



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 04-JAN-2022. 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 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): ACS880-x04/1604-yyyyA-3/5/7+zzzz (Category 1.a),
ACS880-x4/04XT-yyyyA-3/5/7+zzzz (Category 1.b)

Presented to:

ABB OY DRIVES
HIOMOTIE 13
PO BOX 184
FIN-00380
Finland

Intended Service:

For use on ABS Classed Vessels and Offshore Facilities in accordance with the listed ABS Rules and International Standards.

Description:

Electrical drives for ships and offshore units. Air-cooled ACS880 Drive modules (Category 1.a: ACS880-x04/1604-yyyyA-3/5/7+zzzz) and ACS880 High power single drive module packages (Category 1.b: ACS880-x4/04XT-yyyyA-3/5/7+zzzz) with built in PLC capability are suitable for controlling the speed and torque of various type of motors such as induction motors, permanent magnet motors, servo motors and ABB synchronous reluctance motors (SynRM motors). The drive can be configured in multidrive or single drive modes. The power range is from 5.2 to 5320 kW and the voltage range is from 380 to 690 V. The enclosure class of the modules is IP00 as standard (cabinets are not included in Cat. 1). ACS880 multidrive modules and module packages are designed to be built into ABB Common Cabinet or by machine builders and system integrators into customers' own cabinets. Multidrive modules are used for building multidrive configurations and for building high power single drives. All supply units offer supply voltages from 380 to 690 V. Category 1.a (Drive modules): Inverter Modules: ACS880-104-0140A...5130A-3, ACS880-104-0110A...4610A-5, ACS880-104-007A3...5700A-7. Output power: 5 - 5320 kW, Frames: R5i10xR8i IGBT Supply Units: ACS880-204-0210A...4620A-3,

ACS880-204-0210A...4150A-5, ACS880-204-0310A...5130A-7. Output power: 138 - 5819 kVA, Frame: R6i+ALCL-05-5... 10xR8i+5xBLCL-25-7 Diode Supply Units: ACS880-304-0650A...5470A-3, ACS880-304-0650A...5470A-5, ACS880-304-0570A...4560A-7: Output power: 430 - 5174 kVA, Frame: 2xD7T, D8T... 6xD8T Brake Modules: ACS880-604-0210...3770-3, ACS880-604-0260...4710-5, ACS880-604-0400...6500-7. Output power: 67 - 6180 kW, Frame: NBRA-658... 6xNBRA-669, R8i... 5xR8i DC/DC Converter Modules: ACS880-1604-0600A...4500A-3, ACS880-1604-0600A...4500A-5, ACS880-1604-0400A...3000A-7. Output power: 290 - 2721 kW, Frame: R8i... 5xR8i Category 1.b (High power single drive module packages): ACS880-04XT-1190A...1610A-3, ACS880-04XT-1160A...1610A-5, ACS880-04XT-0810A...1320A-7. Output power: 599 - 1140 kW, Frame: 2xR10 ... 2xR11 ACS880-04-0990A...2610A-3, ACS880-04-0990A...1980A-5, ACS880-04-0800A...2300A-7. Output power: 532 - 2090 kW, Frame: 2xD7T, D8T... 4xD8T + 2xR8i... 4xR8i ACS880-14/34-0450A...2530A-3, ACS880-14-0420A...2270A-5, ACS880-14-0320A...2230A-7. Output power: 238 - 2090 kW, Frame: R8i... 4xR8i + BLCL-XX-X + R8i ...4xR8i Category 1.b consist of ACS880-04, ACS880-04XT and ACS880-14/34, where the same supply and inverter modules and optional brake and DC/DC converter modules are used as in the category 1.a.

