

## Description

Single pole thermal-magnetic circuit breaker with tease-free, trip-free, snap action mechanism and two button operation (M-type TM CBE to EN 60934). Featuring a flange for panel mounting, and optional auxiliary contacts and unprotected shunt tap terminal. Type 4000 offers lower internal resistance values and is fitted as standard with auxiliary contacts and an intermediate reset position in which all contacts are isolated.

Approved to CBE standard EN 60934 (IEC 60934).

## Typical applications

Control systems, instrumentation, medical equipment, machine tools, robotics, communications systems.

## Ordering information

| Type No.                                            |                                                                         |
|-----------------------------------------------------|-------------------------------------------------------------------------|
| 3500                                                | standard version                                                        |
| 4000                                                | low resistance version                                                  |
| <b>Mounting (optional)</b>                          |                                                                         |
| F11                                                 | flange with additional M3 insertion nuts                                |
| <b>Terminal design</b>                              |                                                                         |
| P10                                                 | blade terminals 6.3-0.8 (QC .250), tinned                               |
| K20                                                 | screw terminals M3.5x5.5 with clamp (not with -Si or type 4000)         |
| <b>Shunt terminal (optional)</b>                    |                                                                         |
| A3                                                  | same as main terminals (up to $I_N = 7$ A, max. load 5 A)               |
| <b>Auxiliary contacts (optional with type 3500)</b> |                                                                         |
| Si                                                  | auxiliary contacts, silver plated terminals one each N/O and N/C        |
| ZR-Si                                               | auxiliary contacts with intermediate position (standard with type 4000) |
| <b>Current ratings</b>                              |                                                                         |
| 0.05...16 A                                         | (type 3500)                                                             |
| 0.05...10 A                                         | (type 4000)                                                             |
| 3500 - .. - P10 - A3 - Si - 10 A                    | ordering example                                                        |

The exact part number required can be built up from the table of choices shown above. Ordering references for optional features should be omitted if not required.

## Standard current ratings and typical internal resistance values

| Current ratings (A) | Internal resistance (Ω) 3500 | Internal resistance (Ω) 4000 | Current ratings (A) | Internal resistance (Ω) 3500 | Internal resistance (Ω) 4000 |
|---------------------|------------------------------|------------------------------|---------------------|------------------------------|------------------------------|
| 0.05                | 447                          | 211                          | 3                   | 0.19                         | 0.054                        |
| 0.1                 | 131                          | 48                           | 4                   | 0.090                        | 0.035                        |
| 0.2                 | 40                           | 12.4                         | 5                   | 0.061                        | 0.025                        |
| 0.3                 | 19.3                         | 5.4                          | 6                   | 0.041                        | ≤ 0.02                       |
| 0.4                 | 10.4                         | 3.1                          | 7                   | 0.034                        | ≤ 0.02                       |
| 0.5                 | 7.1                          | 2.0                          | 8                   | ≤ 0.02                       | ≤ 0.02                       |
| 0.6                 | 4.3                          | 1.32                         | 10                  | ≤ 0.02                       | ≤ 0.02                       |
| 0.8                 | 2.5                          | 0.76                         | 12                  | ≤ 0.02                       |                              |
| 1                   | 1.67                         | 0.49                         | 14                  | ≤ 0.02                       |                              |
| 1.5                 | 0.61                         | 0.21                         | 15                  | ≤ 0.02                       |                              |
| 2                   | 0.38                         | 0.101                        | 16                  | ≤ 0.02                       |                              |
| 2.5                 | 0.24                         | 0.078                        |                     |                              |                              |



