



# Variable Frequency Drive, 1-/3-phase 230 V, 7.0 A, 1.5 kW, Vector control, EMC-Filter, Brake-Chopper

**Part no.** DA1-127D0FB-B66C  
**Article no.** 169349  
**Catalog No.** DA1-127D0FB-B66C

## Delivery program

|                                    |                 |    |                                                                                                                                                                 |
|------------------------------------|-----------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product range                      |                 |    | Variable frequency drives                                                                                                                                       |
| Part group reference (e.g. DIL)    |                 |    | DA1                                                                                                                                                             |
| Rated operational voltage          | U <sub>e</sub>  |    | 230 V AC, 1-phase<br>240 V AC, single-phase                                                                                                                     |
| Output voltage with V <sub>e</sub> | U <sub>2</sub>  |    | 230 V AC, 3-phase<br>240 V AC, 3-phase                                                                                                                          |
| Mains voltage (50/60Hz)            | U <sub>LN</sub> | V  | 200 (-10%) - 240 (+10%)                                                                                                                                         |
| <b>Rated operational current</b>   |                 |    |                                                                                                                                                                 |
| At 150% overload                   | I <sub>e</sub>  | A  | 7                                                                                                                                                               |
| 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 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 <sub>M</sub>  | A  | 6.3                                                                                                                                                             |
| Note                               |                 |    | at 220 - 240 V, 60 Hz                                                                                                                                           |
| 150 % Overload                     | P               | HP | 2                                                                                                                                                               |
| 150 % Overload                     | I <sub>M</sub>  | A  | 6.8                                                                                                                                                             |
| Degree of Protection               |                 |    | IP66/NEMA 4X                                                                                                                                                    |
| 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                                                                                      |
| Fitted with                        |                 |    | Radio interference suppression filter<br>Brake chopper<br>Additional PCB protection<br>OLED display                                                             |
| 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, c-Tick, UkrSepco, EAC                                                                                                                                        |
| Production quality             |                |    | RoHS, ISO 9001                                                                                                                                                            |
| Climatic proofing              | P <sub>w</sub> | %  | < 95%, average relative humidity (RH), non-condensing, non-corrosive                                                                                                      |
| Ambient temperature            |                |    |                                                                                                                                                                           |
| operation (150 % overload)     | θ              | °C | -10 - +40                                                                                                                                                                 |
| Storage                        | θ              | °C | -40 - +60                                                                                                                                                                 |
| Radio interference level       |                |    |                                                                                                                                                                           |
| Radio interference class (EMC) |                |    | C1, C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary. |
| Environment (EMC)              |                |    | 1st and 2nd environments as per EN 61800-3                                                                                                                                |

