



**Variable frequency drive, 230 V AC, 3-phase, 180 A, 55 kW, IP55/NEMA 12,  
Radio interference suppression filter, OLED display, DC link choke**



Powering Business Worldwide™



**Part no.** DA1-32180FB-B55C  
**Catalog No.** 169373  
**Alternate Catalog No.** DA1-32180FB-B55C  
**EL-Nummer (Norway)** 4137247

## Delivery program

Product range			Variable frequency drives
Part group reference (e.g. DIL)			DA1
Rated operational voltage	$U_e$		230 V AC, 3-phase 240 V AC, 3-phase
Output voltage with $V_e$	$U_2$		230 V AC, 3-phase 240 V AC, 3-phase
Mains voltage (50/60Hz)	$U_{LN}$	V	200 (-10%) - 240 (+10%)
<b>Rated operational current</b>			
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
<b>Assigned motor rating</b>			
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	55
150 % Overload	$I_M$	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	$I_M$	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 SmartWire-DT
Fitted with			Radio interference suppression filter Brake chopper Additional PCB protection OLED display DC link choke
Parameterization			Keypad Fieldbus drivesConnect drivesConnect mobile (App)
Frame size			FS6
Connection to SmartWire-DT			yes in conjunction with DX-NET-SWD1 SmartWire DT module

## Technical data

<b>General</b>			
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, UkrSEPRO, EAC
Approvals			DNV
Production quality			RoHS, ISO 9001
Climatic proofing	$\rho_w$	%	< 95%, average relative humidity (RH), non-condensing, non-corrosive
Air quality			3C3, 3S3
Ambient temperature			
Operating ambient temperature min.		°C	-10
Operating ambient temperature max.		°C	+ 40
			operation (with 150 % overload)
Storage	$\theta$	°C	-40 - +60
Radio interference level			
Radio interference class (EMC)			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 ≤ 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			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 240 V AC, 3-phase
Mains voltage (50/60Hz)	$U_{LN}$	V	200 (-10%) - 240 (+10%)
Input current (150% overload)	$I_{LN}$	A	187.5
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			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 every 40 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. 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)	$\Delta f$	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 $I_e=150\%$	$P_V$	W	945
Efficiency	$\eta$	%	97.9
Maximum leakage current to ground (PE) without motor	$I_{PE}$	mA	1.54
Fitted with			Radio interference suppression filter Brake chopper Additional PCB protection OLED display DC link choke

Safety function			STO (Safe Torque Off, SIL2, PLd Cat 3)
Frame size			FS6
Motor feeder			
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	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 <sub>N</sub>
DC braking torque			max. 100% of rated operational current I <sub>e</sub> , variable
Braking torque with external braking resistance			Max. 100% of rated operational current I <sub>e</sub> with external braking resistor
minimum external braking resistance	R <sub>min</sub>	Ω	6
Switch-on threshold for the braking transistor	U <sub>DC</sub>	V	390 V DC

### Control section

External control voltage	U <sub>c</sub>	V	24 V DC (max. 100 mA)
Reference voltage	U <sub>s</sub>	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			
Safety device (fuse or miniature circuit-breaker)			
IEC (Type B, gG), 150 %			NZMC3-S250
UL (Class CC or J)		A	250
Mains contactor			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DILM170
Main choke			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DX-LN3-200
Note regarding mains choke			Mains choke recommended only if the power quality is poor. Current harmonics (THD) are attenuated by internal DC link chokes.
Radio interference suppression filter (external, 150 %)			DX-EMC34-250
Radio interference suppression filter, low leakage currents (external, 150 %)			DX-EMC34-250-L
Note regarding radio interference suppression filter			Optional external radio interference suppression filter for longer motor cable lengths and for use in different EMC environments
DC link connection			
Braking resistance			
10 % duty factor (DF)			DX-BR006-9K2
20 % duty factor (DF)			DX-BR006-18K1
40 % duty factor (DF)			DX-BR006-33K3
Notes concerning braking resistances:			The brake resistors are assigned based on the maximum rated power of the variable frequency drive. Additional brake resistors and designs (e.g. different duty cycles) are available upon request.
Motor feeder			

motor choke			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DX-LM3-220
Sine filter			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DX-SIN3-180
All-pole sine filter			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			P:2 x DX-SIN3-110-A

## Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I <sub>n</sub>	A	180
Heat dissipation per pole, current-dependent	P <sub>vid</sub>	W	0
Equipment heat dissipation, current-dependent	P <sub>vid</sub>	W	945
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	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			
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	180 - 264
Mains frequency			50/60 Hz
Number of phases input			3
Number of phases output			3
Max. output frequency		Hz	500
Max. output voltage		V	250
Nominal output current I <sub>2N</sub>		A	180
Max. output at quadratic load at rated output voltage		kW	45

