



**Variable Frequency Drive, 1-/1- 230 V, 10.5 A, 1.1 kW, Brake-Chopper**



**Part no.** DC1-S2011NB-A6SN  
**Catalog No.** 169520  
**Eaton Catalog No.** DC1-S2011NB-A6SN

**Delivery program**

|                                  |          |    |  |   |
|----------------------------------|----------|----|--|---|
|                                  |          |    |  | This item will continue to be available for a limited time only and is being replaced by the following item: 186087, DC1-S2011NB-A6SCE1 |
| Product range                    |          |    |  | Variable frequency drives   |
| Part group reference (e.g. DIL)  |          |    |  | DC1   |
| Rated operational voltage        | $U_e$    |    |  | 230 V AC, 1-phase<br>240 V AC, single-phase   |
| Output voltage with $V_e$        | $U_2$    |    |  | 230 V AC, single-phase<br>240 V AC, single-phase  |
| Mains voltage (50/60Hz)          | $U_{LN}$ | V  |  | 200 (-10%) - 240 (+10%)   |
| <b>Rated operational current</b> |          |    |  |   |
| At 150% overload                 | $I_e$    | A  |  | 10.5  |
| Note                             |          |    |  | Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +40 °C                                   |
| Note                             |          |    |  | Overload cycle for 60 s every 600 s   |
| <b>Assigned motor rating</b>     |          |    |  |   |
| Note                             |          |    |  | For AC motors with internal and external ventilation with 50/60 Hz without additional start capacitor                                   |
| Note                             |          |    |  | Overload cycle for 60 s every 600 s   |
| Note                             |          |    |  | at 230 V, 50 Hz   |
| 150 % Overload                   | P        | kW |  | 1.1   |
| 150 % Overload                   | $I_M$    | A  |  | 10.5  |
| Note                             |          |    |  | at 220 - 240 V, 60 Hz   |
| 150 % Overload                   | P        | HP |  | 1.5   |
| 150 % Overload                   | $I_M$    | A  |  | 9.6   |
| Degree of Protection             |          |    |  | IP66/NEMA 4X  |
| Interface/field bus (built-in)   |          |    |  | OP-Bus (RS485)/Modbus RTU, CANopen®   |
| Fieldbus connection (optional)   |          |    |  | SmartWire-DT  |
| Fitted with                      |          |    |  | Brake chopper<br>7-digital display assembly<br>Local controls   |
| Frame size                       |          |    |  | FS2   |
| Connection to SmartWire-DT       |          |    |  | with SmartWire-DT module DX-NET-SWD2  |

**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, UkrSEPRO, EAC   |
| Production quality                |          |    |  | RoHS, ISO 9001  |
| Climatic proofing                 | $\rho_w$ | %  |  | < 95%, average relative humidity (RH), non-condensing, non-corrosive  |
| Ambient temperature               |          |    |  |   |
| operation (150 % overload)        | $\theta$ | °C |  | -10 - +40   |
| 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)   |

## Main circuit

|   |            |          |  |
|---|------------|----------|--|
| Supply  |            |          |  |
| Rated operational voltage                                   | $U_e$      |          | 230 V AC, 1-phase<br>240 V AC, single-phase  |
| Mains voltage (50/60Hz)                                     | $U_{LN}$   | V        | 200 (-10%) - 240 (+10%)  |
| Input current (150% overload)                               | $I_{LN}$   | A        | 19.2   |
| 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  |            |          | Frequency inverter with internal DC link and IGBT inverter   |
| Overload current (150% overload)                            | $I_L$      | A        | 15.75  |
| max. starting current (High Overload)                       | $I_H$      | %        | 175  |
| Note about max. starting current                            |            |          | for 2 seconds every 20 seconds   |
| Output voltage with $U_e$                                   | $U_2$      |          | 230 V AC, single-phase<br>240 V AC, single-phase   |
| Output Frequency  | $f_2$      | Hz       | 0 - 50/60 (max. 120)   |
| Switching frequency   | $f_{PWM}$  | kHz      | 16<br>adjustable 4 - 32 (audible)  |
| Operation Mode  |            |          | U/f control<br>Speed control with slip compensation  |
| Frequency resolution (setpoint value)                       | $\Delta f$ | Hz       | 0.1  |
| Rated operational current                                   |            |          |  |
| At 150% overload  | $I_e$      | A        | 10.5   |
| Note  |            |          | Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +40 °C    |
| Power loss  |            |          |  |
| Heat dissipation at rated operational current $I_e = 150\%$ | $P_V$      | W        | 44   |
| Efficiency  | $\eta$     | %        | 96   |
| Maximum leakage current to ground (PE) without motor        | $I_{PE}$   | mA       | < 1  |
| Fitted with   |            |          | Brake chopper<br>7-digital display assembly<br>Local controls  |
| Frame size  |            |          | FS2  |
| Motor feeder  |            |          |  |
| Note  |            |          | For AC motors with internal and external ventilation with 50/60 Hz without additional start capacitor    |
| Note  |            |          | Overload cycle for 60 s every 600 s  |
| Note  |            |          | at 230 V, 50 Hz  |
| 150 % Overload  | P          | kW       | 1.1  |
| Note  |            |          | at 220 - 240 V, 60 Hz  |
| 150 % Overload  | P          | HP       | 1.5  |
| maximum permissible cable length                            | l          | m        | screened: 100<br>screened, with motor choke: 200<br>unscreened: 150<br>unscreened, with motor choke: 300 |
| Apparent power  |            |          |  |
| Apparent power at rated operation 230 V                     | S          | kVA      | 2.42   |
| Apparent power at rated operation 240 V                     | S          | kVA      | 2.52   |
| Braking function  |            |          |  |
| DC braking torque   |            |          | adjustable to 100 %  |
| Braking torque with external braking resistance             |            |          | Max. 100% of rated operational current $I_e$ with external braking resistor                              |
| minimum external braking resistance                         | $R_{min}$  | $\Omega$ | 47   |
| Switch-on threshold for the braking transistor              | $U_{DC}$   | V        | 390 V DC   |

