



US Catalog | October 2016

# E 90 range of fuse holders for the North American market Uncompromising performance





# E 90 range of fuse holders

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## Simplicity of design ABB excellence meets customer demands



Your customer demands devices for circuit protection with effective heat dissipation, in addition to meeting mandatory requirements and international standards.

The dedicated designers at ABB have directed their passion, expertise and creativity in the development of the E 90 Series of fuse holders designed for the North American market.

This range of fuse holders includes class CC, class J, PV and midget fuse holders, all certified according to North American standards.

# The new ABB standard North American and international marks



## A passport to the world.

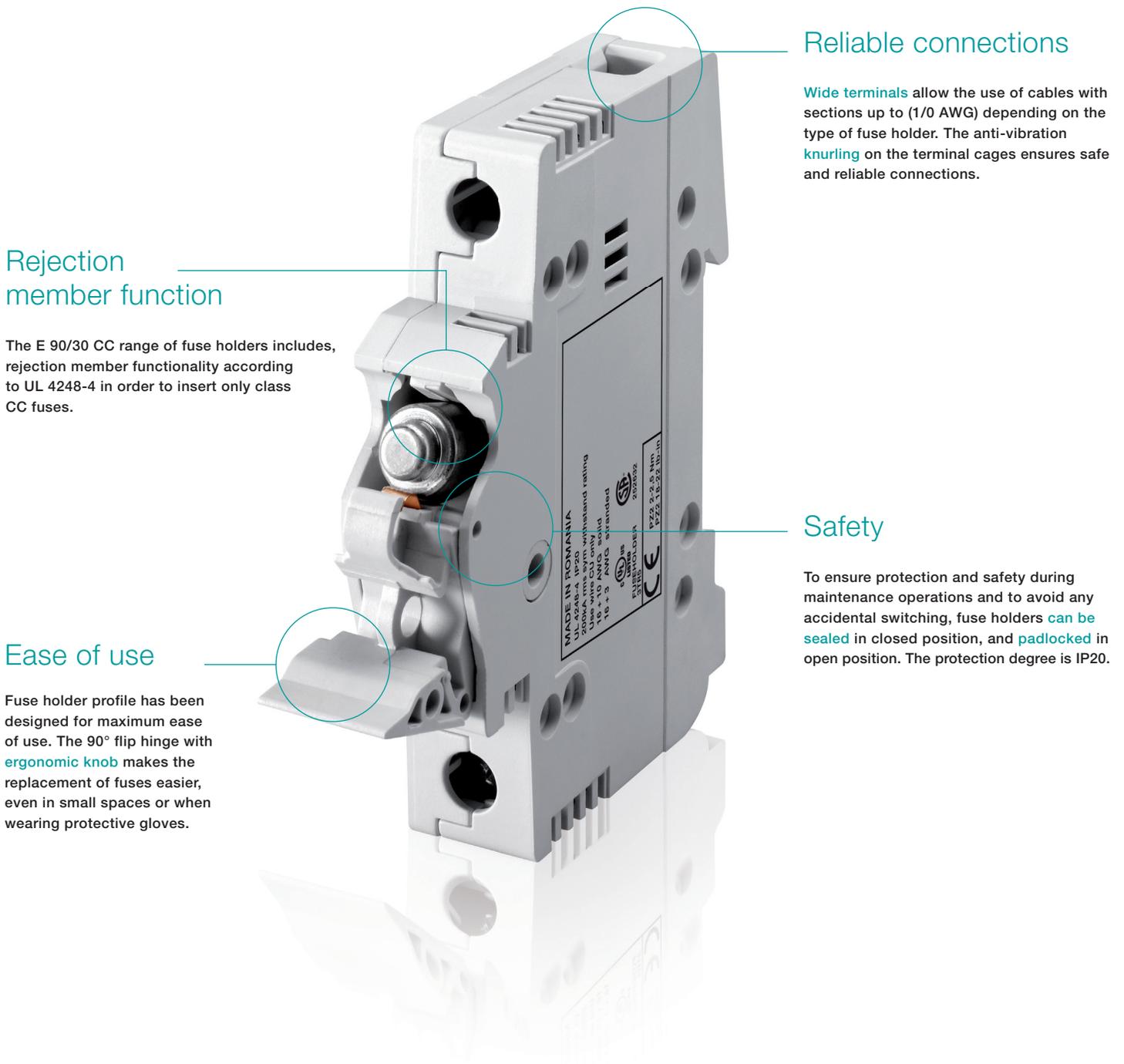
International quality marks and UL certification make E 90 the ideal choice for designers and manufacturers of switchboards and installations.





# Quick installations with E 90

The E 90 safe and smart range is designed for quick and flawless installations. Because of its unique features, the E 90 series sets a new safety standard.



## Reliable connections

**Wide terminals** allow the use of cables with sections up to (1/0 AWG) depending on the type of fuse holder. The anti-vibration **knurling** on the terminal cages ensures safe and reliable connections.

## Rejection member function

The E 90/30 CC range of fuse holders includes, rejection member functionality according to UL 4248-4 in order to insert only class CC fuses.

## Safety

To ensure protection and safety during maintenance operations and to avoid any accidental switching, fuse holders **can be sealed** in closed position, and **padlocked** in open position. The protection degree is IP20.

## Ease of use

Fuse holder 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 fuse holders are compliant with RoHS (Restriction of Hazardous Substances) European directive, which prohibits the use of certain hazardous substances in the manufacture of electrical and electronic equipment.

E 90 CC fuse holders  
Designed for the North American market



# E 90 CC fuse holders

## Specifically developed for branch circuit protection



E 90 CC range has been designed to comply with North American market regulations enabling global manufacturers to offer their equipment in conformity with safety requirements in this region.

### Features:

- For use with Class CC fuses only - rejection member only allows insertion of Class CC fuses
- 1, 1N, 2, 3, 3N, and 4 pole versions available
- Rated current 30A
- Rated voltage 600V AC/DC according to UL 4248-4
- All versions are available with optical blown fuse indicator

Class CC fuses have specific characteristics dedicated to terminal protection of components and devices against short-term overloads and protection against the short circuiting of motors. Maximum rated current of a Class CC fuse is 30 A, whereas the maximum rated voltage is 600V. The breaking capacity reaches 200kA. The specific properties of the Class CC fuses are valued in the North American market because they provide protection against short-circuits, even with equipment with limited resistance. The use of Class CC fuses is growing in the North American market with safety and reliability requirements of users becoming critical in preventing permanent damage to motors.

