## **DATASHEET - DC1-S24D3FN-A20CE1**



Variable frequency drives, 1-/single-phase 230 V, 4.3 A, 0.37 kW, EMC Filters



Part no. DC1-S24D3FN-A20CE1 Catalog No. 186088

Eaton Catalog No. DC1-S24D3FN-A20CE1

**EL-Nummer** 4137044

(Norway)

### Technical data General

delleral			
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	$\rho_{W}$	%	< 95%, average relative humidity (RH), non-condensing, non-corrosive
Ambient temperature			
operation (150 % overload)	9	°C	-10 - +50
Storage	θ	°C	-40 - +60
Radio interference level			
Radio interference class (EMC)			C1 (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.
Environment (EMC)			1st and 2nd environments as per EN 61800-3
maximum motor cable length	1	m	C1 ≤ 1 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 <sub>e</sub>		230 V AC, 1-phase 240 V AC, single-phase
Mains voltage (50/60Hz)	$U_LN$	V	200 (-10%) - 240 (+10%)
Input current (150% overload)	I <sub>LN</sub>	Α	7.5
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)	IL	Α	6.45
max. starting current (High Overload)	I <sub>H</sub>	%	175
Note about max. starting current			for 3.75 seconds every 600 seconds
Output voltage with $V_{\rm e}$	$U_2$		230 V AC, single-phase 240 V AC, single-phase
Output Frequency	f <sub>2</sub>	Hz	0 - 50/60 (max. 500)
Switching frequency	f <sub>PWM</sub>	kHz	16 adjustable 4 - 32 (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	l <sub>e</sub>	Α	4.3

Note			Rated operational current at an operating frequency of 16 kHz and an ambient air temperature of +50 $^{\circ}\text{C}$
Power loss			
Heat dissipation at rated operational current I $_{\rm e}$ =150 $\%$	$P_{V}$	W	18.5
Efficiency	η	%	95
Maximum leakage current to ground (PE) without motor	I <sub>PE</sub>	mA	2.49
Fitted with			Radio interference suppression filter 7-digital display assembly
Frame size			FS1
Motor feeder			
Note			For AC motors with internal and external ventilation with 50/60 Hz without addition start capacitor
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	'	m	screened: 50 screened, with motor choke: 100 unscreened: 75 unscreened, with motor choke: 150
Apparent power			
Apparent power at rated operation 230 V	S	kVA	0.99
Apparent power at rated operation 240 V	S	kVA	1.03
Braking function			
DC braking torque			max. 100% of rated operational current l <sub>e,</sub> 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			
IEC (Type B, gG), 150 %			FAZ-B10/1N
UL (Class CC or J)		Α	10

DX-LN1-009 150 % overload (CT/I<sub>H</sub>, at 50 °C)

# Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	In	Α	4.3
Heat dissipation per pole, current-dependent	P <sub>vid</sub>	W	0
Equipment heat dissipation, current-dependent	P <sub>vid</sub>	W	18.5
Static heat dissipation, non-current-dependent	P <sub>vs</sub>	W	0
Heat dissipation capacity	P <sub>diss</sub>	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 6.0**

