

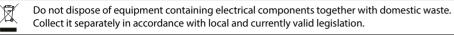


130R1215

iC2-Micro Frequency Converters

1 Introduction

This operating guide provides necessary information for gualified personnel to install and commission the AC drive. Read and follow the instructions to use the drive safely and professionally.



2 Safetv

Pay particular attention to the safety instructions and general warnings to avoid the risk of death, serious injury, and equipment or property damage.

🛦 W A R N I N G 🛦

HIGH VOLTAGE

AC drives contain high voltage when connected to AC mains input, DC supply, or load sharing.

UNINTENDED START

The motor may start from control panel, I/O inputs, fieldbus, or MyDrive® Insight at any time, when the drive is connected to the AC mains, DC supply, or load sharing.

DISCHARGE TIME

The drive contains DC-link capacitors, which can remain charged even when the drive is not powered. High voltage can be

present even when the warning indicator lights are off

- Stop the motor, disconnect AC mains and permanent magnet type motors, and remove DC-link supplies, including battery backups, UPS, and DC-link connections to other drives.

Wait for the capacitors to discharge fully and measure it before performing any service or repair work

The minimum waiting time is 4 minutes for MA01c, MA02c, MA01a, MA02a, and MA03a drives, and 15 minutes for MA04a and MA05a drives.

LEAKAGE CURRENT

Leakage currents of the drive exceed 3.5 mA. Make sure that the minimum size of the ground conductor complies with the local safety regulations for high touch current equipment.

3 Installation

3.1 Mechanical Dimensions

Enclosure size	Height [mm (in)]			dth n (in)]	Depth [mm (in)] ⁽²⁾	Mounting holes [mm (in)]	
5120	Α	A ⁽¹⁾	а	В	b	С	D
MA01c	150 (5.9)	216 (8.5)	140.4 (5.5)	70 (2.8)	55 (2.2)	143 (5.6)	4.5 (0.18)
MA02c	176 (6.9)	232.2 (9.1)	150.5 (5.9)	75 (3.0)	59 (2.3)	157 (6.2)	4.5 (0.18)
MA01a	150 (5.9)	202.5 (8.0)	140.4 (5.5)	70 (2.8)	55 (2.2)	158 (6.2)	4.5 (0.18)
MA02a	186 (7.3)	240 (9.4)	176.4 (6.9)	75 (3.0)	59 (2.3)	175 (6.9)	4.5 (0.18)
MA03a	238.5 (9.4)	291 (11.5)	226 (8.9)	90 (3.5)	69 (2.7)	200 (7.9)	5.5 (0.22)
MA04a	292 (11.5)	365.5 (14.4)	272.4 (10.7)	125 (4.9)	97 (3.8)	244.5 (9.6)	7.0 (0.28)
MA05a	335 (13.2)	396.5 (15.6)	315 (12.4)	165 (6.5)	140 (5.5)	248 (9.8)	7.0 (0.28)

Note: (1) Including decoupling plate

3.2 Mounting Clearance

Table 1: Minimum Mounting Clearance

Enclosure size	Minimum mounting clearance [maximum temperature 50 °C (122 °F)]
All enclosure sizes	Above and below: 100 mm (3.9 in).
MA01a–MA05a, MA02c	Sides: 0 mm (0 in).
MA01c (natural cooling)	Sides: 0 mm (0 in) for 40 °C (104 °F), 10 mm (0.39 in) and above for 50 °C (122 °F).

3.3 Connecting to Mains and Motor

- Mount the ground wires to the PE terminal.
- Connect motor to terminals U, V, and W.
- Mount mains supply to terminals L1/L, L2, and L3/N (3-phase) or L1/L
- and L3/N (single-phase) and tighten.
- For required maximum screwing torque, see the back of the terminal cover.

3.4 Load Sharing/Brake

Table 2: Connect Terminals

Load sharing	-UDC and +UDC/+BR	/
Brake	-BR and +UDC/+BR	6

• For MA01a, MA02a, and MA03a drives, wire with recommended connector (Ultra-

Pod Fully Insulated FASTON Receptacles and Tabs, 521366-2, TE connectivity). For other enclosure sizes, mount the wires to the related terminal and tighten.

For required maximum screwing torque, see the back of the terminal cover. • For more details, contact Danfoss or refer to the drive's design guide.

NOTICE

Voltage levels of up to 850 V DC may occur between terminals +UDC/+BR and -UDC. Not short-circuit protected.

3.5 Control Terminals

 All control cable terminals are located underneath the terminal cover in front of the drive.

