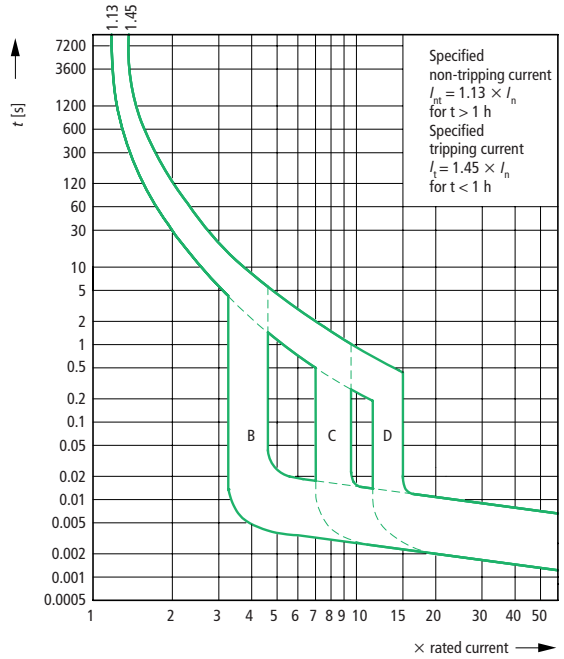
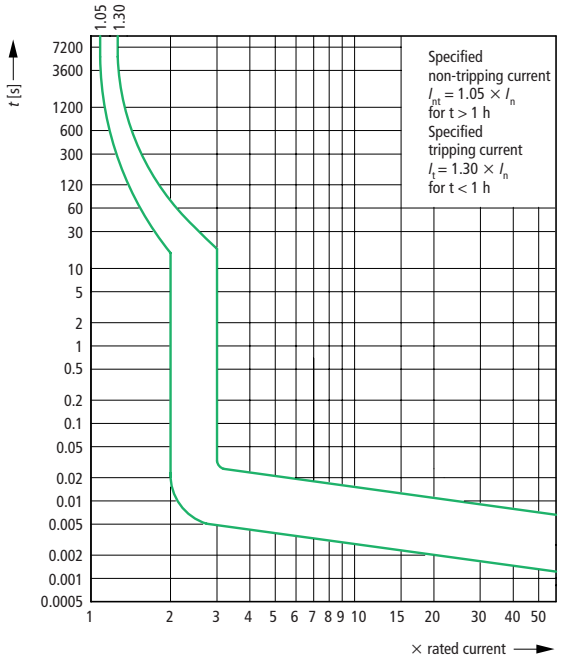
# FAZ Miniature Circuit-Breakers, AZ High-Capacity Miniature Circuit-Breakers
## Tripping Characteristics

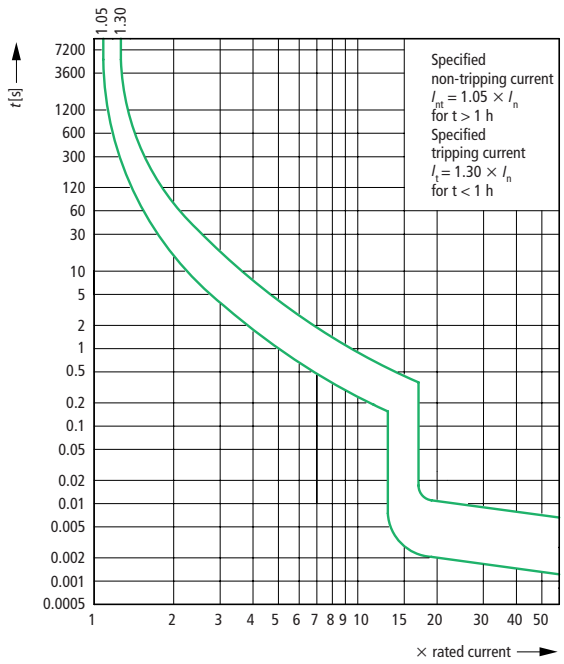
FAZ tripping characteristics at 30 °C: B, C, D to IEC/EN 60 898



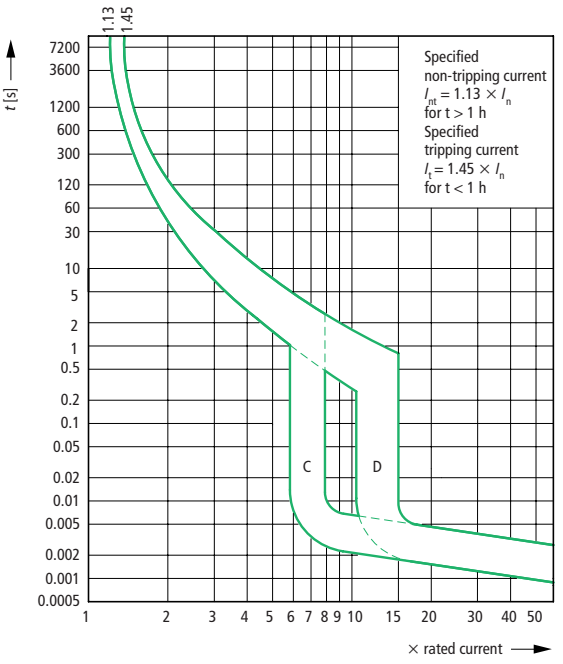

FAZ tripping characteristics at 30 °C: R to IEC/EN 60 947




FAZ tripping characteristic at 30 °C: S to IEC/EN 60 947



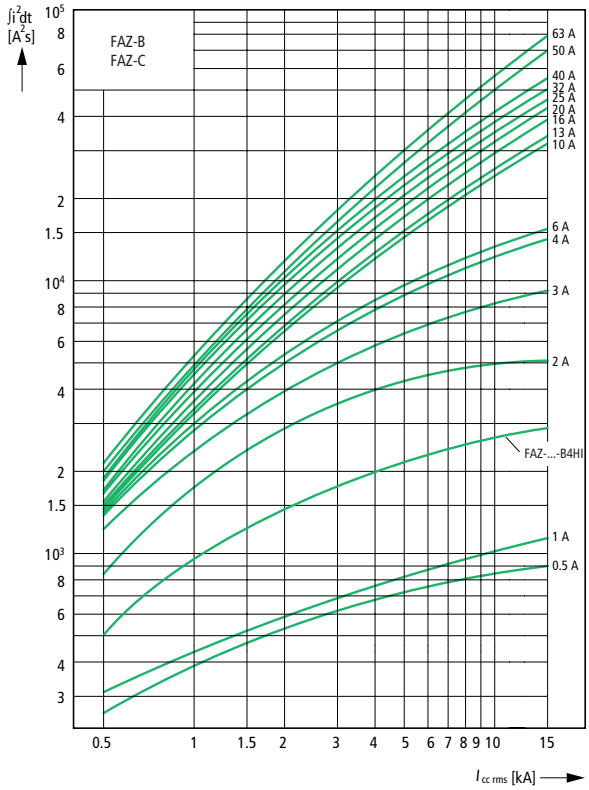

AZ tripping characteristic at 30 °C: C, D to IEC/EN 60 898



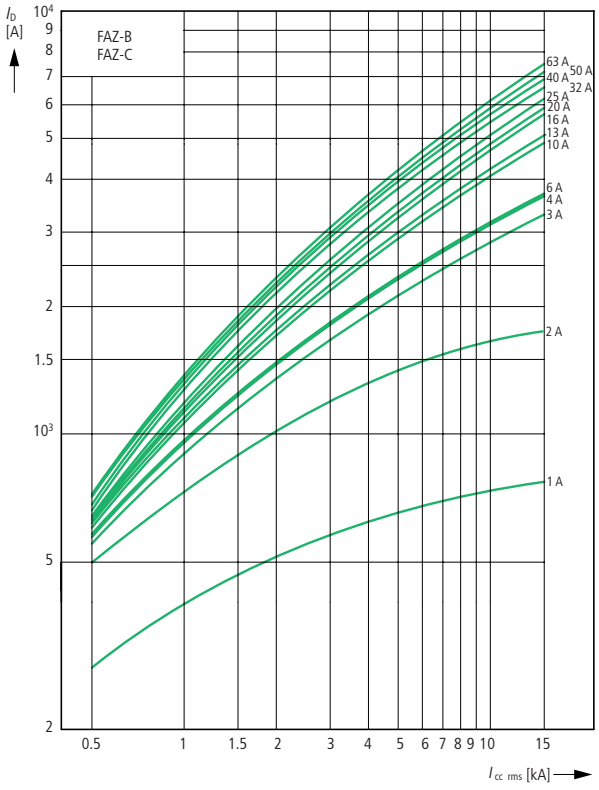
# FAZ Miniature Circuit-Breakers
## Let-Through Characteristics

