



ENGINEERING  
TOMORROW

## HIGHLIGHTS

- Modular and configurable drive
- STO SIL3 as standard
- Scalable control platform
- Powerful hardware-based security including end-to-end encrypted data transfer
- Connectivity with multiple fieldbuses
- Industrial IoT-ready
- High-torque machine performance
- Superior motor control
- High power density with a small footprint

[Explore the specifications](#)

### Intelligence

to empower your application

### iC7-Automation Frequency Converter

# Need **flexibility** to **create** more **competitive systems**?

The iC7 series of intelligent AC drives puts the power of compactness and integrated intelligence in your hands, so you can boost machine performance in new ways.

With the best heat management available anywhere, this drive delivers high torque performance in a small footprint, so you can get much more power into small spaces.

Integrated intelligence enables the drive to function as your most powerful sensor meaning you can regulate your process highly efficiently, saving money by reducing external devices.

For quick and trouble-free system integration the frequency converter comes with built-in EMC and harmonic filters.

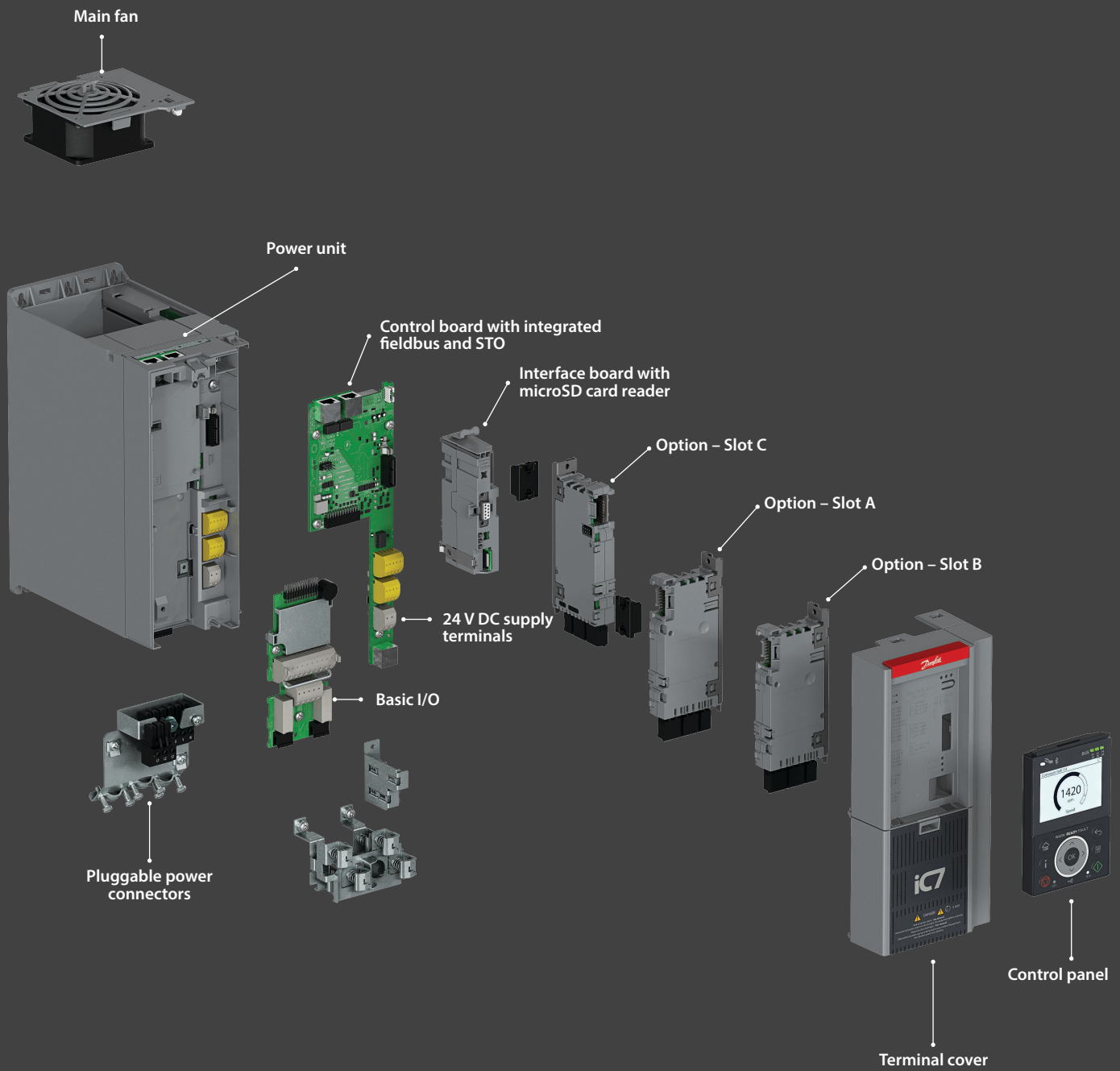
Manage your process data in the cloud or your internal network with world-class stringent security.