### Ordering information

Poles	Rated current In [A]	Modules	Catalog number	Pack unit pcs
<b>E 90/30 CC fuse holder for Class CC 10.4 x 38 mm fuses</b>				
1	30	1	E 91/30 CC	6
1	30	1	E 91/30 CCs*	6
1+N	30	2	E 91N/30 CC	3
1+N	30	2	E 91N/30 CCs*	3
2	30	2	E 92/30 CC	3
2	30	2	E 92/30 CCs*	3
3	30	3	E 93/30 CC	2
3	30	3	E 93/30 CCs*	2
3+N	30	4	E 93N/30 CC	1
3+N	30	4	E 93N/30 CCs*	1
4	30	4	E 94/30 CC	1
4	30	4	E 94/30 CCs*	1

\* Version with blown fuse indicator.

Developed for the North American market—universally reliable  
E 90/30 J and E 90/60 J fuse holders



# E 90 J fuse holders

## Specifically designed to be equipped with class J fuses



The E 90 J range has been designed to comply with North American market regulations. The E 90 J fuse holders are the ideal solution for industrial installations, motors and transformer protection, heating systems and control circuits.

### Features:

- For use with Class J fuses only
- 1, 2, and 3 pole versions available
- Rated current 30A and 60A
- Rates voltage 600V AC/DC according to UL 4248-8
- All versions are available with optical blown fuse indicator

In accordance with the reference standard UL 4248-8, they come in voltage and current ratings up to 600 V and 30/60A. The breaking capacity reaches 200kA. They are available in 1P, 2P and 3P versions. The versions with blown fuse indicator light provide a visual signal of the fuse break condition. They can be padlocked open and sealed closed to ensure operator safety during maintenance operations.

### Ordering information

Poles	Rated current I <sub>n</sub> [A]	Modules	Catalog number	Pack unit pcs
<b>E 90/30 J fuse holder for Class J 21 x 57 mm fuses</b>				
1	30	2	E 91/30 J	4
2	30	4	E 92/30 J	2
3	30	6	E 93/30 J	1
1	30	2	E 91/30 Js*	4
2	30	4	E 92/30 Js*	2
3	30	6	E 93/30 Js*	1
<b>E 90/60 J fuse holder for Class J 27 x 60 mm fuses</b>				
1	60	2.5	E 91/60 J	3
2	60	5	E 92/60 J	1
3	60	7.5	E 93/60 J	1
1	60	2.5	E 91/60 Js*	3
2	60	5	E 92/60 Js*	1
3	60	7.5	E 93/60 Js*	1

\* Version with blown fuse indicator.

# E 90 PV fuse holders for photovoltaic applications

## Designed for industry professionals



E 90 PV fuse holders have been specifically designed for photovoltaic applications. Because of their rated voltage up to 1000V DC, they are the ideal solution for protecting cells, inverters, or surge arresters. During maintenance operations, they ensure isolation of circuits and strings up to 1000V DC, all in total safety.

### Features:

- For use with 10.3mm (0.406“) x 38mm (1.496“) gPV fuses only
- 1 and 2 pole versions available
- Rated current 30A
- Rated voltage 1000V DC according to UL 4248-18
- DC-20B according to IEC60947-3
- All versions are available with optical blown fuse indicator

### Ordering information

Poles	Rated current In [A]	Modules	Catalog number	Pack unit pcs
<b>E 90 PV fuse holder for 10.3 x 38 mm fuses for DC</b>				
1	30	1	E 91/32 PV	6
1	30	1	E 91/32 PVs*	6
2	30	2	E 92/32 PV	3
2	30	2	E 92/32 PVs*	3

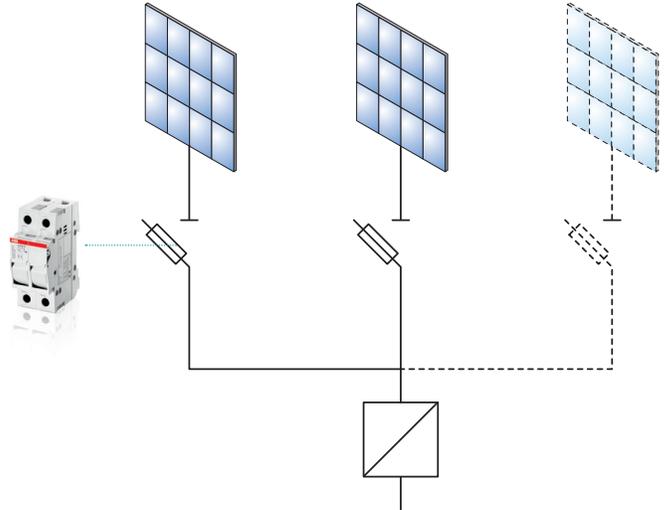
\* Version with blown fuse indicator.

# Isolation and protection of strings up to 1000 V

## Application examples

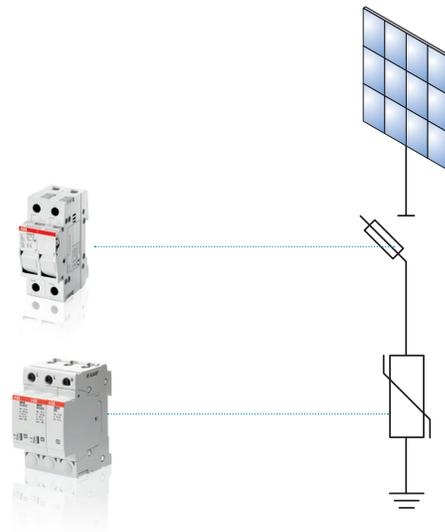
### String protection

To prevent damage to photovoltaic equipment on the DC side of photovoltaic installations and to ensure that it remains **isolated** when maintenance work is performed, E90 PV fuse holders can be installed downstream of the inverter so that each string is protected. The fuses must be selected to match the rated current of the line.



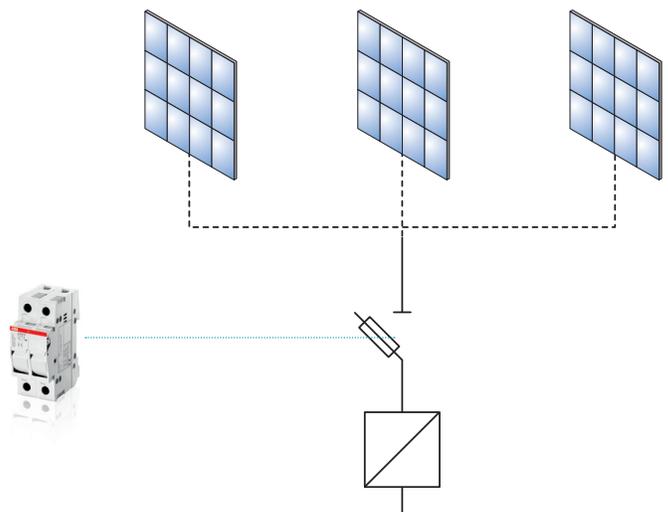
### Surge arrester back-up

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



### DC side of the inverter

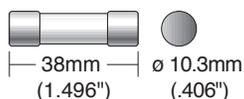
In small photovoltaic installations, E 90 PV fuse holders can be used to protect the direct current side of the inverter. Fuse holder should be selected according to the inverter rated current.



