



**Contactor, 3p, 75kW/400V/AC3**

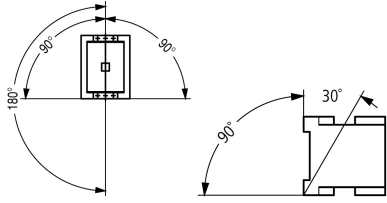
**Part no. DILM150(RAC24)**  
**Article no. 239585**  
**Catalog No. XTCE150G00T**

## Delivery program

|   |                |    |  |
|---|----------------|----|--|
| Product range   |                |    | Contactors   |
| Application   |                |    | Contactors for Motors  |
| Subrange  |                |    | Contactors up to 170 A, 3 pole   |
| Utilization category                                      |                |    | AC-1: Non-inductive or slightly inductive loads, resistance furnaces<br>NAC-3: Normal AC induction motors: starting, switch off during running<br>AC-4: Normal AC induction motors: starting, plugging, reversing, inching |
|   |                |    |  |
| Notes   |                |    | Also suitable for motors with efficiency class IE3.<br>IE3-ready devices are identified by the logo on their packaging.  |
| Connection technique                                      |                |    | Screw terminals  |
| Number of poles   |                |    | 3 pole   |
| <b>Rated operational current</b>                          |                |    |  |
| AC-3  |                |    |  |
| 380 V 400 V   | $I_e$          | A  | 150  |
| AC-1  |                |    |  |
| Conventional free air thermal current, 3 pole, 50 - 60 Hz |                |    |  |
| Open  |                |    |  |
| at 40 °C  | $I_{th} = I_e$ | A  | 190  |
| enclosed  | $I_{th}$       | A  | 144  |
| Conventional free air thermal current, 1 pole             |                |    |  |
| open  | $I_{th}$       | A  | 400  |
| enclosed  | $I_{th}$       | A  | 360  |
| <b>Max. rating for three-phase motors, 50 - 60 Hz</b>     |                |    |  |
| AC-3  |                |    |  |
| 220 V 230 V   | P              | kW | 48   |
| 380 V 400 V   | P              | kW | 75   |
| 660 V 690 V   | P              | kW | 96   |
| AC-4  |                |    |  |
| 220 V 230 V   | P              | kW | 20   |
| 380 V 400 V   | P              | kW | 33   |
| 660 V 690 V   | P              | kW | 48   |
| Contact sequence  |                |    |  |
| <b>Instructions</b>                                       |                |    | Contacts to EN 50012.<br>integrated suppressor circuit in actuating electronics  |
| Can be combined with auxiliary contact                    |                |    | DILM150-XHI(V)..<br>DILM1000-XHI(V)..  |
| Voltage AC/DC   |                |    | AC operation   |

## Technical data

|                      |            |               |                                 |
|----------------------|------------|---------------|---------------------------------|
| <b>General</b>       |            |               |                                 |
| Standards            |            |               | IEC/EN 60947, VDE 0660, UL, CSA |
| Lifespan, mechanical |            |               |                                 |
| AC operated          | Operations | $\times 10^6$ | 10                              |

|   |                                     |                   |  |
|---|-------------------------------------|-------------------|--|
| DC operated   | Operations                          | x 10 <sup>6</sup> | 10   |
| Operating frequency, mechanical                                       |                                     |                   |  |
| AC operated   | Operations/h                        |                   | 3600   |
| 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  |                                     |                   |  |
| AC operated   |                                     | kg                | 2  |
| DC operated   |                                     | kg                | 2.1  |
| 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               | 8...3/0  |
| Flat conductor  | Lamellenzahl<br>x Breite x<br>Dicke | mm                | 2 x (6 x 16 x 0.8)   |
| Main cable connection screw/bolt                                      |                                     |                   |  |
|   |                                     |                   | M10  |
| Tightening torque   |                                     |                   |  |
|   |                                     |                   | Nm 14  |
| Terminal capacity control circuit cables                              |                                     |                   |  |
| Solid   |                                     | mm <sup>2</sup>   | 1 x (0.75 - 4)<br>2 x (0.75 - 4)   |
| 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  |
| Control circuit cable connection screw/bolt                           |                                     |                   |  |
|   |                                     |                   | M3.5   |
| Tightening torque   |                                     |                   |  |
|   |                                     |                   | Nm 1.2   |
| Tool  |                                     |                   |  |
| Main cable  |                                     |                   |  |
| Hexagon socket-head spanner   | SW                                  | mm                | 5  |
| Control circuit cables  |                                     |                   |  |