• See the back of the terminal cover for outlines of control terminals and switches

ΝΟΤΙΟΕ



Illustration 2: Removing Terminal Cover

ö

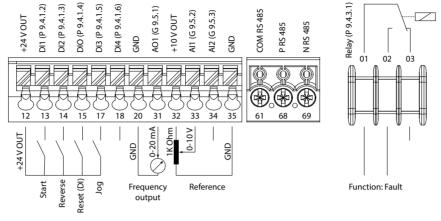


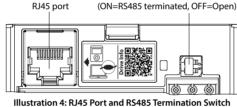
Illustration 3: Overview of Control Terminals in PNP-configuration with Factory Setting (Speed Control Mode)

3.6 RJ45 Port and RS485 Termination Switch

The drive has an RJ45 port which complies with Modbus 485 protocol

The RJ45 port is used for connecting:

• External control panel (Control Panel 2.0 OP2). PC tool (MyDrive® Insight) via an adapter option



NOTICE

The RJ45 port supports up to 3 m (9.8 ft) of shielded CAT5e cable which is NOT used to directly connect the drive to a PC Failure to follow this notice causes damage to the PC.

- If the drive is at the end of the fieldbus, set the RS485 termination switch to ON.

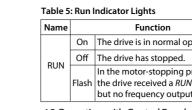
- Do not operate RS485 termination switch when the drive is powered on.

Table 3: Operation Buttons and Potentiometer

In display Signed S			Name	Function
Status MARN READY FAULT WARN	in display	30bu992.10	Home/Menu	the shortcut menu for quickly reading
Potenti- ometer OK Remote Local Back VLocal Back VLocal Back VLocal Back Start Vp Down Run indicator Vp Down Run indicator		Status	Up/Down	
OK REM OK OK Remote OK Local Back Confirms the operation. Back Confirms the operation. Toggles between remote and local mode. Start Start Start Up Down Run indicator Start Confirms the operation.	WARN READY FAULT		Left	Moves the cursor 1 bit to the left.
Image: Construction of the construc	-^ O	ometer	Back	menu structure or cancels the setting
Viscol Cocal Toggles between remote and local mode. Back Start Start start stre drive in local mode. Stop/Reset Stop/Reset Stop/Reset the drive to clear a fault. Up Down Run indicator Potenti- ometer Changes the reference value is selected as potenti- ometer	A REM	0.0	OK	Confirms the operation.
Up Down Run indicator Up Down Run indicator Up Down Run indicator Up Down Run indicator			Remote/Local	33
Stop/Reset Stops the drive in local mode, or reset the drive to clear a fault. Up Down Run indicator Potentionmeter		- Start	Start	Starts the drive in local mode.
Up Down Run indicator Potenti- ometer reference value is selected as potenti-	• • • • • • • • • • • • • • • • • • •	Start	Stop/Reset	Stops the drive in local mode, or resets the drive to clear a fault.
	•	ons		Changes the reference value when the reference value is selected as potenti- ometer.

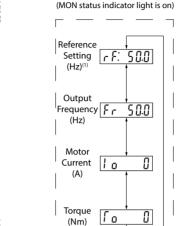
Table 4: Status and Operating Indicator Lights

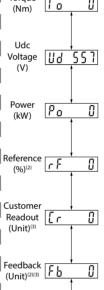
Name		Function	Name		Function		
MON	On	On Shows the drive status.		On	On The drive is in reverse direction.		
PGM	On	The drive is in programming status.	REV	Off	The drive is in forward direction.		
TOR	On	The drive is in torque mode.	ST2	Refer to Table 6 Multiple Setups Indicator Lights.			
IUK	Off The drive is in speed mode.		WARN	Steadily lit when a warning occurs.			
LOC	On	On The drive is in local mode.		Steadily lit when the drive is ready.			
	Off The drive is in remote mode.		FAULT	Flashes when a fault occurs.			



4.2 Operation with Control Panel

Status Display





no need to execute AMA.

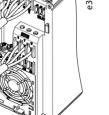
4.3 Automatic Motor Adaptation (AMA)

AMA in parameter P4.2.1.3 AMA Mode.

Procedure:



Danfoss A/S © 2024.06



Cable, Mains, and Motor Wires

Illustration 1: Mounting of Ground

(2) The potentiometer on the local control panel extends 6.5 mm (0.26 in) from the drive.

S.	
	2



Illustration 5: I

/		/	~^ \ \		ometer		menu structure or cancels the sett during tuning parameter values.
. —	P	//		<u> </u>	— ОК		during turing parameter values.
.	(/	OV C	REM	Remote	ОК	Confirms the operation.
		1			/Local	Remote/Local	Toggles between remote and loca
I	· · · ·	A		S 11	a 1	nemote/Local	

Name Function		Name	Function			
MON	N On Shows the drive status.		DEV	On	The drive is in reverse direction.	
PGM	On	The drive is in programming status.	REV	Off	The drive is in forward direction.	
TOR	On	The drive is in torque mode.	ST2	Refer t	o Table 6 Multiple Setups Indicator Ligh	
IOK	Off	The drive is in speed mode.	WARN	Steadily lit when a warning occurs.		
LOC	On	The drive is in local mode.	READY	Steadi	ly lit when the drive is ready.	
LUC	Off	The drive is in remote mode.	FAULT	Flashe	s when a fault occurs.	

