



Variable frequency drive, 400 V AC, 3-phase, 310 A, 160 kW, IP00, DC link choke



Part no. DG1-34310FN-C00C
Catalog No. 3-4917-101A

Delivery program

Product range			Variable frequency drives
Part group reference (e.g. DIL)			DG1
Rated operational voltage	U_e		400 V AC, 3-phase 480 V AC, 3-phase 500 V AC, 3-phase
Output voltage with V_e	U_2		400 V AC, 3-phase 480 V AC, 3-phase 500 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	380 (-15%) - 500 (+10%)
Rated operational current			
At 150% overload	I_e	A	310
At 110% overload	I_e	A	385
Note			Rated operational current for a switching frequency of 1.5 - 6 kHz and an ambient temperature of +50° C for a 150% overload and +40° C for a 110% overload
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	160
110 % Overload	P	kW	200
150 % Overload	I_M	A	283
110 % Overload	I_M	A	353
Note			at 500 V, 50 Hz
150 % Overload	P	kW	200
110 % Overload	P	kW	250
150 % Overload	I_M	A	279
110 % Overload	I_M	A	349
Note			at 480 V, 60 Hz
150 % Overload	P	HP	250
110 % Overload	P	HP	300
150 % Overload	I_M	A	302
110 % Overload	I_M	A	361
Degree of Protection			IP00
Interface/field bus (built-in)			Modbus RTU Modbus TCP BACnet MS/TP Ethernet IP
Fieldbus connection (optional)			PROFIBUS CANopen® DeviceNet SmartWire-DT
Fitted with			Radio interference suppression filter Additional PCB protection Multi-line graphic display DC link choke
Parameterization			Keypad Feldbus Power Xpert inControl
Frame size			FS7
Connection to SmartWire-DT			yes in conjunction with DXG-NET-SWD 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
Certifications			CE, UL, cUL, c-Tick, UkrSEPRO, 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	+40
operation (110 % overload)	θ	°C	-10 - +40
			Operation with 150% overload (1 min./10 min.): -10 to +40 (max. +50 with 1% derating per Kelvin temperature increase) Operation with 150% overload (1 min./10 min.): -10 to +40 (max. +50 with 1% derating per Kelvin temperature increase)
Storage	θ	°C	-40 - +70
Overvoltage category			III
Pollution degree			2
Radio interference level			
Radio interference class (EMC)			C1 (with external filter, 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	l	m	C2 ≤ 10 m C3 ≤ 50 m
Mechanical shock resistance		g	EN 61800-5-1, EN 60068-2-27 UPS drop test (for weights inside the UPS frame) Storage and transportation: maximum 15 g, 11 ms (inside the packaging)
Vibration			EN 61800-5-1, EN 60068-2-6: 5 - 150 Hz Amplitude: 1 mm (peak) at 5 - 15.8 Hz Maximum acceleration amplitude: 1 g at 15.8 – 150 Hz
Mounting position			Vertical
Altitude		m	0 - 1000 m above sea level Above 1000 m: 1% derating for every 100 m max. 3000 m (2000 m for Corner Grounded TN Systems)
Degree of Protection			IP00
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 500 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	380 (-15%) - 500 (+10%)
Input current (150% overload)	I_{LN}	A	311
Input current (110% overload)	I_{LN}	T	385
System configuration			TN-S, TN-C, TN-C-S, TT, IT
Supply frequency	f_{LN}	Hz	50/60
Frequency range	f_{LN}	Hz	45–66 (± 0%)
Mains switch-on frequency			Maximum of one time every 60 seconds
Mains current distortion	THD	%	28
Rated conditional short-circuit current	I_q	kA	< 65
Power section			
Function			Variable frequency drive with internal DC link, DC link choke and IGBT inverter
Overload current (150% overload)	I_L	A	465
Overload current (110% overload)	I_L	A	423.5
max. starting current (High Overload)	I_H	%	200
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 500 V AC, 3-phase

Output Frequency	f_2	Hz	0 - 50/60 (max. 400)
Switching frequency	f_{PWM}	kHz	2 adjustable 1.5 - 6
Operation Mode			U/f control Speed control with slip compensation sensorless vector control (SLV) Torque regulation
Frequency resolution (setpoint value)	Δf	Hz	0.01
Rated operational current			
At 150% overload	I_e	A	310
At 110% overload	I_e	A	385
Note			Rated operational current for a switching frequency of 1.5 - 6 kHz and an ambient temperature of +50° C for a 150% overload and +40° C for a 110% overload
Motor current limit	I	A	$0.1 - 2 \times I_H$ (CT)
Power loss			
Heat dissipation at rated operational current $I_e = 110\%$	P_V	W	5465
Efficiency	η	%	97.9
Fan			temperature controlled externally accessible
Internal fan delivery rate		m^3/h	1400
Fitted with			Radio interference suppression filter Additional PCB protection Multi-line graphic display DC link choke
Safety function			STO (Safe Torque Off, SIL1, PLc Cat 1)
Frame size			FS7
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	160
110 % Overload	P	kW	200
Note			at 500 V, 50 Hz
150 % Overload	P	kW	200
110 % Overload	P	kW	250
Note			at 480 V, 60 Hz
150 % Overload	P	HP	250
110 % Overload	P	HP	300
maximum permissible cable length	l	m	screened: 50
Apparent power			
Apparent power at rated operation 400 V	S	kVA	266.7
Apparent power at rated operation 480 V	S	kVA	333.4
Braking function			
Standard braking torque			max. 30 % MN
DC braking torque			adjustable to 150 %
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	1.4
Switch-on threshold for the braking transistor	U_{DC}	V	850 V DC
DC braking	%	I/I_e	≤ 150 , adjustable

