


Overload relay, ZB12, I<sub>r</sub>= 12 - 16 A, 1 N/O, 1 N/C, Direct mounting, IP20

**Part no.** ZB12-16  
**Catalog No.** 290168  
**Alternate Catalog No.** XTOB016BC1  
**EL-Nummer (Norway)** 4110005

Similar to illustration

## Delivery program

|  |                |   |  |
|--|----------------|---|--|
| Product range  |                |   | Overload relay ZB up to 150 A  |
| Product range  |                |   | Accessories  |
| Accessories  |                |   | Overload relays  |
| Frame size   |                |   | ZB12   |
| Phase-failure sensitivity  |                |   | IEC/EN 60947, VDE 0660 Part 102  |
| Description  |                |   | Test/off button<br>Reset pushbutton manual/auto<br>Trip-free release                               |
| Mounting type  |                |   | Direct mounting  |
|  | I <sub>r</sub> | A | 12 - 16  |
| Contact sequence   |                |   |  |
| <b>Auxiliary contacts</b>  |                |   |  |
| N/O = Normally open  |                |   | 1 N/O  |
| N/C = Normally closed  |                |   | 1 N/C  |
| For use with   |                |   | DILM7, DILM9, DILM12, DILM15,<br>DIULM7, DIULM9, DIULM12,<br>SDAINLM12,<br>SDAINLM16,<br>SDAINLM22 |
| <b>Short-circuit protection</b>  |                |   |  |
| Type "1" coordination  | gG/gL          | A | 50   |
| Type "2" coordination  | gG/gL          | A | 25   |

## Notes

Overload release: tripping class 10 A

short-circuit protective device: Observe the maximum permissible fuse of the contactor with direct device mounting.

Suitable for protection of Ex e-motors.

II(2)G [Ex d] [Ex e] [Ex px], II(2)D [Ex p] [Ex t]

PTB 10 ATEX 3010

Observe manual MN03407005Z-DE/EN.

## Notes

Fitted directly to the contactor

1 Contactor

## Technical data

|                     |  |    |  |
|---------------------|--|----|--|
| Standards           |  |    | IEC/EN 60947, VDE 0660, UL, CSA  |
| Climatic proofing   |  |    | Damp heat, constant, to IEC 60068-2-78<br>Damp heat, cyclic, to IEC 60068-2-30 |
| Ambient temperature |  |    | Operating range to IEC/EN 60947<br>PTB: -5 °C - +55 °C                         |
| Open                |  | °C | -25 - +55  |

|   |    |  |
|---|----|--|
| Enclosed  | °C | - 25 - 40                                |
| Temperature compensation  |    | Continuous                               |
| Weight  | kg | 0.145                                    |
| Mechanical shock resistance   | g  | 10<br>Sinusoidal<br>Shock duration 10 ms |
| Degree of Protection  |    | IP20                                     |
| Protection against direct contact when actuated from front (EN 50274) |    | Finger and back-of-hand proof            |
| Altitude  | m  | Max. 2000                                |

### Main conducting paths

|  |                  |                 |                            |
|--|------------------|-----------------|----------------------------|
| Rated impulse withstand voltage                | U <sub>imp</sub> | V AC            | 6000                       |
| Overvoltage category/pollution degree          |                  |                 | III/3                      |
| Rated insulation voltage                       | U <sub>i</sub>   | V               | 690                        |
| Rated operational voltage                      | U <sub>e</sub>   | V AC            | 690                        |
| Safe isolation to EN 61140                     |                  |                 |                            |
| Between auxiliary contacts and main contacts   |                  | V AC            | 440                        |
| Between main circuits                          |                  | V AC            | 440                        |
| Temperatur compensation residual error > 40 °C |                  |                 | ≤ 0.25 %/K                 |
| Current heat loss (3 conductors)               |                  |                 |                            |
| Lower value of the setting range               |                  | W               | 3                          |
| Maximum setting                                |                  | W               | 5.4                        |
| Terminal capacities                            |                  | mm <sup>2</sup> |                            |
| Solid  |                  | mm <sup>2</sup> | 1 x (1 - 6)<br>2 x (1 - 6) |
| Flexible with ferrule                          |                  | mm <sup>2</sup> | 1 x (1 - 4)<br>2 x (1 - 4) |
| Solid or stranded                              |                  | AWG             | 18 - 8                     |
| Terminal screw                                 |                  |                 | M4                         |
| Tightening torque                              |                  | Nm              | 1.8                        |
| Stripping length                               |                  | mm              | 10                         |
| Tools  |                  |                 |                            |
| Pozidriv screwdriver                           |                  | Size            | 2                          |
| Standard screwdriver                           |                  | mm              | 1 x 6                      |

