




**Contactors, 380 V 400 V 55 kW, 2 N/O, 2 NC, RDC 24: 24 - 27 V DC, DC operation, Screw terminals**

**Part no.** DILM115-22(RDC24)  
**Catalog No.** 239581  
**Alternate Catalog No.** XTCE115G22TD  
**EL-Nummer (Norway)** 4110248

**Delivery program**

|                      |  |  |  |
|----------------------|--|--|--|
| Product range        |  |  | Contactors   |
| Application          |  |  | Contactors for Motors  |
| Subrange             |  |  | Complete devices up to 170 A   |
| 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 |
| Connection technique |  |  | Screw terminals  |
|                      |  |  |    |
| Notes                |  |  | Also suitable for motors with efficiency class IE3.<br>IE3-ready devices are identified by the logo on their packaging.  |

**Rated operational current**

|   |                |   |     |
|---|----------------|---|-----|
| AC-3  |                |   |     |
| 380 V 400 V   | $I_e$          | A | 115 |
| AC-1  |                |   |     |
| Conventional free air thermal current, 3 pole, 50 - 60 Hz |                |   |     |
| Open  |                |   |     |
| at 40 °C  | $I_{th} = I_e$ | A | 160 |
| enclosed  | $I_{th}$       | A | 115 |
| Conventional free air thermal current, 1 pole             |                |   |     |
| open  | $I_{th}$       | A | 325 |
| enclosed  | $I_{th}$       | A | 285 |

**Max. rating for three-phase motors, 50 - 60 Hz**

|             |   |    |    |
|-------------|---|----|----|
| AC-3        |   |    |    |
| 220 V 230 V | P | kW | 37 |
| 380 V 400 V | P | kW | 55 |
| 660 V 690 V | P | kW | 90 |
| AC-4        |   |    |    |
| 220 V 230 V | P | kW | 17 |
| 380 V 400 V | P | kW | 28 |
| 660 V 690 V | P | kW | 43 |

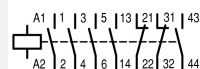
**Contacts**

|                       |  |  |       |
|-----------------------|--|--|-------|
| N/O = Normally open   |  |  | 2 N/O |
| N/C = Normally closed |  |  | 2 NC  |

**Instructions**

Contacts to EN 50 012.  
 integrated suppressor circuit in actuating electronics with mirror contact.

**Contact sequence**



**Actuating voltage**

RDC 24: 24 - 27 V DC

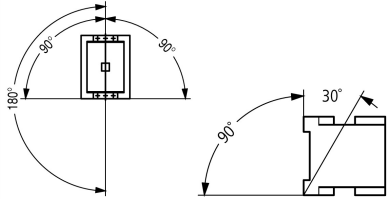
**Voltage AC/DC**

DC operation

**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                        |                 | 3600   |
| 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  |
| Weight  |                                     |                 |  |
| DC operated   |                                     | kg              | 2.1  |
| Screw connector terminals   |                                     |                 |  |
| Terminal capacity main cable  |                                     |                 |  |
| Flexible with ferrule   |                                     | mm <sup>2</sup> | 1 x (10 - 95)<br>2 x (10 - 70)   |
| Stranded  |                                     | mm <sup>2</sup> | 1 x (16 - 95)<br>2 x (16 - 70)   |
| Solid or stranded   |                                     | AWG             | single 8...3/0, double 8...2/0   |
| Flat conductor  | Lamellenzahl<br>x Breite x<br>Dicke | mm              | 2 x (6 x 16 x 0.8)   |
| Stripping length  |                                     | mm              | 24   |
| Terminal screw  |                                     |                 | M10  |
| Tightening torque   |                                     | Nm              | 14   |
| Tool  |                                     |                 |  |
| Hexagon socket-head spanner   | SW                                  | mm              | 5  |
| Terminal capacity control circuit cables                              |                                     |                 |  |
| Solid   |                                     | 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 - 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 | 690   |
| between the contacts                   |                | V AC | 690   |
| Making capacity (p.f. to IEC/EN 60947) |                |      |       |
|  | $U_p$ to 690 V | A    | 1610  |
| Breaking capacity                      |                |      |       |
| 220 V 230 V                            |                | A    | 1150  |
| 380 V 400 V                            |                | A    | 1150  |
| 500 V                                  |                | A    | 1150  |
| 660 V 690 V                            |                | A    | 1100  |
| Short-circuit rating                   |                |      |       |
| Short-circuit protection maximum fuse  |                |      |       |
| Type "2" coordination                  |                |      |       |
| 400 V                                  | gG/gL 500 V    | A    | 250   |
| 690 V                                  | gG/gL 690 V    | A    | 250   |
| Type "1" coordination                  |                |      |       |
| 400 V                                  | gG/gL 500 V    | A    | 250   |
| 690 V                                  | gG/gL 690 V    | A    | 250   |