You get full data traceability with end-to-end integrated digitized quality control throughout the drive lifetime from design and testing through to installation and service.

Frequency converters in the iC7 series are optimized for wall-mounted, cabinet-mounted or free-standing installation, and meet requirements for operation at ambient temperatures up to 60°C.

[Learn more about iC7-Automation](#)

iC7.danfoss.com 



*iC7 series frequency converter, frame FA03b*

# Configured to your needs

The iC7 drive is configured and delivered to meet your exact requirements, saving expensive installation time. Everything is integrated: EMC and harmonic filter, brake chopper and DC terminals. Fuse and disconnect are also available built-in, for IP21/Type 1 and IP54/UK Type 12 enclosures.

Control is highly configurable and is preconfigured at the factory or can easily be upgraded in the field.

## Enclosures fit for installation

Install this space-saving drive easily in cabinets and protected rooms:

- Bookstyle IP20/UL Open Type optimized in width for side-by-side mounting without clearance, to save cabinet space  
(Frames FA02-FA12)
- Designed for flexible installation with minimum use of space
  - IP21/UL Type 1 for frames FK06-FK12
  - IP54/UL Type 21 for frames FB09-FB12

## High power density cooling

You get high power density thanks to superior heat management using heat-pipe technology and high-performance heat sinks. Closed air ducts enable flexible mounting, and back-channel cooling supports removal of heat to the surroundings without extra cooling equipment. Remove fans easily for cleaning and service.

## Fast installation and service

Focus on ease of installation and service has been a key driver during development, with intensive installation testing during the design phase to ensure easy installation and user access.

Control connectors are pluggable. Power connectors are also pluggable for units up to 43 A (22 kW). Connectors are color-coded and clearly marked for easier identification.

Power connectors are rated for use of copper cable at full current plus 25%, matching updated installation standards.

## Environmental exposure

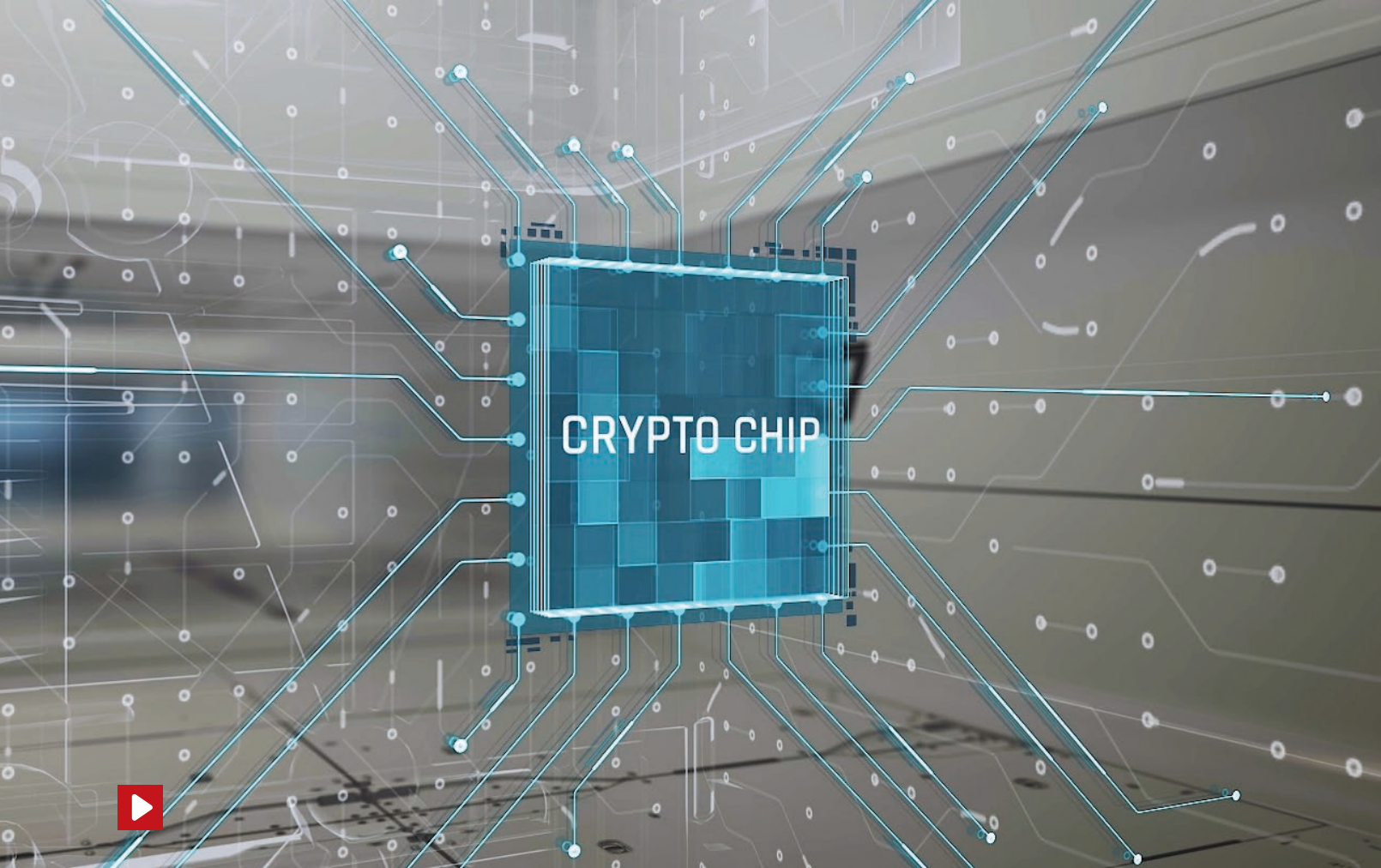
The iC7 drive delivers exceptional performance under demanding operating conditions, and its design criteria match the environments described in the IEC60721 standard.