# 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 1000V. Available in the 10.3mm (0.406") x 38mm (1.496") size for up to 30A 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 I <sub>n</sub> [A]	Catalog number
<b>E 9F gPV 10.3mm (.406") x 38mm (1.496") cylindrical fuses</b>	
1	E 9F1PV
2	E 9F2PV
3	E 9F3PV
4	E 9F4PV
5	E 9F5PV
6	E 9F6PV
7	E 9F7PV
8	E 9F8PV
10	E 9F10PV
12	E 9F12PV
15	E 9F15PV
20	E 9F20PV
25	E 9F25PV
30	E 9F30PV

### Technical specifications

<b>Rated voltage</b>	[V]	1000V DC
<b>Rated current</b>	[A]	1...30
<b>Breaking capacity</b>	[kA]	10
<b>Minimum breaking capability</b>		from 1A to 7A = 1.3 x I <sub>n</sub> from 8A to 30A = 2.0 x I <sub>n</sub>
<b>Dimensions</b>	[mm]	10.3mm (0.406") x 38mm (1.496")
<b>Weight</b>	[g]	7
<b>Standards</b>		IEC 60269-6; ROHS 2002/98/CE; UL2579; CSA 22.2

# E 9F gPV cylindrical fuses

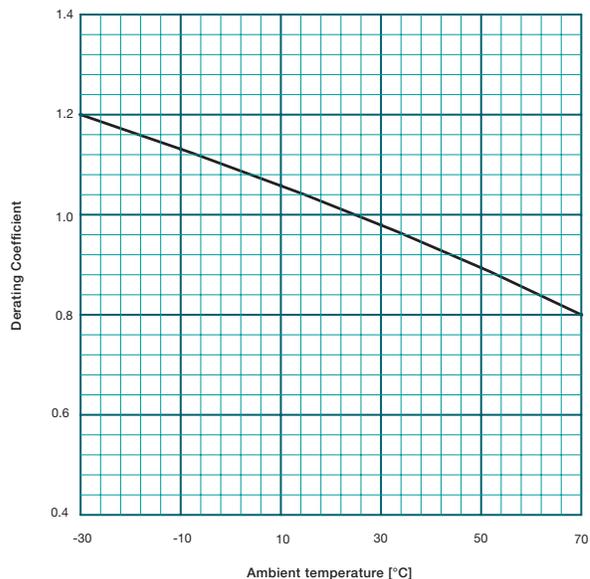
The best protection for direct current photovoltaic installations

## E 9F gPV 10.3mm (0.406") x 38mm (1.496") cylindrical fuses

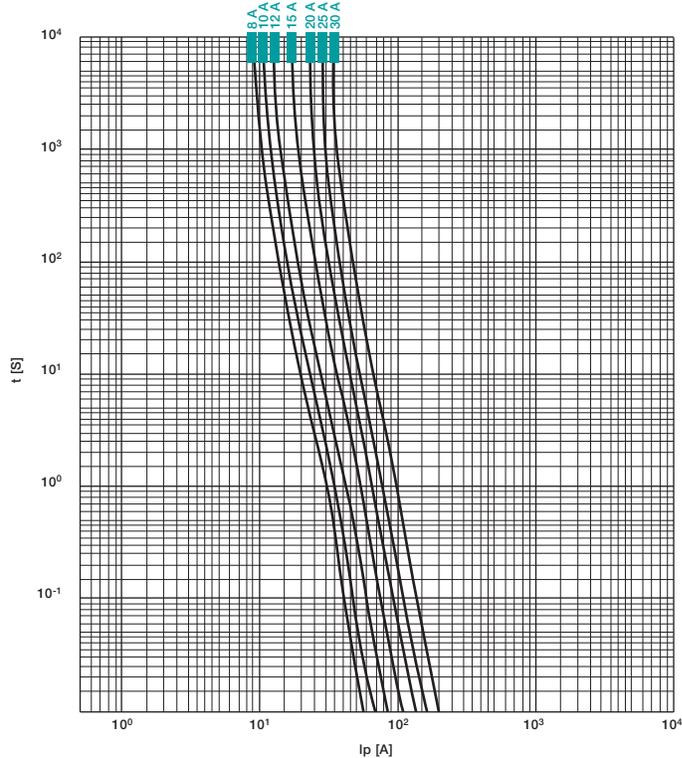
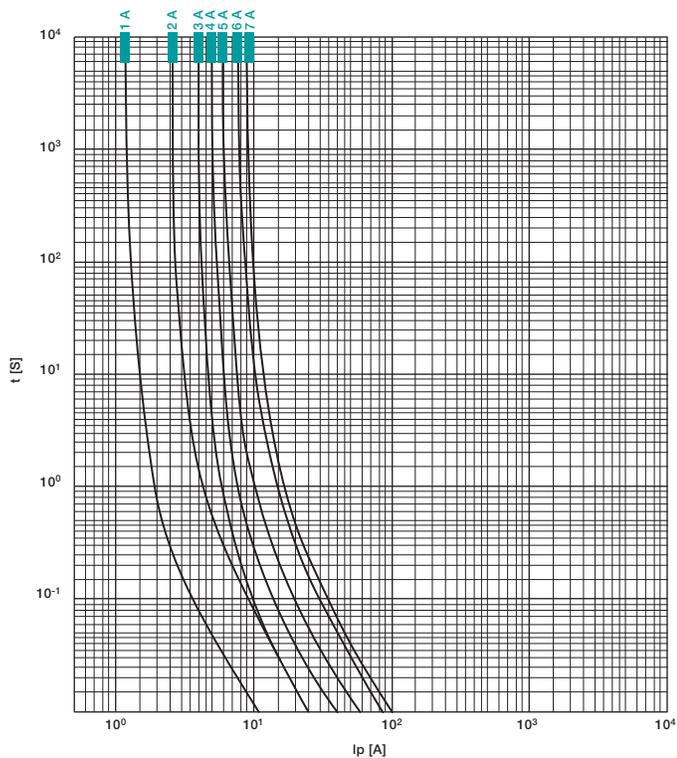
Type	Rated current [A]	Dissipated power 0.7 I <sub>n</sub> [W]	Dissipated power 0.8 I <sub>n</sub> [W]	Dissipated power I <sub>n</sub> [W]
E 9F1 PV	1	0.125	0.175	0.25
E 9F2 PV	2	0.160	0.250	0.32
E 9F3 PV	3	0.66	0.87	1.36
E 9F4 PV	4	0.69	0.8	1.25
E 9F5 PV	5	0.59	0.73	1.12
E 9F6 PV	6	0.42	0.67	1.05
E 9F7 PV	7	0.40	0.64	1
E 9F8 PV	8	0.77	0.88	1.48
E 9F10 PV	10	0.67	0.9	1.5
E 9F12 PV	12	0.72	1	1.8
E 9F15 PV	15	0.9	1.3	2.2
E 9F20 PV	20	1.1	1.5	2.8
E 9F25 PV	25	1.3	1.8	3
E 9F30 PV	30	1.5	1.9	3.7

