



Variable frequency drive, 400 V AC, 3-phase, 1.5 A, 0.55 kW, IP20/NEMA0, 7-digital display assembly, Setpoint potentiometer, Brake chopper, STO (Safe Torque Off, SIL2, PLd Cat 3)



Part no. DM1-341D5NB-S20S-EM
Catalog No. 3-5010-005A

EL-Nummer 4132255
(Norway)

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 | 1.5 |
| At 110% overload | I _e | A | 2.2 |
| 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 | 0.55 |
| 110 % Overload | P | kW | 0.75 |
| 150 % Overload | I _M | A | 1.4 |
| 110 % Overload | I _M | A | 1.9 |
| Note | | | at 500 V, 50 Hz |
| 150 % Overload | P | kW | 0.75 |
| 110 % Overload | P | kW | 1.1 |
| 150 % Overload | I _M | A | 1.2 |
| 110 % Overload | I _M | A | 2.1 |
| Note | | | at 480 V, 60 Hz |
| 150 % Overload | P | HP | 0.5 |
| 110 % Overload | P | HP | 1 |
| 150 % Overload | I _M | A | 1.1 |
| 110 % Overload | I _M | A | 2.1 |
| 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 | | | 7-digital display assembly Setpoint potentiometer Brake chopper |
| Parameterization | | | Keypad Fieldbus Power Xpert inControl |

| | | | |
|----------------------------|--|--|--|
| Frame size | | | FS1 |
| 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 |
| 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 | 1.8 |
| Input current (110% overload) | I_{LN} | A | 2.6 |
| 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 ($\pm 0\%$) |
| 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 | 2.25 |
| Overload current (110% overload) | I_L | A | 2.42 |
| 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 | 4 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 | 1.5 |
| At 110% overload | I_e | A | 2.2 |
| 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 | 37 |
| Heat dissipation at rated operational current $I_e = 110\%$ | P_V | W | 43 |
| Heat dissipation at current/speed [%] | | | |
| Current = 100% | | | |
| Speed = 0 % | P_V | W | 22 |
| Speed = 50 % | P_V | W | 13 |
| Speed = 90 % | P_V | W | 33 |
| Current = 50 % | | | |
| Speed = 0 % | P_V | W | 27 |
| Speed = 50 % | P_V | W | 20 |
| Speed = 90 % | P_V | W | 23 |
| Current = 50 % | | | |
| Speed = 0 % | P_V | W | 24 |
| Speed = 50 % | P_V | W | 28 |
| Fan | | | temperature controlled |
| Internal fan delivery rate | | m^3/h | 26 |
| Fitted with | | | 7-digital display assembly Setpoint potentiometer Brake chopper |
| Safety function | | | STO (Safe Torque Off, SIL2, PLd Cat 3) |
| Frame size | | | FS1 |
| 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 | 0.55 |
| 110 % Overload | P | kW | 0.75 |
| Note | | | at 500 V, 50 Hz |
| 150 % Overload | P | kW | 0.75 |
| 110 % Overload | P | kW | 1.1 |
| Note | | | at 480 V, 60 Hz |
| 150 % Overload | P | HP | 0.5 |
| 110 % Overload | P | HP | 1 |
| 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 | 105 |
| Switch-on threshold for the braking transistor | U_{DC} | V | 800 V DC |

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| 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 % | | | PKZM0-1,6 |
| IEC (Type B, gG), 110 % | | | PKZM0-2,5 |
| UL (Class CC or J) | | A | 4 |
| Mains contactor | | | |
| 150 % overload (CT/I _H , at 50 °C) | | | DILM7-10 (230V50HZ,240V60HZ) |
| 110 % overload (VT/I _L , at 40 °C) | | | DILM7-10 (230V50HZ,240V60HZ) |
| Main choke | | | |
| 150 % overload (CT/I _H , at 50 °C) | | | DX-LN3-004 |
| 110 % overload (VT/I _L , at 40 °C) | | | DX-LN3-004 |
| Radio interference suppression filter (external, 150 %) | | | DX-EMC34-008 |
| Radio interference suppression filter (external, 110 %) | | | DX-EMC34-008 |
| Radio interference suppression filter, low leakage currents (external, 150 %) | | | DX-EMC34-008-L |
| Radio interference suppression filter, low leakage currents (external, 110 %) | | | DX-EMC34-008-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-BR150-200 |
| 20 % duty factor (DF) | | | DX-BR150-0K5 |
| 40 % duty factor (DF) | | | DX-BR150-0K5 |
| 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-LM3-008 |
| 110 % overload (VT/I _L , at 40 °C) | | | DX-LM3-008 |
| Sine filter | | | |
| 150 % overload (CT/I _H , at 50 °C) | | | DX-SIN3-004 |
| 110 % overload (VT/I _L , at 40 °C) | | | DX-SIN3-004 |
| All-pole sine filter | | | |
| 150 % overload (CT/I _H , at 50 °C) | | | DX-SIN3-006-A |
| 110 % overload (VT/I _L , at 40 °C) | | | DX-SIN3-006-A |