**3500**  
standard type

**4000**  
low-resistance type

## Technical data

For further details please see chapter: Technical Information

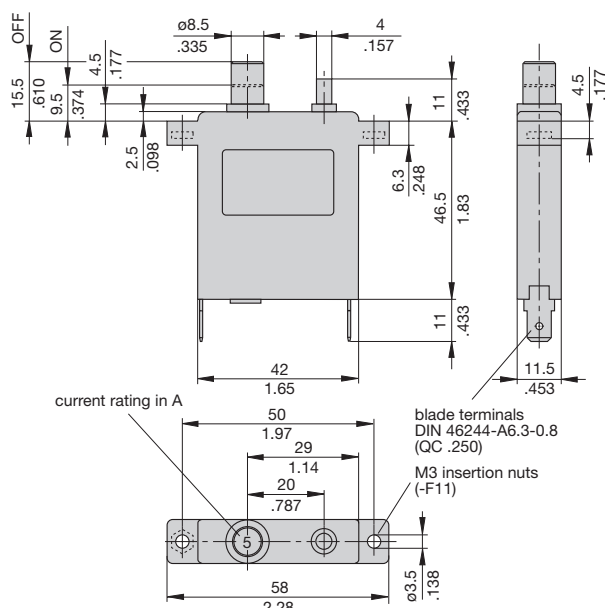
|                                                                                                              |                                                                                                          |                                                 |                                 |
|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------|
| Voltage rating                                                                                               | AC 240 V, 50/60 Hz; DC 65 V<br>(UL: AC 250 V; DC 80 V)                                                   |                                                 |                                 |
| Current rating range                                                                                         | 3500: 0.05...16 A<br>4000: 0.05...10 A                                                                   |                                                 |                                 |
| Auxiliary circuit                                                                                            | 1 A, AC 240 V / DC 65 V                                                                                  |                                                 |                                 |
| Typical life                                                                                                 | 5,000 operations at 1 x I <sub>N</sub> , inductive<br>5,000 operations at 2 x I <sub>N</sub> , resistive |                                                 |                                 |
| Ambient temperature                                                                                          | -30...+60 °C (-22...+140 °F)                                                                             |                                                 |                                 |
| Insulation co-ordination<br>(IEC 60664 and 60664 A)                                                          | rated impulse<br>withstand voltage<br>2.5 kV<br>reinforced insulation in operating area                  | pollution<br>degree<br>2                        |                                 |
| Dielectric strength<br>(IEC 60664 and 60664A)<br>operating area<br>main/aux. circuit<br>aux. circuit 4-5/6-7 | test voltage<br>AC 3,000 V<br>AC 1,500 V<br>AC 840 V                                                     |                                                 |                                 |
| Insulation resistance                                                                                        | > 100 MΩ (DC 500 V)                                                                                      |                                                 |                                 |
| Interrupting capacity I <sub>cn</sub>                                                                        | 3500<br>0.05...0.8 A<br>1...2 A<br>2.5...16 A                                                            | 4000<br>0.05...0.2 A<br>0.3...2 A<br>2.5...10 A | self-limiting<br>200 A<br>400 A |
| Interrupting capacity<br>(UL 1077)<br><br>type 3500:                                                         | I <sub>N</sub><br>0.05...16 A<br>0.05...16 A                                                             | U <sub>N</sub><br>AC 250 V<br>DC 80 V           | 1,000 A<br>1,000 A              |
| Degree of protection<br>(IEC 60529/DIN 40050)                                                                | operating area IP40<br>terminal area IP00                                                                |                                                 |                                 |
| Vibration                                                                                                    | 5 g (57-500 Hz), ±0.38 mm (10-57 Hz)<br>to IEC 60068-2-6, test Fc<br>10 frequency cycles/axis            |                                                 |                                 |
| Shock                                                                                                        | 25 g (11 ms) to IEC 60068-2-27, test Ea                                                                  |                                                 |                                 |
| Corrosion                                                                                                    | 96 hours at 5 % salt mist<br>to IEC 60068-2-11, test Ka                                                  |                                                 |                                 |
| Humidity                                                                                                     | 240 hours at 95 % RH<br>to IEC 60068-2-3, test Ca                                                        |                                                 |                                 |
| Mass                                                                                                         | approx. 40 g                                                                                             |                                                 |                                 |

## Approvals

| Authority      | Voltage ratings   | Current ratings |
|----------------|-------------------|-----------------|
| <b>3500:</b>   |                   |                 |
| VDE (EN 60934) | AC 240 V; DC 65 V | 0.05...16 A     |
| CSA, UL        | AC 250 V; DC 80 V | 0.05...16 A     |
| <b>4000:</b>   |                   |                 |
| VDE (EN 60934) | AC 240 V; DC 65 V | 0.05...10 A     |
| CSA            | AC 250 V          | 0.05...10 A     |

