



**174330**  
**DE1-124D3FN-N20N**

Overview

Specifications

Resources



Delivery program

Technical data

Design verification as per IEC/EN 61439

Technical data ETIM 7.0

Approvals

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## DELIVERY PROGRAM

Product range  
Variable speed starter

Part group reference (e.g. DIL)  
DE1

Rated operational voltage [ $U_e$ ]  
230 V AC, 1-phase  
240 V AC, single-phase

Output voltage with  $V_e$  [ $U_2$ ]  
230 V AC, 3-phase  
240 V AC, 3-phase

Mains voltage (50/60Hz) [ $U_{LN}$ ]  
200 (-10%) - 240 (+10%) V

### Rated operational current [ $I_e$ ]

At 150% overload [ $I_e$ ]  
4.3 A

Note  
Rated operational current at an operating  
frequency of 16 kHz and an ambient air  
temperature of +50 °C

### Assigned motor rating

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]  
0.75 kW

150 % Overload [I<sub>M</sub>]  
3.2 A

Note  
at 220 - 240 V, 60 Hz

150 % Overload [P]  
1 HP

150 % Overload [I<sub>M</sub>]  
3.2 A

Degree of Protection  
IP20/NEVA0

Interface/field bus (built-in)  
OP-Bus (RS485)/Modbus RTU

Fitted with  
Radio interference suppression filter

Parameterization  
Keypad

Fieldbus  
drivesConnect  
drivesConnect mobile (App)

Frame size  
FS1

Connection to SmartWire-DT  
yes  
in conjunction with DX-NET-SWD3 SmartWire DT  
module

## TECHNICAL DATA

### General

Standards  
Specification for general requirements: IEC/EN  
61800-2  
EMC requirements: IEC/EN 61800-3  
Safety requirements: IEC/EN 61800-5-1

Certifications  
CE, UL, cUL, RCM

Production quality  
RoHS, ISO 9001

Climatic proofing [ $\rho_w$ ]  
< 95%, average relative humidity (RH), non-  
condensing, non-corrosive %

Ambient temperature  
Operating ambient temperature min.  
-10 °C

Ambient temperature  
Operating ambient temperature max.  
+60 °C

Ambient temperature  
operation (150 % overload); max. +60 °C

Ambient temperature

Storage [9]  
-40 - +70 °C

Radio interference level  
Radio interference class (EMC)  
C1 (for conducted emissions only), C2, C3,  
depending on the motor cable length, the  
connected load, and ambient conditions. External  
radio interference suppression filters (optional)  
may be necessary.

Radio interference level  
Environment (EMC)  
1st and 2nd environments as per EN61800-3

Radio interference level  
maximum motor cable length [l]  
C1 ≤ 5 m  
C2 ≤ 10 m  
C3 ≤ 25 mm

Mechanical shock resistance  
15 (11 m/s, EN60068-2-27) g

Vibration  
EN61800-5-1

Altitude  
0 - 1000 m above sea level  
Above 1000 m: 1% derating for every 100 m  
max. 2000 mm

Degree of Protection  
IP20/NEVA0

Protection against direct contact  
BGV A3 (VBG4, finger- and back-of-hand proof)

## Main circuit

Supply  
Rated operational voltage [ $U_b$ ]  
230 V AC, 1-phase  
240 V AC, single-phase

Supply  
Mains voltage (50/60Hz) [ $U_N$ ]  
200 (-10%) - 240 (+10%) V

Supply  
Input current (150% overload) [ $I_{LN}$ ]  
11.3 A

Supply  
Supply frequency [ $f_{LN}$ ]  
50/60 Hz

Supply  
Frequency range [ $f_{LN}$ ]  
45–66 ( $\pm 0\%$ ) Hz

Supply  
Mains switch-on frequency  
Maximum of one time every 30 seconds

Power section  
Overload current (150% overload) [ $I_L$ ]  
6.45 A

Power section  
max. starting current (High Overload) [ $I_H$ ]  
200 %

Power section  
Note about max. starting current  
for 1.875 seconds every 600 seconds

