



**Contactor, 3 pole, 380 V 400 V 4 kW, 1 N/O, 220 V DC, DC operation, Spring-loaded terminals**



**Part no. DILMC9-10(220VDC)**  
**Catalog No. 277472**  
**Alternate Catalog No. XTCEC009B10BD**

Similar to illustration

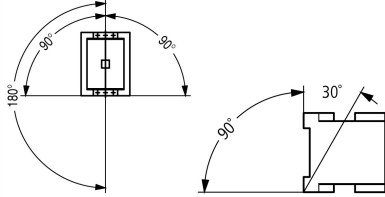
## Delivery program

|   |                |    |  |  |
|---|----------------|----|--|--|
| Product range   |                |    |  | Contactors   |
| Application   |                |    |  | Contactors for Motors  |
| Subrange  |                |    |  | Contactors up to 170 A, 3 pole   |
| Utilization category                                      |                |    |  | AC-1: Non-inductive or slightly inductive loads, resistance furnaces<br>NAC-3: Normal AC induction motors: starting, switch off during running<br>AC-4: Normal AC induction motors: starting, plugging, reversing, inching |
|   |                |    |  |  |
| Notes   |                |    |  | Also suitable for motors with efficiency class IE3.<br>IE3-ready devices are identified by the logo on their packaging.  |
| Connection technique                                      |                |    |  | Spring-loaded terminals  |
| Number of poles   |                |    |  | 3 pole   |
| <b>Rated operational current</b>                          |                |    |  |  |
| AC-3  |                |    |  |  |
| Notes   |                |    |  | At maximum permissible ambient temperature (open.)   |
| 380 V 400 V   | $I_e$          | A  |  | 9  |
| AC-1  |                |    |  |  |
| Conventional free air thermal current, 3 pole, 50 - 60 Hz |                |    |  |  |
| Open  |                |    |  |  |
| at 40 °C  | $I_{th} = I_e$ | A  |  | 22   |
| enclosed  | $I_{th}$       | A  |  | 18   |
| Conventional free air thermal current, 1 pole             |                |    |  |  |
| open  | $I_{th}$       | A  |  | 50   |
| enclosed  | $I_{th}$       | A  |  | 45   |
| <b>Max. rating for three-phase motors, 50 - 60 Hz</b>     |                |    |  |  |
| AC-3  |                |    |  |  |
| 220 V 230 V   | P              | kW |  | 2.5  |
| 380 V 400 V   | P              | kW |  | 4  |
| 660 V 690 V   | P              | kW |  | 4.5  |
| AC-4  |                |    |  |  |
| 220 V 230 V   | P              | kW |  | 1.5  |
| 380 V 400 V   | P              | kW |  | 2.5  |
| 660 V 690 V   | P              | kW |  | 3.6  |
| <b>Contacts</b>   |                |    |  |  |
| N/O = Normally open                                       |                |    |  | 1 N/O  |
| Contact sequence  |                |    |  |  |
| <b>Instructions</b>                                       |                |    |  |  |
|   |                |    |  | Contacts to EN 50 012.<br>Auxiliary current, coil, and main current terminals with spring-cage connection technology.<br>Integrated varistor suppressor circuit.   |
| Can be combined with auxiliary contact                    |                |    |  | DILM32-XHIC..<br>DILA-XHIC(V)..  |
| Actuating voltage   |                |    |  | 220 V DC   |

|                            |  |              |
|----------------------------|--|--------------|
| Voltage AC/DC              |  | DC operation |
| Connection to SmartWire-DT |  | no           |