Design verification as per IEC/EN 61439

| | | | |
|--|------------------|----|-----|
| Technical data for design verification | | | |
| Rated operational current for specified heat dissipation | I _n | A | 2.2 |
| Equipment heat dissipation, current-dependent | P _{vid} | W | 43 |
| Operating ambient temperature min. | | °C | -10 |
| Operating ambient temperature max. | | °C | 50 |

| | | |
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| 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

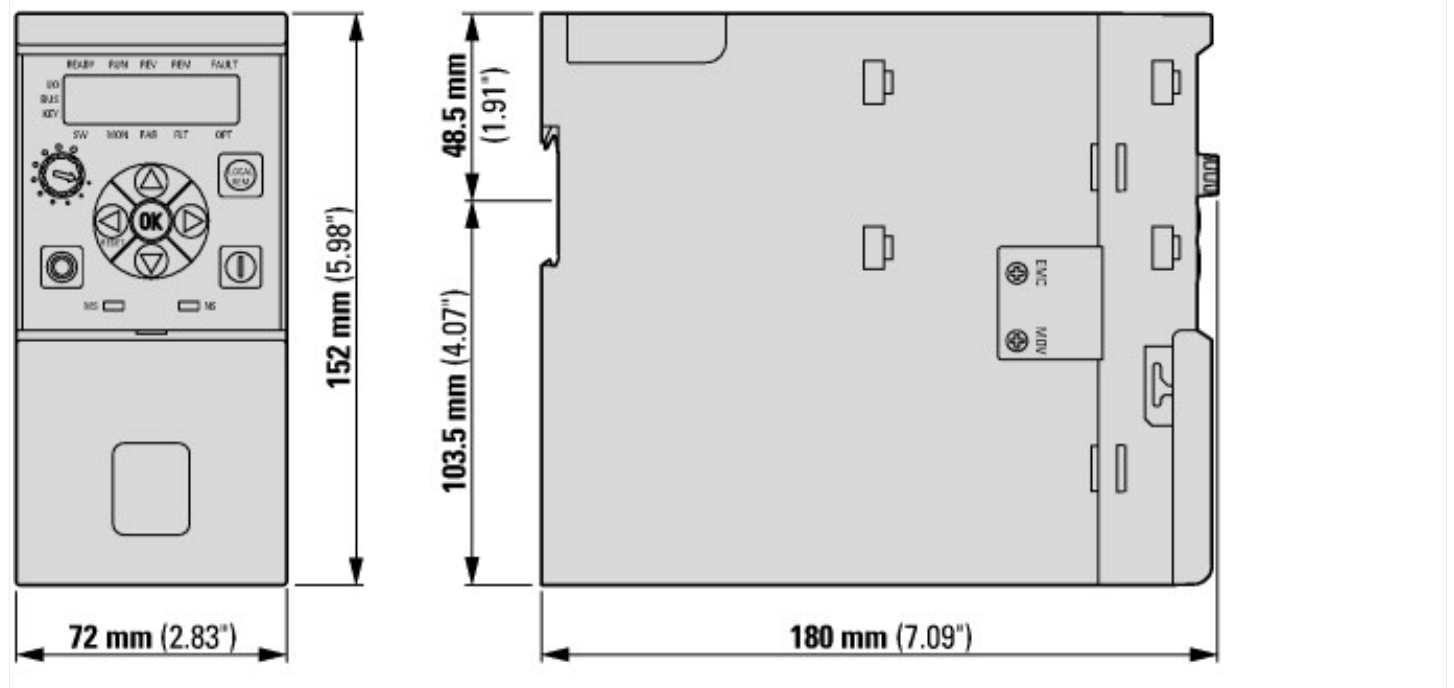
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| Low-voltage industrial components (EG000017) / Frequency converter =< 1 kV (EC001857) | | | |
| Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency converter = < 1 kV (ecl@ss10.0.1-27-02-31-01 [AKE177014]) | | | |
| Mains voltage | V | | 380 - 480 |
| 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 | | 1.5 |
| Max. output at quadratic load at rated output voltage | kW | | 0.75 |
| Max. output at linear load at rated output voltage | kW | | 0.37 |
| 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 | | | 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 |

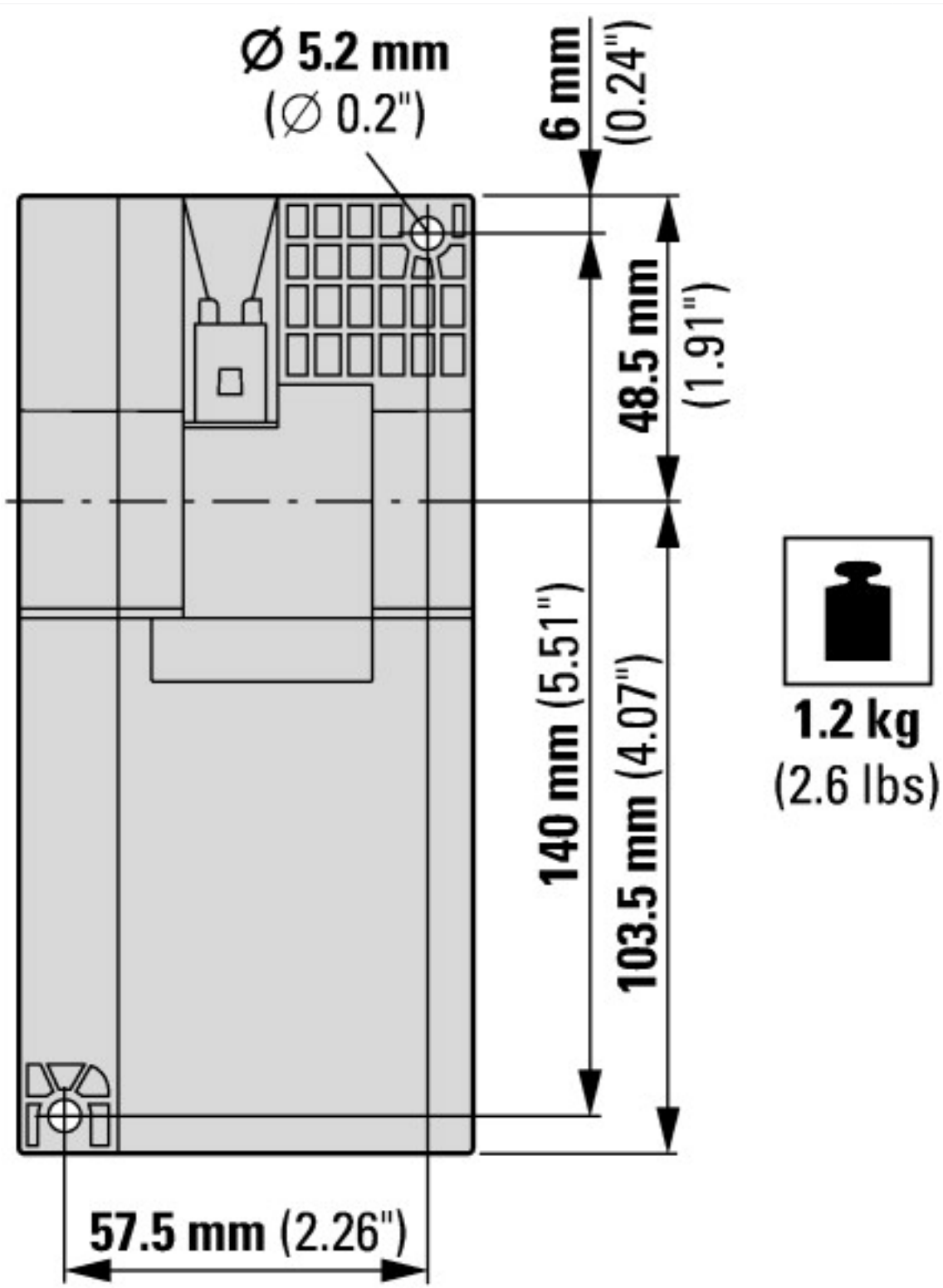
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| Supporting protocol for Modbus | | Yes |
| Supporting protocol for Data-Highway | | No |
| Supporting protocol for DeviceNet | | No |
| Supporting protocol for SUCONET | | No |
| Supporting protocol for LON | | No |
| Supporting protocol for PROFINET IO | | No |
| Supporting protocol for PROFINET CBA | | No |
| Supporting protocol for SERCOS | | No |
| Supporting protocol for Foundation Fieldbus | | No |
| Supporting protocol for EtherNet/IP | | 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 | 152 |
| Width | mm | 72 |
| Depth | mm | 180 |