The ability to operate at ambient temperatures ranging from -30°C to 50°C (60°C with derating) ensures the drive meets a broad range of application requirements. With an altitude capability of up to 4400 m (14300 ft) above sea level, you can install this drive in virtually any location. For additional protection, specify the optional coated printed circuit boards increasing corrosion resistance.

This robust drive matches the required vibration resistance for operation in cabinets, in control rooms and on machines.

## Next-level reliability

- Temperature -30 to +50 °C
- Altitude 4400 m
- Optional coated PCBs for increased protection



### Secure-by-design

Your drive is equipped with market-leading hardware-based protection against unauthorized access with a built-in crypto chip on the control unit. Use a microSD card to copy settings, log data and download software – all protected by the crypto chip ensuring end-to-end encrypted data transfer.

 Security

 Security video

### Functional safety to match your needs

STO SIL3, PI e as standard makes certification easier. A flexible offering allows the addition of functional safety via fieldbus.

### User interfaces

A new range of user interfaces integrate well-known features and functionality. Integration of features in MyDrive® tools is supported.

**Halo indicator**  
Normal = white  
Fault = red  
Warning = orange



## More built-in sensors for enhanced control

The iC7 drive has an increased number of built-in sensors. This enables improved control performance, increased protection of application and drive, and capability to support Industrial IoT solutions.

## Superior sensorless control

In open or closed loop, the iC7 drive delivers superior shaft performance even at low speed.

-  **Motor Control**
-  **Motor Control video**

## Filters and accessories

For a complete installation, a range of integrated and separate filter options are available.

## Engineering support

Danfoss provides an extensive selection of support material and tools to help in engineering, such as:

- Digital tools, such as MyDrive® Select, MyDrive® Harmonics and MyDrive® ecoSmart™
- EPLAN P8 macros
- Dimensional and electrical drawings

## Simulation reduces time to market

Remove the constraints of the physical environment and open up new opportunities using iC7 simulation models which perfectly mirror the converter or drive.

You can predict performance, test scenarios, streamline commissioning, and collaborate across teams and locations in an open environment.

Reliably validate interoperability of systems, using high-fidelity hardware-in-the-loop (HIL) simulation support from Danfoss.

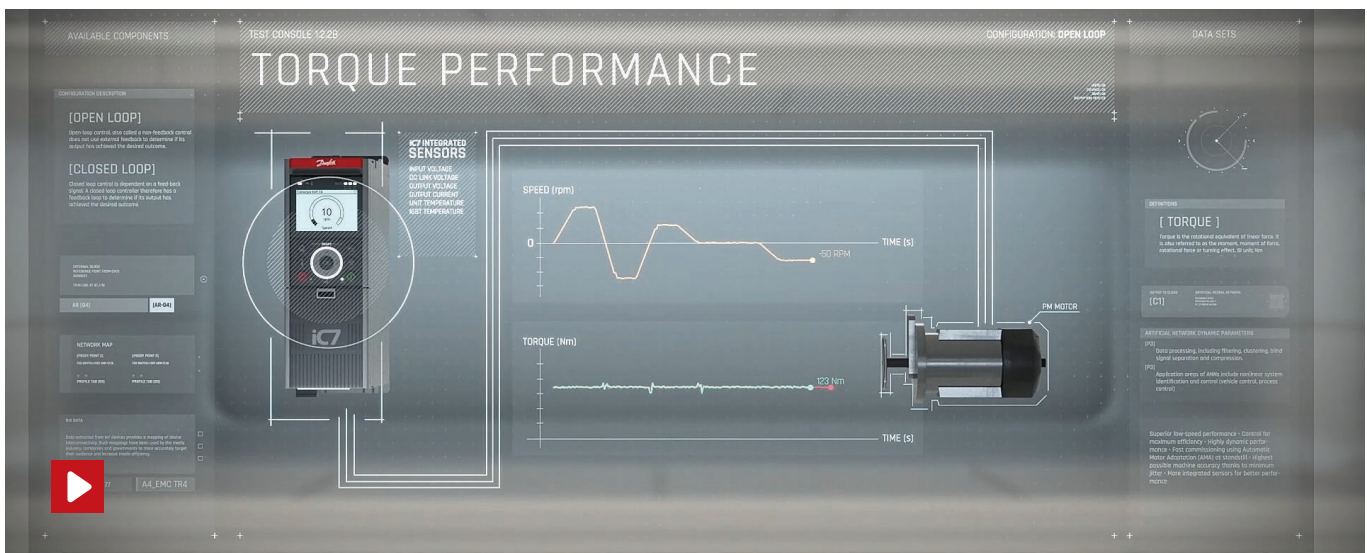
The iC7 platform is founded on model-based design, which ensures the simulation models are always valid: up to date and accurate.

