



Certificate No. 03-001990/031694

TYPE APPROVAL CERTIFICATE

This is to certify that this product complies with the Rules for the classification of ships, Part 1 - General requirements, Chapter 3 - Type approval of products.

TYPE AND DESCRIPTION OF PRODUCT:

FREQUENCY CONVERTERS

Frequency converters, type: NXS, NXP, NXI, NXA, NXB and NXN.

MANUFACTURER:

DANFOSS DRIVES Oy

Runsorintie 7, 65380 Vaasa

FINLAND

THE PRODUCT MEETS FOLLOWING RULES/REGULATIONS:

CRS RULES FOR THE CLASSIFICATION OF SHIPS

FURTHER DETAILS OF THE PRODUCT AND CONDITIONS FOR CERTIFICATION ARE GIVEN OVERLEAF.

APPROVAL IS VALID UNTIL: 2027-12-12

Place and date: Split, 2023-12-13

Seal _____

Marinko Popović, dipl.ing.

NOTE: This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Croatian Register of Shipping of any modification or changes to the product in order to obtain a valid certificate.

DETAILED PRODUCT DESCRIPTION:

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

General Specification:

| | |
|---------------------------------|---|
| Supply voltage range: | 208 - 690 V, 50/60 Hz |
| Voltage variation: | - 10 %, + 10 % |
| Frequency variation: | - 10 %, + 10 % |
| Output frequency: | 0 - 320 Hz |
| Temperature range in operation: | Air cooled: 0 - 40 °C (40 - 50 °C when derated 1,5% / °C, 50 - 55 when derated 2,5% / °C) Liquid cooled: 0 - 50 °C (CH6x series 50 - 55 °C when derated 2,5% / °C) |
| Protection class: | IP00, IP21 & IP54 |

Frequency converter type NXS

| Type designation | Frame size | Mains supply (V) | Number of phases | Motor shaft power (kW) ¹ |
|------------------|------------|------------------|------------------|-------------------------------------|
| NXS | FR4-FR9 | 208-240 | 3 | 0,75-90 |
| NXS | FR4-FR11 | 380-500 | 3 | 1,1-400 |
| NXS | FR6-FR11 | 500-690 | 3 | 3-560 |

Frequency converter type NXP

| Type designation | Frame size | Mains supply (V) | Number of phases | Motor shaft power (kW) ¹ |
|------------------|---------------------|------------------|------------------|-------------------------------------|
| NXP | FR4-FR9 | 208-240 | 3 | 0,55-90 |
| NXP | FR4-FR14 / FI9-FI14 | 380-500 | 3 | 1,1-1200 |
| NXP | FR6-FR14 / FI9-FI14 | 525-690 | 3 | 3-2000 |

Frequency converter type NXP – liquid cooled drive

| Type designation | Frame size | Mains supply (V) | Number of phases | Motor shaft power (kW) ¹ |
|------------------|------------|------------------|------------------|-------------------------------------|
| NXP | CH3-CH74 | 400-500 | 3 | 7,5-5150 |
| NXP | CH61-CH74 | 525-690 | 3 | 160-5300 |

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 "General Specification".

In addition, NXP can be substituted by NXI, NXA, NXB, or NXN depending on the software application used. NXI, NXA and NXB units are exactly based on DC-fed Vacon NXP control and power electronics component platforms. NXN is a building block of FR13-14 or independent rectifier unit.

NXI = Inverter
NXA = Active frontend
NXN = non regenerative frontend
NXB = brake chopper unit

Drives can be accompanied with external components as brake chopper, brake resistors, AC chokes, filters (SIN, RFI, DUT, L, LCL) and heat exchangers (HXL, HXM, HXS and HXT).

APPLICATION / LIMITATIONS:

The actual installation shall be designed according to Danfoss Drives Installation & Operating Instructions and according to the CRS Rules for the actual application. Documents for the actual application are to be submitted for approval in each case.

FI9, FR10 and above drives are delivered as IP00 modules and do not comply with EMC requirement. Evidence to ensure compliance with EMC requirements shall be submitted for review prior to installation of these models onboard.

TYPE APPROVAL DOCUMENTATION:

Drawings:

- Drawings approved by CRS with letter 2742/TSE/DD/031694 dated 2023-12-11

Product brochure:

- DKDDPB905A102_NXP_NXC
- DKDDPB909A202_NXP_Liquid_Cooled_LR
- DKDDPB911A102_VACON_NXP_Common_DC_Bus_LR
- DKDDPB913A102_VACON_NXS_LR
- Vacon-NXP-Vacon-NXC-Brochure-BC00167H-EN

User Manuals:

- Liquid-cooled-NFE-User-Manual-DPD01795D-UK,
- Vacon-NX-Inverters-FI4-8-User-Manual-DPD00908A-EN,
- Vacon-NX-Inverters-FI9-14-User-Manual-DPD00909A-EN,
- Vacon-NXP-IPOO-Modules-Installation-Manual-DPD0088,
- Vacon-NXP-Liquid-Cooled-Drives-User-Manual-DPD0088,
- Vacon-NXP-Marine-APFIF09-Application-Manual-DPDO1667A_VO10,
- Vacon-NXS-NXP-User-Manual-DPD01241A-US

Product Statements:

- STC_EMN NX, Vacon NX FR4-6 STR,
- Vacon NX FR7-9 STR,
- Vacon NX FRI 0-12 STR,
- Vacon NX FR13-14_FI9-14 STR,
- Vacon NX LC CH3_CH4 STR,
- Vacon NX LC CHS STR,
- Vacon NX LC CH6x STR,
- Vacon NX LC CH7x STR,
- Vacon NXI FR4-8 STR MI

Test Reports:

- EMC test reports no. 228338-1, 231330-1, 234713-1 issued by SGS Fimko Ltd
- EMC test report no. 295115-1-1, 300477-2-1 issued by SGS Fimko Ltd
- Environmental test reports no. VTT-S-00992-09 issued by VTT, Technical Research Centre of Finland
- FR6 & FR8 Damp heat test report issued by VACON
- FR6 Vibration test report Version 1.0.0 dated 9-13.2006 issued by Centria
- SGS Fimko test report no. 234085, 2820088-1, 233444-1, 263815-1, 263816-1, 261486-1, 263817-1, 263818-1, 263819-1, 26950-1/2, 270705-1 (IEC 61800-5-1)
- Vacon Doc. "CH60 Liquid Cooled NFE 400-690V Summary of IEC 61800-5-1 Type tests" rev. V001 dated 2016-01-19

MARKING OF PRODUCT:

The Manufacturer, type designation, main data and serial number.

CONDITIONS FOR CERTIFICATION:

CRS product certificate is required.