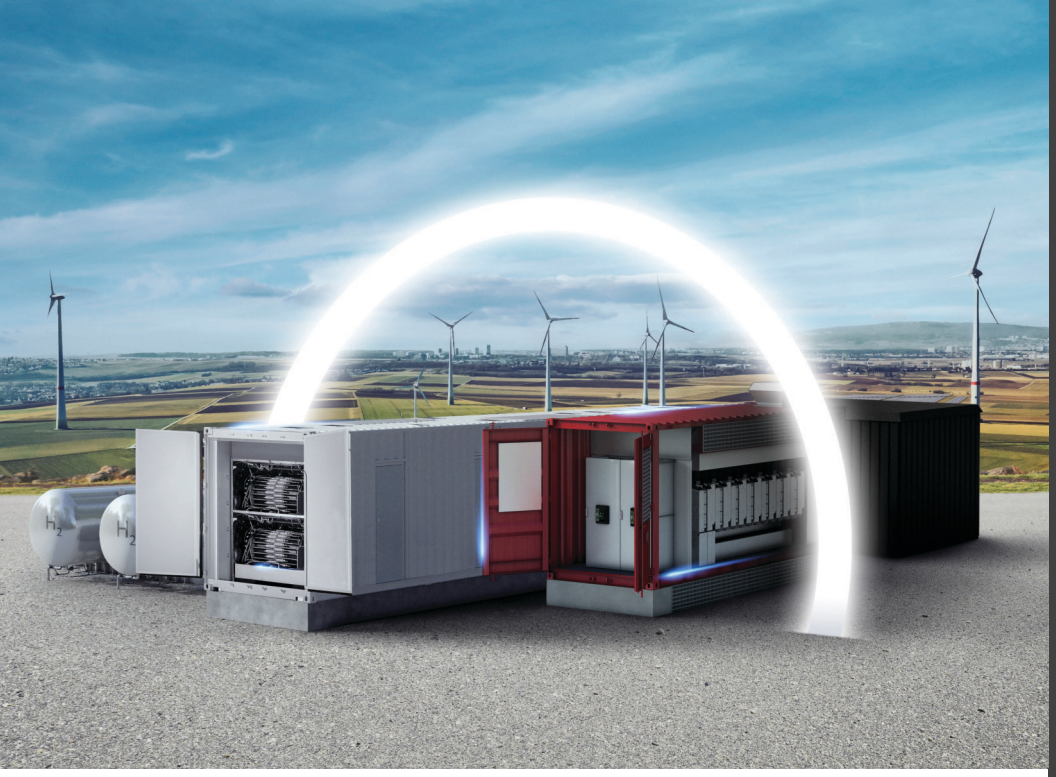

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Fact sheet | iC7-Hybrid

Intelligent **power conversion** to drive the **energy transition**

The iC7-Hybrid power converter allows for the integration of energy sources or storage into a variety of systems. This range of intelligent power converters is designed to enable you to meet carbon goals while remaining profitable. iC7-Hybrid is available as liquid-cooled system modules, and its unique filter integration concept comes equipped with built-in wiring and coolant distribution for added convenience.
Powerful support for hybrid and electric applications in

- Marine and Offshore
- Shore power supply
- Power-to-X

Feature	Benefit
Purpose-built product dedicated to power conversion	Fit-for-purpose in your industry increases competitiveness and reduces engineering effort
Quality in focus – world most reliable power converter	High uptime and low operating expenses
Supported by DrivePro Lifecycle services for global service capability	High uptime and long term planning capability
Engineering support from expert staff and a range of engineering tools	Go to market faster
Future-proof iC7 platform includes power conversion and AC drives applications	Shorter time to market. Lower lifecycle costs when both power converters and AC drives run in the same system

HIGHLIGHTS

- Unrivalled power density
- Robust in harsh environments
- Modular, scalable and serviceable
- Designed for easy integration
- Superior control performance
- Digital twin simulation models reduce risk and get you to market faster
- Cybersecure by design

Competitive
clean energy enabler

Learn more about iC7-Hybrid

iC7.danfoss.com iC7

iC7-Hybrid liquid-cooled system modules – the **ultimate** in **power density**

iC7-Hybrid is available in 2 variants

- System modules: Ideal for installations with low height clearance
- System modules with integration unit: integrated filters in a compact housing. Optimized power density for easy cabinet installation and serviceability

For specifications and dimensions, refer to the Selection Guide:

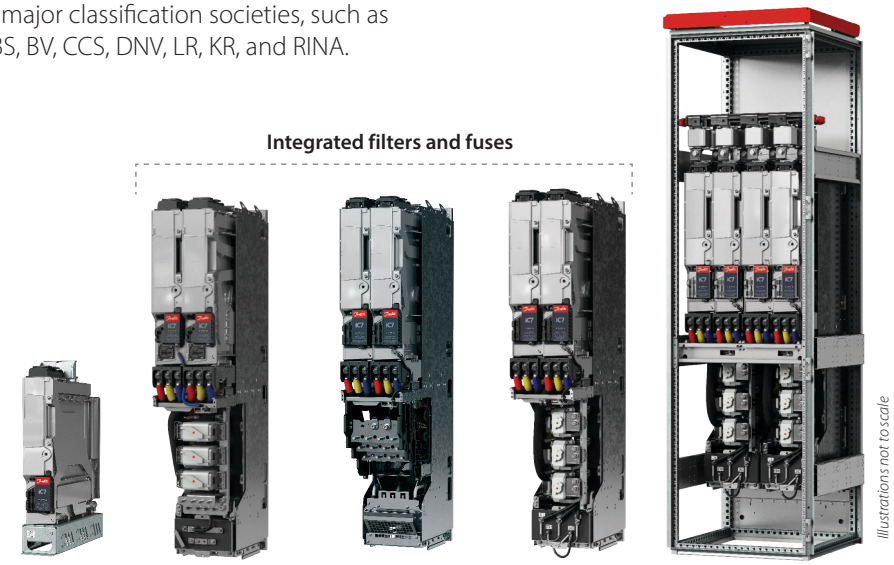
iC7-Marine and iC7-Hybrid Selection Guide