RS485 termination switch

4 Programming

4.1 Control Panel

Status

indicators

Operating

indicators

Home/

Menu

Left

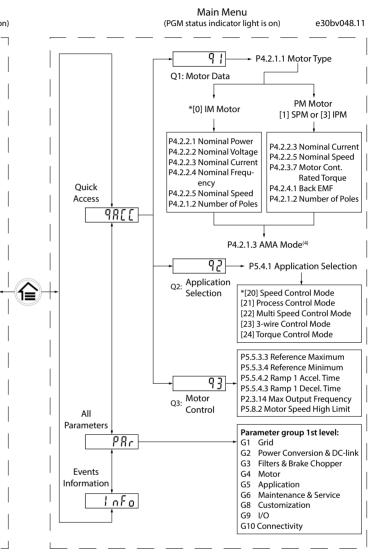
Stop

(Quick Adapter USB-C/RJ45 OAX00).

Table 6: Multiple Setups Indicator Lights

			<u>-</u>		
ction	ST2	Off	On	Flash	Flash quickly
normal operation.	Active setup ⁽¹⁾	Setup 1	Setup 2	Setup 1	Setup 2
stopped.	Programming setup ⁽²⁾	Setup 1	Setup 2	Setup 2	Setup 1
stopping process; or ived a <i>RUN</i> command, ency output.	Note: (1) Select active setup in p (2) Select programming set				Setup.

After the drive is powered up, press the Home/Menu button to toggle between status display and main menu. Use the Up/Down buttons to select items, and press the OK button to confirm selection.



Note: (1) Local mode only. (2) Remote mode only. (3) The status is only shown when the corresponding function is enabled. (4) For AMA execution, refer to chapter Automatic Motor Adaptation (AMA). If parameter P5.4.3 Motor Control Principle is set as [0] U/f,

Illustration 6: Operation with Control Panel

• Via running AMA in VVC+ mode, the drive builds a mathematical model of the motor to optimize compatibility between drive and motor, and thus enhances the motor control performance.

• Some motors may be unable to run the complete version of the test. In that case, select [2] Enable Reduced

• AMA completes within 5 minutes. For best results, run the following procedure on a cold motor.

1. Set motor data according to the motor nameplate.

2. If needed, set motor cable length in parameter P4.2.1.4 Motor Cable Length.

3. Set [1] Enable Complete AMA or [2] Enable Reduced AMA for parameter P4.2.1.3 AMA Mode, the main display shows To start AMA, see illustration 7.

4. Press the Start button, the test runs automatically and the main display indicates when it is completed. 5. When AMA is completed, press any button to exit and return to normal operation mode.



