



Variable frequency drive, 400 V AC, 3-phase, 24 A, 11 kW, IP20/NEMA 0, Radio interference suppression filter, Brake chopper, FS3



Part no. DC1-34024FB-A20N
Catalog No. 169496
Alternate Catalog No. DC1-34024FB-A20N

Delivery program

Product range				This item will continue to be available for a limited time only and is being replaced by the following item: 185764, DC1-34024FB-A20CE1
Part group reference (e.g. DIL)				Variable frequency drives
Rated operational voltage	U_e			DC1
Output voltage with V_e	U_2			400 V AC, 3-phase 480 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V		400 V AC, 3-phase 480 V AC, 3-phase
Rated operational current				380 (-10%) - 480 (+10%)
At 150% overload	I_e	A		24
Note				Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +50 °C
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		11
150 % Overload	I_M	A		21.7
Note				at 440 - 480 V, 60 Hz
150 % Overload	P	HP		15
150 % Overload	I_M	A		21
Degree of Protection				IP20/NEMA0
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
Parameterization				Keypad Fieldbus drivesConnect drivesConnect mobile (App)
Frame size				FS3
Connection to SmartWire-DT				yes in conjunction with DX-NET-SWD3 SmartWire DT module

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, UkrSEPRO, EAC
Production quality				RoHS, ISO 9001
Climatic proofing	ρ_w	%		< 95%, average relative humidity (RH), non-condensing, non-corrosive
Ambient temperature				
Operating ambient temperature min.		°C		-10
Operating ambient temperature max.		°C		+ 50
				operation (with 150 % overload)

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/NEMA0
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	27.5
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			Variable frequency drive with internal DC link and IGBT inverter
Overload current (150% overload)	I_L	A	36
max. starting current (High Overload)	I_H	%	175
Note about max. starting current			for 2 seconds every 20 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	8 adjustable 4 - 24 (audible)
Operation Mode			U/f control Speed control with slip compensation
Frequency resolution (setpoint value)	Δf	Hz	0.1
Rated operational current			
At 150% overload	I_e	A	24
Note			Rated operational current at a switching frequency of 8 kHz and an ambient air temperature of +50 °C
Power loss			
Heat dissipation at rated operational current $I_e = 150\%$	P_V	W	297
Efficiency	η	%	97.3
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	2.49
Fitted with			Radio interference suppression filter Brake chopper 7-digital display assembly
Frame size			FS3
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	11
Note			at 440 - 480 V, 60 Hz
150 % Overload	P	HP	15
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	16.63	
Apparent power at rated operation 480 V	S	kVA	19.95	
Braking function				
Standard braking torque			max. 30 % M_N	
DC braking torque			max. 100% of rated operational current I_e , variable	
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	50	
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				
Safety device (fuse or miniature circuit-breaker)				
IEC (Type B, gG), 150 %			FAZ-B32/3	
UL (Class CC or J)		A	35	
Mains contactor				
150 % overload (CT/ I_H , at 50 °C)			DILM17	
Main choke				
150 % overload (CT/ I_H , at 50 °C)			DX-LN3-025	
Radio interference suppression filter (external, 150 %)			DX-EMC34-030	
Radio interference suppression filter, low leakage currents (external, 150 %)			DX-EMC34-030-L	
Note regarding radio interference suppression filter			Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments	
DC link connection				
Braking resistance				
10 % duty factor (DF)			DX-BR050-3K1	
20 % duty factor (DF)			DX-BR050-5K1	
40 % duty factor (DF)			P:2 x DX-BR100-6K2	
Notes concerning braking resistances:			P:n = "n" resistors connected in parallel 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.	
Motor feeder				
motor choke				
150 % overload (CT/ I_H , at 50 °C)			DX-LM3-035	
Sine filter				
150 % overload (CT/ I_H , at 50 °C)			DX-SIN3-023	
All-pole sine filter				
150 % overload (CT/ I_H , at 50 °C)			DX-SIN3-024-A	

Design verification as per IEC/EN 61439

Technical data for design verification				
Rated operational current for specified heat dissipation	I_n	A	24	
Heat dissipation per pole, current-dependent	P_{vid}	W	0	
Equipment heat dissipation, current-dependent	P_{vid}	W	297	
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	

