



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 05/OCT/2016. 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 22/MAY/2018 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, FC-30x

Presented to:

DANFOSS POWER ELECTRONICS A/S
ULSNAES 1
DK-6300 GRAASTEN
Denmark

Intended Service:

Marine and Offshore Installations.

Description:

VLT® Automation Drive FC300 series type FC301/302, VLT® AQUA Drive series FC202 and VLT® HVAC Drive series FC102; FC-102, FC-202 and FC-30x series configurations are as per attached product description.

Tier:

5

Ratings:

Range of ratings is per the configurations in attached product description sheet.

Service Restrictions:

Unit Certification is required for drive units where required for essential services as per 4-8-3/5.11 of the Rules. 1) Environmental tests and approval are for hardware and firmware only. 2) For the computer-based frequency drive control system, the documentation is to be submitted to ABS, or to be available for checking by ABS, in accordance with the requirements of 4-9-6/Table 2 "Tests and Evidence of Quality Assurance" for System Category II as detailed in 4-9-6/9.1 and 4-9-6/Table 1 of SVR 2012.

Comments:

The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product. 1) Each installation onboard is to be specifically approved and drawings/schematics will need to be submitted. 2) Where used in machinery space (i.e. engine room, boiler room) the units are to have an ambient rating of 45°C. 3) The units are to have the appropriate enclosure IP rating as per 4-8-3/Table 2 based on their installed location. 4) Details pertaining to overload

protection, running protection and motor starter disconnects are to be submitted for each installation.

Notes / Documentation:

Supporting Data: Danak/Delta Test report Project Nos.: E400877; A401850, A401850-01 and A402498; Test Reports A402342, P407-151/152/154 and P420-316/341/366/367/395/423/539/540/541/543-547/549/550/552/553/554/561/563/575/57 * Doc. ID 00708685, Rev. A3, dated 2013-11-01, P462 C3 EMC Test Summary Report, Test Report, 8 Pages; * Doc. ID 00714890, Rev. A3, dated 2013-11-01, P462 B4 EMC Test Summary Report, Test Report, 9 Pages; * Doc. ID 00709825, Rev. A1, dated 2013-11-01, P462 A3 EMC Test Summary Report, Test Report, 9 Pages; * Test Report No. CTR-13-0155, Rev. Released, dated 26 Aug. 13, Electromagnetic Compatability Testing of Danfos Power Electronics Programmable Motor Drive System, 31 Pages; * Test Report No. CTR-13-0120, Rev. Draft 2, dated 17 May 13, Electromagnetic Compatability Testing Performed the Danfos Programmable Motor Drive System, 134 Pages; * Test Report No. CTR-12-0125, dated 11 May 2012, Test Report of Qualification Testing Performed on the Programmable Motor Drive System, 81 Pages; * Test Report No. CTR-12-0130, dated 30 May 2012, Test Report of Qualification Testing Performed on the Programmable Motor Drive System, 119 Pages; * P462-362, Ver.1.00b, P462 FC-302P7K5T7E20-A3, LVD Test Report, 32 Pages, dated 2013-11-01; * P462-391, -122, Ver.1.00b, P462 FC-302P30T7E20-B4, LVD (Dry Heat Test) Test Report, 31 Pages, dated 2013-11-01; * P462-305, Ver.1.00a, P462 IP20 690V FC-302, Safety EMC Test Report, dated 2013-11-01, 71 Pages; * P462-159, -451, Ver.1.00a, P462 IP20 690V FC-302, DD-DS1 Test Report, dated 2013-11-01, 20 Pages; * P462-473, Ver.1.00a, P462 IP20 690V FC-302, Power Supply Variation Test Report, dated 2013-11-01, 19 Pages; * P462-467,-469, Ver.1.00a, P462 IP20 690V FC-302, Wide Band Random Test Report, dated 2013-11-01, 13 and 19 Pages * P462-321, -454, Ver.1.00a, P462 IP20 690V FC-302, Damp Heat Test Report, dated 2013-11-01, 13 Pages; * P462-308,- 91 & -456, Ver.1.00a, P462 IP20 690V FC-Burst/Fast Transient Test Report, dated 2013-11-01; *P462-164, Ver. 1.00a, P462 IP20 690V FC-302, Voltage Harmonics Distortion, dated 2013-11-01; *P462-459, Ver. 1.00a, P462 IP20 690V FC-302, Voltage Harmonics Distortion, dated 2013-11-01; *P462-355, Ver. 1.00a, P462 IP20 690V FC-302, Voltage Harmonics Distortion, dated 2013-11-01; *P462_A3_Visual Inspection, P462-690 IP20, A3 Frame, dated 14 Aug 2012, 17 Pages; *P462_Visual Inspection, P462-690 IP20, dated 29 June 2012, 17 Pages; *P420-368, -541, Ver. 1.00a, dated 11-01-2013, P420 Mid Range Panel Mount (Cold Test); *P420-367, Ver. 1.00a, dated 11-01-2013, P420 Mid Range Panel Mount (Damp Heat Test);

