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iC7-Marine | Brochure

Need strong and secure maritime performance?

Unlock

competitive new marine performance levels, with scalable and ultra-compact drives

iC7.danfoss.com iC7

iC7-Marine highlights

- Unrivaled power density
- Modular control architecture
- Integrated Industrial IoT security
- Streamlined system integration
- Efficient cooling management
- Integrated functional safety
- Precision motor control
- Ultra-low harmonic current distortion THDi
- Supported by DrivePro® services

Over 50 years in pioneering power electronics and 25 years in marine-optimized drives prepares us well to innovate for tomorrow

Explore the specifications

Contents

Need strong and **secure maritime performance?**

Embark on a new voyage of opportunity with the versatile and intelligent iC7-Marine, optimized for both ocean-going and inland waterway vessels. This drive features a new dimension of power density, motor control accuracy, and ultra-low THD. Navigate the most challenging of applications as diverse as propulsion, thrusters, winches, and more.

iC7-Marine gives you the edge on competitors with a whole new level of modular control, industry benchmark thermal management, and unparalleled ease of system integration.

This drive series supports your business with the highest quality and reliability standard available on the planet – thanks to a development approach based on unmatched expertise, the latest simulation techniques, and exhaustive testing.

Building on this foundation, iC7-Marine is equipped with a world-class Industrial IoT security approach that enables you to future-proof your system for the decades ahead.

Applications

Choose the optimal application for your process, to open a new dimension in system performance:

- **Propulsion & Machinery**, optimized for high-performance marine applications

Choose additional hardware functionalities to tailor the drive to your application needs:

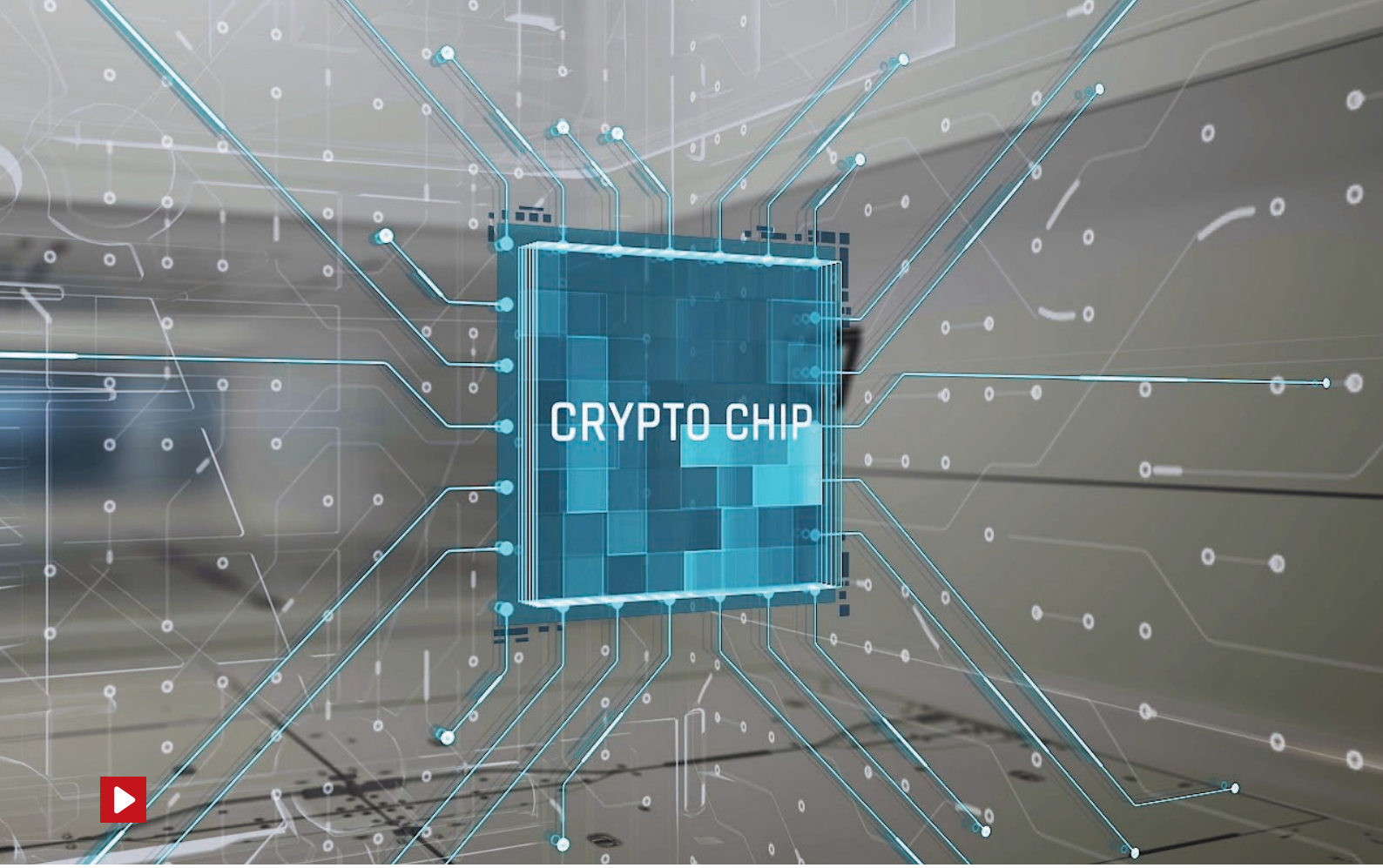
- **Active Front End** (AFE)
- **Inverter** (INU)

