



CERTIFICATE NUMBER	22-2274357-PDA-DUP
EFFECTIVE DATE	10-Aug-2022
EXPIRY DATE	09-Aug-2027
ABS TECHNICAL OFFICE	Rio de Janeiro Engineering - Machinery

CERTIFICATE OF Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

KONGSBERG MARITIME KOREA LTD.

located at

**1058-7, DALSAN-RI, JUNGKWAN-MYEON,, GIJANG-GUN , BUSAN,
Korea, Republic of**

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product: ACC, Electronic Ship Automation Equipment
Model: K-Chief 500, K-Chief 600, AutoChief C20, AutoChief 600, K-Thrust C20/600, WCC 600
Endorsements:
Tier: 5 - Unit Certification Required

This Product Design Assessment (PDA) Certificate remains valid until 09/Aug/2027 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau Of Shipping

João Claudio Machado

Joao C. Bastos Machado, Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

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Tier: 5 - Unit Certification Required

Product: ACC, Electronic Ship Automation Equipment

Model: K-Chief 500, K-Chief 600, AutoChief C20, AutoChief 600, K-Thrust C20/600, WCC 600

Endorsements:

Intended Service:

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

Description:

K-Chief 500, K-Chief 600, AutoChief C20, AutoChief 600, K-Thrust C20/600, WCC 600 is an integrated system which can carry out the following functions:

K-Chief 500, K-Chief 600:

- Alarm and Monitoring
- Auxiliary Machinery Control
- Power Management
- Engine/Generator Protection

AutoChief C20, AutoChief 600:

- Remote Control System for FPP and CPP

K-Thrust 600, K-Steering 600:

- Control of Side Tunnel Thrusters
- Azimuth Propulsion Units
- Retractable Azimuth Thrusters
- Rudder/Steering
- Electric Main Propulsion
- Medium/High-Speed Diesel Propulsion
- Water Jet

WCC 600:

- Indicating and accepting the transfer of machine watch responsibility to/from the bridge
- Call the on-duty engineer at his quarters at any time
- Self-check function with "system failure" indication
- Buzzer, sound off and test function
- Alarm summary
- Date & time indication
- Fire alarm (optional)

Software version according to document "Revision History for K-Chief 600 / AutoChief 600 Software: 359018.12", No. 386083 - Rev. F dated 24 May 2022.

Notes:

- The K-Chief Hardware components which are common with the C600 platform are listed in the current certificate.
- Hardware components which are specific for the K-Chief are listed in ABS certificate 22-2274355-PDA for K-Chief 700, K-Chief and K-Safe.

Additional information with detailed list of assemblies and sub-assemblies is provided on an attachment "Hardware List Table".

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Rating:

Supply voltage: 18 -32 V DC from a 230 VAC UPS

Operational temperature: -15 to +70 C degrees.

Maximum relative humidity: 96% non-condensing

Ambient storage temperature: -25 to +70 C degrees in a dry area with approx. 70% humidity

DPU Degree of protection: IP 20 or IP 54 with extra encapsulation. DPUs are qualified for non-resilient mounting on machinery.

Pushbutton 4 (PB4): Supply voltage: 18-24 VDC, Power consumption: 1W, Operating temperature: -15°C to 70°C degrees., IP56 (Front)

L2C (LAN to 2 CAN gateway): Supply voltage:18 - 32 VDC, Power: 2.4 W Max, Operating temperature: -15°C to +70°C degrees., Ingress protection: IP22.

Service Restriction:

- 1) Unit Certification is required for the products, specified on ABS Rules for Building and Classing Marine Vessel Rules (2022) 4-1-1/Table 3 item 35. Unit Certification may be carried out during Factory Acceptance Test of the overall system.
- 2) Evidence and documentation as required by 4-9-3/Table 2 of the ABS Rules for Building and Classing Marine Vessel Rules (2022), is to be submitted for review when requested.
- 3) Fault simulation and factory acceptance testing, as these are detailed in 4-9-3/Table 2, Items 3.6 and 3.7 of the ABS Rules for Building and Classing Marine Vessel Rules (2022) are to be witnessed by an ABS Surveyor.
- 4) On-board complete system and integration testing, as these are detailed in 4-9-3/Table 2, Items 4.1 and 4.2 of the ABS Rules for Building and Classing Marine Vessel Rules (2022) are to be witnessed by an ABS Surveyor.
- 5) If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

