

ARC FAULT DETECTION DEVICE (AFDD)

The new Arc Fault Detection Device S-ARC1

Maximum safety – easy installation



The S-ARC1 is the new 1P+N Arc Fault Detection Device (AFDD) with an integrated Miniature Circuit Breaker (MCB) in only two module width. Besides the overcurrent protection of the MCB, the S-ARC1 provides additional protection against parallel and series arc faults.

01

01 The Arc Fault Detection Device S-ARC1 with an integrated Miniature Circuit Breaker

The S-ARC1 is an AFDD compliant to the product standard “IEC 62606 - General requirements for Arc Fault Detection Devices” intended to mitigate the effects of arcing faults by disconnecting the circuit when an arc fault is detected. Integrated with an MCB in 6kA and 10kA breaking capacity, S-ARC1 and S-ARC1 M offer protection against overcurrents and arc faults in only two modules width. Combined with a Residual Current Circuit Breaker (RCCB) as upstream device, the S-ARC1 series provides the best solution for complete protection in the switchboard, for people, buildings, and irreplaceable goods.

Strongly recommended applications according to the standard IEC 60364-4-42:

- **Sleeping and common rooms** in nurseries, senior and care homes, equipment for disabled persons
- **Places and rooms with existing fire risks and flammable materials**, such as production facilities, barns, carpenter workshops, paper manufacturing plants or printing shops where the fire risk is high
- **Places and rooms with prevalingly flammable building materials** like wood houses, flammable buildings or forced ventilation systems
- **Places and rooms with irreplaceable goods (cultural assets)**, such as those in museums, libraries, galleries, archives or architectural monuments

Recommendation for any room

The use of the AFDD is additionally recommended in any rooms with sleeping facilities in private apartments, houses, hospitals (does not apply in medically use areas) and hotels.

Offers protection against

- Overload
- Short-circuit
- Earth arc fault
- Parallel arc fault
- Series arc fault
- Overvoltage (higher than 275 V)

Application benefits

- Easy cross-wiring and easy installation with System pro *M compact*® busbars without any extra cables
- Supply possible both from top and bottom side: double slots available for connection with cables and busbars
- Family feeling in the System pro *M compact*® range
- Compatible with System pro *M compact*® accessories
- LED for an easy troubleshooting of the network
- Test button to verify the correct working conditions of the device
- Continuous internal self-test

S-ARC1 arc fault detection device with integrated MCB

Technical data

Technical specifications

| | | S-ARC1 | S-ARC1 M | |
|--|--|--|--|---|
| Standards | | IEC/EN 62606; IEC/EN 60898-1 | IEC/EN 62606; IEC/EN 60898-1 | |
| Electrical Functions | Number of poles | 1P + N | 1P + N | |
| | Rated current I_n | A $6 \leq I_n \leq 20$ | $6 \leq I_n \leq 20$ | |
| | Rated voltage U_e | V 230 - 240 | 230 - 240 | |
| | Insulation voltage U_i | V 500 V AC | 500 V AC | |
| | Overvoltage category | III | III | |
| | Pollution degree | 2 | 2 | |
| | Min. operating voltage | V 170 | 170 | |
| | Threshold for protection against overvoltage | V 275 | 275 | |
| | Rated frequency | Hz 50/60 | 50/60 | |
| | Rated breaking capacity acc. to IEC 60898-1 | ultimate I_{cn} | A 6000 | 10000 |
| | Rated breaking capacity acc. to IEC 60947-2 | ultimate I_{cu} | kA 7.5 | 10 |
| | | service I_{cs} | kA 6 | 7.5 |
| | Rated residual breaking capacity I_{cn1} | A 6000 | 6000 | |
| | Rated impulse withstand voltage (1.2/50) U_{imp} | kV 4 (test voltage 6.2kV at sea level; 5kV at 2000 m) | 4 (test voltage 6.2kV at sea level; 5kV at 2000 m) | |
| | Dielectric test voltage at ind. freq. for 1 min. | kV 2 (50/60 Hz, 1 min.) | 2 (50/60 Hz, 1 min.) | |
| | Thermomagnetic release – characteristic | B: $3 I_n \leq I_m \leq 5 I_n$ | ■ | ■ |
| C: $5 I_n \leq I_m \leq 10 I_n$ | | ■ | ■ | |
| Energy limiting class | 3 | 3 | | |
| Mechanical Main features | Housing | Insulation group II, RAL 7035 | Insulation group II, RAL 7035 | |
| | Toggle | Insulation group IIIA, Orange RAL 2004, sealable in ON-OFF-positions | Insulation group IIIA, Orange RAL 2004, sealable in ON-OFF-positions | |
| | Contact position indication | Green/red window | Green/red window | |
| | Electrical life | 10000 operations | 10000 operations | |
| | Mechanical life | 20000 operations | 20000 operations | |
| | Protection degree acc. to EN 60529 | housing | IP4X | IP4X |
| | | terminals | IP2X | IP2X |
| | Shock resistance acc. to IEC/EN 60068-2-27 | 30 g - 2 shocks - 13 ms | 30 g - 2 shocks - 13 ms | |
| | Vibration resistance acc. to IEC/EN 60068-2-6 | 0.35 mm or 5g - 20 cycles at 5...150...5 Hz without load | 0.35 mm or 5g - 20 cycles at 5...150...5 Hz without load | |
| | Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30 | °C/RH | 28 cycles with 55°C/90 - 96% and 25°C/95 - 100% | 28 cycles with 55°C/90 - 96% and 25°C/95 - 100% |
| | | °C | 30 | 30 |
| | Reference temperature for setting of thermal element | °C 30 | 30 | |
| | Ambient temperature (with daily average $\leq +35$ °C) | °C -25...+55 | -25...+55 | |
| Storage temperature | °C -40...+70 | -40...+70 | | |
| Assembly | Terminal type | top/bottom | failsafe bi-directional cylinder-lift terminal (shock-protected) | |
| | Terminal size for cables | top/bottom | mm ² 25/25 | |
| | Terminal size for busbars | top/bottom | mm ² 10/10 | |
| | Tightening torque | top/bottom | Nm 2.8 | |
| | Stripping length of the cable | | mm 12.5 | |
| | Mounting | | on DIN rail EN 60715 (35 mm) by means of mounting clip | |
| | Mounting position | | any | |
| | Supply from | | Top/bottom terminals | |
| Dimensions and weight | Dimensions (H x D x W) | mm | 85 x 69 x 35 | |
| | Weight | g | 180 | |
| Combination with auxiliary elements | See next page for details | | | |

