

# Specifications



Photo is representative

## Eaton 169029

Eaton Moeller series NZM - Molded Case Circuit Breaker. Circuit-breaker, 4 p, 160A, 100A in 4th pole, plug-in module

### General specifications

|                                 |                                                                       |
|---------------------------------|-----------------------------------------------------------------------|
| <b>PRODUCT NAME</b>             | Eaton Moeller series NZM<br>molded case circuit<br>breaker electronic |
| <b>CATALOG NUMBER</b>           | 169029                                                                |
| <b>MODEL CODE</b>               | NZML2-4-VE160/100-SVE                                                 |
| <b>EAN</b>                      | 4015081655229                                                         |
| <b>PRODUCT<br/>LENGTH/DEPTH</b> | 180 mm                                                                |
| <b>PRODUCT HEIGHT</b>           | 245 mm                                                                |
| <b>PRODUCT WIDTH</b>            | 140 mm                                                                |
| <b>PRODUCT WEIGHT</b>           | 3.57 kg                                                               |
| <b>COMPLIANCES</b>              | RoHS conform                                                          |
| <b>CERTIFICATIONS</b>           | IEC/EN 60947<br>IEC                                                   |



Powering Business Worldwide

## Additional information

### FUNCTIONS

Systems, cable, selectivity  
and generator protection

## Delivery programme

**ACCESSORIES REQUIRED** NZM2-4-XSVS

**AMPERAGE RATING** 160 A

**APPLICATION** Use in unearthed supply  
systems at 690 V

**CIRCUIT BREAKER FRAME  
TYPE** NZM2

**FEATURES** Motor drive optional  
Protection unit

**NUMBER OF POLES** Four-pole

**RELEASE SYSTEM** Electronic release

### SPECIAL FEATURES

- Maximum back-up fuse, if the expected short-circuit currents at the installation location exceed the switching capacity of the circuit breaker (Rated short-circuit breaking capacity  $I_{cn}$ )
- R.m.s. value measurement and "thermal memory"
- Adjustable time delay setting to overcome current peaks  $I_r$  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.
- Rated current = rated uninterrupted current: 160 A
- Reduced neutral conductor protection

**TYPE** Circuit breaker

## Design verification to IEC/EN 61439

|                                                                                         |                                                                                                                                  |
|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>10.10 TEMPERATURE RISE</b>                                                           | The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices. |
| <b>10.11 SHORT-CIRCUIT RATING</b>                                                       | Is the panel builder's responsibility. The specifications for the switchgear must be observed.                                   |
| <b>10.12 ELECTROMAGNETIC COMPATIBILITY</b>                                              | Is the panel builder's responsibility. The specifications for the switchgear must be observed.                                   |
| <b>10.13 MECHANICAL FUNCTION</b>                                                        | The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.                         |
| <b>10.2.2 CORROSION RESISTANCE</b>                                                      | Meets the product standard's requirements.                                                                                       |
| <b>10.2.3.1 VERIFICATION OF THERMAL STABILITY OF ENCLOSURES</b>                         | Meets the product standard's requirements.                                                                                       |
| <b>10.2.3.2 VERIFICATION OF RESISTANCE OF INSULATING MATERIALS TO NORMAL HEAT</b>       | Meets the product standard's requirements.                                                                                       |
| <b>10.2.3.3 RESIST. OF INSUL. MAT. TO ABNORMAL HEAT/FIRE BY INTERNAL ELECT. EFFECTS</b> | Meets the product standard's requirements.                                                                                       |
| <b>10.2.4 RESISTANCE TO ULTRA-VIOLET (UV) RADIATION</b>                                 | Meets the product standard's requirements.                                                                                       |
| <b>10.2.5 LIFTING</b>                                                                   | Does not apply, since the entire switchgear needs to be evaluated.                                                               |
| <b>10.2.6 MECHANICAL IMPACT</b>                                                         | Does not apply, since the entire switchgear needs to be evaluated.                                                               |
| <b>10.2.7 INSCRIPTIONS</b>                                                              | Meets the product standard's requirements.                                                                                       |
| <b>10.3 DEGREE OF PROTECTION OF ASSEMBLIES</b>                                          | Does not apply, since the entire switchgear needs to be evaluated.                                                               |
| <b>10.4 CLEARANCES AND CREEPAGE DISTANCES</b>                                           | Meets the product standard's requirements.                                                                                       |
| <b>10.5 PROTECTION</b>                                                                  | Does not apply, since the                                                                                                        |

