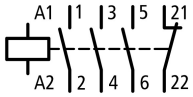
# Contactor,4kW/400V,DC-operated

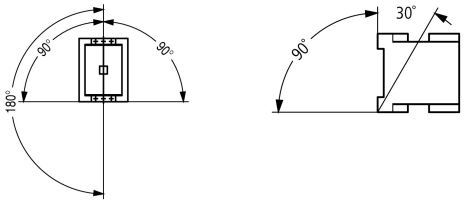
**Part no.** DILM9-01(24VDC)

**Article no.** 276740

## Delivery programme

| | | | |
|---|---|---|---|
| Connection technique | | | Screw terminals |
| Actuating voltage | | | 24 V DC |
| Voltage AC/DC | | | DC operation |
| | | | 3 pole |
| Rated operational current | | | |
| AC-3 | | | |
| 380 V 400 V | $I_e$ | A | 9 |
| Max. rating for three-phase motors, 50 – 60 Hz | | | |
| AC-3 | | | |
| 220 V 230 V | *P* | kW | 2.5 |
| 380 V 400 V | *P* | kW | 4 |
| 660 V 690 V | *P* | kW | 4.5 |
| AC-4 | | | |
| 220 V 230 V | *P* | kW | 1.5 |
| 380 V 400 V | *P* | kW | 2.5 |
| 660 V 690 V | *P* | kW | 3.6 |
| Conventional free air thermal current $I_{th} = I_e$ AC-1 at 60 °C | | | |
| Open | $I_{th} = I_e$ | A | 20 |
| Contacts | | | |
| N/C = Normally closed | | | 1 N/C |
| Contact sequence | | |   |
| Can be combined with auxiliary contact | | | DILA-XHI(V).. |

## General

| | | | |
|---|---|---|---|
| Standards | | | IEC/EN 60947, VDE 0660, UL, CSA |
| Lifespan, mechanical | | | |
| AC operated | Operations | × $10^6$ | 10 |
| DC operated | Operations | × $10^6$ | 10 |
| Operating frequency, mechanical | | | |
| AC operated | Operations/h | | 9000 |
| DC operated | Operations/h | | 9000 |
| Climatic proofing | | | Damp heat, constant, to IEC 60068-2-78<br>Damp heat, cyclical, to IEC 60068-2-30 |
| Ambient temperature | | °C | |
| Open | | °C | – 25 … 60 |
| Enclosed | | °C | - 25 … 40 |
| Storage | | °C | – 40 - 80 |
| Mounting position, AC- and DC operated | | |   |
| 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 | 5.7 |
| Auxiliary contacts | | |
| N/O contact | g | 3.4 |
| N/C contact | g | 3.4 |
| Protection type | | IP20 |
| Protection against direct contact when actuated from front (IEC 536) | | Finger- and back-of-hand proof |
| Weight | | |
| AC operated | kg | 0.23 |
| DC operated | kg | 0.28 |
| Terminal capacity main cable | | |
| Solid | $mm^2$ | 1 × (0.75 – 4)<br>2 × (0.75 – 2.5) |
| Flexible with ferrule | $mm^2$ | 1 × (0.75 – 2.5)<br>2 × (0.75 – 2,5) |
| Solid or stranded | AWG | 18 – 10 |
| Main cable connection screw/bolt | | M3.5 |
| Tightening torque | Nm | 1.2 |
| Terminal capacity control circuit cables | | |
| Solid | $mm^2$ | 1 × (0.75 – 4)<br>2 × (0.75 – 2.5) |
| Flexible with ferrule | $mm^2$ | 1 × (0.75 – 2.5)<br>2 × (0.75 – 2.5) |
| Solid or stranded | AWG | 18 – 10 |
| Control circuit cable connection screw/bolt | | M3.5 |
| Tightening torque | Nm | 1.2 |
| Tool | | |
| Main cable | | |
| Pozidriv screwdriver | Size | 2 |
| Standard screwdriver | mm | 0.8 × 5.5<br>1 × 6 |
| Control circuit cables | | |
| Pozidriv screwdriver | Size | 2 |
| Standard screwdriver | mm | 0.8 × 5.5<br>1 × 6 |
| Terminal capacity main cable | | |
| Solid | $mm^2$ | 1 × (0.75 – 2.5)<br>2 × (0.75 – 2.5) |
| flexible | $mm^2$ | 1 × (0.75 – 2.5)<br>2 × (0.75 – 2.5) |
| flexible with ferrules | $mm^2$ | 1 × (0.75 – 1.5)<br>2 × (0.75 – 1.5) |
| Solid or stranded | AWG | 18 – 14 |
| Terminal capacity control circuit cables | | |
| Solid | $mm^2$ | 1 × (0.75 – 2.5)<br>2 × (0.75 – 2.5) |
| Flexible | $mm^2$ | 1 × (0.75 – 1.5)<br>2 × (0.75 – 1.5) |
| Flexible with ferrule | $mm^2$ | 1 × (0.75 – 1.5)<br>2 × (0.75 – 1.5) |
| Solid or stranded | AWG | 18 – 14 |

