281236
N1-160

DELIVERY PROGRAM

Product range
Switch-disconnectors

Protective function
Disconnectors/main switches

Standard/Approval
IEC

Installation type
Fixed

Construction size
N1

Description
Main switch characteristics including positive drive to IEC/EN 60204 and VDE 0113.
Isolating characteristics to IEC/EN 60947-3 and VDE 0660.
Busbar tag shroud to VDE 0160 Part 100.

Number of poles
3 pole

Standard equipment
Box terminal

Switch positions
I, +, 0

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

Short-circuit protection max. fuse gL-characteristic
160 A gL

TECHNICAL DATA

General

Standards
IEC/EN 60947

Protection against direct contact
Finger and back-of-hand proof to DIN EN 50274/VDE 0106 part 110

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

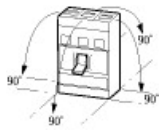
Mechanical shock resistance (10 ms half-sinusoidal shock) according to IEC 60068-2-27
20 (half-sinusoidal shock 20 ms) g

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
Mounting position

Vertical and 90° in all directions



With residual-current release XFI:

- NZM1, N1, NZM2, N2: vertical and 90° in all directions

with plug-in adapter elements

- NZM1, N1, NZM2, N2: vertical, 90° right/left

with withdrawable unit:

- NZM3, N3: vertical, 90 ° 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 area of the HMI devices: IP20 (basic protection type)

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

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

Switch-disconnectors

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

6000 V

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

Rated operational voltage [Ue]
690 V AC

Rated operating frequency [f]
50/60 Hz

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

Overvoltage category/pollution degree
III/3

Rated insulation voltage [U_i]
690 V

Use in unearthed supply systems
☐ 690 V

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

Rated short-circuit making capacity [I_{cm}]

690 V 50/60 H [Ic]
2.8 kA

Rated short-time withstand current

t = 0.3 s [I_{cw}]
2 kA

t = 1 s [I_{cw}]
2 kA

Rated conditional short-circuit current [kA]

With back-up fuse
gR: 160 A gG/gL

400 … 415 V
100 kA

690 V
80 kA

With downstream fuse
gR: 160 A gG/gL

400 … 415 V
100 kA

690 V
10 kA

Rated making and breaking capacity

Rated operational current [I_e]
AC-22/23A
415 V [I_e]
160 A

Rated operational current [I_e]
AC-22/23A
690 V [I_e]
160 A

Lifespan, mechanical [Operations]
20000

Max. operating frequency
120 Ops/h

Lifespan, electrical

AC-1
400 V 50/60 Hz [Operations]
7500

AC-1
415 V 50/60 Hz [Operations]

7500

AC-1
690 V 50/60 Hz [Operations]
5000

AC-23A
400 V 50/60 Hz [Operations]
1000

AC-23A
415 V 50/60 Hz [Operations]
1000

AC-23A
690 V 50/60 Hz [Operations]
1000

Terminal capacity

Standard equipment
Box terminal

Optional accessories
Screw connection
Tunnel terminal
connection on rear

Copper conductors and cables
Box terminal
Solid
1 x (10 - 16)
2 x (6 - 16) mm^2

Copper conductors and cables
Box terminal
Stranded
1 x (10 - 70) [3)]
2 x (6 - 25) mm^2

Copper conductors and cables
Box terminal
[3)] Up to 95 mm^2 can be connected depending on the cable manufacturer.

Copper conductors and cables
Tunnel terminal
Solid

1 x 16 mm²

Copper conductors and cables
Tunnel terminal
Stranded
1-hole
1 x (25 - 95) mm²

Copper conductors and cables
Bolt terminal and rear-side connection
Direct on the switch
Solid
1 x (10 - 16)
2 x (6 - 16) mm²

Copper conductors and cables
Bolt terminal and rear-side connection
Direct on the switch
Stranded
1 x (25 - 70) [3)]
2 x 25 mm²

Copper conductors and cables
Bolt terminal and rear-side connection
Direct on the switch
[3)] Up to 95 mm² can be connected depending on the cable manufacturer.

Al conductors, Al cable
Tunnel terminal
Solid
1 x 16 mm²

Al conductors, Al cable
Tunnel terminal
Stranded
1-hole
1 x (25 - 95) mm²

Al conductors, Al cable
Bolt terminal and rear-side connection
Direct on the switch
Solid
1 x (10 - 16)
2 x (10 - 16) mm²

Al conductors, Al cable
Bolt terminal and rear-side connection
Direct on the switch
Stranded
1 x (25 - 70) [3)]
2 x 25 mm²

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

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_{vid}]
29.18 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.

Low-voltage industrial components (EG000017) / Switch disconnector (EC000216)

Electric engineering, automation, process control engineering / Low-voltage switch technology / Off-load switch, circuit breaker, control switch / Switch disconnector (ecl@ss10.0.1-27-37-14-03 [AKF060013])

Version as main switch
Yes

Version as maintenance-/service switch
Yes

Version as safety switch
No

Version as emergency stop installation
Yes

Version as reversing switch
No

Number of switches
1

Max. rated operation voltage Ue AC
690 V

Rated operating voltage
690 - 690 V

Rated permanent current Iu
160 A

Rated permanent current at AC-23, 400 V
0 A

Rated permanent current at AC-21, 400 V
0 A

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

Rated short-time withstand current Icw
2 kA

Rated operation power at AC-23, 400 V
90 kW

Switching power at 400 V
0 kW

Conditioned rated short-circuit current Iq
0 kA

Number of poles
3

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

Motor drive optional
Yes

Motor drive integrated
No

Voltage release optional
Yes

Device construction
Built-in device fixed built-in technique

Suitable for ground mounting
Yes

Suitable for front mounting 4-hole
No

Suitable for front mounting centre

No

Suitable for distribution board installation
Yes

Suitable for intermediate mounting
Yes

Colour control element
Black

Type of control element
Rocker lever

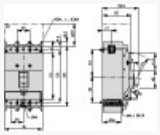
Interlockable
Yes

Type of electrical connection of main circuit
Frame clamp

Degree of protection (IP), front side
IP20

Degree of protection (NEMA)

DIMENSIONS



□ Blow out area, minimum clearance to adjacent parts