



**Variable frequency drive, 230 V AC, 3-phase, 48 A, 11 kW, IP20/NEMA0,
Radio interference suppression filter, Brake chopper**



Part no. DM1-32048EB-N20B-EM
Catalog No. 3-5023-004A

EL-Nummer 4132254
(Norway)

Delivery program

| | | | |
|------------------------------------|-----------------|----|--|
| Product range | | | Variable frequency drives |
| Part group reference (e.g. DIL) | | | DM1 |
| | | | |
| Rated operational voltage | U _e | | 230 V AC, 3-phase 240 V AC, 3-phase |
| Output voltage with V _e | U ₂ | | 230 V AC, 3-phase 240 V AC, 3-phase |
| Mains voltage (50/60Hz) | U _{LN} | V | 208 (-10%) - 240 (+10%) |
| Rated operational current | | | |
| At 150% overload | I _e | A | 48 |
| At 110% overload | I _e | A | 61 |
| Note | | | Rated operational current for a switching frequency of 1 - 16 kHz and an ambient temperature of +50 °C for a 150% overload and +40 °C for a 110% overload |
| Assigned motor rating | | | |
| Note | | | for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm ⁻¹ at 50 Hz or 1800 min ⁻¹ at 60 Hz for PM motors |
| Note | | | Overload cycle for 60 s every 600 s |
| Note | | | at 230 V, 50 Hz |
| 150 % Overload | P | kW | 11 |
| 110 % Overload | P | kW | 15 |
| 150 % Overload | I _M | A | 38 |
| 110 % Overload | I _M | A | 51 |
| Note | | | at 230 V, 60 Hz |
| 150 % Overload | P | HP | 15 |
| 110 % Overload | P | HP | 20 |
| 150 % Overload | I _M | A | 42 |
| 110 % Overload | I _M | A | 54 |
| Degree of Protection | | | IP20/NEMA0 |
| Interface/field bus (built-in) | | | Modbus RTU |
| Fieldbus connection (optional) | | | Profibus, CAN, DeviceNet, SmartWireDT |
| Fitted with | | | Radio interference suppression filter Brake chopper |
| Parameterization | | | Keypad Fieldbus Power Xpert inControl |
| Frame size | | | FS4 |
| Connection to SmartWire-DT | | | yes in conjunction with DXG-NET-SWD SmartWire DT module |

Technical data

| | | | |
|--------------------|--|--|--|
| General | | | |
| Standards | | | General requirements: IEC/EN 61800-2 EMV requirements: IEC/EN 61800-3 Safety requirements: IEC/EN 61800-5-1:2007/A1:2017; UL 61800-5-1:2012 (Rev. 2018), CSA C22.2 No. 274-17:2017 |
| Certifications | | | CE, UL, cUL, c-Tick, UkrSEPRO, EAC |
| Production quality | | | RoHS, ISO 9001 |

| | | | |
|------------------------------------|----------|----|---|
| Climatic proofing | P_w | % | < 95%, average relative humidity (RH), non-condensing, non-corrosive |
| Air quality | | | 3C2, 3S2 |
| Ambient temperature | | | |
| Operating ambient temperature min. | | °C | -10 |
| Operating ambient temperature max. | | °C | + 50 |
| operation (110 % overload) | θ | °C | -10 - +40 (max. +55 with 1 % derating per Kelvin temperature rise) °C |
| | | | Operation with 110 % overload (1 min./10 min.): -10 to +40 (max. +55 with 1% derating per Kelvin above limit) Operation with 150% overload (1 min./10 min.): -10 to +50 (max. +60 with 1% derating per Kelvin above limit) -20 with cold-weather mode |
| Storage | θ | °C | -40 - +70 |
| Overvoltage category | | | III |
| Pollution degree | | | 2 |
| Radio interference level | | | |
| Radio interference class (EMC) | | | C1 (with external filter, for conducted emissions only), C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary. |
| Environment (EMC) | | | 1st and 2nd environments as per EN 61800-3 |
| maximum motor cable length | l | m | C2 ≤ 5 m C3 ≤ 25 m |
| Mechanical shock resistance | | g | EN 61800-5-1, EN 60068-2-6: 10 - 150 Hz Amplitude: 0,75 mm (peak) bei 10 - 57 Hz Maximum acceleration amplitude: 1 g at 57 – 150 Hz |
| Mounting position | | | Vertical |
| Altitude | | m | 0 - 1000 m above sea level Above 1000 m: 1% derating for every 100 m max. 3000 m (2000 m for Corner Grounded TN Systems) |
| Degree of Protection | | | IP20/NEMA0 |
| Protection against direct contact | | | BGV A3 (VBG4, finger- and back-of-hand proof) |

