# Specifications



## Eaton 185780

Eaton DC1 Variable frequency drive, 400 V AC, 3-phase, 30 A, 15 kW, IP20/NEMA 0, Brake chopper, braking transistor, FS4 DC1-34030FB-A20CE1

### General specifications

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| **PRODUCT NAME** | Eaton DC1 Variable frequency drive |
| **CATALOG NUMBER** | 185780 |
| **MODEL CODE** | DC1-34030FB-A20CE1 |
| **EAN** | 4015081812790 |
| **PRODUCT LENGTH/DEPTH** | 211 mm |
| **PRODUCT HEIGHT** | 418.5 mm |
| **PRODUCT WIDTH** | 173 mm |
| **PRODUCT WEIGHT** | 8.4 kg |
| **CERTIFICATIONS** | Certified by UL for use in Canada<br>Safety requirements: IEC/EN 61800-5-1<br>CUL<br>IEC/EN 61800-3<br>RCM<br>UL report applies to both US and Canada<br>IEC/EN61800-3<br>UL 508C<br>UL Category Control No.: NMMS, NMMS7<br>EAC<br>IEC/EN61800-5<br>UL<br>CE<br>UkrSEPRO<br>RoHS, ISO 9001<br>Specification for general requirements: IEC/EN 61800-2<br>CSA-C22.2 No. 14<br>UL File No.: E172143 |
| **CATALOG NOTES** | • Environmental class: 3C2, 3S2<br>• Overload cycle for 60 s every 600 s |

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## Apparent power

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| **APPARENT POWER AT 400 V** | 12 kVA |
| **APPARENT POWER AT 480 V** | 14.4 kVA |

## Braking function

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| **BRAKING RESISTANCE** | 30 Ω |
| **BRAKING TORQUE** | Max. 100 % of rated operational current Ie, variable, DC - Main circuit |
| **SWITCH-ON THRESHOLD FOR THE BRAKING TRANSISTOR** | 780 VDC |

## Climatic environmental conditions

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| **ALTITUDE** | Above 1000 m with 1 % derating per 100 m<br>Max. 4000 m |
| **AMBIENT OPERATING TEMPERATURE - MAX** | 50 °C |
| **AMBIENT STORAGE TEMPERATURE - MAX** | 60 °C |
| **AMBIENT OPERATING TEMPERATURE - MIN** | -10 °C |
| **AMBIENT OPERATING TEMPERATURE AT 150% OVERLOAD - MAX** | 50 °C |
| **AMBIENT OPERATING TEMPERATURE AT 150% OVERLOAD - MIN** | -10 °C |
| **AMBIENT STORAGE TEMPERATURE - MIN** | -40 °C |
| **CLIMATIC PROOFING** | < 95 average relative humidity (RH), no condensation, no corrosion |

## Control circuit

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| **NUMBER OF INPUTS (ANALOG)** | 2 (parameterizable, 0 - 10 V DC, 0/4 - 20 mA) |
| **NUMBER OF INPUTS (DIGITAL)** | 4 (parameterizable, 10 - 30 V DC) |
| **NUMBER OF OUTPUTS (ANALOG)** | 1 |
| **NUMBER OF OUTPUTS (DIGITAL)** | 1 |
| **NUMBER OF RELAY OUTPUTS** | 1 (parameterizable, N/O, 6 A (250 V, AC-1) / 5 A (30 V, DC-1)) |

## Design verification

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| **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. |
| **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 RESIST. OF INSUL. MAT. TO ABNORMAL HEAT/FIRE BY INTERNAL ELECT. 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** | Does not apply, since the |

## Features & functions

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| **FEATURES** | Parameterization: drivesConnect<br>Parameterization: drivesConnect mobile (App)<br>Parameterization: Fieldbus<br><br>Parameterization: Keypad |
| **FITTED WITH:** | IGBT inverter<br>7-digital display assembly<br>Internal DC link<br>PC connection<br>Control unit<br>Brake chopper<br>Breaking resistance<br>Additional PCB protection<br>Radio interference suppression filter |
| **FUNCTIONS** | 4-quadrant operation possible |

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| **AGAINST ELECTRIC SHOCK** | 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. |
| **10.9.2 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. |
| **EQUIPMENT HEAT DISSIPATION, CURRENT-DEPENDENT PVID** | 607 W |
| **HEAT DISSIPATION CAPACITY PDISS** | 0 W |
| **HEAT DISSIPATION DETAILS** | Operation (with 150 % overload) |
| **HEAT DISSIPATION PER POLE, CURRENT-DEPENDENT PVID** | 0 W |
| **RATED OPERATIONAL CURRENT FOR SPECIFIED HEAT DISSIPATION (IN)** | 30 A |
| **STATIC HEAT DISSIPATION, NON-CURRENT-DEPENDENT PVS** | 0 W |

