



NIPPON KAIJI KYOKAI

TYPE APPROVAL CERTIFICATE FOR AUTOMATIC DEVICES AND EQUIPMENT

Certificate No. TA17438M

This is to certify that the undernoted product(s) has/have been approved in accordance with the requirements specified in Chapter 1, Part 7 of “Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use” and the relevant Society's Rules.

This certificate is issued to

Manufacturer: **Danfoss Power Electronics A/S**
Place of Manufacturing: **4401 N. Bell School Rd Loves park, IL 61111, USA**
Ulsnaes 1, DK-6300 Graasten, Denmark
Product description: **Frequency Converters and Filter**
Model: **FC-102, FC-202, FC-301/302, FC-322 Frequency Converters;**
AAF006 Active Filter

Approval No.: **15A003**
Valid until: **12 January 2020**

This certificate is subject to the conditions specified in the attached sheet(s).

Issued at Tokyo on 3 October 2017.



F. Taguchi
General Manager
Machinery Department

- Note: 1. This certificate has been re-issued due to addition of new component.
2. The manufacturer, if desired, is requested to apply to the Society for renewal prior to the expiration date.

NIPPON KAIJI KYOKAI

Attached sheet -1/7 to the Certificate No. TA17438M

Specification & documents:

1. Particulars: Power supply: 200-240V, 380-480/500V, 525-690V

2. Components and reference drawings:

VLT®HVAC Drive series FC-102;

200-240V (T2): Power rating 1.1~45kW

380-480V (T4): Power rating 1.1~90kW

525-690V (T7): Power rating 1.1~90kW

380-480V (T4): Power rating 110~1,000kW

525-690V (T7): Power rating 75~1,400kW

380-480V (T4): Power rating 315~1,000kW: (12-pulse)

525-690V (T7): Power rating 450~1,400kW: (12-pulse)

380-480V (T4): Power rating 160~710kW: (Low Harmonic Drive)

VLT®AQUA Drive series FC-202;

200-240V (T2): Power rating 0.25~45kW

380-480V (T4): Power rating 0.37~90kW

525-690V (T7): Power rating 1.1~90kW

380-480V (T4): Power rating 110~1,000kW

380-480V (T7): Power rating 75~1,400kW

380-480V (T4): Power rating 315~1,000kW: (12-pulse)

525-690V (T7): Power rating 450~1,400kW: (12-pulse)

380-480V (T4): Power rating 160~710kW: (Low Harmonic Drive)

VLT®Automation Drive FC-300 series FC-301/302;

200-240V (T2): Power rating 0.25~37kW

380-480/500V (T4/T5): Power rating 0.37~75kW

525-690V (T7): Power rating 1.1~75kW

380-500V (T5): Power rating 90~800kW

525-690V (T7): Power rating 55~1,200kW

380-500V (T5): Power rating 250~800kW: (12-pulse)

525-690V (T7): Power rating 355~1,200kW: (12-pulse)

380-500V (T5): Power rating 132~630kW: (Low Harmonic Drive)

VLT®Active Filter AAF006

380-480V (T4): Current rating 190~400 Amps

- To be continued -

NIPPON KAIJI KYOKAI

Attached sheet -2/7 to the Certificate No. TA17438M

Selection types for Type Codes for FC102, 202, 300 Series and AAF006 Active Filters

----- (Character 24-39 software + options)

1 4 7 10 11 23

Basic string definitions:

Product Group (character 1-3)

FC- : Adjustable Frequency Converters

AAF : Active Filters

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

006 : VLT Active Filter

Power size (character 7-10; representative examples – complete range not listed here)

PK25 : 0.25kW / 0.33HP

P75K : 75kW / 100HP

P90K : 90kW / 125HP

N75K : 75kW / 100HP D3h

N90K : 90kW / 125HP D3h

P110 : 110kW / 150HP

N110 : 110kW / 150HP

Current Rating (character 7-10)

A190 : 190 Amp

Voltage (character 11-12)

T2: Three phase 200-240V AC

T4: Three phase 380-480V AC

T5: Three phase 380-500V AC

T7: Three phase 525-690V AC

- To be continued -

NIPPON KAIJI KYOKAI

Attached sheet -3/7 to the Certificate No. TA17438M

Enclosure (character 13-15)

E00: IP00 / Chassis

E20: IP20 / Chassis

E2S: IP20 / Chassis (medium power D-Frame)

E21: IP21 / Type 1

E2D: IP21 / Type 1 with heater

H21: IP21 / Type 1 with heater

E54: IP54 / Type 12

H54: IP54 / Type 12

E5H: Hybrid IP54

E2M: IP20 / Type 1 with mains shield

E5M: IP54 / Type 12 with mains shield

E5D: IP54 / Type 12 (medium power D-Frame)

E55: IP55 / Type 12

E66: IP66 / Type 4X

Hardware (character 16-23)

Hardware, RFI filter (character 16-17)

H1; H2; H3; H4; H5; B2; B4; N2; N4; HX

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)

- To be continued -

NIPPON KAIJI KYOKAI

Attached sheet -4/7 to the Certificate No. TA17438M

Basic string definitions for brand labeling and customer specific drives:

Product Group and VLT series (character 1-6)

TR-200 Equals to FC-102

ITT102 Equals to FC-102

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

FC-103 Equals to FC-102

CUE202 Equals to FC-202

FC-322 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

- To be continued -

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Attached sheet -5/7 to the Certificate No. TA17438M

3. Documentation and Test Reports:

VLT® Low Harmonic Drive for AAF006 Operating Instructions

TR424_PTP_THD_LHD120_P200_Series_6 Test Report

VLT® Laboratory test report

CTR-11-0205, REVISION RELEASED

P424, PTP, EMC results, AAF006A190T4 Test Report

CTR-11-0155, REVISION RELEASED

P424, PTP, EMC results, LHD330 series 006 Test Report

P424, PTP, EMC results, AAF006A190T4 Test Report

CTR-11-0125, REVISION B

P424, PTP, EMC results, LHD120 series 006 Test Report

CTR-11-0127, REVISION RELEASED

CTR-11-0145, REVISION DRAFT 2

P424, PTP, EMC results, LHD210 series 006 Test Report

CTR-11-0185, REVISION DRAFT 4

177R0339, 177R0340, 177R0349, 177R0350, 177R0351, 177R0352, 177R0354, 177R0374,

177R0375, 177R0490, 177R0491, 177R0492, 177R0493,

DATASYST PROJECT: D15-14976, D15-14845

Operating Instructions, 90kW-315kW D-frame VLT® AutomationDrive FC 300

Operating Instructions, 110kW-400kW D-frame VLT® AQUA Drive FC 200

Operating Instructions, 110kW-400kW D-frame VLT® AQUA Drive FC 100

ENGINEERING TEST REPORT #: 312204, 312202,312171 and 312172,312169 and 312170,

312081B, 312081A, 312080B, 312080A,

Radiometric Document RP-7154, RP-7120,

EMC test results: 00708507, 00705781, 00708506, 00705683, 00702489

P424, vibration testing – Danfoss Specs, Document ID: 00706801, 00596396, 00596396, 00702667

NTS Report: Danfoss Drives A10116 Report, A8366-500B0432, Danfoss Drives A11198 Report

Product overview complete Maine approval Note (Document ID: 00714813, Rev. A,29)

Operating Guide, 355-800 kW, Enclosure Size E, VLT® HVAC Drive FC102 (MG16O102)

Operating Guide, 355-800 kW, Enclosure Size E, VLT® AQUA Drive FC202 (MG22A102)

Operating Guide, 315-710 kW, Enclosure Size E, VLT® Automation Drive FC302 (MG38A102)

Electromagnetic Compatibility Test Report (11494250A)

Electromagnetic Compatibility Test Report (11494250B)

Test Report (19645766 001_N560, 19645767 001_N710)

Visual inspection for Power Drive System (00734665)

VIBRATION TESTING OF E2 AND E4 DRIVES (D15-17445)

- To be continued -

NIPPON KAIJI KYOKAI

Attached sheet -6/7 to the Certificate No. TA17438M

DAMP HEAT TESTING ON A D7h NEMA 12, IP54, VARIABLE FREQUENCY DRIVE
(D15-15766 REVISION A)

Danfoss Report Cold test (4786962025-S1-1)

EMC test results for FC-302N315T5 in E1h frame size (00734306)

EMC test results for FC302-N500T5 in E2h frame size (00734307)

EMC test results for FC302-N560T7 in E3h frame size (00734308)

EMC test results for FC302-N710T7 in E4h frame size (00734309)

Marine Certification Dry Heat Test Report (00735629)

P454 Damp Heat Test Report Class B Cyclic (00715502)

P4001 Immunity Test Simulations. Test Report

P4001_PTP_IACS10_no3_Intermittent_AC_Line_Loss_N400T5

P7020 Cold Test Report (00726256)

tr4001_PTP_4_Quadrant_Operation_N400T5

tr4001_PTP_LVD_Insulation_Resistance_Test

UL Testing (00733941)

- To be continued -

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Attached sheet -7/7 to the Certificate No. TA17438M

Test items & approval conditions:

1. Test items:

(Applied testing items are marked with X.)

ENVIRONMENTAL TESTS		Mark
External examination		X
Operation test and performance test		X
Electric power supply failure test		X
Power supply fluctuation test	Electric	X
	Pneumatic and Hydraulic	--
Insulation resistance test		X
High voltage test		X
Pressure test (Pneumatic and Hydraulic)		--
Dry heat test (Temperature 40°C × 1.5 h & 50°C × 1.5 h & 55°C × 16 h)		X
Damp heat test		X
Vibration test (Acceleration ±0.7g)		X
Inclination test		--
Cold test (Temperature 5°C × 2 hours)		X
Salt mist test		--
Electrostatic discharge immunity test		X
Radiated radio frequency immunity test		X
Conducted low frequency immunity test		X
Conducted high frequency immunity test		X
Burst / Fast transient immunity test		X
Surge immunity test		X
Radiated emission test		X
Conducted emission test		X
Flame retardant test		--

2. Approval condition:

The product is not allowed to be installed in the bridge and on open deck.

- The End -