



E 90 range of fuse disconnectors
and fuseholders
Uncompromising performance

Power and productivity
for a better world™



Phone: 800.894.0412 - Fax: 888.723.4773 - Web: www.clrwtr.com - Email: info@clrwtr.com

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.

The result is the first AC-22B fuse disconnector, certified up to 32 A and 690 V by the most outstanding marks and approvals all over the world.



The new ABB standard Certified according to the most important international marks



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

* Under approval. To check the approvals availability, please contact ABB Local Sales Organization

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E 90 range

Designed by ABB for the most demanding customers

Industrial automation

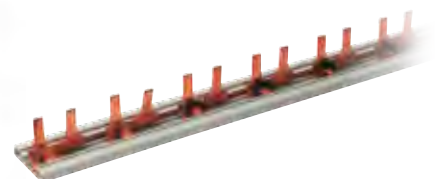
E 90 fuse switch disconnectors

- One module per pole
- Versions 1, 1N, 2, 3, 3N, 4
- AC-22B according to IEC 60947-3
- Rated current 20 A and 32 A
- Rated voltage 400 V~ and 690 V~
- Can be equipped with 8.5 x 31.5 mm and 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
- Compatible with ABB busbars of S 200 series and Unifix plug-in system

Switchboards

E 90h fuseholders

- One pole plus neutral in one module
- Versions 1N, 3N
- Certified according to IEC 60269
- Rated current 20 A and 32 A
- Rated voltage 400 V~ and 690 V~
- Can be equipped with 8.5 x 31.5 mm and 10.3 x 38 mm aM and gG fuses
- Designed for instruments and auxiliaries protection in switchboards and consumer units
- Compatible with ABB busbars of SN 201 series and Unifix plug-in system



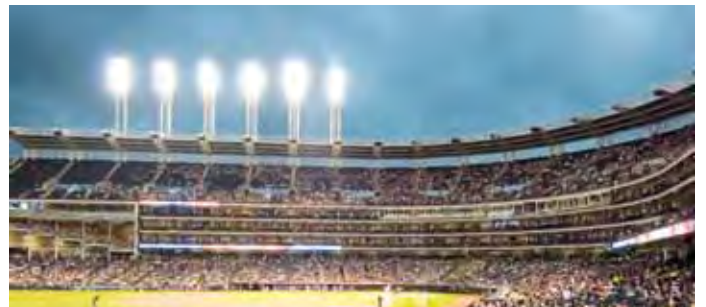
Photovoltaic installations E 90 PV fuse disconnectors

- One module per pole
- 1 and 2-pole versions
- DC-20B according to IEC EN 60947-3
- Rated current 32 A
- Rated voltage 1000 V =
- Can be equipped with 10.3 x 38 mm fuses for d.c.
- Designed for isolation and protection of circuits in photovoltaic installations up to 1000 V d.c.



For the American market E 90 UL fuseholders

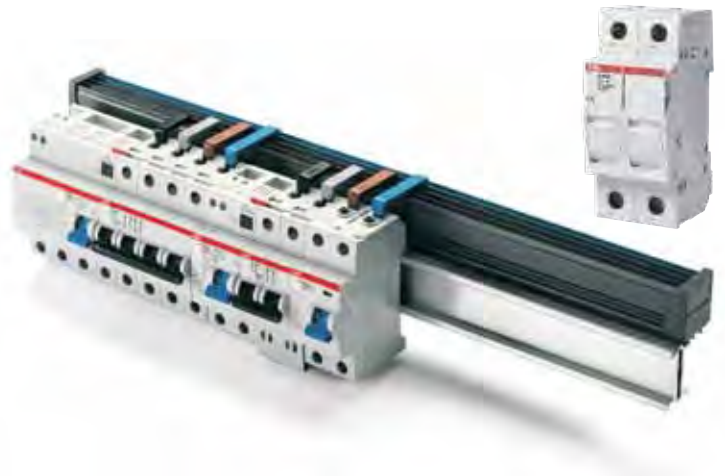
- One module per pole
- Versions 1, 1N, 2, 3, 3N, 4 poles
- Rated current 30 A
- Rated voltage 600 V~
- Can be equipped with Class CC fuses
- Specifically designed for the North American market
- UL listed according to UL 4248
- Compatible with ABB busbars of S 200 series and Unifix plug-in system



