



Variable frequency drive, 230 V AC, 3-phase, 7 A, 1.5 kW, IP66/NEMA 4X, Local controls, FS1



Part no. **DC1-327D0NN-A6SCE1**  
 Catalog No. **185826**  
 Alternate Catalog No. **DC1-327D0NN-A6SCE1**

## Delivery program

|                                  |          |    |   |
|----------------------------------|----------|----|---|
| Product range                    |          |    | Variable frequency drives   |
| Part group reference (e.g. DIL)  |          |    | DC1   |
| Rated operational voltage        | $U_e$    |    | 230 V AC, 3-phase<br>240 V AC, 3-phase  |
| Output voltage with $V_e$        | $U_2$    |    | 230 V AC, 3-phase<br>240 V AC, 3-phase  |
| Mains voltage (50/60Hz)          | $U_{LN}$ | V  | 200 (-10%) - 240 (+10%)   |
| <b>Rated operational current</b> |          |    |   |
| At 150% overload                 | $I_e$    | A  | 7   |
| Note                             |          |    | Rated operational current at an operating frequency of 6 kHz and an ambient air temperature of +40 °C   |
| <b>Assigned motor rating</b>     |          |    |   |
| Note                             |          |    | for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm <sup>-1</sup> at 50 Hz or 1800 min <sup>-1</sup> at 60 Hz |
| Note                             |          |    | Overload cycle for 60 s every 600 s   |
| Note                             |          |    | at 230 V, 50 Hz   |
| 150 % Overload                   | P        | kW | 1.5   |
| 150 % Overload                   | $I_M$    | A  | 6.3   |
| Note                             |          |    | at 220 - 240 V, 60 Hz   |
| 150 % Overload                   | P        | HP | 2   |
| 150 % Overload                   | $I_M$    | A  | 6.8   |
| Degree of Protection             |          |    | IP66/NEMA 4X  |
| Interface/field bus (built-in)   |          |    | OP-Bus (RS485)/Modbus RTU, CANopen®   |
| Fieldbus connection (optional)   |          |    | SmartWire-DT  |
| Fitted with                      |          |    | 7-digital display assembly<br>Local controls<br>Additional PCB protection   |
| Frame size                       |          |    | FS1   |
| Connection to SmartWire-DT       |          |    | no  |

## Technical data

### General

|                                    |          |    |   |
|------------------------------------|----------|----|---|
| Standards                          |          |    | Specification for general requirements: IEC/EN 61800-2<br>EMC requirements: IEC/EN 61800-3<br>Safety requirements: IEC/EN 61800-5-1 |
| Certifications                     |          |    | CE, UL, cUL, RCM, Ukr SEPPO, EAC  |
| Production quality                 |          |    | RoHS, ISO 9001  |
| Climatic proofing                  | $\rho_w$ | %  | < 95%, average relative humidity (RH), non-condensing, non-corrosive  |
| Air quality                        |          |    | 3C3, 3S3  |
| Ambient temperature                |          |    |   |
| Operating ambient temperature min. |          | °C | -10   |
| Operating ambient temperature max. |          | °C | + 40  |
|                                    |          |    | operation (with 150 % overload)   |
| Storage                            | $\theta$ | °C | -40 - +60   |
| Mounting position                  |          |    | Vertical  |
| Altitude                           |          | m  | 0 - 1000 m above sea level<br>Above 1000 m: 1% derating for every 100 m<br>max. 4000 m  |
| Degree of Protection               |          |    | IP66/NEMA 4X  |

|   |            |     |   |
|---|------------|-----|---|
| Protection against direct contact                           |            |     | BGV A3 (VBG4, finger- and back-of-hand proof)   |
| <b>Main circuit</b>   |            |     |   |
| Supply  |            |     |   |
| Rated operational voltage                                   | $U_e$      |     | 230 V AC, 3-phase<br>240 V AC, 3-phase  |
| Mains voltage (50/60Hz)                                     | $U_{LN}$   | V   | 200 (-10%) - 240 (+10%)   |
| Input current (150% overload)                               | $I_{LN}$   | A   | 9.5   |
| System configuration  |            |     | AC supply systems with earthed center point   |
| Supply frequency  | $f_{LN}$   | Hz  | 50/60   |
| Frequency range   | $f_{LN}$   | Hz  | 48 - 62   |
| Mains switch-on frequency                                   |            |     | Maximum of one time every 30 seconds  |
| Power section   |            |     |   |
| Function  |            |     | Variable frequency drive with internal DC link and IGBT inverter  |
| Overload current (150% overload)                            | $I_L$      | A   | 10.5  |
| max. starting current (High Overload)                       | $I_H$      | %   | 175   |
| Note about max. starting current                            |            |     | for 2,5 seconds every 600 seconds   |
| Output voltage with $V_e$                                   | $U_2$      |     | 230 V AC, 3-phase<br>240 V AC, 3-phase  |
| Output Frequency  | $f_2$      | Hz  | 0 - 50/60 (max. 500)  |
| Switching frequency   | $f_{PWM}$  | kHz | 8<br>adjustable 4 - 32 (audible)  |
| Operation Mode  |            |     | U/f control<br>Speed control with slip compensation<br>sensorless vector control (SLV)<br>PM motors<br>Synchronous reluctance motors<br>BLDC motors               |
| Frequency resolution (setpoint value)                       | $\Delta f$ | Hz  | 0.1   |
| Rated operational current                                   |            |     |   |
| At 150% overload  | $I_e$      | A   | 7   |
| Note  |            |     | Rated operational current at an operating frequency of 6 kHz and an ambient air temperature of +40 °C   |
| Power loss  |            |     |   |
| Heat dissipation at rated operational current $I_e = 150\%$ | $P_V$      | W   | 61.5  |
| Efficiency  | $\eta$     | %   | 95.9  |
| Maximum leakage current to ground (PE) without motor        | $I_{PE}$   | mA  | 7.5   |
| Fitted with   |            |     | 7-digital display assembly<br>Local controls<br>Additional PCB protection   |
| Frame size  |            |     | FS1   |
| Motor feeder  |            |     |   |
| Note  |            |     | for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with $1500 \text{ rpm}^{-1}$ at 50 Hz or $1800 \text{ min}^{-1}$ at 60 Hz |
| Note  |            |     | Overload cycle for 60 s every 600 s   |
| Note  |            |     | at 230 V, 50 Hz   |
| 150 % Overload  | P          | kW  | 1.5   |
| Note  |            |     | at 220 - 240 V, 60 Hz   |
| 150 % Overload  | P          | HP  | 2   |
| maximum permissible cable length                            | l          | m   | screened: 50<br>screened, with motor choke: 100<br>unscreened: 75<br>unscreened, with motor choke: 150  |
| Apparent power  |            |     |   |
| Apparent power at rated operation 230 V                     | S          | kVA | 2.79  |
| Apparent power at rated operation 240 V                     | S          | kVA | 2.91  |
| Braking function  |            |     |   |
| Standard braking torque                                     |            |     | max. 30 % MN  |
| DC braking torque   |            |     | max. 100% of rated operational current $I_e$ , variable   |
| <b>Control section</b>                                      |            |     |   |
| Reference voltage   | $U_s$      | V   | 10 V DC (max. 10 mA)  |
| Analog inputs   |            |     | 2, parameterizable, 0 - 10 V DC, 0/4 - 20 mA  |

|                                |  |  |   |
|--------------------------------|--|--|---|
| Analog outputs                 |  |  | 1, parameterizable, 0 - 10 V                                  |
| Digital inputs                 |  |  | 4, parameterizable, max. 30 V DC                              |
| Digital outputs                |  |  | 1, parameterizable, 24 V DC                                   |
| Relay outputs                  |  |  | 1, parameterizable, N/O, 6 A (250 V, AC-1) / 5 A (30 V, DC-1) |
| Interface/field bus (built-in) |  |  | OP-Bus (RS485)/Modbus RTU, CANopen®                           |

### Assigned switching and protective elements

|  |  |   |  |
|--|--|---|--|
| Power Wiring   |  |   |  |
| Safety device (fuse or miniature circuit-breaker)    |  |   |  |
| IEC (Type B, gG), 150 %                              |  |   | FAZ-B10/3  |
| UL (Class CC or J)                                   |  | A | 10   |
| Mains contactor                                      |  |   |  |
| 150 % overload (CT/I <sub>H</sub> , at 50 °C)        |  |   | DILM7<br>DILEM-...   |
| Main choke   |  |   |  |
| 150 % overload (CT/I <sub>H</sub> , at 50 °C)        |  |   | DX-LN3-010   |
| Note regarding radio interference suppression filter |  |   | Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments |
| Motor feeder   |  |   |  |
| motor choke  |  |   |  |
| 150 % overload (CT/I <sub>H</sub> , at 50 °C)        |  |   | DX-LM3-008   |
| Sine filter  |  |   |  |
| 150 % overload (CT/I <sub>H</sub> , at 50 °C)        |  |   | DX-SIN3-010  |

### Design verification as per IEC/EN 61439

|  |                   |    |  |
|--|-------------------|----|--|
| Technical data for design verification   |                   |    |  |
| Rated operational current for specified heat dissipation   | I <sub>n</sub>    | A  | 7  |
| Heat dissipation per pole, current-dependent   | P <sub>vid</sub>  | W  | 0  |
| Equipment heat dissipation, current-dependent  | P <sub>vid</sub>  | W  | 61.5   |
| Static heat dissipation, non-current-dependent   | P <sub>vs</sub>   | W  | 0  |
| Heat dissipation capacity  | P <sub>diss</sub> | W  | 0  |
| Operating ambient temperature min.   |                   | °C | -10  |
| Operating ambient temperature max.   |                   | °C | 40   |
| IEC/EN 61439 design verification   |                   |    |  |
| 10.2 Strength of materials and parts   |                   |    |  |
| 10.2.2 Corrosion resistance  |                   |    |  |
| 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

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 (ec@ss10.0.1-27-02-31-01 [AKE177014])

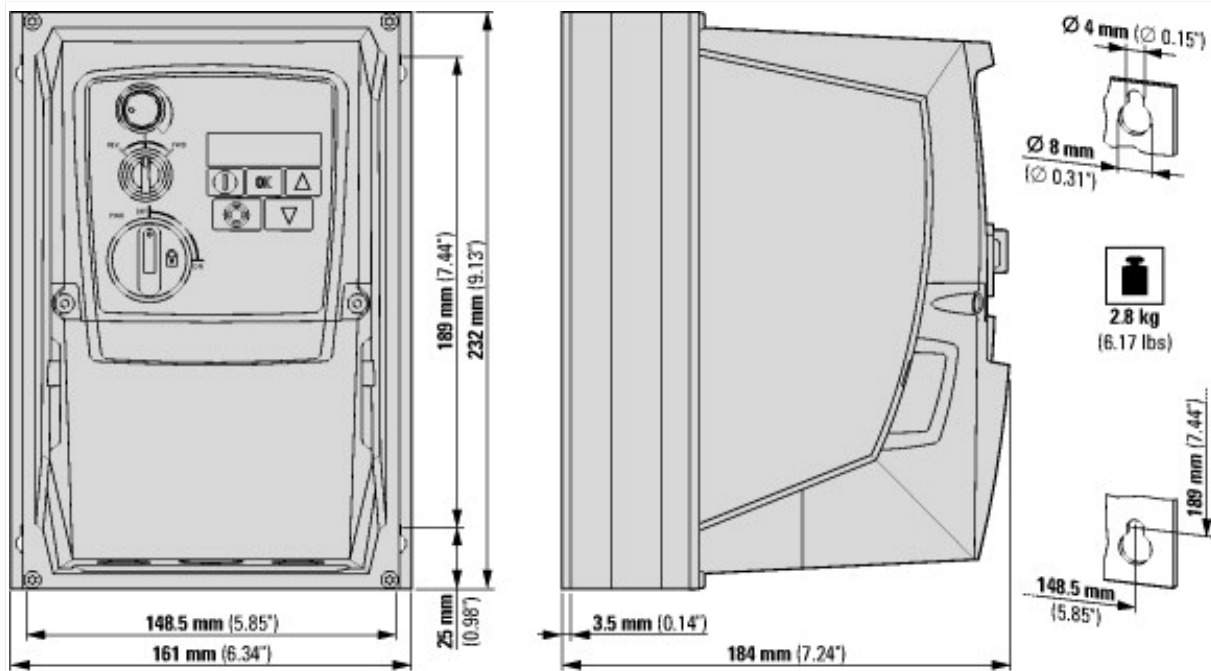
|  |    |           |
|--|----|-----------|
| Mains voltage  | V  | 200 - 240 |
| Mains frequency  |    | 50/60 Hz  |
| Number of phases input                                 |    | 3         |
| Number of phases output                                |    | 3         |
| Max. output frequency                                  | Hz | 500       |
| Max. output voltage                                    | V  | 250       |
| Nominal output current I2N                             | A  | 7         |
| Max. output at quadratic load at rated output voltage  | kW | 1.5       |
| Max. output at linear load at rated output voltage     | kW | 1.5       |
| Relative symmetric net frequency tolerance             | %  | 10        |
| Relative symmetric net voltage tolerance               | %  | 10        |
| Number of analogue outputs                             |    | 1         |
| Number of analogue inputs                              |    | 2         |
| Number of digital outputs                              |    | 1         |
| 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                         |    | No        |
| Supporting protocol for PROFIBUS                       |    | No        |
| 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                      |    | 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                         |    | No        |
| Supporting protocol for other bus systems              |    | Yes       |
| 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   |    | No          |
| 4-quadrant operation possible    |    | No          |
| Type of converter                |    | U converter |
| Degree of protection (IP)        |    | IP66        |
| Degree of protection (NEMA)      |    | 4X          |
| Height                           | mm | 232         |
| Width                            | mm | 161         |
| Depth                            | mm | 184         |

