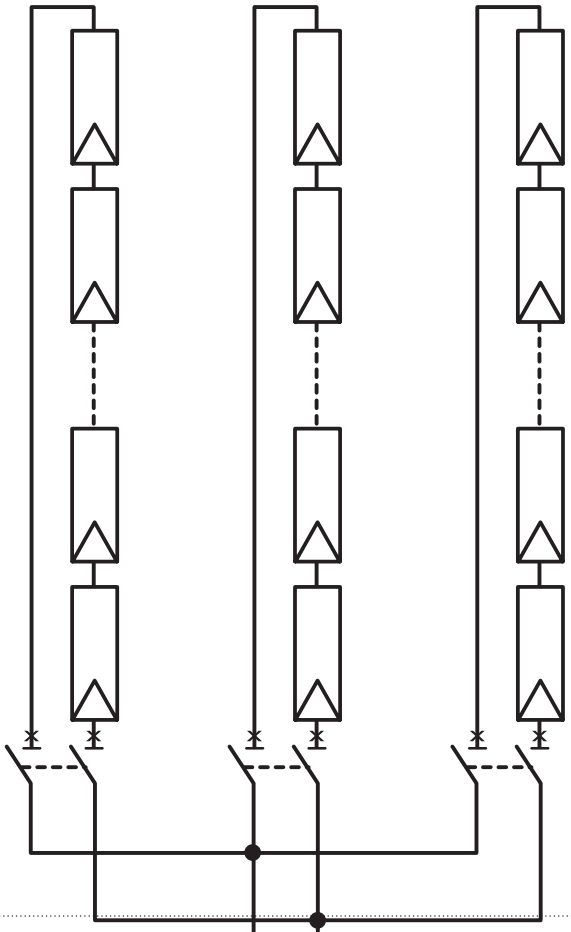
Technical catalogue
S800PV Photovoltaic

Power and productivity
for a better world™

Table of content

Fuseless PV distribution for maximum system availability

String protection



DC main switch

AC-side protection

S800PV-S

High-performance string protection MCB

The High-Performance MCB S800PV-S specially developed for use in photovoltaic systems offers reliable protection for PV modules and lines against reverse currents from defective strings and AC regenerative feedback due to defective inverters. The high demands of PV systems have already been taken into consideration in the development of the S800PV-S:

- Optimum protection for cost-intensive system components
- Minimised standstill times thanks to reclosing capability
- Simple fault signalling
- High ambient temperatures
- Covers all common PV system voltages and currents
- Selective string shutdown even under load
- Easy installation thanks to DIN rail mounting
- Remote shutdown using working current and low-voltage trips possible
- In operation worldwide in generator terminal boxes and inverters

S800PV-S in combination with S800-RSU

High-performance string protection MCB with remote switching unit

The combination with S800PV-S and S800-RSU makes the use even more convenient.
S800-RSU ensures fast remote-controlled operation.
For example, in GFDI applications, the low initial cost for using fuses for PV string protection seems advantageous. But fuses always need a switch disconnector isolating the system in case of fuse replacement or a ground fault detection and interruption. This eliminates system availability and negatively affects the system efficiency. In conclusion, fuses are not acceptable from a commercial point of view. In addition, GFDI Applications require drawn-out fault detection in case of a ground fault is not acceptable. A combination of S800PV-S and S800-RSU replaces three things: Fuses, switch disconnectors and “the electrician’s thumb”.

S800PV-M

Switch disconnector for DC side isolation of PV systems

With highly compact design for installation on the DIN rail, the S800PV-M switch disconnector offers safety-relevant isolation properties. As master switch for PV systems, the whole DC side can thus be safely isolated – locally or remote. Here again, consideration was given to the special ambient influences of photovoltaic systems up to 1200 VDC even at the development stage:

- Reliable isolation of up to 125 A rated current at ambient temperatures of up to 60 °C without any losses
- Safe switching of ohmic and inductive loads (inductive loads can occur with long line lengths)
- Extensive range of accessories

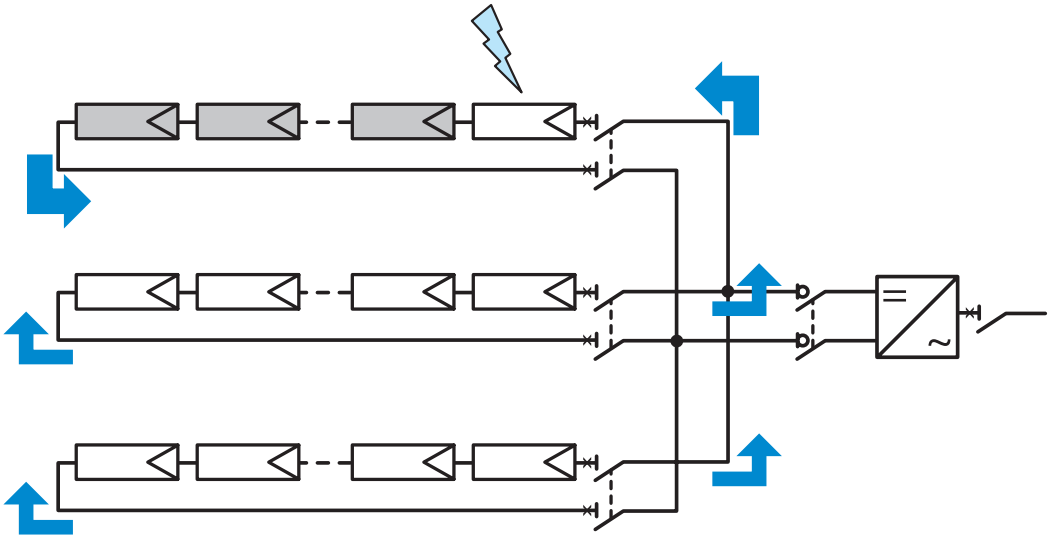
S800

High-performance MCB for AC applications up to 50 kA short-circuit breaking capacity

The extensive portfolio of the S800 Series for AC applications offers a large number of trip characteristics and short-circuit breaking capacities. Thanks to its selectivity and back-up properties, it therefore impresses as a circuit breaker on the AC side. Detailed information can be found in the technical catalogue of the S800 (2CCC413003C0202).

Convincing answers for the fuseless protection of PV systems

The short-circuit current of solar cells, PV modules and strings is only slightly higher than the operating current. An overcurrent protective device designed for the short-circuit current of a string will therefore hardly trip in the event of a simple short-circuit in the string. A particularly fast trip is also not desirable as higher currents can flow briefly due i.a. to cloud enhancements or increased irradiation intensity due to reflection of the solar radiation. The danger for the modules installed in the strings is created by the reverse currents from still intact strings occurring in the event of a fault.



How does a reverse current occur – and what are the dangers?

A reverse current can be caused by short-circuit or an earth fault over one or more modules in a string of a PV system. This can occur i.a. in the event of damage to the insulation or in case of a short-circuit in the module or lines and can damage other modules installed in the string.

Bypass diodes installed in modern modules can offer no protection against reverse currents; they merely reduce the effects of shading. The sum of the short-circuit current of all intact strings can thus flow into the defective string – and not to the inverter.

How high can reverse currents be?

Where strings are connected in parallel, the reverse current in the defective string is the aggregated current of the other strings:

$$I_r = (n_{sp} - 1) \times I_{sc}$$

Where:	I_r	Maximum reverse current
	n_{sp}	Number of strings connected in parallel
	I_{sc}	Short-circuit current of a solar module/string

With large PV-S systems comprising a large number of part-generators connected in parallel, the reverse currents of the faulty part-generator together with the aggregate currents of the surrounding part-generators can lead to very high system loads.

How does the S800PV-S protect?

The S800PV-S string protection MCB developed specially for the demands of photovoltaic systems protects the string – and hence the cost-intensive investment – in three ways:

On one hand, the magnetic trip trips reliably and quickly in the case of the fault described above. The high and quickly occurring reverse currents thus have no chance to endanger the system and hence the installed capital. On the other hand, the S800PV-S has a thermal trip. If a fault in the system results in slightly increased currents over a prolonged period, the high-performance MCB reliably disconnects the circuit here, too.

In addition, the S800PV-S offers disconnector properties. If the MCB trips or is switched manually, the string is reliably disconnected and for non-earthed networks with all poles from the mains supply disconnected.

What are the advantages of the S800PV-S compared to fuses?

Investors and operators of modern photovoltaic power stations attach importance to maximum earnings of the system. Stand still times have to be minimised, faults detracting from the earnings have to be detected and remedied as quickly as possible. In addition, strings have to be selectively switchable even under load in the event of a fault or for maintenance purposes – also remotely. For reasons of fire protection and personal safety, hazardous arcs have to be avoided. Furthermore, selective isolation of the strings in the event of inadequate system performance should permit quick fault detection.