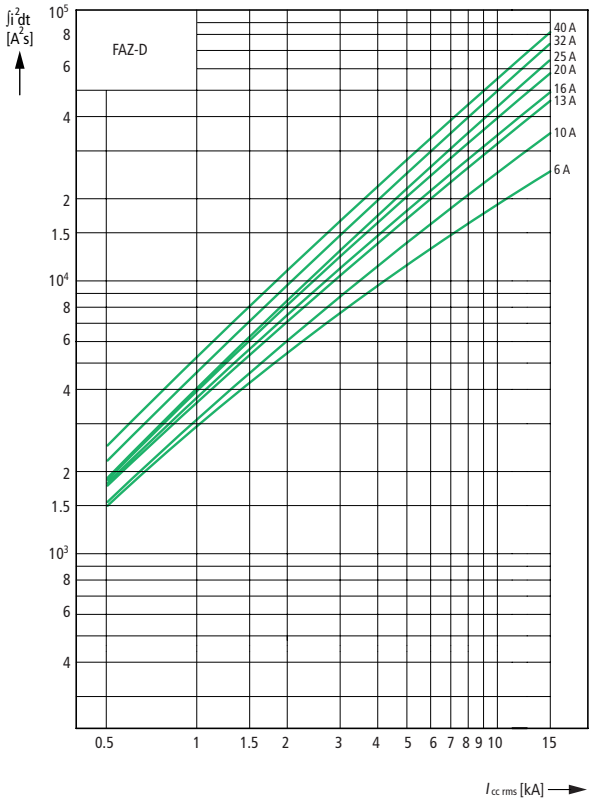
**Let-through energy $I^2t$/let-through current $\hat{I}_D$**
Determined in accordance with IEC/EN 60 898

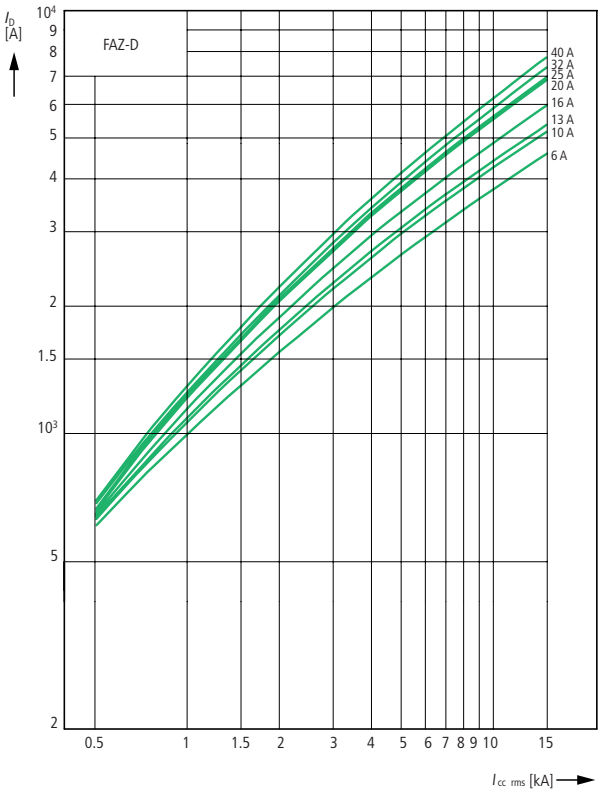
**Let-through energy $I^2t$**




**Let-through current $\hat{I}_D$**



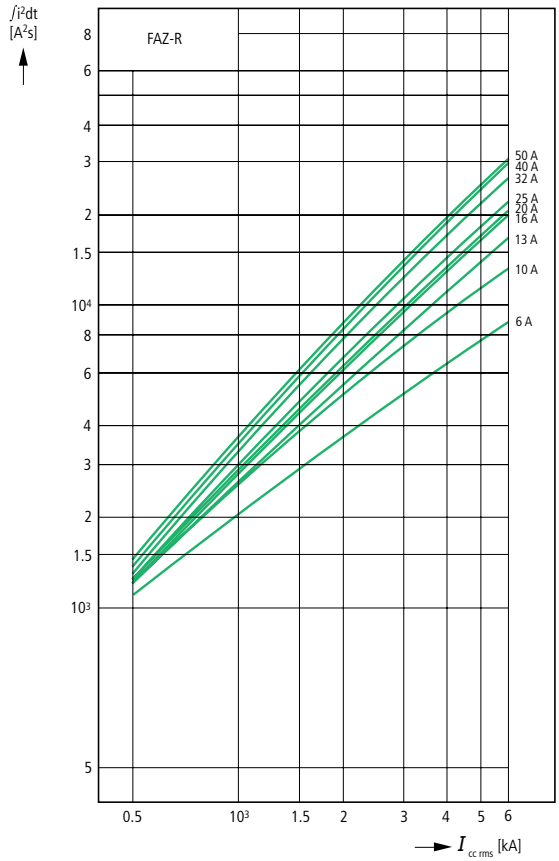



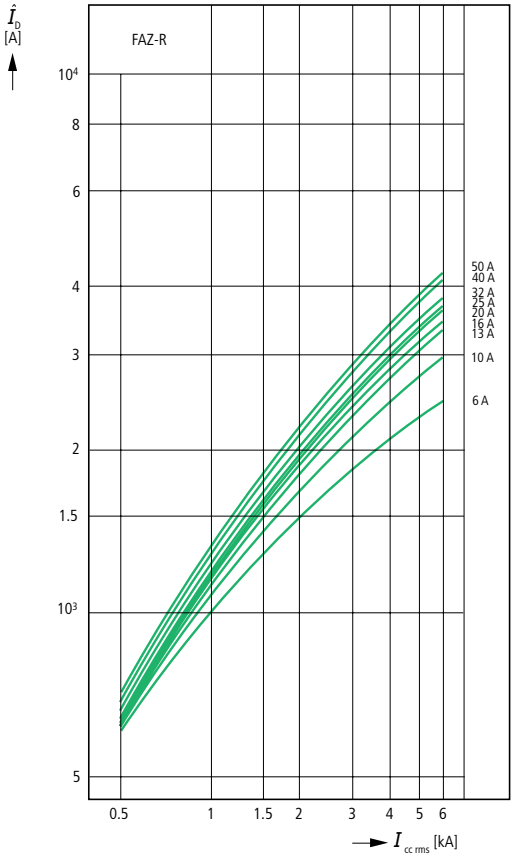
# FAZ Miniature Circuit-Breakers
## Let-Through Characteristics

