



Marine & Offshore

Certificate number: 61265/A0 BV

File number: AP 3763

Product code: 2592H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

DANFOSS Drives A/S

Graasten - DENMARK

for the type of product

FREQUENCY CONVERTERS (Power below 50kW)

Drives frequency converters FC-30x, FC-202, FC-102.

Requirements:

Bureau Veritas Rules for the Classification of Steel Ships

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 03 Aug 2025

For Bureau Veritas Marine & Offshore,

At BV FREDERICIA, on 03 Aug 2020,

Jesper JENSEN



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 6 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

1.1 - VLT HVAC Drive Series FC102:

Power rating (kW)	200-240V (T2)				380-480V (T4) & 380-500V (T5)				525-690V (T7)			
	Enclosure type				Enclosure type				Enclosure type			
	IP 20 (*1)	IP 21 (*2)	IP 55 (*3)	IP 66 (*4)	IP 20 (*1)	IP 21 (*2)	IP 55 (*3)	IP 66 (*4)	IP 20 (*1)	IP 21 (*2)	IP 55 (*3)	IP 66 (*4)
1,1	A2	A2 (*5)	A4/ A5		A2	A2 (*5)	A4/ A5		A3	N/A		
1,5										B2		
2,2										B2		
3,0	A3	A3 (*5)	A5		N/A							
3,7					N/A							
4,0	N/A				A2	A2 (*5)	A4/ A5		A3	B2		
5,5	B3	B1		A3	A3 (*5)	A5						
7,5				B3		B1		B4				
11									B4			
15	C3	C1		B4		B2						
18,5								C4				
22	C3		C1		B4		B2					
30									C4		C2	
37	C3		C1		C3		C2					
45									C3		C1	

1.2 - VLT AQUA Drive FC202:

Power rating (kW)	200-240V (T2)				380-480V (T4) & 380-500V (T5)				525-690V (T7)															
	Enclosure type				Enclosure type				Enclosure type															
	IP 20 (*1)	IP 21 (*2)	IP 55 (*3)	IP 66 (*4)	IP 20 (*1)	IP 21 (*2)	IP 55 (*3)	IP 66 (*4)	IP 20 (*1)	IP 21 (*2)	IP 55 (*3)	IP 66 (*4)												
0.25	A2	A2 (*5)	A4/ A5		N/A				B2*															
0.37					A4/ A5																			
0.55													A4/ A5											
0.75																	A4/ A5							
1.1																					A4/ A5			
1.5																								
2.2	A4/ A5																							
3.0					A3	A3 (*5)	A5		N/A		A3*													
3.7													N/A											
4.0					N/A				A2	A2 (*5)	A4/ A5													
5.5					B3	B1		A3	A3 (*5)	A5														
7.5	B3		B1					B4																
11									B4		B2													
15	C3	C1		B4		B2																		
18.5								C4		C2		C1		C2										
22	C3		C1		B4		B2																	
30									C4		C2		C1		C2									
37	C3		C1		C3		C2																	
45									C3		C1		C3		C2									

1.3 - VLT Automation Drive FC301/ FC302:

Power rating (kW)	200-240V (T2)				380-480V (T4) & 380-500V (T5)				525-690V (T7)			
	Enclosure type				Enclosure type				Enclosure type			
	IP 20 (*1)	IP 21 (*2)	IP 55 (*3)	IP 66 (*4)	IP 20 (*1)	IP 21 (*2)	IP 55 (*3)	IP 66 (*4)	IP 20 (*1)	IP 21 (*2)	IP 55 (*3)	IP 66 (*4)
0.25	A2	A2 (*5)	A4/ A5		A2	A2 (*5)	A4/ A5		A3			
0.37												
0.55												
0.75												
1.1												
1.5	A3		N/A									
2.2												
3.0	A3	A3 (*5)	A5				N/A					
3.7												
4.0	N/A				A2	A2 (*5)	A4/ A5		A3			
5.5	B3	B1			A3	A3 (*5)	A5					
7.5	B4		B2		B3		B1		B4			B2
11												
15												
18.5	C3	C1			B4		B2		B4			
22												
30	C4	C2			C3		C1		C3			C2
37												
45												

(*1) IP 20 / Panel mount. All IP 20 versions can be upgraded to IP 21 with optional kit

(*2) IP 21 / NEMA Type 1

(*3) IP 55 / NEMA Type 12

(*4) IP 66 / NEMA Type 4X

(*5) IP 20 / Panel with IP 21 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

* For future product line expansion (power rating 2.2 to 7.5kW).

****Limitations:** Converters which exceed the limits for radiated and conducted emissions of IACS E10 can be installed in "special power distribution zone" according to IEC60533. For installations in "general power distribution zone" measures must be taken to attenuate the effects on the distribution system Planned EMC measures according to IEC60533 shall be assessed prior to installation on board.