### Auxiliary and control circuits

|                                       |                  |                 |                                      |
|---------------------------------------|------------------|-----------------|--------------------------------------|
| Rated impulse withstand voltage       | U <sub>imp</sub> | V               | 4000                                 |
| Overvoltage category/pollution degree |                  |                 | III/3                                |
| Terminal capacities                   |                  | mm <sup>2</sup> |                                      |
| Solid                                 |                  | mm <sup>2</sup> | 1 x (0.75 - 4)<br>2 x (0.75 - 4)     |
| Flexible with ferrule                 |                  | mm <sup>2</sup> | 1 x (0.75 - 2.5)<br>2 x (0.75 - 2.5) |
| Solid or stranded                     |                  | AWG             | 2 x (18 - 14)                        |
| Terminal screw                        |                  |                 | M3.5                                 |
| Tightening torque                     |                  | Nm              | 1.2                                  |
| Stripping length                      |                  | mm              | 8                                    |
| Tools                                 |                  |                 |                                      |
| Pozidriv screwdriver                  |                  | Size            | 2                                    |
| Standard screwdriver                  |                  | mm              | 1 x 6                                |
| Rated insulation voltage              | U <sub>i</sub>   | V AC            | 500                                  |
| Rated operational voltage             | U <sub>e</sub>   | V AC            | 500                                  |
| Safe isolation to EN 61140            |                  |                 |                                      |
| between the auxiliary contacts        |                  | V AC            | 240                                  |
| Conventional thermal current          | I <sub>th</sub>  | A               | 6                                    |
| Rated operational current             | I <sub>e</sub>   | A               |                                      |
| AC-15                                 |                  |                 |                                      |
| Make contact                          |                  |                 |                                      |
| 120 V                                 | I <sub>e</sub>   | A               | 1.5                                  |

|                                      |                |         |   |
|--------------------------------------|----------------|---------|---|
| 220 V 230 V 240 V                    | I <sub>e</sub> | A       | 1.5   |
| 380 V 400 V 415 V                    | I <sub>e</sub> | A       | 0.5   |
| 500 V                                | I <sub>e</sub> | A       | 0.5   |
| Break contact                        |                |         |   |
| 120 V                                | I <sub>e</sub> | A       | 1.5   |
| 220 V 230 V 240 V                    | I <sub>e</sub> | A       | 1.5   |
| 380 V 400 V 415 V                    | I <sub>e</sub> | A       | 0.9   |
| 500 V                                | I <sub>e</sub> | A       | 0.8   |
| DC L/R ≤ 15 ms                       |                |         |   |
|                                      |                |         | Switch-on and switch-off conditions based on DC-13, time constant as specified. |
| 24 V                                 | I <sub>e</sub> | A       | 0.9   |
| 60 V                                 | I <sub>e</sub> | A       | 0.75  |
| 110 V                                | I <sub>e</sub> | A       | 0.4   |
| 220 V                                | I <sub>e</sub> | A       | 0.2   |
| Short-circuit rating without welding |                |         |   |
| max. fuse                            |                | A gG/gL | 6   |

## Notes

**Notes** Ambient air temperature: Operating range to IEC/EN 60947, PTB: -5°C to +55°C  
Main circuits terminal capacity solid and flexible conductors with ferrules: When using 2 conductors use equal cross-sections.