Namian voltage	Low-voltage industrial components (EG000017) / Frequency converter =< 1 kV (EC001857)			
Mains frequency         6000 Hz           Number of phases input         1           Number of phases output         1           Max. cutput frequency         1           Max. cutput frequency         2           Max. cutput votrage         2           Rated output current IZN         3           Max. cutput at quadratic load at rated output voltage         4           Max. cutput at linear load at rated output voltage         8           Max. cutput at linear load at rated output voltage         9           Max. cutput at linear load at rated output voltage         9           Max. cutput at linear load at rated output voltage         9           Max. cutput at linear load at rated output voltage         9           Max. cutput at linear load at rated output voltage         9           Application in dimestic- and commercial area permitted         9           Application in dimestic- and commercial area permitted         9           Supporting protocol for TCPIP         9           Supporting protocol for FNBGFIBUS         9           Supporting protocol for KNX         9           Supporting protocol for MNDBUS         9           Supporting protocol for MDBUS         9           Supporting protocol for DeviceNet         9 <t< td=""><td>Electric engineering, automation, process control engineering / Electrical drive / Static freque</td><td>ncy converte</td><td>r / Static frequency converter = &lt; 1 kv (ecl@ss8.1-27-02-31-01 [AKE177011])</td></t<>	Electric engineering, automation, process control engineering / Electrical drive / Static freque	ncy converte	r / Static frequency converter = < 1 kv (ecl@ss8.1-27-02-31-01 [AKE177011])	
Number of phases input         Incompany of phases output         Incompany of phases output         Incompany of phases output (anguency)         Incompany of phases outpu	Mains voltage	V	200 - 240	
Number of phases output         Max. output frequency         Hz         500           Max. output voltage         V         29           Max. output current I2N         A         3           Max. output a timear load at rated output voltage         W         0.37           Max. output at linear load at rated output voltage         W         0.37           Max. output at linear load at rated output voltage         W         0.37           With control unit         W         0.37           Application in industrial area permitted         W         0.9           Application in industrial area permitted         W         0.9           Supporting protect for TCP/IP         W         0.0           Supporting protect for TCP/IP         W         0.0           Supporting protect for PROFIBUS         W         0.0           Supporting protect for ASI         W         0.0           Supporting protect for MXX         0.0         0.0           Supporting protect for Data-Highway         0.0         0.0           Supporting protect for Data-Highway         0.0         0.0           Supporting protect for EUONET         0.0         0.0           Supporting protect for EUONET         0.0         0.0           Suppor	Mains frequency		50/60 Hz	
Max. output frequency         #2         90           Max. output voltage         V         20           Rited output current IZN         A         4           Max. output at quadratic load at rated output voltage         W         03           Wax. output at flinear load at rated output voltage         W         03           With control unit         F         V         V           Application in industrial area permitted         F         V         V           Application in domestic- and commercial area permitted         F         V         V           Supporting protocol for TCP/IP         V         V         V           Supporting protocol for ASA         V         V         V           Supporting protocol for ASA         V         V         V           Supporting protocol for MXX         V         V         V           Supporting protocol for Bata-Highway         V         V         V           Supporting protocol for Data-Highway         V         V         V           Supporting protocol for Data-Highway         V         V         V           Supporting protocol for EverceNet         V         V         V           Supporting protocol for PROFINET CBA         V         V <td>Number of phases input</td> <td></td> <td>1</td>	Number of phases input		1	
Max. output vottage         V         250           Rated output current I2N         A         4.3           Max. output at quadratic load at rated output voltage         6W         0.37           Max. output at linear load at rated output voltage         6W         0.37           With control unit         6W         0.37           With control unit         6W         0.37           Application in industrial area permitted         6W         8           Application in domestic- and commercial area permitted         6W         8           Supporting protocol for TCP/IP         7W         8           Supporting protocol for PROFIBUS         No         9           Supporting protocol for PROFIBUS         No         9           Supporting protocol for INTERBUS         No         9           Supporting protocol for ASI         No         9           Supporting protocol for MODBUS         No         9           Supporting protocol for Duta-Highway         No         No           Supporting protocol for SUCONET         No         No           Supporting protocol for PROFINET I0         No         No           Supporting protocol for PROFINET CBA         No         No           Supporting protocol for Edward Nevil'Pa <td>Number of phases output</td> <td></td> <td>1</td>	Number of phases output		1	
