Confirmation of Product Type Approval

Company Name: DANFOSS LLC

Address: POWER ELECTRONICS4401 N. BELL SCHOOL ROAD LOVES PARK IL 61111 United States

Product: Frequency Converter

Model(s): Series FC-102, FC-202, FC-301, FC-302, iC7-Automation, iC7-HVACR, iC7-Aqua

Endorsements:

Certificate Type	Certificate Number	Issue Date	Expiry Date
Product Design Assessment (PDA)	23-00T2443672-1-PDA-DUP	02-JUL-2026	14-DEC-2028
Manufacturing Assessment (MA)	25-7290383	14-NOV-2025	13-NOV-2030
Product Quality Assurance (PQA)	25-7290383-PQA	14-NOV-2025	04-NOV-2030

Tier
4 - Enrolled in PQA Program

Intended Service
Marine and Offshore Installations - Air-cooled adjustable frequency converters for variable speed control of AC motors

Description
Frequency Converters with Frame sizes A, B, C, D, E, F, FA09-12, FK09-12, and FB09-12 Frame (Enclosure Type) used to control motor drives having rated power 0. 25KW to 1400KW, including Series FC-102, FC-202, FC-301, FC-302 and iC7 with Radio Frequency Interference (RFI) filter.

FC-102: VLT HVAC Drive - Advanced version

FC-202: VLT AQUA Drive - Advanced version

FC-301: VLT Automation Drive - Standard version

FC-302: VLT Automation Drive - Advanced version

iC7 - Automation

iC7 - HVACR

iC7 - Aqua

* Refer to "Products List" attached for details of configurations of each series.

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Ratings
Rated power: 0.25-1400 KW

Input voltage: 200-240 VAC (A, B & C Frame)

380-480 VAC, 380-500 VAC, 525-690 VAC (A, B, C, D, E and F Frame)

380-480 VAC, 380-500VAC (iC7)

Input frequency: 50/60 Hz

Output voltage: 0-100% of input voltage

Output frequency: 0-590 Hz

Input/Output Phase: 3

Degree of ingress protection (enclosure): IP20, IP21, IP55, IP66 (A, B and C Frame)

IP00, IP20, IP21, IP54 (D, E and F Frame)

IP20, IP21, IP54 (Fx09-12 Frame)

Design Ambient Temperature: 0°C to +45°C, Maximum 55°C with current derating

-30°C to +45°C, Maximum 60°C with current derating (iC7)

Relative humidity: 5-95% (non-condensing)

* Refer to "Products List" attached for details of design ratings based on Type Codes.

Service Restrictions
1) Unit Certification is required for the frequency converters used to control motor drives having a rated power of 100 kW and over intended for essential services defined in Marine Vessel Rules 4-8-1/7.3.3 and Mobile Offshore Units Rules 4-1-1/3.5 or for services indicated in Marine Vessel Rules 4-8-3/TABLE 7 or related to additional optional notations requested for the ship and offshore unit.

2) If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

3) The products are not to be installed in the bridge and deck zone.

4) The converters are not intended for the service in hazardous areas.

Comments
1) The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

2) Where the converters with (RFI) filter, which exceeds the limits for radiated and conducted emissions required by Marine Vessel Rules 4-9-9/Table 1, are to be installed in the general power distribution zone, measures shall be taken per Danfoss Operating Guides / Instructions for the relevant Series for EMC-compliant installation to attenuate the emission effects on the distribution system. Planned EMC measures shall be assessed and communicated with the user in accordance with Marine Vessel Rules 4-8-3/8.5.14.

3) The converters are to be selected to have a degree of ingress protection suitable for intended installation locations in accordance with Marine Vessel Rules 4-8-3/Table 2 and Offshore Units Rules 4-3-3/Table 1, or to be installed in an enclosure with an IP degree complying with the Rules aforementioned.

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4) The current derating of the converters is according to relevant Danfoss Design Guide for the associated series.

5) The alarm functions of converters, as a minimum, as specified per Marine Vessel Rules 4-8-3/8.5.12 are to be tested, as applicable at the plant of the manufacturer.

6) Assessment is for hardware only.

7) External cables of the subject converters are not covered by this PDA certificate.

