



**Variable frequency drive, 500 V AC, 3-phase, 144 A, 90 kW, IP54/NEMA12, DC link choke**



**Part no. DG1-35144FN-C54C**  
**Catalog No. 9703-6104-00P**  
**Alternate Catalog No. DG1-35144FN-C54C**

**Delivery program**

Product range			Variable frequency drives
Part group reference (e.g. DIL)			DG1
Rated operational voltage	$U_e$		600 V AC, 3-phase
Output voltage with $V_e$	$U_2$		600 V AC, 3-phase
Mains voltage (50/60Hz)	$U_{LN}$	V	500 (-10%) - 600 (+10%)
<b>Rated operational current</b>			
At 150% overload	$I_e$	A	144
At 110% overload	$I_e$	A	208
Note			Rated operational current for a switching frequency of 1 - 6 kHz and an ambient temperature of +50 °C for a 150% overload and +40 °C for a 110% overload
<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 525 V, 50 Hz
150 % Overload	P	kW	90
110 % Overload	P	kW	132
150 % Overload	$I_M$	A	129
110 % Overload	$I_M$	A	184
Note			at 600 V, 50 Hz
150 % Overload	P	kW	110
110 % Overload	P	kW	160
150 % Overload	$I_M$	A	137
110 % Overload	$I_M$	A	197
Note			at 600 V, 60 Hz
150 % Overload	P	HP	150
110 % Overload	P	HP	200
150 % Overload	$I_M$	A	125
110 % Overload	$I_M$	A	192
Degree of Protection			IP54/NEMA12
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			FS6
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			UL, cUL, c-Tick, UkrSEPRO, EAC
Production quality			RoHS, ISO 9001
Climatic proofing	$\rho_w$	%	< 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 (110 % overload)	$\theta$	°C	-10 - +40
			Operation with 110 % overload (1 min./10 min.): -10 to +40 (max. +55 with 1% derating per Kelvin above limit) Operation with 150% overload (1 min./10 min.): -10 to +50 (max. +60 with 1% derating per Kelvin above limit) -20 with cold-weather mode
Storage	$\theta$	°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	C3 ≤ 10 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. 2000 m
Degree of Protection			IP54/NEMA12
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)

### Main circuit

Supply			
Rated operational voltage	$U_e$		600 V AC, 3-phase
Mains voltage (50/60Hz)	$U_{LN}$	V	500 (-10%) - 600 (+10%)
Input current (150% overload)	$I_{LN}$	A	133.9
Input current (110% overload)	$I_{LN}$	T	192
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	%	31.5
Rated conditional short-circuit current	$I_q$	kA	< 100
Power section			
Function			Variable frequency drive with internal DC link, DC link choke and IGBT inverter
Overload current (150% overload)	$I_L$	A	216
Overload current (110% overload)	$I_L$	A	228.8
max. starting current (High Overload)	$I_H$	%	200
Note about max. starting current			for 2 seconds every 20 seconds
Output voltage with $V_e$	$U_2$		600 V AC, 3-phase
Output Frequency	$f_2$	Hz	0 - 50/60 (max. 400)
Switching frequency	$f_{PWM}$	kHz	1.5 adjustable 1 - 6

