



Marine & Offshore
Division

Certificate number: 47562/A0 BV

File number: ACE6/842/2

Product code: 2592H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

Vacon Ltd

VAASA - FINLAND

for the type of product

FREQUENCY CONVERTERS (Power below 50kW)

VACON 100 & 100X series.

Requirements:

Bureau Veritas Rules for the Classification of Steel Ships.

EC Code: 31.

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 18 Nov 2021

For BUREAU VERITAS,

At BV HELSINKI, on 18 Nov 2016,

Tommy Andersson



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine & Offshore Division available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 October 2014

This certificate consists of 5 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

The VACON100 & 100X series are frequency converters for Marine applications.

1.1 - VACON100 approval range:

1.1.1 - Mains voltage 208-240 V, 50-60 Hz

Frequency converter type	Module drive	Enclosed drive -ED (IP21, IP54)	Low overload			High overload			45°C continuous current	Max current Is (2s) (A)
			Loadability	Motor shaft power		Loadability	Motor shaft power			
			40°C continu- ous current ILout (A)	230V 40°C LO (kW)	NEC 230V 40°C LO (HP)	50°C continuous current IHout (A)	230V 50°C HO (kW)	NEC 230V 50°C HO (HP)		
0100-3L-0003-2-xxxx	IP21, IP54	-	3.7	0.55	0.75	2.6	0.37	0.5	3.15	5.2
0100-3L-0004-2-xxxx	IP21, IP54	-	4.8	0.75	1	3.7	0.55	0.75	4.25	7.4
0100-3L-0007-2-xxxx	IP21, IP54	-	6.6	1.1	1.5	4.8	0.75	1	5.7	9.6
0100-3L-0008-2-xxxx	IP21, IP54	-	8	1.5	2	6.6	1.1	1.5	7.3	13.2
0100-3L-0011-2-xxxx	IP21, IP54	-	11	2.2	3	8	1.5	2	9.5	16
0100-3L-0012-2-xxxx	IP21, IP54	-	12.5	3	4	9.6	2.2	3	11.05	19.6
0100-3L-0018-2-xxxx	IP21, IP54	-	18	4	5	12.5	3	4	15.25	25
0100-3L-0024-2-xxxx	IP21, IP54	-	24	5.5	7.5	18	4	5	21	36
0100-3L-0031-2-xxxx	IP21, IP54	-	31	7.5	10	25	5.5	7.5	28	46
0100-3L-0048-2-xxxx	IP21, IP54	-	48	11	15	31	7.5	10	39.5	62
0100-3L-0062-2-xxxx	IP21, IP54	-	62	15	20	48	11	15	55	96
0100-3L-0075-2-xxxx	IP21, IP54	-	75	18.5	25	62	15	20	68.5	124
0100-3L-0088-2-xxxx	IP21, IP54	-	88	22	30	75	18.5	25	81.5	150
0100-3L-0105-2-xxxx	IP21, IP54	-	105	30	40	88	22	30	96.5	176
0100-3L-0140-2-xxxx	IP00, IP21,IP54	-	140	37	50	114	30	40	127	210
0100-3L-0170-2-xxxx	IP00, IP21,IP54	-	170	45	60	140	37	50	155	280

1.1.2 - Mains voltage 380-500 V, 50-60 Hz

Frequency converter type	Module drive	Enclosed drive -ED (IP21, IP54)	Low overload			High overload			45°C continuous current	Max current Is (2s) (A)
			Loadability	Motor shaft power		Loadability	Motor shaft power			
			40°C continu- ous current ILout (A)	400V 40°C LO (kW)	480V NEMA / NEC 40°C LO (HP)	50°C continuous current IHout (A)	400V 50°C HO (kW)	480V NEMA / NEC 50°C HO (HP)		
0100-3L-0003-5-xxxx	IP21, IP54	-	3.4	1.1	1.5	2.6	0.75	1	3	5.2
0100-3L-0004-5-xxxx	IP21, IP54	-	4.8	1.5	2	3.4	1.1	1.5	4.1	6.8
0100-3L-0005-5-xxxx	IP21, IP54	-	5.6	2.2	3	4.3	1.5	2	4.95	8.6
0100-3L-0008-5-xxxx	IP21, IP54	-	8	3	4	5.6	2.2	3	6.8	11.2
0100-3L-0009-5-xxxx	IP21, IP54	-	9.6	4	5	8	3	4	8.8	16
0100-3L-0012-5-xxxx	IP21, IP54	-	12	5.5	7.5	9.6	4	5	10.8	19.2
0100-3L-0016-5-xxxx	IP21, IP54	-	16	7.5	10	12	5.5	7.5	14	24
0100-3L-0023-5-xxxx	IP21, IP54	-	23	11	15	16	7.5	10	19.5	32
0100-3L-0031-5-xxxx	IP21, IP54	-	31	15	20	23	11	15	27	46
0100-3L-0038-5-xxxx	IP21, IP54	-	38	18.5	25	31	15	20	34.5	62
0100-3L-0046-5-xxxx	IP21, IP54	-	46	22	30	38	18.5	25	42	76
0100-3L-0061-5-xxxx	IP21, IP54	-	61	30	40	46	22	30	53.5	92
0100-3L-0072-5-xxxx	IP21, IP54	-	72	37	50	61	30	40	66.5	122
0100-3L-0087-5-xxxx	IP21, IP54	-	87	45	60	72	37	50	79.5	144

