Need strong and secure performance, with flexible integration?

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

iC7-Marine liquid-cooled system modules enable you to build ultra-compact configurations performing with powerful robustness in marine and offshore environments.

Choose application software to suit your purpose:

- Propulsion & Machinery
- Active Front-end
- Brake Chopper

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
Power unit can be replaced in 15 minutes, without draining the cooling system	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
Integrated functional safety with STO and SS1-t SIL3, PI e as standard, or functional safety via fieldbus	Obtain certification more easily
Logic feature in MyDrive® Insight extends features and provides increased flexibility	Apply conditional controls, implement fault detection and diagnostics, create sequencing, modes, states, and interlocking logic
Sine-in sine-out (SISO) filter compatibility for excellent and cost-efficient harmonic mitigation	Improved system reliability at reduced cost Enables transformerless power systems and unshielded cable lengths up to 2000 m

Learn more about iC7-Marine

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

iC7-Marine is available in 3 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
- System modules with short integration unit: Easy serviceability of the integration unit, while saving space

Type approvals

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

Illustrations not to scale

Voltage range	3 x 525-690 V AC (07) 640-1100 V DC (07) 3 x 380-500 V AC (A5 and B5) 465-830 V DC (A5 and B5)
Current range	Active front-end AFE 236-5750 A Inverter module 170-6400 A

Key specifications [1]

Mains connection (AFE)	
Mains voltage U_{in}	– Voltage class 07: 3 x 525-690 V AC (-15% – +10%); 640-1100 V DC (-0% – +0%) – Voltage class B5: 3 x 380-500 V AC (-15%…+10%); 465-830 V DC (-0%…+0%)
Mains frequency	– 45-66 Hz
Supply network	– TN-S, TN-C, IT and TT – Supply voltage limited to 500 V AC for corner grounded networks
Power factor	– cosφ = 1 (fundamental)
Short circuit current	– Maximum short circuit current must be < 100 kA
Total harmonics distortion THDi	– < 5%: < 3% with dedicated transformer
Overvoltage category	– Class III according to IEC/EN 61800-5-1
Imbalance	– Nominal performance with voltage imbalance ≤ 3%. – Limited performance with >3% voltage imbalance
Connections to mains	– Once every 120 s

[1] *Values subject to validation*

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

Motor connection inverter (IN)	
Output voltage	– 0-Uin 3-phase
Output frequency	– 0-599 Hz (Limited performance with output filters above 70 Hz)
Switching frequency	– 1.5-10 kHz (525-690 V AC) Default switching frequency 3 kHz
Motor control principles	– U/f control – Voltage Vector Control (VVC+) – Flux Vector Control (FVC+)
Motor and generator types supported	– Induction/asynchronous motor – Permanent magnet motor – Salient permanent magnet motor – Synchronous reluctance assisted permanent magnet motor
Cable length	– Up to 150 m [492 feet] with symmetrical 3-phase screened motor cable
DC connection	
DC bus voltage	– Voltage class 07: 640-1100 V DC (-0%..+0%) – Voltage class B5: 465-800 V DC (-0%..+0%)
DC source voltage	– 3%-100% of DC bus voltage – 3%-97% of DC bus voltage with full control performance
Source current ripple with iC7 DC/DC Filters	– DR10L < 1% RMS (typical) – DR12L < 0.5% RMS (typical)
EMC (IEC61800-3)	
Immunity	– Fulfils IEC/EN61800-3 (2018), 2nd environment
Emissions	– IEC/EN61800-3 (2018), category C4, default for the IP00/UL Open Type drive – IEC/EN61800-3 (2018), category C3, if the drive is installed according to the instructions of the manufacturer (C3 not applicable for DC/DC Converter)
Liquid cooling	
Temperature of cooling agent	– -10 to +45°C (IN)(nominal), up to 60 C with derating – Temperature rise during circulation max 10 °C – Glycol to be used in cooling agent below 0 °C and ice formation not permitted
System max. working pressure	– Operating pressure 100-150 kPa (recommended) – Maximum pressure 500 kPa
Pressure drop	– 50-120 kPa at rated volumetric flow.
Allowed cooling agents	– Demineralized water or good pure quality water according to cooling liquid quality specification with inhibitor and propylene or ethylene glycol
Corrosion inhibitor	– Corrosion inhibitor recommended, for long lifetime
Allowed materials in the cooling system	– Aluminum – Stainless steel AISI 304/316 – Plastic (PVC not allowed) – Elastomers (EPDM, NBR, FDM)
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), up to 60 °C with derating
Storage/transportation temperature	– -40 °C to +70 °C; glycol to be used in liquid under 0°C and ice formation not permitted
Relative humidity	– 5 to 96% RH, no dripping water or condensation allowed
Pollution degree	– PD3
Altitude	– 0-3000 m above sea level: voltage class 07 without AFE supply – 0-2000 m: voltage class 07 with AFE supply – Above 1,000 m derating of maximum ambient operating temperature by 0.5 °C per each 100 m is required
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 – Special climatic conditions (heat radiation): Class 3Z1
Compliance	– IEC-62477-1 Cybersecurity – Product certification IEC 62443-4-2, with Security Level Capability 2 (SL-C 2) – Marine cybersecurity IACS UR E26/E27 – Product development process IEC 62443-4-1
EMC	– EMC Immunity – IEC/EN 61000-6-2 – EMC emissions – CISPR 11 (EN 55011) Class A (Grid Converter, DC/DC Converter) – IEC/EN61800-3 (2018), category C3, when installed according to the instructions (for GC + INU)

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Your ambition. Our drive. Meet iC7 series

iC7-Automation | iC7-Marine | iC7-Hybrid | iC7-HVACR | iC7-Aqua

Imagine versatile and highly secure motor control and power conversion. The iC7 series puts this capability securely in your hands. Intensely powerful and compact variable frequency drives and converters built to optimize a vast range of systems, while giving you the flexibility to distribute intelligence the way you want.
Paving the way for new ambitions, where intelligent, efficient, and connected systems are the new reality.

Some functionalities listed in this fact sheet are for future implementation

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