Need future-proof MCS charging for marine, mining, and e-trucks?

Highlights

- Scalable from 800 kW to multi-MW charging hubs
- High efficiency power conversion with SiC technology reduces operating cost
- Ready for MCS and CCS architectures
- Seamless integration of BESS, PV and DC energy sources
- Built-in grid support (reactive current control)
- Platform approach reduces engineering time and certification effort

Features of iC7-Hybrid Grid Converter	
DC-bus technology	System design, based on grid connection and DC-power needs
Bi-directional	Enable V2G
Cybersecure-by-design	Resistant to unauthorized access
Wide DC voltage output 500-1500 V DC	Flexibility by integrated MCS and CCS standard
Charge what you connect	Charging solutions for high-power depot charging systems and standalone MCS chargers
Common-mode filter technology	Enables low Y-cap, low inductance and common-mode filtering

[1] For voltage range 525-690 V AC / 640-1100 V DC

100%
MW power conversion

Learn more about iC7-Hybrid

Megawatt charging systems (MCS)

Megawatt charging system (MCS) infrastructure requires scalable, high-efficiency power conversion and seamless integration with energy storage and renewable sources. iC7-Hybrid enables OEMs and system integrators to build future-proof high-power charging systems while minimizing total cost of ownership.

Total cost of ownership
Integrate BESS, PV, or any source with DC-bus technology and standard grid converters. Connect DC sources directly to the DC-bus to maximize efficiency and reduce total cost of ownership (TCO).

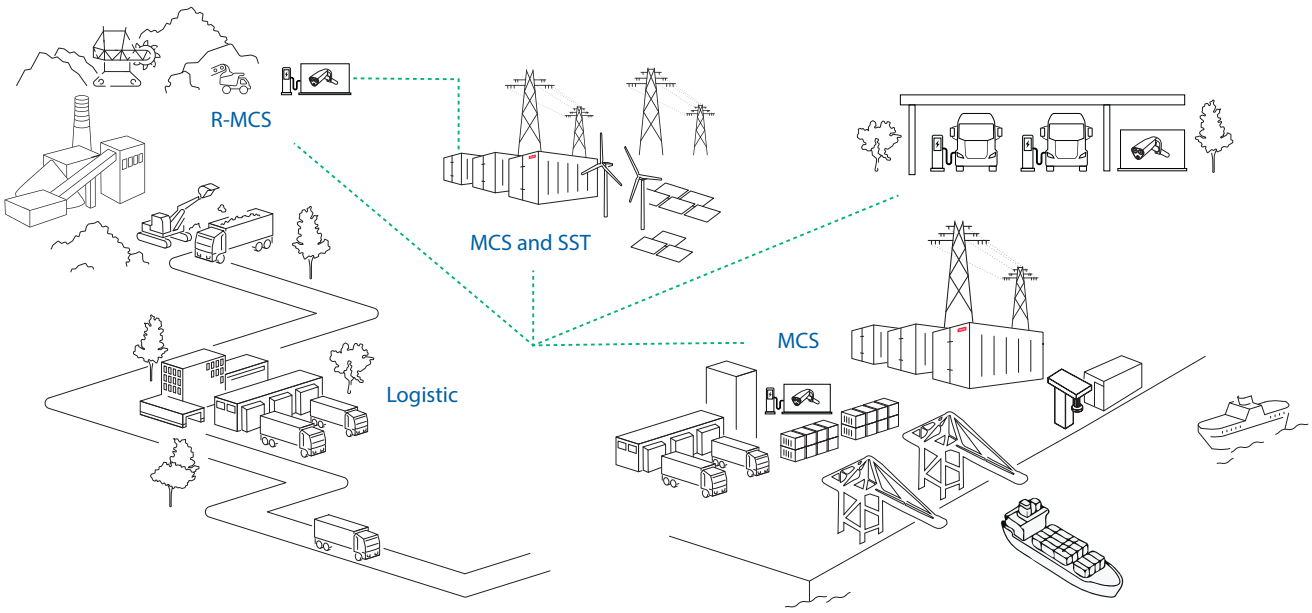
Grid impact reduction
Integrated grid support functions enable reactive current control and grid stabilization, helping operators meet grid code requirements while minimizing infrastructure upgrades.

iC7-Hybrid Grid Converter for DC fast charging system overview

AC-coupled MCS charging
- Grid support for active and reactive current
- Technology for BESS and MW charging
- High efficiency
- Compactness
- Simulation reduces time to market

Compliant with R-MCS standards
- 500-1500 VDC
- Low Y-capacitance
- Low inductance
- Fulfilling ripple current/voltage specs
- Common mode filtering
- Low THDi
- Grid support, active and reactive current injection

Future topology considerations



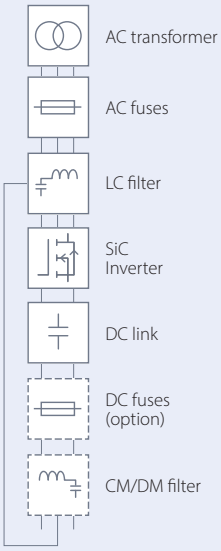
With a view to future grid topologies, Danfoss is developing the technology required for HV to LVDC grid connectivity. This approach takes advantage of DC-grid connected renewable energy (storage) with low conversion losses advancing total cost of ownership (TCO), efficiency and space.

As well as solid state transformer (SST) development, the other LVDC components required to efficiently operate DC-grids for Depot or R-MCS charging are galvanically isolated DC/DC converters.

Examples of future topologies

Solid state transformer (SST)
- MV to LVDC
- 690 V AC to 1500 V DC Grid Converter
- 1500 VDC DC//DC Converter
- BESS 1500VDC DC/DC

Charging hub to integrate R-MCS portside and shoreside charging for vessels, mining machines, electric port or mine equipment, and eTrucks.



1.5 MW R-MCS
charging/power/1500 A
with LC filter in
600 x 600 x 2000 mm enclosure

Key specifications

Ratings	
Voltage range	3 x 380-690 V AC (-15+10%) 500-1500 V DC
Current range	1000-7600 A AR12L-8xAR12L
DC current range	1180-9000 A
Power range	1.2-9 MVA
Euro efficiency	99.2%
Temperature of cooling agent	-10 to +45 °C at (I_N)(nominal), up to 60 °C with derating
Ambient operating temperature	-15 °C (no frost) to +50 °C (at I_N), up to +60 °C with derating
Environmental conditions	
Protection rating drive modules	IP00/UL Open Type; (IP55 protected power electronics)
Dimensions (W x H x D)	235 x 1295 x 566 mm (excluding DC-fuses)
Weight	230 kg
Noise level	69 dBA 1 m in reference cabinet SPL: 62 dBA 1 m in a reference cabinet, SWL: 67 dBA
Maximum altitude	2000 m
THDi	<3%
Grid connection type	IT grid, 3-phase. TN-S, TN-C [1]
EMC	
EMC Immunity	IEC/EN 61000-6-2
EMC emissions	CISPR 11 (EN 55011) Class A
Safety	IEC-62477-1
Grid codes	EN 50549-1:2019 [1], EN 50549-2:2019 and EN 50549-10:2022 VDE-AR-N 4110, VDE-AR-N 4120, and VDE-AR-N 4130 ENTSO-e (Regulation 2016/631) [1], UL1741SB [1], CSA 22.3 no. 9 [1]
Cybersecurity compliance	Product certification IEC 62443-4-2, with Security Level Capability 2 (SL-C 2) Product development process IEC 62443-4-1

[1] *Pending*