



## Frequency Inverters, 3-/3-phase 600 V, 4.1 A, 2.2 kW, Vector control, Brake-Chopper

**Part no.** DA1-354D1NB-A20C  
**Article no.** 177036  
**Catalog No.** DA1-354D1NB-A20C

### Delivery program

|                                    |                 |    |                                                                                                                                                                 |
|------------------------------------|-----------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product range                      |                 |    | Variable frequency drives                                                                                                                                       |
| Part group reference (e.g. DIL)    |                 |    | DA1                                                                                                                                                             |
| Rated operational voltage          | U <sub>e</sub>  |    | 500 V AC, 3-phase<br>600 V AC, 3-phase                                                                                                                          |
| Output voltage with V <sub>e</sub> | U <sub>2</sub>  |    | 500 V AC, 3-phase<br>600 V AC, 3-phase                                                                                                                          |
| Mains voltage (50/60Hz)            | U <sub>LN</sub> | V  | 500 (-10%) - 600 (+10%)                                                                                                                                         |
| <b>Rated operational current</b>   |                 |    |                                                                                                                                                                 |
| At 150% overload                   | I <sub>e</sub>  | A  | 4.1                                                                                                                                                             |
| Note                               |                 |    | Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +50 °C                                                            |
| Note                               |                 |    | Overload cycle for 60 s every 600 s                                                                                                                             |
| <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 500 V, 50 Hz                                                                                                                                                 |
| 150 % Overload                     | P               | kW | 2.2                                                                                                                                                             |
| 150 % Overload                     | I <sub>M</sub>  | A  | 4                                                                                                                                                               |
| Note                               |                 |    | at 525 V, 50 Hz                                                                                                                                                 |
| 150 % Overload                     | P               | kW | 2.2                                                                                                                                                             |
| 150 % Overload                     | I <sub>M</sub>  | A  | 3.8                                                                                                                                                             |
| Note                               |                 |    | at 550 - 600 V, 60 Hz                                                                                                                                           |
| 150 % Overload                     | P               | HP | 3                                                                                                                                                               |
| 150 % Overload                     | I <sub>M</sub>  | A  | 3.9                                                                                                                                                             |
| Degree of Protection               |                 |    | IP20/NEMA 0                                                                                                                                                     |
| Interface/field bus (built-in)     |                 |    | OP-Bus (RS485)/Modbus RTU, CANopen®                                                                                                                             |
| Fieldbus connection (optional)     |                 |    | Ethernet IP<br>DeviceNet<br>PROFIBUS<br>PROFINET<br>Modbus-TCP<br>EtherCAT<br>SmartWire-DT                                                                      |
| Fitted with                        |                 |    | Brake chopper<br>7-digital display assembly<br>Additional PCB protection                                                                                        |
| Frame size                         |                 |    | FS2                                                                                                                                                             |
| Connection to SmartWire-DT         |                 |    | with SmartWire-DT module DX-NET-SWD1                                                                                                                            |

### Technical data

|                            |                |    |                                                                                                                                     |
|----------------------------|----------------|----|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>General</b>             |                |    |                                                                                                                                     |
| 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, c-Tick, UkrSepro, EAC                                                                                                  |
| Production quality         |                |    | RoHS, ISO 9001                                                                                                                      |
| Climatic proofing          | ρ <sub>w</sub> | %  | < 95%, average relative humidity (RH), non-condensing, non-corrosive                                                                |
| Ambient temperature        |                |    |                                                                                                                                     |
| operation (150 % overload) | θ              | °C | -10 - +50                                                                                                                           |
| Storage                    | θ              | °C | -10 - +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              |  |   | IP20/NEMA 0                                                                            |
| Protection against direct contact |  |   | BGV A3 (VBG4, finger- and back-of-hand proof)                                          |

