

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Semiconductor Converter

with type designation(s)
FlexKraft Marine rectifier series

Issued to

KraftPowercon Sweden AB
Surte Västra Götalands Län, Sweden

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft
USCG Federal Register 46 CFR part 162, subpart 162.060-30
Resolution MEPC.174(58) – Annex Part 3

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2021-12-14**.

Issued at **Høvik** on **2016-12-15**

DNV GL local station: **Gothenburg**

Approval Engineer: **Marta Alonso Pontes**

for **DNV GL**

Andreas Kristoffersen
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.

Job Id:
Certificate No: **TAE00001K4**

Product description

Rectifier for marine applications. Water cooled.

Mains voltage: 380 – 480 VAC +/-10 % stationary, +/- 20% transient
Mains frequency: 50/60 Hz +/- 5 % stationary, +/- 10% transient
Number of phases: 3

Power module data:

Output voltage: Up to 100 VDC
Output current: Up to 250 A
Output power : Up to 10kW

Modules:

Voltage [V]	30	40	50	60	70	80	90	100
Current [A]	250	224	200	125	118	112	106	100

Stack size: 1 – 10 modules (power modules and/or Pole Reverse Unit modules).

Stack output voltage: Up to 200 VDC
Stack output current: Up to 2500 A

See manufacturer's Output matrix for possible power modules combinations within a stack.

Application/Limitation

A system is build up by 1 to 5 stacks. One master and up to four slaves in parallel.

Ambient temperature: 0-45 °C
Test temperature (dry and damp heat): 55 °C
Protection degree: IP44
Temperature class: A
Vibration class: A
Humidity class: B
EMC class: A

A product certificate is required in accordance with Rule requirement Pt.4. Ch.8. Sec.1 for units > 50kVA when serving an important or essential service as defined by DNV GL rules Pt.4 Ch.8. In these cases, documents for the actual application are to be submitted for approval in accordance with DNVGL Rules Pt.4 Ch.8 Sec.1 Table 2.

Type Approval documentation

Tests carried out

The following environmental tests have been carried out according to the requirements for BWMS from USCG (46 CFR 162.060-30), IMO G8, IACS E10 Rev.6 (2014) and DNVGL-CG-0339:

Vibration, low temperature, dry heat, damp heat, power supply variations, inclination, high voltage and insulation resistance.

In addition, tests as required by DNVGL-CP-0395 and DNVGL rules Pt.4 Ch.8 Sec.7 (visual inspection, temperature rise, EMC immunity and emission, rated current, short circuit capability, cooling failure, capacitor discharge).

Marking of product

FLEXKRAFT MARINE - Type designation – Power – Current – Voltage – IP degree

Periodical assessment



Job Id:
Certificate No: **TAE00001K4**

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.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE