Specifications







Eaton 9702-2004-00P

Eaton DG1 Variable frequency drive, 500 V AC, 3-phase, 16 A/7.5 kW/10 HP, NEMA 1, IP21, FS2, Radio interference, Brake chopper

General specifications	
PRODUCT NAME	Eaton DG1 variable frequency drive
CATALOG NUMBER	9702-2004-00P
MODEL CODE	DG1-34016FB-C21C
EAN	4015081721429
PRODUCT LENGTH/DEPTH	244.7 mm
PRODUCT HEIGHT	419 mm
PRODUCT WIDTH	167.8 mm
PRODUCT WEIGHT	10.7 kg
CERTIFICATIONS	IEC/EN 61800-3 IEC/EN61800-5 RoHS, ISO 9001 UL UL File No.: E134360 Specification for general requirements: IEC/EN 61800-2 CE CSA-C22.2 No. 274-13 Certified by UL for use in Canada IEC/EN61800-3 UL report applies to both US and Canada Safety requirements: IEC/EN 61800-5 UL508 CUL EAC UkrSEPRO C-Tick UL Category Control No.: NMMS, NMMS7
CATALOG NOTES	The brake resistors are assigned based on the maximum rated power of the variable frequency drive. Additional brake resistors and designs (e.g.

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	different duty cycles) are available upon request.

Apparent power

APPARENT POWER AT 400 V	15.9 kVA
APPARENT POWER AT 480 V	19.9 kVA

Braking function

BRAKING RESISTANCE	42 Ω
BRAKING TORQUE	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 Max. 30 % MN, Standard - Main circuit
SWITCH-ON THRESHOLD FOR THE BRAKING TRANSISTOR	850 VDC

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 - MAX	50 °C
AMBIENT STORAGE TEMPERATURE - MAX	70 °C
AMBIENT OPERATING TEMPERATURE - MIN	-10 °C
AMBIENT OPERATING TEMPERATURE AT 150% OVERLOAD - MAX	50 °C
AMBIENT OPERATING TEMPERATURE AT 150% OVERLOAD - MIN	-30 °C
AMBIENT STORAGE TEMPERATURE - MIN	-40 °C
CLIMATIC PROOFING	< 95 average relative humidity (RH), no condensation, no corrosion

Communication

COMMUNICATION INTERFACE	BACnet MS/TP, built in Ethernet IP, built in Modbus RTU, built in PROFIBUS, optional DeviceNet, optional Modbus TCP, built in CANopen®, optional SmartWire-DT, optional
CONNECTION TO SMARTWIRE-DT	In conjunction with DXG-NET-SWD SmartWire DT module Yes
PROTOCOL	TCP/IP MODBUS DeviceNet PROFIBUS CAN PROFINET IO BACnet Other bus systems EtherNet/IP

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.)

Design verification

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.
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	Does not apply, since the

SWITCHING DEVICES AND COMPONENTS	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.
EQUIPMENT HEAT DISSIPATION, CURRENT-DEPENDENT PVID	293 W
HEAT DISSIPATION CAPACITY PDISS	0 W
HEAT DISSIPATION DETAILS	Operation (with 150 % overload), allow for derating
HEAT DISSIPATION PER POLE, CURRENT-DEPENDENT PVID	0 W
RATED OPERATIONAL CURRENT FOR SPECIFIED HEAT DISSIPATION (IN)	16 A
STATIC HEAT DISSIPATION, NON-CURRENT-DEPENDENT PVS	15.75 W

Features & functions

FEATURES	Temperature-controlled fan Tool-less swapping of fan Parameterization: Fieldbus Parameterization: Keypad Parameterization: Power Xpert inControl
FUNCTIONS	4-quadrant operation possible

General information

AIR VOLUME CAPACITY	94 m³/h
CABLE LENGTH	150 m, screened, maximum permissible, Motor feeder C2 ≤ 10 m, Radio interference level, maximum motor cable length C3 ≤ 50 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:	IGBT inverter Internal DC link Multi-line graphic display PC connection Brake chopper Additional PCB protection Breaking resistance DC link choke Radio interference suppression filter Control unit
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 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.
SAFETY FUNCTION/LEVEL	STO (Safe Torque Off, SIL1, PLc Cat 1)
SHOCK RESISTANCE	Storage and transportation: maximum 15 g, 11 ms (inside the packaging) UPS drop test (for weights inside the UPS frame) 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)
FRAME SIZE	FS2

Main circuit

CURRENT LIMITATION	0.1 - 2 x IH (CT), motor, main circuit
EFFICIENCY	98.2 % (η)
HEAT DISSIPATION AT CURRENT/SPEED	110 W at 25% current and 50% speed 124 W at 100% current and 50% speed 145 W at 50% current and 50% speed 161 W at 50% current and 90% speed 165 W at 100% current and 0% speed 244 W at 50% current and 0% speed 276 W at 100% current and 90% speed 97 W at 25% current and 0% speed
INPUT CURRENT ILN AT 110% OVERLOAD	21.5 A
INPUT CURRENT ILN AT 150% OVERLOAD	15 A
LEAKAGE CURRENT AT GROUND IPE - MAX	9 mA
MAINS CURRENT DISTORTION	33.8 %
MAINS SWITCH-ON FREQUENCY	Maximum of one time every 60 seconds
MAINS VOLTAGE - MAX	500 V
MAINS VOLTAGE - MIN	380 V
MAINS VOLTAGE TOLERANCE	380 - 500 V (-15%/+10%, at 50/60Hz)
OPERATING MODE	U/f control Speed control with slip compensation Torque regulation Sensorless vector control (SLV)
OUTPUT FREQUENCY - MAX	400 Hz
OUTPUT FREQUENCY - MIN	0 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	25.3 A
OVERLOAD CURRENT IL AT 150% OVERLOAD	24 A
RATED CONTROL SUPPLY	10 V DC (Us, max. 10 mA)