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

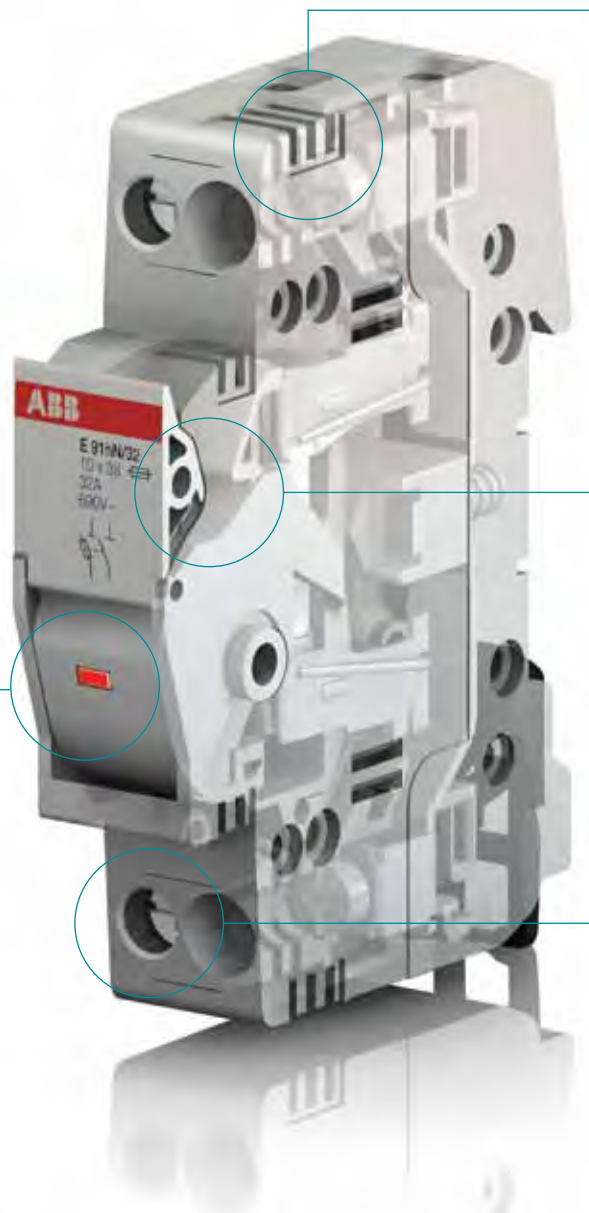
Maximum performance

E 90 fuseholders can be used in any applications where you need to ensure electrical protection, isolation and switching under load of inductive or resistive loads in compliance with IEC 60947-3 Standard, AC-22B utilization category. The technology solutions applied to reduce power dissipation help to minimize module heating.



Ease of installation.

The PS connection busbars make wiring easier and safer, providing complete integration with the S 200 e SN 201 System pro M compact® miniature circuit breakers. Faster product installation can be achieved also by mean of Unifix system thanks to its standard connections.



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.

Completeness

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

Universality

Screw holes have increased diameter to accommodate insulated screwdrivers and electric screwdrivers. In addition, with the Prozidriv PZ2 screws tightening can be performed by exerting less torque than conventional screws, and the same electric screwdriver can be used for all terminals.

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.

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.

