




**Contactor, 380 V 400 V 7.5 kW, 2 N/O, 1 NC, 230 V 50/60 Hz, AC operation, Screw terminals**

**Part no. DILM17-21(230V50/60HZ)**  
**Catalog No. 277076**  
**Alternate Catalog No. XTCE018C21G2**

### 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>AC-3/AC-3e: Normal AC induction motors: Starting, switching off while 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>Also tested according to AC-3e.  |

### Rated operational current

|   |                |   |    |
|---|----------------|---|----|
| AC-3  |                |   |    |
| 380 V 400 V   | $I_e$          | A | 18 |
| AC-1  |                |   |    |
| Conventional free air thermal current, 3 pole, 50 - 60 Hz |                |   |    |
| Open  |                |   |    |
| at 40 °C  | $I_{th} = I_e$ | A | 40 |
| enclosed  | $I_{th}$       | A | 32 |
| Conventional free air thermal current, 1 pole             |                |   |    |
| open  | $I_{th}$       | A | 88 |
| enclosed  | $I_{th}$       | A | 80 |

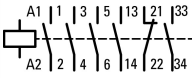
### Max. rating for three-phase motors, 50 - 60 Hz

|             |   |    |     |
|-------------|---|----|-----|
| AC-3        |   |    |     |
| 220 V 230 V | P | kW | 5   |
| 380 V 400 V | P | kW | 7.5 |
| 660 V 690 V | P | kW | 11  |
| AC-4        |   |    |     |
| 220 V 230 V | P | kW | 2.5 |
| 380 V 400 V | P | kW | 4.5 |
| 660 V 690 V | P | kW | 6.5 |

### Contacts

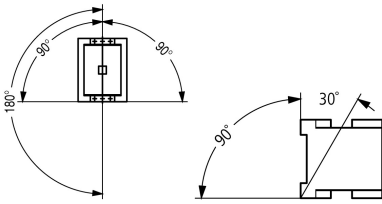
|                       |  |  |       |
|-----------------------|--|--|-------|
| N/O = Normally open   |  |  | 2 N/O |
| N/C = Normally closed |  |  | 1 NC  |

### Instructions

|                   |  |  |  |
|-------------------|--|--|--|
| Instructions      |  |  | Contacts to EN 50 012.<br>with mirror contact.                                       |
| Contact sequence  |  |  |  |
| Actuating voltage |  |  | 230 V 50/60 Hz   |
| Voltage AC/DC     |  |  | AC operation   |

### Technical data

|                      |  |  |                                 |
|----------------------|--|--|---------------------------------|
| Standards            |  |  | IEC/EN 60947, VDE 0660, UL, CSA |
| Lifespan, mechanical |  |  |                                 |

|  |                 |                   |                                      |
|--|-----------------|-------------------|--------------------------------------|
| AC operated  | Operations      | x 10 <sup>6</sup> | 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               |                   | 6.9                                  |
| Auxiliary contacts   |                 |                   |                                      |
| N/O contact  | g               |                   | 5.3                                  |
| N/C contact  | g               |                   | 3.5                                  |
| 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              |                   | 0.503                                |
| Screw connector terminals  |                 |                   |                                      |
| Terminal capacity main cable   |                 |                   |                                      |
| Solid  | mm <sup>2</sup> |                   | 1 x (0.75 - 16)<br>2 x (0.75 - 10)   |
| Flexible with ferrule  | mm <sup>2</sup> |                   | 1 x (0.75 - 16)<br>2 x (0.75 - 10)   |
| Stranded   | mm <sup>2</sup> |                   | 1 x 16                               |
| Solid or stranded  | AWG             |                   | single 18 - 6, double 18 - 8         |
| Stripping length   | mm              |                   | 10                                   |
| Terminal screw   |                 |                   | M5                                   |
| Tightening torque  | Nm              |                   | 3.2                                  |
| 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 - 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 | 440   |
| between the contacts                   |             | V AC | 440   |
| Making capacity (p.f. to IEC/EN 60947) |             |      |       |
|  | Up to 690 V | A    | 238   |
| Breaking capacity                      |             |      |       |
| 220 V 230 V                            |             | A    | 170   |
| 380 V 400 V                            |             | A    | 170   |
| 500 V                                  |             | A    | 170   |
| 660 V 690 V                            |             | A    | 120   |
| Short-circuit rating                   |             |      |       |
| Short-circuit protection maximum fuse  |             |      |       |
| Type "2" coordination                  |             |      |       |
| 400 V                                  | gG/gL 500 V | A    | 35    |
| 690 V                                  | gG/gL 690 V | A    | 35    |
| Type "1" coordination                  |             |      |       |
| 400 V                                  | gG/gL 500 V | A    | 63    |
| 690 V                                  | gG/gL 690 V | A    | 50    |

