



Marine &amp; Offshore

Certificate number: 47562/B0 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 &amp; 100X series.

**Requirements:**

Bureau Veritas Rules for the Classification of Steel Ships.

EC Code: 31.

*This certificate is issued to attest that Bureau Veritas Marine & Offshore 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: 23 Sep 2026****For Bureau Veritas Marine & Offshore,**

At BV TURKU (ABO), on 23 Sep 2021,

Miika KOKKO



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 Marine & Offshore. 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 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 Marine & Offshore 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 June 2017

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<br>-ED (IP21,<br>IP54) | Low overload                              |                      |                                   | High overload                              |                            |                                   | 45°C<br>continuous<br>current | Max<br>current<br>Is (2s) (A) |
|--------------------------|-----------------|---------------------------------------|---|----------------------|-----------------------------------|--|----------------------------|-----------------------------------|-------------------------------|-------------------------------|
|                          |                 |                                       | Loadability                               | Motor shaft power    |                                   | Loadability                                | Motor shaft power          |                                   |                               |                               |
|                          |                 |                                       | 40°C continu-<br>ous current<br>ILout (A) | 230V 40°C<br>LO (kW) | NEC<br>230V<br>40°C<br>LO<br>(HP) | 50°C<br>continuous<br>current<br>IHout (A) | 230V<br>50°C<br>HO<br>(kW) | NEC<br>230V<br>50°C<br>HO<br>(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<br>-ED (IP21,<br>IP54) | Low overload                              |                         |   | High overload                              |                            |   | 45°C<br>continuous<br>current | Max<br>current<br>Is (2s)<br>(A) |
|--------------------------|--------------|---------------------------------------|---|-------------------------|---|--|----------------------------|---|-------------------------------|----------------------------------|
|                          |              |                                       | Loadability                               | Motor shaft power       |   | Loadability                                | Motor shaft power          |   |                               |                                  |
|                          |              |                                       | 40°C continu-<br>ous current<br>ILout (A) | 400V<br>40°C<br>LO (kW) | 480V<br>NEMA<br>/ NEC<br>40°C<br>LO<br>(HP) | 50°C<br>continuous<br>current<br>IHout (A) | 400V<br>50°C<br>HO<br>(kW) | 480V<br>NEMA<br>/ NEC<br>50°C<br>HO<br>(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<br>-ED (IP21,<br>IP54) | Low overload  |                            | High overload   |                      | 45°C continuous<br>current | Max<br>current<br>Is (2s) (A) |
|--------------------------|--------------|---------------------------------------|---|----------------------------|---|----------------------|----------------------------|-------------------------------|
|                          |              |                                       | Loadability   | Motor<br>shaft<br>power    | Loadability   | Motor shaft<br>power |                            |                               |
|                          |              |                                       | 40°C continu-<br>ous current<br>I <sub>Lout</sub> (A) | 600V<br>40°C<br>LO<br>(HP) | 50°C continu-<br>ous current<br>I <sub>Hout</sub> (A) | 600V 50°C<br>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<br>-ED (IP21,<br>IP54) | Low overload  |                         |                            | High overload   |                            |                            | 45°C continuos<br>current | Max<br>current<br>Is (2s)<br>(A) |
|--------------------------|--------------|---------------------------------------|---|-------------------------|----------------------------|---|----------------------------|----------------------------|---------------------------|----------------------------------|
|                          |              |                                       | Loadability   | Motor shaft power       |                            | Loadabi-<br>lity  | Motor shaft power          |                            |                           |                                  |
|                          |              |                                       | 40°C continu-<br>ous current<br>I <sub>Lout</sub> (A) | 690V<br>40°C<br>LO (kW) | 600V<br>40°C<br>LO<br>(HP) | 50°C continu-<br>ous<br>current<br>I <sub>Hout</sub><br>(A) | 690V<br>50°C<br>HO<br>(kW) | 600V<br>50°C<br>HO<br>(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 I <sub>n</sub> (A) | 50% overload current (A) | Max current I <sub>s</sub> (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 I <sub>n</sub> (A) | 50% overload current (A) | Max current I <sub>s</sub> (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.

### **For modification B0 version:**

### **SGS:**

- EMC Test Report No. 300620-1, dated 24-11-2020.
- EMC Test Report No. 290708-1-2, dated 15-01-2018.

## **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<br>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.

- 4.7 - Equipment covered by this Type Approval certificate has been tested according to requirements of IACS UR E10 rev7.

**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 :**

7.1 - 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.

7.2 - This certificate supersedes the Type Approval Certificate No. 47562/A0 BV issued on 18 Nov 2016 by the Society

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