Main circuit

| | | | |
|---|------------|-----|---|
| Supply | | | |
| Rated operational voltage | U_e | | 230 V AC, 3-phase 240 V AC, 3-phase |
| Mains voltage (50/60Hz) | U_{LN} | V | 208 (-10%) - 240 (+10%) |
| Input current (150% overload) | I_{LN} | A | 53.1 |
| Input current (110% overload) | I_{LN} | A | 68.3 |
| System configuration | | | TN-S, TN-C, TN-C-S, TT, IT |
| Supply frequency | f_{LN} | Hz | 50/60 |
| Frequency range | f_{LN} | Hz | 45–66 (± 0%) |
| Mains switch-on frequency | | | Maximum of one time every 60 seconds |
| Mains current distortion | THD | % | 40 |
| Rated conditional short-circuit current | I_q | kA | < 100 |
| Power section | | | |
| Function | | | Variable frequency drive with internal DC link, DC link choke and IGBT inverter |
| Overload current (150% overload) | I_L | A | 72 |
| Overload current (110% overload) | I_L | A | 67.1 |
| max. starting current (High Overload) | I_H | % | 200 |
| Note about max. starting current | | | for 2 seconds every 20 seconds |
| Output voltage with V_e | U_2 | | 230 V AC, 3-phase 240 V AC, 3-phase |
| Output Frequency | f_2 | Hz | 0 - 50/60 (max. 400) |
| Switching frequency | f_{PWM} | kHz | 3.6 adjustable 1 - 16 |
| Operation Mode | | | U/f control |
| Frequency resolution (setpoint value) | Δf | Hz | 0.01 |
| Rated operational current | | | |
| At 150% overload | I_e | A | 48 |
| At 110% overload | I_e | A | 61 |
| Note | | | Rated operational current for a switching frequency of 1 - 16 kHz and an ambient temperature of +50 °C for a 150% overload and +40 °C for a 110% overload |

| | | | |
|---|------------------|-------------------|--|
| Motor current limit | I | A | 0.1 - 2 x I _H (CT) |
| Power loss | | | |
| Heat dissipation at rated operational current I _e =150 % | P _V | W | 445.4 |
| Heat dissipation at rated operational current I _e =110% | P _V | W | 618.2 |
| Heat dissipation at current/speed [%] | | | |
| Current = 100% | | | |
| Speed = 0 % | P _V | W | 439.7 |
| Speed = 50 % | P _V | W | 231.1 |
| Speed = 90 % | P _V | W | 627.3 |
| Current = 50 % | | | |
| Speed = 0 % | P _V | W | 573 |
| Speed = 50 % | P _V | W | 286.4 |
| Speed = 90 % | P _V | W | 320.9 |
| Current = 50 % | | | |
| Speed = 0 % | P _V | W | 193 |
| Speed = 50 % | P _V | W | 214.1 |
| Fan | | | temperature controlled |
| Internal fan delivery rate | | m ³ /h | 129 |
| Fitted with | | | Radio interference suppression filter Brake chopper |
| Frame size | | | FS4 |
| Motor feeder | | | |
| Note | | | for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm ⁻¹ at 50 Hz or 1800 min ⁻¹ at 60 Hz for PM motors |
| Note | | | Overload cycle for 60 s every 600 s |
| Note | | | at 230 V, 50 Hz |
| 150 % Overload | P | kW | 11 |
| 110 % Overload | P | kW | 15 |
| Note | | | at 230 V, 60 Hz |
| 150 % Overload | P | HP | 15 |
| 110 % Overload | P | HP | 20 |
| Braking function | | | |
| Standard braking torque | | | max. 30 % M _N |
| DC braking torque | | | adjustable to 150 % |
| Braking torque with external braking resistance | | | Max. 100% of rated operational current I _e with external braking resistor |
| minimum external braking resistance | R _{min} | Ω | 6 |
| DC braking | % | I/I _e | ≤ 150, adjustable |