| | | | |
|---|---|---|---|
| Tool | | | |
| Stripping length | | mm | 10 |
| Screwdriver blade width | | mm | 3.5 |

## 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 VDE 0106 Part 101 and Part 101/A1 | | | |
| between coil and contacts | | V AC | 400 |
| between the contacts | | V AC | 400 |
| Making capacity (p.f. to IEC/EN 60947) | | | |
| | Up to 690 V | A | 112 |
| Breaking capacity | | | |
| 230 V | | A | 90 |
| 380/400 V | | A | 90 |
| 500 V | | A | 70 |
| 660/690 V | | A | 50 |
| Short-circuit rating | | | |
| Short-circuit protection maximum fuse | | | |
| Type “2” coordination | | | |
| 400 V | gG/gL 500 V | A | 20 |
| 690 V | gG/gL 690 V | A | 16 |
| Type “1” coordination | | | |
| 400 V | gG/gL 500 V | A | 35 |
| 690 V | gG/gL 690 V | A | 20 |

## AC

| | | | |
|---|---|---|---|
| AC-1 duty | | | |
| conv. therm. current 3 pole 50 – 60 Hz | | | |
| open | | | |
| at 40 °C | $I_{th}$ | A | 22 |
| at 50 °C | $I_{th}$ | A | 21 |
| at 55 °C | $I_{th}$ | A | 21 |
| at 60 °C | $I_{th}$ | A | 20 |
| enclosed | $I_{th}$ | A | 18 |
| Conventional free air thermal current, 1 pole | | | |
| open | $I_{th}$ | A | 50 |
| enclosed | $I_{th}$ | A | 45 |
| AC-3 duty | | | |
| Rated operational current AC-3 open, 50 – 60 Hz, 3 pole | $I_e$ | | |
| 230 V | $I_e$ | A | 9 |
| 240 V | $I_e$ | A | 9 |
| 380/400 V | $I_e$ | A | 9 |
| 415 V | $I_e$ | A | 9 |
| 440V | $I_e$ | A | 9 |
| 500 V | $I_e$ | A | 7 |
| 660/690 V | $I_e$ | A | 5 |
| Motor rating | *P* | *P* | |
| 230 V | *P* | kW | 2.5 |
| 240V | *P* | kW | 3 |
| 380/400 V | *P* | kW | 4 |
| 415 V | *P* | kW | 5.5 |
| 440 V | *P* | kW | 5.5 |
| 500 V | *P* | kW | 4.5 |

| | | | |
|---|---|---|---|
| 660/690 V | *P* | kW | 4.5 |
| AC-4 duty | | | |
| Rated operational current AC-4 open, 50 – 60 Hz, 3 pole | $I_e$ | | |
| 230 V | $I_e$ | A | 6 |
| 240 V | $I_e$ | A | 6 |
| 380/400 V | $I_e$ | A | 6 |
| 415 V | $I_e$ | A | 6 |
| 440 V | $I_e$ | A | 6 |
| 500 V | $I_e$ | A | 5 |
| 660/690 V | $I_e$ | A | 4.5 |
| Motor rating | *P* | *P* | |
| 230 V | *P* | kW | 1.5 |
| 240 V | *P* | kW | 1.6 |
| 380/400 V | *P* | kW | 2.5 |
| 415 V | *P* | kW | 2.8 |
| 440 V | *P* | kW | 3 |
| 500 V | *P* | kW | 2.8 |
| 660/690 V | *P* | kW | 3.6 |