Reliable connections

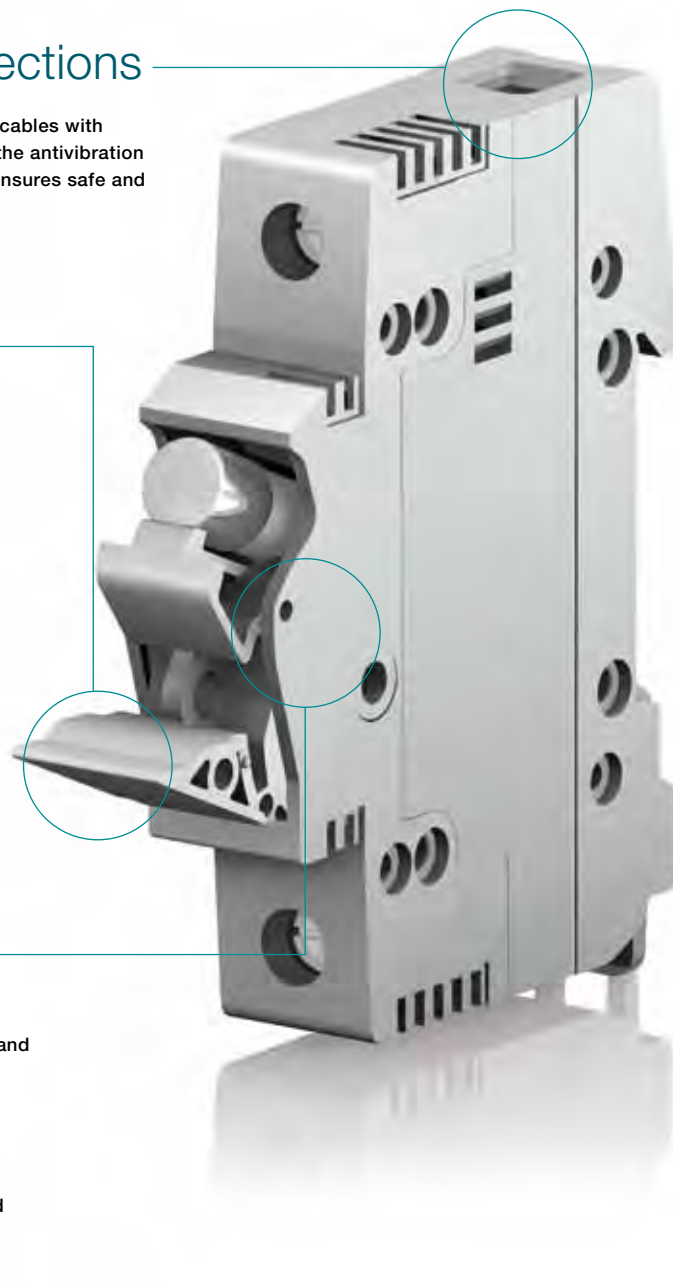
Wide terminals allow the use of cables with section up to 25 mm², whereas the antivibration knurling on the terminal cages ensures safe and reliable connections.

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.

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.



Results you can trust High performances of E 90 fuse disconnectors



E 90 protection and control: a range developed for automation and industry

Applications

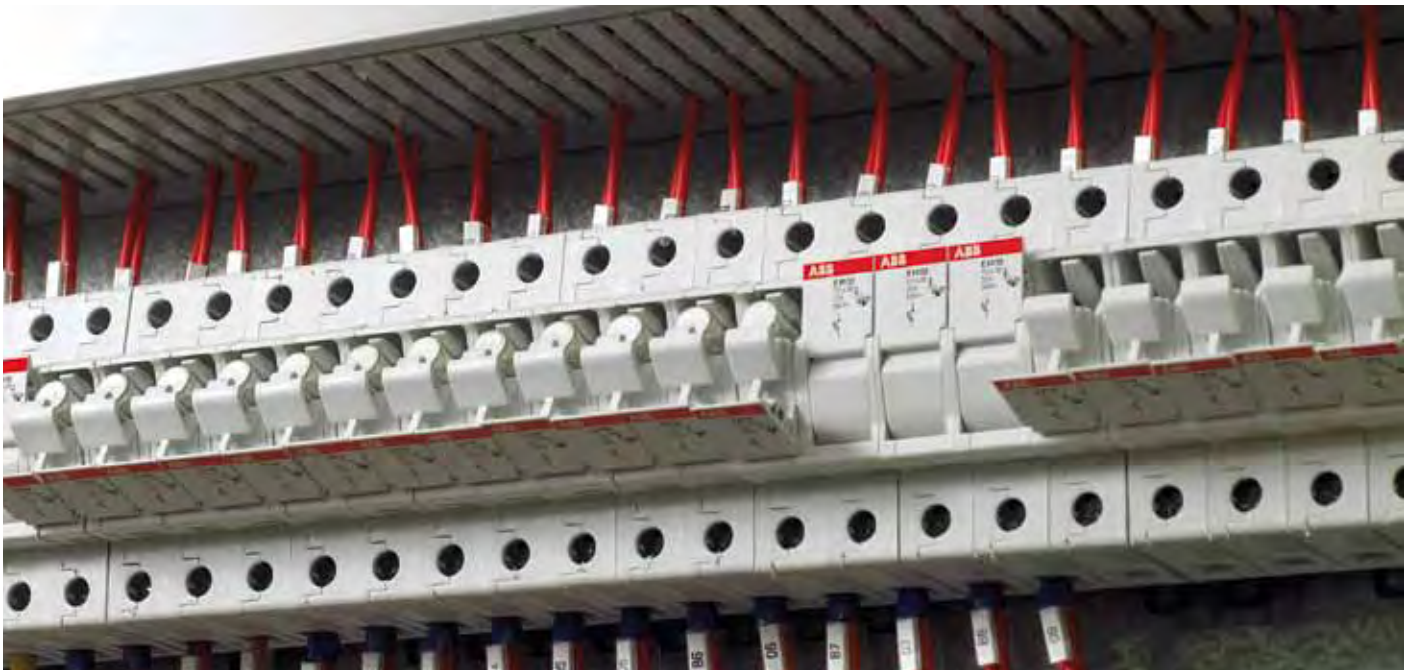
- Automation switchboards
- On-board switchboards and OEMs

