# TYPE APPROVAL CERTIFICATE

Certificate No:
**TAE00000Y0**
Revision No:
**1**

## This is to certify:

**That the Frequency Converter**

with type designation(s)
**Vacon 100X series,**

Issued to
**Vacon Ltd**
**VAASA, Finland**

is found to comply with
**DNV GL rules for classification – Ships, offshore units, and high speed and light craft**

## Application :

**Frequency Converter for Asyncronous Motors Range: 1,1 kW to 37 kW**
**208-240 / 380-480 / 380-500 V AC 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 **2016-10-05**

DNV GL local station: **Turku**

Approval Engineer: **Nicolay Horn**

for **DNV GL**
Digitally Signed By:
Kristoffersen, Andreas
Location: DNV GL Høvik, Norway
Signing Date: 2016-10-10

**Andreas Kristoffersen**
**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.

Job Id: **262.1-020692-3**
Certificate No: **TAE00000Y0**
Revision No: **1**

## Name and place of manufacturer

Vacon Ltd
Runsorintie 7, VAASA
Finland

Vacon S.r.l. –
via Roma, 2 I-39014 POSTAL, Merano (BZ)
Italy

## Product description

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

| Mains voltage 208-240V, 50/60Hz, 3~ | | | |
|---|---|---|---|
| **Frequency converter type** | **Current rating** 40degC continuous current $I_{Lout}$ (A) | **Frame size** | **Enclosure Protection** |
| 0007-2-X | 6,6 | MM4 | IP66 |
| 0008-2-X | 8 | MM4 | IP66 |
| 0011-2-X | 11 | MM4 | IP66 |
| 0012-2-X | 12,5 | MM4 | IP66 |
| 0018-2-X | 18 | MM5 | IP66 |
| 0024-2-X | 24,2 | MM5 | IP66 |
| 0031-2-X | 31 | MM5 | IP66 |
| 0048-2-X | 48 | MM6 | IP66 |
| 0062-2-X | 62 | MM6 | IP66 |

| Mains voltage 380-480V, 50/60Hz, 3~ | | | |
|---|---|---|---|
| **Frequency converter type** | **Current rating** 40degC 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 | MM4 | IP66 |
| 0009-4-X | 9,6 | MM4 | IP66 |
| 0012-4-X | 12 | MM4 | IP66 |
| 0016-4-X | 16 | MM5 | IP66 |
| 0023-4-X | 23 | MM5 | IP66 |
| 0031-4-X | 31 | MM5 | IP66 |
| 0038-4-X | 38 | MM6 | IP66 |
| 0046-4-X | 46 | MM6 | IP66 |
| 0061-4-X | 61 | MM6 | IP66 |
| 0072-4-X | 72 | MM6 | IP66 |

| Mains voltage 380-500V, 50/60Hz, 3~ | | | |
|---|---|---|---|
| **Frequency converter type** | **Current rating** 40degC 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 | MM4 | IP66 |
| 0009-5-X | 9,6 | MM4 | IP66 |
| 0012-5-X | 12 | MM4 | IP66 |
| 0016-5-X | 16 | MM5 | IP66 |

| Mains voltage 380-500V, 50/60Hz, 3~ | | | |
|---|---|---|---|
| **Frequency converter type** | **Current rating** 40degC continuous current $I_{Lout}$ (A) | **Frame size** | **Enclosure Protection** |
| 0023-5-X | 23 | MM5 | IP66 |
| 0031-5-X | 31 | MM5 | IP66 |
| 0038-5-X | 38 | MM6 | IP66 |
| 0046-5-X | 46 | MM6 | IP66 |
| 0061-5-X | 61 | MM6 | IP66 |
| 0072-5-X | 72 | MM6 | IP66 |

## Application/Limitation

| | |
|---|---|
| Supply voltage range: | 208-240V / 380-480V / 380 -500V, 50/60 Hz |
| Voltage variation: | - 15 %, +10 % continuously |
| Frequency variation: | 47.5 – 66 Hz |
| Output frequency: | 0 – 320 Hz |
| Temperature range in operation: | 0 – 40 °C (40 – 60 °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<br>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 DNVGL Rules Pt.4, Ch.8, Sec.1 Table 2. 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.

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

Technical info:

"VACON 100X & VACON 20X, Decentralizes AC Drives",Brochure from Vacon, "Vacon 100X series voltage and currect ratings", XL sheet from Vacon.

Test reports:

TÜV SÜD Technical Report No. 028-71395934-000 Rev.00 issued 2011-12-14.
TÜV SÜD Technical Report No. 71395257 issued 2011-10-12.
TÜV SÜD Compliance Document No. D8 12 02 76674 006 issued 2012-02-27.
VTT Test Report no VTT-S-02611-15 issued 2015-06-17.

## 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 100X - Type designation – Power – Voltage

## Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are 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 Routine tests (RT) checked (if not available tests according to 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