5 Troubleshooting

Table 7: Warning and Fault Events Summary

Number	Description	Warning	Fault	Trip lock	Cause
2	Live Zero Error	х	x	_	Signal on terminal 33 or 34 is less than 50% of the value set in par- ameter P9.5.2.3 T33 Low Voltage, parameter P9.5.2.5 T33 Low Curren parameter P9.5.3.3 T34 Low Voltage, and parameter P9.5.3.5 T34 Low Current.
3	No Motor	Х	Х	-	No motor has been connected to the output of the drive.
4	Mains Ph. Loss ⁽¹⁾	х	Х	х	Missing phase on the supply side, or the voltage imbalance is too high. Check the supply voltage.
7	DC overvol ⁽¹⁾	Х	Х	-	DC-link voltage exceeds the limit.
8	DC undervolt ⁽¹⁾	Х	Х	-	DC-link voltage drops below the voltage warning low limit.
9	Inverter Overld.	Х	Х	-	More than 100% load for too long.
10	Motor ETR Overld.	х	Х	-	Motor is too hot due to more than 100% load for too long.
11	Motor Th. Overld.	х	х	-	Thermistor or thermistor connection is disconnected, or the moto is too hot.
12	Torque Limit	х	Х	-	Torque exceeds the value set in either <i>parameter P5.10.1 Motor Tor</i> <i>que Limit</i> or <i>parameter P5.10.2 Regenerative Torque Limit</i> .
13	Overcurrent	х	х	x	Inverter peak current limit is exceeded. If this fault occurs on power-up, check whether power cables are mistakenly connected to the motor terminals.
14	Earth Fault	Х	х	x	Discharge from output phases to ground.
	Short Circuit	-	X	X	Short circuit in motor or on motor terminals.
17	Ctrl. Word TO	Х	Х	-	No communication to the drive.
18	Start Failed	-	Х	-	May be caused by a blocked motor.
25	Brake Resistor Short	_	х	x	Brake resistor is short-circuited, thus the brake function is discon-
	Brake Overload	- X	x	-	nected. The power transmitted to the brake resistor over the last 120 s exceeds the limit. Possible corrections: Decrease brake energy via
27	Brake IGBT/Brake	_	x	x	lower speed or longer ramp time. Brake transistor is short-circuited, thus brake function is disconn-
	chopper Short Circuited	_	^	^	ected.
28	Brake Check	-	Х	Х	Brake resistor is not connected/working.
	U phase loss	-	Х	Х	Motor phase U is missing. Check the phase.
31	V phase loss	-	X	X	Motor phase V is missing. Check the phase.
	W phase loss Mains Failure	- X	x	-	Motor phase W is missing. Check the phase. This warning/fault is only active if the supply voltage to the drive less than the value set in <i>parameter P2.3.7 Power Loss Controller</i> <i>Limit</i> , and <i>parameter P2.3.6 Power Loss Action</i> is NOT set to [0] No Function.
38	Internal Fault	-	Х	Х	Contact the local supplier.
40	Overload T15	х	-	-	Check the load connected to terminal 15 or remove short-circuit connection.
	Gate drive Voltage Fault	-	Х	Х	-
47 50	24 V Supply Low AMA calibration failed	X –	X X	X _	24 V DC may be overloaded. A calibration error has occurred.
		-		-	
	AMA U _{nom} /I _{nom} AMA Iow I _{nom}	_	X	_	Wrong setting for motor voltage and/or motor current. Motor current is too low. Check the settings.
	AMA big motor	_	X	_	The power size of the motor is too large for the AMA to operate.
54	AMA small motor	-	X	_	The power size of the motor is too small for the AMA to operate.
55	AMA par. range	-	Х	-	The parameter values of the motor are outside of the acceptable range. AMA does not run.
56	AMA interrupt	-	Х	-	The AMA is interrupted.
57	AMA timeout	-	Х	-	-
58	AMA internal	-	Х	-	Contact the local supplier.
	Current Limit	Х	Х	-	The drive is overloaded.
60	External Interlock	-	X	-	External interlock has been activated.
61 63	Feedback Error Mech. Brake Low	X _	x x	-	- Actual motor current has not exceeded release brake current within start datawing window
69	Pwr. Card Temp	x	х	х	within start delay time window. The cutout temperature of the power card has exceeded the upper limit.
80	Drive Initialized	-	Х	-	All parameter settings are initialized to default settings.
87	Auto DC brake	x	-	-	Occurs in IT mains when the drive coasts, and the DC voltage is higher than 830 V for 400 V units and 425 V for 200 V units. The motor consumes energy on the DC link. This function can be enabled/disabled in <i>parameter P2.3.13 Auto DC Braking</i> .
95	Lost load detected	Х	Х	-	-
99	Locked Rotor	-	Х	-	Rotor is blocked.
	Motor Rotating	-	Х	-	PM motor is rotating when AMA is performed.
126		V V	-	-	The back EMF of PM motor is too high before starting.
126	Back EMF too High	Х			5 5
126 127	Back EMF too High Read only	- X	-	-	Parameters cannot be changed.
126 127 Err. 89	-				

