



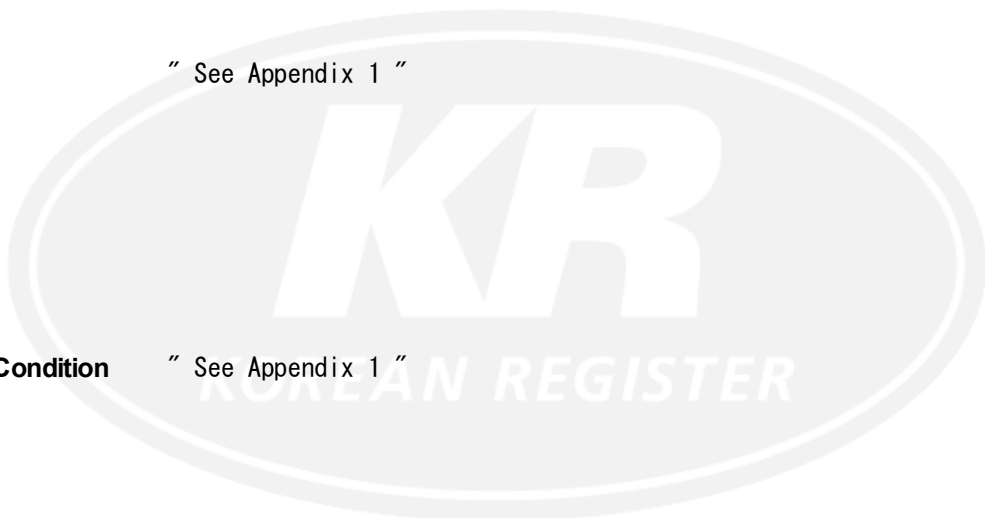
Type Approval Certificate

[Frequency Converter]

Initial Approval 28 July 2014
Manufacturer Vacon Ltd.
Runsorintie 7, 65380 Vaasa, Finland

Product Description Frequency Converter
- Type : NXP, NXA, NXN, NXI, NXS series

" See Appendix 1 "



Approval Condition " See Appendix 1 "

THIS IS TO CERTIFY that the above-mentioned product has been approved in accordance with the relevant requirement of this Society's Rules and / or of the recognized standards as follows.

Pt. 6, Ch. 2, Art. 301 of the Rules for Classification, Steel Ships.

This Certificate is valid until 27 July 2024
Reissued at Busan, Korea on 20 October 2022



This certificate is signed electronically in accordance with IMO FAL.5/Circ.39/Rev.2. Validation and authentication of the certificate can be confirmed from "<http://e-cert.krs.co.kr>" by using the tracking No(ME22030460872) and certificate No.(HMB28683-AC001).



KOREAN REGISTER

*General Manager of
Marine & Ocean Equipment Team*

- Note :**
1. This certificate will be valid subject to complying with the approval conditions described on the certificate and/or on the Rules of this Society.
 2. This certificate will be invalid from the expiry date aforementioned unless the extension or renewal has been granted to the applicant or the manufacturer.
 3. Any significant modifications or changes in design or construction to the above product without approval from this Society will render this certificate invalid.
 4. Should the specified rules, regulations or standards be amended during the validity of this certificate, the product is to be re-approved by this Society in accordance with the requirements as amended.

Product Description and/or Approval Condition

Date of Issue : 20 October 2022

A. Product Description

1. Product Specification

1) NXS Industrial Drive

- Rated voltage & motor power
 - 208 ~ 240 V, 3 phase : 0.37 ~ 75 kW
 - 380 ~ 500 V, 3 phase : 0.75 ~ 400 kW
 - 525 ~ 690 V, 3 phase : 2.2 ~ 560 kW
- Frame (Air cooled) : FR4 ~ FR12
- Degree of protection : IP 00, IP 21 & IP 54

2) NXP High Performance Drive

- Rated voltage & motor power
 - 208 ~ 240 V, 3 phase : 0.30 ~ 75 kW
 - 380 ~ 500 V, 3 phase : 0.75 ~ 1500 kW
 - 525 ~ 690 V, 3 phase : 2.2 ~ 2000 kW
- Frame (Air cooled) : FR4 ~ FR14, F19 ~ F113
- Degree of protection : IP 00, IP 21 & IP 54

3) NXP Liquid Cooled Drive

- Rated voltage & motor power
 - 380 ~ 500 V, 3 phase : 7.5 ~ 5150 kW
 - 525 ~ 690 V, 3 phase : 5.5 ~ 5300 kW
- Frame (Liquid cooled) : CH3, CH4, CH5, CH60, CH61, CH62, CH63, CH64, CH72, CH74
- Degree of protection : IP 00

