



Type Approval Certificate

[Frequency Converter]

Initial Approval 11th August, 2021
Manufacturer Vacon Ltd.
Runsorintie 7, 65380 Vaasa, Finland

Product Description Type : Vacon 100 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 10th August, 2026
Issued at Busan, Korea on 11th August, 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(ME21020493325) and certificate No.(HMB28683-AC002).



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 : 11th August, 2021

A. Product Description

1. Product Specification

- Supply voltage : 200-240 V / 380-480 (500) V / 525-690 V, 50/60 Hz
- Temperature range in operation : 40-50 °C derate 1.5% /°C, 50-55 °C derate 2,5% /°C

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

Frequency Converter type	45 degC continuous current I _{out} (A)	Frame size	Enclosure Protection
0100-3L-0003-2-xxxx	3.15	MR4	IP21, IP54
0100-3L-0004-2-xxxx	4.25	MR4	IP21, IP54
0100-3L-0007-2-xxxx	5.7	MR4	IP21, IP54
0100-3L-0008-2-xxxx	7.3	MR4	IP21, IP54
0100-3L-0011-2-xxxx	9.5	MR4	IP21, IP54
0100-3L-0012-2-xxxx	11.05	MR4	IP21, IP54
0100-3L-0018-2-xxxx	15.25	MR5	IP21, IP54
0100-3L-0024-2-xxxx	21	MR5	IP21, IP54
0100-3L-0031-2-xxxx	28	MR5	IP21, IP54
0100-3L-0048-2-xxxx	39.5	MR6	IP21, IP54
0100-3L-0062-2-xxxx	55	MR6	IP21, IP54
0100-3L-0075-2-xxxx	68.5	MR7	IP21, IP54
0100-3L-0088-2-xxxx	81.5	MR7	IP21, IP54
0100-3L-0105-2-xxxx	96.5	MR7	IP21, IP54
0100-3L-0140-2-xxxx	127	MR8	IP00, IP21, IP54
0100-3L-0170-2-xxxx	155	MR8	IP00, IP21, IP54
0100-3L-0205-2-xxxx	187.5	MR8	IP00, IP21, IP54
0100-3L-0261-2-xxxx	236	MR9A	IP00, IP21, IP54
0100-3L-0310-2-xxxx	280.5	MR9A	IP00, IP21, IP54

Mains voltage 380-480V (500V), 50/60Hz, 3~

Frequency Converter type	45 degC continuous current I _{out} (A)	Frame size	Enclosure Protection
0100-3L-0003-5-xxxx	3	MR4	IP21, IP54
0100-3L-0004-5-xxxx	4.1	MR4	IP21, IP54
0100-3L-0005-5-xxxx	4.95	MR4	IP21, IP54
0100-3L-0008-5-xxxx	6.8	MR4	IP21, IP54
0100-3L-0009-5-xxxx	8.8	MR4	IP21, IP54
0100-3L-0012-5-xxxx	10.8	MR4	IP21, IP54
0100-3L-0016-5-xxxx	14	MR5	IP21, IP54
0100-3L-0023-5-xxxx	19.5	MR5	IP21, IP54
0100-3L-0031-5-xxxx	27	MR5	IP21, IP54
0100-3L-0038-5-xxxx	34.5	MR6	IP21, IP54
0100-3L-0046-5-xxxx	42	MR6	IP21, IP54
0100-3L-0061-5-xxxx	53.5	MR6	IP21, IP54
0100-3L-0072-5-xxxx	66.5	MR7	IP21, IP54
0100-3L-0087-5-xxxx	79.5	MR7	IP21, IP54
0100-3L-0105-5-xxxx	96	MR7	IP21, IP54
0100-3L-0140-5-xxxx	122.5	MR8	IP00, IP21, IP54
0100-3L-0170-5-xxxx	155	MR8	IP00, IP21, IP54
0100-3L-0205-5-xxxx	187.5	MR8	IP00, IP21, IP54
0100-3L-0261-5-xxxx	233	MR9A	IP00, IP21, IP54
0100-3L-0310-5-xxxx	280.5	MR9A	IP00, IP21, IP54
0100-3L-0386-5-xxxx	347.5	MR9B	IP00, IP21, IP54
0100-3L-0385-5-xxxx	347.5	MR10	IP00, IP21, IP54
0100-3L-0460-5-xxxx	422.5	MR10	IP00, IP21, IP54
0100-3L-0520-5-xxxx	490	MR10	IP00, IP21, IP54
0100-3L-0590-5-xxxx	555	MR10	IP00, IP21, IP54
0100-3L-0651-5-xxxx	620	MR11	IP00, IP21, IP54
0100-3L-0731-5-xxxx	690	MR11	IP00, IP21, IP54

