



Variable frequency drive, 400 V AC, 3-phase, 38 A, 18.5 kW, IP20/NEMA0, Radio interference suppression filter, 7-digital display assembly, Setpoint potentiometer, Brake chopper, STO (Safe Torque Off, SIL2, PLd Cat 3)



Part no. DM1-34038EB-S20S-EM
Catalog No. 3-5015-004A

Delivery program

| | | | |
|------------------------------------|-----------------|----|--|
| Product range | | | Variable frequency drives |
| Part group reference (e.g. DIL) | | | DM1 |
| | | | |
| Rated operational voltage | U _e | | 400 V AC, 3-phase 480 V AC, 3-phase 500 V AC, 3-phase |
| Output voltage with V _e | U ₂ | | 400 V AC, 3-phase 480 V AC, 3-phase 500 V AC, 3-phase |
| Mains voltage (50/60Hz) | U _{LN} | V | 380 (-10%) - 500 (+10%) |
| Rated operational current | | | |
| At 150% overload | I _e | A | 38 |
| At 110% overload | I _e | A | 46 |
| 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 400 V, 50 Hz |
| 150 % Overload | P | kW | 18.5 |
| 110 % Overload | P | kW | 22 |
| 150 % Overload | I _M | A | 36 |
| 110 % Overload | I _M | A | 41 |
| Note | | | at 500 V, 50 Hz |
| 150 % Overload | P | kW | 22 |
| 110 % Overload | P | kW | 30 |
| 150 % Overload | I _M | A | 33 |
| 110 % Overload | I _M | A | 44 |
| Note | | | at 480 V, 60 Hz |
| 150 % Overload | P | HP | 25 |
| 110 % Overload | P | HP | 30 |
| 150 % Overload | I _M | A | 34 |
| 110 % Overload | I _M | A | 40 |
| Degree of Protection | | | IP20/NEMA0 |
| Interface/field bus (built-in) | | | Modbus RTU Modbus TCP BACnet MS/TP Ethernet IP BACnet TCP |
| Fieldbus connection (optional) | | | Profibus, CAN, DeviceNet, SmartwireDT |
| Fitted with | | | Radio interference suppression filter 7-digital display assembly Setpoint potentiometer 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 | ρ_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 | | 400 V AC, 3-phase 480 V AC, 3-phase 500 V AC, 3-phase |
| Mains voltage (50/60Hz) | U_{LN} | V | 380 (-10%) - 500 (+10%) |
| Input current (150% overload) | I_{LN} | A | 43.7 |
| Input current (110% overload) | I_{LN} | A | 52.9 |
| 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 | 57 |
| Overload current (110% overload) | I_L | A | 50.6 |
| 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 | | 400 V AC, 3-phase 480 V AC, 3-phase 500 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 Speed control with slip compensation sensorless vector control (SLV) Torque regulation PM motors |
| Frequency resolution (setpoint value) | Δf | Hz | 0.01 |
| Rated operational current | | | |
| At 150% overload | I_e | A | 38 |
| At 110% overload | I_e | A | 46 |
| 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 | $0.1 - 2 \times I_H$ (CT) |
| Power loss | | | |
| Heat dissipation at rated operational current $I_e = 150\%$ | P_V | W | 428.2 |
| Heat dissipation at rated operational current $I_e = 110\%$ | P_V | W | 473.4 |
| Heat dissipation at current/speed [%] | | | |
| Current = 100% | | | |
| Speed = 0 % | P_V | W | 267.1 |
| Speed = 50 % | P_V | W | 187.9 |
| Speed = 90 % | P_V | W | 335 |
| Current = 50 % | | | |
| Speed = 0 % | P_V | W | 334.9 |
| Speed = 50 % | P_V | W | 170.2 |
| Speed = 90 % | P_V | W | 195.7 |
| Current = 50 % | | | |
| Speed = 0 % | P_V | W | 178 |
| Speed = 50 % | P_V | W | 197.6 |
| Fan | | | temperature controlled |
| Internal fan delivery rate | | m^3/h | 98 |
| Fitted with | | | Radio interference suppression filter 7-digital display assembly Setpoint potentiometer Brake chopper |
| Safety function | | | STO (Safe Torque Off, SIL2, PLd Cat 3) |
| 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 400 V, 50 Hz |
| 150 % Overload | P | kW | 18.5 |
| 110 % Overload | P | kW | 22 |
| Note | | | at 500 V, 50 Hz |
| 150 % Overload | P | kW | 22 |
| 110 % Overload | P | kW | 30 |
| Note | | | at 480 V, 60 Hz |
| 150 % Overload | P | HP | 25 |
| 110 % Overload | P | HP | 30 |
| 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 | 17 |
| Switch-on threshold for the braking transistor | U_{DC} | V | 800 V DC |
| 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 | | | 2, parameterizable, 1 changeover contacts and 1 N/O, 3 A (240 VAC) / 3 A (24 VDC) |
| Interface/field bus (built-in) | | | Modbus RTU Modbus TCP BACnet MS/TP Ethernet IP BACnet TCP |
| Expansion slots | | | 1 |

