

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Frequency Converter**with type designation(s)
Vacon 100 series,

Issued to

Vacon Ltd
VAASA, Finlandis found to comply with
DNV GL rules for classification – Ships and offshore units**Application :****Frequency Converter for Asynchronous Motors Range: 0,55 kW to 800 kW**
208-240 / 380-480 (500) / 525-690 VAC supply.**Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**This Certificate is valid until **2021-03-14**.Issued at **Høvik** on **2016-03-15**DNV GL local station: **Turku**Approval Engineer: **Nicolay Horn**for **DNV GL**-----
Marit Laumann
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.

Product Description:

Vacon 100. Frequency converter for use in various marine applications.

Mains voltage 208-240V, 50/60Hz, 3~			
Frequency Converter type	Current rating 45 degC continuous current I_{Lout} (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	MR9	IP00 / IP21, IP54
0100-3L-0310-2-xxxx	280,5	MR9	IP00 / IP21, IP54

Mains voltage 380-480V (500V), 50/60Hz, 3~			
Frequency Converter type	Current rating 45degC continuous current I_{Lout} (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	MR9	IP00, IP21, IP54

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Mains voltage 380-480V (500V), 50/60Hz, 3~			
Frequency Converter type	Current rating 45degC continuous current I_{Lout} (A)	Frame size	Enclosure Protection**
0100-3L-0310-5-xxxx	280,5	MR9	IP00, IP21,IP54
0100-3L-0385-5-xxxx	347,5	MR10	IP00
0100-3L-0460-5-xxxx	422,5	MR10	IP00
0100-3L-0520-5-xxxx	490	MR10	IP00
0100-3L-0590-5-xxxx	555	MR10	IP00
0100-3L-0650-5-xxxx	620	MR12	IP00
0100-3L-0730-5-xxxx	690	MR12	IP00
0100-3L-0820-5-xxxx	775	MR12	IP00
0100-3L-0920-5-xxxx	870	MR12	IP00
0100-3L-1040-5-xxxx	980	MR12	IP00
0100-3L-1180-5-xxxx	1050	MR12	IP00

Mains voltage 525-600V, 50/60Hz, 3~			
Frequency Converter type	Current rating 45degC continuous current I_{Lout} (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	MR9	IP00, IP21,IP54
0100-3L-0208-6-xxxx	189	MR9	IP00, IP21,IP54
0100-3L-0261-6-xxxx	234,5	MR10	IP00
0100-3L-0325-6-xxxx	293	MR10	IP00
0100-3L-0385-6-xxxx	355	MR10	IP00
0100-3L-0416-6-xxxx	400,5	MR10	IP00
0100-3L-0460-6-xxxx	438	MR12	IP00
0100-3L-0520-6-xxxx	490	MR12	IP00
0100-3L-0590-6-xxxx	555	MR12	IP00
0100-3L-0650-6-xxxx	620	MR12	IP00
0100-3L-0750-6-xxxx	700	MR12	IP00
0100-3L-0820-6-xxxx	735	MR12	IP00

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Mains voltage 525-690V, 50/60Hz, 3~			
Frequency Converter type	Current rating 45degC continuous current I _{Lout} (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
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	MR9	IP00, IP21,IP54
0100-3L-0170-7-xxxx	157	MR9	IP00, IP21,IP54
0100-3L-0208-7-xxxx	189	MR9	IP00, IP21,IP54
0100-3L-0261-7-xxxx	234,5	MR10	IP00
0100-3L-0325-7-xxxx	293	MR10	IP00
0100-3L-0385-7-xxxx	355	MR10	IP00
0100-3L-0416-7-xxxx	400,5	MR10	IP00
0100-3L-0460-7-xxxx	438	MR12	IP00
0100-3L-0520-7-xxxx	490	MR12	IP00
0100-3L-0590-7-xxxx	555	MR12	IP00
0100-3L-0650-7-xxxx	620	MR12	IP00
0100-3L-0750-7-xxxx	700	MR12	IP00
0100-3L-0820-7-xxxx	735	MR12	IP00

Application/Limitation

Supply voltage range:	200-240 V / 380-480 (500) V / 525-690 V, 50/60 Hz
Voltage variation:	± 10 %
Frequency variation:	47- 65 Hz
Output frequency:	8 - 320 Hz
Temperature range in operation:	0 - 40 °C (40 – 55 °C when derated 2,5%/°C)
Temperature class:	A
Vibration class:	A
Humidity class:	A
EMC class*:	DNV Standard No 2.4 / IEC 61800-3 C2 To be used on EMC class A locations

Documents for the actual application are to be submitted for approval in each case in accordance with DNV Rules Pt.4, Ch.8, Sec.1 Table B2. A Product Certificate is required for converters ≥ 100 kW.

* Converters EMC classed C2 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.

** To be installed in an enclosure with an IP degree in accordance with DNV Rules w.r.t. location.

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.

Type Approval documentation

Tests carried out

Visual inspection, Performance, Power supply failure, Power supply variations, Voltage/frequency variation, Vibration/shock, Dry heat, Damp heat, Insulation resistance, High voltage.

EMC: Electrical fast transient (Burst), electrical slow transient (Surge), RF-common mode Voltage, radiated RF-electromagnetic fields, electric discharge (ESD), radiated and conducted emission.

Marking of product

Vacon 100 - Type designation – Power – Voltage

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type Approval is 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 Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and 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 least every second year.

END OF CERTIFICATE