

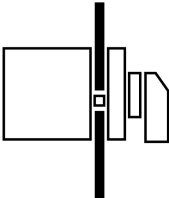
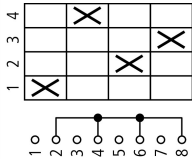
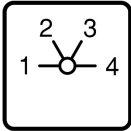


Step switches, TM, 10 A, flush mounting, 2 contact unit(s), Contacts: 4, 60 °, maintained, Without 0 (Off) position, 1-4, design no. 8231

Part no. TM-2-8231/E  
Catalog No. 044029

Similar to illustration

Delivery program

|                                                    |                |                 |                                                                                               |
|----------------------------------------------------|----------------|-----------------|-----------------------------------------------------------------------------------------------|
| Product range                                      |                |                 | Control switches                                                                              |
| Part group reference                               |                |                 | TM                                                                                            |
| Basic function                                     |                |                 | Step switches                                                                                 |
|                                                    |                |                 | with black thumb grip and front plate                                                         |
| Contacts                                           |                |                 | 4                                                                                             |
| Number of steps                                    |                |                 | 4 steps, 60°                                                                                  |
| Degree of Protection                               |                |                 | Front IP65                                                                                    |
| Design                                             |                |                 | flush mounting                                                                                |
|                                                    |                |                 |             |
| Contact sequence                                   |                |                 |            |
| Switching angle                                    |                | °               | 60                                                                                            |
| Switching performance                              |                |                 | maintained<br>Without 0 (Off) position                                                        |
| Design number                                      |                |                 | 8231                                                                                          |
| Front plate no.                                    |                |                 | <br>F 077 |
| front plate                                        |                |                 | 1-4                                                                                           |
| Motor rating AC-23A, 50 - 60 Hz                    |                |                 |                                                                                               |
| 400 V                                              | P              | kW              | 3                                                                                             |
| Rated uninterrupted current                        | I <sub>u</sub> | A               | 10                                                                                            |
| Note on rated uninterrupted current I <sub>u</sub> |                |                 | Rated uninterrupted current I <sub>u</sub> is specified for max. cross-section.               |
| Number of contact units                            |                | contact unit(s) | 2                                                                                             |

Technical data

|                                       |  |    |                                                                                                                       |
|---------------------------------------|--|----|-----------------------------------------------------------------------------------------------------------------------|
| Standards                             |  |    | IEC/EN 60947, VDE 0660, CSA, UL<br>Control switch as per IEC/EN 60947-5-1<br>Auxiliary switch as per IEC/EN 60947-5-1 |
| Climatic proofing                     |  |    | Damp heat, constant, to IEC 60068-2-78<br>Damp heat, cyclic, to IEC 60068-2-30                                        |
| Ambient temperature                   |  |    |                                                                                                                       |
| Open                                  |  | °C | -25 - +50                                                                                                             |
| Overvoltage category/pollution degree |  |    | III/3                                                                                                                 |

|                                 |                  |      |             |
|---------------------------------|------------------|------|-------------|
| Rated impulse withstand voltage | U <sub>imp</sub> | V AC | 4000        |
| Mounting position               |                  |      | As required |

Contacts

|                                                    |                |         |                                                                                 |
|----------------------------------------------------|----------------|---------|---------------------------------------------------------------------------------|
| Electrical characteristics                         |                |         |                                                                                 |
| Rated operational voltage                          | U <sub>e</sub> | V AC    | 500                                                                             |
| Rated uninterrupted current                        | I <sub>u</sub> | A       | 10                                                                              |
| Note on rated uninterrupted current I <sub>u</sub> |                |         | Rated uninterrupted current I <sub>u</sub> is specified for max. cross-section. |
| Short-circuit rating                               |                |         |                                                                                 |
| Fuse                                               |                | A gG/gL | 10                                                                              |

Switching capacity

|                                                                         |                   |                   |                                                                  |
|-------------------------------------------------------------------------|-------------------|-------------------|------------------------------------------------------------------|
| Safe isolation to EN 61140                                              |                   |                   |                                                                  |
| Current heat loss per contact at I <sub>ø</sub>                         |                   | W                 | 0.15                                                             |
| Current heat loss per auxiliary circuit at I <sub>ø</sub> (AC-15/230 V) |                   | CO                | 0.15                                                             |
| Lifespan, mechanical                                                    | Operations        | x 10 <sup>6</sup> | > 1                                                              |
| Maximum operating frequency                                             | Operations/h      |                   | 1200                                                             |
| AC                                                                      |                   |                   |                                                                  |
| AC-23A                                                                  |                   |                   |                                                                  |
| Motor rating AC-23A, 50 - 60 Hz                                         | P                 | kW                |                                                                  |
| 400 V 415 V                                                             | P                 | kW                | 3                                                                |
| Control circuit reliability at 24 V DC, 10 mA                           | Fault probability | H <sub>F</sub>    | < 10 <sup>-5</sup> , < 1 failure in 100,000 switching operations |

