



Certificate No:  
**TAE00004BJ**

# TYPE APPROVAL CERTIFICATE

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## This is to certify:

**That the Frequency Converter**

with type designation(s)  
**EC-C1200-450-L**

Issued to

**Danfoss Editron Oy**  
**Lappeenranta, Finland**

is found to comply with

**DNV GL rules for classification – Ships, offshore units, and high speed and light craft**

## Application :

**Products approved by this certificate are accepted for installation on all vessels classed by DNV.**

Issued at **Høvik** on **2021-10-07**

This Certificate is valid until **2026-10-06**.

DNV local station: **Helsinki FIS**

for **DNV**

Approval Engineer: **Georgy Abramenko**

.....  
**Trond Sjøvåg**  
**Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.  
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: TA 251

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## Name and place of manufacturer

Danfoss Editron Oy  
Lentokentäntie 44  
FI-53600 Lappeenranta Finland

## Product description

**EC-C1200-450-L.** Semiconductor converter for use in various marine applications, can act as a motor inverter, active frond end, microgrid or as a DC/DC converter depending on options selected:

- +DC option – boosting battery voltage to higher DC-link voltage;
- +MC option – controlling the speed and torque of electrical motors, converting AC from electrical generator to DC for energy storage;
- +AFE option – active frond end for connecting to AC grid with regenerative power;
- +UG option – microgrid.

| Frequency converter type    | Nominal current [A]* | Nominal power** | Enclosure Protection |
|-----------------------------|----------------------|-----------------|----------------------|
| EC-C1200-450-L+DC150        | 150                  | 90              | IP67                 |
| EC-C1200-450-L+DC250        | 250                  | 150             | IP67                 |
| EC-C1200-450-L+DC300        | 300                  | 180             | IP67                 |
| EC-C1200-450-L+DC400        | 400                  | 240             | IP67                 |
| EC-C1200-450-L+MC/AFE/UG70  | 70                   | 50              | IP67                 |
| EC-C1200-450-L+MC/AFE/UG120 | 120                  | 100             | IP67                 |
| EC-C1200-450-L+MC/AFE/UG180 | 180                  | 150             | IP67                 |
| EC-C1200-450-L+MC/AFE/UG240 | 240                  | 200             | IP67                 |
| EC-C1200-450-L+MC/AFE/UG300 | 300                  | 250             | IP67                 |
| EC-C1200-450-L+MC/AFE/UG350 | 350                  | 300             | IP67                 |

\*-Adc for DC option and Arms for MC/AFE/UG options

\*\*-[kW] for DC option, [kVA] for MC/AFE/UG options

## Application/Limitation

Supply voltage range: DC connection: 0 – 850V DC;  
AC connection: 0 – 560V AC.  
Output frequency: 0 – 580 Hz  
Temperature range in operation: 0 – 45 °C  
Temperature class: A  
Vibration class: B  
Humidity class: B  
EMC class: DNVGL-CG-0339  
To be used on EMC class A locations

1. +DC option requires an external E-LTS1200-410 inductor unit, used to transfer energy between two different voltage levels.
2. +AFE/+UG options require an external LCL-filter unit or a transformer with integrated LC filter.
3. Leakage detection for the converter liquid cooling system should be provided within commissioning onboard.
4. Converters are capable to deliver 750A peak fault current for 1 ms, 350A fault current continuously.

## Product certificate

Frequency converters rated equal or larger than 100kW serving essential or important functions as defined in DNV GL rules Pt.4 Ch.8 shall have a product certificate according to DNV GL Pt.4 Ch.8 Sec.1 Table 3 for each delivery to DNV GL classed vessels.

For product certification, the following documents shall be submitted for approval:

- Reference to this Type Approval Certificate
- Functional description for the intended use, configuration and interface (e.g. alarms, monitoring and auxiliary power supplies)

- Test program for routine tests and functional tests
- Single line diagram (only applicable for multi drive configuration)
- If additional components apart from the type approved frequency converter are part of the delivery, documentation in accordance with DNVGL rules Pt.4 Ch.8 Sec.1 table 2 shall be delivered for the additional components

The Type Approval covers hardware and software for the basic controller.

Clause for software control:

All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV for evaluation and approval. Major changes in the software are to be approved before being installed in the converter.

### Tests carried out

Visual inspection, Performance, Power supply failure, Power supply variations, Voltage/frequency variation, Vibration, Dry heat, Damp heat, Insulation resistance, High voltage, EMC tests (immunity and emission), Temperature rise test, Short circuit test according to DNV Rules for Ships Pt.4 Ch.8 Sec.7 Table 4.

### Marking of product

Danfoss – Type designation – Option – Power – Voltage

### Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine tests (RT) checked (if not available tests according to RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at 2 and 3.5 year and at renewal.

END OF CERTIFICATE