Intelligent power conversion

Voltage range	3 x 525-690 V AC 640-1100 V DC 3 x 380-500 V AC (B5) 465-800 V DC (B5)
Current range	Grid Converter 236-5750 A DC/DC converter 300-3600 A Inverter module for Generator application 170-6400 A

Type approvals

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



DC/DC Converter
1200 A
1100 V DC

Inverter module
820 A
690 V AC

Grid Converter
760 A
690 V AC

1.8 MVA Grid Converter
with LC filter in 600 mm wide enclosure

Illustrations not to scale

Key specifications

Environmental conditions	
Protection rating drive modules	– IP00/UL Open Type
Ambient operating temperature	– -15 °C (no frost) to +60 °C (at I_N)
Temperature of cooling agent	– -10 to +38 or +45 °C at (I_N)(nominal), up to 60 °C with derating
Vibration (IEC60068-2-6)	– Displacement amplitude 1 mm (peak) at 2-13.2 Hz – Maximum acceleration amplitude 0.7 G at 13.2-100 Hz with maximum amplification of 5
Shock (IEC60068-2-27)	– Max 15G, 11 ms *(in package)*
Environmental operating conditions (IEC 60721-3-3	– Climatic conditions: Class 3K22 – Chemically active substances: IEC 60721-3-3 Edition 3.0/ISO 3223 Second Edition, class C4 – Biological conditions: Class 3B1 – Mechanically active substances: Class 3S6
Compliance	– IEC-62477-1
EMC	
EMC Immunity	– IEC/EN 61000-6-2
EMC emissions	– CISPR 11 (EN 55011) Class A (Grid Converter) – IEC/EN61800-3 (2018), category C3, when installed according to the instructions (for GC + INU)

For ratings and dimensions, refer to the iC7-Marine & iC7-Hybrid Selection Guide

Grid Converter application software key features

Control references		Fit for purpose application features
Grid following	– DC voltage control (AFE) – DC power and DC current – Active and reactive AC power – Limit controllers	– Online transition between control modes during run state – Independent converter paralleling in same common AC and DC bus – Short circuit current injection with high overloadability – Support for 2 x 3-phase or DC voltage measurement option – Fall back to open loop in case feedback is lost – Blackout prevention (fall back to grid forming when limit is hit) – Black-start capability – Transformer interactive control & voltage drop compensation – Synchronization to external grid – Filter & transformer pre-magnetization – Main circuit breaker and pre-charge control – I/O, fieldbus, PC and control panel control place changeover during run state – Dedicated fieldbus control and status words & fieldbus customizer – Resilient mode enables operation at reduced power in the event that one of the parallel system modules is out of service
Grid forming	– Island mode (grid forming) – Droop control (microgrid) – Droop control with base load – Active and reactive power (PQ) – Limit controllers	
Fieldbus protocols	– Modbus TCP – PROFINET RT	

DC/DC Converter application software key features

Control references		Fit for purpose application features
	– DC bus voltage and current control – DC source voltage, power and current control – DC bus voltage as well as source voltage and current limit controllers – Buck or boost operation	– Smooth transition between control modes during run state – Droop controllers for voltage references and limit controllers – I/O, fieldbus, PC and control panel control place changeover during run state – Dedicated fieldbus control and status words – Fieldbus customizer – Black start from 350 V DC and higher – Resilient mode enables operation at reduced power in the event that one of the parallel system modules is out of service
Fieldbus protocols	– Modbus TCP – PROFINET RT	

Generator application software key features

Control references & highlights		Key application features
– Torque, power and speed references – DC-voltage reference and limit controllers – Externally excited synchronous machine supported with AFE control mode – True sensorless Flux Vector Control provides superior performance also at low speed even without encoder for PM and IM machine types – Closed loop control with bumpless transfer to open loop in case feedback is lost – Identify motor parameters with an automated sequence even at standstill (AMA)		– Multi-purpose use cases: Motor/generator control and AFE for shore connection with same hardware – Control shaft generator efficiently with pre-defined PTI/PTO operation modes – PTI/PTO transition assistant – Generator overload & stall protection – I/O, fieldbus, PC and control panel control place changeover during run state – Dedicated fieldbus control and status words & fieldbus customizer – Motor breaker control – Mains breaker & pre-charge control for shore connection applications – Load drooping with drooping removal – Black start from as low as 350 V DC – Comprehensive supervisions, protections, exceptions, limits & limit controllers – Resilient mode enables operation at reduced power in the event that one of the parallel system modules is out of service
Fieldbus protocols	– Modbus TCP – PROFINET RT	

iC7-Hybrid supports these functional extensions:

- I/O and relay option
- Temperature measurement option
- Voltage measurement option

MyDrive® Virtual simulation models reduce time to market

Remove constraints of the physical environment.

FMU models of Grid Converter, DC/DC Converter and Generator application are available for system simulation.

MyDrive® Virtual

fmi Functional Mock-Up Interface

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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.

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