



I/O module, 24 V DC, for MFD-CP8/CP10, 12DI(4AI), 4DO relays

**Part no.** MFD-R16  
**Catalog No.** 265254

**EL-Nummer (Norway)** 4519704

## Delivery program

|                                |  |  |                         |
|--------------------------------|--|--|-------------------------|
| Supply voltage                 |  |  | 24 V DC                 |
| <b>Inputs</b>                  |  |  |                         |
| Digital                        |  |  | 12                      |
| of which can be used as analog |  |  | 4                       |
| <b>Outputs</b>                 |  |  |                         |
| Relay 10 A (UL)                |  |  | 4                       |
| <b>Temperature range</b>       |  |  |                         |
| Temperature detector           |  |  | -                       |
| For use with                   |  |  | MFD-CP8..<br>MFD-CP10.. |
| Connection type                |  |  | screw terminal          |

## Technical data

### General

|                        |  |    |                                                                      |
|------------------------|--|----|----------------------------------------------------------------------|
| Standards              |  |    | EN 61000-6-1/-2/-3/-4, IEC/EN 61000-4, IEC 60068-2-6, IEC 60068-2-27 |
| Dimensions (W x H x D) |  | mm | 89 x 90 x 44                                                         |
| Weight                 |  | kg | 0.15                                                                 |
| Mounting               |  |    | Fitted into the power supply unit.                                   |

### Terminal capacities

|                       |  |                 |                      |
|-----------------------|--|-----------------|----------------------|
| Solid                 |  | mm <sup>2</sup> | 0.24 (AWG 24 - 12)   |
| Flexible with ferrule |  | mm <sup>2</sup> | 0.22.5 (AWG 24 - 12) |
| Standard screwdriver  |  | mm              | 3.5 x 0.6            |

### Climatic environmental conditions

|                                                       |  |     |                                                                 |
|-------------------------------------------------------|--|-----|-----------------------------------------------------------------|
| Operating ambient temperature                         |  | °C  | -25 to 55, cold as per IEC 60068-2-1, heat as per IEC 60068-2-2 |
| Condensation                                          |  |     | Take appropriate measures to prevent condensation               |
| Storage                                               |  | °C  | - 40 - 70                                                       |
| Relative humidity, non-condensing (IEC/EN 60068-2-30) |  | %   | 5 - 95                                                          |
| Air pressure (operation)                              |  | hPa | 795 - 1080                                                      |

### Ambient conditions, mechanical

|                                                                            |             |         |                        |
|----------------------------------------------------------------------------|-------------|---------|------------------------|
| Pollution degree                                                           |             |         | 2                      |
| Protection type (IEC/EN 60529, EN50178, VBG 4)                             |             |         | IP20                   |
| Vibrations (IEC/EN 60068-2-6)                                              |             | Hz      |                        |
| Constant amplitude 0.15 mm                                                 |             | Hz      | 10 - 57                |
| Constant acceleration 2 g                                                  |             | Hz      | 57 - 150               |
| Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 15 g/11 ms |             | Impacts | 18                     |
| Drop to IEC/EN 60068-2-31                                                  | Drop height | mm      | 50                     |
| Free fall, packaged (IEC/EN 60068-2-32)                                    |             | m       | 1                      |
| Mounting position                                                          |             |         | Vertical or horizontal |

### Electromagnetic compatibility (EMC)

|                                                          |  |     |                                    |
|----------------------------------------------------------|--|-----|------------------------------------|
| Electrostatic discharge (IEC/EN 61000-4-2, Level 3, ESD) |  | kV  |                                    |
| Air discharge                                            |  | kV  | 8                                  |
| Contact discharge                                        |  | kV  | 6                                  |
| Electromagnetic fields (RFI) to IEC EN 61000-4-3         |  | V/m | 10                                 |
| Radio interference suppression                           |  |     | EN 55011 Class B, EN 55022 Class B |
| Burst Impulse (IEC/EN 61000-4-4, Level 3)                |  |     |                                    |
| Supply cable                                             |  | kV  | 2                                  |
| Signal lines                                             |  | kV  | 2                                  |