These models comply with the FMI standard and are easy to integrate in your simulation platform.

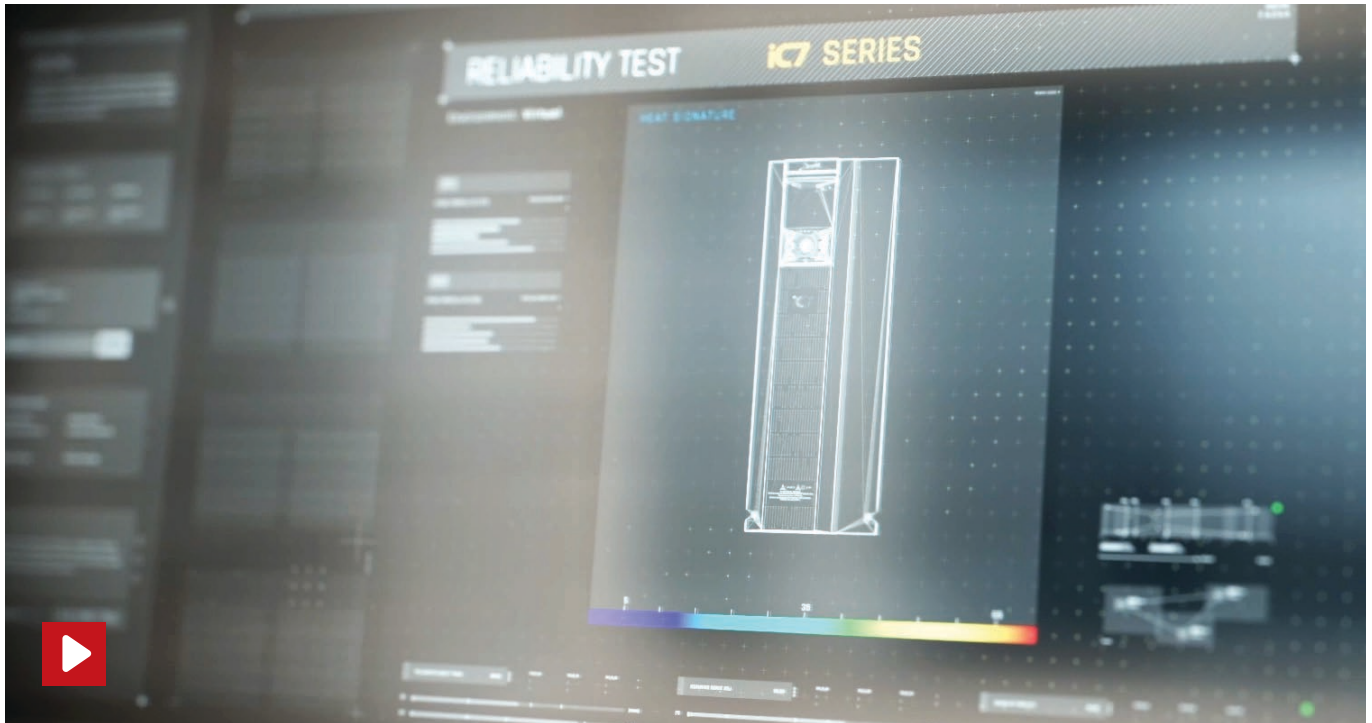


## Supported by MyDrive® tools

You can use MyDrive® tools on the device of your choice, supporting the entire lifecycle of the iC7 drive; from selection and dimensioning, through programming and commissioning, to maintenance and support during operation.



What if sensorless open loop performance could match closed loop?



### Quality in focus

Reliable and predictable operation has been a key driver. With an ISO 9001-certified and IATF 16949-compliant quality system combined with use of 6-Sigma principles, quality and reliability are at absolute market-leading standards.

Reliability is assured by design based on application load profiles and data collected from intensive simulations and feedback from testing.

Automated assembly enables close control and monitoring of critical processes. The finished drives are 100% full-load tested ensuring reliability before leaving the factory.