|                      |      |                    |
|----------------------|------|--------------------|
| 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    | 2100  |
| Breaking capacity                      |                |      |       |
| 220 V 230 V                            |                | A    | 1500  |
| 380 V 400 V                            |                | A    | 1500  |
| 500 V                                  |                | A    | 1500  |
| 660 V 690 V                            |                | A    | 1200  |
| 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   | 190 |
| at 50 °C  | $I_{th} = I_e$ | A   | 180 |
| at 55 °C  | $I_{th} = I_e$ | A   | 170 |
| at 60 °C  | $I_{th} = I_e$ | A   | 160 |
| enclosed  | $I_{th}$       | A   | 144 |
| Conventional free air thermal current, 1 pole             |                |     |     |
| open  | $I_{th}$       | A   | 400 |
| enclosed  | $I_{th}$       | A   | 360 |
| AC-3  |                |     |     |
| Rated operational current                                 |                |     |     |
| Open, 3-pole: 50 – 60 Hz                                  |                |     |     |
| 220 V 230 V   | $I_e$          | A   | 150 |
| 240 V   | $I_e$          | A   | 150 |
| 380 V 400 V   | $I_e$          | A   | 150 |
| 415 V   | $I_e$          | A   | 150 |
| 440V  | $I_e$          | A   | 150 |
| 500 V   | $I_e$          | A   | 150 |
| 660 V 690 V   | $I_e$          | A   | 100 |
| 380 V 400 V   | $I_e$          | A   | 150 |
| Motor rating  | P              | kWh |     |
| 220 V 230 V   | P              | kW  | 48  |
| 240V  | P              | kW  | 52  |
| 380 V 400 V   | P              | kW  | 75  |
| 415 V   | P              | kW  | 91  |

|                          |                |    |     |
|--------------------------|----------------|----|-----|
| 440 V                    | P              | kW | 95  |
| 500 V                    | P              | kW | 110 |
| 660 V 690 V              | P              | kW | 96  |
| <b>AC-4</b>              |                |    |     |
| Open, 3-pole: 50 – 60 Hz |                |    |     |
| 220 V 230 V              | I <sub>e</sub> | A  | 65  |
| 240 V                    | I <sub>e</sub> | A  | 65  |
| 380 V 400 V              | I <sub>e</sub> | A  | 65  |
| 415 V                    | I <sub>e</sub> | A  | 65  |
| 440 V                    | I <sub>e</sub> | A  | 65  |
| 500 V                    | I <sub>e</sub> | A  | 65  |
| 660 V 690 V              | I <sub>e</sub> | A  | 50  |
| Motor rating             |                |    |     |
| 220 V 230 V              | P              | kW | 20  |
| 240 V                    | P              | kW | 22  |
| 380 V 400 V              | P              | kW | 33  |
| 415 V                    | P              | kW | 39  |
| 440 V                    | P              | kW | 41  |
| 500 V                    | P              | kW | 47  |
| 660 V 690 V              | P              | kW | 48  |

## DC

|                                 |                |   |     |
|---------------------------------|----------------|---|-----|
| Rated operational current, open |                |   |     |
| <b>DC-1</b>                     |                |   |     |
| 60 V                            | I <sub>e</sub> | A | 160 |
| 110 V                           | I <sub>e</sub> | A | 160 |
| 220 V                           | I <sub>e</sub> | A | 90  |
| 440 V                           | I <sub>e</sub> | A | 4.5 |
| <b>DC-3</b>                     |                |   |     |
| 60 V                            | I <sub>e</sub> | A | 160 |
| 110 V                           | I <sub>e</sub> | A | 160 |
| 220 V                           | I <sub>e</sub> | A | 40  |
| 440 V                           | I <sub>e</sub> | A | 1   |
| <b>DC-5</b>                     |                |   |     |
| 60 V                            | I <sub>e</sub> | A | 160 |
| 110 V                           | I <sub>e</sub> | A | 160 |
| 220 V                           | I <sub>e</sub> | A | 40  |
| 440 V                           | I <sub>e</sub> | A | 1   |

## Current heat loss

|   |    |      |
|---|----|------|
| 3-pole at I <sub>th</sub>                         | W  | 41.1 |
| Current heat loss at I <sub>e</sub> to AC-3/400 V | W  | 32.1 |
| Impedance per pole                                | mΩ | 0.6  |

## Magnet systems

|  |   |                  |            |
|--|---|------------------|------------|
| Voltage tolerance  |   |                  |            |
| AC operated  | Pick-up   | x U <sub>c</sub> | 0.8 - 1.15 |
| Drop-out voltage AC operated   | Drop-out  | x U <sub>c</sub> | 0.25 - 0.6 |
| DC operated  | Pick-up   | x U <sub>c</sub> | 0.7 - 1.2  |
| 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>c</sub> |   |                  |            |
| 50 Hz  | Pick-up   | VA               | 180        |
| 50 Hz  | Sealing   | VA               | 3.1        |
| 50 Hz  | Sealing   | W                | 2.1        |
| 60 Hz  | Pick-up   | VA               | 170        |
| 60 Hz  | Sealing   | VA               | 3.1        |

|  |         |                   |   |
|--|---------|-------------------|---|
| 60 Hz  | Sealing | W                 | 2.1   |
| 50/60 Hz   | Pick-up | VA                | 170<br>170  |
| 50/60 Hz   | Sealing | VA                | 3.1<br>3.1  |
| 50/60 Hz   | Sealing | W                 | 2.1   |
| DC operated  | Pick-up | W                 | 149   |
| DC operated  | Sealing | W                 | 2.1   |
| Duty factor  |         | % DF              | 100   |
| Changeover time at 100 % U <sub>C</sub> (recommended value)                                |         |                   |   |
| Main contacts  |         |                   |   |
| AC operated  |         |                   |   |
| Closing delay  |         | ms                | 28 - 33   |
| Opening delay  |         | ms                | 35 - 41   |
| DC operated  |         |                   |   |
| 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                | $\leq 1$  |
| 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 |