Main functions:

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

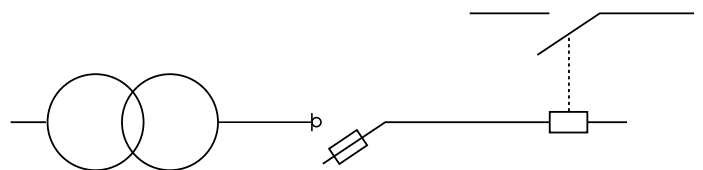
E90 fuse disconnectors are designed for switching under load, ensuring isolation and protection against short circuit and overload, in compliance with the IEC 60947-3 Standard.

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.



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 a.c. power supply to a battery of industrial contactors.



Industrial distribution E 90h fuseholders: ideal for distribution switchboards



E 90h fuseholders

Compact protection of electric auxiliaries in distribution switchboards

Applications

- Switchboards
- Consumer units

Terminal protection of:

- Electric auxiliaries
- Switchboard instrumentation
- Surge arresters

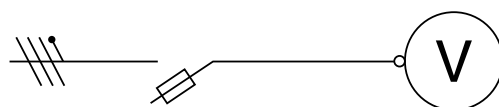
E90 Fuseholders – 1P+N in one module and 3P+N in three modules, respectively – are very compact in size and are the most suitable solution for protection of circuits and devices inside switchboards.

E 90h range is designed for protecting electrical devices both in single phase and in three-phase networks with neutral. They are particularly suitable inside switchboards and consumer units for protecting lighting circuits, modular sockets and electrical devices for monitoring, measuring and signalling.



Application example

Here you can find a typical application inside a secondary distribution switchboard. Following the manufacturer's instruction, the voltmeter inputs of the multimeter are protected with fuses.



E 90 PV fuse disconnectors for photovoltaic applications

Designed for industry professionals

Features

- For 10.3 x 38 mm fuses
- Rated voltage 1000 V d.c.
- Rated current 32 A
- DC-20B Utilization category
- Reference standards:
IEC 60947-3

E 90 fuse disconnectors have been specifically designed for photovoltaic applications. Thanks to their rated voltage up to 1000 V d.c. 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.

