Specifications

Eaton 9702-4010-00P

Catalog Number: 9702-4010-00P

Eaton DG1 Variable frequency drive, 400 V AC, 3-phase, 87 A, 45 kW, IP21/NEMA1, Brake chopper, DC link choke



General specifications

Product Name
Eaton DG1 variable frequency drive

Catalog Number
9702-4010-00P

EAN
4015081710966

Product Length/Depth
294 mm

Product Height
630 mm

Product Width
237.7 mm

Product Weight
35.8 kg

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

Powering Business Worldwide

Catalog Notes

Features & Functions

Features

Externally accessible fan

Temperature-controlled fan

Parameterization: Fieldbus

Parameterization: Keypad

Parameterization: Power Xpert inControl

Functions

4-quadrant operation possible

General

Air volume capacity

260 m³/h

Cable length

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

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

200 m, screened, maximum permissible, Motor feeder

Degree of protection

NEMA 1

IP21

Electromagnetic compatibility

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

Environmental class

3C2, 3S2 (Air quality)

Fitted with:

Multi-line graphic display

Radio interference suppression filter

Brake chopper

PC connection

Additional PCB protection

Breaking resistance

Control unit

DC link choke

IGBT inverter

Internal DC link

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.
Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments
C1: with external filter, for conducted emissions only

Safety function/level

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

Shock resistance

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

Suitable for

Branch circuits, (UL/CSA)

Vibration

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

Climatic environmental conditions

Altitude

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

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

98.3 % (η)

Heat dissipation at current/speed

1115 W at 50% current and 0% speed
1261 W at 100% current and 90% speed
362 W at 25% current and 0% speed
439 W at 25% current and 50% speed
495 W at 100% current and 50% speed
602 W at 50% current and 50% speed
656 W at 50% current and 90% speed
735 W at 100% current and 0% speed

Input current ILN at 110% overload

97 A

Input current ILN at 150% overload

79.4 A

Leakage current at ground IPE - max

8.5 mA

Mains current distortion

31.5 %

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)
Speed control with slip compensation
U/f control
Torque regulation

Output frequency - min

0 Hz

Output frequency - max

400 Hz

Output voltage (U2)

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

Overload current IL at 110% overload

115.5 A

Overload current IL at 150% overload

130.5 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

99 A

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

82.1 A

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

77 A

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

96 A

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

79 A

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

79 A

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

60 HP

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

75 HP

Apparent power

Apparent power at 400 V

72.7 kVA

Apparent power at 480 V

90.9 kVA

Braking function

Braking resistance

6.5 Ω

Braking torque

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

Switch-on threshold for the braking transistor

850 VDC

105 A

Rated operational current (Ie) at 150% overload

87 A

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

45 kW

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

55 kW

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

55 kW

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

55 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

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

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
Modbus TCP, built in
PROFIBUS, optional
CANopen®, optional
Ethernet IP, built in
SmartWire-DT, optional
DeviceNet, optional
BACnet MS/TP, built in

Connection to SmartWire-DT

Yes
In conjunction with DXG-NET-SWD SmartWire DT module

Protocol

TCP/IP
PROFINET IO
DeviceNet
BACnet
PROFIBUS
Other bus systems
CAN
MODBUS
EtherNet/IP

Design verification

Equipment heat dissipation, current-dependent Pvid

1217 W

Heat dissipation capacity Pdiss

0 W

Heat dissipation per pole, current-dependent Pvid

0 W

Rated operational current for specified heat dissipation (In)

87 A

Static heat dissipation, non-current-dependent Pvs

24.42 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

Dual Rating What exactly does that mean?

DG1 in pump and fan applications

Starting, stopping and operation

Operating at low temperatures

Motor data and V/f curves

Load balancing in multi motor applications

Electromagnetic compatibility (EMC)

Digital I/Os

Real time clock and use of the timers

Analog I/Os

Torque control

Connecting drives to generator supplies

Smoke Mode and fire mode

PID controller

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.DG1-34087FB-C21C

Manuals and user guides

MN040002_EN

mCAD model

DA-CD-dg1_fs4

DA-CS-dg1_fs4

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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