Rated output current I2N         A         4.3           Max. output at quadratic load at rated output voltage         WW         0.37           Max. output at linear load at rated output voltage         WW         0.37           With control unit         E         Yes           Application in industrial area permitted         Yes           Application in industrial area permitted         Yes           Supporting protocol for TCP/IP         No           Supporting protocol for TCP/IP         No           Supporting protocol for CAN         Yes           Supporting protocol for INTERBUS         No           Supporting protocol for NIX         No           Supporting protocol for NIX         No           Supporting protocol for MOBUS         Yes           Supporting protocol for Data-Highway         No           Supporting protocol for Data-Highway         No           Supporting protocol for SUCONET         No           Supporting protocol for PROFINET IO         No           Supporting protocol for PROFINET CBA         No           Supporting protocol for AS-Int	Max. output frequency	Hz	500	
Max. output at quadratic load at rated output voltage  kW 0.37  With control unit  Application in industrial area permitted  Supporting protocol for TCP/IP  Supporting protocol for TCP/IP  Supporting protocol for CAN  Supporting protocol for PNDFIBUS  Supporting protocol for NXX  Supporting protocol for NXX  Supporting protocol for NXX  Supporting protocol for NXX  Supporting protocol for Data-Highway  Supporting protocol for Data-Highway  Supporting protocol for Data-Highway  Supporting protocol for SUCONET  Supporting protocol for SUCONET  Supporting protocol for SUCONET  Supporting protocol for PNDFINET IO  Supporting protocol for PNDFINET IO  Supporting protocol for PNDFINET OBA  Supporting protocol for FNDFINET OBA  Support	Max. output voltage	V	250	
Max. output at linear load at rated output voltage         kW         0.37           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 MX         No           Supporting protocol for MXD         No           Supporting protocol for MXDBUS         No           Supporting protocol for Data-Highway         No           Supporting protocol for Data-Highway         No           Supporting protocol for SUCONET         No           Supporting protocol for SUCONET         No           Supporting protocol for PROFINET IO         No           Supporting protocol for PROFINET GBA         No           Supporting protocol for Foundation Fieldbus         No           Supporting protocol for Foundation Fieldbus         No           Supporting protocol for Foundation Fieldbus         No           Supporting protocol for DeviceNet Safety at Work         No           Supporting protocol for DeviceNet Safety	Rated output current I2N	Α	4.3	
With control unit Application in industrial area permitted Application in industrial area permitted Application in domestic- and commercial area permitted Supporting protocol for TCP/IP Supporting protocol for PROFIBUS Supporting protocol for PROFIBUS Supporting protocol for PROFIBUS Supporting protocol for INTERBUS Supporting protocol for INTERBUS Supporting protocol for INTERBUS Supporting protocol for KNX Supporting protocol for KNX Supporting protocol for MNX Supporting protocol for MOBUS Supporting protocol for Data-Highway Supporting protocol for Data-Highway Supporting protocol for Success Supporting protocol for Success Supporting protocol for Success Supporting protocol for Success Supporting protocol for PROFINET IO Supporting protocol for PROFINET IO Supporting protocol for PROFINET IO Supporting protocol for FROFINET IO Supporting pro	Max. output at quadratic load at rated output voltage	kW	0.37	
Application in industrial area permitted Application in domestic- and commercial area permitted Application in domestic- and commercial area permitted Supporting protocol for TCP/IP Supporting protocol for PROFIBUS No Supporting protocol for PROFIBUS Supporting protocol for CAN Supporting protocol for INTERBUS Supporting protocol for INTERBUS Supporting protocol for ASI Supporting protocol for KNX Supporting protocol for KNX Supporting protocol for MOBUS Supporting protocol for MOBUS Supporting protocol for Bushighway Supporting protocol for DeviceNet Supporting protocol for DeviceNet Supporting protocol for SUCONET Supporting protocol for PROFINET IO Supporting protocol for PROFINET IO Supporting protocol for PROFINET IO Supporting protocol for PROFINET GBA Supporting protocol for Successed Supporting protocol for Supporting protocol for Successed Supporting protocol for Succe	Max. output at linear load at rated output voltage	kW	0.37	