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

## Derating in combination with ambient temperature

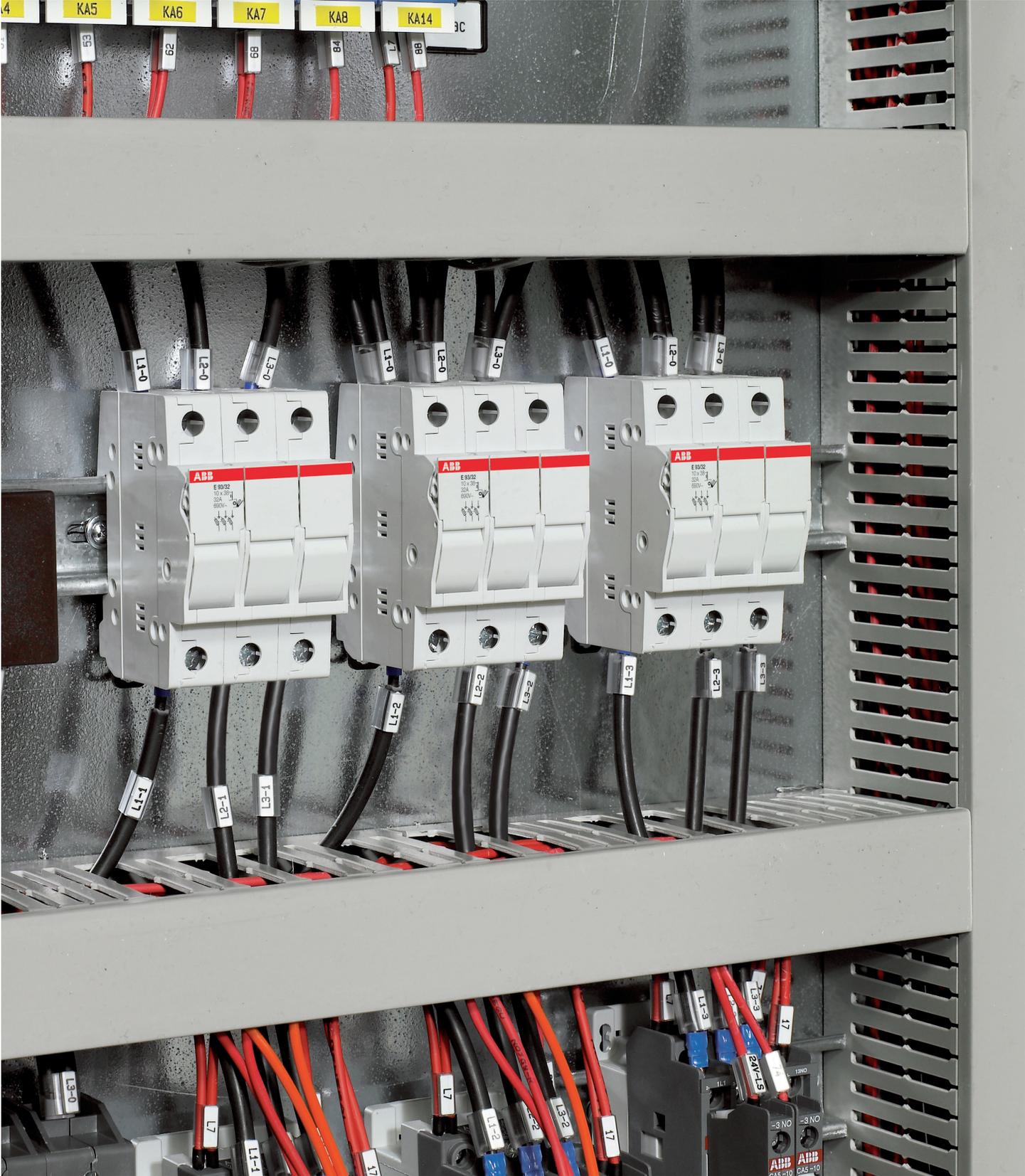


## Time/current tripping characteristics



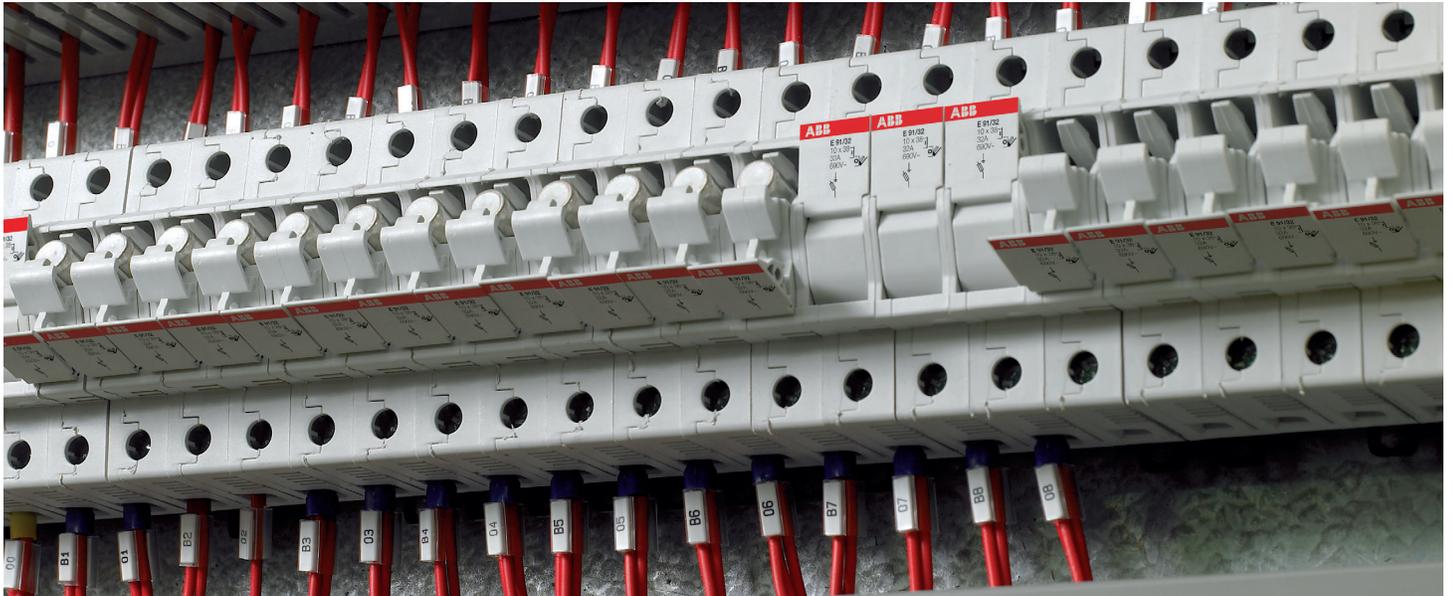
# Results you can trust

## High performance E 90/32 fuse holders



# E 90/32 protection and control

## Developed for automation and industry



E 90/32 fuse holders are designed for protection against short circuit and overload, in compliance with the UL 4248-1 Standard.

### Features:

- For use with 10.3mm (0.406") x 38mm (1.496") aM and gG fuses only
- 1, 1N, 2, 3, 3N, and 4 pole versions available
- Rated current 32A
- Rated voltage 600V AC/DC according to UL 4248-1
- All versions are available with optical blown fuse indicator

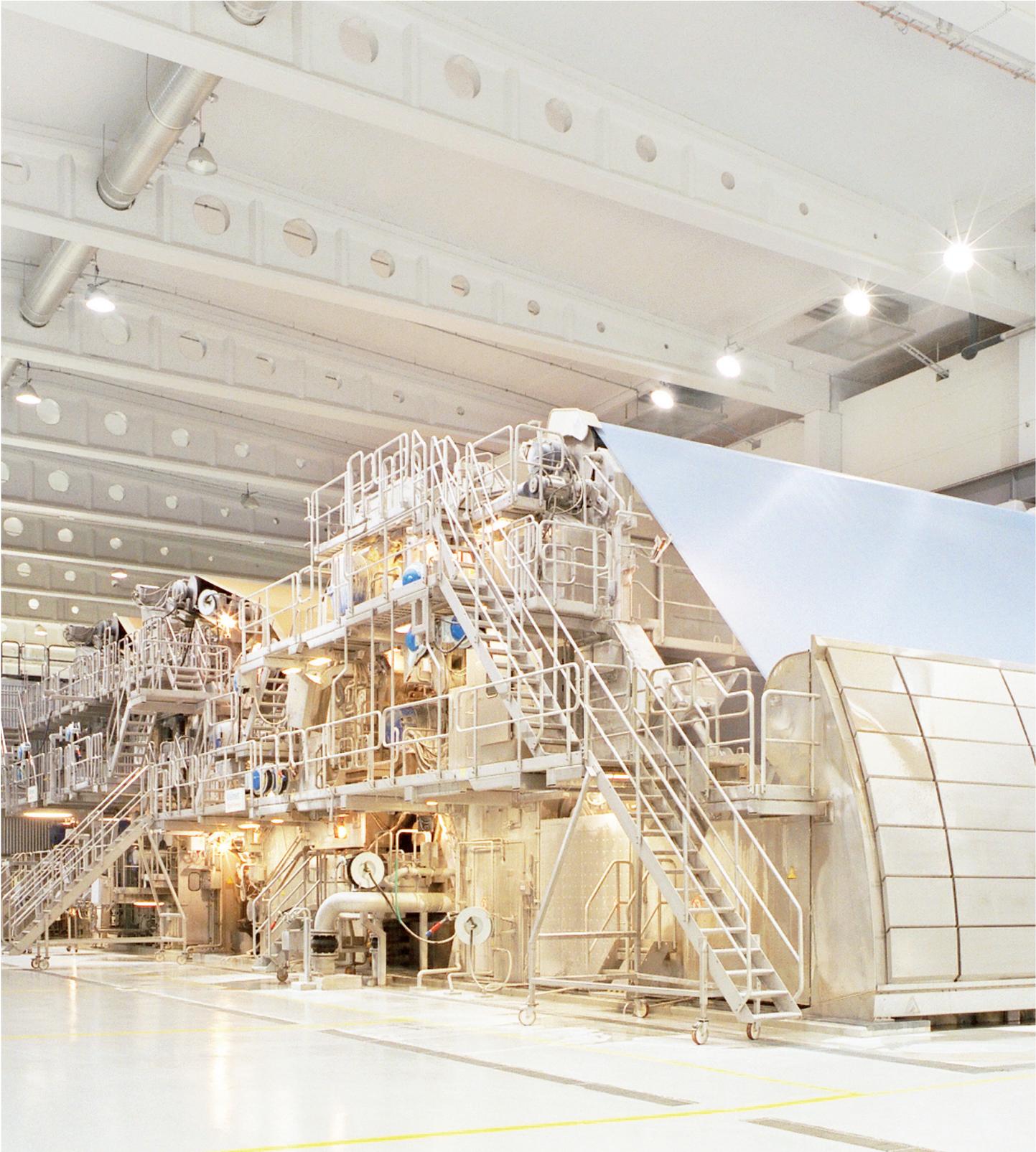
E 90/32 range is designed to comply with the strictest requirements of OEMs and panel builders. They are ideally installed in industrial automation switchboards to protect secondary circuits, primary and secondary transformers, motors, and other resistive or inductive loads. E 90/32 fuse holders are convenient, simple, and reliable devices. Fuse holders ensure selectivity, if equipped with appropriate fuses. Since they are cURus type-approved, they can be installed in UL-certified machines designed for the North American market.

### Ordering information

Poles	Rated current In [A]	Modules	Catalog number	Pack unit pcs
<b>E 90/32 fuse holder for 10.3 x 38 mm fuses</b>				
1	32	1	E 91/32	6
1	32	1	E 91/32s*	6
1+N	32	2	E 91N/32	3
1+N	32	2	E 91N/32s*	3
2	32	2	E 92/32	3
2	32	2	E 92/32s*	3
3	32	3	E 93/32	2
3	32	3	E 93/32s*	2
3+N	32	4	E 93N/32	1
3+N	32	4	E 93N/32s*	1
4	32	4	E 94/32	1
4	32	4	E 94/32s*	1

\* Version with blown fuse indicator.