### Design verification as per IEC/EN 61439

|  |                   |    |  |
|--|-------------------|----|--|
| Technical data for design verification   |                   |    |  |
| Rated operational current for specified heat dissipation   | I <sub>n</sub>    | A  | 150  |
| Heat dissipation per pole, current-dependent   | P <sub>vid</sub>  | W  | 10.7   |
| Equipment heat dissipation, current-dependent  | P <sub>vid</sub>  | W  | 32.1   |
| Static heat dissipation, non-current-dependent   | P <sub>vs</sub>   | W  | 2.3  |
| Heat dissipation capacity  | P <sub>diss</sub> | 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.                             |

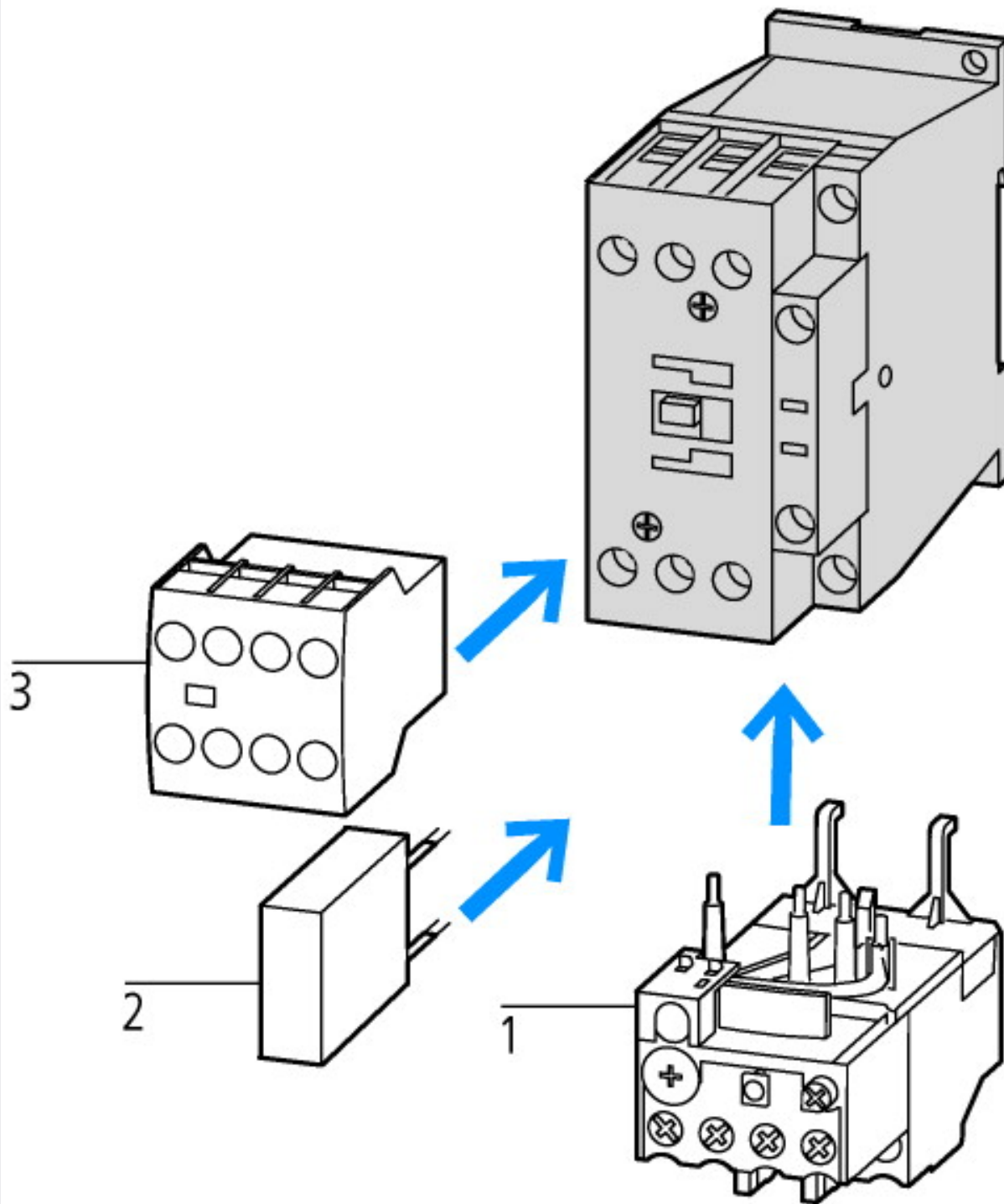
|                                     |  |  |
|-------------------------------------|--|--|
| 10.10 Temperature rise              |  | The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices. |
| 10.11 Short-circuit rating          |  | 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 6.0