S-ARC1 AFDD with integrated MCB

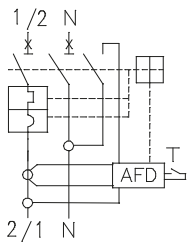
Order information, accessories, electrical diagrams and dimensions

Order Information



S-ARC1. 6kA

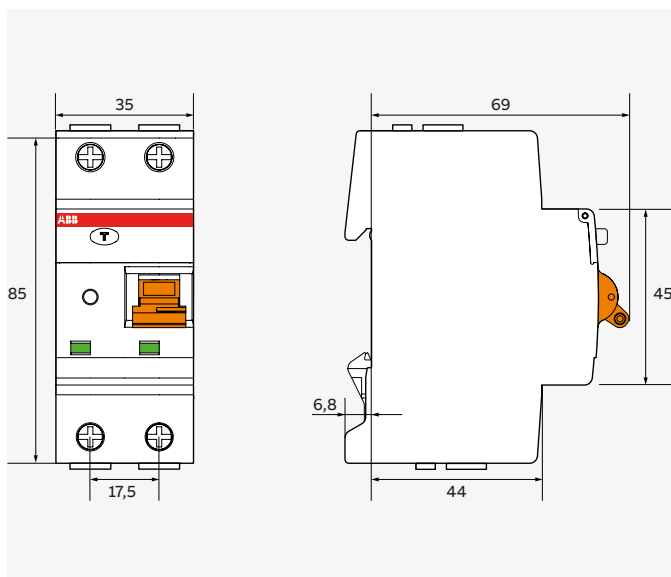
| Number of poles | Charac-teristics | Rated current I _n A | Bbn EAN 8012542 | Order data Type | Order data Order code | Weight 1 pcs kg | Pkg qty pce |
|-----------------|------------------|--------------------------------|-----------------|-----------------|-----------------------|-----------------|-------------|
| 1P+N | B | 6 | 750130 | S-ARC1 B6 | 2CSA255901R9065 | 0.180 | 1 |
| | | 10 | 178132 | S-ARC1 B10 | 2CSA255901R9105 | 0.180 | 1 |
| | | 13 | 750031 | S-ARC1 B13 | 2CSA255901R9135 | 0.180 | 1 |
| | | 16 | 178033 | S-ARC1 B16 | 2CSA255901R9165 | 0.180 | 1 |
| | | 20 | 749936 | S-ARC1 B20 | 2CSA255901R9205 | 0.180 | 1 |
| 1P+N | C | 6 | 177937 | S-ARC1 C6 | 2CSA255901R9064 | 0.180 | 1 |
| | | 10 | 749837 | S-ARC1 C10 | 2CSA255901R9104 | 0.180 | 1 |
| | | 13 | 500735 | S-ARC1 C13 | 2CSA255901R9134 | 0.180 | 1 |
| | | 16 | 886136 | S-ARC1 C16 | 2CSA255901R9164 | 0.180 | 1 |
| | | 20 | 175438 | S-ARC1 C20 | 2CSA255901R9204 | 0.180 | 1 |