Product Description and/or Approval Condition

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Mains voltage 380-480V (500V), 50/60Hz, 3~			
Frequency Converter type	45 degC continuous current I _{Out} (A)	Frame size	Enclosure Protection
0100-3L-0650-5-xxxx	620	MR12	IP00, IP21, IP54
0100-3L-0730-5-xxxx	690	MR12	IP00, IP21, IP54
0100-3L-0820-5-xxxx	775	MR12	IP00, IP21, IP54
0100-3L-0920-5-xxxx	870	MR12	IP00, IP21, IP54
0100-3L-1040-5-xxxx	980	MR12	IP00, IP21, IP54
0100-3L-1180-5-xxxx	1050	MR12	IP00, IP21, IP54

Mains voltage 525-600V, 50/60Hz, 3~			
Frequency Converter type	45 degC continuous current I _{Out} (A)	Frame size	Enclosure Protection
0100-3L-0004-6-xxxx	3, 3	MR5	IP21, IP54
0100-3L-0006-6-xxxx	5	MR5	IP21, IP54
0100-3L-0009-6-xxxx	7. 55	MR5	IP21, IP54
0100-3L-0011-6-xxxx	10	MR5	IP21, IP54
0100-3L-0018-6-xxxx	15. 75	MR6	IP21, IP54
0100-3L-0022-6-xxxx	20	MR6	IP21, IP54
0100-3L-0027-6-xxxx	24. 5	MR6	IP21, IP54
0100-3L-0034-6-xxxx	30. 5	MR6	IP21, IP54
0100-3L-0041-6-xxxx	37. 5	MR7	IP21, IP54
0100-3L-0052-6-xxxx	46. 5	MR7	IP21, IP54
0100-3L-0062-6-xxxx	57	MR7	IP21, IP54
0100-3L-0080-6-xxxx	71	MR8	IP00, IP21, IP54
0100-3L-0100-6-xxxx	90	MR8	IP00, IP21, IP54
0100-3L-0125-6-xxxx	112. 5	MR8	IP00, IP21, IP54
0100-3L-0144-6-xxxx	134. 5	MR9A	IP00, IP21, IP54
0100-3L-0208-6-xxxx	189	MR9A	IP00, IP21, IP54
0100-3L-0262-6-xxxx	234. 5	MR9B	IP00, IP21, IP54
0100-3L-0261-6-xxxx	234. 5	MR10	IP00, IP21, IP54
0100-3L-0325-6-xxxx	293	MR10	IP00, IP21, IP54
0100-3L-0385-6-xxxx	355	MR10	IP00, IP21, IP54
0100-3L-0416-6-xxxx	400. 5	MR10	IP00, IP21, IP54
0100-3L-0461-6-xxxx	438	MR11	IP00, IP21, IP54
0100-3L-0521-6-xxxx	490	MR11	IP00, IP21, IP54
0100-3L-0460-6-xxxx	438	MR12	IP00, IP21, IP54
0100-3L-0520-6-xxxx	490	MR12	IP00, IP21, IP54
0100-3L-0590-6-xxxx	555	MR12	IP00, IP21, IP54
0100-3L-0650-6-xxxx	620	MR12	IP00, IP21, IP54
0100-3L-0750-6-xxxx	700	MR12	IP00, IP21, IP54
0100-3L-0820-6-xxxx	735	MR12	IP00, IP21, IP54

