



## Type Approval Certificate

*This is to certify that the under noted product(s) have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.*

This certificate is issued to:

|                             |  |  |
|-----------------------------|--|--|
| <b>PRODUCER</b>             | Vacon Plc<br>Runsorintie 7<br>65380 Vaasa<br>Finland   |  |
| <b>PLACES OF PRODUCTION</b> | Vacon Plc<br>Runsorintie 7<br>65380 Vaasa<br>Finland   | Vacon Suzhou Drives Co. Ltd<br>71 Xinfra Rd, Loufeng Town, SIP<br>Suzhou,<br>China, 215125 |
| <b>DESCRIPTION</b>          | Frequency Converters   |  |
| <b>TYPES</b>                | NXS Air Cooled FR4 to FR12<br>NXP Air Cooled FR4 to FR14, FI9-FI13<br>NXP Liquid Cooled CH3, CH4, CH5, CH61, CH62, CH72, CH63,<br>CH64, CH74<br><br><i>NXP can also be replaced by NXA, NXI, NXF, NXB, NXN, depending on application.</i><br><br><i>All drives can be accompanied with external brake resistors, AC-chokes, SIN-, RFI-DUT-, L- or LCL-filters.</i> |  |
| <b>APPLICATION</b>          | For use in environmental category ENV1   |  |

|                        |               |
|------------------------|---------------|
| <b>Certificate No.</b> | 11/60005      |
| <b>Issue Date</b>      | 12 April 2011 |
| <b>Expiry Date</b>     | 11 April 2016 |
| <b>Sheet</b>           | 1 of 2        |

A.Munden



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3050 Harvester Road, Suite 208, Burlington, Ontario, L7N 3J1, Canada

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**SPECIFIED  
STANDARDS**

Lloyd's Register Test Specification Number 1, 2002  
EN 61800-5-1:2003  
EN 61800-3:1996 + A11:2000  
EN 50178:1998  
EN 60068-2-6:2008

**OTHER CONDITIONS**

Installation of this equipment for marine applications is to be in accordance with the Rules and Regulations for the Classification of Ships.

See producer's literature for ambient conditions and associated equipment ratings.

Modules are to be suitably installed to meet EMC requirements.

*"This Certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register of any modification or changes to the equipment in order to obtain a valid certificate."*

*The Design Appraisal Document No. 11/60005 and its supplementary Type Approval Terms and Conditions form part of this Certificate.*

Certificate No. 11/60005  
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Sheet 2 of 2

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 Issue number **1**  
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# Marine Design Appraisal Document

**Lloyd's Register North America, Inc.**  
**Toronto Design Support Office**  
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**Canada**

Date  
**12 April 2011**

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**TDSO/AM/W02454504**

## LLOYD'S REGISTER TYPE APPROVAL SYSTEM 2002

Issued to: VACON PLC

For: FREQUENCY CONVERTERS

Types: NXS AIR COOLED FR4 TO FR12, NXP AIR COOLED FR4 TO FR14,  
 NXP LIQUID COOLED CH3, CH4, CH5, CH61, CH72, CH63, CH74

TYPE APPROVAL CERTIFICATE NO: 11/60005

The undernoted documents have been reviewed for compliance with the requirements of the Lloyd's Register Type Approval System, 2002 and this Design Appraisal Document forms part of the Certificate.

### APPROVAL DOCUMENTATION

|   |                   |
|---|-------------------|
| Approval Services Request for Quotation   | 09 June 2010      |
| Inspection and Surveillance of Production Facilities Report HEL0901132 (Vaasa, Finland)         | 25 February 2011  |
| Inspection and Surveillance of Production Facilities Report W02526815 (Suzhou, China)           | 5 March 2011      |
| Vacon Product Matrix for Class Approvals.xls  | -                 |
| BC00169M – Datasheet Vacon NX Products For Common Dc Bus Systems                                | -                 |
| BC00054D – Datasheet Vacon NXP Liquid Cooled Powerdrives For Extreme Conditions                 | -                 |
| BC00167D – Datasheet Vacon NXP And NXC Superlative Performance                                  | -                 |
| BC00146E – Datasheet Vacon NXS Robust Drive For Heavy Use                                       | -                 |
| UD01190B - User's Manual Active Front End Unit (AFE)  | 26 September 2008 |
| UD00971C - User's Manual NX Frequency Converters Brake Resistors                                | -                 |
| UD01143B - NX frequency converters Filter Manual RFI-filters Du/DT-filters Sinus filters        | 27 October 2008   |
| UD00741M - User's Manual NX Freq Converters Basic I/O Boards Expander I/O Boards Adapter Boards | 23 October 2009   |
| UD00908G - NXP Frequency Converters IP00 Module Installation Frames FR10 To FR14                | -                 |
| UD01217C - Users Manual Non-Regenerative Front End Unit (NFE)                                   | 06 April 2010     |
| UD01047B - Vacon NXI User's Manual  | 09 November 2005  |
| UD01063B - User's Manual NX Inverters F19 – F14   | 18 October 2006   |
| UD00907F - User's Manual NX Liquid-Cooled Frequency Converters                                  | 7 July 2006       |
| UD00701T - User's Manual NXS/P Frequency Converters Enclosures IP21 And IP54                    | 21 June 2007      |
| dm 00003 Rev C - NX/FR6/FC/230 and 500 Main Circuit Diagram                                     | -                 |
| dm 00033 Rev A - NX/FR6/FC/690 Main Circuit Diagram   | -                 |
| dm 00047 Rev A - NX/FR8/FC/230 Main Circuit Diagram   | -                 |
| dm 00005 Rev D - NX/FR8/FC/500 and 690 Main Circuit Diagram                                     | -                 |
| dm 00029 - NX/FR8/REG/500 Main Circuit Diagram  | -                 |