E 90/50 and E 90/125 fuse holders  
Protection for industrial circuits



# Perfect integration, guaranteed innovation



E 90/50 and E 90/125 fuse holders are specifically designed to protect industrial circuits because of aM and gG cylindrical fuses with 50 A and 125 A ratings. The usage of 125 A fuses within E 90/125 fuse holder is allowed only in case the fuse power dissipation is lower than the maximum acceptable power dissipation value of the fuse holder. For more details see the "Questions and Answers" section on page 35.

## Features:

- For use with any type of cylindrical fuse sizes:  
E90/50: 14mm (0.551") x 51mm (2.008") only  
E90/125: 22mm (0.866") x 58mm (2.283") only
- 1, 1N, 2, 3, and 3N versions available
- Rated current 50A and 125A
- Rated voltage 600V AC/DC according to UL 4248-1
- All versions are available with optical blown fuse indicator

The E 90/50 and E 90/125 fuse holders have been specifically designed to be used in all applications that require protection and isolation of high-current loads. Because of their compatibility with gG and aM cylindrical fuses, they offer maximum flexibility in terms of protection of installation with rated currents up to 125A.

The fuse holder can be padlocked in the open position ensuring safety for personnel who carry out maintenance operations. In addition, the availability of optical blown fuse indicators in all versions of the new E 90 50A and 125A enables easy and efficient monitoring of distribution networks with high current ratings.

## Ordering information

Poles	Rated current In [A]	Modules	Catalog number	Pack unit pcs
<b>E 90/50 fuse holder for 14 x 51 mm fuses</b>				
1	50	1,5	E 91/50	4
1	50	1,5	E 91/50s*	4
1+N	50	3	E 91N/50	2
1+N	50	3	E 91N/50s*	2
2	50	3	E 92/50	2
2	50	3	E 92/50s*	2
3	50	4,5	E 93/50	1
3	50	4,5	E 93/50s*	1
3+N	50	6	E 93N/50	1
3+N	50	6	E 93N/50s*	1

Poles	Rated current In [A]	Modules	Catalog number	Pack unit pcs
<b>E 90/125 fuse holder for 22 x 58 mm fuses</b>				
1	125	2	E 91/125	4
1	125	2	E 91/125s*	4
1+N	125	4	E 91N/125	2
1+N	125	4	E 91N/125s*	2
2	125	4	E 92/125	2
2	125	4	E 92/125s*	2
3	125	6	E 93/125	1
3	125	6	E 93/125s*	1
3+N	125	8	E 93N/125	1
3+N	125	8	E 93N/125s*	1

\* Version with blown fuse indicator.

# Technical specifications

## E 90 series for North American market

### Data according to UL

Type		E 90/32	E 90 PV
Rated current	[A]	32	30
Rated voltage	[V]	600	1000
Type of current		AC/DC	DC
Withstand rating	[kA]	200 rms sym	50 rms sym
Fuse		10.3mm (0.406") x 38mm (1.496")	10.3mm (0.406") x 38mm (1.496")
Rated frequency	[Hz]	50-60	-
Tightening torque	[Nm]	PZ2 2-2.5	PZ2 2-2.5
Protection degree		IP20	IP20
Terminals section	[mm <sup>2</sup> ] ([AWG])	25 ([4])	25 ([4])
Wire size rigid copper conductor	[AWG]	16-10	-
Wire size stranded copper conductor	[AWG]	16-3	8-3
Padlockable (when open)		•	•
Sealable (when closed)		•	•
Terminal wire rating (Cu wire)	[°C]	60, 75, or 90	60, 75, or 90

### Marks and Approvals

cULus File Number			
UL File Number			• <sup>(2)</sup> E345878
cURus File Number		• <sup>(1)</sup> E327750	
CSA			

- (1) = certified in compliance with UL 4248-1  
 (2) = certified in compliance with UL 4248-18  
 (3) = certified in compliance with UL 4248-8  
 (4) = certified in compliance with UL 4248-4

E 90/50	E 90/125	E 90/30 CC	E 90/30 J	E 90/60 J
50	125	30	30	60
600	600	600	600	600
AC/DC	AC/DC	AC/DC	AC/DC	AC/DC
200 rms sym	200 rms sym	200 rms sym	200 rms sym	200 rms sym
14mm (0.551") x 51mm (2.008")	22mm (0.866") x 58mm (2.283")	Class CC 10.4mm (0.409") x 38mm (1.496")	Class J 21mm (0.827") x 57mm (2.244")	Class J 27mm (1.063") x 60mm (2.362")
50-60	50-60	60	60	60
PZ2 3-3.5	PZ2 3.5-4	PZ2 2-2.5	PZ2 3.5-4	PZ2 3.5-4
IP20	IP20	IP20	IP20	IP20
35 ([2])	50 ([1/0])	25 ([4])	50 ([1/0])	50 ([1/0])
14-10	14-10	16-10	12-10	12-10
14-2	14-1	16-3	12-1	12-1
•	•	•	•	•
•	•	•	•	•
60 or 75	60 or 75	60, 75, or 90	60 or 75	60 or 75
		• <sup>(4)</sup> E327750	• <sup>(3)</sup> E327750	• <sup>(3)</sup> E327750
• <sup>(1)</sup> E327750	• <sup>(1)</sup> E327750	•	•	•

# Technical specifications

## E 90 series for North American market

### Data according to IEC

Type		E 90/32	
Rated current	[A]	32	
Type of current		AC	
Fuse	[mm]	10.3 x 38	
Max power dissipation accepted	[W]	3	
Rated frequency	[Hz]	50-60	
Tightening torque	[Nm]	PZ 2-2.5	
Protection degree		IP20	
Terminals section	[mm <sup>2</sup> ]	25	
Cross section rigid copper conductor	[mm <sup>2</sup> ]	1.5 - 25	
Cross section stranded copper conductor	[mm <sup>2</sup> ]	1.5 - 26	
Padlockable (when open)		•	
Sealable (when closed)		•	
IEC 60947-3		E 90/32	
Utilization category		AC-22B	AC-20B
Rated voltage	[V]	400	690
Marks and approvals		E 90/32	
IMQ		•*(1)	
NF		•**(1)	
CCC - China		•*(1)	
RINA		•*(1)	
LLOYD		•*(1)	
BV		•(1)	
EAC		•	
GOST - Ukraine		•	

•\*= without LED version

•\*\* = no neutral and without LED version

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

(2) = according to IEC 60296-2

(2b) = with aM-type fuses and in combination with a device that ensures overload protection

E 90 PV	E 90/50	E 90/125
32	50	100 <sup>(2)</sup> /125 <sup>(2b)</sup>
DC	AC	AC
10.3 x 38	14 x 51	22 x 58
3	5	9.5
-	50-60	
PZ2 2-2.5	PZ2 3-3.5	PZ2 3.5-4
IP20	IP20	
25	35	50
1.5 - 25	2.5 - 35	4 - 50
1.5 - 16	2.5 - 25	4 - 35
•	•	
•	•	

DC-20B	AC-20B	AC-20B
1000	690	690

E 90 PV	E 90/50	E 90/125
	•	•
•	•	•
	•	•
	•	•
•	•	•
•	•	•
•		

# E 90 fuse holders

## How to use it

The E 90 fuse holder design meets the most stringent security requirements. Beyond the blown fuse indicator light, which provides a visual signal of the fuse break condition, the fuse holders can be padlocked open and sealed closed to ensure operator safety during maintenance operations.

