Variable Frequency Drive, 3~/3~ 230 V, 180 A, 45 kW, Vector control, EMC-Filter

Powering Business Worldwide

Part no.	**DA1-32180FN-A55C**
Article no.	**169111**
Catalog No.	**DA1-32180FN-A55C**

Delivery programme

Product range			Variable frequency drives
Rated operational voltage	U_e		230 V AC, 3-phase
Output voltage with V_e	U_2		230 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	200 (-10%) - 240 (+10%)
Rated operational current			
At 150% overload	I_e	A	180
Note			Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +40 °C
Note			Overload cycle for 60 s every 600 s
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	55
150 % Overload	I_e	A	173
Note			at 220 - 240 V, 60 Hz
150 % Overload	P	HP	60
Note			Alternatively: allocated motor output of 45 kW (230 V) with 141-A rated motor current
150 % Overload	I_e	A	154
Degree of Protection			IP55/NEMA 12
Interface/field bus (built-in)			OP-Bus (RS485)/Modbus RTU, CANopen®
Fieldbus connection (optional)			Ethernet IP DeviceNet PROFIBUS PROFINET Modbus-TCP EtherCAT BACnet/IP SmartWire-DT
Fitted with			Radio interference suppression filter Additional PCB protection 7-digital display assembly DC link choke
Frame size			FS6
Connection to SmartWire-DT			with SmartWire-DT module DX-NET-SWD2

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, cUL, UL, c-Tick, Ukr Sepro, EAC
Production quality			RoHS, ISO 9001
Climatic proofing	ρ_w	%	< 95%, average relative humidity (RH), non-condensing, non-corrosive (EN 50178)
Ambient temperature		°C	
operation (150 % overload)	ϑ	°C	-10 - +40

Storage	ϑ	°C	-40 - +60
Radio interference level			
Radio interference class (EMC)			C1, 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
maximum motor cable length	l	m	C1 ≤ 1 m C2 ≤ 5 m C3 ≤ 25 m
Mounting position			Vertical
Altitude		m	0 - 1000 m above sea level above 1000 m with 1 % performance reduction per 100 m max. 4000 m
Degree of Protection			IP55/NEMA 12
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)

Main circuit

Supply			
Rated operational voltage	U_e		230 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	200 (-10%) - 240 (+10%)
Input current (150% overload)	I_{LN}	A	183.8
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, DC link choke and IGBT inverter
Overload current (150% overload)	I_L	A	270
max. starting current (High Overload)	I_H	%	200
Note about max. starting current			for 4 seconds
Output voltage with V_e	U_2		230 V AC, 3-phase
Output Frequency	f_2	Hz	0 - 50/60 (max. 250)
Switching frequency	f_{PWM}	kHz	4 adjustable 4 - 8 (audible)
Operation Mode			U/f control Speed control with slip compensation sensorless vector control (SLV) optional: Vector control with feedback (CLV)
Frequency resolution (setpoint value)	Δf	Hz	0.1
Rated operational current			
At 150% overload	I_e	A	180
Note			Rated operational current at an operating frequency of 4 kHz and an ambient air temperature of +40 °C
Power loss			
Heat dissipation at rated operational current	P_V	W	945
Efficiency	η	%	97.9
Maximum leakage current to ground (PE) without motor	I_{PE}	mA	1.54
Fitted with			Radio interference suppression filter Additional PCB protection 7-digital display assembly DC link choke
Safety function			STO (Safe Torque Off)
Frame size			FS6
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	55
Note			at 220 - 240 V, 60 Hz
150 % Overload	P	HP	60

Note			Alternatively: allocated motor output of 45 kW (230 V) with 141-A rated motor current
maximum permissible cable length	l	m	screened: 100 screened, with motor choke: 200 unscreened: 150 unscreened, with motor choke: 300
Apparent power			
Apparent power at rated operation 230 V	S	kVA	71.71
Apparent power at rated operation 240 V	S	kVA	74.82
Braking function			
Standard braking torque			max. 30 % M_N
DC braking torque			100 %, adjustable

Control section

External control voltage	U_c	V	24 V DC (max. 100 mA)
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			2, parameterizable, 0 - 10 V, 0/4 - 20 mA
Digital inputs			3, parameterizable, max. 30 VDC, max. 5 for non-parameterized analog inputs
Digital outputs			2, parameterizable, 24 V DC
Relay outputs			2, parameterizable, 1 N/O and 1 changeover contact, 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 (Typ B, gG)			NZMC2-S200
150 % overload (CT/I_H, at 50 °C)			DX-LN3-200
Motor feeder			
150 % overload (CT/I_H, at 50 °C)			DX-LM3-180
150 % overload (CT/I_H, at 50 °C)			DX-SIN3-180

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	180
Equipment heat dissipation, current-dependent	P_{vid}	W	945
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 5.0