## Main circuit

|                                                             |            |     |                                                                                                                                                                   |
|-------------------------------------------------------------|------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supply                                                      |            |     |                                                                                                                                                                   |
| Rated operational voltage                                   | $U_e$      |     | 500 V AC, 3-phase<br>600 V AC, 3-phase                                                                                                                            |
| Mains voltage (50/60Hz)                                     | $U_{LN}$   | V   | 500 (-10%) - 600 (+10%)                                                                                                                                           |
| Input current (150% overload)                               | $I_{LN}$   | A   | 4.9                                                                                                                                                               |
| 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   | 7.35                                                                                                                                                              |
| max. starting current (High Overload)                       | $I_H$      | %   | 200                                                                                                                                                               |
| Note about max. starting current                            |            |     | for 4 seconds every 40 seconds                                                                                                                                    |
| Output voltage with $V_e$                                   | $U_2$      |     | 500 V AC, 3-phase<br>600 V AC, 3-phase                                                                                                                            |
| Output Frequency                                            | $f_2$      | Hz  | 0 - 50/60 (max. 500)                                                                                                                                              |
| Switching frequency                                         | $f_{PWM}$  | kHz | 8<br>adjustable 4 - 24 (audible)                                                                                                                                  |
| Operation Mode                                              |            |     | U/f control<br>Speed control with slip compensation<br>sensorless vector control (SLV)<br>optional: Vector control with feedback (CLV)                            |
| Frequency resolution (setpoint value)                       | $\Delta f$ | Hz  | 0.1                                                                                                                                                               |
| Rated operational current                                   |            |     |                                                                                                                                                                   |
| At 150% overload                                            | $I_e$      | A   | 4.1                                                                                                                                                               |
| Note                                                        |            |     | Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +50 °C                                                              |
| Power loss                                                  |            |     |                                                                                                                                                                   |
| Heat dissipation at rated operational current $I_e = 150\%$ | $P_V$      | W   | 66                                                                                                                                                                |
| Efficiency                                                  | $\eta$     | %   | 97                                                                                                                                                                |
| Maximum leakage current to ground (PE) without motor        | $I_{PE}$   | mA  | 4,1                                                                                                                                                               |
| Fitted with                                                 |            |     | Brake chopper<br>7-digital display assembly<br>Additional PCB protection                                                                                          |
| Safety function                                             |            |     | STO (Safe Torque Off, SIL1, PLc Cat 1)                                                                                                                            |
| Frame size                                                  |            |     | FS2                                                                                                                                                               |
| 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 500 V, 50 Hz                                                                                                                                                   |
| 150 % Overload                                              | P          | kW  | 2.2                                                                                                                                                               |
| Note                                                        |            |     | at 525 V, 50 Hz                                                                                                                                                   |
| 150 % Overload                                              | P          | kW  | 2.2                                                                                                                                                               |
| Note                                                        |            |     | at 550 - 600 V, 60 Hz                                                                                                                                             |
| 150 % Overload                                              | P          | HP  | 3                                                                                                                                                                 |
| 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 600 V                     | S          | kVA | 4.26                                                                                                                                                              |
| Braking function                                            |            |     |                                                                                                                                                                   |

|                                                 |                  |   |                                                                                      |
|-------------------------------------------------|------------------|---|--------------------------------------------------------------------------------------|
| Standard braking torque                         |                  |   | max. 30 % M <sub>N</sub>                                                             |
| DC braking torque                               |                  |   | adjustable to 100 %                                                                  |
| Braking torque with external braking resistance |                  |   | Max. 100% of rated operational current I <sub>e</sub> with external braking resistor |
| minimum external braking resistance             | R <sub>min</sub> | Ω | 50                                                                                   |
| Switch-on threshold for the braking transistor  | U <sub>DC</sub>  | V | 975 V DC                                                                             |

