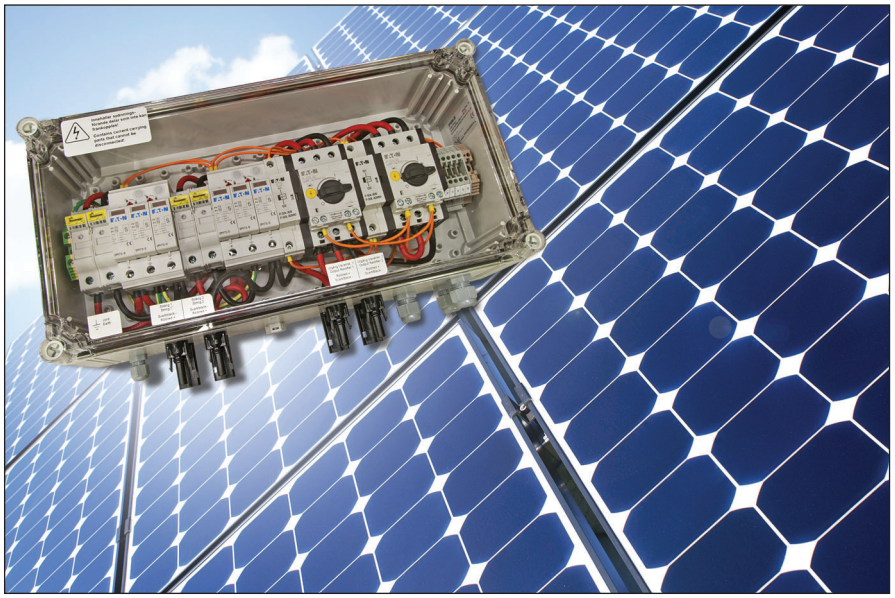
CHS Controls

PV combiner boxes with fireman’s switch



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Photovoltaic system protection - DC

Protect the DC side of the PV system against overcurrent's and overvoltage's, install PV combiner boxes with fuses and surge protection devices!

Interest in renewable energy such as solar power is rapidly increasing, the industry for photovoltaic modules is growing at 30-40% per year. Rising energy prices has generated an increased interest also in Scandinavia.

A photovoltaic (PV) cell converts light into electrical current - DC. A PV module is an assembly comprising a number of interconnected PV cells. To be able to generate sufficient voltage, the PV modules are connected in series and form a string. A number of strings can then be connected in parallel, forming an array to achieve the desired output power. The PV modules should be protected against overcurrent and overvoltage.

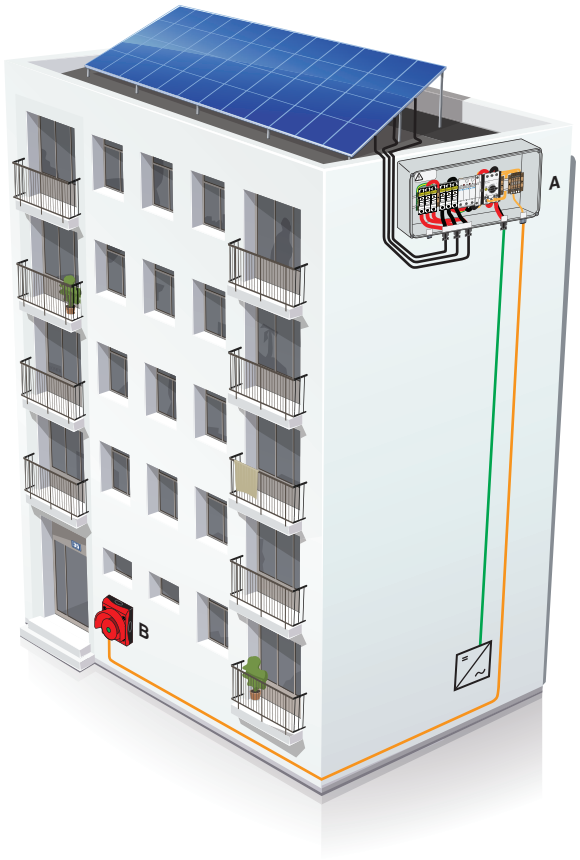
PV modules produce continuous voltage during most weather conditions, they cannot be turned off by other means than shut out the light. It is not unusual that the lines between the PV modules and the inverter can be long and are placed in cable routes together with AC cables. Live cables increase the hazard for the firefighters during a fire.

