

# Specifications



Photo is representative



## Eaton DX1-324D8FB-C21CE

Eaton PowerXL DX1 High Performance Frequency inverter, Three-phase, 240 V, 6.6 A, 1.1 kW/1.5 kW, EMC Filter & DC-Choke, Brake chopper, LCD, IP21, NEMA 1

### General Specifications

|                             |                                                                                                                                                                                                    |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PRODUCT NAME</b>         | Eaton PowerXL DX1<br>Variable frequency drives                                                                                                                                                     |
| <b>CATALOG NUMBER</b>       | DX1-324D8FB-C21CE                                                                                                                                                                                  |
| <b>PRODUCT LENGTH/DEPTH</b> | 237.4 mm                                                                                                                                                                                           |
| <b>PRODUCT HEIGHT</b>       | 327 mm                                                                                                                                                                                             |
| <b>PRODUCT WIDTH</b>        | 153 mm                                                                                                                                                                                             |
| <b>PRODUCT WEIGHT</b>       | 6.4 kg                                                                                                                                                                                             |
| <b>CERTIFICATIONS</b>       | CE                                                                                                                                                                                                 |
| <b>CATALOG NOTES</b>        | 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. |
| <b>UPC</b>                  | 786689831110                                                                                                                                                                                       |
| <b>MODEL CODE</b>           | DX1-324D8FB-C21CE                                                                                                                                                                                  |

## Product specifications

|                                                                                         |                                                                                                                                  |
|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>BRAKE CHOPPER</b>                                                                    | Brake chopper                                                                                                                    |
| <b>FRAME SIZE</b>                                                                       | FR1                                                                                                                              |
| <b>PHASE</b>                                                                            | Three-phase                                                                                                                      |
| <b>VOLTAGE RATING</b>                                                                   | 230 V                                                                                                                            |
| <b>COMMUNICATION</b>                                                                    | <ul style="list-style-type: none"> <li>• Modbus RTU</li> <li>• Modbus TCP</li> <li>• Bluetooth</li> </ul>                        |
| <b>ENCLOSURE</b>                                                                        | IP21                                                                                                                             |
| <b>SERIES</b>                                                                           | P0600                                                                                                                            |
| <b>KEYPAD</b>                                                                           | Membrane Keypad                                                                                                                  |
| <b>DISPLAY</b>                                                                          | LCD                                                                                                                              |
| <b>10.10 TEMPERATURE RISE</b>                                                           | The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices. |
| <b>10.11 SHORT-CIRCUIT RATING</b>                                                       | Is the panel builder's responsibility. The specifications for the switchgear must be observed.                                   |
| <b>10.12 ELECTROMAGNETIC COMPATIBILITY</b>                                              | The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.                         |
| <b>10.13 MECHANICAL FUNCTION</b>                                                        | The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.                         |
| <b>10.2.2 CORROSION RESISTANCE</b>                                                      | Meets the product standard's requirements.                                                                                       |
| <b>10.2.3.1 VERIFICATION OF THERMAL STABILITY OF ENCLOSURES</b>                         | Meets the product standard's requirements.                                                                                       |
| <b>10.2.3.2 VERIFICATION OF RESISTANCE OF INSULATING MATERIALS TO NORMAL HEAT</b>       | Meets the product standard's requirements.                                                                                       |
| <b>10.2.3.3 RESIST. OF INSUL. MAT. TO ABNORMAL HEAT/FIRE BY INTERNAL ELECT. EFFECTS</b> | Meets the product standard's requirements.                                                                                       |
| <b>10.2.4 RESISTANCE TO ULTRA-VIOLET (UV) RADIATION</b>                                 | Meets the product standard's requirements.                                                                                       |