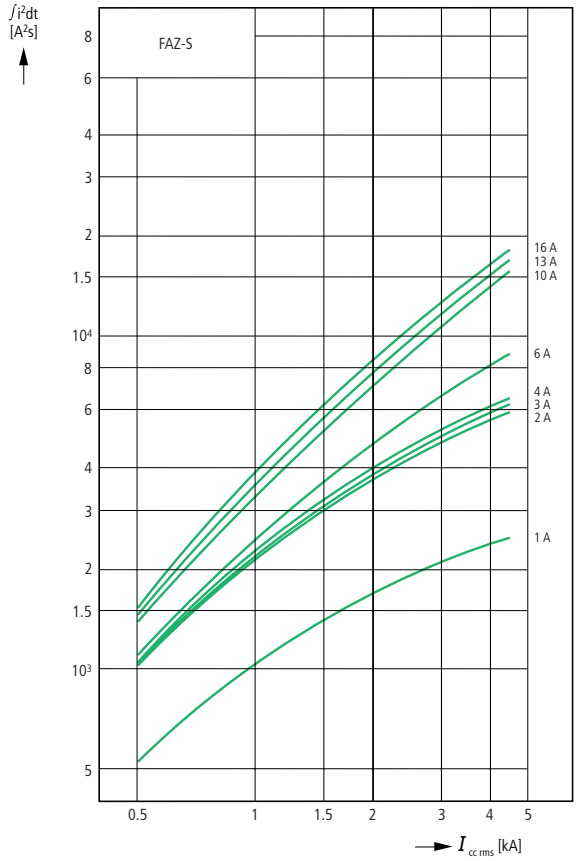
**Let-through energy $I^2t$/let-through current $\hat{I}_D$**
Determined in accordance with IEC/EN 60 898

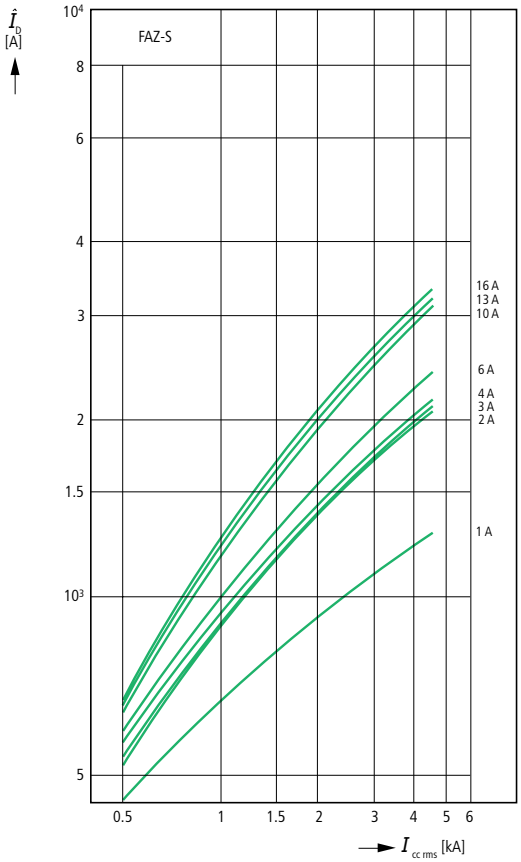
**Let-through energy $I^2t$**




**Let-through current $\hat{I}_D$**



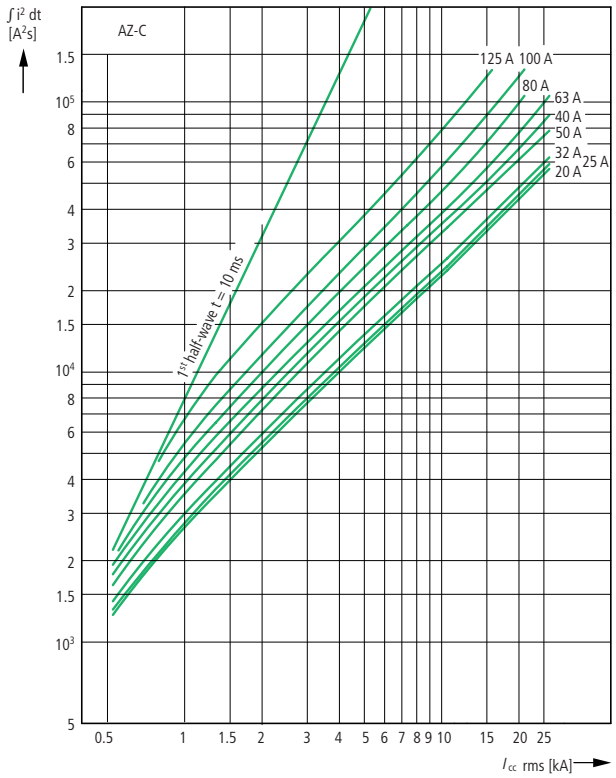



# AZ High-Capacity Miniature Circuit-Breakers

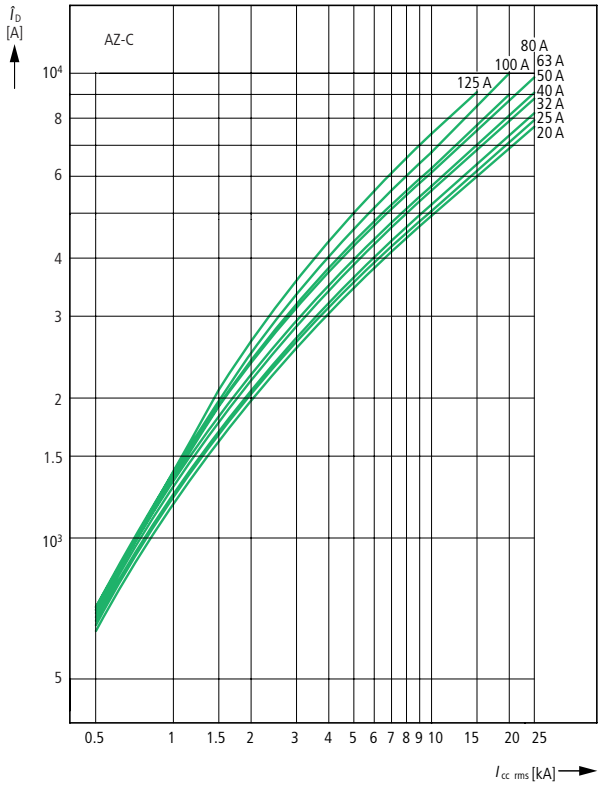
## Let-Through Characteristics

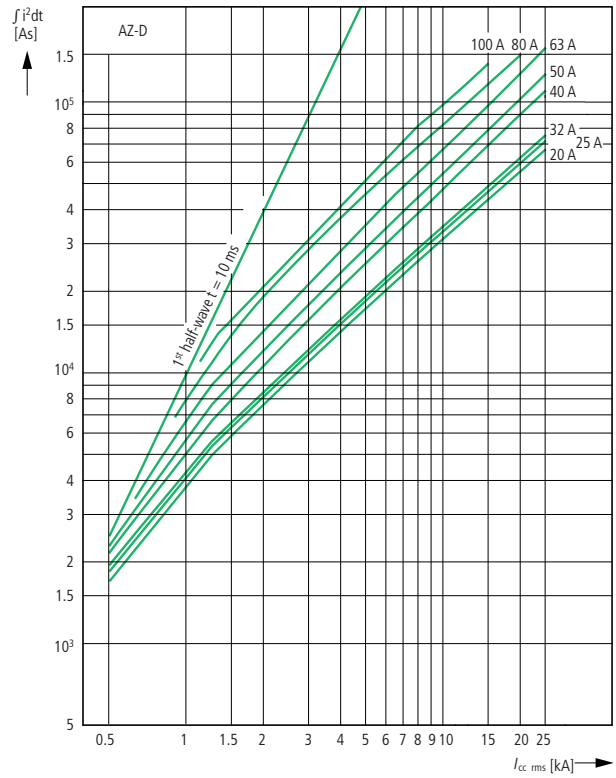
**Let-through energy $I^2t$/let-through current $\hat{I}_D$**
Determined in accordance with IEC/EN 60 898