Eaton's fireman's switch makes it possible to disconnect the lines between PV panels and the inverter. They allow firefighters to operate without risk of electrocution from live cables.

The fireman's switch is a DC disconnect switch equipped with an undervoltage release. The undervoltage release is time delayed to prevent brief power failures and voltage drops not to cause a trip. All fireman's switches feature NO-NC auxiliary contacts to be used for switch position indication.

The image to the right illustrate how the fireman's switches (A) are installed close to the PV modules, a pushbutton (B) is located in a manner that allows the firemen to trip the switches. The line between switches and inverter (green) will be isolated.

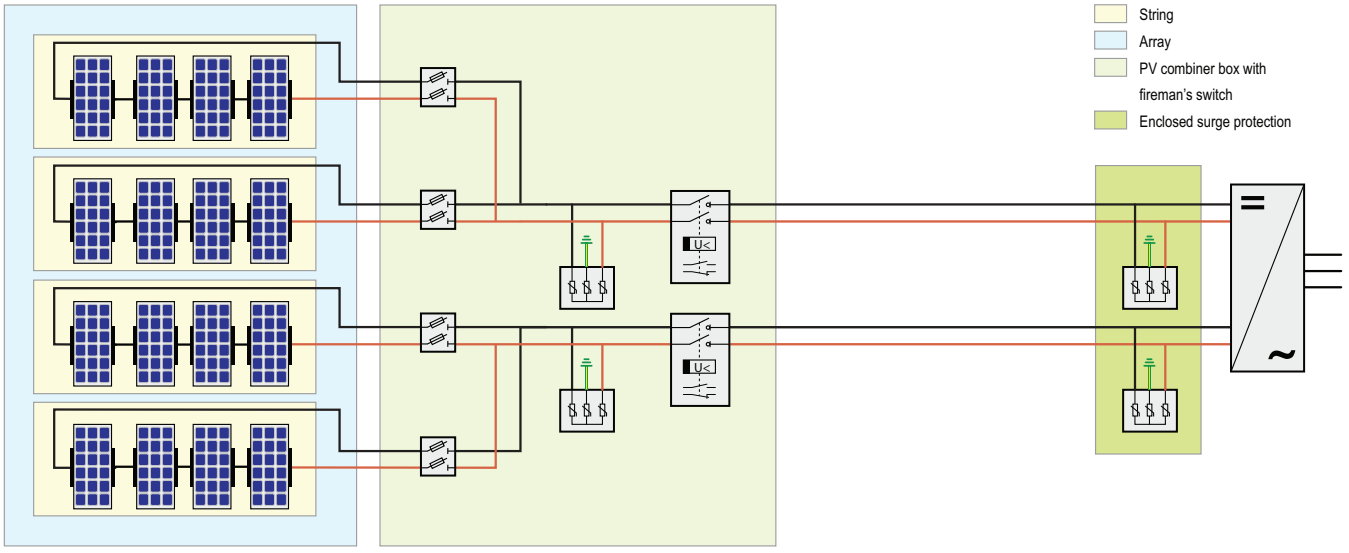
Swedish Fire Departments have started to recommend increased safety measures, allowing safe operation for the firemen in buildings with PV systems.



PV combiner boxes with fireman's switch - Perfect protection and safer fire fighting

PV combiner boxes are designed for easy and efficient installation and provide electrical protection for the PV modules. PV combiner boxes include overcurrent protection, fuses, surge protection and a fireman's switch has been added.

PV combiner boxes are normally installed close to the PV modules. To speed-up installation, the PV combiner boxes are normally equipped with connectors for fast and easy installation.

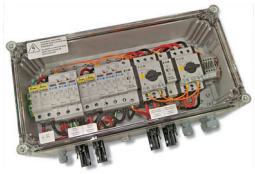


System design example of a PV system connected to the grid, DC side.