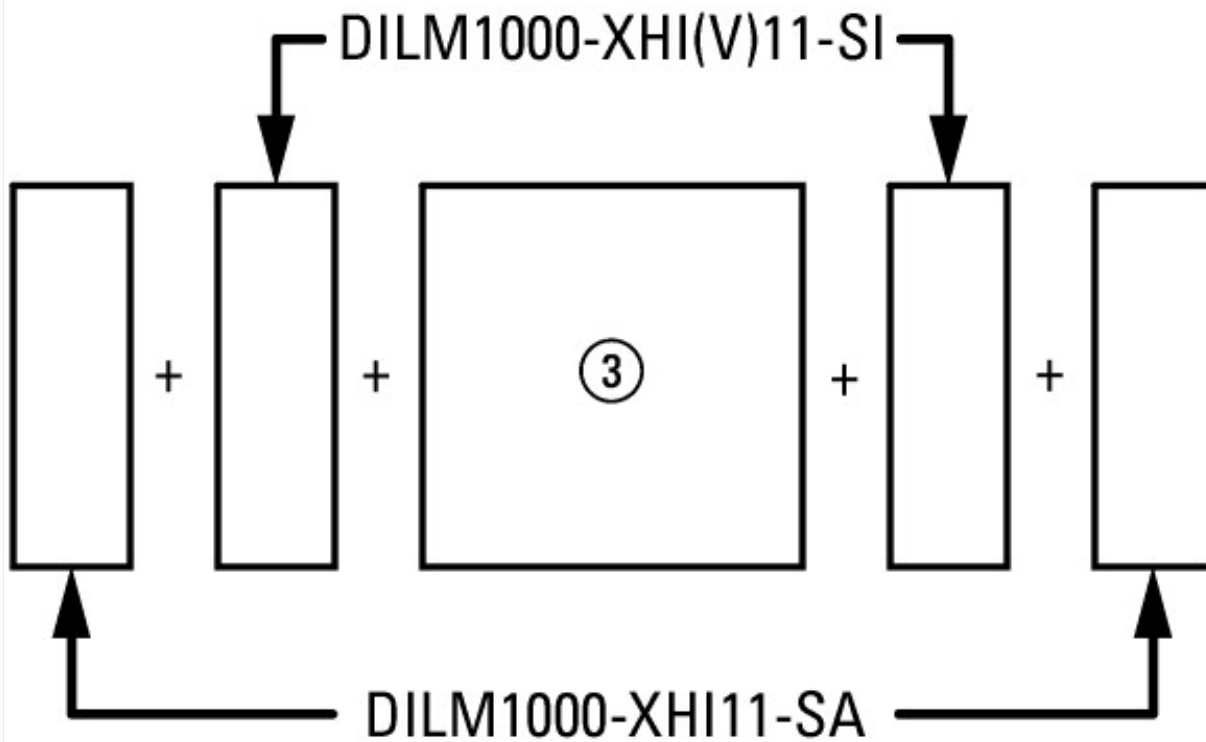
|  |    |                  |
|--|----|------------------|
| Low-voltage industrial components (EG000017) / Power contactor, AC switching (EC000066)  |    |                  |
| Electric engineering, automation, process control engineering / Low-voltage switch technology / Contactor (LV) / Power contactor, AC switching (ecl@ss8.1-27-37-10-03 [AAB718012]) |    |                  |
| Rated control supply voltage Us at AC 50HZ   | V  | 24 - 24          |
| Rated control supply voltage Us at AC 60HZ   | V  | 24 - 24          |
| Rated control supply voltage Us at DC  | V  | 0 - 0            |
| Voltage type for actuating   |    | AC               |
| Rated operation current Ie at AC-1, 400 V  | A  | 190              |
| Rated operation current Ie at AC-3, 400 V  | A  | 150              |
| Rated operation power at AC-3, 400 V   | kW | 75               |
| Rated operation current Ie at AC-4, 400 V  | A  | 65               |
| Rated operation power Ie at AC-4, 400 V  | kW | 33               |
| 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

