Specifications

Eaton 9701-4001-00P

Catalog Number: 9701-4001-00P

Eaton DG1 Variable frequency drive, 230 V AC, 3-phase, 88 A, 22 kW, IP21/NEMA1, DC link choke



General specifications

Product Name
Eaton DG1 variable frequency drive

Catalog Number
9701-4001-00P

EAN
4015081735037

Product Length/Depth
294 mm

Product Height
630 mm

Product Width
237.7 mm

Product Weight
34 kg

Certifications
CSA-C22.2 No. 274-13
Certified by UL for use in Canada
IEC/EN61800-5
CE
UL508
UL Category Control No.: NMMS, NMMS7
Safety requirements: IEC/EN 61800-5
RoHS, ISO 9001
UkrSEPRO
C-Tick
IEC/EN 61800-3
IEC/EN61800-3
Specification for general requirements: IEC/EN 61800-2
UL
EAC
CUL
UL File No.: E134360
UL report applies to both US and Canada

Powering Business Worldwide

Features & Functions

Features

Temperature-controlled fan

Externally accessible fan

Parameterization: Fieldbus

Parameterization: Keypad

Parameterization: Power Xpert inControl

General

Air volume capacity

260 m³/h

Cable length

C3 ≤ 50 m, Radio interference level, maximum motor cable length

200 m, screened, maximum permissible, Motor feeder

C2 ≤ 10 m, Radio interference level, maximum motor cable length

Degree of protection

IP21

NEMA 1

Electromagnetic compatibility

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

Environmental class

3C2, 3S2 (Air quality)

Fitted with:

DC link choke

Multi-line graphic display

Control unit

Internal DC link

PC connection

Radio interference suppression filter

Additional PCB protection

IGBT inverter

Frame size

FS4

Mounting position

Vertical

Number of slots

2 (expansion)

Overvoltage category

III

Pollution degree

2

Product Category

Variable frequency drives

Protection

Finger and back-of-hand proof, Protection against direct contact

(BGV A3, VBG4)

Radio interference class

C2, C3: depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.
C1: with external filter, for conducted emissions only
Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments

Safety function/level

STO (Safe Torque Off, SIL1, PLc Cat 1)

Shock resistance

Storage and transportation: maximum 15 g, 11 ms (inside the packaging)
UPS drop test (for weights inside the UPS frame)
Mechanical, According to EN 61800-5-1, IEC/EN 60068-2-27

Suitable for

Branch circuits, (UL/CSA)

Vibration

Resistance: 5 - 15.8 Hz, Amplitude 1 mm (peak)
Resistance: 5 - 150 Hz, According to EN 61800-5-1, IEC/EN 60068-2-6
Resistance: 15.8 – 150 Hz, 1 g, Maximum acceleration amplitude

Climatic environmental conditions

Altitude

Max. 3000 m
Above 1000 m with 1 % derating per 100 m
Max. 1000 m
Max. 2000 m for Corner Grounded TN Systems

Ambient operating temperature - min

-10 °C

Ambient operating temperature - max

50 °C

Ambient operating temperature at 150% overload - min

-30 °C

Ambient operating temperature at 150% overload - max

50 °C

Ambient storage temperature - min

-40 °C

Ambient storage temperature - max

70 °C

Climatic proofing

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

Main circuit

Current limitation

0.1 - 2 x IH (CT), motor, main circuit

Efficiency

97.4 % (η)

Heat dissipation at current/speed

1185 W at 100% current and 90% speed
303 W at 25% current and 0% speed
388 W at 25% current and 50% speed
408 W at 100% current and 50% speed
533 W at 50% current and 50% speed
612 W at 50% current and 90% speed
753 W at 100% current and 0% speed
994 W at 50% current and 0% speed

Input current ILN at 110% overload

94.3 A

Motor rating

Assigned motor current IM at 220 - 240 V, 60 Hz, 150% overload

80 A

Assigned motor current IM at 230 V, 50 Hz, 110% overload

96 A

Assigned motor current IM at 230 V, 50 Hz, 150% overload

71 A

Assigned motor current IM at 230 V, 60 Hz, 110% overload

104 A

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

30 HP

Assigned motor power at 230/240 V, 60 Hz, 3-phase, 110 % overload

40 HP

Input current ILN at 150% overload

81.4 A

Leakage current at ground IPE - max

6.2 mA

Mains current distortion

25.6 %

Mains switch-on frequency

Maximum of one time every 60 seconds

Mains voltage - min

208 V

Mains voltage - max

240 V

Operating mode

Speed control with slip compensation
U/f control
Sensorless vector control (SLV)
Torque regulation

