

# Specifications



## Eaton 199648

Eaton Moeller® series DILM Contactor, 3 pole, 380 V 400 V 4 kW, 1 NC, 230 V 50/60 Hz, AC operation, Push in terminals

### General specifications

|                             |                                      |
|-----------------------------|--------------------------------------|
| <b>PRODUCT NAME</b>         | Eaton Moeller® series DILM contactor |
| <b>CATALOG NUMBER</b>       | 199648                               |
| <b>MODEL CODE</b>           | DILM9-01(230V50/60HZ)-PI             |
| <b>EAN</b>                  | 4015081983490                        |
| <b>PRODUCT LENGTH/DEPTH</b> | 75 mm                                |
| <b>PRODUCT HEIGHT</b>       | 68 mm                                |
| <b>PRODUCT WIDTH</b>        | 45 mm                                |
| <b>PRODUCT WEIGHT</b>       | 0.225 kg                             |
| <b>CERTIFICATIONS</b>       | VDE 0660<br>IEC/EN 60947             |



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## Ambient conditions, mechanical

### SHOCK RESISTANCE

3.4 g, N/C auxiliary contact, Mechanical, according to IEC/EN 60068-2-27 when tabletop-mounted, Half-sinusoidal shock 10 ms  
5 g, N/C auxiliary contact, Mechanical, according to IEC/EN 60068-2-27, Half-sinusoidal shock 10 ms  
5.7 g, N/O main contact, Mechanical, according to IEC/EN 60068-2-27 when tabletop-mounted, Half-sinusoidal shock 10 ms  
10 g, N/O main contact, Mechanical, according to IEC/EN 60068-2-27, Half-sinusoidal shock 10 ms  
7 g, N/O auxiliary contact, Mechanical, according to IEC/EN 60068-2-27, Half-sinusoidal shock 10 ms  
3.4 g, N/O auxiliary contact, Mechanical, according to IEC/EN 60068-2-27 when tabletop-mounted, Half-sinusoidal shock 10 ms

## Communication

**CONNECTION TO SMARTWIRE-DT** No

## Climatic environmental conditions

**AMBIENT OPERATING TEMPERATURE - MAX** 60 °C

**AMBIENT STORAGE TEMPERATURE - MAX** 80 °C

**AMBIENT OPERATING TEMPERATURE - MIN** -25 °C

**AMBIENT OPERATING TEMPERATURE (ENCLOSED) - MAX** 40 °C

**AMBIENT OPERATING TEMPERATURE (ENCLOSED) - MIN** -25 °C

**AMBIENT STORAGE TEMPERATURE - MIN** -40 °C

**CLIMATIC PROOFING** Damp heat, constant, to IEC 60068-2-78  
Damp heat, cyclic, to IEC 60068-2-30

## Contacts

**NUMBER OF MAIN CONTACTS (NORMALLY OPEN CONTACT)** 3

**NUMBER OF AUXILIARY CONTACTS (NORMALLY CLOSED CONTACTS)** 1

**NUMBER OF AUXILIARY CONTACTS (NORMALLY OPEN CONTACTS)** 0

**NUMBER OF CONTACTS (NORMALLY CLOSED CONTACTS)** 1

**NUMBER OF CONTACTS (NORMALLY OPEN CONTACTS)** 0

**NUMBER OF CONTACTS (NORMALLY CLOSED) AS MAIN CONTACT** 0

## Conventional thermal current Ith

**CONVENTIONAL  
THERMAL CURRENT ITH  
(1-POLE, ENCLOSED)** 45 A

**CONVENTIONAL  
THERMAL CURRENT ITH  
(3-POLE, ENCLOSED)** 18 A

**CONVENTIONAL  
THERMAL CURRENT ITH  
AT 55°C (3-POLE, OPEN)** 21 A

**CONVENTIONAL  
THERMAL CURRENT ITH  
OF MAIN CONTACTS (1-  
POLE, OPEN)** 50 A

## Design verification

### 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.

### 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 RESIST. OF INSUL. MAT. TO ABNORMAL HEAT/FIRE BY INTERNAL ELECT. 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