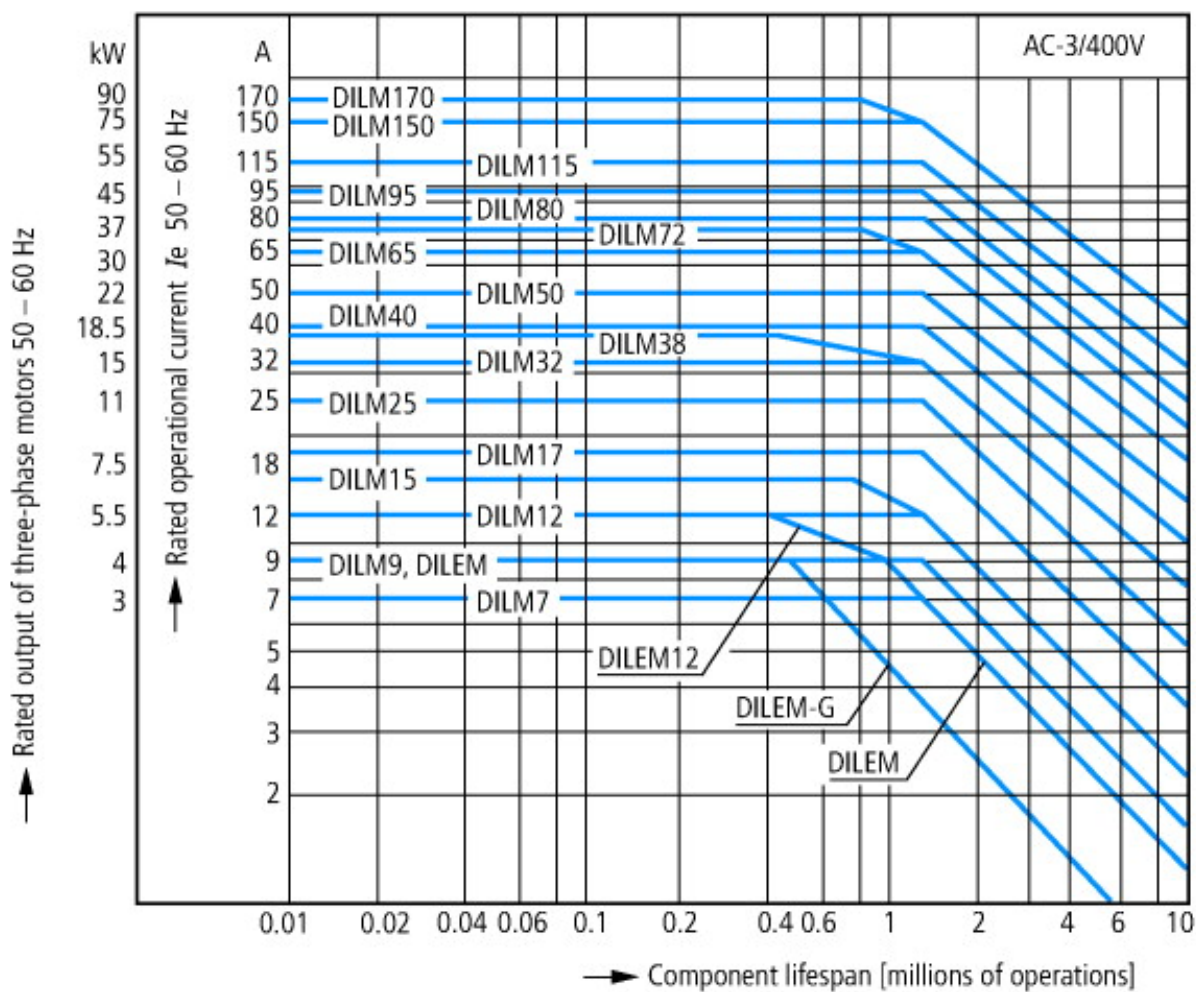
|                                      |  |   |
|--------------------------------------|--|---|
| Product Standards                    |  | IEC/EN 60947-4-1; UL 508; CSA-C22.2 No. 14-05; CE marking |
| UL File No.                          |  | E29096  |
| UL Category Control No.              |  | NLDX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



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



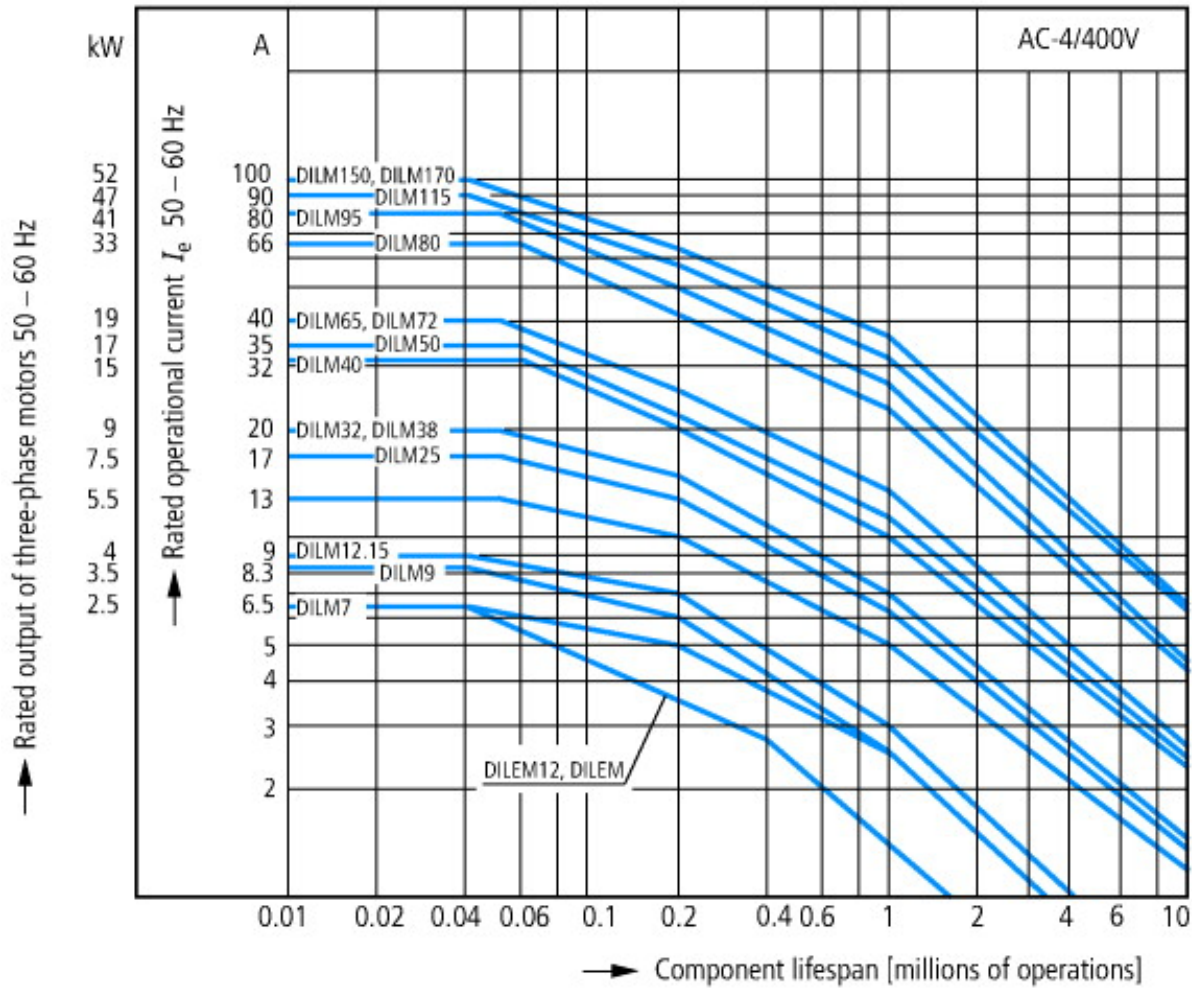
on the side: 2 x DILM820-XHI11(V)-SI; 2 x DILM820-XHI11-SA



