

Variable frequency drive, 500 V AC, 3-phase, 3.1 A, 1.5 kW, IP20/NEMA 0, 7-digital display assembly



Part no. DA1-353D1NB-A20C

177035

EL Number

4110151

(Norway)

General specifications	
Product name	Eaton DA1 Variable frequency drive
Part no.	DA1-353D1NB-A20C
EAN	4015081714780
Product Length/Depth	186 millimetre
Product height	231 millimetre
Product width	107 millimetre
Product weight	1.8 kilogram
Certifications	CUL Specification for general requirements: IEC/EN 61800-2 Certified by UL for use in Canada RoHS, ISO 9001 IEC/EN61800-3 CE RCM IEC/EN61800-5 Safety: EN 61800-5-1: 2003 IEC/EN 61800-3 UL 508C UL report applies to both US and Canada UL Category Control No.: NMMS, NMMS7 CSA-C22.2 No. 14 UL EAC UkrSEPRO UL File No.: E172143
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	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
Communication interface	PROFINET, optional EtherCAT, optional SmartWire-DT, optional PROFIBUS, optional Ethernet IP, optional OP-Bus (RS485), built in CANopen®, built in Modbus-TCP, optional Modbus RTU, built in DeviceNet, optional
Connection to SmartWire-DT	In conjunction with DX-NET-SWD1 SmartWire DT module Yes
Degree of protection	IP20 NEMA Other
Fitted with:	Additional PCB protection Breaking resistance IGBT inverter Internal DC link Control unit 7-digital display assembly Brake chopper PC connection
Frame size	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 PROFIBUS PROFINET IO EtherNet/IP MODBUS DeviceNet TCP/IP
Safety function/level		STO (Safe Torque Off, SIL2, PLc Cat 2)
Suitable for		Branch circuits, (UL/CSA)
Climatic environmental conditions		
Ambient operating temperature - min		-10 °C
Altitude		Above 1000 m with 1 % derating per 100 m Max. 1000 m Max. 4000 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		97 % (η)
Heat dissipation at current/speed		45 W at 25% current and 0% speed 45 W at 25% current and 50% speed 47 W at 50% current and 0% speed 51 W at 50% current and 50% speed 53 W at 100% current and 0% speed 54 W at 50% current and 90% speed 55 W at 100% current and 50% speed 60 W at 100% current and 90% speed
Input current ILN at 150% overload		4.2 A
Leakage current at ground IPE - max		3.1 mA
Mains switch-on frequency		Maximum of one time every 30 seconds
Mains voltage - min		500 V
Mains voltage - max		600 V
Operating mode		Sensorless vector control (SLV) Optional: Vector control with feedback (CLV) U/f control Speed control with slip compensation
Output frequency - min		0 Hz
Output frequency - max		500 Hz
Output voltage (U ₂)		600 V AC, 3-phase 500 V AC, 3-phase
Overload current IL at 150% overload		4.65 A
Rated control supply voltage		10 V DC (U _s , max. 10 mA)
Rated frequency - min		48 Hz
Rated frequency - max		62 Hz
Rated operational current (I _e) at 150% overload		3.1 A
Rated operational power at 500 V, 50 Hz, 3-phase		1.5 kW
Rated operational power at 525 V, 50 Hz, 3-phase		1.5 kW
Rated operational voltage		500 V AC, 3-phase 600 V AC, 3-phase
Resolution		0.1 Hz (Frequency resolution, setpoint value)
Short-circuit protection		LPJ fuse used together with J60060-3 fuse base, Power wiring, Assigned switching and protective elements NH fuse used together with TB00-D fuse base, Power wiring, Assigned switching and protective elements
Short-circuit protection rating		6 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 - 24 kHz adjustable (audible), fPWM, Power section, Main circuit
System configuration type		AC supply systems with earthed center point

Voltage rating - max		600 V AC
Motor rating		
Assigned motor current IM at 500 V, 50 Hz, 150% overload		2.9 A
Assigned motor current IM at 525 V, 50 Hz, 150% overload		2.8 A
Assigned motor current IM at 550 - 600 V, 60 Hz, 150% overload		2.7 A
Assigned motor power at 575/600 V, 60 Hz, 3-phase		2 HP
Apparent power		
Apparent power at 600 V		3.22 kV-A
Braking function		
Braking resistance		300 Ω
Braking torque		Max. 100 % of rated operational current I _e with external braking resistor - Main circuit Max. 30 % MN, Standard - Main circuit Max. 100 % of rated operational current I _e , variable, DC - Main circuit
Switch-on threshold for the braking transistor		975 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 (U _c)		24 V DC (external, max. 100 mA)
Design verification		
Equipment heat dissipation, current-dependent P _{vid}		45 W
Heat dissipation capacity P _{diss}		0 W
Heat dissipation per pole, current-dependent P _{vid}		0 W
Rated operational current for specified heat dissipation (I _n)		3.1 A
Static heat dissipation, non-current-dependent P _{vs}		0 W
Heat dissipation details		Operation (with 150 % overload)
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)

Mains voltage	V	500 - 600
Mains frequency		50/60 Hz
Number of phases input		3
Number of phases output		3
Max. output frequency	Hz	500
Max. output voltage	V	600
Nominal output current I _{2N}	A	3.1
Max. output at quadratic load at rated output voltage	kW	1.5
Max. output at linear load at rated output voltage	kW	1.5
Power consumption	W	45
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 PROFI-safe		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