



**109670**  
**NZMN3-A400**

Overview

Specifications

Resources



## DELIVERY PROGRAM

[Delivery program](#)

Product range

Circuit-breaker

[Technical data](#)

Protective function

System and cable protection

[Design verification as per IEC/EN 61439](#)

Standard/Approval

IEC

[Technical data ETIM 7.0](#)

Installation type

Fixed

[Characteristics](#)

Release system

Thermomagnetic release

[Dimensions](#)

Construction size

NZM3

Number of poles

3 pole

Standard equipment  
Screw connection

## Switching capacity

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

## Rated current = rated uninterrupted current [ $I_h = I_u$ ]

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

## Setting range

Overload trip  
 [ $I_r$ ]  
320 - 400 A

Short-circuit releases  [ $I_m$ ]  
Non-delayed  [ $I_t = I_h \times \dots$ ]  
6 - 10

Short-circuit releases  [ $I_m$ ]  
2400 - 4000 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

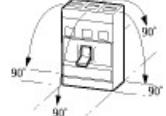
Safe isolation to EN 61140  
Between auxiliary contacts and main contacts  
500 V AC

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

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)  
Temperature dependency, Derating

## Circuit-breakers

Rated current = rated uninterrupted current [ $I_h = I_u$ ]  
400 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

Rated operational voltage [ $U_e$ ]  
750 V DC

The following settings are required in order to ensure correct tripping:

The fast-response release will take longer to respond when used for DC applications. Because of this, the setting on the trip block inscription, which is specified for AC currents, must be set to a lower value for DC currents.

DC correction factor for instantaneous release response value:

- o NZM1: 1.25
- o NZM2: 1.35
- o NZM3: 1.45

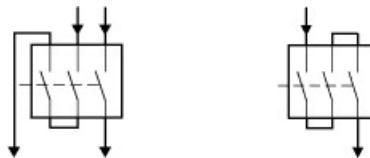
Example: NZM3  $I_e = 500A$ . Desired DC tripping current:  $10 * I_e = 5000A$ .

Calculation:

- Desired DC value / correction factor = AC setting on trip block

- $5000\text{A} / 1.45 = 3448\text{ A} \sim 7 * \text{Ie}$  = Value that needs to be set on the trip block

Permitted circuit configurations:



Overvoltage category/pollution degree  
III/3

Rated insulation voltage [ $U_r$ ]  
1000 V

Use in unearthing supply systems  
 690 V

## Switching capacity

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

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

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

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

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

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

50 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cu}$  to IEC/EN 60947 test cycle O-t-OO [ $I_{cu}$ ]

440 V 50/60 Hz [ $I_{cu}$ ]

35 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cu}$  to IEC/EN 60947 test cycle O-t-OO [ $I_{cu}$ ]

525 V 50/60 Hz [ $I_{cu}$ ]

25 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cu}$  to IEC/EN 60947 test cycle O-t-OO [ $I_{cu}$ ]

690 V 50/60 Hz [ $I_{cu}$ ]

20 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cu}$  to IEC/EN 60947 test cycle O-t-OO [ $I_{cu}$ ]

500 V DC [ $I_{cu}$ ]

30 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cu}$  to IEC/EN 60947 test cycle O-t-OO [ $I_{cu}$ ]

750 V DC [ $I_{cu}$ ]

30 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cs}$  to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]

240 V 50/60 Hz [ $I_{cs}$ ]

85 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cs}$  to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]

400/415 V 50/60 Hz [ $I_{cs}$ ]

50 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cs}$  to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]

440 V 50/60 Hz [ $I_{cs}$ ]

35 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cs}$  to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]

525 V 50/60 Hz [ $I_{cs}$ ]

13 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cs}$  to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]

690 V 50/60 Hz [ $I_{cs}$ ]

5 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cs}$  to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]

500 V DC [ $I_{cs}$ ]

30 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]

$I_{cs}$  to IEC/EN 60947 test cycle O-t-OO-t-OO [ $I_{cs}$ ]

750 V DC [ $I_{cs}$ ]

30 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 [ $I_{cw}$ ]

85 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  
DC-1  
500 V DC [Operations]  
5000

Lifespan, electrical  
DC-1  
750 V DC [Operations]  
5000

Lifespan, electrical  
DC - 3  
500 V DC [Operations]  
2000

Lifespan, electrical  
DC - 3  
750 V DC [Operations]  
2000

Lifespan, electrical  
Max. operating frequency  
60 Ops/h

Total break time at short-circuit  
< 10 ms

## Terminal capacity

Standard equipment  
Screw connection

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 [ $I_h$ ]  
400 A

Equipment heat dissipation, current-dependent [ $P_{vid}$ ]  
72.48 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) / Power circuit-breaker for trafo/generator/installation protection (EC000228)

Rated permanent current  $I_{\text{u}}$   
400 A

Rated voltage  
690 - 690 V

Rated short-circuit breaking capacity  $I_{\text{cu}}$  at 400 V,  
50 Hz  
50 kA

Overload release current setting  
320 - 400 A

Adjustment range short-term delayed short-circuit release  
0 - 0 A

Adjustment range undelayed short-circuit release  
2400 - 4000 A

Integrated earth fault protection  
No

Type of electrical connection of main circuit  
Screw connection

Device construction  
Built-in device fixed built-in technique

Suitable for DIN rail (top hat rail) mounting  
No

DIN rail (top hat rail) mounting optional  
No

Number of auxiliary contacts as normally closed contact  
0

Number of auxiliary contacts as normally open

contact

0

Number of auxiliary contacts as change-over

contact

0

With switched-off indicator

No

With under voltage release

No

Number of poles

3

Position of connection for main current circuit

Front side

Type of control element

Rocker lever

Complete device with protection unit

Yes

Motor drive integrated

No

Motor drive optional

Yes

Degree of protection (IP)

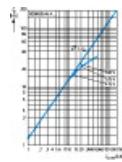
IP20

## CHARACTERISTICS

Characteristic curve

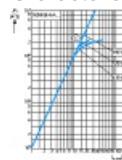


Characteristic curve



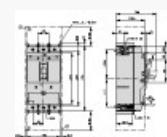
Let-through current

Characteristic curve



Let-through energy

## DIMENSIONS



- Blow out area, minimum clearance to adjacent parts
- Minimum clearance to adjacent parts





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