



191553

NZMH3-MX450-AVE

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## DELIVERY PROGRAM

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#### Description

IEC/EN 60947-2 with characteristic conforming to IEC/EN 60947-4-1 with phase failure sensitivity  
The circuit-breaker fulfills all requirements for AC-3 switching category.

Rms. value measurement and "thermal memory"  
Adjustable time delay setting to overcome current peaks  $t_r$  at  $6 \times I_r$  also infinity (without overload releases)

All AC-3 rating data applies to direct switching by the circuit-breaker under normal operating conditions. If, for example, a contactor takes over AC-3 switching under normal operating conditions, the full rated uninterrupted current applies to the circuit-breaker,  $I_h = I_u$ .

Number of poles  
3 pole

Standard equipment  
Screw connection

#### Switching capacity

400/415 V 50 Hz [ $I_{cu}$ ]  
150 kA

Rated current = rated uninterrupted current [ $I_h = I_u$ ]  
450 A

#### Setting range

Overload trip  
 [ $I_r$ ]  
180 - 450 A

Short-circuit releases  [ $I_m$ ]  
Non-delayed [ $I_t = I_h \times \dots$ ]  
2 - 12

#### Motor rating AC-3 50/60 Hz [P]

380 V 400 V [P]  
250 kW

660 V 690 V [P]

450 kW

### Motor rating AC-3 50/60 Hz [P]

400 V [P]  
250 kW

660 V 690 V [P]  
450 kW

### Rated operational current AC-3 50/60 Hz [ $I_e$ ]

400 V [ $I_e$ ]  
437 A

## TECHNICAL DATA

### General

Standards  
IEC/EN 60947

Protection against direct contact  
Finger and back of hand proof to VDE 0106 Part  
100

Climatic proofing  
Damp heat, constant, to IEC 60068-2-78  
Damp heat, cyclic, to IEC 60068-2-30

Ambient temperature  
Ambient temperature, storage  
- 40 - +70 °C

Ambient temperature  
Operation  
-25 - +70 °C

Mechanical shock resistance (10 ms half-sinusoidal shock) according to IEC 60068-2-27  
20 (half-sinusoidal shock 20 ms) g

Safe isolation to EN 61140  
Between auxiliary contacts and main contacts  
500 V AC

Safe isolation to EN 61140  
between the auxiliary contacts  
300 V AC

Weight  
6.34 kg

Mounting position  
Vertical and 90° in all directions  
With XFI earth-fault release:  
 - NZM1, N1, NZM2, N2: vertical and 90° in all directions  
with plug-in unit  
- NZM1, N1, NZM2, N2: vertical, 90° right/left  
with withdrawable unit:  
- NZM3, N3: vertical, 90° right/left  
- NZM4, N4: vertical  
with remote operator:  
- NZM2, N(S)2, NZM3, N(S)3, NZM4, N(S)4:  
vertical and 90° in all directions

Direction of incoming supply  
as required

Degree of protection  
Device  
In the operating controls area: IP20 (basic degree of protection)

Degree of protection  
Enclosures  
With insulating surround: IP40  
With door coupling rotary handle: IP66

Degree of protection  
Terminations  
Tunnel terminal: IP10  
Phase isolator and strip terminal: IP00

Other technical data (sheet catalogue)  
Weight  
Temperature dependency, Derating  
Effective power loss

Rated current = rated uninterrupted current [ $I_h = I_u$ ]  
450 A

Rated surge voltage invariability [ $U_{imp}$ ]  
Main contacts  
8000 V

Rated surge voltage invariability [ $U_{imp}$ ]  
Auxiliary contacts  
6000 V

Rated operational voltage [ $U_e$ ]  
690 V AC

Overvoltage category/pollution degree  
III/3

Rated insulation voltage [ $U_i$ ]  
690 V

Use in unearthed supply systems  
 690 V

## Switching capacity

Rated short-circuit making capacity [ $I_{cm}$ ]  
240 V [ $I_{cm}$ ]  
330 kA

Rated short-circuit making capacity [ $I_{cm}$ ]  
400/415 V [ $I_{cm}$ ]  
330 kA

Rated short-circuit making capacity [ $I_{cm}$ ]  
440 V 50/60 Hz [ $I_{cm}$ ]  
286 kA

Rated short-circuit making capacity [ $I_{cm}$ ]  
525 V 50/60 Hz [ $I_{cm}$ ]  
143 kA