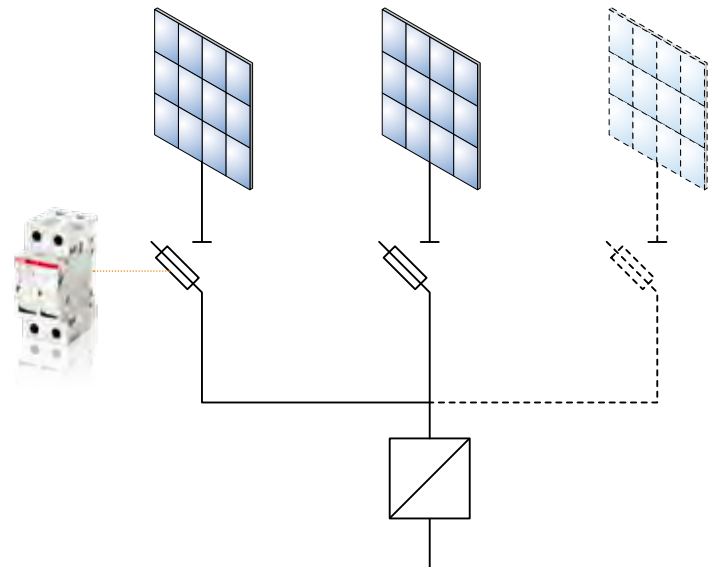


Isolation and protection of strings up to 1000 V

Application examples

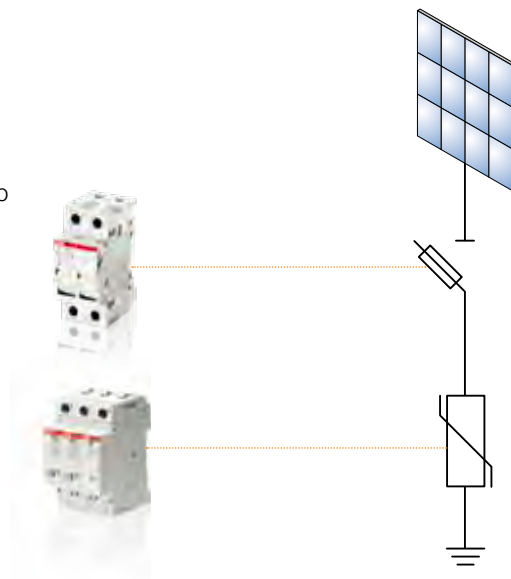
String protection

To prevent any damage to the equipment on direct current lines of the photovoltaic installation and ensure **isolation** in case of maintenance, E 90 PV fuse disconnectors can be installed downstream of the inverter, to protect each string. Fuses must be selected according to the line rated current, up to 32 A.



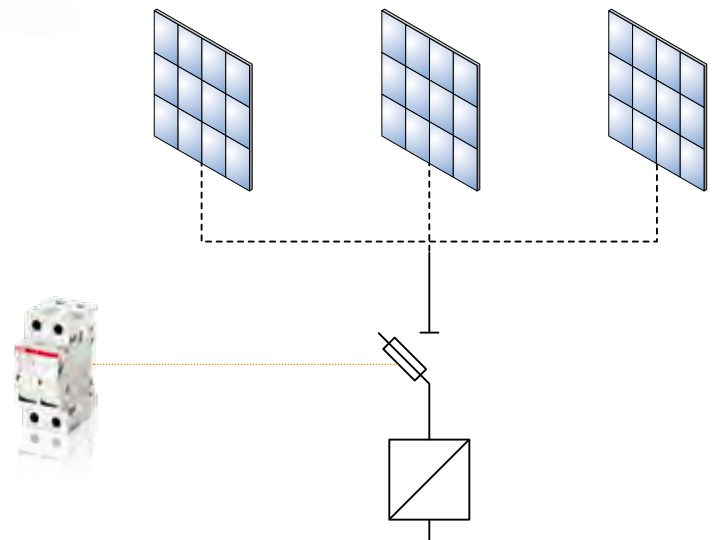
Surge arrester back-up

When the I_{cc} short circuit current at the installation point exceeds 25 A d.c., **OVR PV** surge arresters require back-up protection with a specific gR-type fuse.



Inverter DC side

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 also speaks American E 90 UL fuseholders, designed for the North American market

Features

- UL Listed according to UL 4248-1 and UL 4248-4
- Can be equipped with Class CC fuses
- Rated voltage 600 V
- Versions 1, 1N, 2, 3, 4 poles

E 90 UL 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.



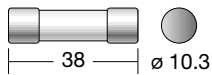
Technical features of the whole E 90 series

Type		E 90/20	E 90/32	E 90hN/20	E 90hN/32	E 90/32 PV
Fuse	mm	8 x 31	10 x 38	8 x 31	10 x 38	10 x 38
Current type		a.c. / d.c.		a.c. / d.c.		d.c.
Rated frequency	Hz	= / 50-60		= / 50-60		–
Rated current	A	20	32	20	32	32
Max power dissipation	W	2,5	3	2,5	3	3
Tightening torque	Nm	PZ2 2-2,5		PZ2 0,8-1,2		PZ2 2-2,5
Terminal cross section	mm ²	25	25	16	16	25
Protection degree		IP20		IP20		IP20
Padlockable (when open)		•		•		•
Sealable (when closed)		•		•		•
IEC 60947-3						
Operating rated voltage	V	400	690	–	–	1000
Utilization category		AC-22B		–	–	DC-20B
Marks		IMQ, NF		–	–	–
Alternate current performance according to IEC 60947-3						
Rated voltage	V	400	690	–	–	–
Utilization category		AC-22B*		–	–	–
Direct current performance according to IEC 60947-3						
Rated voltage	V	400	690	–	–	–
Utilization category		DC-20B*		–	–	–
IEC 60269-1						
AC rated voltage	V	400	690	400	400	–
DC rated voltage	V	400	690	400	400	–
IEC 60269-2						
Fuse system		F		F		–
AC rated voltage	V	400	690	400	690	–
DC rated voltage	V	250	440	250	440	–
Breaking capacity	kA	200 (a.c.) – 100 (d.c.)		200 (a.c.) – 100 (d.c.)		–
IEC 60269-3						
Fuse system		B		B		–
AC rated voltage	V	400		400		–
IEC 60269-4						
Fuse system		F		F		–
AC rated voltage	V	400	690	400	690	–
DC rated voltage	V	400	690	400	690	–
Marks and type approvals						
		E 90/20	E 90/32	E 90hN/20	E 90hN/32	E 90/32 PV
NF		•	•	•	•	
UR – cURus			•		•	
CCC		•	•	•	•	•
IMQ		•	•	•	•	
LLOYD		•	•	•	•	
BV		•	•	•	•	
RINA			•		•	

