

**Variable frequency drive, 400 V AC, 3-phase, 9.5 A, 4 kW, IP20/NEMA 0,  
Radio interference suppression filter, 7-digital display assembly**



**Part no.** DA1-349D5FB-A20C  
**169054**  
**EL Number** 4137164  
**(Norway)**

<b>General specifications</b>		
Product name		Eaton DA1 Variable frequency drive
Part no.		DA1-349D5FB-A20C
EAN		4015081655458
Product Length/Depth		186 millimetre
Product height		231 millimetre
Product width		107 millimetre
Product weight		1.8 kilogram
Certifications		UkrSEPRO RCM CE Specification for general requirements: IEC/EN 61800-2 EAC Safety: EN 61800-5-1: 2003 IEC/EN61800-3 IEC/EN 61800-3 RoHS, ISO 9001 UL 508C CUL UL File No.: E172143 IEC/EN61800-5 UL Category Control No.: NMMS, NMMS7 Certified by UL for use in Canada CSA-C22.2 No. 14 UL 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.
<b>General information</b>		
Cable length		200 m, screened, with motor choke, maximum permissible, Motor feeder 100 m, screened, maximum permissible, Motor feeder C2 ≤ 5 m, Radio interference level, maximum motor cable length 150 m, unscreened, 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		EtherCAT, optional PROFINET, optional DeviceNet, optional Modbus-TCP, optional OP-Bus (RS485), built in CANopen®, built in PROFIBUS, optional SmartWire-DT, optional Modbus RTU, built in Ethernet IP, 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 Radio interference suppression filter PC connection Control unit Brake chopper Breaking resistance 7-digital display assembly IGBT inverter Internal DC link
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		PROFINET IO PROFIBUS MODBUS CAN EtherNet/IP Other bus systems DeviceNet TCP/IP
Safety function/level		STO (Safe Torque Off, SIL2, PLc Cat 2)
Suitable for		Branch circuits, (UL/CSA)
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.
<b>Climatic environmental conditions</b>		
Ambient operating temperature - min		-10 °C
Altitude		Max. 4000 m Above 1000 m with 1 % derating per 100 m Max. 1000 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
<b>Main circuit</b>		
Efficiency		96.6 % ( $\eta$ )
Heat dissipation at current/speed		111 W at 100% current and 50% speed 134 W at 100% current and 90% speed 56 W at 25% current and 0% speed 56 W at 25% current and 50% speed 59 W at 50% current and 0% speed 70 W at 50% current and 50% speed 85 W at 50% current and 90% speed 87 W at 100% current and 0% speed
Input current ILN at 150% overload		11.5 A
Leakage current at ground IPE - max		4.65 mA
Mains switch-on frequency		Maximum of one time every 30 seconds
Mains voltage - min		380 V
Mains voltage - max		480 V
Operating mode		U/f control Optional: Vector control with feedback (CLV) Speed control with slip compensation Sensorless vector control (SLV)
Output frequency - min		0 Hz
Output frequency - max		500 Hz
Output voltage (U2)		480 V AC, 3-phase 400 V AC, 3-phase
Overload current IL at 150% overload		14.25 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		9.5 A
Rated operational power at 380/400 V, 50 Hz, 3-phase		4 kW
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		15 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 V AC
<b>Motor rating</b>		
Assigned motor current IM at 400 V, 50 Hz, 150% overload		8.5 A
Assigned motor current IM at 440 - 480 V, 60 Hz, 150% overload		7.6 A
Assigned motor power at 460/480 V, 60 Hz, 3-phase		5 HP
<b>Apparent power</b>		
Apparent power at 400 V		6.58 kV-A
Apparent power at 480 V		7.9 kV-A
<b>Braking function</b>		
Braking resistance		100 Ω
Braking torque		Max. 100 % of rated operational current Ie, variable, DC - Main circuit Max. 30 % MN, Standard - Main circuit Max. 100 % of rated operational current Ie with external braking resistor - Main circuit
Switch-on threshold for the braking transistor		780 V DC
<b>Control circuit</b>		
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)
<b>Design verification</b>		
Equipment heat dissipation, current-dependent Pvid		136 W
Heat dissipation capacity Pdis		0 W
Heat dissipation per pole, current-dependent Pvid		0 W
Rated operational current for specified heat dissipation (In)		9.5 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

Mains voltage	V	380 - 480
Mains frequency		50/60 Hz
Number of phases input		3
Number of phases output		3
Max. output frequency	Hz	500
Max. output voltage	V	500
Nominal output current I <sub>2N</sub>	A	9.5
Max. output at quadratic load at rated output voltage	kW	4
Max. output at linear load at rated output voltage	kW	4
Power consumption	W	136
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