

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Frequency Converter**with type designation(s)
NXS

Issued to

Vacon Ltd
VAASA, Finlandis found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Frequency Converter for Asynchronous Motors NXS series. Range: 0,55 kW to 560 kW**
208 - 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 **2018-12-31**.Issued at **Høvik** on **2016-11-22**DNV GL local station: **Turku**Approval Engineer: **Nicolay Horn**for **DNV GL**

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: **262.1-010767-6**
Certificate No: **TAE00001J9**

Name and place of manufacturer

Vacon Oyj
VAASA, Finland

Vacon (China) Drives Co. Ltd
No.71 Xinqing Road, 215123 Suzhou, China

Vacon (China) Drives Co. Ltd Haiyan Branch
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Street, Haiyan Country, JiaXing City,
Zhejiang Province, China

Product description

Variable speed controller for asynchronous motor. Constant / variable torque applications.
Air cooled. FRxx = air cooled.

Type designation	Frame size	Mains supply (V)	Number of phases	Motor shaft power (kW) ¹⁾
NXS0004	FR4	208 - 240	3	0,55
NXS0007	FR4	208 - 240	3	0,75
NXS0008	FR4	208 - 240	3	1,1
NXS0011	FR4	208 - 240	3	1,5
NXS0012	FR4	208 - 240	3	2,2
NXS0017	FR5	208 - 240	3	3
NXS0025	FR5	208 - 240	3	4
NXS0031	FR5	208 - 240	3	5,5
NXS0048	FR6	208 - 240	3	7,5
NXS0061	FR6	208 - 240	3	11
NXS0075	FR7	208 - 240	3	15
NXS0088	FR7	208 - 240	3	18,5
NXS0114	FR7	208 - 240	3	22
NXS0140	FR8	208 - 240	3	30
NXS0170	FR8	208 - 240	3	37
NXS0205	FR8	208 - 240	3	45
NXS0261	FR9	208 - 240	3	55
NXS0300	FR9	208 - 240	3	75
NXS0003	FR4	380 - 500	3	1,1
NXS0004	FR4	380 - 500	3	1,5
NXS0005	FR4	380 - 500	3	2,2
NXS0007	FR4	380 - 500	3	3
NXS0009	FR4	380 - 500	3	4
NXS0012	FR4	380 - 500	3	5,5
NXS0016	FR5	380 - 500	3	7,5
NXS0022	FR5	380 - 500	3	11
NXS0031	FR5	380 - 500	3	15
NXS0038	FR6	380 - 500	3	18,5
NXS0045	FR6	380 - 500	3	22
NXS0061	FR6	380 - 500	3	30
NXS0072	FR7	380 - 500	3	37
NXS0087	FR7	380 - 500	3	45
NXS0105	FR7	380 - 500	3	55
NXS0140	FR8	380 - 500	3	75

Type designation	Frame size	Mains supply (V)	Number of phases	Motor shaft power (kW) ¹⁾
NXS0168	FR8	380 - 500	3	90
NXS0205	FR8	380 - 500	3	110
NXS0261	FR9	380 - 500	3	132
NXS0300	FR9	380 - 500	3	160
NXS0385	FR10	380 - 500	3	200
NXS0460	FR10	380 - 500	3	250
NXS0520	FR10	380 - 500	3	250
NXS0590	FR11	380 - 500	3	315
NXS0650	FR11	380 - 500	3	355
NXS0730	FR11	380 - 500	3	400
NXS0004	FR6	525 - 690	3	3
NXS0005	FR6	525 - 690	3	4
NXS0007	FR6	525 - 690	3	5,5
NXS0010	FR6	525 - 690	3	7,5
NXS0013	FR6	525 - 690	3	11
NXS0018	FR6	525 - 690	3	15
NXS0022	FR6	525 - 690	3	18,5
NXS0027	FR6	525 - 690	3	22
NXS0034	FR6	525 - 690	3	30
NXS0041	FR7	525 - 690	3	37,5
NXS0052	FR7	525 - 690	3	45
NXS0062	FR8	525 - 690	3	55
NXS0080	FR8	525 - 690	3	75
NXS0100	FR8	525 - 690	3	90
NXS0125	FR9	525 - 690	3	110
NXS0144	FR9	525 - 690	3	132
NXS0170	FR9	525 - 690	3	160
NXS0208	FR9	525 - 690	3	200
NXS0261	FR10	525 - 690	3	250
NXS0325	FR10	525 - 690	3	315
NXS0385	FR10	525 - 690	3	355
NXS0416	FR10	525 - 690	3	400
NXS0460	FR11	525 - 690	3	450
NXS0502	FR11	525 - 690	3	500
NXS0590	FR11	525 - 690	3	560

1) Values applicable for 40 °C, 10 % overload and highest voltage in each voltage class. To be modified for ships application at 45 °C. See under "Application / limitation".

NXS FR10-FR12 will include external chokes.

Choke types
CHK0261
CHK0400
CHK0520
CHK0650

CHK0750
CHK0820
CHK1030
CHK1150

NXS units can be equipped with following options: SIN Filters, DUT Filters, RFI Filters and Brake Resistor. (For details see Vacon documentation.)

Application/Limitation

Supply voltage range:	208 - 690 V, 50/60 Hz
Voltage variation:	- 10 % , + 10 %
Frequency variation:	± 10 %
Output frequency:	0 - 320 Hz
Temperature range in operation:	0 - 40 °C (40 - 50 °C when derated 1,5% /°C, 50 - 55 when derated 2,5% /°C)
Temperature class:	A
Vibration class:	A
Humidity class:	A
Protection class:	IP00, IP21 & IP54
EMC class*:	DNV CN 2,4 / IEC 61800-3 To be used on EMC class A locations

The NXS must be regarded as a component. The actual installation shall be designed according to Vacon Installation & Operating Instructions and according to the applicable DNV Rules for the actual application. 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 2. A Product Certificate is required for converters ≥ 100 kW

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

*Converters EMC classed C3 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.

For marine applications size of drive to be derated with respect to an ambient temperature of 40°C (1,5% per deg. C for ambient above 40 - 50 °C) or chosen acc. to 50 °C rating. See manual.

Type Approval documentation

Technical info:

"Vacon request for update" Part of email from Vacon to DNV dated 2010-09-23.

"Vacon User's manual NXS Frequency Converters dated 2005 (parts).

Test reports:

"Classification documentation of frequency converters – Air cooled Fr4-14, Liq. Cooled Ch3-7, dated 2006.

Tests carried out

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

EMC: The following tests are in accordance with the DNV CN2.4/ IEC 61800-3: Electrical fast transient (Burst), electrical slow transient (Surge), RF-common mode Voltage, radiated RF-electromagnetic fields, electric discharge (ESD), radiated and conducted emission. (See under application limitation).

Marking of product

Vacon NXS – Type designation – Power – Voltage

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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 survey 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.

Survey to be performed at least every second year.

END OF CERTIFICATE