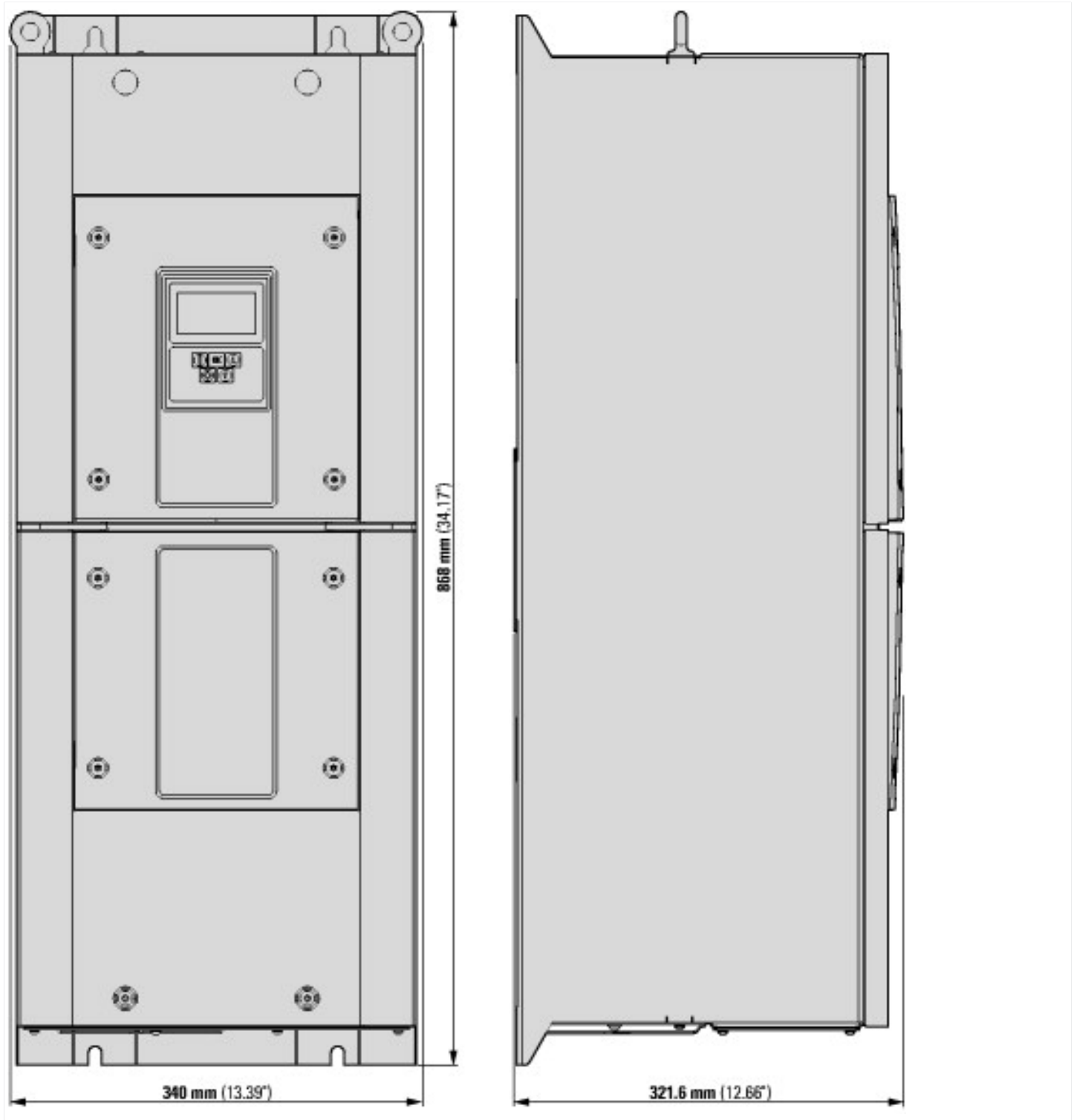
Max. output at linear load at rated output voltage		kW	45
Relative symmetric net frequency tolerance		%	10
Relative symmetric net voltage tolerance		%	10
Number of analogue outputs			2
Number of analogue inputs			2
Number of digital outputs			2
Number of digital inputs			5
With control unit			Yes
Application 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			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			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			Yes
4-quadrant operation possible			No
Type of converter			U converter
Degree of protection (IP)			IP55
Degree of protection (NEMA)			12
Height		mm	868
Width		mm	340
Depth		mm	321.6

## Approvals

Product Standards		UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
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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 [https://es-assets.eaton.com/DOCUMENTATION/AWA\\_INSTRUCTIONS/IL04020011Z2018\\_04.pdf](https://es-assets.eaton.com/DOCUMENTATION/AWA_INSTRUCTIONS/IL04020011Z2018_04.pdf) - 7)

**MN04020005Z DA1 variable frequency drives, Installation manual**

MN04020005Z Frequenzumrichter DA1, Installationshandbuch - Deutsch	<a href="https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020005Z_DE.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020005Z_DE.pdf</a>
MN04020005Z DA1 variable frequency drives, Installation manual - English	<a href="https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020005Z_EN.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020005Z_EN.pdf</a>
MN04020005Z Convertitore di frequenza DA1, manuale Installazione - italiano	<a href="https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020005Z_IT.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020005Z_IT.pdf</a>
<b>MN04020006Z DA1 variable frequency drives, Parameters manual</b>	
MN04020006Z Frequenzumrichter DA1, Parameterhandbuch - Deutsch	<a href="https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020006Z_DE.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020006Z_DE.pdf</a>
MN04020006Z DA1 variable frequency drives, Parameters manual - English	<a href="https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020006Z_EN.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020006Z_EN.pdf</a>
MN04020006Z Convertitore di frequenza DA1, manuale Parametri - italiano	<a href="https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020006Z_IT.pdf">https://es-assets.eaton.com/DOCUMENTATION/AWB_MANUALS/MN04020006Z_IT.pdf</a>
CA04020001Z-EN Product Range Catalog: Efficient Engineering for Starting and Controlling Motors	<a href="http://www.eaton.eu/DE/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_1095238.pdf">http://www.eaton.eu/DE/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_1095238.pdf</a>