
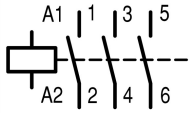




**Contactors, 3 pole, 380 V 400 V 30 kW, 48 V 50 Hz, AC operation, Screw terminals**

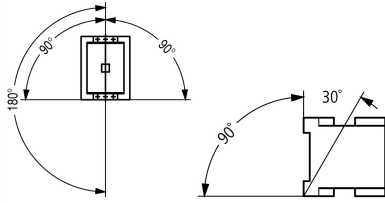
**Part no.** DILM65(48V50HZ)  
**Catalog No.** 277882  
**Alternate Catalog No.** XTCE065D00Y

### 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>AC-3/AC-3e: Normal AC induction motors: Starting, switching off while 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                                      |                |    | Screw terminals   |
| Number of poles   |                |    | 3 pole  |
| <b>Rated operational current</b>                          |                |    |   |
| AC-3  |                |    |   |
| Notes   |                |    | At maximum permissible ambient temperature (open.)<br>Also tested according to AC-3e.   |
| 380 V 400 V   | $I_e$          | A  | 65  |
| AC-1  |                |    |   |
| Conventional free air thermal current, 3 pole, 50 - 60 Hz |                |    |   |
| Open  |                |    |   |
| at 40 °C  | $I_{th} = I_e$ | A  | 98  |
| enclosed  | $I_{th}$       | A  | 72  |
| Conventional free air thermal current, 1 pole             |                |    |   |
| open  | $I_{th}$       | A  | 200   |
| enclosed  | $I_{th}$       | A  | 180   |
| <b>Max. rating for three-phase motors, 50 - 60 Hz</b>     |                |    |   |
| AC-3  |                |    |   |
| 220 V 230 V   | P              | kW | 20  |
| 380 V 400 V   | P              | kW | 30  |
| 660 V 690 V   | P              | kW | 35  |
| AC-4  |                |    |   |
| 220 V 230 V   | P              | kW | 7   |
| 380 V 400 V   | P              | kW | 12  |
| 660 V 690 V   | P              | kW | 17  |
| Contact sequence  |                |    |   |
| <b>Instructions</b>                                       |                |    | Contacts to EN 50 012.  |
| Can be combined with auxiliary contact                    |                |    | DILM150-XHI(V)...<br>DILM1000-XHI(V)...   |
| Actuating voltage   |                |    | 48 V 50 Hz  |
| Voltage AC/DC   |                |    | AC operation  |
| Connection to SmartWire-DT                                |                |    | no  |
| Frame size  |                |    | 3   |

## Technical data

### General

|   |                                     |               |  |
|---|-------------------------------------|---------------|--|
| Standards   |                                     |               | IEC/EN 60947, VDE 0660, UL, CSA  |
| Lifespan, mechanical  |                                     |               |  |
| AC operated   | Operations                          | $\times 10^6$ | 10   |
| Operating frequency, mechanical                                       |                                     |               |  |
| AC operated   | Operations/h                        |               | 5000   |
| 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                                   |               | 10   |
| Auxiliary contacts  |                                     |               |  |
| N/O contact   | g                                   |               | 7  |
| N/C contact   | g                                   |               | 5  |
| Degree of Protection  |                                     |               | IP00   |
| Protection against direct contact when actuated from front (EN 50274) |                                     |               | Finger and back-of-hand proof  |
| Altitude  | m                                   |               | Max. 2000  |
| Weight  |                                     |               |  |
| AC operated   | kg                                  |               | 0.87   |
| Screw connector terminals   |                                     |               |  |
| Terminal capacity main cable  |                                     |               |  |
| Solid   | mm <sup>2</sup>                     |               | 1 x (0.75 - 16)<br>2 x (0.75 - 16)   |
| Flexible with ferrule   | mm <sup>2</sup>                     |               | 1 x (0.75 - 35)<br>2 x (0.75 - 25)   |
| Stranded  | mm <sup>2</sup>                     |               | 1 x (16 - 50)<br>2 x (16 - 35)   |
| Solid or stranded   | AWG                                 |               | single 14 - 1, double 14 - 2   |
| Flat conductor  | Lamellenzahl<br>x Breite x<br>Dicke | mm            | 2 x (6 x 9 x 0.8)  |
| Stripping length  | mm                                  |               | 14   |
| Terminal screw  |                                     |               | M6   |
| Tightening torque   | Nm                                  |               | 3.3  |
| Tool  |                                     |               |  |
| Pozidriv screwdriver  | Size                                |               | 2  |
| Standard screwdriver  | mm                                  |               | 0.8 x 5.5<br>1 x 6   |
| Terminal capacity control circuit cables                              |                                     |               |  |

