

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Frequency Converter

with type designation(s)
Altivar 312,

Issued to

STIE
PACY SUR EURE, France

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 Altivar 312 series. Range: 0,18 kW to 15 kW
200 - 500 VAC supply.**

This Certificate is valid until **2018-06-30**.

Issued at **Høvik** on **2014-07-03**

DNV GL local station: **Le Havre**

Approval Engineer: **Kristine Bruun Ludvigsen**

for **DNV GL**

.....
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. If any person suffers loss or damage which is proven to have been caused by any negligent act or omission of the Society, then the Society shall pay compensation to such person for his proven direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question. The maximum compensation shall never exceed USD 2 million. In this provision the "Society" shall mean DNV GL AS as well as all its direct and indirect owners, affiliates, subsidiaries, directors, officers, employees, agents and any other person or entity acting on behalf of DNV GL AS.

Certificate No: **E-13484**
 File No: **822.21**
 Job Id: **262.1-009688-3**

Product description

Variable speed controller for asynchronous motor. Constant / variable torque applications.

Single phase supply with integrated EMC filter

| Type designation | Mains supply (V) | Number of phases | Motor power output (kW) ¹⁾ |
|------------------|------------------|------------------|---------------------------------------|
| ATV 312H018M2 | 200 - 240 | 1 | 0,18 |
| ATV 312H037M2 | 200 - 240 | 1 | 0,37 |
| ATV 312H055M2 | 200 - 240 | 1 | 0,55 |
| ATV 312H075M2 | 200 - 240 | 1 | 0,75 |
| ATV 312HU11M2 | 200 - 240 | 1 | 1,1 |
| ATV 312HU15M2 | 200 - 240 | 1 | 1,5 |
| ATV 312HU22M2 | 200 - 240 | 1 | 2,2 |

3-phase supply without EMC filter

| Type designation | Mains supply (V) | Number of phases | Motor power output (kW) ¹⁾ |
|------------------|------------------|------------------|---------------------------------------|
| ATV 312H018M3 | 200 - 240 | 3 | 0,18 |
| ATV 312H037M3 | 200 - 240 | 3 | 0,37 |
| ATV 312H055M3 | 200 - 240 | 3 | 0,55 |
| ATV 312H075M3 | 200 - 240 | 3 | 0,75 |
| ATV 312HU11M3 | 200 - 240 | 3 | 1,1 |
| ATV 312HU15M3 | 200 - 240 | 3 | 1,5 |
| ATV 312HU22M3 | 200 - 240 | 3 | 2,2 |
| ATV 312HU30M3 | 200 - 240 | 3 | 3,0 |
| ATV 312HU40M3 | 200 - 240 | 3 | 4,0 |
| ATV 312HU55M3 | 200 - 240 | 3 | 5,5 |
| ATV 312HU75M3 | 200 - 240 | 3 | 7,5 |
| ATV 312HD11M3 | 200 - 240 | 3 | 11 |
| ATV 312HD15M3 | 200 - 240 | 3 | 15 |

3-phase phase supply with integrated EMC filter

| Type designation | Mains supply (V) | Number of phases | Motor power output (kW) ¹⁾ |
|------------------|------------------|------------------|---------------------------------------|
| ATV 312H037N4 | 380 - 500 | 3 | 0,37 |
| ATV 312H055N4 | 380 - 500 | 3 | 0,55 |
| ATV 312H075N4 | 380 - 500 | 3 | 0,75 |
| ATV 312HU11N4 | 380 - 500 | 3 | 1,1 |
| ATV 312HU15N4 | 380 - 500 | 3 | 1,5 |
| ATV 312HU22N4 | 380 - 500 | 3 | 2,2 |
| ATV 312HU30N4 | 380 - 500 | 3 | 3,0 |
| ATV 312HU40N4 | 380 - 500 | 3 | 4,0 |
| ATV 312HU55N4 | 380 - 500 | 3 | 5,5 |
| ATV 312HU75N4 | 380 - 500 | 3 | 7,5 |
| ATV 312HD11N4 | 380 - 500 | 3 | 11 |
| ATV 312HD15N4 | 380 - 500 | 3 | 15 |

1) Values applicable for 40 °C. To be modified for ships application at 45 °C. See under "Application / limitation".

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Application/Limitation

Supply voltage range: 200 - 500 V, 50/60 Hz
Voltage variation: $\pm 10\%$
Frequency variation: $\pm 10\%$
Output frequency: 0 - 500 Hz.
Temperature range in operation: 0 - 40 °C (40 - 60 °C when derated)
Temperature class: A
Vibration class: A
Humidity class: A
EMC class: IEC 61800-3, To be used on EMC A levels only

The Altivar 312 must be regarded as a component. The actual installation to be designed according to Schneider Users Manual and according to the applicable DNV Rules for the actual application. To be installed in an enclosure with an IP degree in accordance with DNV Rules w.r.t. location.

Converters with conducted and radiated emission above the DNV required limits may 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. Planned EMC precautions shall be submitted for approval prior to installation onboard.

The EMC precautions should be derived from an EMC analysis and plan in accordance with IEC 60533 Annex B and /or IEC 61800-3 Annex E.

Use of mechanical adaptation required to reduce the Vibration level.

For marine applications size of drive to be chosen according to chapter "Technical Specification" and derated with respect to an ambient temperature of 45°C and drive mode in accordance with chapter "Environment" in "Altivar 31 Users Manual" (2,2% per deg. C for ambient above 45 °C).

Type Approval documentation

Technical info:

"Letter from Schneider Toshiba Inverter SAS to DNV" dated 2010-03-23.

Test reports:

Technical Report Product Range no. RT-032-PNT-09-103328-2-A dated 2010-01-19.

Schneider Electric Toshiba test report nos. ATV312_QTR_90056.doc56 dated 2009-01-21, ATV312_QTR_90215.doc215 dated 2009-03-11, ATV312_QTR_90244 dated 2009-03-17, ATV312_LTR_90031 dated 2008-01-13, CNPP test report nos. LM 09 00 20 & LM 09 00 21 dated 2009-04-22, UL-RQ-RS2-4150-00_S9 dated 2004-07-25, Schneider Electric test reports nos. 204-03 dated 2003-05-23, 207-03 dated 2003-06-06, 231-03 dated 2003-06-27, 376-03 dated 2003-06-30, Schneider-Toshiba test reports nos. 312 DNV-03 dated 2005-09-08, 312-DNV-05 dated 2005-10-23, 313-34-01 dated 2003-05-15, RQ3130317 & 19 dated 2003-09-19, RQ3133017 & 19 and RQ3134606 & 07 dated 2003-09-18, RQ3133101 & 110 dated 2003-07-21 & 22, RQ3131301 & 06 dated 2003-07-17, RQ3131016 & 2816 dated 2003-09-18 & 19, RQ312-DNV-01 & 02 dated 2004-07-28 & 2004-08-05, 378-03 dated 2003-07-22, Sopema test report LH 34031 dated 2004-08-19, Emitech test report RC-04-45628-1-A-BPE-SG dated 2005-12-01.

Tests carried out

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

EMC: The following tests are in accordance with the IEC 601800-3: Electrical fast transient (Burst), electrical slow transient (Surge), conducted disturbances, electric discharge (ESD), radiated and conducted emission.

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Marking of product

Altivar 312 – 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 periodical assessment 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.

Periodical assessment to be performed at least every second year.

END OF CERTIFICATE