



Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

This certificate supersedes certificate number 10/70021 (E2) issued on 23.07.2014 which is hereby cancelled.

This certificate is issued to:

PRODUCER Danfoss Power Electronics A/S
Ulsnaes 1
6300 Graasten
Denmark

DESCRIPTION Adjustable frequency converters and standalone advanced active filter

TYPE VLT® Drives and VLT® Advanced Active Filter
according following selection types for type codes

----- (character 24 - 39 software + options)
1 4 7 11 13 16 23

Product group (character 1-3):
FC-, AAF

VLT® series (character 4-6):
102: VLT® HVAC Drive
202: VLT® AQUA Drive
302: VLT® Automation Drive
006: Advanced Active Filter

Certificate No. 18/20010

Issue Date 06 April 2018

Expiry Date 22 July 2019

Sheet 1 of 6

Thorsten Wolff
Hamburg Technical Support Office
Lloyd's Register EMEA



LR031.1.2013.12

Thorsten Wolff
Hamburg Technical Support Office
Lloyd's Register EMEA

Lloyd's Register EMEA
71 Fenchurch Street, London EC3M 4BS

Lloyd's Register EMEA
Is a subsidiary of Lloyd's Register Group



TYPE (continued)

Power size or current rating (character 7-10):

P***: 0.25 - 1.4 MW

N***: 55 - 800 kW

A***: 190 - 400 A

*** to be selected according to Danfoss Design Guide

Voltage (character 11-12):

T2: 3x 200-240V AC

T4: 3x 380-480V AC

T5: 3x 380-500V AC

T7: 3x 525-690V AC

Protection degree (character 13-15):

C00: IP 00 Chassis

C20: IP 20 Chassis

C21: IP21

C2H: IP21 + Heater

C54: IP54

C5H: IP54 + Heater

C2M: IP21 + Mains shield

C2S: IP 20 Chassis

C5M: IP54 + Mains shield

E00: IP 00 Chassis

E20: IP 20 Chassis

E21: IP 21

E2D: IP 21 (only D-frame)

E2M: IP 21 + Mains shield

E2S: IP 20 Chassis stainless steel screws

E5D: IP54 (only D-frame)

E5M: IP 54 + Mains shield

E5S: IP 54 With stainless steel screws+ Heater

E54: IP 54

E55: IP 55

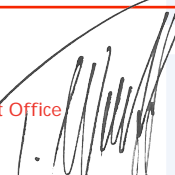

E66: IP 66

Certificate No. 18/20010

Issue Date 06 April 2018

Expiry Date 22 July 2019

Sheet 2 of 6

<p>Thorsten Wolff Hamburg Technical Support Office</p>  <p>Lloyd's Register EMEA</p> <p><small>LR031.1.2013.12</small></p>	 <p>Lloyd's Register</p>
---	---

Thorsten Wolff
Hamburg Technical Support Office
Lloyd's Register EMEA

Lloyd's Register EMEA
71 Fenchurch Street, London EC3M 4BS

Lloyd's Register EMEA
Is a subsidiary of Lloyd's Register Group



TYPE (continued)

Protection degree (character 13-15) continued:

H21: IP 21 + Heater

H54: IP 54 + Heater

Hardware (character 16-23):

RFI filter character 16-17: H1, B2, H2, H3, B4, H4, H5, L2, N2, N4, HX

Braking character 18: B, C, D, E, R, S, T, U, X

Display character 19: G, J, K, L, N, X

PCB coating character 20: C, R

Mains input character 21: E, J, X, 1, 2, 3, 4, 7

Hardware options character 22-23*

* to be selected according to Danfoss Design Guide

Software character 24-28

VLT® options (character 29-30):

Fieldbus options A

VLT® options (character 31-32):

I/O options B

VLT® options (character 33-34):

Motion control options C

VLT® options (character 35):

Application options

Character 36- 37 not used

VLT® options (character 38-39):

External control input: D0, DX

Certificate No. 18/20010

Issue Date 06 April 2018

Expiry Date 22 July 2019

Sheet 3 of 6



 Lloyd's Register
 Hamburg Technical Support Office
 Lloyd's Register EMEA

LR031.1.2013.12

Thorsten Wolff
Hamburg Technical Support Office
Lloyd's Register EMEA

Lloyd's Register EMEA
71 Fenchurch Street, London EC3M 4BS

Lloyd's Register EMEA
Is a subsidiary of Lloyd's Register Group

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.