Terminal capacities

|                                      |  |                 |                    |
|--------------------------------------|--|-----------------|--------------------|
| Solid or stranded                    |  | mm <sup>2</sup> | 1 x 1,5<br>2 x 1,5 |
| Flexible with ferrules to DIN 46228  |  | mm <sup>2</sup> | 1 x 1.0<br>2 x 1.0 |
| Flexible                             |  | mm <sup>2</sup> | 1 x 1.5<br>2 x 1.5 |
| Terminal screw                       |  |                 | M2.5               |
| Tightening torque for terminal screw |  | Nm              | 0.4                |

Rating data for approved types

|                                          |                |       |       |
|------------------------------------------|----------------|-------|-------|
| Contacts                                 |                |       |       |
| Rated operational voltage                | U <sub>e</sub> | V AC  | 300   |
| Rated uninterrupted current max.         |                |       |       |
| Main conducting paths                    |                |       |       |
| General use                              |                | A     | 10    |
| Auxiliary contacts                       |                |       |       |
| General Use                              | I <sub>U</sub> | A     | 10    |
| Pilot Duty                               |                |       | A 300 |
| Switching capacity                       |                |       |       |
| Maximum motor rating                     |                |       |       |
| Single-phase                             |                |       |       |
| 120 V AC                                 |                | HP    | 0.33  |
| 240 V AC                                 |                | HP    | 0.75  |
| 277 V AC                                 |                | HP    | 0.75  |
| Three-phase                              |                |       |       |
| 120 V AC                                 |                | HP    | 0.75  |
| 240 V AC                                 |                | HP    | 1     |
| Terminal capacity                        |                |       |       |
| Solid or flexible conductor with ferrule |                | AWG   | 14    |
| Terminal screw                           |                |       | M2.5  |
| Tightening torque                        |                | lb-in | 3.5   |

Design verification as per IEC/EN 61439

|                                                          |                  |   |      |
|----------------------------------------------------------|------------------|---|------|
| Technical data for design verification                   |                  |   |      |
| Rated operational current for specified heat dissipation | I <sub>n</sub>   | A | 10   |
| Heat dissipation per pole, current-dependent             | P <sub>vid</sub> | W | 0.15 |

|                                                                                                                        |                   |    |                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------|-------------------|----|----------------------------------------------------------------------------------------------------------------------------------|
| Equipment heat dissipation, current-dependent                                                                          | P <sub>vid</sub>  | W  | 0                                                                                                                                |
| Static heat dissipation, non-current-dependent                                                                         | P <sub>vs</sub>   | W  | 0                                                                                                                                |
| Heat dissipation capacity                                                                                              | P <sub>diss</sub> | W  | 0                                                                                                                                |
| Operating ambient temperature min.                                                                                     |                   | °C | -25                                                                                                                              |
| Operating ambient temperature max.                                                                                     |                   | °C | 50                                                                                                                               |
| IEC/EN 61439 design verification                                                                                       |                   |    |                                                                                                                                  |
| 10.2 Strength of materials and parts                                                                                   |                   |    |                                                                                                                                  |
| 10.2.2 Corrosion resistance                                                                                            |                   |    | Meets the product standard's requirements.                                                                                       |
| 10.2.3.1 Verification of thermal stability of enclosures                                                               |                   |    | Meets the product standard's requirements.                                                                                       |
| 10.2.3.2 Verification of resistance of insulating materials to normal heat                                             |                   |    | Meets the product standard's requirements.                                                                                       |
| 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.                                                                                       |
| 10.2.4 Resistance to ultra-violet (UV) radiation                                                                       |                   |    | UV resistance only in connection with protective shield.                                                                         |
| 10.2.5 Lifting                                                                                                         |                   |    | Does not apply, since the entire switchgear needs to be evaluated.                                                               |
| 10.2.6 Mechanical impact                                                                                               |                   |    | Does not apply, since the entire switchgear needs to be evaluated.                                                               |
| 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.                                                                                           |
| 10.9.3 Impulse withstand voltage                                                                                       |                   |    | Is the panel builder's responsibility.                                                                                           |
| 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.                         |