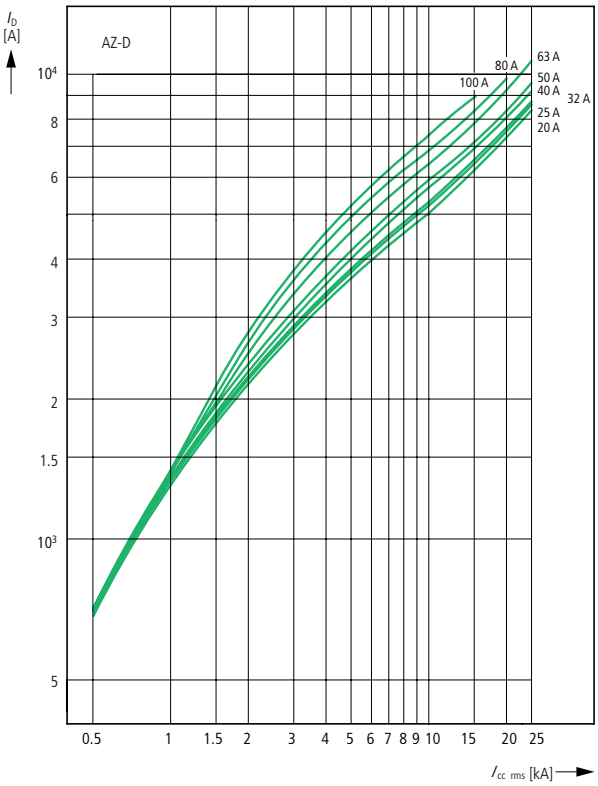
### Let-through energy $I^2t$




### Let-through current $\hat{I}_D$



# Miniature Circuit-Breakers
## Technical Data

| Miniature circuit-breakers | | | FAZ | AZ | FAZ-PN |
|---|---|---|---|---|---|
| **General technical data** | | | | | |
| Standards | | | | | |
| B, C, D characteristics | | | IEC/EN 60 898, VDE 0641, DIN 43 880 | | |
| S, R characteristics | | | IEC/EN 60 947-2, VDE 0660 Part 1, DIN 43 880 | | |
| Ambient temperature | Min./Max. | °C | –5/+40 | –5/+40 | –5/+40 |
| Influence of ambient temperature on rated current | | | | | |
| (Ref. 30 °C) | | %/K | → Page 12/045 | → Page 12/045 | → Page 12/045 |
| Mechanical shock resistance (shock duration 20 ms) | | g | 10 | 20 | – |
| Mounting position/direction of incoming supply | | | As required | As required | As required |
| Isolating characteristics | | | Yes | Yes | Yes |
| Protection against electric shock to IEC 536 | | | Finger and back-of-hand proof | | |
| Degree of protection (terminals) | | | IP20 (IP00), IP30 when fitted in distribution board | | IP20 |
| Dimensions | | | → Page 12/049 | → Page 12/049 | → Page 12/049 |
| Weight per pole | | kg | 0.12 | 0.24 | 0.12 |
| Terminal capacity | | | | | |
| Solid or stranded[1] | Min./Max. | $mm^2$ | 1 × (1 – 25) | 1 × (2.5 – 50) | 1 × (1 – 16) |
| | Min./Max. | $mm^2$ | 2 × (1 – 10) | 2 × (2.5 – 25) | 2 × (1 – 6) |
| Flexible, with ferrule[1] (ferrule to DIN 46 228) | Min./Max. | $mm^2$ | 1 × (0.75 – 16) | – | 1 × (0.75 – 10) |
| | Min./Max. | $mm^2$ | 2 × (4 – 6) | 2 × (2.5 – 16) | 2 × (1 – 4) |
| Tightening torque | | Nm | 2.4 | 3.0 | 1.5 |
| **Contacts** | | | | | |
| Rated current $I_n$ = rated uninterrupted current $I_u$ | | A | 0.5 – 63 | 20 – 125 | 2 – 40 |
| Rated impulse withstand voltage $U_{imp}$ | | V | 4000 | 4000 | 4000 |
| Rated insulation voltage $U_i$ | | V AC | 440 | 440 | 440 |
| Overvoltage category/pollution degree | | | III/3 | III/2 | III/3 |
| Rated operational voltage $U_e$ | | VAC | 230/400; 240/415 | 230/400; 240/415 | 230/400; 240/415 |
| DC | | | | | |
| B, C, D and R characteristic, per pole | | V DC | 48 | 60 | 48 |
| FAZ-C-...DC; 1-pole/2-pole | | V DC | 250/500 | – | – |
| Rated frequency | | Hz | 50 – 60 | 50 – 60 | 50 – 60 |
| **Switching capacity** | | | | | |
| Rated short-circuit breaking capacity $I_{cn}$ | | | | | |
| IEC/EN 60 898, VDE 0641 | | | | | |
| 230/400 V AC, 240/415 V AC | B, C, D 0.5 – 50 | kA | 10/10 | – | 6 |
| | B, C 63 | kA | 10/8 | – | – |
| 48 V DC (T = 4 ms) | B, C, D 0.5 – 50 | kA | 10 | – | 6 |
| | B, C 63 | kA | 8 | – | – |
| Single-pole for IT system, 400 V | B, C | kA | 1 | – | – |
| Rated ultimate short-circuit breaking capacity $I_{cu}$ | | | | | |
| IEC/EN 60 947-2 | | | | | |
| 230/400 V AC, 240/415 V AC | B, C, D 0.5 – 63 | kA/cos φ | 15/0.5 | 25/0.25 | – |
| | C, D 80/100 | kA/cos φ | – | 20/0.3 | – |
| | C 125 | kA/cos φ | – | 15/0.5 | – |
| | R 6 – 50 | kA/cos φ | 6/0.7 | – | – |
| | S 1 – 16 | kA/cos φ | 4.5/0.8 | – | – |
| Up to 250 V DC | 1-pole | kA | 6 | – | – |
| Up to 500 V DC | 2-pole | kA | 6 | – | – |
| Lifespan, mechanical (1 operation = 2 switching movements) | Operations | | ≧ 7000 | ≧ 10000 | ≧ 7000 |
| **Selectivity** | | | | | |
| Current limiting class to VDE 0641 B, C, D characteristic 0.5 – 32 A | | | 3 | – | 3 |
| **Back-up protection** | | | | | |
| With LV h.b.c. fuses, max. gG/gL | | A/kA | 100 ≧ 10 | 200 ≧ 15 – 25 | 100 ≧ 6 |

**Notes**

[1] When using 2 conductors, the maximum admissible difference in cross-section is one size.

# Miniature Circuit-Breakers
## Technical Data

| Residual-current protective module | | | FIM-40 | FIM-63 | FILS |
|---|---|---|---|---|---|
| **General technical data** | | | | | |
| Standards | | | IEC/EN 61 009, VDE 0664, DIN 43 880 | | |
| Ambient temperature | Min./Max. | °C | –5/+40 | –5/+40 | –5/+40 |
| Mounting position/direction of incoming supply | | | As required | As required | As required |
| Degree of protection (terminals) | | | IP20 (IP00), IP30 when fitted in distribution board | | |
| Dimensions | | | → Page 12/049 | → Page 12/049 | → Page 12/049 |
| Weight of FAZ-...FIM/FILS | 2-pole | kg | 0.48 | 0.48 | 0.22 |
| | 4-pole | kg | 0.82 | 0.82 | – |
| Terminal capacity | | | | | |
| Solid or stranded[1)] | Min./Max. | $mm^2$ | 1 × (1 – 25) | 1 × (1 – 25) | 1 × (1 – 25) |
| | Min./Max. | $mm^2$ | 2 × (1 – 10) | 2 × (1 – 10) | 2 × (1 – 10) |
| Flexible, with ferrule[1)] (ferrule to DIN 46 228) | Min./Max. | $mm^2$ | 1 × (0.75 – 16) | 1 × (0.75 – 16) | 1 × (0.75 – 16) |
| | Min./Max. | $mm^2$ | 2 × (4 – 6) | 2 × (4 – 6) | 2 × (4 – 6) |
| Solid or stranded | | $mm^2$ | – | – | – |
| Tightening torque | | Nm | 2.4 | 2.4 | 2.4 |
| **Contacts** | | | | | |
| Uninterrupted current | | A | Max. 40 | Max. 63 | – |
| Rated uninterrupted current $I_u$ | | A | – | – | 6 – 40 |
| Rated impulse withstand voltage $U_{imp}$ | | V | 4000 | 4000 | 4000 |
| Rated operational voltage $U_e$ | | V AC | 240/415 | 240/415 | 230 |
| Rated frequency | | Hz | 50 – 60 | 50 – 60 | 50 – 60 |
| Rated insulation voltage $U_i$ | | V AC | 440 | 440 | 440 |
| Heat dissipation | 2-pole/ 4-pole | VA | 10.2/20.4 | 10.2/20.4 | → Page 12/045, 046 |
| **Switching capacity** | | | | | |
| Rated short-circuit breaking capacity $I_{cn}$ | | | | | |
| IEC/EN 60 898, VDE 0641 | B, C 6 – 40 | kA | – | – | 10 |
| **Releases** | | | | | |
| Rated fault current $I_{\Delta n}$ | | A | 0.03/0.3 | 0.03/0.3 | 0.03/0.3 |
| Tripping time $t_a$ | | | | | |
| At $I_\Delta = I_{\Delta n}$ | | ms | ≦ 200 | ≦ 200 | ≦ 200 |
| At $I_\Delta = 5 \times I_{\Delta n}$ | | ms | ≦ 40 | ≦ 40 | ≦ 40 |
| Peak withstand current (lightning current 8/20) | | A | 250 | 250 | 250 |
| Working voltage range of test device (–15%/+10%) | | V AC | 230 – 415 | 230 – 415 | 230 |
| Lifespan, mechanical and electrical | | | See FAZ | See FAZ | See FAZ/FIP |