|                       |  |                 |                                      |
|-----------------------|--|-----------------|--------------------------------------|
| Solid                 |  | mm <sup>2</sup> | 1 x (0.75 - 4)<br>2 x (0.75 - 2.5)   |
| Flexible with ferrule |  | mm <sup>2</sup> | 1 x (0.75 - 2.5)<br>2 x (0.75 - 2.5) |
| Solid or stranded     |  | AWG             | 18 - 14                              |
| Stripping length      |  | mm              | 10                                   |
| Terminal screw        |  |                 | M3.5                                 |
| Tightening torque     |  | Nm              | 1.2                                  |
| Tool                  |  |                 |                                      |
| Pozidriv screwdriver  |  | Size            | 2                                    |
| Standard screwdriver  |  | mm              | 0.8 x 5.5<br>1 x 6                   |

### 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 | 440   |
| between the contacts                   |             | V AC | 440   |
| Making capacity (p.f. to IEC/EN 60947) |             |      |       |
|  | Up to 690 V | A    | 910   |
| Breaking capacity                      |             |      |       |
| 220 V 230 V                            |             | A    | 650   |
| 380 V 400 V                            |             | A    | 650   |
| 500 V                                  |             | A    | 650   |
| 660 V 690 V                            |             | A    | 370   |
| Short-circuit rating                   |             |      |       |
| Short-circuit protection maximum fuse  |             |      |       |
| Type "2" coordination                  |             |      |       |
| 400 V                                  | gG/gL 500 V | A    | 125   |
| 690 V                                  | gG/gL 690 V | A    | 80    |
| Type "1" coordination                  |             |      |       |
| 400 V                                  | gG/gL 500 V | A    | 250   |
| 690 V                                  | gG/gL 690 V | A    | 100   |

### 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 | 98  |
| at 50 °C  | $I_{th} = I_e$ | A | 88  |
| at 55 °C  | $I_{th} = I_e$ | A | 83  |
| at 60 °C  | $I_{th} = I_e$ | A | 80  |
| enclosed  | $I_{th}$       | A | 72  |
| Conventional free air thermal current, 1 pole             |                |   |   |
| open  | $I_{th}$       | A | 200   |
| enclosed  | $I_{th}$       | A | 180   |
| AC-3  |                |   |   |
| Rated operational current                                 |                |   |   |
| Open, 3-pole: 50 – 60 Hz                                  |                |   |   |
| Notes   |                |   | At maximum permissible ambient temperature (open.)<br>Also tested according to AC-3e. |
| 220 V 230 V   | $I_e$          | A | 65  |
| 240 V   | $I_e$          | A | 65  |
| 380 V 400 V   | $I_e$          | A | 65  |