Notes, Drawings and Documentation
Drawing No. Product Overview complete Marine approval 00714813 Revision B,1

Drawing No. UL Test Datasheet-1, 1-DataSheet-1, Revision: 0

Drawing No. UL Test Datasheet-2, 1-DataSheet-2, Revision: 0

Drawing No. UL Test Datasheet-3, 1-DataSheet-3, Revision: 0

Drawing No. Conducted RF Immunity FB09 C3,
EMC-2023-3-20210204-2228_FB09-C3_RF-CM-STO.docx, Revision: 0

Drawing No. BH31974037964402, Safety Guide - BH31974037964402-000301, Revision: 0301

Drawing No. EFT-Burst FB09 C2, EMC-2023-1-20210205-1716_FB09_C2_Burst_STO.docx, Revision: 0

Drawing No. ESD FB12 C2, EMC-2023-2_20210205-2125-FB12_C2_ESD-STO.docx, Revision: 0

Drawing No. 178R0011, 178R0011_MCAD_FK09c_IP21_rev1, Revision: 001

Drawing No. 178R0007, 178R0007_MCAD_FA10_IP20_rev2, Revision: 002

Drawing No. Power Supply Failure Fx09, P4016_PTP_AC_Line_Loss_N160T5, Revision: 0

Drawing No. 178R0019, 178R0019_MCAD_FK11_IP21_rev1, Revision: 001

Drawing No. Radiated RF Immunity FB09 C2, EMC-2023-001_20210204-1919-RI-STO-FB9 C2.docx, Revision: 0

Drawing No. Surge FB12 C3, EMC-2023-4-20210205-2229_FB12_C3_SURGE_STO.docx, Revision: 0

Drawing No. ESD FB12 C3, EMC-2023-4_20210205-2204-FB12_C3_ESD-STO.docx, Revision: 0

Drawing No. Radiated Emission FB10, FB10
15856602A-20250630-model+137U7071-DANFOSS+L+L+C-EMC+Test+Report_250, Revision: 0

Drawing No. AJ319739940640en, Design Guide - AJ319739940640en-000601, Revision: 0601:

Drawing No. Conducted Emission FB12, FB12 Test+Report+TR-21-PR132066+rev+A, Revision: 0

Drawing No. 178R0021, 178R0021_MCAD_FK10a_IP21_rev1, Revision: 001, Pages:

Drawing No. Surge FB09 C2, EMC-2023-1-20210205-1737_FB09_C2_SURGE_STO.docx, Revision: 0, Pages: :

Drawing No. Vibration, TDP-2376_etr2502453-01B, Revision: 0

Drawing No. Conducted RF Immunity FB12 C3, EMC-2023-4-20210205-2116_FB12-C3_RF-CM-STO, Revision: 0

Drawing No. AX503760047329en, Service Guide - AX503760047329en-000401, Revision: 0401, Pages:

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Drawing No. 178R0015, 178R0015_MCAD_FB09c_IP54_rev1, Revision: 001, Pages:

Drawing No. EFT-Burst FB12 C2, EMC-2023-2-20210205-2215_FB12_C2_Burst_STO.docx, Revision: 0

Drawing No. ESD FB09 C3, EMC-2023-003_20210205-1644-C3-ESD-STO-FB9.docx, Revision: 0

Drawing No. Power Supply Failure Fx12, P4016_PTP_AC_Line_Loss_N630T5, Revision: 0

Drawing No. Conducted Emission FB09 FB10, FB09 FB10_9_TR-20-PR129086+Test+Report+rev+C, Revision: 0

Drawing No. Radiated RF Immunity FB12, TR-22-PR151044-2_Radiated Immunity_ FB12_ rev Basic_C2_C3, Revision: 0

Drawing No. 178R0020, 178R0020_MCAD_FK12_IP21_rev1, Revision: 001

Drawing No. 178R0017, 178R0017_MCAD_FK10c_IP21_rev2, Revision: 002

Drawing No. EMC, TR-22-PR151055 Test Report rev Basic, Revision: 0

Drawing No. 178R0009, 178R0009_MCAD_FA12_IP20_rev1, Revision: 001

Drawing No. Impulse Voltage Fx09, Impulse Voltage Fx09 Test Report, Revision: 0

Drawing No. Radiated Emission FB12, FB12 15856602B-20250630-model+137U7824-DANFOSS+L+L+C-EMC+Test+Report_630, Revision: 0

Drawing No. Conducted RF Immunity FB09 C2, EMC-2023-1-20210204-2215_FB09-C2_RF-CM-STO.docx, Revision: 0

Drawing No. Surge FB12 C2, EMC-2023-2-20210205-2227_FB12_C2_SURGE_STO.docx, Revision: 0

Drawing No. 178R0022, 178R0022_MCAD_FB11_IP54_rev1, Revision: 001

Drawing No. 178R0023, 178R0023_MCAD_FB12_IP54_rev1, Revision: 001

Drawing No. Cold Test, P4016 Cold Test Report - 630kw, Revision: 0

Drawing No. Visual Inspection, P4016 Visual Inspection Checklist, Revision: 0

Drawing No. Damp Heat, ETR2201458-01A Damp Heat FB10a_FB12, Revision: 0

Drawing No. EFT-Burst FB09 C3, EMC-2023-3-20210205-1722_FB09_C3_Burst_STO.docx, Revision: 0

