



CERTIFICATE NUMBER

13-HS1004774-PDA

DATE

30 April 2013

ABS TECHNICAL OFFICE

Houston SED - Ship Systems

## CERTIFICATE OF DESIGN ASSESSMENT

This is to Certify that a representative of this Bureau did, at the request of  
**DANFOSS, LLC - LOVES PARK**

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

PRODUCT: **Frequency Converter**

MODEL: **Series N (LHD) & AAF Series 06**

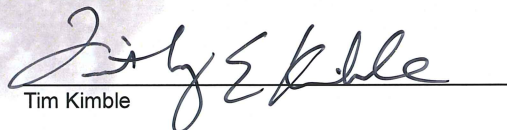
This Product Design Assessment (PDA) Certificate 13-HS1004774-PDA, dated 30/Apr/2013 remains valid until 29/Apr/2018 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

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.

AMERICAN BUREAU OF SHIPPING

  
Tim Kimble  
Engineer

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by the terms and conditions as contained in ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010).

**DANFOSS, LLC**

NORTH AMERICA MOTION CONTROLS  
4401 N. BELL SCHOOL ROAD  
LOVES PARK  
IL 61111  
United States  
Telephone: +1 815 639 8803 / 8600  
Fax: +1 815 639 8003  
Email: mary\_warfel@danfoss.com

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**Product:** Frequency Converter

**Model:** Series N (LHD) & AAF Series 06

**Intended Service:**

Marine and Offshore Installations.

**Description:**

VLT Automation Drives LHD Series N & AAF Series 006

**Ratings:**

Low Harmonic Drives (LHD) Series N VLT 102, 202, 302 & Advanced Active Filter (AAF) VLT Series 006  
Complete Drive Configurations, Ratings, and Frames as per attached "pdf"

**Service Restrictions:**

Unit Certification is required for Drive Units for Essential Services as per 4-8-3/5.11 and for Propulsion Application as per 4-8-5/5.17.9 of the Rules.

The drives are approved for Non-Propulsion Application and in order to use for Propulsion Application the required Testing and Inspection as per 4-8-5/5.17.9 (b) will need to be carried out.

**Comments:**

The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

1) Tests and Approval are for the Basic Components. Each Configuration and External Connection is to be specifically approved.

2) Main Propulsion Control Systems are assigned with System Category II in accordance with 4-9-6/Table 2 of the Steel Vessels Rules. If the subject Drives are used in Main Propulsion System, Evidence of Documentation as required by 4-9-6/Table 3 of the Steel Vessels Rules is to be submitted for Review when requested.

**Notes / Drawings / Documentation:**

Supporting Data:

Task T1004774:

\* Doc.No CTR-11-0155, EMC Test Report VLT Automation Drive, Model P600 LHD330 Series 006, dated 3 Jan 2012, 215 Pages;

\* Doc.No CTR-11-0205, EMC Test Report P424 Advanced Active Filter AAF006A190, dated 29 Dec 2011, 260 Pages;

\* Doc.No CTR-10-0185, Rev. Draft 4, EMC Test Report Advanced Active Filter Model AAF400, dated 11 Aug.2011, 156 Pages;

\* Doc.No CTR-10-0125, Rev. B, EMC Test Report LHDP200T4/6, dated 24 Aug.2011, 232 Pages;

\* Doc.No CTR-10-0127, Rev. Released, EMC Test Report LHDP200T4/6, Immunity Testing, dated 11 Apr .2011, 214 Pages;

\* NTS Report Danfoss Drives A10116 Report Active Filter, dated 14 June 2010, 39 Pages;

\* NTS Report Danfoss Drives A11198 Report LHD 120, dated 14 June 2010, 17 Pages;

\* P424 Vibration Test Report AAF500/400, IP 54 Configuration, Rev. A,6 dated 2012-09-19;

\* P424 Vibration testing Report 00706801, Rev. A,4 dated 2012-11-26;

\* P424, PTP, EMC Results AAF006A400T4 Test Report, dated 2011-08-24;

\* P424, PTP, EMC Results AAF006A190T4 Test Report, dated 2012-01-06;

\* P424, PTP 2.8.3.2 Vibration, LHD120 Series N, Rev. A,3 dated 2013-02-01;

\* P424, PTP, EMC Results LHD210 Series 006 Test Report, Rev. A,1 dated 2011-09-01;

\* P424. PTP. EMC Results LHD120 Series 006 Test Renort. Rev. A.2 dated 2011-09-25;

