DNV·GL

TYPE APPROVAL CERTIFICATE

Certificate No:
TAE000013B
Revision No:
2

This is to certify:

That the Frequency Converter

with type designation(s)
NXA, NXB, NXI, NXN & NXP

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 :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2019-03-20**

This Certificate is valid until **2023-12-31**.
DNV GL local station: **Turku**

Approval Engineer: **Nicolay Horn**

for **DNV GL**
Digitally Signed By: Trond Sjåvåg
Location: DNV GL Høvik, Norway

Trond Sjåvåg
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: **262.1-010767-7**
Certificate No: **TAE000013B**
Revision No: **2**

Name and place of manufacturer

Vacon Ltd. Vaasa Branch
VAASA, Finland

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

Product description

Variable speed controller for asynchronous motor. Constant / variable torque applications.
Air and liquid cooled. CHxx = liquid cooled, FRxx = air cooled, FIxx = Inverter module, Air cooled.

Type designation	Frame size	Mains supply (V)	Number of phases	Motor shaft power (kW) [1) 2)]
NXP0004	FR4	208 - 240	3	0,55 /-
NXP0007	FR4	208 - 240	3	0,75 /-
NXP0008	FR4	208 - 240	3	1,1 /-
NXP0011	FR4	208 - 240	3	1,5 /-
NXP0012	FR4	208 - 240	3	2,2 /-
NXP0017	FR5	208 - 240	3	3 /-
NXP0025	FR5	208 - 240	3	4 /-
NXP0031	FR5	208 - 240	3	5,5 /-
NXP0048	FR6	208 - 240	3	7,5 /-
NXP0061	FR6	208 - 240	3	11 /-
NXP0075	FR7	208 - 240	3	15 /-
NXP0088	FR7	208 - 240	3	18,5 /-
NXP0114	FR7	208 - 240	3	22 /-
NXP0140	FR8	208 - 240	3	30 /-
NXP0170	FR8	208 - 240	3	37 /-
NXP0205	FR8	208 - 240	3	45 /-
NXP0261	FR9	208 - 240	3	55 /-
NXP0300	FR9	208 - 240	3	75 /-
NXP0003	FR4	380 - 500	3	1,1 /-
NXP0004	FR4	380 - 500	3	1,5 /-
NXP0005	FR4	380 - 500	3	2,2 /-
NXP0007	FR4	380 - 500	3	3 /-
NXP0009	FR4	380 - 500	3	4 /-
NXP0012	FR4	380 - 500	3	5,5 /-
NXP0016	FR5 / CH3	380 - 500	3	7,5 / 11
NXP0022	FR5 / CH3	380 - 500	3	11 / 15
NXP0031	FR5 / CH3	380 - 500	3	15 / 18,5
NXP0038	FR6 / CH3	380 - 500	3	18,5 / 22
NXP0045	FR6 / CH3	380 - 500	3	22 / 30
NXP0061	FR6 / CH3	380 - 500	3	30 / 37
NXP0072	FR7 / CH4	380 - 500	3	37 / 45
NXP0087	FR7 / CH4	380 - 500	3	45 / 55
NXP0105	FR7 / CH4	380 - 500	3	55 / 75
NXP0140	FR8 / CH4	380 - 500	3	75 / 90
NXP0168	FR8 / FI9 / CH5	380 - 500	3	90 / 110
NXP0205	FR8 / FI9 / CH5	380 - 500	3	110 / 132