Motor rating

ASSIGNED MOTOR CURRENT IM AT 400 V, 50 HZ, 110% OVERLOAD	21.7 A
ASSIGNED MOTOR CURRENT IM AT 400 V, 50 HZ, 150% OVERLOAD	15.2 A
ASSIGNED MOTOR CURRENT IM AT 440 - 480 V, 60 HZ, 150% OVERLOAD	14 A
ASSIGNED MOTOR CURRENT IM AT 440/480 V, 60 HZ, 110% OVERLOAD	21 A
ASSIGNED MOTOR CURRENT IM AT 500 V, 50 HZ, 110% OVERLOAD	17.4 A
ASSIGNED MOTOR CURRENT IM AT 500 V, 50 HZ, 150% OVERLOAD	12.1 A
ASSIGNED MOTOR POWER AT 460/480 V, 60 HZ, 3-PHASE	10 HP
ASSIGNED MOTOR POWER AT 460/480 V, 60 HZ, 3-PHASE, 110 % OVERLOAD	15 HP

VOLTAGE	
RATED FREQUENCY - MAX	66 Hz
RATED FREQUENCY - MIN	45 Hz
RATED OPERATIONAL CURRENT (IE) AT 110% OVERLOAD	23 A
RATED OPERATIONAL CURRENT (IE) AT 150% OVERLOAD	16 A
RATED OPERATIONAL POWER AT 380/400 V, 50 HZ, 3-PHASE	7.5 kW
RATED OPERATIONAL POWER AT 380/400 V, 50 HZ, 3-PHASE, 110% OVERLOAD	11 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	30 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
RATED CONDITIONAL SHORT-CIRCUIT CURRENT (IQ)	100 kA

Resources

APPLICATION NOTES	eaton-powerxl-dg1-pump-fan-application-ap040128-en-us.pdf eaton-powerxl-dg1-digital-io-ap040132-en-us.pdf eaton-powerxl-dg1-torque-control-ap040167-en-us.pdf eaton-powerxl-dg1-operating-at-low-temperature-ap040058-en-us.pdf eaton-powerxl-vfd-dual-rating-ap040114-en-us.pdf eaton-powerxl-dg1-firmware-update-ap040184-en-us.pdf eaton-powerxl-dg1-starting-stopping-operation-ap040176-en-us.pdf eaton-powerxl-dg1-load-balancing-ap040168-en-us.pdf eaton-powerxl-dg1-pid-controller-ap040164-en-us.pdf eaton-connecting-drive-to-generator-supplies-ap040169-en-us.pdf eaton-powerxl-dg1-analog-io-ap040129-en-us.pdf eaton-powerxl-dg1-real-time-clock-timers-ap040172-en-us.pdf eaton-powerxl-dg1-motor-data-vf-curves-ap040177-en-us.pdf eaton-powerxl-dg1-smoke-fire-mode-ap040065-en-us.pdf
CATALOGUES	eaton-drives-soft-starter-catalog-ca04020001zen-us.pdf

DECLARATIONS OF CONFORMITY	eaton-variable-frequency-drive-declaration-of-conformity-eu250870en.pdf
DRAWINGS	eaton-frequency-inverter-dg1-dimensions-002.eps eaton-frequency-inverter-dg1-3d-drawing-002.eps
ECAD MODEL	DA-CE-ETN.DG1-34016FB-C21C
MANUALS AND USER GUIDES	powerxl-installation-manual-mn040002en1.pdf powerxl-dg1-application-manual-mz040004en.pdf eaton-powerxl-option-card-manual-mn040007-en-us.pdf eaton-powerxl-vfd-profinet-manual-mn040062en-us.pdf powerxl-communication-manual-mn040010en.pdf
MCAD MODEL	DA-CS-dg1_fs2 eaton-general-purpose-drives-mcad-drawings-dg1-fs2.dwg
MULTIMEDIA	PowerXL DG1 Variable Frequency Drive - Setup via WebUI Power XL General Purpose Drives
PRODUCT NOTIFICATIONS	eaton-drives-ecodesign-directive-mz040046en-en.pdf
SOFTWARE, FIRMWARE, AND APPLICATIONS	powerxl-canopen-v1_7.zip powerxl-dg1-frame0-8-firmware-bundle-v37_04.zip eaton-powerxl-dx-cbl-pccable-usb-driver.zip powerxl-dg1-fr0-8-gsd-file.zip powerxl-dg1-eip-eds-files.zip powerxl-eip-fr0-6-v2_8.zip eaton-powerxl-dg1-dm1-profinet-gsdml-v244.zip

PROJECT NAME:	
PROJECT NUMBER:	
PREPARED BY:	
DATE:	

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