All these points have been taken into consideration in the development of the S800PV-S. The possibility of quick re-starting after a fault, the

signalling of the operating state by means of auxiliary and signal contacts, the safe and – if required – remote controlled isolation even under load and the safe extinguishing of the arc in the double chamber system are characteristic of the S800PV-S. Last but not least the S800PV-S offers flexible and space-saving installation compared with fuses for high DC voltages and currents.

Best Practice S800PV wiring

ABB Low Voltage Products are often used in photovoltaic applications. Assembly engineering in the PV industry differs to a certain extent to well known AC switchgear assembly. This guideline provides useful PV wiring advice.

There is no Simultaneity Factor for PV applications

Depending on the national installation rules, assembly engineering takes into consideration that not all AC consumers are active at the same time. By applying a simultaneity factor, upstream MCBs' rated currents are less than the sum of the downstream circuit breakers.

However, in PV applications, all strings produce the same solar power leading to a simultaneity factor of 1.

Ambient Temperature

The PV industry requires low voltage products operable in a large temperature range. Inverters and combiners can become very cold at night and very warm during daytime with a typical peak reached in the early afternoon.

Therefore, S800PV can be used not only in the temperature range given by the breaker standards but also at temperatures down to –40 °C and up till 60 °C with regard to a certain uprating or derating factor (for S800PV-S). Please keep in mind that ambient temperature always refers to S800PV, not the air temperature outside the combiner or inverter. The power loss as a result of internal contact resistance of S800PV cabling connection and surrounding low voltage products lead to an internal heating of the enclosure. This fact must be considered when choosing the right enclosure size.

Combiner boxes should preferably be placed at locations where direct sun exposure is prohibited. Low environmental temperature usually increases the lifetime of components and the reliability of the application. A box directly put in the sun, can easily have an inside air temperature increase of 30 K. Under worst case conditions, (maximum environment temperature, maximum load, direct sunlight exposure, etc.) the internal box temperature can easily exceed 100 °C.

Example: In a typical combiner containing an S800PV-M125, 24 fuses (12 strings) connectors and cables, the total internal resistance of cables and components could be 0.01 ohm, which would result in a total dissipation of 100 W at 100 A DC load. 100 watt dissipation in a hermetically closed enclosure will definitely lead to a significant increase of the temperature inside the enclosure. The temperature might even exceed the temperature specifications of components inside the box. Therefore enclosure dimensions are a very important design issue.

It should also be noticed that temperature increase usually correlates with the load current square (I2). E.g. if a 100 A DC load would give a temperature rise of 30 K, 125 A DC would probably result in a temperature increase of 45 K.

Pole Connection

When using three and four pole S800PV, the poles must be wired in series in compliance with the assembly standards. Best practice has shown that the following variables must be considered:

– Jumper diameter (pole connector): Make sure the cable diameter meets the requirements of the assembly standards

– Jumper length: Jumper length must be sufficient for S800PV heat dissipation as jumpers work as heat sinks for low voltage products. In addition, please check the cable manufacturers' minimum bending radius data. Over-bending cables might affect the long term cable insulation

– Jumper insulation: Photovoltaic cables often have extra insulation. This might lead to low heat radiation

– Tightening torque: Please follow the S800PV mounting instruction for the correct terminal tightening torque value. If the tightening torque is not as specified by the manufacturer it will definitely lead to an increase of the electrical impedance, but also the thermal resistance will go up. On the long run, this might result in reliability problems or overheating

– Please mind that non-ABB 27mm busbars are not approved.

Best Practice S800PV wiring

Enclosure Dimensioning

Against the background given above, dimensioning a PV enclosure differs from the dimensioning of a typical AC enclosure. The following variables affect the heating performance of an equipped PV enclosure

– IP class: The tighter the enclosure, the worse the heat dissipation. For this reason, state-of-the-art inverters and combiners are equipped with heat exchangers or ventilation

– Transparent covers: Transparent enclosure covers are reported to influence the inside temperature by 40 K within just a few minutes of direct solar radiation. In addition, not every transparent cover is 100 % UV resistant

– Ground plate material: Metallic ground plates are reported to have positive effect on enclosure heat management. ABB offers a large variety of metallic ground plates for a broad enclosure range.

– DIN rail size: Industrial DIN-Rails (15 mm or higher) have a positive effect on low voltage product heat dissipation as they increase air space between the ground plate and the low voltage products

– Dimensions (volume) in general

MCB Mounting Distances

Due to the temperature related derating values of S800PV-S, a distance between adjacent breakers should be considered with regard to the other variables in this context

Recommendation

ABB strongly recommends performing temperature tests on enclosure under maximum application conditions to verify the appropriate design of the enclosure. In addition, please make sure that national and international installation standards are fulfilled.

Standards

The Installation of switches, switch-disconnectors and MCBs shall comply with national and /or international standards.

For the erection of panel boards these standards usually refer to IEC 61439-1 and IEC 61439-2 (low-voltage switchgear and control gear assemblies – part 1: general rules / – part 2: power switchgear and control gear assemblies)

In these standards the requirements for cable dimensions, environmental conditions like max. allowed temperature, etc. is specified.

The applicant must make sure that the installation is compliant with these relevant standards e.g. IEC 61439-1 and IEC 61439-2.

Additional Information: Temperature Related First Aid

If an enclosure has not been assembled with regard to the special features described above, the following first aid advice might be helpful:

– Upside-down mounting of S800PV-S has a positive derating effect

– Terminal tightening torque according to the mounting instructions optimizes the contact resistance between cable and terminal

– Ring lug kits for S800PV allow the mounting of cable diameters >70 sqmm. This can have a positive effect on temperature related nuisance tripping

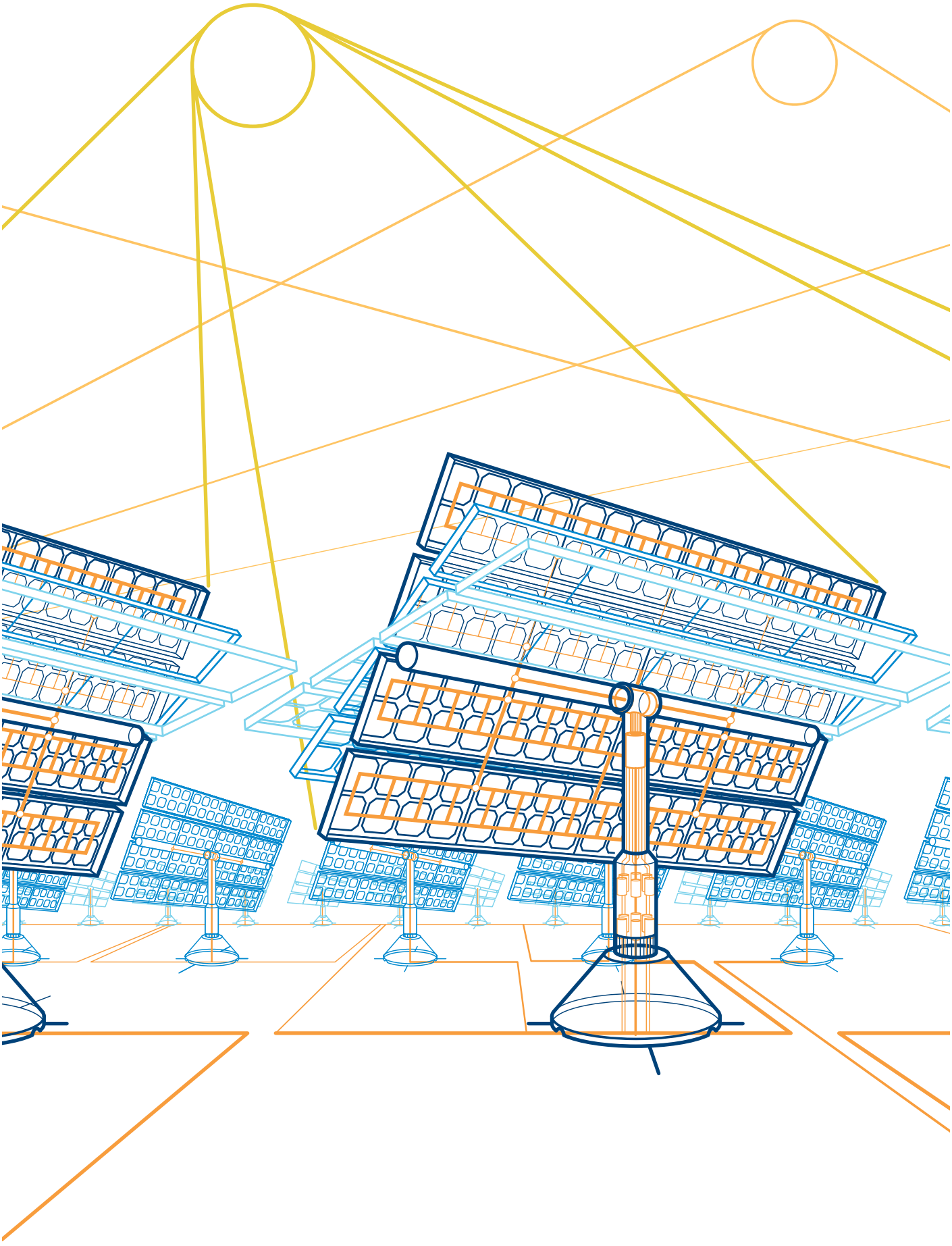


Table of content

S800PV-S Characteristic S
Photovoltaic string protection with interchangeable cage terminal


