



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)] <sup>(2)</sup>	Mounting holes [mm (in)]
5120	Α	<b>A</b> <sup>(1)</sup>	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).

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

### 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

12

4 V OUT

13

 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

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Remove the terminal cover with a screwdriver, see illustration 2



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Table 5: Run Indicator Lights

## 4.2 Operation with Control Panel





(MON status indicator light is on)



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 (Quick Adapter USB-C/RJ45 OAX00).



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.

## 4 Programming 4.1 Control Panel



#### **Table 4: Status and Operating Indicator Lights**

Name		Function	Name		Function		
MON	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	to Table 6 Multiple Setups Indicator Lights.		
IUK	Off	The drive is in speed mode.	WARN	Steadi	ly 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	Flashes when a fault occurs.		





### 4.3 Automatic Motor Adaptation (AMA)

- AMA in parameter P4.2.1.3 AMA Mode.

## Procedure:



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Cable, Mains, and Motor Wires

Illustration 1: Mounting of Ground

RS485 termination switch (ON=RS485 terminated, OFF=Open)

Table 3: Operation Buttons and Potentiometer

Function

### Table 6: Multiple Setups Indicator Lights

			<u>-</u>		
ction	ST2	Off	On	Flash	Flash quickly
normal operation.	Active setup <sup>(1)</sup>	Setup 1	Setup 2	Setup 1	Setup 2
stopped.	Programming setup <sup>(2)</sup>	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 Pane

• 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	x	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 <sup>(1)</sup>	х	Х	Х	Missing phase on the supply side, or the voltage imbalance is too high. Check the supply voltage.
7	DC overvol <sup>(1)</sup>	Х	Х	-	DC-link voltage exceeds the limit.
8	DC undervolt <sup>(1)</sup>	X	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 parameter P5.10.1 Motor Tor que Limit or parameter P5.10.2 Regenerative Torque Limit.
13	Overcurrent	x	х	х	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	Х	Discharge from output phases to ground.
	Short Circuit	-	Х	Х	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	Х	Brake resistor is short-circuited, thus the brake function is discon- nected.
26	Brake Overload	х	х	-	The power transmitted to the brake resistor over the last 120 s exceeds the limit. Possible corrections: Decrease brake energy via lower speed or longer ramp time.
27	Brake IGBT/Brake chopper Short Circuited	-	Х	х	Brake transistor is short-circuited, thus brake function is disconnected.
28	Brake Check	-	Х	Х	Brake resistor is not connected/working.
	U phase loss	-	Х	Х	Motor phase U is missing. Check the phase.
	V phase loss	-	Х	Х	Motor phase V is missing. Check the phase.
32	W phase loss	-	Х	Х	Motor phase W is missing. Check the phase.
36	Mains Failure	х	х	-	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 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.
46	Gate drive Voltage Fault	-	Х	Х	-
47	24 V Supply Low	X	X	Х	24 V DC may be overloaded.
50	AMA calibration failed	-	X	-	A calibration error has occurred.
	AMA U <sub>nom</sub> /I <sub>nom</sub> AMA Iow I <sub>nom</sub>	-	X X	-	Wrong setting for motor voltage and/or motor current. Motor current is too low. Check the settings.
53	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.
	AMA par. range	-	X	-	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.
59	Current Limit	X	Х	-	The drive is overloaded.
		-	X	-	External interlock has been activated.
	External Interlock			-	-
61	Feedback Error Mech. Brake Low	X _	x x	_	Actual motor current has not exceeded release brake current within start delay time window.
61 63	Feedback Error			- X	within start delay time window. The cutout temperature of the power card has exceeded the upper
61 63 69	Feedback Error Mech. Brake Low Pwr. Card Temp	-	x x	- X	within start delay time window. The cutout temperature of the power card has exceeded the uppe limit.
61 63 69 80	Feedback Error Mech. Brake Low	- X	х		within start delay time window. The cutout temperature of the power card has exceeded the upper
61 63 69 80	Feedback Error Mech. Brake Low Pwr. Card Temp Drive Initialized	- X -	x x		within start delay time window. The cutout temperature of the power card has exceeded the upper limit. All parameter settings are initialized to default settings. 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 en-
61 63 69 80 87 95	Feedback Error Mech. Brake Low Pwr. Card Temp Drive Initialized Auto DC brake	- X - X	x x x -	-	within start delay time window. The cutout temperature of the power card has exceeded the upper limit. All parameter settings are initialized to default settings. 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 en-
61 63 69 80 87 95 99	Feedback Error Mech. Brake Low Pwr. Card Temp Drive Initialized Auto DC brake Lost load detected	- X - X X	X X X - X	-	within start delay time window. The cutout temperature of the power card has exceeded the upper limit. All parameter settings are initialized to default settings. 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 en- abled/disabled in <i>parameter P2.3.13 Auto DC Braking</i> . –
61 63 69 80 87 95 99 126	Feedback Error Mech. Brake Low Pwr. Card Temp Drive Initialized Auto DC brake Lost load detected Locked Rotor	- X - X X -	X X X - X X	-	within start delay time window. The cutout temperature of the power card has exceeded the upp- limit. All parameter settings are initialized to default settings. 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 en- abled/disabled in <i>parameter P2.3.13 Auto DC Braking</i> . - Rotor is blocked.
61 63 69 80 87 95 99 99 126 127	Feedback Error Mech. Brake Low Pwr. Card Temp Drive Initialized Auto DC brake Lost load detected Locked Rotor Motor Rotating	- X - X X - -	X X X - X X	-	within start delay time window. The cutout temperature of the power card has exceeded the upper limit. All parameter settings are initialized to default settings. 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 en- abled/disabled in <i>parameter P2.3.13 Auto DC Braking</i> . - Rotor is blocked. PM motor is rotating when AMA is performed.
61 63 69 80 87 95 99 126 127 Err.89	Feedback Error Mech. Brake Low Pwr. Card Temp Drive Initialized Auto DC brake Lost load detected Locked Rotor Motor Rotating Back EMF too High	- X - X - - - X	X X - X X X X X -	-	within start delay time window. The cutout temperature of the power card has exceeded the upper limit. All parameter settings are initialized to default settings. 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 en- abled/disabled in <i>parameter P2.3.13 Auto DC Braking</i> . – Rotor is blocked. PM motor is rotating when AMA is performed. The back EMF of PM motor is too high before starting.