Type		E 90/30
Poles		1, 1N, 2, 3, 3N, 4
Modules		1, 2, 3, 4
Fuse		Class CC
Breaking capacity	kA	200
Rated voltage	V	600
Rated current	A	30
Wiring		CU only
Tightening torque	Nm	PZ 2-2,5
Temperature	°C	75

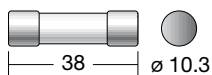
* In case of using the product in direct current, operating under load is prohibited. In that case, on the front of the device it is necessary to indicate the sentence "do not operate under load".

Order codes



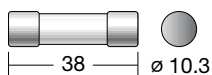
Poles	Rated current	Modules	Description Type	Order Code	Bbn 8012542 EAN	Weight 1 piece kg	Pack unit pc.
E 90 fuse disconnectors for 10.3 x 38 mm fuses (AC-22B)							
1	32	1	E 91/32	2CSM200923R1801	009238	0,061	6
1	32	1	E 91/32s*	2CSM202483R1801	024835	0,062	6
1+N	32	2	E 91N/32	2CSM200893R1801	008934	0,130	3
2	32	2	E 92/32	2CSM200883R1801	008835	0,122	3
3	32	3	E 93/32	2CSM204753R1801	047537	0,183	2
3+N	32	4	E 93N/32	2CSM204733R1801	047339	0,252	1
4	32	4	E 94/32	2CSM204723R1801	047230	0,244	1
E 90 fuse disconnectors for 8.5 x 31.5 mm fuses (AC-22B)							
1	20	1	E 91/20	2CSM200983R1801	009832	0,061	6
1	20	1	E 91/20s*	2CSM202423R1801	024231	0,062	6
2	20	2	E 92/20	2CSM200953R1801	009535	0,122	3
3	20	3	E 93/20	2CSM200943R1801	009436	0,183	2

The most widely used codes are blue.

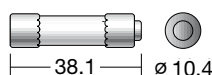


Poles	Rated current	Modules	Description Type	Order Code	Bbn 8012542 EAN	Weight 1 piece kg	Pack unit pc.
E 90h fuseholders for 10.3 x 38 mm fuses							
1+N	32	1	E 91hN/32	2CSM200913R1801	009139	0,070	6
1+N	32	1	E 91hN/32s*	2CSM206573R1801	065739	0,071	6
3+N	32	2	E 93hN/32	2CSM204743R1801	047438	0,192	2
E 90h fuseholders for 8.5 x 31.5 mm fuses							
1+N	20	1	E 91hN/20	2CSM200963R1801	009634	0,070	6
1+N	20	1	E 91hN/20s*	2CSM200703R1801	007036	0,071	6
3+N	20	3	E 93hN/20	2CSM200933R1801	009337	0,192	2

The most widely used codes are purple.



Poles	Rated current	Modules	Description Type	Order Code	Bbn 8012542 EAN	Weight 1 piece kg	Pack unit pc.
E 90 PV fuse disconnectors for 10.3 x 38 mm fuses (DC-20B)							
1	32	1	E 91/32 PV	2CSM204713R1801	047131	0,061	6
1	32	1	E 91/32 PVs*	2CSM204693R1801	046936	0,062	6
2	32	2	E 92/32 PV	2CSM204703R1801	047032	0,122	3