|                          |                |     |     |
|--------------------------|----------------|-----|-----|
| 415 V                    | I <sub>e</sub> | A   | 65  |
| 440V                     | I <sub>e</sub> | A   | 65  |
| 500 V                    | I <sub>e</sub> | A   | 65  |
| 660 V 690 V              | I <sub>e</sub> | A   | 37  |
| 380 V 400 V              | I <sub>e</sub> | A   | 65  |
| Motor rating             | P              | kWh |     |
| 220 V 230 V              | P              | kW  | 20  |
| 240V                     | P              | kW  | 22  |
| 380 V 400 V              | P              | kW  | 30  |
| 415 V                    | P              | kW  | 39  |
| 440 V                    | P              | kW  | 41  |
| 500 V                    | P              | kW  | 47  |
| 660 V 690 V              | P              | kW  | 35  |
| <b>AC-4</b>              |                |     |     |
| Open, 3-pole: 50 – 60 Hz |                |     |     |
| 220 V 230 V              | I <sub>e</sub> | A   | 25  |
| 240 V                    | I <sub>e</sub> | A   | 25  |
| 380 V 400 V              | I <sub>e</sub> | A   | 25  |
| 415 V                    | I <sub>e</sub> | A   | 25  |
| 440 V                    | I <sub>e</sub> | A   | 25  |
| 500 V                    | I <sub>e</sub> | A   | 25  |
| 660 V 690 V              | I <sub>e</sub> | A   | 20  |
| Motor rating             | P              | kWh |     |
| 220 V 230 V              | P              | kW  | 7   |
| 240 V                    | P              | kW  | 7.5 |
| 380 V 400 V              | P              | kW  | 12  |
| 415 V                    | P              | kW  | 13  |
| 440 V                    | P              | kW  | 14  |
| 500 V                    | P              | kW  | 16  |
| 660 V 690 V              | P              | kW  | 17  |

## DC

|                                 |                |   |    |
|---------------------------------|----------------|---|----|
| Rated operational current, open |                |   |    |
| DC-1                            |                |   |    |
| 60 V                            | I <sub>e</sub> | A | 72 |
| 110 V                           | I <sub>e</sub> | A | 72 |
| 220 V                           | I <sub>e</sub> | A | 65 |

## Current heat loss

|   |  |    |      |
|---|--|----|------|
| 3 pole, at I <sub>th</sub> (60°)                  |  | W  | 25.9 |
| Current heat loss at I <sub>e</sub> to AC-3/400 V |  | W  | 17.1 |
| Impedance per pole                                |  | mΩ | 1.9  |

## Magnet systems

|  |          |                  |           |
|--|----------|------------------|-----------|
| Voltage tolerance  |          |                  |           |
| AC operated  | Pick-up  | x U <sub>c</sub> | 0.8 - 1.1 |
| Drop-out voltage AC operated   | Drop-out | x U <sub>c</sub> | 0.3 - 0.6 |
| Power consumption of the coil in a cold state and 1.0 x U <sub>S</sub> |          |                  |           |
| 50 Hz  | Pick-up  | VA               | 149       |
| 50 Hz  | Sealing  | VA               | 16        |
| 50 Hz  | Sealing  | W                | 4.1       |
| 60 Hz  | Pick-up  | VA               | 178       |
| 60 Hz  | Sealing  | VA               | 19        |
| 60 Hz  | Sealing  | W                | 4.1       |
| Duty factor  |          | % DF             | 100       |
| Changeover time at 100 % U <sub>S</sub> (recommended value)            |          |                  |           |
| Main contacts  |          |                  |           |

|               |    |         |
|---------------|----|---------|
| AC operated   |    |         |
| Closing delay | ms | 12 - 18 |
| Opening delay | ms | 8 - 13  |
| 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 | 20              |
| 230 V<br>240 V  | HP | 25              |
| 460 V<br>480 V  | HP | 50              |
| 575 V<br>600 V  | HP | 60              |
| Single-phase  |    |                 |
| 115 V<br>120 V  | HP | 5               |
| 230 V<br>240 V  | HP | 15              |
| General use   | A  | 88              |
| Short Circuit Current Rating                              |    |                 |
| Basic Rating  |    |                 |
| SCCR  | kA | 10              |
| max. Fuse   | A  | 250             |
| max. CB   | A  | 250             |
| 480 V High Fault  |    |                 |
| SCCR (fuse)   | kA | 30/100          |
| max. Fuse   | A  | 250/150 Class J |
| SCCR (CB)   | kA | 65              |
| max. CB   | A  | 100             |
| 600 V High Fault  |    |                 |
| SCCR (fuse)   | kA | 30/100          |
| max. Fuse   | A  | 250/150 Class J |
| SCCR (CB)   | kA | 30              |
| max. CB   | A  | 250             |
| Special Purpose Ratings                                   |    |                 |
| Electrical Discharge Lamps (Ballast)                      |    |                 |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 88              |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 88              |
| Incandescent Lamps (Tungsten)                             |    |                 |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 88              |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 88              |
| Resistance Air Heating                                    |    |                 |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 88              |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 88              |
| Definite Purpose Ratings (100,000 cycles acc. to UL 1995) |    |                 |
| LRA 480V 60Hz 3phase                                      | A  | 390             |
| FLA 480V 60Hz 3phase                                      | A  | 65              |
| Elevator Control  |    |                 |
| 200V 60Hz 3phase  | HP | 10              |
| 200V 60Hz 3phase  | A  | 32.2            |
| 240V 60Hz 3phase  | HP | 15              |
| 240V 60Hz 3phase  | A  | 42              |