PV combiner boxes

Fireman's switch, overcurrent and overvoltage protection

Technical data



Rated voltage, U_e	1000 VDC, un-earthed system
Overcurrent protection	10x38 mm cylindrical fuses gPV, 1-30 A, off-load fuse disconnectors with lamp indicator
Surge protection	Typ 1/2 lightning arrester with signal contact
Fireman's switch	DC-21A 30 A, with time delay undervoltage release, auxiliary contact
Connection	T4 connector (MC4 connectors can be terminated), control signals to screw terminals
Ambient temperature	-20 - + 55°C
Enclosure	Polycarbonate enclosure with transparent cover, UV resistant
Ingress prot., IEC 60529	IP 66
Standard, certificate	IEC 60947-3, IEC 60269-1, IEC 60269-6, EN 50539-11, IEC 61439-1, IEC 60363-7-712, RoHS, CE

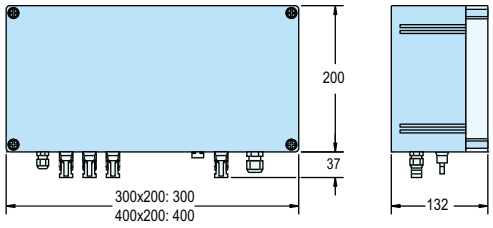
Catalogue numbers - PV combiner boxes

PV modules No. of strings	Surge protection device Quantity	Type	Fireman's switch Quantity	Control voltage	Catalogue number[1)]	Enclosure size	Weight each, kg	Packing size
PV combiner box for connection to 1 MPP input, I_{sc}: 25 A								
1	1	Type 1/2	1	230 VAC	CHSPV10-1ST1R-F1-CC-15-1A	300x200	2,5	1
2	1	Type 1/2	1	230 VAC	CHSPV10-1ST1R-F2-CC-15-1A	300x200	2,7	1
PV combiner box for connection to 2 MPP input, I_{sc}: 25 A								
2 (1+1)	2	Type 1/2	2	230 VAC	CHSPV10-2ST1R-F2-CC-15-2A	400x200	3,8	1
3 (2+1)	2	Type 1/2	2	230 VAC	CHSPV10-2ST1R-F3-CC-15-2A	600x300	5,3	1
4 (2+2)	2	Type 1/2	2	230 VAC	CHSPV10-2ST1R-F4-CC-15-2A	600x300	5,5	1
PV combiner box for connection to 3 MPP input, I_{sc}: 25A								
3 (1+1+1)	3	Type 1/2	3	230 VAC	CHSPV10-3ST1R-F3-CC-15-3A	600x300	6,2	1

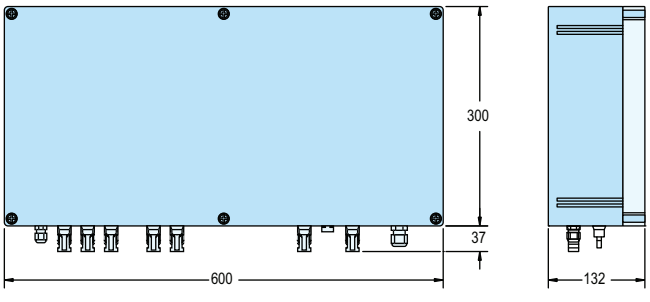
Catalogue numbers - Enclosed pushbutton for tripping the fireman's switch, IP67

Description	Catalogue number	Weight each, kg	Packing size
Enclosed pushbutton with protection collar, twist release, 500 V, 6 A, NO-NC	M22-SOL-PVT45PMPI11Q	0,4	1
Enclosed pushbutton with protection collar, twist release, 500 V, 6 A, 2NC	M22-SOL-PVT45PMPII02Q	0,4	1
Enclosed pushbutton with protection collar, pull release, sealable, 500 V, 6 A, NO-NC	M22-SOL-PVLPL11-230Q	0,4	1