2CCC413246F0001

I_{cu} [kA]	Rated current [A]	Type designation	Product number	EAN number 76122712	Weight [kg]	Pack. unit
5	10	S802PV-S10	2CCP842001R1109	10939	0.49	1
5	13	S802PV-S13	2CCP842001R1139	10946	0.49	1
5	16	S802PV-S16	2CCP842001R1169	10953	0.49	1
5	20	S802PV-S20	2CCP842001R1209	10960	0.49	1
5	25	S802PV-S25	2CCP842001R1259	10977	0.49	1
5	32	S802PV-S32	2CCP842001R1329	10984	0.49	1
5	40	S802PV-S40	2CCP842001R1409	10991	0.49	1
5	50	S802PV-S50	2CCP842001R1509	11004	0.49	1
5	63	S802PV-S63	2CCP842001R1639	11011	0.49	1
5	80	S802PV-S80	2CCP842001R1809	11028	0.49	1
5	100	S802PV-S100	2CCP842001R1829	14968	0.49	1
5	125	S802PV-S125	2CCP842001R1849	14999	0.49	1


2CCC413247F0001

5	10	S803PV-S10	2CCP843001R1109	11035	0.74	1
5	13	S803PV-S13	2CCP843001R1139	11042	0.74	1
5	16	S803PV-S16	2CCP843001R1169	11059	0.74	1
5	20	S803PV-S20	2CCP843001R1209	11066	0.74	1
5	25	S803PV-S25	2CCP843001R1259	11073	0.74	1
5	32	S803PV-S32	2CCP843001R1329	11080	0.74	1
5	40	S803PV-S40	2CCP843001R1409	11097	0.74	1
5	50	S803PV-S50	2CCP843001R1509	11103	0.74	1
5	63	S803PV-S63	2CCP843001R1639	11110	0.74	1
5	80	S803PV-S80	2CCP843001R1809	11127	0.74	1
5	100	S803PV-S100	2CCP843001R1829	14975	0.74	1
5	125	S803PV-S125	2CCP843001R1849	15002	0.74	1


2CCC413248F0001

5	10	S804PV-S10	2CCP844001R1109	11134	0.98	1
5	13	S804PV-S13	2CCP844001R1139	11141	0.98	1
5	16	S804PV-S16	2CCP844001R1169	11158	0.98	1
5	20	S804PV-S20	2CCP844001R1209	11165	0.98	1
5	25	S804PV-S25	2CCP844001R1259	11172	0.98	1
5	32	S804PV-S32	2CCP844001R1329	11189	0.98	1
5	40	S804PV-S40	2CCP844001R1409	11196	0.98	1
5	50	S804PV-S50	2CCP844001R1509	11202	0.98	1
5	63	S804PV-S63	2CCP844001R1639	11219	0.98	1
5	80	S804PV-S80	2CCP844001R1809	11226	0.98	1
5	100	S804PV-S100	2CCP844001R1829	14982	0.98	1
5	125	S804PV-S125	2CCP844001R1849	15019	0.98	1

S800PV-M
Photovoltaic DC disconnector with interchangeable cage terminal

2CCC413249F0001

I_{cu} [kA]	Rated current [A]	Type designation	Product number	EAN number 76122712	Weight [kg]	Pack. unit
1.5	32	S802PV-M32	2CCP812001R1329	11233	0.43	1
1.5	63	S802PV-M63	2CCD842001R1590	15026	0.43	1
1.5	125	S802PV-M125	2CCP812001R1849	11240	0.43	1

2CCC413250F0001

1.5	32	S803PV-M32	2CCP813001R1329	11257	0.65	1
1.5	63	S803PV-M63	2CCD843001R1590	15033	0.65	1
1.5	125	S803PV-M125	2CCP813001R1849	11264	0.65	1

2CCC413251F0001

1.5	32	S804PV-M32	2CCP814001R1329	11271	0.86	1
1.5	63	S804PV-M63	2CCD844001R1590	15040	0.86	1
1.5	125	S804PV-M125	2CCP814001R1849	11288	0.86	1

S800PV
Accessories

Auxiliary contact Designation	Type designation	Product number	EAN number 761227	Weight [kg]	Pack. unit
Auxiliary contact	S800-AUX	2CCS800900R0011	1206802	0.05	1

Combined auxiliary and signal contact Designation	Type designation	Product number	EAN number 761227	Weight [kg]	Pack. unit
Auxiliary/signal contact	S800-AUX/ALT	2CCS800900R0021	1206819	0.05	1

Remote Switching Unit* Designation	Type designation	Product number	EAN number 761227	Weight [kg]	Pack. unit
Remote Switching Unit S800-RSU-H	S800-RSU-H	2CCS800900R0501	1411244	0.3	1
Remote Switching Unit S800W-RSU	S800W-RSU	2CCS800900R0511	1411169	0.3	1

*High performance circuit breaker is not included in delivery

S800-RSU cable incl. plug Designation	Type designation	Product number	EAN number 761227	Weight [kg]	Pack. unit
3 meters cable 0,5 mm² (AWG20) incl. 10-pole Micro Fit 3.0 plug	S800-RSU-CP	2CCS800900R0541	1412869	0.35	1

10-pole Micro Fit 3.0 plug Designation	Type designation	Product number	EAN number 761227	Weight [kg]	Pack. unit
10-pole Micro Fit 3.0 plug	S800-RSU-P	2CCS800900R0551	1412845	0.00	1

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Shunt operation release Designation	Type designation	Product number	EAN number 761227	Weight [kg]	Pack. unit
Shunt operat. release 12 VAC/DC	S800-SOR12	2CCS800900R0201	1212070	0,15	1
Shunt operat. release 24 VAC/DC	S800-SOR24	2CCS800900R0191	1208318	0.15	1
Shunt operat. release 48...130 VAC/DC	S800-SOR130	2CCS800900R0221	1208349	0.15	1
Shunt operat. release 110...250 VAC/DC	S800-SOR250	2CCS800900R0211	1208332	0.15	1
Shunt operat. release 220...400 VAC/DC	S800-SOR400	2CCS800900R0231	1208356	0.15	1

2CCC413240F0001

Undervoltage release Designation	Type designation	Product number	EAN number 761227	Weight [kg]	Pack. unit
Undervoltage release 24...36 VAC/DC	S800-UVR36	2CCS800900R0241	1208363	0.15	1
Undervoltage release 48...60 VAC/DC	S800-UVR60	2CCS800900R0251	1208370	0.15	1
Undervoltage release 110...130 VAC/DC	S800-UVR130	2CCS800900R0261	1208387	0.15	1
Undervoltage release 220...250 VAC/DC	S800-UVR250	2CCS800900R0271	1208394	0.15	1

2CCC413061F0002

Rotary drive adapter for 2- to 4-pole high performance MCB Designation	Type designation	Product number	EAN number 761227	Weight [kg]	Pack. unit
Rotary drive	S800-RD	2CCS800900R0041	1208172	0.08	1

2CCC413062F0001

Anthracite/Standard rotary handle for door assembly Designation	Type designation	Product number	EAN number 80156446	Weight [kg]	Pack. unit
Anthracite rotary handle	S800-RHE-H	1SDA060150R1	25771	0.21	1

S800PV
Accessories


2CCC413063F0001

Red/Emergency rotary handle for door assembly Designation	Type designation	Product number	EAN number 80156446	Weight [kg]	Pack. unit
Red rotary handle	S800-RHE-EM	1SDA060151R1	25764	0.21	1


