DM1-32017NB-S20S-EM - Variable frequency drive, 230 V AC, 3-phase, 17.5 A, 4 kW, IP20/NEMA0, 7-digital display assembly, Setpoint potentiometer, Brake chopper, STO (Safe Torque Off, SIL2, PLd Cat 3)

3-5004-004A DM1-32017NB-S20S-EM

3-5004-004A DM1-32017NB-S20S-EM

Variable frequency drive, 230 V AC, 3-phase, 17.5 A, 4 kW, IP20/NEMA0, 7-digital display assembly, Setpoint potentiometer, Brake chopper, STO (Safe Torque Off, SIL2, PLd Cat 3)
Variable frequency drive, DM1, Output voltage with Ve: 230 V AC, 3-phase, Mains voltage (50/60Hz): 208 (-10%) - 240 (+10%) V, Rated operational current At 150% overload: 17.5 A, at 230 V, 50 Hz, 150 % Overload: 4 kW, 110 % Overload: 5.5 kW, Degree of Protection: IP20/NEMA0, 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: 7-digital display assembly, Setpoint potentiometer, Brake chopper, Parameterization: Keypad, Fieldbus, Power Xpert inControl, Frame size: FS2, Connection to SmartWire-DT: yes, in conjunction with DXG-NET-SWD SmartWire DT module

Delivery program

Product range
Variable frequency drives
Part group reference (e.g. DIL)
DM1

Rated operational voltage [U_e]
230 V AC, 3-phase
240 V AC, 3-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]
17.5 A
At 110% overload [I_e]
25 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]
4 kW
110 % Overload [P]
5.5 kW
150 % Overload [I_M]
14.8 A
110 % Overload [I_M]
19.6 A
Note
at 230 V, 60 Hz
150 % Overload [P]
5 HP
110 % Overload [P]
7.5 HP
150 % Overload [I_M]
15.2 A
110 % Overload [I_M]
22 A
Degree of Protection
IP20/NEMA0
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
7-digital display assembly
Setpoint potentiometer
Brake chopper
Parameterization
Keypad
Fieldbus
Power Xpert inControl
Frame size
FS2
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 temperatureOperating ambient temperature min.
-10 °C
Ambient temperatureOperating ambient temperature max.
+50 °C
Ambient temperatureoperation (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 temperatureStorage [ϑ]
-40 - +70 °C
Overvoltage category
III
Pollution degree
2
Radio interference levelRadio 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 levelEnvironment (EMC)
1st and 2nd environments as per EN 61800-3
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
SupplyRated operational voltage [U_e]
230 V AC, 3-phase
240 V AC, 3-phase
SupplyMains voltage (50/60Hz) [U_{LN}]
208 (-10%) - 240 (+10%) V
SupplyInput current (150% overload) [I_{LN}]
20.1 A
SupplyInput current (110% overload) [I_{LN}]
29.1 A
SupplySystem configuration
TN-S, TN-C, TN-C-S, TT, IT
SupplySupply frequency [f_{LN}]
50/60 Hz
SupplyFrequency range [f_{LN}]
45–66 (± 0%) Hz
SupplyMains switch-on frequency
Maximum of one time every 60 seconds
SupplyMains current distortion [THD]
40 %
SupplyRated conditional short-circuit current [I_q]
< 100 kA
Power sectionFunction
Variable frequency drive with internal DC link, DC link choke and IGBT inverter
Power sectionOverload current (150% overload) [I_L]
26.25 A
Power sectionOverload current (110% overload) [I_L]
27.5 A
Power sectionmax. starting current (High Overload) [I_H]
200 %
Power sectionNote about max. starting current
for 2 seconds every 20 seconds
Power sectionOutput voltage with V_e [U_2]
230 V AC, 3-phase
240 V AC, 3-phase
Power sectionOutput Frequency [f_2]
0 - 50/60 (max. 400) Hz
Power sectionSwitching frequency [f_{PWM}]
4
adjustable 1 - 16 kHz
Power sectionOperation Mode
U/f control
Speed control with slip compensation