|                                   |   |   |                                                                                        |
|-----------------------------------|---|---|----------------------------------------------------------------------------------------|
| maximum motor cable length        | I | m | C1 ≤ 1 m<br>C2 ≤ 5 m<br>C3 ≤ 25 m                                                      |
| 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 <sub>e</sub>   |     | 230 V AC, 1-phase<br>240 V AC, single-phase                                                                                                                     |
| Mains voltage (50/60Hz)                                              | U <sub>LN</sub>  | V   | 200 (-10%) - 240 (+10%)                                                                                                                                         |
| Input current (150% overload)                                        | I <sub>LN</sub>  | A   | 12.9                                                                                                                                                            |
| System configuration                                                 |                  |     | AC supply systems with earthed center point                                                                                                                     |
| Supply frequency                                                     | f <sub>LN</sub>  | Hz  | 50/60                                                                                                                                                           |
| Frequency range                                                      | f <sub>LN</sub>  | 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 <sub>L</sub>   | A   | 10.5                                                                                                                                                            |
| max. starting current (High Overload)                                | I <sub>H</sub>   | %   | 200                                                                                                                                                             |
| Note about max. starting current                                     |                  |     | for 4 seconds every 40 seconds                                                                                                                                  |
| Output voltage with V <sub>e</sub>                                   | U <sub>2</sub>   |     | 230 V AC, 3-phase<br>240 V AC, 3-phase                                                                                                                          |
| Output Frequency                                                     | f <sub>2</sub>   | Hz  | 0 - 50/60 (max. 500)                                                                                                                                            |
| Switching frequency                                                  | f <sub>PWM</sub> | kHz | 16<br>adjustable 4 - 32 (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)                                | Δf               | Hz  | 0.1                                                                                                                                                             |
| Rated operational current                                            |                  |     |                                                                                                                                                                 |
| At 150% overload                                                     | I <sub>e</sub>   | A   | 7                                                                                                                                                               |
| 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 <sub>e</sub> = 150 % | P <sub>V</sub>   | W   | 63                                                                                                                                                              |
| Efficiency                                                           | η                | %   | 95.8                                                                                                                                                            |
| Maximum leakage current to ground (PE) without motor                 | I <sub>PE</sub>  | mA  | 2.49                                                                                                                                                            |
| Fitted with                                                          |                  |     | Radio interference suppression filter<br>Brake chopper<br>Additional PCB protection<br>OLED display                                                             |
| 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 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                                                                                                                                                             |
| Note                                                                 |                  |     | at 220 - 240 V, 60 Hz                                                                                                                                           |
| 150 % Overload                                                       | P                | HP  | 2                                                                                                                                                               |
| maximum permissible cable length                                     | I                | 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 | 2.79                                                                                                                                                            |

|                                                 |                  |     |                                                                                      |
|-------------------------------------------------|------------------|-----|--------------------------------------------------------------------------------------|
| Apparent power at rated operation 240 V         | S                | kVA | 2.91                                                                                 |
| 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   | 390 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 %                           |  |   | FAZ-B20/1N   |
| UL (Class CC or J)                                |  | A | 20           |
| 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-LN1-018   |
| DC link connection                                |  |   |              |
| Braking resistance                                |  |   |              |
| 10 % Einschaltdauer (ED)                          |  |   | DX-BR050-0K4 |
| 20 % duty factor (DF)                             |  |   | DX-BR050-0K8 |

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  | 63                                                                 |
| 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                                                                                            |                   |    | 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 6.0

