



Type Approval Certificate

[Frequency Converter]

Initial Approval 21st December, 2021
Manufacturer Vacon Ltd.
Runsorintie 7, 65380 Vaasa, Finland

Product Description Type : Vacon 100X series

“ See Appendix 1 ”

* Place of Production : Danfoss s.r.l.
Via Roma 2, 39014 Postal (BZ), Italy

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 20th December, 2026

Issued at Busan, Korea on 21st December, 2021



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(ME21032649217) and certificate No.(HMB28683-AC003).



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 : 21st December, 2021

A. Product Description

1. Product Specification

- Supply voltage : 208-240V / 380-480V / 380-500V, 50/60Hz
- Temperature range in operation : 0-40°C (40-60°C when derated 2.5%/°C)

Mains voltage 208-240V, 50/60Hz, 3~

Frequency Converter type	40 degC continuous current I _{Lout} (A)	Frame size	Enclosure Protection
0007-2-X	6.6	MM4	IP66
0008-2-X	8.0	MM4	IP66
0011-2-X	11.0	MM4	IP66
0012-2-X	12.5	MM4	IP66
0018-2-X	18.0	MM5	IP66
0024-2-X	24.2	MM5	IP66
0031-2-X	31.0	MM5	IP66
0048-2-X	48.0	MM6	IP66
0062-2-X	62.0	MM6	IP66

Mains voltage 380-480V, 50/60Hz, 3~

Frequency Converter type	40 degC continuous current I _{Lout} (A)	Frame size	Enclosure Protection
0003-4-X	3.4	MM4	IP66
0004-4-X	4.8	MM4	IP66
0005-4-X	5.6	MM4	IP66
0008-4-X	8.0	MM4	IP66
0009-4-X	9.6	MM4	IP66
0012-4-X	12.0	MM4	IP66
0016-4-X	16.0	MM5	IP66
0023-4-X	23.0	MM5	IP66
0031-4-X	31.0	MM5	IP66
0038-4-X	38.0	MM6	IP66
0046-4-X	46.0	MM6	IP66
0061-4-X	61.0	MM6	IP66
0072-4-X	72.0	MM6	IP66

Mains voltage 380-500V, 50/60Hz, 3~

Frequency Converter type	40 degC continuous current I _{Lout} (A)	Frame size	Enclosure Protection
0003-5-X	3.4	MM4	IP66
0004-5-X	4.8	MM4	IP66
0005-5-X	5.6	MM4	IP66
0008-5-X	8.0	MM4	IP66
0009-5-X	9.6	MM4	IP66
0012-5-X	12.0	MM4	IP66
0016-5-X	16.0	MM5	IP66
0023-5-X	23.0	MM5	IP66
0031-5-X	31.0	MM5	IP66
0038-5-X	38.0	MM6	IP66
0046-5-X	46.0	MM6	IP66
0061-5-X	61.0	MM6	IP66
0072-5-X	72.0	MM6	IP66

Product Description and/or Approval Condition

Date of Issue : 21st December, 2021

2. Approved Drawings and Documents

- 1) Brochure No. DPD01194B (page 8-11)

3. Test Reports, etc.

- 1) Test Reports
 - 278414-1 dated 2015-03-12, 278414-2 dated 2015-03-12, 265797-1 dated 2012-01-20, 269776-1 dated 2013-01-02, 269776-2 dated 2013-01-02, 290708-1-2 dated 2018-01-15, 300620-1 dated 2020-11-24
 - TED10757 dated 2015-07-17, TED10721 dated 2015-07-03, TED10723 dated 2015-07-08, TED10758 dated 2015-07-17, TED10724 dated 2015-07-17, TED10720 dated 2015-07-03
 - VTT-S-02611-15 dated 2015-06-17
- 2) Manuals, Circuit diagrams and Product statements

B. Approval Condition

1. Application & Limitation

- 1) This approval is granted on the basis of the test reports and the approved documentation.
- 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 shall not be installed in the bridge or on open decks.
- 5) Converters with conducted and radiated emission above the KR required limits can be installed in special distribution zone and general power distribution zone, in accordance with IEC 60533 provided measures are taken to attenuate these effects on the distribution system, so safe operation is assured.

2. Individual Product Cert. and Drawing Approval Requirement

- 1) If the converters are used as parts of the motor controller which drive 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.
- 2) If the converters are used for electric propulsion unit, drawing approval for individual vessel, and individual product certification are required.

3. Marking

- 1) The product or packing is to be marked with the manufacturer's name and type designation on a suitable position.

4. Others

- 1) Test condition (IACS UR E10 Rev. 8 basis)

Test	Condition	Remark
EMC	All locations excluding the bridge and deck zone	-
Temperature	+5°C ~ +55°C	-
Vibration	Acceleration $\pm 0.7g$	-

< End of Certificate >