sensorless vector control (SLV)
Torque regulation
PM motors
Power sectionFrequency resolution (setpoint value) [Δf]
0.01 Hz
Power sectionRated operational currentAt 150% overload [I_e]
17.5 A
Power sectionRated operational currentAt 110% overload [I_e]
25 A
Power sectionNote
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 sectionMotor current limit [I]
0.1 - 2 x I_H (CT) A
Power sectionPower lossHeat dissipation at rated operational current I_e =150 % [P_V]
140.3 W
Power sectionPower lossHeat dissipation at rated operational current I_e =110% [P_V]
242.7 W
Power sectionHeat dissipation at current/speed [%]Current = 100%Speed = 0 % [P_V]
149.7 W
Power sectionHeat dissipation at current/speed [%]Current = 100%Speed = 50 % [P_V]
96.4 W
Power sectionHeat dissipation at current/speed [%]Current = 100%Speed = 90 % [P_V]
231.6 W
Power sectionHeat dissipation at current/speed [%]Current = 50 %Speed = 0 % [P_V]
203.2 W
Power sectionHeat dissipation at current/speed [%]Current = 50 %Speed = 50 % [P_V]
117 W
Power sectionHeat dissipation at current/speed [%]Current = 50 %Speed = 90 % [P_V]
132.6 W
Power sectionHeat dissipation at current/speed [%]Current = 50 %Speed = 0 % [P_V]
77 W
Power sectionHeat dissipation at current/speed [%]Current = 50 %Speed = 50 % [P_V]
92.7 W
Power sectionFan
temperature controlled
Power sectionInternal fan delivery rate
42 m^3/h
Power sectionFitted with
7-digital display assembly
Setpoint potentiometer
Brake chopper
Power sectionSafety function
STO (Safe Torque Off, SIL2, PLd Cat 3)
Power sectionFrame size
FS2
Motor feederNote
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 feederNote
Overload cycle for 60 s every 600 s
Motor feederNote
at 230 V, 50 Hz
Motor feeder150 % Overload [P]
4 kW
Motor feeder110 % Overload [P]
5.5 kW
Motor feederNote
at 230 V, 60 Hz
Motor feeder150 % Overload [P]
5 HP
Motor feeder110 % Overload [P]
7.5 HP
Motor feederBraking functionStandard braking torque
max. 30 % M_N
Motor feederBraking functionDC braking torque
adjustable to 150 %
Motor feederBraking functionBraking torque with external braking resistance

Max. 100% of rated operational current I_e with external braking resistor
Motor feederBraking functionminimum external braking resistance [R_{min}]
16 Ω
Motor feederBraking functionDC 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 WiringSafety device (fuse or miniature circuit-breaker)IEC (Type B, gG), 150 %
PKZM0-20
Power WiringSafety device (fuse or miniature circuit-breaker)IEC (Type B, gG), 110 %
PKZM0-25
Power WiringSafety device (fuse or miniature circuit-breaker)UL (Class CC or J)
32 A
Power WiringMains contactor150 % overload (CT/I_H, at 50 °C)
DILM7-10 (230V50HZ,240V60HZ)
Power WiringMains contactor110 % overload (VT/I_L, at 40 °C)
DILM17-10 (230V50HZ,240V60HZ)
Power WiringMain choke150 % overload (CT/I_H, at 50 °C)
DX-LN3-025
Power WiringMain choke110 % overload (VT/I_L, at 40 °C)
DX-LN3-025
Power WiringRadio interference suppression filter (external, 150 %)
DX-EMC34-030
Power WiringRadio interference suppression filter (external, 110 %)
DX-EMC34-030
Power WiringRadio interference suppression filter, low leakage currents (external, 150 %)
DX-EMC34-030-L
Power WiringRadio interference suppression filter, low leakage currents (external, 110 %)
DX-EMC34-030-L
Power WiringNote 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 connectionBraking resistance10 % duty factor (DF)
DX-BR022-1K4
DC link connectionBraking resistance20 % duty factor (DF)
DX-BR022-3K1
DC link connectionBraking resistance40 % duty factor (DF)
DX-BR022-5K1
DC link connectionBraking resistanceNotes concerning braking resistances:
The brake resistors are assigned based on the maximum rated power of the variable frequency drive. Additional brake resistors and designs (e.g. different duty cycles) are available upon request.
Motor feedermotor choke150 % overload (CT/I_H, at 50 °C)
DX-LM3-035
Motor feedermotor choke110 % overload (VT/I_L, at 40 °C)
DX-LM3-035
Motor feederSine filter150 % overload (CT/I_H, at 50 °C)
DX-SIN3-023
Motor feederSine filter110 % overload (VT/I_L, at 40 °C)
DX-SIN3-032

