DNV·GL

Certificate No:
TAE000027E

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Frequency Converter

with type designation(s)
HES880-104-xxxxA-5, HES880-HLCL-xxxxA-5, HES880-HDCL-xxxxA-5

Issued to
ABB Oy, Drives
Helsinki, Finland

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2017-10-18**

This Certificate is valid until **2022-10-17**.
DNV GL local station: **Helsinki**

Approval Engineer: **Marta Alonso Pontes**

for **DNV GL**
Digitally Signed By: Trond Sjåvåg
Location: DNV GL Høvik, Norway
on behalf of

Andreas Kristoffersen
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.

Job Id: **262.1-025812-1**
Certificate No: **TAE000027E**

Product description

The HES880 product family consists of 3 power modules (-104), 2 LCL filter modules (-HLCL) and 2 DC Choke modules (-HDCL). Each power module can be used in three different operation modes depending on what firmware have been installed: inverter, line converter and DC/DC converter.

HES880-104-	Inverter (INU)			Line converter (ISU)			DC/DC converter		
	0352A-5	0602A-5	0902A-5	0352A-5	0602A-5	0902A-5	0352A-5	0602A-5	0902A-5
Maximum power	303 kVA	520 kVA	779 kVA	303 kVA	520 kVA	779 kVA	332 kW	518 kW	776 kW
Nominal full load current (Input Aac/ Output AdC)*	415/ 350	600/ 600	900/ 900	262/ 311	450/ 534	647/ 767	340/ 120	225/ 600	338/ 900
AC Voltage Range	0-500 V			230-550 V			-		
Voltage tolerance	Steady state ±10%, transient state ±20%			Steady state ±10%, transient state ±20%			-		
Nominal DC Voltage	730 V								
Nominal Frequency	-			50/60 Hz			DC		
Frequency tolerance	-			Steady state ±5%, transient state ±10%			-		
Ambient Operational Temperature Range	-40 … +85 ^{O}C								
Humidity	0-100%, condensation								
Ingress Protection	IP67								

*The values in the table are the nominal rating at ambient temperature up to 45°C. For higher ambient temperature see de-rate tables from ABB.

Application/Limitation

Temperature class: D
Humidity class: A (for HDCL) and B (for 104 and HLCL)
Vibration class: A
Enclosure class: B
EMC class: IEC 61800-3. To be used on EMC class A locations (see below).

Converters with conducted and radiated emission above the DNV GL required limits can be installed in "special distribution zone" and "general power distribution zone", in accordance with IEC 60533 provided measures are taken to attenuate these effects on the distribution system, so the safe operation is assured.

Product certification:
Frequency converters larger than 100kW serving important or essential equipment are subjected for additional case by case based product certification. Documentation to be submitted for product certification shall be according DNVGL ship rules Pt.4 Ch.8 or DNVGL offshore standard D201, including reference to this type approval certificate and confirmation that the correct marine options and power ratings are used.

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Type Approval documentation

Documents and test reports listed in approval letter with ref. MCANO381/PONT/262.1-025812-J-25 dated 2017/10/17

Tests carried out

According to DNVGL-CP-0395

Marking of product

ABB Oy – Type designation – S/N – Coolant Req - Output – Input – IP degree

Warning signboard for HES880-104 and HES880-HLCL: Disconnect the frequency converter supply and wait at least 6 minutes before working on the unit.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine Tests (RT) checked (if not available tests according to 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 is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE