DNV·GL

Certificate No:
E-12867
File No:
822.21
Job Id:
262.1-008827-4

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Frequency Converter

with type designation(s)
Active Filter AAF

Issued to
Danfoss Drives, Division of Danfoss Inc.
LOVES PARK IL, United States

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application :

Active Filter for Danfoss Frequency Converters Range:
190 - 400 kW, 380 - 480 V AC

This Certificate is valid until **2018-12-31**.
Issued at **Høvik** on **2014-11-13**

DNV GL local station: **New York**

Approval Engineer: **Nicolay Horn**

for **DNV GL**
Digitally Signed By: Laumann, Marit
Location: DNV Høvik, Norway
Signing Date: 2014-11-14

Marit Laumann
Head of Section

Product description

Active Filter

Model: VLT® Active Filter AAF006

AAF006: 380-480 (T4)					
Current rating [Amps]	Enclosure type				**RFI filter**
	IP20 (*1)	**IP00** (*1)	**IP21** (*2)	**IP54** (*3)	**Type** (*4)
190	NA	NA	D14	D14	HX**
250	NA	NA	E1	E1	
310					
400					

(*1) IP00/IP20 Panel mount.
(*2) IP21/NEMA Type 1
(*3) IP54/NEMA Type 12
(*4) HX: Active Filter RFI complies with IACS E10 requirements except radiated and conducted emissions.

***See Application / limitation*

Selection types for Type Codes for AAF006 Active Filters

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

Basic string definitions:

Product Group (character 1-3)
AAF : Active Filters

VLT series (character 4-6)
006 : VLT Active Filter – Series 6

Current Rating (character 7-10)
A190 : 190 Amp

Voltage: (character 11-12)
T4 : Three phase 380-480 VAC

Enclosure (character 13-15)
E21 : IP21 / Type 1
E54 : IP54/ Type 12
E2M : IP21 / Type 1 with mains shield
E5M : IP54 / Type 12 with mains shield

Hardware (character 16-23)
Hardware, RFI filter (character 16-17)
HX: Active Filter complies with IACS E10 requirements except radiated and conducted emissions

Hardware, Not Used X
Hardware, Display (character 19)
Hardware, Coating and Ruggedized (character 20)
Hardware, Mains options (character 21)
Hardware, Reserved for Future (character 22)
Hardware, Reserved for Future (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)

Application/Limitation

Supply voltage range:	380-480, 50/60 Hz
Voltage variation:	± 10 % , -15% reduced power rating (steady state)
Frequency variation:	± 5 %
Temperature range in operation:	0 - 45 °C, 46 - 55 °C with current derating of 1% / °C
Temperature class:	A
Vibration class:	A
Humidity class:	B*
EMC class:	A**
Protection class:	IP00 / 20 / 21 / 54***

The AAF6 shall be regarded as a component. The actual installation to be designed according to Danfoss VLT Active Filter AAF006 Operating Instructions and according to the applicable DNV Rules for the actual application. A DNV GL Product Certificate is required. A copy of the type approval certificate is to be submitted for each certification.

Each harmonic filter shall be protected against short circuit and overcurrent. Circuit protection in filter units shall be monitored and provided with an alarm to a manned control station.

* Relative humidity 5 to 95%, no condensation allowed.

** The filter AAF6 is EMC classed C4 according to IEC 61800-3. To fulfill EMC requirements the converter must be installed as described in the document "EMC measures in IT-Grid on ships *GUIDELINE" doc no.00720010 and Operating instructions Active Filter AA6.*

*** To be installed in an enclosure with an IP degree in accordance with DNV Rules w.r.t. location.

The Type Approval covers hardware and software for the basic controller.

Clause for software control:

All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV for evaluation and approval. Major changes in the software are to be approved before being installed in the converter.

Type Approval documentation

Technical info:

Product overview par of pages 1-20 dated 2013-01-11. EMC measures in IT-Grid on ships *GUIDELINE" doc no.00720010 and Operating instructions Active Filter AA6..*

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Test reports:

Part of CD: P424 _LHD & AAF" :

Danfoss Termal test reports nos. 0711203 & 711218,, dated 2012-10-31. EMC reports CTR-11-205 & CTR-11-185 dated 2011-12-29. Danfoss report nos. 00705602 dated 2012-10-31 & 00702489 dated 2011-08-24, test report no NTS Report A8366 -500B0432 dated 2008-12-05, Danfoss Drives A10116 Report,, Danfoss report no. 00706801 dated 2012-11-26

Tests carried out

Visual inspection, Performance, Power supply failure, Power supply variations, Voltage/frequency variation, Vibration/shock, Dry heat, Damp heat, Insulation resistance, High voltage.

EMC: Electrical fast transient (Burst), electrical slow transient (Surge), RF-common mode Voltage, radiated RF-electromagnetic fields, electric discharge (ESD), radiated and conducted emission.

Marking of product

Danfoss – Type designation – Power – Voltage

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Survey to be performed at least every second year.

END OF CERTIFICATE