Does not apply, since the

|                                                                 |                                                                    |
|-----------------------------------------------------------------|--------------------------------------------------------------------|
| <b>AGAINST ELECTRIC SHOCK</b>                                   | entire switchgear needs to be evaluated.                           |
| <b>10.6 INCORPORATION OF SWITCHING DEVICES AND COMPONENTS</b>   | Does not apply, since the entire switchgear needs to be evaluated. |
| <b>10.7 INTERNAL ELECTRICAL CIRCUITS AND CONNECTIONS</b>        | Is the panel builder's responsibility.                             |
| <b>10.8 CONNECTIONS FOR EXTERNAL CONDUCTORS</b>                 | Is the panel builder's responsibility.                             |
| <b>10.9.2 POWER-FREQUENCY ELECTRIC STRENGTH</b>                 | Is the panel builder's responsibility.                             |
| <b>10.9.3 IMPULSE WITHSTAND VOLTAGE</b>                         | Is the panel builder's responsibility.                             |
| <b>10.9.4 TESTING OF ENCLOSURES MADE OF INSULATING MATERIAL</b> | Is the panel builder's responsibility.                             |

## Electrical rating

|                                             |      |
|---------------------------------------------|------|
| <b>RATED BREAKING CAPACITY AT 220/230 V</b> | 90 A |
|---------------------------------------------|------|

|                                             |      |
|---------------------------------------------|------|
| <b>RATED BREAKING CAPACITY AT 380/400 V</b> | 90 A |
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|                                         |      |
|-----------------------------------------|------|
| <b>RATED BREAKING CAPACITY AT 500 V</b> | 70 A |
|-----------------------------------------|------|

|                                             |      |
|---------------------------------------------|------|
| <b>RATED BREAKING CAPACITY AT 660/690 V</b> | 50 A |
|---------------------------------------------|------|

|                                      |       |
|--------------------------------------|-------|
| <b>RATED INSULATION VOLTAGE (UI)</b> | 690 V |
|--------------------------------------|-------|

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| <b>RATED MAKING CAPACITY UP TO 690 V (COS PHI TO IEC/EN 60947)</b> | 112 A |
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|--------------------------------------------------------------------|------|
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-1, 380 V, 400 V, 415 V</b> | 22 A |
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| <b>RATED OPERATIONAL CURRENT (IE) AT AC-3, 220 V, 230 V, 240 V</b> | 9 A |
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|--------------------------------------------------------------------|-----|
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-3, 380 V, 400 V, 415 V</b> | 9 A |
|--------------------------------------------------------------------|-----|

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|------------------------------------------------------|-----|
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-3, 440 V</b> | 9 A |
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| <b>RATED OPERATIONAL CURRENT (IE) AT AC-3, 500 V</b> | 7 A |
|------------------------------------------------------|-----|

|                                                             |     |
|-------------------------------------------------------------|-----|
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-3, 660 V, 690 V</b> | 5 A |
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|--------------------------------------------------------------------|-----|
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-4, 220 V, 230 V, 240 V</b> | 6 A |
|--------------------------------------------------------------------|-----|

|                                                      |     |
|------------------------------------------------------|-----|
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-4, 440 V</b> | 6 A |
|------------------------------------------------------|-----|

|                                                      |     |
|------------------------------------------------------|-----|
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-4, 500 V</b> | 5 A |
|------------------------------------------------------|-----|

|                                                             |       |
|-------------------------------------------------------------|-------|
| <b>RATED OPERATIONAL CURRENT (IE) AT AC-4, 660 V, 690 V</b> | 4.5 A |
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| <b>RATED OPERATIONAL CURRENT (IE) AT DC-1, 110 V</b> | 20 A |
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| <b>RATED OPERATIONAL CURRENT (IE) AT DC-1, 220 V</b> | 15 A |
|------------------------------------------------------|------|

## Electro magnetic compatibility

|                             |                         |
|-----------------------------|-------------------------|
| <b>EMITTED INTERFERENCE</b> | According to EN 60947-1 |
|-----------------------------|-------------------------|

|                              |                         |
|------------------------------|-------------------------|
| <b>INTERFERENCE IMMUNITY</b> | According to EN 60947-1 |
|------------------------------|-------------------------|

