

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Frequency Converter

with type designation(s)
FC-202 series

Issued to

Danfoss Drives A/S
GRAASTEN, Denmark

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

Application :

Frequency Converter for Asynchronous Motors Range: 0,25 kW to 90 kW 200-240 / 380-500 / 525-690 VAC supply.

This Certificate is valid until **2015-06-30**.

Issued at **Høvik** on **2014-12-19**

DNV GL local station: **Fredericia**

Approval Engineer: **Nicolay Horn**

for **DNV GL**

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Marit Laumann
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Certificate No: **E-12942**
 File No: **822.21**
 Job Id: **262.1-004066-3**

Product description

Product: Frequency converter / Variable speed controller for asynchronous motors used for HVAC application. Constant / variable torque applications.

Model: VLT® HVAC Drive series FC202

FC-202 power rating vs. enclosure type and IP rating

FC-202: 200-240V (T2)				
Power rating [kW]	Enclosure type			
	IP20	IP21	IP55	IP66
0,25	A2	A2 (*5)	A4+A5	A4+A5
0,37				
0,55				
0,75				
1,1				
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				
22	C3	C1	C1	C1
30				
37	C4	C2	C2	C2
45				

FC-202: 380-480/500V (T4/T5)				
Power rating [kW]	Enclosure type			
	IP20 (*1)	IP21 (*2)	IP55 (*3)	IP66 (*4)
0,37	A2	A2 (*5)	A4+A5	A4+A5
0,55				
0,75				
1,1				
1,5				
2,2				
3,0				
4,0	A2	A2 (*5)	A4+A5	A4+A5
5,5	A3	A3 (*5)	A5	A5
7,5				
11	B3	B1	B1	B1
15				
18,5				
22	B4	B2	B2	B2
30				
37	C3	C1	C1	C1
45				
55	C4	C2	C2	C2
75				
90			NA	

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Voltage: (character 11-12)

T2 : Three phase 200-240 VAC
T4 : Three phase 380-480 VAC
T5 : Three phase 380-500 VAC
T7 : Three Phase 525-690 VAC

Enclosure (character 13-15)

E20 : IP20 / Chassis
E21 : IP21 / Type 1
E55 : IP55/ Type 12
E66 : IP66
E4X : NEMA 4X indoor

Hardware (character 16-23)

Hardware, RFI filter (character 16-17)

H5 : RFI for Maritime use. H5 RFI complies with IACS E10 requirements except radiated and conducted emissions

H6 : RFI for Maritime use. H6 RFI complies with all IACS E10 requirements

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)

CUE202 Equals to FC-202

Application/Limitation

Supply voltage range:	200-240, 380-500 V, 525- 690 V, 50/60 Hz
Voltage variation:	± 10 %
Frequency variation:	± 10 %
Output frequency:	0 - 1000 Hz.
Temperature range in operation:	In accordance with Danfoss deign guide.
Temperature class:	A
Vibration class:	A
Humidity class:	B*
EMC class:	A**
Protection class:	IP20, IP21, IP55 & IP66***

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The FC202 shall be regarded as a component. The actual installation to be designed according to Danfoss design guide MG.33.X.YY – VLT and according to the applicable DNV Rules for the actual application.

This type approval can not replace the requirement for a product certificates in accordance with the DNV Rules for drives > 100 kVA

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

** 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.

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

Type Approval documentation

Technical info:

Product overview "FC-202 power rating vs enclosure type and IP rating", part of email from Danfos dated 2009-04-14.

Test reports:

DD-DS3 P420 - Marine test overview version 1.00

P462-91_R0132T02v200c dated 2012-07-03
P462-120_R0101T02v200a dated 2012-11-20
P462-122_R0102T01v300b dated 2013-04-30
P462-159_R0132T04v100d dated 2013-05-28
P462-164_R0134T05v210a dated 2013-11-18
P462-308_R0132T02v200c dated 2013-11-18
P462-321_R0123T03v110a dated 2013-04-30
P462-329_R0101T02v200a dated 2012-11-20
P462-308_R0132T02v200c dated 2012-07-03
P462-355_R0134T05v210c dated 2013-11-18
P462-91_R0132T02v200c dated 2012-07-03
P462-362_R0102T01v300b dated 2013-04-30
P462-367_R0123T03v110a dated 2013-04-30
P462-391_R0102T01v300b dated 2013-04-30
P462-395_R0101T02v200a dated 2012-11-20
P462-451_R0124T02v110a dated 2013-07-03
P462-454_R0123T03v110a dated 2013-04-30
P462-456_R0132T02v200c dated 2013-07-03
P462-459_R0134T05v210 dated 2013-11-18
P462-473_R0122T01v110a dated 2013-09-18
P420-541_R0123T04v110a dated 2007-12-19
P420-321_R0123T03v110a dated 2007-12-19
P420-367_R0123T03v110a dated 2007-12-19
P420-368_R0123T04v110a dated 2007-12-19
P420-454_R0123T03v110a dated 2007-12-19
DocCM 00708685
DocCM 00709825
DocCM 0071489
CTR 13-0120 dated 2013-05-17
DD-DS3 P420 - Marine test overview version 1.00
P429 -58_R0101T01v220a "Visual inspection, dated 2009-12-19
P429 -81_R0111T01v201a "Temperature test" dated 2008-06-02
P429 -151_R0126T02v100a "Burst – fast transient" dated 2008-11-25
P429 -162_R0126T02v100a "Burst – fast transient" dated 2008-11-25

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P429 -150_R0126T02v100a "Electrostatic discharge" dated 2008-11-25
P429 -161_R0126T02v100a "Electrostatic discharge" dated 2008-11-25
P429 -159_R0127T02v100b "Conducted emission" dated 2008-11-25
P429 -231_R0127T02v100c "Conducted emission" dated 2008-11-25
P429 -165_R0122T01v110a "Power supply variation and interruptions" dated 2008-11-25
P429 -154_R0122T02v110a "Power supply variation and interruptions" dated 2008-11-25
P429 -144_R0123T01v110a "Dry heat test" dated 2008-11-25
P429 -155_R0123T01v110a "Dry heat test" dated 2008-11-25
P429 -163_R0124T01v100a "Wide band random" dated 2008-11-26
P429 -164_R0124T01v100a "Wide band random" dated 2008-12-22
130R0319 – Marine test overview FC302PK25T5 – FC302P7K5T5
130R0320 – Marine test overview FC302P11KT5 – FC302P75KT5
DANAK EMC test report no.19K0123, dated 2004-05-26
DANAK EMC test report no.19K0337, dated 2006-04-11
DANAK EMC test report no.19K0351, dated 2006-04-11
Danfos test reports P401-10, -749, -758, -1093, -1094,-1095,-1096, -1098 & -1129, Document version 1.00a
Danfos test reports P404-363, -449, -682, -683, -684, -685, -686, -688, -689, -691, -692, -697, -698, & -699, Document version 1.00a.

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