2CCC413064F0001

Axle extension Rotary drive-rotary handle 500 mm Designation	Type designation	Product number	EAN number 80156446	Weight [kg]	Pack. unit
Axial extension 500 mm	S800-RHE-S	1SDA060179R1	26242	0.2	1

IP54 kit for door mounting Designation	Type designation	Product number	EAN number 80156446	Weight [kg]	Pack. unit
IP54 Kit	S800-RHE-IP54	1SDA060180R1	26259	0.08	1


2CCC413068F0001

Intermediate piece 9 mm Designation	Type designation	Product number	EAN number 76122712	Weight [kg]	Pack. unit
Intermediate piece 9 mm	S800-IP9	2CCS800900R0031	08202	0.01	1

2CCC413066F0001

Padlock lever lock with hasp Designation	Type designation	Product number	EAN number 76122712	Weight [kg]	Pack. unit
Padlock lever lock with hasp 4 mm	S800-PLL	2CCS800900R0051	08189	0.12	10

2CCC413308F0001

UL locking device* Designation	Type designation	Product number	EAN number 76122712	Weight [kg]	Pack. unit
UL locking device	S800U-PLL	2CCS800017R0001	15057	0.02	1

*High performance circuit breaker and lockout tag are not included in delivery

2CCC413046F0004

Interchangeable adapter kit Designation	Type designation	Product number	EAN number 76122712	Weight [kg]	Pack. unit
Ring terminal connection	S800-RT2125	2CCS800900R0161	08240	0.03	2
Ring terminal connection	S800-RT4125	2CCS800900R0131	08219	0.06	4

2CCC413254F0001

Pole connector Designation	Type designation	Product number	EAN number 76122712	Weight [kg]	Pack. unit
Pole connector 50 A	S802-LINK50	2CCS800900R0411	11295	0.03	10

S800-ILS Designation	Type designation	Product number	EAN number 76122712	Weight [kg]	Pack. unit
Identification labeling system 168 x 6 x 11.5 mm	S800-ILS	2CCS800900R0121	08271	0.01	1

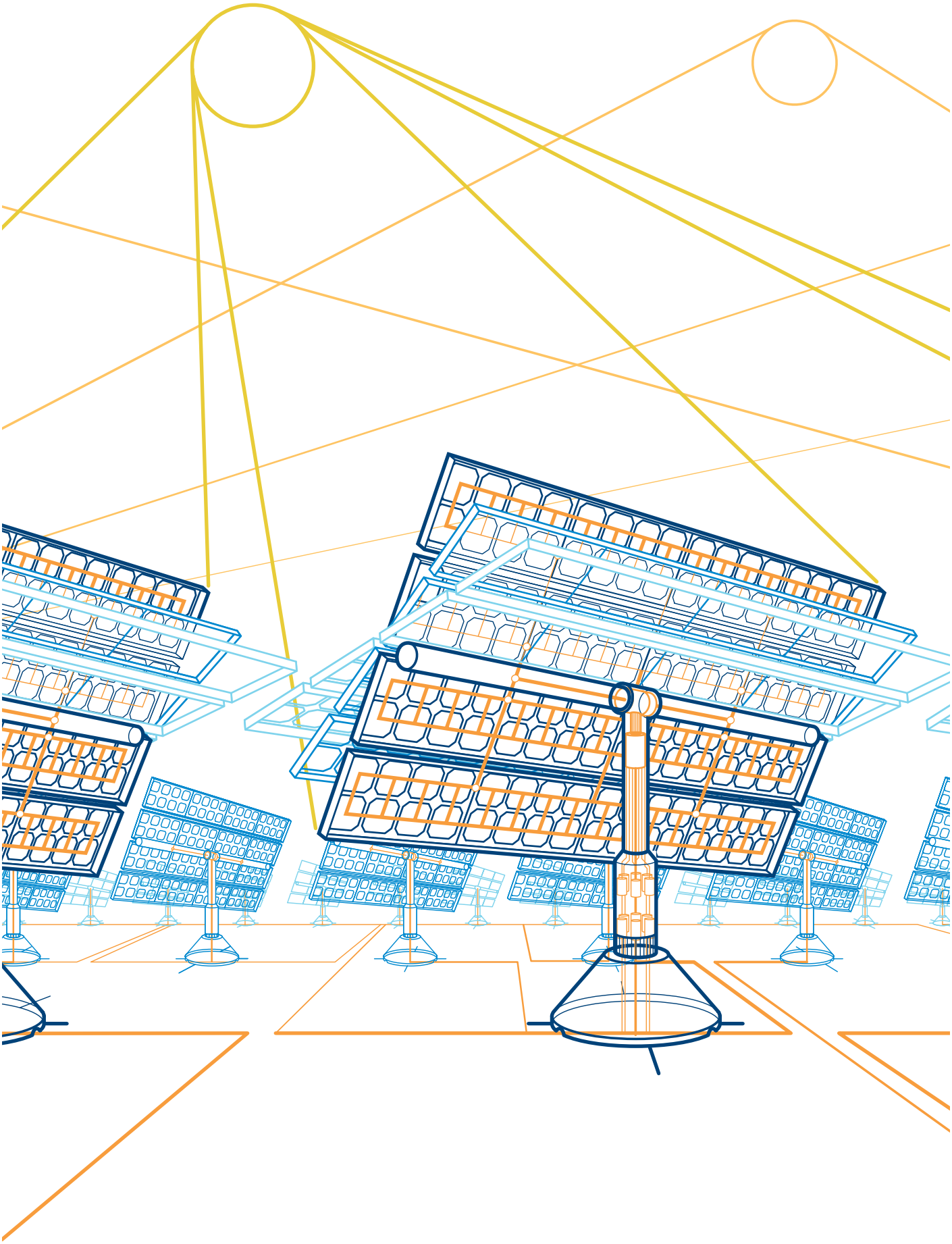


Table of content

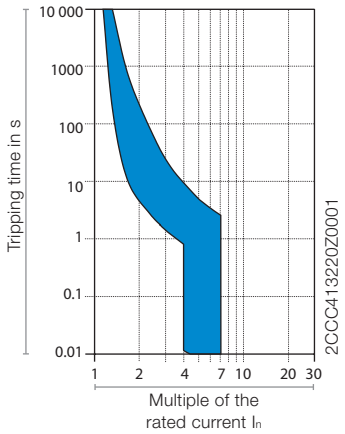
Photovoltaic High Performance MCB
Characteristic of the S800PV-S

Characteristics

Tripping characteristic
Thermal tripping 1.05 ...1.3 x I_n
Electromagnetic tripping 6 x I_n
Calibration temperature 30 °C

DC protection independent of polarity in photovoltaic plants up to 1200 VDC at a time constant ≤ 5 ms.

Tripping characteristics



Tripping behaviour compliant to IEC 60947-2

		Thermal tripping		Electromagnetic tripping
Characteristics	**Currents**	**Small test current**	**Large test current**	
PV-S	10 ... 125 A	1.05 x I_n	1.30 x I_n	6 x I_n (DC)

Properties
Special features of S800PV-S, S800PV-M

String protection with S800PV-S

A large proportion of the costs for photovoltaic systems is tied up in the equipment for the DC generation. The S800PV-S protects these investments in the event of a fault.

Convincing:	Suitable for up to 1200 VDC
Loadable:	String protection up to 125 A
	Reliable protection at high ambient temperatures
Tested:	Rated ultimate short-circuit breaking capacity I_{cu} of 5 kA in accordance with IEC 60947-2
Fast:	Reclosable for minimum standstill times
Safe:	Disconnector properties, switching under load
Flexible:	Extensive range of accessories for remote shutdown and fault signalling

System isolation with S800PV-M

The use of a DC isolator can be implemented reliably and in the minimum of space with the S800PV-M. Not only the pole-independent installation offers enormous user friendliness.

