

Eaton EP-400020

Catalog Number: EP-400020

Eaton DA1 Variable frequency drive, 230 V AC, 1-phase, 10.5 A, 2.2 kW, IP66/NEMA 4X, Radio interference suppression filter, OLED display, Local controls, UV resistant



Photo is representative

General specifications

Product Name	Catalog Number
Eaton DA1 Variable frequency drive	EP-400020
Model Code	EAN
DA1-12011FB-B6SO	4015082950644
Product Length/Depth	Product Height
182 mm	257 mm
Product Width	Product Weight
188 mm	3.5 kg

Certifications

CE
 Certified by UL for use in Canada
 CSA-C22.2 No. 14
 CUL
 EAC
 IEC/EN 61800-3
 IEC/EN61800-3
 IEC/EN61800-5
 RCM
 RoHS, ISO 9001
 Safety: EN 61800-5-1: 2003
 Specification for general requirements:
 IEC/EN 61800-2
 UkrSEPRO
 UL
 UL 508C
 UL Category Control No.: NMMS,
 NMMS7
 UL File No.: E172143

Catalog Notes

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.

General

Cable length

100 m, screened, maximum permissible, Motor feeder
150 m, unscreened, maximum permissible, Motor feeder
200 m, screened, with motor choke, maximum permissible, Motor feeder
300 m, unscreened, with motor choke, maximum permissible, Motor feeder
C1 ≤ 1 m, Radio interference level, maximum motor cable length
C2 ≤ 5 m, Radio interference level, maximum motor cable length
C3 ≤ 25 m, Radio interference level, maximum motor cable length

Communication interface

CANopen®, built in
EtherCAT, optional
Ethernet IP, optional
Modbus RTU, built in
Modbus-TCP, optional
OP-Bus (RS485), built in
PROFIBUS, optional
PROFINET, optional
BACnet/IP, optional

Connection to SmartWire-DT

No

Degree of protection

IP66
NEMA 4X

Electromagnetic compatibility

1st and 2nd environments (according to EN 61800-3)

Fitted with:

PC connection
Control unit
Breaking resistance
Additional PCB protection
Brake chopper
IGBT inverter
Internal DC link
OLED display
Radio interference suppression filter
Local controls

Frame size

Climatic environmental conditions

Altitude

Max. 1000 m
Above 1000 m with 1 % derating per 100 m
Max. 4000 m

Ambient operating temperature - min

-10 °C

Ambient operating temperature - max

40 °C

Ambient operating temperature at 150% overload - min

-10 °C

Ambient operating temperature at 150% overload - max

40 °C

Ambient storage temperature - min

-40 °C

Ambient storage temperature - max

60 °C

Climatic proofing

< 95 average relative humidity (RH), no condensation, no corrosion

Main circuit

Efficiency

95.3 % (η)

Heat dissipation at current/speed

101 W at 100% current and 0% speed
119 W at 100% current and 50% speed
139 W at 100% current and 90% speed
54 W at 50% current and 0% speed
78 W at 50% current and 50% speed
80 W at 50% current and 90% speed
62 W at 25% current and 50% speed
44 W at 25% current and 0% speed

Input current ILN at 150% overload

19.2 A

Leakage current at ground IPE - max

2.49 mA

Mains switch-on frequency

FS2	Maximum of one time every 30 seconds
Functions	Mains voltage - min
4-quadrant operation possible	180 V
Mounting position	Mains voltage - max
Vertical	264 V
Product Category	Operating mode
Variable frequency drives	Optional: Vector control with feedback (CLV)
Protection	Sensorless vector control (SLV)
Finger and back-of-hand proof, Protection against direct contact (BGV A3, VBG4)	Speed control with slip compensation
Protocol	U/f control
CAN	Output frequency - min
EtherNet/IP	0 Hz
MODBUS	Output frequency - max
Other bus systems	500 Hz
PROFIBUS	Output voltage (U₂)
PROFINET IO	240 V AC, 3-phase
TCP/IP	230 V AC, 3-phase
BACnet/IP	Overload current I_L at 150% overload
Safety function/level	15.75 A
STO (Safe Torque Off, SIL3, PLe Cat 3)	Rated control supply voltage
Suitable for	10 V DC (Us, max. 10 mA)
Branch circuits, (UL/CSA)	Rated frequency - min
Radio interference class	48 Hz
C1: for conducted emissions only	Rated frequency - max
Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments	62 Hz
C2, C3: depending on the motor cable length, the connected load, and ambient conditions.	Rated operational power at 220/230 V, 50 Hz, 1-phase
	2.2 kW
	Rated operational voltage
	240 V AC, 1-phase
	230 V AC, 1-phase
	Resolution
	0.1 Hz (Frequency resolution, setpoint value)
	Short-circuit protection rating
	25 A, UL (Class CC or J), Safety device (fuse or miniature circuit-breaker), Power Wiring
	Starting current - max
	200 %, I _H , max. starting current (High Overload), for 4 seconds every 40 seconds, Power section