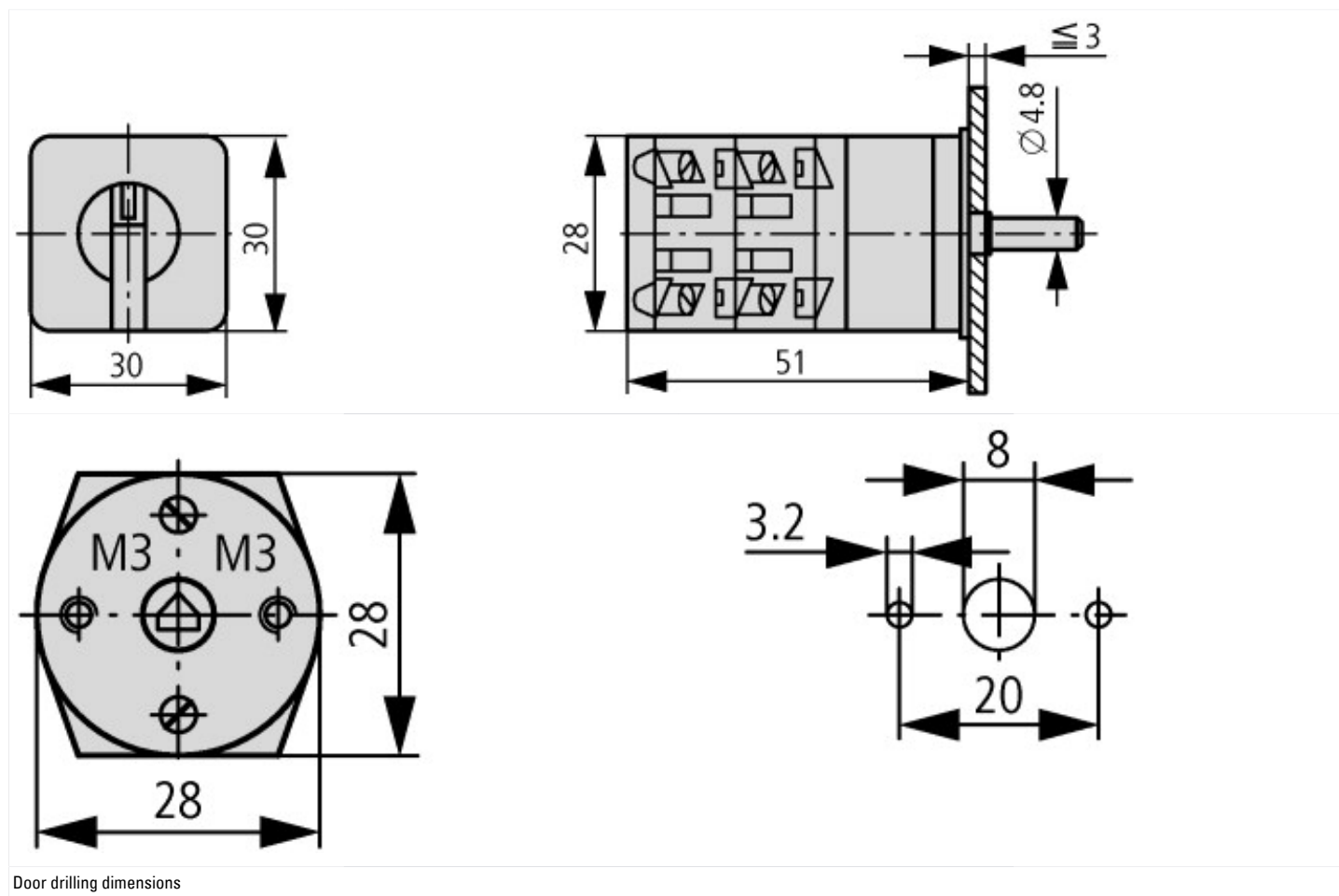
## Technical data ETIM 7.0

|                                                                                                                                                                                                          |  |   |                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---|-----------------|
| Low-voltage industrial components (EG000017) / Control switch (EC002611)                                                                                                                                 |  |   |                 |
| Electric engineering, automation, process control engineering / Low-voltage switch technology / Off-load switch, circuit breaker, control switch / Control switch (ecl@ss10.0.1-27-37-14-14 [ACN998011]) |  |   |                 |
| Type of switch                                                                                                                                                                                           |  |   | Level switch    |
| Number of poles                                                                                                                                                                                          |  |   | 1               |
| Max. rated operation voltage U <sub>e</sub> AC                                                                                                                                                           |  | V | 500             |
| Rated permanent current I <sub>u</sub>                                                                                                                                                                   |  | A | 10              |
| Number of switch positions                                                                                                                                                                               |  |   | 4               |
| With 0 (off) position                                                                                                                                                                                    |  |   | No              |
| With retraction in 0-position                                                                                                                                                                            |  |   | No              |
| Device construction                                                                                                                                                                                      |  |   | Built-in device |
| Width in number of modular spacings                                                                                                                                                                      |  |   | 0               |
| Suitable for ground mounting                                                                                                                                                                             |  |   | No              |
| Suitable for front mounting 4-hole                                                                                                                                                                       |  |   | Yes             |
| Suitable for distribution board installation                                                                                                                                                             |  |   | No              |
| Suitable for intermediate mounting                                                                                                                                                                       |  |   | No              |
| Complete device in housing                                                                                                                                                                               |  |   | No              |
| Type of control element                                                                                                                                                                                  |  |   | Toggle          |
| Front shield size                                                                                                                                                                                        |  |   | 30x30 mm        |