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 5.0

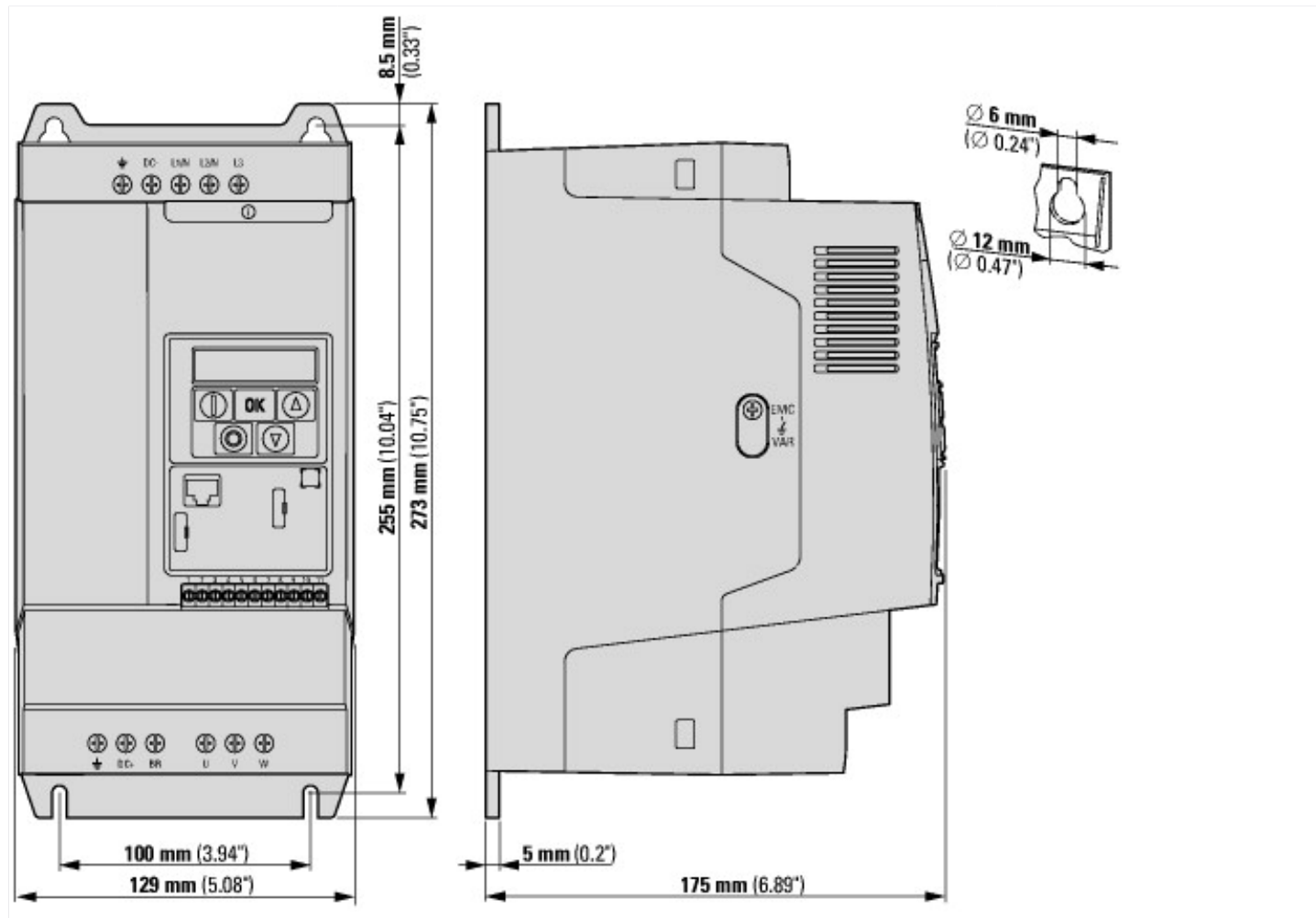
Low-voltage industrial components (EG000017) / Frequency controller =< 1 kV (EC001857)		
Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency converter = < 1 kv (ecl@ss8-27-02-31-01 [AKE177010])		
Mains voltage	V	380 - 480
Mains frequency		50/60 Hz
Number of phases input		3
Number of phases output		3
Max. output frequency	Hz	500
Rated output voltage	V	400
Measuring output current	A	11
Output power at rated output voltage	kW	11
Max. output at quadratic load at rated output voltage	kW	11
Max. output at linear load at rated output voltage	kW	11
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		No
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		No
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		1
Number of HW-interfaces parallel		0
Number of HW-interfaces other		0
With optical interface		No
With PC connection		Yes
Integrated braking resistance		Yes
4-quadrant operation possible		No
Type of converter		U converter
Degree of protection (IP)		IP20
Height	mm	273
Width	mm	131
Depth	mm	175
Relative symmetric net frequency tolerance	%	5
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 drives (FS1 - FS3, IP20)

IL04020009Z DC1 variable frequency drives (FS1 - FS3, IP20) https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL04020009Z2021_04.pdf

MN04020003Z DC1 variable frequency drives, Installation manual

MN04020003Z Frequenzumrichter DC1, Installationshandbuch - Deutsch https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020003Z_DE.pdf

MN04020003Z DC1 variable frequency drives, Installation manual - English https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020003Z_EN.pdf

MN04020003Z Frekvenční měnič DC1, manuál Instalace - čeština https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020003Z_CZ.pdf

MN04020003Z Convertitore di frequenza DC1, manuale Installazione - italiano https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020003Z_IT.pdf

MN04020004Z DC1 variable frequency drives, Parameters manual

MN04020004Z Frequenzumrichter DC1, Parameterhandbuch - Deutsch https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020004Z_DE.pdf

MN04020004Z DC1 variable frequency drives, Parameters manual - English https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020004Z_EN.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