### 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   | 40  |
| at 50 °C  | $I_{th} = I_e$ | A   | 38  |
| at 55 °C  | $I_{th} = I_e$ | A   | 37  |
| at 60 °C  | $I_{th} = I_e$ | A   | 35  |
| enclosed  | $I_{th}$       | A   | 32  |
| Conventional free air thermal current, 1 pole             |                |     |   |
| open  | $I_{th}$       | A   | 88  |
| enclosed  | $I_{th}$       | A   | 80  |
| 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   | 18  |
| 240 V   | $I_e$          | A   | 18  |
| 380 V 400 V   | $I_e$          | A   | 18  |
| 415 V   | $I_e$          | A   | 18  |
| 440V  | $I_e$          | A   | 18  |
| 500 V   | $I_e$          | A   | 18  |
| 660 V 690 V   | $I_e$          | A   | 12  |
| Motor rating  | P              | kWh |   |
| 220 V 230 V   | P              | kW  | 5   |
| 240V  | P              | kW  | 5.5   |

|                          |                |    |      |
|--------------------------|----------------|----|------|
| 380 V 400 V              | P              | kW | 7.5  |
| 415 V                    | P              | kW | 10   |
| 440 V                    | P              | kW | 10.5 |
| 500 V                    | P              | kW | 12   |
| 660 V 690 V              | P              | kW | 11   |
| <b>AC-4</b>              |                |    |      |
| Open, 3-pole: 50 – 60 Hz |                |    |      |
| 220 V 230 V              | I <sub>e</sub> | A  | 10   |
| 240 V                    | I <sub>e</sub> | A  | 10   |
| 380 V 400 V              | I <sub>e</sub> | A  | 10   |
| 415 V                    | I <sub>e</sub> | A  | 10   |
| 440 V                    | I <sub>e</sub> | A  | 10   |
| 500 V                    | I <sub>e</sub> | A  | 10   |
| 660 V 690 V              | I <sub>e</sub> | A  | 8    |
| <b>Motor rating</b>      |                |    |      |
| 220 V 230 V              | P              | kW | 2.5  |
| 240 V                    | P              | kW | 3    |
| 380 V 400 V              | P              | kW | 4.5  |
| 415 V                    | P              | kW | 5    |
| 440 V                    | P              | kW | 5.5  |
| 500 V                    | P              | kW | 6    |
| 660 V 690 V              | P              | kW | 6.5  |

## DC

|  |                |   |    |
|--|----------------|---|----|
| <b>Rated operational current, open</b> |                |   |    |
| <b>DC-1</b>                            |                |   |    |
| 60 V                                   | I <sub>e</sub> | A | 35 |
| 110 V                                  | I <sub>e</sub> | A | 35 |
| 220 V                                  | I <sub>e</sub> | A | 35 |

## Current heat loss

|   |  |    |     |
|---|--|----|-----|
| 3 pole, at I <sub>th</sub> (60°)                  |  | W  | 7.9 |
| Current heat loss at I <sub>e</sub> to AC-3/400 V |  | W  | 2.1 |
| Impedance per pole                                |  | mΩ | 2.7 |

## Magnet systems

|  |          |                   |  |
|--|----------|-------------------|--|
| <b>Voltage tolerance</b>   |          |                   |  |
| 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  |
| <b>Power consumption of the coil in a cold state and 1.0 x U<sub>S</sub></b> |          |                   |  |
| 50/60 Hz   | Pick-up  | VA                | 62<br>58   |
| 50/60 Hz   | Sealing  | VA                | 9.1<br>6.5   |
| 50/60 Hz   | Sealing  | W                 | 2.1  |
| Duty factor  |          | % DF              | 100  |
| <b>Changeover time at 100 % U<sub>S</sub> (recommended value)</b>            |          |                   |  |
| <b>Main contacts</b>   |          |                   |  |
| AC operated  |          |                   |  |
| Closing delay  |          | ms                | 16 - 22  |
| Opening delay  |          | ms                | 8 - 14   |
| Arcing time  |          | ms                | 10   |
| 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  |  |  | according to EN 60947-1 |
| Interference immunity |  |  | according to EN 60947-1 |