Motor feederAll-pole sine filter150 % overload (CT/I_H, at 50 °C)
DX-SIN3-024-A
Motor feederAll-pole sine filter110 % overload (VT/I_L, at 40 °C)
DX-SIN3-046-A

Design verification as per IEC/EN 61439

Technical data for design verification
Rated operational current for specified heat dissipation [I_n]
25 A
Equipment heat dissipation, current-dependent [P_{vid}]
242.7 W
Operating ambient temperature min.
-10 °C
Operating ambient temperature max.
+50 °C
IEC/EN 61439 design verification
10.2 Strength of materials and parts10.2.2 Corrosion resistance
Meets the product standard's requirements.
10.2 Strength of materials and parts10.2.3.1 Verification of thermal stability of enclosures
Meets the product standard's requirements.
10.2 Strength of materials and parts10.2.3.2 Verification of resistance of insulating materials to normal heat
Meets the product standard's requirements.
10.2 Strength of materials and parts10.2.3.3 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 parts10.2.4 Resistance to ultra-violet (UV) radiation
Meets the product standard's requirements.
10.2 Strength of materials and parts10.2.5 Lifting
Does not apply, since the entire switchgear needs to be evaluated.
10.2 Strength of materials and parts10.2.6 Mechanical impact
Does not apply, since the entire switchgear needs to be evaluated.
10.2 Strength of materials and parts10.2.7 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 properties10.9.2 Power-frequency electric strength
Is the panel builder's responsibility.
10.9 Insulation properties10.9.3 Impulse withstand voltage
Is the panel builder's responsibility.
10.9 Insulation properties10.9.4 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

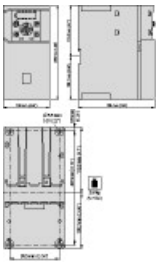
50/60 Hz
Number of phases input
3
Number of phases output
3
Max. output frequency
400 Hz
Max. output voltage
240 V
Nominal output current I2N
25 A
Max. output at quadratic load at rated output voltage
5.5 kW
Max. output at linear load at rated output voltage
4 kW
Relative symmetric net frequency tolerance
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
No
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
220 mm
Width
109 mm
Depth
180 mm

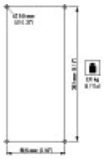
Approvals

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
3~240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
Degree of Protection
IP20/NEMA0

Dimensions



Back view



Drilling patterns

CAD data

- Product-specific CAD data
  (Web)
- 3D Preview
  (Web)

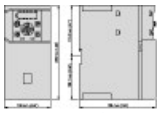
DWG files

- DA-CD-fs2_89_1311
  File
  (Web, Language independent)

Step files

- DA-CS-fs2-89-1311
  File
  (Web, Language independent)

Dimensions single product

- 
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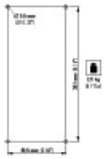
  Line drawing
- 
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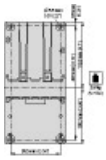
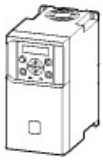
- 
  8230DIM-196
  Line drawing

3D drawing

- 
  8230DRW-702
  Line drawing

Standards

- 0000SPC-706
  Logo
  IE2-ready logo 4c
  (Int)

Software

Software

- PowerXL DG1 PowerXpert inControl Software (DA-SW-DG1 and DM1 PowerXpert inControl)
  PowerXL DG1 PowerXpert inControl
  (ZIP 279018 KB, 01/2021)

Product photo

- 
  DM1_PRO_FS2_L
  Photo
  Product Photo
  (Web)

Manual

- PowerXL DM1 application manual (MN040049EN)
  Asset
  PowerXL DM1 application manual
  (PDF, 08/2020, en)
- PowerXL™ DM1 Variable Frequency Drives - Application (MN040049_DE)
  (PDF, 09/2021, de)
- PowerXL™ DM1 Variable Frequency Drives - Communication (MN040051DE)
  (PDF, 08/2021, de)
- PowerXL™ DM1 Variable Frequency Drives - Web User Interface (MN040055_DE)
  (PDF, 02/2021, de)
- PowerXL DM1 installation manual (MN040060EN)
  Asset
  PowerXL DM1 installation manual
  (PDF, 09/2020, en)

Declaration of Conformity

UK

- PowerXL DM1 Series Variable Frequency Drive (DA-DC-00004342)
  Asset
  (PDF)

Download-Center

- Download-Center (this item)
  Eaton EMEA Download-Center - download data for this item
- Download-Center
  Eaton EMEA Download-Center

Generate data sheet in PDF format

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