Specifications







Eaton 169051

Eaton DA1 Variable frequency drive, 480 V AC, 3-phase, 5.8 A/2.2 kW/3 HP, IP20, FS2, Radio interference, Brake chopper, Digital display

General specifications	
PRODUCT NAME	Eaton DA1 Variable frequency drive
CATALOG NUMBER	169051
MODEL CODE	DA1-345D8FB-A20C
EAN	4015081655427
PRODUCT LENGTH/DEPTH	186 mm
PRODUCT HEIGHT	231 mm
PRODUCT WIDTH	107 mm
PRODUCT WEIGHT	1.8 kg
CERTIFICATIONS	Safety: EN 61800-5-1: 2003 UL CSA-C22.2 No. 14 UL report applies to both US and Canada RoHS, ISO 9001 UkrSEPRO UL 508C IEC/EN61800-3 RCM UL File No.: E172143 IEC/EN 61800-3 EAC CE Certified by UL for use in Canada IEC/EN61800-5 Specification for general requirements: IEC/EN 61800-2 UL Category Control No.: NMMS, NMMS7 CUL
CATALOG NOTES	The brake resistors are assigned based on the maximum rated power of the variable frequency drive. Additional brake

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	resistors and designs (e.g. different duty cycles) are available upon request.

Apparent power

APPARENT POWER AT 400 V	4.02 kVA
APPARENT POWER AT 480 V	4.82 kVA

Braking function

BRAKING RESISTANCE	150 Ω
BRAKING TORQUE	Max. 30 % MN, Standard - Main circuit Max. 100 % of rated operational current Ie with external braking resistor - Main circuit Max. 100 % of rated operational current Ie, variable, DC - Main circuit
SWITCH-ON THRESHOLD FOR THE BRAKING TRANSISTOR	780 VDC

Climatic environmental conditions

ALTITUDE	Max. 4000 m Max. 1000 m Above 1000 m with 1 % derating per 100 m
AMBIENT OPERATING TEMPERATURE - MAX	50 °C
AMBIENT STORAGE TEMPERATURE - MAX	60 °C
AMBIENT OPERATING TEMPERATURE - MIN	-10 °C
AMBIENT OPERATING TEMPERATURE AT 150% OVERLOAD - MAX	50 °C
AMBIENT OPERATING TEMPERATURE AT 150% OVERLOAD - MIN	-10 °C
AMBIENT STORAGE TEMPERATURE - MIN	-40 °C
CLIMATIC PROOFING	< 95 average relative humidity (RH), no condensation, no corrosion

Control circuit

NUMBER OF INPUTS (ANALOG)	2
NUMBER OF INPUTS (DIGITAL)	5
NUMBER OF OUTPUTS (ANALOG)	2
NUMBER OF OUTPUTS (DIGITAL)	2
NUMBER OF RELAY OUTPUTS	2 (parameterizable, 1 N/O and 1 changeover contact, 6 A (250 V, AC-1) / 5 A (30 V, DC-1))
RATED CONTROL VOLTAGE (UC)	24 V DC (external, max. 100 mA)

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.
10.5 PROTECTION	Does not apply, since the

General information

CABLE LENGTH	150 m, unscreened, maximum permissible, Motor feeder C2 ≤ 5 m, Radio interference level, maximum motor cable length 200 m, screened, with motor choke, maximum permissible, Motor feeder 100 m, screened, maximum permissible, Motor feeder 300 m, unscreened, with motor choke, maximum permissible, Motor feeder C3 ≤ 25 m, Radio interference level, maximum motor cable length
COMMUNICATION INTERFACE	OP-Bus (RS485), built in Modbus-TCP, optional Ethernet IP, optional Modbus RTU, built in DeviceNet, optional EtherCAT, optional SmartWire-DT, optional PROFIBUS, optional CANopen®, built in PROFINET, optional
CONNECTION TO SMARTWIRE-DT	Yes In conjunction with DX-NET-SWD1 SmartWire DT module
DEGREE OF PROTECTION	IP20 NEMA Other
ELECTROMAGNETIC COMPATIBILITY	1st and 2nd environments (according to EN 61800-3)
FITTED WITH:	Additional PCB protection IGBT inverter Radio interference suppression filter Control unit 7-digital display assembly Internal DC link PC connection Breaking resistance Brake chopper
FRAME SIZE	FS2
FUNCTIONS	4-quadrant operation possible
MOUNTING POSITION	Vertical
PRODUCT CATEGORY	Variable frequency drives