6 Specifications

Table 8: Mains Supply 1x100- Frequency converter	120 V AC (N		A4	o lor i minut	:e)	04	A 0		
Typical shaft output [kW (hp)]			(0.5)		04A8				
Enclosure size			(0.5) .01c		1.1 (1.5) MA02c				
Output current		IVIA	UTC			IVIA	020		
Continuous (3x200–240 V) [A]		2	.4			4	8		
Intermittent (3x200–240 V) [A]			-	4.8					
Maximum cable size	3.6 4/10						-		
(Mains, motor) [mm ³ /AWG]				4/	10				
Maximum input current									
Continuous (1x100–120 V) [A]		11	25	5.6					
Intermittent (1x100–120 V) [A]	17.4 38.4						3.4		
EMC filter type	EMC filter type C4								
Table 9: Mains Supply 1x200-2	240 V AC (N	ormal ove	rload 150%	6 for 1 minut	e)				
Frequency converter	02	A2	0	4A2	06	A8	09	9A6	
Typical shaft output [kW (hp)]	0.37	(0.5)	0.7	5 (1.0)	1.5 (2.0)	2.2	(3.0)	
Enclosure size	MA	01c	M	A01c	MA	02c	MA	02a	
Output current			1				1		
Continuous (3x200–240 V) [A]	2	2		4.2	6	.8	9	9.6	
Intermittent (3x200–240 V) [A]	3.	3		6.3	10).2	1.	4.4	
Maximum cable size				4/	10				
(Mains, motor) [mm ² /AWG]				4/					
Maximum input current									
Continuous (1x200–240 V) [A]	6			1.6	18			6.4	
Intermittent (1x200–240 V) [A]	8	3	1	15.6	26	.4	3	37	
EMC filter type				C1/	/C4				
Table 10: Mains Supply 3x200-	-240 V AC (Normal ov	erload 150	% for 1 minu	ute)				
Frequency converter	02A4	04A2	07A8	11A0	15A2	24A2	31A0	46A2	
Typical shaft output [kW (hp)]	0.37 (0.5)				3.7 (5.0)	5.5 (7.5)	7.5 (10)	11 (15)	
Enclosure size	MA01a	MA01a	MA02a	MA03a	MA03a	MA04a	MA04a	MA05a	
Output current									
Continuous (3x200–240 V) [A]	2.4	4.2	7.8	11.0	15.2	24.2	31.0	46.2	
Intermittent (3x200–240 V) [A]	3.6	6.3	11.7	16.5	22.8	36.3	46.5	69.3	
Maximum cable size (Mains, motor) [mm ² /AWG]			4/10				16/6		
Maximum input current									
Continuous (3x200–240 V) [A]	3.8	6.7	12.5	17.7	24.3	33.0	42.0	42.0	
Intermittent (3x200–240 V) [A]	5.7	8.3	18.8	26.6	35.3	49.5	63.0	63.0	
EMC filter type				C	4				
Table 11: Mains Supply 3x380-	480 V AC (Normal ov	orload 150	10% for 1 minu	ite)				
Frequency converter	01A2		2A2	03A7	05A3		A2	09A0	
Typical shaft output [kW (hp)]	0.37 (0.		5 (1.0)	1.5 (2.0)	2.2 (3.0)			4.0 (5.5)	
Enclosure size	MA01a	n M/	A01a	MA01a	MA02a	MA	02a	MA02a	
Output current		1			_		-		
Continuous (3x380–440 V) [A]	1.2		2.2	3.7	5.3	7	.2	9.0	
Intermittent (3x380–440 V) [A]	1.8	1 3	ן נינ	.	<u> </u>	10.8			
Cantinua (2.440 40010 [4]			3.3	5.6	8.0			13.7	
	1.1	:	2.1	3.4	4.8	6	.3	13.7 8.2	
Intermittent (3x440–480 V) [A]	1.1	:				6		13.7	
Intermittent (3x440–480 V) [A] Maximum cable size	1.1	:	2.1	3.4	4.8 7.2	6	.3	13.7 8.2	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm?/AWG]	1.1	:	2.1	3.4 5.1	4.8 7.2	6	.3	13.7 8.2	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm³/AWG] Maximum input current	1.1 1.7		2.1	3.4 5.1 4/	4.8 7.2	6	.3	13.7 8.2 12.3	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm ³ /AWG] Maximum input current Continuous (3x380–440 V) [A]	1.1		2.1	3.4 5.1	4.8 7.2	6 9	.3	13.7 8.2	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm?/AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A]	1.1 1.7 1.9		2.1 3.2 3.5	3.4 5.1 4/ 5.9	4.8 7.2 10 8.5	6 9 11 16	.5	13.7 8.2 12.3 14.4	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm ² /AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Continuous (3x440–480 V) [A]	1.1 1.7 1.9 2.6 1.7		2.1 3.2 3.5 4.7	3.4 5.1 4/ 5.9 8.7	4.8 7.2 10 8.5 12.6	6 9 11 16 9	.5 .5 .5	13.7 8.2 12.3 14.4 20.2	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm?/AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Continuous (3x440–480 V) [A] Intermittent (3x440–480 V) [A]	1.1 1.7 1.9 2.6 1.7		2.1 3.2 3.5 4.7 3.0	3.4 5.1 4/ 5.9 8.7 5.1 7.5	4.8 7.2 10 8.5 12.6 7.3	6 9 11 16 9	3 5 5 5 5.5 5 5.8 9 9	13.7 8.2 12.3 14.4 20.2 12.4	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm ² /AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Continuous (3x440–480 V) [A] Intermittent (3x440–480 V) [A] EMC filter type	1.1 1.7 1.9 2.6 1.7 2.3		2.1 3.2 3.5 4.7 3.0 4.0	3.4 5.1 4/ 5.9 8.7 5.1 7.5 C2/	4.8 7.2 10 8.5 12.6 7.3 10.8 7C4	6 9 11 16 9	3 5 5 5 5.5 5 5.8 9 9	13.7 8.2 12.3 14.4 20.2 12.4	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm ² /AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Continuous (3x440–480 V) [A] Intermittent (3x440–480 V) [A] EMC filter type Table 12: Mains Supply 3x380-	1.1 1.7 1.9 2.6 1.7 2.3 -480 V AC (Normal ov	2.1 3.2 3.5 4.7 3.0 4.0 erload 150	3.4 5.1 4/ 5.9 8.7 5.1 7.5 C2/ 1% for 1 minu	4.8 7.2 10 8.5 12.6 7.3 10.8 7C4 rtte)	6 9 11 16 9 14	3 5 5 5 5.5 5.8 9 9.1 1.4	13.7 8.2 12.3 14.4 20.2 12.4 17.5	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm?/AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Continuous (3x440–480 V) [A] Intermittent (3x440–480 V) [A] EMC filter type Fable 12: Mains Supply 3x380- Frequency converter	1.1 1.7 1.9 2.6 1.7 2.3 -480 V AC (12A0	Normal over	2.1 3.2 3.5 4.7 3.0 4.0 erload 150 5A5	3.4 5.1 4/ 5.9 8.7 5.1 7.5 C2/ 0% for 1 minu 23A0	4.8 7.2 10 8.5 12.6 7.3 10.8 7(C4 4 tte) 31A0	6 9 111 16 9 14 14 37	3 55 55 55 55 55 55 55 55 55 55 55 55 55	13.7 8.2 12.3 14.4 20.2 12.4 17.5 43A0	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm?/AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Continuous (3x440–480 V) [A] Intermittent (3x440–480 V) [A] EMC filter type Table 12: Mains Supply 3x380 Frequency converter Typical shaft output [kW (hp)]	1.1 1.7 1.9 2.6 1.7 2.3 -480 V AC (12A0 5.5 (7.5)	Normal ov.	2.1 3.2 3.2 3.5 4.7 3.0 4.0 4.0 55A5 5 5 (10)	3.4 5.1 4/ 5.9 8.7 5.1 7.5 C2/ 0% for 1 minu 23A0 11 (15)	4.8 7.2 10 8.5 12.6 7.3 10.8 7.4 10.8 7.4 tte) 31A0 15 (20)	6 9 111 16 9 14 14 37 18.5	3 55 568 568 569 569 569 569 569 569 569 569 569 569	13.7 8.2 12.3 14.4 20.2 12.4 17.5 43A0 22 (30)	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm ² /AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Continuous (3x440–480 V) [A] Intermittent (3x440–480 V) [A] EMC filter type Table 12: Mains Supply 3x380- Frequency converter Typical shaft output [kW (hp)] Enclosure size	1.1 1.7 1.9 2.6 1.7 2.3 -480 V AC (12A0	Normal ov.	2.1 3.2 3.5 4.7 3.0 4.0 erload 150 5A5	3.4 5.1 4/ 5.9 8.7 5.1 7.5 C2/ 0% for 1 minu 23A0	4.8 7.2 10 8.5 12.6 7.3 10.8 7(C4 4 tte) 31A0	6 9 111 16 9 14 14 37 18.5	3 55 55 55 55 55 55 55 55 55 55 55 55 55	13.7 8.2 12.3 14.4 20.2 12.4 17.5 43A0	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm ² /AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Intermittent (3x440–480 V) [A] Intermittent (3x440–480 V) [A] EMC filter type Fable 12: Mains Supply 3x380- Frequency converter Typical shaft output [kW (hp)] Enclosure size Output current	1.1 1.7 1.9 2.6 1.7 2.3 -480 V AC (12A0 5.5 (7.1 MA03	Normal ov 1: 5) 7.55	2.1 3.2 3.2 3.5 4.7 3.0 4.0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	3.4 5.1 4/ 5.9 8.7 5.1 7.5 C2/ 1% for 1 minu 23A0 11 (15) MA04a	4.8 7.2 10 8.5 12.6 7.3 10.8 7(C4 4 10.8 7(C4 15 (20) MA04a	6 9 111 10 9 14 14 37 18.5 MA	3 55 55 55 55 55 55 55 55 55 55 55 55 55	13.7 8.2 12.3 14.4 20.2 12.4 17.5 43A0 22 (30) MA05a	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm ³ /AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Intermittent (3x440–480 V) [A] Intermittent (3x440–480 V) [A] EMC filter type Table 12: Mains Supply 3x380- Frequency converter Typical shaft output [kW (hp)] Enclosure size Output current Continuous (3x380–440 V) [A]	1.1 1.7 1.9 2.6 1.7 2.3 -480 V AC (12A0 5.5 (7.1 MA03.	