## Resources

|                                      |                                                                             |
|--------------------------------------|-----------------------------------------------------------------------------|
| BROCHURES                            | <a href="#">eaton-powerxl-dx1-vfd-brochure-br040026en-us.pdf</a>            |
| CATALOGUES                           | <a href="#">eaton-drives-soft-starter-catalog-ca04020001zen-us.pdf</a>      |
| FLYERS                               | <a href="#">eaton-powerxl-dx1-vfd-flyer-fl040007en-us.pdf</a>               |
| MANUALS AND USER GUIDES              | <a href="#">eaton-fiber-card-manual-mn040076en-us.pdf</a>                   |
|                                      | <a href="#">eaton-dx1-io-options-card-user-manual-mn040079en-us.pdf</a>     |
|                                      | <a href="#">eaton-abz-card-user-manual-mn040075en-us.pdf</a>                |
|                                      | <a href="#">eaton-dx1-app-manual-mn040069en-us.pdf</a>                      |
|                                      | <a href="#">eaton-powerxl-dx1-communication-manual-mn040071en-us.pdf</a>    |
|                                      | <a href="#">eaton-dual-port-eip-communication-manual-mn040077en-us.pdf</a>  |
|                                      | <a href="#">powerxl-dx1-vfd-installation-manual-mn040068en.pdf</a>          |
|                                      | <a href="#">eaton-powerxl-vfd-profinet-manual-mn040062en-us.pdf</a>         |
|                                      | <a href="#">eaton-powerxl-dx1-dxx-ext-sabz-dxx-ext-fs-mn040070en-us.pdf</a> |
|                                      | <a href="#">eaton-powerxl-dx1-safety-tool-mn040074en-us.pdf</a>             |
| SOFTWARE, FIRMWARE, AND APPLICATIONS | <a href="#">eaton-power-xpert-incontrol-mn040013en-us.pdf</a>               |
|                                      | <a href="#">eaton-powerxl-dx1-profinet-gsdml-v244.zip</a>                   |

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|-----------------------------------------------------------------------|--------------------------------------------------------------------|
| <b>10.2.5 LIFTING</b>                                                 | Does not apply, since the entire switchgear needs to be evaluated. |
| <b>10.2.6 MECHANICAL IMPACT</b>                                       | Does not apply, since the entire switchgear needs to be evaluated. |
| <b>10.2.7 INSCRIPTIONS</b>                                            | Meets the product standard's requirements.                         |
| <b>10.3 DEGREE OF PROTECTION OF ASSEMBLIES</b>                        | Does not apply, since the entire switchgear needs to be evaluated. |
| <b>10.4 CLEARANCES AND CREEPAGE DISTANCES</b>                         | Meets the product standard's requirements.                         |
| <b>10.5 PROTECTION AGAINST ELECTRIC SHOCK</b>                         | Does not apply, since the entire switchgear needs to be evaluated. |
| <b>10.6 INCORPORATION OF SWITCHING DEVICES AND COMPONENTS</b>         | Does not apply, since the entire switchgear needs to be evaluated. |
| <b>10.7 INTERNAL ELECTRICAL CIRCUITS AND CONNECTIONS</b>              | Is the panel builder's responsibility.                             |
| <b>10.8 CONNECTIONS FOR EXTERNAL CONDUCTORS</b>                       | Is the panel builder's responsibility.                             |
| <b>10.9.2 POWER-FREQUENCY ELECTRIC STRENGTH</b>                       | Is the panel builder's responsibility.                             |
| <b>10.9.3 IMPULSE WITHSTAND VOLTAGE</b>                               | Is the panel builder's responsibility.                             |
| <b>10.9.4 TESTING OF ENCLOSURES MADE OF INSULATING MATERIAL</b>       | Is the panel builder's responsibility.                             |
| <b>AMBIENT OPERATING TEMPERATURE - MAX</b>                            | 50 °C                                                              |
| <b>AMBIENT OPERATING TEMPERATURE - MIN</b>                            | -10 °C                                                             |
| <b>AMBIENT OPERATING TEMPERATURE AT 150% OVERLOAD - MAX</b>           | 50 °C                                                              |
| <b>AMBIENT OPERATING TEMPERATURE AT 150% OVERLOAD - MIN</b>           | -30 °C                                                             |
| <b>AMBIENT STORAGE TEMPERATURE - MAX</b>                              | 70 °C                                                              |
| <b>AMBIENT STORAGE TEMPERATURE - MIN</b>                              | -40 °C                                                             |
| <b>ASSIGNED MOTOR CURRENT IM AT 220 - 240 V, 60 HZ, 150% OVERLOAD</b> | 4.2 A                                                              |
| <b>ASSIGNED MOTOR CURRENT IM AT 230 V, 50</b>                         | 6.3 A                                                              |