Control section

| | | | |
|--------------------------------|----------------|---|---|
| External control voltage | U _c | V | 24 V DC (max. 100 mA options incl.) |
| Reference voltage | U _s | V | 10 V DC (max. 10 mA) |
| Analog inputs | | | 1, can be parameterized, 0–10 V DC, 2–10 V DC, 0/4–20 mA |
| Analog outputs | | | 1, parameterizable, 0 - 10 V |
| Digital inputs | | | 4, parameterizable, max. 30 V DC |
| Relay outputs | | | 1, parametrierbar, 1 Wechsler, 3 A (240 V AC) / 3 A (24 V DC) |
| Interface/field bus (built-in) | | | Modbus RTU |
| Expansion slots | | | 1 |

Assigned switching and protective elements

| | | | |
|---|--|---|----------------------------|
| Power Wiring | | | |
| Safety device (fuse or miniature circuit-breaker) | | | |
| IEC (Type B, gG), 150 % | | | PKZM4-50 |
| IEC (Type B, gG), 110 % | | | PKZM4-63 |
| UL (Class CC or J) | | A | 80 |
| Mains contactor | | | |
| 150 % overload (CT/I _H , at 50 °C) | | | DILM40 (230V50HZ,240V60HZ) |

| | | | |
|---|--|--|--|
| 110 % overload (VT/I _L , at 40 °C) | | | DILM50 (230V50HZ,240V60HZ) |
| Main choke | | | |
| 150 % overload (CT/I _H , at 50 °C) | | | DX-LN3-050 |
| 110 % overload (VT/I _L , at 40 °C) | | | DX-LN3-080 |
| Radio interference suppression filter (external, 150 %) | | | DX-EMC34-055 |
| Radio interference suppression filter (external, 110 %) | | | DX-EMC34-075 |
| Radio interference suppression filter, low leakage currents (external, 150 %) | | | DX-EMC34-055-L |
| Radio interference suppression filter, low leakage currents (external, 110 %) | | | DX-EMC34-075-L |
| Note regarding radio interference suppression filter | | | Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments |
| DC link connection | | | |
| Braking resistance | | | |
| 10 % duty factor (DF) | | | DX-BR006-5K1 |
| 20 % duty factor (DF) | | | DX-BR006-5K1 |
| 40 % duty factor (DF) | | | DX-BR006-9K2 |
| Notes concerning braking resistances: | | | The brake resistors are assigned based on the maximum rated power of the variable frequency drive. Additional brake resistors and designs (e.g. different duty cycles) are available upon request. |
| Motor feeder | | | |
| motor choke | | | |
| 150 % overload (CT/I _H , at 50 °C) | | | DX-LM3-050 |
| 110 % overload (VT/I _L , at 40 °C) | | | DX-LM3-063 |
| Sine filter | | | |
| 150 % overload (CT/I _H , at 50 °C) | | | DX-SIN3-048 |
| 110 % overload (VT/I _L , at 40 °C) | | | DX-SIN3-061 |
| All-pole sine filter | | | |
| 150 % overload (CT/I _H , at 50 °C) | | | DX-SIN3-065-A |
| 110 % overload (VT/I _L , at 40 °C) | | | DX-SIN3-065-A |

Design verification as per IEC/EN 61439

| | | | |
|--|------------------|----|--|
| Technical data for design verification | | | |
| Rated operational current for specified heat dissipation | I _n | A | 61 |
| Equipment heat dissipation, current-dependent | P _{vid} | W | 618.2 |
| Operating ambient temperature min. | | °C | -10 |
| Operating ambient temperature max. | | °C | 50 |
| 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 8.0