TYPE (continued)

Firmware versions:
FC102 -4.xx and 5.xx
FC202 -2.xx and 3.xx
FC302 -7.xx and 8.xx
AAF006-2.xx

APPLICATION

Marine, Offshore and Industry applications for use in environmental categories ENV1 and ENV2 (for radiated and conducted emission suitable for special power distribution zones acc. IEC 60533 only) as defined in Lloyd's Register Test Specification Number 1:2002

STANDARD

IEC 61800-3:2005 +A1:2012
IEC 61800-5-1:2007

RATINGS

Power Size	Power Rating Normal Overload [kW]	AC Mains Voltage [V]
FC 102		
P1K1 -P45K	1.1 - 45	200 - 240
P1K1 - P1M0	1.1 - 1000	380 - 480
P1K1 - P1M4	1.1 - 1400	525 - 690
N110 - N560	110 - 560	380 - 480
N75K - N800	75 - 800	525 - 690
FC 202		
PK25 - P45K	0.25 - 45	200 - 240
PK37 - P1M0	0.37 - 1000	380 - 480
P1K1 - P1M4	1.1 - 1400	525 - 690
N110 - N560	110 - 560	380 - 480
N75K - N800	75 - 800	525 - 690

Certificate No.

18/20010

Issue Date

06 April 2018

Expiry Date

22 July 2019

Sheet

4 of 6



Thorsten Wolff
Hamburg Technical Support Office



Lloyd's Register

Lloyd's Register EMEA

LR031.1.2013.12

Thorsten Wolff
Hamburg Technical Support Office
Lloyd's Register EMEA

Lloyd's Register EMEA
71 Fenchurch Street, London EC3M 4BS

Lloyd's Register EMEA
Is a subsidiary of Lloyd's Register Group



RATINGS continued

Power Size	Power Rating Normal Overload [kW]	AC Mains Voltage [V]
FC302		
PK25 - P37K	0.25 - 37	200 - 240
PK37 - P800	0.37 - 800	380 - 500
P1K1 - P1M2	1.1 - 1200	525 - 690
N90K - N560	90 - 560	380 - 500
N55K - N710	55 - 710	525 - 690

OTHER CONDITIONS

The complete installation and function is subject to separate plan appraisal according applicable Rules and Regulations, when installed on LR classed vessels. Screened cables between motor and converter to be installed on LR classed vessels. Converters used for essential services rated above 100kW to be manufactured and tested in compliance with LR Rules and Regulations. If used in marine and offshore applications the equipment is to be installed in special power distribution zones according IEC 60533 and Danfoss EMC Installation Guideline 00720010 revision sequence A8. Appropriate measures should be taken to attenuate EMC effects on the distribution system so that safe operation is assured. Planned EMC measures are matter of assessment prior to installation on board. The type selection has to be according Danfoss Design Guide. The installation requirements according Danfoss Installation Guide have to be fulfilled.

The temperature range in operation is up to 45 °C. For 46 - 55 °C with current derating of 1%/°C or 1.5%/°C as applicable according to Danfoss Design Guide.

Certificate No. 18/20010
Issue Date 06 April 2018
Expiry Date 22 July 2019
Sheet 5 of 6



Thorsten Wolff
 Hamburg Technical Support Office

Lloyd's Register EMEA

LR031.1.2013.12



Thorsten Wolff
 Hamburg Technical Support Office
 Lloyd's Register EMEA

Lloyd's Register EMEA
 71 Fenchurch Street, London EC3M 4BS

Lloyd's Register EMEA
 Is a subsidiary of Lloyd's Register Group

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.



Lloyd's
Register

PLACE OF PRODUCTION Danfoss Power Electronics A/S
Ulsnaes 1
6300 Graasten
Denmark

Danfoss LLC*
4401 N Bell School Road
IL 61111 Loves Park
USA

*E1h – E4h can be produced at Loves Park only

The Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations.

If the specified standards are amended during the validity of this certificate, the product is to be re-approved prior to it being supplied to vessels to which the amended standards apply.

The Design Appraisal Document No. HTS/ETS 36424-18 and its supplementary Type Approval Terms and Conditions form part of this Certificate.

Certificate No. 18/20010
Issue Date 06 April 2018
Expiry Date 22 July 2019
Sheet 6 of 6

Thorsten Wolff
Hamburg Technical Support Office
Lloyd's Register EMEA
LR031.1.2013.12



Thorsten Wolff
Hamburg Technical Support Office
Lloyd's Register EMEA

Lloyd's Register EMEA
71 Fenchurch Street, London EC3M 4BS

Lloyd's Register EMEA
Is a subsidiary of Lloyd's Register Group

Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.