Application in domestic- and commercial area permitted  Supporting protocol for CP/IP  Supporting protocol for PROFIBUS  Supporting protocol for CAN  Supporting protocol for INTERBUS  Supporting protocol for INTERBUS  Supporting protocol for INTERBUS  Supporting protocol for KNX  Supporting protocol for MODBUS  Supporting protocol for MODBUS  Supporting protocol for MODBUS  Supporting protocol for Bu-Highway  Supporting protocol for Bu-Highway  Supporting protocol for Bu-Highway  Supporting protocol for DeviceNet  Supporting protocol for DeviceNet  Supporting protocol for DeviceNet  Supporting protocol for PROFINET IO  Supporting protocol for PROFINET IOS  Supporting protocol for PROFINET GBA  Supporting protocol for FROFINET GBA  Supporting protocol for Execos  Supporting protocol for DeviceNet Safety at Work  Supporting protocol for DeviceNet Safety at Work  Supporting protocol for DeviceNet Safety  Supporting protocol for PROFIsafe	With control unit		Yes	
Supporting protocol for PROFIBUS  Supporting protocol for RAN  Supporting protocol for INTERBUS  Supporting protocol for INTERBUS  Supporting protocol for INTERBUS  Supporting protocol for KNX  Supporting protocol for KNX  Supporting protocol for MODBUS  Supporting protocol for Data-Highway  Supporting protocol for Data-Highway  Supporting protocol for SUCONET  Supporting protocol for SUCONET  Supporting protocol for PROFINET IO  Supporting protocol for PROFINET IO  Supporting protocol for PROFINET IO  Supporting protocol for SERCOS  Supporting protocol for SerCOS  Supporting protocol for Fundation Fieldbus  Supporting protocol for Fundation Fieldbus  Supporting protocol for EtherNet/IP  Supporting protocol for DeviceNet Safety at Work  Supporting protocol for DeviceNet Safety  Supporting protocol for INTERBUS-Safety  Supporting protocol for PROFINET Bafety  Supporting protocol for PROFINET Safety  Supporting protocol for DeviceNet Safety  Supporting protocol for PROFINET Safety	Application in industrial area permitted		Yes	
Supporting protocol for CAN Supporting protocol for INTERBUS Supporting protocol for INTERBUS Supporting protocol for INTERBUS Supporting protocol for KNX Supporting protocol for KNX Supporting protocol for MODBUS Supporting protocol for Data-Highway Supporting protocol for DeviceNet Supporting protocol for DeviceNet Supporting protocol for SUCONET Supporting protocol for SUCONET Supporting protocol for PROFINET IO Supporting protocol for PROFINET IO Supporting protocol for PROFINET CBA Supporting protocol for SERCOS Supporting protocol for FROFINET SERCOS Supporting protocol for Endudation Fieldbus Supporting protocol for SerCoS Supporting pr	Application in domestic- and commercial area permitted		Yes	
Supporting protocol for INTERBUS Supporting protocol for INTERBUS Supporting protocol for ASI Supporting protocol for KNX Supporting protocol for KNX Supporting protocol for MODBUS Supporting protocol for Data-Highway Supporting protocol for Data-Highway Supporting protocol for DeviceNet Supporting protocol for DeviceNet Supporting protocol for SUCONET Supporting protocol for DeviceNet Supporting protocol for PROFINET IO Supporting protocol for PROFINET CBA Supporting protocol for SERCOS Supporting protocol for SerCOS Supporting protocol for Euchatien Fieldbus Supporting protocol for Euchatien Fieldbus Supporting protocol for SerCOS Supporting protocol for SerCOS Supporting protocol for SerCOS Supporting protocol for Euchatien Fieldbus Supporting protocol for Euchatien Fieldbus Supporting protocol for SerCOS Supporting protocol for SerCOS Supporting protocol for SerCOS Supporting protocol for Euchatien Fieldbus Supporting protocol for Euchatien Safety at Work Supporting protocol for Euchatien Safety at Work Supporting protocol for PeviceNet Safety Supporting protocol for INTERBUS-Safety Supporting protocol for INTERBUS-Safety Supporting protocol for INTERBUS-Safety Supporting protocol for PROFIsafe	Supporting protocol for TCP/IP		No	
Supporting protocol for INTERBUS  Supporting protocol for ASI  Supporting protocol for KNX  Supporting protocol for MODBUS  Supporting protocol for Data-Highway  Supporting protocol for DeviceNet  Supporting protocol for SUCONET  Supporting protocol for SUCONET  Supporting protocol for PROFINET IO  Supporting protocol for PROFINET CBA  Supporting protocol for FROFINET CBA  Supporting protocol for EtherNet/IP  Supporting protocol for EtherNet/IP  Supporting protocol for EtherNet/IP  Supporting protocol for AS-Interface Safety at Work  Supporting protocol for PROFISafe  Supporting protocol for PROFISafe  Supporting protocol for PROFISafe  Supporting protocol for PROFISafe  Supporting protocol for FROFISafe  Supporting protocol for PROFISafe	Supporting protocol for PROFIBUS		No	
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Supporting protocol for INTERBUS-Safety  No Supporting protocol for PROFIsafe  No	Supporting protocol for AS-Interface Safety at Work		No	
Supporting protocol for PR0Flsafe No	Supporting protocol for DeviceNet Safety		No	
	Supporting protocol for INTERBUS-Safety		No	
Supporting protocol for SafetyBUS p No	Supporting protocol for PROFIsafe		No	
	Supporting protocol for SafetyBUS p		No	

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	No
	Yes
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	No
	U converter
	IP20
mm	184
mm	81
mm	124
%	10
%	10
	mm mm %

# 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~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
Degree of Protection	IEC: IP20

## **Dimensions**