**DANFOSS, LLC**

NORTH AMERICA MOTION CONTROLS

4401 N. BELL SCHOOL ROAD

LOVES PARK

IL 61111

United States

Telephone: +1 815 639 8803 / 8600

Fax: +1 815 639 8003

Email: mary\_warfel@danfoss.com

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\* P424, PTP, EMC Results LHD330 Series 006 Test Report, Rev. A,3 dated 2012-01-04;  
\* P424, PTP, THD LHD120 P200 Series 006 Test Report, Rev. A,1 dated 2012-08-07;  
\* P424, PTP, THD LHD330 P630 Series 006 Test Report, Rev. A,1 dated 2012-08-07;  
\* P424, PTP, THD LHD210 P400 Series 006 Test Report, Rev. A,1 dated 2013-02-01;  
\* 500V Thermal Test Report AAF190, LHD210, LHD120, AAF400 dated 2012-10-31 & 2012-10-30;  
\* VLT Test Reports PTP 2.8.6.11, 2.8.6.5 for LHD210 & LHD120 Series 6, LHD & LH330 Series 6, dated 08/09/11 & 1/04/11;

**Term of Validity:**

This Product Design Assessment (PDA) Certificate 13-HS1004774-PDA, dated 30/Apr/2013 remains valid until 29/Apr/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.

**STANDARDS****ABS Rules:**

2013 Steel Vessels Rules 1-1-4/7.7, 1-1-Appendix 3, 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, and 4-9-7/Table 9 & 10

**National:**

UL 508C File E70524, UL508A dated 2 Apr 2007

**International:**

EN60204-1, EN954-1

**Government Authority:**

NA

**EUMED:**

NA

**Others:**

# Product: Frequency Converters

## Model: VLT® HVAC Drive Series FC-102

380-480V (T4)					
Power rating [kW]	Enclosure type				RFI filter Type (*4)
	IP20 (*1)	IP00 (*1)	IP21 (*2)	IP54 (*3)	
110	D3h	NA	D1h/D5h/D6h	D1h/D5h/D6h	H2**
132					
160					
200	D4h	NA	D2h/D7h/D8h	D2h/D7h/D8h	
250					
315					
110	NA	D3	D1	D1	H2** or H6**
132					
160	NA	D4	D2	D2	
200					
250					
315	NA	E2	E1	E1	H2**
355					
400					
450					
500	NA	NA	F1/F3	F1/F3	
560					
630					
710					
800	NA	NA	F2/F4	F2/F4	
1M0					



**Product: Frequency Converters**  
**Model: VLT® HVAC Drive Series FC-102**

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525-690V (T7)					
Power rating [kW]	Enclosure type				RFI filter Type (*4)
	IP20 (*1)	IP00 (*1)	IP21 (*2)	IP54 (*3)	
75	D3h	NA	D1h/D5h/D6h	D1h/D5h/D6h	H2**
90					
110					
132					
160					
200	D4h	NA	D2h/D7h/D8h	D2h/D7h/D8h	
250					
315					
400					
45	NA	D3	D1	D1	
55					
75					
90					
110					
132					
160	NA	D4	D2	D2	
200					
250					
315					
400					
450	NA	E2	E1	E1	H2**
500					
560					
630					
710	NA	NA	F1/F3	F1/F3	
800					
900					
1M0	NA	NA	F2/F4	F2/F4	
1M2					
1M4					

**Product: Frequency Converters**  
**Model: VLT® HVAC Drive Series FC-102**

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380-480V (T4)				
Power rating [kW]	Enclosure type			RFI filter
	IP00 (*1)	IP21 (*2)	IP54 (*3)	Type (*5)
315	NA	F8/F9	F8/F9	B2**
355				
400				
450				
500	NA	F10/F11	F10/F11	
560				
630				
710				
800	NA	F12/F13	F12/F13	
1M0				

525-690V (T7)				
Power rating [kW]	Enclosure type			RFI filter
	IP00(*1)	IP21 (*2)	IP54 (*3)	Type (*5)
450	NA	F8/F9	F8/F9	B2**
500				
560				
630				
710	NA	F10/F11	F10/F11	
800				
900				
1M0	NA	F12/F13	F12/F13	
1M2				
1M4				

380-480V (T4)				
Power rating [kW]	Enclosure type			RFI filter Type (*6)
	IP00 (*1)	IP21 (*2)	IP54 (*3)	
160	NA	D11	D11	L2**
200				
250				
315	NA	E7	E7	L2**
355				
400				
450				
500	NA	F17	F17	
560				
630				
710				

**Product: Frequency Converters**  
**Model: VLT® HVAC Drive Series FC-102**

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380-480V (T4)				
Power rating [kW]	Enclosure type			RFI filter Type (*7)
	IP00 (*1)	IP21 (*2)	IP54 (*3)	
160	NA	D13	D13	N2**
200				
250				
315	NA	E9	E9	N2**
355				
400				
450				
500	NA	F18	F18	
560				
630				
710				

(\*1) IP00/IP20/Panel mount.