Supply frequency

50/60 Hz

Switching frequency

16 kHz, 4 - 32 kHz adjustable (audible), fPWM, Power section, Main circuit

System configuration type

AC supply systems with earthed center point

Voltage rating - max

240 VAC

Motor rating

Assigned motor current I_M at 220 - 240 V, 60 Hz, 150% overload
9.6 A

Assigned motor current I_M at 230 V, 50 Hz, 150% overload
8.7 A

Assigned motor power at 230/240 V, 60 Hz, 1-phase
3 HP

Apparent power

Apparent power at 230 V
4.18 kVA

Apparent power at 240 V
4.36 kVA

Braking function

Braking resistance

35 Ω

Braking torque

Max. 30 % MN, Standard - Main circuit

Max. 100 % of rated operational current I_e , variable, DC - Main circuit

Max. 100 % of rated operational current I_e with external braking resistor - Main circuit

Switch-on threshold for the braking transistor

390 VDC

Control circuit

Number of inputs (analog)

2

Number of inputs (digital)

5

Number of outputs (analog)

2

Number of outputs (digital)

2

Number of relay outputs

2 (parameterizable, 1 N/O and 1 changeover contact, 6 A (250 V, AC-1) / 5 A (30 V, DC-1))

Rated control voltage (U_c)

24 V DC (external, max. 100 mA)

Design verification

Equipment heat dissipation, current-dependent P_{vid}

103.4 W

Heat dissipation capacity P_{diss}

0 W

Resources

3D models

[eaton-EP-400016-3d-model.stp](#)

[eaton-EP-400016-drawing.dwg](#)

Application notes

Heat dissipation per pole, current-dependent P_{vid}

0 W

Static heat dissipation, non-current-dependent P_{vs}

0 W

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 Resist. of insul. mat. to abnormal heat/fire by internal elect. 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.

10.6 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.

10.9.2 Power-frequency electric strength

Is the panel builder's responsibility.

10.9.3 Impulse withstand voltage

Master slave operation

Start, Stopp und Betrieb

Connecting drives to generator supplies

Update DX-COM-STICK3

Vector Control of Induction Motors

Closed Loop Vector Control

Dual Rating What exactly does that mean?

Setpoint Setting

Equal load sharing with the droop function

Hoist applications

I/O Configuration

Operating Permanent Magnet and Brushless DC Motors

Starting, Stopping and Operation

Access to Parameter Level 2 and 3 Parameter Lock RESET

PID controller

Use of multiple ramps

How does the internal motor protection work?

Electromagnetic compatibility (EMC)

DX-COM-STICK3_Connection

Motor data Motor Protection V/f curves for induction motors

The OP System Bus - Parameterizing - Control

Conformal Coating

Dependency of the output current on switching frequency and ambient temperature

Brochures

[eaton-powerxl-variable-frequency-drives-dc1-da1-brochure-br040001en-en-us.pdf](#)

Catalogues

[Product Range Catalog Drives Engineering](#)

[Drives - Product range catalog](#)

Declarations of conformity

[DA-DC-00005022.pdf](#)

[DA-DC-00005013.pdf](#)

Installation instructions

[eaton-da1-variable-frequency-drive-il040061zu.pdf](#)

Installation videos

[Video PowerXL DA1](#)

[PowerXL Variable Frequency Drives DC1 and DA1 - EN](#)

Manuals and user guides

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.

[eaton-da1-variable-frequency-drive-mn040063-en-us.pdf](#)

mCAD model

[eaton-cadenas-front_view-p2_ip66_size2_switched_front.pra](#)

[eaton-cadenas-path-drives-p2_ip66_size2_switched.3db](#)

[eaton-cadenas-side_view-p2_ip66_size2_switched_side.pra](#)

Multimedia

System solutions based on EtherCAT

Looking for variable frequency drives DC1 and DA1 which can be used in harsh environments?

Software, firmware, and applications

[eaton-powerxl-da1-swd-codesys-v3-library.zip](#)

[eaton-powerxl-da1-canopen-eds-v250.zip](#)

[eaton-powerxl-da1-ethercat-esi-v310.zip](#)

[eaton-powerxl-dx-cbl-pc-1m5-usb-driver.zip](#)

[eaton-powerxl-da1-profinet-tia-v12-library.zip](#)

[eaton-powerxl-da1-profibusb-gsd-v216.zip](#)

[eaton-powerxl-dx-cbl-pc-3m0-usb-driver.zip](#)

[eaton-powerxl-da1-devicenet-eds-v100.zip](#)

[eaton-powerxl-da1-firmware-release-note-mz040041en-us.pdf](#)

[eaton-powerxl-da1-canopen-codesys-v3-library.zip](#)

[eaton-powerxl-da1-ethernetip-eds-v150.zip](#)

[eaton-powerxl-da1-profinet-gsdml-v226.zip](#)

[eaton-powerxl-dx-comstick3-ble-drivers.zip](#)

[eaton-powerxl-pcsoftware-drivesconnect-v1501.zip](#)

[eaton-powerxl-da1-ethercat-esi-for-omron-v311.zip](#)