Specifications







Eaton 9702-3002-00P

Eaton DG1 Variable frequency drive, 500 V AC, 3-phase, 31 A/15 kW/20 HP, NEMA 1, IP21, FS3, Radio interference, Brake chopper

General specifications	
PRODUCT NAME	Eaton DG1 variable frequency drive
CATALOG NUMBER	9702-3002-00P
MODEL CODE	DG1-34031FB-C21C
EAN	4015081721443
PRODUCT LENGTH/DEPTH	265.1 mm
PRODUCT HEIGHT	558 mm
PRODUCT WIDTH	204.6 mm
PRODUCT WEIGHT	22.6 kg
CERTIFICATIONS	Specification for general requirements: IEC/EN 61800-2 RoHS, ISO 9001 CE UkrSEPRO EAC IEC/EN61800-5 IEC/EN61800-3 Certified by UL for use in Canada UL Category Control No.: NMMS, NMMS7 CUL UL508 IEC/EN 61800-3 CSA-C22.2 No. 274-13 UL File No.: E134360 UL UL report applies to both US and Canada C-Tick Safety requirements: IEC/EN 61800-5
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	26.3 kVA
APPARENT POWER AT 480 V	32.9 kVA

Braking function

BRAKING RESISTANCE	14 Ω
BRAKING TORQUE	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 Max. 30 % MN, Standard - Main circuit
SWITCH-ON THRESHOLD FOR THE BRAKING TRANSISTOR	850 VDC

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 - 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	Modbus RTU, built in PROFIBUS, optional BACnet MS/TP, built in DeviceNet, optional CANopen®, optional SmartWire-DT, optional Modbus TCP, built in Ethernet IP, built in
CONNECTION TO SMARTWIRE-DT	In conjunction with DXG-NET-SWD SmartWire DT module Yes
PROTOCOL	TCP/IP MODBUS DeviceNet PROFIBUS PROFINET IO Other bus systems CAN BACnet 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	471 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)	31 A
STATIC HEAT DISSIPATION, NON-CURRENT-DEPENDENT PVS	24.12 W

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 information

AIR VOLUME CAPACITY	144 m³/h
CABLE LENGTH	C3 ≤ 50 m, Radio interference level, maximum motor cable length 150 m, screened, maximum permissible, Motor feeder C2 ≤ 10 m, Radio interference level, maximum motor cable length
DEGREE OF PROTECTION	IP21 NEMA 1
ELECTROMAGNETIC COMPATIBILITY	1st and 2nd environments (according to EN 61800-3)
ENVIRONMENTAL CLASS	3C2, 3S2 (Air quality)

FITTED WITH:	Radio interference suppression filter DC link choke Breaking resistance IGBT inverter Control unit Brake chopper Internal DC link Additional PCB protection Multi-line graphic display PC connection
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	Storage and transportation: maximum 15 g, 11 ms (inside the packaging) Mechanical, According to EN 61800-5-1, IEC/EN 60068-2-27 UPS drop test (for weights inside the UPS frame)
SUITABLE FOR	Branch circuits, (UL/CSA)
VIBRATION	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

	Resistance: 5 - 15.8 Hz, Amplitude 1 mm (peak)
FRAME SIZE	FS3

Main circuit

CURRENT LIMITATION	0.1 - 2 x IH (CT), motor, main circuit
EFFICIENCY	97.7 % (η)
HEAT DISSIPATION AT CURRENT/SPEED	121 W at 25% current and 0% speed 139 W at 25% current and 50% speed 153 W at 100% current and 50% speed 182 W at 50% current and 50% speed 204 W at 50% current and 90% speed 248 W at 100% current and 0% speed 299 W at 50% current and 0% speed 350 W at 100% current and 90% speed
INPUT CURRENT ILN AT 110% OVERLOAD	35.2 A
INPUT CURRENT ILN AT 150% OVERLOAD	29 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 - MAX	500 V
MAINS VOLTAGE - MIN	380 V
MAINS VOLTAGE TOLERANCE	380 - 500 V (-15%/+10%, at 50/60Hz)
OPERATING MODE	Sensorless vector control (SLV) Torque regulation U/f control Speed control with slip compensation
OUTPUT FREQUENCY - MAX	400 Hz
OUTPUT FREQUENCY - MIN	0 Hz
OUTPUT VOLTAGE (U2)	480 V AC, 3-phase 500 V AC, 3-phase 400 V AC, 3-phase
OVERLOAD CURRENT IL AT 110% OVERLOAD	41.8 A
OVERLOAD CURRENT IL AT 150% OVERLOAD	46.5 A
RATED CONTROL SUPPLY	10 V DC (Us, max. 10 mA)