## Design verification to IEC/EN 61439 - technical data

|                                                                      |         |
|----------------------------------------------------------------------|---------|
| <b>AMBIENT OPERATING TEMPERATURE - MAX</b>                           | 70 °C   |
| <b>AMBIENT STORAGE TEMPERATURE - MAX</b>                             | 70 °C   |
| <b>AMBIENT OPERATING TEMPERATURE - MIN</b>                           | -25 °C  |
| <b>AMBIENT STORAGE TEMPERATURE - MIN</b>                             | 40 °C   |
| <b>EQUIPMENT HEAT DISSIPATION, CURRENT-DEPENDENT</b>                 | 21.12 W |
| <b>RATED OPERATIONAL CURRENT FOR SPECIFIED HEAT DISSIPATION (IN)</b> | 160 A   |

|                                                                 |                                                                    |
|-----------------------------------------------------------------|--------------------------------------------------------------------|
| <b>AGAINST ELECTRIC SHOCK</b>                                   | entire switchgear needs to be evaluated.                           |
| <b>10.6 INCORPORATION OF SWITCHING DEVICES AND COMPONENTS</b>   | Does not apply, since the entire switchgear needs to be evaluated. |
| <b>10.7 INTERNAL ELECTRICAL CIRCUITS AND CONNECTIONS</b>        | Is the panel builder's responsibility.                             |
| <b>10.8 CONNECTIONS FOR EXTERNAL CONDUCTORS</b>                 | Is the panel builder's responsibility.                             |
| <b>10.9.2 POWER-FREQUENCY ELECTRIC STRENGTH</b>                 | Is the panel builder's responsibility.                             |
| <b>10.9.3 IMPULSE WITHSTAND VOLTAGE</b>                         | Is the panel builder's responsibility.                             |
| <b>10.9.4 TESTING OF ENCLOSURES MADE OF INSULATING MATERIAL</b> | Is the panel builder's responsibility.                             |

## Technical data - electrical

|                                                                     |                                                                                                                                                                                                      |
|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AMPERAGE RATING</b>                                              | 160 A                                                                                                                                                                                                |
| <b>CURRENT RATING OF NEUTRAL CONDUCTOR</b>                          | 100 A<br>60% of phase conductor                                                                                                                                                                      |
| <b>DIRECTION OF INCOMING SUPPLY</b>                                 | As required                                                                                                                                                                                          |
| <b>ELECTRICAL CONNECTION TYPE OF MAIN CIRCUIT</b>                   | Screw connection                                                                                                                                                                                     |
| <b>HANDLE TYPE</b>                                                  | Rocker lever                                                                                                                                                                                         |
| <b>INSTANTANEOUS CURRENT SETTING (II) - MAX</b>                     | 1920 A                                                                                                                                                                                               |
| <b>INSTANTANEOUS CURRENT SETTING (II) - MIN</b>                     | 1920 A                                                                                                                                                                                               |
| <b>ISOLATION</b>                                                    | 300 V AC (between the auxiliary contacts)<br>500 V AC (between auxiliary contacts and main contacts)                                                                                                 |
| <b>LIFESPAN, ELECTRICAL</b>                                         | 5000 operations at 690 V AC-3<br>10000 operations at 400 V AC-1<br>10000 operations at 415 V AC-1<br>6500 operations at 400 V AC-3<br>6500 operations at 415 V AC-3<br>7500 operations at 690 V AC-1 |
| <b>NUMBER OF OPERATIONS PER HOUR - MAX</b>                          | 120                                                                                                                                                                                                  |
| <b>OVERLOAD CURRENT SETTING (IR)</b>                                | 50 A - 100 A                                                                                                                                                                                         |
| <b>OVERLOAD CURRENT SETTING (IR) - MAX</b>                          | 160 A                                                                                                                                                                                                |
| <b>OVERLOAD CURRENT SETTING (IR) - MIN</b>                          | 80 A                                                                                                                                                                                                 |
| <b>OVERVOLTAGE CATEGORY</b>                                         | III                                                                                                                                                                                                  |
| <b>POLLUTION DEGREE</b>                                             | 3                                                                                                                                                                                                    |
| <b>RATED IMPULSE WITHSTAND VOLTAGE (UIMP) AT AUXILIARY CONTACTS</b> | 6000 V                                                                                                                                                                                               |
| <b>RATED IMPULSE WITHSTAND VOLTAGE (UIMP) AT MAIN</b>               | 8000 V                                                                                                                                                                                               |