## Control section

|                   |       |   |  |
|-------------------|-------|---|--|
| 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                                  |  |   |            |
| IEC (Type B, gG), 150 %                       |  |   | FAZ-B25/1N |
| UL (Class CC or J)                            |  | A | 25         |
| 150 % overload (CT/I <sub>H</sub> , at 50 °C) |  |   | DX-LN1-024 |
| 10 % duty factor (DF)                         |  |   | DX-BR3-100 |

### Design verification as per IEC/EN 61439

|  |                   |    |  |
|--|-------------------|----|--|
| Technical data for design verification   |                   |    |  |
| Rated operational current for specified heat dissipation   | I <sub>n</sub>    | A  | 10.5   |
| Heat dissipation per pole, current-dependent   | P <sub>vid</sub>  | W  | 0  |
| Equipment heat dissipation, current-dependent  | P <sub>vid</sub>  | W  | 44   |
| Static heat dissipation, non-current-dependent   | P <sub>vs</sub>   | W  | 0  |
| Heat dissipation capacity  | P <sub>diss</sub> | W  | 0  |
| Operating ambient temperature max.   |                   | °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  |                   |    |  |
|  |                   |    | 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 5.0

|  |   |           |
|--|---|-----------|
| Low-voltage industrial components (EG000017) / Frequency controller =< 1 kV (EC001857)   |   |           |
| Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency converter = < 1 kv (ec@ss8-27-02-31-01 [AKE177010]) |   |           |
| Mains voltage  | V | 200 - 240 |
| Mains frequency  |   | 50/60 Hz  |
| Number of phases input   |   | 1         |
| Number of phases output  |   | 1         |

