

# Moulded Case Circuit Breaker Type AE, 4-pole, 85kA, 800A

Size type 4, Rated current 800A, Poles 4, IP Rating IP20, Short circuit switching capacity 85kA, Tripping Unit AE electronic protection for system and line



## Technical Data

|                                       |                                              |
|---------------------------------------|----------------------------------------------|
| Net width (mm)                        | 280,00                                       |
| Net height (mm)                       | 401,00                                       |
| Net weight (kg)                       | 27,00                                        |
| EAN                                   | 9004840386660                                |
| Power loss (W)                        | 71,00                                        |
| Min. ambient temperature (°C)         | -25                                          |
| Max. ambient temperature (°C)         | 60                                           |
| Standard                              | IEC EN 60947<br>VDE 0660                     |
| Device category                       | circuit breaker                              |
| Rated current (A)                     | 800                                          |
| Rated voltage                         | < 690VAC                                     |
| Short circuit switching capacity (kA) | 85                                           |
| Size type                             | 4                                            |
| Tripping Unit                         | AE electronic protection for system and line |
| Poles                                 | 4                                            |

## Technical Data - continued

|                                                   |                                                                                |
|---------------------------------------------------|--------------------------------------------------------------------------------|
| Short circuit current                             | 800A                                                                           |
| Protection against direct contact                 | finger-proof and back-of-hand-proof according to VDE 0106 Part 100             |
| Climatic proofing                                 | Damp heat, constant, to IEC 60068-2-78<br>Damp heat, cyclic, to IEC 60068-2-30 |
| Mech. shock resistance Half-sinusoidal shock 10ms | 20 (Halbsinusstoß 20 ms)                                                       |
| IP Rating                                         | IP20                                                                           |
| Rated insulation voltage [Ui] (V)                 | 1000                                                                           |
| Mechanical durability                             | 20000 operation cycles                                                         |
| Electrical endurance (Operation cycle)            | 10000                                                                          |
| Terminal type                                     | Screw terminal                                                                 |
| Rated short-time withstand current Icw            | 19,2kA                                                                         |

## GENERAL DATA - MC2, MC3, MC4

|                                              |                                                                                |
|----------------------------------------------|--------------------------------------------------------------------------------|
| <b>Standards and regulations</b>             | IEC/EN 60947, VDE 0660                                                         |
| <b>Protection against accidental contact</b> | Finger and back-of-hand proof to VDE 0106 Part 100                             |
| <b>Climate resistance</b>                    | Damp heat, constant to IEC 60068-2-78<br>Damp heat, ciclical to IEC 60068-2-30 |
| <b>Ambient temperature</b>                   |                                                                                |
| Storage                                      | -25...+70°C                                                                    |
| Operation                                    | -25...+70°C                                                                    |
| <b>Impact resistance (IEC/EN 60068-2-27)</b> | 20 (half-sinusoidal shock 20 ms)                                               |
| <b>Safe isolation to EN 61140</b>            |                                                                                |
| between auxiliary contacts and main circuits | 500V AC                                                                        |
| between auxiliary contacts                   | 300V AC                                                                        |

## Datei Tabelle: Moulded Case Circuit Breaker Type AE, 4-pole, 85kA, 800A

|                          |                                    |
|--------------------------|------------------------------------|
| <b>Mounting position</b> | vertical and 90° in all directions |
|--------------------------|------------------------------------|



|                                  |                                                                          |
|----------------------------------|--------------------------------------------------------------------------|
| <b>Direction of power supply</b> | any                                                                      |
| <b>Degree of protection</b>      |                                                                          |
| Device                           | in region of component patts: IP20 (basic degree of protection)          |
| Housing                          | with insulating surround: IP40<br>with door coupling roatry handle: IP66 |
| Connectors                       | Tunnel terminal: IP10<br>Phase isolator and strip terminal: IP00         |