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|------------------------------------------------------------------|--------|
| <b>RATED OPERATIONAL<br/>CURRENT (IE) AT DC-1, 60<br/>V</b>      | 20 A   |
| <b>RATED OPERATIONAL<br/>POWER AT AC-3, 240 V, 50<br/>HZ</b>     | 3 kW   |
| <b>RATED OPERATIONAL<br/>POWER AT AC-3, 380/400<br/>V, 50 HZ</b> | 4 kW   |
| <b>RATED OPERATIONAL<br/>POWER AT AC-3, 415 V, 50<br/>HZ</b>     | 5.5 kW |
| <b>RATED OPERATIONAL<br/>POWER AT AC-4, 220/230<br/>V, 50 HZ</b> | 1.5 kW |
| <b>RATED OPERATIONAL<br/>POWER AT AC-4, 240 V, 50<br/>HZ</b>     | 1.6 kW |
| <b>RATED OPERATIONAL<br/>POWER AT AC-4, 415 V, 50<br/>HZ</b>     | 2.8 kW |
| <b>RATED OPERATIONAL<br/>POWER AT AC-4, 440 V, 50<br/>HZ</b>     | 3 kW   |
| <b>RATED OPERATIONAL<br/>POWER AT AC-4, 500 V, 50<br/>HZ</b>     | 2.8 kW |
| <b>RATED OPERATIONAL<br/>POWER AT AC-4, 660/690<br/>V, 50 HZ</b> | 3.6 kW |
| <b>RATED OPERATIONAL<br/>VOLTAGE (UE) AT AC -<br/>MAX</b>        | 690 V  |

## Features & functions

|                        |                |
|------------------------|----------------|
| <b>FITTED WITH:</b>    | Mirror contact |
| <b>NUMBER OF POLES</b> | Three-pole     |

## General information

|                             |                                                                       |
|-----------------------------|-----------------------------------------------------------------------|
| <b>APPLICATION</b>          | Contactors for Motors                                                 |
| <b>CONNECTION</b>           | Push in terminals                                                     |
| <b>DEGREE OF PROTECTION</b> | IP20                                                                  |
| <b>LIFESPAN, MECHANICAL</b> | 10,000,000 Operations (AC operated)                                   |
| <b>OPERATING FREQUENCY</b>  | 9000 mechanical Operations/h (AC operated)                            |
| <b>OVERVOLTAGE CATEGORY</b> | III                                                                   |
| <b>POLLUTION DEGREE</b>     | 3                                                                     |
| <b>PRODUCT CATEGORY</b>     | Contactors                                                            |
| <b>PROTECTION</b>           | Finger and back-of-hand proof, Protection against direct contact when |

|                                                       |                                                                                                                                                                                                                           |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                       | actuated from front (EN 50274)                                                                                                                                                                                            |
| <b>RATED IMPULSE<br/>WITHSTAND VOLTAGE<br/>(UIMP)</b> | 6000 V AC                                                                                                                                                                                                                 |
| <b>SUITABLE FOR</b>                                   | Also motors with efficiency class IE3                                                                                                                                                                                     |
| <b>UTILIZATION CATEGORY</b>                           | AC-3: Normal AC induction motors: starting, switch off during running<br>AC-1: Non-inductive or slightly inductive loads, resistance furnaces<br>AC-4: Normal AC induction motors: starting, plugging, reversing, inching |
| <b>VOLTAGE TYPE</b>                                   | AC                                                                                                                                                                                                                        |
| <b>FRAME SIZE</b>                                     | FS1                                                                                                                                                                                                                       |

