281231
NZMN1-A20

DELIVERY PROGRAM

Product range
Circuit-breaker

Protective function
System and cable protection

Standard/Approval
IEC

Installation type
Fixed

Release system
Thermomagnetic release

Construction size
NZM1

Number of poles
3 pole

Standard equipment
Box terminal

Switching capacity

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

Rated current = rated uninterrupted current [$I_n = I_u$]

Rated current = rated uninterrupted current [$I_n = I_u$]
20 A

Setting range

Overload trip
[I_r]
15 - 20 A

Short-circuit releases [I_{rm}]
Non-delayed [$I_i = I_n$ x ...]
350 A fixed

Short-circuit releases [I_{rm}]
min.
350 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

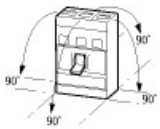
Mechanical shock resistance (10 ms half-sinusoidal shock) according to IEC 60068-2-27
20 (half-sinusoidal shock 20 ms) g

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 [$I_n = I_u$]
20 A

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

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

Rated operational voltage [U_e]
690 V AC

Rated operational voltage [U_e]
450 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

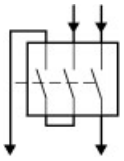
Example: NZM3 Ie = 500A. Desired DC tripping current: 10 * Ie = 5000A.

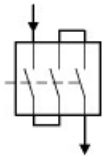
Calculation:

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

• 5000A / 1.45 = 3448 A ~ 7 * Ie = Value that needs to be set on the trip block

Permitted circuit configurations:





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}]
40 kA

Rated short-circuit making capacity [I_{cm}]
690 V 50/60 H [Ic]
17 kA

Rated short-circuit breaking capacity I_{cn} [I_{cn}]
Icu to IEC/EN 60947 test cycle O-t-CO [Icu]
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-CO [Icu]

400/415 V 50/60 Hz [I_{cu}]
50 kA

Rated short-circuit breaking capacity I_{cn} [I_{cn}]
Icu to IEC/EN 60947 test cycle O-t-CO [Icu]
440 V 50/60 Hz [I_{cu}]
35 kA

Rated short-circuit breaking capacity I_{cn} [I_{cn}]
Icu to IEC/EN 60947 test cycle O-t-CO [Icu]
525 V 50/60 Hz [I_{cu}]
20 kA

Rated short-circuit breaking capacity I_{cn} [I_{cn}]
Icu to IEC/EN 60947 test cycle O-t-CO [Icu]
690 V 50/60 Hz [I_{cu}]
10 kA

Rated short-circuit breaking capacity I_{cn} [I_{cn}]
Icu to IEC/EN 60947 test cycle O-t-CO [Icu]
450 V DC [I_{cu}]
15 kA

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

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

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

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

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

Rated short-circuit breaking capacity I_{cn} [I_{cn}]
Ics to IEC/EN 60947 test cycle O-t-CO-t-CO [Ics]

450 V DC [I_{cs}]
15 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.

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
DC-1
450 V DC [Operations]
10000

Lifespan, electrical
Max. operating frequency
120 Ops/h

Total break time at short-circuit
< 10 ms

Terminal capacity

Standard equipment
Box terminal

Optional accessories
Screw connection
Tunnel terminal
connection on rear

Round copper conductor
Box terminal
Solid
1 x (6 - 16)
2 x (4 - 16) mm²

Round copper conductor
Box terminal
Stranded
1 x (6 - 70) 3)
2 x (4 - 25) mm²

Round copper conductor
Box terminal
3) Up to 95 mm² can be connected depending on the cable manufacturer.

Round copper conductor
Tunnel terminal
Solid
1 x 16 mm²

Round copper conductor
Tunnel terminal
Stranded
1-hole
1 x (25 - 95) mm²

Round copper conductor
Bolt terminal and rear-side connection
Direct on the switch
Solid
1 x (6 - 16)
2 x (4 - 16) mm²

Round copper conductor
Bolt terminal and rear-side connection
Direct on the switch
Stranded
1 x (6 - 70) 3)
2 x (4 - 25) mm²

Round copper conductor
Bolt terminal and rear-side connection
Direct on the switch
3) Up to 95 mm² can be connected depending on the cable manufacturer.

Al circular conductor
Tunnel terminal
Solid
1 x 16 mm^2

Al circular conductor
Tunnel terminal
Stranded
Stranded
1 x (25 - 95) mm^2

Al circular conductor
Bolt terminal and rear-side connection
Direct on the switch
Solid
1 x (10 - 16)
2 x (10 - 16) mm^2

Al circular conductor
Bolt terminal and rear-side connection
Direct on the switch
Stranded
1 x (25 - 35)
2 x (25 - 35) mm^2

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.]
9 x 9 x 0.8 mm

Copper busbar (width x thickness) [mm]
Bolt terminal and rear-side connection
Screw connection
M6

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

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

Control cables
1 x (0.75 - 2.5)
2 x (0.75 - 1.5) mm^2

DESIGN VERIFICATION AS PER IEC/EN 61439

Technical data for design verification

Rated operational current for specified heat dissipation [I_n]
20 A

Equipment heat dissipation, current-dependent [P_{vid}]
9.82 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)

Electric engineering, automation, process control engineering / Low-voltage switch technology / Circuit breaker (LV < 1 kV) / Circuit breaker for power transformer, generator and system protection (ecl@ss10.0.1-27-37-04-09 [AJZ716013])

Rated permanent current Iu
20 A

Rated voltage
690 - 690 V

Rated short-circuit breaking capacity Icu at 400 V, 50 Hz
50 kA

Overload release current setting
15 - 20 A

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

Adjustment range undelayed short-circuit release
350 - 350 A

Integrated earth fault protection
No

Type of electrical connection of main circuit
Frame clamp

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
Yes

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

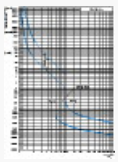
Motor drive integrated
No

Motor drive optional
No

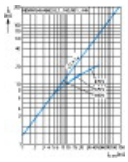
Degree of protection (IP)
IP20

CHARACTERISTICS

Characteristic curve

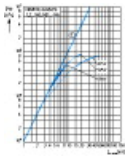


Characteristic curve



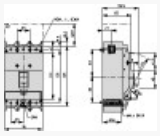
Let-through current

Characteristic curve



Let-through energy

DIMENSIONS



□ Blow out area, minimum clearance to adjacent parts