## Technical data

### General

|   |              |                 |  |
|---|--------------|-----------------|--|
| Standards   |              |                 | IEC/EN 60947, VDE 0660, UL, CSA  |
| Lifespan, mechanical  |              |                 |  |
| DC operated   | Operations   | $\times 10^6$   | 10   |
| Operating frequency, mechanical                                       |              |                 |  |
| DC operated   | Operations/h |                 | 9000   |
| Climatic proofing   |              |                 | Damp heat, constant, to IEC 60068-2-78<br>Damp heat, cyclic, to IEC 60068-2-30     |
| Ambient temperature   |              |                 |  |
| Open  |              | °C              | -25 - +60  |
| Enclosed  |              | °C              | -25 - 40   |
| Storage   |              | °C              | -40 - 80   |
| Mounting position   |              |                 |  |
| Mechanical shock resistance (IEC/EN 60068-2-27)                       |              |                 |  |
| Half-sinusoidal shock, 10 ms  |              |                 |  |
| Main contacts   |              |                 |  |
| N/O contact   |              | g               | 10   |
| Auxiliary contacts  |              |                 |  |
| N/O contact   |              | g               | 7  |
| N/C contact   |              | g               | 5  |
| Mechanical shock resistance (IEC/EN 60068-2-27) when tabletop-mounted |              |                 |  |
| Half-sinusoidal shock, 10 ms  |              |                 |  |
| Main contacts   |              |                 |  |
| N/O contact   |              | g               | 5.7  |
| Auxiliary contacts  |              |                 |  |
| N/O contact   |              | g               | 3.4  |
| N/C contact   |              | g               | 3.4  |
| Degree of Protection  |              |                 | IP20   |
| Protection against direct contact when actuated from front (EN 50274) |              |                 | Finger and back-of-hand proof  |
| Altitude  |              | m               | Max. 2000  |
| Weight  |              |                 |  |
| DC operated   |              | kg              | 0.29   |
| Spring-loaded terminal connection                                     |              |                 |  |
| Terminal capacity main cable  |              |                 |  |
| Solid   |              | mm <sup>2</sup> | 1 x (0.75 - 2.5)<br>2 x (0.75 - 2.5)   |
| flexible  |              | mm <sup>2</sup> | 1 x (0.75 - 2.5)<br>2 x (0.75 - 2.5)   |
| flexible with ferrules  |              | mm <sup>2</sup> | 1 x (0.75 - 1.5)<br>2 x (0.75 - 1.5)   |
| Solid or stranded   |              | AWG             | 18 - 14  |
| Stripping length  |              | mm              | 10   |
| Terminal capacity control circuit cables                              |              |                 |  |
| Solid   |              | mm <sup>2</sup> | 1 x (0.75 - 2.5)<br>2 x (0.75 - 2.5)   |
| Flexible  |              | mm <sup>2</sup> | 1 x (0.75 - 2.5)<br>2 x (0.75 - 2.5)   |
| Flexible with ferrule   |              | mm <sup>2</sup> | 1 x (0.75 - 1.5)<br>2 x (0.75 - 1.5)   |

|                         |     |         |
|-------------------------|-----|---------|
| Solid or stranded       | AWG | 18 - 14 |
| Stripping length        | mm  | 10      |
| Tool                    |     |         |
| Screwdriver blade width | mm  | 3.5     |

### Main conducting paths

|  |             |      |       |
|--|-------------|------|-------|
| Rated impulse withstand voltage        | $U_{imp}$   | V AC | 8000  |
| Overvoltage category/pollution degree  |             |      | III/3 |
| Rated insulation voltage               | $U_i$       | V AC | 690   |
| Rated operational voltage              | $U_e$       | V AC | 690   |
| Safe isolation to EN 61140             |             |      |       |
| between coil and contacts              |             | V AC | 400   |
| between the contacts                   |             | V AC | 400   |
| Making capacity (p.f. to IEC/EN 60947) |             |      |       |
|  | Up to 690 V | A    | 126   |
| Breaking capacity                      |             |      |       |
| 220 V 230 V                            |             | A    | 90    |
| 380 V 400 V                            |             | A    | 90    |
| 500 V                                  |             | A    | 70    |
| 660 V 690 V                            |             | A    | 50    |
| Short-circuit rating                   |             |      |       |
| Short-circuit protection maximum fuse  |             |      |       |
| Type "2" coordination                  |             |      |       |
| 400 V                                  | gG/gL 500 V | A    | 20    |
| 690 V                                  | gG/gL 690 V | A    | 16    |
| Type "1" coordination                  |             |      |       |
| 400 V                                  | gG/gL 500 V | A    | 35    |
| 690 V                                  | gG/gL 690 V | A    | 20    |