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

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## Appendix

|                                       |                 |
|---------------------------------------|-----------------|
| Vacon NX Mechanical constructions.pdf | -               |
| Parts List FR6                        | 26 October 2009 |
| Parts List FR8                        | 10 March 2010   |
| Vacon AC Chokes and Options.xls       | -               |

### TEST REPORTS

|   |                   |
|---|-------------------|
| Underwriters Laboratories Certificate NMMS.E171278                      | 04 November 2009  |
| SGS Fimko Ltd Electromagnetic Compatibility (EMC) Test Report 219812-1  | 26 October 2001   |
| SGS Fimko Oy Electromagnetic Compatibility (EMC) Test Report 228338-1   | 16 May 2003       |
| VTT Technical Research Centre Environmental Tests Report VTT-S-00992-09 | 13 February 2009  |
| FR6 500V Heat Test.pdf  | -                 |
| FR6 690V Heat Test.pdf  | -                 |
| Vacon FR6 Damp Heat Test Report   | 21 August 2006    |
| FR8 500V Heat Test.pdf  | -                 |
| FR8 690V Heat Test.pdf  | -                 |
| Vacon FR8 Damp Heat Test Report   | 15 August 2006    |
| Vacon FR8 Cold Test Report  | 10 December 2009  |
| SGS Fimko Ltd IEC 61800-5-1/ EN 61800-5-1 Test Report 238191-1          | 31 May 2005       |
| SGS Fimko Ltd IEC 61800-5-1/ EN 61800-5-1 Test Report 221045/3          | 28 February 2005  |
| Vacon FR8 Power Supply Failure Test Report                              | 10 December 2009  |
| Vacon FR8 Power Supply Variation Test Report                            | 10 December 2009  |
| Vacon NXP-FR8 Environmental Tests Report VTT-S-00992-09                 | 13 February 2009  |
| Centria NX FR 6 Vibration Test Report                                   | 30 October 2006   |
| SGS Fimko Ltd EN 50178:1997 Test Report 214262/5                        | 03 September 2003 |
| SGS Fimko Ltd EN 50178:1997 Test Report 221045/2                        | 10 January 2005   |

### Supplementary Type Approval Terms and Conditions

*Type Approval certifies that a representative sample of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein. It does not mean or imply approval for any other use, nor approval of any product(s) designed or manufactured otherwise than in strict conformity with the said representative sample.*

*Type Approval is based on the understanding that the manufacturer's recommendations and instructions and any relevant requirements of the Rules and Regulations are complied with.*

*Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations.*

*Lloyd's Register North America, Inc. reserves the right to cancel or withdraw this Type Approval Certificate in accordance with the Lloyd's Register Type Approval System Procedure.*

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

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## Appendix



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**Part 2  
Electronic Frequency Converter (Part 2)**

| Producer/Licence No.                                 | Type   | Technical Details             |                                      |                                      |   | Category/<br>Additional Tests  | Remarks  | Cert. No. |
|--|--|-------------------------------|--------------------------------------|--------------------------------------|---|--|--|-----------|
|  |  | Nominal Current Rating @ 45°C | Light Overload Current Rating @ 45°C | Heavy Overload Current Rating @ 45°C | Mains Supply Voltage Rating<br>Frequency 48-63 Hz |  |  |           |
| Vacon Plc<br>Runsorintie 7<br>65380 Vaasa<br>Finland | Frequency Converters<br><br><u>Types:</u><br>NXS Air Cooled:<br>FR4 to FR12<br><br>NXP Air Cooled:<br>FR4 to FR14, F19-F113<br><br>NXP Liquid Cooled:<br>CH3, CH4, CH5, CH61,<br>CH62, CH72, CH63, CH64,<br>CH74 |                               |                                      |                                      | Frequency 48-63 Hz                                | ENV1<br>(2002)<br><br>EN 61800-5-1:2003<br>EN 61800-3:1996 +<br>A11:2000<br>EN 50178:1998<br>EN 60068-2-6:2008 | Expires: 11 April 2016<br><br>Installation of this equipment for marine applications is to be in accordance with the Rules and Regulations for the Classification of Ships.<br><br>See producer's literature for ambient conditions and associated equipment ratings.<br><br>Modules are to be suitably installed to meet EMC requirements.<br><br>NXP can also be replaced by NXA, NXI, NXF, NXB, NXN, depending on application.<br><br>All drives can be accompanied with external brake resistors, AC-chokes, SIN-, RFI- DUT-, L- or LCL-filters. | 11/60005  |