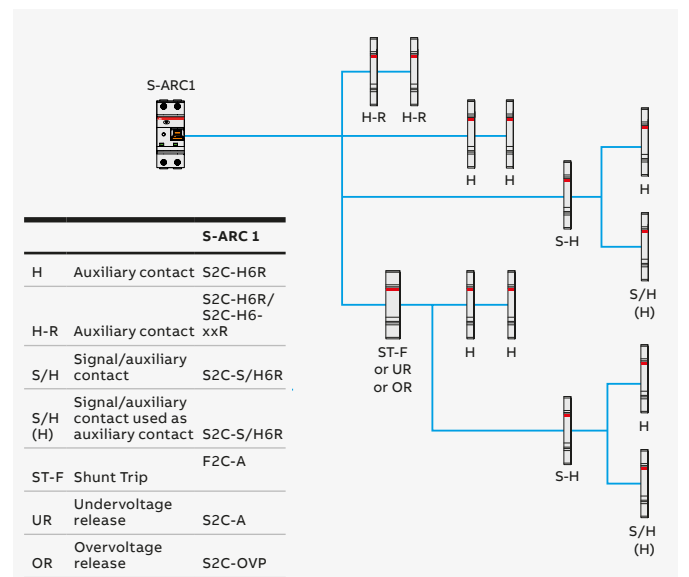
S-ARC1 M, 10kA

| Number of poles | Charac-teristics | Rated current I _n A | Bbn EAN 8012542 | Order data Type | Order data Order code | Weight 1 pcs kg | Pkg qty pce |
|-----------------|------------------|--------------------------------|-----------------|-----------------|-----------------------|-----------------|-------------|
| 1P+N | B | 6 | 374312 | S-ARC1 M B6 | 2CSA275901R9065 | 0.180 | 1 |
| | | 10 | 342113 | S-ARC1 M B10 | 2CSA275901R9105 | 0.180 | 1 |
| | | 13 | 342014 | S-ARC1 M B13 | 2CSA275901R9135 | 0.180 | 1 |
| | | 16 | 342212 | S-ARC1 M B16 | 2CSA275901R9165 | 0.180 | 1 |
| | | 20 | 341215 | S-ARC1 M B20 | 2CSA275901R9205 | 0.180 | 1 |
| 1P+N | C | 6 | 339816 | S-ARC1 M C6 | 2CSA275901R9064 | 0.180 | 1 |
| | | 10 | 339717 | S-ARC1 M C10 | 2CSA275901R9104 | 0.180 | 1 |
| | | 13 | 339618 | S-ARC1 M C13 | 2CSA275901R9134 | 0.180 | 1 |
| | | 16 | 340416 | S-ARC1 M C16 | 2CSA275901R9164 | 0.180 | 1 |
| | | 20 | 340317 | S-ARC1 M C20 | 2CSA275901R9204 | 0.180 | 1 |

Overall dimensions in mm



System pro M compact® accessories – Combinations with accessories



S-ARC1 arc fault detection device with integrated MCB

Technical data

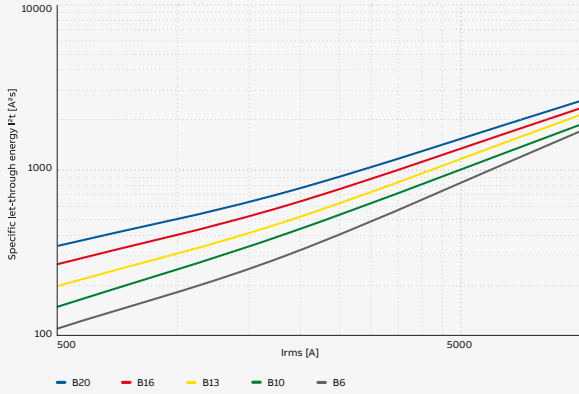
Specific let-through energy I^2t S-ARC1 and S-ARC1 M