| Degree of protection (IP), front side                                                                                                                                                                    |  |   | IP65            |
| Degree of protection (NEMA), front side                                                                                                                                                                  |  |   | Other           |

## Approvals

|                             |  |                                                                           |
|-----------------------------|--|---------------------------------------------------------------------------|
| Product Standards           |  | UL 508; CSA-C22.2 No. 14-05; CSA-C22.2 No. 94; IEC/EN 60947-3; CE marking |
| UL File No.                 |  | E36332                                                                    |
| UL Category Control No.     |  | NLRV                                                                      |
| CSA File No.                |  | UL report applies to both US and Canada                                   |
| North America Certification |  | UL listed, certified by UL for use in Canada                              |
| Degree of Protection        |  | IEC: IP65; UL/CSA Type: –                                                 |

## Dimensions



Door drilling dimensions

## Additional product information (links)

|                                                               |                                                                                                                                                                                                 |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IL03801026Z step switch</b>                                |                                                                                                                                                                                                 |
| IL03801026Z step switch                                       | <a href="https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL03801026Z2018_04.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL03801026Z2018_04.pdf</a>               |
| Display flip catalog page.                                    | <a href="http://ecat.moeller.net/flip-cat/?edition=K115A&amp;startpage=169">http://ecat.moeller.net/flip-cat/?edition=K115A&amp;startpage=169</a>                                               |
| Technical overview cam switch, switch-disconnector            | <a href="http://de.ecat.moeller.net/flip-cat/?edition=HPLTEv1&amp;startpage=4.2">http://de.ecat.moeller.net/flip-cat/?edition=HPLTEv1&amp;startpage=4.2</a>                                     |
| System overview cam switch T                                  | <a href="http://de.ecat.moeller.net/flip-cat/?edition=HPLTEv1&amp;startpage=4.4">http://de.ecat.moeller.net/flip-cat/?edition=HPLTEv1&amp;startpage=4.4</a>                                     |
| System overview switch-disconnector P                         | <a href="http://de.ecat.moeller.net/flip-cat/?edition=HPLTEv1&amp;startpage=4.6">http://de.ecat.moeller.net/flip-cat/?edition=HPLTEv1&amp;startpage=4.6</a>                                     |
| Key to part numbers Cam switch                                | <a href="http://de.ecat.moeller.net/flip-cat/?edition=HPLTEv1&amp;startpage=4.8">http://de.ecat.moeller.net/flip-cat/?edition=HPLTEv1&amp;startpage=4.8</a>                                     |
| Key to part numbers Switch-disconnector                       | <a href="http://de.ecat.moeller.net/flip-cat/?edition=HPLTEv1&amp;startpage=4.8">http://de.ecat.moeller.net/flip-cat/?edition=HPLTEv1&amp;startpage=4.8</a>                                     |
| Switches for ATEX                                             | <a href="http://www.coopercrouse-hinds.eu/en/products/25-ex-safety-and-main-current-switches.html">http://www.coopercrouse-hinds.eu/en/products/25-ex-safety-and-main-current-switches.html</a> |
| Ordering form for SOND switches and SOND front plates(DE_EN)  | <a href="https://es-assets.eaton.com/DOCUMENTATION/PDF/MZ008006ZU_Orderform_Customized_Switch.pdf">https://es-assets.eaton.com/DOCUMENTATION/PDF/MZ008006ZU_Orderform_Customized_Switch.pdf</a> |
| Ordering form for SOND switches and SOND front plates(DE_EN)] | <a href="https://es-assets.eaton.com/DOCUMENTATION/PDF/MZ008005ZU_Orderform_Customized_Switch.pdf">https://es-assets.eaton.com/DOCUMENTATION/PDF/MZ008005ZU_Orderform_Customized_Switch.pdf</a> |