(\*2) IP21/NEMA Type 1

(\*3) IP54/NEMA Type 12

(\*4) H2: 6 Pulse drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

(\*4) H6: 6 Pulse drive RFI complies with IACS E10 requirements.

(\*5) B2: 12 Pulse drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

(\*6) L2: Low Harmonic Drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

(\*7) N2: Low Harmonic Drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

**\*\*Limitations:** Converters with conducted and radiated emission above the CCS required limits can be installed in “special distribution zone” and “general power distribution zone”, in accordance with IEC60553 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 on-board.

Ruggedized boards, selection “R” in character 20, must be selected for D1h – D8h.

## Product: Frequency Converters

### Model: VLT<sup>®</sup> HVAC Drive Series FC-102

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#### Selection types for Type Codes for FC-100

\_\_\_\_ ( 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

##### Power size (character 7-10)

P110: 110 kW / 150 HP

N110: 110 kW/ 150 HP

##### Voltage: (character 11-12)

T4 : Three phase 380-480 VAC

T7 : Three Phase 525-690 VAC

##### 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 (medium power D-Frame)**

**H21: IP21 / Type 1 with heater**

E54 : IP54/ Type 12

**H54:: IP54 / Type 12 with heater**

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)**

##### Hardware (character 16-23)

*Hardware, RFI filter (character 16-17)*

H2: 6 Pulse Drive RFI for Maritime (complies with IACS E10 requirements except radiated and conducted emissions)

H6: 6 Pulse Drive RFI for Maritime (complies with IACS E10 requirements)

B2: 12 Pulse Drive with RFI for Maritime (complies with IACS E10 requirements except radiated and conducted emissions)

L2: Low Harmonic Drive with RFI for Maritime (complies with IACS E10 requirements except radiated and conducted emissions)

**N2: Low Harmonic Drive with RFI for Maritime (complies with IACS E10 requirements except radiated and conducted emissions)**

## **Product: Frequency Converters**

### **Model: VLT® HVAC Drive Series FC-102**

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*Hardware, Brake & Stop (character 18)*

*Hardware, Display (character 19)*

*Hardware, Coating (character 20)*

*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
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



**Product: Frequency Converters**  
**Model: VLT® AQUA Drive Series FC-202**

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380-480V (T4)					
Power rating [kW]	Enclosure type				RFI filter
	IP20 (*1)	IP00 (*1)	IP21 (*2)	IP54 (*3)	Type (*4)
110	D3h	NA	D1h/D5h/D6h	D1h/D5h/D6h	H2**
132					
160					
200	D4h	NA	D2h/D7h/D8h	D2h/D7h/D8h	
250					
315					
110	NA	D3	D1	D1	H2** or H6**
132					
160	NA	D4	D2	D2	
200					
250					
315	NA	E2	E1	E1	H2**
355					
400					
450					
500	NA	NA	F1/F3	F1/F3	
560					
630					
710					
800	NA	NA	F2/F4	F2/F4	
1M0					

**Product: Frequency Converters**  
**Model: VLT® AQUA Drive Series FC-202**

525-690V (T7)					
Power rating [kW]	Enclosure type				RFI filter Type (*4)
	IP20 (*1)	IP00 (*1)	IP21 (*2)	IP54 (*3)	
75	D3h	NA	D1h/D5h/D6h	D1h/D5h/D6h	H2**
90					
110					
132					
160					
200	D4h	NA	D2h/D7h/D8h	D2h/D7h/D8h	H2**
250					
315					
400					
45					
55	NA	D3	D1	D1	H2**
75					
90					
110					
132					
160	NA	D4	D2	D2	H2**
200					
250					
315					
400					
450	NA	E2	E1	E1	H2**
500					
560					
630					
710					
800	NA	NA	F1/F3	F1/F3	H2**
900					
1M0					
1M2	NA	NA	F2/F4	F2/F4	H2**
1M4					