Term of Validity:

This Product Design Assessment (PDA) Certificate 06-HS192435-3-PDA, dated 23/Dec/2013 remains valid until 22/May/2018 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:

2013 Steel Vessels Rules 1-1-4/7.7, 1-1-A3, 4-8-3/1.7, 4-8-3/1.9, 4-8-3/1.11, 4-8-3/1.17, 4-8-3/7.5, 4-9-7/Table 9 and Table 10;

- National Standards:**
- International Standards:**
- Government Authority:**
- EUMED:**
- Others:**

None

Model Certificate

Model Certificate No

Issue Date

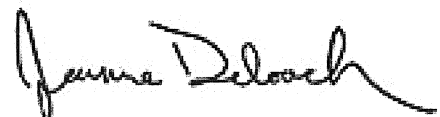
Expiry Date

PDA

06-HS192435-3-PDA

23/DEC/2013

22/MAY/2018



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.

Product overview complete Marine approval Note

Document ID: 00714813

Rev., Sequence: A,17

Project/ Activity: P400 - Platform

File Origin Date: 2013-05-31

File Last Modified 2014-01-22

Creator: Schultz, Jorn #f39424#

Description:

Product: Frequency converter

Model: VLT® HVAC Drive series FC102

FC-102: 200-240V						
Power rating	Enclosure type					
[kW]	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)		
1,1	A2	A2 (*5)	A4+A5	A4+A5		
1,5						
2,2						
3,0	A3	A3 (*5)	A5	A5		
3,7						
4,0	N/A					
5,5	B3	B1	B1	B1		
7,5						
11						
15	B4	B2	B2	B2		
18,5						
22	C3	C1	C1	C1		
30						
37	C4	C2	C2	C2		
45						
55	N/A					
75						
90						

FC-102: 380-480/500V						
Power rating	Enclosure type					
[kW]	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)		
1,1	A2	A2 (*5)	A4+A5	A4+A5		
1,5						
2,2						
3,0						
3,7	N/A					
4,0	A2	A2 (*5)	A4+A5	A4+A5		
5,5	A3	A3 (*5)	A5	A5		
7,5						
11	B3	B1	B1	B1		
15						
18,5						
22	B4	B2	B2	B2		
30						
37						
45	C3	C1	C1	C1		
55						
75	C4	C2	C2	C2		
90			N/A			

FC-102: 525-690V						
Power rating	Enclosure type					
[kW]	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)		
1,1	A3	N/A				
1,5		N/A				
2,2*		B2	B2	B2		
3,0*		B2	B2	B2		
4,0*		B2	B2	B2		
5,5*	B4	B2	B2	B2		
7,5*						
11						
15						
18,5						
22	C3	C2	C2	C2		
30						
37						
45	Se HP Drives	C2	C2	C2		
55						
75						
90						

(*1) IP20/Panel mount. All IP20 versions can be upgraded to IP21 with optional kit

(*2) IP21/NEMA Type 1

(*3) IP55/NEMA Type 12

(*4) IP66/NEMA Type 4X

(*5) IP20/Panel with IP21 upgrade kit

H1; H2; H3; H4 RFI comply with IACS E10 requirements except radiated and conducted emissions.