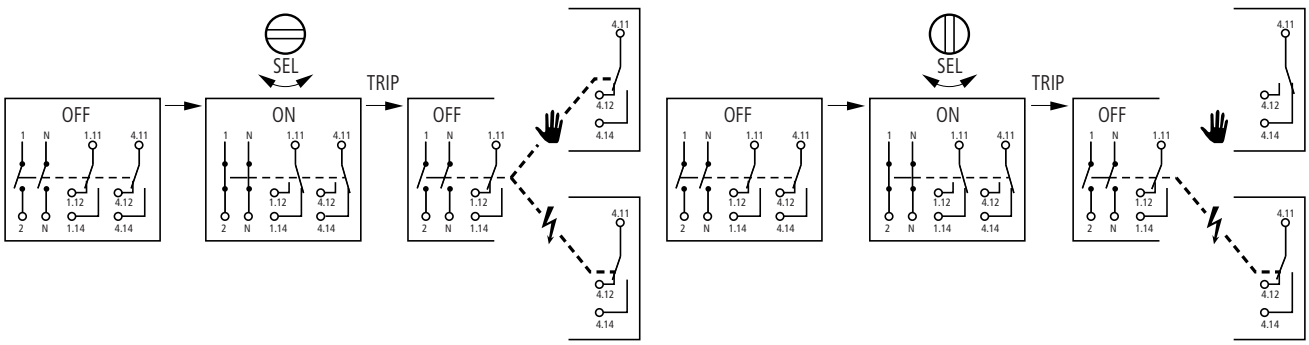
**Notes** 1) When using 2 conductors, the maximum admissible difference in cross-section is one size.

# Miniature Circuit-Breakers
## Technical Data

| Auxiliary contacts, voltage releases | | | FIP-XHI11 | FAZ-XHI001 | FAZ/ FIP-XRHI002 | FAZ-XUA | FAZ-XAA | AZ-XHI 11 | AZ-XAA |
|---|---|---|---|---|---|---|---|---|---|
| **General technical data** | | | | | | | | | |
| Degree of protection (terminals) | | | IP20 (IP00), IP30 when fitted in distribution board | | | | | | |
| Dimensions | | | → Page 12/050 | | | | | | |
| Weight | | kg | 0.045 | 0.045 | 0.045 | 0.155 | 0.155 | 0.045 | 0.095 |
| Terminal capacity | | | | | | | | | |
| Solid | Min./Max. | $mm^2$ | 1 × 0.5/2.5 | 1 × 0.5/2.5 | 1 × 0.5/2.5 | 1 × 0.5/4 | 1 × 1/25 | 1 × 0.5/2.5 | 1 × 2.5/50 |
| Stranded | Min./Max. | $mm^2$ | 2 × 0.5/2.5 | 2 × 0.5/2.5 | 2 × 0.5/2.5 | 2 × 0.5/2.5 | 2 × 1/4 | 2 × 0.5/2.5 | 2 × 2.5/25 |
| Tightening torque | | Nm | 0.8 | 0.8 | 0.8 | 0.8 | 2.4 | 0.8 | 3.0 |
| **Auxiliary contacts** | | | | | | | | | |
| Rated insulation voltage $U_i$ | | V AC | 440 | 440 | 250 | 440 | 440 | 440 | 440 |
| Rated operational current $I_e$ XHI/XRHI | | | | | | | | | |
| AC-12 | 230 V | A | – | – | 2 | – | – | – | – |
| AC-13 | 230 V | A | – | – | 2 | – | – | – | – |
| | 250 V | A | 6 | 3 | – | – | – | 6 | – |
| | 440 V | A | 2 | – | – | – | – | 2 | – |
| AC-15 | 230 V | A | – | 2 | 1 | – | – | – | – |
| DC-12 | 110 V | A | – | 0.5 | 0.5 | – | – | – | – |
| DC-13 | 60 V | A | 4 | – | – | – | – | 4 | – |
| | 110 V | A | 2 | – | – | – | – | 2 | – |
| | 230 V | A | 0.5 | – | – | – | – | 0.5 | – |
| Safe isolation to IEC 536 between auxiliary contacts and main contacts | | V AC | 440 | 440 | 440 | – | – | 440 | – |
| Minimum operational voltage $U_e$ (AC/DC) | | V/mA | 24/50 | 5/10 | 5/10 | – | – | 24/50 | – |
| Minimum pulse duration | | ms | – | – | – | – | > 15 | – | > 15 |
| Minimum command time | | ms | – | – | – | – | ≦ 100 ms | – | – |
| Max. short-circuit protective device | | | | | | | | | |
| Fuseless | Type | | FAZ-B4HI | FAZ-B4HI | FAZ-B4HI | – | – | FAZ-B4HI | – |
| Fuse | gG/gL | A | 6 | 6 | 6 | Inherently | Inherently | 6 | Inherently |
| Lifespan, mechanical | Operations | | ≧6000 | ≧6000 | ≧6000 | > 10000 | > 4000 | ≧6000 | > 4000 |
| **Coil** | | | | | | | | | |
| Rated operational voltage $U_e$ | (F)AZ-XAA | V AC | – | – | – | – | 12 – 110 | – | 12 – 60 |
| | | V DC | – | – | – | – | 24 – 60 | – | 12 – 60 |
| | (F)AZ-XAA | V AC | – | – | – | – | 110 – 415 | – | 110 – 415 |
| | | V DC | – | – | – | – | 110 – 220 | – | 110 – 220 |
| | FAZ-XUA | V AC | – | – | – | 115/230/400 | – | – | – |
| Undervoltage release | | | | | | | | | |
| Drop-out voltage | | × $U_s$ | – | – | – | 0.7 – 0.35 | – | – | |
| Inrush current (AC/DC) | Pick-up | A | – | – | – | 3.6/44 | – | – | – |
| Shunt release | | | | | | | | | |
| Operating range | | × $U_s$ | – | – | – | – | 0.7 – 1.1 | – | – |
| Inrush current | Pick-up | A (AC) | – | – | – | – | 25/12 ms | – | 38/2.1ms |
| | | A (DC) | – | – | – | – | 15/3 ms | – | 34/2 ms |

**Notes**

[1] The component is supplied with the groove of the yellow selector button horizontal: this means that the changeover contact 4.11 – 4.12/4.14 switches when actuated by hand as well as electrically. If the yellow selector button is turned through 90°, the contact 4.11 – 4.12/4.14 switches only when actuated electrically, but remains closed when operated by hand.