|                                                               |                |      |                                                                                             |
|---------------------------------------------------------------|----------------|------|---------------------------------------------------------------------------------------------|
| Power pulses (surge) (IEC/EN 61000-4-5)                       |                | kV   | 2 (supply cables, symmetrical)                                                              |
| power pulses (surge) (IEC/EN 61000-4-5, level 2)              |                | kV   | 0.5 (symmetrical power lines)                                                               |
| Immunity to line-conducted interference to (IEC/EN 61000-4-6) |                | V    | 10                                                                                          |
| <b>Insulation resistance</b>                                  |                |      |                                                                                             |
| Clearance in air and creepage distances                       |                |      | EN 50178, UL 508, CSA C22.2, No. 142                                                        |
| Insulation resistance                                         |                |      | EN 50178                                                                                    |
| <b>Power supply</b>                                           |                |      |                                                                                             |
| Heat dissipation                                              |                | W    | 2                                                                                           |
| <b>Digital inputs 24 V DC</b>                                 |                |      |                                                                                             |
| Number                                                        |                |      | 12                                                                                          |
| Inputs can be used as analog inputs                           |                |      | 4 (I7, I8, I11, I12)                                                                        |
| Potential isolation                                           |                |      |                                                                                             |
| From power supply                                             |                |      | No                                                                                          |
| Between digital inputs                                        |                |      | No                                                                                          |
| From the outputs                                              |                |      | Yes                                                                                         |
| to PC interface, memory card, easyNet, easyLink               |                |      | Yes                                                                                         |
| Rated operational voltage                                     | U <sub>e</sub> | V DC | 24                                                                                          |
| On 0 signal                                                   | U <sub>e</sub> | V DC | < 5.0 (I1 - I6, I9 - I10) < 8 (I7, I8, I11, I12)                                            |
| On 1 signal                                                   | U <sub>e</sub> | V DC | < 5.0 (I1 - I6, I9 - I10) < 8 (I7, I8, I11, I12)                                            |
| Input current on 1 signal                                     |                |      |                                                                                             |
| I1 to I6                                                      |                | mA   | 3.3 (at 24 V DC)                                                                            |
| I7, I8                                                        |                | mA   | 2.2 (at 24 V DC)                                                                            |
| I9, I10                                                       |                | mA   | 3.3 (at 24 V DC)                                                                            |
| I11, I12                                                      |                | mA   | 2.2 (at 24 V DC)                                                                            |
| Delay time from 0 to 1                                        |                | ms   |                                                                                             |
| Debounce ON                                                   |                | ms   | 20                                                                                          |
| Debounce OFF                                                  |                | ms   | Normally 0.025 (I1 - I4), normally 0.25 (I5, I6, I9, I10), normally 0.15 (I7, I8, I11, I12) |
| Delay time from 1 to 0                                        |                | ms   |                                                                                             |
| Debounce ON                                                   |                | ms   | 20                                                                                          |
| Debounce OFF                                                  |                | ms   | Normally 0.025 (I1 - I4), normally 0.25 (I5, I6, I9, I10), normally 0.15 (I7, I8, I11, I12) |
| Cable length (unscreened)                                     |                | m    | 100                                                                                         |
| Frequency counter                                             |                |      |                                                                                             |
| Quantity                                                      |                |      | 4 (I1, I2, I3, I4)                                                                          |
| Counter frequency                                             |                | kHz  | < 3                                                                                         |
| Pulse shape                                                   |                |      | Square                                                                                      |
| Pulse pause ratio                                             |                |      | 01:01                                                                                       |
| Incremental counter                                           |                |      |                                                                                             |
| Quantity                                                      |                |      | 2 (I1 + I2, I3 + I4)                                                                        |
| Counter frequency                                             |                | kHz  | ≤ 3                                                                                         |
| Pulse shape                                                   |                |      | Square                                                                                      |
| Signal offset                                                 |                |      | 90°                                                                                         |
| Pulse pause ratio                                             |                |      | 01:01                                                                                       |
| Rapid counter inputs                                          |                |      |                                                                                             |
| Number                                                        |                |      | 4 (I1, I2, I3, I4)                                                                          |
| Counter frequency                                             |                | kHz  | < 3                                                                                         |
| Pulse shape                                                   |                |      | Square                                                                                      |
| Pulse pause ratio                                             |                |      | 01:01                                                                                       |
| Cable length, screened                                        |                | m    | < 20                                                                                        |
| <b>Analog inputs</b>                                          |                |      |                                                                                             |
| Number                                                        |                |      | 1                                                                                           |
| Potential isolation                                           |                |      |                                                                                             |
| From power supply                                             |                |      | No                                                                                          |
| From the digital inputs                                       |                |      | No                                                                                          |
| From the outputs                                              |                |      | Yes                                                                                         |
| From the PC interface, memory card NET network, EASY-Link     |                |      | Yes                                                                                         |
| Input type                                                    |                |      | DC voltage                                                                                  |