### ▶ Quality video

### Scalable and flexible control

Enjoy a new level of performance thanks to the rapid-response control of iC7 drives.

The control capability is scalable and equipped with Ethernet-based fieldbus and STO inputs as standard. Add more I/Os as needed, to match your applications.

An optional basic I/O board offers typical I/O connectivity, and if more is needed, then you can add up to 4 options as listed in the **Options** table.

Configure fieldbus protocol from the factory: Modbus TCP, PROFINET, or Ethernet/IP.


Connect to a computer via the extra Ethernet port, enabling you to use MyDrive® commissioning or service tools.



## Features and benefits

Feature	Benefit
Compact side-by-side mounting	Save space and reduce installation costs
Compact bookshelf design reduces footprint	Reduce space requirement and air-conditioning load
Isolated cooling channel minimizes required installation space	
Integrated options such as functional extensions, common-mode filters, fuses and disconnects mean no extra external devices are required	Save cost and time in installation
Installer-friendly design includes pluggable control terminals, pluggable power terminals <sup>1)</sup> , and replaceable fans	Save cost and time in installation and service
Robust by design, high uptime and quality	Reliable in heavy-duty service

<sup>1)</sup> For frames up to FA05.

Ensuring you shine in the marketplace is our goal. Learn how Danfoss supports your success [here](#) 

# Technical data <sup>1)</sup>

Input	
Voltage rating	380-500 V AC, +10%/-15%
Supply frequency	50/60 Hz
Switching on input	1-2 times pr. minute
Grid type	TN, TT, IT, Delta

Output	
Output frequency	0-590 Hz
Switching on output	Unlimited
Overload capacity	110% and 150/160%

Protection ratings	
Frames FAxx	IP20 – Open Type
Frames FKxx	IP21 – UL Type 1
Frames FBxx	IP54 – UL Type 21

Environmental conditions	
Rated temperature	-30 to 50 °C (-22 to 122 °F) <sup>2)</sup>
Nominal temperature 24 hours	-30 to 45 °C (-22 to 113 °F) <sup>2)</sup>
Maximum temperature with derating	60 °C (140 °F)
Rated altitude	1000 m (3280 feet)
Maximum altitude	4400 m (14400 feet) with derating
Relative humidity	3K22, maximum 95% non-condensing
Particles (IEC 60721-3-3:2019)	Solid particles (nonconductive particles/dust) 3S6
Chemically active substances (IEC 60721-3-3:2019, ISO 9223:2012)	– C3 (P1) – Medium corrosivity – Non coated – C4 (P2) – High corrosivity – Coated in IP54/IP55/UL Type 12 enclosure or for IP20/Open Type and IP21/UL Type 1 following installation guidance.
Shock & vibration (IEC 60721-3-3:2019)	3M11

Functional Safety I/O	
STO	Dual-channel, with galvanic isolation
STO feedback	Single channel, with galvanic isolation

External supply	
Rating	24 V/2 A

Basic I/O	
Digital inputs	4+2 <sup>4)</sup>
– Logic	NPN/PNP selectable – 0/24V
– Pulse/Encoder input	0-110 kHz

Digital outputs	2 <sup>4)</sup>
– Logic	NPN/PNP selectable – 0/24V
– Pulse output	0-100 kHz

Analog inputs	2
Voltage mode	0-10 or ±10V, scalable
Current mode	0/4-20 mA

Relay output	2
Function	NO/NC
Rating	250V AC 2 A, 24VDC 2 A

Analog output	0/4-20 mA
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<sup>1)</sup> Preliminary values pending validation.

<sup>2)</sup> 5 °C lower for frames Fx09 to Fx12.

<sup>3)</sup> When installed in suitable enclosure

<sup>4)</sup> 2 of the inputs can be reconfigured to outputs

EMC category (model code)	Frame	EN/IEC 61800-3 compliance class					
		Conducted emission			Radiated emission		
		C1	C2	C3	C1	C2	C3
		Cable length [m (ft)]					
F1 – Combined C1 and C2 filter	Fx02–Fx08	50 (164)	150 (492)	150 (492)	No	Yes	Yes
F2 – C2 filter	Fx02–Fx08	–	150 (492)	150 (492)	No	Yes	Yes
	Fx09–Fx12	–	150 (492)	150 (492)	No	Yes	Yes
F3 – C3 filter	Fx02–Fx05	–	–	250 (820)	No	No	Yes
	Fx06–Fx08	–	–	300 (984)	No	No	Yes
	Fx09–Fx12	–	–	150 (492)	No	No	Yes

