

## 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

### Version

**N** general application (type 446 only)

**FN** general application (types 447 and 449 only)

### Auxiliary contacts (optional)

**Si** 2 electrically separate auxiliary contacts with screw terminals M3.5 and blade terminals DIN 46244-C-MS-S

### Remote trip (optional)

**FA24** DC 24 V coil voltage

### Current ratings

**30...400 A** type 446

**100...400 A** type 447

**125...500 A** type 449

**447 - K - H - FN - ... - ... - 400 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. **Please be informed that we have minimum ordering quantities to be observed.**

## Standard current ratings and typical internal resistance values

| Current ratings (A) | Internal resistance (Ω) | Current ratings (A)    | Internal resistance (Ω) |
|---------------------|-------------------------|------------------------|-------------------------|
| <b>Type 446:</b>    |                         | <b>Type 447:</b>       |                         |
| 30                  | 0.006                   | 100                    | < 0.002                 |
| 40                  | 0.0048                  | 125                    | < 0.001                 |
| 50                  | 0.0038                  | 160                    | < 0.001                 |
| 60                  | 0.0028                  | 225                    | < 0.001                 |
| 70                  | 0.0025                  | 300                    | < 0.001                 |
| 80                  | 0.0023                  | 400                    | < 0.001                 |
| 90                  | 0.0019                  | <b>Type 449:</b>       |                         |
| 100                 | 0.0016                  | 125                    | < 0.001                 |
| 125                 | < 0.001                 | 160                    | < 0.001                 |
| 150                 | < 0.001                 | 225                    | < 0.001                 |
| 170                 | < 0.001                 | 315                    | < 0.001                 |
| 200                 | < 0.001                 | 350                    | < 0.001                 |
| 225                 | < 0.001                 | 400                    | < 0.001                 |
| 250                 | < 0.001                 | 500                    | < 0.001                 |
| 300                 | < 0.001                 | only with 50 % ON duty |                         |
| 350                 | < 0.001                 |                        |                         |
| 400                 | < 0.001                 |                        |                         |

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.



**446-... 447-... 449-...**

## Technical data

For further details please see: [www.e-t-a.de/ti\\_e](http://www.e-t-a.de/ti_e)