|                                 |      |                     |
|---------------------------------|------|---------------------|
| Signal range                    | V DC | 0 - 10              |
| Resolution, analog              | V    | 0.01                |
| Resolution, digital             | V    | 0.01                |
| Resolution                      | Bit  | 10 (value 0 - 1023) |
| Input impedance                 | kΩ   | 11.2                |
| Accuracy of actual value        |      |                     |
| two MFD devices                 | %    | ± 3                 |
| Within a single device          | %    | ± 2                 |
| Conversion time, analog/digital | ms   | Every CPU cycle     |
| Input current                   | mA   | < 1                 |
| Cable length screened           | m    | < 30                |

#### Analog inputs temperature resistance Pt100 or Ni1000 sensors

|                         |  |  |     |
|-------------------------|--|--|-----|
| Potential isolation     |  |  |     |
| From power supply       |  |  | No  |
| From the digital inputs |  |  | No  |
| From the outputs        |  |  | Yes |

#### Relay outputs

|                                                                           |                |                   |                                                  |
|---------------------------------------------------------------------------|----------------|-------------------|--------------------------------------------------|
| Number                                                                    |                |                   | 4                                                |
| Parallel switching of outputs for increased output                        |                |                   | Not permissible                                  |
| Protection of an output relay                                             |                |                   | Miniature circuit-breaker B16 or fuse 8 A (slow) |
| Potential isolation                                                       |                |                   |                                                  |
| From power supply                                                         |                |                   | Yes                                              |
| From the inputs                                                           |                |                   | Yes                                              |
| From the PC interface, memory card NET network, EASY-Link                 |                |                   | Yes                                              |
| Safe isolation according to EN 50178                                      |                | V AC              | 300                                              |
| Basic insulation                                                          |                | V AC              | 600                                              |
| Lifespan, mechanical                                                      | Operations     | x 10 <sup>6</sup> | 10                                               |
| Contacts                                                                  |                |                   |                                                  |
| Conventional thermal current (10 A UL)                                    |                | A                 | 8                                                |
| Recommended for load: 12 V AC/DC                                          |                | mA                | > 500                                            |
| Short-circuit-proof cos φ = 1, characteristic B16 at 600 A                |                | A                 | 16                                               |
| Short-circuit-proof cos φ = 0.5 to 0.7, characteristic B16 at 900 A       |                | A                 | 16                                               |
| Rated impulse withstand voltage U <sub>imp</sub> of contact coil          |                | kV                | 6                                                |
| Rated operational voltage                                                 | U <sub>e</sub> | V AC              | 250                                              |
| Rated insulation voltage                                                  | U <sub>i</sub> | V AC              | 250                                              |
| Safe isolation to EN 50178 between coil and contact                       |                | V AC              | 300                                              |
| Safe isolation to EN 50178 between 2 contacts                             |                | V AC              | 300                                              |
| Making capacity                                                           |                |                   |                                                  |
| AC-15, 230 V AC, 3 A                                                      | Operations     |                   | 300000                                           |
| DC-13, 24 V DC, 5 A, 0.1 Hz                                               | Operations     |                   | 200000                                           |
| Breaking capacity                                                         |                |                   |                                                  |
| AC-15, 250 V AC, 3 A (600 Ops./h)                                         | Operations     |                   | 300000                                           |
| DC-13, L/R ≤ 150 ms, 24 V DC, 1 A (500 S/h)                               | Operations     |                   | 200000                                           |
| Filament bulb load                                                        |                |                   |                                                  |
| 1000 W at 230/240 V AC                                                    | Operations     |                   | 25000                                            |
| 500 W at 115/120 V AC                                                     | Operations     |                   | 25000                                            |
| Fluorescent lamp load                                                     |                |                   |                                                  |
| Fluorescent lamp load 10 x 58 W at 230/240 V AC                           |                |                   |                                                  |
| With upstream electrical device                                           | Operations     |                   | 25000                                            |
| Uncompensated                                                             | Operations     |                   | 25000                                            |
| Fluorescent lamp load 1 x 58 W at 230/240 V AC, conventional, compensated | Operations     |                   | 25000                                            |
| Switching frequency                                                       |                |                   |                                                  |
| Mechanical operations                                                     |                | x 10 <sup>6</sup> | 10                                               |
| Switching frequency                                                       |                | Hz                | 10                                               |
| Resistive load/lamp load                                                  |                | Hz                | 2                                                |