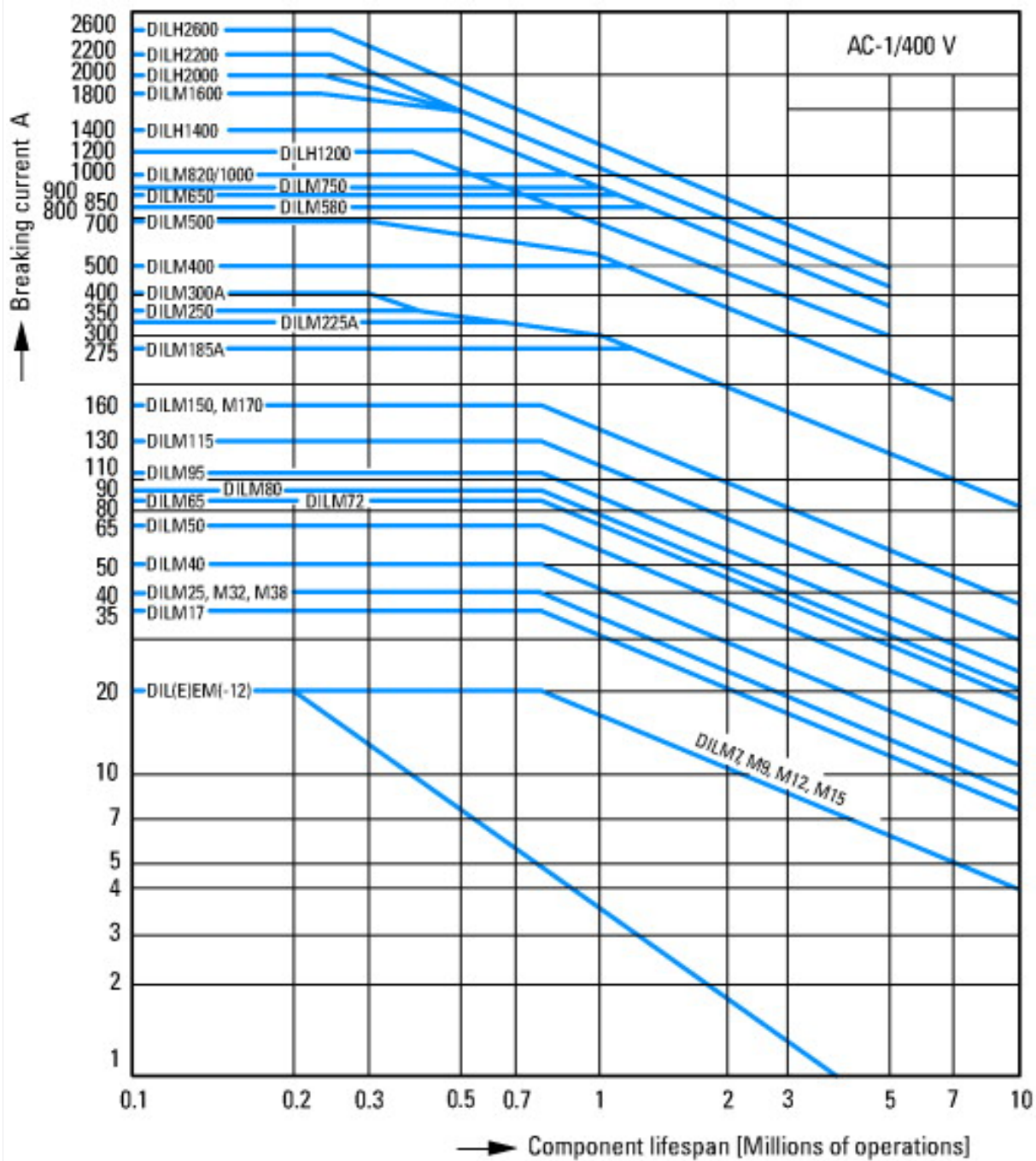
Squirrel-cage motor  
 Operating characteristics  
 Starting: from rest  
 Stopping: after attaining full running speed  
 Electrical characteristics  
 Make: up to 6 x rated motor current  
 Break: up to 1 x rated motor current  
 Utilization category  
 100 % AC-3  
 Typical applications