### 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   | 160  |
| at 50 °C  | $I_{th} = I_e$ | A   | 142  |
| at 55 °C  | $I_{th} = I_e$ | A   | 135  |
| at 60 °C  | $I_{th} = I_e$ | A   | 130  |
| enclosed  | $I_{th}$       | A   | 115  |
| Conventional free air thermal current, 1 pole             |                |     |  |
| open  | $I_{th}$       | A   | 325  |
| enclosed  | $I_{th}$       | A   | 285  |
| 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   | 115  |
| 240 V   | $I_e$          | A   | 115  |
| 380 V 400 V   | $I_e$          | A   | 115  |
| 415 V   | $I_e$          | A   | 115  |
| 440V  | $I_e$          | A   | 115  |
| 500 V   | $I_e$          | A   | 115  |
| 660 V 690 V   | $I_e$          | A   | 93   |
| 380 V 400 V   | $I_e$          | A   | 115  |
| Motor rating  | P              | kWh |  |
| 220 V 230 V   | P              | kW  | 37   |
| 240V  | P              | kW  | 40   |

|                          |                |     |    |
|--------------------------|----------------|-----|----|
| 380 V 400 V              | P              | kW  | 55 |
| 415 V                    | P              | kW  | 70 |
| 440 V                    | P              | kW  | 75 |
| 500 V                    | P              | kW  | 85 |
| 660 V 690 V              | P              | kW  | 90 |
| <b>AC-4</b>              |                |     |    |
| Open, 3-pole: 50 – 60 Hz |                |     |    |
| 220 V 230 V              | I <sub>e</sub> | A   | 55 |
| 240 V                    | I <sub>e</sub> | A   | 55 |
| 380 V 400 V              | I <sub>e</sub> | A   | 55 |
| 415 V                    | I <sub>e</sub> | A   | 55 |
| 440 V                    | I <sub>e</sub> | A   | 55 |
| 500 V                    | I <sub>e</sub> | A   | 55 |
| 660 V 690 V              | I <sub>e</sub> | A   | 45 |
| Motor rating             | P              | kWh |    |
| 220 V 230 V              | P              | kW  | 17 |
| 240 V                    | P              | kW  | 19 |
| 380 V 400 V              | P              | kW  | 28 |
| 415 V                    | P              | kW  | 33 |
| 440 V                    | P              | kW  | 35 |
| 500 V                    | P              | kW  | 40 |
| 660 V 690 V              | P              | kW  | 43 |

## DC

|                                 |                |   |     |
|---------------------------------|----------------|---|-----|
| Rated operational current, open |                |   |     |
| DC-1                            |                |   |     |
| 60 V                            | I <sub>e</sub> | A | 160 |
| 110 V                           | I <sub>e</sub> | A | 160 |
| 220 V                           | I <sub>e</sub> | A | 90  |

## Current heat loss

|   |  |    |      |
|---|--|----|------|
| 3 pole, at I <sub>th</sub> (60°)                  |  | W  | 24.2 |
| Current heat loss at I <sub>e</sub> to AC-3/400 V |  | W  | 18.9 |
| Impedance per pole                                |  | mΩ | 0.6  |