1. E 90 fuse holders are IP20 finger safe, ensuring operator safety against accidentally touching live wires when fuse holder is open.

2. Fuse holder 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.

3. To ensure protection and safety during maintenance operations and to avoid any accidental switching, fuse holders can be sealed in closed position, and padlocked in open position.

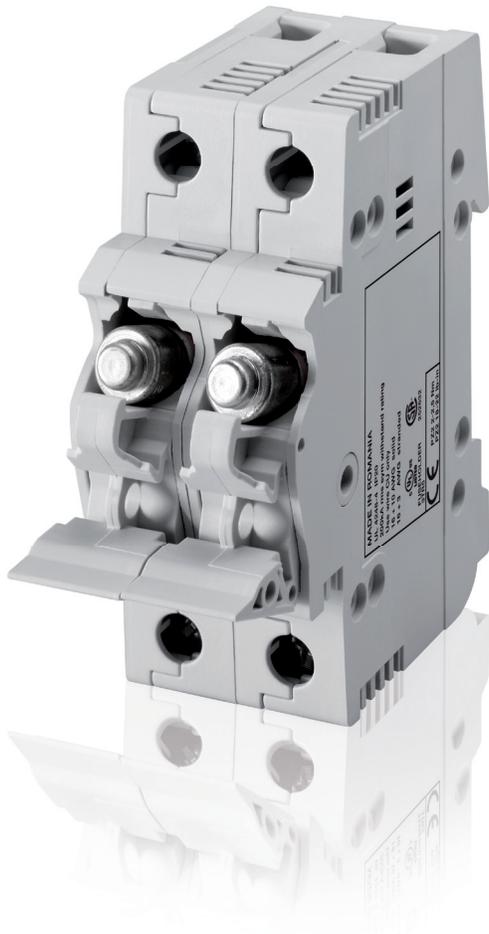


# How to choose a protection system

When choosing a protection system, an important feature to consider is the power dissipation of the system “fuse + fuse holder.” It is important to make sure that the power dissipated by the fuse does not exceed the limit imposed by the fuse holder in which it is installed.

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 fuse holders

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 90/32		E 90/50 and E 90/125	
Poles	Maximum current	Poles	Maximum current
1...4	$I_n$	1...3	$I_n$
5...7	$0.80 \times I_n$	4...6	$0.95 \times I_n$
more than 7	$0.70 \times I_n$	more than 7	$0.90 \times I_n$

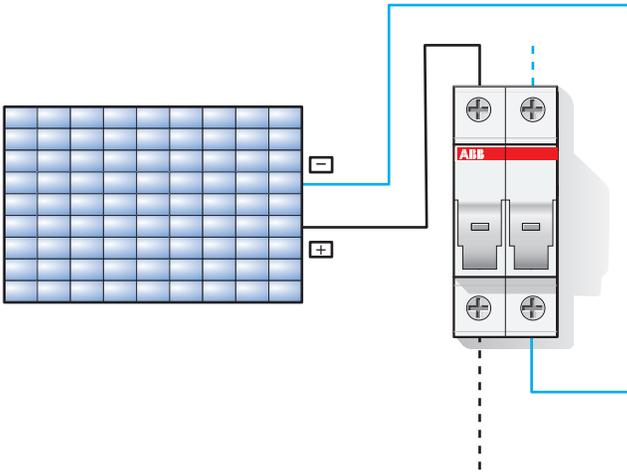
### Climatic conditions

E 90/32		E 90/50 and E 90/125	
Maximum temperature	Maximum current	Maximum temperature	Maximum current
20 °C	$I_n$	20 °C	$I_n$
30 °C	$0.95 \times I_n$	30 °C	$0.95 \times I_n$
40 °C	$0.90 \times I_n$	40 °C	$0.90 \times I_n$
50 °C	$0.80 \times I_n$	50 °C	$0.85 \times I_n$

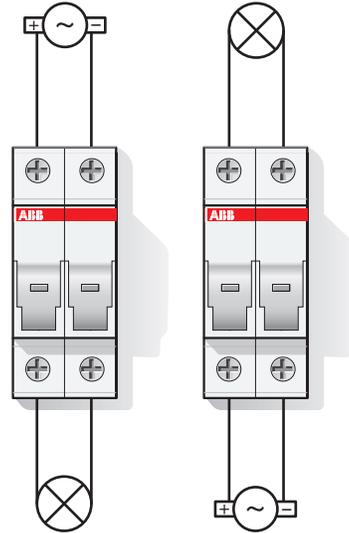
# Connection scheme and approximate dimensions