## Magnet system

|                                                                         |                                                                    |
|-------------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>ARCING TIME</b>                                                      | 10 ms                                                              |
| <b>DROP-OUT VOLTAGE</b>                                                 | AC operated: 0.6 - 0.3 x Uc, AC operated                           |
| <b>DUTY FACTOR</b>                                                      | 100 %                                                              |
| <b>PICK-UP VOLTAGE</b>                                                  | 0.8 - 1.1 V AC x Uc                                                |
| <b>POWER CONSUMPTION, PICK-UP, 50 HZ</b>                                | 27 VA, Dual-frequency coil in a cold state and 1.0 x Us            |
| <b>POWER CONSUMPTION, PICK-UP, 60 HZ</b>                                | 25 VA, Dual-frequency coil in a cold state and 1.0 x Us            |
| <b>POWER CONSUMPTION, SEALING, 50 HZ</b>                                | 1.4 W, Dual-frequency coil in a cold state and 1.0 x Us            |
| <b>POWER CONSUMPTION, SEALING, 60 HZ</b>                                | 3.3 VA, Dual-frequency coil in a cold state and 1.0 x Us, at 60 Hz |
|                                                                         | 1.4 W, Dual-frequency coil in a cold state and 1.0 x Us            |
|                                                                         | 4.2 VA, Dual-frequency coil in a cold state and 1.0 x Us, at 60 Hz |
| <b>RATED CONTROL SUPPLY VOLTAGE (US) AT AC, 50 HZ - MAX</b>             | 230 V                                                              |
| <b>RATED CONTROL SUPPLY VOLTAGE (US) AT AC, 50 HZ - MIN</b>             | 230 V                                                              |
| <b>RATED CONTROL SUPPLY VOLTAGE (US) AT AC, 60 HZ - MAX</b>             | 230 V                                                              |
| <b>RATED CONTROL SUPPLY VOLTAGE (US) AT AC, 60 HZ - MIN</b>             | 230 V                                                              |
| <b>SWITCHING TIME (AC OPERATED, MAKE CONTACTS, CLOSING DELAY) - MAX</b> | 21 ms                                                              |
| <b>SWITCHING TIME (AC OPERATED, MAKE CONTACTS, CLOSING DELAY) - MIN</b> | 15 ms                                                              |
| <b>SWITCHING TIME (AC OPERATED, MAKE CONTACTS, OPENING DELAY) - MAX</b> | 18 ms                                                              |
| <b>SWITCHING TIME (AC OPERATED, MAKE CONTACTS, OPENING DELAY) - MIN</b> | 9 ms                                                               |

## Safety

### SAFE ISOLATION

400 V AC, Between the contacts, According to EN 61140  
400 V AC, Between coil and contacts, According to EN 61140

## Short-circuit rating

|                                                    |                                                                          |
|----------------------------------------------------|--------------------------------------------------------------------------|
| <b>SHORT-CIRCUIT CURRENT RATING (BASIC RATING)</b> | 5 kA, 30 A max. fuse, SCCR (UL/CSA)<br>5 kA, 30 A max. CB, SCCR (UL/CSA) |
|----------------------------------------------------|--------------------------------------------------------------------------|

|                                                           |                                                                                                                                       |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>SHORT-CIRCUIT CURRENT RATING (HIGH FAULT AT 480 V)</b> | 100 kA, 20 A CLASS J max. fuse, SCCR (UL/CSA)<br>30 kA, 25 A CLASS RK5 max. fuse, SCCR (UL/CSA)<br>65 kA, 16 A max. CB, SCCR (UL/CSA) |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|

|                                                           |                                                                                                 |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>SHORT-CIRCUIT CURRENT RATING (HIGH FAULT AT 600 V)</b> | 100 kA, 20 A CLASS J max. fuse, SCCR (UL/CSA)<br>30 kA, 25 A CLASS RK5 max. fuse, SCCR (UL/CSA) |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------|

|                                                                       |            |
|-----------------------------------------------------------------------|------------|
| <b>SHORT-CIRCUIT PROTECTION RATING (TYPE 1 COORDINATION) AT 400 V</b> | 35 A gG/gL |
|-----------------------------------------------------------------------|------------|

|                                                                       |            |
|-----------------------------------------------------------------------|------------|
| <b>SHORT-CIRCUIT PROTECTION RATING (TYPE 1 COORDINATION) AT 690 V</b> | 20 A gG/gL |
|-----------------------------------------------------------------------|------------|

|                                                                       |            |
|-----------------------------------------------------------------------|------------|
| <b>SHORT-CIRCUIT PROTECTION RATING (TYPE 2 COORDINATION) AT 400 V</b> | 20 A gG/gL |
|-----------------------------------------------------------------------|------------|

|                                                                       |            |
|-----------------------------------------------------------------------|------------|
| <b>SHORT-CIRCUIT PROTECTION RATING (TYPE 2 COORDINATION) AT 690 V</b> | 16 A gG/gL |
|-----------------------------------------------------------------------|------------|