Approvals

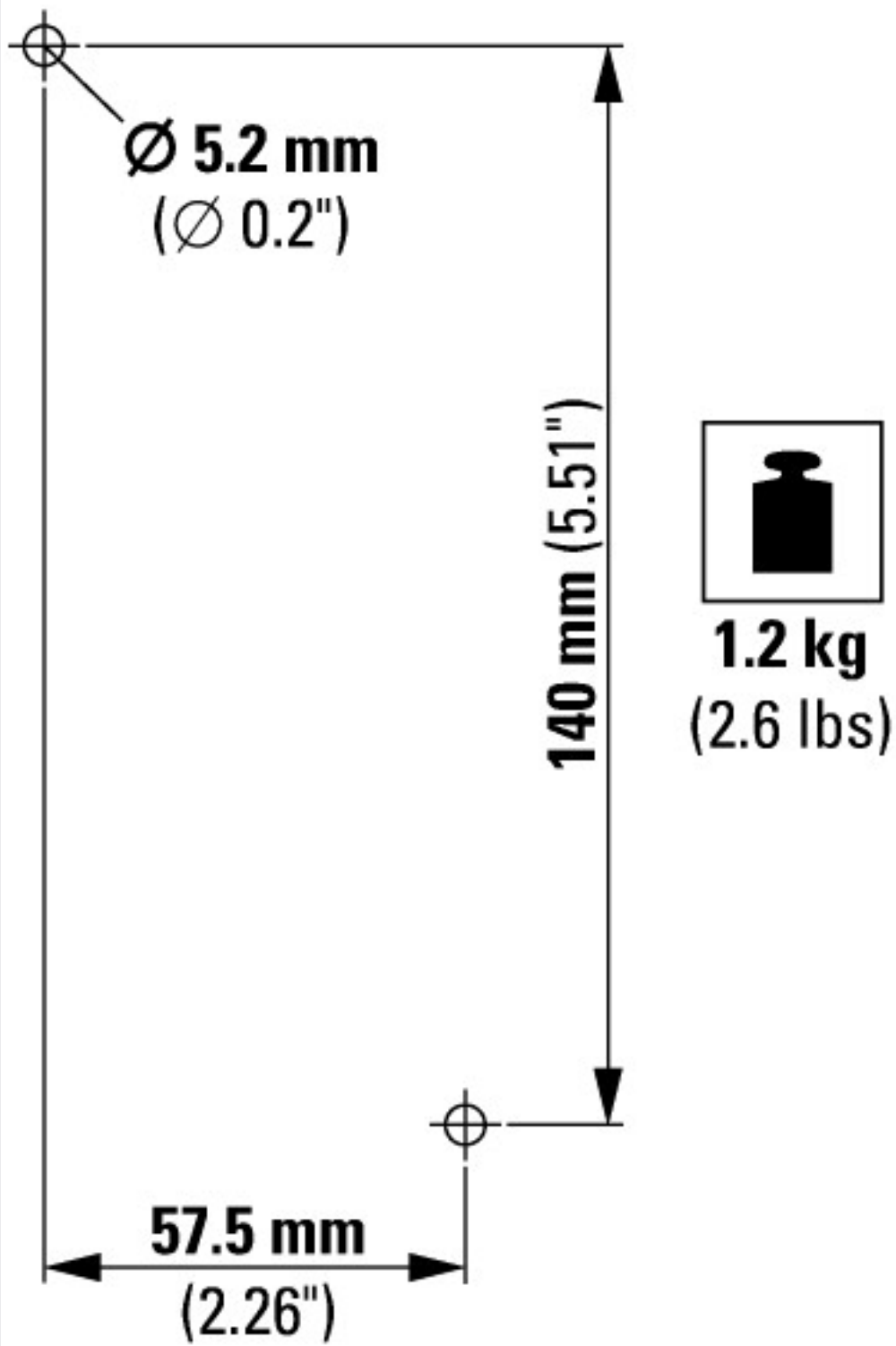
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| Product Standards | | UL508C, CSA-C22.2 No. 274-13; IEC/EN61800-3; IEC/EN61800-5; CE marking |
| UL File No. | | E134360 |
| UL Category Control No. | | NMMS, NMMS7 |
| CSA File No. | | UL report applies to both US and Canada |
| North America Certification | | 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





Back view



Drilling patterns