



TYPE APPROVAL CERTIFICATE

Certificate No:
TAA000018
Revision No:
6

This is to certify:

That the Control and Monitoring System

with type designation(s)

K-Chief 600, K-Chief 500, K-Chief Alarm, Monitoring, Control and Power management System

Issued to

Kongsberg Maritime AS
Kongsberg, Norway

is found to comply with

DNV rules for classification – Ships

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Location classes are listed in the certificate

Issued at **Høvik** on **2022-09-05**

for **DNV**

This Certificate is valid until **2023-07-01**.

DNV local station: **Sandefjord**

Approval Engineer: **Jostein Sund Jensen**

Jan Tore Grimsrud
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

This type approval certificate covers:

Hardware and basic software for the K-Chief 600, K-Chief 500 and DataChief C20 control, monitoring and alarm systems.

The K-Chief 600 and 500 systems can vary from a simple alarm system to an integrated automation system, comprising:

- Alarm system
- Engineers' alarm system
- Extension alarm system
- Power Management System
- Control of machinery/ship auxiliaries

The K-Chief 600 system is implemented on the common platform C600. This certificate includes the hardware components listed in the tables below which are common for the following systems implemented on this common platform:

- K-Chief 600
- AutoChief C600
- K-Steering 600
- K-Thrust 600

In addition, this certificate includes hardware components which are specific for the K-Chief 600 and K-Chief 500 systems.

For K-Chief 600, this type approval covers basic software version 12.16 which is included in the common C600 software platform release 359018.12 as described in revision history document 386083/F.

For K-Chief 500, this type approval covers basic software version 10 which is included in the common software platform release 311245/DC60052.10.07 as described in revision history document 311246/G.

K-Chief:

Equipment and basic Alarm, Monitoring and Control functionality as described in the Product Description 493992/A

Vessel related functionality as described in Product Description 304844/C, sec.9, (vessel specific configuration will be addressed for each delivery, ref. Approval Conditions, Product Certificate). These functions can typically include:

- Watch call (alarm extension systems)
- Power Management
- Machinery Control
- Cargo Control
- Ballast Control
- Vessel Performance Monitoring System
- Vessel Mode Control
- Heating, Venting and Air Conditioning Controls

The K-Chief Hardware components which are common with the C600 platform, are listed in the current type approval certificate and TAA0000017 for AutoChief C20, AutoChief 600. Hardware components which are specific for the K-Chief are listed in type approval certificate TAA00000W5.

Product name	Product Description	Product no.	Location Classes	Compass Safe Distance
WCC 600	Watch Call Panel for bridge, duty engineer's cabin and public quarters. Application software version 1.00.01, Board Support Package version 2.24.	373860	B/B/B/B/B	650 mm
RAi-16xe	Remote Analogue Input Modules	329714	B/B/B/B/*	
RAi-10tc	Remote Analogue Input Modules (thermo couples)	8100161	B/B/B/B/*	50 mm
RAo-8xe	Remote Analogue Output Modules	333505	B/B/B/B/*	
SIUxe	Sensor Interface Unit Input Module	350928	B/B/B/B/*	200 mm

Product name	Product Description	Product no.	Location Classes	Compass Safe Distance
RDi-32xe	Remote Digital Input Modules	333523	B/B/B/B/*	
RDi-32Axe		333824		
RDo-16xe	Remote Digital Output Modules	329699	B/B/B/B/*	
SCU	Segmet Control Unit	329785	B/B/B/B/*	
PSS	Process Segment Starcoupler	8100184	B/B/B/B/*	
C2xe	Combi Module 2 for control applications	333346	B/B/B/B/*	
C3xe	Combi Module 3 for Generator Protection	334893	B/B/B/B/*	90 mm
C4xe	Combi Module 4 for Generator Control	334894	B/B/B/B/*	100 mm
PSO-P	Power Switch over unit, simplified version	8100334	B/B/B/B/*	
COP-05	COP-05 is a common name for a series of panels with identical HW: <ul style="list-style-type: none"> • CRP: Control Room Panel (603525) • INP: Input Panel (603524) • ALC: Alarm and Control Panel (603526) 	330952 330951 344687	B/B/B/B/*	
ROS**	Remote Operator Station (third party equipment) <ul style="list-style-type: none"> • PC • VDU • Printer 		B/B/B/B/*	
HUB**	Hub or Switch (third party equipment) <ul style="list-style-type: none"> • Switch FM LM 8TX RJ45 • Switch FM LM 8TX RJ45 Master • Firewall FL MGuard GT/GT • Switch Moxa EDS-308-MMC-SC, 6xRJ45, 2xSC fiber 	356021 358673 356238 703659	B/B/B/B/*	
Ixxat CAN Adapter**	CAN-Ethernet Gateway (DCEG) RAILM CANbridge IXXAT (CEG)	4604600	B/B/B/B/*	
UPS**	Standby power, 230V/24V (third party equipment)		B/B/B/B/*	
	K-Malware computer, with 7" Marine Touch Panel	379496	B/B/A/B/*	550 mm
TBP	Tracker Ball Panel, mounted in Pointer Carrier Panel, PCP (385675)	388930	B/B/A/B/*	500 mm
TPP	Touch Pad Panel, mounted in Pointer Carrier Panel, PCP (385675)	388010	B/B/A/B/*	400 mm