01 I^2t
S-ARC1 Tripping
Characteristics B

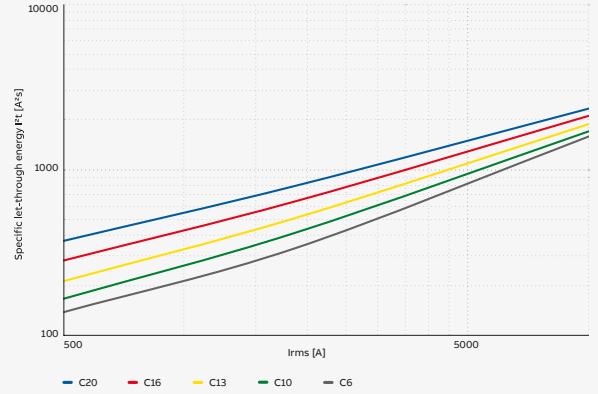
02 I^2t
S-ARC1 Tripping
Characteristics C

03 I^2t
S-ARC1 M Tripping
Characteristics B

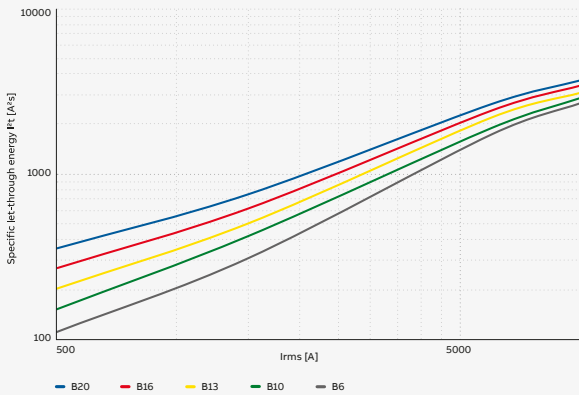
04 I^2t
S-ARC1 M Tripping
Characteristics C