|                                                             |  |      |                        |
|-------------------------------------------------------------|--|------|------------------------|
| Inductive load                                              |  | Hz   | 0.5                    |
| UL/CSA                                                      |  |      |                        |
| Uninterrupted current at 240 V AC                           |  | A    | 10                     |
| Uninterrupted current at 24 V DC                            |  | A    | 8                      |
| AC                                                          |  |      |                        |
| Control Circuit Rating Codes (utilization category)         |  |      | B 300 Light Pilot Duty |
| Max. rated operational voltage                              |  | V AC | 300                    |
| max. thermal continuous current $\cos \varphi = 1$ at B 300 |  | A    | 5                      |
| max. make/break $\cos \varphi \neq$ capacity 1 at B 300     |  | VA   | 3600/360               |
| DC                                                          |  |      |                        |
| Control Circuit Rating Codes (utilization category)         |  |      | R 300 Light Pilot Duty |
| Max. rated operational voltage                              |  | V DC | 300                    |
| Max. thermal uninterrupted current at R 300                 |  | A    | 1                      |
| Max. make/break capacity at R 300                           |  | VA   | 28/28                  |

## Design verification as per IEC/EN 61439

|                                                                                                                        |            |    |                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------|------------|----|----------------------------------------------------------------------------------------------------------------------------------|
| Technical data for design verification                                                                                 |            |    |                                                                                                                                  |
| Rated operational current for specified heat dissipation                                                               | $I_n$      | A  | 0                                                                                                                                |
| Heat dissipation per pole, current-dependent                                                                           | $P_{vid}$  | W  | 0                                                                                                                                |
| Equipment heat dissipation, current-dependent                                                                          | $P_{vid}$  | W  | 0                                                                                                                                |
| Static heat dissipation, non-current-dependent                                                                         | $P_{vs}$   | W  | 2                                                                                                                                |
| Heat dissipation capacity                                                                                              | $P_{diss}$ | W  | 0                                                                                                                                |
| Operating ambient temperature min.                                                                                     |            | °C | -25                                                                                                                              |
| Operating ambient temperature max.                                                                                     |            | °C | 55                                                                                                                               |
| 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                                                                       |            |    | Meets the product standard's requirements.                                                                                       |
| 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                                                                                |            |    | Meets the product standard's requirements.                                                                                       |
| 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.                                                                                           |
| 10.12 Electromagnetic compatibility                                                                                    |            |    | Is the panel builder's responsibility.                                                                                           |
| 10.13 Mechanical function                                                                                              |            |    | The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.                         |