Low-voltage industrial components (EG000017) / Frequency converter =< 1 kV (EC001857)

Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency converter = < 1 kV (ecl@ss10.0.1-27-02-31-01 [AKE177014])

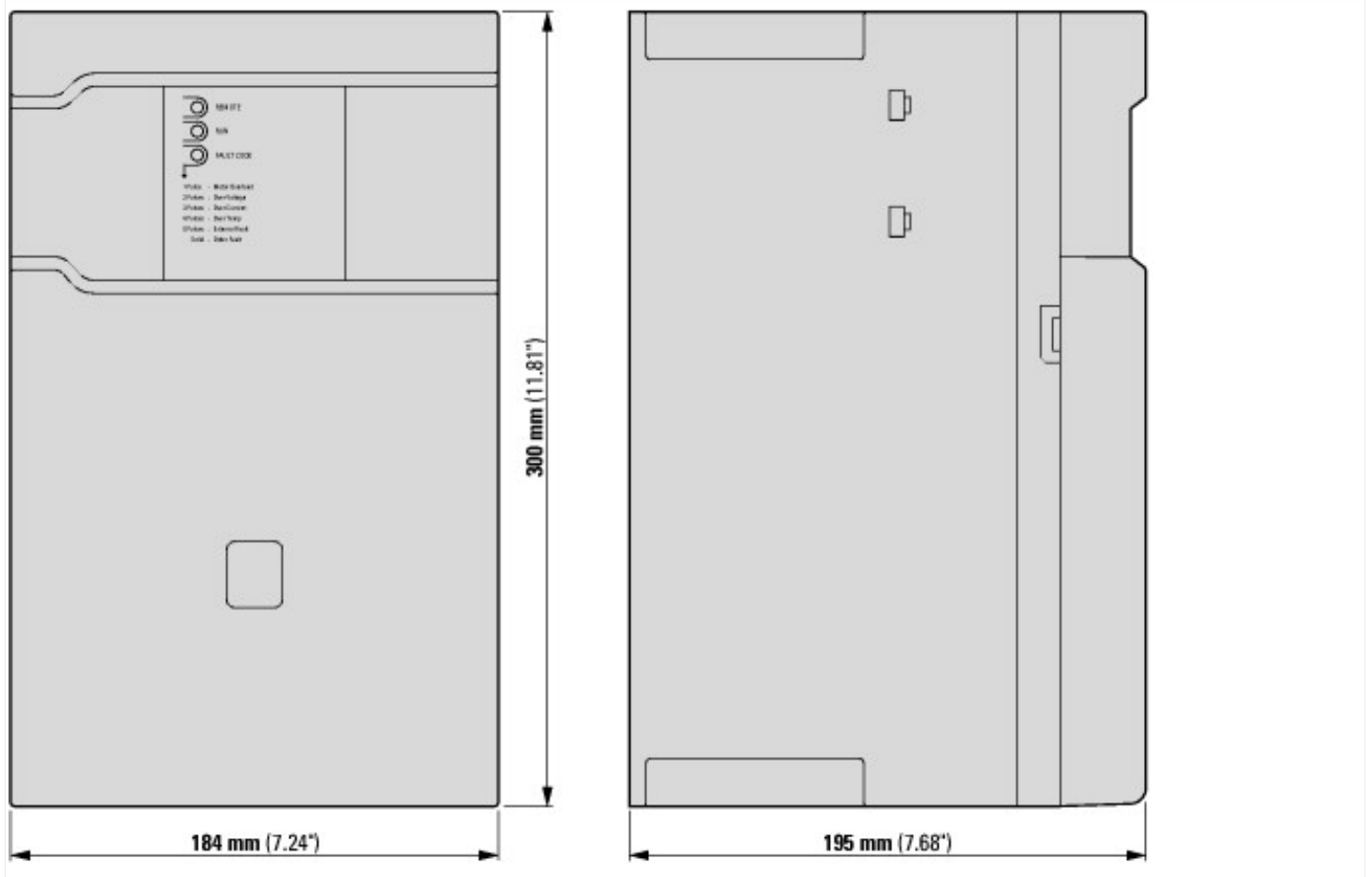
| | | |
|--|----|-----------|
| Mains voltage | V | 200 - 240 |
| Mains frequency | | 50/60 Hz |
| Number of phases input | | 3 |
| Number of phases output | | 3 |
| Max. output frequency | Hz | 400 |
| Max. output voltage | V | 240 |
| Nominal output current I _{2N} | A | 48.3 |
| Max. output at quadratic load at rated output voltage | kW | 15 |
| Max. output at linear load at rated output voltage | kW | 11 |
| Relative symmetric net frequency tolerance | % | 10 |
| Relative symmetric net voltage tolerance | % | 10 |
| Number of analogue outputs | | 1 |
| Number of analogue inputs | | 1 |
| Number of digital outputs | | 0 |
| Number of digital inputs | | 4 |
| With control element | | No |
| Application in industrial area permitted | | Yes |
| Application in domestic- and commercial area permitted | | Yes |
| Supporting protocol for TCP/IP | | No |
| Supporting protocol for PROFIBUS | | No |
| Supporting protocol for CAN | | No |
| Supporting protocol for INTERBUS | | No |
| Supporting protocol for ASI | | No |
| Supporting protocol for KNX | | No |
| Supporting protocol for Modbus | | Yes |
| Supporting protocol for Data-Highway | | No |
| Supporting protocol for DeviceNet | | No |
| Supporting protocol for SUCONET | | No |
| Supporting protocol for LON | | No |
| Supporting protocol for PROFINET IO | | No |
| Supporting protocol for PROFINET CBA | | No |
| Supporting protocol for SERCOS | | No |
| Supporting protocol for Foundation Fieldbus | | No |
| Supporting protocol for EtherNet/IP | | No |
| Supporting protocol for AS-Interface Safety at Work | | No |
| Supporting protocol for DeviceNet Safety | | No |
| Supporting protocol for INTERBUS-Safety | | No |
| Supporting protocol for PROFIsafe | | No |
| Supporting protocol for SafetyBUS p | | No |
| Supporting protocol for BACnet | | No |
| Supporting protocol for other bus systems | | No |
| Number of HW-interfaces industrial Ethernet | | 0 |
| Number of interfaces PROFINET | | 0 |
| Number of HW-interfaces RS-232 | | 0 |
| Number of HW-interfaces RS-422 | | 0 |