## DC

| | | | |
|---|---|---|---|
| Rated operational current, open | | | |
| DC-1 operation | | | |
| 60 V | $I_e$ | A | 20 |
| 110 V | $I_e$ | A | 20 |
| 220 V | $I_e$ | A | 15 |
| 440 V | $I_e$ | A | 1.3 |
| DC-3 operation | | | |
| 60 V | $I_e$ | A | 20 |
| 110 V | $I_e$ | A | 20 |
| 220 V | $I_e$ | A | 1.5 |
| 440 V | $I_e$ | A | 0.2 |
| DC-5 operation | | | |
| 60 V | $I_e$ | A | 20 |
| 110 V | $I_e$ | A | 20 |
| 220 V | $I_e$ | A | 1.5 |
| 440 V | $I_e$ | A | 0.2 |

## Current heat loss (3 pole)

| | | | |
|---|---|---|---|
| Current heat loss at $\mathbf{I_{th}}$ | | W | 3 |
| Current heat loss at $I_e$ to AC-3/400 V | | W | 0.6 |
| Impedance per pole | | m# | 2.5 |

## Magnet systems

| | | | |
|---|---|---|---|
| Voltage tolerance | | × $U_c$ | |
| AC operated | Pick-up | × $U_c$ | 0.8 … 1.1 |
| Drop-out voltage AC operated | Drop-out | × $U_c$ | 0.3 … 0.6 |
| DC operated | Pick-up | × $U_c$ | 0.8 … 1.1 |
| DC operated | Drop-out | × $U_c$ | 0.15 … 0.6 |
| Power consumption of the coil in a cold state and 1.0 × $U_c$ | | | |
| 50 Hz | Pick-up | VA | 24 |
| 50 Hz | Sealing | VA | 3.4 |
| 50 Hz | Sealing | W | 1.2 |
| 60 Hz | Pick-up | VA | 30 |
| 60 Hz | Sealing | VA | 4.4 |
| 60 Hz | Sealing | W | 1.4 |
| 50/60 Hz | Pick-up | VA | 27<br>25 |