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Max. rated uninterrupted current 1600A

|                                                     | MC4 - 50kA | MC4 - 85kA |
|-----------------------------------------------------|------------|------------|
| Rated impulse withstand voltage U <sub>imp</sub>    |            |            |
| Main circuits                                       | 8000V      | 8000V      |
| Auxiliary cricuits                                  | 6000V      | 6000V      |
| Rated operational voltage U <sub>e</sub>            | 690V AC    | 690V AC    |
| Rated operational voltage breaking via 3 conductors | -          | -          |
| Surge protection/pollution degree                   | III/3      | III/3      |
| Rated insulation voltage U <sub>i</sub>             | 1000V      | 1000V      |
| Range of application in IT networks                 | 525V       | 525V       |

## BREAKING CAPACITY - MC4

Max. rated uninterrupted current 1600A

MC4 - 50kA

MC4 - 85kA

### Rated short-circuit breaking capacity values $I_{cm}$

|          |       |       |
|----------|-------|-------|
| 240V     | 105kA | 275kA |
| 400/415V | 105kA | 187kA |
| 440V     | 74kA  | 187kA |
| 525V     | 53kA  | 143kA |
| 690V     | 40kA  | 105kA |

### Rated short-circuit breaking capacity value $I_{cn}/I_{cs}$

|                                                              |                  |      |                    |
|--------------------------------------------------------------|------------------|------|--------------------|
| $I_{cu}$ meets IEC/EN 60947<br>Breaking sequence O-t-CO      | 240V 50/60Hz     | 50kA | 125kA              |
|                                                              | 400/415V 50/60Hz | 50kA | 85kA               |
|                                                              | 440V 50/60Hz     | 35kA | 85kA <sup>1)</sup> |
|                                                              | 525V 50/60Hz     | 25kA | 65kA               |
|                                                              | 690V 50/60Hz     | 20kA | 50kA               |
|                                                              | 500V DC          | -    | -                  |
| $I_{cs}$ meets IEC/EN 60947<br>Breaking sequence O-t-CO-t-CO | 750V DC          | -    | -                  |
|                                                              | 240V 50/60Hz     | 37kA | 63kA               |
|                                                              | 400/415V 50/60Hz | 37kA | 43kA               |
|                                                              | 440V 50/60Hz     | 26kA | 43kA               |
|                                                              | 525V 50/60Hz     | 19kA | 49kA               |
|                                                              | 690V 50/60Hz     | 15kA | 37kA               |

Maximum HBC fuse  $\leq 1600A$

MC4-...630...1250: 2x630A gG/gL

MC4-...1600: 2x800A gG/gL

MC4-2000A: 2x1000A gG/gL

### Utilization category to IEC/EN 60947-2

B (bei 2000A: A)

B (bei 2000A: A)

### Rated short-time withstand current $I_{cw}$

|            |        |        |
|------------|--------|--------|
| $t = 0,3s$ | 19,2kA | 19,2kA |
| $t = 1s$   | 19,2kA | 19,2kA |

### Rated making and breaking capacity $I_e$

|                         |      |                              |                     |                     |
|-------------------------|------|------------------------------|---------------------|---------------------|
| Rated operating current | AC-1 | 400/415V 50/60Hz             | 1600A               | 1600A               |
|                         |      | 690V 50/60Hz                 | 1600A               | 1600A               |
|                         | AC-3 | 400/415V 50/60Hz             | 1600A <sup>2)</sup> | 1600A <sup>2)</sup> |
|                         |      | 690V 50/60Hz                 | 1600A <sup>2)</sup> | 1600A <sup>2)</sup> |
|                         | DC-1 | 500V DC with thermal release | -                   | -                   |
|                         |      | 750V DC with thermal release | -                   | -                   |
|                         | DC-3 | 500V DC with thermal release | -                   | -                   |
|                         |      | 750V DC with thermal release | -                   | -                   |

<sup>1)</sup> higher switching capacity on request

<sup>2)</sup> The following applies for rated operating current AC-3 with MC4: 400V: max. 650kW; 690V: max. 600kW