1.1.3 - Mains voltage 525-600V, 50-60 Hz

Frequency converter type	Module drive	Enclosed drive -ED (IP21, IP54)	Low overload		High overload		45°C continuous current	Max current Is (2s) (A)
			Loadability	Motor shaft power	Loadability	Motor shaft power		
			40°C continu- ous current ILout (A)	600V 40°C LO (HP)	50°C continu- ous current IHout (A)	600V 50°C HO (HP)		
0100-3L-0004-6-xxxx	IP21, IP54	-	3.9	3	2.7	2	3.3	5.4
0100-3L-0006-6-xxxx	IP21, IP54	-	6.1	5	3.9	3	5	7.8
0100-3L-0009-6-xxxx	IP21, IP54	-	9	7.5	6.1	5	7.55	12.2
0100-3L-0011-6-xxxx	IP21, IP54	-	11	10	9	7.5	10	18
0100-3L-0018-6-xxxx	IP21, IP54	-	18	15	13.5	10	15.75	27
0100-3L-0022-6-xxxx	IP21, IP54	-	22	20	18	15	20	36
0100-3L-0027-6-xxxx	IP21, IP54	-	27	25	22	20	24.5	44
0100-3L-0034-6-xxxx	IP21, IP54	-	34	30	27	25	30.5	54
0100-3L-0041-6-xxxx	IP21, IP54	-	41	40	34	30	37.5	68
0100-3L-0052-6-xxxx	IP21, IP54	-	52	50	41	40	46.5	82
0100-3L-0062-6-xxxx	IP21, IP54	-	62	60	52	50	57	104

1.1.4 - Mains voltage 525-690 V, 50-60 Hz

Frequency converter type	Module drive	Enclosed drive -ED (IP21, IP54)	Low overload			High overload			45°C continuos current	Max current Is (2s) (A)
			Loadability	Motor shaft power		Loadability	Motor shaft power			
			40°C continu- ous current ILout (A)	690V 40°C LO (kW)	600V 40°C LO (HP)	50°C continu- ous current IHout (A)	690V 50°C HO (kW)	600V 50°C HO (HP)		
0100-3L-0007-7-xxxx	IP21, IP54	-	7.5	5.5	5	5.5	4	3	6.5	11
0100-3L-0010-7-xxxx	IP21, IP54	-	10	7.5	7.5	7.5	5.5	5	8.75	15
0100-3L-0013-7-xxxx	IP21, IP54	-	13.5	11	10	10	7.5	7.5	11.75	20
0100-3L-0018-7-xxxx	IP21, IP54	-	18	15	15	13.5	11	10	15.75	27
0100-3L-0022-7-xxxx	IP21, IP54	-	22	18.5	20	18	15	15	20	36
0100-3L-0027-7-xxxx	IP21, IP54	-	27	22	25	22	18.5	20	24.5	44
0100-3L-0034-7-xxxx	IP21, IP54	-	34	30	30	27	22	25	30.5	54
0100-3L-0041-7-xxxx	IP21, IP54	-	41	37	40	34	30	30	37.5	68
0100-3L-0052-7-xxxx	IP21, IP54	-	52	45	50	41	37	40	46.5	82

1.2 - VACON100 X (IP66) approval range:

Mains voltage 3AC 208-240V							
Specification		Loadability			Motor shaft power 230 V supply		
Converter type	Input Current (A)	Rated continuous current In(A)	50% overload current (A)	Max current Is (A)	(kW)	(HP)	
0007	6.0	6.6	9.9	13.2	1.1	1.5	
0008	7.2	8	12	16	1.5	2	
0011	9.7	11	16.5	22	2.2	3	
0012	10.9	12.5	18.8	25	3	4	
0018	16.1	18	27	36	4	5	
0024	21.7	24.2	36.3	48.4	5.5	7.5	
0031	27.7	31	46.5	62	7.5	10	
0048	43.8	48	72	96	11	15	
0062	57.0	62	93	124	15	20	

