



Variable frequency drives; 3-/3-phase 400 V; 9.5 A; 4 kW; EMC filters; braking transistor



Part no. DC1-349D5FB-A20CE1
Catalog No. 185755
Eaton Catalog No. DC1-349D5FB-A20CE1
EL-Nummer 4137032
(Norway)

Delivery program

Product range			Variable frequency drives
Part group reference (e.g. DIL)			DC1
Rated operational voltage	U _e		400 V AC, 3-phase 480 V AC, 3-phase
Output voltage with V _e	U ₂		400 V AC, 3-phase 480 V AC, 3-phase
Mains voltage (50/60Hz)	U _{LN}	V	380 (-10%) - 480 (+10%)
Rated operational current			
At 150% overload	I _e	A	9.5
Note			Rated operational current at an operating frequency of 16 kHz and an ambient air temperature of +50 °C
Note			Overload cycle for 60 s every 600 s
Assigned motor rating			
Note			for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm ⁻¹ at 50 Hz or 1800 min ⁻¹ at 60 Hz
Note			Overload cycle for 60 s every 600 s
Note			at 400 V, 50 Hz
150 % Overload	P	kW	4
150 % Overload	I _M	A	8.5
Note			at 440 - 480 V, 60 Hz
150 % Overload	P	HP	5
150 % Overload	I _M	A	7.6
Degree of Protection			IP20/NEMA 0
Interface/field bus (built-in)			OP-Bus (RS485)/Modbus RTU, CANopen®
Fieldbus connection (optional)			SmartWire-DT
Fitted with			Radio interference suppression filter Brake chopper 7-digital display assembly
Frame size			FS2
Connection to SmartWire-DT			with SmartWire-DT module DX-NET-SWD3

Technical data

General

Standards			Specification for general requirements: IEC/EN 61800-2 EMC requirements: IEC/EN 61800-3 Safety requirements: IEC/EN 61800-5-1
Certifications			CE, UL, cUL, RCM, Ukr SEPRO, EAC
Production quality			RoHS, ISO 9001
Climatic proofing	p _w	%	< 95%, average relative humidity (RH), non-condensing, non-corrosive
Ambient temperature			
operation (150 % overload)	θ	°C	-10 - +50
Storage	θ	°C	-40 - +60
Radio interference level			
Radio interference class (EMC)			C2, C3, depending on the motor cable length, the connected load, and ambient conditions. External radio interference suppression filters (optional) may be necessary.
Environment (EMC)			1st and 2nd environments as per EN 61800-3
maximum motor cable length	l	m	C2 ≤ 5 m C3 ≤ 25 m

Mounting position			Vertical
Altitude		m	0 - 1000 m above sea level Above 1000 m: 1% derating for every 100 m max. 4000 m
Degree of Protection			IP20/NEMA 0
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)
Main circuit			
Supply			
Rated operational voltage	U_e		400 V AC, 3-phase 480 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	380 (-10%) - 480 (+10%)
Input current (150% overload)	I_{LN}	A	11.5
System configuration			AC supply systems with earthed center point
Supply frequency	f_{LN}	Hz	50/60
Frequency range	f_{LN}	Hz	48 - 62
Mains switch-on frequency			Maximum of one time every 30 seconds
Power section			
Function			Frequency inverter with internal DC link and IGBT inverter
Overload current (150% overload)	I_L	A	14.25
max. starting current (High Overload)	I_H	%	175
Note about max. starting current			for 3.75 seconds every 600 seconds
Output voltage with V_e	U_2		400 V AC, 3-phase 480 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 50/60 (max. 500)
Switching frequency	f_{PWM}	kHz	16 adjustable 4 - 32 (audible)
Operation Mode			U/f control Speed control with slip compensation sensorless vector control (SLV)
Frequency resolution (setpoint value)	Δf	Hz	0.1
Rated operational current			
At 150% overload	I_e	A	9.5
Note			Rated operational current at an operating frequency of 16 kHz and an ambient air temperature of +50 °C
Power loss			
Heat dissipation at rated operational current $I_e = 150\%$	P_V	W	136
Efficiency	η	%	96.6
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	12.6
Fitted with			Radio interference suppression filter Brake chopper 7-digital display assembly
Frame size			FS2
Motor feeder			
Note			for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm^{-1} at 50 Hz or 1800 min^{-1} at 60 Hz
Note			Overload cycle for 60 s every 600 s
Note			at 400 V, 50 Hz
150 % Overload	P	kW	4
Note			at 440 - 480 V, 60 Hz
150 % Overload	P	HP	5
maximum permissible cable length	l	m	screened: 100 screened, with motor choke: 200 unscreened: 150 unscreened, with motor choke: 300
Apparent power			
Apparent power at rated operation 400 V	S	kVA	6.58
Apparent power at rated operation 480 V	S	kVA	7.9
Braking function			
Standard braking torque			max. 30 % MN
DC braking torque			adjustable to 100 %

