Specifications

# Eaton 9702-5111-00P

## Catalog Number: 9702-5111-00P

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



### General specifications

**Product Name**
Eaton DG1 variable frequency drive

**Catalog Number**
9702-5111-00P

**EAN**
4015081711017

**Product Length/Depth**
340.7 mm

**Product Height**
888.5 mm

**Product Width**
288 mm

**Product Weight**
70.6 kg

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

Powering Business Worldwide

## Features & Functions

### Features

Externally accessible fan

Temperature-controlled fan

Parameterization: Fieldbus

Parameterization: Keypad

Parameterization: Power Xpert inControl

## General

### Air volume capacity

395 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 12

IP54

### Electromagnetic compatibility

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

### Environmental class

3C2, 3S2 (Air quality)

### Fitted with:

Internal DC link

Multi-line graphic display

IGBT inverter

DC link choke

PC connection

Radio interference suppression filter

Additional PCB protection

Control unit

### 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
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.

### 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: 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

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

## 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

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

U/f control

Sensorless vector control (SLV)

Speed control with slip compensation

Torque regulation

Output frequency - min

0 Hz

Output frequency - max

400 Hz

Output voltage (U2)

480 V AC, 3-phase

400 V AC, 3-phase

500 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

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

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

Adjustable to 150 %, DC - Main circuit

Max. 100 % of rated operational current Ie with external braking resistor - Main circuit

Switch-on threshold for the braking transistor

850 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.)

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

## Communication

### Communication interface

Ethernet IP, built in

DeviceNet, optional

PROFIBUS, optional

Modbus TCP, built in

BACnet MS/TP, built in

SmartWire-DT, optional

Modbus RTU, built in

CANopen®, optional

### Connection to SmartWire-DT

Yes

In conjunction with DXG-NET-SWD SmartWire DT module

### Protocol

TCP/IP

Other bus systems

PROFIBUS

PROFINET IO

BACnet

DeviceNet

MODBUS

CAN

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.

#### 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

## Resources

### Application notes

Real time clock and use of the timers

Connecting drives to generator supplies

Operating at low temperatures

Motor data and V/f curves

Dual Rating What exactly does that mean?

Smoke Mode and fire mode

Load balancing in multi motor applications

Analog I/Os

DG1 in pump and fan applications

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.DG1-34170FN-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

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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