Power section  
Output voltage with  $V_e$  [ $U_2$ ]  
230 V AC, 3-phase  
240 V AC, 3-phase

Power section  
Output Frequency [ $f_2$ ]  
0 - 50/60 (max. 300) Hz

Power section  
Switching frequency [ $f_{PWM}$ ]  
16  
adjustable 4 - 32 (audible) kHz

Power section  
Operation Mode  
U/f control  
Speed control with slip compensation

Power section  
Frequency resolution (setpoint value) [ $\Delta f$ ]  
0.025 Hz

Power section  
Rated operational current  
At 150% overload [ $I_e$ ]  
4.3 A

Power section  
Note  
Rated operational current at an operating  
frequency of 16 kHz and an ambient air  
temperature of +50 °C

Power section  
Maximum leakage current to ground (PE) without  
motor [ $I_{PE}$ ]  
< 3.5 AC, < 10 DC mA

Power section  
Fitted with  
Radio interference suppression filter

Power section  
Frame size  
FS1

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

Motor feeder  
Note  
Overload cycle for 60 s every 600 s

Motor feeder  
Note  
at 230 V, 50 Hz

Motor feeder  
150 % Overload [P]  
0.75 kW

Motor feeder  
Note  
at 220 - 240 V, 60 Hz

Motor feeder  
150 % Overload [F]  
1 HP

Motor feeder  
Apparent power  
Apparent power at rated operation 230 V [S]  
1.71 kVA

Motor feeder  
Apparent power  
Apparent power at rated operation 240 V [S]  
1.79 kVA

Motor feeder  
Braking function  
Standard braking torque  
max. 30 %  $M_N$

Motor feeder  
Braking function  
DC braking torque  
adjustable to 100 %

## Control section

Reference voltage [ $U_s$ ]  
10 V DC (max. 0.2 mA) V

Analog inputs  
1, parameterizable, 0 - 10 V DC, 0/4 - 20 mA

Digital inputs  
4, parameterizable, 10 - 30 V DC

Relay outputs  
1, N/O contact, 6 A (250 V, AC-1) / 5 A (30 V, DC-1)

Interface/field bus (built-in)  
OP-Bus (RS485)/Modbus RTU

## Assigned switching and protective elements

Power Wiring

Safety device (fuse or miniature circuit-breaker)  
IEC (Type B, gG), 150 %  
FAZ-B16/1N

Power Wiring  
Safety device (fuse or miniature circuit-breaker)  
UL (Class CC or J)  
15 A

Power Wiring  
Mains contactor  
150 % overload (CT/I<sub>n</sub>, at 50 °C)  
DILM7-... + DILM12-XP1

Power Wiring  
Main choke  
150 % overload (CT/I<sub>n</sub>, at 50 °C)  
DX-LN1-013

Power Wiring  
Radio interference suppression filter (external,  
150 %)  
DX-EMC12-014-FS1

Power Wiring  
Note regarding radio interference suppression  
filter  
Optional external radio interference suppression  
filter for longer motor cable lengths and for use in  
different EMC environments

Motor feeder  
motor choke  
150 % overload (CT/I<sub>n</sub>, at 50 °C)  
DX-LMB-008

## DESIGN VERIFICATION AS PER IEC/EN 61439

### Technical data for design verification

Rated operational current for specified heat  
dissipation [I<sub>n</sub>]  
4.3 A

Heat dissipation per pole, current-dependent [P<sub>id</sub>]  
0 W



Equipment heat dissipation, current-dependent

[ $P_{\text{vid}}$ ]

32 W

Static heat dissipation, non-current-dependent [ $P_{\text{vs}}$ ]

0 W

Heat dissipation capacity [ $P_{\text{diss}}$ ]

0 W

Operating ambient temperature min.

