Specifications

Eaton 9702-3002-00P

Catalog Number: 9702-3002-00P

Eaton DG1 Variable frequency drive, 400 V AC, 3-phase, 31 A, 15 kW, IP21/NEMA1, Brake chopper, DC link choke



General specifications

Product Name
Eaton DG1 variable frequency drive

Catalog Number
9702-3002-00P

EAN
4015081721443

Product Length/Depth
265.1 mm

Product Height
558 mm

Product Width
204.6 mm

Product Weight
22.6 kg

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

Powering Business Worldwide

Catalog Notes

Features & Functions

Features

Tool-less swapping of fan

Temperature-controlled fan

Parameterization: Fieldbus

Parameterization: Keypad

Parameterization: Power Xpert inControl

Functions

4-quadrant operation possible

General

Air volume capacity

144 m³/h

Cable length

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

150 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:

Radio interference suppression filter

DC link choke

Breaking resistance

IGBT inverter

Control unit

Brake chopper

Internal DC link

Additional PCB protection

Multi-line graphic display

PC connection

Frame size

FS3

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

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

Safety function/level

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

Shock resistance

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

Suitable for

Branch circuits, (UL/CSA)

Vibration

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
Resistance: 5 - 15.8 Hz, Amplitude 1 mm (peak)

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

97.7 % (η)

Heat dissipation at current/speed

121 W at 25% current and 0% speed
139 W at 25% current and 50% speed
153 W at 100% current and 50% speed
182 W at 50% current and 50% speed
204 W at 50% current and 90% speed
248 W at 100% current and 0% speed
299 W at 50% current and 0% speed
350 W at 100% current and 90% speed

Input current ILN at 110% overload

35.2 A

Input current ILN at 150% overload

29 A

Leakage current at ground IPE - max

12.2 mA

Mains current distortion

32.6 %

Mains switch-on frequency

Maximum of one time every 60 seconds

Mains voltage - min

380 V

Mains voltage - max

500 V

Operating mode

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

Output frequency - min

0 Hz

Output frequency - max

400 Hz

Output voltage (U2)

480 V AC, 3-phase
500 V AC, 3-phase
400 V AC, 3-phase

Overload current IL at 110% overload

41.8 A

Overload current IL at 150% overload

46.5 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

Motor rating

Assigned motor current IM at 400 V, 50 Hz, 110% overload

36 A

Assigned motor current IM at 400 V, 50 Hz, 150% overload

29.3 A

Assigned motor current IM at 440 - 480 V, 60 Hz, 150% overload

27 A

Assigned motor current IM at 440/480 V, 60 Hz, 110% overload

34 A

Assigned motor current IM at 500 V, 50 Hz, 110% overload

33 A

Assigned motor current IM at 500 V, 50 Hz, 150% overload

28.9 A

Assigned motor power at 460/480 V, 60 Hz, 3-phase

20 HP

Assigned motor power at 460/480 V, 60 Hz, 3-phase, 110 % overload

25 HP

Apparent power

Apparent power at 400 V

26.3 kVA

Apparent power at 480 V

32.9 kVA

Braking function

Braking resistance

14 Ω

Braking torque

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

Switch-on threshold for the braking transistor

850 VDC

38 A

Rated operational current (Ie) at 150% overload

31 A

Rated operational power at 380/400 V, 50 Hz, 3-phase

15 kW

Rated operational power at 380/400 V, 50 Hz, 3-phase, 110% overload

18.5 kW

Rated operational power at 500 V, 50 Hz, 3-phase

18.5 kW

Rated operational power at 500 V, 50 Hz, 3-phase, 110% overload

22 kW

Rated operational voltage

480 V AC, 3-phase

400 V AC, 3-phase

500 V AC, 3-phase

Resolution

0.01 Hz (Frequency resolution, setpoint value)

Short-circuit protection rating

50 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

4 kHz, 1 - 12 kHz adjustable, fPWM, Power section, Main circuit

System configuration type

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

Voltage rating - max

500 VAC

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

Modbus RTU, built in

PROFIBUS, optional

BACnet MS/TP, built in

DeviceNet, optional

CANopen®, optional

SmartWire-DT, optional

Modbus TCP, built in

Ethernet IP, built in

Connection to SmartWire-DT

In conjunction with DXG-NET-SWD SmartWire DT module

Yes

Protocol

TCP/IP

MODBUS

DeviceNet

PROFIBUS

PROFINET IO

Other bus systems

CAN

BACnet

EtherNet/IP

Design verification

Equipment heat dissipation, current-dependent Pvid

471 W

Heat dissipation capacity Pdiss

0 W

Heat dissipation per pole, current-dependent Pvid

0 W

Rated operational current for specified heat dissipation (In)

31 A

Static heat dissipation, non-current-dependent Pvs

24.12 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.

Resources

Application notes

Motor data and V/f curves

Operating at low temperatures

Dual Rating What exactly does that mean?

DG1 in pump and fan applications

Starting, stopping and operation

Load balancing in multi motor applications

Real time clock and use of the timers

Torque control

Analog I/Os

Digital I/Os

Electromagnetic compatibility (EMC)

Smoke Mode and fire mode

PID controller

Connecting drives to generator supplies

Catalogs

Product Range Catalog Drives Engineering

Declarations of conformity

DA-DC-00004861.pdf

DA-DC-00004676

Drawings

eaton-frequency-inverter-dg1-dimensions-003.eps

eaton-frequency-inverter-dg1-3d-drawing-003.eps

eCAD model

DA-CE-ETN.DG1-34031FB-C21C

Manuals and user guides

MN040002_EN

mCAD model

DA-CS-dg1_fs3

DA-CD-dg1_fs3

Multimedia

PowerXL DG1 Variable Frequency Drive - Setup via WebUI

Power XL General Purpose Drives

Product notifications

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

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

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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