* Remark

- a) NXP can be substituted by BCU, DCDC, NXA, NXN & NXI by application selection.
- b) All drive can be accompanied with external components as follows.
 - brake chopper, brake resistors, AC chokes, filters(SIN-, RFI-, DUT-, LCL)
- c) Applicable with different applications as:
 - ARFIFF02 and ARFIFF05, AFE (Active Front End)
 - ANFIFF01, NFE (Non-regenerative Front End)
 - ARFIFF03, Grid converter
 - ADFIF101, DCDC converter
 - ABFIFF01, BCU (Brake Chopper Unit)
- d) In case of applying ARFIFF03, the supply voltage and power range is as follow :
 - Air Cooled :
 - 1) From AC Grid : 3 x 380-500VAC (50/60Hz) and 180-1100 kW
3 x 525-690VAC (50/60Hz) and 200-1200 kW
 - 2) From Battery : Battery Voltage 465-1100VC depending on the voltage class
 - Liquid Cooled :
 - 1) From AC Grid : 3 x 380-500VAC (50/60Hz) and 160-1800 kW
3 x 525-690VAC (50/60Hz) and 210-1800 kW
 - 2) From Battery : 465-1100VC depending on the voltage class
- e) In case of applying ADFIF101, the supply voltage and power range is as follow :
 - Air Cooled :
 - 1) From DC Bus : 465-1100VDC and 180-1200 kW
 - 2) From Battery : 50-1100VDC depending on the voltage class
(Battery Voltage should always be lower than DC bus voltage)
 - Liquid Cooled :
 - 1) From DC Bus : 465-1100VDC and 160-1800 kW
 - 2) From Battery : 50-1100VDC depending on the voltage class
(Battery Voltage should always be lower than DC bus voltage)

2. Documentation

1) Test reports

- EMC test reports No. 228338-1, 231330-1, 234713-1 issued by SGS
- Environmental test reports No. VTT-S-00992-09 issued by VTT
- FR6 & FR8 Damp heat test report issued by VACON
- FR6 Vibration test report issued by Centria
- Other test data for CH3 ~ CH7, FR4 ~ FR14
- SGS Fimko test report No. 282088-1 (IEC 61800-5-1)
- Vacon Doc. "CH60 Liquid Cooled NFE 400-690V Summary of IEC 61800-5-1 Type tests" rev.V001 dated 2016-01-19
- SGS EMC Test Report No. 295115-1-1 and 300477-2-1
- VACON @ NXP Grid Converter Short Circuit Tests, dated 2019-02-07.

Product Description and/or Approval Condition

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- 2) Circuit diagrams & outline drawings for CH3 ~ CH7, FR4 ~ FR14
- 3) User Manual
 - Vacon NX Inverters FI4~8 User Manual
 - Vacon NX Inverters FI9~14 User Manual
 - Vacon NXP IPO0 Modules FR10~14 Installation Manual
 - Vacon NXP Liquid Cooled Drives User Manual
 - Vacon NXS NXP User Manual
 - Vacon NX DC/DC Drives, ADFIF101 DC/DC Converter Application Manual
 - Vacon NXP AC Drives, ARFIF03 Grid Converter Application Manual
 - Vacon NXP AC Drives, Brake Chopper Unit (BCU) Application Manual
- 4) Brochure, Product Statements & Quality Certificates

B. Approval Condition

1. This approval is granted on the basis of the approved documentation and the test reports (IACS UR E10 Rev.7)
2. The manufacturer should inform this Society of all kinds of revisions of the equipment. If the changes are recognized to affect functionality of the approved equipment, type test to confirm the reliability of the revised equipment may be performed in the presence of our surveyor.
3. Degree of protection shall be complied with Rule Pt.6 Ch.1 Sec.2 201.2. (5).
4. The product or packing is to be marked with manufacturer name and type designation on a suitable position.
5. Converters EMC classed C3 according to IEC 61800-3 can be installed in "special distribution zone" and "general power distribution zone" in accordance with IEC 60533 provided precautions are taken to attenuate these effects on the distribution system, so the safe operation is assured.
6. The actual installation is to be undertaken as per Manufacturer's manual, KR Rule Pt. 6, Ch. 1 & 2 and KR Guidance for Battery Systems on Board of Ship.
7. If the converters are used as parts of the motor controller which drives essential auxiliaries specified in KR Rule Pt. 5, Ch. 1, 102 and exceed the output 7.5 kW, or for electric propulsion, drawing approval for individual vessel, and/or individual product certification is required for the motor controller.
8. If the converters are used for electric propulsion unit or the power converter according to KR Guidance for Battery Systems on Board of Ship, individual product certification is required.
9. Unless specially directed by the Administration, this approval is not to be construed as a substitute for a flag Administration's approval. This certificate may not be used for Korea flagged vessels.

< End of Certificate >