Rated short-circuit making capacity [ $I_{cm}$ ]  
690 V 50/60 Hz [ $I_c$ ]  
74 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]  
Icu to IEC/EN 60947 test cycle O-t-OO [ $I_{cu}$ ]  
400/415 V 50/60 Hz [ $I_{cu}$ ]  
150 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]  
Ics to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]  
240 V 50/60 Hz [ $I_{cs}$ ]  
150 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]  
Ics to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]  
400/415 V 50/60 Hz [ $I_{cs}$ ]  
150 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]  
Ics to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]  
440 V 50/60 Hz [ $I_{cs}$ ]  
130 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]  
Ics to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]  
525 V 50/60 Hz [ $I_{cs}$ ]  
33 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]  
Ics to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]  
690 V 50/60 Hz [ $I_{cs}$ ]  
9 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]  
Maximum back-up fuse, if the expected short-circuit currents at the installation location exceed the switching capacity of the circuit-breaker.

Rated short-time withstand current  
 $t = 0.3$  s [ $I_{cw}$ ]  
3.3 kA

Rated short-time withstand current  
 $t = 1$  s [ $I_{cw}$ ]  
3.3 kA

Utilization category to IEC/EN 60947-2  
A

Lifespan, mechanical (of which max. 50 % trip by shunt/undervoltage release) [Operations]  
15000

Lifespan, electrical  
AC-1  
400 V 50/60 Hz [Operations]  
5000

Lifespan, electrical  
AC-1  
415 V 50/60 Hz [Operations]  
5000

Lifespan, electrical  
AC-1  
690 V 50/60 Hz [Operations]  
3000

Lifespan, electrical  
AC-3  
400 V 50/60 Hz [Operations]  
2000

Lifespan, electrical  
AC-3  
415 V 50/60 Hz [Operations]  
2000

Lifespan, electrical  
AC-3  
690 V 50/60 Hz [Operations]  
2000

Lifespan, electrical  
Max. operating frequency  
60 Ops/h

Total break time at short-circuit  
< 10 ms

## Terminal capacity

Standard equipment  
Screw connection

Accessories required  
NZMB-XAVS

Optional accessories  
Box terminal

Tunnel terminal  
connection on rear

Round copper conductor  
Box terminal  
Solid  
 $2 \times 16 \text{ mm}^2$

Round copper conductor  
Box terminal  
Stranded  
 $1 \times (35 - 240)$   
 $2 \times (25-120) \text{ mm}^2$

Round copper conductor  
Tunnel terminal  
Solid  
 $1 \times 16 \text{ mm}^2$

Round copper conductor  
Tunnel terminal  
Stranded  
1-hole  
 $1 \times (16 - 185) \text{ mm}^2$

Round copper conductor  
Bolt terminal and rear-side connection  
Direct on the switch  
Solid  
 $1 \times 16$   
 $2 \times 16 \text{ mm}^2$

Round copper conductor  
Bolt terminal and rear-side connection  
Direct on the switch  
Stranded  
 $1 \times (25 - 240)$   
 $2 \times (25 - 240) \text{ mm}^2$

Round copper conductor  
Bolt terminal and rear-side connection  
Connection width extension  
Connection width extension  
 $2 \times 300 \text{ mm}^2$

Al circular conductor  
Tunnel terminal  
Solid  
 $1 \times 16 \text{ mm}^2$

Al circular conductor

Tunnel terminal  
Stranded  
Stranded  
1 x (25 - 185)<sup>2)</sup> mm<sup>2</sup>

Al circular conductor  
Tunnel terminal  
Stranded  
Double hole  
1 x (50 - 240)  
2 x (50 - 240) mm<sup>2</sup>

Al circular conductor  
Tunnel terminal  
Stranded  
2) Up to 240 mm<sup>2</sup> can be connected depending on  
the cable manufacturer.

Cu strip (number of segments x width x segment  
thickness)  
Box terminal [min.]  
6 x 16 x 0.8 mm

Cu strip (number of segments x width x segment  
thickness)  
Box terminal [max.]  
10 x 24 x 1.0  
+ 5 x 24 x 1.0  
(2 x) 8 x 24 x 1.0 mm

Cu strip (number of segments x width x segment  
thickness)  
Bolt terminal and rear-side connection  
Flat copper strip, with holes [min.]  
6 x 16 x 0.8 mm

Cu strip (number of segments x width x segment  
thickness)  
Bolt terminal and rear-side connection  
Flat copper strip, with holes [max.]  
10 x 32 x 1.0 + 5 x 32 x 1.0 mm

Cu strip (number of segments x width x segment  
thickness)  
Bolt terminal and rear-side connection  
Connection width extension  
(2 x) 10 x 50 x 1.0 mm

Copper busbar (width x thickness) [mm]  
Bolt terminal and rear-side connection  
Screw connection  
M10

