DATASHEET - DA1-12011FB-A20C

Variable frequency drive, 230 V AC, 1-phase, 10.5 A, 2.2 kW, IP20/NEMA 0, Radio interference suppression filter, 7-digital display assembly

Part no.	**DA1-12011FB-A20C**
	169084
EL Number (Norway)	**4137155**

General specifications

Product name	Eaton DA1 Variable frequency drive
Part no.	DA1-12011FB-A20C
EAN	4015081655700
Product Length/Depth	186 millimetre
Product height	231 millimetre
Product width	107 millimetre
Product weight	1.8 kilogram
Compliances	Contact Manufacturer
Certifications	RoHS, ISO 9001 UL report applies to both US and Canada CSA-C22.2 No. 14 Safety: EN 61800-5-1: 2003 UL File No.: E172143 EAC RCM IEC/EN61800-5 CUL CE UL Specification for general requirements: IEC/EN 61800-2 UL 508C Certified by UL for use in Canada IEC/EN 61800-3 UkrSEPRO UL Category Control No.: NMMS, NMMS7 IEC/EN61800-3
Product Tradename	DA1
Product Type	Variable frequency drive
Product Sub Type	None
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. different duty cycles) are available upon request.

General information

Cable length	C3 ≤ 25 m, Radio interference level, maximum motor cable length 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 150 m, unscreened, maximum permissible, Motor feeder 300 m, unscreened, with motor choke, maximum permissible, Motor feeder C1 ≤ 1 m, Radio interference level, maximum motor cable length
Communication interface	OP-Bus (RS485), built in EtherCAT, optional SmartWire-DT, optional Ethernet IP, optional PROFINET, optional Modbus-TCP, optional Modbus RTU, built in CANopen®, built in DeviceNet, optional PROFIBUS, optional
Connection to SmartWire-DT	In conjunction with DX-NET-SWD1 SmartWire DT module Yes
Degree of protection	IP20 NEMA Other
Electromagnetic compatibility	1st and 2nd environments (according to EN 61800-3)
Fitted with:	Control unit Radio interference suppression filter Additional PCB protection PC connection Breaking resistance Brake chopper 7-digital display assembly IGBT inverter Internal DC link

Frame size	2 FS2
Functions	4-quadrant operation possible
Mounting position	Vertical
Product Category	Variable frequency drives
Protection	Finger and back-of-hand proof, Protection against direct contact (BGV A3, VBG4)
Protocol	CAN Other bus systems PROFINET IO PROFIBUS DeviceNet EtherNet/IP MODBUS TCP/IP
Safety function/level	STO (Safe Torque Off, SIL2, PLc Cat 2)
Suitable for	Branch circuits, (UL/CSA)
Radio interference class	C1: for conducted emissions only 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.

Climatic environmental conditions

Ambient operating temperature - min	-10 °C
Altitude	Max. 1000 m Max. 4000 m Above 1000 m with 1 % derating per 100 m
Ambient operating temperature - max	50 °C
Ambient operating temperature at 150% overload - min	-10 °C
Ambient operating temperature at 150% overload - max	50 °C
Ambient storage temperature - min	-40 °C
Ambient storage temperature - max	60 °C
Climatic proofing	< 95 average relative humidity (RH), no condensation, no corrosion

Main circuit

Efficiency	95.3 % (η)
Heat dissipation at current/speed	101 W at 100% current and 0% speed 119 W at 100% current and 50% speed 139 W at 100% current and 90% speed 44 W at 25% current and 0% speed 54 W at 50% current and 0% speed 62 W at 25% current and 50% speed 78 W at 50% current and 50% speed 80 W at 50% current and 90% speed
Input current ILN at 150% overload	19.2 A
Leakage current at ground IPE - max	2.49 mA
Mains switch-on frequency	Maximum of one time every 30 seconds
Mains voltage - min	200 V
Mains voltage - max	240 V
Operating mode	Sensorless vector control (SLV) U/f control Optional: Vector control with feedback (CLV) Speed control with slip compensation
Output frequency - min	0 Hz
Output frequency - max	500 Hz
Output voltage (U2)	230 V AC, 3-phase 240 V AC, 3-phase
Overload current IL at 150% overload	15.75 A
Rated control supply voltage	10 V DC (Us, max. 10 mA)
Rated frequency - min	48 Hz
Rated frequency - max	62 Hz
Rated operational current (Ie) at 150% overload	10.5 A
Rated operational power at 220/230 V, 50 Hz, 1-phase	2.2 kW
Rated operational voltage	230 V AC, 1-phase 240 V AC, 1-phase
Resolution	0.1 Hz (Frequency resolution, setpoint value)