Braking torque with external braking resistance			Max. 100% of rated operational current I _e with external braking resistor
minimum external braking resistance	R _{min}	Ω	100
Switch-on threshold for the braking transistor	U _{DC}	V	780 V DC

Control section

Reference voltage	U _s	V	10 V DC (max. 10 mA)
Analog inputs			2, parameterizable, 0 - 10 V DC, 0/4 - 20 mA
Analog outputs			1, parameterizable, 0 - 10 V
Digital inputs			4, parameterizable, max. 30 V DC
Digital outputs			1, parameterizable, 24 V DC
Relay outputs			1, parameterizable, N/O, 6 A (250 V, AC-1) / 5 A (30 V, DC-1)
Interface/field bus (built-in)			OP-Bus (RS485)/Modbus RTU, CANopen®

Assigned switching and protective elements

Power Wiring			
IEC (Type B, gG), 150 %			FAZ-B16/3
UL (Class CC or J)		A	15
150 % overload (CT/I _H , at 50 °C)			DX-LN3-016
Motor feeder			
150 % overload (CT/I _H , at 50 °C)			DX-LM3-011
150 % overload (CT/I _H , at 50 °C)			DX-SIN3-010
10 % duty factor (DF)			DX-BR100-0K8
20 % duty factor (DF)			DX-BR100-1K6
40 % duty factor (DF)			DX-BR100-6K2

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I _n	A	9.5
Heat dissipation per pole, current-dependent	P _{vid}	W	0
Equipment heat dissipation, current-dependent	P _{vid}	W	136
Static heat dissipation, non-current-dependent	P _{vs}	W	0
Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-10
Operating ambient temperature max.		°C	50
			Operation (with 150 % overload)
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
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 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric 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 Insulation properties			
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 6.0

