

Variable speed starter, Rated operational voltage 230 V AC, 1-phase, Ie 9.6 A, 2.2 kW, 3 HP, Radio interference suppression filter



Powering Business Worldwide™



**Part no.** DE1-129D6FN-N20N  
**Catalog No.** 174332  
**Alternate Catalog No.** DE1-129D6FN-N20N  
**EL-Nummer (Norway)** 4110096

## Delivery program

Product range			Variable speed starter
Part group reference (e.g. DIL)			DE1
Rated operational voltage	U <sub>e</sub>		230 V AC, 1-phase 240 V AC, single-phase
Output voltage with V <sub>e</sub>	U <sub>2</sub>		230 V AC, 3-phase 240 V AC, 3-phase
Mains voltage (50/60Hz)	U <sub>LN</sub>	V	200 (-10%) - 240 (+10%)
<b>Rated operational current</b>			
At 150% overload	I <sub>e</sub>	A	9.6
Note			Rated operational current at an operating frequency of 16 kHz and an ambient air temperature of +50 °C
<b>Assigned motor rating</b>			
Note			for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with 1500 rpm <sup>-1</sup> at 50 Hz or 1800 min <sup>-1</sup> at 60 Hz
Note			Overload cycle for 60 s every 600 s
Note			at 230 V, 50 Hz
150 % Overload	P	kW	2.2
150 % Overload	I <sub>M</sub>	A	8.7
Note			at 220 - 240 V, 60 Hz
150 % Overload	P	HP	3
150 % Overload	I <sub>M</sub>	A	9.6
Degree of Protection			IP20/NEMA0
Interface/field bus (built-in)			OP-Bus (RS485)/Modbus RTU
Fitted with			Radio interference suppression filter
Parameterization			Keypad Fieldbus drivesConnect drivesConnect mobile (App)
Frame size			FS2
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
Production quality			RoHS, ISO 9001
Climatic proofing	ρ <sub>w</sub>	%	< 95%, average relative humidity (RH), non-condensing, non-corrosive
Ambient temperature			
Operating ambient temperature min.		°C	-10
Operating ambient temperature max.		°C	+ 60
			operation (150 % overload); max. +60 °C
Storage	θ	°C	-40 - +70
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	I	m	C1 $\leq$ 5 m C2 $\leq$ 10 m C3 $\leq$ 25 m
Mechanical shock resistance		g	15 (11 m/s, EN 60068-2-27)
Vibration			EN 61800-5-1
Altitude		m	0 - 1000 m above sea level Above 1000 m: 1% derating for every 100 m max. 2000 m
Degree of Protection			IP20/NEMA0
Protection against direct contact			BGV A3 (V рG4, finger- and back-of-hand proof)

### Main circuit

Supply			
Rated operational voltage	$U_e$		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)	$I_{LN}$	A	23.2
Supply frequency	$f_{LN}$	Hz	50/60
Frequency range	$f_{LN}$	Hz	45–66 ( $\pm$ 0%)
Mains switch-on frequency			Maximum of one time every 30 seconds
Power section			
Overload current (150% overload)	$I_L$	A	14.4
max. starting current (High Overload)	$I_H$	%	200
Note about max. starting current			for 1.875 seconds every 600 seconds
Output voltage with $V_e$	$U_2$		230 V AC, 3-phase 240 V AC, 3-phase
Output Frequency	$f_2$	Hz	0 - 50/60 (max. 300)
Switching frequency	$f_{PWM}$	kHz	16 adjustable 4 - 32 (audible)
Operation Mode			U/f control Speed control with slip compensation
Frequency resolution (setpoint value)	$\Delta f$	Hz	0.025
Rated operational current			
At 150% overload	$I_e$	A	9.6
Note			Rated operational current at an operating frequency of 16 kHz and an ambient air temperature of +50 °C
Heat dissipation at current/speed [%]			
Current = 100%			
Speed = 0 %	$P_V$	W	72
Speed = 50 %	$P_V$	W	72
Speed = 90 %	$P_V$	W	91
Current = 50 %			
Speed = 0 %	$P_V$	W	46
Speed = 50 %	$P_V$	W	46
Speed = 90 %	$P_V$	W	55
Current = 25 %			
Speed = 0 %	$P_V$	W	30
Speed = 50 %	$P_V$	W	38
Maximum leakage current to ground (PE) without motor	$I_{PE}$	mA	< 3.5 AC, < 10 DC
Fitted with			Radio interference suppression filter
Frame size			FS2
Motor feeder			
Note			for normal internally and externally ventilated 4 pole, three-phase asynchronous motors with $1500 \text{ rpm}^{-1}$ at 50 Hz or $1800 \text{ min}^{-1}$ at 60 Hz
Note			Overload cycle for 60 s every 600 s
Note			at 230 V, 50 Hz
150 % Overload	P	kW	2.2
Note			at 220 - 240 V, 60 Hz

150 % Overload	P	HP	3
Apparent power			
Apparent power at rated operation 230 V	S	kVA	3.82
Apparent power at rated operation 240 V	S	kVA	3.99
Braking function			
Standard braking torque			max. 30 % $M_N$
DC braking torque			adjustable to 100 %

#### Control section

Reference voltage	U <sub>s</sub>	V	10 V DC (max. 0.2 mA)
Analog inputs			1, parameterizable, 0 - 10 V DC, 0/4 - 20 mA
Digital inputs			4, parameterizable, 10 - 30 V DC
Relay outputs			1, N/O contact, 6 A (250 V, AC-1) / 5 A (30 V, DC-1)
Interface/field bus (built-in)			OP-Bus (RS485)/Modbus RTU

#### Assigned switching and protective elements

Power Wiring			
Safety device (fuse or miniature circuit-breaker)			
IEC (Type B, gG), 150 %			FAZ-B32/1N
UL (Class CC or J)	A	35	
Mains contactor			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DILM7-... + DILM12-XP1
Main choke			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DX-LN1-024
Radio interference suppression filter (external, 150 %)			DX-EMC12-025-FS2
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 <sub>H</sub> , at 50 °C)			DX-LM3-011

#### Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I <sub>n</sub>	A	9.6
Heat dissipation per pole, current-dependent	P <sub>vid</sub>	W	0
Equipment heat dissipation, current-dependent	P <sub>vid</sub>	W	105
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	60
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	200 - 240
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 I <sub>2N</sub>	A	9.6
Max. output at quadratic load at rated output voltage	kW	2.2
Max. output at linear load at rated output voltage	kW	2.2
Relative symmetric net frequency tolerance	%	10
Relative symmetric net voltage tolerance	%	10
Number of analogue outputs		0
Number of analogue inputs		1
Number of digital outputs		0
Number of digital inputs		4
With control unit		No
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		No
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	230
Width	mm	90
Depth	mm	169