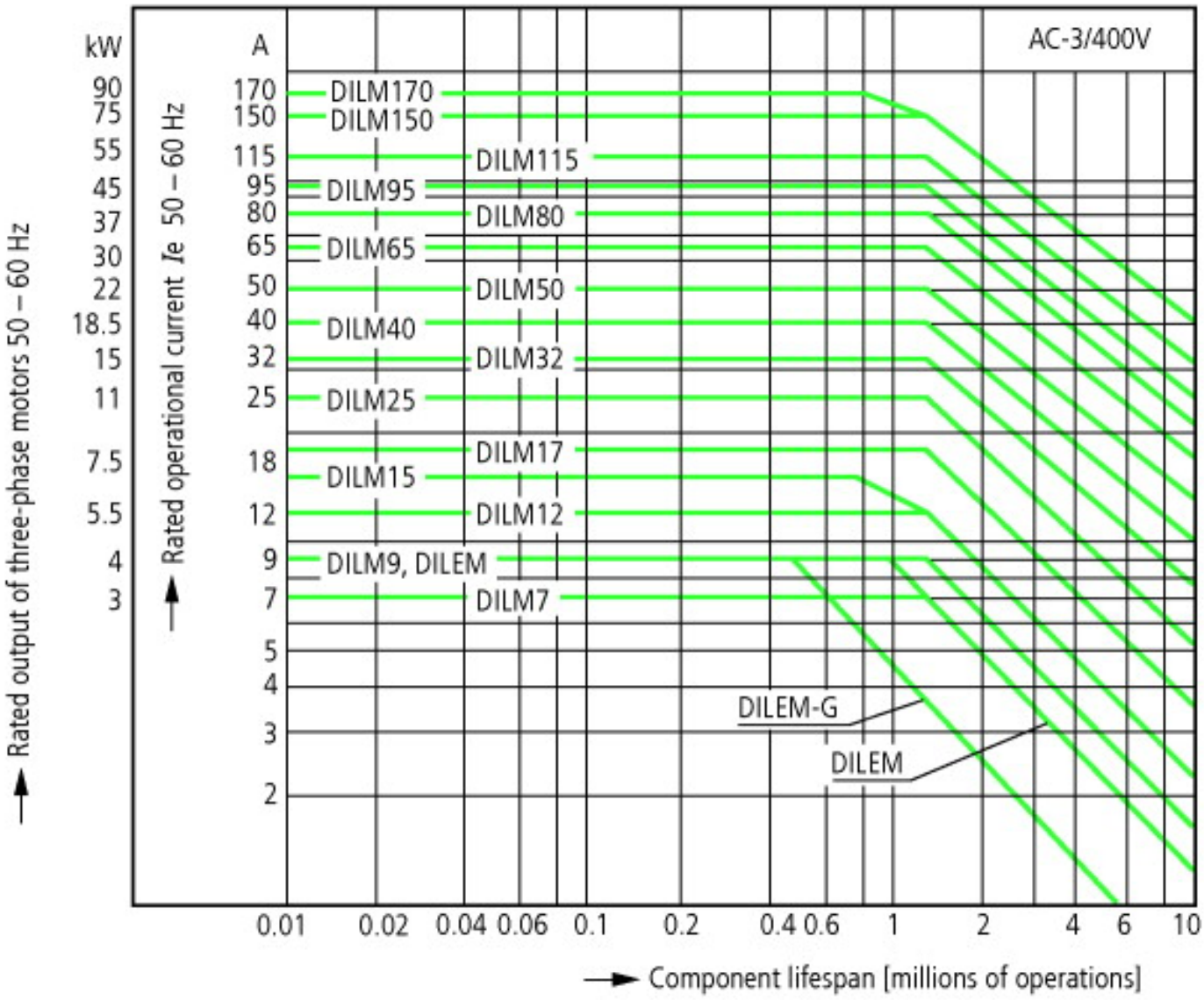
| | | | |
|---|---|---|---|
| 50/60 Hz | Sealing | VA | 4.2<br>3.3 |
| 50/60 Hz | Sealing | W | 1.4<br>1.2 |
| DC operated | Pick-up | W | 3 |
| DC operated | Sealing | W | 3 |
| Duty factor | | % DF | 100 |
| Switching times at 100 % $U_c$ (approximate values) | | | |
| Main contacts | | | |
| AC operated | | | |
| Closing delay | | ms | 15 … 21 |
| Opening delay | | ms | 9 … 18 |
| DC operated | | ms | |
| Closing delay | | ms | 31 |
| Opening delay | | ms | 12 |
| Arcing time | | ms | 10 |
| Lifespan, mechanical; Coil 50/60 Hz | at 50 Hz | | Mechanical lifespan at 50 Hz approx. 30% lower than under “Technical data, general” |

