

Specifications



Eaton 169401

Eaton DA1 Variable frequency drive, 480 V AC, 3-phase, 164.7 A, IP55, NEMA 12, FS6, Radio interference, Brake chopper

General specifications

PRODUCT NAME	Eaton DA1 Variable frequency drive
CATALOG NUMBER	169401
MODEL CODE	DA1-34150FB-B55C
EAN	4015081658428
PRODUCT LENGTH/DEPTH	313.5 mm
PRODUCT HEIGHT	865 mm
PRODUCT WIDTH	330 mm
PRODUCT WEIGHT	50 kg

CERTIFICATIONS

UL File No.: E172143
EAC
IEC/EN61800-3
RoHS, ISO 9001
CE
RCM
IEC/EN 61800-3
DNV
UL
CUL
UL report applies to both
US and Canada
IEC/EN61800-5
Specification for general
requirements: IEC/EN
61800-2
UL Category Control No.:
NMMS, NMMS7
Certified by UL for use in
Canada
UL 508C
Safety: EN 61800-5-1: 2003

UkrSEPRO
CSA-C22.2 No. 14

CATALOG NOTES

The brake resistors are assigned based on the maximum rated power of the variable frequency drive. Additional brake



Powering Business Worldwide

Apparent power

APPARENT POWER AT 400 V	103.92 kVA
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APPARENT POWER AT 480 V	124.71 kVA
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Climatic environmental conditions

ALTITUDE	Max. 1000 m Above 1000 m with 1 % derating per 100 m Max. 4000 m
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AMBIENT OPERATING TEMPERATURE - MAX	40 °C
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AMBIENT STORAGE TEMPERATURE - MAX	60 °C
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AMBIENT OPERATING TEMPERATURE - MIN	-10 °C
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AMBIENT OPERATING TEMPERATURE AT 150% OVERLOAD - MAX	40 °C
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AMBIENT OPERATING TEMPERATURE AT 150% OVERLOAD - MIN	-10 °C
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AMBIENT STORAGE TEMPERATURE - MIN	-40 °C
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CLIMATIC PROOFING	< 95 average relative humidity (RH), no condensation, no corrosion
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resistors and designs (e.g. different duty cycles) are available upon request.

Braking function

BRAKING RESISTANCE	6 Ω
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BRAKING TORQUE	Max. 30 % MN, Standard - Main circuit Max. 100 % of rated operational current I _e with external braking resistor - Main circuit Max. 100 % of rated operational current I _e , variable, DC - Main circuit
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SWITCH-ON THRESHOLD FOR THE BRAKING TRANSISTOR	780 VDC
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Control circuit

NUMBER OF INPUTS (ANALOG)	2
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NUMBER OF INPUTS (DIGITAL)	5
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NUMBER OF OUTPUTS (ANALOG)	2
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NUMBER OF OUTPUTS (DIGITAL)	2
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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))
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RATED CONTROL VOLTAGE (UC)	24 V DC (external, max. 100 mA)
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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	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 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
COMMUNICATION INTERFACE	CANopen®, built in DeviceNet, optional Modbus RTU, built in OP-Bus (RS485), built in PROFIBUS, optional Modbus-TCP, optional Ethernet IP, optional EtherCAT, optional SmartWire-DT, optional PROFINET, optional
CONNECTION TO SMARTWIRE-DT	In conjunction with DX-NET-SWD1 SmartWire DT module Yes
DEGREE OF PROTECTION	NEMA 12 IP55
ELECTROMAGNETIC COMPATIBILITY	1st and 2nd environments (according to EN 61800-3)
FITTED WITH:	DC link choke PC connection Radio interference suppression filter Breaking resistance IGBT inverter Brake chopper Internal DC link OLED display Control unit Additional PCB protection
FRAME SIZE	FS6
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	1575 W
HEAT DISSIPATION CAPACITY PDISS	0 W
HEAT DISSIPATION PER POLE, CURRENT-DEPENDENT PVID	0 W
RATED OPERATIONAL CURRENT FOR SPECIFIED HEAT DISSIPATION (IN)	150 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	CAN PROFINET IO DeviceNet PROFIBUS MODBUS Other bus systems EtherNet/IP 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, PLc Cat 2)
SUITABLE FOR	Branch circuits, (UL/CSA)

Main circuit

EFFICIENCY	97.9 % (η)
HEAT DISSIPATION AT CURRENT/SPEED	1200 W at 100% current and 0% speed 1530 W at 100% current and 50% speed 1650 W at 100% current and 90% speed 570 W at 25% current and 0% speed 570 W at 25% current and 50% speed 700 W at 50% current and 0% speed 840 W at 50% current and 90% speed 860 W at 50% current and 50% speed
INPUT CURRENT ILN AT 150% OVERLOAD	164.7 A
LEAKAGE CURRENT AT GROUND IPE - MAX	2.68 mA
MAINS SWITCH-ON FREQUENCY	Maximum of one time every 30 seconds
MAINS VOLTAGE - MAX	480 V
MAINS VOLTAGE - MIN	380 V
OPERATING MODE	U/f control Speed control with slip compensation Sensorless vector control (SLV) Optional: Vector control with feedback (CLV)
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	225 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	150 A
RATED OPERATIONAL POWER AT 380/400 V, 50 HZ, 3-PHASE	75 kW