Convincing:	Suitable for up to 1200 VDC
Loadable:	System isolation up to 125 A
	No change in operating behaviour up to 60 °C ambient temperature
	Reliable switching of ohmic and industive loads
Compact:	Minimum dimensions with maximum efficiency
Tested:	Short-time withstand current I_{cw} of 1.5 kA in accordance with IEC 60947-3
Safe:	Disconnector properties, switching under load

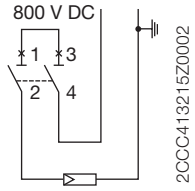
Maximum device voltages

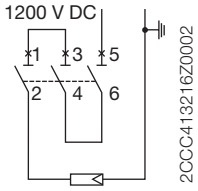
S800PV-S	2-pole	3-pole	4-pole
I_e 10...80 A	800 VDC	1200 VDC	1200 VDC
I_e 100, 125 A	600 VDC	1000 VDC	1200 VDC

S800PV-M			
I_e 32, 63, 125 A	800 VDC	1200 VDC	1200 VDC

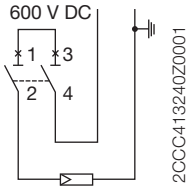
Exemplary circuit diagrams

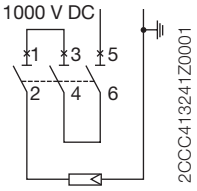
Earthed network ≤ 80 A



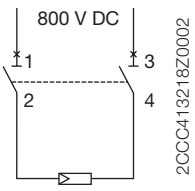


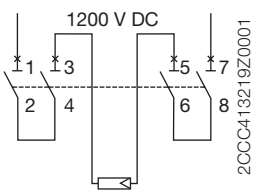
100, 125 A

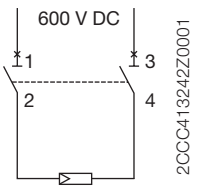


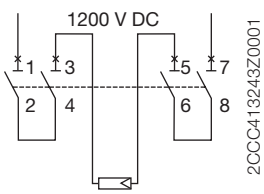


Non-earthed network









Properties
Special features of S800PV-S, S800PV-M

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Play it safe: display the operational state

The mechanical drive of the S800 high performance MCB is equipped with a trip-free release. It therefore switches independent of the actuating force or speed on the actuating lever. The trip position display thereby always reliably displays the exact position of the moving contact. The trip position display* provides additional trip detection allowing you to easily find the reason for the cut-off. Because the switch lever moves to the middle position in case of thermal or magnetic tripping, the user sees at a glance that this is an error state and can then initiate suitable measures.

*Middle position of switch lever, see picture

Reliable: the disconnector properties

In the OFF position (0 position), the S800 high performance MCB guarantees safe electrical isolation of the circuit compliant to IEC 60947-2.

Flexible: the installation

The S800 high performance MCB can be directly mounted onto any position on the DIN mounting rail without any impairment to its characteristics. Because the pole dimensions are identical for all rated currents, installation in switching systems is simplified.

Cage and ring terminals

By using the interchangeable adapter kits you can choose between cage terminals or ring terminal connectors. No matter which type you select.

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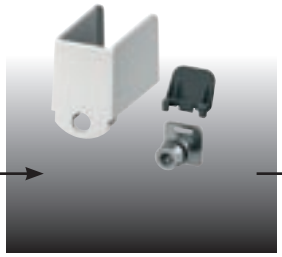

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Properties
Special features of S800-RSU

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S800PV in combination with S800-RSU

The string protection MCB S800PV-S and the switch disconnector S800PV-M safely switch and protect PV strings, arrays and systems up to 1200 VDC. Due to its outstanding DC arc extinction, convenient DIN rail mounting and high Swiss quality, S800PV-S has become the market leader in its segment.
ABB now adds a remote switching unit to the S800 product range: S800-RSU.
S800-RSU simplifies the control of commercial PV systems. Driven by a Swiss made brushless high precision DC motor, the remote switching units provide fastest switching performance at lowest power consumption. Wiring and operation is easy: RSU can be operated with standard MDRC pushbuttons or via programmable logic controllers (PLCs).

Strong arguments against fuses

Regarding the low initial cost, using fuses for PV string protection seems advantageous. But fuses always need a switch disconnector isolating the system in case of fuse replacement or ground fault identification. This eliminates system availability and negatively affects the system efficiency. In conclusion, fuses are not acceptable from a commercial point of view. In addition, GFDI applications requiring drawn-out fault detection in case of an ground fault is not acceptable.
A combination of S800PV-S and S800-RSU replaces three things: Fuses, switch disconnectors and “the electrician’s thumb”.
When selecting PV components, efficiency is always focused on. Maximize your PV system efficiency by using ABB S800PV-S and S800-RSU.

Product facts

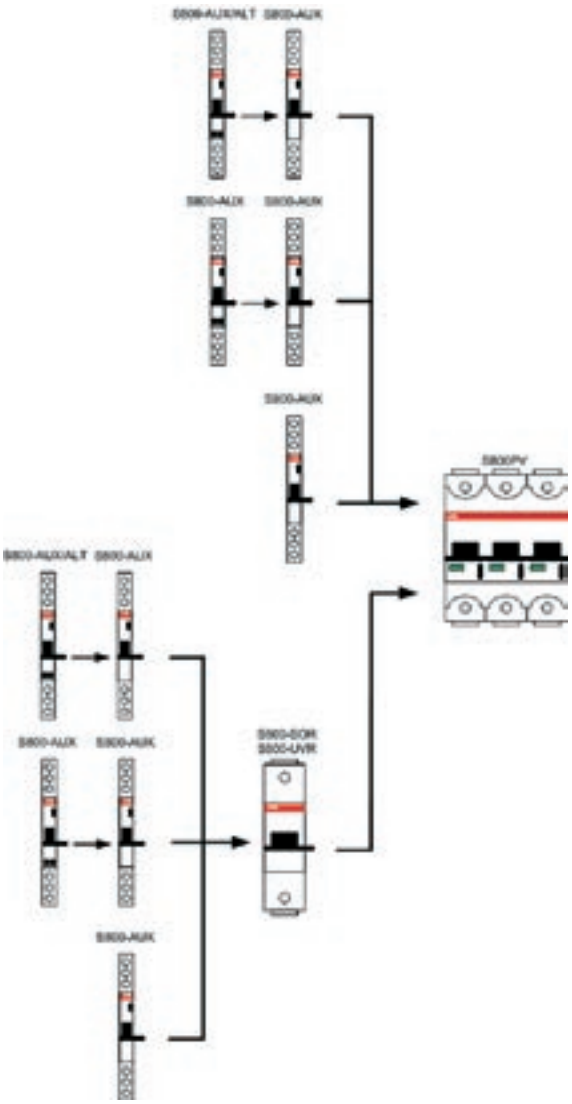
- Highest PV system availability. Keeps feeding the grid even in case of failure.
- S800PV-S replaces fuses and switch disconnectors
- S800-RSU enables PV strings to be remotely controlled
- String protection from 0.1 to 125 A at PV voltages up to 1200 VDC
- Compatible to ABB pro M compact 9 mm pushbuttons and indicator lights
- Compatible to ABB Programmable Logic Controllers
- User safety due to hand switching recognition
- Low power consumption
- Low stand-by current
- Connecting has to be done by a 10-pole Micro Fit 3.0 plug (not included in delivery)
- Two versions
  - S800-RSU-H IEC-Version according to IEC 60947-2
  - S800W-RSU World version according to IEC 60947-2 and UL489

inter solar award 2010

Winner 2010 in the category Photovoltaics

Properties
Accessories for the PV series

Electrical properties



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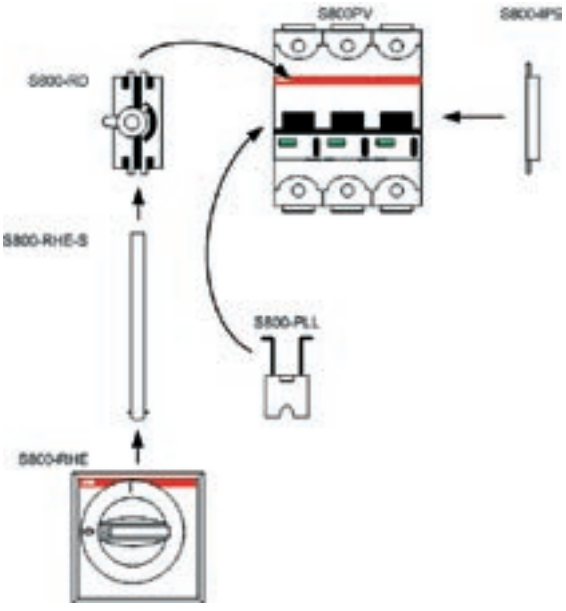

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Properties
Accessories

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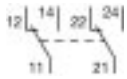

S800-AUX

Auxiliary contact for external display

The S800-AUX auxiliary contact is for electrical display of the operating state of the high performance MCB. Both changeover contacts always switch simultaneously with the live conductor contact and detect the following operating states:

– Manual tripping
– Tripping due to thermal overload
– Tripping due to magnetic overload (short-circuit)

Mode of function of the test button

The test button is operated by a tool and allows the user to simulate the mode of function of the auxiliary contact when switched on without tripping the high performance MCB itself.

Mode of function of the two changeover contacts

– Off position of the high performance MCB contacts 11–12 and 21–22 closed
– On position of the high performance MCB contacts 11–14 und 21–24 closed

Mounting ability of the auxiliary contact

– Two S800-AUX auxiliary contacts can be mounted by the user at the left on the high performance MCB.