## Magnet systems

|  |          |                   |   |
|--|----------|-------------------|---|
| Voltage tolerance  |          |                   |   |
| DC operated  | Pick-up  | x U <sub>c</sub>  | 0.7 - 1.2   |
| Notes  |          |                   | RDC 24 (U <sub>min</sub> 24 V DC/U <sub>max</sub> 27 V DC)<br>Example: U <sub>S</sub> = 0.7 x U <sub>min</sub> - 1.2 x U <sub>max</sub> / U <sub>S</sub> = 0.7 x 24V - 1.2 x 27V DC |
| 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                 | 149   |
| DC operated  | Sealing  | W                 | 1.9   |
| Duty factor  |          | % DF              | 100   |
| Changeover time at 100 % U <sub>S</sub> (recommended value)                                |          |                   |   |
| Main contacts  |          |                   |   |
| DC operated  |          | ms                |   |
| Closing delay  |          | ms                | 35  |
| Opening delay  |          | ms                | 30  |
| Arcing time  |          | ms                | 15  |
| Permissible residual current with actuation of A1 - A2 by the electronics (with 0 signal). |          | mA                | ≤ 1   |
| Lifespan, mechanical; Coil 50/60 Hz  |          | x 10 <sup>6</sup> | Mechanical lifespan at 50 Hz approx. 30% lower than under "Technical data, general"   |

## 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 | 40              |      |
| 230 V<br>240 V  | HP | 50              |      |
| 460 V<br>480 V  | HP | 100             |      |
| 575 V<br>600 V  | HP | 100             |      |
| Single-phase  |    |                 |      |
| 115 V<br>120 V  | HP | 10              |      |
| 230 V<br>240 V  | HP | 25              |      |
| General use   | A  | 180             |      |
| Auxiliary contacts  |    |                 |      |
| Pilot Duty  |    |                 |      |
| AC operated   |    |                 | A600 |
| DC operated   |    |                 | P300 |
| General Use   |    |                 |      |
| AC  | V  | 600             |      |
| AC  | A  | 15              |      |
| DC  | V  | 250             |      |
| DC  | A  | 1               |      |
| Short Circuit Current Rating                              |    |                 |      |
| Basic Rating  |    |                 |      |
| SCCR  | kA | 10              |      |
| max. Fuse   | A  | 600             |      |
| max. CB   | A  | 600             |      |
| 480 V High Fault  |    |                 |      |
| SCCR (fuse)   | kA | 30/100          |      |
| max. Fuse   | A  | 300/300 Class J |      |
| SCCR (CB)   | kA | 65              |      |
| max. CB   | A  | 250             |      |
| 600 V High Fault  |    |                 |      |
| SCCR (fuse)   | kA | 30/100          |      |
| max. Fuse   | A  | 300/300 Class J |      |
| SCCR (CB)   | kA | 30              |      |
| max. CB   | A  | 350             |      |
| Special Purpose Ratings                                   |    |                 |      |
| Electrical Discharge Lamps (Ballast)                      |    |                 |      |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 160             |      |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 160             |      |
| Incandescent Lamps (Tungsten)                             |    |                 |      |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 160             |      |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 160             |      |
| Resistance Air Heating                                    |    |                 |      |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 160             |      |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 160             |      |
| Refrigeration Control (CSA only)                          |    |                 |      |
| LRA 480V 60Hz 3phase                                      | A  | 540             |      |
| FLA 480V 60Hz 3phase                                      | A  | 84              |      |
| LRA 600V 60Hz 3phase                                      | A  | 540             |      |
| FLA 600V 60Hz 3phase                                      | A  | 84              |      |
| Definite Purpose Ratings (100,000 cycles acc. to UL 1995) |    |                 |      |

|                      |    |     |
|----------------------|----|-----|
| LRA 480V 60Hz 3phase | A  | 690 |
| FLA 480V 60Hz 3phase | A  | 115 |
| Elevator Control     |    |     |
| 200V 60Hz 3phase     | HP | 30  |
| 200V 60Hz 3phase     | A  | 92  |
| 240V 60Hz 3phase     | HP | 40  |
| 240V 60Hz 3phase     | A  | 104 |
| 480V 60Hz 3phase     | HP | 75  |
| 480V 60Hz 3phase     | A  | 96  |
| 600V 60Hz 3phase     | HP | 100 |
| 600V 60Hz 3phase     | A  | 99  |