## Technical data - mechanical

|                                                                |                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CLIMATIC PROOFING</b>                                       | Damp heat, cyclic, to IEC 60068-2-30<br>Damp heat, constant, to IEC 60068-2-78                                                                                                                                                                          |
| <b>DEGREE OF PROTECTION</b>                                    | IP20<br>IP20 (basic degree of protection, in the operating controls area)                                                                                                                                                                               |
| <b>DEGREE OF PROTECTION (IP), FRONT SIDE</b>                   | IP40 (with insulating surround)<br>IP66 (with door coupling rotary handle)                                                                                                                                                                              |
| <b>DEGREE OF PROTECTION (TERMINATIONS)</b>                     | IP00 (terminations, phase isolator and strip terminal)<br>IP10 (tunnel terminal)                                                                                                                                                                        |
| <b>LIFESPAN, MECHANICAL</b>                                    | 20000 operations                                                                                                                                                                                                                                        |
| <b>MOUNTING METHOD</b>                                         | DIN rail (top hat rail)<br>mounting optional<br>Withdrawable<br>Built-in device plug-in technique                                                                                                                                                       |
| <b>NUMBER OF AUXILIARY CONTACTS (CHANGE-OVER CONTACTS)</b>     | 0                                                                                                                                                                                                                                                       |
| <b>NUMBER OF AUXILIARY CONTACTS (NORMALLY CLOSED CONTACTS)</b> | 0                                                                                                                                                                                                                                                       |
| <b>NUMBER OF AUXILIARY CONTACTS (NORMALLY OPEN CONTACTS)</b>   | 0                                                                                                                                                                                                                                                       |
| <b>POSITION OF CONNECTION FOR MAIN CURRENT CIRCUIT</b>         | Front side                                                                                                                                                                                                                                              |
| <b>PROTECTION AGAINST DIRECT CONTACT</b>                       | Finger and back-of-hand proof to DIN EN 50274/VDE 0106 part 110                                                                                                                                                                                         |
| <b>SHOCK RESISTANCE</b>                                        | 20 g (half-sinusoidal shock 20 ms)                                                                                                                                                                                                                      |
| <b>SPECIAL FEATURES</b>                                        | <ul style="list-style-type: none"> <li>Maximum back-up fuse, if the expected short-circuit currents at the installation location exceed the switching capacity of the circuit breaker (Rated short-circuit breaking capacity I<sub>cn</sub>)</li> </ul> |

| CONTACTS                                                                               |           |
|----------------------------------------------------------------------------------------|-----------|
| <b>RATED INSULATION VOLTAGE (UI)</b>                                                   | 1000 V AC |
| <b>RATED SHORT-CIRCUIT BREAKING CAPACITY ICS (IEC/EN 60947) AT 230 V, 50/60 HZ</b>     | 150 kA    |
| <b>RATED SHORT-CIRCUIT BREAKING CAPACITY ICS (IEC/EN 60947) AT 400/415 V, 50/60 HZ</b> | 150 kA    |
| <b>RATED SHORT-CIRCUIT BREAKING CAPACITY ICS (IEC/EN 60947) AT 440 V, 50/60 HZ</b>     | 130 kA    |
| <b>RATED SHORT-CIRCUIT BREAKING CAPACITY ICS (IEC/EN 60947) AT 525 V, 50/60 HZ</b>     | 100 kA    |
| <b>RATED SHORT-CIRCUIT BREAKING CAPACITY ICS (IEC/EN 60947) AT 690 V, 50/60 HZ</b>     | 80 kA     |
| <b>RATED SHORT-CIRCUIT MAKING CAPACITY ICM AT 240 V, 50/60 HZ</b>                      | 330 kA    |
| <b>RATED SHORT-CIRCUIT MAKING CAPACITY ICM AT 400/415 V, 50/60 HZ</b>                  | 330 kA    |
| <b>RATED SHORT-CIRCUIT MAKING CAPACITY ICM AT 440 V, 50/60 HZ</b>                      | 286 kA    |
| <b>RATED SHORT-CIRCUIT MAKING CAPACITY ICM AT 525 V, 50/60 HZ</b>                      | 220 kA    |
| <b>RATED SHORT-CIRCUIT MAKING CAPACITY ICM AT 690 V, 50/60 HZ</b>                      | 176 kA    |
| <b>RATED SHORT-TIME WITHSTAND CURRENT (T = 0.3 S)</b>                                  | 1.3 kA    |
| <b>RATED SHORT-TIME WITHSTAND CURRENT (T = 1 S)</b>                                    | 1.3 kA    |
| <b>SHORT DELAY CURRENT SETTING (ISD) - MAX</b>                                         | 1600 A    |
| <b>SHORT DELAY CURRENT SETTING (ISD) - MIN</b>                                         | 160 A     |
| <b>SHORT-CIRCUIT RELEASE DELAYED SETTING - MAX</b>                                     | 1600 A    |
| <b>SHORT-CIRCUIT RELEASE DELAYED SETTING - MIN</b>                                     | 160 A     |