## Terminal capacities

|                         |                                                            |
|-------------------------|------------------------------------------------------------|
| <b>SCREWDRIVER SIZE</b> | 3.0 x 0.5 mm, Terminal screw<br>3 x 0.5 mm, Terminal screw |
|-------------------------|------------------------------------------------------------|

|                                      |       |
|--------------------------------------|-------|
| <b>STRIPPING LENGTH (MAIN CABLE)</b> | 10 mm |
|--------------------------------------|-------|

|                                                             |                                                                    |
|-------------------------------------------------------------|--------------------------------------------------------------------|
| <b>TERMINAL CAPACITY (FLEXIBLE WITH UNISOLATED FERRULE)</b> | 1 x (0.5 - 2.5) mm <sup>2</sup><br>2 x (0.5 - 2.5) mm <sup>2</sup> |
|-------------------------------------------------------------|--------------------------------------------------------------------|

|                                     |                                                                    |
|-------------------------------------|--------------------------------------------------------------------|
| <b>TERMINAL CAPACITY (FLEXIBLE)</b> | 2 x (0.5 - 2.5) mm <sup>2</sup><br>1 x (0.5 - 2.5) mm <sup>2</sup> |
|-------------------------------------|--------------------------------------------------------------------|

|                                                                      |                                                                    |
|----------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>TERMINAL CAPACITY (FLEXIBLE WITH ULTRASONIC WELDED CABLE END)</b> | 1 x (0.5 - 2.5) mm <sup>2</sup><br>2 x (0.5 - 2.5) mm <sup>2</sup> |
|----------------------------------------------------------------------|--------------------------------------------------------------------|

|                                  |                                                                    |
|----------------------------------|--------------------------------------------------------------------|
| <b>TERMINAL CAPACITY (SOLID)</b> | 1 x (0.5 - 2.5) mm <sup>2</sup><br>2 x (0.5 - 2.5) mm <sup>2</sup> |
|----------------------------------|--------------------------------------------------------------------|

|                                                  |                                                                    |
|--------------------------------------------------|--------------------------------------------------------------------|
| <b>TERMINAL CAPACITY (FLEXIBLE WITH FERRULE)</b> | 1 x (0.5 - 2.5) mm <sup>2</sup><br>2 x (0.5 - 1.5) mm <sup>2</sup> |
|--------------------------------------------------|--------------------------------------------------------------------|

|                                               |         |
|-----------------------------------------------|---------|
| <b>TERMINAL CAPACITY (SOLID/STRANDED AWG)</b> | 20 - 14 |
|-----------------------------------------------|---------|

## Resources

|                            |                                                                                                                                                      |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| CATALOGUES                 | <a href="#">eaton-product-overview-for-machinery-catalogue-ca08103003zen-en-us.pdf</a>                                                               |
| DECLARATIONS OF CONFORMITY | <a href="#">eaton-contactor-declaration-of-conformity-uk251209en.pdf</a><br><a href="#">eaton-contactor-declaration-of-conformity-eu250726en.pdf</a> |
| DRAWINGS                   | <a href="#">eaton-contactors-dimensions-007.eps</a>                                                                                                  |
| ECAD MODEL                 | <a href="#">ETN.199648.edz</a>                                                                                                                       |
| INSTALLATION VIDEOS        | <a href="#">WIN-WIN with push-in technology</a>                                                                                                      |
| MCAD MODEL                 | <a href="#">eaton-iec-contactors-mcad-drawings-dil-m7-15-pi.dwg</a><br><a href="#">eaton-iec-contactors-mcad-3d-models-dil-m7-15-pi.stp</a>          |
| WIRING DIAGRAMS            | <a href="#">eaton-contactors-wiring-diagram-2100swi-117.eps</a>                                                                                      |

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**PROJECT NAME:**

**PROJECT NUMBER:**

**PREPARED BY:**

**DATE:**

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**Eaton Corporation plc** Eaton House  
30 Pembroke Road  
Dublin 4, Ireland  
Eaton.com

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