H5 RFI complies with IACS E10 requirements except radiated and conducted emissions.

Ruggedized boards, selection "R" in character 20, or H5 in character 16-17 must be selected

Limitations: Converters with conducted and radiated emission above the IACS E10 required limits can be installed in "special distribution zone" and "general power distribution zone", in accordance with IEC60533 provided measures are taken to attenuate these effects on the distribution system, so safe operation is assured. Planned EMC measures shall be submitted for approval prior installation onboard.

Model: VLT® AQUA Drive series FC202

FC-202: 200-240V						
Power rating [kW]	Enclosure type					
	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)		
0,25	A2	A2 (*5)	A4+A5	A4+A5		
0,37						
0,55						
0,75						
1,1						
1,5						
2,2						
3,0	A3	A3 (*5)	A5	A5		
3,7						
4,0	N/A					
5,5	B3	B1	B1	B1		
7,5						
11						
15	B4	B2	B2	B2		
18,5						
22	C3	C1	C1	C1		
30						
37	C4	C2	C2	C2		
45						
55	N/A					
75	N/A					
90	N/A					

FC-202: 380-480/500V						
Power rating [kW]	Enclosure type					
	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)		
0,37	A2	A2 (*5)	A4+A5	A4+A5		
0,55						
0,75						
1,1						
1,5						
2,2						
3,0						
4,0	A2	A2 (*5)	A4+A5	A4+A5		
5,5	A3	A3 (*5)	A5	A5		
7,5						
11	B3	B1	B1	B1		
15						
18,5						
22	B4	B2	B2	B2		
30						
37						
45	C3	C1	C1	C1		
55						
75	C4	C2	C2	C2		
90			N/A			

FC-202: 525-690V						
Power rating	Enclosure type					
[kW]	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)		
1,1	A3	N/A				
1,5						
2,2*		B2	B2	B2		
3,0*						
4,0*						
5,5*						
7,5*						
11	B4	B2	B2	B2		
15						
18,5						
22						
30						
37	C3					
45						
55						
75	See HP Drives	C2	C2	C2		
90						

(*1) IP20/Panel mount. All IP20 versions can be upgraded to IP21 with optional kit

(*2) IP21/NEMA Type 1

(*3) IP55/NEMA Type 12

(*4) IP66/NEMA Type 4X

(*5) IP20/Panel with IP21 upgrade kit

H1; H2; H3; H4 RFI comply with IACS E10 requirements except radiated and conducted emissions

H5 RFI complies with IACS E10 requirements except radiated and conducted emissions.

Ruggedized boards, selection "R" in character 20, or H5 in character 16-17 must be selected

Limitations: Converters with conducted and radiated emission above the IACS E10 required limits can be installed in "special distribution zone" and "general power distribution zone", in accordance with IEC60533 provided measures are taken to attenuate these effects on the distribution system, so safe operation is assured. Planned EMC measures shall be submitted for approval prior installation onboard.

Model: VLT® Automation Drive FC300 series type FC301/302

FC-300: 200-240V							
Power rating	Enclosure type						
[kW]	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)			
0,25	A2	A2 (*5)	A4+A5	A4+A5			
0,37							
0,55							
0,75							
1,1							
1,5							
2,2							
3,0	A3	A3 (*5)	A5	A5			
3,7							
5,5	B3	B1	B1	B1			
7,5							
11	B4	B2	B2	B2			
15							
18,5	C3	C1	C1	C1			
22							
30	C4	C2	C2	C2			
37							
45	N/A						
55							
75							

FC-300: 380-480/500V						
Power rating	Enclosure type					
[kW]	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)		
0,37	A2	A2 (*5)	A4+A5	A4+A5		
0,55						
0,75						
1,1						
1,5						
2,2						
3,0						
4,0	A2	A2 (*5)	A4+A5	A4+A5		
5,5	A3	A3 (*5)	A5	A5		
7,5						
11	B3	B1	B1	B1		
15						
18,5	B4	B2	B2	B2		
22						
30	C3	C1	C1	C1		
37						
45	C4	C2	C2	C2		
55						
75						

