Specifications

Eaton 9701-5109-00P

Catalog Number: 9701-5109-00P

Eaton DG1 Variable frequency drive, 230 V AC, 3-phase, 170 A, 45 kW, IP54/NEMA12, Brake chopper, DC link choke



General specifications

Product Name
Eaton DG1 variable frequency drive

Catalog Number
9701-5109-00P

EAN
4015081734252

Product Length/Depth
340.7 mm

Product Height
888.5 mm

Product Width
288 mm

Product Weight
73.6 kg

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

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

395 m³/h

Cable length

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

200 m, screened, maximum permissible, Motor feeder

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

Degree of protection

NEMA 12

IP54

Electromagnetic compatibility

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

Environmental class

3C2, 3S2 (Air quality)

Fitted with:

Control unit

Radio interference suppression filter

PC connection

Breaking resistance

Brake chopper

DC link choke

Internal DC link

Multi-line graphic display

Additional PCB protection

IGBT inverter

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

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

UPS drop test (for weights inside the UPS frame)
Mechanical, According to EN 61800-5-1, IEC/EN 60068-2-27
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 - 15.8 Hz, Amplitude 1 mm (peak)
Resistance: 5 - 150 Hz, According to EN 61800-5-1, IEC/EN 60068-2-6

Climatic environmental conditions

Altitude

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

98.2 % (η)

Heat dissipation at current/speed

1208 W at 100% current and 0% speed
1627 W at 50% current and 0% speed
1924 W at 100% current and 90% speed
469 W at 25% current and 0% speed
612 W at 25% current and 50% speed
638 W at 100% current and 50% speed
857 W at 50% current and 50% speed
975 W at 50% current and 90% speed

Input current ILN at 110% overload

189 A

Input current ILN at 150% overload

157.3 A

Leakage current at ground IPE - max

5.4 mA

Mains current distortion

25 %

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
Torque regulation
Sensorless vector control (SLV)
U/f control

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

232.1 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

211 A

Motor rating

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

154 A

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

173 A

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

141 A

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

192 A

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

60 HP

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

75 HP

Apparent power

Apparent power at 230 V

84.1 kVA

Apparent power at 240 V

87.7 kVA

Braking function

Braking resistance

1.4 Ω

Braking torque

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

Switch-on threshold for the braking transistor

425 VDC

Control circuit

Number of inputs (analog)

2

Rated operational current (Ie) at 150% overload

170 A

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

45 kW

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

55 kW

Rated operational voltage

240 V AC, 3-phase

230 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

240 VAC

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

BACnet MS/TP, built in

Modbus TCP, built in

Modbus RTU, built in

Ethernet IP, built in

PROFIBUS, optional

SmartWire-DT, optional

DeviceNet, optional

Connection to SmartWire-DT

Yes

In conjunction with DXG-NET-SWD SmartWire DT module

Protocol

TCP/IP

Other bus systems

CAN

BACnet

PROFIBUS

PROFINET IO

MODBUS

DeviceNet

EtherNet/IP

Design verification

Equipment heat dissipation, current-dependent Pvid

1724 W

Heat dissipation capacity Pdiss

Resources

Application notes

Smoke Mode and fire mode

Connecting drives to generator supplies

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

19.32 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.

Motor data and V/f curves

Operating at low temperatures

Dual Rating What exactly does that mean?

Load balancing in multi motor applications

Analog I/Os

DG1 in pump and fan applications

Real time clock and use of the timers

Digital I/Os

Electromagnetic compatibility (EMC)

Starting, stopping and operation

PID controller

Torque control

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.DG1-32170FB-C54C

Manuals and user guides

MN040002_EN

mCAD model

DA-CD-dg1_fs5

DA-CS-dg1_fs5

Multimedia

PowerXL DG1 Variable Frequency Drive - Setup via WebUI

Power XL General Purpose Drives

Product notifications

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

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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