## E 90 series for North American market

### Connection scheme



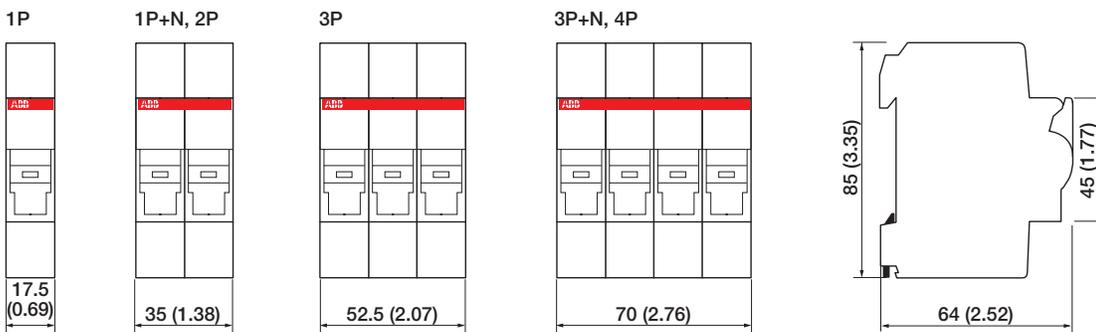
Wiring diagram for DC networks



Wiring diagram for AC networks

### Approximate dimensions

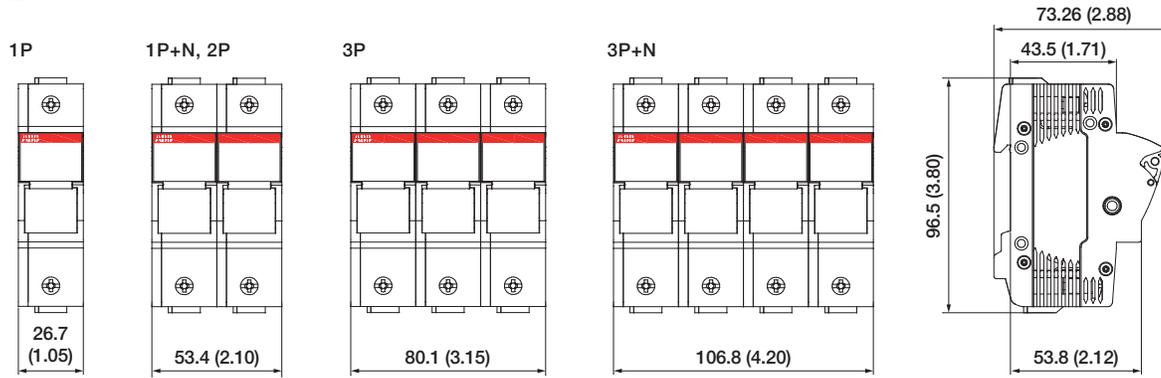
E 90 CC, E 90 PV, E 90/32



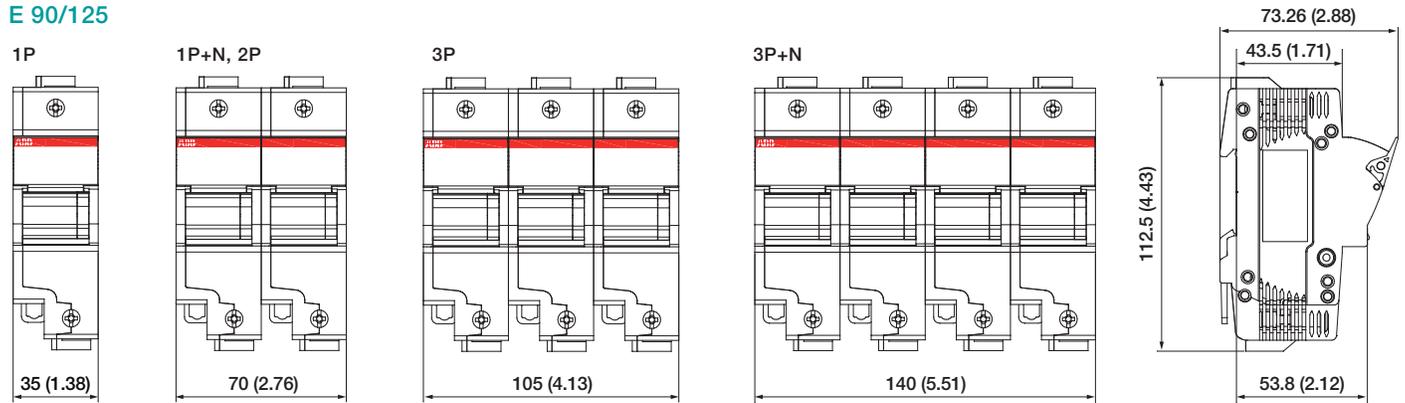
Dimensions in mm (inches)

# Approximate dimensions E 90/50 and E 90/125 series

## E 90/50



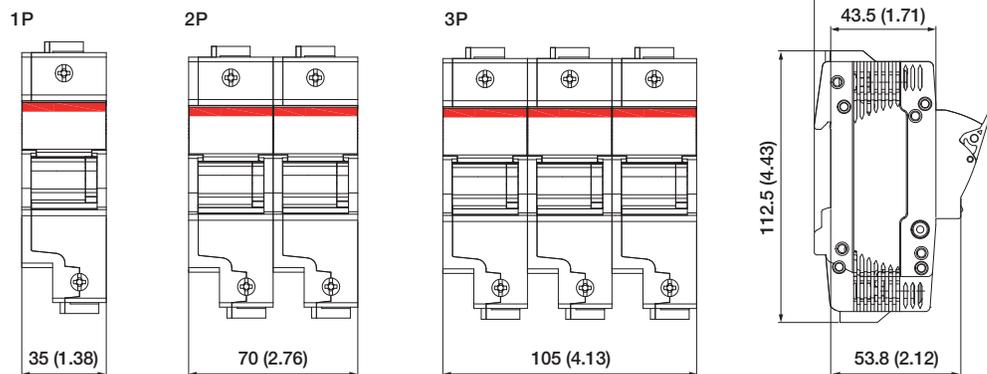
## E 90/125



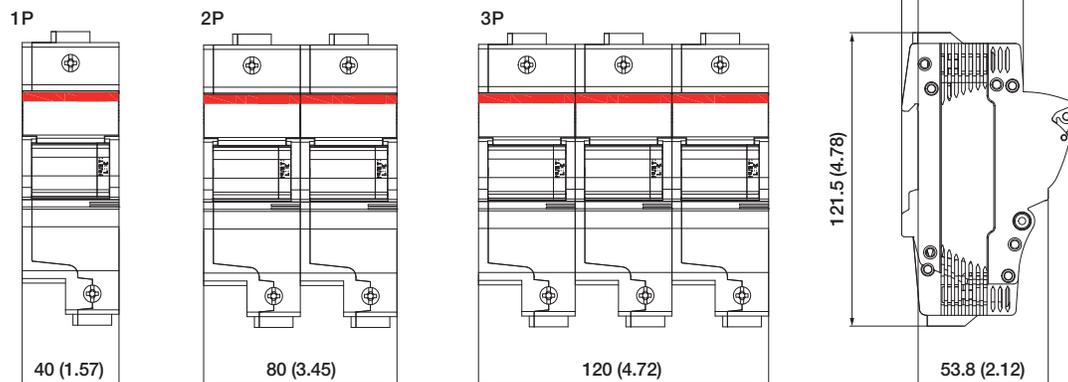
Dimensions in mm (inches)

# Approximate dimensions E 90/30 J and E 90/60 J

## E 90/30 J



## E 90/60 J



Dimensions in mm (inches)

# Questions and answers

## Technical details and insights for E 90 fuse holders 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. There is no risk of being contaminated by oil, corrosion or dust and no unexpected tripping.
- **Universal use:** The fuse's characteristics are standardized in order to ensure 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 fuse holder for class CC fuses (E 90/30 CC) from a fuse holder for IEC fuses?

Class CC fuse holders are 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 bottom to prevent them from 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.





# Contact us

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