### AC

|   |                |     |  |
|---|----------------|-----|--|
| AC-1  |                |     |  |
| Rated operational current                                 |                |     |  |
| Conventional free air thermal current, 3 pole, 50 - 60 Hz |                |     |  |
| Open  |                |     |  |
| at 40 °C  | $I_{th} = I_e$ | A   | 22   |
| at 50 °C  | $I_{th} = I_e$ | A   | 21   |
| at 55 °C  | $I_{th} = I_e$ | A   | 21   |
| at 60 °C  | $I_{th} = I_e$ | A   | 20   |
| enclosed  | $I_{th}$       | A   | 18   |
| Conventional free air thermal current, 1 pole             |                |     |  |
| open  | $I_{th}$       | A   | 50   |
| enclosed  | $I_{th}$       | A   | 45   |
| AC-3  |                |     |  |
| Rated operational current                                 |                |     |  |
| Open, 3-pole: 50 – 60 Hz                                  |                |     |  |
| Notes   |                |     | At maximum permissible ambient temperature (open.) |
| 220 V 230 V   | $I_e$          | A   | 9  |
| 240 V   | $I_e$          | A   | 9  |
| 380 V 400 V   | $I_e$          | A   | 9  |
| 415 V   | $I_e$          | A   | 9  |
| 440V  | $I_e$          | A   | 9  |
| 500 V   | $I_e$          | A   | 7  |
| 660 V 690 V   | $I_e$          | A   | 5  |
| 380 V 400 V   | $I_e$          | A   | 9  |
| Motor rating  | P              | kWh |  |
| 220 V 230 V   | P              | kW  | 2.5  |

|                          |                |    |     |
|--------------------------|----------------|----|-----|
| 240 V                    | P              | kW | 3   |
| 380 V 400 V              | P              | kW | 4   |
| 415 V                    | P              | kW | 5.5 |
| 440 V                    | P              | kW | 5.5 |
| 500 V                    | P              | kW | 4.5 |
| 660 V 690 V              | P              | kW | 4.5 |
| <b>AC-4</b>              |                |    |     |
| Open, 3-pole: 50 – 60 Hz |                |    |     |
| 220 V 230 V              | I <sub>e</sub> | A  | 6   |
| 240 V                    | I <sub>e</sub> | A  | 6   |
| 380 V 400 V              | I <sub>e</sub> | A  | 6   |
| 415 V                    | I <sub>e</sub> | A  | 6   |
| 440 V                    | I <sub>e</sub> | A  | 6   |
| 500 V                    | I <sub>e</sub> | A  | 5   |
| 660 V 690 V              | I <sub>e</sub> | A  | 4.5 |
| Motor rating             |                |    |     |
| 220 V 230 V              | P              | kW | 1.5 |
| 240 V                    | P              | kW | 1.6 |
| 380 V 400 V              | P              | kW | 2.5 |
| 415 V                    | P              | kW | 2.8 |
| 440 V                    | P              | kW | 3   |
| 500 V                    | P              | kW | 2.8 |
| 660 V 690 V              | P              | kW | 3.6 |

## DC

|                                 |                |   |    |
|---------------------------------|----------------|---|----|
| Rated operational current, open |                |   |    |
| DC-1                            |                |   |    |
| 60 V                            | I <sub>e</sub> | A | 20 |
| 110 V                           | I <sub>e</sub> | A | 20 |
| 220 V                           | I <sub>e</sub> | A | 15 |

## Current heat loss

|   |  |    |     |
|---|--|----|-----|
| 3 pole, at I <sub>th</sub> (60°)                  |  | W  | 4.4 |
| Current heat loss at I <sub>e</sub> to AC-3/400 V |  | W  | 0.9 |
| Impedance per pole                                |  | mΩ | 4.6 |

## Magnet systems

|  |          |                  |   |
|--|----------|------------------|---|
| Voltage tolerance  |          |                  |   |
| DC operated  | Pick-up  | x U <sub>c</sub> | 0.8 - 1.1   |
| Notes  |          |                  | 0.85 - 1.1 only with auxiliary contact module with 3 or more N/C contacts |
| DC operated  | Drop-out | x U <sub>c</sub> | 0.15 - 0.6  |
| Notes  |          |                  | at least smoothed two-phase bridge rectifier or three-phase rectifier     |
| Power consumption of the coil in a cold state and 1.0 x U <sub>S</sub> |          |                  |   |
| DC operated  | Pick-up  | W                | 4.5   |
| DC operated  | Sealing  | W                | 4.5   |
| Duty factor  |          | % DF             | 100   |
| Changeover time at 100 % U <sub>S</sub> (recommended value)            |          |                  |   |
| Main contacts  |          |                  |   |
| DC operated  |          | ms               |   |
| Closing delay  |          | ms               | 31  |
| Opening delay  |          | ms               | 12  |
| Arcing time  |          | ms               | 10  |