|                                                                                      |             |
|--------------------------------------------------------------------------------------|-------------|
| <b>HZ, 110% OVERLOAD</b>                                                             |             |
| <b>ASSIGNED MOTOR<br/>CURRENT IM AT 230 V, 50<br/>HZ, 150% OVERLOAD</b>              | 4.6 A       |
| <b>ASSIGNED MOTOR<br/>CURRENT IM AT 230 V, 60<br/>HZ, 110% OVERLOAD</b>              | 6 A         |
| <b>RELATIVE SYMMETRIC<br/>NET FREQUENCY<br/>TOLERANCE</b>                            | 10 %        |
| <b>RELATIVE SYMMETRIC<br/>NET VOLTAGE<br/>TOLERANCE</b>                              | 10 %        |
| <b>SWITCH-ON THRESHOLD<br/>FOR THE BRAKING<br/>TRANSISTOR</b>                        | 425 VDC     |
| <b>VOLTAGE RATING - MAX</b>                                                          | 240         |
| <b>ASSIGNED MOTOR<br/>CURRENT IM AT 440 - 480<br/>V, 60 HZ, 150%<br/>OVERLOAD</b>    | 1 A         |
| <b>ASSIGNED MOTOR<br/>CURRENT IM AT 440/480<br/>V, 60 HZ, 110%<br/>OVERLOAD</b>      | 1.5 A       |
| <b>ASSIGNED MOTOR<br/>POWER AT 230/240 V, 60<br/>HZ</b>                              | 1 HP        |
| <b>ASSIGNED MOTOR<br/>POWER AT 230/240 V, 60<br/>HZ, 110% OVERLOAD</b>               | 1.5 HP      |
| <b>ASSIGNED MOTOR<br/>POWER AT 230/240 V, 60<br/>HZ, 3-PHASE, 110 %<br/>OVERLOAD</b> | 1.5 HP      |
| <b>BRAKING RESISTANCE</b>                                                            | 30 $\Omega$ |
| <b>INPUT CURRENT ILN AT<br/>110% OVERLOAD</b>                                        | 6.1 A       |
| <b>INPUT CURRENT ILN AT<br/>150% OVERLOAD</b>                                        | 4.4 A       |
| <b>MAINS CURRENT<br/>DISTORTION</b>                                                  | 29.9 %      |
| <b>MAINS VOLTAGE - MAX</b>                                                           | 240 V       |
| <b>MAINS VOLTAGE - MIN</b>                                                           | 208 V       |
| <b>NOMINAL OUTPUT<br/>CURRENT I2N</b>                                                | 6.6 A       |
| <b>NUMBER OF HW-<br/>INTERFACES<br/>(INDUSTRIAL ETHERNET)</b>                        | 1           |
| <b>NUMBER OF HW-<br/>INTERFACES (OTHER)</b>                                          | 1           |

|                                                               |                                                                                                                      |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>NUMBER OF HW-INTERFACES (PARALLEL)</b>                     | 0                                                                                                                    |
| <b>NUMBER OF HW-INTERFACES (RS-232)</b>                       | 0                                                                                                                    |
| <b>NUMBER OF HW-INTERFACES (RS-422)</b>                       | 0                                                                                                                    |
| <b>NUMBER OF HW-INTERFACES (RS-485)</b>                       | 1                                                                                                                    |
| <b>NUMBER OF HW-INTERFACES (SERIAL TTY)</b>                   | 0                                                                                                                    |
| <b>NUMBER OF HW-INTERFACES (USB)</b>                          | 0                                                                                                                    |
| <b>NUMBER OF INTERFACES (PROFINET)</b>                        | 2                                                                                                                    |
| <b>NUMBER OF OUTPUTS (ANALOG)</b>                             | 2                                                                                                                    |
| <b>OUTPUT AT LINEAR LOAD AT RATED OUTPUT VOLTAGE - MAX</b>    | 1.1 kW                                                                                                               |
| <b>OUTPUT AT QUADRATIC LOAD AT RATED OUTPUT VOLTAGE - MAX</b> | 1.5 kW                                                                                                               |
| <b>OUTPUT FREQUENCY - MAX</b>                                 | 400 Hz                                                                                                               |
| <b>OUTPUT VOLTAGE - MAX</b>                                   | 240 V                                                                                                                |
| <b>OVERLOAD CURRENT IL AT 110% OVERLOAD</b>                   | 7.26 A                                                                                                               |
| <b>OVERLOAD CURRENT IL AT 150% OVERLOAD</b>                   | 7.2 A                                                                                                                |
| <b>RATED FREQUENCY - MAX</b>                                  | 66 Hz                                                                                                                |
| <b>RATED FREQUENCY - MIN</b>                                  | 45 Hz                                                                                                                |
| <b>RATED OPERATIONAL CURRENT (IE) AT 110% OVERLOAD</b>        | 6.6 A                                                                                                                |
| <b>RATED OPERATIONAL CURRENT (IE) AT 150% OVERLOAD</b>        | 4.8 A                                                                                                                |
| <b>AIR VOLUME CAPACITY</b>                                    | 24 m³/h                                                                                                              |
| <b>ALTITUDE</b>                                               | Max. 1000 m<br>Max. 3000 m<br>Above 1000 m with 1 % derating per 100 m<br>Max. 2000 m for Corner Grounded TN Systems |
| <b>PROTECTION</b>                                             | Finger and back-of-hand proof, Protection against direct contact (BGV A3, VBG4)                                      |
| <b>RESOLUTION</b>                                             | 0.01 Hz (Frequency resolution, setpoint value)                                                                       |