## LIFETIME - MC4

|                                                                     |                           | Max. rated uninterrupted current 2000A |                             |
|---------------------------------------------------------------------|---------------------------|----------------------------------------|-----------------------------|
|                                                                     |                           | MC4 - 50kA                             | MC4 - 85kA                  |
| <b>Service life, mechanical (operations)</b>                        |                           | 10000                                  | 10000                       |
| <b>Maximum operating cycles</b>                                     |                           | 60S/h                                  | 60S/h                       |
| <b>Service life, electrical</b>                                     |                           |                                        |                             |
|                                                                     | AC-1 400/415V 50/60Hz     | 3000                                   | 3000                        |
|                                                                     | 690V 50/60Hz              | 2000                                   | 2000                        |
| AC-3                                                                | 400/415V 50/60Hz          | 2000                                   | 2000                        |
|                                                                     | 690V 50/60Hz              | 1000                                   | 1000                        |
| DC-1                                                                | 500V with thermal release | -                                      | -                           |
|                                                                     | 750V with thermal release | -                                      | -                           |
| DC-3                                                                | 500V with thermal release | -                                      | -                           |
|                                                                     | 750V with thermal release | -                                      | -                           |
| <b>Current heat loss per pole at <math>I_u</math> <sup>1)</sup></b> |                           | 97W (2000A)                            | 97W (2000A)                 |
| <b>Total disconnecting time at short-circuit</b>                    |                           | <25ms ≤415V;<br><35ms >415V;           | <25ms ≤415V;<br><35ms >415V |

<sup>1)</sup> The current heat loss per pole ratings refer to the maximum current rating for the particular frame size.

## WEIGHT - MC1

### Response times for the overload release at temperatures diverging from the reference temperature (40°)

Device type

Temperature compensation coefficient

20°C | 30°C | 40°C | 50°C | 60°C | 65°C | 70°C

#### Thermomagnetic release <sup>TM</sup>

##### System protection

Reference temperature (40°)

|                                         |      |      |      |      |      |      |      |
|-----------------------------------------|------|------|------|------|------|------|------|
| MC1 - 15...80                           | 1,14 | 1,07 | 1    | 0,93 | 0,86 | 0,83 | 0,79 |
| MC1 - 90...125                          | 1,14 | 1,07 | 1    | 0,93 | 0,86 | 0,83 | 0,79 |
| MC1 - 160                               | 1,08 | 1,04 | 1    | 0,96 | 0,92 | 0,90 | 0,88 |
| MC2 - 15...200                          | 1,04 | 1,02 | 1    | 0,98 | 0,96 | 0,95 | 0,94 |
| MC2 - 20...200 with plug-in technology  | 1,04 | 1,02 | 1    | 0,98 | 0,96 | 0,95 | 0,94 |
| MC2 - 250 with plug-in technology       | 1,04 | 1,02 | 1    | 0,98 | 0,96 | 0,95 | 0,94 |
| MC3 - 250...500                         | 1,12 | 1,06 | 1    | 0,94 | 0,88 | 0,85 | 0,85 |
| MC3 - 250...500 with withdrawable units | 1,06 | 1    | 0,94 | 0,88 | 0,82 | 0,79 | 0,79 |

##### Short-circuit/motor contactor

reference temperature 40°C

|                                        |   |      |      |      |      |      |      |
|----------------------------------------|---|------|------|------|------|------|------|
| MC1 - 40...80                          | 1 | 0,98 | 0,95 | 0,93 | 0,90 | 0,89 | 0,88 |
| MC1 - 100                              | 1 | 0,98 | 0,95 | 0,93 | 0,90 | 0,89 | 0,88 |
| MC2 - 20...200                         | 1 | 0,98 | 0,96 | 0,94 | 0,92 | 0,91 | 0,90 |
| MC2 - 20...200 with plug-in technology | 1 | 0,98 | 0,96 | 0,94 | 0,92 | 0,91 | 0,90 |

**Note:** A slight change to the overload protection properties occurs at temperatures which diverge from the reference temperature. Therefore, in order to calculate the tripping time using the tripping characteristics curve, the temperature compensation coefficients set out in the table must also be taken into account.

Example: An MC1 - 100A has been calibrated for a reference temperature of 40°C.

What happens when it is operated at an ambient temperature of 60°C?

At 60°C, a reduced operating current of  $I_r = 100A \times 0.86 = 86A$  must be taken account above the temperature coefficients. In other words, at an ambient temperature of 60°C, the MC1 - 100A would trips as if it were set to 86A.