Type designation	Frame size	Mains supply (V)	Number of phases	Motor shaft power (kW) [1) 2)]
NXP0261	FR9 / FI9 / CH5	380 - 500	3	132 / 160
NXP0300	FR9 / FI9 / CH61	380 - 500	3	160 / 200
NXP0385	FR10 / FI10 / CH61	380 - 500	3	200 / 250
NXP0460	FR10 / FI10 / CH62/72	380 - 500	3	250 / 315
NXP0520	FR10 / FI10 / CH62/72	380 - 500	3	250 / 355
NXP0385	FR10 / FI12 / CH62/72	380 - 500	3	200 / 250
NXP0460	FR10 / FI12 / CH62/72	380 - 500	3	250 / 315
NXP0520	FR10 / FI12 / CH62/72	380 - 500	3	250 / 355
NXP0590	FR11 / FI12 / CH62/72	380 - 500	3	315 / 400
NXP0650	FR11 / FI12 / CH62/72	380 - 500	3	355 / 450
NXP0730	FR11 / FI12 / CH62/72	380 - 500	3	400 / 500
NXP0820	FR12 / FI12 / CH63	380 - 500	3	450 / 560
NXP0920	FR12 / FI12 / CH63	380 - 500	3	500 / 600
NXP1030	FR12 / FI12 / CH63	380 - 500	3	560 / 700
NXP1150	FR13 / FI13 / CH63	380 - 500	3	630 / 750
NXP1300	FR13 / FI13	380 - 500	3	710 / -
NXP1370	CH64/74	380 - 500	3	- / 900
NXP1450	FR13	380 - 500	3	800 / -
NXP1640	CH64/74	380 - 500	3	- / 1100
NXP1770	FR14 / FI14	380 - 500	3	900 / -
NXP2060	CH64/74	380 - 500	3	- / 1400
NXP2150	FR14 / FI14	380 - 500	3	1100 / -
NXP2300	CH64/74	380 - 500	3	- / 1500
NXP2470	2xCH64/74	380 - 500	3	- / 1600
NXP2700	FR14 / FI14	380 - 500	3	1400 / -
NXP2950	2xCH64/74	380 - 500	3	- / 1950
NXP3710	2xCH64/74	380 - 500	3	- / 2450
NXP4140	2xCH64/74	380 - 500	3	- / 2700
NXP0004	FR6	525 - 690	3	3 /-
NXP0005	FR6	525 - 690	3	4 /-
NXP0007	FR6	525 - 690	3	5,5 /-
NXP0010	FR6	525 - 690	3	7,5 /-
NXP0013	FR6	525 - 690	3	10 /-
NXP0018	FR6	525 - 690	3	15 /-
NXP0022	FR6	525 - 690	3	18,5 /-
NXP0027	FR6	525 - 690	3	22 /-
NXP0034	FR6	525 - 690	3	30 /-
NXP0041	FR7	525 - 690	3	37,5 /-
NXP0052	FR7	525 - 690	3	45 /-
NXP0062	FR8	525 - 690	3	55 /-
NXP0080	FR8	525 - 690	3	75 /-
NXP0100	FR8	525 - 690	3	90 /-
NXP0125	FR9 / FI9	525 - 690	3	110 /-
NXP0144	FR9 / FI9	525 - 690	3	132 /-
NXP0170	FR9 / FI9 / CH61	525 - 690	3	160

Type designation	Frame size	Mains supply (V)	Number of phases	Motor shaft power (kW) [1) 2)]
NXP0208	FR9 / FI9 / CH61	525 - 690	3	200
NXP0261	FR10 / FI10 / CH61	525 - 690	3	250
NXP0325	FR10 / FI10 / CH62/72	525 - 690	3	315
NXP0385	FR10 / FI10 / CH62/72	525 - 690	3	355
NXP0416	FR10 / FI10 / CH62/72	525 - 690	3	450
NXP0460	FR10 / FI12 / CH62/72	525 - 690	3	450
NXP0502	FR10 / FI12 / CH62/72	525 - 690	3	500
NXP0590	FR11 / FI12 / CH63	525 - 690	3	560
NXP0650	FR11 / FI12 / CH63	525 - 690	3	630
NXP0750	FR11 / FI12 / CH63	525 - 690	3	710
NXP0815	CH63	525 - 690	3	750
NXP0820	FR12 / FI12 / CH74/74	525 - 690	3	800
NXP0920	FR13 / FI13 / CH64/74	525 - 690	3	900
NXP1030	FR13 / FI13 / CH64/74	525 - 690	3	1000
NXP1180	FR13 / FI13 / CH64/74	525 - 690	3	1150
NXP1300	CH64/74	525 - 690	3	1150
NXP1500	FR14 / FI14 / CH64/74	525 - 690	3	1500
NXP1700	CH64/74	525 - 690	3	- /1550
NXP1850	2x CH64/74	525 - 690	3	- /1650
NXP1900	FR14 / FI14	525 - 690	3	1800/ -
NXP2120	2x CH64/74	525 - 690	3	- /1900
NXP2250	FR14 / FI14	525 - 690	3	2000/ -
NXP2340	2x CH64/74	525 - 690	3	- /2100
NXP2700	2x CH64/74	525 - 690	3	- /2450
NXP3100	2x CH64/74	525 - 690	3	- /3100
2 x NXP2470	4 x CH64/74	400 - 500	3	3050
2 x NXP2950	4 x CH64/74	400 - 500	3	3600
2 x NXP3710	4 x CH64/74	400 - 500	3	4500
2 x NXP4140	4 x CH64/74	400 - 500	3	5150
2 x NXP1850	4 x CH74	525 - 690	3	3150
2 x NXP2120	4 x CH74	525 - 690	3	3600
2 x NXP2340	4 x CH74	525 - 690	3	3950
2 x NXP2700	4 x CH74	525 - 690	3	4600
2 x NXP3100	4 x CH74	525 - 690	3	5300
NXN2000	CH60	400 - 690	3	2200

