DATASHEET - DM1-34023EB-S20S-EM

Variable frequency drive, 400 V AC, 3-phase, 23 A, 11 kW, IP20/NEMA0, Radio interference suppression filter, 7-digital display assembly, Setpoint potentiometer, Brake chopper, FS3

Part no.	**DM1-34023EB-S20S-EM**
	3-5013-002A
EL Number (Norway)	**4132256**

General specifications

Product name	Eaton DM1 Variable frequency drive
Part no.	DM1-34023EB-S20S-EM
EAN	4015081981052
Product Length/Depth	180 millimetre
Product height	260 millimetre
Product width	130 millimetre
Product weight	3.7 kilogram
Certifications	UL 508C IEC/EN61800-3 IEC/EN 61800-5-1 CE marking UL report applies to both US and Canada C-Tick CUL EAC Certified by UL for use in Canada UL Listed CE UkrSEPRO IEC/EN 61800-3 UL UL Category Control No.: NMMS, NMMS7 CSA-C22.2 No. 274-13 UL File No.: E134360 IEC/EN 61800-2 RoHS, ISO 9001 CSA-C22.2 No. 274-17 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	100 m^3/h
Cable length	C3 ≤ 25 m, maximum motor cable length C2 ≤ 5 m, maximum motor cable length
Communication interface	BACnet TCP SmartWire-DT, optional BACnet MS/TP, built in Modbus RTU, built in DeviceNet, optional CANopen®, optional PROFIBUS, optional Modbus TCP, built in Ethernet IP, built in
Connection to SmartWire-DT	Yes In conjunction with DXG-NET-SWD SmartWire DT module
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 Parameterization: Keypad Parameterization: Fieldbus

	Temperature-controlled fan
Fitted with:	IGBT inverter Radio interference suppression filter 7-digital display assembly DC link choke Brake chopper Setpoint potentiometer Internal DC link Breaking resistance Control unit PC connection
Frame size	FS3
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	C1: with external filter, for conducted emissions only C2, C3: depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary. Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments
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	Above 1000 m with 1 % derating per 100 m Max. 1000 m Max. 3000 m Max. 2000 m for Corner Grounded TN Systems
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	166.7 W at 25% current and 50% speed 170 W at 25% current and 0% speed 205.8 W at 100% current and 50% speed 223.4 W at 50% current and 90% speed 276.5 W at 50% current and 50% speed 326.5 W at 100% current and 0% speed 392.9 W at 100% current and 90% speed 520.8 W at 50% current and 0% speed
Input current ILN at 110% overload	35.7 A
Input current ILN at 150% overload	26.5 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	Speed control with slip compensation U/f control Sensorless vector control (SLV) Torque regulation PM motors
Output frequency - min	0 Hz
Output frequency - max	400 Hz
Output voltage (U2)	400 V AC, 3-phase 480 V AC, 3-phase 500 V AC, 3-phase
Overload current IL at 110% overload	34.1 A
Overload current IL at 150% overload	34.5 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	31 A
Rated operational current (Ie) at 150% overload	23 A
Rated operational power at 380/400 V, 50 Hz, 110% overload	15 kW
Rated operational power at 380/400 V, 50 Hz, 3-phase	11 kW
Rated operational power at 500 V, 50 Hz, 3-phase	11 kW
Rated operational power at 500 V, 50 Hz, 3-phase, 110% overload	18.5 kW
Rated operational voltage	480 V AC, 3-phase 400 V AC, 3-phase 500 V AC, 3-phase
Resolution	0.01 Hz (Frequency resolution, setpoint value)
Short-circuit protection rating	40 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	29.3 A
Assigned motor current IM at 400 V, 50 Hz, 150% overload	21.7 A
Assigned motor current IM at 440 - 480 V, 60 Hz, 150% overload	21 A
Assigned motor current IM at 440/480 V, 60 Hz, 110% overload	27 A
Assigned motor current IM at 500 V, 50 Hz, 110% overload	28.9 A
Assigned motor current IM at 500 V, 50 Hz, 150% overload	17.4 A
Assigned motor power at 460/480 V, 60 Hz	15 HP
Assigned motor power at 460/480 V, 60 Hz, 110% overload	20 HP
Braking function	
Braking resistance	26 Ω
Braking torque	Max. 100 % of rated operational current Ie with external braking resistor - Main circuit Max. 30 % MN, Standard - Main circuit Adjustable to 150 %, DC - 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	407.4 W
Rated operational current for specified heat dissipation (In)	31 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	23
Max. output at quadratic load at rated output voltage		kW	15
Max. output at linear load at rated output voltage		kW	11
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	260
Width		mm	130
Depth		mm	180

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