# Miniature Circuit-Breakers
## Technical Data

### Heat dissipation

### Influence of the ambient temperature on the thermal tripping characteristic

The table shows the corrected values of the rated current dependent on the ambient temperature.

Example:
To maintain the specified tripping times at an ambient temperature of 60 °C, with rated current 10 A, a miniature circuit-breaker suitable for 13 A must be used.

| FAZ B, C, D, R, S | Rated heat dissipation/pole | | | Reference temperature | Ambient temperature | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | B, C, D | R | S | | | | | | | |
| $I_n$ [A] | [W] | [W] | [W] | 30 °C | 35 °C | 40 °C | 45 °C | 50 °C | 55 °C | 60 °C |
| 0.5 | 1.2 | – | – | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 |
| 1 | 1.3 | – | 1.6 | 1 | 1.0 | 1.0 | 0.9 | 0.9 | 0.9 | 0.9 |
| 2 | 1.4 | 2.6 | 1.0 | 2 | 2.0 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 |
| 3 | 1.2 | 2.6 | 1.4 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 |
| 4 | 1.2 | 2.7 | 1.6 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.5 |
| 6 | 1.8 | 2.8 | 2.4 | 6 | 5.9 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 |
| 10 | 2.1 | 2.9 | 1.6 | 10 | 9.8 | 9.6 | 9.4 | 9.2 | 9.0 | 8.8 |
| 13 | 2.3 | 3.2 | – | 13 | 12.7 | 12.5 | 12.2 | 12.0 | 11.7 | 11.4 |
| 16 | 2.0 | 2.6 | 2.2 | 16 | 15.7 | 15.4 | 15.0 | 14.7 | 14.4 | 14.1 |
| 20 | 2.9 | 3.4 | – | 20 | 19.6 | 19.2 | 18.8 | 18.4 | 18.0 | 17.6 |
| 25 | 3.1 | 3.3 | – | 25 | 24.5 | 24.0 | 23.5 | 23.0 | 22.5 | 22.0 |
| 32 | 3.1 | 3.6 | – | 32 | 31.4 | 30.7 | 30.1 | 29.4 | 28.8 | 28.2 |
| 40 | 4.2 | 4.3 | – | 40 | 39.2 | 38.4 | 37.6 | 36.8 | 36.0 | 35.2 |
| 50 | 4.6 | 5.2 | – | 50 | 49.0 | 48.0 | 47.0 | 46.0 | 45.0 | 44.0 |
| 63 | 5.3 | – | – | 63 | 61.7 | 60.5 | 59.2 | 58.0 | 56.7 | 55.4 |

| AZ C, D | Rated heat dissipation/pole | Reference temperature | Ambient temperature | | | | | |
|---|---|---|---|---|---|---|---|---|
| $I_n$ [A] | [W] | 30 °C | 35 °C | 40 °C | 45 °C | 50 °C | 55 °C | 60 °C |
| 20 | 2.7 | 20 | 19.4 | 19.0 | 18.4 | 18.0 | 17.4 | 16.8 |
| 25 | 2.8 | 25 | 24.3 | 23.8 | 23.0 | 22.5 | 21.8 | 21.0 |
| 32 | 3.8 | 32 | 31.0 | 30.4 | 29.4 | 28.8 | 27.8 | 26.9 |
| 40 | 4.4 | 40 | 38.8 | 38.0 | 36.8 | 36.0 | 34.8 | 33.6 |
| 50 | 5.1 | 50 | 48.5 | 47.5 | 46.0 | 45.0 | 43.5 | 42.0 |
| 63 | 5.2 | 63 | 61.1 | 59.9 | 58.0 | 56.7 | 54.8 | 52.9 |
| 80 | 7.1 | 80 | 77.6 | 76.0 | 73.6 | 72.0 | 69.6 | 67.2 |
| 100 | 9.1 | 100 | 97.0 | 95.0 | 92.0 | 90.0 | 87.0 | 84.0 |
| 125 | 11.9 | 125 | 121.0 | 119.0 | 115.0 | 113.0 | 109.0 | 105.0 |

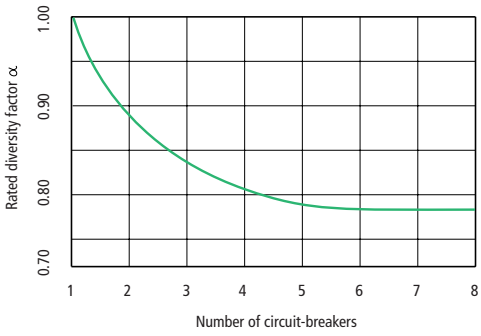
### FAZ miniature circuit-breakers in series

| Outgoing circuit-breaker | Incoming circuit-breaker |
|---|---|
| FAZ-(2)(3)(4)(N)-B(C)... | CL-PKZ0 |
| 0.5 – 4 | 65kA |
| 6 – 32 | 45 kA |
| 63 – 40 | 25 kA |

| FAZ-(2)(3)(4)(N)-B(C)... | NZM7-40(...100)N(S)(H) |
|---|---|
| 0.5 – 4 | 50 kA |
| 6 – 16 | 35kA |
| 20 – 40 | 25 kA |
| 50, 63 | 15kA |

### Load carrying capacity of adjoining FAZ, AZ miniature circuit-breakers

Rated diversity factor $\alpha$, where miniature circuit-breakers mounted side by side influence one another thermally at rated load.



# FI(P)(S) Residual-Current Circuit-Breakers
## Technical Data

| Residual-current circuit-breakers | | | | 4-pole FIP(S), FI(S) | | | | FIP | | 2-pole FIP, FI | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated operational current | | | A | 25 | 40 | 63 | 80 | 100 | 125 | 16 | 25 | 40 | 63 | 80 |
| **General technical data** | | | | | | | | | | | | | | |
| Standards | | | | IEC/EN 61 008, VDE 0664 Part 1 (FI switches) | | | | | | | | | | |
| Ambient temperature | | Min./Max. | °C | –25/+40 | | | | –25/+40 | | –25/+40 | | | | |
| Mechanical shock resistance | (shock duration 20 ms) | | g | 20 | | | | 20 | | 20 | | | | |
| Mounting position/direction of incoming supply | | | | As required | | | | As required | | As required | | | | |
| Degree of protection (terminals) | | | | IP40 (IP00), IP40 when fitted in distribution board | | | | | | IP40 (IP00) | | | | |
| Dimensions | | | | → Page 12/049 | | | | | | → Page 12/049 | | | | |
| Weight | | | kg | 0.32 | | | | 0.975 | | 0.22 | | | | |
| Terminal capacity | | | | | | | | | | | | | | |
| Solid, stranded | | Min./Max. | mm² | 1/25 | | | | 2.5/35 | | 1/25 | | | | |
| Tightening torque | | | Nm | 2.4 | 2.4 | 3 | 3 | 4 | | 3 | | | | |
| **Contacts** | | | | | | | | | | | | | | |
| Rated uninterrupted current $I_u$ | | | A | 25 | 40 | 63 | 80 | 100 | 125 | 16 | 25 | 40 | 63 | 80 |
| Rated operational voltage $U_e$ | | | V AC | 230/400 | | | | | | 230 | | | | |
| Max. operational voltage | | | V AC | 253/440 | | | | | | 253 | | | | |
| Rated frequency | | | Hz | 50 – 60 | | | | | | | | | | |
| Max. short-circuit protective device | | gG/gL | A | 63 | 63 | 63 | 80 | 125 | 125 | 63 | 63 | 63 | 63 | 80 |
| Short-circuit rating | | | kA | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Current heat losses, all contacts | | | | | | | | | | | | | | |
| At $I_n$ and $I_{\Delta n}$ = 0.3 A | | | W | 6 | 9 | 20 | 12 | 17 | 27 | 2 | 4 | 10 | 8 | 8 |
| At $I_n$ and $I_{\Delta n}$ = 0.1 A | | | W | 4 | 6 | 13 | – | – | – | – | 4 | 7 | 8 | 8 |
| At $I_n$ and $I_{\Delta n}$ = 0.03 A and 0.5 A | | | W | 2 | 5 | 11 | 12 | 17 | 27 | – | 2 | 5 | 10 | 10 |
| **Releases** | | | | | | | | | | | | | | |
| Rated fault current $I_{\Delta n}$ | | | A | 0.03/ 0.1/ 0.3/ 0.5 | | | | | | 0.03/ 0.1/ 0.3 | | | | |
| Tripping time $t_a$ | | | | | | | | | | | | | | |
| At $I_\Delta = I_{\Delta n}$ | | | ms | 200 | | | | | | 200 | | | | |
| At $I_\Delta = 5 \times I_{\Delta n}$ | | | ms | ≦ 40 | | | | | | ≦ 40 | | | | |
| Peak withstand current (lightning current 8/20) | | FIP | A | 250 | | | | | | 250 | | | | |
| | | FIPS | A | 5000 | | | | | | – | | | | |
| Working voltage range of test device [1] | | | V AC | 184 – 440 | | | | 100 – 250 | | 184 – 253 | | | | |
| Lifespan, mechanical | | Operations | | ≧ 10000 | | | | ≧ 5000 | | ≧ 10000 | | | | |
| Lifespan, electrical | At $I_n$, $U_n$ and cos φ = 0.9 | Operations | | ≧ 2000 | | | | ≧ 5000 | | ≧ 2000 | | | | |