AGAINST ELECTRIC SHOCK	entire switchgear needs to be evaluated.
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.
EQUIPMENT HEAT DISSIPATION, CURRENT-DEPENDENT PVID	101.2 W
HEAT DISSIPATION CAPACITY PDISS	0 W
HEAT DISSIPATION PER POLE, CURRENT-DEPENDENT PVID	0 W
RATED OPERATIONAL CURRENT FOR SPECIFIED HEAT DISSIPATION (IN)	5.8 A
STATIC HEAT DISSIPATION, NON-CURRENT-DEPENDENT PVS	0 W

PROTECTION	Finger and back-of-hand proof, Protection against direct contact (BGV A3, VBG4)
PROTOCOL	EtherNet/IP Other bus systems DeviceNet PROFINET IO CAN PROFIBUS MODBUS TCP/IP
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.
SAFETY FUNCTION/LEVEL	STO (Safe Torque Off, SIL2, PLd Cat 2)
SUITABLE FOR	Branch circuits, (UL/CSA)

Main circuit

EFFICIENCY	95.4 % (η)
HEAT DISSIPATION AT CURRENT/SPEED	35 W at 25% current and 0% speed 38 W at 25% current and 50% speed 43 W at 50% current and 0% speed 47 W at 50% current and 50% speed 51 W at 100% current and 0% speed 57 W at 50% current and 90% speed 66 W at 100% current and 50% speed 81 W at 100% current and 90% speed
INPUT CURRENT ILN AT 150% OVERLOAD	7.5 A
LEAKAGE CURRENT AT GROUND IPE - MAX	4.65 mA
MAINS SWITCH-ON FREQUENCY	Maximum of one time every 30 seconds
MAINS VOLTAGE - MAX	480 V
MAINS VOLTAGE - MIN	380 V
MAINS VOLTAGE TOLERANCE	380 - 480 V (-10 %/+10 %, at 50/60 Hz)
OPERATING MODE	U/f control Optional: Vector control with feedback (CLV) Sensorless vector control (SLV) Speed control with slip compensation
OUTPUT FREQUENCY - MAX	500 Hz
OUTPUT FREQUENCY - MIN	0 Hz
OUTPUT VOLTAGE (U2)	400 V AC, 3-phase 480 V AC, 3-phase
OVERLOAD CURRENT IL AT 150% OVERLOAD	8.7 A
RATED CONTROL SUPPLY VOLTAGE	10 V DC (Us, max. 10 mA)
RATED FREQUENCY - MAX	62 Hz
RATED FREQUENCY - MIN	48 Hz
RATED OPERATIONAL CURRENT (IE) AT 150% OVERLOAD	5.8 A
RATED OPERATIONAL	2.2 kW

Motor rating

ASSIGNED MOTOR CURRENT IM AT 400 V, 50 HZ, 150% OVERLOAD	5 A
ASSIGNED MOTOR CURRENT IM AT 440 - 480 V, 60 HZ, 150% OVERLOAD	4.8 A
ASSIGNED MOTOR POWER AT 460/480 V, 60 HZ, 3-PHASE	3 HP

POWER AT 380/400 V, 50 HZ, 3-PHASE	
RATED OPERATIONAL VOLTAGE	400 V AC, 3-phase 480 V AC, 3-phase
RESOLUTION	0.1 Hz (Frequency resolution, setpoint value)
SHORT-CIRCUIT PROTECTION RATING	10 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 4 seconds every 40 seconds, Power section
SUPPLY FREQUENCY	50/60 Hz
SWITCHING FREQUENCY	8 kHz, 4 - 32 kHz adjustable (audible), fPWM, Power section, Main circuit
SYSTEM CONFIGURATION TYPE	AC supply systems with earthed center point
VOLTAGE RATING - MAX	480 VAC