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Ratings:

Category 1.a (Drive modules): Nominal Voltage: 380-690V Supply Frequency: 50/60Hz (+/-5%) IP rating: IP00 as standard Ambient Temperature: +45...55 °C (Derated by 1% for every added 1 °C) Output Power: Supply modules (ISU): 138 - 5819 kVA, Frame: R6i+ALCL-05-5... 10xR8i+5xBLCL-25-7, (DSU): 430 - 5174 kVA, Frame: 2xD7T, D8T... 6xD8T Inverter Modules (INU) : 5 - 5320 kW, Frame: R5i10xR8i Brake Modules: 67 - 6180 kW, Frame: NBRA-658... 6xNBRA-669, R8i... 5xR8i DC/DC converter Modules: 290 - 2721 kW, Frame: R8i... 5xR8i Category 1.b (High power single drive module packages): Nominal Voltage: 380-690V Supply Frequency: 50/60Hz (+/-5%) IP rating: IP00, IP20 as an option of ACS880-04XT Ambient Temperature: +45...55 °C (Derated by 1% for every added 1 °C) Output Power: ACS880-04 : 532 - 2090 kW, Frame: 2xD7T, D8T... 4xD8T + 2xR8i... 4xR8i ACS880-04XT: 599 - 1140 kW, Frame: 2xR10 ... 2xR11 ACS880-14/34: 238 - 2090 kW, Frame: R8i... 4xR8i + BLCL-XX-X + R8i ...4xR8i Input current and output current ratings are as per Technical Data of "Product types, Category 1: 3AXD10000497338_1.B.pdf, 3AXD10000497338_2.B.pdf, 3AXD10000497338_3.B.pdf.

Service Restrictions:

Unit Certification is required for semiconductor converters used to control motor drives having a rated power of 100 kW(135 hp) and over intended for essential services as ABS Rules for Building and Classing Steel Vessels 2016 4-8-3/1.5, 4-8-3/5.11 and 4-8-3/8. Inspection and testing of equipment should comply with ABS Steel Vessels Rules (2016) 4-8-3/8.7.

Comments:

The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product. The Frequency Drives are not intended for installation in hazardous areas.

Notes / Documentation:

Drawing No. 3AXD10000497338_1, Revision: B List of the Air-cooled ACS880 drive modules and high power single drive module packages, Date: 09.09.2016, Pages: 1 Drawing No. 3AXD10000497338_2, Revision: B, Category 1.a: Modules , Date: 09.09.2016, Pages: 1 Drawing No. 3AXD10000497338_3, Revision: B, Category 1.b: High power single drive module, Date: 09.09.2016, Pages: 1 Drawing No. 3AXD50000010104, Revision: C, Hardware manual: ACS880-304, Date: 03.12.2015, Pages: 280 Drawing No. 3AXD50000023642, Revision: A, Hardware manual: ACS880-1604, Date: 30.06.2015, Pages: 196 Drawing No. 206452, Revision: A, Emission and immunity type test report: Date: 18.04.2012, Pages: 19 Drawing No. 217226, Revision: A, Emission and immunity type test report : Date: 13.08.2012, Pages: 16 Drawing No. 233032, Revision: A, Emission and immunity type test report : Date: 04.03.2013, Pages: 22 Drawing No. 234675-1, Revision: A, Emission type test report : Date: 28.03.2013, Pages: 12 Drawing No. 234675-2, Revision: A, Radiated emission type test report: Date: 28.03.2013, Pages: 11 Drawing No. 238152-1, Revision: A, Emission and immunity type test report: Date: 04.03.2013, Pages: 23 Drawing No. 238152-2, Revision: A, Radiated emission type test report: Date: 13.05.2013, Pages: 11 Drawing No. 267928-1, Revision: A, EMC type Test report: Date: 03.05.2012, Pages: 17