Comments:

- 1) The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.
- 2) WCC 600 system is listed as System Category II in accordance with 4-9-3/Table 1 of the ABS Rules for Building and Classing Marine Vessels (2022).
- 3) K-Chief 500, K-Chief 600, AutoChief C20, AutoChief 600, K-Thrust 600 and K-Steering 600 systems are listed as System Category III in accordance with 4-9-3/Table 1 of the ABS Rules for Building and Classing Marine Vessel Rules (2022).
- 4) Tests and approval are for the basic systems. Each configuration and external connection are to be specifically approved.

Notes/Drawing/Documentation:

Drawing No. 110-0000939, Connection Diagram, Revision: a

Drawing No. 110-0001301, Data Sheet, Revision: a

Drawing No. 386083, SW Revision History for C600, Revision: f

Drawing No. 442395, 0516 Outline Drawing, Revision: a

Drawing No. 443346, 0516 Datasheet, Revision: a

Drawing No. 468844, Outline, Revision: a

Drawing No. 468845, Assembly, Revision: a

Drawing No. 469179, Internal wiring, Revision:

Drawing No. 473083, outline, Revision: a

Drawing No. 473084, Assembly, Revision: a

Drawing No. 477386, Datasheet, Revision: a

Drawing No. 493430, AC600 ELACT3812 System Test, Revision: a

Drawing No. DANAK 1910475 Rev.B, Missing Test reports 19-LD1896003-PDA, Revision: B, dated 27-Nov-2009

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Tier: 5 - Unit Certification Required

Drawing No. DANAK 1910740, Missing Test reports 19-LD1896003-PDA, dated 18-Dec-2009
Drawing No. DANAK 194157, Missing Test reports 19-LD1896003-PDA, dated 03-Nov-1998
Drawing No. DANAK 194874, Missing Test reports 19-LD1896003-PDA, dated 21-Dec-1999
Drawing No. DANAK 197536, Missing Test reports 19-LD1896003-PDA, dated 06-Jul-2004
Drawing No. DANAK 197538, Missing Test reports 19-LD1896003-PDA, dated 06-Jul-2004
Drawing No. DANAK-1910979, Test for Marine Type Approval of Panel Input Mk2 COP 05, dated: 13-Jul-2010
Drawing No. NEMKO E15157-02, Missing Test reports 19-LD1896003-PDA, dated 21-Aug-2017
Drawing No. NEMKO E15165.01, Missing Test reports 19-LD1896003-PDA, dated 28-Apr-2017
Drawing No. NEMKO E18040-01, Missing Test reports 19-LD1896003-PDA, dated 27-10-2021
Drawing No. Nemko E19116.02, Test report, dated 18-Dec-2019
Drawing No. Nemko E21017.03, Test report, dated 20-Jan-2022
Drawing No. Nemko E21088.03, Test Report - 1 to 6 GHz / Tests Evaluation, dated 28-Oct-2021
Drawing No. Nemko E21239.00, Test report, dated 31-Mar-2022

Support documentation from previous review:

Drawing No. 320663, FMEA K-Chief 500, Revision: D, Pages: -
Drawing No. 344794, FMEA for K-Chief 600, Revision: C, Pages: -
Drawing No. 386083, SW Revision History for C600, Revision: E, Pages: -
Drawing No. 390547, FMEA AutoChief 600, Revision: A, Pages: -
Drawing No. 394622, FMECA K-Steering 600, Revision: D, Pages: -
Drawing No. 404047, FMECA K-Thrust 600, Revision: B, Pages: -
Drawing No. 412948A, Common Thruster lever, Revision: A, Pages: -
Drawing No. E16203.00, NEMKO Test Report for K-Thrust Modules, 29 March 2017, NEMKO Group, Revision: -, Pages: -
Drawing No.2012-10-25 - updated and added items RAi-10tcxe, GPM C3GPxe, GCM C4xe, MSI-12, MSI-CL, NQB-101.
Drawing No.2013-02 Revised to include AC 600 module and AC600 Lever Telegraph Unit (LTU11).
Drawing No. DELTA Test Reports: DANAK-1911256, A507423, 1911279, 1912904, 1913963, 1914404, 1914440, DELTA Test Report 2014;
Drawing No. NEMKO Test Reports E12103.01, E14127.00; Applica Test Report 2018; NEMKO Group, SP Technical Research Institute of Sweden Test Report 3P08182
Drawing No.381827 Rev B Datasheet WCC 600 Watch Call Panels
Drawing No.354760 Rev C Functional Description Standard K-Chief 600 Alarm & Monitoring system
Drawing No.367938 Rev D AutoChief 600 LTU11 and LTU11-ME Lever Telegraph Unit Datasheet
Drawing No.389143 Rev A KM 7" Marine Touch Panel PC Hardware Module Description
Drawing No.389994B Touchpad Panel Datasheet
Drawing No.390759A Touchpad Panel Product Description
Drawing No.389995C Tracker Ball Panel Datasheet
Drawing No.390760A Tracker Ball Panel Product Description
Drawing No.398092A Datasheet RPM Pickup CAN
Drawing No.358700 Rev D Software Quality Plan C600
Drawing No.386083 Rev C Software Revision History for C600
Drawing No. 19/15712, Test for Marine Type Approval of TMI, 20 October 2015, DELTA, Revision: -, Pages: 1
Drawing No. 19/15815, Test for Marine Type Approval of RFU mk2, 5 November 2015, DELTA, Revision: -, Pages: 1
Drawing No. 19/16085, Test for Marine Type Approval of L2C, 21 January 2016, DELTA, Revision: -, Pages: 1
Drawing No. 398682, TMI module Torque Motor Interface, Revision: B, Pages: 1
Drawing No. 404663, L2C LAN to CAN converter, Revision: A, Pages: 1
Drawing No. 406806, Rudder Feedback Unit mk2, Revision: -, Pages: 1
Drawing No. 409453/A, L2C LAN to CAN Gateway, Revision: -, Pages: 1
Drawing No. 409590A, Torque Motor Interface, Revision: -, Pages: 1

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Tier: 5 - Unit Certification Required

Drawing No. 409612, Rudder Feedback Unit mk2, Revision: A, Pages: 1

Drawing No. NA1224 PB4 Standard Module drawing , Revision: B, Pages: 1

Drawing No. 1915862 - Kongsberg Maritime AS - PB4, DELTA TEST REPORT, Revision: 0, Pages: 1

Drawing No. 405886A PB4, PUSH BUTTON 4, Revision: 0, Pages: 1

Drawing No. 406171A PB4, PRODUCT DESCRIPTION PB4 PUSH BUTTON 4, Revision: 0, Pages: 1

Drawing No. OS2207220, Certificate of Manufacturing Assessment, Revision: -, Pages: 1

Drawing No. 394651D FDD K-Steering 600, Revision: -, Pages: 1

Terms of Validity:

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STANDARDS

ABS Rules:

Rules for Conditions of Classification (2022) – 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:

Rules for Building and Classing Marine Vessel Rules: 4-9-1/7.3.3, 4-9-1/7.3.5, 4-9-2/3.1.1, 4-9-2/3.1.2, 4-9-2/3.1.3, 4-9-2/3.1.4, 4-9-2/3.1.5, 4-9-2/3.5, 4-9-2/3.7, 4-9-2/7.1, 4-9-2/7.5, 4-9-2/7.7, 4-9-2/7.9, 4-9-2/7.11, 4-9-2/7.13, 4-9-3/5, 4-9-3/7, 4-9-3/11, 4-9-3/13.1, 4-9-4, 4-9-9/1, 4-9-9/3, 4-9-9/7, 4-9-9/13, 4-9-9/Table 1 and Table 2.

Rules for Conditions of Classification (2022) – Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following:

Rules for Building and Classing Mobile Offshore Units: 6-1-1/9, 6-1-1/13.

National:

NA

International:

IEC 60945:2002 (corrigendum 1, 2008)

IEC 60533:2015

Government:

NA

EUMED:

NA

OTHERS:

IACS UR E10 Rev 8:2022

IACS UR E22 Rev 2:2016 (CAT II and III)