## Electromagnetic compatibility (EMC)

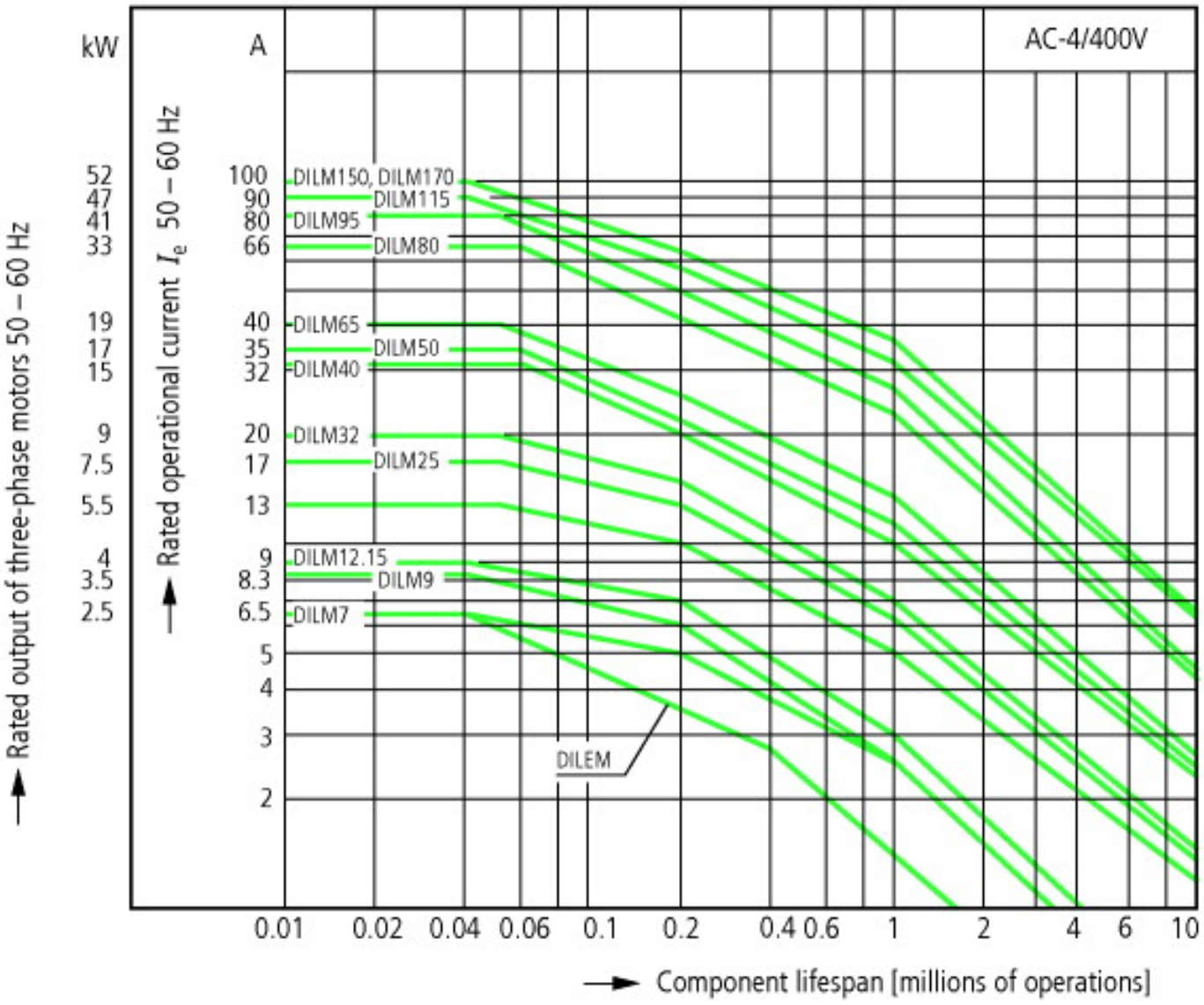
| | | | |
|---|---|---|---|
| Emitted interference | | | to EN 60947-1 |
| Interference immunity | | | to EN 60947-1 |

## Notes

**Notes** The following applies to magnet systems, voltage tolerance, pickup voltage DC-operated DILM17 – DILM32:
RDC 24 ($U_{min}$ 24 V DC/$U_{max}$ 27 V DC)
RDC 60 ($U_{min}$ 48 V DC/$U_{max}$ 60 V DC)
RDC 130 ($U_{min}$ 110 V DC/$U_{max}$ 130 V DC)
RDC 240 ($U_{min}$ 200 V DC/$U_{max}$ 240 V DC)
Example:
$U_c = 0.7 \times U_{min} - 1.2 \times U_{max}$
$U_c = 0.7 \times 24$ V $- 1.2 \times 27$ V DC
With voltage tolerance and DC operated power consumption the following applies: At least smoothed double-pulse bridge rectification or a three-phase current rectifier is necessary