## General information

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| **CABLE LENGTH** | 100 m, screened, maximum permissible, Motor feeder<br>C2 ≤ 5 m, Radio interference level, maximum motor cable length<br>300 m, unscreened, with motor choke, maximum permissible, Motor feeder<br>200 m, screened, with motor choke, maximum permissible, Motor feeder<br>150 m, unscreened, maximum permissible, Motor feeder<br>C3 ≤ 25 m, Radio interference level, maximum motor cable length |
| **COMMUNICATION INTERFACE** | OP-Bus (RS485), built in<br>SmartWire-DT, optional<br>CANopen®, built in<br>Modbus RTU, built in |
| **CONNECTION TO SMARTWIRE-DT** | Yes<br>In conjunction with DX-NET-SWD3 SmartWire DT module |
| **DEGREE OF PROTECTION** | IP20<br>NEMA Other |
| **ELECTROMAGNETIC COMPATIBILITY** | 1st and 2nd environments (according to EN 61800-3) |
| **FRAME SIZE** | FS4 |
| **MOUNTING POSITION** | Vertical |
| **PRODUCT CATEGORY** | Variable frequency drives |
| **PROTECTION** | Finger and back-of-hand proof, Protection against direct contact (BGV A3, VBG4) |
| **PROTOCOL** | MODBUS<br>EtherNet/IP<br>Other bus systems<br>CAN |
| **RADIO INTERFERENCE CLASS** | C2, C3: depending on the motor cable length, the connected load, and ambient conditions.<br>External radio interference suppression filters (optional) may be necessary.<br>Optional external radio interference suppression filter for longer motor |

## Main circuit

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| **HEAT DISSIPATION AT CURRENT/SPEED** | 122 W at 25% current and 0% speed<br>139 W at 25% current and 50% speed<br>149 W at 50% current and 0% speed<br>181 W at 50% current and 50% speed<br>186 W at 50% current and 90% speed<br>259 W at 100% current and 0% speed<br>310 W at 100% current and 50% speed<br>348 W at 100% current and 90% speed |
| **INPUT CURRENT ILN AT 150% OVERLOAD** | 34.2 A |
| **LEAKAGE CURRENT AT GROUND IPE - MAX** | 12.9 mA |
| **MAINS SWITCH-ON FREQUENCY** | Maximum of one time every 30 seconds |
| **MAINS VOLTAGE - MAX** | 480 V |
| **MAINS VOLTAGE - MIN** | 380 V |
| **OPERATING MODE** | Speed control with slip compensation<br>Sensorless vector control (SLV)<br>U/f control<br>BLDC motors<br>PM motors<br>Synchronous reluctance motors |
| **OUTPUT FREQUENCY - MAX** | 500 Hz |
| **OUTPUT FREQUENCY - MIN** | 0 Hz |
| **OUTPUT VOLTAGE (U2)** | 400 V AC, 3-phase<br>480 V AC, 3-phase |
| **OVERLOAD CURRENT IL AT 150% OVERLOAD** | 45 A |
| **RATED CONTROL SUPPLY VOLTAGE** | 10 V DC (Us, max. 10 mA) |
| **RATED FREQUENCY - MAX** | 62 Hz |
| **RATED FREQUENCY - MIN** | 48 Hz |
| **RATED OPERATIONAL CURRENT (IE)** | 30 A at 150% overload (at an operating frequency of 16 kHz and an ambient air temperature of +50 °C) |
| **RATED OPERATIONAL** | 15 kW |

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| | cable lengths and for use in different EMC environments |
| **SUITABLE FOR** | Branch circuits, (UL/CSA) |

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| **POWER AT 380/400 V, 50 HZ, 3-PHASE** | |
| **RATED OPERATIONAL VOLTAGE** | 480 V AC, 3-phase<br>400 V AC, 3-phase |
| **RESOLUTION** | 0.1 Hz (Frequency resolution, setpoint value) |
| **SHORT-CIRCUIT PROTECTION RATING** | 45 A, UL (Class CC or J), Safety device (fuse or miniature circuit-breaker), Power Wiring |
| **STARTING CURRENT - MAX** | 175 %, IH, max. starting current (High Overload), For 2.5 seconds every 600 seconds, Power section |
| **SUPPLY FREQUENCY** | 50/60 Hz |
| **SWITCHING FREQUENCY** | 8 kHz, 4 - 24 kHz adjustable (audible), fPWM, Power section, Main circuit |
| **SYSTEM CONFIGURATION TYPE** | AC supply systems with earthed center point |
| **VOLTAGE RATING - MAX** | 240 V |

