



## *Confirmation of Product Type Approval*

Please refer to the "Service Restrictions" shown below to determine if Unit Certification is required for this product. This certificate reflects the information on the product in the ABS Records as of the date and time the certificate is printed.

Pursuant to the Rules of the American Bureau of Shipping (ABS), the manufacturer of the below listed product held a valid Manufacturing Assessment (MA) with expiration date of 28-APR-2021. The continued validity of the Manufacturing Assessment is dependent on completion of satisfactory audits as required by the ABS Rules.

And; a Product Design Assessment (PDA) valid until subject to continued compliance with the Rules or standards used in the evaluation of the product.

The above entitle the product to be called Product Type Approved.

The Product Design Assessment is valid for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

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.

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.

**Product Name:** Frequency Converter  
**Model Name(s):** FC-102, FC-202 and FC-302 Series drives, FC-102/202/302 LHD with RFI N2, N4 and AAF Series 006.

**Presented to:**  
DANFOSS LLC  
POWER ELECTRONICS  
4401 N. BELL SCHOOL ROAD  
IL 61111  
United States

**Intended Service:** Marine and Offshore Installations.

**Description:** Frequency Converters: VLT® HVAC Drive Series FC-102, VLT® AQUA Drive Series FC-202 and VLT® Automation Drive FC-302 Series. These are Motor Controllers that converts AC Mains Input into variable AC Waveform Output. The Output Frequency & Voltage are regulated to control the Motor Speed or Torque. FC-102/202/302 LHD (low harmonic) with RFI (radio frequency interference) N2 and N4 & AAF ( Advanced Active Filter ) Series 006

**Tier:** 4

**Ratings:** Complete Drive Configurations, Power Ratings, and Frames as per attached "pdf" Product Description. Enclosure Protection: IP54/IP21, NEMA Type 12/1 VLT FC-102/202/302 LHD with RFI N2, N4 & AAF Series 006

**Service Restrictions:** Unit Certification is required for Drives intended for Essential Services as per 4-8-3/5.11 (110 kW and over) and for Propulsion Application as per 4-8-5/5.17.8 of the 2017 Steel Vessels Rules. Unit certification is also required for Drives intended for Essential Services as per 4-1-1/3.5 of the 2017 Mobile Offshore Drilling Unit Rules.

**Comments:** The Manufacturer has provided a declaration about the control of, or the lack of

Asbestos in this product. Please contact Danfoss for National/International Standard dates.

**Notes / Documentation:**

Drawings: 177R0659, Block Diagram, E-Frame, P4001 177R0676, E1h Enclosure Dimensional & Layout Drawing, Revision: 0.1, Pages: 2 177R0673, E2h Enclosure Dimensional & Layout Drawing, Revision: 0.1, Pages: 2 177R0674, E3h Enclosure Dimensional & Layout Drawing, Revision: 0.1, Pages: 2 177R0675, E4h Enclosure Dimensional & Layout Drawing, Revision: 0.1, Pages: 2 Test Reports: 130B5510 ( 9.9KV test) 2012-06-06, Transformer Test Report 130B5510 TEST REPORT 2011-07-29, Transformer Test Report 640F0022\_720W\_9.9kV test, Transformer, SMPS, 720W, 400V-1200V, ETD, LCC 640F0804 ( 9.9KV test) 2012-06-06, 640F0065 ( 9.9KV test) 2102-06-06, tr4001\_PTP\_4\_Quadrant\_Operation\_N710T7, UL File E70524, UL Break Down of Component Test, UL Testing 00733941, tr4001\_PTP\_4\_Quadrant\_Operation\_N400T5, tr4001\_PTP\_LVD\_Insulation\_Resistance\_Test RQM-TER-345855\_ESD Test Report FC302N250T5 v3, 18 May 2017 RQM-TER-345856\_EFT-Burst Test Report FC302N250T5 v3, 18 May 2017 RQM-TER-345857\_ESD Test Report FC302P560T7 v3, 18 May 2017 RQM-TER-345858\_EFT-Burst Test Report FC302P560T7 v3, 18 May 2017 RQM-TER-345859\_ESD Test Report FC302P800T5 v3, 18 May 2017 RQM-TER-345860\_EFT-Burst Test Report FC302P0800T5 v3, 18 May 2017 RQM-TER-345861\_Surge Test Report FC302N250T5 v3, 18 May 2017 RQM-TER-345862\_Surge Test Report FC302P560T7 v3, 18 May 2017 RQM-TER-345863\_Surge Test Report FC302P800T5 v3, 18 May 2017 RQM-TER-345864\_EFT-Burst Test Report AAF006A250T4 v3, 18 May 2017 RQM-TER-345865\_Surge Test Report AAF006A250T4 v3, 18 May 2017 RQM-TER-345866\_Surge Test Report AAF006A250T4 v3, 18 May 2017 RQM-TER-345867\_CS Test Report FC302N250T4 v3, 18 May 2017 RQM-TER-345868\_CS Test Report FC302P560T7 v3, 18 May 2017 RQM-TER-345869\_CS Test Report FC302P800T5 v3, 18 May 2017 RQM-TER-345870\_CS Test Report AA%006A250T4 v3, 18 May 2017 RQM-TER-345881+1to+RQM-TER-345885\_TR+416365+EMC+V2, 17 February 2017 RQM-TER-345886\_Radiated RF Susceptibility Test Report FC302P450T5 v4, 18 May 2017 Data Sheets: 612L0314 Avago HCNW4506, Data Sheet - Avago HCNW4506 Optocoupler 613B3128 Tyco Relay, Data Sheet - Tyco Power PCB Relay RT2 640F0025 IEC60747-5-5, Data Sheet - Avago ACNV2601 Digital Optocoupler 640F0789 CNY64 1, Data Sheet - Everlight CNY64(DFS) Series Photocoupler 640F0838-ACNV4506, Data Sheet - Avago ACNV4506 Optocouplers Other Documentation: Checklist for visual inspection P4001 00734665 Doc. No. MG16O102, Operating Guide - VLT HVAC Drive FC 102, 355-800kW, Enclosure Size E Doc. No. MG22A102, Operating Guide - VLT AQUA Drive FC 202, 355-800kW, Enclosure Size E Doc. No. MG38A102, Operating Guide - VLT Automation Drive FC 302, 315-710kW, Enclosure Size E Product overview complete Marine approval - Note (High Power Only) ABS P5050 Project Introduction Letter Other Supporting Documents: Contained in product design assessment task-984080, task-T1004774 & task-T1493491