- R.m.s. value measurement and "thermal memory"
- Adjustable time delay setting to overcome current peaks  $I_r$  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.
- Rated current = rated uninterrupted current: 160 A
- Reduced neutral conductor protection

|                                                       |                    |
|-------------------------------------------------------|--------------------|
| <hr/>                                                 |                    |
| SHORT-CIRCUIT RELEASE<br>NON-DELAYED SETTING -<br>MAX | 1920 A             |
| <hr/>                                                 |                    |
| SHORT-CIRCUIT RELEASE<br>NON-DELAYED SETTING -<br>MIN | 1920 A             |
| <hr/>                                                 |                    |
| SHORT-CIRCUIT TOTAL<br>BREAKTIME                      | < 10 ms            |
| <hr/>                                                 |                    |
| UTILIZATION CATEGORY                                  | A (IEC/EN 60947-2) |
| <hr/>                                                 |                    |
| VOLTAGE RATING                                        | 690 V - 690 V      |
| <hr/>                                                 |                    |

## Technical data - mechanical - terminals

|                                                              |                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OPTIONAL TERMINALS</b>                                    | Box terminal. Connection on rear. Tunnel terminal                                                                                                                                                                                                                                                                                                                                     |
| <b>STANDARD TERMINALS</b>                                    | Screw terminal                                                                                                                                                                                                                                                                                                                                                                        |
| <b>TERMINAL CAPACITY (ALUMINUM SOLID CONDUCTOR/CABLE)</b>    | 16 mm <sup>2</sup> (1x) at tunnel terminal                                                                                                                                                                                                                                                                                                                                            |
| <b>TERMINAL CAPACITY (ALUMINUM STRANDED CONDUCTOR/CABLE)</b> | 25 mm <sup>2</sup> - 185 mm <sup>2</sup> (1x) at tunnel terminal                                                                                                                                                                                                                                                                                                                      |
| <b>TERMINAL CAPACITY (CONTROL CABLE)</b>                     | 0.75 mm <sup>2</sup> - 1.5 mm <sup>2</sup> (2x)<br>0.75 mm <sup>2</sup> - 2.5 mm <sup>2</sup> (1x)                                                                                                                                                                                                                                                                                    |
| <b>TERMINAL CAPACITY (COPPER BUSBAR)</b>                     | M8 at rear-side screw connection<br>Min. 16 mm x 5 mm direct at switch rear-side connection<br>Max. 24 mm x 8 mm direct at switch rear-side connection                                                                                                                                                                                                                                |
| <b>TERMINAL CAPACITY (COPPER SOLID CONDUCTOR/CABLE)</b>      | 6 mm <sup>2</sup> - 16 mm <sup>2</sup> (2x) at box terminal<br>6 mm <sup>2</sup> - 16 mm <sup>2</sup> (2x) direct at switch rear-side connection<br>10 mm <sup>2</sup> - 16 mm <sup>2</sup> (1x) direct at switch rear-side connection<br>10 mm <sup>2</sup> - 16 mm <sup>2</sup> (1x) at box terminal<br>16 mm <sup>2</sup> (1x) at tunnel terminal                                  |
| <b>TERMINAL CAPACITY (COPPER STRANDED CONDUCTOR/CABLE)</b>   | 25 mm <sup>2</sup> - 70 mm <sup>2</sup> (2x) direct at switch rear-side connection<br>25 mm <sup>2</sup> - 185 mm <sup>2</sup> (1x) at box terminal<br>25 mm <sup>2</sup> - 185 mm <sup>2</sup> (1x) direct at switch rear-side connection<br>25 mm <sup>2</sup> - 70 mm <sup>2</sup> (2x) at box terminal<br>25 mm <sup>2</sup> - 185 mm <sup>2</sup> (1x) at 1-hole tunnel terminal |
| <b>TERMINAL CAPACITY (COPPER STRIP)</b>                      | Max. 10 segments of 24 mm x 0.8 mm at rear-side connection (punched)<br>Max. 8 segments of 24 mm x 1 mm (2x) at box terminal<br>Min. 2 segments of 16 mm x 0.8 mm at rear-side connection (punched)<br>Min. 2 segments of 9 mm x 0.8 mm at box terminal<br>Max. 10 segments of 16                                                                                                     |