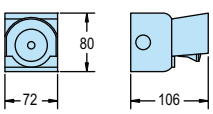
Dimensions, mm



Enclosure size 300x200 and 400x200

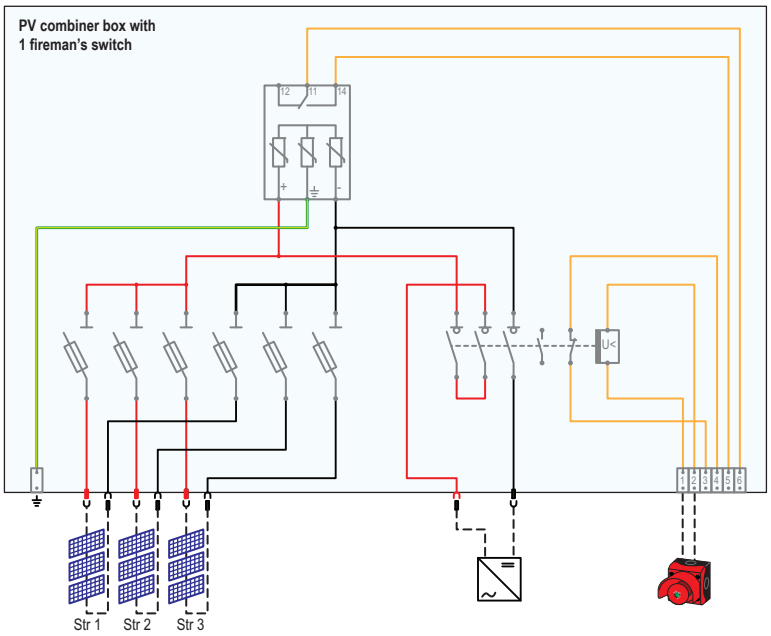


Enclosure size 600x300

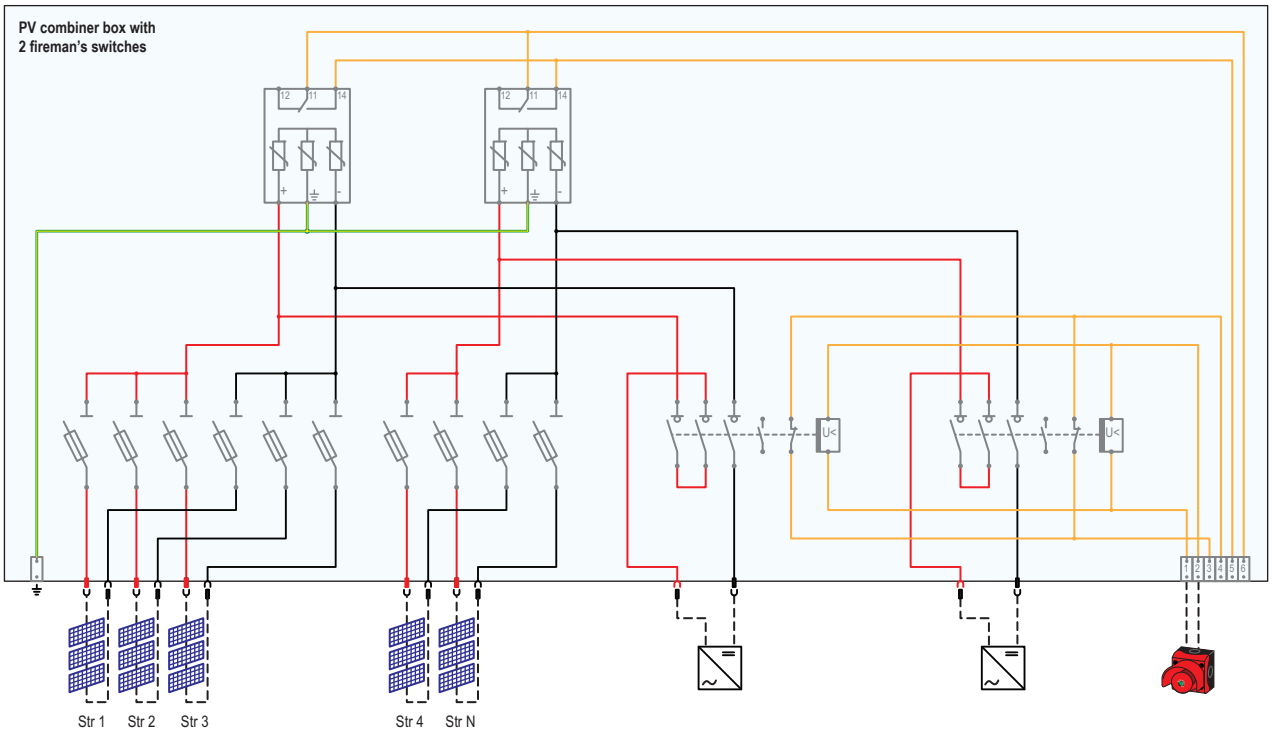


1) For different fuse rating, replace "15" with requested current rating. Example: PV combiner box for two strings with 10 A fuse will be CHSPV10-1ST1R-F2-CC-**10**-1A.

Wiring diagram



Control signals
1-2 Undervoltage release
3-4 Signal contact, switch open
5-6 Signal contact, surge protection device tripped



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