

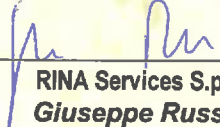


TYPE APPROVAL CERTIFICATE
No. ELE105017XG/001

This is to certify that the product below is found to be in compliance with the applicable requirement of the RINA type approval system.

<i>Description</i>	FREQUENCY CONVERTERS
<i>Type</i>	Series FC-102
<i>Applicant</i>	DANFOSS POWER ELECTRONICS A/S ULSNAES 1 DK-6300 GRAASTEN DENMARK
<i>Manufacturer</i>	DANFOSS, LLC
<i>Place of manufacture</i>	4401 N. BELL SCHOOL RD., 61111 LOVES PARK (IL), U.S.A ULSNAES 1, DK-6300 GRAASTEN, DENMARK
<i>Reference standards</i>	Rules for the classification of ships.- Part C - Machinery, systems and fire protection. - Ch.3, Sect. 6, Table 1

Issued in **HAMBURG** on **July 24, 2017**. *This Certificate is valid until* **July 23, 2022**


RINA Services S.p.A.
Giuseppe Russo

This certificate consists of this page and 1 enclosure



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Series FC-102

Product description:

The VLT[®] HVAC Drive Series FC-102 series are frequency converter for asynchronous motors for use in various marine applications.

FC-102: 200-240V

Power rating [kW]	Enclosure type			
FC-102	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				
5,5	B3	B1	B1	B1
7,5				
11				
15	B4	B2	B2	B2
18,5		C1	C1	C1
22	C3			
30				
37	C4	C2	C2	C2
45				

FC-102: 380-480/500V

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



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Series FC-102

FC-102: 525-690V

Power rating [kW]	Enclosure type			
	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)
FC-102				
1,1	A3	NA	NA	NA
1,5				
2,2				
3,0				
3,7				
5,5				
7,5				
11	B4	B2	B2	B2
15				
18				
22				
30				
37				
45	C3	C2	C2	C2
55				
75	D3h			
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

FC-102: 380-480/500V

Power rating [kW]	Enclosure type						
	6-pulse		12-pulse	Low Harmonic Drive (LHD)			
FC-102	IP00 (*1)	IP20 (*1)	IP21 / IP54 (*2)				
110	NA	D3H	D1h/D5h/D6h	NA	NA		
132							D1n
160					D2n		
200		D4h	D2h/D7h/D8h		F8/F9	E9	
250							
315	E2	E3h	E1/E1h				
355							
400							
450	NA	E4h	F1/F3/E2h	F10/F11	F18		
500							
560		NA	F1/F3			F12/F13	NA
630							
710							
800							
1000							



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Series FC-102

FC-102: 525-690V

Power rating [kW]	Enclosure type				
	6-pulse			12-pulse	
FC-102	IP00 (*1)	IP20 (*1)	IP21 / IP54 (*2)		
75	NA	D3h	D1h/D5h/D6h		
90					
110					
132					
160					
200					
250	E2	D4h	D2h/D7h/D8h		
315					
400	E2	E3h	E1/E1h		
450					
500					
560	NA	E4h	F1/F3/E2h		
630					
710		NA	NA	F10/F11	
800				F8/F9	
900				F1/F3	
1000				F2/F4	
1200	F12/F13				
1400					

(*1) IP00/IP20/Panel mount.

(*2) IP21/NEMA Type 1; IP54/NEMA Type 12

Technical data: (In accordance with Danfoss design guide)

Power supply: 200-240V / 380-480V / 525-690V, 50/60Hz

Voltage variation: +-10 %, -15% reduced power rating

Frequency variation: A, B and C frames: +-10%; D, E and F frames: +-5%

Output frequency: A, B and C frames: 0 - 590 Hz; D, E and F frames: 0 - 590 Hz

Temperature range in operation: 0 - 45°C, 46-55°C with current derating of 1.5 %/°C.

Protection class: IP00 / 20 / 21 / 54 / 55 / 66

Documents and drawings:

User manuals: - MG16O102 dated 01/2017; MG22A102 dated 01/2017; MG38A102 dated 01/2017;

Drawings: - 177r0659 dated 9/15/16; 177r0673 dated 01/25/2017; 177r0674 dated 01/25/2017; 177r0675 dated 01/25/2017;
- 177r0676 dated 01/25/2017;

Test reports:

Checklist for visual inspection 4001PRT2 00734665 Rev. 2.10 dated 2017-01-18;

Danfoss A/S: - 00715502 Rev. A dated 2013-07-30; 00734306 Rev. A dated 2017-01-12; 00734307 Rev. A dated 2017-01-13;

- 00734308 Rev. A dated 2017-01-13; 00734309 Rev. A dated 2017-01-13; 00734724 dated 2017-01-26;

- 00735629 Rev. A dated 2017-03-16; 00735840 dated 2017-03-27; P4001 dated 3/15/2017;

- P4001 Rev. A dated 2017-01-10; P7020 dated 2015-07-10; tr4001 dated 12-09-16;

Datasyst Engineering & Testing Services Inc.: - D15-15766 Rev. A dated July 29,2013; D15-17445 dated August 17,2016;

Elite Electronic Engineering Inc.: - 1604970-01 Rev.B dated January 17, 2017;

TÜV Rheinland: - 19645766001 dated 11 Jan 2017; 19645767001 dated 11 Jan 2017;

UL: - 00733941; 11494250A dated December 16,2016; 11494250B dated December 16,2016;

- 4786962025-S1-1 dated 9 July 2015; Break Down of Component_Test DataSheet;



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Series FC-102

Manufacturing sites:

DANFOSS, LLC
4401 N. BELL SCHOOL RD.
61111 LOVES PARK (IL)
U.S.A.

DANFOSS DRIVES A/S
ULSNAES 1
6300 GRAASTEN
DANMARK

Remarks:

- The products fulfill EC-Code: EC21.
- All changes in software are to be recorded as long as the system is in use on board. Major changes in the software are to be approved before being installed in the converter.
- Converters EMC classed C3 according to IEC 61800-3 can be installed in "special distribution zone" and "general power distribution zone" in accordance with IEC 60533 provided precautions are taken to attenuate these effects on the distribution system, so the safe operation is assured.

This certificate replaces and annuls the previous certificate ELE030414XG/001.

HAMBURG July 24, 2017



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