DATASHEET - DC1-1D2D3NN-A20CE1

Variable frequency drive, 115 V AC, single-phase, 2.3 A, 0.37 kW, IP20/ NEMA 0, FS1

Part no.	**DC1-1D2D3NN-A20CE1**
Catalog No.	**185765**
Alternate Catalog No.	**DC1-1D2D3NN-A20CE1**

Delivery program

Product range			Variable frequency drives
Part group reference (e.g. DIL)			DC1
Rated operational voltage	U_e		115 V AC, single-phase
Output voltage with V_e	U_2		230 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	110 (-10%) - 115 (+10%)
Rated operational current			
At 150% overload	I_e	A	2.3
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 230 V, 50 Hz
150 % Overload	P	kW	0.37
150 % Overload	I_M	A	2
Note			at 220 - 240 V, 60 Hz
150 % Overload	P	HP	0.5
150 % Overload	I_M	A	2.2
Degree of Protection			IP20/NEMA 0
Interface/field bus (built-in)			OP-Bus (RS485)/Modbus RTU, CANopen®
Fieldbus connection (optional)			SmartWire-DT
Fitted with			7-digital display assembly Additional PCB protection
Frame size			FS1
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, Ukr SEPRO, EAC
Production quality			RoHS, ISO 9001
Climatic proofing	ρ_w	%	< 95%, average relative humidity (RH), non-condensing, non-corrosive
Air quality			3C2, 3S2
Ambient temperature			
Operating ambient temperature min.		°C	-10
Operating ambient temperature max.		°C	+ 50
			operation (with 150 % overload)
Storage	ϑ	°C	-40 - +60
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		115 V AC, single-phase
Notes			The mains voltage of 115 V is raised to 230 V (output voltage) through an internal voltage double connection.
Mains voltage (50/60Hz)	U_{LN}	V	110 (-10%) - 115 (+10%)
Input current (150% overload)	I_{LN}	A	7.8
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	3.45
max. starting current (High Overload)	I_H	%	175
Note about max. starting current			for 2,5 seconds every 600 seconds
Output voltage with V_e	U_2		230 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 50/60 (max. 500)
Switching frequency	f_{PWM}	kHz	8 adjustable 4 - 32 (audible)
Operation Mode			U/f control Speed control with slip compensation sensorless vector control (SLV) PM motors Synchronous reluctance motors BLDC motors
Frequency resolution (setpoint value)	Δf	Hz	0.1
Rated operational current			
At 150% overload	I_e	A	2.3
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	18.5
Efficiency	η	%	95
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	4.8
Fitted with			7-digital display assembly Additional PCB protection
Frame size			FS1
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 230 V, 50 Hz
150 % Overload	P	kW	0.37
Note			at 220 - 240 V, 60 Hz
150 % Overload	P	HP	0.5
maximum permissible cable length	l	m	screened: 50 screened, with motor choke: 100 unscreened: 75 unscreened, with motor choke: 150
Braking function			
Standard braking torque			max. 30 % MN
DC braking torque			max. 100% of rated operational current I_e, variable

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-B16/1N
UL (Class CC or J)		A	15
Mains contactor			
150 % overload (CT/I_H, at 50 °C)			DILEM-… + P1DILEM
Main choke			
150 % overload (CT/I_H, at 50 °C)			DX-LN1-009
Radio interference suppression filter (external, 150 %)			DX-EMC12-014-FS1
Note regarding radio interference suppression filter			Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments
Motor feeder			
motor choke			
150 % overload (CT/I_H, at 50 °C)			DX-LM3-005
Sine filter			
150 % overload (CT/I_H, at 50 °C)			DX-SIN3-004

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	7
Heat dissipation per pole, current-dependent	P_{vid}	W	0
Equipment heat dissipation, current-dependent	P_{vid}	W	18.5
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 7.0

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])