## Motor rating

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| **ASSIGNED MOTOR CURRENT IM AT 400 V, 50 HZ, 150% OVERLOAD** | 30 A |
| **ASSIGNED MOTOR CURRENT IM AT 440 - 480 V, 60 HZ, 150% OVERLOAD** | 30 A |
| **ASSIGNED MOTOR POWER AT 460/480 V, 60 HZ, 3-PHASE** | 20 HP |

## Resources

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|---|---|
| APPLICATION NOTES | eaton-powerxl-da1-dc1-de1-internal-motor-protection-ap040016-en-us.pdf<br>eaton-powerxl-da1-dc1-de1-system-bus-ap040022-en-us.pdf<br>eaton-powerxl-da1-dc1-db1-de1-rapidlink5-firmware-update-ap040214-en-us.pdf<br>eaton-powerxl-dc1-motor-vf-curves-ap040049-en-us.pdf<br>eaton-powerxl-dc1-fire-mode-ap040064-en-us.pdf<br>eaton-powerxl-dc1-operating-pm-bldc-motors-ap040063-en-us.pdf<br>eaton-powerxl-dc1-setpoint-setting-ap040060-en-us.pdf<br>eaton-powerxl-vfd-dual-rating-ap040114-en-us.pdf |

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| | eaton-powerxl-dc1-derating-ap040059-en-us.pdf<br><br>eaton-powerxl-dc1-accesslevel-parameterlock-ap040052-en-us.pdf<br><br>eaton-powerxl-dc1-io-configuration-ap040057-en-us.pdf<br><br>eaton-powerxl-da1-dc1-de1-conformal-coating-ap040182-en-us.pdf<br><br>eaton-powerxl-dc1-starting-stopping-operation-ap040054-en-us.pdf<br><br>eaton-powerxl-dc1-pi-controller-ap040053-en-us.pdf<br><br>eaton-powerxl-dx-com-stick-3-ap040190-en-us.pdf |
| BROCHURES | eaton-powerxl-variable-frequency-drives-dc1-da1-brochure-br040001en-en-us.pdf |
| CATALOGUES | eaton-drives-soft-starter-catalog-ca04020001zen-us.pdf |
| DECLARATIONS OF CONFORMITY | eaton-variable-frequency-drive-declaration-of-conformity-uk251078en.pdf<br><br>eaton-variable-frequency-drive-declaration-of-conformity-eu250595en.pdf |
| DRAWINGS | eaton-frequency-inverter-dimensions-011.eps<br><br>eaton-frequency-inverter-3d-drawing-019.eps |
| ECAD MODEL | DA-CE-ETN.DC1-34030FB-A20CE1 |
| INSTALLATION INSTRUCTIONS | IL040024ZU |
| INSTALLATION VIDEOS | PowerXL Variable Frequency Drives DC1 and DA1 - EN<br><br>Video PowerXL DA1 |

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|---|---|
| MANUALS AND USER GUIDES | eaton-dc1-variable-frequency-drive-mn040059en-us.pdf<br>MN040022_EN<br>MN040018_EN<br>MN040023_EN<br>eaton-canopen-communication-manual-for-variable-frequency-drives-variable-speed-starters-da1-db1-dc1-de11-mn040019-en-us.pdf |
| MCAD MODEL | DA-CS-dc1_fs4_ip20 |
| MULTIMEDIA | Looking for variable frequency drives DC1 and DA1 which can be used in harsh environments? |
| PRODUCT NOTIFICATIONS | eaton-drives-ecodesign-directive-mz040046en-en.pdf |
| SOFTWARE, FIRMWARE, AND APPLICATIONS | eaton-powerxl-dc1-firmware-release-note-mz040040en-us.pdf<br>eaton-powerxl-de1-dc1-profinet-gsdml-v240.zip<br>eaton-powerxl-dc1-canopen-codesys-v3-library.zip<br>eaton-powerxl-dx-comstick3-ble-drivers.zip<br>eaton-powerxl-dc1-canopen-eds-v211.zip<br>eaton-powerxl-dx-cbl-pc-3m0-usb-driver.zip<br>eaton-powerxl-de1-dc1-ethernetip-eds-v120.zip<br>eaton-powerxl-dx-cbl-pc-1m5-usb-driver.zip<br>eaton-powerxl-dc1-de1-swd-codesys-v3-library.zip<br>eaton-powerxl-pcsoftware-drivesconnect-v1501.zip |

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|---|---|
| **PROJECT NAME:** | |
| **PROJECT NUMBER:** | |
| **PREPARED BY:** | |
| **DATE:** | |

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