Normal ov 11: 5) 7.55 1	2.1 3.2 3.2 3.5 4.7 3.0 4.0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	3.4 5.1 4/ 5.9 8.7 5.1 7.5 C2/ 1% for 1 minu 23A0 11 (15) MA04a 23	4.8 7.2 10 8.5 12.6 7.3 10.8 (C4 4 (C4 4 (C4 15 (20) MA04a 31	6 9 111 10 9 14 14 18 5 18 5 3 3	3 5 5 5 3.5 5 3.8 9 9 1 4.4 1 5 (25) 1 005a 1 77 1	13.7 8.2 12.3 12.3 14.4 20.2 12.4 17.5 43A0 22 (30) MA05a 43	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm ³ /AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Intermittent (3x440–480 V) [A] Intermittent (3x440–480 V) [A] EMC filter type Table 12: Mains Supply 3x380- Frequency converter Typical shaft output [kW (hp)] Enclosure size Output current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A]	1.1 1.7 1.9 2.6 1.7 2.3 -480 V AC (12A0 5.5 (7.1 MA03. 12 18	Normal ov 1: 5) 7.55 a M/ 12 2	2.1 3.2 3.2 3.5 4.7 3.0 4.0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	3.4 5.1 4/ 5.9 8.7 5.1 7.5 C2/ 1% for 1 minu 23A0 11 (15) MA04a 23 34.5	4.8 7.2 10 8.5 12.6 7.3 10.8 (C4 ite) 31A0 15 (20) MA04a 31 46.5	6 9 111 16 9 14 14 18.5 37 18.5 33 55	3 5 5 5 5.5 5 5.8 5 9 6 1.4 7 6 (25) 5 6 (25) 7 7 7 5.5 7	13.7 8.2 12.3 14.4 20.2 12.4 17.5 43A0 22 (30) MA05a 43 64.5	
Continuous (3x440–480 V) [A] Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm ³ /AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Intermittent (3x440–480 V) [A] Intermittent (3x440–480 V) [A] EMC filter type Table 12: Mains Supply 3x380- Frequency converter Typical shaft output [kW (hp)] Enclosure size Output current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Intermittent (3x440–480 V) [A]	1.1 1.7 1.9 2.6 1.7 2.3 -480 V AC (12A0 5.5 (7.1 MA03 - 12 18 11	Normal ov 11: 5) 7.55 a M/ 12 2	2.1 3.2 3.2 3.5 4.7 3.0 4.0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	3.4 5.1 4/ 5.9 8.7 5.1 7.5 C2/ 1% for 1 minu 23A0 11 (15) MA04a 23 34.5 21	4.8 7.2 10 8.5 12.6 7.3 10.8 (C4 ite) 31A0 15 (20) MA04a 31 46.5 27	6 9 111 10 9 14 14 18.5 18.5 3 3 5 5 3	3 5 5 5 6.8 9 9 1 4.4 0 5 (25) 0 5.5 0 64 0	13.7 8.2 12.3 12.3 14.4 20.2 12.4 17.5 43A0 22 (30) MA05a 43 64.5 40	
Intermittent (3x440–480 V) [A] Maximum cable size (Mains, motor) [mm ³ /AWG] Maximum input current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A] Intermittent (3x440–480 V) [A] Intermittent (3x440–480 V) [A] EMC filter type Table 12: Mains Supply 3x380- Frequency converter Typical shaft output [kW (hp)] Enclosure size Output current Continuous (3x380–440 V) [A] Intermittent (3x380–440 V) [A]	1.1 1.7 1.9 2.6 1.7 2.3 -480 V AC (12A0 5.5 (7.1 MA03 - 12 18 11	Normal ov 11: 5) 7.55 a M/ 12 2	2.1 3.2 3.2 3.5 4.7 3.0 4.0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	3.4 5.1 4/ 5.9 8.7 5.1 7.5 C2/ 1% for 1 minu 23A0 11 (15) MA04a 23 34.5	4.8 7.2 10 8.5 12.6 7.3 10.8 (C4 ite) 31A0 15 (20) MA04a 31 46.5	6 9 111 10 9 14 14 18.5 18.5 3 3 5 5 3	3 5 5 5 5.5 5 5.8 5 9 6 1.4 7 6 (25) 5 6 (25) 7 7 7 5.5 7	13.7 8.2 12.3 14.4 20.2 12.4 17.5 43A0 22 (30) MA05a 43 64.5	