-10 °C

Operating ambient temperature max.

+60 °C

## 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 Strength of materials and parts

10.2.3.1 Verification of thermal stability of enclosures

Meets the product standard's requirements.

10.2 Strength of materials and parts

10.2.3.2 Verification of resistance of insulating materials to normal heat

Meets the product standard's requirements.

10.2 Strength of materials and parts

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 Strength of materials and parts

10.2.4 Resistance to ultra-violet (UV) radiation

Meets the product standard's requirements.

10.2 Strength of materials and parts

10.2.5 Lifting

Does not apply, since the entire switchgear needs to be evaluated.

10.2 Strength of materials and parts  
10.2.6 Mechanical impact  
Does not apply, since the entire switchgear needs to be evaluated.

10.2 Strength of materials and parts  
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 Insulation properties  
10.9.3 Impulse withstand voltage  
Is the panel builder's responsibility.

10.9 Insulation properties  
10.9.4 Testing of enclosures made of insulating material  
Is the panel builder's responsibility.

10.10 Temperature rise  
The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.

10.11 Short-circuit rating  
Is the panel builder's responsibility. The specifications for the switchgear must be observed.

10.12 Electromagnetic compatibility  
Is the panel builder's responsibility. The specifications for the switchgear must be observed.

10.13 Mechanical function  
The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

## TECHNICAL DATA ETIM 7.0

Low-voltage industrial components (EG000017) / Frequency converter  $\leq 1$  kV (EC001857)

Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency converter  $= < 1$  kV (ecl@ss10.0.1-27-02-31-01 [AKE177014])

Mains voltage  
200 - 240 V

Mains frequency  
50/60 Hz

Number of phases input  
1

Number of phases output  
3

Max. output frequency  
300 Hz

Max. output voltage  
250 V

Nominal output current I<sub>N</sub>  
4.3 A

Max. output at quadratic load at rated output  
voltage  
0.5 kW

Max. output at linear load at rated output voltage  
0.5 kW

Relative symmetric net frequency tolerance  
10 %

Relative symmetric net voltage tolerance  
10 %

Number of analogue outputs  
0

Number of analogue inputs  
1

Number of digital outputs  
0

Number of digital inputs  
4

With control unit  
No

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  
No

Supporting protocol for INTERBUS  
No

Supporting protocol for ASI  
No

Supporting protocol for KNX  
No

Supporting protocol for MODBUS  
Yes

Supporting protocol for Data-Highway  
No

Supporting protocol for DeviceNet  
No

Supporting protocol for SUCONET  
No

Supporting protocol for LON  
No

Supporting protocol for PROFINET IO  
No

Supporting protocol for PROFINET CBA  
No

Supporting protocol for SERCOS  
No

Supporting protocol for Foundation Fieldbus  
No

Supporting protocol for EtherNet/IP  
Yes

Supporting protocol for AS-Interface Safety at  
Work  
No

Supporting protocol for DeviceNet Safety  
No

Supporting protocol for INTERBUS-Safety  
No

Supporting protocol for PROFI-safe  
No

Supporting protocol for SafetyBUS p  
No

Supporting protocol for BACnet  
No

Supporting protocol for other bus systems  
Yes

Number of HW-interfaces industrial Ethernet  
0

Number of interfaces PROFINET  
0

Number of HW-interfaces RS-232  
0

Number of HW-interfaces RS-422  
0

Number of HW-interfaces RS-485  
1

Number of HW-interfaces serial TTY  
0

Number of HW-interfaces USB  
0

Number of HW-interfaces parallel  
0

Number of HW-interfaces other  
0

With optical interface  
No

With PC connection  
Yes

Integrated breaking resistance  
No

4-quadrant operation possible  
No

Type of converter  
U converter

Degree of protection (IP)  
IP20

Degree of protection (NEMA)  
Other

Height  
230 mm

Width  
45 mm

Depth  
168 mm

## 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: IP20

## DIMENSIONS