Assigned switching and protective elements

| | | | |
|---|--|---|---|
| Power Wiring | | | |
| Safety device (fuse or miniature circuit-breaker) | | | |
| IEC (Type B, gG), 150 % | | | PKZM4-40 |
| IEC (Type B, gG), 110 % | | | PKZM4-50 |
| UL (Class CC or J) | | A | 63 |
| Mains contactor | | | |
| 150 % overload (CT/ I_H , at 50 °C) | | | DILM17-10 (230V50HZ,240V60HZ) |
| 110 % overload (VT/ I_L , at 40 °C) | | | DILM40 (230V50HZ,240V60HZ) |
| Main choke | | | |
| 150 % overload (CT/ I_H , at 50 °C) | | | DX-LN3-040 |
| 110 % overload (VT/ I_L , at 40 °C) | | | DX-LN3-050 |
| Radio interference suppression filter (external, 150 %) | | | DX-EMC34-055 |
| Radio interference suppression filter (external, 110 %) | | | DX-EMC34-055 |
| Radio interference suppression filter, low leakage currents (external, 150 %) | | | DX-EMC34-055-L |
| Radio interference suppression filter, low leakage currents (external, 110 %) | | | DX-EMC34-055-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-BR022-5K1 |
| 20 % duty factor (DF) | | | DX-BR022-9K2 |
| 40 % duty factor (DF) | | | P:2 x DX-BR047-9K2 |
| Notes concerning braking resistances: | | | P:n = "n" resistors connected in parallel 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-LM3-050 |
| Sine filter | | | |
| 150 % overload (CT/ I_H , at 50 °C) | | | DX-SIN3-048 |
| 110 % overload (VT/ I_L , at 40 °C) | | | DX-SIN3-048 |
| All-pole sine filter | | | |
| 150 % overload (CT/ I_H , at 50 °C) | | | DX-SIN3-046-A |
| 110 % overload (VT/ I_L , at 40 °C) | | | DX-SIN3-046-A |

Design verification as per IEC/EN 61439

| | | | |
|--|-----------|---|-------|
| Technical data for design verification | | | |
| Rated operational current for specified heat dissipation | I_n | A | 46 |
| Equipment heat dissipation, current-dependent | P_{vid} | W | 473.4 |