Maximum input current Continuous (3x380-440 V) [/ Intermittent (3x380-440 V) [Continuous (3x440-480 V) [/ Intermittent (3x440–480 V) EMC filter type 7 Ambient Conditions Protection rating Temperature during operation Temperature during storage **Relative humidity** Altitude⁽¹⁾ Storage Contamination Transpo level Operati

Storage Mechanical Transpo conditions Operati

8 EMC Compatibility and Motor Cable Length

Table 14 Maximum Motor Cable Length.

Tuble 15. Ellie e	omputionity motor cubic	Lengen	rubic i in maximum		engen
Drive with built-	Maximum motor cable I	ength (shielded), @4kHz		Shielded	50 m (164 ft)
in EMC filter	C1 (Conducted)	Maximum motor	Sillelded	50 111 (104 11)	
1x200-240 V AC	5 m (16.4 ft)	-	cable length	Unshielded	75 m (246 ft)
3x400-480 V AC	_	15 m (49.2 ft)		Unshielded	75111(24011)

9 Fuses and Circuit Breakers

iC2-Micro	
kW (hp)	RK1
Standard fault current SCCR	5 kA
High fault current SCCR	-
1x100-120 V AC	
0.37 (0.5)	
1.1 (1.5)	
1x200-240 V AC	
0.37-0.75 (0.5-1.0)	
1.5 (2.0)	
2.2 (3.0)	
3x200-240 V AC	
0.37–0.75 (0.5–1.0)	
1.5 (2.0)	
2.2-3.7 (3.0-5.0)	
5.5–7.5 (7.5–10)	
11 (15)	
3x380-480 V AC	
0.37–1.5 (0.5–2.0)	
2.2-4.0 (3.0-5.5)	
5.5–7.5 (7.5–10)	
11–15 (15–20)	
18.5–22 (25–30)	
Note: (1) The power rating by Type E CMC, 18.5 kW (2)	

10 Technical Documentation

Danfoss A/S	
Ulsnaes 1	
DK-6300 Graasten	
drives.danfoss.com	

Danfoss A/S © 2024.06

(Mains, motor) [mm²/AWG]

[A]	19.2	24.8	33	42	34.7	41.2
[A]	27.4	36.3	47.5	60	49	57.6
[A]	16.6	21.4	29	36	31.5	37.5
[A]	23.6	30.1	41	52	44	53
	C2/C4					

	IP20/Open Type (IP21/Type 1 conversion kit as an option).	
tion	-20 °C to 55 °C (-4 °F to 131 °F), -10 °C to 50 °C (14 °F to 131 °F) without derating.	
ge/transport	ansport -25 °C to 65/70 °C (-13 °F to 149/158 °F).	
	5–95%, non-condensing during operation.	
	Without derating: 1000 m (3280 ft). With derating: 1000 m (3280 ft) to 4000 m (13123 ft), derate the output current by 1% for each 100 m (328 ft).	
e	IEC 60721-3-1, Class 1C2 (aggressive gases), Class 1S11 (dust/sand).	
ortation	IEC 60721-3-2, Class 2C2 (aggressive gases), Class 2S5 (dust/sand).	
tion	IEC 60721-3-3, Class C4 (aggressive gases), Class 3S6 (dust/sand).	
e	IEC 60721-3-1, Class 1M11.	
ortation	IEC 60721-3-2, Class 2M4.	
tion	IEC 60721-3-3, Class 3M11.	

Note: (1) Regarding IEC 61800-5-1 compliance, the default maximum altitude is 2000 m (6562 ft). When the installation site is at an altitude of 2000 m (6562 ft) to 4000 m (13123 ft), contact Danfoss for further informa

Drive with built-in EMC filter fulfills radiated emission C2 limits.

Drive with non built-in EMC filter fulfills conducted/radiated emission C4 requirements.

• The drive is designed to operate with optimum performance within the maximum motor cable lengths defined in

Table 13: EMC Compatibility Motor Cable Length

Table 14: Maximum Motor Cable Length

_		-						
Non cabinet			Cabinet					
_	UL fuse		CE fuse	UL circuit breaker	CE circuit breaker			
	т	J	сс	gG	ABB MS165 Maximum trip level	Eaton Maximum trip level	Test cabinet size [Height x Width x Depth] [mm (in)]	Minimum cabinet volume [L]
		5 kA		5 kA	5 kA	5 kA		
		100 kA		-	65 kA ⁽¹⁾	-		
	25	A		25 A	25 A	PKZM4-25	500 x 400 x 260	52
	35	A		50 A	42 A	PKZM4-50	(19.7 x 15.7 x 10.2)	52
	25	A		25 A	25 A	PKZM4-25	500 x 400 x 260	
	35	A		35 A	32 A	PKZM4-32	(19.7 x 15.7 x 10.2)	52
	40	A		50 A	42 A	PKZM4-50		
	15	A		16 A	16 A	PKZM0-16	500 x 400 x 260	
	30	A		32 A	32 A	PKZM4-32	(19.7 x 15.7 x 10.2)	52
	40	A		40 A	42 A	PKZM4-40		
	60	A		63 A	65 A	PKZM4-63	800 x 400 x 300	96
	60	A		80 A	80 A	NZMN1-A80	(31.5 x 15.7 x 11.8)	,0
	15	A		16 A	16 A	PKZM0-16		
	30	A		40 A	32 A	PKZM4-32	500 x 400 x 260 (19.7 x 15.7 x 10.2)	52
	40	A		40 A	42 A	PKZM4-40	(15.0 × 15.0 × 10.2)	
	60	A		63 A	65 A	PKZM4-63	800 x 400 x 300	96
	60	A		80 A	80 A	NZMN1-A80	(31.5 x 15.7 x 11.8)	90
	·	~			(20 h) (C h			

2-Micro Frequency Converters up to 15 kW (20 hp) are 65 kA when protected by Type E CMC, 18.5 kW (25 hp) and 22 kW (30 hp) are 50 kA when protected by Type E CMC.

Scan the QR code to access more technical documents for the drive. Or, after scanning the QR code, click Global English on the website to select your local region's website, search iC2 to find the documents with your own languages.

> Danfoss can accept no responsibility for possible errors in catalogs, brochures, and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.