At a glance

- Voltage rating:
  3 x 380-500 VAC -15%/+10%
  3 x 525-690 V AC -15%/+10%
- Output current: 170-6400 A
- Protection rating: IP00
  (IP55 electronics housing)

Fully compatible with:

iC7-Hybrid



Features to **enhance** marine **performance**

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, download software and activate additional features – all protected by the crypto chip ensuring end-to-end encrypted data transfer.

Security
Security video

Functional safety to match your needs [1]

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

[1] *Awaiting certification*

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.

iC7 Filters

Engineering support

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

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

MyDrive® Simulation
MyDrive® Virtual
MyDrive® Hil

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.

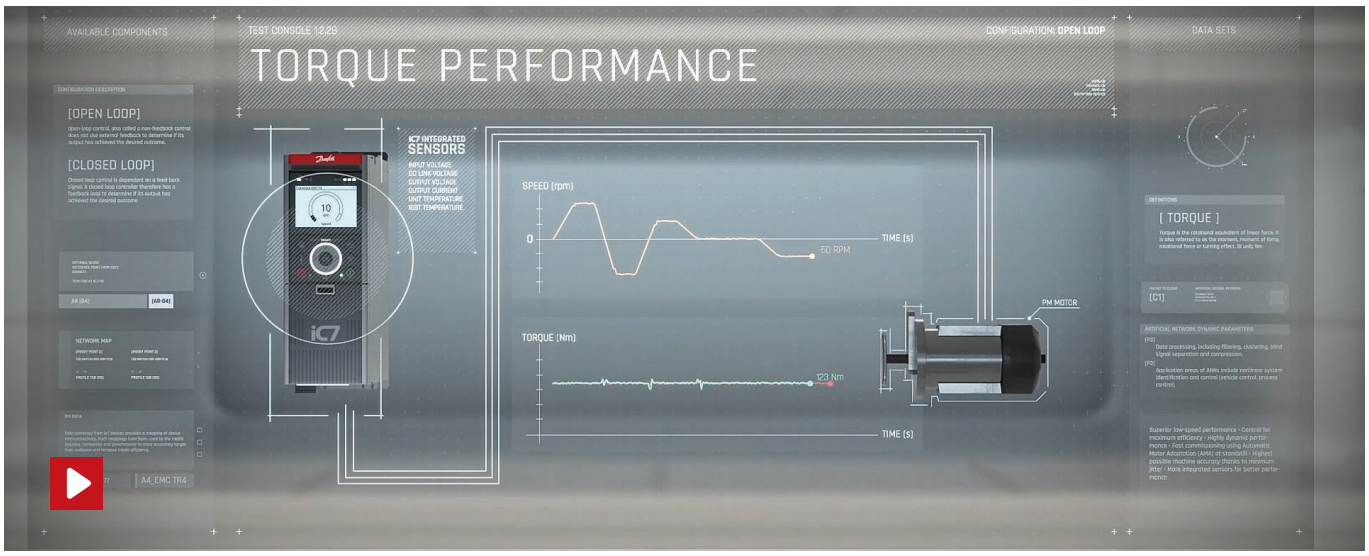
These models comply with the FMI standard and are easy to integrate in your simulation platform.

