



Variable frequency drive, 230 V AC, 1-phase, 15.3 A, 4 kW, IP66/NEMA 4X, Radio interference suppression filter, Brake chopper, 7-digital display assembly, Additional PCB protection, UV resistant, FS3



Part no. DC1-12015FB-A660E1  
 Catalog No. 199409

## Delivery program

Photo			
Product range			Variable frequency drives
Part group reference (e.g. DIL)			DC1
Rated operational voltage	$U_e$		230 V AC, 1-phase 240 V AC, single-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	15.3
Note			Rated operational current at an operating frequency of 6 kHz and an ambient air temperature of +40 °C
<b>Assigned motor rating</b>			
Note			For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
Note			Overload cycle for 60 s every 600 s
Note			at 230 V, 50 Hz
150 % Overload	P	kW	4
150 % Overload	$I_M$	A	14.8
Note			at 220 - 240 V, 60 Hz
150 % Overload	P	HP	5
150 % Overload	$I_M$	A	15.2
Degree of Protection			IP66/NEMA 4X
Interface/field bus (built-in)			OP-Bus (RS485)/Modbus RTU, CANopen®
Fieldbus connection (optional)			SmartWire-DT
Fitted with			Radio interference suppression filter Brake chopper 7-digital display assembly Additional PCB protection UV resistant
Parameterization			Keypad Fieldbus drivesConnect drivesConnect mobile (App)
Frame size			FS3
Connection to SmartWire-DT			no

## Technical data

<b>General</b>			
Standards			General requirements: IEC/EN 61800-2 EMV requirements: IEC/EN 61800-3 Safety requirements: IEC/EN 61800-5-1
Certifications			CE, UL, cUL, RCM, Ukr SEPRO, EAC

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	-20
Operating ambient temperature max.		°C	+ 40
			operation (with 150 % overload)
Storage	$\theta$	°C	-40 - +60
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
Mounting position			Vertical
Altitude		m	0–2000 m above sea level Above 1000 m: 1% derating for every 100 m max. 4000 m without UL
Degree of Protection			IP66/NEMA 4X
Protection against direct contact			BGV A3 (VBG4, 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	29.2
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 and IGBT inverter
Overload current (150% overload)	$I_L$	A	22.9
max. starting current (High Overload)	$I_H$	%	175
Note about max. starting current			for 2,5 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. 500)
Switching frequency	$f_{PWM}$	kHz	8 adjustable 4 - 24 (audible)
Operation Mode			U/f control Speed control with slip compensation sensorless vector control (SLV) PM motors Synchronous reluctance motors BLDC motors
Frequency resolution (setpoint value)	$\Delta f$	Hz	0.1
Rated operational current			
At 150% overload	$I_e$	A	15.3
Note			Rated operational current at an operating frequency of 6 kHz and an ambient air temperature of +40 °C
Power loss			
Heat dissipation at rated operational current $I_e = 150\%$	$P_V$	W	120
Efficiency	$\eta$	%	97
Heat dissipation at current/speed [%]			
Current = 100%			
Speed = 0 %	$P_V$	W	99.4
Speed = 50 %	$P_V$	W	139.5
Speed = 90 %	$P_V$	W	188.3
Current = 50 %			
Speed = 0 %	$P_V$	W	65.6

Speed = 50 %	P <sub>V</sub>	W	83.3
Speed = 90 %	P <sub>V</sub>	W	107.6
Current = 50 %			
Speed = 0 %	P <sub>V</sub>	W	52.2
Speed = 50 %	P <sub>V</sub>	W	62.2
Maximum leakage current to ground (PE) without motor	I <sub>PE</sub>	mA	4.7
Fitted with			Radio interference suppression filter Brake chopper 7-digital display assembly Additional PCB protection UV resistant
Frame size			FS3
Motor feeder			
Note			For normal internally and externally ventilated four-pole three-phase asynchronous motors with 1500 rpm at 50 Hz and 1800 rpm at 60 Hz
Note			Overload cycle for 60 s every 600 s
Note			at 230 V, 50 Hz
150 % Overload	P	kW	4
Note			at 220 - 240 V, 60 Hz
150 % Overload	P	HP	5
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	5.98
Apparent power at rated operation 240 V	S	kVA	6.24
Braking function			
Standard braking torque			max. 30 % MN
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	25
Switch-on threshold for the braking transistor	U <sub>DC</sub>	V	390 V DC

### Control section

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			1, parameterizable, 0 - 10 V
Digital inputs			4, parameterizable, max. 30 V DC
Digital outputs			1, parameterizable, 24 V DC
Relay outputs			1, parameterizable, N/O, 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 %			FAZ-B40/1N
UL (Class CC or J)		A	50
Mains contactor			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DILM7 DILM7-...+DILM12-XP2
Main choke			
150 % overload (CT/I <sub>H</sub> , at 50 °C)			DX-LN1-032
Radio interference suppression filter (external, 150 %)			DX-EMC12-031-FS3
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-BR035-1K1
20 % duty factor (DF)			DX-BR035-1K1
40 % duty factor (DF)			DX-BR040-3K1

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-LM3-016
Sine filter		
150 % overload (CT/I <sub>H</sub> , at 50 °C)		DX-SIN3-016
All-pole sine filter		
150 % overload (CT/I <sub>H</sub> , at 50 °C)		DX-SIN3-024-A

## Design verification as per IEC/EN 61439

Technical data for design verification		
Operating ambient temperature min.	°C	-20
Operating ambient temperature max.	°C	40

## 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		1
Number of phases output		3
Max. output frequency	Hz	500
Max. output voltage	V	250
Nominal output current I <sub>2N</sub>	A	11
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		1
Number of analogue inputs		2
Number of digital outputs		1
Number of digital inputs		4
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		No
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		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			Yes
4-quadrant operation possible			Yes
Type of converter			U converter
Degree of protection (IP)			IP66
Degree of protection (NEMA)			4X
Height		mm	310
Width		mm	210.5
Depth		mm	225.2

## 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			1~ 240 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
Degree of Protection			IEC: IP66

## Dimensions