## Design verification as per IEC/EN 61439

|  |            |    |      |
|--|------------|----|------|
| Technical data for design verification   |            |    |      |
| Rated operational current for specified heat dissipation   | $I_n$      | A  | 115  |
| Heat dissipation per pole, current-dependent   | $P_{vid}$  | W  | 6.3  |
| Equipment heat dissipation, current-dependent  | $P_{vid}$  | W  | 18.9 |
| Static heat dissipation, non-current-dependent   | $P_{vs}$   | W  | 1.9  |
| 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  |            |    |      |
| 10.2.3.1 Verification of thermal stability of enclosures   |            |    |      |
| 10.2.3.2 Verification of resistance of insulating materials to normal heat   |            |    |      |
| 10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects |            |    |      |
| 10.2.4 Resistance to ultra-violet (UV) radiation   |            |    |      |
| 10.2.5 Lifting   |            |    |      |
| 10.2.6 Mechanical impact   |            |    |      |
| 10.2.7 Inscriptions  |            |    |      |
| 10.3 Degree of protection of ASSEMBLIES  |            |    |      |
| 10.4 Clearances and creepage distances   |            |    |      |
| 10.5 Protection against electric shock   |            |    |      |
| 10.6 Incorporation of switching devices and components   |            |    |      |
| 10.7 Internal electrical circuits and connections  |            |    |      |
| 10.8 Connections for external conductors   |            |    |      |
| 10.9 Insulation properties   |            |    |      |
| 10.9.2 Power-frequency electric strength   |            |    |      |
| 10.9.3 Impulse withstand voltage   |            |    |      |
| 10.9.4 Testing of enclosures made of insulating material   |            |    |      |
| 10.10 Temperature rise   |            |    |      |
| 10.11 Short-circuit rating   |            |    |      |
| 10.12 Electromagnetic compatibility  |            |    |      |
| 10.13 Mechanical function  |            |    |      |

## 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 |  | 24 - 27 |

|   |    |                  |
|---|----|------------------|
| Voltage type for actuating                              |    | DC               |
| Rated operation current Ie at AC-1, 400 V               | A  | 160              |
| Rated operation current Ie at AC-3, 400 V               | A  | 115              |
| Rated operation power at AC-3, 400 V                    | kW | 55               |
| Rated operation current Ie at AC-4, 400 V               | A  | 55               |
| Rated operation power at AC-4, 400 V                    | kW | 28               |
| Rated operation power NEMA                              | kW | 74               |
| Modular version   |    | No               |
| Number of auxiliary contacts as normally open contact   |    | 2                |
| Number of auxiliary contacts as normally closed contact |    | 2                |
| 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 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   |