## Resources

|                                   |                                                                                                                                                                                                                                                                                                             |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BROCHURES</b>                  | <a href="#">eaton-feerum-the-whole-grain-solution-success-story-en-us.pdf</a><br><a href="#">eaton-digital-nzm-brochure-br013003en-en-us.pdf</a>                                                                                                                                                            |
| <b>CATALOGUES</b>                 | <a href="#">eaton-digital-nzm-catalog-ca013003en-en-us.pdf</a><br><a href="#">eaton-circuit-breaker-nzm-mccb-characteristic-curve-006.eps</a><br><a href="#">eaton-circuit-breaker-nzm-mccb-characteristic-curve-007.eps</a><br><a href="#">eaton-circuit-breaker-nzm-mccb-characteristic-curve-054.eps</a> |
| <b>CHARACTERISTIC CURVE</b>       | <a href="#">eaton-molded-case-circuit-breaker-declaration-of-conformity-eu250291en.pdf</a>                                                                                                                                                                                                                  |
| <b>DECLARATIONS OF CONFORMITY</b> | <a href="#">eaton-circuit-breaker-adapter-nzm-mccb-dimensions-002.eps</a>                                                                                                                                                                                                                                   |
| <b>DRAWINGS</b>                   | <a href="#">eaton-circuit-breaker-nzm-mccb-dimensions-035.eps</a><br><a href="#">eaton-circuit-breaker-switch-nzm-mccb-dimensions-017.eps</a>                                                                                                                                                               |
| <b>ECAD MODEL</b>                 | <a href="#">DA-CE-ETN.NZML2-4-VE160_100-SVE</a>                                                                                                                                                                                                                                                             |
| <b>INSTALLATION INSTRUCTIONS</b>  | <a href="#">eaton-circuit-breaker-plugin-adapter-nzm2-il01219023z.pdf</a>                                                                                                                                                                                                                                   |
| <b>INSTALLATION VIDEOS</b>        | <a href="#">Introduction of the new digital circuit breaker NZM</a><br><a href="#">The new digital NZM Range</a>                                                                                                                                                                                            |
| <b>MCAD MODEL</b>                 | <a href="#">eaton-molded-case-switches-mcad-drawings-nzm2-4p-xsve.dwg</a><br><a href="#">eaton-molded-case-switches-mcad-3d-models-nzm2-4p-xsve.stp</a>                                                                                                                                                     |
| <b>PEP ECO-PASSPORT</b>           | <a href="#">eaton-molded-case-switches-pep-eato-00208-v0101-en.pdf</a>                                                                                                                                                                                                                                      |

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mm x 0.8 mm at box  
terminal  
Min. 2 segments of 16 mm  
x 0.8 mm at rear-side  
connection (punched)

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TECHNICAL DATA SHEETS

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[eaton-nzm-technical-  
information-sheet](#)

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**PROJECT NAME:**

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**PROJECT NUMBER:**

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**PREPARED BY:**

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**DATE:**

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