Control section

External control voltage	U_c	V	24 V DC (max. 250 mA options incl.)
Reference voltage	U_s	V	10 V DC (max. 10 mA)
Analog inputs			2, parameterizable, 0 - 10 V DC, 2 - 10 V DC, -10 - +10 V DC, 0/4 - 20 mA
Analog outputs			2, parameterizable, 0 - 10 V, 0/4 - 20 mA
Digital inputs			8, parameterizable, max. 30 V DC
Digital outputs			1, parameterizable, 24 V DC
Relay outputs			3, parameterizable, 2 changeover contacts and 1 N/O, 6 A (240 VAC) / 6 A (24 VDC)
Interface/field bus (built-in)			Modbus RTU

			Modbus TCP BACnet MS/TP Ethernet IP
Expansion slots			2

Assigned switching and protective elements

Power Wiring			
Safety device (fuse or miniature circuit-breaker)			
IEC (Type B, gG), 150 %			NZMC3-A320
IEC (Type B, gG), 110 %			NZMC3-A500
UL (Class CC or J)		A	500
Mains contactor			
150 % overload (CT/I _H , at 50 °C)			DILM225A
110 % overload (VT/I _L , at 40 °C)			DILM400
Main choke			
150 % overload (CT/I _H , at 50 °C)			Integrated DC link choke, uk = 5%
110 % overload (VT/I _L , at 40 °C)			Integrated DC link choke, uk = 5%
Radio interference suppression filter (external, 150 %)			
Radio interference suppression filter (external, 110 %)			
Radio interference suppression filter, low leakage currents (external, 150 %)			
Radio interference suppression filter, low leakage currents (external, 110 %)			
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-LM3-370
110 % overload (VT/I _L , at 40 °C)			DX-LM3-450
Sine filter			
150 % overload (CT/I _H , at 50 °C)			DX-SIN3-440
110 % overload (VT/I _L , at 40 °C)			DX-SIN3-440

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I _n	A	310
Equipment heat dissipation, current-dependent	P _{vid}	W	5465
Static heat dissipation, non-current-dependent	P _{vs}	W	108
Operating ambient temperature min.		°C	-10
Operating ambient temperature max.		°C	40
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.			
10.9 Insulation properties			
10.9.3 Impulse withstand voltage			
Is the panel builder's responsibility.			

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 (ec1@ss10.0.1-27-02-31-01 [AKE177014])

Mains voltage	V	380 - 500
Mains frequency		50/60 Hz
Number of phases input		3
Number of phases output		3
Max. output frequency	Hz	400
Max. output voltage	V	500
Nominal output current I2N	A	385
Max. output at quadratic load at rated output voltage	kW	200
Max. output at linear load at rated output voltage	kW	160
Relative symmetric net frequency tolerance	%	10
Relative symmetric net voltage tolerance	%	10
Number of analogue outputs		2
Number of analogue inputs		2
Number of digital outputs		1
Number of digital inputs		8
With control unit		Yes
Application in industrial area permitted		Yes
Application in domestic- and commercial area permitted		Yes
Supporting protocol for TCP/IP		Yes
Supporting protocol for PROFIBUS		Yes
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		Yes
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		Yes
Supporting protocol for other bus systems		Yes
Number of HW-interfaces industrial Ethernet		1
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		1
With optical interface		No
With PC connection		Yes
Integrated breaking resistance		No
4-quadrant operation possible		Yes
Type of converter		U converter

Degree of protection (IP)		IP00
Degree of protection (NEMA)		Other
Height	mm	980
Width	mm	506
Depth	mm	561

Approvals

UL File No.		E134360
UL Category Control No.		NMMS, NMMS7
Suitable for		Branch circuits
Max. Voltage Rating		3-500 V AC IEC: TN-S UL/CSA: 'Y' (Solidly Grounded Wey)
Degree of Protection		IP00

Assets (links)

Declaration of CE Conformity

00003265

Additional product information (links)

Documentation	http://www.eaton.eu/Europe/Electrical/ProductsServices/AutomationControl/SwitchingProtectingDrivingMotors/PowerXLfrequencydrives/DG1GeneralPurposeDrives/index.htm?wtredirect=www.eaton.eu/dg1#tabs-7
Manuals	http://www.eaton.eu/Europe/Electrical/ProductsServices/AutomationControl/SwitchingProtectingDrivingMotors/PowerXLfrequencydrives/DG1GeneralPurposeDrives/index.htm?wtredirect=www.eaton.eu/dg1#tabs-8