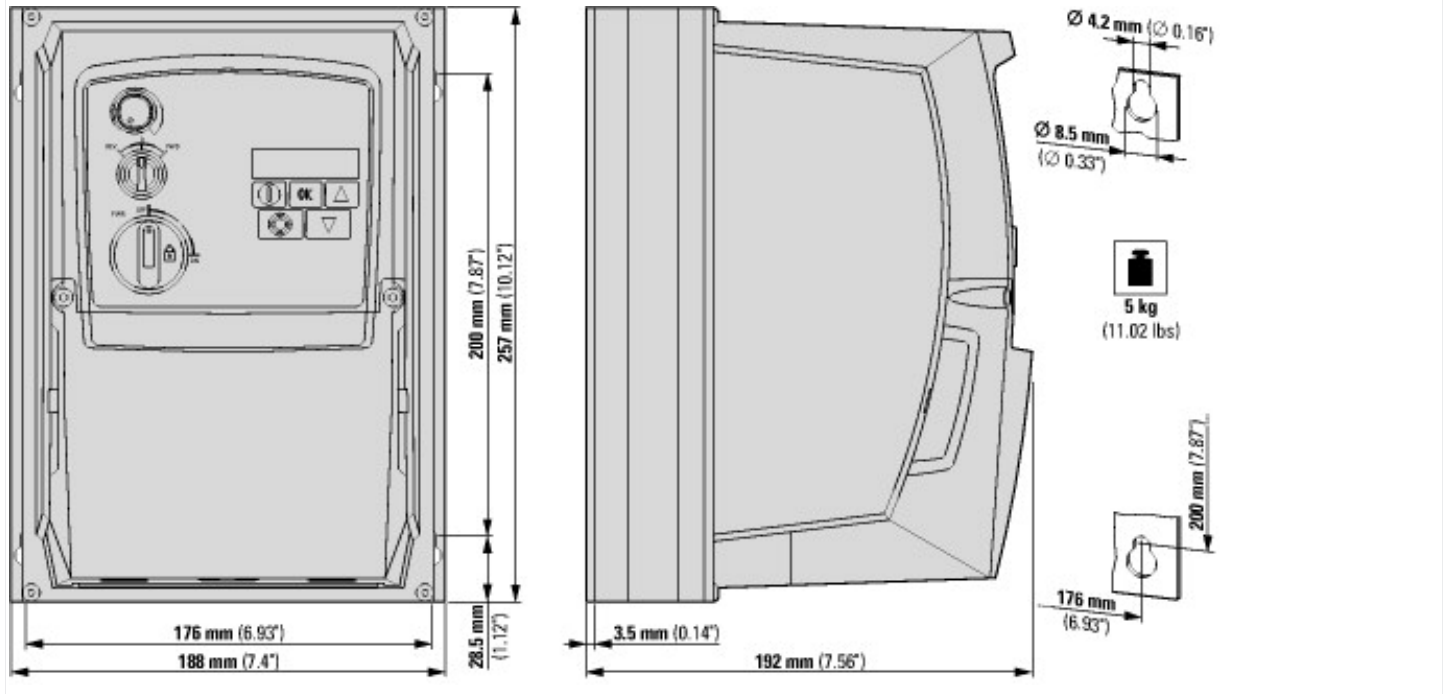
|  |    |             |
|--|----|-------------|
| Max. output frequency                                  | Hz | 500         |
| Rated output voltage                                   | V  | 230         |
| Measuring output current                               | A  | 10.5        |
| Output power at rated output voltage                   | kW | 1.1         |
| Max. output at quadratic load at rated output voltage  | kW | 1.1         |
| Max. output at linear load at rated output voltage     | kW | 1.1         |
| 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                    |    | No          |
| 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 other bus systems              |    | No          |
| Number of HW-interfaces industrial Ethernet            |    | 0           |
| Number of HW-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                            |    | 1           |
| Number of HW-interfaces parallel                       |    | 0           |
| Number of HW-interfaces other                          |    | 0           |
| With optical interface                                 |    | No          |
| With PC connection                                     |    | Yes         |
| Integrated braking resistance                          |    | Yes         |
| 4-quadrant operation possible                          |    | No          |
| Type of converter                                      |    | U converter |
| Degree of protection (IP)                              |    | IP66        |
| Height   | mm | 231         |
| Width  | mm | 107         |
| Depth  | mm | 152         |
| Relative symmetric net frequency tolerance             | %  | 5           |
| Relative symmetric net current tolerance               | %  | 10          |

## 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                  |  | 1~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey) |
| Degree of Protection                 |  | IEC: IP66  |

## Dimensions



## Assets (Links)

### Declaration of Conformity

00002521

## Additional product information (links)

### IL040001ZU DC1 variable frequency drive (FS1 - FS3, IP66)

IL040001ZU DC1 variable frequency drive (FS1 - FS3, IP66) [ftp://ftp.moeller.net/DOCUMENTATION/AWA\\_INSTRUCTIONS/IL040001ZU2017\\_01.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL040001ZU2017_01.pdf)

### MN04020003Z DC1 variable frequency drives, Installation manual

MN04020003Z Frequenzumrichter DC1, Installationshandbuch - Deutsch [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN04020003Z\\_DE.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020003Z_DE.pdf)

MN04020003Z DC1 variable frequency drives, Installation manual - English [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN04020003Z\\_EN.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020003Z_EN.pdf)

MN04020003Z Frekvenční měnič DC1, manuál Instalace - čeština [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN04020003Z\\_CZ.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020003Z_CZ.pdf)

MN04020003Z Convertitore di frequenza DC1, manuale Installazione - italiano [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN04020003Z\\_IT.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020003Z_IT.pdf)

### MN04020004Z DC1 variable frequency drives, Parameters manual

MN04020004Z Frequenzumrichter DC1, Parameterhandbuch - Deutsch [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN04020004Z\\_DE.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020004Z_DE.pdf)

MN04020004Z DC1 variable frequency drives, Parameters manual - English [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN04020004Z\\_EN.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020004Z_EN.pdf)

CA04020001Z-EN Product Range Catalog: Efficient Engineering for Starting and Controlling Motors [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)