| | | | |
|------------------------------------|--|----|-------------|
| Number of HW-interfaces RS-485 | | | 1 |
| Number of HW-interfaces serial TTY | | | 0 |
| Number of HW-interfaces USB | | | 0 |
| Number of HW-interfaces parallel | | | 0 |
| Number of HW-interfaces other | | | 0 |
| With optical interface | | | No |
| With PC connection | | | Yes |
| Integrated breaking resistance | | | Yes |
| 4-quadrant operation possible | | | Yes |
| Type of converter | | | U converter |
| Degree of protection (IP) | | | IP20 |
| Degree of protection (NEMA) | | | Other |
| Height | | mm | 300 |
| Width | | mm | 184 |
| Depth | | mm | 195 |

Approvals

| | | | |
|-----------------------------|--|--|--|
| Product Standards | | | UL508C, CSA-C22.2 No. 274-13; IEC/EN61800-3; IEC/EN61800-5; CE marking |
| UL File No. | | | E134360 |
| UL Category Control No. | | | NMMS, NMMS7 |
| CSA File No. | | | UL report applies to both US and Canada |
| North America Certification | | | UL listed, certified by UL for use in Canada |
| Suitable for | | | Branch circuits |
| Max. Voltage Rating | | | 3-240 V AC IEC: TN-S UL/CSA: 'Y' (Solidly Grounded Wey) |
| Degree of Protection | | | IP20/NEMA0 |

Dimensions



Ø 6 mm
(Ø 0.24")

Ø 10 mm
(Ø 0.39")