## **6** Specifications

	0.37 MA	A4 (0.5) 01c .4 .6			1.1 MA	A8 (1.5) 02c	
	MA 2.	01c .4			MA	02c	
	2.	.4					
					4		
					4		
	3.	.6	4.8				
					7	.2	
			4/	10			
1		6			21		
		.6 7.4				5.6 3.4	
		.4		4	30	5.4	
240 V AC (N	ormal over	rload 150%	for 1 minut	e)			
02	A2	04	A2	06	A8	09	9A6
0.37	(0.5)	0.75	(1.0)	1.5 (	(2.0)	2.2	(3.0)
MA01c		MA	01c	MA	02c	MA	02a
2	.2	4	.2	6.			9.6
3.	.3	6	.3	10	).2	14	4.4
			4/	10			
-	1	1.	1.6	10	27		6.4
							6.4 37
0.	.5				0.4		./
	Nermalary						
				-	2442	2140	4642
							46A2
							11 (15) MA05a
IVIAUTa	MAUTa	MAUZa	IVIAUSa	IVIAUSa	IVIA04a	IVIA04a	MAUSa
24	12	7.8	11.0	15.2	24.2	31.0	46.2
							69.3
5.0	0.5	11.7	10.5	22.0	50.5	10.5	05.5
		4/10			16/6		
3.8	6.7	12.5	17.7	24.3	33.0	42.0	42.0
5.7	8.3	18.8	26.6	35.3	49.5	63.0	63.0
			C	4			
-480 V AC (	Normal ove	erload 1509	% for 1 minu	ute)			
01A2	0	242	0347	0543	07	A2	09A0
							4.0 (5.5)
						. ,	MA02a
INAUTO	1 1017		WAUTa	MAUZa	IVIA	UZd	WAUZa
1 2		22 I	37	5 2	7	2	9.0
							13.7
				4.8			8.2
			5.1	7.2			12.3
		1				I	
			4/	10			
1.9	3	3.5	5.9	8.5	11	1.5	14.4
			8.7	12.6			20.2
1.7	3	3.0	5.1	7.3	9	.9	12.4
2.3	4	4.0	7.5	10.8	14	1.4	17.5
			C2/	/C4			
-480 V AC (	Normal ove	erload 150	% for 1 minu	ute)			
12A0	15	5A5	23A0	31A0	37	7A0	43A0
+		(10)	11 (15)	15 (20)		5 (25)	22 (30)
5.5 (7.5				MA04a		05a	MA05a
		\03a	MA04a				
5.5 (7.5 MA03		A03a	MA04a	IVIA04d	INIT		
MA03	a MA	403a	MA04a 23	MA04a 31		37	43
MA03	a MA				3		43 64.5
MA03	a MA	5.5	23	31	3	37 5.5 34	
MA03	a MA 1: 2:	5.5	23 34.5	31 46.5	3	5.5	64.5
	02 0.37 MA 2 3.3 -240 V AC ( 02A4 0.37 (0.5) MA01a 2.4 3.6 3.8 5.7 -480 V AC ( 01A2 0.37 (0. MA01a 2.4 3.6 3.8 5.7 -480 V AC ( 01A2 0.37 (0. 1.2 1.8 1.1 1.7 2.3	02A2      0.37 (0.5)      MA01c      2.2      3.3      -240 V AC (Normal over 000000000000000000000000000000000000	02A2    04      0.37 (0.5)    0.75      MA01c    MA      2.2    4      3.3    6      6.1    11      8.3    12      -240 V AC (Normal overload 150%    0.75 (1.0)      02A4    04A2    07A8      0.37 (0.5)    0.75 (1.0)    