fmi Functional Mock-Up Interface

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.

MyDrive® Insight

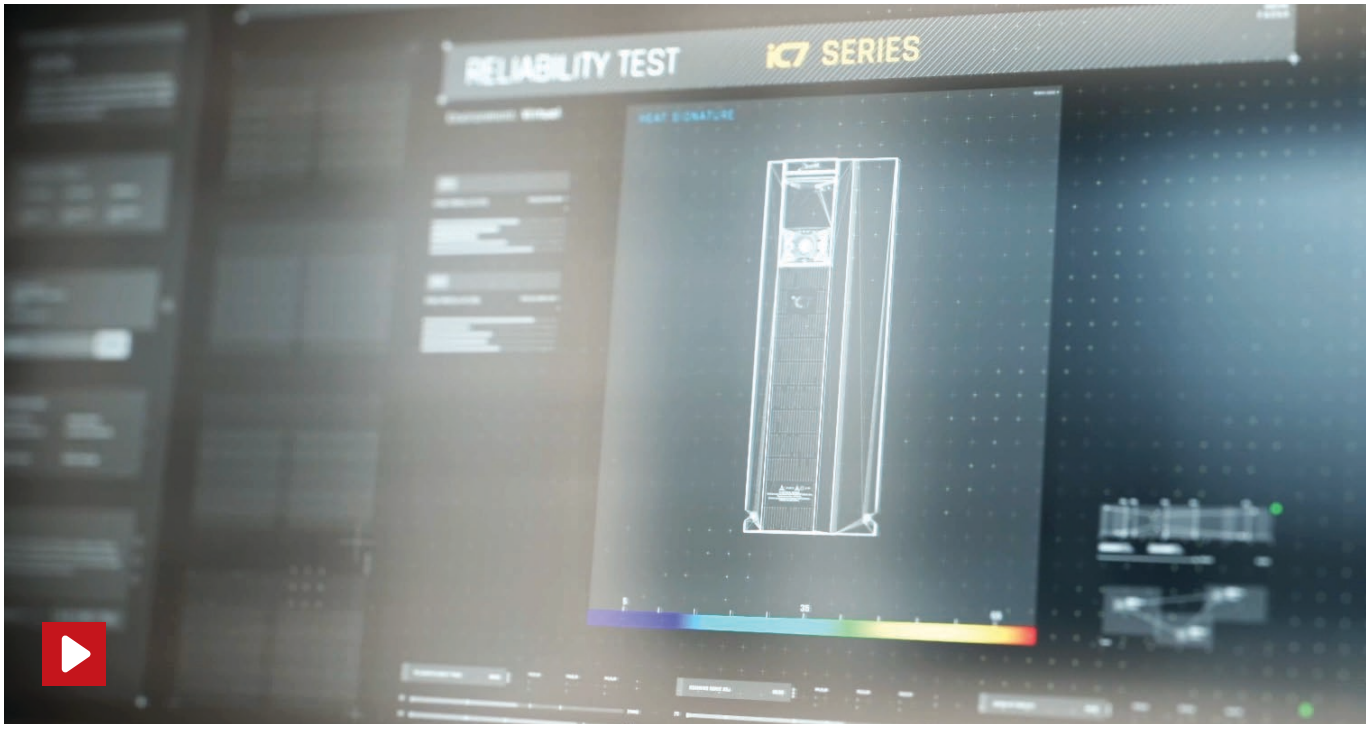


What if sensorless open loop performance could match closed loop?