**Combination options of miniature circuit-breaker and residual-current protective switch with accessories**

| FAZ-XHI001 | FAZ/FIP-XRHI002 | FAZ-XAA | FAZ-XUA | FIP-XPM | Left AZ-XAA | FAZ | FAZ-PN | FAZ-2(4)-...FIM | FILS | AZ | Right FAZ/FIP-XFSM | AZ-XHI11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | | ● | | | | ● | | | | | ● | |
| | ● | ● | | | | ● | | | | | ● | |
| | | | ● | | | ● | | | | | ● | |
| ● | | ● | | | | | ● | | | | ● | |
| | ● | ● | | | | | ● | | | | ● | |
| ● | | ● | | | | | | ● | ● | | | |
| | ● | ● | | | | | | ● | ● | | | |
| | | | ● | | | | | ● | | | | |
| | | | | ● | | | | ● | ● | | | |
| | | | | | ● | | | | | ● | | ● |

| Left FIP-XHI11 | Left FIP-XPM | FI; FIS; FIP; FIPS; ≦ 80 A | FIP ≧ 100A | Right FAZ/FIP-XRHI002 | FAZ/FIP-XFSM | FIP100/125-XHI11 |
|---|---|---|---|---|---|---|
| ● | | ● | | ● | ● | |
| | ● | ● | | ● | ● | |
| | | | ● | | | ● |

**Notes** [1] With FIP-4-25(40)(63)(80), fit test device between 2 phases, otherwise between phase and neutral conductor

# REG-SS Impulse Relay
## Technical Data

| Impulse relays | | | REG-SS10 | REG-SS20 |
|---|---|---|---|---|
| **General technical data** | | | | |
| Standards | | | IEC/EN 60 669-1 | IEC/EN 60 669-1 |
| Degree of protection (terminals) | | | IP20 (IP00), IP30 when fitted in distribution board | |
| Ambient temperature | Min./Max. | °C | –10/+50 | –10/+50 |
| Mechanical shock resistance (shock duration 20 ms) | | g | 20 | 20 |
| Mounting position | | | As required | As required |
| Dimensions | | | → Page 12/051 | → Page 12/051 |
| Weight | | kg | 0.14 | 0.16 |
| Terminal capacity | | | | |
| Coil connection | | | | |
| Solid | Min./Max. | $mm^2$ | 1/6 | 1/6 |
| Flexible with ferrule to DIN 46 228 | Min./Max. | $mm^2$ | 0.5/4 | 0.5/4 |
| Contacts | | | | |
| Solid | Min./Max. | $mm^2$ | 1.5/10 | 1.5/10 |
| Flexible with ferrule to DIN 46 228 | Min./Max. | $mm^2$ | 1/6 | 1/6 |
| Tightening torque | | | | |
| Coil $A_1 – A_2$ | | Nm | 1 | 1 |
| Contacts | | Nm | 1.5 | 1.5 |
| **Load circuit** | | | | |
| Rated operational voltage $U_e$ (switching contact) | | V AC | 250 | 250 |
| Rated insulation voltage $U_i$ | | V AC | 500 | 500 |
| Rated operational current $I_e$ (switching contact) | | A | 16 | 16 |
| Total heat dissipation per contact at $I_e$ = 16 A | | W | 1.3 | 1.3 |
| **Control circuit** | | | | |
| Rated operational voltage $U_e$ | | V AC/DC | 24/12, 230/110 | 24/12, 230/110 |
| Operating range | | | (0.85 – 1.1) × $U_e$ | (0.85 – 1.1) × $U_e$ |
| Rated frequency | | Hz | 50 – 60 | 50 – 60 |
| Power consumption, pull-in | | VA | 16 | 16 |
| Pulse duration | Min./Max. | s | 0.1/3600 | 0.1/3600 |
| Lifespan, mechanical | Operations | | 500 000 | 500 000 |
| Lifespan, electrical 16 A/AC-1 | Operations | | 100 000 | 100 000 |

**Lamp load per contact at 230 V AC**

| Designation | Rating W | Qty. of lamps | C[1] µF | Designation | Rating W | Qty. of lamps | C[1] µF | Designation | Rating W | Qty. of lamps | C[1] µF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 230 V filament and halogen lamps, lamps with and without halogen | 40 | 45 | – | Duo circuit with electronic devices upstream | 18 | 30 | – | High-pressure mercury-vapour lamps, compensated | 50 | 8 | 63 |
| | 60 | 30 | – | | 36 | 26 | – | | 80 | 8 | 56 |
| | 75 | 24 | – | | 58 | 15 | – | | 125 | 6 | 60 |
| | 100 | 18 | – | Duo circuit | 2 × 20 | 40 | 2.7 | | 250 | 3 | 54 |
| | 150 | 12 | – | | 2 × 40 | 22 | 3.4 | | 400 | 2 | 50 |
| | 200 | 9 | – | | 2 × 65 | 12 | 5.3 | Mixed lamp load | 100 | 9 | – |
| | 300 | 5 | – | Fluorescent lamps duo circuit with electronic devices upstream, low-consumption lamps, non-compensated | 2 × 18 | 13 | – | | 160 | 6 | – |
| | 500 | 3 | – | | 2 × 36 | 8 | – | | 250 | 3 | – |
| | 1000 | 2 | – | | 2 × 58 | 22 | – | | 400 | 2 | – |
| Low-voltage halogen lamps (12 or 24 V) with electronic transformer | 20 | 70 | – | | 7 | 50 | – | High-pressure sodium-vapour lamps, non-compensated | 70 | 9 | – |
| | 50 | 28 | – | | 10 | 45 | – | | 150 | 5 | – |
| | 75 | 19 | – | | 18 | 40 | – | | 250 | 3 | – |
| | 100 | 14 | – | | 26 | 25 | – | | 400 | 2 | – |
| | 150 | 9 | – | Low-consumption/ economy lamps with electronic devices upstream | 11 | 80 | – | High-pressure sodium-vapour lamps, compensated | 70 | 5 | 60 |
| | 300 | 3 | – | | 15 | 60 | – | | 150 | 3 | 54 |
| Fluorescent lamps, non-compensated | 15 | 29 | – | | 20 | 50 | – | | 250 | 2 | 64 |
| | 30 | 25 | – | | 23 | 40 | – | | 400 | 1 | 50 |
| | 36 | 24 | – | Discharge lamps High-pressure mercury-vapour lamps, non-compensated | 50 | 11 | – | | | | |
| | 58 | 14 | – | | 80 | 9 | – | | | | |
| Parallel-compensated | 18 | 27 | 121 | | 125 | 7 | – | | | | |
| | 36 | 25 | 112 | | 250 | 3 | – | | | | |
| | 58 | 16 | 72 | | 400 | 2 | – | | | | |