## Electromagnetic compatibility (EMC)

|                       |  |  |               |
|-----------------------|--|--|---------------|
| Emitted interference  |  |  | to EN 60947-1 |
| Interference immunity |  |  | to EN 60947-1 |

## Rating data for approved types

|                      |  |  |  |
|----------------------|--|--|--|
| Switching capacity   |  |  |  |
| Maximum motor rating |  |  |  |

|   |    |                         |
|---|----|-------------------------|
| Three-phase   |    |                         |
| 200 V<br>208 V  | HP | 3                       |
| 230 V<br>240 V  | HP | 3                       |
| 460 V<br>480 V  | HP | 5                       |
| 575 V<br>600 V  | HP | 7.5                     |
| Single-phase  |    |                         |
| 115 V<br>120 V  | HP | 0.5                     |
| 230 V<br>240 V  | HP | 1.5                     |
| General use   | A  | 20                      |
| Auxiliary contacts  |    |                         |
| Pilot Duty  |    |                         |
| AC operated   |    | A600                    |
| DC operated   |    | P300                    |
| General Use   |    |                         |
| AC  | V  | 600                     |
| AC  | A  | 10                      |
| DC  | V  | 250                     |
| DC  | A  | 1                       |
| Short Circuit Current Rating                              |    |                         |
| Basic Rating  |    |                         |
| SCCR  | kA | 5                       |
| max. Fuse   | A  | 45                      |
| max. CB   | A  | 60                      |
| 480 V High Fault  |    |                         |
| SCCR (fuse)   | kA | 30/100                  |
| max. Fuse   | A  | 25 Class RK5/20 Class J |
| SCCR (CB)   | kA | 65                      |
| max. CB   | A  | 16                      |
| 600 V High Fault  |    |                         |
| SCCR (fuse)   | kA | 30/100                  |
| max. Fuse   | A  | 25 Class RK5/20 Class J |
| Special Purpose Ratings                                   |    |                         |
| Electrical Discharge Lamps (Ballast)                      |    |                         |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 18                      |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 18                      |
| Incandescent Lamps (Tungsten)                             |    |                         |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 14                      |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 14                      |
| Resistance Air Heating                                    |    |                         |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 18                      |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 18                      |
| Refrigeration Control (CSA only)                          |    |                         |
| LRA 480V 60Hz 3phase                                      | A  | 60                      |
| FLA 480V 60Hz 3phase                                      | A  | 10                      |
| LRA 600V 60Hz 3phase                                      | A  | 60                      |
| FLA 600V 60Hz 3phase                                      | A  | 10                      |
| Definite Purpose Ratings (100,000 cycles acc. to UL 1995) |    |                         |
| LRA 480V 60Hz 3phase                                      | A  | 54                      |
| FLA 480V 60Hz 3phase                                      | A  | 9                       |
| Elevator Control  |    |                         |
| 200V 60Hz 3phase  | HP | 2                       |
| 200V 60Hz 3phase  | A  | 7.8                     |

|                  |    |     |
|------------------|----|-----|
| 240V 60Hz 3phase | HP | 2   |
| 240V 60Hz 3phase | A  | 6.8 |
| 480V 60Hz 3phase | HP | 3   |
| 480V 60Hz 3phase | A  | 4.8 |
| 600V 60Hz 3phase | HP | 5   |
| 600V 60Hz 3phase | A  | 6.1 |