Copper busbar (width x thickness) [mm]  
Bolt terminal and rear-side connection  
Direct on the switch [min.]  
20 x 5 mm

Copper busbar (width x thickness) [mm]  
Bolt terminal and rear-side connection  
Direct on the switch [max.]  
30 x 10  
+ 30 x 5 mm

Copper busbar (width x thickness) [mm]  
Bolt terminal and rear-side connection  
Connection width extension  
Connection width extension [max.]  
2 x (10 x 50) mm

Control cables  
1 x (0.75 - 2.5)  
2 x (0.75 - 1.5) mm<sup>2</sup>

## DESIGN VERIFICATION AS PER IEC/EN 61439

### Technical data for design verification

Rated operational current for specified heat dissipation [ $I_h$ ]  
450 A

Equipment heat dissipation, current-dependent [ $P_{vid}$ ]  
60.75 W

Operating ambient temperature min.  
-25 °C

Operating ambient temperature max.  
+70 °C

### IEC/EN 61439 design verification

10.2 Strength of materials and parts  
10.2.2 Corrosion resistance  
Meets the product standard's requirements.

10.2 Strength of materials and parts  
10.2.3.1 Verification of thermal stability of enclosures  
Meets the product standard's requirements.

10.2 Strength of materials and parts  
10.2.3.2 Verification of resistance of insulating materials to normal heat  
Meets the product standard's requirements.

10.2 Strength of materials and parts  
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects  
Meets the product standard's requirements.

10.2 Strength of materials and parts  
10.2.4 Resistance to ultra-violet (UV) radiation  
Meets the product standard's requirements.

10.2 Strength of materials and parts  
10.2.5 Lifting  
Does not apply, since the entire switchgear needs to be evaluated.

10.2 Strength of materials and parts  
10.2.6 Mechanical impact  
Does not apply, since the entire switchgear needs to be evaluated.

10.2 Strength of materials and parts  
10.2.7 Inscriptions  
Meets the product standard's requirements.

10.3 Degree of protection of ASSEMBLIES  
Does not apply, since the entire switchgear needs to be evaluated.

10.4 Clearances and creepage distances  
Meets the product standard's requirements.

10.5 Protection against electric shock  
Does not apply, since the entire switchgear needs to be evaluated.

10.6 Incorporation of switching devices and components  
Does not apply, since the entire switchgear needs

to be evaluated.

10.7 Internal electrical circuits and connections  
Is the panel builder's responsibility.

10.8 Connections for external conductors  
Is the panel builder's responsibility.

10.9 Insulation properties  
10.9.2 Power-frequency electric strength  
Is the panel builder's responsibility.

10.9 Insulation properties  
10.9.3 Impulse withstand voltage  
Is the panel builder's responsibility.

10.9 Insulation properties  
10.9.4 Testing of enclosures made of insulating  
material  
Is the panel builder's responsibility.

10.10 Temperature rise  
The panel builder is responsible for the  
temperature rise calculation. Eaton will provide  
heat dissipation data for the devices.

10.11 Short-circuit rating  
Is the panel builder's responsibility. The  
specifications for the switchgear must be  
observed.

10.12 Electromagnetic compatibility  
Is the panel builder's responsibility. The  
specifications for the switchgear must be  
observed.

10.13 Mechanical function  
The device meets the requirements, provided the  
information in the instruction leaflet (IL) is  
observed.

## TECHNICAL DATA ETIM 7.0

Low-voltage industrial components (EG000017) / Motor protection circuit-breaker (EO000074)

Overload release current setting  
180 - 450 A

Adjustment range undelayed short-circuit release  
2 - 12 A

With thermal protection  
Yes

Phase failure sensitive  
Yes

Switch off technique  
Electronic

Rated operating voltage  
690 - 690 V

Rated permanent current  $I_p$   
450 A

Rated operation power at AC-3, 230 V  
132 kW

Rated operation power at AC-3, 400 V  
250 kW

Type of electrical connection of main circuit  
Other

Type of control element  
Rocker lever

Device construction  
Built-in device slide-in technique (withdrawable)

With integrated auxiliary switch  
No

With integrated under voltage release  
No

Number of poles

3

Rated short-circuit breaking capacity Icu at 400 V,

AC

150 kA

Degree of protection (IP)

IP20

Height

346 mm

Width

185 mm

Depth

260 mm

## CHARACTERISTICS

Characteristic curve

Let-through current

Characteristic curve

Let-through energy

## DIMENSIONS

- Blow out area, minimum clearance to adjacent parts

Minimum clearance to adjacent parts