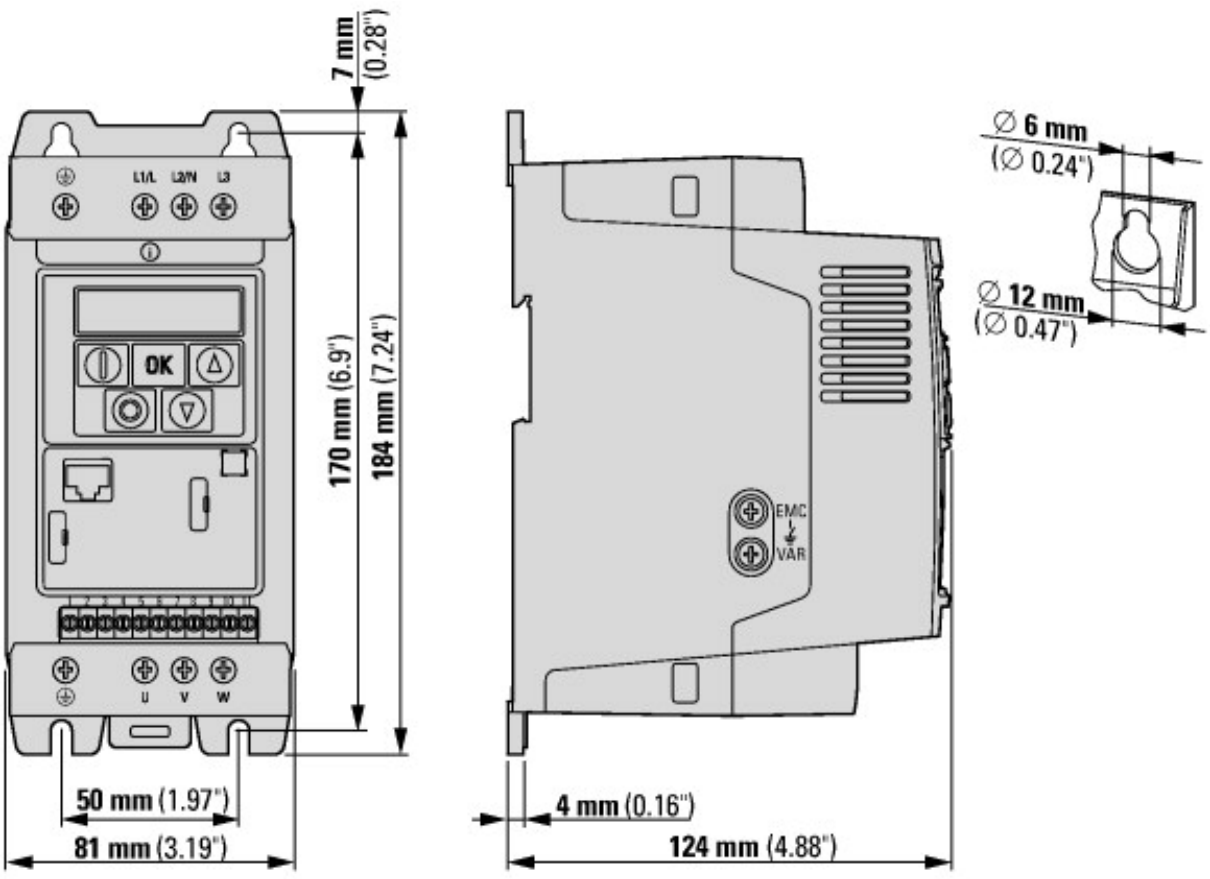
Mains voltage		V	110 - 115
Mains frequency			50/60 Hz
Number of phases input			1
Number of phases output			3
Max. output frequency		Hz	500
Max. output voltage		V	250
Nominal output current I2N		A	2.3
Max. output at quadratic load at rated output voltage		kW	0.37
Max. output at linear load at rated output voltage		kW	0.37
Relative symmetric net frequency tolerance		%	10
Relative symmetric net voltage tolerance		%	10
Number of analogue outputs			1
Number of analogue inputs			2
Number of digital outputs			1
Number of digital inputs			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 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		No
4-quadrant operation possible		No
Type of converter		U converter
Degree of protection (IP)		IP20
Degree of protection (NEMA)		Other
Height	mm	184
Width	mm	81
Depth	mm	124

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		1~ 120 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/AWA_INSTRUCTIONS/IL04020009Z2018_05.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