



191631  
NZMN2-MX90

Overview

Specifications

Resources



Delivery program

Technical data

Design verification as  
per IEC/EN 61439

Technical data ETIM 7.0

Characteristics

Dimensions

## DELIVERY PROGRAM

Product range  
Circuit-breaker

Protective function  
Motor protection



Standard/Approval  
IEC

Installation type  
Fixed

Release system  
Electronic release

Construction size  
NZM2

#### 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.

R.m.s. 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,  $I_n = I_u$ .

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 [ $I_n = I_u$ ]

90 A

### Setting range

Overload trip

 [ $I_r$ ]

36 - 90 A

Short-circuit releases  [ $I_{rm}$ ]

Non-delayed  [ $I_r = I_n \times \dots$ ]

2 – 18

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

380 V 400 V [P]

45 kW

660 V 690 V [P]

75 kW

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

400 V [P]  
45 kW

660 V 690 V [P]  
75 kW

### Rated operational current AC-3 50/60 Hz [I<sub>e</sub>]

400 V [I<sub>e</sub>]  
81 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

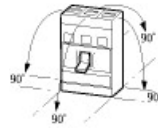
Mechanical shock resistance (10 ms half-  
sinusoidal shock) according to IEC 60068-2-27  
20 (half-sinusoidal shock 20 ms) g

Safe isolation to EN61140  
Between auxiliary contacts and main contacts  
500 V AC

Safe isolation to EN61140  
between the auxiliary contacts  
300 V AC

#### Mounting position

Vertical and 90° in all directions



With XF 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 withdraw able 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

## Circuit-breakers

Rated current = rated uninterrupted current [ $I_n = I_u$ ]  
90 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 [ $I_{cm}$ ]  
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 [ $I_c$ ]  
40 kA

Rated short-circuit breaking capacity  $I_{cn}$  [ $I_{cn}$ ]  
 $I_{cu}$  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  $I_{cn}$  [ $I_{cn}$ ]  
 $I_{cu}$  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  $I_{cn}$  [ $I_{cn}$ ]  
 $I_{cs}$  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 [ $I_{cs}$ ]  
25 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  $I_{cn}$  [ $I_{cn}$ ]  
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 [ $I_{cw}$ ]  
1.9 kA

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

Utilization category to IEC/EN 60947-2  
A

Lifespan, mechanical (of which max. 50 % trip by shunt/undervoltage release) [Operations]  
20000

Lifespan, electrical  
AC-1  
400 V 50/60 Hz [Operations]  
10000

Lifespan, electrical  
AC-1  
415 V 50/60 Hz [Operations]  
10000

Lifespan, electrical  
AC-1  
690 V 50/60 Hz [Operations]  
7500

Lifespan, electrical  
AC-3  
400 V 50/60 Hz [Operations]  
6500

Lifespan, electrical  
AC-3  
415 V 50/60 Hz [Operations]  
6500

Lifespan, electrical

AC--3  
690 V 50/60 Hz [Operations]  
5000

Lifespan, electrical  
Max. operating frequency  
120 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  
1 x (10 - 16)  
2 x (6 - 16) mm<sup>2</sup>

Round copper conductor  
Box terminal  
Stranded  
1 x (25 - 185)  
2 x (25 - 70) mm<sup>2</sup>

Round copper conductor  
Tunnel terminal  
Solid  
1 x 16 mm<sup>2</sup>

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

Round copper conductor  
Bolt terminal and rear-side connection  
Direct on the switch  
Solid  
1 x (10 - 16)  
2 x (6 - 16) mm<sup>2</sup>



Round copper conductor  
Bolt terminal and rear-side connection  
Direct on the switch  
Stranded  
1 x (25 - 185)  
2 x (25 - 70) mm<sup>2</sup>

Al circular conductor  
Tunnel terminal  
Solid  
1 x 16 mm<sup>2</sup>

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

Cu strip (number of segments x width x segment thickness)  
Box terminal [min.]  
2 x 9 x 0.8 mm

Cu strip (number of segments x width x segment thickness)  
Box terminal [max.]  
10 x 16 x 0.8  
(2x) 8 x 15.5 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 [min.]  
2 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 24 x 0.8 mm

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

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

Copper busbar (width x thickness) [mm]  
Bolt terminal and rear-side connection  
Direct on the switch [max.]  
24 x 8 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 [ $I_n$ ]  
90 A

Equipment heat dissipation, current-dependent  
[ $P_{vid}$ ]  
6.6825 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 (EC000074)

Electric engineering, automation, process control engineering / Low-voltage switch technology / Circuit breaker (LV < 1 kV) / Motor protection circuit-breaker (ecl@ss10.0.1-27-37-04-01 [AGZ529016])

Overload release current setting  
36 - 90 A

Adjustment range undelayed short-circuit release  
2 - 18 A

With thermal protection  
Yes

Phase failure sensitive  
Yes

Switch off technique  
Electronic

Rated operating voltage  
690 - 690 V

Rated permanent current I<sub>n</sub>  
90 A

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

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

Type of electrical connection of main circuit  
Screw connection

Type of control element  
Rocker lever

Device construction  
Built-in device fixed built-in technique

With integrated auxiliary switch  
No

With integrated under voltage release  
No

Number of poles  
3

Rated short-circuit breaking capacity I<sub>cu</sub> at 400 V,  
AC  
50 kA

Degree of protection (IP)

IP20

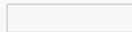
Height  
184 mm

Width  
105 mm

Depth  
149 mm

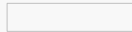
## CHARACTERISTICS

Characteristic curve



Let-through current

Characteristic curve



Let-through energy

## DIMENSIONS



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

