DATASHEET - DM1-34012EB-S20S-EM

Variable frequency drive, 400 V AC, 3-phase, 12 A, 5.5 kW, IP20/NEMA0, Radio interference suppression filter, 7-digital display assembly, Setpoint potentiometer, Brake chopper, FS2

Part no.	**DM1-34012EB-S20S-EM**
	3-5011-005A
EL Number (Norway)	**4132291**

General specifications

Product name	Eaton DM1 Variable frequency drive
Part no.	DM1-34012EB-S20S-EM
EAN	4015081981038
Product Length/Depth	180 millimetre
Product height	220 millimetre
Product width	109 millimetre
Product weight	2.6 kilogram
Certifications	UL Category Control No.: NMMS, NMMS7 IEC/EN 61800-5-1 RoHS, ISO 9001 Certified by UL for use in Canada CE marking C-Tick CUL UL File No.: E134360 CSA-C22.2 No. 274-17 CE EAC UkrSEPRO UL report applies to both US and Canada CSA-C22.2 No. 274-13 IEC/EN 61800-3 IEC/EN61800-3 UL Listed UL 508C UL IEC/EN 61800-2 IEC/EN61800-5
Product Tradename	DM1
Product Type	Variable frequency drive
Product Sub Type	None
Catalog Notes	Assigned motor rating: for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm at 50 Hz or 1800 min at 60 Hz Assigned motor rating: Overload cycle for 60 s every 600 s for PM motors Operation with 110 % overload (1 min./10 min.): -10 to +40 (max. +55 with 1% derating per Kelvin above limit) Operation with 150% overload (1 min./10 min.): -10 to +50 (max. +60 with 1% derating per Kelvin above limit) Rated operational current for a switching frequency of 1 - 16 kHz and an ambient temperature of +50 °C for a 150% overload and +40 °C for a 110% overload

General information

Air volume capacity	64 m^3/h
Cable length	C2 ≤ 5 m, maximum motor cable length C3 ≤ 25 m, maximum motor cable length
Communication interface	Ethernet IP, built in SmartWire-DT, optional Modbus TCP, built in BACnet TCP CANopen®, optional PROFIBUS, optional Modbus RTU, built in BACnet MS/TP, built in DeviceNet, optional
Connection to SmartWire-DT	In conjunction with DXG-NET-SWD SmartWire DT module Yes
Degree of protection	IP20 NEMA Other
Electromagnetic compatibility	1st and 2nd environments (according to EN 61800-3)
Environmental class	3C2, 3S2 (Air quality)
Features	Parameterization: Power Xpert inControl Temperature-controlled fan Parameterization: Fieldbus

	Parameterization: Keypad
Fitted with:	IGBT inverter Radio interference suppression filter Brake chopper DC link choke Internal DC link 7-digital display assembly Setpoint potentiometer Breaking resistance Control unit PC connection
Frame size	FS2
Mounting position	Vertical
Number of slots	1 (expansion)
Overvoltage category	III
Pollution degree	2
Product Category	Variable frequency drives
Protection	Finger and back-of-hand proof, Protection against direct contact (BGV A3, VBG4)
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. C1: with external filter, for conducted emissions only
Safety function/level	STO (Safe Torque Off, SIL2, PLc Cat 2)
Shock resistance	0.75 mm (peak) at 10 - 57 Hz, max. 1 g at 57 - 150 Hz, according to EN 61800-5-1, EN 60068-2-6: 10 - 150 Hz
Suitable for	Branch circuits, (UL/CSA)

Climatic environmental conditions

Altitude	Max. 2000 m for Corner Grounded TN Systems Max. 3000 m Max. 1000 m Above 1000 m with 1 % derating per 100 m
Ambient operating temperature - min	-10 °C
Ambient operating temperature - max	50 °C
Ambient storage temperature - min	-40 °C
Ambient storage temperature - max	70 °C
Climatic proofing	< 95 average relative humidity (RH), no condensation, no corrosion

