



169029  
NZML2-4-VE160/100-SVE

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  
Systems, cable, selectivity and generator  
protection

Standard/Approval  
IEC

Installation type  
Withdrawable

Release system  
Electronic release

Construction size  
NZM2

Description  
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)  
Adjustable delay time  $t_{sd}$   
 $i^2t$  constant function: fixed OFF  
Set value in neutral conductor is synchronous with set value  $I_r$  of main pole.

Number of poles  
4 pole

Standard equipment  
Screw connection

### Switching capacity

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

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


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


Neutral conductor [% of phase conductor]  
60 %

Reduced neutral conductor protection  
100 A


Neutral conductor protection  
Reduced neutral conductor protection



### Setting range

Overload trip  
 [ $I_r$ ]  
80 - 160 A

Overload trip  
Main pole  [ $I_r$ ]  
50 - 100 A

Short-circuit releases  [ $I_m$ ]

Non-delayed  [ $I = I_n \times \dots$ ]  
1920 A fixed

Short-circuit releases  [ $I_{rm}$ ]  
Delayed  [ $I_{sd} = I_r \times \dots$ ]  
2 - 10

## 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

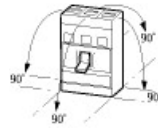
Mechanical shock resistance (10 ms half-sinusoidal shock) according to IEC 60068-2-27  
20 (half-sinusoidal shock 20 ms) g

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 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)

Temperature dependency, Derating

## Circuit-breakers

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

Rated surge voltage invariability [ $U_{mp}$ ]

Main contacts

8000 V

Rated surge voltage invariability [ $U_{mp}$ ]

Auxiliary contacts  
6000 V

Rated operational voltage [ $U_e$ ]  
690 V AC

Overvoltage category/pollution degree  
III/3

Rated insulation voltage [ $U_i$ ]  
1000 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 [ $I_{cm}$ ]  
220 kA

Rated short-circuit making capacity [ $I_{cm}$ ]  
690 V 50/60 Hz [ $I_{cm}$ ]  
176 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 [ $I_{cu}$ ]  
150 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 [ $I_{cu}$ ]  
150 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 [ $I_{cu}$ ]  
150 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 [ $I_{cu}$ ]  
100 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 [ $I_{cu}$ ]  
80 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 [ $I_{cs}$ ]  
150 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 [ $I_{cs}$ ]  
150 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 [ $I_{cs}$ ]  
130 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 [ $I_{cs}$ ]  
100 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 [ $I_{cs}$ ]  
80 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 [ $I_{cw}$ ]  
1.3 kA

Rated short-time withstand current  
 $t = 1 \text{ s } [I_{cw}]$   
1.3 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

Accessories required  
NZM2-4-XSVS

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 [ $I_n$ ]  
160 A

Equipment heat dissipation, current-dependent  
[ $P_{id}$ ]  
21.12 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  $I_u$   
160 A

Rated voltage  
690 - 690 V

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

Overload release current setting  
80 - 160 A

Adjustment range short-term delayed short-circuit  
release  
160 - 1600 A

Adjustment range undelayed short-circuit release  
1920 - 1920 A

Integrated earth fault protection  
No

Type of electrical connection of main circuit  
Screw connection

Device construction  
Built-in device plug-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

Position of connection for main current circuit  
Front side

Type of control element  
Rocker lever

Complete device with protection unit  
Yes

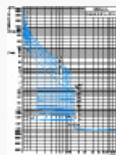
Motor drive integrated  
No

Motor drive optional  
Yes

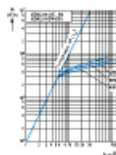
Degree of protection (IP)  
IP20

## CHARACTERISTICS

Characteristic curve

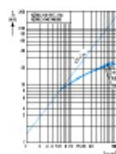


Characteristic curve



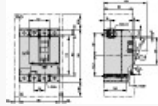
Let-through current

Characteristic curve



Let-through energy

## DIMENSIONS



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