Output frequency - min

0 Hz

Output frequency - max

400 Hz

Output voltage (U2)

230 V AC, 3-phase
240 V AC, 3-phase

Overload current IL at 110% overload

125.4 A

Overload current IL at 150% overload

132 A

Rated conditional short-circuit current (Iq)

100 kA

Rated control supply voltage

10 V DC (Us, max. 10 mA)

Rated frequency - min

45 Hz

Rated frequency - max

66 Hz

Rated operational current (Ie) at 110% overload

114 A

Apparent power

Apparent power at 230 V

45.4 kVA

Apparent power at 240 V

47.4 kVA

Braking function

Braking resistance

3.3 Ω

Braking torque

Adjustable to 150 %, DC - Main circuit
Max. 100 % of rated operational current Ie with external braking resistor - Main circuit
Max. 30 % MN, Standard - Main circuit
Adjustable to 150 % (I/Ie), DC - Main circuit

Switch-on threshold for the braking transistor

425 VDC

Control circuit

Number of inputs (analog)

2

Number of inputs (digital)

8

Number of outputs (analog)

2

Number of outputs (digital)

1

Number of relay outputs

3 (parameterizable, 2 changeover contacts and 1 N/O, 6 A (240 V AC) / 6 A (24 V DC))

Rated control voltage (Uc)

24 V DC (external, max. 250 mA options incl.)

Communication

Communication interface

Ethernet IP, built in

Rated operational current (Ie) at 150% overload

88 A

Rated operational power at 220/230 V, 50 Hz, 1-phase

22 kW

Rated operational power at 220/230 V, 50 Hz, 3-phase, 110% overload

30 kW

Rated operational voltage

230 V AC, 3-phase

240 V AC, 3-phase

Resolution

0.01 Hz (Frequency resolution, setpoint value)

Short-circuit protection rating

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

Starting current - max

200 %, IH, max. starting current (High Overload), For 2 seconds every 20 seconds, Power section

Supply frequency

50/60 Hz

Switching frequency

3.6 kHz, 1 - 10 kHz adjustable, fPWM, Power section, Main circuit

System configuration type

TN-S, TN-C, TN-C-S, TT, IT

Voltage rating - max

240 VAC

BACnet MS/TP, built in

DeviceNet, optional

PROFIBUS, optional

SmartWire-DT, optional

Modbus RTU, built in

Modbus TCP, built in

CANopen®, optional

Connection to SmartWire-DT

Yes

In conjunction with DXG-NET-SWD SmartWire DT module

Protocol

BACnet

Other bus systems

DeviceNet

TCP/IP

CAN

PROFIBUS

PROFINET IO

EtherNet/IP

MODBUS

Design verification

Equipment heat dissipation, current-dependent Pvid

1167 W

Heat dissipation capacity Pdiss

0 W

Heat dissipation per pole, current-dependent Pvid

0 W

Rated operational current for specified heat dissipation (In)

88 A

Static heat dissipation, non-current-dependent Pvs

17.1 W

Heat dissipation details

Operation (with 150 % overload), allow for derating

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

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

Resources

Application notes

Torque control

Starting, stopping and operation

PID controller

DG1 in pump and fan applications

Digital I/Os

Real time clock and use of the timers

Analog I/Os

Dual Rating What exactly does that mean?

Operating at low temperatures

Motor data and V/f curves

Electromagnetic compatibility (EMC)

Smoke Mode and fire mode

Connecting drives to generator supplies

Load balancing in multi motor applications

Catalogs

Product Range Catalog Drives Engineering

Declarations of conformity

DA-DC-00004676

DA-DC-00004861.pdf

Drawings

eaton-frequency-inverter-dg1-dimensions-004.eps

eaton-frequency-inverter-dg1-3d-drawing-004.eps

eCAD model

DA-CE-ETN.DG1-32088FN-C21C

Manuals and user guides

MN040002_EN

mCAD model

DA-CS-dg1_fs4

DA-CD-dg1_fs4

Multimedia

Power XL General Purpose Drives

PowerXL DG1 Variable Frequency Drive - Setup via WebUI

Product notifications

eaton-drives-ecodesign-directive-mz040046en-en.pdf

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.

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