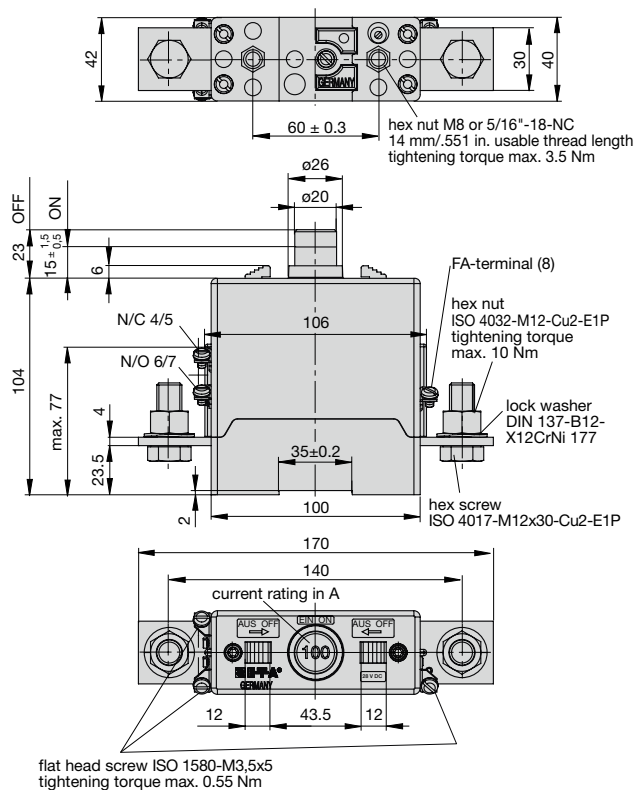
|                                            |                                                                                                                                                                                       |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage rating                             | DC 28 V                                                                                                                                                                               |
| Current rating range                       | type 446: 30...400 A<br>type 447: 100...400 A<br>type 449: 125...500 A                                                                                                                |
| Auxiliary circuit                          | 10 A                                                                                                                                                                                  |
| Electrical remote disconnection (-FA)      | operating voltage DC 12 V or DC 24 V<br>operating current approx. 18 A or 12 A<br>max. pulse time 10 ms < t <sub>ON</sub> < 20 ms / t <sub>OFF</sub> > 10 s<br>switching time < 20 ms |
| Typical life                               | 1,000 operations at I <sub>N</sub><br>2,000 operations mechanical                                                                                                                     |
| Ambient temperature                        | -55...+75 °C (-67...+167 °F)                                                                                                                                                          |
| Insulation co-ordination (IEC 60664)       | Overvoltage category pollution degree 2 / 3<br>Resulting in a rated impulse withstand voltage of 500 V at DC 28 V to DIN EN 60664-1                                                   |
| Dielectric strength (IEC 60664 and 60664A) | test voltage AC 1,500 V<br>operating area main circuit to auxiliary contacts AC 1,500 V                                                                                               |
| Insulation resistance                      | > 100 MΩ (DC 500 V)                                                                                                                                                                   |
| Interrupting capacity I <sub>cn</sub>      | 10,000 A                                                                                                                                                                              |
| Degree of protection (IEC 60529/DIN 40050) | operating area IP40<br>terminal area IP00                                                                                                                                             |
| Vibration                                  | to VG 95210, sheet 19, IEC 60068-2-6, test Fc:<br>without aux. contacts: 10 g (56-500 Hz), ± 0.76 mm (10-55 Hz)<br>with auxiliary contacts: 4 g (56-500 Hz), ± 0.30 mm (10-56 Hz)     |
| Shock                                      | to VG 95210, sheet 28, IEC 60068-2-27, test Ea:<br>without aux. contacts: 50 g (11 ms)<br>with auxiliary contacts: 20 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

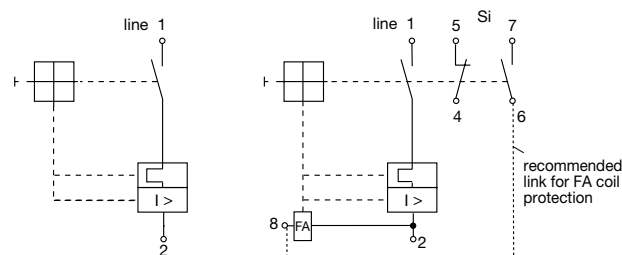
| Authority                 | Standard | Rated voltage  | Current ratings |
|---------------------------|----------|----------------|-----------------|
| <b>Type 446/ Type 447</b> | UL       | UL 1077        | DC 28 V         |
|                           | CSA      | C22.2 No 235   | DC 28 V         |
| <b>Type 449:</b>          | UL       | UL 1077        | DC 28 V         |
|                           | CSA      | C22.2 No 235   | DC 28 V         |
|                           | Bw       | 95345, part 15 | DC 28 V         |

## Dimensions

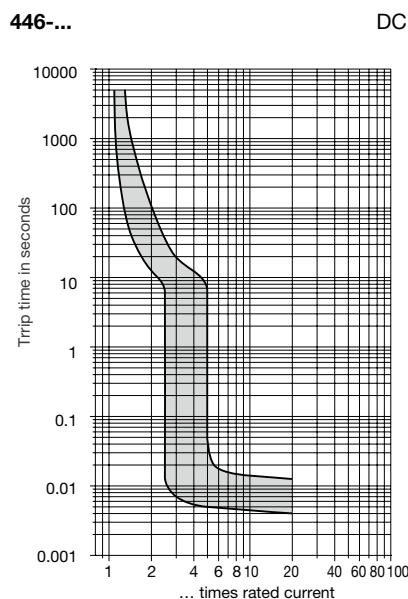
447-K-H-FN-Si-FA (<350A)  
449-K-H-FN-Si-FA (<350A)



## Internal connection diagrams



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



This is a metric design and millimeter dimensions take precedence (mm) inch

## Typical time/current characteristics