## Technical data ETIM 7.0

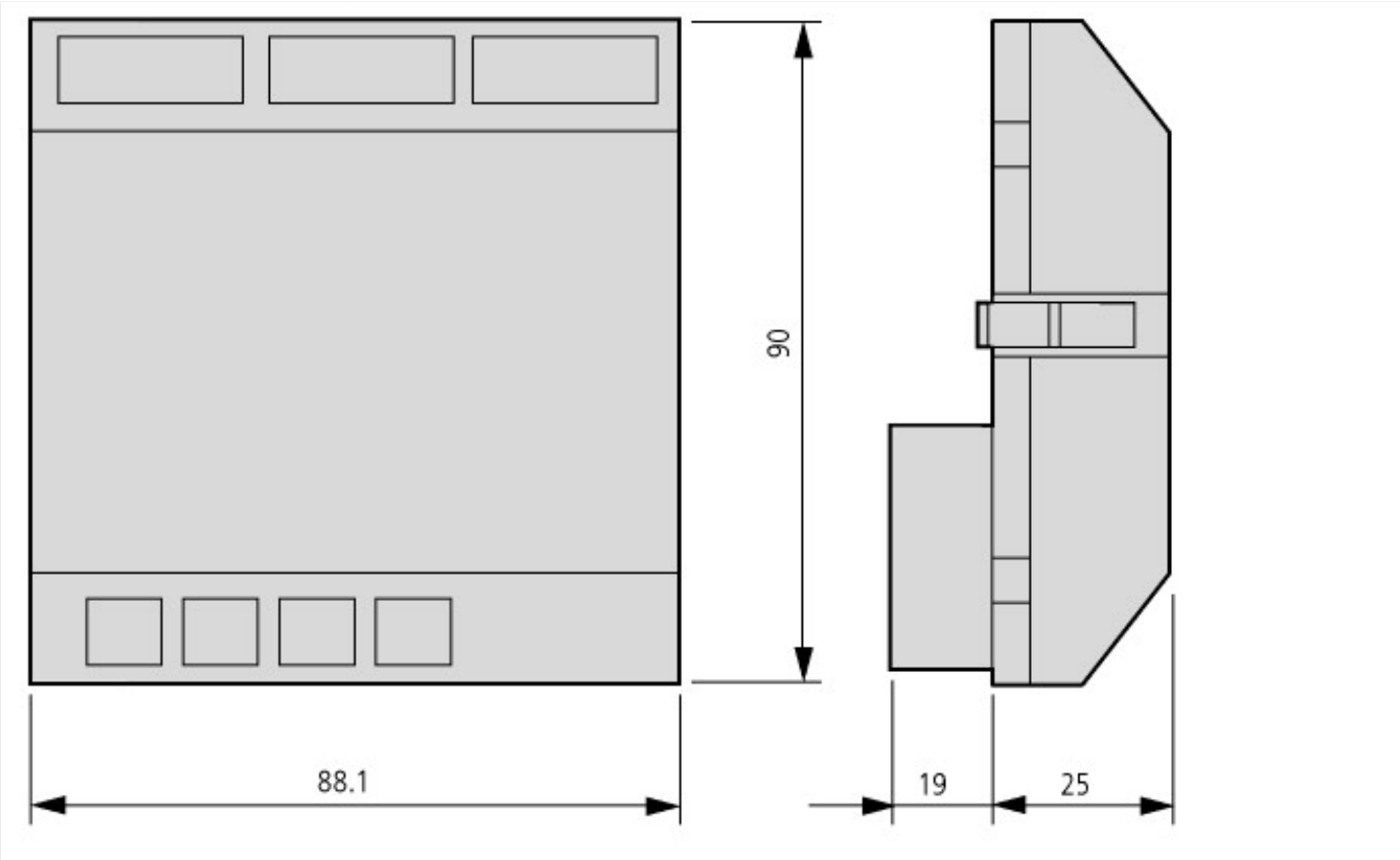
|                                                                                                                                                                                     |   |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------|
| PLC's (EG000024) / PLC digital I/O-module (EC001419)                                                                                                                                |   |       |
| Electric engineering, automation, process control engineering / Control / Programmable logic control (SPS) / SPS digital input/output module (ecl@ss10.0.1-27-24-22-04 [AKE527014]) |   |       |
| Supply voltage AC 50 Hz                                                                                                                                                             | V | 0 - 0 |