### Control section

|                                |                |   |                                                                                          |
|--------------------------------|----------------|---|------------------------------------------------------------------------------------------|
| External control voltage       | U <sub>c</sub> | V | 24 V DC (max. 100 mA)                                                                    |
| Reference voltage              | U <sub>s</sub> | V | 10 V DC (max. 10 mA)                                                                     |
| Analog inputs                  |                |   | 2, parameterizable, 0 - 10 V DC, 0/4 - 20 mA                                             |
| Analog outputs                 |                |   | 2, parameterizable, 0 - 10 V, 0/4 - 20 mA                                                |
| Digital inputs                 |                |   | 3, parameterizable, max. 30 VDC, max. 5 for non-parameterized analog inputs              |
| Digital outputs                |                |   | 2, parameterizable, 24 V DC                                                              |
| Relay outputs                  |                |   | 2, parameterizable, 1 N/O and 1 changeover contact, 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 %                           |  |   | 10NHG000B                                      |
| Notes                                             |  |   | NH fuse used together with TB00-D fuse base    |
| UL (Class CC or J)                                |  | A | 10                                             |
| Notes                                             |  |   | LPJ fuse used together with J60060-3 fuse base |
| UL (Class CC or J)                                |  | A | LPJ-10SP                                       |
| Mains contactor                                   |  |   |                                                |
| 150 % overload (CT/I <sub>H</sub> , at 50 °C)     |  |   | DILM7                                          |
| Main choke                                        |  |   |                                                |
| 150 % overload (CT/I <sub>H</sub> , at 50 °C)     |  |   | DX-LN3-006                                     |
| DC link connection                                |  |   |                                                |
| Braking resistance                                |  |   |                                                |
| 10 % Einschaltdauer (ED)                          |  |   | DX-BR200-0K4                                   |
| 20 % duty factor (DF)                             |  |   | DX-BR200-0K8                                   |
| Motor feeder                                      |  |   |                                                |
| motor choke                                       |  |   |                                                |
| 150 % overload (CT/I <sub>H</sub> , at 50 °C)     |  |   | DX-LM3-005                                     |
| Sine filter                                       |  |   |                                                |
| 150 % overload (CT/I <sub>H</sub> , at 50 °C)     |  |   | SIN-0005-6-0-P                                 |

### Design verification as per IEC/EN 61439

|                                        |  |    |     |
|----------------------------------------|--|----|-----|
| Technical data for design verification |  |    |     |
| Operating ambient temperature min.     |  | °C | -10 |
| Operating ambient temperature max.     |  | °C | 50  |

