3-5045-005A
DM1-123D0EB-S20S-EM

DELIVERY PROGRAM

Product range
Variable frequency drives

Part group reference (e.g. DIL)
DM1

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}]
208 (-10%) - 240 (+10%) V

Rated operational current [I_e]

At 150% overload [I_e]
3 A

At 110% overload [I_e]
4.8 A

Note
Rated operational current for a switching frequency of 1 - 16 kHz and an ambient temperature of +50 °C for a 150% overload and +40 °C for a 110% overload

Assigned motor rating

Note
for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm^{-1} at 50 Hz or 1800 min^{-1} at 60 Hz
for PM motors

Note
Overload cycle for 60 s every 600 s

Note
at 230 V, 50 Hz

150 % Overload [P]
0.55 kW

110 % Overload [P]
1.1 kW

150 % Overload [I_M]
2.7 A

110 % Overload [I_M]
4.6 A

Note
at 230 V, 60 Hz

150 % Overload [P]
0.5 HP

110 % Overload [P]
1 HP

150 % Overload [I_M]
2.2 A

110 % Overload [I_M]
4.2 A

Degree of Protection
IP20/NEMA 0

Interface/field bus (built-in)
Modbus RTU
Modbus TCP
BACnet MS/TP
Ethernet IP
BACnet TCP

Fieldbus connection (optional)
Profibus, CAN, DeviceNet, SmartwireDT

Fitted with
Radio interference suppression filter
7-digital display assembly
Setpoint potentiometer
Brake chopper

Parameterization
Keypad
Fieldbus
Power Xpert inControl

Frame size
FS1

Connection to SmartWire-DT
yes
in conjunction with DXG-NET-SWD SmartWire DT module

TECHNICAL DATA

General

Standards
General requirements: IEC/EN 61800-2
EMV requirements: IEC/EN 61800-3
Safety requirements: IEC/EN 61800-5-1:2007/A1:2017; UL 61800-5-1:2012 (Rev. 2018), CSA C22.2 No. 274-17:2017

Certifications
CE, UL, cUL, c-Tick, UkrSEPRO, EAC

Production quality
RoHS, ISO 9001

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

Air quality
3C2, 3S2

Ambient temperature
Operating ambient temperature min.
-10 °C

Ambient temperature
Operating ambient temperature max.
+50 °C

Ambient temperature
operation (110 % overload) [ϑ]
-10 - +40 (max. +55 with 1 % derating per Kelvin temperature rise) °C °C

Ambient temperature
Operation with 110 % overload (1 min./10 min.): -10 to +40 (max. +55 with 1% derating per Kelvin above limit)
Operation with 150% overload (1 min./10 min.): -10 to +50 (max. +60 with 1% derating per Kelvin above limit)
-20 with cold-weather mode

Ambient temperature
Storage [ϑ]
-40 - +70 °C

Overvoltage category
III

Pollution degree
2

Radio interference level
Radio interference class (EMC)
C1 (with external filter, 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 EN 61800-3

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

Mechanical shock resistance
EN 61800-5-1, EN 60068-2-6: 10 - 150 Hz
Amplitude: 0,75 mm (peak) bei 10 - 57 Hz
Maximum acceleration amplitude: 1 g at 57 – 150 Hz g

Mounting position
Vertical

Altitude
0 - 1000 m above sea level
Above 1000 m: 1% derating for every 100 m
max. 3000 m (2000 m for Corner Grounded TN Systems) 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]
230 V AC, 1-phase
240 V AC, single-phase

Supply
Mains voltage (50/60Hz) [U_{LN}]
208 (-10%) - 240 (+10%) V

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

Supply
Input current (110% overload) [I_{LN}]
5.8 A

Supply
System configuration
TN-S, TN-C, TN-C-S, TT, IT

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

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

Supply
Mains switch-on frequency
Maximum of one time every 60 seconds

Supply
Mains current distortion [THD]
40 %

Supply
Rated conditional short-circuit current [I_q]
< 100 kA

Power section
Function
Variable frequency drive with internal DC link, DC link choke and IGBT inverter

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

Power section
Overload current (110% overload) [I_L]