1.5 (2.0)      MA01a    MA01a    MA02a      2.4    4.2    7.8      3.6    6.3    11.7      2.4    4.2    7.8      3.6    6.3    11.7      4/10    4/10    4/10      3.8    6.7    12.5      5.7    8.3    18.8      -480 V AC (Normal overload 150%    0.75 (1.0)      MA01a    MA01a    1.2      1.2    2.2    1.8      1.1    2.1    1.7      1.2    2.2    1.8      1.1    2.1    1.7      1.7    3.2    1      1.7    3.0    1	240 V AC (Normal overload 150% for 1 minut    02A2  04A2    0.37 (0.5)  0.75 (1.0)    MA01c  MA01c    2.2  4.2    3.3  6.3    6.1  11.6    8.3  15.6    -240 V AC (Normal overload 150% for 1 minut    02A4  04A2    07A8  11A0    0.37 (0.5)  0.75 (1.0)  1.5 (2.0)    -240 V AC (Normal overload 150% for 1 minut  02A4    02A4  04A2  07A8  11A0    0.37 (0.5)  0.75 (1.0)  1.5 (2.0)  2.2 (3.0)    MA01a  MA02a  MA03a    2.4  4.2  7.8  11.0    3.6  6.3  11.7  16.5    4/10  4/10  4/10  C    3.8  6.7  12.5  17.7    5.7  8.3  18.8  26.6    C	0.37 (0.5)    0.75 (1.0)    1.5 (1.0)      MA01c    MA01c    MA      2.2    4.2    6      3.3    6.3    10      4/10    4/10      6.1    11.6    16      8.3    15.6    26      -240 V AC (Normal overload 150% for 1 minute)    02A4    04A2    07A8    11A0    15A2      0.37 (0.5)    0.75 (1.0)    1.5 (2.0)    2.2 (3.0)    3.7 (5.0)      MA01a    MA02a    MA03a    MA03a      2.4    4.2    7.8    11.0    15.2      3.6    6.3    11.7    16.5    22.8      4/10    4/10    14.0    15.2      3.6    6.7    12.5    17.7    24.3      5.7    8.3    18.8    26.6    35.3	240 V AC (Normal overload 150% for 1 minute)      02A2    04A2    06A8      0.37 (0.5)    0.75 (1.0)    1.5 (2.0)      MA01c    MA01c    MA02c      2.2    4.2    6.8      3.3    6.3    10.2      4/10    4/10      6.1    11.6    18.7      8.3    15.6    26.4      C1/C4	240 VAC (Normal overload 150% for 1 minute)    02A2    04A2    06A8    09      0.37 (0.5)    0.75 (1.0)    1.5 (2.0)    2.2      MA01c    MA01c    MA02c    MA      2.2    4.2    6.8    9      3.3    6.3    10.2    14      4/10      C1/C4