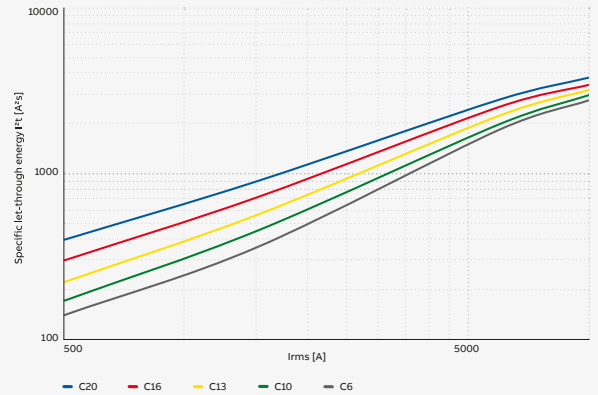
01



02



03



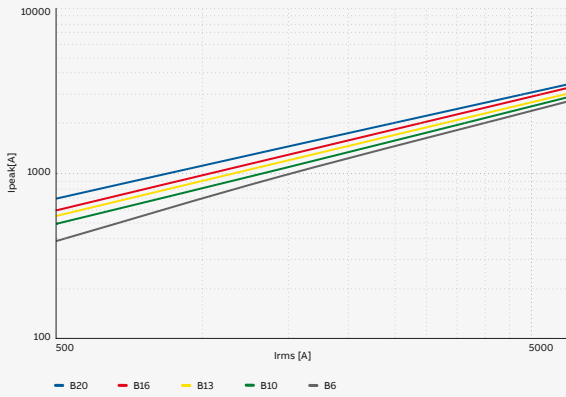
04

S-ARC1 arc fault detection device with integrated MCB

Technical data

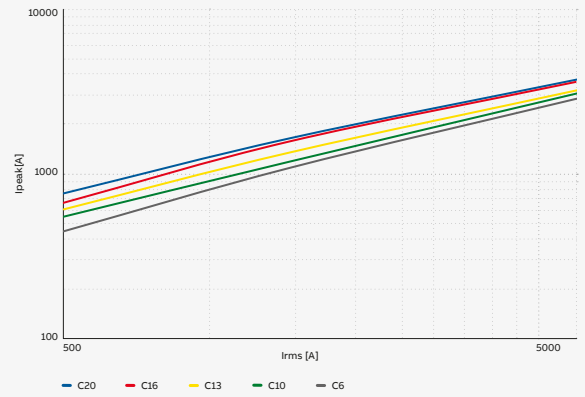
Ipeak S-ARC1 and S-ARC1 M

01 Ipeak
S-ARC1 Tripping
Characteristics B



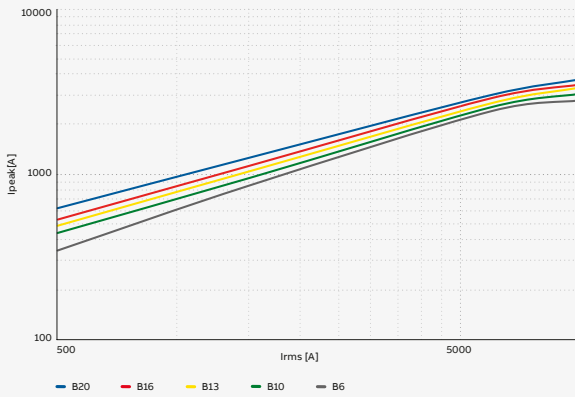
01

02 Ipeak
S-ARC1 Tripping
Characteristics C



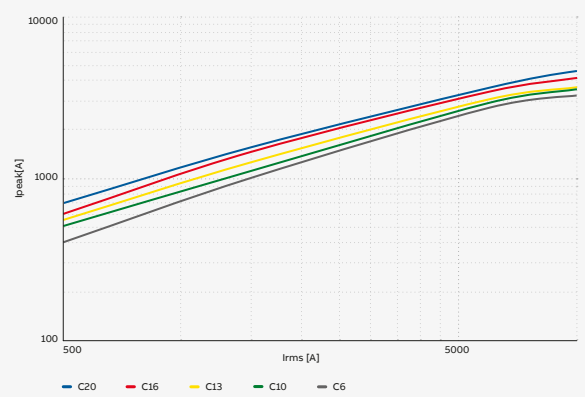
02

03 Ipeak
S-ARC1 M Tripping
Characteristics B



03

04 Ipeak
S-ARC1 M Tripping
Characteristics C



04

S-ARC1 arc fault detection device with integrated MCB

Technical data

Technical data

| Influence of adjacent devices | Number of devices | 1 | 3 | 5 | 7 | 9 |
|-------------------------------|-------------------|---|------|------|------|------|
| | Correction factor | 1 | 0.92 | 0.88 | 0.85 | 0.84 |

| Derating in temperature Max operating current depending on the ambient temperature (daily average $\leq +35^\circ\text{C}$) of characteristics type B and C. | In (A) | Temperature ($^\circ\text{C}$) | | | | | | | | | |
|--|--------|----------------------------------|------|------|------|------|------|------|------|------|------|
| | | -25 | -20 | 0 | 10 | 20 | 25 | 30 | 40 | 50 | 55 |
| 6 | 7.2 | 6.8 | 6.4 | 6.3 | 6.1 | 6.0 | 6.0 | 6.0 | 6.0 | 5.8 | 5.8 |
| 10 | 12.2 | 11.9 | 10.8 | 10.7 | 10.5 | 10.2 | 10.0 | 10.0 | 10.0 | 9.8 | 9.6 |
| 13 | 15.6 | 15.2 | 14.2 | 13.8 | 13.4 | 13.2 | 13.0 | 12.9 | 12.9 | 12.7 | 12.6 |
| 16 | 19.5 | 18.9 | 17.9 | 17.3 | 16.7 | 16.3 | 16.0 | 15.8 | 15.8 | 15.5 | 15.4 |
| 20 | 24.4 | 24.0 | 22.4 | 21.6 | 21.0 | 20.4 | 20.0 | 19.8 | 19.8 | 19.5 | 19.4 |

| Voltage Drop, power loss, internal resistance, own consumption | In (A) | Voltage drop (mV) | Internal resistance (m Ω) | Power loss (W) | Own consumption (W) |
|--|--------|-------------------|-----------------------------------|----------------|---------------------|
| | | 6 | 380 | 63.3 | 2.3 |
| 10 | 203 | 20.3 | 2.0 | 0.5 | |
| 13 | 166 | 12.8 | 2.2 | 0.5 | |
| 16 | 175 | 10.9 | 2.8 | 0.5 | |
| 20 | 182 | 9.1 | 3.6 | 0.5 | |

| Performance in altitude | Elevation (m) | 3000 | 4000 | 5000 | 6000 |
|-------------------------|--------------------|--------------------|--------------------|--------------------|-------------------|
| | | Rated Current (A) | $0.96 \times I_n$ | $0.94 \times I_n$ | $0.92 \times I_n$ |
| Rated Voltage (V) | $0.877 \times U_n$ | $0.775 \times U_n$ | $0.676 \times U_n$ | $0.588 \times U_n$ | |

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