|                  |    |    |
|------------------|----|----|
| 480V 60Hz 3phase | HP | 30 |
| 480V 60Hz 3phase | A  | 40 |
| 600V 60Hz 3phase | HP | 40 |
| 600V 60Hz 3phase | A  | 41 |

## Design verification as per IEC/EN 61439

| Technical data for design verification   |            |    |  |
|--|------------|----|--|
| Rated operational current for specified heat dissipation   | $I_n$      | A  | 65   |
| Heat dissipation per pole, current-dependent   | $P_{vid}$  | W  | 5.7  |
| Equipment heat dissipation, current-dependent  | $P_{vid}$  | W  | 17.1   |
| Static heat dissipation, non-current-dependent   | $P_{vs}$   | W  | 4.1  |
| 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  |  | 48 - 48 |
| Rated control supply voltage $U_s$ at AC 60HZ   | V  |  | 0 - 0   |
| Rated control supply voltage $U_s$ at DC  | V  |  | 0 - 0   |
| Voltage type for actuating  |    |  | AC      |
| Rated operation current $I_e$ at AC-1, 400 V  | A  |  | 98      |
| Rated operation current $I_e$ at AC-3, 400 V  | A  |  | 65      |
| Rated operation power at AC-3, 400 V  | kW |  | 30      |
| Rated operation current $I_e$ at AC-4, 400 V  | A  |  | 25      |
| Rated operation power at AC-4, 400 V  | kW |  | 12      |
| Rated operation power NEMA  | kW |  | 37      |

|   |  |                  |
|---|--|------------------|
| Modular version   |  | No               |
| Number of auxiliary contacts as normally open contact   |  | 0                |
| Number of auxiliary contacts as normally closed contact |  | 0                |
| Type of electrical connection of main circuit           |  | Screw connection |
| Number of normally closed contacts as main contact      |  | 0                |
| Number of main contacts as normally open contact        |  | 3                |