## Rating data for approved types

|                    |  |  |  |
|--------------------|--|--|--|
| Switching capacity |  |  |  |
|--------------------|--|--|--|

|   |    |                |
|---|----|----------------|
| Maximum motor rating                                      |    |                |
| Three-phase   |    |                |
| 200 V<br>208 V  | HP | 5              |
| 230 V<br>240 V  | HP | 5              |
| 460 V<br>480 V  | HP | 10             |
| 575 V<br>600 V  | HP | 15             |
| Single-phase  |    |                |
| 115 V<br>120 V  | HP | 2              |
| 230 V<br>240 V  | HP | 3              |
| General use   | A  | 40             |
| 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  | 125            |
| max. CB   | A  | 125            |
| 480 V High Fault  |    |                |
| SCCR (fuse)   | kA | 10/100         |
| max. Fuse   | A  | 125/70 Class J |
| SCCR (CB)   | kA | 10/65          |
| max. CB   | A  | 50/32          |
| 600 V High Fault  |    |                |
| SCCR (fuse)   | kA | 10/100         |
| max. Fuse   | A  | 125/70 Class J |
| SCCR (CB)   | kA | 10/22          |
| max. CB   | A  | 50/32          |
| Special Purpose Ratings                                   |    |                |
| Electrical Discharge Lamps (Ballast)                      |    |                |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 40             |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 40             |
| Incandescent Lamps (Tungsten)                             |    |                |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 40             |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 40             |
| Resistance Air Heating                                    |    |                |
| 480V 60Hz 3phase, 277V 60Hz 1phase                        | A  | 40             |
| 600V 60Hz 3phase, 347V 60Hz 1phase                        | A  | 40             |
| Refrigeration Control (CSA only)                          |    |                |
| LRA 480V 60Hz 3phase                                      | A  | 240            |
| FLA 480V 60Hz 3phase                                      | A  | 40             |
| LRA 600V 60Hz 3phase                                      | A  | 180            |
| FLA 600V 60Hz 3phase                                      | A  | 30             |
| Definite Purpose Ratings (100,000 cycles acc. to UL 1995) |    |                |
| LRA 480V 60Hz 3phase                                      | A  | 108            |
| FLA 480V 60Hz 3phase                                      | A  | 18             |

|                  |  |    |     |
|------------------|--|----|-----|
| Elevator Control |  |    |     |
| 200V 60Hz 3phase |  | HP | 3   |
| 200V 60Hz 3phase |  | A  | 11  |
| 240V 60Hz 3phase |  | HP | 3   |
| 240V 60Hz 3phase |  | A  | 9.6 |
| 480V 60Hz 3phase |  | HP | 7.5 |
| 480V 60Hz 3phase |  | A  | 11  |
| 600V 60Hz 3phase |  | HP | 10  |
| 600V 60Hz 3phase |  | A  | 11  |

## Design verification as per IEC/EN 61439

|  |            |    |  |
|--|------------|----|--|
| Technical data for design verification   |            |    |  |
| Rated operational current for specified heat dissipation   | $I_n$      | A  | 18   |
| Heat dissipation per pole, current-dependent   | $P_{vid}$  | W  | 0.7  |
| Equipment heat dissipation, current-dependent  | $P_{vid}$  | W  | 2.1  |
| Static heat dissipation, non-current-dependent   | $P_{vs}$   | W  | 2.1  |
| 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