### Technical data ETIM 6.0

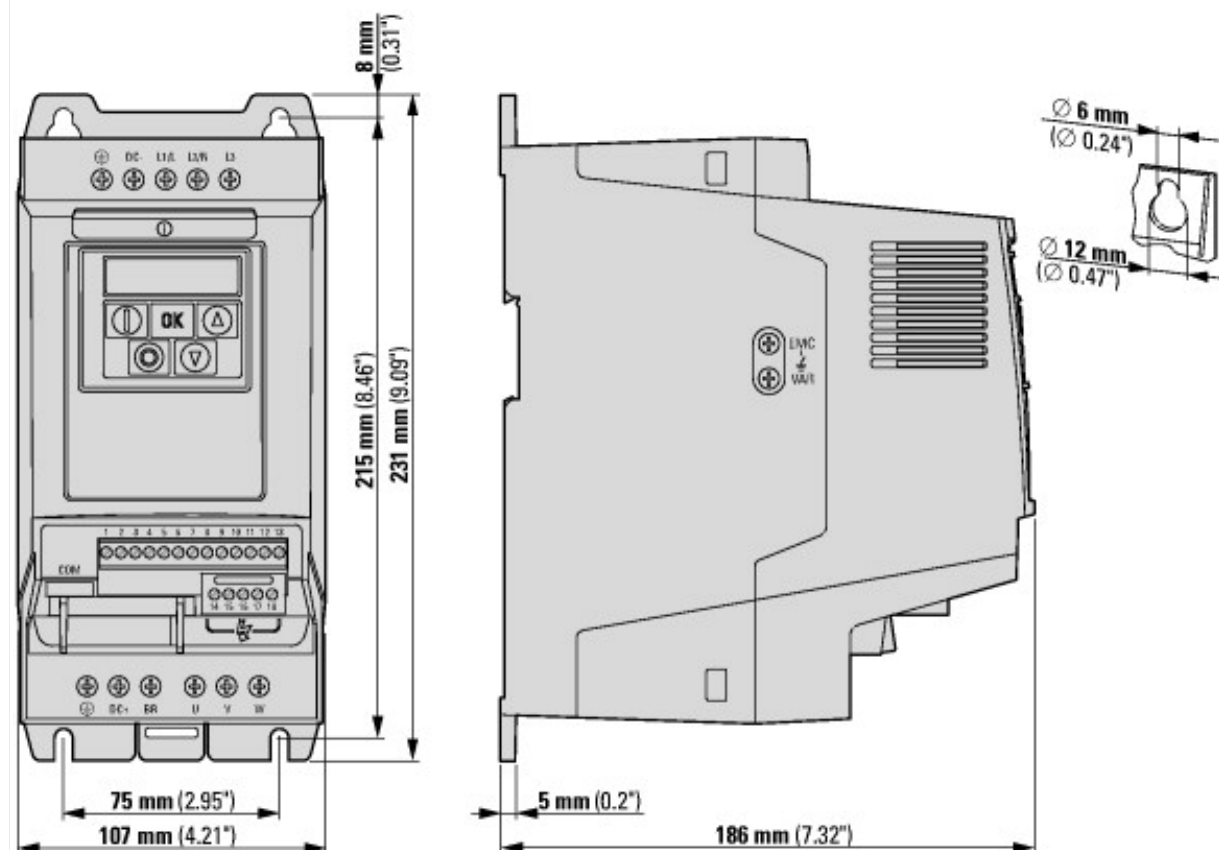
|                                                                                                                                                                                        |  |    |           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----|-----------|
| 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@ss8.1-27-02-31-01 [AKE177011]) |  |    |           |
| Mains voltage                                                                                                                                                                          |  | V  | 500 - 600 |
| Mains frequency                                                                                                                                                                        |  |    | 50/60 Hz  |
| Number of phases input                                                                                                                                                                 |  |    | 3         |
| Number of phases output                                                                                                                                                                |  |    | 3         |
| Max. output frequency                                                                                                                                                                  |  | Hz | 500       |
| Max. output voltage                                                                                                                                                                    |  | V  | 500       |
| Rated output current I <sub>2N</sub>                                                                                                                                                   |  | A  | 4.1       |
| Max. output at quadratic load at rated output voltage                                                                                                                                  |  | kW | 2.2       |
| Max. output at linear load at rated output voltage                                                                                                                                     |  | kW | 2.2       |
| 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                       |  |    | Yes         |
| 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                    |  |    | Yes         |
| 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 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                            |  |    | 0           |
| Number of HW-interfaces parallel                       |  |    | 0           |
| Number of HW-interfaces other                          |  |    | 0           |
| With optical interface                                 |  |    | No          |
| With PC connection                                     |  |    | Yes         |
| Integrated breaking resistance                         |  |    | Yes         |
| 4-quadrant operation possible                          |  |    | No          |
| Type of converter                                      |  |    | U converter |
| Degree of protection (IP)                              |  |    | IP20        |
| Height                                                 |  | mm | 107         |
| Width                                                  |  | mm | 231         |
| Depth                                                  |  | mm | 186         |
| 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                  |  |  | 3- 600 V AC (+10 %) IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)    |
| Degree of Protection                 |  |  | IEC: IP20                                                           |

## Dimensions



## Additional product information (links)

### IL04020011Z Variable frequency drives DA1 (FS4 - 7)

IL04020011Z Variable frequency drives DA1 (FS4 - 7) [ftp://ftp.moeller.net/DOCUMENTATION/AWA\\_INSTRUCTIONS/IL04020011Z2013\\_10.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL04020011Z2013_10.pdf)

### MN04020005Z DA1 variable frequency drives, Installation manual

MN04020005Z Frequenzumrichter DA1, Handbuch - Deutsch [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN04020005Z\\_DE.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020005Z_DE.pdf)

MN04020005Z DA1 variable frequency drive, manual - English [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN04020005Z\\_EN.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020005Z_EN.pdf)

### MN04020006Z DA1 variable frequency drives, Parameters manual

MN04020006Z DA1 variable frequency drives, Parameters manual - Deutsch [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN04020006Z\\_DE.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020006Z_DE.pdf)

MN04020006Z DA1 variable frequency drives, Parameters manual - English [ftp://ftp.moeller.net/DOCUMENTATION/AWB\\_MANUALS/MN04020006Z\\_EN.pdf](ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020006Z_EN.pdf)

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