## Design verification as per IEC/EN 61439

| Technical data for design verification   |            |    |  |
|--|------------|----|--|
| Rated operational current for specified heat dissipation   | $I_n$      | A  | 9  |
| Heat dissipation per pole, current-dependent   | $P_{vid}$  | W  | 0.3  |
| Equipment heat dissipation, current-dependent  | $P_{vid}$  | W  | 0  |
| Static heat dissipation, non-current-dependent   | $P_{vs}$   | W  | 4.5  |
| Heat dissipation capacity  | $P_{diss}$ | W  | 0  |
| Operating ambient temperature min.   |            | °C | -25  |
| Operating ambient temperature max.   |            | °C | 60   |
| 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 7.0

| Low-voltage industrial components (EG000017) / Power contactor, AC switching (EC000066)   |    |  |           |
|---|----|--|-----------|
| Electric engineering, automation, process control engineering / Low-voltage switch technology / Contactor (LV) / Power contactor, AC switching (ecl@ss10.0.1-27-37-10-03 [AAB718015]) |    |  |           |
| Rated control supply voltage $U_s$ at AC 50HZ   | V  |  | 0 - 0     |
| Rated control supply voltage $U_s$ at AC 60HZ   | V  |  | 0 - 0     |
| Rated control supply voltage $U_s$ at DC  | V  |  | 220 - 220 |
| Voltage type for actuating  |    |  | DC        |
| Rated operation current $I_e$ at AC-1, 400 V  | A  |  | 22        |
| Rated operation current $I_e$ at AC-3, 400 V  | A  |  | 9         |
| Rated operation power at AC-3, 400 V  | kW |  | 4         |
| Rated operation current $I_e$ at AC-4, 400 V  | A  |  | 6         |

|   |  |    |                         |
|---|--|----|-------------------------|
| Rated operation power at AC-4, 400 V                    |  | kW | 2.5                     |
| Rated operation power NEMA                              |  | kW | 3.7                     |
| Modular version   |  |    | No                      |
| Number of auxiliary contacts as normally open contact   |  |    | 1                       |
| Number of auxiliary contacts as normally closed contact |  |    | 0                       |
| Type of electrical connection of main circuit           |  |    | Spring clamp connection |
| Number of normally closed contacts as main contact      |  |    | 0                       |
| Number of main contacts as normally open contact        |  |    | 3                       |

## 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.                          |  |  | E29096   |
| UL Category Control No.              |  |  | NLDX   |
| CSA File No.                         |  |  | 012528   |
| CSA Class No.                        |  |  | 2411-03, 3211-04   |
| North America Certification          |  |  | UL listed, CSA certified   |
| Specially designed for North America |  |  | No   |



- 1: Overload relay
- 2: Suppressor
- 3: Auxiliary contact modules





- Squirrel-cage motor
- Operating characteristics
- Starting: from rest
- Stopping: after attaining full running speed
- Electrical characteristics
- Make: up to 6 x rated motor current
- Break: up to 1 x rated motor current
- Utilization category
- 100 % AC-3
- Typical applications
- Compressors
- Lifts
- Mixers
- Pumps
- Escalators
- Agitators
- Fans
- Conveyor belts
- Centrifuges
- Hinged flaps
- Bucket-elevators
- Air conditioning system
- General drives in manufacturing and processing machines



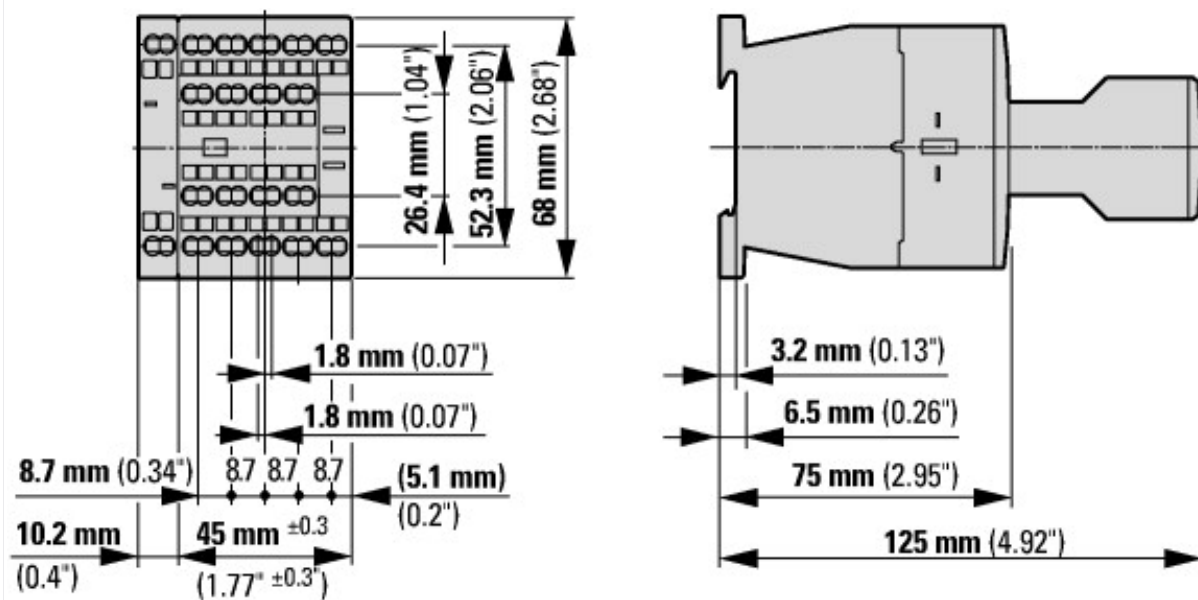
- Extreme switching duty
- Squirrel-cage motor
- Operating characteristics
- Inching, plugging, reversing
- Electrical characteristics
- Make: up to 6 x rated motor current
- Break: up to 6 x rated motor current
- Utilization category
- 100 % AC-4
- Typical applications
- Printing presses
- Wire-drawing machines
- Centrifuges
- Special drives for manufacturing and processing machines