## Approvals

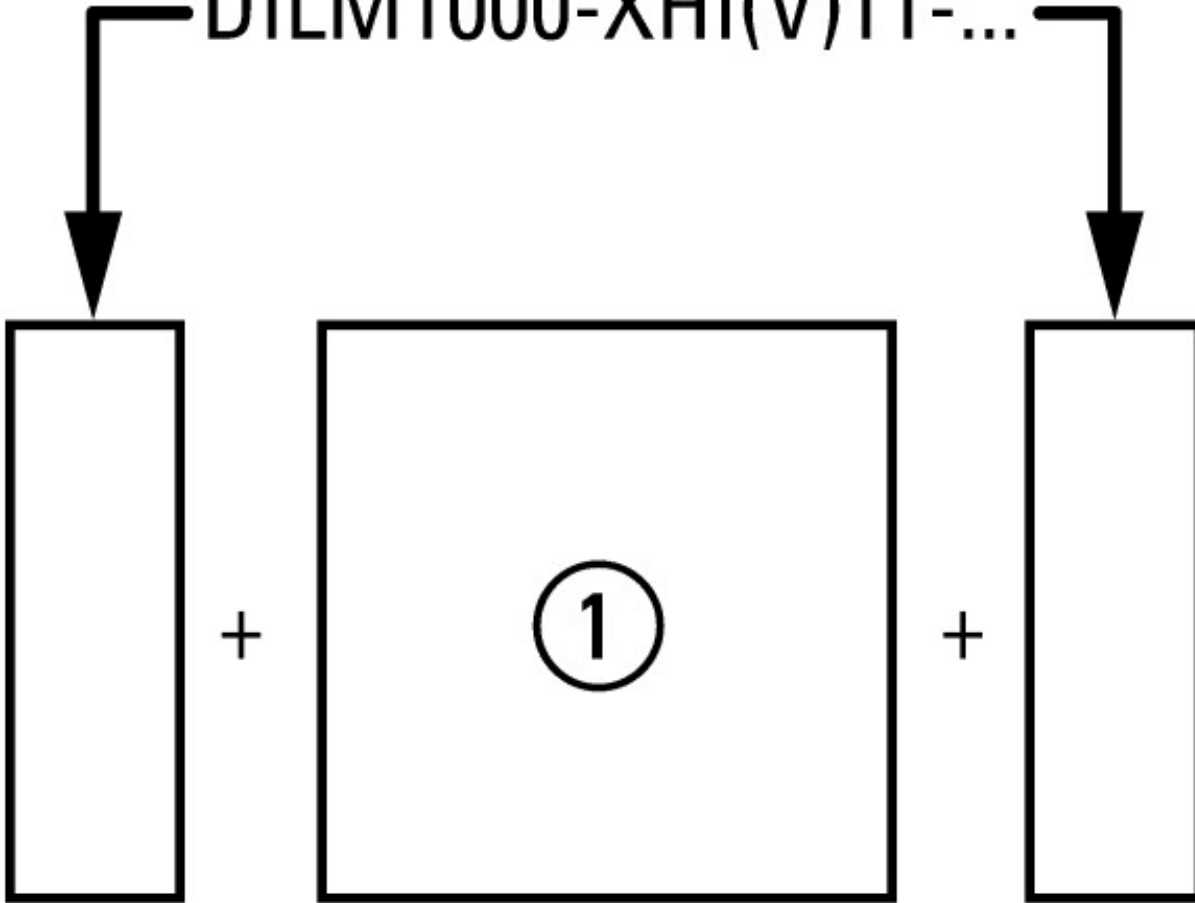
|                                      |  |   |
|--------------------------------------|--|---|
| Product Standards                    |  | IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking |
| UL File No.                          |  | E29096  |
| UL Category Control No.              |  | NLDX  |
| CSA File No.                         |  | 012528  |
| CSA Class No.                        |  | 2411-03, 3211-04  |
| North America Certification          |  | UL listed, CSA certified                                  |
| Specially designed for North America |  | No  |

## Characteristics



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

# DILM1000-XHI(V)11-...



- on the side: 2 x DILM1000-XHI(V)11-SI; surface mounting: 1 x DILM150-XHIA11
- on the side: 2 x DILM1000-XHI(V)11-SA; surface mounting: 1 x DILM150-XHI (2 pole)
- on the side: 1 x DILM1000-XHI(V)11-SI; surface mounting: 1 x DILM150-XHIA22
- on the side: 1 x DILM1000-XHI(V)11-SA; surface mounting: 1 x DILM150-XHI (4 pole)