**Product: Frequency Converters**  
**Model: VLT® AQUA Drive Series FC-202**

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380-480V (T4)				
Power rating [kW]	Enclosure type			RFI filter
	IP00 (*1)	IP21 (*2)	IP54 (*3)	Type (*5)
315	NA	F8/F9	F8/F9	B2**
355				
400				
450				
500	NA	F10/F11	F10/F11	
560				
630				
710				
800	NA	F12/F13	F12/F13	
1M0				

525-690V (T7)				
Power rating [kW]	Enclosure type			RFI filter
	IP00 (*1)	IP21 (*2)	IP54 (*3)	Type (*5)
450	NA	F8/F9	F8/F9	B2**
500				
560				
630				
710	NA	F10/F11	F10/F11	
800				
900				
1M0	NA	F12/F13	F12/F13	
1M2				
1M4				

380-480V (T4)				
Power rating [kW]	Enclosure type			RFI filter
	IP00 (*1)	IP21 (*2)	IP54 (*3)	Type (*6)
160	NA	D11	D11	L2**
200				
250				
315	NA	E7	E7	L2**
355				
400				
450				
500	NA	F17	F17	
560				
630				
710				

**Product: Frequency Converters**  
**Model: VLT® AQUA Drive Series FC-202**

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380-480V (T4)				
Power rating [kW]	Enclosure type			RFI filter
	IP00 (*1)	IP21 (*2)	IP54 (*3)	Type (*7)
160	NA	D13	D13	N2**
200				
250				
315	NA	E9	E9	N2**
355				
400				
450				
500	NA	F18	F18	
560				
630				
710				

(\*1) IP00/IP20/Panel mount.

(\*2) IP21/NEMA Type 1

(\*3) IP54/NEMA Type 12

(\*4) H2: 6 Pulse drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

(\*4) H6: 6 Pulse drive RFI complies with IACS E10 requirements.

(\*5) B2: 12 Pulse drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

(\*6) L2: Low Harmonic Drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

(\*7) N2: Low Harmonic Drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

**\*\*Limitations:** Converters with conducted and radiated emission above the CCS required limits can be installed in “special distribution zone” and “general power distribution zone”, in accordance with IEC60553 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 on-board.

Ruggedized boards, selection “R” in character 20, must be selected for D1h – D8h.

## Product: Frequency Converters

### Model: VLT® AQUA Drive Series FC-202

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## Selection types for Type Codes for FC-200

----- ( 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)

202 VLT AQUA Drive – Advanced version

#### Power size (character 7-10)

P110: 110 KW / 150 HP

N110: 110 KW / 150 HP

#### Voltage: (character 11-12)

T4 : Three phase 380-480 VAC

T7 : Three Phase 525-690 VAC

#### 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 (medium power D-Frame)**

**H21: IP21 / Type 1 with heater**

E54 : IP54/ Type 12

**H54:: IP54 / Type 12 with heater**

E5H : Hybrid IP54

E2M: IP21 / Type 1 with mains shield

E5M: IP54 / Type 12 with mains shield

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

#### Hardware (character 16-23)

*Hardware, RFI filter (character 16-17)*

H2: 6 Pulse Drive RFI for Maritime (complies with IACS E10 requirements except radiated and conducted emissions)

H6: 6 Pulse Drive RFI for Maritime (complies with IACS E10 requirements)

B2: 12 Pulse Drive with RFI for Maritime (complies with IACS E10 requirements except radiated and conducted emissions)

L2: Low Harmonic Drive with RFI for Maritime (complies with IACS E10 requirements except radiated and conducted emissions)

**N2: Low Harmonic Drive with RFI for Maritime (complies with IACS E10 requirements except radiated and conducted emissions)**



**Product: Frequency Converters**  
**Model: VLT® AQUA Drive Series FC-202**

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*Hardware, Brake & Stop (character 18)*  
*Hardware, Display (character 19)*  
*Hardware, Coating and ruggedized (character 20)*  
*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)**

CUE202	Equals to FC-202
FC-322	Equals to FC-202

# Product: Frequency Converters

## Model: VLT® Automation Drive Series FC-302

FC-302: 380-500V (T5)					
Power rating [kW]		Enclosure type			RFI filter
	IP20 (*1)	IP00 (*1)	IP21 (*2)	IP54 (*3)	Type (*4)
90	D3h	NA	D1h/D5h/D6h	D1h/D5h/D6h	H2**
110					
132					
160	D4h	NA	D2h/D7h/D8h	D2h/D7h/D8h	
200					
250					
90	NA	D3	D1	D1	H2** or H6**
110					
132	NA	D4	D2	D2	
160					
200					
250	NA	E2	E1	E1	H2**
315					
355					
400					
450	NA	NA	F1/F3	F1/F3	
500					
560					
630					
710	NA	NA	F2/F4	F2/F4	
800					