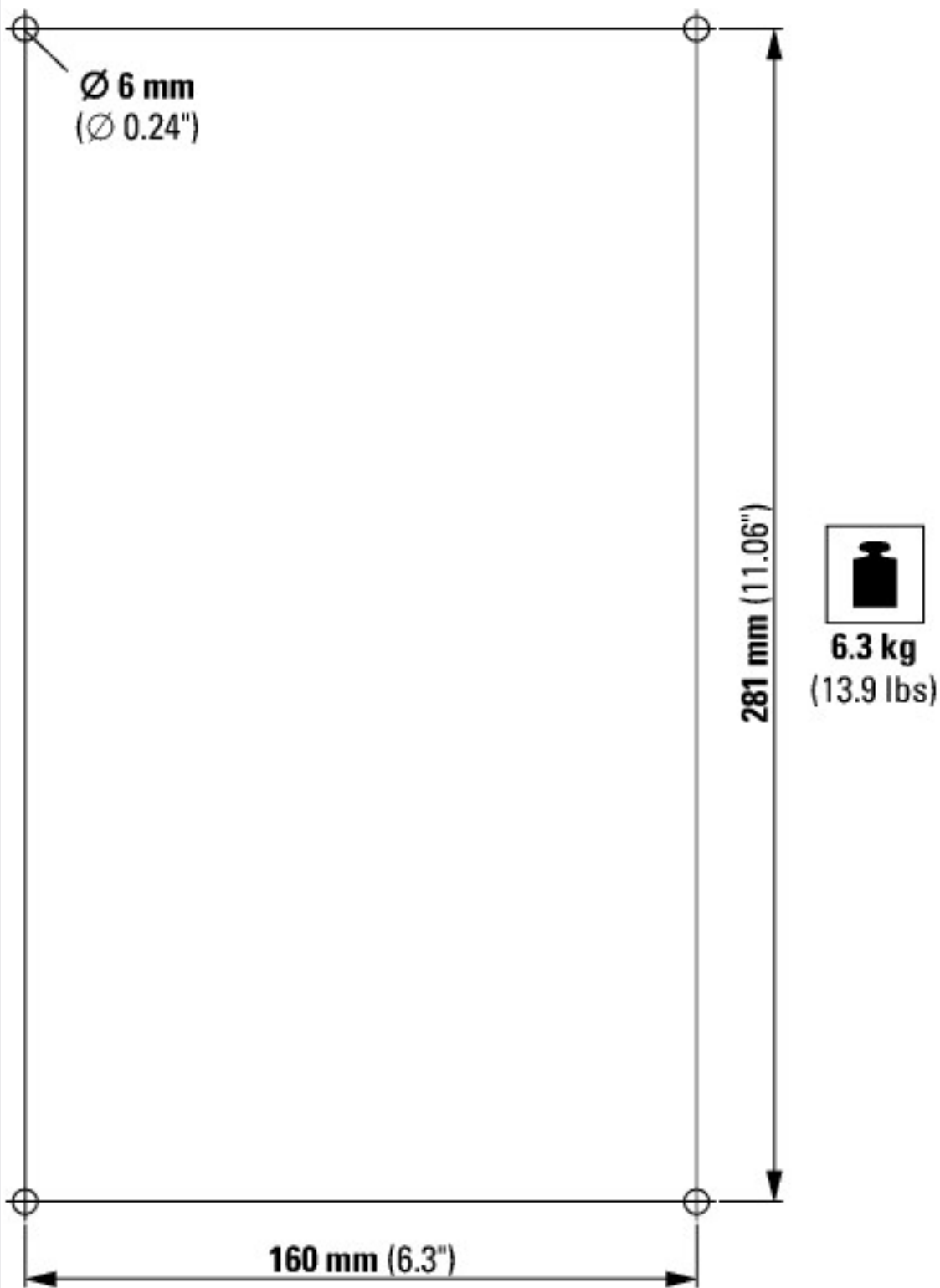
281 mm (11.06")



6.3 kg
(13.9 lbs)

160 mm (6.3")

Back view



Drilling patterns