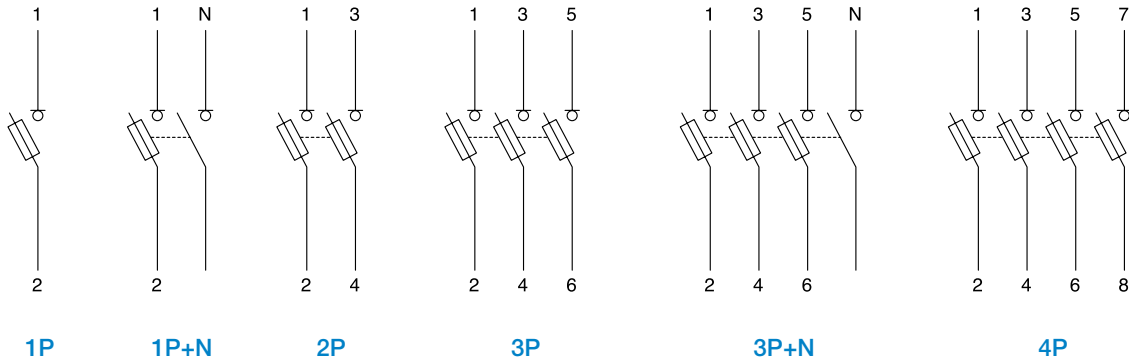


Poles	Rated current	Modules	Description Type	Order Code	Bbn 8012542 EAN	Weight 1 piece kg	Pack unit pc.
E 90 fuseholders for Class 10.4 x 38.1 mm fuses							
1	30	1	E 91/30	2CSM205833R1801	058335	0,061	6
1	30	1	E 91/30s*	2CSM251533R1801	515333	0,062	6
1+N	30	2	E 91N/30	2CSM200693R1801	006930	0,13	3
2	30	2	E 92/30	2CSM202443R1801	024439	0,122	3
3	30	3	E 93/30	2CSM200683R1801	006831	0,183	2
3+N	30	4	E 93N/30	2CSM202433R1801	024330	0,252	1
4	30	4	E 94/30	2CSM200673R1801	006732	0,244	1

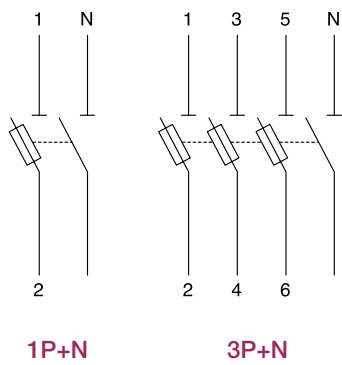
*s: version with blown fuse indicator

Wiring diagrams and overall dimensions

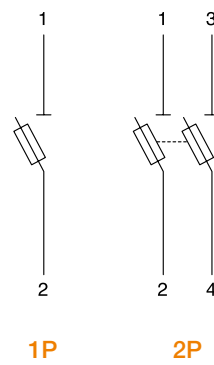
E 90 wiring diagrams



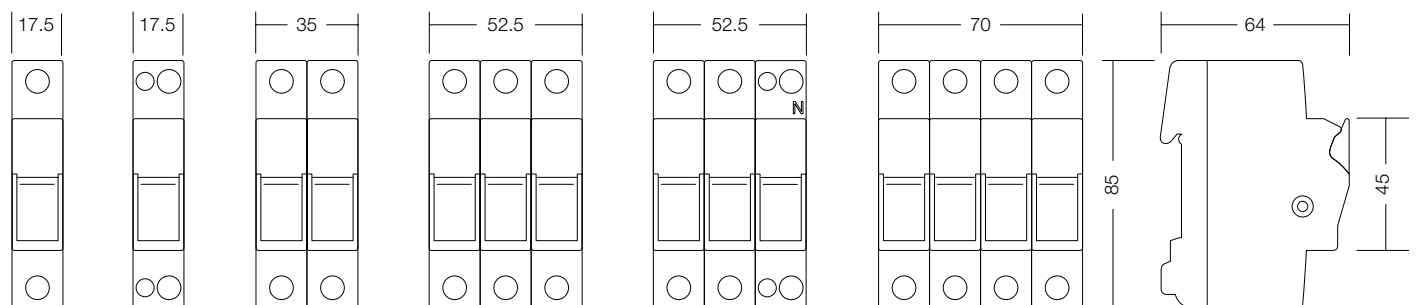
E 90h wiring diagrams



E 90 PV wiring diagrams



Overall dimensions



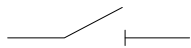
Questions and answers

Technical and regulatory details on E 90 range

IEC 60947-3: switches, disconnectors, switch-disconnectors and fuse-combination units

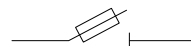
This standard establishes the requirements of a device to ensure its suitability for disconnection and operation.