Drawing No. 267928-2, Revision: A, EMC type Test report: Date: 03.05.2012, Pages: 15 Drawing No. 269768-1, Revision: A, Safety requirement Test report: Date: 17.12.2012, Pages: 39 Drawing No. 269768-1, Att.1, Revision: A, Safety requirement Test report attachment: Date: 17.12.2012, Pages: 7 Drawing No. 269768-1, Att.2, Revision: A, Safety requirement Test report attachment: Date: 17.12.2012, Pages: 15 Drawing No. 270905-1a, Revision: A, Safety requirement Test report: Date: 04.12.2013, Pages: 15 Drawing No. 270905-1a A1, Revision: A, Safety requirement Test report amendment: Date: 04.12.2013, Pages: 15 Drawing No. 270905-1a, Att.1, Revision: A, Safety requirement Test report attachment: Date: 17.12.2013, Pages: 4 Drawing No. 270905-1a, Att.2, Revision: A, Safety requirement Test report attachment: Date: 17.12.2013, Pages: 6 Drawing No. 270905-1b, Revision: A, Safety requirement Test report: Date: 19.12.2013, Pages: 42 Drawing No. 270905-1b, Att.1, Revision: A, Safety requirement Test report attachment: Date: 19.12.2013, Pages: 9 Drawing No. 270905-1b, Att.2, Revision: A, Safety requirement Test report attachment: Date: 19.12.2013, Pages: 18 Drawing No. 273826, Revision: A, Vibration type Test report: Date: 27.09.2013, Pages: 15 Drawing No. 273886D, Revision: A, Vibration type Test report: Date: 13.12.2013, Pages: 11 Drawing No. 278187-2, Revision: A, Safety requirement Test report: Date: 09.10.2015, Pages: 47 Drawing No. 3AUA0000085967, Revision: P, Firmware manual: ACS880, Date: 27.06.2016, Pages: 570 Drawing No. 3AUA0000104271, Revision: E, Hardware manual: ACS880-104, Date: 14.07.2014, Pages: 364 Drawing No. 3AUA0000106244, Revision: B, Hardware manual: ACS880-604, 1-phase, Date: 05.12.2013, Pages: 76 Drawing No. 3AUA0000131525, Revision: D, Hardware manual: ACS880-204, Date: 19.05.2015, Pages: 370 Drawing No. 3AUA0000131562, Revision: D, Firmware manual: ACS880 IGBT supply, Date: 01.09.2015, Pages: 224 Drawing No. 3AXD10000081363, Revision: A, Electrical safety type test report, Date: 08.06.2012, Pages: 8 Drawing No. 3AXD10000081404, Revision: A, Electrical safety type test report, Date: 08.06.2012, Pages: 8 Drawing No. 3AXD10000081409, Revision: B, Temperature rise test report, Date: 13.08.2012, Pages: 39 Drawing No. 3AXD10000088539, Revision: D, Temperature rise and abnormal operation type test report, Date: 15.12.2012, Pages: 47 Drawing No. 3AXD10000088704, Revision: A, Capacitor discharge type test report, Date: 11.10.2012, Pages: 9 Drawing No. 3AXD10000089018, Revision: C, EMC type test report, Date: 19.09.2012, Pages: 11 Drawing No. 3AXD10000091636, Revision: B, Electrical safety type test report, Date: 18.10.2012, Pages: 11 Drawing No. 3AXD10000124037, Revision: A, Temperature rise type test report, Date: 15.01.2013, Pages: 26 Drawing No. 3AXD10000240310, Revision: B, Electrical safety type test report, Date: 14.05.2013, Pages: 10 Drawing No. 3AXD10000240312, Revision: B, Temperature rise and abnormal operation type test report, Date: 28.04.2013, Pages: 25 Drawing No. 3AXD10000241184, Revision: A, Abnormal operation and protections type test report, Date: 28.04.2013, Pages: 17 Drawing No. 3AXD10000241633, Revision: C, Temperature rise and abnormal operation type test report, Date: 18.09.2013, Pages: 27 Drawing No. 3AXD10000241634, Revision: A, Electrical safety type test report, Date: 02.05.2013, Pages: 10 Drawing No. 3AXD10000241635, Revision: B, Temperature rise and abnormal operation type test report, Date: 16.04.2013, Pages: 30 Drawing No. 3AXD10000242637, Revision: C, Temperature rise and abnormal operation type test report, Date: 26.03.2015, Pages: 46 Drawing No. 3AXD10000244213, Revision: A, Temperature rise and abnormal operation type test report, Date: 10.06.2013, Pages: 33 Drawing No. 3AXD10000246796, Revision: A, Efficiency and harmonic distortion type test report, Date: 17.06.2013, Pages: 11 Drawing No. 3AXD10000251640, Revision: A, Temperature rise and abnormal operation type test report, Date: 10.07.2013, Pages: 31 Drawing No. 3AXD10000251641, Revision: A, Temperature rise and abnormal operation type test report, Date: 01.07.2013, Pages: 25 Drawing No. 3AXD10000252249, Revision: B, Temperature rise and abnormal operation type test report, Date: 10.07.2013, Pages: 17 Drawing No. 3AXD10000290757, Revision: B, Temperature rise and abnormal operation type test report, Date: 14.11.2013, Pages: 23 Drawing No. 3AXD10000290758, Revision: B, Temperature rise and abnormal operation type test report, Date: 01.10.2013, Pages: 24 Drawing No. 3AXD10000290762, Revision: A, Electrical safety type test report, Date: 07.11.2013, Pages: 8 Drawing No. 3AXD10000311720, Revision: B, Environmental type test report, Date: 10.10.2013, Pages: 8 Drawing No. 3AXD10000320896, Revision: B, Temperature rise and abnormal operation type test report, Date: 26.03.2014, Pages: 32 Drawing No.