Features and benefits

Feature	Benefit
Secure-by-design	Reduce risk of downtime due to unauthorized access
High power density	Save space and reduce cooling costs
Native integration of filters below the power units	Save space and reduce installation costs
Highly accurate motor control	Save costs and improve performance
Modular control architecture	Improve performance by adapting to your application's needs
Integrated Ethernet communication interfaces	Save costs and time in installation
Quick-connection of power unit cooling when using the integration units	Save costs and time in installation and servicing
High number of integrated sensors	Improve performance and control accuracy
Expandable, encrypted microSD card-based memory	Securely record operational data for offline analysis

Ensuring you shine in the marketplace is our goal. Learn how Danfoss supports your success here



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 exhaustive 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 10 options.

Configure fieldbus protocol from the factory: Modbus TCP, PROFINET, or EtherNet/IP [1].

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

[1] *Awaiting certification*

Application software and hardware – for **precise navigation** of **marine needs**

Propulsion & Machinery
Propulsion & Machinery-dedicated software is optimized for essential high-end applications and gives you the power of focus on vessel-wide system requirements. It offers an open and flexible interface to the Power Management System, in a drive which self-adapts to any motor application. Typically employed in propulsion and thrusters, winches and cranes, pumps, fans and steering gears, the Propulsion & Machinery application software provides:

- Versatility for drive applications requiring a wide range of drive features for different motor types for either closed loop or open loop control methods
- Torque and power control/limit features: control the torque and power references, and limit using analog and digital signals or fieldbus
- Flexible control place options: control the drive from various control places and switch them smoothly and easily
- Flexible reference options: set up references and switch them smoothly and easily
- Basic PID-controller with flexible inputs/outputs: Utilize the integrated PID-controller to control any drive variable, by using any other drive variable
- DC-link handling: Enable, disable, set up, and adjust the over-voltage and under-voltage controllers
- Mechanical brake control: Connect a mechanical brake to the drive and operate it smoothly
- Motor breaker control: Monitor and control a motor breaker manually or by using the drive
- Fault simulation: Simulate any drive fault to accelerate your problem solving

Active Front-end application

Active Front-end dedicated hardware ensures a stable DC-bus for inverter modules, as well as effortless interaction with the grid, even in less-than-ideal grid conditions. It is designed for grid compliance and establishes grid-friendly harmonic content. It also safeguards energy recovery back to grid when excess energy from the process is available. It delivers robust control which is easy to customize and commission, with quick start-up and parametrization using wizards.

- Robust DC-link regulation
- Ultra-low harmonic current distortion THDi
- Unity power factor
- Support for grid voltage feedback option
- Power and current limitation
- Automatic AC-grid synchronization


KEEP
CLOSED
AT SEA
SWL 65 T
SWL 65 T
SWL 65 T

Specifications and dimensions

iC7-Marine is available in a liquid-cooled hardware variant with two separate mounting configurations:

- System modules: for versatile cabinet integration
- System modules with integration unit: integrated filters in a compact housing with quick-connections for cooling. Optimizing cabinet building and foot print.

For specifications and dimensions please refer to the related fact sheet:

Liquid-cooled System Modules

Pack in more power video

Type approvals [1]

Based on decades of experience across a wide range of Marine and Offshore applications, iC7-Marine drives fulfill type approvals of major classification societies, such as ABS, BV, CCS, DNV, and RINA.

[1] *Additional type approvals will be available during 2024.*

Illustrations not to scale

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Imagine versatile and highly secure power conversion and motor control. Intensely powerful and compact converters and drives built to optimize a vast range of systems while giving you the flexibility to distribute intelligence the way you want. Paving the way for a new dimension, where open, connected and intelligent systems are the new reality.

iC7

Open up a new dimension with iC7 series

iC7-Automation | iC7-Marine | iC7-Hybrid

Contact us

Some functionalities listed in this fact sheet are for future implementation