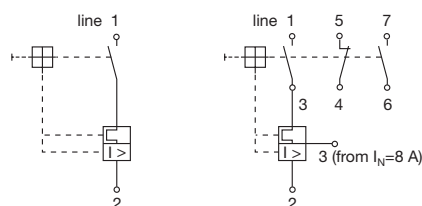
## Dimensions

### Version -P10

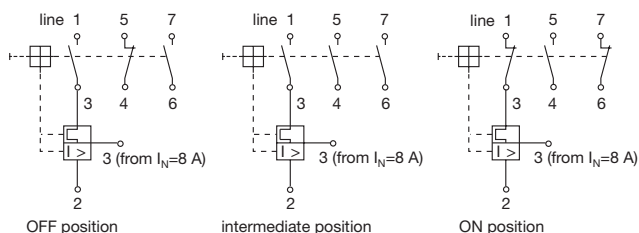


## Internal connection diagrams

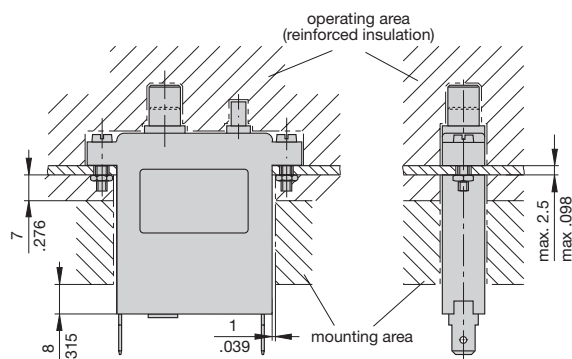
### with shunt terminal (-A3) and auxiliary contacts (-Si)



### Switching position with intermediate position and auxiliary contacts (-ZR-Si)

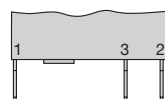


## Installation drawing

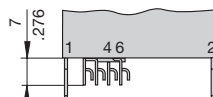


## Terminal design

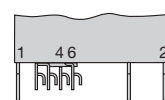
### -P10-A3



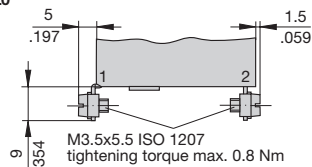
### -P10-Si



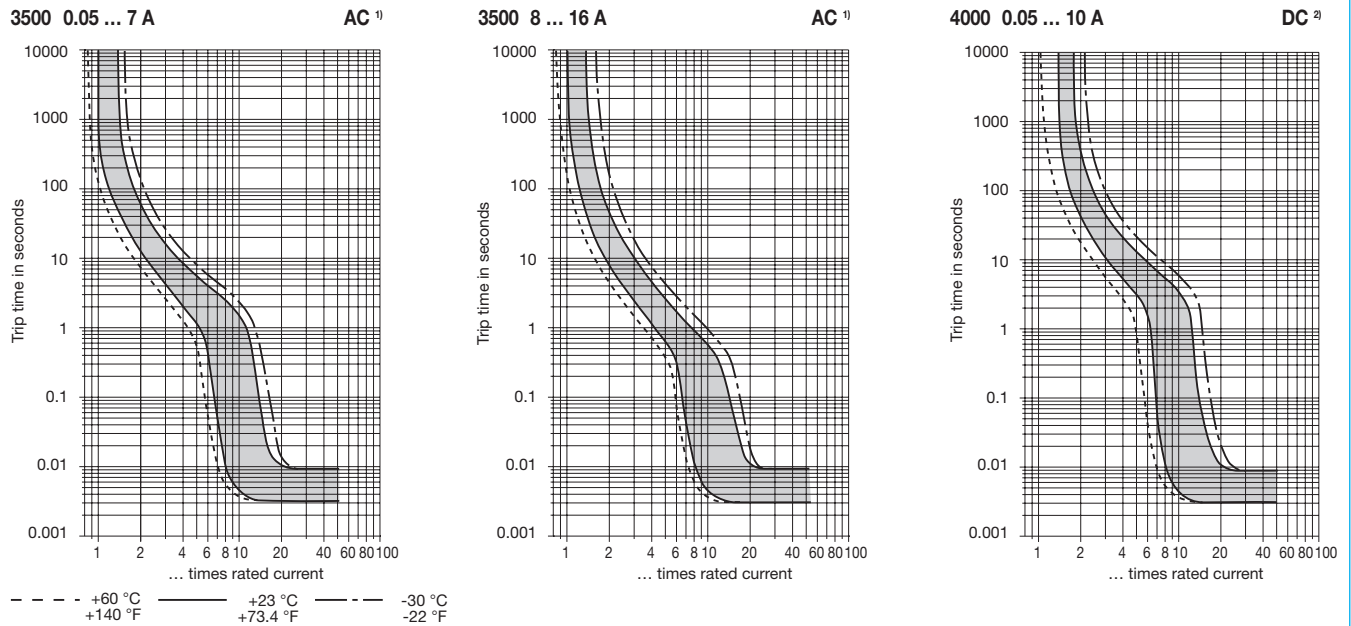
### -P10-A3-Si



### -K20



## Typical time/current characteristics



- <sup>1)</sup> Magnetic tripping currents are increased by 20% on DC supplies.  
<sup>2)</sup> Magnetic tripping currents are decreased by 20% on AC supplies.