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| <b>APPLICATION IN DOMESTIC AND COMMERCIAL AREA PERMITTED</b> | Yes                                                                                                                                                                                                                                            |
| <b>APPLICATION IN INDUSTRIAL AREA PERMITTED</b>              | Yes                                                                                                                                                                                                                                            |
| <b>BRAKING TORQUE</b>                                        | Adjustable to 150 % (I/Ie),<br>DC - Main circuit<br>Max. 30 % MN, Standard -<br>Main circuit<br>Adjustable to 150 %, DC -<br>Main circuit<br>Max. 100 % of rated<br>operational current Ie with<br>external braking resistor -<br>Main circuit |
| <b>CABLE LENGTH</b>                                          | 100 m, screened,<br>maximum permissible,<br>Motor feeder<br>C3 ≤ 50 m, Radio<br>interference level,<br>maximum motor cable<br>length<br>C2 ≤ 10 m, Radio<br>interference level,<br>maximum motor cable<br>length                               |
| <b>CLIMATIC PROOFING</b>                                     | < 95 average relative<br>humidity (RH), no<br>condensation, no<br>corrosion                                                                                                                                                                    |
| <b>COMMUNICATION INTERFACE</b>                               | Modbus RTU, built in<br>Modbus TCP, built in<br>Ethernet IP, built in<br>Ethernet IP dual port,<br>optional<br>PROFIBUS, optional<br>PROFINET, optional                                                                                        |
| <b>CONVERTER TYPE</b>                                        | U converter                                                                                                                                                                                                                                    |
| <b>DEGREE OF PROTECTION</b>                                  | NEMA 1<br>IP21                                                                                                                                                                                                                                 |
| <b>EFFICIENCY</b>                                            | 96.70%                                                                                                                                                                                                                                         |
| <b>ELECTROMAGNETIC COMPATIBILITY</b>                         | 1st and 2nd environments<br>(according to EN 61800-3)                                                                                                                                                                                          |
| <b>ENVIRONMENTAL CLASS</b>                                   | 3C2, 3S2 (Air quality)                                                                                                                                                                                                                         |
| <b>FEATURES</b>                                              | Parameterization: Fieldbus<br><br>Parameterization: Keypad<br>Parameterization: Power<br>Xpert inControl<br>Tool-less swapping of fan<br>Temperature-controlled<br>fan                                                                         |
| <b>FITTED WITH:</b>                                          | Internal DC link                                                                                                                                                                                                                               |

