Specifications

# Eaton 9702-3004-00P

## Catalog Number: 9702-3004-00P

Eaton DG1 Variable frequency drive, 400 V AC, 3-phase, 38 A, 18.5 kW, IP21/NEMA1, Brake chopper, DC link choke



## General specifications

**Product Name**
Eaton DG1 variable frequency drive

**Catalog Number**
9702-3004-00P

**EAN**
4015081721450

**Product Length/Depth**
265.1 mm

**Product Height**
558 mm

**Product Width**
204.6 mm

**Product Weight**
22.6 kg

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

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

150 m, screened, maximum permissible, Motor feeder

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

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

### 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:

Additional PCB protection

Radio interference suppression filter

Multi-line graphic display

Control unit

DC link choke

IGBT inverter

PC connection

Internal DC link

Breaking resistance

Brake chopper

### 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

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

97.7 % ( η)

### Heat dissipation at current/speed

187 W at 25% current and 50% speed
191 W at 25% current and 0% speed
209 W at 50% current and 50% speed
243 W at 100% current and 50% speed
272 W at 50% current and 90% speed
403 W at 100% current and 0% speed
474 W at 50% current and 0% speed
547 W at 100% current and 90% speed

### Input current ILN at 110% overload

42.6 A

Input current ILN at 150% overload

35.2 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

Torque regulation

U/f control

Sensorless vector control (SLV)

Speed control with slip compensation

Output frequency - min

0 Hz

Output frequency - max

400 Hz

Output voltage (U2)

400 V AC, 3-phase

480 V AC, 3-phase

500 V AC, 3-phase

Overload current IL at 110% overload

50.6 A

Overload current IL at 150% overload

57 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

41 A

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

36 A

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

34 A

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

40 A

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

44 A

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

33 A

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

25 HP

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

30 HP

## Apparent power

Apparent power at 400 V

31.9 kVA

Apparent power at 480 V

39.8 kVA

## Braking function

Braking resistance

14 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

46 A

### Rated operational current (Ie) at 150% overload

38 A

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

18.5 kW

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

22 kW

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

22 kW

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

30 kW

### Rated operational voltage

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

### Resolution

0.01 Hz (Frequency resolution, setpoint value)

### Short-circuit protection rating

60 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

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

### Connection to SmartWire-DT

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

### Protocol

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

## Design verification

Equipment heat dissipation, current-dependent Pvid

575 W

Heat dissipation capacity Pdiss

0 W

Heat dissipation per pole, current-dependent Pvid

0 W

Rated operational current for specified heat dissipation (In)

38 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

DG1 in pump and fan applications

Dual Rating What exactly does that mean?

Starting, stopping and operation

Load balancing in multi motor applications

Real time clock and use of the timers

Analog I/Os

Torque control

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.DG1-34038FB-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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