Location classes in the table above are denoted in the following sequence:
 Temperature / Humidity / Vibration / EMC / Enclosure class

Where enclosure class is denoted as "**", required enclosure protection according to the rules to be provided upon installation onboard.

Where compass safe distance is not listed, a minimum distance of 5 meters shall be applied according to section 6.3 in ISO 694:2000.

Application/Limitation

WCC 600 shall be powered from a device having built-in high voltage protection.

Modules C3xe are approved for use as backup short circuit protection only.

The Type Approval covers basic software for vessel alarm systems (including for class notation E0), but is limited to the following control functions:

- Decision-making based on logical operators ("gates"/"flexigates")
- Control of various actuators (positioners)
- Starter control of various equipment
- Standby control of various sets of equipment
- Control of compressors
- Control of pumps

- PID control of various equipment

For K-Thrust 600 and K-Steering 600, this certificate covers only common hardware on the C600 platform. Eventual additional hardware and software for these control systems are not covered by this type approval and are subject to case-by-case approval according to DNV Pt.4 Ch.9 Sec.1.

When the type approved software is revised (affecting all future deliveries) DNV is to be informed by forwarding an updated software maintenance document. If the changes are judged to affect functionality for which rule requirements apply a new type test may be required.

With reference to DNV Rules for Classification of Ships Pt.4 Ch.9, documentation specific for the delivery as listed below is required submitted for approval to DNV.

- Reference to this type approval certificate
- Reference to valid type approval certificates for other hardware/third party equipment, alternatively datasheets of similar information documenting compliance with environmental requirements in DNV Pt.4 Ch.9 Sec.5 [2]
- System block diagram/topology drawing
- Power supply arrangement (may be part of the system block diagram)
- Equipment list/asset inventory
- Functional description
- List of control and monitored points (I/O list, including data transferred on communication links)
- For deliveries of integrated systems, a functional failure analysis documenting compliance with requirements for redundancy, segregation and effect of single failures in the system.
- Test program for product certification

For newbuilding projects, identical deliveries to sister vessels with the same DNV project ID are to be documented/submitted as one common transmittal.

Product certificate

Each delivery of the application system is to be certified according to DNV Pt.4 Ch.9 Sec.1. The certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. After the certification the following clause for application software control will be in force:

Clause for application software control

All changes in software are to be recorded. The records of all changes are to be forwarded to DNV for evaluation and approval. Major changes in the software are to be approved and possibly tested before being installed in the computer onboard.

Tests carried out

- Tests according to DNV Standard for Certification 2.4 as documented in the various test reports submitted.
- Functional tests performed second half of 2006, Document AO-18309-A.
- Additional tests related to implementation of K-Chief 600, Q2-Q4 2010.
- TA test of K-Chief 600 surveyed at March 2nd 2010, Document 343172A.
- BWU09 tested according to IEC60068-2-52
- Functional tests of K-malware computer and revised software as part of renewal Q1-2015.
- Tests according to DNV-CG-0339 (2021-09) as documented in the various test reports submitted.
- IAT/FAT procedure for K-Chief doc 496335 rev. D

Place of manufacture

- Kongsberg Maritime AS Bekkajordet 8A 3189 Horten
- Kongsberg Maritime Korea Ltd, 1058-7, Dalsan-ri, Jungkwan-myeon, Gijang-gun, 619-961, Busan, Korea
- Kongsberg Maritime China Ltd., No. 136 North Fute Road, China (Shanghai), Pilot Free Trade Zone, 200131, China
- Kongsberg Maritime China Jiangsu Ltd, 1-2F No 711 Changjiang Road, Runzhoud district, Jiangsu Province, P.C. 212002 Zhenjiang, China

Marking of product

- Components are marked with product name and product number as listed in the table above.
- Basic software version is displayed in the system graphical user interface.
- Each project application configuration is documented in a dedicated version log file which is specific for each vessel.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed at least every second year and at renewal of this certificate.

END OF CERTIFICATE