**Description**

Single pole thermal-magnetic circuit breakers with tease-free, trip-free, press-to-reset snap action mechanism and special dual button manual release which avoids the danger of unintended disconnection (M-type TM CBE to EN 60934). Surface mounted, compact design available with fast acting, standard and delayed switching characteristics. Options include auxiliary contact and remote electrical disconnection.

**Typical applications**

Heavy duty vehicles, battery systems, process control.

**Ordering information**

**Type No.**
- 446 single pole base mounting, fast characteristic curve
- 447 single pole base mounting, medium delay characteristic curve
- 449 single pole base mounting, delayed characteristic curve

**Terminal design, mounting**
- K screw terminals M12, insertion nuts M8

**Manual release**
- H standard

**Auxiliary contacts (optional)**
- N general application (type 446 only)
- FN general application (types 447 and 449 only)

**Remote trip (optional for types 447 and 449)**
- FA24 DC 24 V coil voltage

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**

<table>
<thead>
<tr>
<th>Current ratings (A)</th>
<th>Internal resistance (Ω)</th>
<th>Current ratings (A)</th>
<th>Internal resistance (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 446:</td>
<td></td>
<td>Type 447:</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>0.006</td>
<td>100</td>
<td>&lt; 0.002</td>
</tr>
<tr>
<td>40</td>
<td>0.0048</td>
<td>125</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>50</td>
<td>0.0038</td>
<td>160</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>60</td>
<td>0.0028</td>
<td>225</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>70</td>
<td>0.0025</td>
<td>300</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>80</td>
<td>0.0023</td>
<td>400</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>90</td>
<td>0.0019</td>
<td>100</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>100</td>
<td>0.0006</td>
<td>125</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>125</td>
<td>&lt; 0.001</td>
<td>160</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>150</td>
<td>&lt; 0.001</td>
<td>225</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>170</td>
<td>&lt; 0.001</td>
<td>315</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>200</td>
<td>&lt; 0.001</td>
<td>350</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>225</td>
<td>&lt; 0.001</td>
<td>400</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>250</td>
<td>&lt; 0.001</td>
<td>500</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>300</td>
<td>&lt; 0.001</td>
<td>only with 50 % ON duty</td>
<td></td>
</tr>
<tr>
<td>350</td>
<td>&lt; 0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>&lt; 0.001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Technical data**

- **Voltage rating**: DC 28 V
- **Current rating range**
  - type 446: 30...400 A
  - type 447: 100...400 A
  - type 449: 125...500 A
- **Auxiliary circuit**: 10 A
- **Electrical remote disconnection (-FA)**
  - operating voltage: DC 12 V or DC 24 V
  - max. pulse time: 10 ms < tON < 20 ms / tOFF > 10 s
  - switching time: < 20 ms
- **Typical life**: 1,000 operations at I<sub>N</sub>, 2,000 operations mechanical
- **Ambient temperature**: -55...+75 °C (-67...+167 °F)
- **Insulation co-ordination rated impulse pollution (IEC 60664 and 60664A)**
  - withstand voltage degree IEC 1.5 kV: 3
- **Dielectric strength (IEC 60664 and 60664A)**
  - test voltage: AC 1,500 V
- **Insulation resistance**: > 100 MΩ (DC 500 V)
- **Interrupting capacity Icn**: 10,000 A
- **Degree of protection**
  - operating area: IP40
  - terminal area: IP00
- **Vibration**
  - to VG 95210, sheet 19, IEC 60068-2-6, test Fc:
  - without aux. contacts: 10 g (56-500 Hz), ± 0.76 mm (10-55 Hz)
  - with auxiliary contacts: 20 g (11 ms)
- **Shock**
  - to VG 95210, sheet 28, IEC 60068-2-27, test Ea:
  - without aux. contacts: 50 g (11 ms)
  - with auxiliary contacts: 40 g (11 ms)
- **Corrosion**
  - 96 hours at 5 % salt mist to VG 95210, sheet 2, IEC 60068-2-11, test Ka
- **Humidity**
  - 240 hours at 95 % RH to VG 95210, sheet 7, IEC 60068-2-3, test C
- **Mass**
  - approx. 850 g

**Approvals**

- **Authority**
- Voltage ratings
  - Type 446: UL DC 28 V
  - Type 447: UL DC 28 V
  - Type 449: UL DC 28 V
  - QPL Sweden DC 28 V
  - VG 95345, part 15 DC 28 V
- **Current ratings**
  - Type 446: 30...400 A
  - Type 447: 100...400 A
  - Type 449: 125...500 A

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.
This is a metric design and millimeter dimensions take precedence (mm).

Typical time/current characteristics at +23 °C/+73.4 °F

**Dimensions**

- **Hex nut M8 or 5/16"-18 NC:** 14 mm/0.551 in. usable thread length
- **Tightening torque max. 3.5 Nm**
- **FA-terminal (8):** ISO 4032-M12-Cu2-E1P
- **Tightening torque max. 10 Nm**
- **Lock washer:** DIN 137-B12-X12CrNi177
- **Tightening torque max. 10 Nm**
- **Hex screw:** ISO 4017-M12x30-Cu2-E1P
- **Tightening torque max. 3.5 Nm**
- **Hex nut ISO 4032-M12-Cu2-E1P**
- **Tightening torque max. 10 Nm**
- **Flat head screw ISO 1580-M3.5x5**
- **Tightening torque max. 0.55 Nm**
- **Blade terminal DIN 46244-C-MS-5**
- **Tightening torque max. 0.7 Nm**
- **Circuit breakers with remote disconnection facility will trip 10% faster.**

**Typical time/current characteristics**