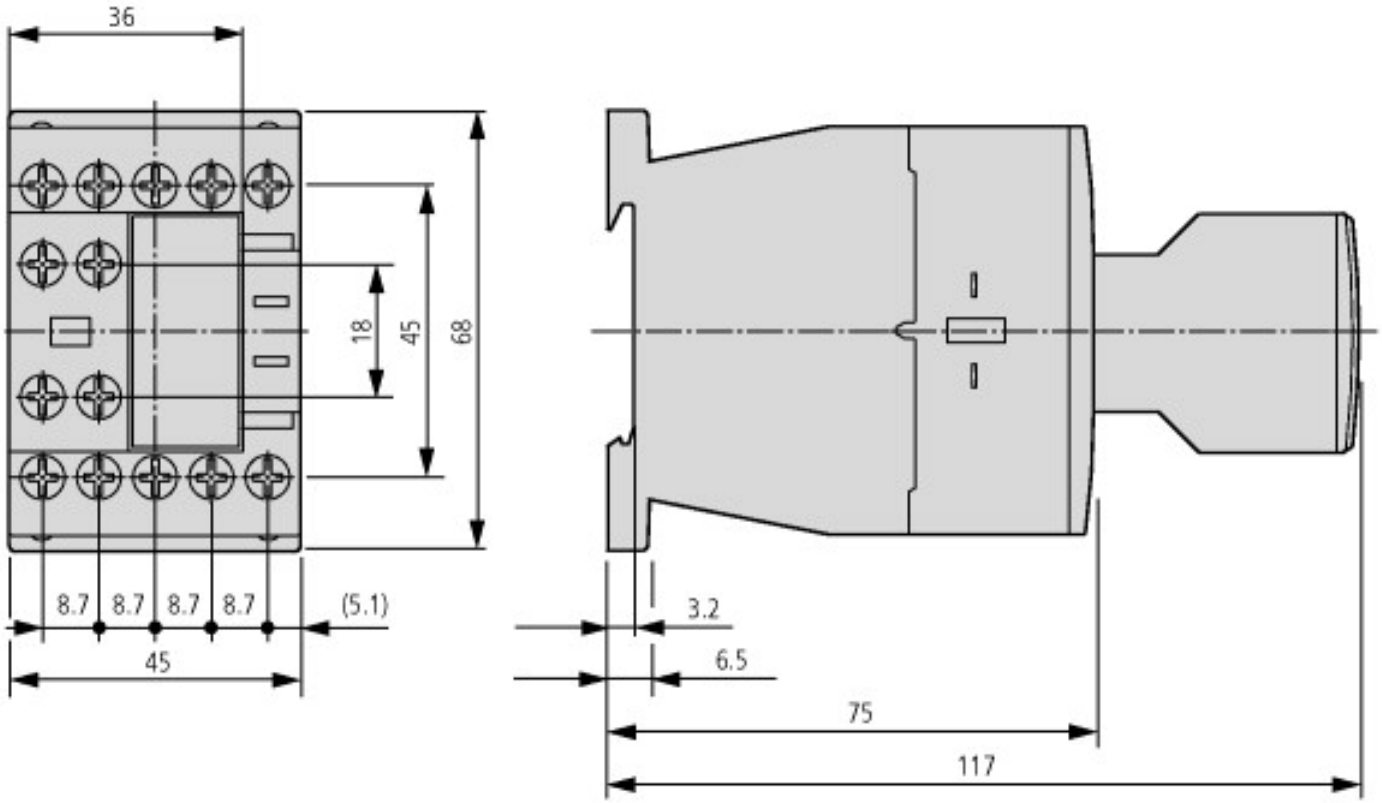



Squirrel-cage motor
Operating characteristics
Starting:from rest
Stopping:after attaining full running speed
Electrical characteristics
Make: up to 6 × rated motor current
Break: up to 1 × rated motor current
Utilization category
100 % AC-3
Typical applications
Compressors
Lifts
Mixers
Pumps
Escalators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