Properties
Accessories

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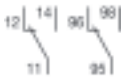

S800-AUX/ALT

Combined auxiliary and signal contact for the external display

The S800-AUX/ALT combined auxiliary and signal contact is used for electrical signaling of the operating state of the high performance MCB.

The **AUX** auxiliary contact always switches simultaneously with the live conductor contact and detect the following forms of tripping:

– Manual switch on/off
– Tripping due to thermal overload
– Tripping due to magnetic overload (short-circuit)
– Tripping by S800-SOR or S800-UVR

The **ALT** signal contact detects the following forms of tripping of the high performance MCB:

– Tripping due to thermal overload
– Tripping due to magnetic overload (short-circuit)
– Tripping by S800-SOR or S800-UVR

Mode of function of the test button

The test button is operated by a tool and allows the user to simulate the mode of function of the combined auxiliary and signal contact when switched on without tripping the high performance MCB itself.

Mode of function of the ALT reset button

The reset button, which can be used at will, resets the **ALT** signal contact after a tripping. The high performance MCB is switched on independent of the state of the **ALT** signal contact.

Mode of function of the AUX changeover contact

– Off position of the high performance MCB	Contact 11–12 closed
– On position of the high performance MCB	Contact 11–14 closed

Mode of function of the ALT changeover contact

– No ALT tripping	Contact 95–96 closed
– ALT tripping	Contact 95–98 closed

2CCC413353F0001

S800-RSU-H IEC version
S800W-RSU World version
Remote Switching Units for High Performance MCB

The S800-RSU makes the use of S800 even more convenient. Driven by a brushless high precision DC motor, S800-RSU ensures fast remote-controlled operation.

Mounting ability

The S800-RSU is mountable on any multipole S800 High Performance MCB. Wiring and operation is feasible on field. The connection has to be done by a 10-pole Micro Fit 3.0 (not included in delivery).
S800-RSU operated with standard MDRC pushbuttons and indicator lights or can be done via programmable logic controllers (PLCs).

Switching times

OFF –> ON from signal to contact closing	<<500 ms
ON –> OFF from signal to contact opening	<<250 ms
TRIP –> OFF –> ON from signal to contact closing	<<1500 ms

For differing requirements, please contact your local ABB partner

Safety Intelligence

- When detecting manual use, inputs are deactivated for 10 seconds
- If the spindle is rotated more than 360°, all outputs become active
- Manual switch off via lever is possible (S803, S804)
- Manual switch on via lever is not possible (S802)
- RSU is locked for five minutes after three switching attempts leading to a trip
- Mechanical fixation via lock slider blocking the spindle

2CCC413357F0001

S800-RSU-CP
S800-RSU cable incl. 10-pole Micro Fit 3.0 plug

Length of cable:	3 meters
Cross section:	10 x 0.5 m^2
Temperature range:	
moving state:	–5 °C ... +70 °C
fixed state:	–30 °C ... +80 °C
Rated voltage:	300 V
Conductor resistance:	39.0 Ω/km
Approvals:	S+, UL

S800-RSU-P
10-pole Micro Fit 3.0 plug

10-pole Micro Fit 3.0 plug with 12 loose crimped contacts. You need tongs for connecting.

Properties
Accessories

2CCC413239F0001

S800-SOR
Shunt opening release

The S800-SOR shunt opening release is for remote release of the S800- high performance MCB using an electrical impulse. Operation of the trigger is guaranteed at a voltage between 70% and 110% of the rated mains voltage U_n both for AC and DC.

Mounting ability of the S800-SOR operating current release

– The S800-SOR can be mounted by the user at the left side of the high performance MCB.

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S800-UVR
Undervoltage release

The S800-UVR undervoltage release can be used as an emergency-stop cut-as by use of suitable emergency stop buttons. The undervoltage release switches the power supply to the high performance MCB off in case of a failure or if the value falls below 0.7 x U_n. After tripping, the high performance MCB can be switched back on as soon as the voltage is over 0.85 x U_n.

Mounting ability of the S800-UVR undervoltage release

– The S800-UVR can be mounted by the user at the left side of the high performance MCB.

2CCC413062F0001

S800-RD
Rotary drive

The rotary drive for 2-4 pole devices can be delivered for assembly on the switching field door. Switching is effortless due to the ergonomic design of the swivel lever. It is equipped with a lock for the OFF position that prevents switching on of the S800 high performance MCB.
The slot hole of the lock can accept up to 3 padlocks with lug diameters of 7 mm (not included in delivery). Operation of the trigger and a view of the characteristics are not prevented
Additionally, a rotary drive can also be supplied to switch machines; it has a red grip on a yellow background.
The rotary drive on the switching field door is comprised of the following three components:

– Rotary handle S800-RHE-H, -EM
– Axle (500 mm) S800-RHE-S

2CCC413068F0001

S800-IP9
Intermediate piece

The S800-IP9 intermediate piece fits the profile of the high performance MCB and is used to fill in empty device slots. Thanks to its width of just 9mm, the slots of all devices of the S800 range can be expanded using this intermediate piece.

2CCC413066F0001

S800-PLL
Padlock device

The S800-PLL padlock device safely prevents unintentional switching on and off. Simply insert the lug of the padlock device through the borehole on the high performance MCB and lock with a padlock with lug diameter Ø 4 mm (not included in delivery). Even when the high performance MCB is secured with an padlock device against unintentional switching off, tripping remains possible in case of overload or short-circuit by the S800-SOR, S800-UVR and DDA800.

S800-ILS
Identification labelling system

The individual identification labelling system for ILS legend plates is a DIN A5 polyester foil for inkjet and laser printers with high temperature resistance (if a laser printer is used please check whether self-sticking foils with a thickness of 250 µm can be printed with it). The 3M™9471 LE adhesive backing is UL-approved with Appl. No. MH 11410. The single plates are butt-cut on one side. Can be manually labelled with ink, pen, pencil and felt pen.

2CCC413254F0001

S802-LINK50
Pole connector up to 50 A

The pole connector S802-LINK50 can be used up to 50 A. The height is 16.3 mm.

Table of content

Technical data
S800PV

Characteristics		S800PV S	S800PV S	S800PV M
Rated current I_n	[A]	10…80	100, 125	32, 63, 125
Pole		2…4	2…4	2…4
Rated operational voltage U_e				
(DC) 2-pole	[V]	800	600	800
(DC) 3-pole	[V]	1200	1000	1200
(DC) 4-pole	[V]	1200	1200	1200
Rated insulation voltage U_i	[V]	1250		1250
Rated impulse withstand voltage U_{imp}	[kV]	8		8
Rated ultimate short-circuit breaking capacity I_{cu} **compliant to IEC 60947-2**				
(DC) 800 V (2-pole)	[kA]	5		–
(DC) 1200 V (3-pole)	[kA]	5		–
(DC) 1200 V (4-pole)	[kA]	5		–
Rated service short-circuit breaking capacity I_{cs} **compliant to IEC 60947-2**				
(DC) 800 V (2-pole)	[kA]	5		–
(DC) 1200 V (3-pole)	[kA]	5		–
(DC) 1200 V (4-pole)	[kA]	5		–
Rated short-term withstand current I_{cw} **compliant to IEC 60947-3**				
(DC) 800 V (2-pole)	[kA]	–		1.5
(DC) 1200 V (3-pole)	[kA]	–		1.5
(DC) 1200 V (4-pole)	[kA]	–		1.5
Rated short-circuit making capacity I_{cm} **compliant to IEC 60947-3**				
(DC) 800 V (2-pole)	[kA]	–		0.5
(DC) 1200 V (3-pole)	[kA]	–		0.5
(DC) 1200 V (4-pole)	[kA]	–		0.5
Mounting position		any		any
Disconnector properties		yes		yes
Standards		IEC 60947-2		IEC 60947-3
Connections C_u	[mm²]	1…50 strand		1…50 strand
		1…70 cable		1…70 cable
Tightening torque	[Nm]	min. 3 / max. 4		min. 3 / max. 4
DC feed		any		any
Mounting on DIN top hat rail		EN 60715		EN 60715
Permissible operating ambient temperature	[°C]	–25…+60		–25…+60
Storage temperature	[°C]	–40…+70		–40…+70
Protection category		IP20		
		IP40 (actuating end only)		
Vibration resistance		IEC 60068-2-6; EN 61373 Cat.1/Class B		
Utilisation categories		A		DC-21A
Pollution degree		2		2
Overvoltage category		III		III
Electrical and mechanical lifetime **compliant to IEC 60947-2**				
S800PV-S 10 … 100 A	1500 electrical; 8500 mechanical operations			
S800PV-S 125 A	1000 electrical; 7000 mechanical operations			
Electrical and mechanical lifetime **compliant to IEC 60947-3**				
S800PV-M 32, 63 A	1500 electrical; 8500 mechanical operations			
S800PV-S 125 A	1000 electrical; 7000 mechanical operations			