Mains voltage 525-690V, 50/60Hz, 3~			
Frequency Converter type	45 degC continuous current I _{Out} (A)	Frame size	Enclosure Protection
0100-3L-0007-7-xxxx	6. 5	MR6	IP21, IP54
0100-3L-0010-7-xxxx	8. 75	MR6	IP21, IP54
0100-3L-0013-7-xxxx	11. 75	MR6	IP21, IP54
0100-3L-0018-7-xxxx	15. 75	MR6	IP21, IP54
0100-3L-0022-7-xxxx	20	MR6	IP21, IP54
0100-3L-0027-7-xxxx	24. 5	MR6	IP21, IP54
0100-3L-0034-7-xxxx	30. 5	MR6	IP21, IP54
0100-3L-0041-7-xxxx	37. 5	MR7	IP21, IP54
0100-3L-0052-7-xxxx	46. 5	MR7	IP21, IP54

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Frequency Converter type	45 degC continuous current I _{Lout} (A)	Frame size	Enclosure Protection
0100-3L-0062-7-xxxx	57	MR7	IP21, IP54
0100-3L-0080-7-xxxx	71	MR8	IP00, IP21, IP54
0100-3L-0100-7-xxxx	90	MR8	IP00, IP21, IP54
0100-3L-0125-7-xxxx	112.5	MR8	IP00, IP21, IP54
0100-3L-0144-7-xxxx	134.5	MR9A	IP00, IP21, IP54
0100-3L-0170-7-xxxx	157	MR9A	IP00, IP21, IP54
0100-3L-0208-7-xxxx	189	MR9A	IP00, IP21, IP54
0100-3L-0262-7-xxxx	234.5	MR9B	IP00, IP21, IP54
0100-3L-0261-7-xxxx	234.5	MR10	IP00, IP21, IP54
0100-3L-0325-7-xxxx	293	MR10	IP00, IP21, IP54
0100-3L-0385-7-xxxx	355	MR10	IP00, IP21, IP54
0100-3L-0416-7-xxxx	400.5	MR10	IP00, IP21, IP54
0100-3L-0461-7-xxxx	438	MR11	IP00, IP21, IP54
0100-3L-0521-7-xxxx	490	MR11	IP00, IP21, IP54
0100-3L-0460-7-xxxx	438	MR12	IP00, IP21, IP54
0100-3L-0520-7-xxxx	490	MR12	IP00, IP21, IP54
0100-3L-0590-7-xxxx	555	MR12	IP00, IP21, IP54
0100-3L-0650-7-xxxx	620	MR12	IP00, IP21, IP54
0100-3L-0750-7-xxxx	700	MR12	IP00, IP21, IP54
0100-3L-0820-7-xxxx	735	MR12	IP00, IP21, IP54

2. Approved Drawings and Documents

- 1) Datasheet No. BC00446A

3. Test Reports, etc.

- 1) Test Reports
 - 265797-1 dated 2012-01-20, 269776-1 dated 2013-01-02, 269776-2 dated 2013-01-02, 294638-1a, -1b Attachment 1 & 2, 290708-1-2 dated 2018-01-15, 276122-2 Amendment No.1 dated 2015-01-19, 276122-3 Amendment No.1 dated 2015-07-06, 276122-4 Amendment No.1 dated 2015-07-06, 278414-1 dated 2015-03-12, 278414-2 dated 2015-03-12, 278414-3 dated 2015-03-12, 278414-4 dated 2015-03-13, 278414-5 dated 2015-03-13, 293589-1 dated 2018-10-03, 293589-2 dated 2018-10-03, 294638-1a dated 2019-03-13, 294638-1b dated 2019-03-13, 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-01016-15 dated 2015-03-25, VTT-S-02593-15 dated 2015-06-17, VTT-S-00567-18 dated 2018-02-06, P VTT-S-01711-18 dated 2018-04-10
- 2) Manuals, Circuit diagrams, Product statements, Fact sheets

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.
- 6) We note that MR8, MR9, MR10, MR11 and MR12 can be delivered as IP00 modules and they do not comply with EMC requirements. Evidences to ensure the compliance with EMC requirement are required to be submitted for review prior to installation of these models on board.

Product Description and/or Approval Condition

Date of Issue : 11th August, 2021

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 >

KOREAN REGISTER