Motor rating

ASSIGNED MOTOR CURRENT IM AT 400 V, 50 HZ, 110% OVERLOAD	36 A
ASSIGNED MOTOR CURRENT IM AT 400 V, 50 HZ, 150% OVERLOAD	29.3 A
ASSIGNED MOTOR CURRENT IM AT 440 - 480 V, 60 HZ, 150% OVERLOAD	27 A
ASSIGNED MOTOR CURRENT IM AT 440/480 V, 60 HZ, 110% OVERLOAD	34 A
ASSIGNED MOTOR CURRENT IM AT 500 V, 50 HZ, 110% OVERLOAD	33 A
ASSIGNED MOTOR CURRENT IM AT 500 V, 50 HZ, 150% OVERLOAD	28.9 A
ASSIGNED MOTOR POWER AT 460/480 V, 60 HZ, 3-PHASE	20 HP
ASSIGNED MOTOR POWER AT 460/480 V, 60 HZ, 3-PHASE, 110 % OVERLOAD	25 HP

VOLTAGE	
RATED FREQUENCY - MAX	66 Hz
RATED FREQUENCY - MIN	45 Hz
RATED OPERATIONAL CURRENT (IE) AT 110% OVERLOAD	38 A
RATED OPERATIONAL CURRENT (IE) AT 150% OVERLOAD	31 A
RATED OPERATIONAL POWER AT 380/400 V, 50 HZ, 3-PHASE	15 kW
RATED OPERATIONAL POWER AT 380/400 V, 50 HZ, 3-PHASE, 110% OVERLOAD	18.5 kW
RATED OPERATIONAL VOLTAGE	480 V AC, 3-phase 400 V AC, 3-phase 500 V AC, 3-phase
RESOLUTION	0.01 Hz (Frequency resolution, setpoint value)
SHORT-CIRCUIT PROTECTION RATING	50 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-firmware-update-ap040184-en-us.pdf eaton-powerxl-dg1-digital-io-ap040132-en-us.pdf eaton-powerxl-dg1-pump-fan-application-ap040128-en-us.pdf eaton-powerxl-dg1-operating-at-low-temperature-ap040058-en-us.pdf eaton-powerxl-dg1-load-balancing-ap040168-en-us.pdf eaton-powerxl-dg1-motor-data-vf-curves-ap040177-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-vfd-dual-rating-ap040114-en-us.pdf eaton-connecting-drive-to-generator-supplies-ap040169-en-us.pdf eaton-powerxl-dg1-smoke-fire-mode-ap040065-en-us.pdf eaton-powerxl-dg1-pid-controller-ap040164-en-us.pdf eaton-powerxl-dg1-starting-stopping-operation-ap040176-en-us.pdf eaton-powerxl-dg1-torque-control-ap040167-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-003.eps eaton-frequency-inverter-dg1-3d-drawing-003.eps
ECAD MODEL	DA-CE-ETN.DG1-34031FB-C21C
MANUALS AND USER GUIDES	powerxl-dg1-application-manual-mz040004en.pdf powerxl-installation-manual-mn040002en1.pdf powerxl-communication-manual-mn040010en.pdf eaton-powerxl-option-card-manual-mn040007-en-us.pdf eaton-powerxl-vfd-profinet-manual-mn040062en-us.pdf
MCAD MODEL	DA-CS-dg1_fs3 eaton-general-purpose-drives-mcad-drawings-dg1-fs3.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	eaton-powerxl-dg1-dm1-profinet-gsdml-v244.zip powerxl-dg1-eip-eds-files.zip powerxl-eip-fr0-6-v2_8.zip powerxl-canopen-v1_7.zip powerxl-dg1-fr0-8-gsd-file.zip powerxl-dg1-frame0-8-firmware-bundle-v37_04.zip eaton-powerxl-dx-cbl-pccable-usb-driver.zip

PROJECT NAME:	
PROJECT NUMBER:	
PREPARED BY:	
DATE:	

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