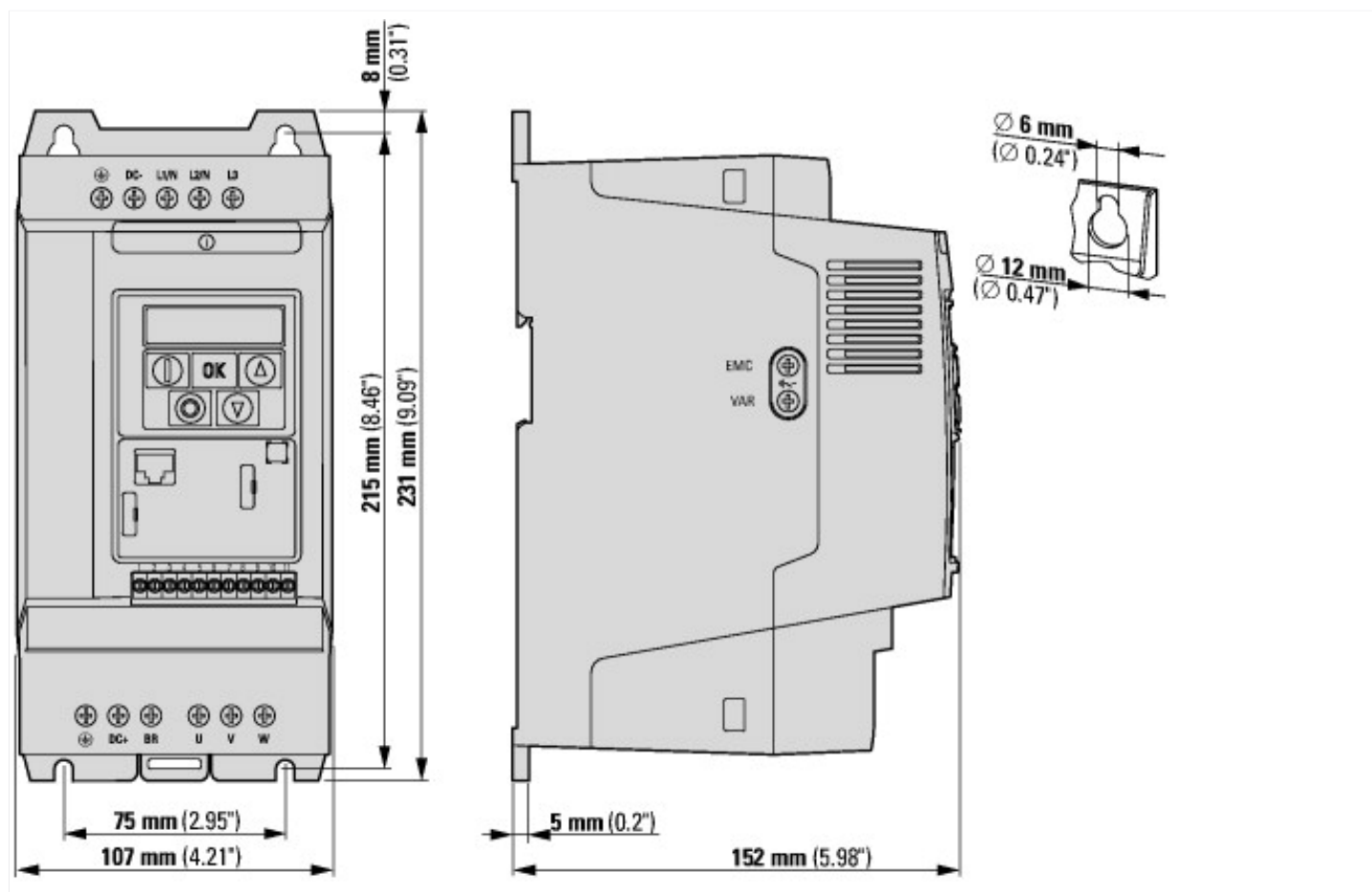
Low-voltage industrial components (EG000017) / Frequency converter =< 1 kV (EC001857)			
Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency converter = < 1 kv (ecl@ss8.1-27-02-31-01 [AKE177011])			
Mains voltage	V	380 - 480	
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	
Rated output current I2N	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	
With control unit		Yes	
Application in industrial area permitted		Yes	
Application in domestic- and commercial area permitted		Yes	
Supporting protocol for TCP/IP		No	
Supporting protocol for PROFIBUS		No	
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 other bus systems		Yes	
Number of HW-interfaces industrial Ethernet		0	
Number of HW-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	