Typical Internal resistances and power losses at 25 °C ambient temperature

Rated current I_n [A]	Internal resistance R_i [mΩ]		Power loss P_v [W]	
	PV-S	PV-M	PV-S	PV-M
10	15.2		1.5	
13	12.1		2.0	
16	12.1		3.1	
20	8.7		3.5	
25	6.8		4.3	
32	3.1	1.8	3.2	1.8
40	2.3		3.7	
50	1.7		4.3	
63	1.6		6.4	
80	1.0		6.4	
100	0.8		8.0	
125	0.6	0.5	9.4	7.8

Influence of ambient temperature

Devices mounted singly (specifications in A)

S800PV-S

I_n [A]	10 °C	15 °C	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C
10	11.2	11.0	10.7	10.4	10.0	9.6	9.3	9.0	8.7	8.4	8.0
13	14.6	14.3	13.9	13.5	13.0	12.5	12.1	11.7	11.3	10.9	10.4
16	17.9	17.6	17.1	16.6	16.0	15.4	14.9	14.4	13.9	13.4	12.8
20	22.4	22.0	21.4	20.8	20.0	19.2	18.6	18.0	17.4	16.8	16.0
25	28.0	27.5	26.8	26.0	25.0	24.0	23.3	22.5	21.8	21.0	20.0
32	35.8	35.2	34.2	33.3	32.0	30.7	29.8	28.8	27.8	26.9	25.6
40	44.8	44.0	42.8	41.6	40.0	38.4	37.2	36.0	34.8	33.6	32.0
50	56.0	55.0	53.5	52.0	50.0	48.0	46.5	45.0	43.5	42.0	40.0
63	70.6	69.3	67.4	65.5	63.0	60.5	58.6	56.7	54.8	52.9	50.4
80	89.6	88.0	85.6	83.2	80.0	76.8	74.4	72.0	69.6	67.2	64.0
100	112.0	110.0	107.0	104.0	100.0	96.0	93.0	90.0	87.0	84.0	80.0
125	140.0	137.5	133.8	130.0	125.0	120.0	116.3	112.5	108.8	105.0	100.0

For the effects of temperatures not given in the above table, please get in touch with your ABB contact.

Technical data
Accessories

Electrical properties

Auxiliary contact S800-AUX

Utilisation categories compliant to IEC 60947-5-1		AC15 400/2 A AC15 240/6 A DC13 250/0.55 A DC13 125 V/1.1 A DC13 60 V/2 A DC13 24 V/4 A
Rated values compliant to UL 489		125 VAC 6 A 250 VAC 5 A 24 VDC 4 A 125 VDC 0.3 A 250 VDC 0.15 A
Rated operational voltage I_{th}	[A]	6
Rated insulation voltage I_{min}	[mA]	3
Rated impulse withstand voltage U_{min}	[mV]	24
Rated insulation voltage U_i	[V]	690
Number of contacts		2
Rated impulse withstand voltage U_{imp}	[kV]	6
Pollution degree		3
Standard		IEC 60947-5-1 / UL 489
Contact function		Changeover contact
Connection C_u	[mm²]	1 x 2.5 2 x 1.5 14 AWG
Tightening torque	[Nm]	1
AC/DC feed		any
Mounting on DIN top hat rail		EN 60715
Protection category		IP20
Permissible operating ambient temperature	[°C]	–25 ... +60
Storage temperature	[°C]	–40 ... +70
Mech. lifetime of device		6000 switching cycles
I_{cu} mit S450E	[A]	1000
Vibration resistance		IEC 60068-2-6; EN 61373 Cat.1/Class B 5 g, 20 frequency cycle 5 ... 150 ... 5 Hz at 24 V AC/DC, 5 mA short-term interruption <10 ms

Electrical properties

Combined auxiliary and signal contact S800-AUX/ALT

Utilisation categories		AC15 400/2 A
compliant to IEC 60947-5-1		AC15 240/6 A
		DC13 250/0.55 A
		DC13 125 V/1.1 A
		DC13 60 V/2 A
		DC13 24 V/4 A
Rated values compliant to UL 489		125 VAC 6 A 250 VAC 5 A
		24 VDC 4 A
		125 VDC 0.3 A
		250 VDC 0.15 A
Rated operational voltage I_{th}		6
Rated insulation voltage I_{min}	[mA]	3
Rated impulse withstand voltage U_{min}	[mV]	24
Rated insulation voltage U_i	[A]	690
Number of contacts		2 (1x AUX, 1x AUX/ALT)
Rated impulse withstand voltage U_{imp}	[V]	6
Pollution degree	[kV]	3
Standard		IEC 60947-5-1 / UL 489
Contact function		Changeover contact
Connection C_u	[mm^2]	1 x 2.5
		2 x 1.5
		14 AWG
Tightening torque	[Nm]	1
AC/DC feed.		any
Mounting on DIN top hat rail		EN 60715
Protection category		IP20
Permissible operating ambient temperature	[°C]	–25 ... +60
Storage temperature	[°C]	–40 ... +70
Mech. lifetime of device		6000 switching cycles
I_{cu} mit S450E	[A]	1000
Vibration resistance		IEC 60068-2-6;
		EN 61373 Cat.1/Class B
		5 g, 20 frequency cycle 5 ... 150 ... 5 Hz
		at 24 V AC/DC, 5 mA short-term interruption
		<10 ms

S800-RSU

Operating Voltage		24 VDC
Current Consumption I_{rms}	[A]	2.5
Stand-by Current	[mA]	< 50
Switching Time OFF-ON	[ms]	< 500
Switching Time ON-OFF	[ms]	< 250
Ambient Operation Temperature	[°C]	–25 ... 70
Switching Cycles over Lifetime		10.000
Standard		IEC 60947-2 Annex N
Protection		IP20
Weight	[gr]	300
Connection		10 pole Micro Fit 3.0

Technical data
Accessories

Electrical properties — Shunt release S800-SOR

		S800-SOR12*1	S800-SOR24	S800-SOR130	S800-SOR250	S800-SOR400
Rated operational voltage **U_e**	[VAC/DC]	12	24	48 ... 130	110...250	220 ... 400/250*
Operating range	[%] U_e			70 ... 110		
Rated insulation voltage **U_i**	[V]			690		
Coil pull in consumption	[W/VA]	15.5	16.6/17*	41.9 ... 307.3	23 ... 119	45 ... 148.1
				42 ... 310*	20 ... 105*	
Rated frequency	[Hz]			DC; 50/60		
Pollution degree				3		
Standard				IEC 60947-5-1/UL 489		
Resistance value*	[V/A]	1.8	4.6	25	120	600
Connection C_u	[mm²]			1 ... 25 (14-2 AWG) strand		
				1 ... 35 (14-3 AWG) cable		
Tightening torque	[Nm]			min.3/ max.4		
AC/DC supply				any		
Mounting on DIN top hat rail				EN 60715		
Protection category				IP20 IP40 (actuating end only)		
Permissible operating ambient temperature	[°C]			–25 ... +60		
Storage temperature	[°C]			–40 ... +70		
Vibration resistance				IEC 60068-2-6; EN 61373 Cat.1/Class B		

* compliant to UL 489.
*1 on request

Electrical properties — Undervoltage release S800-UVR

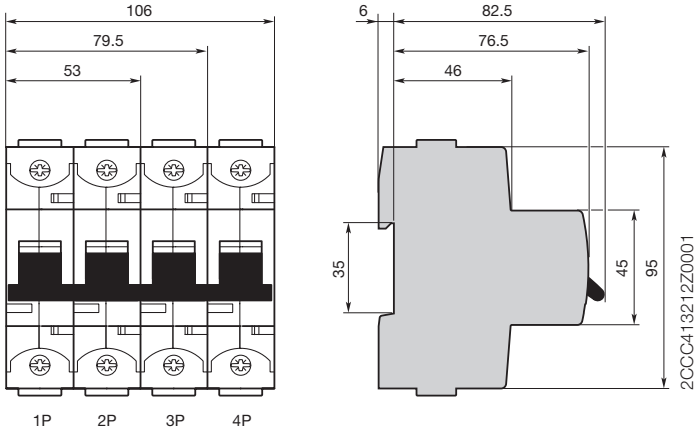
		S800-UVR36	S800-UVR60	S800-UVR130	S800-UVR250
Rated operational voltage **U_e**	[VAC/DC]	24 ... 36	48 ... 60	110 ... 130	220 ... 250
Operating range					
open	[%] U_e		35 ... 70		
closed	[%] U_e		85		
Rated insulation voltage **U_i**	[V]		690		
Power loss of coil when attracted	[W/VA]	1.11 ... 1.14/1.2*	1.14 ... 1.25/1.3*	1.3 ... 1.41/1.4*	1.71 ... 1.91/1.9*
Rated frequency	[Hz]		DC; 50/60		
Pollution degree			3		
Standard			IEC 60947-5-1 / UL 489		
Resistance value	[V/A]	2.2	10	56	220
Connection C_u	[mm²]		1 ... 25 (14-2 AWG) strand		
			1 ... 35 (14-3 AWG) cable		
Tightening torque	[Nm]		min.3/ max.4		
AC/DC supply			any		
Mounting on DIN top hat rail			EN 60715		
Protection category			IP20		
			IP40 (actuating end only)		
Permissible operating ambient temperature	[°C]		–25 ... +60		
Storage temperature	[°C]		–40 ... +70		
Vibration resistance			IEC 60068-2-6; EN 61373 Cat.1/Class B		

* compliant to UL 489.