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".

2) Values applicable for 50 °C, 0 % overload and highest voltage in each voltage class.

3) Module is rectifier unit and does not run motor but feed DC power to the inverters.

In addition NXP can be substituted by NXI, NXA, NXB, or NXN. NXI, NXA and NXB -units are exactly based on DC-fed Vacon NXP control and power electronics component platforms, excluding for rectifierunits and charging circuitry, which are not used in these products. Variation is made by application selection. NXN is a building block of FR13-14 or independent rectifier unit.

NXP FR10-FR14 and all CH units will include external chokes.

Choke types
CHK0261
CHK0400
CHK0520
CHK0650
CHK0750
CHK0820
CHK1030
CHK1150

NXA units can also be accompanied with following L/LCL filters and NXF units with following L filters

L/LCL Filters
LCL 0261 5
LCL 0460 5
LCL 1300 5
LCL 0170 6
LCL 0325 6
LCL 1030 6
L 0300 5
L 0520 5
L 1450 5
L 0208 6
L 0416 6

NX_ Liquid cooled (CHxx) units can be accompanied with hoses attached to the modules.
NX Liquid cooled (CHxx) units can be accompanied with following options: Heat Exchangers, Air-cooled Regenerative LCL filters IP00 (Naturally convected) and Liquid-cooled Regenerative LCL filters IP00. For details see Vacon documentation.

"The power range can be extended up to 5 MW by using the Vacon DriveSynch control concept for running 2..4 pcs of CH64/74 or NXI modules frequency converter modules/ cabinet solutions in parallel", see document "Vacon DriveSynch".

NXP 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:	Air cooled: 0 - 40 °C (40 - 50 °C when derated1,5% /°C, 50 - 55 when derated 2,5% /°C) Liquid cooled: 0 - 50 °C (CH6x series 50 – 55 °C 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 NX_ must be regarded as a component. The actual installation shall be designed according to Vacon Installation & Operating Instructions and according to the applicable DNVGL Rules for the actual application. 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.

To be installed in an enclosure with an IP degree in accordance with DNV GL 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 choosen acc. to 50 °C rating. See manual.

Type Approval documentation

Technical info:
VACON® NX AC DRIVES – Liquid –Cooled DRIVES NON-REGENERATEIVE END UNIT – USER MANUAL
"Vacon request for update" Part of email from Vacon to DNV dated 2010-09-23.
"Vacon User's manual NXP Frequency Converters dated 2005 (parts).

Test reports:
SGS Fimko Test report No. 282088-1.
VACON Doc. "CH60 Liquid Cooled NFE 400-690V Summary of IEC 61800-5-1 Type tests" rev V001 dated 2016-01-19.
UL Approval Test Report No. E171278, Vol.1, New Section, dated 2016-01-14.
Vacon Test Report "CH60 Liquid Cooled NFE 400-690V Sumary of IEC61800-5-1 Type Tests Doc. No.????, dated 2014-12-14.
"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 NXP/NXN – 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 2 and 3.5 years and at renewal.

END OF CERTIFICATE