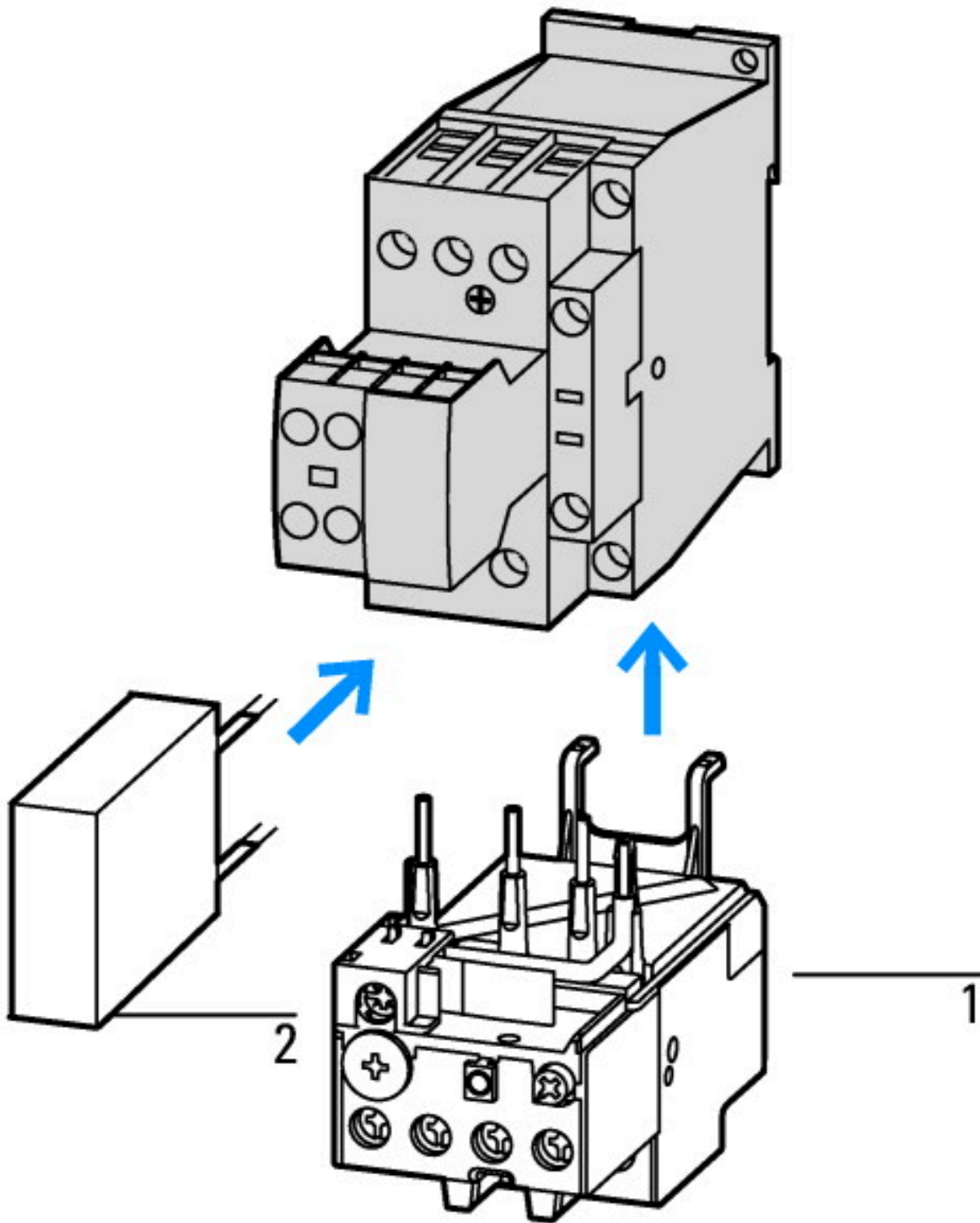
|   |  |   |           |
|---|--|---|-----------|
| Low-voltage industrial components (EG000017) / Power contactor, AC switching (EC000066)   |  |   |           |
| Electric engineering, automation, process control engineering / Low-voltage switch technology / Contactor (LV) / Power contactor, AC switching (ecl@ss10.0.1-27-37-10-03 [AAB718015]) |  |   |           |
| Rated control supply voltage $U_s$ at AC 50HZ   |  | V | 230 - 230 |
| Rated control supply voltage $U_s$ at AC 60HZ   |  | V | 230 - 230 |
| 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 | 40        |

|   |    |                  |
|---|----|------------------|
| Rated operation current Ie at AC-3, 400 V               | A  | 18               |
| Rated operation power at AC-3, 400 V                    | kW | 7.5              |
| Rated operation current Ie at AC-4, 400 V               | A  | 10               |
| Rated operation power at AC-4, 400 V                    | kW | 4.5              |
| Rated operation power NEMA                              | kW | 7.4              |
| Modular version   |    | No               |
| Number of auxiliary contacts as normally open contact   |    | 2                |
| Number of auxiliary contacts as normally closed contact |    | 1                |
| 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