Disconnector:



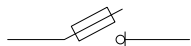
A disconnector is a mechanical control device which, when open, meets the prescriptions for the disconnection function laid down by the international IEC 60947-3 standard. Opening a disconnector ensures that downstream the circuit is electrically isolated from upstream. This condition is necessary if you need to operate on a network component, e.g. during maintenance. Pursuant to the IEC 60364 standard, any maintenance operations on the installation are prohibited unless circuits have been previously disconnected.

Fuse-disconnector:



This defines a fuseholder that also performs disconnecting functions. Not all fuseholders are also disconnectors: to meet this definition they must meet the requirements and pass the tests provided for in the IEC 60947-3 standard.

Fuse-switch-disconnector:



According to the IEC 60947-3 standard, this definition concerns a fuse-switch-disconnector that enables switching under load. Not all fuse-disconnectors enable this operation: to be considered as a fuse-switch-disconnector a device must have utilization category equal to AC-21B or above.

Utilization categories:

Not all devices intended for disconnection have the same performance. The type of operation allowed depends on a designation that specifically defines the methods of use, i.e. the utilization category.

This identifies:

- The nature of current (a.c./d.c.)
- The type of switching allowed (no load, resistive loads, highly inductive loads, etc.)
- The operation frequency

E 90 fuse-switch disconnectors have AC-22B utilization category. The E 90 PV fuse-switch-disconnectors have DC-20B utilization category.

Current nature	Utilization category		Typical applications
	A	B	
Alternating current	AC-20A	AC-20B	Connecting and disconnecting under no-load conditions
	AC-21A	AC-21B	Switching of resistive loads including moderate overloads
	AC-22A	AC-22B	Switching of mixed resistive and inductive loads, including moderate overload
	AC-23A	AC-23B	Switching of motor loads or other highly inductive loads
Direct current	DC-20A	DC-20B	Connecting and disconnecting under no-load conditions
	DC-21A	DC-21B	Switching of resistive loads including moderate overloads
	DC-22A	DC-22B	Switching of mixed resistive and inductive loads, including moderate overloads (e.g. shunt motors)
	DC-23A	DC-23B	Switching of highly inductive loads? (e.g. series motors)

Which loads can be disconnected using a product with AC-22B utilization category?

The AC-22B utilization category allows occasional operation of mixed, resistive and inductive loads with moderate overloads in alternating current circuits. Mixed loads include: transformers, corrected motors, capacitor batteries, discharge lamps, heating, etc.

Which loads can be disconnected using a product with AC-20B utilization category?

The AC-20B utilization category does not allow operation under load. Disconnection is possible only by first disconnecting the load through an appropriate switch.



IEC 60269-1: Fuses with voltage not exceeding 1000 V in alternating current and 1500 V in direct current

This standard establishes the requirements of low voltage fuses, and as a result the requirements of fuseholders as devices intended to accommodate fuses. This standard includes two different sections, with different requirements depending on the type of individual using the equipment:

IEC 60269-2: supplementary requirements for fuses for use by skilled persons (mainly for industrial application).

IEC 60269-3: supplementary requirements for fuses for use by unskilled persons (mainly for household and similar applications).

What is the difference between a IEC 60947-3-compliant fuseholder and a IEC 60947-2-compliant fuseholder?

These are two complementary standards: IEC 60269-2 establishes the characteristics of fuses, and, from these general requirements for fuseholders are derived. It is the reference standard for overcurrent protection but not for disconnection and switching.

A IEC 60269-1- compliant fuseholder is a disconnecter?

A device complying only with IEC 60269 is “suitable for disconnection”, but is not recognized as disconnecter compliant to the stricter IEC 60947-3 standard.

Why is the direct current operating voltage of the E 90 series, according to IEC 60269-3, lower than the value indicated under IEC 60269-2?

The IEC 60269-2 standard establishes the requirements for industrial applications; therefore, the reference voltage is higher than that of civil applications mentioned in IEC 60269-3. In other words, the fuseholder rated voltage depends on its field of use and, as a result, on the applicable standard.

Can a coupling kit be used to create multiple pole configurations?

The configurations made from a single pole by means of coupling kits are not compliant with the reference standards.

In case of installation of several poles side by side or in particular climate conditions, what performance derating should be considered compared to rated values?

The following tables include the rated current derating parameters depending on the number of poles side by side, or on temperature and relative humidity.

Installation of single poles side by side:			
E 91/32		E 91hN/32	
Poles	Maximum current	Poles	Maximum current
1...4	In	1...3	In
5...7	0,8 x In	4...9	0,7 x In
More than 7	0,7 x In	More than 10	0,6 x In

Climate 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