Switching conditions for non-motor consumers, 3 pole, 4 pole  
 Operating characteristics  
 Non inductive and slightly inductive loads  
 Electrical characteristics  
 Switch on: 1 x rated operational current  
 Switch off: 1 x rated operational current  
 Utilization category  
 100 % AC-1  
 Typical examples of application  
 Electric heat



## Dimensions



Contactor with auxiliary contact module



## Assets (links)

### Declaration of CE Conformity

00002875

### Instruction Leaflets

IL03407013Z2018\_07

## Additional product information (links)

### IL03407013Z (AWA2100-2126) Contactors

|  |   |
|--|---|
| IL03407013Z (AWA2100-2126) Contactors  | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407013Z2020_05.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407013Z2020_05.pdf</a>   |
| Motor starters and "Special Purpose Ratings" for the North American market     | <a href="http://www.eaton.eu/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_3258146.pdf">http://www.eaton.eu/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_3258146.pdf</a> |
| Switchgear of Power Factor Correction Systems                                  | <a href="http://www.moeller.net/binary/ver_techpapers/ver934en.pdf">http://www.moeller.net/binary/ver_techpapers/ver934en.pdf</a>   |
| X-Start - Modern Switching Installations Efficiently Fitted and Wired Securely | <a href="http://www.moeller.net/binary/ver_techpapers/ver938en.pdf">http://www.moeller.net/binary/ver_techpapers/ver938en.pdf</a>   |

|  |   |
|--|---|
| Mirror Contacts for Highly-Reliable Information Relating to Safety-Related Control Functions   | <a href="http://www.moeller.net/binary/ver_techpapers/ver944en.pdf">http://www.moeller.net/binary/ver_techpapers/ver944en.pdf</a> |
| Effect of the Cabel Capacitance of Long Control Cables on the Actuation of Contactors          | <a href="http://www.moeller.net/binary/ver_techpapers/ver949en.pdf">http://www.moeller.net/binary/ver_techpapers/ver949en.pdf</a> |
| Switchgear for Luminaires  | <a href="http://www.moeller.net/binary/ver_techpapers/ver955en.pdf">http://www.moeller.net/binary/ver_techpapers/ver955en.pdf</a> |
| Standard Compliant and Functionally Safe Engineering Design with Mechanical Auxiliary Contacts | <a href="http://www.moeller.net/binary/ver_techpapers/ver956en.pdf">http://www.moeller.net/binary/ver_techpapers/ver956en.pdf</a> |
| The Interaction of Contactors with PLCs  | <a href="http://www.moeller.net/binary/ver_techpapers/ver957en.pdf">http://www.moeller.net/binary/ver_techpapers/ver957en.pdf</a> |
| Busbar Component Adapters for modern Industrial control panels                                 | <a href="http://www.moeller.net/binary/ver_techpapers/ver960en.pdf">http://www.moeller.net/binary/ver_techpapers/ver960en.pdf</a> |