### Reducing rated operational voltage (derating) under special ambient conditions (to IEC947)

Device type

Derating-coefficient

20°C | 30°C | 40°C | 50°C | 60°C | 65°C | 70°C

#### Thermomagnetic release (Typ A)

##### System protection

reference temperature 40°C

|                                         |   |      |      |      |      |      |      |
|-----------------------------------------|---|------|------|------|------|------|------|
| MC1 - 15...80                           | 1 | 1    | 1    | 1    | 1    | 1    | 1    |
| MC1 - 90...125                          | 1 | 1    | 1    | 1    | 0,86 | 0,83 | 0,8  |
| MC1 - 160                               | 1 | 1    | 1    | 0,95 | 0,9  | 0,85 | 0,8  |
| MC2 - 15...200                          | 1 | 1    | 1    | 1    | 1    | 1    | 1    |
| MC2 - 250                               | 1 | 1    | 1    | 1    | 0,9  | 0,85 | 0,8  |
| MC2 - 20...200 with plug-in technology  | 1 | 1    | 1    | 1    | 1    | 1    | 1    |
| MC2 - 250 with plug-in technology       | 1 | 0,97 | 0,92 | 0,87 | 0,81 | -    | -    |
| MC3 - 250...500                         | 1 | 1    | 1    | 0,94 | 0,88 | 0,85 | 0,85 |
| MC3 - 250...500 with withdrawable units | 1 | 1    | 0,94 | 0,88 | 0,82 | 0,79 | 0,79 |

##### Short-circuit/motor contactor

reference temperature 40°C

|                                        |   |   |   |   |      |      |     |
|----------------------------------------|---|---|---|---|------|------|-----|
| MC1 - 40...80                          | 1 | 1 | 1 | 1 | 1    | 1    | 1   |
| MC1 - 100                              | 1 | 1 | 1 | 1 | 0,86 | 0,83 | 0,8 |
| MC2 - 20...200                         | 1 | 1 | 1 | 1 | 1    | 1    | 1   |
| MC2 - 20...200 with plug-in technology | 1 | 1 | 1 | 1 | 1    | 1    | 1   |

**Note:** To calculate the maximum permissible current load at different ambient operating temperatures, the derating coefficients must be taken into account as set out in the table.

Example : An MC2 - 250A is to be used under an ambient operating temperature of 65°C.

How much is the permissible Rated operational voltage  $I_e$ ? At 65°C, the derating coefficient is 0.85, in other words  $I_e = 250A \times 0,85 = 212,5A$ . In other words, the MC2 . 250A may be operated at a maximum  $I_e = 215.5A$  under an ambient temperature of 65°C.