Main circuit

Current limitation	0.1 - 2 x IH (CT), motor, main circuit
Heat dissipation at current/speed	108 W at 50% current and 50% speed 120 W at 50% current and 90% speed 126 W at 100% current and 0% speed 169 W at 50% current and 0% speed 205 W at 100% current and 90% speed 71 W at 25% current and 0% speed 90 W at 100% current and 50% speed 94 W at 25% current and 50% speed
Input current ILN at 110% overload	19.2 A
Input current ILN at 150% overload	14.4 A
Mains current distortion	40 %
Mains switch-on frequency	Maximum of one time every 60 seconds
Mains voltage - min	380 V
Mains voltage - max	480 V
Operating mode	Torque regulation Sensorless vector control (SLV) U/f control Speed control with slip compensation PM motors
Output frequency - min	0 Hz
Output frequency - max	400 Hz
Output voltage (U2)	480 V AC, 3-phase 500 V AC, 3-phase 400 V AC, 3-phase
Overload current IL at 110% overload	17.6 A
Overload current IL at 150% overload	18 A
Rated conditional short-circuit current (Iq)	100 kA
Rated control supply voltage	10 V DC (Us, max. 10 mA)

Rated frequency - min	45 Hz
Rated frequency - max	66 Hz
Rated operational current (Ie) at 110% overload	16 A
Rated operational current (Ie) at 150% overload	12 A
Rated operational power at 380/400 V, 50 Hz, 110% overload	7.5 kW
Rated operational power at 380/400 V, 50 Hz, 3-phase	5.5 kW
Rated operational power at 500 V, 50 Hz, 3-phase	5.5 kW
Rated operational power at 500 V, 50 Hz, 3-phase, 110% overload	7.5 kW
Rated operational voltage	400 V AC, 3-phase 480 V AC, 3-phase 500 V AC, 3-phase
Resolution	0.01 Hz (Frequency resolution, setpoint value)
Short-circuit protection rating	20 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 2 seconds every 20 seconds, Power section
Supply frequency	50/60 Hz
Switching frequency	4 kHz, 1 - 16 kHz adjustable, fPWM, Power section, Main circuit
System configuration type	TN-S, TN-C, TN-C-S, TT, IT
Voltage rating - max	500 V
Motor rating	
Assigned motor current IM at 400 V, 50 Hz, 110% overload	15.2 A
Assigned motor current IM at 440/480 V, 60 Hz, 110% overload	14 A
Assigned motor current IM at 500 V, 50 Hz, 110% overload	12.1 A
Assigned motor current IM at 500 V, 50 Hz, 150% overload	9 A
Assigned motor power at 460/480 V, 60 Hz	7.5 HP
Assigned motor power at 460/480 V, 60 Hz, 110% overload	10 HP
Braking function	
Braking resistance	35 Ω
Braking torque	Adjustable to 150 %, DC - Main circuit Max. 100 % of rated operational current Ie with external braking resistor - Main circuit Max. 30 % MN, Standard - Main circuit
Switch-on threshold for the braking transistor	800 V DC
Control circuit	
Number of inputs (analog)	1
Number of inputs (digital)	4
Number of outputs (analog)	1
Number of relay outputs	2 (parameterizable, 1 changeover contact and 1 N/O, 3 A (240 V AC) / 3 A (24 V DC))
Rated control voltage (Uc)	24 V DC (external, max. 100 mA options incl.)
Design verification	
Equipment heat dissipation, current-dependent Pvid	203 W
Rated operational current for specified heat dissipation (In)	16 A
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 8.0

Low-voltage industrial components (EG000017) / Frequency converter =< 1 kV (EC001857)		
Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency converter = < 1 kV (ecl@ss10.0.1-27-02-31-01 [AKE177014])		
Mains voltage	V	380 - 480
Mains frequency		50/60 Hz
Number of phases input		3
Number of phases output		3
Max. output frequency	Hz	400
Max. output voltage	V	500
Nominal output current I2N	A	12
Max. output at quadratic load at rated output voltage	kW	7.5
Max. output at linear load at rated output voltage	kW	5.5
Relative symmetric net frequency tolerance	%	10
Relative symmetric net voltage tolerance	%	10
Number of analogue outputs		1
Number of analogue inputs		1
Number of digital outputs		0
Number of digital inputs		4
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		No
Supporting protocol for SUCONET		No
Supporting protocol for LON		No
Supporting protocol for PROFINET IO		No
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		Yes
Supporting protocol for other bus systems		Yes
Number of HW-interfaces industrial Ethernet		1

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			1
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	220
Width		mm	109
Depth		mm	180

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