5.28 A

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

Power section
Note about max. starting current
for 2 seconds every 20 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. 400) Hz

Power section
Switching frequency [f_{PWM}]
4
adjustable 1 - 16 kHz

Power section
Operation Mode
U/f control
Speed control with slip compensation
sensorless vector control (SLV)
Torque regulation
PM motors

Power section
Frequency resolution (setpoint value) [Δf]
0.01 Hz

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

Power section
Rated operational current
At 110% overload [I_e]
4.8 A

Power section
Note
Rated operational current for a switching
frequency of 1 - 16 kHz and an ambient

temperature of +50 °C for a 150% overload and
+40 °C for a 110% overload

Power section
Motor current limit [I]
0.1 - 2 x I_H (CT) A

Power section
Power loss
Heat dissipation at rated operational current I_e
=150 % [R_V]
0 W

Power section
Power loss
Heat dissipation at rated operational current I_e
=110% [R_V]
0 W

Power section
Heat dissipation at current/speed [%]
Current = 100%
Speed = 0 % [R_V]
35.54 W

Power section
Heat dissipation at current/speed [%]
Current = 100%
Speed = 50 % [R_V]
25.89 W

Power section
Heat dissipation at current/speed [%]
Current = 100%
Speed = 90 % [R_V]
54.43 W

Power section
Heat dissipation at current/speed [%]
Current = 50 %
Speed = 0 % [R_V]
44.08 W

Power section
Heat dissipation at current/speed [%]
Current = 50 %
Speed = 50 % [R_V]
29.15 W

Power section
Heat dissipation at current/speed [%]
Current = 50 %

Speed = 90 % [P_V]
33.95 W

Power section
Heat dissipation at current/speed [%]
Current = 50 %
Speed = 0 % [P_V]
23 W

Power section
Heat dissipation at current/speed [%]
Current = 50 %
Speed = 50 % [P_V]
24.82 W

Power section
Fan
temperature controlled

Power section
Internal fan delivery rate
26 m^3/h

Power section
Fitted with
Radio interference suppression filter
7-digital display assembly
Setpoint potentiometer
Brake chopper

Power section
Safety function
STO (Safe Torque Off, SIL2, PLd Cat 3)

Power section
Frame size
FS1

Motor feeder
Note
for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm^{-1} at 50 Hz or 1800 min^{-1} at 60 Hz
for PM motors

Motor feeder
Note
Overload cycle for 60 s every 600 s

Motor feeder

Note
at 230 V, 50 Hz

Motor feeder
150 % Overload [P]
0.55 kW

Motor feeder
110 % Overload [P]
1.1 kW

Motor feeder
Note
at 230 V, 60 Hz

Motor feeder
150 % Overload [P]
0.5 HP

Motor feeder
110 % Overload [P]
1 HP

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

Motor feeder
Braking function
DC braking torque
adjustable to 150 %

Motor feeder
Braking function
Braking torque with external braking resistance
Max. 100% of rated operational current I_e with
external braking resistor

Motor feeder
Braking function
minimum external braking resistance [R_{min}]
36 Ω

Motor feeder
Braking function
DC braking [%]
□ 150, adjustable I/I_e

Control section

External control voltage [U_c]
24 V DC (max. 100 mA options incl.) V

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

Analog inputs
1, can be parameterized, 0–10 V DC, 2–10 V DC, 0/4–20 mA

Analog outputs
1, parameterizable, 0 - 10 V

Digital inputs
4, parameterizable, max. 30 V DC

Relay outputs
2, parameterizable, 1 changeover contacts and 1 N/O, 3 A (240 VAC) / 3 A (24 VDC)

Interface/field bus (built-in)
Modbus RTU
Modbus TCP
BACnet MS/TP
Ethernet IP
BACnet TCP

Expansion slots
1

Assigned switching and protective elements

Power Wiring
Safety device (fuse or miniature circuit-breaker)
IEC (Type B, gG), 150 %
PKZM0-4

Power Wiring
Safety device (fuse or miniature circuit-breaker)
IEC (Type B, gG), 110 %
PKZM0-6,3