# Product: Frequency Converters

## Model: VLT® Automation Drive Series FC-302

525-690V (T7)					
Power rating [kW]	Enclosure type				RFI filter Type (*4)
	IP20 (*1)	IP00 (*1)	IP21 (*2)	IP54 (*3)	
55	D3h	NA	D1h/D5h/D6h	D1h/D5h/D6h	H2**
75					
90					
110					
132					
160	D4h	NA	D2h/D7h/D8h	D2h/D7h/D8h	H2**
200					
250					
315					
37					
45	NA	D3	D1	D1	H2**
55					
75					
90					
110					
132	NA	D4	D2	D2	H2**
160					
200					
250					
315					
355	NA	E2	E1	E1	H2**
400					
500					
560					
630	NA	NA	F1/F3	F1/F3	H2**
710					
800					
900	NA	NA	F2/F4	F2/F4	H2**
1M0					
1M2					

## Product: Frequency Converters

### Model: VLT® Automation Drive Series FC-302

380-500V (T5)				
Power rating [kW]	Enclosure type			RFI filter
	IP00(*1)	IP21 (*2)	IP54 (*3)	Type (*5)
250	NA	F8/F9	F8/F9	B2**
315				
355				
400				
450	NA	F10/F11	F10/F11	
500				
560				
630				
710	NA	F12/F13	F12/F13	
800				

525-690V (T7)				
Power rating [kW]	Enclosure type			RFI filter Type (*5)
	IP00(*1)	IP21 (*2)	IP54 (*3)	
355	NA	F8/F9	F8/F9	B2**
400				
500				
560				
630	NA	F10/F11	F10/F11	
710				
800				
900				
1M0	NA	F12/F13	F12/F13	
1M2				

380-500V (T5)				
Power rating [kW]	Enclosure type			RFI filter Type (*6)
	IP00 (*1)	IP21 (*2)	IP54 (*3)	
132	NA	D11	D11	L2**
160				
200				
250	NA	E7	E7	L2**
315				
355				
400				
450	NA	F17	F17	
500				
560				
630				

## Product: Frequency Converters

### Model: VLT® Automation Drive Series FC-302

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380-500V (T5)				
Power rating [kW]	Enclosure type			RFI filter Type (*7)
	IP00 (*1)	IP21 (*2)	IP54 (*3)	
132	NA	D13	D13	N2**
160				
200				
250	NA	E9	E9	N2**
315				
355				
400				
450	NA	F18	F18	N2**
500				
560				
630				

(\*1) IP00/IP20 Panel mount.

(\*2) IP21/NEMA Type 1

(\*3) IP54/NEMA Type 12

(\*4) H2: 6 Pulse drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

(\*4) H6: 6 Pulse drive RFI complies with IACS E10 requirements.

(\*5) B2: 12 Pulse drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

(\*6) L2: Low Harmonic Drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

(\*7) N2: Low Harmonic Drive RFI complies with IACS E10 requirements except radiated and conducted emissions.

**\*\*Limitations:** Converters with conducted and radiated emission above the CCS required limits can be installed in “special distribution zone” and “general power distribution zone”, in accordance with IEC60553 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 on-board.

Ruggedized boards, selection “R” in character 20, must be selected for D1h – D8h.



## Model: VLT® Automation Drive Series FC-302

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

## **Product: Frequency Converters**

### **Model: VLT® Automation Drive Series FC-302**

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*Hardware, Brake & Stop (character 18)*

*Hardware, Display (character 19)*

*Hardware, Coating and Ruggedized (character 20)*

*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)**

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

**Model: VLT® Active Filter AAF006**

AAF006: 380-480 (T4)					
Current rating [Amps]		Enclosure type			RFI filter Type (*4)
	IP20 (*1)	IP00 (*1)	IP21 (*2)	IP54 (*3)	
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.

**\*\*Limitations:** Converters with conducted and radiated emission above the CCS required limits can be installed in “special distribution zone” and “general power distribution zone”, in accordance with IEC60553 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 on-board.

### Selection types for Type Codes for AAF006 Active Filters

\_\_\_\_\_ ( character 24 – 39 software + options)

## 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

## **Product: Frequency Converters**

### **Model: VLT® Automation Drive Series FC-302**

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#### **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)**