## Rating data for approved types

|                              |  |      |  |
|------------------------------|--|------|--|
| Auxiliary contacts           |  |      |  |
| Pilot Duty                   |  |      |  |
| AC operated                  |  |      | B300 at opposite polarity<br>B600 at same polarity |
| DC operated                  |  |      | R300   |
| Short Circuit Current Rating |  | SCCR |  |
| 600 V High Fault             |  |      |  |
| SCCR (fuse)                  |  | kA   | 100  |
| max. Fuse                    |  | A    | 30 Class J/CC                                      |

## Design verification as per IEC/EN 61439

|  |                   |    |  |
|--|-------------------|----|--|
| Technical data for design verification   |                   |    |  |
| Rated operational current for specified heat dissipation   | I <sub>n</sub>    | A  | 16   |
| Heat dissipation per pole, current-dependent   | P <sub>vid</sub>  | W  | 1.8  |
| Equipment heat dissipation, current-dependent  | P <sub>vid</sub>  | W  | 5.4  |
| 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 | 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  |                   |    | 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 8.0

|  |  |   |                   |
|--|--|---|-------------------|
| Low-voltage industrial components (EG000017) / Thermal overload relay (EC000106)   |  |   |                   |
| Electric engineering, automation, process control engineering / Low-voltage switch technology / Overload protection device / Thermal overload relay (ecl@ss10.0.1-27-37-15-01 [AKF075014]) |  |   |                   |
| Adjustable current range   |  | A | 12 - 16           |
| Max. rated operation voltage Ue  |  | V | 690               |
| Mounting method  |  |   | Direct attachment |
| Type of electrical connection of main circuit  |  |   | Screw connection  |
| Number of auxiliary contacts as normally closed contact  |  |   | 1                 |
| Number of auxiliary contacts as normally open contact  |  |   | 1                 |
| Number of auxiliary contacts as change-over contact  |  |   | 0                 |
| Release class  |  |   | CLASS 10 A        |
| Reset function input   |  |   | No                |
| Reset function automatic   |  |   | Yes               |
| Reset function push-button   |  |   | Yes               |

Approvals

|                                      |  |  |  |
|--------------------------------------|--|--|--|
| Product Standards                    |  |  | IEC/EN 60947-4-1; UL 60947-4-1; CSA - C22.2 No. 60947-4-1-14; CE marking |
| UL File No.                          |  |  | E29184   |
| UL Category Control No.              |  |  | NKCR   |
| CSA File No.                         |  |  | 12528  |
| CSA Class No.                        |  |  | 3211-03  |
| North America Certification          |  |  | UL listed, CSA certified   |
| Specially designed for North America |  |  | No   |
| Suitable for                         |  |  | Branch circuits  |
| Max. Voltage Rating                  |  |  | 600 V AC   |
| Degree of Protection                 |  |  | IEC: IP20, UL/CSA Type: -  |

Characteristics

|   |  |  |  |
|---|--|--|--|
| These tripping characteristics are mean values of the spreads at 20 °C ambient air temperature in a cold state.<br>Tripping time depends on response current.<br>When the devices are at operational temperature the tripping time of the overload relay falls to approx. 25 % of the read off value.<br>1: Minimum level, 3-phase<br>2: Maximum level, 3-phase<br>3: Minimum marker, 2-phase<br>4: Highest marker, 2-phase |  |  |  |
|---|--|--|--|

Dimensions

|                     |  |  |  |
|---------------------|--|--|--|
| ① OFF<br>② Reset/ON |  |  |  |
|---------------------|--|--|--|

Additional product information (links)

|   |  |  |   |
|---|--|--|---|
| IL03407015Z (AWA2300-2114) Overload relay |  |  |   |
| IL03407015Z (AWA2300-2114) Overload relay |  |  | <a href="https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407015Z2021_11.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407015Z2021_11.pdf</a> |
| IL03407195Z Sealable shroud               |  |  |   |
| IL03407195Z Sealable shroud               |  |  | <a href="https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407195Z2021_10.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407195Z2021_10.pdf</a> |

|  |   |
|--|---|
| <b>MN03407004Z (AWB2300-1527D/GB) ZB12/XTOB...BC1 and ZB32/XTOB...CC1 overload relays, overload monitoring of Ex e motors</b>              |   |
| MN03407004Z (AWB2300-1527D/GB) ZB12/XTOB...BC1 and ZB32/XTOB...CC1 overload relays, overload monitoring of Ex e motors - Deutsch / English | <a href="https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN03407004Z_DE_EN.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN03407004Z_DE_EN.pdf</a> |