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

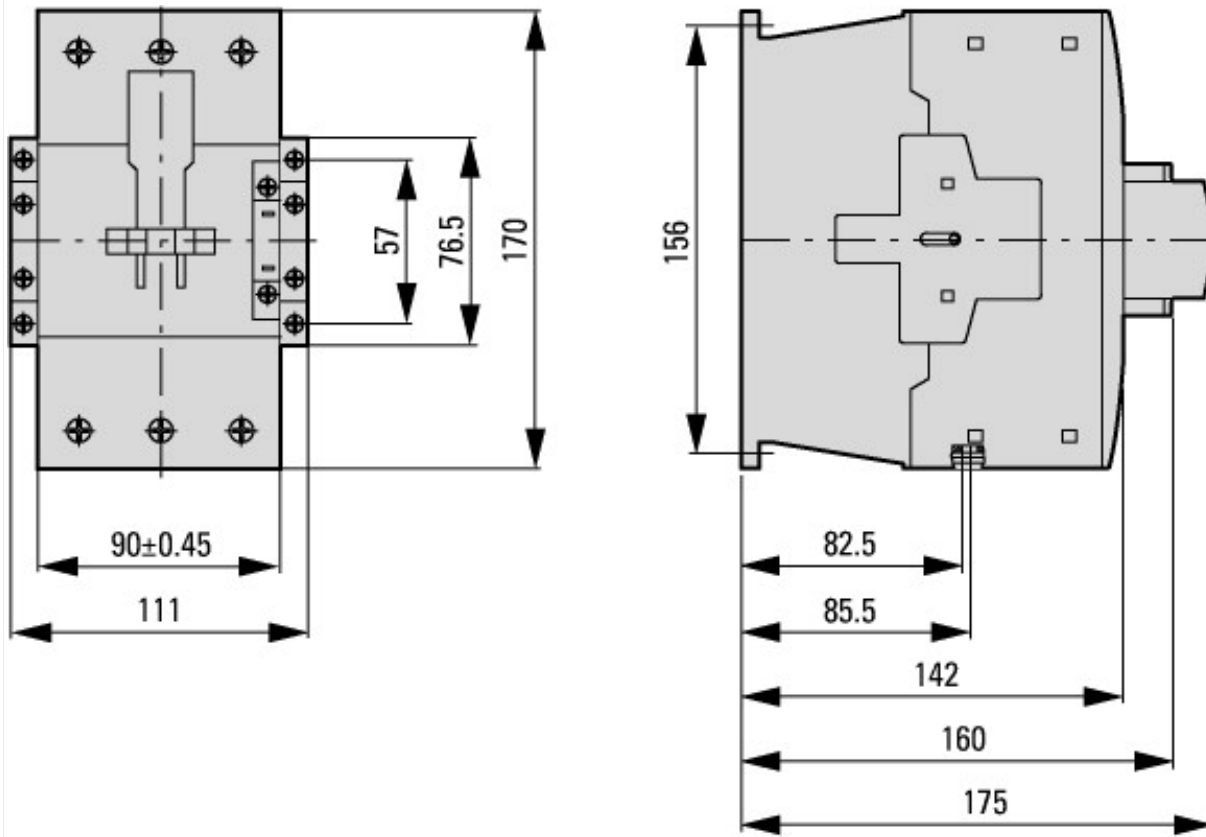


- Extreme switching duty
- Squirrel-cage motor
- Operating characteristics
- Inching, plugging, reversing
- Electrical characteristics
- Make: up to 6 x rated motor current
- Break: up to 6 x rated motor current
- Utilization category
- 100 % AC-4
- Typical applications
- Printing presses
- Wire-drawing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