1.4 - Selection types for Type Codes for FC-102, FC-202, FC-301/302 (Low/Medium Power):

(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) – As follows:

- H5: RFI for Maritime use. H5 RFI complies with IACS E10 requirements except radiated and conducted emissions
- H4: RFI for Maritime use. H4 RFI complies with IACS E10 requirements except radiated and conducted emissions
- H2: RFI Class A2 (C3)

Hardware, Brake & Stop (character 18)

Hardware, Display (character 19)

Hardware, Coating (character 20) – As follows:

- 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)

Model	Description
AF-600	
AKD102	
FC-103	
ADS102	Same as FC-102
IVS102	
TR-200	
ITT102	
IPC102	
CUE202	
FC-322	
CUE203	Same as FC-202
WI-EFC	
KSB202	
PNR202	
FC-311	Same as FC-301

Model	Description
LD-302	
IR-302	
IRV302	
CD-302	
MWU302	
CDS302	
DV-302	Same as FC-302
3G3DV	
LB-302	
AFE302	
AF-650	
FCK302	
FC-312	
CDS303	

2. DOCUMENTS AND DRAWINGS:

Documentation, drawings and schematics stored in AP 3763.

- Product overview complete Marine approval- Note, No.: 00714813 Rev. A.17, dated 2014-01-22.

3. TEST REPORTS:**DANFOSS Drives A/S:**

Test report N° P401-749_R0104T03v200a, dated 2006-09-29

Test reports N° P401-1093_R0123T01v110a, P404-682_R0123T01v110a, all dated 2006-04-19

Test report N° P401-1094_R0123T03v110a, dated 2006-06-27

Test reports N° P401-1095_R0123T04v110a, P404-684_R0123T04v110a, all dated 2006-04-20

Test report N° P401-1096_R0124T01v100a, dated 2006-04-06

Test reports N° P401-1098_R0131T01v100, P404-686_R0131T01v100, P404-689_R0132T02v100,

P404-688_R0132T01v100, P404-691_R0132T04v100, P404-692_R0132T05v100, all dated 2006-04-05

Test reports N° P401-1129_R0121T01v100a, P404-685_R0124T01v100a, all dated 2006-04-25

Test report N° P404-363_R0104T03v200a, dated 2006-01-17

Test report N° P404-683_R0123T03v110a, dated 2006-06-23

Test reports N° P404-697_R0122T01v110a,

P404-699_R0126T06v200a, all dated 2006-03-06

Test report N° P420-368_R0123T04v110a, dated 2007-12-13

Test report N° P420-541_R0123T04v110a, dated 2007-12-19

Test report N° P420-367_R0123T03v110a, dated 2007-12-20

Test reports N° P429-144_R0123T01v110a, P429-150_R0126T01v100b, P429-151_R0126T02v100a,

P429-155_R0123T01v110a, P429-162_R0126T02v100a, P429-159_R0127T01v100b, P429-161_R0126T01v100b, all dated 2008-11-25

Test reports N° P429-154_R0122T01v110a, P429-165_R0122T01v110a, all dated 2008-12-19

Test report N° P429-164_R0124T01v100a, dated 2008-12-22

Test report N° P429-163_R0124T01v100a, dated 2008-11-26

Test report N° P462-91_R0132T02v200c, dated 2012-01-03

Test report N° P462-164_R0134T05v210a, dated 2012-02-09

Test report N° P462-308_R0132T02v200c, dated 2012-06-25

Test report N° P462-305_R0131T01v100e, dated 2012-06-28

Test report N° P462-321_R0123T03v110an, dated 2012-07-11

Test report N° P462-355_R0134T05v210a, dated 2012-08-14

Test report N° P462-122_R0102T01v300b, dated 2012-11-27

Test report N° P462-329_R0101T02v200a, dated 2012-12-17

Test report N° P462-459_R0134T05v300a, dated 2013-03-21

Test reports N° P462-454_R0123T03v110a, P462-456_R0132T02v200c, all dated 2013-05-08

Test report N° P462-451_R0124T02v100a, dated 2013-07-03

Test report N° P462-159_R0132T04v100d, dated 2013-05-28

Test report N° P462-469_R0124T02v100a, dated 2013-06-04

Test report N° P462-467_R0124T02v100a, dated 2014-01-15

Test report N° P462-473_R0122T01v110a, dated 2015-07-01

Test reports N° P462-120_R0101T02v200a, P462-362_R0102T01v300b, P462-391_R0102T01v300b,

P462-395_R0101T02v200a, all dated 2020-07-09

National Technical Systems:

Test report N° CTR-12-0125, dated 05-11-2012

Test report N° CTR-12-0130, dated 05-30-2012

Test report N° CTR-13-0120, dated 05-17-2013

Test report N° CTR-13-0155, dated 08-26-2013

4. APPLICATION / LIMITATION :

4.1 - According to B.V. Rules for the Classification of Steel Ships.

4.2 - Approval valid for ships granted with the following class notations: **AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.**

4.3 - The equipment, once installed on board ship, is to be tested in accordance with the above referred Regulations under the supervision of a Society's Surveyor.

4.4 - The products comply with the test requirements of IACS E10 Rev.6.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 - The above products are to be supplied by **DANFOSS Drives A/S** in compliance with the type and the requirements described in this certificate.

5.2 - This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.3 - BV product certificate is required.

5.4 - For information, **DANFOSS Drives A/S** has declared to Bureau Veritas the following production site:

DANFOSS Drives A/S

Ulsnaes 1

6300 Graasten

DENMARK

6. MARKING OF PRODUCT :

6.1 - Maker's name or trade mark,

6.2 - Serial number of the units,

6.3 - Equipment type number or model identification under which it was type-tested,

6.4 - \ or @ conformity marking, as relevant.

7. OTHERS :

It is **DANFOSS Drives A/S**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

***** END OF CERTIFICATE *****