3AXD10000320897, Revision: A, Electrical safety type test report, Date: 17.04.2014, Pages: 8 Drawing No. 3AXD10000320898, Revision: A, Electrical safety type test report, Date: 17.04.2014, Pages: 8 Drawing No. 3AXD10000333046, Revision: A, Temperature rise and abnormal operation type test report, Date: 22.05.2014, Pages: 36 Drawing No. 3AXD10000333047, Revision: A, Temperature rise and abnormal operation type test report, Date: 03.06.2014, Pages: 33 Drawing No. 3AXD10000353319, Revision: B, Environmental type test report, Date: 10.01.2014, Pages: 8 Drawing No. 3AXD10000371670, Revision: A, Environmental type test report, Date: 07.12.2014, Pages: 10 Drawing No. 3AXD10000509983, Revision: A, Marine Type test requirements, Date: 02.06.2016, Pages: 15 Drawing No. 3AXD50000022033, Revision: B, Hardware manual: ACS880-604, 3-phase, Date: 08.12.2015, Pages: 128 Drawing No. 3AXD50000025169, Revision: C, Hardware manual: ACS880-04XT, Date: 13.05.2016, Pages: 244 Drawing No. 3AXD50000037752, Revision: B, ACS880 Marine Supplement (Cat. 1), Date: 09.09.2016, Pages: 50 Drawing No. ISO9001 certificate, Estonia by DNV, Date: 15.12.2015, Pages: 3 Drawing No. 3AUA0000115038, ACS880, Revision: H, ACS880_drive_modules_cataloge, Date: 10.12.2015, Pages: 60 Drawing No. Abb-9_14_20140307095153. ISO9001 certificate, Helsinki by BV, Date: 06.03.2014, Pages: 3, Drawing No. General information, Revision: A, Date: 03.06.2016, Pages: 2 Drawing No. List of documentation_ABS.pdf, Revision: A, Date: 21.07.2016, Pages: 1 Drawing No. 3AXD10000569615, Revision: A, List of type tests reports, Date: 21.07.2016, Pages: 3 Drawing No. VTT-S-08265-12, Revision: A, Vibration type test report, Date: 26.09.2012, Pages: 15 Drawing No. VTT-S-08388-12, Revision: A, Damp heat type test report, Date: 04.12.2012, Pages: 4 Drawing No. 3AXD10000415632, Revision: A, Date: 26.03.2015, Pages: 12 Drawing No. 252375. Revision: A, Date: 20.01.2014, Pages: 8 Drawing No. 3AUA0000102324, Revision: A, Electrical planning instructions, Date: 23.04.2012, Pages: 38 Drawing No. VTT-S 01320-13, Revision: A, Environmental type test report, Date: 15.02.2013, Pages: 6 Drawing No. 3AXD10000367645, Revision: A, Low temperature test, Date: 16.09.2014, Pages: 8 Drawing No. 3AXD10000321226, Revision: A, Efficiency and harmonic distortions test report, Date: 15.04.2014, Pages: 12 Drawing No. 3AXD10000335564., Revision: B, Efficiency and harmonic distortions test report, Date: 28.04.2014, Pages: 10 Drawing No. 239999-2, Revision: A, Emission tests report, Date: 30.06.2013, Pages: 11 Drawing No. 238150-2, Revision: A, Emission and immunity test report, , Date: 16.06.2013, Pages: 15 Drawing No. 276203-2, Revision: A, Emission and immunity test report, Date: 02.04.2013, Pages: 15