| | | |
|--|----|--|
| 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 7.0

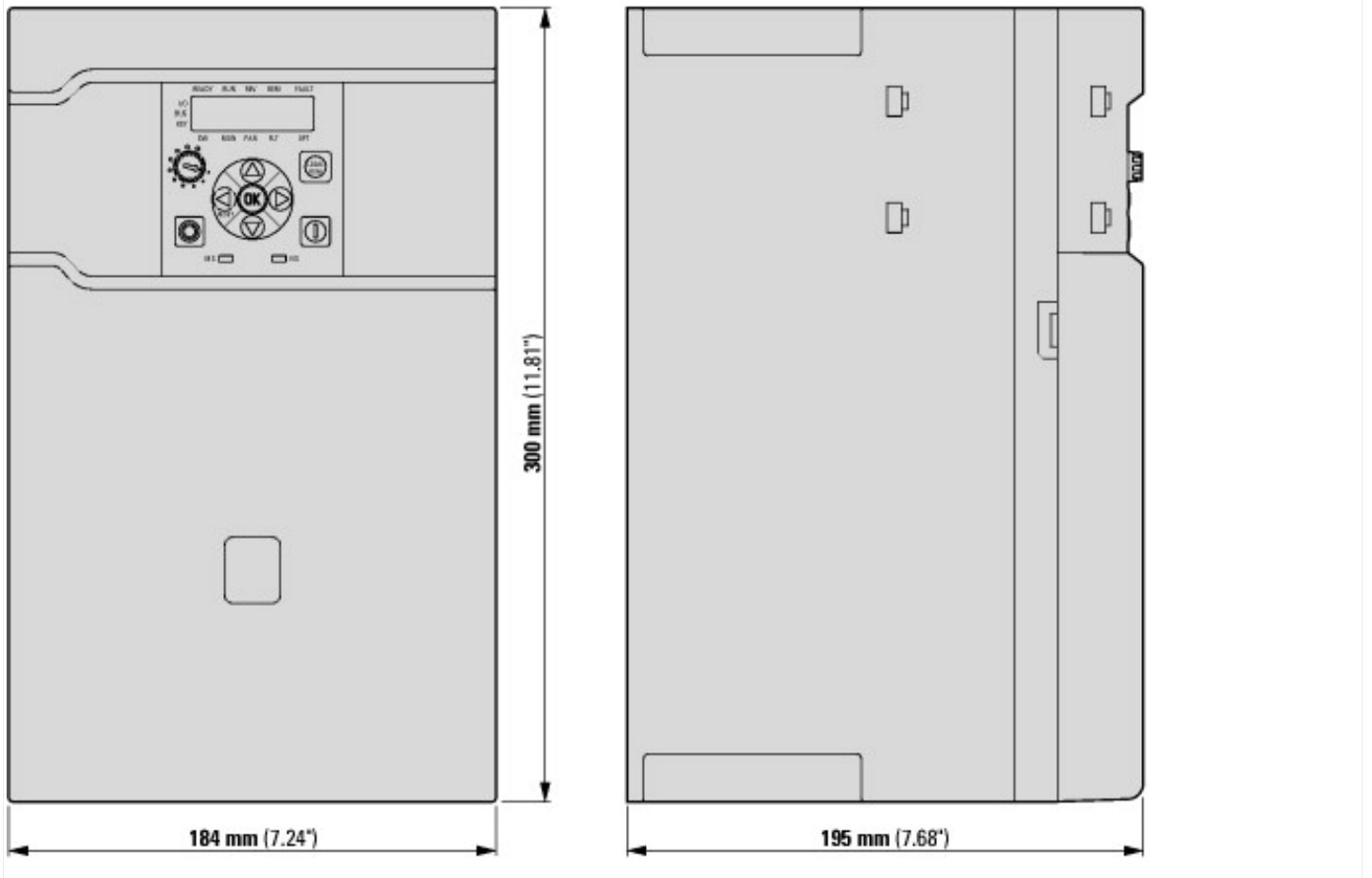
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|--|----|-----------|
| Low-voltage industrial components (EG000017) / Frequency converter =< 1 kV (EC001857) | | |
| Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency converter = < 1 kV (ecl@ss10.0.1-27-02-31-01 [AKE177014]) | | |
| Mains voltage | V | 323 - 528 |
| Mains frequency | | 50/60 Hz |
| Number of phases input | | 3 |
| Number of phases output | | 3 |
| Max. output frequency | Hz | 400 |
| Max. output voltage | V | 500 |
| Nominal output current I2N | A | 46 |
| Max. output at quadratic load at rated output voltage | kW | 22 |
| Max. output at linear load at rated output voltage | kW | 18.5 |
| 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 unit | | Yes |
| Application in industrial area permitted | | Yes |
| Application in domestic- and commercial area permitted | | Yes |
| Supporting protocol for TCP/IP | | Yes |
| Supporting protocol for PROFIBUS | | Yes |
| Supporting protocol for CAN | | Yes |
| 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 | | | Yes |
| 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 | | | Yes |
| 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 | | | Yes |
| Supporting protocol for other bus systems | | | Yes |
| Number of HW-interfaces industrial Ethernet | | | 1 |
| 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 | | | 1 |
| 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 | | | 3~500 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")