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

6.3 A

Power Wiring
Mains contactor
150 % overload (CT/I_H, at 50 °C)
DILM7-10 (230V50HZ,240V60HZ)

Power Wiring
Mains contactor
110 % overload (VT/I_L, at 40 °C)
DILM7-10 (230V50HZ,240V60HZ)

Power Wiring
Main choke
150 % overload (CT/I_H, at 50 °C)
DX-LN1-006

Power Wiring
Main choke
110 % overload (VT/I_L, at 40 °C)
DX-LN1-006

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

Power Wiring
Radio interference suppression filter (external, 110 %)
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

DC link connection
Braking resistance
10 % duty factor (DF)
DX-BR040-3K1

DC link connection
Braking resistance
20 % duty factor (DF)
DX-BR040-3K1

DC link connection

Braking resistance
40 % duty factor (DF)
DX-BR040-3K1

Motor feeder
motor choke
150 % overload (CT/I_H, at 50 °C)
DX-LM3-008

Motor feeder
motor choke
110 % overload (VT/I_L, at 40 °C)
DX-LM3-008

Motor feeder
Sine filter
150 % overload (CT/I_H, at 50 °C)
DX-SIN3-004

Motor feeder
Sine filter
110 % overload (VT/I_L, at 40 °C)
DX-SIN3-010

Motor feeder
All-pole sine filter
150 % overload (CT/I_H, at 50 °C)
DX-SIN3-006-A

Motor feeder
All-pole sine filter
110 % overload (VT/I_L, at 40 °C)
DX-SIN3-006-A

DESIGN VERIFICATION AS PER IEC/EN 61439

Technical data for design verification

Rated operational current for specified heat dissipation [I_n]
4.8 A

Operating ambient temperature min.
-10 °C

Operating ambient temperature max.

+50 °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 =< 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
170 - 264 V

Mains frequency
50/60 Hz

Number of phases input
1

Number of phases output
3

Max. output frequency
400 Hz

Max. output voltage
240 V

Nominal output current I2N
4.8 A

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

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

Relative symmetric net frequency tolerance
10 %

Relative symmetric net voltage tolerance
10 %

Number of analogue outputs
1

Number of analogue inputs
1

Number of digital outputs
0

Number of digital inputs
4

With control unit
Yes

Application in industrial area permitted
Yes

Application in domestic- and commercial area permitted
Yes

Supporting protocol for TCP/IP
Yes

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
Yes

Supporting protocol for SUCONET
No

Supporting protocol for LON
No

Supporting protocol for PROFINET IO
No

Supporting protocol for PROFINET CBA
No

Supporting protocol for SERCOS
No

Supporting protocol for Foundation Fieldbus
No

Supporting protocol for EtherNet/IP
Yes

Supporting protocol for AS-Interface Safety at Work
No

Supporting protocol for DeviceNet Safety
No

Supporting protocol for INTERBUS-Safety
No

Supporting protocol for PROFIsafe
No

Supporting protocol for SafetyBUS p
No

Supporting protocol for BACnet
Yes

Supporting protocol for other bus systems
Yes

Number of HW-interfaces industrial Ethernet
1

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
1

With optical interface
No

With PC connection
Yes

Integrated breaking resistance
Yes

4-quadrant operation possible
Yes

Type of converter

U converter

Degree of protection (IP)
IP20

Degree of protection (NEMA)
Other

Height
152 mm

Width
72 mm

Depth
180 mm

APPROVALS

Product Standards
UL508C, CSA-C22.2 No. 274-13; IEC/EN61800-3;
IEC/EN61800-5; CE marking

UL File No.
E134360

UL Category Control No.
NMMS, NMMS7

CSA File No.
UL report applies to both US and Canada

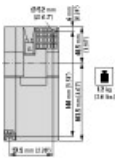
North America Certification
UL listed, certified by UL for use in Canada

Suitable for
Branch circuits

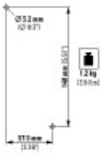
Max. Voltage Rating
1~240 V AC IEC: TN-S UL/CSA: 'Y' (Solidly
Grounded Wey)

Degree of Protection
IP20/NEMA0

DIMENSIONS



Back view



Drilling patterns