For information on functional extension option slots, go to page 14



## Ratings Fx02-Fx12 – High overload

Designation	Rated output current						Typical shaft output power		Frame
	3 x 380-440 V			3 x 441-500 V			400 V	460 V	
	$I_L$	$I_H$	$I_{H2}$	$I_L$	$I_H$	$I_{H2}$	$P_H$	$P_H$	
	[A]	[A]	[A]	[A]	[A]	[A]	[kW]	[HP]	
01A3	1.3	1.3	0.9	1.2	1.2	0.8	0.37	0.5	Fx02
01A8	1.8	1.8	1.3	1.6	1.6	1.1	0.55	0.75	
02A4	2.4	2.4	1.8	2.1	2.1	1.6	0.75	1.0	
03A0	3.0	3.0	2.4	2.7	2.7	2.1	1.1	1.5	
04A0	4.0	4.0	3.4	3.4	3.4	3.0	1.5	2.0	
05A6	5.6	5.6	4.3	4.8	4.8	3.4	2.2	3.0	
07A2	7.2	7.2	5.6	6.3	6.3	4.8	3.0	4.0	
09A2	9.2	9.2	8.0	8.2	8.2	6.3	4.0	5.0	
12A5	12.5	12.5	10	11	11	7.6	5.5	7.5	
16A0	16	16	13	14.5	14.5	11	7.5	10	Fx03
24A0	24	24	17	21	21	14.5	11	15	Fx04
31A0	31	31	25	27	27	21	15	20	
38A0	38	38	32	34	34	27	18.5	25	Fx05
43A0	43	43	38	40	40	34	22	30	Fx06
61A0	61	61	46	55	55	40	30	40	
73A0	73	73	61	66	66	55	37	50	
90A0	90	90	73	81	81	66	45	60	Fx07
106A	106	106	90	96	96	81	55	75	Fx08
147A	147	147	106	133	133	96	75	100	
170A	170	170	147	156	156	133	90	125	
206A	206	170	147	196	166	156	90	125	Fx09
245A	245	206	170	240	196	166	110	150	
302A	302	245	206	302	240	196	132	200	
385A <sup>1)</sup>	385	302	245	364	302	240	160	250	
395A	395	302	245	364	302	240	160	250	Fx10
480A	480	385	302	456	364	302	200	300	
588A	588	480	385	520	456	364	250	350	
658A	658	588	480	590	520	456	315	450	Fx11
736A	736	658	588	658	590	520	355	500	
799A	799	695	658	730	653	590	400	550	
893A	893	799	736	784	700	653	450	550	Fx12
1000	1000	880	799	896	784	700	500	650	
1120	1120	1000	893	1028	896	784	560	750	
1260	1260	1100	1000	1150	1028	896	630	850	

<sup>1)</sup> 385A is without brake or disconnect. If brake or disconnect is required, select 395A

$I_L$ : Low overload – 110% overload – 1 min every 10 min

$I_H$ : High overload 150/160% overload – 1 min every 10 min

$I_{H2}$ : High overload 150/160% with increased duty – 1 min every 5 min

## Ratings Fx09-Fx12 – Low overload <sup>1)</sup>

Designation	Rated output current						Typical shaft output power		Frame
	3 x 380-440 V			3 x 441-500 V			400 V	460 V	
	$I_L$	$I_H$	$I_{H2}$	$I_L$	$I_H$	$I_{H2}$	$P_L$	$P_L$	
	[A]	[A]	[A]	[A]	[A]	[A]	[kW]	[HP]	
206A	206	170	147	196	166	156	110	150	Fx09
245A	245	206	170	240	196	166	132	200	
302A	302	245	206	302	240	196	160	250	
385A <sup>1)</sup>	385	302	245	364	302	240	200	300	
395A	395	302	245	364	302	240	200	300	Fx10
480A	480	385	302	456	364	302	250	350	
588A	588	480	385	520	456	364	315	450	
658A	658	588	480	590	520	456	355	500	Fx11
736A	736	658	588	658	590	520	400	550	
799A	799	695	658	730	653	590	450	600	
893A	893	799	736	784	700	653	500	650	Fx12
1000	1000	880	799	896	784	700	560	750	
1120	1120	1000	893	1028	896	784	630	850	
1260	1260	1100	1000	1150	1028	896	710	950	

<sup>1)</sup> 385A is without brake or disconnect. If brake or disconnect is required, select 395A

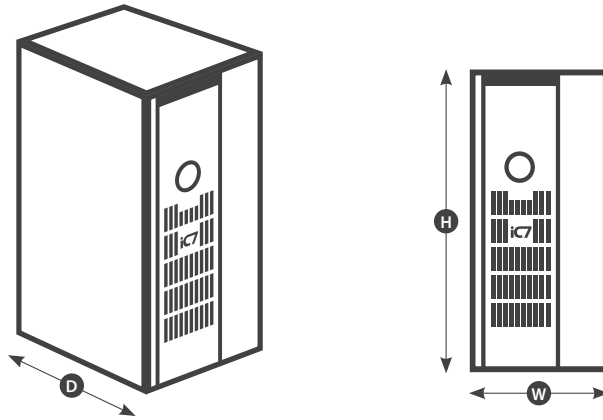
$I_L$ : Low overload – 110% overload – 1 min every 10 min