## Approvals

|                                      |  |   |
|--------------------------------------|--|---|
| Product Standards                    |  | UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking |
| UL File No.                          |  | E172143   |
| 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                        |
| Specially designed for North America |  | No  |
| Suitable for                         |  | Branch circuits   |
| Max. Voltage Rating                  |  | 3- 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)            |
| Degree of Protection                 |  | IEC: IP66   |

## Dimensions



## Additional product information (links)

### IL04020013Z DC1 variable frequency drive (FS1 - FS3, IP66)

IL04020013Z DC1 variable frequency drive (FS1 - FS3, IP66) [ftp://ftp.moeller.net/DOCUMENTATION/AWA\\_INSTRUCTIONS/IL04020013Z2019\\_08.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL04020013Z2019_08.pdf)

### MN040023 DC1...E1 Installation manual

MN040023 DC1...E1 Installationshandbuch - Deutsch [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN040023\\_DE.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040023_DE.pdf)

MN040023 DC1...E1 Installation manual - English [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN040023\\_EN.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040023_EN.pdf)

MN040023 DC1...E1 manuale Installazione - italiano [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN040023\\_IT.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040023_IT.pdf)

MN040023 DC1...E1 podręcznik instalacji - polski [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN040023\\_PL.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040023_PL.pdf)

**MN040022 DC1...E1, Parameters manual**

|   |   |
|---|---|
| MN040022 DC1...E1, Parameterhandbuch - Deutsch  | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_DE.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_DE.pdf</a>   |
| MN040022 DC1...E1, Parameters manual - English  | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_EN.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_EN.pdf</a>   |
| MN040022 DC1...E1, manuale Parametri - italiano   | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_IT.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_IT.pdf</a>   |
| MN040022 DC1...E1, podręcznik parametrów - polski   | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_PL.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_PL.pdf</a>   |
| CA04020001Z-EN Product Range Catalog: Efficient Engineering for Starting and Controlling Motors | <a href="http://www.eaton.eu/DE/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_1095238.pdf">http://www.eaton.eu/DE/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_1095238.pdf</a> |