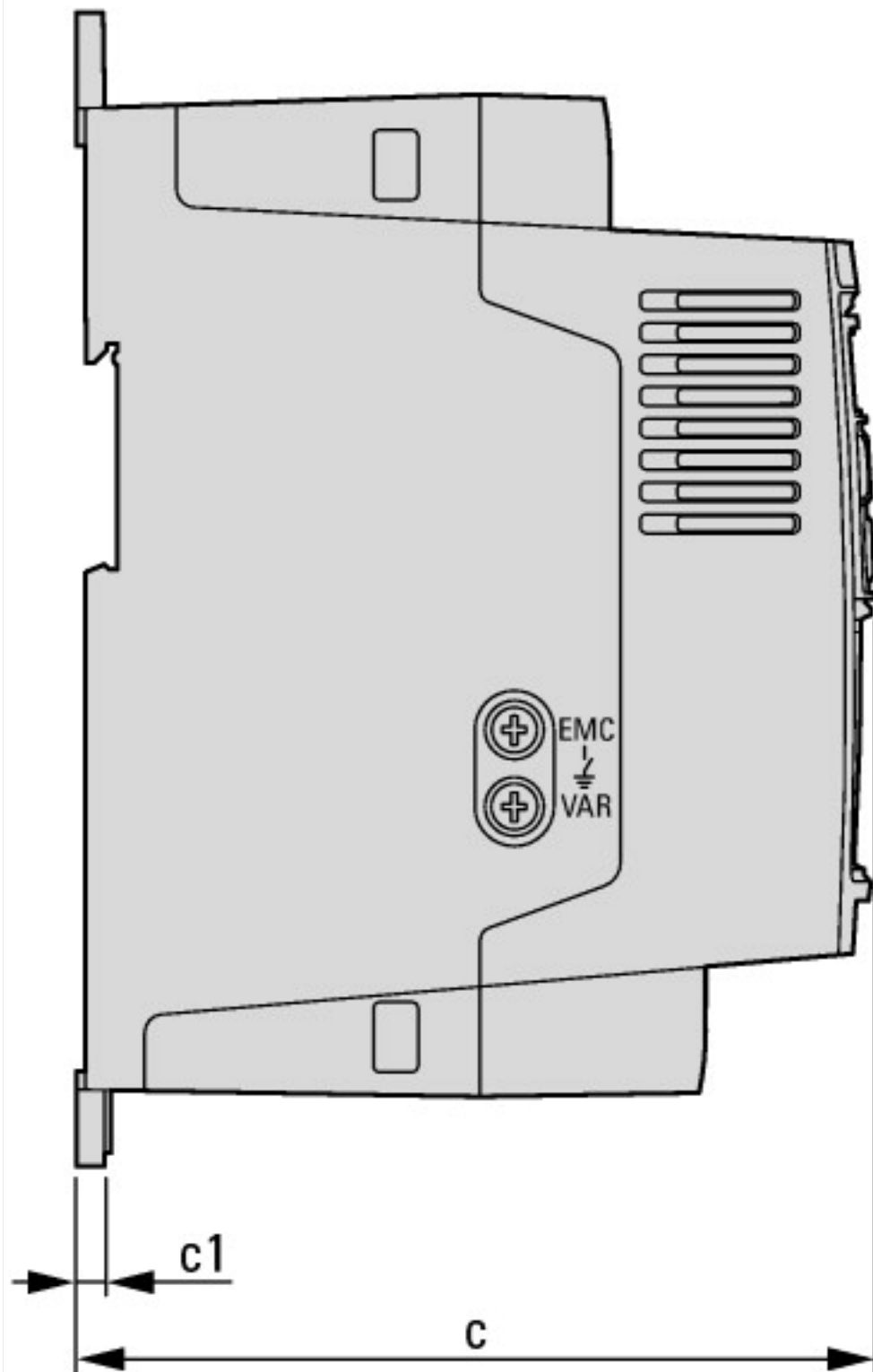
4-quadrant operation possible		No
Type of converter		U converter
Degree of protection (IP)		IP20
Height	mm	231
Width	mm	107
Depth	mm	152
Relative symmetric net frequency tolerance	%	10
Relative symmetric net current tolerance	%	10

Approvals

Product Standards		UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.		E172143
UL Category Control No.		NMMS, NMMS7
CSA File No.		UL report applies to both US and Canada
North America Certification		UL listed, certified by UL for use in Canada
Specially designed for North America		No
Suitable for		Branch circuits
Max. Voltage Rating		3~ 480 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
Degree of Protection		IEC: IP20

Dimensions





Additional product information (links)

IL04020009Z DC1 variable frequency drive (FS1 - FS3, IP20)

IL04020009Z DC1 variable frequency drive (FS1 - FS3, IP20) ftp://ftp.moeller.net/DOCUMENTATION/AWB_INSTRUCTIONS/IL04020009Z2017_01.pdf

MN040023 DC1...E1 Installation manual

MN040023 DC1...E1 Installationshandbuch - Deutsch ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040023_DE.pdf

MN040023 DC1...E1 Installation manual - English ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040023_EN.pdf

MN040023 DC1...E1 manuale Installazione - italiano ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040023_IT.pdf

MN040023 DC1...E1 podręcznik instalacji - polski ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040023_PL.pdf

MN040022 DC1...E1, Parameters manual

MN040022 DC1...E1, Parameterhandbuch - Deutsch ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_DE.pdf

MN040022 DC1...E1, Parameters manual - English	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_EN.pdf
MN040022 DC1...E1, manuale Parametri - italiano	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_IT.pdf
MN040022 DC1...E1, podręcznik parametrów - polski	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN040022_PL.pdf
CA04020001Z-EN Product Range Catalog: Efficient Engineering for Starting and Controlling Motors	http://www.eaton.eu/DE/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_1095238.pdf