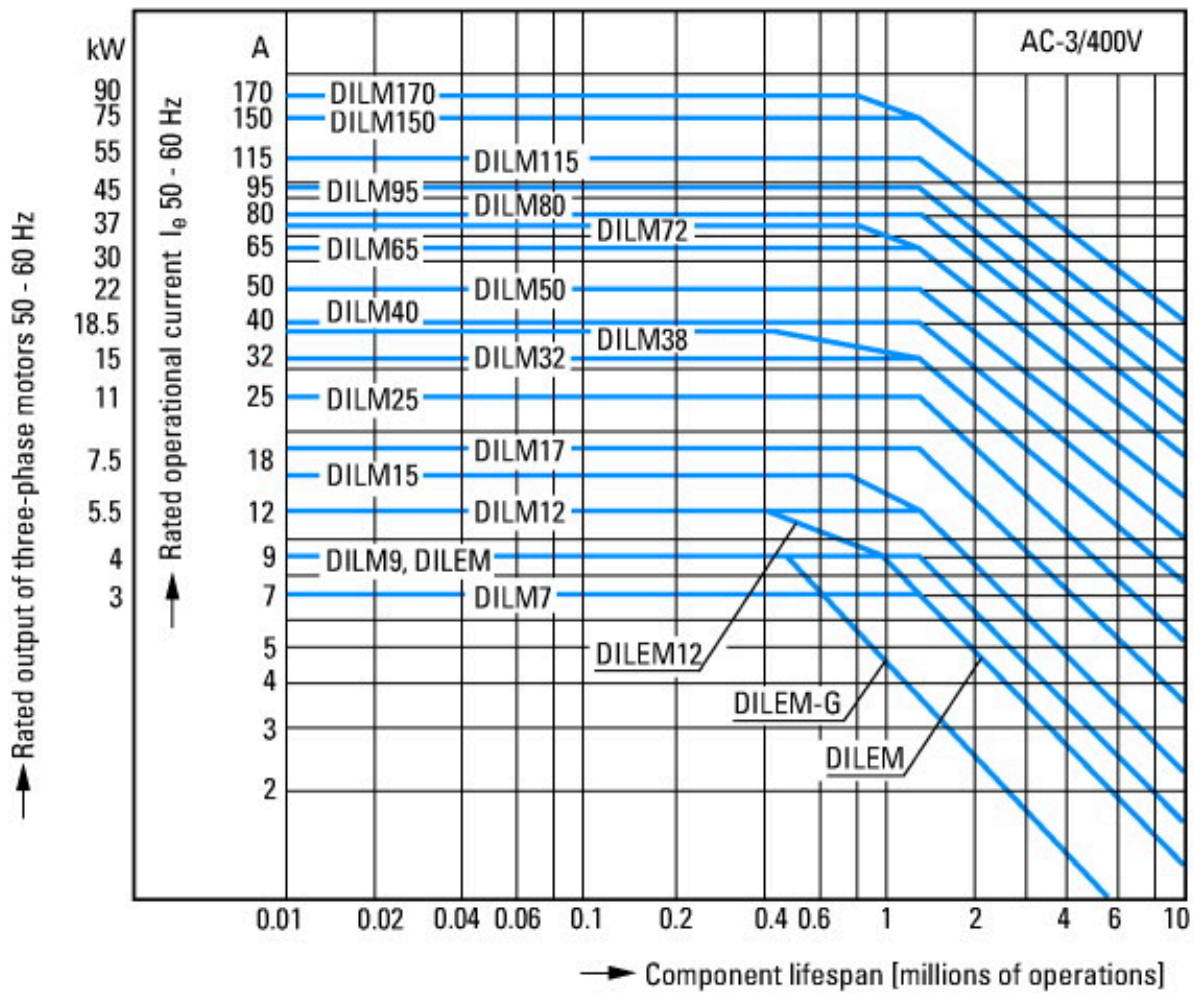
|                                      |  |   |
|--------------------------------------|--|---|
| Product Standards                    |  | IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking |
| UL File No.                          |  | E29096  |
| UL Category Control No.              |  | NLDX  |
| 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