## Characteristics



- 1: Overload relay
- 2: Suppressor





on the side: 2 x DILM820-XHI11(V)-SI; 2 x DILM820-XHI11-SA



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

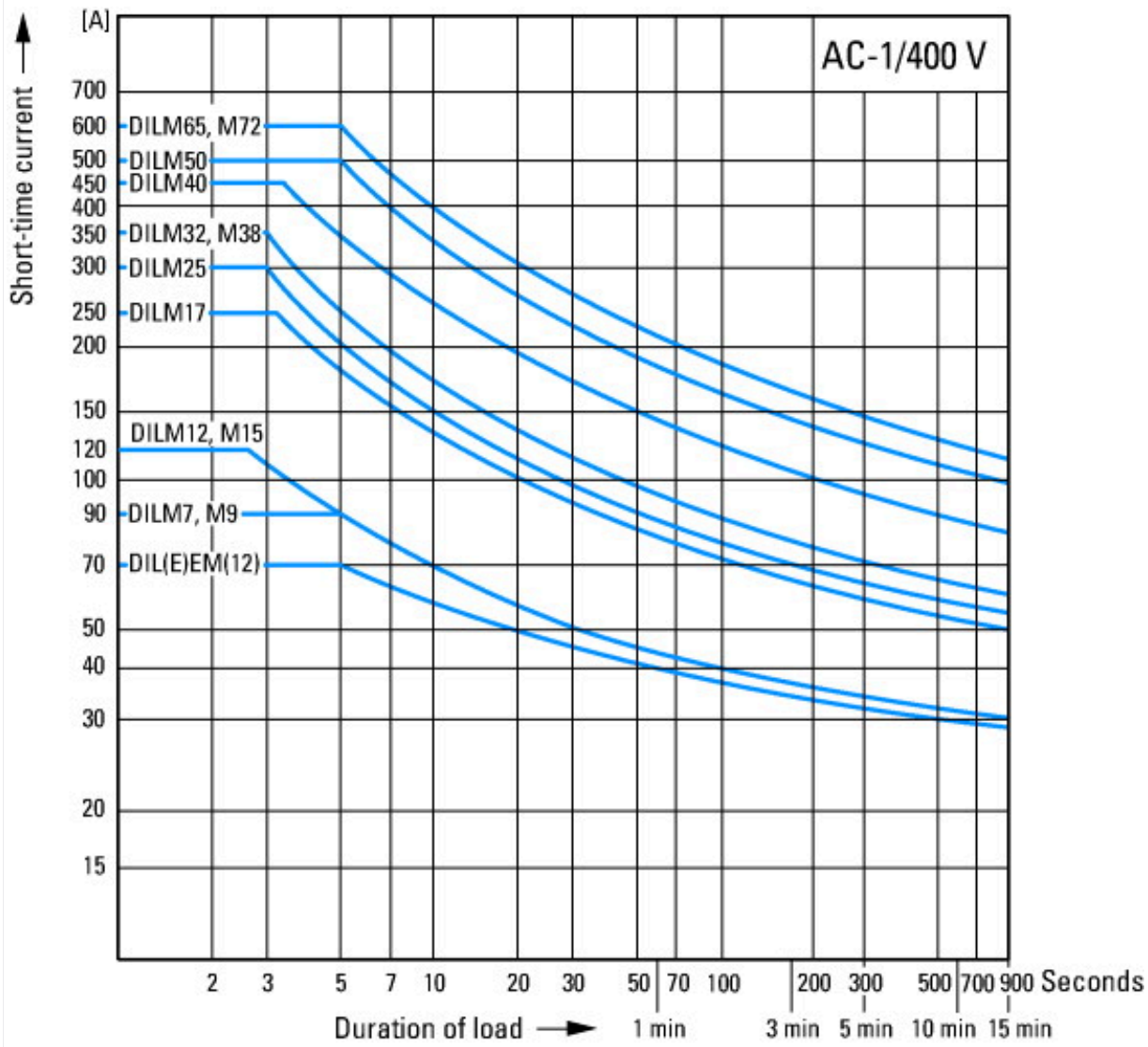
- Compressors
- Lifts
- Mixers
- Pumps
- Escalators
- Agitators
- Fans
- Conveyor belts
- Centrifuges
- Hinged flaps
- Bucket-elevators
- Air conditioning system
- General drives in manufacturing and processing machines



- 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 3 pole, non-motor loads  
 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 with auxiliary contact module



distance at side to earthed parts: 10 mm

DILM80...DILM170  
 DILMC80...DILMC150  
 DILMF80...DILMF150

## Assets (links)

### Declaration of CE Conformity

00003251

### Instruction Leaflets

IL03407039Z2019\_09

## Additional product information (links)

### IL03407039Z (AWA2100-2286) Contactors

IL03407039Z (AWA2100-2286) Contactors [ftp://ftp.moeller.net/DOCUMENTATION/AWA\\_INSTRUCTIONS/IL03407039Z2019\\_09.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407039Z2019_09.pdf)

### MN034004 Rapid Link 5.0 RAMO RASP

MNxx3 <Title> - Deutsch [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN034004\\_DE.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN034004_DE.pdf)

|  |   |
|--|---|
| 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 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>   |