## CONNECTION CROSS SECTIONS

|                                                           |          |        | MC4                                                             | I <sub>n</sub> <sup>1)</sup> |
|-----------------------------------------------------------|----------|--------|-----------------------------------------------------------------|------------------------------|
| Standard equipment                                        |          |        | Screw connection                                                | -                            |
| Accessories                                               |          |        | Tunnel terminals                                                |                              |
|                                                           |          |        | Rear-side connection                                            |                              |
|                                                           |          |        | Strip terminal                                                  |                              |
| Cu-conductors, Cu-cable                                   |          |        |                                                                 |                              |
| Box terminal                                              | solid    |        | -                                                               | -                            |
|                                                           | stranded |        | -                                                               | -                            |
| Tunnel terminal                                           | solid    |        | -                                                               | -                            |
|                                                           | stranded | 1-hole | -                                                               | -                            |
|                                                           |          | 2-hole | -                                                               | -                            |
|                                                           |          | 4-hole | 4 x (50 - 240)mm <sup>2</sup>                                   | 1400A                        |
| Screw connection and Rear-side connection                 |          |        |                                                                 |                              |
| directly on switch                                        | solid    |        | -                                                               | -                            |
|                                                           | stranded |        | 1 x (120 - 185)mm <sup>2</sup><br>4 x (50 - 185)mm <sup>2</sup> | 1250A                        |
| Module plate                                              | 1-hole   | min.   | 1 x (120 - 300)mm <sup>2</sup>                                  | 1000A                        |
|                                                           |          | max.   | 2 x (95 - 300)mm <sup>2</sup>                                   |                              |
| Module plate                                              | 2-hole   | min.   | 2 x (95 - 185)mm <sup>2</sup>                                   | 1400A                        |
|                                                           |          | max.   | 4 x (35 - 185)mm <sup>2</sup>                                   | -                            |
| Connection extension                                      |          |        | 4 x 300mm <sup>2</sup> 6 x (95 - 240)mm <sup>2</sup>            | 1600A4 x 240A                |
| Al-conductors, Al-cable                                   |          |        |                                                                 |                              |
| Tunnel terminal                                           | solid    |        | -                                                               | -                            |
|                                                           | stranded | 1-hole | -                                                               | -                            |
|                                                           |          | 2-hole | -                                                               | -                            |
|                                                           |          | 4-hole | 4 x (50 - 240) mm <sup>2</sup>                                  | 1400A                        |
| Screw connection and Rear-side connection                 |          |        |                                                                 |                              |
| directly on switch                                        | solid    |        | -                                                               | -                            |
|                                                           | stranded |        | -                                                               |                              |
| Module plate                                              | 1-hole   | min.   | 1 x (185-240)mm <sup>2</sup>                                    | upon request                 |
|                                                           |          | max.   | 2 x (70-185)mm <sup>2</sup>                                     | upon request                 |
| Module plate                                              | 2-hole   |        | 4 x 50mm <sup>2</sup>                                           | -                            |
| Connection exstension                                     |          |        | 2 x 240mm <sup>2</sup><br>6 x (70 - 240)mm <sup>2</sup>         | upon request                 |
| Cu-strip (number of segments x width x segment thickness) |          |        |                                                                 |                              |
| Box terminal                                              |          | min.   | -                                                               | -                            |
|                                                           |          | max.   | -                                                               | -                            |
| Flat conductor terminal, basic                            |          | min.   | 6 x 16 x 0,8mm                                                  | 1100A                        |
|                                                           |          | max.   | (2x) 10 x 32 x 1,0mm                                            |                              |
| Module plate                                              | 1-hole   |        | (2x) 10 x 50 x 1,0mm                                            | 1250A<br>(2x) 10 x 40 x 1,0  |
| Screw connection and Rear-side connection                 |          |        |                                                                 |                              |
| Cu-strip, with holes                                      |          | min.   | (2x) 10 x 50 x 1,0mm                                            | 1600A                        |
|                                                           |          | max.   | (2x) 10 x 50 x 1,0mm                                            |                              |
| Connection extension                                      |          |        | (2x) 10 x 80 x 1,0mm                                            | 1600A                        |