Short-circuit protection rating	25 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	16 kHz, 4 - 32 kHz adjustable (audible), fPWM, Power section, Main circuit
System configuration type	AC supply systems with earthed center point
Motor rating	
Assigned motor current IM at 220 - 240 V, 60 Hz, 150% overload	9.6 A
Assigned motor current IM at 230 V, 50 Hz, 150% overload	8.7 A
Assigned motor power at 230/240 V, 60 Hz, 1-phase	3 HP
Apparent power	
Apparent power at 230 V	4.18 kV·A
Apparent power at 240 V	4.36 kV·A
Braking function	
Braking resistance	35 Ω
Braking torque	Max. 100 % of rated operational current Ie with external braking resistor - Main circuit Max. 30 % MN, Standard - Main circuit Max. 100 % of rated operational current Ie, variable, DC - Main circuit
Switch-on threshold for the braking transistor	390 V DC
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	
Equipment heat dissipation, current-dependent Pvid	103.4 W
Heat dissipation capacity Pdiss	0 W
Heat dissipation per pole, current-dependent Pvid	0 W
Rated operational current for specified heat dissipation (In)	10.5 A
Static heat dissipation, non-current-dependent Pvs	0 W
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 against electric shock	Does not apply, since the 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.
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.

Technical data ETIM 9.0

Low-voltage industrial components (EG000017) / Frequency converter =< 1 kV (EC001857)

Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency / Servo converter = < 1 kV (ecl@ss13-27-02-31-01 [AKE177019])

Mains voltage		V	200 - 240
Mains frequency			50/60 Hz
Number of phases input			1
Number of phases output			3
Max. output frequency		Hz	500
Max. output voltage		V	250
Nominal output current I2N		A	10.5
Max. output at quadratic load at rated output voltage		kW	2.2
Max. output at linear load at rated output voltage		kW	2.2
Power consumption		W	103.4
Relative symmetric net frequency tolerance		%	10
Relative symmetric net voltage tolerance		%	10
Number of analogue outputs			2
Number of analogue inputs			2
Number of digital outputs			2
Number of digital inputs			5
With control element			Yes
Application in industrial area permitted			Yes
Application in domestic- and commercial area permitted			Yes
Supporting protocol for TCP/IP			Yes
Supporting protocol for PROFIBUS			Yes
Supporting protocol for CAN			Yes
Supporting protocol for INTERBUS			No
Supporting protocol for ASI			No
Supporting protocol for KNX			No
Supporting protocol for Modbus			Yes
Supporting protocol for Data-Highway			No
Supporting protocol for DeviceNet			Yes
Supporting protocol for SUCONET			No
Supporting protocol for LON			No
Supporting protocol for PROFINET IO			Yes
Supporting protocol for PROFINET CBA			No
Supporting protocol for SERCOS			No
Supporting protocol for Foundation Fieldbus			No
Supporting protocol for EtherNet/IP			Yes
Supporting protocol for AS-Interface Safety at Work			No
Supporting protocol for DeviceNet Safety			No
Supporting protocol for INTERBUS-Safety			No
Supporting protocol for PROFIsafe			No
Supporting protocol for SafetyBUS p			No
Supporting protocol for BACnet			No
Supporting protocol for other bus systems			Yes
Number of HW-interfaces industrial Ethernet			0
Number of interfaces PROFINET			0
Number of HW-interfaces RS-232			0
Number of HW-interfaces RS-422			0
Number of HW-interfaces RS-485			1
Number of HW-interfaces serial TTY			0
Number of HW-interfaces USB			0
Number of HW-interfaces parallel			0

Number of HW-interfaces other			0
With optical interface			No
With PC connection			Yes
Integrated breaking resistance			Yes
4-quadrant operation possible			Yes
Type of converter			U converter
Degree of protection (IP)			IP20
Degree of protection (NEMA)			Other
Height		mm	231
Width		mm	107
Depth		mm	186

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