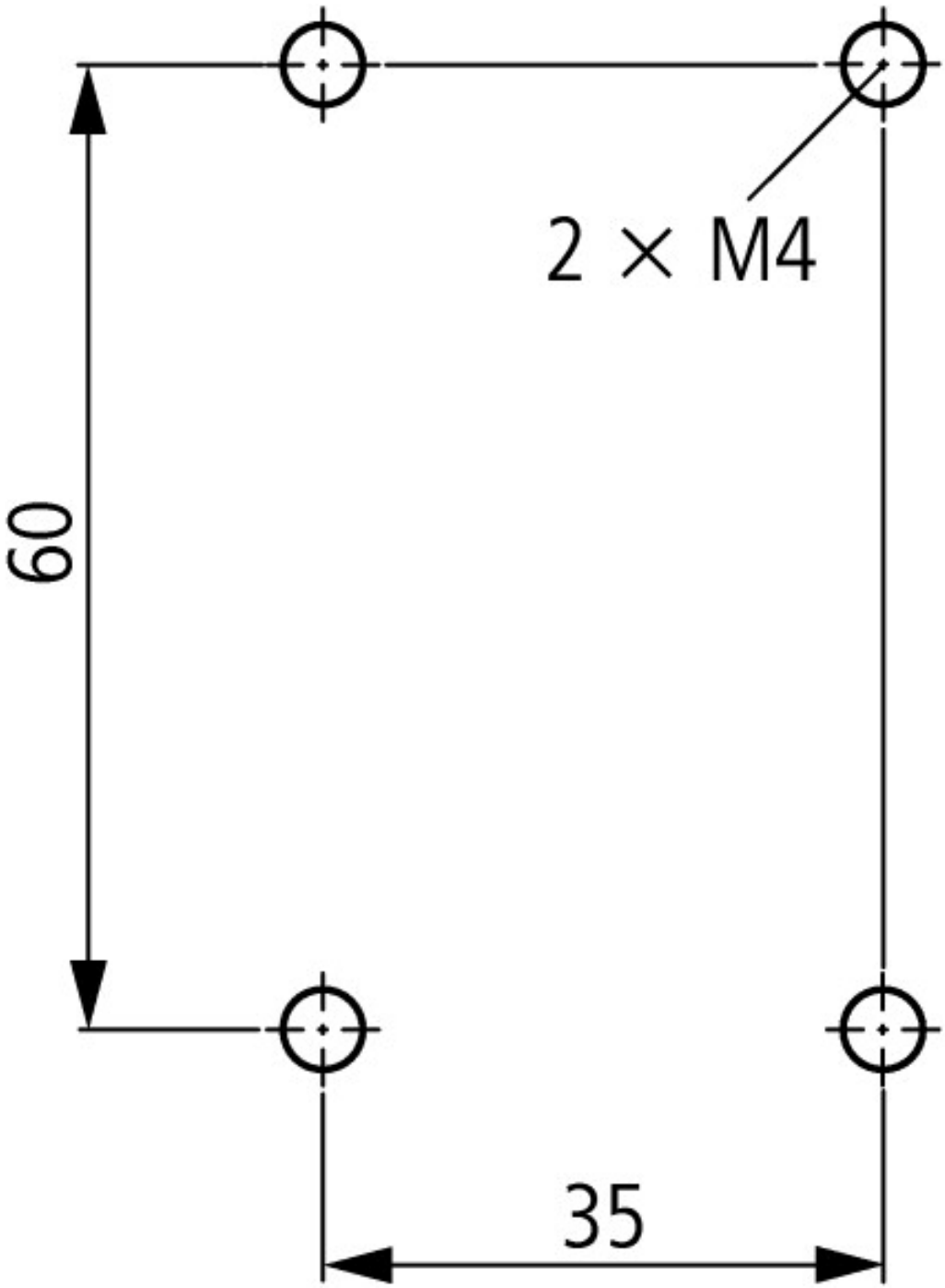



Extreme switching duty
Squirrel-cage motor
Operating characteristics
Inching, plugging, reversing
Electrical characteristics
Make: up to 6 × rated motor current
Break: up to 6 × rated motor current
Utilization category
100 % AC-4
Typical applications
Printing presses
Wire-drawing machines
Centrifuges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

## Dimensions




Contactor with auxiliary contact module


2 × M4
60
35