Mains voltage 3AC 380-480V/380-500V							
Specification		Loadability			Motor shaft power 400/480 V supply		
Converter type	Input Current (A)	Rated continuous current In(A)	50% overload current (A)	Max current Is (A)	(kW)	(HP)	
0003	3.4	3.4	5.1	6.8	1.1	1.5	
0004	4.6	4.8	7.2	9.6	1.5	2	
0005	5.4	5.6	8.4	11.2	2.2	3	
0008	8.1	8	12	16	3	4	
0009	9.3	9.6	14.4	19.2	4	5	
0012	11.3	12	18	24	5.5	7.5	
0016	15.4	16	24	32	7.5	10	
0023	21.3	23	34.5	46	11	15	
0031	28.4	31	46.5	62	15	20	
0038	36.7	38	57	76	18.5	25	
0046	43.6	46	69	92	22	30	
0061	58.2	61	91.5	122	30	40	

Mains voltage 3AC 380-480V/380-500V						
Specification		Loadability			Motor shaft power 400/480 V supply	
Converter type	Input Current (A)	Rated continuous current In(A)	10% overload current (A)	Max current Is (A)	(kW)	(HP)
0072	67.5	72	80	108	37	50

2. DOCUMENTS AND DRAWINGS :

VACON100 installation manual for wall mounted drives, ref. DPD01711F, dated 20.Feb.2015.
 VACON100 installation manual for IP00 drives, ref. DPD01665B, dated 15.Jun.2015.
 VACON100 marine installation guide, ref. DPD01773A Rev. A, dated 11.Aug.2015.
 VACON100 installation manual for enclosed drives, ref. DPD01666B, dated 25.Jun.2015.
 VACON100 installation instruction for drive supply switch, ref. DPD01421 Rev. A, dated 13.Jan.2014.
 VACON100 data sheet, ref. BC00446A.
 VACON100 X installation manual, ref. DPD00534H Rev. H, dated 10.Jul.2015.
 VACON100 X Mains switch manual, ref. DPD00978B.
 VACON100 X Control keypad manual, ref. DPD00979A.
 VACON100 X optional heater manual, ref. DPD01097A.
 VACON100 X data sheet, ref. DPD01194B.
 Drawings refs. Binder#1 & Binder#2 dated 11.Dec.2015.

3. TEST REPORTS :

VACON:

- Test report No. TED10720 & TED10721, dated 03.Jul.2015.
- Test report No. TED10724, dated 17.Jul.2015.
- Test report No. TED10728, dated 08.Jul.2015.
- Test report No. TED10757 & TED10758, dated 17.Jul.2015.

VTT:

- Test report No. VTT-S-02593-15, dated 17.Jun.2015.

SGS:

- Tests report No. 269776-1/2, dated 02.Jan.2013.

4. APPLICATION / LIMITATION :

- 4.1 - BUREAU VERITAS Rules and Regulations for the Classification of Steel Ships.
 4.2 - Approval valid for ships intended to be granted with the following additional class notations: **AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.**
 4.3 - BUREAU VERITAS Environmental Category, **EC Code: 31.**
 4.4 - The equipment fulfils the EMC requirements for installation in General Power Distribution Zones.
 4.5 - The installation shall comply with the Manufacturer's recommendation described in the above-referenced documentation.
 4.6 - The **VACON 100 & 100X series** use a derating factor as follows:

Models	Maximum temperature	Derating possible
VACON 100 & 100X series	40°C	40-50°C derate 1.5%/°C, 50-55°C derate 2.5%/°C 40-60°C when derated 2.5%/°C for Vacon 100X

Note: Frequency converters with safety-related options have a maximum ambient temperature of 40°C.

5. PRODUCTION SURVEY REQUIREMENTS :

- 5.1 - The **VACON 100 & 100X series** are to be supplied by **Vacon Ltd** in compliance with the type described in this certificate.
 5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.
 5.3 - **Vacon Ltd** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.
 5.4 - **Vacon Ltd** has declared to Bureau Veritas that the type of product described in this certificate are manufactured at the following production sites:

Vacon 100
Vacon Ltd
Runsorintie 7
65380 Vaasa
Finland

Vacon 100X
Vacon S.R.L.
Via Roma 2
39014 Postal
Italy

6. MARKING OF PRODUCT :

6.1 - Trade name.

6.2 - Date of manufacture and serial number.

6.3 - Equipment type or model identification under which it was type-tested

7. OTHERS :

It is **Vacon Ltd** responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

***** END OF CERTIFICATE *****