Operation Mode			U/f control Speed control with slip compensation sensorless vector control (SLV) Torque regulation
Frequency resolution (setpoint value)	$\Delta f$	Hz	0.01
Rated operational current			
At 150% overload	$I_e$	A	144
At 110% overload	$I_e$	A	208
Note			Rated operational current for a switching frequency of 1 - 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 x $I_H$ (CT)
Power loss			
Heat dissipation at rated operational current $I_e = 150\%$	$P_V$	W	2502
Heat dissipation at rated operational current $I_e = 110\%$	$P_V$	W	1688
Efficiency	$\eta$	%	98.5
Maximum leakage current to ground (PE) without motor	$I_{PE}$	mA	11.8
Fan			temperature controlled externally accessible
Internal fan delivery rate		$m^3/h$	679
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			FS6
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 525 V, 50 Hz
150 % Overload	P	kW	90
110 % Overload	P	kW	132
Note			at 600 V, 50 Hz
150 % Overload	P	kW	110
110 % Overload	P	kW	160
Note			at 600 V, 60 Hz
150 % Overload	P	HP	150
110 % Overload	P	HP	200
maximum permissible cable length	$l$	m	screened: 200
Apparent power			
Apparent power at rated operation 600 V	S	kVA	216.2
Braking function			
Standard braking torque			max. 30 % $M_N$
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	$R_{min}$	$\Omega$	2.5
Switch-on threshold for the braking transistor	$U_{DC}$	V	Supply voltage UAUX 1050 V DC
DC braking	%	$I/I_e$	$\leq 150$ , 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
<b>Assigned switching and protective elements</b>			
<b>Power Wiring</b>			
Safety device (fuse or miniature circuit-breaker)			
IEC (Type B, gG), 150 %			NZMC1-A160
IEC (Type B, gG), 110 %			NZMC2-A250
UL (Class CC or J)		A	400
Mains contactor			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DILM150
110 % overload (VT/I <sub>L</sub> , at 40 °C)			DILM185A
Main choke			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			Integrated DC link choke, uk = 5%
110 % overload (VT/I <sub>L</sub> , at 40 °C)			Integrated DC link choke, uk = 5%
Note regarding radio interference suppression filter			Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments
<b>Motor feeder</b>			
motor choke			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DX-LM3-150
110 % overload (VT/I <sub>L</sub> , at 40 °C)			DX-LM3-220
Sine filter			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DX-SIN3-150
110 % overload (VT/I <sub>L</sub> , at 40 °C)			DX-SIN3-250

## Design verification as per IEC/EN 61439

<b>Technical data for design verification</b>			
Rated operational current for specified heat dissipation	I <sub>n</sub>	A	144
Heat dissipation per pole, current-dependent	P <sub>vid</sub>	W	0
Equipment heat dissipation, current-dependent	P <sub>vid</sub>	W	2502
Static heat dissipation, non-current-dependent	P <sub>vs</sub>	W	84.3
Heat dissipation capacity	P <sub>diss</sub>	W	0
Operating ambient temperature min.		°C	-10
Operating ambient temperature max.		°C	50
			Operation (with 150 % overload), allow for derating
<b>IEC/EN 61439 design verification</b>			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			
10.2.2.1 Verification of thermal stability of enclosures			
10.2.2.2 Verification of resistance of insulating materials to normal heat			
10.2.2.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects			
10.2.4 Resistance to ultra-violet (UV) radiation			
10.2.5 Lifting			
10.2.6 Mechanical impact			
10.2.7 Inscriptions			
10.3 Degree of protection of ASSEMBLIES			
10.4 Clearances and creepage distances			
10.5 Protection against electric shock			
10.6 Incorporation of switching devices and components			
10.7 Internal electrical circuits and connections			
10.8 Connections for external conductors			
10.9 Insulation properties			
10.9.2 Power-frequency electric strength			
10.9.3 Impulse withstand voltage			
10.9.4 Testing of enclosures made of insulating material			

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

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@ss8.1-27-02-31-01 [AKE177011])		
Mains voltage	V	525 - 600
Mains frequency		50/60 Hz
Number of phases input		3
Number of phases output		3
Max. output frequency	Hz	400
Max. output voltage	V	575
Rated output current I2N	A	144
Max. output at quadratic load at rated output voltage	kW	132
Max. output at linear load at rated output voltage	kW	90
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		Yes
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		Yes
Number of HW-interfaces industrial Ethernet		1
Number of HW-interfaces PROFINET		1
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)		IP54
Height	mm	486
Width	mm	1035
Depth	mm	371
Relative symmetric net frequency tolerance	%	10
Relative symmetric net current tolerance	%	10

## Approvals

Product Standards		UL508C, CSA-C22.2 No. 274-13; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.		E134360
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
Suitable for		Branch circuits
Max. Voltage Rating		3~600 V AC IEC: TN-S UL/CSA: 'Y' (Solidly Grounded Wey)
Degree of Protection		IP54/NEMA12

## Additional product information (links)

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