|                                             |    |                         |
|---------------------------------------------|----|-------------------------|
| Supply voltage AC 60 Hz                     | V  | 0 - 0                   |
| Supply voltage DC                           | V  | 20.4 - 28.8             |
| Voltage type of supply voltage              |    | DC                      |
| Number of digital inputs                    |    | 12                      |
| Number of digital outputs                   |    | 4                       |
| Digital inputs configurable                 |    | No                      |
| Digital outputs configurable                |    | No                      |
| Input current at signal 1                   | mA | 3.3                     |
| Permitted voltage at input                  | V  | 20.4 - 28.8             |
| Type of voltage (input voltage)             |    | DC                      |
| Type of digital output                      |    | Relay                   |
| Output current                              | A  | 8                       |
| Permitted voltage at output                 | V  | 20.4 - 28.8             |
| Type of output voltage                      |    | AC/DC                   |
| Short-circuit protection, outputs available |    | No                      |
| Redundancy                                  |    | No                      |
| Type of electric connection                 |    | Spring clamp connection |
| Time delay at signal exchange               | ms | 0.1 - 20                |
| Suitable for safety functions               |    | No                      |
| Category according to EN 954-1              |    |                         |
| SIL according to IEC 61508                  |    | None                    |
| Performance level acc. EN ISO 13849-1       |    | None                    |
| Appendant operation agent (Ex ia)           |    | No                      |
| Appendant operation agent (Ex ib)           |    | No                      |
| Explosion safety category for gas           |    | None                    |
| Explosion safety category for dust          |    | None                    |
| Width                                       | mm | 90                      |
| Height                                      | mm | 44                      |
| Depth                                       | mm | 89                      |

## Approvals

|                             |  |                                                                                                 |
|-----------------------------|--|-------------------------------------------------------------------------------------------------|
| Product Standards           |  | IEC/EN see Technical Data; UL 508; CSA C22.2 No. 142-M1987; CSA C22.2 No. 213-M1987; CE marking |
| UL File No.                 |  | E135462                                                                                         |
| UL Category Control No.     |  | NRAQ                                                                                            |
| CSA File No.                |  | 012528                                                                                          |
| CSA Class No.               |  | 2252-01 + 2258-02                                                                               |
| North America Certification |  | UL listed, CSA certified                                                                        |
| Degree of Protection        |  | IEC: IP20, UL/CSA Type: -                                                                       |

Dimensions



Additional product information (links)

|                                                                                                     |                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instruction leaflet "Multi-function display, easy control relays" IL05013014Z (AWA2528-2019)</b> |                                                                                                                                                                                   |
| Instruction leaflet "Multi-function display, easy control relays" IL05013014Z (AWA2528-2019)        | <a href="https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL05013014Z2018_02.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL05013014Z2018_02.pdf</a> |
| <b>Manual "MFD-Titan multi-function display" MN05002001Z (AWB2528-1480)</b>                         |                                                                                                                                                                                   |
| Handbuch „Multifunktions-Display MFD-Titan“ MN05002001Z (AWB2528-1480) - Deutsch                    | <a href="https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN05002001Z_DE.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN05002001Z_DE.pdf</a>                   |
| Manual "MFD-Titan multi-function display" MN05002001Z (AWB2528-1480) - English                      | <a href="https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN05002001Z_EN.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN05002001Z_EN.pdf</a>                   |
| f1=1454&f2=1179;Labeleditor                                                                         | <a href="http://applications.eaton.eu/sdlc?LX=11&amp;f1=1454&amp;f2=1179;Labeleditor">http://applications.eaton.eu/sdlc?LX=11&amp;f1=1454&amp;f2=1179;Labeleditor</a>             |