- 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

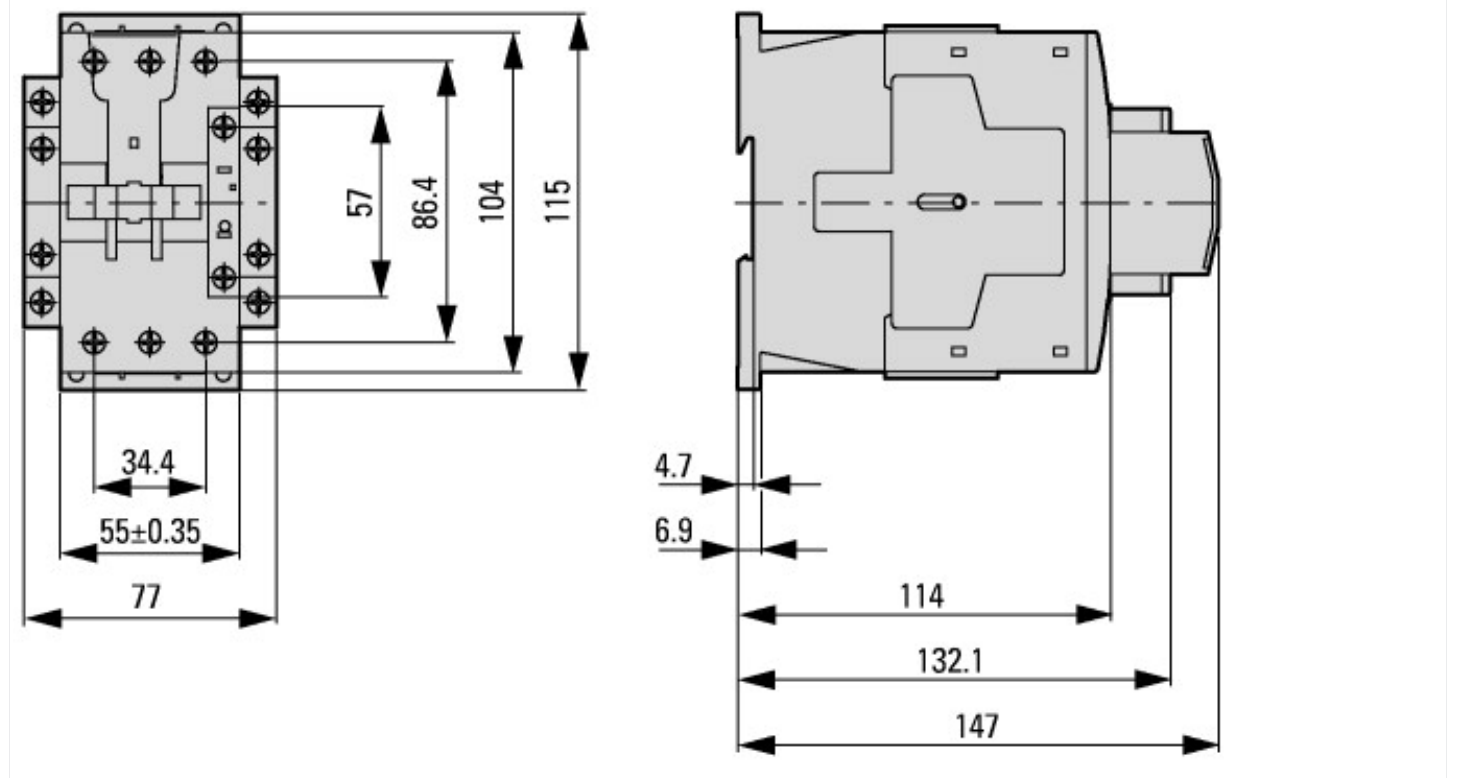


- Extreme switching duty
- Squirrel-cage motor
- Operating characteristics
- Inching, plugging, reversing
- Electrical characteristics
- Make: up to 6 x rated motor current
- Break: up to 6 x rated motor current
- Utilization category
- 100 % AC-4
- Typical applications
- Printing presses
- Wire-drawing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



Contacteur avec module de contact auxiliaire



Lateral clearance to earthed parts: 6 mm

DILM40...DILM72  
 DILMC40...DILMC65  
 DILMF40...DILMF65

## Additional product information (links)

### IL03407033Z (AWA2100-2247) DILM contactor, basic device

|  |   |
|--|---|
| IL03407033Z (AWA2100-2247) DILM contactor, basic device                                      | <a href="https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407033Z2018_03.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407033Z2018_03.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>   |

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| Effect of the Cable 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> |