$I_H$ : High overload 150/160% overload – 1 min every 10 min

$I_{H2}$ : High overload 150/160% with increased duty – 1 min every 5 min

## Options

Functional extensions	Description
General Purpose I/O OC7C0	General purpose I/O extension board: 3 digital inputs 2 digital outputs 2 analog inputs 1 analog output
Relay Option OC7R0	Relay I/O extension board, with 3 relays
Encoder/Resolver Option OC7M0	Encoder/Resolver extension board supports 1 or 2 encoders (TTL, HTL, SinCos, SSI, HIPERFACE®, HIPERFACE DSL®, EnDat, BiSS, resolver)



## Dimensions and weight

Frame		FA02a	FA03a	FA04a	FA05a	FA06	FK06	FA07	FK07	FA08	FK08
[mm]	Width	90	114	130	165	200	210	230	240	255	270
	Height	270	270	399	399	555	670	600	770	746	980
	Depth	221	221	262	269	294	297	308	327	368	365
[kg]	Weight	4.7	5.7	11.6	14.1	26	28	35	38	55	60
[in]	Width	3.5	4.5	5.1	6.5	7.9	8.3	9.1	9.5	10.0	10.6
	Height	10.6	10.6	15.7	15.7	21.9	26.4	23.6	30.3	29.4	38.6
	Depth	8.7	8.7	10.3	10.6	11.6	11.7	12.1	12.9	14.0	14.4
[lb]	Weight	10.4	12.6	25.6	31.1	57	61	77	83	121	132

Frames FA02b to FA05b: Add 26 mm (1 in) to depth.  
Outer dimensions include mounting flange, without EMC shield plates.  
Weight is maximum weight.

Frame		FA09	FB09/ FK09a	FK09c	FA10	FB10/ FK10a	FK10c	FA11	FB11/ FK11a	FA12	FB12/ FK12a
[mm]	Width	250	325	325	350	420	420	508	602	604	698
	Height	909	1001	1421	1122	1232	1779	1578	2043	1578	2043
	Depth	370	378	381	370	378	381	482	513	482	513
[kg]	Weight	81	84	107	127	137	174	225	272	298	320
[in]	Width	9.8	12.8	12.8	13.8	16.5	16.5	20	23.7	23.9	27.5
	Height	35.8	39.4	55.9	44.2	48.5	70.0	62.1	80.4	62.1	80.4
	Depth	14.8	14.9	15.0	14.6	14.9	15.0	19.0	20.2	19.0	20.2
[lb]	Weight	179	184	236	280	302	384	496	600	654	705

Weight is maximum weight.

# Model code overview: iC7 frequency converter

For more detailed information, refer to the Design Guide



[1-2] Product group (character 1-6)	
iC7-60	Indication of product group performance
[3] Product category (character 7)	
F	Frequency converter
[4] Cooling method (character 8)	
A	Air-cooled
[5] Product type (character 9-10)	
3N	Three-phase 6-pulse
[6] Voltage rating (character 11-12)	
05	380-500 V AC
[7] Nominal Amp rating <sup>2)</sup> (character 14-17)	
01A3	1.3 A
01A8	1.8 A
02A4	2.4 A
03A0	3.0 A
04A0	4.0 A
05A6	5.6 A
07A2	7.2 A
09A2	9.2 A
12A5	12.5 A
16A0	16 A
24A0	24 A
31A0	31 A
38A0	38 A
43A0	43 A
61A0	61 A
73A0	73 A
90A0	90 A
106A	106 A
147A	147 A
170A	170 A
206A	206 A
245A	245 A
302A	302 A
385A	385 A
395A	395 A
480A	480 A
588A	588 A
658A	658A
736A	736 A
799A	799 A
893A	893 A
1000	1000 A
1120	1120 A
1260	1260 A

<sup>1)</sup> +codes identifying options  
<sup>2)</sup> See rating tables on pages 9-10

[8] Frame (character 18-20)		Fx02-05	Fx06-08	Fx09-12
E20	IP20/Open Type	■	■	■
E21	IP21/UL Type 1		■	■
E54	IP54/UL Type 12			■
[9] EMC Class (character 21-22)				
F1	C1 and C2 category	■	■	
F2	C2 category	■	■	■
F3	C3 category	■	■	■
[ <sup>1)</sup> ] +code group				
+Axxx	Optional power hardware			
+Bxxx	Control hardware			
+Cxxx	Control options			
+Dxxx	Application software and additional functionality			
+Exxx	Customized settings (for reference only)			

## +Axxx Optional power hardware IP20

Function	Model code	Selection description	Fx02-05	Fx06-08	Fx09-12
Integrated brake chopper	+ACXX	None	–	X	X
	+ACBC	Yes <sup>1)</sup>	X	X	O <sup>2)</sup>
Extra environmental protection	+AGXX	None	X	X	–
	+AGCX	Coated boards	O	O	X
Mains input device	+AJXX	None	X	X	X
	+AJFX	AC fuses	–	–	O
DC terminals	+ALXX	None	–	X	X
	+ALDC	Yes	X	O	O <sup>2)</sup>
Heat sink access panel	+APXX	None	X	X	X
	+APHS	Yes	–	–	O

<sup>1)</sup> Not applicable to model 05-385A.  
<sup>2)</sup> DC terminals and brake chopper cannot be combined.