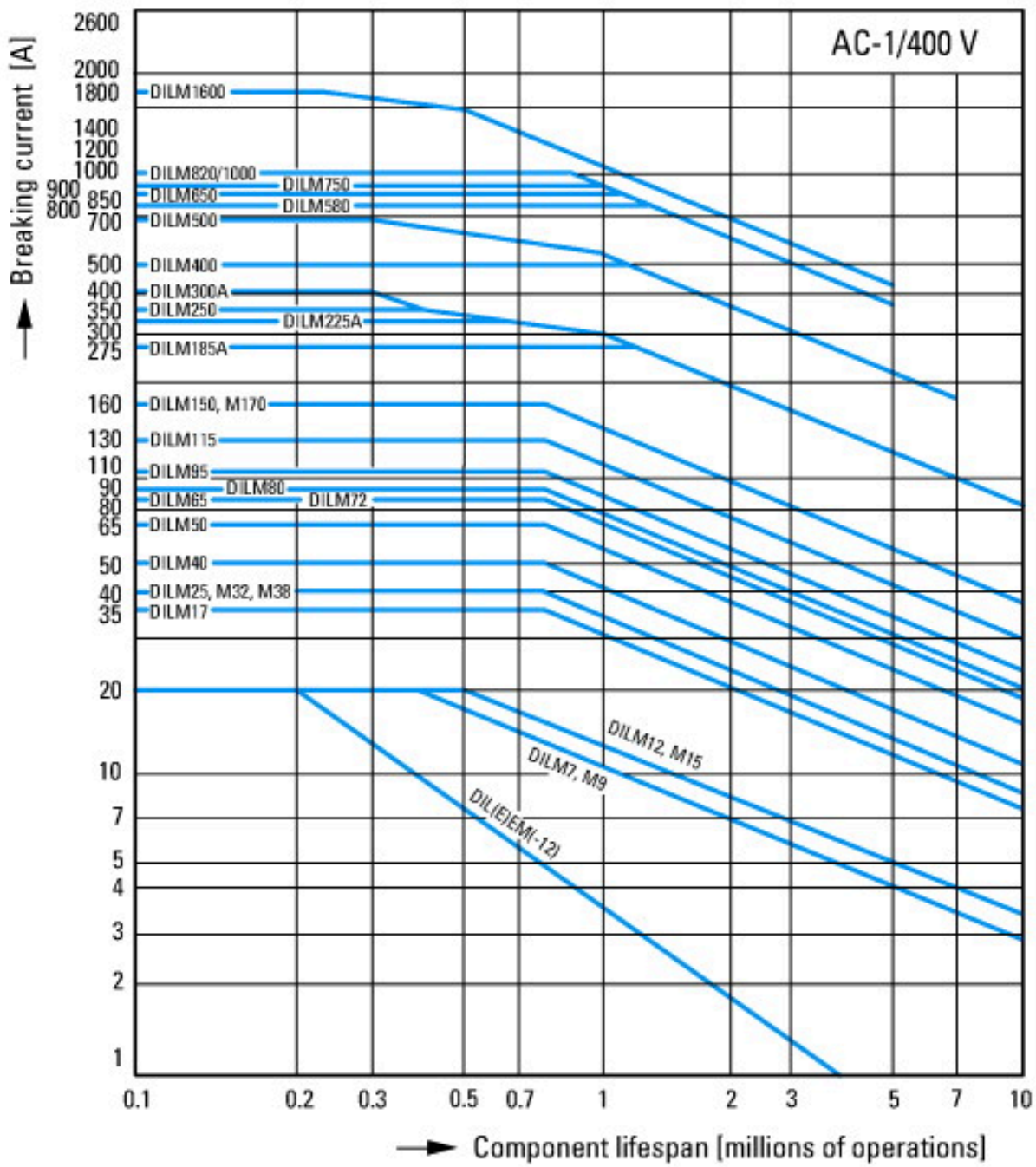




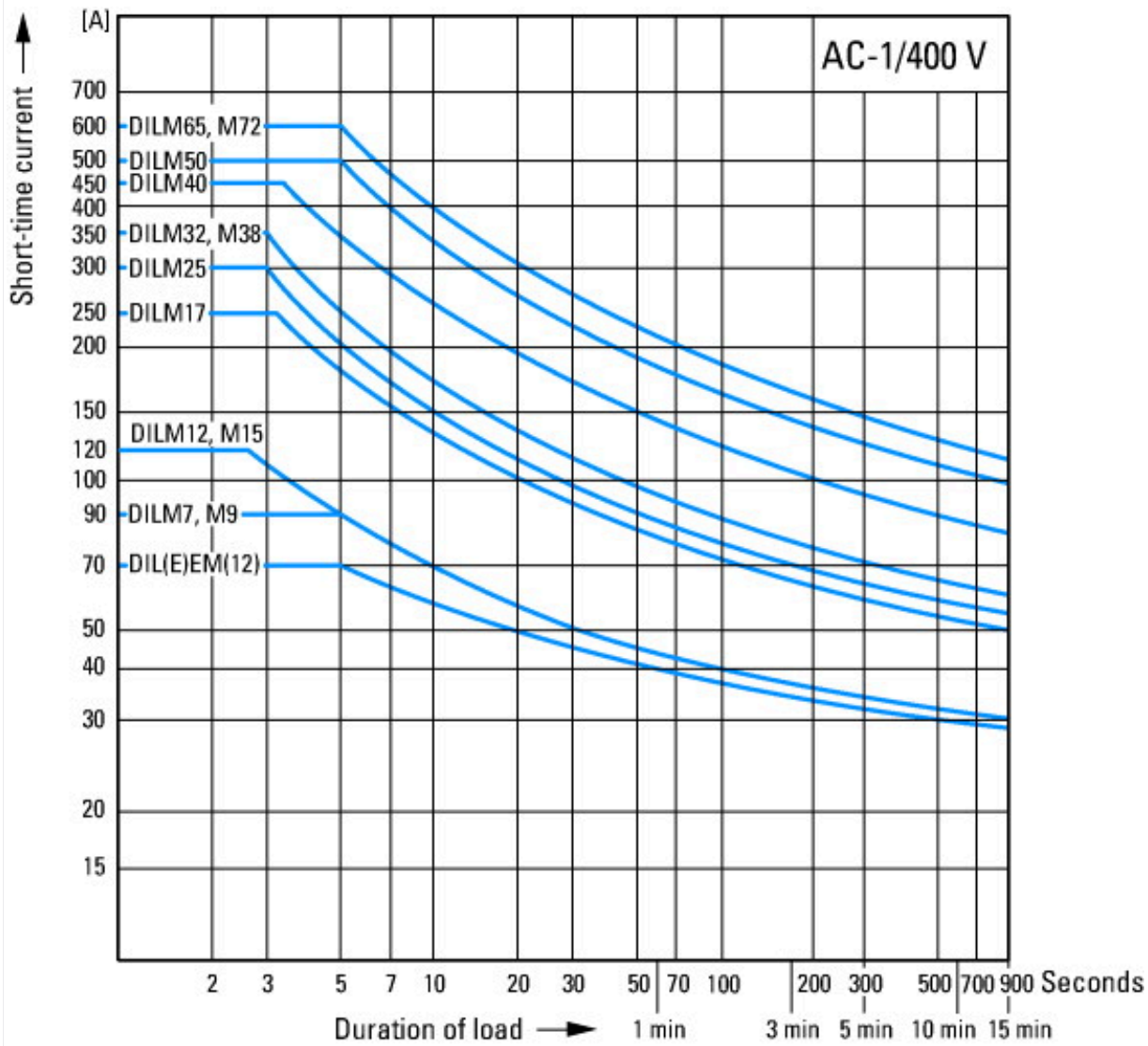
- Squirrel-cage motor
- Operating characteristics
- Starting: from rest
- Stopping: after attaining full running speed
- Electrical characteristics
- Make: up to 6 x rated motor current
- Break: up to 1 x rated motor current
- Utilization category
- 100 % AC-3
- Typical applications
- Compressors
- Lifts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



