



Confirmation of Product Type Approval

Please refer to the "Service Restrictions" shown below to determine if Unit Certification is required for this product. This certificate reflects the information on the product in the ABS Records as of the date and time the certificate is printed.

Pursuant to the Rules of the American Bureau of Shipping (ABS), the manufacturer of the below listed product held a valid Manufacturing Assessment (MA) with expiration date of 24/AUG/2014. The continued validity of the Manufacturing Assessment is dependent on completion of satisfactory audits as required by the ABS Rules.

And; a Product Design Assessment (PDA) valid until 21/MAR/2018 subject to continued compliance with the Rules or standards used in the evaluation of the product.

The above entitle the product to be called Product Type Approved.

The Product Design Assessment is valid for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.

Product Name: Frequency Converter
Model Name(s): ACS800LC Series

Presented to:
ABB OY DRIVES
(TYPE APPROVAL ONLY - INVOICES USE WCN 004531)
HIOMOTIE 13
HELSINKI
Finland

Intended Service: Electrical drives for Ships and Offshore Units.

Description: ACS800LC is based on the control algorithm of DTC resulting ultimate torque and speed performance. The drive can be configured in multi drive or single drive modes to control synchronous as well as induction motors from 1.5KVA to 6000KVA (400V to 690V supply voltage). ACS800LC series can be configured from Diode Supply Units (DSU) or IGBT Supply Units (ISU), IGBT Inverter Units (INU), active LCL filter units, Braking Chopper Units (BRC), Dynamic Braking Unit (DBU), System Control Units and Liquid Cooling Units. These modules are arranged according to the customer requirement such as out put power and motor configurations etc. A number of converter modules (rectifier or inverter) can be linked to a common DC bus, thus enabling multiple machine operation with parallel driving and braking. The following illustrates the available modules and their configurations. Supply Modules: ACS800-204LC: IGBT supply module similar to INU module ACS800-207LC: 1 - 10 IGBT supply modules with 1 to 5 LCL filter unites with power ranges from 240-5450KVA ACS800-304LC (D3): One 6 pulse diode bridge with two types of 3 branch chokes ACS800-704LC (D4): Two 6 pulse diode bridges with two types of 3 branch chokes ACS800-307/507/1107/1207LC: 1-3 DSU modules up to 5700KVA (380 to 690V) Inverter Modules: ACS800-104LC: Direct liquid cooled IGBT inverter modules with frame sizes R7i and R8i ACS800-104: Indirect liquid cooled or air cool IGBT inverter modules with frame

sizes from R2i to R5i ACS800-107LC: Up to 10 direct/indirect liquid cooled IGBT inverter modules from 1.5 to 5600KVA Optional Modules: ALCL-XXLC: Filter Module used only with IGBT supply units to reduce harmonics ACS800-604LC: Dynamic braking module ACS800-607LC DBU: Up to 5 ACS800-604LC modules from 250KW - 6500KW NBRW 669: Braking Module 119KVA ACS800-607LC BRC: Upto 6 NBRW669 modules Drive Configurations: ACS800-04LC: Single drive module consisting of DSUs, INUs and optional BRC/DBUs, LCUs - assembled in customer's own cabinet ACS800-07LC: Single drive of DSU and INU with optional BRC/DBU and LCU delivered with cabinet ACS800-14LC: Regenerative drive modular package consisting of ISU, LCL and INU with optional BRC/DBU, LCU and system control unit - assembled in customer's own cabinet ACS800-17LC: Regenerative drive modular package consisting of ISU, LCL and INU with optional BRC/DBU, LCU and system control unit ACS800-34LC: Low harmonic Module similar to ACS800-14LC without regeneration ACS800-37LC: Low harmonic Module similar to ACS800-17LC without regeneration.

Ratings: Nominal 3-phase supply voltage: range 400V, 500V and 690V. Power Rating: 1.5KVA - 6000KVA, IP Ratings; IP42/IP54 (fully closed), IP20 with open door

Service Restrictions: Unit Certification is required for drive units where required for essential services as per the ABS Rules for Building and Classing Steel Vessels 4-8-3/5.11 and 4-8-5/5.17.9

Comments: Not Applicable

Notes / Documentation: This Product Design Assessment (PDA) is valid only for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

Term of Validity: This Product Design Assessment (PDA) Certificate 07-LD257374-2-PDA, dated 22/Mar/2013 remains valid until 21/Mar/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.

ABS Rules: The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product. The Rules applicable to this assessment are: ABS Rules for Building and Classing Steel Vessels (2013) 1-1-4/7.7, 4-8-3/7.5, 4-8-5/5 and 4-9-7/Table 9 and Table 10.

National Standards:

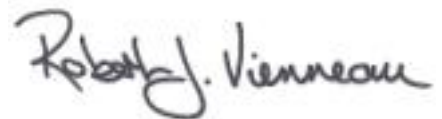
International Standards: IEC60092, IEC60146, IEC60664, IEC60947, IEC60529, IEC60533, IEC61800 (relevant sections)

Government Authority:

EUMED:

Others:

| Model Certificate | Model Certificate No | Issue Date | Expiry Date |
|-------------------|----------------------|-------------|-------------|
| PDA | 07-LD257374-2-PDA | 22/MAR/2013 | 21/MAR/2018 |



ABS Programs

ABS has used due diligence in the preparation of this certificate and it represents the information on the product in the ABS Records as of the date and time the certificate was printed. Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. Limited circumstances may allow only Prototype Testing to satisfy Type Approval. The approvals of Drawings and Products remain valid as long as the ABS Rule, to which they were assessed, remains valid. ABS cautions manufacturers to review and maintain compliance with all other specifications to which the product may have been assessed. Further, unless it is specifically indicated in the description of the product; Type Approval does not necessarily waive witnessed inspection or survey procedures (where otherwise required) for products to be used in a vessel, MODU or facility intended to be ABS classed or that is presently in

class with ABS. Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.