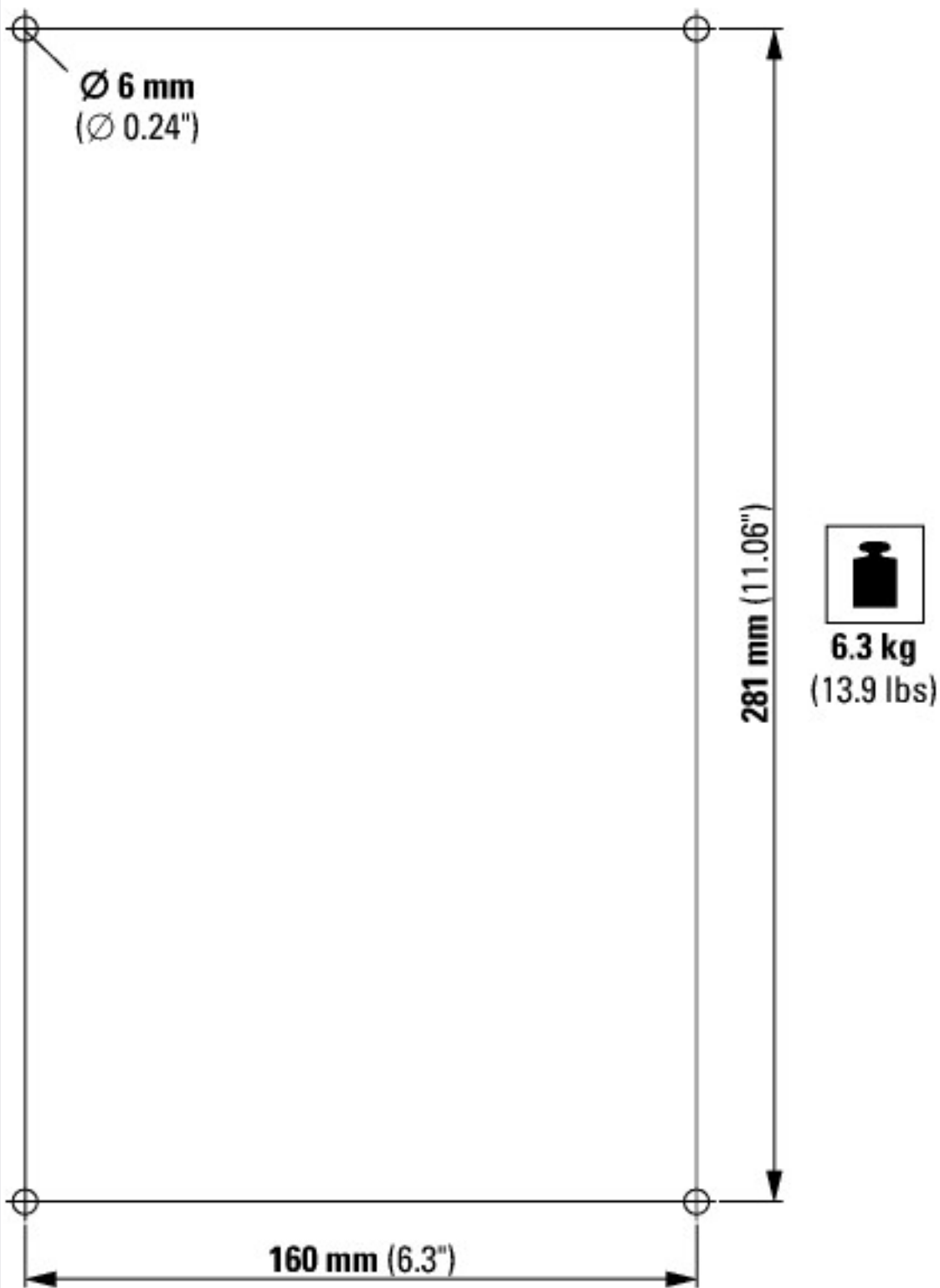
281 mm (11.06")



6.3 kg
(13.9 lbs)

160 mm (6.3")

Back view



Drilling patterns