Resources

APPLICATION NOTES	eaton-powerxl-da1-dc1-de1-system-bus-ap040022-en-us.pdf eaton-powerxl-da1-dc1-db1-de1-rapidlink5-firmware-update-ap040214-en-us.pdf eaton-powerxl-da1-starting-stopping-operation-ap040030-en-us.pdf eaton-powerxl-da1-droop-function-ap040023-en-us.pdf eaton-powerxl-da1-dc1-de1-internal-motor-protection-ap040016-en-us.pdf eaton-powerxl-da1-set-point-setting-ap040040-en-us.pdf eaton-powerxl-da1-i-o-configuration-ap040034-en-us.pdf eaton-powerxl-da1-use-of-multiple-ramps-ap040031-en-us.pdf eaton-powerxl-da1-dc1-de1-conformal-coating-ap040182-en-us.pdf eaton-powerxl-da1-pid-controller-ap040025-en-us.pdf eaton-powerxl-da1-pointer-to-parameter-ap040133-en-us.pdf eaton-powerxl-da1-motor-vf-curves-induction-motors-ap040018-en-us.pdf eaton-powerxl-dx-com-stick-3-ap040190-en-us.pdf eaton-powerxl-da1-master-slave-operation-ap040026-en-us.pdf

	eaton-powerxl-da1-operating-pm-bldc-motors-ap040051-en-us.pdf eaton-powerxl-da1-derating-ap040039-en-us.pdf eaton-powerxl-da1-hoist-applications-ap040032-en-us.pdf eaton-powerxl-vfd-dual-rating-ap040114-en-us.pdf eaton-powerxl-da1-vector-control-induction-motors-ap040028-en-us.pdf
BROCHURES	eaton-powerxl-variable-frequency-drives-dc1-da1-brochure-br040001en-en-us.pdf
CATALOGUES	eaton-drives-soft-starter-catalog-ca04020001zen-us.pdf
DECLARATIONS OF CONFORMITY	eaton-variable-frequency-drive-declaration-of-conformity-eu250662en.pdf eaton-variable-frequency-drive-declaration-of-conformity-uk251145en.pdf
DRAWINGS	eaton-frequency-inverter-dimensions-027.eps eaton-frequency-inverter-3d-drawing-012.eps
ECAD MODEL	DA-CE-ETN.DA1-345D8FB-A20C
INSTALLATION INSTRUCTIONS	eaton-da1-variable-frequency-drive-il04020010z.pdf
INSTALLATION VIDEOS	Video PowerXL DA1 PowerXL Variable Frequency Drives DC1 and DA1 - EN
MANUALS AND USER GUIDES	eaton-powerxl-da1-installation-manual-mn04020005z-en-us.pdf

	eaton-canopen-communication-manual-for-variable-frequency-drives-variable-speed-starters-da1-db1-dc1-de11-mn040019-en-us.pdf eaton-powerxl-vfd-profinet-manual-mn040062en-us.pdf eaton-da1-variable-frequency-drive-mn040063en-us.pdf MN040018_EN eaton-powerxl-da1-application-manual-mn04020006z-en-us.pdf
MCAD MODEL	DA-CS-da1_fs2_ip20 eaton-general-purpose-drives-mcad-drawings-da1-fs2-ip20.dwg
MULTIMEDIA	Looking for variable frequency drives DC1 and DA1 which can be used in harsh environments? System solutions based on EtherCAT
PRODUCT NOTIFICATIONS	eaton-drives-ecodesign-directive-mz040046en-en.pdf
SOFTWARE, FIRMWARE, AND APPLICATIONS	eaton-powerxl-da1-devicenet-eds-v100.zip eaton-powerxl-pcsoftware-drivesconnect-v1501.zip eaton-powerxl-da1-ethernetip-eds-v150.zip eaton-powerxl-da1-ethercat-esi-v310.zip eaton-powerxl-da1-firmware-release-note-mz040041en-us.pdf eaton-powerxl-da1-canopen-codesys-v3-library.zip eaton-powerxl-da1-ethercat-esi-for-omron-v311.zip

	eaton-powerxl-dx-cbl-pc-1m5-usb-driver.zip
	eaton-powerxl-da1-profinet-gsdml-v226.zip
	eaton-powerxl-dx-comstick3-ble-drivers.zip
	eaton-powerxl-da1-canopen-eds-v250.zip
	eaton-powerxl-da1-swd-codesys-v3-library.zip
	eaton-powerxl-dx-cbl-pc-3m0-usb-driver.zip
	eaton-powerxl-da1-profibus-gsd-v216.zip
	eaton-powerxl-da1-profinet-tia-v12-library.zip

PROJECT NAME:	
PROJECT NUMBER:	
PREPARED BY:	
DATE:	

Eaton Corporation plc Eaton House
30 Pembroke Road
Dublin 4, Ireland
Eaton.com

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