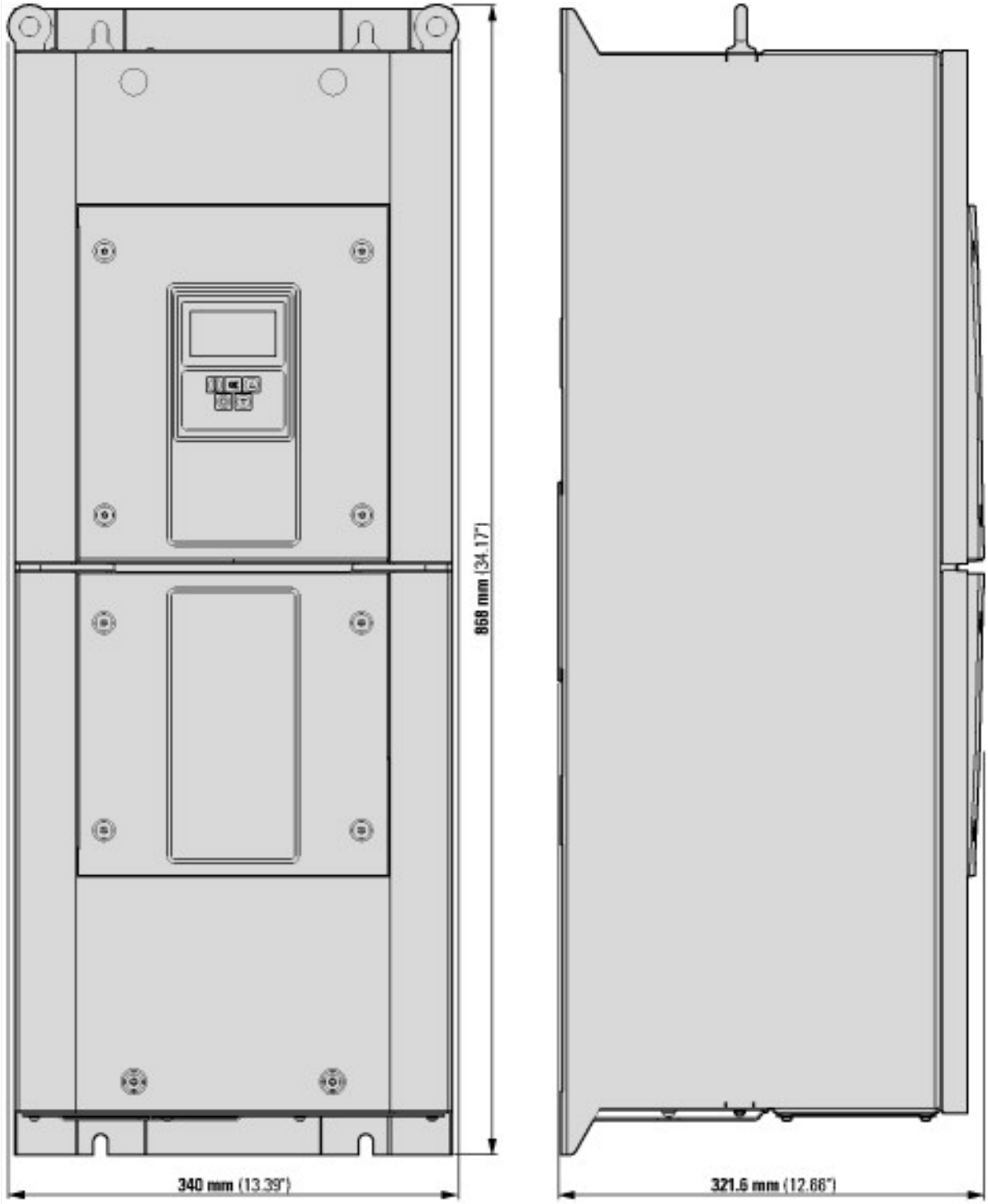
Low-voltage industrial components (EG000017) / Frequency controller =< 1 kV (EC001857)			
Electric engineering, automation, process control engineering / Electrical drive / Static frequency converter / Static frequency converter = < 1 kv (ecl@ss8-27-02-31-01 [AKE177010])			
Mains voltage		V	200 - 240
Mains frequency			50/60 Hz
Number of phases input			3
Number of phases output			3
Max. output frequency		Hz	500
Rated output voltage		V	230
Measuring output current		A	180
Output power at rated output voltage		kW	45
Max. output at quadratic load at rated output voltage		kW	45
Max. output at linear load at rated output voltage		kW	45
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			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			No
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			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 other bus systems			No
Number of HW-interfaces industrial Ethernet			0
Number of HW-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			1
Number of HW-interfaces parallel			0
Number of HW-interfaces other			0
With optical interface			No
With PC connection			Yes

Integrated braking resistance		No
4-quadrant operation possible		No
Type of converter		U converter
Degree of protection (IP)		IP55
Height	mm	865
Width	mm	330
Depth	mm	330
Relative symmetric net frequency tolerance	%	5
Relative symmetric net current tolerance	%	10

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		3~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
Degree of Protection		IEC: IP55

Dimensions



Additional product information (links)

IL04020011Z DA1 variable frequency drives (FS4 - 7)	
	IL04020011Z DA1 variable frequency drives (FS4 - 7)
	IL04020011Z DA1 variable frequency drives (FS4 - 7)
MN04020005Z DA1 variable frequency drive, manual	
	MN04020005Z Frequenzumrichter DA1, Handbuch - Deutsch
	MN04020005Z DA1 variable frequency drive, manual - English
CA04020001Z_EN-INT Product range catalog: Efficient Engineering for starting and controlling motors.	http://www.eaton.eu/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_1095238.pdf