**Term of Validity:**

This Product Design Assessment (PDA) Certificate 16-HS1493491-2-PDA, dated 21/Jul/2017 remains valid until 28/Apr/2021 or until the Rules or specifications used in the assessment are revised (whichever occurs first). This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product. Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA. Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

**ABS Rules:**

2017 Steel Vessel Rules, Part 1 - Rules for Conditions of Classification:1-1-4/7.7, 1-1-A3, 1-1-A4 which covers the following: 2017 Steel Vessel Rules: 4-8-3/1.7, 4-8-3/1.9, 4-8-3/1.11, 4-8-3/1.17, 4-8-3/8 and 4-9-8/Table 1 & 2 2017 Steel Vessels Under 90 Meters (295 feet) in Length 4-6-1/11, 4-6-1/15, 4-6-1/17, 4-6-4/10 and 4-7-2/ Table 1 & 2 2017 Offshore Support Vessels (OSV Rules) 4-8-3/1.7, 4-8-3/1.9, 4-8-3/1.11, 4-8-3/1.17, 4-8-3/8 and 4-9-8/Table 1 & 2 2017 Rules for Conditions of Classification, Part 1 -Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following: 2017 Rules for Building and Classing Mobile Offshore Drilling Units: 4-3-1/11, 4-3-1/15, 4-3-1/17, 4-3-1/19 and 6-1-7/12

**National Standards:** UL508C (2008/2010), UL840 (2007/2012), UL 61800-5-1 (2012)  
**International Standards:** IEC 60068-2-1 (2007), IEC 60068-2-2 (2007), IEC 60068-2-30 (2005), IEC 60068-2-6 (2007), IEC 60068-2-52 (1996); IEC 61000-4-2 (2008), IEC 61000-4-3 (2006), IEC 61000-4-4 (2012), IEC 61000-4-5 (2014), IEC 61000-4-6 (2013); CISPR 16-2-3 (2010), CISPR 16-2-1 (2014); EN61800-5-1 (2007)

**Government Authority:**  
**EUMED:**  
**Others:**

Model Certificate	Model Certificate No	Issue Date	Expiry Date
PDA	16-HS1493491-2-PDA	26-JUL-2017	28-APR-2021



ABS Programs

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 was printed. Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. Limited circumstances may allow only Prototype Testing to satisfy Type Approval. The approvals of Drawings and Products remain valid as long as the ABS Rule, to which they were assessed, remains valid. ABS cautions manufacturers to review and maintain compliance with all other specifications to which the product may have been assessed. Further, unless it is specifically indicated in the description of the product; Type Approval does not necessarily waive witnessed inspection or survey procedures (where otherwise required) for products to be used in a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS. 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.