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|                                                | Brake chopper<br>Multi-line graphic display<br>DC link choke<br>IGBT inverter<br>Radio interference<br>suppression filter<br>Additional PCB protection<br>Breaking resistor<br>terminals<br>Control unit<br>PC connection |
| <b>FRAME SIZE</b>                              | FS1                                                                                                                                                                                                                       |
| <b>FUNCTIONS</b>                               | 4-quadrant operation<br>possible, Closed loop<br>control with Encoder<br>feedback, extended Safety<br>functions with Option<br>board                                                                                      |
| <b>LEAKAGE CURRENT AT<br/>GROUND IPE - MAX</b> | 1.5 mA                                                                                                                                                                                                                    |
| <b>MAINS SWITCH-ON<br/>FREQUENCY</b>           | Maximum of one time<br>every 60 seconds                                                                                                                                                                                   |
| <b>MOUNTING POSITION</b>                       | Vertical                                                                                                                                                                                                                  |
| <b>NUMBER OF INPUTS<br/>(ANALOG)</b>           | 2                                                                                                                                                                                                                         |
| <b>NUMBER OF INPUTS<br/>(DIGITAL)</b>          | 6                                                                                                                                                                                                                         |
| <b>NUMBER OF OUTPUTS<br/>(DIGITAL)</b>         | 1                                                                                                                                                                                                                         |
| <b>NUMBER OF PHASES<br/>(INPUT)</b>            | 3                                                                                                                                                                                                                         |
| <b>NUMBER OF PHASES<br/>(OUTPUT)</b>           | 3                                                                                                                                                                                                                         |
| <b>NUMBER OF RELAY<br/>OUTPUTS</b>             | 2 (parameterizable, 2<br>changeover contacts, 6 A<br>(240 V AC) / 6 A (30 V DC))                                                                                                                                          |
| <b>NUMBER OF SLOTS</b>                         | 4 (expansion)                                                                                                                                                                                                             |
| <b>OPERATING MODE</b>                          | Closed loop speed control<br>(CL)<br>Closed Loop Torque<br>control (CLT)<br>Sensorless vector control<br>(SLV)<br>Speed control with slip<br>compensation<br>Torque regulation<br>V/f control                             |
| <b>OVERVOLTAGE<br/>CATEGORY</b>                | III                                                                                                                                                                                                                       |
| <b>POLLUTION DEGREE</b>                        | 2                                                                                                                                                                                                                         |
| <b>POWER CONSUMPTION</b>                       | 2430 W                                                                                                                                                                                                                    |
| <b>PROTOCOL</b>                                | Other bus systems                                                                                                                                                                                                         |

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| <b>RADIO INTERFERENCE CLASS</b>                     | <p>C1: with external filter, for conducted emissions only</p> <p>C2, C3: depending on the motor cable length, the connected load, and ambient conditions.</p> <p>External radio interference suppression filters (optional) may be necessary.</p> <p>Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments</p> |
| <b>RATED CONDITIONAL SHORT-CIRCUIT CURRENT (IQ)</b> | 100 kA                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>RATED CONTROL SUPPLY VOLTAGE</b>                 | <p>internal, 10 V DC (Us, max. 10 mA) for analog references, 24 V DC</p> <p>external supply Uc</p>                                                                                                                                                                                                                                                                                        |
| <b>RATED CONTROL VOLTAGE (UC)</b>                   | 24 V DC (external, max. 250 mA options incl.)                                                                                                                                                                                                                                                                                                                                             |
| <b>SAFETY FUNCTION/LEVEL</b>                        | <p>STO (Safe Torque Off, SIL3, PLe Cat 4), SS1, SBC, SLS, SSM, SLA, SSR, SAR (SIL3, PLe, Cat 3), SOS, SS2, SDI (SIL2, PLc, Cat 2)</p>                                                                                                                                                                                                                                                     |
| <b>SHOCK RESISTANCE</b>                             | <p>Mechanical, According to EN 61800-5-1, IEC/EN 60068-2-27</p> <p>UPS drop test (for weights inside the UPS frame)</p> <p>Storage and transportation: maximum 15 g, 11 ms (inside the packaging)</p>                                                                                                                                                                                     |
| <b>SHORT-CIRCUIT PROTECTION RATING</b>              | <p>10 A, UL (Class CC or J), Safety device (fuse or miniature circuit-breaker), Power Wiring</p>                                                                                                                                                                                                                                                                                          |
| <b>STARTING CURRENT - MAX</b>                       | <p>200 %, IH, max. starting current (High Overload), For 2 seconds every 20 seconds, Power section</p>                                                                                                                                                                                                                                                                                    |
| <b>SUITABLE FOR</b>                                 | Branch circuits, (UL/CSA)                                                                                                                                                                                                                                                                                                                                                                 |
| <b>SUPPLY FREQUENCY</b>                             | 50/60 Hz                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>SWITCHING FREQUENCY</b>                          | <p>4 kHz, 1 - 12 kHz adjustable, PWM, Power section, Main circuit</p>                                                                                                                                                                                                                                                                                                                     |
| <b>SYSTEM CONFIGURATION TYPE</b>                    | <p>TN-S</p> <p>TN-C</p> <p>TN-C-S</p>                                                                                                                                                                                                                                                                                                                                                     |

|           |                                                                                                                                                                               |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           | TT<br>IT                                                                                                                                                                      |
| VIBRATION | Vibration according to EN 61800-5-1, IEC/EN 60068-2-6: 10 – 150 Hz, displacement amplitude 0.075 mm at 10 Hz to 57 Hz, maximum acceleration amplitude: 1 g at 57 Hz to 150 Hz |

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



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