## +Axxx Optional power hardware IP21

Function	Model code	Selection description	Fx02-05	Fx06-08	Fx09-12
Cable entry and EMC plate	+AAST	Standard, no holes	–	X	X
Integrated brake chopper	+ACXX	None	–	X	X
	+ACBC	Yes <sup>1)</sup>	–	O <sup>2)</sup>	O <sup>3)</sup>
Extra environmental protection	+AGXX	None	–	X	–
	+AGCX	Coated boards	–	O	X
Humidity protection device	+AHXX	None	–	X	X
	+AHHX	Space heater	–	–	O
Mains input device	+AJXX	None	–	X	X
	+AJFX	AC fuses	–	O <sup>2)</sup>	O
	+AJXD	Mains switch	–	–	–
	+AJFD	AC fuses and mains switch	–	O <sup>2)</sup>	O
DC terminals	+ALXX	None	–	X	X
	+ALDC	Yes	–	O <sup>2)</sup>	O <sup>3)</sup>
Touch protection	+AMXX	None	–	X	X
	+AMMX	Yes	–	–	O
Heat sink access panel	+APXX	None	–	X	X
	+APHS	Yes	–	–	O

<sup>1)</sup> Not applicable to model 05-385A.  
<sup>2)</sup> Integrated brake chopper and DC terminals cannot be combined with Mains input device (AC fuses and mains switch).  
<sup>3)</sup> DC terminals and brake chopper cannot be combined. DC and brake are not available in FK09a and FK10a frames.

X indicates a standard selection  
O indicates an optional selection  
A dash (–) indicates that the selection is not available



### +Bxxx Control board features

Function	Model code	Selection description	Fx02-05	Fx06-08	Fx09-12
Communication interface, X1/X2	+BAMT	Modbus TCP OS7MT	■	■	■
	+BAPR	PROFINET RT OS7PR	■	■	■
	+BAIP	Ethernet/IP OS7IP	■	■	■
Standard I/O	<b>+BDXX</b>	None	■	■	■
	+BDDBA	Basic I/O (4 x DI, 2 x combined DI/DO, 2 x AI, 1 x AO, 2 x relay)	■	■	■
Control panel	<b>+BF00<sup>1)</sup></b>	Blind Panel OPX00	■	■	■
	+BF20	Control Panel 2.8 OPX20	■	■	■

<sup>1)</sup> Not available for Fx09-Fx12.

### +Cxxx Control options

Functional extension option slots							
Frame	FA02a	FA02b FA03a	FA03a FA04a	FA03b FA04b	FA05a	FA05b	FA06-FA12
Number of option slots	1	2	1	3	1	4	4
Option slot A	■	■	■	■	■	■	■
Option slot B	■	■	■	■	■	■	■
Option slot C			■	■	■	■	■
Option slot D					■	■	■
Option slot E							■

Control options (character >21)	
+CBXX	None – Not upgradable <sup>1)</sup>
+C_X0	None <sup>2)</sup>
+C_C0	General Purpose I/O OC7C0
+C_R0	Relay Option OC7R0
+CAM0	Encoder/Resolver Option OC7M0 <sup>3)</sup>

<sup>1)</sup> Only selectable for option slot B

<sup>2)</sup> +CBX0 will appear in the model code if "None" is selected for option slot B

<sup>3)</sup> Encoder/Resolver Option must be in option slot A

### +Dxxx Application software and additional functionality

Function & code		Fx02-05	Fx06-08	Fx09-12
Additional drive feature	+DD1X None	■	■	■
	+DD11 Motion	■	■	■

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# OPEN UP A NEW DIMENSION

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# OPTIMIZATION STATUS



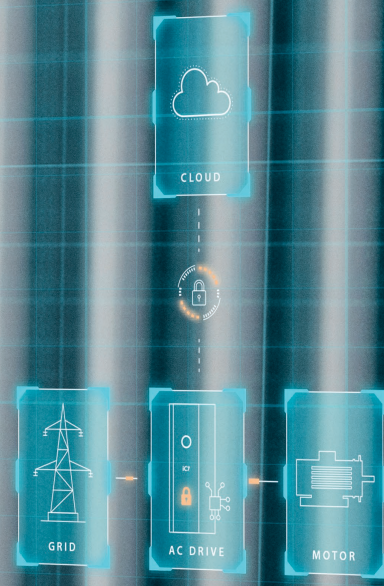
# INTELLIGENCE ON



# SYSTEM COST

# SECURITY

# SYSTEM OVERVIEW



01

02

DATA 05



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