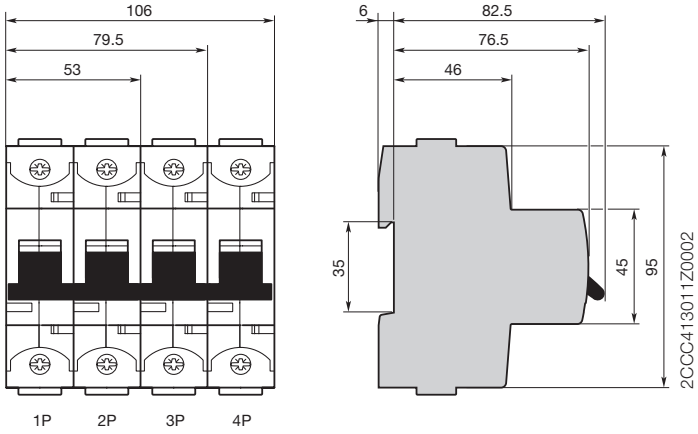
Table of content

Pole dimensions
Photovoltaic High Performance MCB

S800PV-S

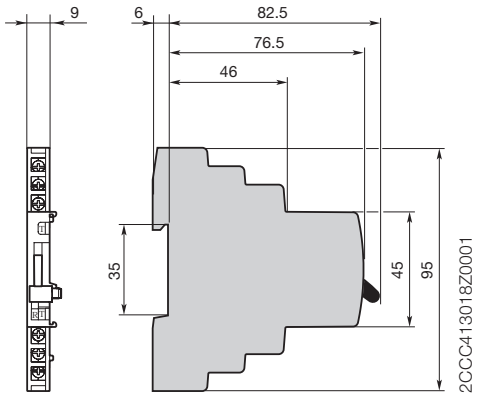


S800PV-M

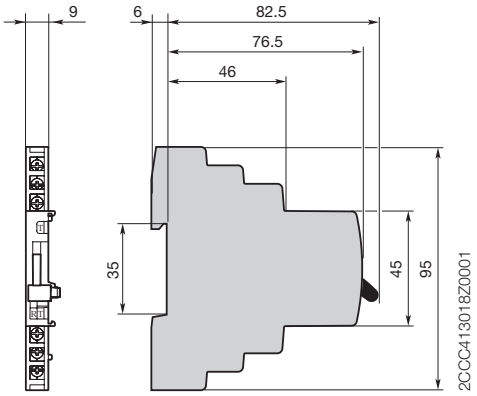


Dimensions of accessories

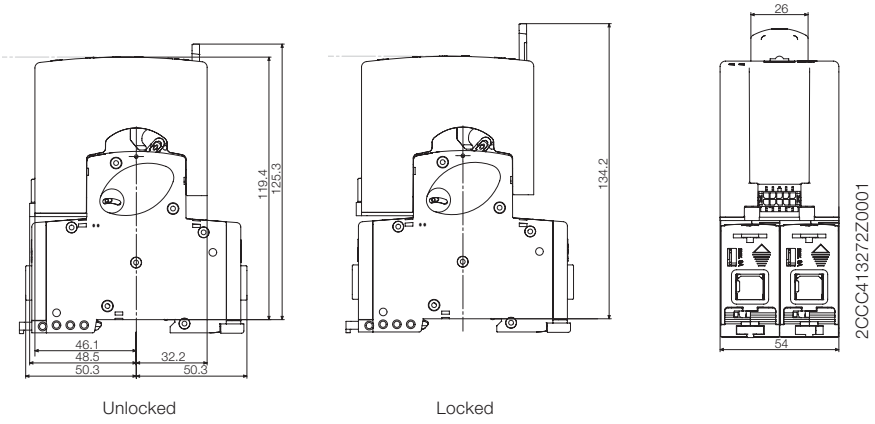
S800-AUX



S800-AUX/ALT



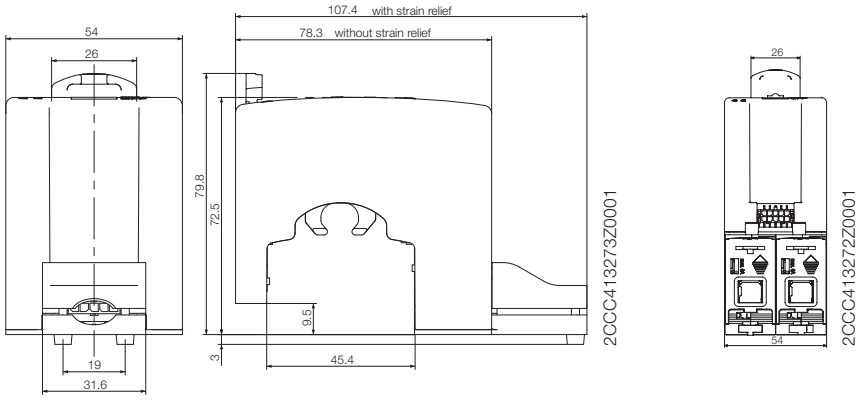
S800-RSU-H



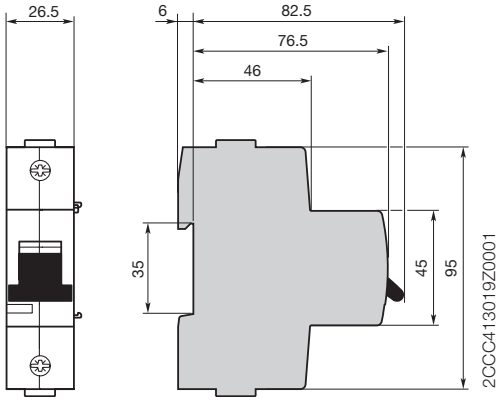
Unlocked Locked

Dimensions of accessories

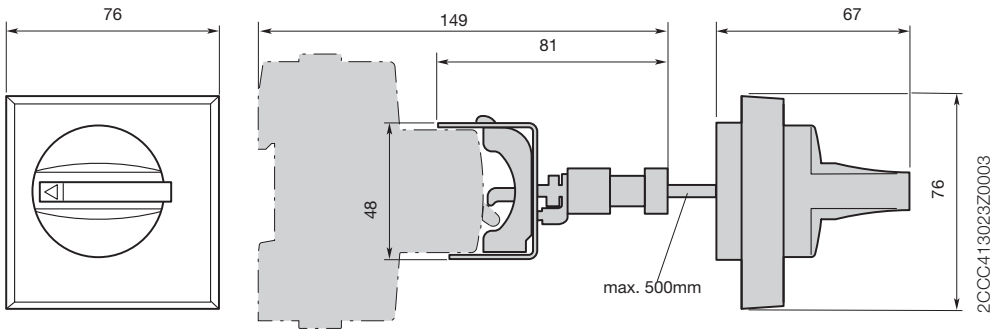
S800W-RSU



S800-SOR
S800-UVR



S800-RD + S800-RHE



Approvals and certifications

	Switzer-land	Germany	China	US/ Canada	Russia			Marine		
S800 Main devices										
S800PV-S High performance MCB		■	■							
S800PV-M High performance MCB		■	■							
S800 accessories										
S800-AUX	■	■	■	■	■	■	■	■	■	■
S800-AUX/ALT	■	■	■	■	■	■	■	■	■	■
S800W-RSU				■						
S800-NT	■									
S800-SOR				■						
S800-UVR				■						

■ devices are approved
☐ devices have been submitted for approval or submission planned for device

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