FC-300: 525-690V					
Power rating	Enclosure type				
[kW]	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)	
1,1	A3				
1,5					
2,2*		B2	B2	B2	
3,0*		B2	B2	B2	
4,0*		B2	B2	B2	
5,5*		B2	B2	B2	
7,5*		B2	B2	B2	
11	B4	B2	B2	B2	
15		B2	B2	B2	
18,5		B2	B2	B2	
22		B2	B2	B2	
30	C3	C2	C2	C2	
37		C2	C2	C2	
45		C2	C2	C2	
55	D3h				
75					

(*1) IP20/Panel mount. All IP20 versions can be upgraded to IP21 with optional kit

(*2) IP21/NEMA Type 1

(*3) IP55/NEMA Type 12

(*4) IP66/NEMA Type 4X

(*5) IP20/Panel with IP21 upgrade kit

H1; H2; H3; H4 RFI comply with IACS E10 requirements except radiated and conducted emissions

H5 RFI complies with IACS E10 requirements except radiated and conducted emissions.

Ruggedized boards, selection "R" in character 20, or H5 in character 16-17 must be selected

Limitations: Converters with conducted and radiated emission above the IACS E10 required limits can be installed in "special distribution zone" and "general power distribution zone", in accordance with IEC60533 provided measures are taken to attenuate these effects on the distribution system, so safe operation is assured. Planned EMC measures shall be submitted for approval prior installation onboard.

Selection types for Type Codes for FC 102, 202 and 300

----- (character 24 – 39 software + options)
1 4 7 10 11 23

Basic string definitions:

Product Group (character 1-3)

FC- : Adjustable Frequency Converters

VLT series (character 4-6)

- 102 : VLT HVAC Drive – Advanced version
- 202 : VLT AQUA Drive – Advanced version
- 301 : VLT Automation Drive - Standard version
- 302 : VLT Automation Drive - Advanced version

Power size (character 7-10)

PK25 : 0.25 kW / 0.33 HP

P75K : 75 kW / 100 HP

P90K : 90 KW / 125 HP

N75K : 75 kW / 100 HP D3h

N90K : 90 KW / 125 HP D3h

Voltage: (character 11-12)

T2 : Three phase 200-240 VAC

T4 : Three phase 380-480 VAC

T5 : Three phase 380-500 VAC

T7 : Three Phase 525-690 VAC

Enclosure (character 13-15)

E20 : IP20 / Chassis

E21 : IP21 / Type 1

E55 : IP55/ Type 12

E66 : IP66 / Type 4X

Hardware (character 16-23)

Hardware, RFI filter (character 16-17)

H1; H2; H3; H4; H5 RFI comply with IACS E10 requirements except radiated and conducted emissions

Hardware, Brake & Stop (character 18)

Hardware, Display (character 19)

Hardware, Coating (character 20) C :Coated PCB ; R : Coated PCB 3C3 + Ruggedized

Hardware, Mains options (character 21)

Hardware, adaptation A (character 22)

Hardware, adaptation B (character 23)

Software (character 24-28)**Options – A (character 29-30)****Options – B (character 31-32)****Options – C (character 33-37)****Options – D (character 38-39)**

Brand labelling and customer specific definitions

Brand labelling and customer specific drives are following the type codes except the characters 1-6 for product group and VLT series. Character 1-6 are used for customer specific definitions.

Basic string definitions for brand labelling and customer specific drives:**Product Group and VLT series (character 1-6)**

AF-600	Equals to FC-102
AKD102	Equals to FC-102
FC-103	Equals to FC-102
ADS102	Equals to FC-102
IVS102	Equals to FC-102
TR-200	Equals to FC-102
ITT102	Equals to FC-102
CUE202	Equals to FC-202
LD-302	Equals to FC-302
IR-302	Equals to FC-302
IRV302	Equals to FC-302
CD-302	Equals to FC-302
MWU302	Equals to FC-302
CDS302	Equals to FC-302
DV-302	Equals to FC-302
3G3DV	Equals to FC-302
LB-302	Equals to FC-302

AFE302	Equals to FC-302
AF-650	Equals to FC-302
FCK302	Equals to FC-302
FC-312	Equals to FC-302
FC-311	Equals to FC-301