Specifications

Eaton 9702-5109-00P

Catalog Number: 9702-5109-00P

Eaton DG1 Variable frequency drive, 400 V AC, 3-phase, 170 A, 90 kW, IP54/NEMA12, Brake chopper, DC link choke



General specifications

Product Name
Eaton DG1 variable frequency drive

Catalog Number
9702-5109-00P

EAN
4015081711079

Product Length/Depth
340.7 mm

Product Height
888.5 mm

Product Width
288 mm

Product Weight
75.9 kg

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

Powering Business Worldwide

Catalog Notes

Features & Functions

Features

Temperature-controlled fan

Externally accessible fan

Parameterization: Fieldbus

Parameterization: Keypad

Parameterization: Power Xpert inControl

Functions

4-quadrant operation possible

General

Air volume capacity

395 m³/h

Cable length

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

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

200 m, screened, maximum permissible, Motor feeder

Degree of protection

IP54

NEMA 12

Electromagnetic compatibility

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

Environmental class

3C2, 3S2 (Air quality)

Fitted with:

Control unit

Brake chopper

Breaking resistance

Radio interference suppression filter

Additional PCB protection

Multi-line graphic display

IGBT inverter

DC link choke

Internal DC link

PC connection

Frame size

FS5

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

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.
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

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

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

98.6 % (η)

Heat dissipation at current/speed

1022 W at 50% current and 50% speed
1122 W at 50% current and 90% speed
1646 W at 100% current and 0% speed
1928 W at 50% current and 0% speed
2172 W at 100% current and 90% speed
620 W at 25% current and 0% speed
740 W at 25% current and 50% speed
861 W at 100% current and 50% speed

Input current ILN at 110% overload

189 A

Input current ILN at 150% overload

157 A

Leakage current at ground IPE - max

7.5 mA

Mains current distortion

29.5 %

Mains switch-on frequency

Maximum of one time every 60 seconds

Mains voltage - min

380 V

Mains voltage - max

500 V

Operating mode

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

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

225.5 A

Overload current IL at 150% overload

255 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

196 A

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

161 A

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

156 A

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

180 A

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

184 A

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

157 A

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

125 HP

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

150 HP

Apparent power

Apparent power at 400 V

142 kVA

Apparent power at 480 V

177.5 kVA

Braking function

Braking resistance

3.3 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 % (I/Ie), DC - Main circuit
Adjustable to 150 %, DC - Main circuit

Switch-on threshold for the braking transistor

850 VDC

205 A

Rated operational current (Ie) at 150% overload

170 A

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

90 kW

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

110 kW

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

110 kW

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

132 kW

Rated operational voltage

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

Resolution

0.01 Hz (Frequency resolution, setpoint value)

Short-circuit protection rating

250 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

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

Connection to SmartWire-DT

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

Protocol

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

Design verification

Equipment heat dissipation, current-dependent Pvid

2024 W

Heat dissipation capacity Pdiss

0 W

Heat dissipation per pole, current-dependent Pvid

0 W

Rated operational current for specified heat dissipation (In)

170 A

Static heat dissipation, non-current-dependent Pvs

30.74 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

Load balancing in multi motor applications

Operating at low temperatures

Motor data and V/f curves

DG1 in pump and fan applications

Starting, stopping and operation

Dual Rating What exactly does that mean?

Torque control

Analog I/Os

Real time clock and use of the timers

Connecting drives to generator supplies

Electromagnetic compatibility (EMC)

Digital I/Os

Smoke Mode and fire mode

PID controller

Catalogs

Product Range Catalog Drives Engineering

Declarations of conformity

DA-DC-00004861.pdf

DA-DC-00004676

Drawings

eaton-frequency-inverter-dg1-dimensions-005.eps

eaton-frequency-inverter-dg1-3d-drawing-005.eps

eCAD model

DA-CE-ETN.DG1-34170FB-C54C

Manuals and user guides

MN040002_EN

mCAD model

DA-CS-dg1_fs5

DA-CD-dg1_fs5

Multimedia

Power XL General Purpose Drives

PowerXL DG1 Variable Frequency Drive - Setup via WebUI

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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