The time/current characteristic curve depends on the ambient temperature prevailing. In order to eliminate nuisance tripping, please multiply the circuit breaker current ratings by the derating factor shown below. See also section 9 – Technical information.

|                        |      |      |      |      |       |      |      |      |
|------------------------|------|------|------|------|-------|------|------|------|
| Ambient temperature °F | -22  | -4   | +14  | +32  | +73.4 | +104 | +122 | +140 |
| °C                     | -30  | -20  | -10  | 0    | +23   | +40  | +50  | +60  |
| Derating factor        | 0.76 | 0.79 | 0.83 | 0.88 | 1     | 1.08 | 1.16 | 1.24 |

## Special version 3500-...-2100

Single pole thermal-magnetic overcurrent circuit breaker with slow magnetic trip curve, suitable for high inrush currents (up to  $12 \times I_N$ ). Suffix -2100 is also available for types 3400 and 3600. Enquire for further details.

## Typical applications

Industrial control systems, telecommunications, etc.

## Standard current ratings and typical internal resistance values

| Current rating (A) | Internal resistance ( $\Omega$ ) | Current rating (A) | Internal resistance ( $\Omega$ ) |
|--------------------|----------------------------------|--------------------|----------------------------------|
| 0.06               | 292                              | 3                  | 0.18                             |
| 0.1                | 165                              | 4                  | 0.11                             |
| 0.2                | 41.7                             | 5                  | 0.067                            |
| 0.3                | 19.7                             | 6                  | 0.052                            |
| 0.4                | 12.1                             | 7                  | 0.035                            |
| 0.5                | 7.9                              | 8                  | 0.031                            |
| 0.6                | 5.5                              | 10                 | 0.022                            |
| 0.8                | 2.6                              | 12                 | $\leq 0.02$                      |
| 1                  | 1.88                             | 14                 | $\leq 0.02$                      |
| 1.5                | 0.77                             | 15                 | $\leq 0.02$                      |
| 2                  | 0.42                             | 16                 | $\leq 0.02$                      |
| 2.5                | 0.24                             |                    |                                  |

## Special version 3500-...-2350

Single pole thermal-magnetic circuit breaker suitable for high ambient temperatures. The special rating of the circuit breaker allows resetting at no load in ambient temperatures up to  $+80^\circ\text{C}$ . Suffix -2350 is also available for types 3400 and 3600. Enquire for further details.

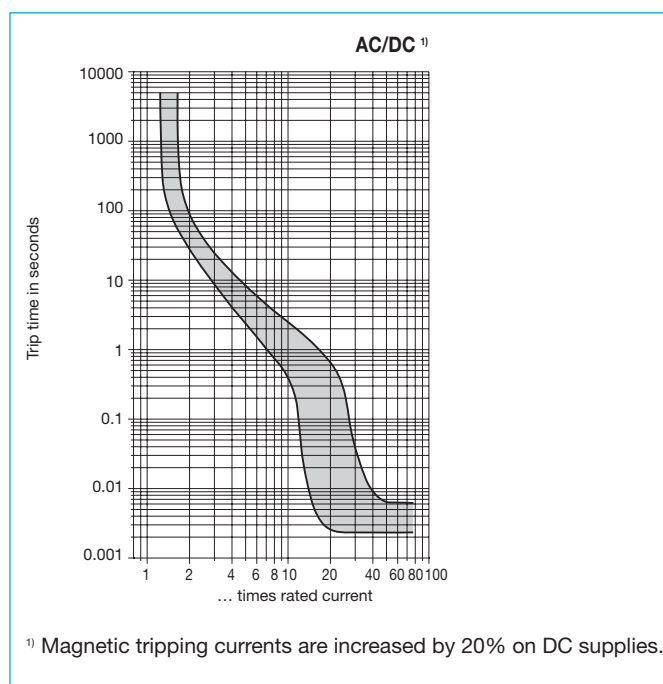
## Typical applications

Industrial control systems.

## Standard current ratings and typical internal resistance values

| Current rating (A) | Internal resistance ( $\Omega$ ) | Current rating (A) | Internal resistance ( $\Omega$ ) |
|--------------------|----------------------------------|--------------------|----------------------------------|
| 0.05               | 583                              | 2.5                | 0.42                             |
| 0.1                | 167                              | 3                  | 0.21                             |
| 0.2                | 49.9                             | 4                  | 0.13                             |
| 0.3                | 23.1                             | 5                  | 0.11                             |
| 0.4                | 12.8                             | 6                  | 0.056                            |
| 0.5                | 8.7                              | 10                 | 0.022                            |
| 0.8                | 3.45                             | 12                 | $\leq 0.02$                      |
| 1                  | 2.3                              | 15                 | $\leq 0.02$                      |
| 1.5                | 0.89                             | 16                 | $\leq 0.02$                      |
| 2                  | 0.48                             |                    |                                  |

## Typical time/current characteristics at $+23^\circ\text{C}$



## Typical time/current characteristics