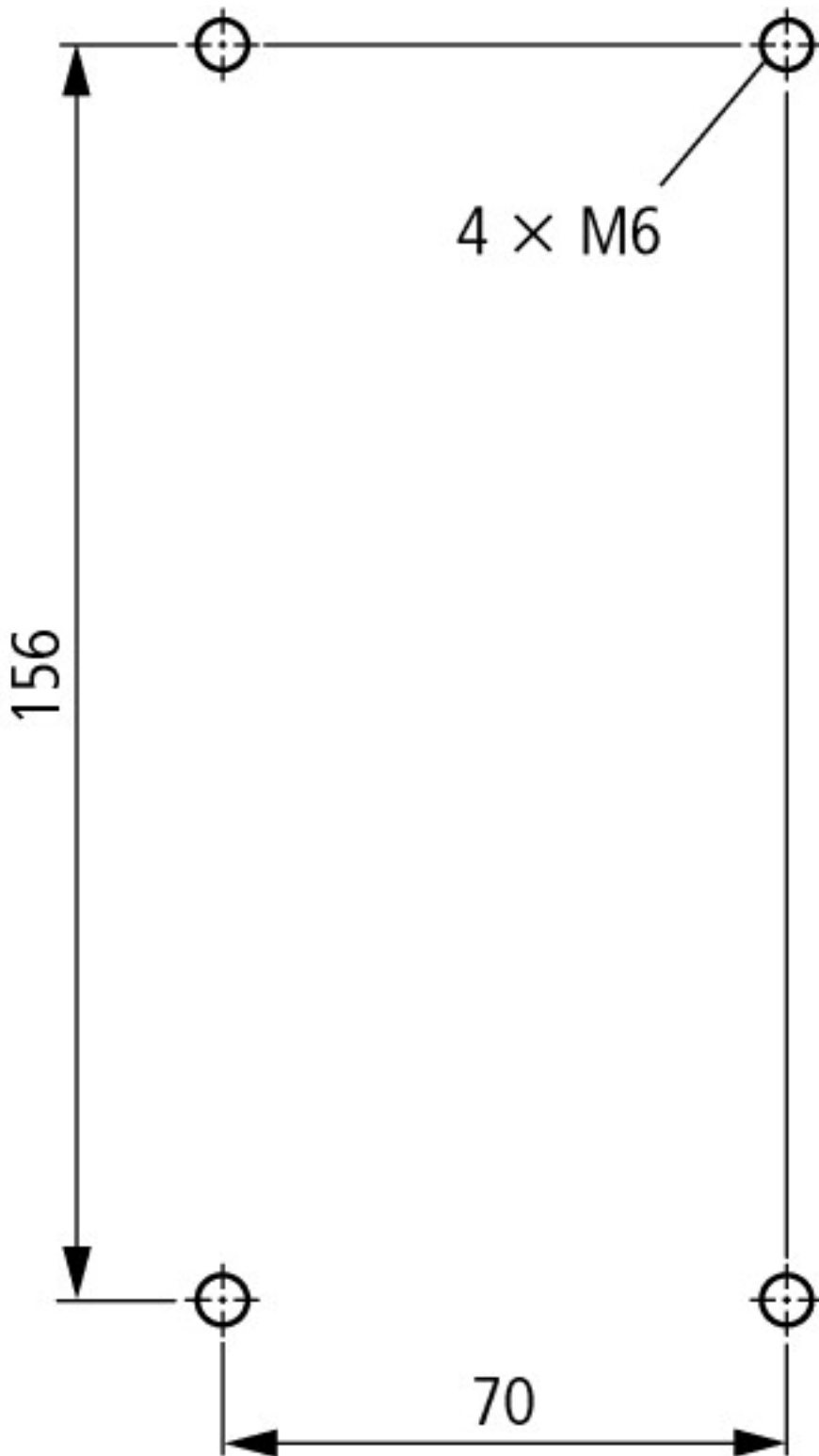


Switching conditions for non-motor consumers, 3 pole, 4 pole  
 Operating characteristics  
 Non inductive and slightly inductive loads  
 Electrical characteristics  
 Switch on: 1 x rated operational current  
 Switch off: 1 x rated operational current  
 Utilization category  
 100 % AC-1  
 Typical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

## Dimensions



Contacteur with auxiliary contact module



distance at side to earthed parts: 10 mm

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

## Additional product information (links)

### IL03407039Z (AWA2100-2286) Contactors

|  |   |
|--|---|
| IL03407039Z (AWA2100-2286) Contactors  | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407039Z2010_10.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL03407039Z2010_10.pdf</a> |
| UL/CSA: Approved rating data   | <a href="http://de.ecat.moeller.net/flip-cat/?edition=HPLTE&amp;startpage=5.84">http://de.ecat.moeller.net/flip-cat/?edition=HPLTE&amp;startpage=5.84</a>             |
| UL/CSA: UL/CSA: Special Purpose Rating   | <a href="http://de.ecat.moeller.net/flip-cat/?edition=HPLTE&amp;startpage=5.85">http://de.ecat.moeller.net/flip-cat/?edition=HPLTE&amp;startpage=5.85</a>             |
| UL/CSA: UL/CSA: Short Circuit Current Rating (SCCR)                            | <a href="http://de.ecat.moeller.net/flip-cat/?edition=HPLTE&amp;startpage=5.86">http://de.ecat.moeller.net/flip-cat/?edition=HPLTE&amp;startpage=5.86</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>                                     |

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| 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> |
| Motor starters and "Special Purpose Ratings" for the North American market                     | <a href="http://www.moeller.net/binary/ver_techpapers/ver953en.pdf">http://www.moeller.net/binary/ver_techpapers/ver953en.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> |