Motor rating

ASSIGNED MOTOR
CURRENT IM AT 400 V, 50 HZ, 150% OVERLOAD 134 A

ASSIGNED MOTOR
CURRENT IM AT 440 - 480 V, 60 HZ, 150% OVERLOAD 124 A

ASSIGNED MOTOR
POWER AT 460/480 V, 60 HZ, 3-PHASE 100 HP

RATED OPERATIONAL VOLTAGE	480 V AC, 3-phase 400 V AC, 3-phase
RESOLUTION	0.1 Hz (Frequency resolution, setpoint value)
SHORT-CIRCUIT PROTECTION RATING	200 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	4 kHz, 4 - 12 kHz adjustable (audible), fPWM, Power section, Main circuit
SYSTEM CONFIGURATION TYPE	AC supply systems with earthed center point
VOLTAGE RATING - MAX	480 VAC

Resources

[eaton-powerxl-da1-operating-pm-bldc-motors-ap040051-en-us.pdf](#)

[eaton-powerxl-da1-motor-vf-curves-induction-motors-ap040018-en-us.pdf](#)

[eaton-powerxl-da1-master-slave-operation-ap040026-en-us.pdf](#)

[eaton-powerxl-dx-com-stick-3-ap040190-en-us.pdf](#)

[eaton-powerxl-da1-pointer-to-parameter-ap040133-en-us.pdf](#)

[eaton-powerxl-da1-pid-controller-ap040025-en-us.pdf](#)

[eaton-powerxl-da1-i-o-configuration-ap040034-en-us.pdf](#)

APPLICATION NOTES

[eaton-powerxl-da1-use-of-multiple-ramps-ap040031-en-us.pdf](#)

[eaton-powerxl-da1-dc1-db1-de1-rapidlink5-firmware-update-ap040214-en-us.pdf](#)

[eaton-powerxl-da1-dc1-de1-system-bus-ap040022-en-us.pdf](#)

[eaton-powerxl-da1-vector-control-induction-motors-ap040028-en-us.pdf](#)

[eaton-powerxl-da1-hoist-applications-ap040032-en-us.pdf](#)

[eaton-powerxl-vfd-dual-rating-ap040114-en-us.pdf](#)

[eaton-powerxl-da1-dc1-de1-internal-motor-protection-ap040016-en-us.pdf](#)

[Start, Stopp und Betrieb](#)

	eaton-powerxl-da1-droop-function-ap040023-en-us.pdf eaton-powerxl-da1-starting-stopping-operation-ap040030-en-us.pdf Electromagnetic compatibility (EMC) eaton-powerxl-da1-derating-ap040039-en-us.pdf eaton-powerxl-da1-dc1-de1-conformal-coating-ap040182-en-us.pdf eaton-powerxl-da1-set-point-setting-ap040040-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-uk251145en.pdf eaton-variable-frequency-drive-declaration-of-conformity-eu250662en.pdf
DRAWINGS	eaton-frequency-inverter-dimensions-025.eps eaton-frequency-inverter-3d-drawing-016.eps
ECAD MODEL	DA-CE-ETN.DA1-34150FB-B55C
INSTALLATION INSTRUCTIONS	eaton-da1-variable-frequency-drive-il04020011z.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-powerxl-da1-application-manual-mn04020006z-en-us.pdf eaton-da1-variable-frequency-drive-mn040063-en-us.pdf MN040018_EN
MCAD MODEL	DA-CS-da1_fs6 eaton-general-purpose-drives-mcad-drawings-da1-fs6.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-ethercat-esi-v310.zip eaton-powerxl-da1-ethercat-esi-for-omron-v311.zip eaton-powerxl-pcsoftware-drivesconnect-v1501.zip eaton-powerxl-da1-swd-codesys-v3-library.zip eaton-powerxl-da1-canopen-eds-v250.zip eaton-powerxl-da1-profinet-gsdml-v226.zip eaton-powerxl-da1-ethernetip-eds-v150.zip eaton-powerxl-da1-devicenet-eds-v100.zip

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1m5-usb-driver.zip](#)

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comstick3-ble-drivers.zip](#)

[eaton-powerxl-da1-
profinet-tia-v12-library.zip](#)

PROJECT NAME:

PROJECT NUMBER:

PREPARED BY:

DATE:



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