Drawing No. 178R0016, 178R0016_MCAD_FB09a_IP54_rev1, Revision: 001

Drawing No. EFT-Burst FB12 C3, EMC-2023-4-20210205-2218_FB12_C3_Burst_STO.docx, Revision: 0

Drawing No. 178R0008, 178R0008_MCAD_FA11_IP20_rev1, Revision: 001

Drawing No. AN45873927295002, Installation Guide - AN45873927295002-000302, Revision: 0302

Drawing No. Dry Heat FB12, P4016 Dry Heat Report - 630kw, Revision: 0

Drawing No. 178R0018, 178R0018_MCAD_FB10c_IP54_rev2, Revision: 002

Drawing No. ESD FB09 C2, EMC-2023-001_20210205-1640-C2-ESD-STO-FB9.docx, Revision: 0

Drawing No. 178R0010, 178R0010_MCAD_FK09a_IP21_rev1, Revision: 001

Drawing No. 178R0006, 178R0006_MCAD_FA09_IP20_rev2, Revision: 002:

Drawing No. Impulse Voltage Fx12, Impulse Voltage Fx12 Test Report, Revision: 0

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Drawing No. Radiated RF Immunity FB09 C3, EMC-2023-001_20210204-1917-RI-STO-FB9 C3.docx, Revision: 0

Drawing No. Conducted RF Immunity FB12 C2, EMC-2023-2-20210205-2112_FB12-C2_RF-CM-STO, Revision: 0

Drawing No. Surge FB09 C3, EMC-2023-3-20210205-1741_FB09_C3_SURGE_STO.docx, Revision: 0

Drawing No. 178R0024, 178R0024_MCAD_FB10a_IP54_rev1, Revision: 001

Drawing No. Dry Heat FB09, P4016 Dry Heat Report - 160kw and 250kw, Revision: 0

* Refer to Documentation List attached for the drawings/documents included in the previous approvals.

Term of Validity
This Product Design Assessment (PDA) Certificate remains valid until 14/Dec/2028 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

ABS Rules
2026 Rules for Conditions of Classification, Part 1A, 1A-1-4/7.7, 1A-1-A3, 1A-1-A4, which covers the following:

2026 Marine Vessel Rules 4-1-1/7.11, 4-8-1/7.3.3, 4-8-3/1.11, 4-8-3/1.17, 4-8-3/8, 4-8-3/Table 2, 4-8-3/Table 7, 4-8-4/1.3, 4-9-9/Table 1 & Table 2

2025 Rules for Conditions of Classification, Part 1B, Offshore Units and Structures 1B-1-4/9.7, 1B-1-A2, 1B-1-A3, which covers the following:

2026 Offshore Units Rules 4-1-1/3.5, 4-1-1/7.7, 4-3-3/3.1, 4-3-3/Table 1, 6-1-7/12, 6-1-7/13.5, 6-1-7/19.1

International Standards
EN IEC 61800-5-1:2023 Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, thermal and energy

EN IEC 61800-3:2023 Adjustable speed electrical power drive systems – Part 3: EMC requirements and specific test methods

EU-MED Standards
NA

National Standards
UL 61800-5-1 Edition 1, 2018 Adjustable Speed Electrical Power Drive Systems - Part 5-1: Safety Requirements - Electrical, Thermal and Energy

UL 508C Edition 4, Power Conversion Equipment

CSA C22.2 No. 274-17, 2nd Ed, Rev. 2017-04-01

Government Standards
NA

Other Standards
None

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ABS has used due diligence in the preparation of this certificate, and it represents the information on the product in the ABS Records as of the date and time the certificate is printed.

If the Rules and/or standards used in the PDA evaluation are revised or if there is a design modification (whichever occurs first), a PDA revalidation may be necessary.

The continued validity of the MA is dependent on completion of satisfactory audits as required by the ABS Rules. The validity of both PDA and MA entitles the product to receive a **Confirmation of Product Type Approval**.

Acceptance of product is limited to the “Intended Service” details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or prior to the effective date of the ABS Rules and standards applied at the time of PDA issuance. ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.

Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. The manufacturer is responsible to maintain compliance with all specifications applicable to the product design assessment. Unless specifically indicated in the description of the product, certification under type approval does not waive requirements for witnessed inspection or additional survey for product use on a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.

Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.

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