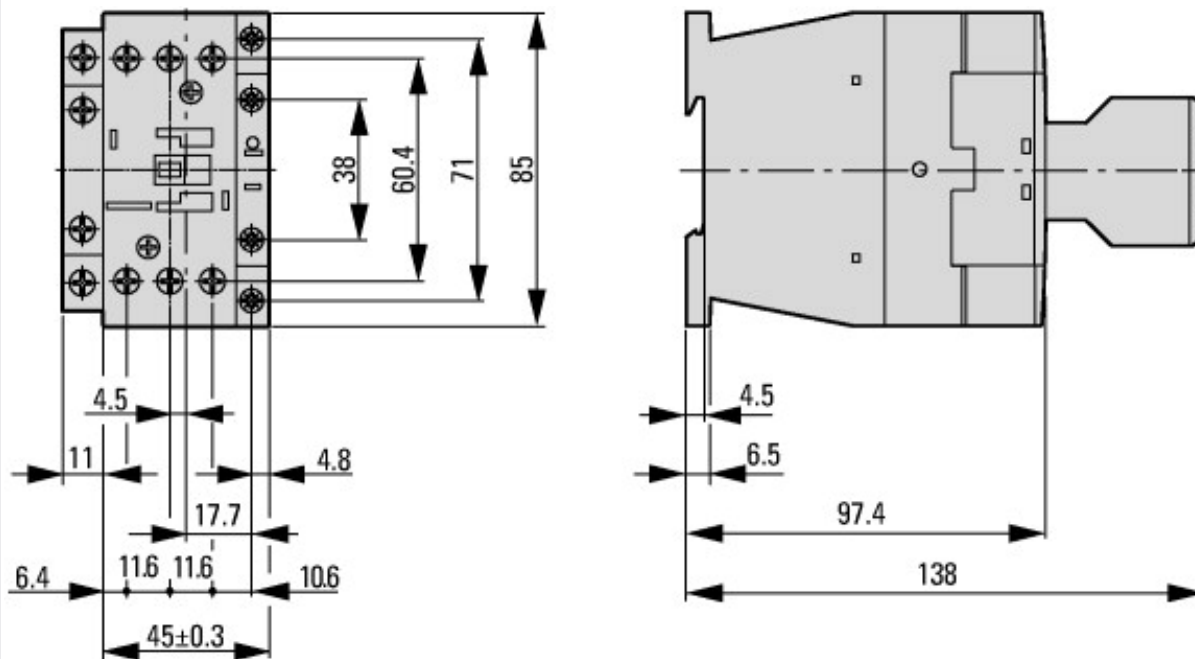
- Extreme switching duty
- Squirrel-cage motor
- Operating characteristics
- Inching, plugging, reversing
- Electrical characteristics
- Make: up to 6 x rated motor current
- Break: up to 6 x rated motor current
- Utilization category
- 100 % AC-4
- Typical applications
- Printing presses
- Wire-drawing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