Term of Validity:

This Product Design Assessment (PDA) Certificate 16-LD1545916-1-PDA, dated 05/Jan/2017 remains valid until 04/Jan/2022 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:

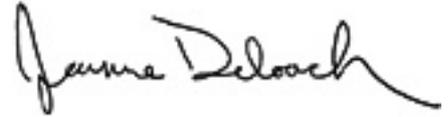
- Steel Vessel Rules (2016): 1-1-4/7.7, 1-1-A3&A4; 4-1-1/7.15, 4-8-3/5.11, 4-8-3/8, 4-9-8/3, 4-9-8/7, 4-9-8/13, 4-9-8 Table 1 and Table 2 - Steel Vessels Under 90 Meters (295 Feet) in Length (2016): 1-1-4/7.7, 1-1-A3&A4; 4-1-1/37, 4-6-4/10, 4-7-2 Table 1; - Facilities on Offshore Installations (2016): 1-1-4/9.7, 1-1-A2&A3; - Offshore Support Vessels (2016): 1-1-4/7.7, 1-1-A3&A4; 4-1-1/7.15, 4-8-3/5.11, 4-8-3/8, 4-9-8/3, 4-9-8/7, 4-9-8/13, 4-9-8 Table 1 and Table 2 - Mobile Offshore Drilling Units (2016): 1-1-4/9.7, 1-1-A2&A3, 6-1-1/9, 6-1-1/13; 4.3.1/11, 4.3.1/15, 6-1-7/12, 6-1-7/13.5 - Steel Vessels for Service on Rivers and Intracoastal Waterways (2016): 1-1-4/7.7, 1-1-A3&A4; 4-1-1/21, 4-5-4/10 - High Speed Crafts (2016): 1-1-4/11.9, 1-1-A2&A3; 4-1-1/37, 4-6-4/10, 4-7-9/3, 4-7-9/7, 4-7-9/15, 4-7-9 Table 9 and Table 10 - Steel Barge Rules (2016): 1-1-4/7.9, 1-1-A3&A4; 4-1-3/5

National Standards:**International Standards:**

IEC 61800-5-1 Ed2.0:2007, IEC 60533 Ed. 3.0:2015, IEC 61800-3 Ed.2.0: 2004 + A1 (2011), IEC 60068-2-6 Ed.7.0:2007, EN 61800-3: (2004) + A1 (2011), EN60068-30:2005, ISO 9001:2008, ISO14001:2004

Government Authority:**EUMED:****Others:**

Model Certificate	Model Certificate No	Issue Date	Expiry Date
PDA	16-LD1545916-1-PDA	11-JAN-2017	04-JAN-2022



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.