Maximum input c	urrent								
Continuous (3x380–440 V) [A]		19.2	24.8	33	42	34.7	41.2		
Intermittent (3x38	0–440 V) [A]	27.4	36.3	47.5	60	49	57.6		
Continuous (3x44	0–480 V) [A]	16.6	21.4	29	36	31.5	37.5		
Intermittent (3x44	0–480 V) [A]	23.6	30.1	41	52	44	53		
EMC filter type				C2	/C4				
7 Ambient Conditions									
Protection rating		IP20/Oper	IP20/Open Type (IP21/Type 1 conversion kit as an option).						
Temperature duri	-20 °C to 55 °C (-4 °F to 131 °F), -10 °C to 50 °C (14 °F to 131 °F) without derating.								
Temperature duri	-25 °C to 65/70 °C (-13 °F to 149/158 °F).								
Relative humidity	5–95%, non-condensing during operation.								
Altitude <sup>(1)</sup>	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).								
	Storage	IEC 60721-3-1, Class 1C2 (aggressive gases), Class 1S11 (dust/sand).							
Contamination level	Transportation	IEC 60721-3-2, Class 2C2 (aggressive gases), Class 2S5 (dust/sand).							
level	Operation	IEC 60721	-3-3, Class C4	(aggressive g	ases), Class 3S	6 (dust/sand).			
	Storage	IEC 60721	-3-1, Class 1M	11.					
Mechanical conditions	Transportation	IEC 60721	-3-2, Class 2M	4.					
conditions	Operation	IEC 60721-	-3-3, Class 3M	11.					

Protection rating		IP20/Open Type (IP21/Type 1 conversion kit as an option).				
Temperature duri	ng operation	-20 °C to 55 °C (-4 °F to 131 °F), -10 °C to 50 °C (14 °F to 131 °F) without derating.				
Temperature during storage/transport Relative humidity Altitude <sup>(1)</sup>		-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).				
	Storage	IEC 60721-3-1, Class 1C2 (aggressive gases), Class 1S11 (dust/sand).				
Contamination level	Transportation	IEC 60721-3-2, Class 2C2 (aggressive gases), Class 2S5 (dust/sand).				
level	Operation	IEC 60721-3-3, Class C4 (aggressive gases), Class 3S6 (dust/sand).				
	Storage	IEC 60721-3-1, Class 1M11.				
Mechanical conditions	Transportation	IEC 60721-3-2, Class 2M4.				
conditions	Operation	IEC 60721-3-3, Class 3M11.				
Note: (1) Regarding IEC	61800-5-1 compliance, th	e default maximum altitude is 2000 m (6562 ft). When the installation site is at an altitude of				

	able 15. ENIC CO	Simpationity Motor Cable	Table 14. Maximum		engui	
Drive with built-		Maximum motor cable l	ength (shielded), @4kHz		Shielded	50 m (164 ft)
ir	EMC filter	C1 (Conducted)	C2 (Conducted)	Maximum motor	Shielded	50 m (104 m)
1	x200-240 V AC	5 m (16.4 ft)	-	cable length	Unshielded	75 m (246 ft)
3	x400-480 V AC	-	15 m (49.2 ft)		onshielded	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

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[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	
	62/64						

Note: (1) Regarding IEC 61800-5-1 compliance, the default maximum altitude i 2000 m (6562 ft) to 4000 m (13123 ft), contact Danfoss for further information.

### 8 EMC Compatibility and Motor Cable Length

• 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 14 Maximum Motor Cable Length. 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			
T J CC 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 <sup>(1)</sup>	-			
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)		
1 1		-			
25 A 25 A	25 A	PKZM4-25	500 x 400 x 260	52	
35 A 35 A	32 A	PKZM4-32	(19.7 x 15.7 x 10.2)		
40 A 50 A	42 A	PKZM4-50	·		
15.4	16.4	DK7140.16			
15 A 16 A	16 A	PKZM0-16	500 x 400 x 260	52	
30 A 32 A	32 A	PKZM4-32	(19.7 x 15.7 x 10.2)		
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)		
15.4 16.4	16.4	DK2M0.16			
15 A 16 A	16 A	PKZM0-16	500 x 400 x 260	52	
30 A 40 A	32 A	PKZM4-32	(19.7 x 15.7 x 10.2)		
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)	,,,	

Note: (1) The power ratings of iC2-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.

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