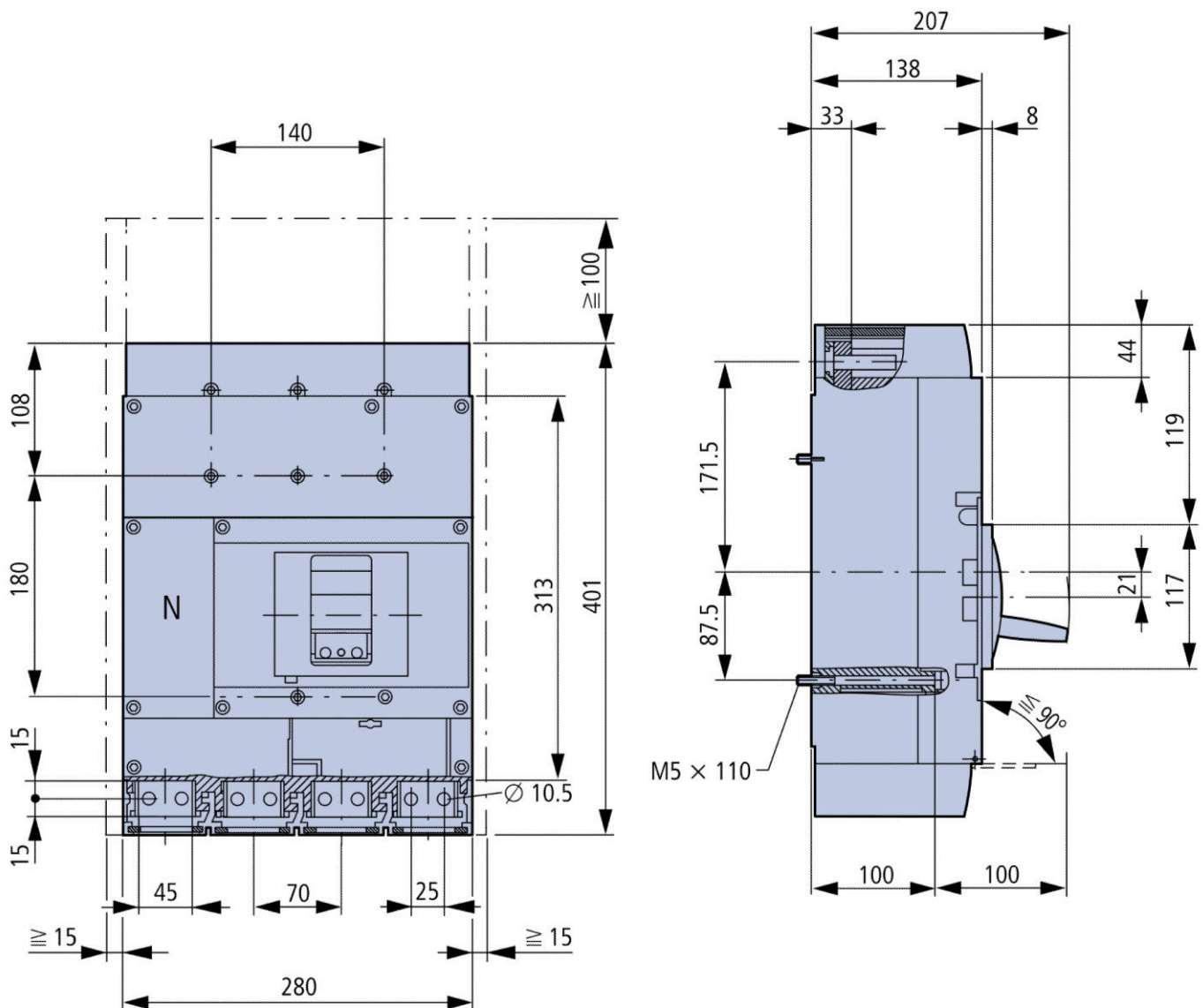
**Cu-rail (width x thickness)**

Screw connection and Rear-side connection

|                      |        |                 |                    |
|----------------------|--------|-----------------|--------------------|
| Screw connection     |        | M10             | -                  |
| directly on switch   | min.   | 25 x 5mm        | 1600A              |
|                      | max.   | 2 x (50 x 10)mm |                    |
|                      |        | 2 x (80 x 10)mm |                    |
| Module plate         | 1-hole | min.            | 1250A              |
|                      |        | max.            | 2x (40 x 10)       |
| Module plate         | 2-hole | min.            | 1600A              |
|                      |        | max.            | 1600A2 x (50 x 10) |
| Connection extension | min.   | 60 x 10mm       | 1600A2 x (50 x 10) |
|                      | max.   | 2 x (80 x 10)mm |                    |

**Note:** <sup>1)</sup> The rated currents  $I_n$  have been calculated in accordance with IEC/EN 60947 (protection devices standard) and generally relate to the max. specified cross-sections and are used here for the purposes of orientation. The design standards with apply in each case must be observed.

**Dimensioned drawing: Moulded Case Circuit Breaker Type AE, 4-pole, 85kA, 800A**



| DESCRIPTION                                                                                                                                                                                                             | Order No. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Moulded Case Circuit Breaker Type AE, 4-pole, 85kA, 800A<br>Size type 4, Rated current 800A, Poles 4, IP Rating IP20, Short circuit switching capacity 85kA, Tripping Unit AE electronic protection for system and line | MC480342  |