DATASHEET - DA1-353D1NB-B6SC

Variable frequency drive, 500 V AC, 3-phase, 3.1 A, 1.5 kW, IP66/NEMA 4X, OLED display, Local controls

Part no. **DA1-353D1NB-B6SC**
177013

General specifications

Product name	Eaton DA1 Variable frequency drive
Part no.	DA1-353D1NB-B6SC
EAN	4015081714568
Product Length/Depth	239.3 millimetre
Product height	257 millimetre
Product width	188 millimetre
Product weight	1.8 kilogram
Certifications	UkrSEPRO RCM UL 508C Certified by UL for use in Canada EAC UL File No.: E172143 IEC/EN61800-5 CSA-C22.2 No. 14 UL Category Control No.: NMMS, NMMS7 IEC/EN61800-3 IEC/EN 61800-3 Safety: EN 61800-5-1: 2003 UL Specification for general requirements: IEC/EN 61800-2 RoHS, ISO 9001 CE CUL UL report applies to both US and Canada
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	100 m, screened, maximum permissible, Motor feeder 150 m, unscreened, maximum permissible, Motor feeder 200 m, screened, with motor choke, maximum permissible, Motor feeder 300 m, unscreened, with motor choke, maximum permissible, Motor feeder
Communication interface	OP-Bus (RS485), built in Modbus RTU, built in PROFINET, optional EtherCAT, optional Modbus-TCP, optional CANopen®, built in Ethernet IP, optional DeviceNet, optional PROFIBUS, optional
Connection to SmartWire-DT	No
Degree of protection	NEMA 4X IP66
Fitted with:	IGBT inverter Brake chopper Breaking resistance Internal DC link PC connection Local controls Control unit Additional PCB protection OLED display
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	TCP/IP

	PROFIBUS DeviceNet Other bus systems EtherNet/IP MODBUS PROFINET IO CAN
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	Max. 1000 m Max. 4000 m Above 1000 m with 1 % derating per 100 m
Ambient operating temperature - max	40 °C
Ambient operating temperature at 150% overload - min	-10 °C
Ambient operating temperature at 150% overload - max	40 °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	60 W at 100% current and 90% speed 55 W at 100% current and 50% speed 54 W at 50% current and 90% speed 53 W at 100% current and 0% speed 51 W at 50% current and 50% speed 47 W at 50% current and 0% speed 45 W at 25% current and 50% speed 45 W at 25% current and 0% 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) Speed control with slip compensation Optional: Vector control with feedback (CLV) U/f control
Output frequency - min	0 Hz
Output frequency - max	500 Hz
Output voltage (U2)	500 V AC, 3-phase 600 V AC, 3-phase
Overload current IL at 150% overload	4.65 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	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 Ie with external braking resistor - Main circuit Max. 100 % of rated operational current Ie, variable, DC - Main circuit Max. 30 % MN, Standard - 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 (Uc)	24 V DC (external, max. 100 mA)
Design verification	
Equipment heat dissipation, current-dependent Pvid	45 W
Heat dissipation capacity Pdiss	0 W
Heat dissipation per pole, current-dependent Pvid	0 W
Rated operational current for specified heat dissipation (In)	3.1 A
Static heat dissipation, non-current-dependent Pvs	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)

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	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 I2N	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 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)			IP66
Degree of protection (NEMA)			4X
Height		mm	257
Width		mm	188
Depth		mm	239.3

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