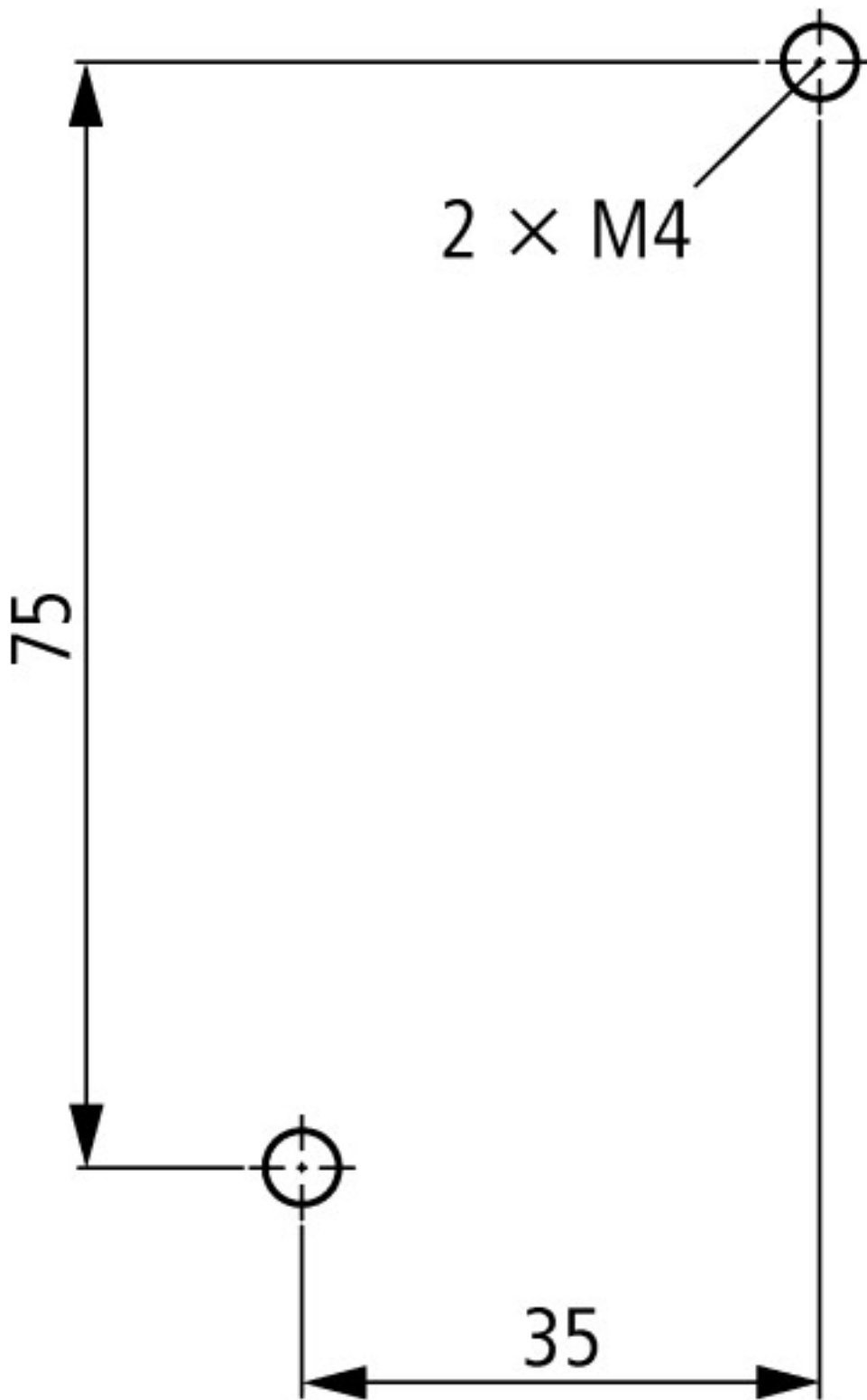
Switching conditions for 3 pole, non-motor loads  
 Operating characteristics  
 Non inductive and slightly inductive loads  
 Electrical characteristics:  
 Switch on: 1 × rated operational current  
 Switch off: 1 × rated operational current  
 Utility category  
 100 % AC-1  
 Type



### Dimensions



Contactors with auxiliary contact module



distance at side to earthed parts: 6 mm

### Additional product information (links)

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