**Notes** [1] The specified capacitor load must not be exceeded.

# Screw Fuse Bases
## Technical Data

| Screw fuse bases | | | S14 | S18 | RS 183-50 | S27 | RS273-50 | S33 | RS333-50 |
|---|---|---|---|---|---|---|---|---|---|
| **General technical data** | | | | | | | | | |
| Standards | | | | | | | | | |
| (R)S27(1), R(S)33(1) fuse bases | | | VDE 0636, CEE 16 | | | | | | |
| RS27-3, RS33-3 fuse bases | | | VDE 0636 | | | | | | |
| Protective covers | | | VDE 0636 | | | | | | |
| Gauge ring system | | | DIN 49 326, DIN 49 327, DIN 49 524 | | | | | | |
| Gauge screw system RS27(33)-3/FORMP | | | DIN 49 510 | | | | | | |
| Ambient temperature | Min./Max. | °C | –5/+25 (+40, at annual and 24 hour mean ≦ 35) | | | | | | |
| Mounting position | | | As | | | | | | |
| Max. rated uninterrupted current $I_u$ | | A | 16 | 63 | 63 | 25 | 25 | 63 | 63 |
| **Contacts** | | | | | | | | | |
| Rated operational voltage $U_e$ | | V AC | 400 | 400 | 400 | 500 | 500 | 690 | 690 |
| Clearances and creepage distances | | | VDE 0636 Part 41 | | | VDE 0636 Part 31 | | | |
| Current heat loss per contact at rated uninterrupted current $I_u$ including gL fuse | | W | 2.2 | 5.5 | 5.5 | 3.9 | 3.9 | 7.5 | 7.5 |
| Terminal capacity: Cu, 1 conductor | | | | | | | | | |
| Solid | Min./Max. | $mm^2$ | 0.75 – 4 | 0.75 – 16 | 2.5 – 1 6 | 1 – 10 | 1.5 – 6 | 2.5 – 16 | 2.5 – 16 |
| Stranded, Flexible with ferrule | Min./Max. | $mm^2$ | 0.5 – 2.5 | 0.5 – 25 | 2.5 – 16 | 0.75 – 10 | 1.5 – 6 | 1.5 – 25 | 1.5 – 25 |

**Notes** The load-carrying capacity of fuse enclosures is based on derating factors to IEC/EN 60 439 and the size of incoming supply cables

# Low-Voltage HBC Fuse Bases, Low-Voltage HBC Fuse Switch-Disconnectors
## Technical Data

| Low-voltage h.b.c. fuse bases, low-voltage h.b.c. fuse switch-disconnectors | | | GS(T...)00 | GS(T...)00-160 | GS(T...)1 | GS(T...)2 | GS(T...)3 |
|---|---|---|---|---|---|---|---|
| **General technical data** | | | | | | | |
| Standards | | | IEC/EN 60 947-3 | | | | |
| Climatic proofing | | | Damp heat, constant, to IEC 60 068-2-3<br>Damp heat, cyclical, to IEC 60 068-2-30 | | | | |
| Ambient temperature | Min./Max. | °C | –25 to +55 (with reduced operational current[1]) | | | | |
| Altitude | | m | Up to 2000 | | | | |
| Mounting position | | | Vertical, horizontal | | | | |
| Overvoltage category | | | III | III | III | III | III |
| Pollution degree | | | 3 | 3 | 3 | 3 | 3 |
| Degree of protection, from the front | | | | | | | |
| Operational state | | | IP20 | IP20 | IP20 | IP20 | IP20 |
| Front cover open | | | IP10 | IP10 | IP10 | IP10 | IP10 |
| Direction of incoming supply | | | As required | As required | As required | As required | As required |
| Lifespan, mechanical Operations | | | 1700 | 1700 | 1700 | 1700 | 1700 |
| Weight | | kg | 0.72 | 0.72 | 2.5 | 3.1 | 4.8 |
| **Contacts** | | | | | | | |
| Rated operational voltage $U_e$ | | V AC | 500 690 | 500 690 | 500 690 | 500 690 | 500 690 |
| | | V DC | 230 440 | 230 440 | 230 440 | 230 440 | 230 440 |
| Rated operational current $I_e$ | | A | 100 100 | 160 100 | 250 200 | 400 315 | 630 500 |
| Rated frequency | | Hz | 60 – 40 | 60 – 40 | 60 – 40 | 60 – 40 | 60 – 40 |
| Rated conditional short-circuit current AC | | $kA_{rms}$ | 50 | 50 | 50 | 50 | 50 |
| Rated conditional short-circuit current DC | | $kA_{rms}$ | 25 | 25 | 25 | 25 | 25 |
| Utilization category AC-22B | | | | | | | |
| Rated making capacity | | A | 480 300 | 480 300 | 750 600 | 1200 945 | 1890 1500 |
| Rated breaking capacity | | A | 480 300 | 480 300 | 750 600 | 1200 945 | 1890 1500 |
| Utilization category DC-21B | | | | | | | |
| Rated making capacity | | A | 240 150 | 240 150 | 375 300 | 600 475 | 945 750 |
| Rated breaking capacity | | A | 240 150 | 240 150 | 375 300 | 600 475 | 945 750 |
| Lifespan, electrical Operations AC/DC | | | 300 | 300 | 200 | 200 | 200 |
| Heat dissipation at $I_{th}$ AC; without fuse link | | W | 2.7 2.7 | 6.9 2.7 | 12.9 5 | 27 16.8 | 52 32.8 |
| Heat dissipation at $I_{th}$ DC; without fuse link | | W | 4.6 1.8 | 4.6 1.8 | 8.6 3.6 | 18 11.2 | 34.7 21.9 |
| Rated insulation voltage $U_i$ | | V AC | 750 | 750 | 750 | 750 | 750 |
| **Fuse links**[2] | | | | | | | |
| Size | | | 00 00 | 00 00 | 1 1 | 2 2 | 3 3 |
| Max. rated current (gG/gL) | | A | 100 100 | 160 100 | 250 200 | 400 315 | 630 500 |
| Max. admissible heat dissipation (NH-SE fuse) | | W | 12 10 | 12 10 | 23 23 | 34 34 | 48 48 |
| **Terminal capacity** | | | | | | | |
| Box terminal | | | | | | | |
| Cu, stranded | Min./Max. | $mm^2$ | 1.5 – 70 | 1.5 – 70 | 25 – 150 | 25 – 240 | 25 – 300 |
| Cu strip | | $mm^2$ | 6 × 9 × 0.8 | 6 × 9 × 0.8 | 6 × 16 × 0.8 | 10 × 16 × 0.8 | 11 × 21 × 1 |
| Tightening torque | | Nm | 4.5 | 4.5 | 9.5 | 23 | 23 |
| Clamp-type terminal (→ Page 12/029) | | | | | | | |
| Al/Cu, stranded | Min./Max. | $mm^2$ | – | – | 70 – 150 | 120 – 240 | 120 – 300 |
| Tightening torque | | Nm | – | – | 9.5 | 11 | 9.5 |
| Double clamp-type terminal (→ Page 12/029) | | | | | | | |
| Al/Cu, stranded | Min./Max. | $mm^2$ | – | – | 2 × (70 – 95) | 2 × (120 – 150) | 2 × (120 – 240) |
| Tightening torque | | Nm | – | – | 11 | 11 | 11 |

**Notes**

GS... and GSTA: resistant to mechanical shock in accordance with regulation classes RK 1.6/16 of the German Ministry of Buildings.

[1] At +55 °C, the influence of the ambient temperature on the load carrying capacity of low-voltage h.b.c. fuse links is $I/I_n \approx 0.9$.

[2] Low-voltage h.b.c. fuse link sizes 00-160 A are outside the scope of VDE 0636 Part 21, May 84, and therefore do not carry the VDE approval mark.