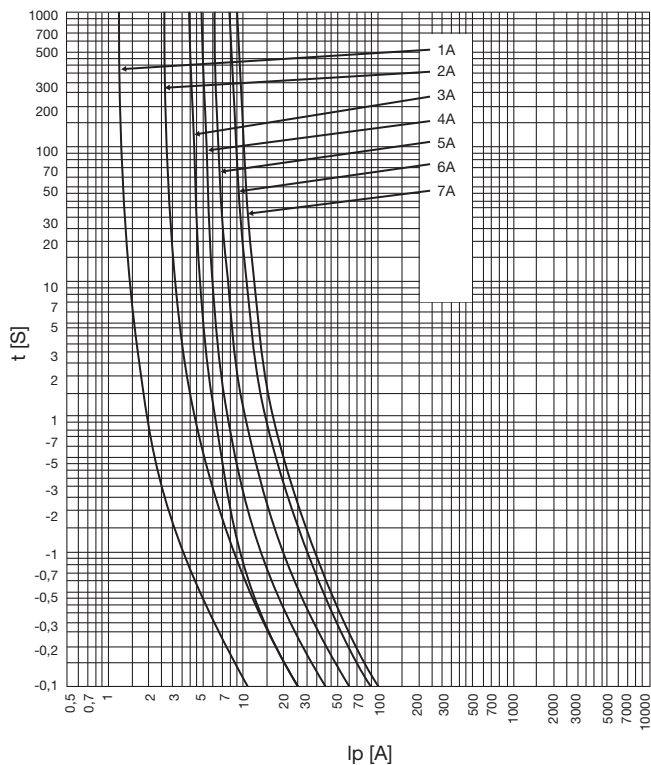
Type	Rated current [A]	Dissipated power 0.7 In [W]	Dissipated power 0.8 In [W]	Dissipated power In [W]	I ² t PreArc [A ² s]	Total I ² t [A ² s]
E 9F1PV	1	0.12	0.16	0.32	1.2	19
E 9F2PV	2	0.15	0.20	0.43	10.4	120
E 9F3PV	3	0.70	0.90	1.4	3.1	130
E 9F4PV	4	0.70	0.80	1.3	10.4	220
E 9F5PV	5	0.70	0.90	1.4	22	330
E 9F6PV	6	0.70	0.90	1.5	49	410
E 9F7PV	7	0.80	1.00	1.5	65	630
E 9F8PV	8	0.80	1.00	1.1	6.5	105
E 9F10PV	10	0.90	1.20	1.5	10	127
E 9F12PV	12	1.00	1.3	2.00	17	215
E 9F15PV	15	1.20	1.60	3.00	26	495
E 9F20PV	20	1.40	1.90	4.4	49	755
E 9F25PV	25	1.20	1.70	2.90	132	1650
E 9F30PV	30	1.50	2.10	3.80	197	1850

The power dissipation of the fuse cannot exceed the maximum power dissipation accepted by the fuseholder.

Derating in combination with Ambient Temperature



Time/current tripping characteristics



Questions & answers

Technical details and insights concerning E 90 fuseholders and fuses



Why should I use a fuse for circuit protection?

There are 4 main reasons:

- Safety: Fuses don't cause dangerous situations (arcs, flames, gas production) since they protect the circuit by blowing. Moreover, the intervention speed on high short circuit currents limits significantly the flash hazard at the fault location.
- Reliability: When a fault is detected, the fuse operates, providing protection. A new fuse is then installed, restoring the protection to its original state. No risk of being contaminated by oil, corrosion or dust and no unexpected tripping.
- Universal use: The fuse's characteristic are standardized in order to ensure an effective coordination with other devices.
- Economic: The fuse is still the most economical solution to prevent damages caused by short-circuits and overloads.

What are the main characteristics of a class CC fuse?

A class CC Fuse meets the following three conditions:

- Interrupts all available overcurrents within its interrupt rating.
- Within its current limiting range, limits the clearing time at rated voltage to an interval equal to, or less than, the first major or symmetrical current loop duration.
- Limits peak let-through current to a value less than the available peak current.

What distinguishes a fuseholder for class CC fuses (E 90/30 CC) from a fuseholder for IEC fuses?

Class CC fuseholders shall be provided with a rejection member to prevent the installation of fuses of other classes according to UL 4248-4.

E 90/30 CC assure the rejection member functionality that has been certified by UL laboratories.

What is the difference between Midget and Class CC fuses?

Class CC fuses are current limiting fuses with rejection tips on the bottoms to prevent them for being used in holders not rated similarly.

Midget fuses are defined as supplemental fuses and are not rated for current limiting. They do not have rejection tips because they can be used in most fuse holders regardless of class ratings.

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