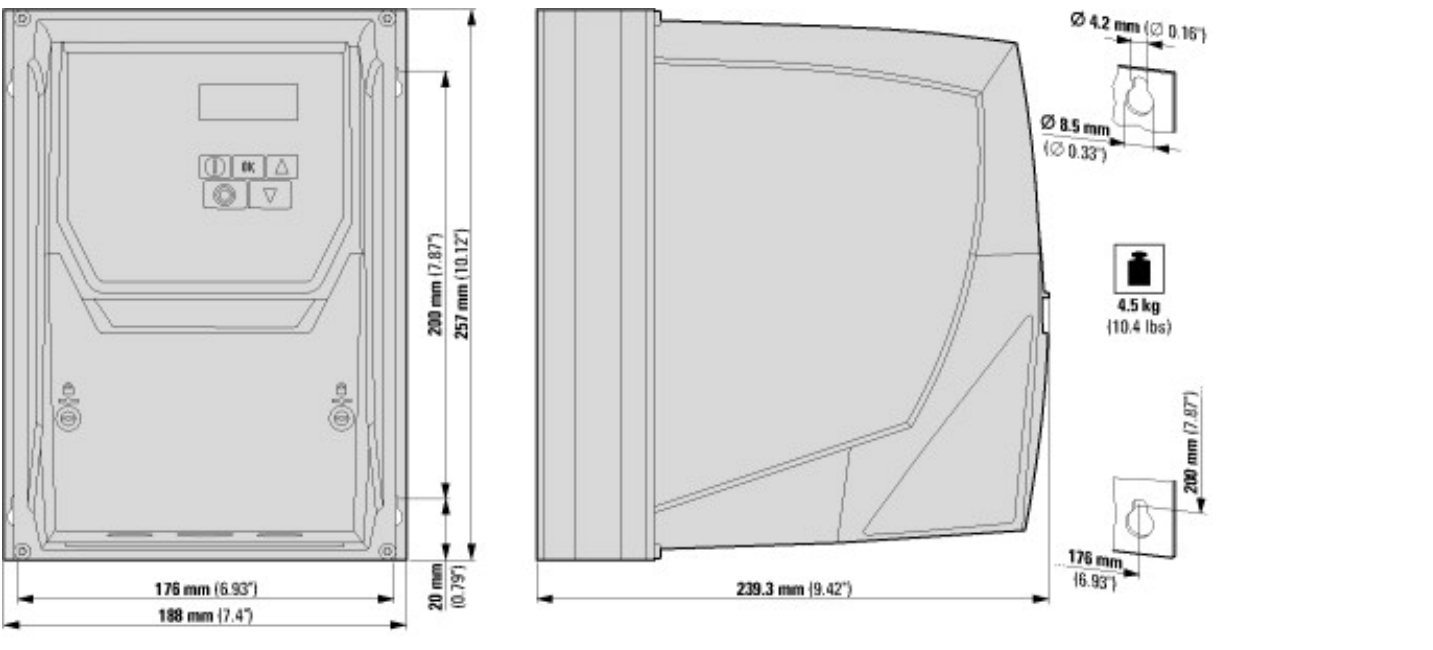
|                                                                                                                                                                                         |    |           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------|
| 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 (ecI@ss8.1-27-02-31-01 [AKE177011]) |    |           |
| Mains voltage                                                                                                                                                                           | V  | 200 - 240 |
| Mains frequency                                                                                                                                                                         |    | 50/60 Hz  |
| Number of phases input                                                                                                                                                                  |    | 1         |
| Number of phases output                                                                                                                                                                 |    | 3         |
| Max. output frequency                                                                                                                                                                   | Hz | 500       |
| Max. output voltage                                                                                                                                                                     | V  | 230       |
| Rated 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       |
| 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                |    | 1           |
| 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)                  |    | IP66        |
| Height                                     | mm | 231         |
| Width                                      | mm | 107         |
| 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                  |  | 1~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)            |
| Degree of Protection                 |  | IEC: IP66                                                           |

### Dimensions



### Additional product information (links)

|                                                                       |                                                                                                                                                                       |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IL04020015Z DA1 variable frequency drives (FS2+3, IP66)</b>        |                                                                                                                                                                       |
| IL04020015Z DA1 variable frequency drives (FS2+3, IP66)               | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL04020015Z2013_08.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL04020015Z2013_08.pdf</a> |
| <b>MN04020005Z DA1 variable frequency drives, Installation manual</b> |                                                                                                                                                                       |
| MN04020005Z Frequenzumrichter DA1, Handbuch - Deutsch                 | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020005Z_DE.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020005Z_DE.pdf</a>                   |
| MN04020005Z DA1 variable frequency drive, manual - English            | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020005Z_EN.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020005Z_EN.pdf</a>                   |
| <b>MN04020006Z DA1 variable frequency drives, Parameters manual</b>   |                                                                                                                                                                       |

|                                                                                                          |                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MN04020006Z DA1 variable frequency drives,<br>Parameters manual - Deutsch                                | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020006Z_DE.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020006Z_DE.pdf</a>                                                                         |
| MN04020006Z DA1 variable frequency drives,<br>Parameters manual - English                                | <a href="ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020006Z_EN.pdf">ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020006Z_EN.pdf</a>                                                                         |
| CA04020001Z-DE Sortimentskatalog:<br>Antriebstechnik effizient gestalten, Motoren<br>starten und steuern | <a href="http://www.eaton.eu/DE/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_1095238_de.pdf">http://www.eaton.eu/DE/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_1095238_de.pdf</a> |