TYPE APPROVAL CERTIFICATE

Certificate No:
TAA0000018
Revision No:
7

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 **2023-06-27**

This Certificate is valid until **2025-07-01**.
DNV local unit: **Sandefjord**

Approval Engineer: **Jostein Sund Jensen**

for **DNV**
Digitally Signed By: Sneen, Ståle
Location: DNV Høvik, Norway
on behalf of
Siri Tag
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.

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/G.

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
RDi-32xe RDi-32Axe	Remote Digital Input Modules	333523 333824	B/B/B/B/*	

Product name	Product Description	Product no.	Location Classes	Compass Safe Distance
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: • 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) • PC • VDU • Printer		B/B/B/B/*	
HUB**	Hub or Switch (third party equipment) • 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.

Type Approval documentation

System Design Description / Midi Operator Station / DC-C20 AU-1231A/20.02.02 rev.A
DC-C20 Generator Protection – Design Principle / AU-01217-C
CN-0314-A Multiple Serial Interface Module, MSI 12, datasheet
HA455427 Multiple Serial Interface-12, MSI 12, parts list and assembly drawing
Type Approval Test Procedure DataChief C20 AU-0666-F/25-07-02
Prosedyre nr. 104 Endring av produktdokumentasjon
Test report DELTA-K250808-2 of 1998-11-03, -K251192-2 of 1999-12-21, –E500301-2 of 2002-07-11 and -E500500-1 of 2002-12-16

DANAK-195838 Type approval testing of Units for VDR (incl. MSI-12)/2001-11-13
8100277bom.pdf: LTU & ESS Dull Chrome
8100279bom.pdf: LTU & ESS E.SHAFT Dull Chrome
ELACT HA460152A.pdf for 0512 max 250Nm, HA460153A.pdf for 1325 max. 720Nm, HA460154A.pdf for 1335 max.1235Nm and HA460155A.pdf for 2945 max. 2400Nm
DSU HA460796A.pdf for 0.5kW, HA460797A.pdf for 1.5kW and HA460798A.pdf for 3.0kW

Updated AutoChief® assembly drawings submitted by email 2004-07-23:
PBT 8100278 revB.pdf
ACP 8100286 revB.pdf
MPD 8100292 revA.pdf
MPD 8100293 revA.pdf
MPD basis 3900506 revA.pdf
MPP 8100290 revA.pdf
MPP 8100291 revA.pdf
MPP basis 3900505 revA.pdf
RPME 8100289 revA.pdf
LTU & E. SHAFT ESS black 8100281 rev A.pdf
LTU & ESS black 8100280 rev A.pdf

AD-00443A Test setup and function test during ENV test- ….pdf
DELTA test reports:
E501399-1-kp-Kongsberg.pdf dated 19 January 2004 for DGU, RPMU, MEI and ESU
E501399-2-kp-Kongsberg.pdf dated 27 January 2004 for DSU and ELACT
E501399-3-kp-Kongsberg.pdf dated 30 January 2004 for LTU and ESS
E501399-4-kp-Kongsberg.pdf dated 30 January 2004 for ACP, PBT, MPP and MPD
E502155-1 dated 09 August 2004 for RPME, PBT, MPP, MPD

DELTA-K250600-1 dated 07.01.1998 MCU8625
DELTA-K250808-1 dated 02.09.1998 RAI, RDO, RDI, RAO
DELTA-K221885-1 dated13.11.2001 VDR
DELTA-E502411-2 dated 07.12.2004 AC C20 modules
DELTA-A503298-6 dated 23.09.2006 CEG
DELTA-A502852-1 dated 19.05.2005 PSO
DELTA-A503298-1 dated 19.12.2005 COP

Added or revised documentation related to TA renewal March 2009:
305606 rev.A C3-GP
323581 rev.A dCEG
HA449742 rev.A2 RAi-16
HA450032 rev.C2 RDi-32
HA450153 rev.B1 RDo-16
HA450688 rev.B3 RAo-8
HA451005 rev.B2 RAi-10tc
HA451714 rev.B1 RDi-32A
HA452272 rev.A3 C1
HA452279 rev.B C2
HA452286 rev.A1 dPSC
HA452543 rev.A3 PSS
HA457063 rev.B3 C4-AUTO
HA457065 rev.B3 VCC-440
HA460346 rev.C1 DGU
HA460348 rev.C1 ESU
HA460349 rev.C1 MEI

HA462123 rev.C RPME
HA462284 rev.A ESU-ext
HA463174 rev.A1 VCC-690

309041 rev.B C20 Aux Control Parameter List
311246 rev.E Revision History for C20 System SW (V10)
312401 rev.A K-Chief 500 AMS PMS Instruction Manual
313618 rev.B K-Chief 500 product description
314325 rev.C K-Chief-500 PMS ParameterGuide
319753 rev.A Watch Call instruction manual
AO-18720 rev.A Test Procedure K-Chief 500 SW
AU-0877 rev.D DC C20 Control Functions
307529 rev.2 SW revision history, C20 system SW 09

DELTA-A503298-1 dated 15.06.2007 Common
DELTA-A503298-4 dated 14.08.2007 C4-Auto
DELTA-A503298-5 dated 14.08.2007 PSO-P, PSO-S
DELTA-A503298-6 dated 15.06.2007 CEG
DELTA-A504697-1 dated 09.01.2008 CSON F1, Indicating and reset panel
DELTA-A505037 dated 01.09.2008 EFI
DELTA-A505749 dated 14.10.2008 EFI-16

Added documentation related to implementation of K-Chief 600, Q2-Q4 2010:
346343 rev.A Release note for K-Chief 600 HMI. Version 1
334609 rev.B K-Chief 600 Marine Automation System
338857 rev.A Kongsberg K-Chief 600 Alarm, Monitoring and Control System, Operator Manual
DANAK-1910740 (for xe-modules) dated 18 December 2009
336081 rev.A RAi-16xe Module
336082 rev.A RDi-32xe Module
336145 rev.A RDi-32Axe Module
336078 rev.A RDo-16xe Module
336083 rev.A RAo-08xe Module
336079 rev.A C2xe Module
DANAK-1910922 (for SCU) dated 11th June 2010
DANAK-1910475 (for COP-05) dated 16th June 2009
339779 rev. C SCU module, Segment Controller Unit

New documentation after implementation of new components at renewal Q2-2011:
DANAK-1911256 (MSI12, MSICL)
DANAK-1910496 (SEFA 160).
DANAK-1911137 (SEFA 800)
DANAK-1910472 (BWU09)
NEMCO test report no. 142846 dated 2010-03-08 (salt mist, BWU09)
346343 rev.D Release note for K-Chief 600.

New documentation after implementation of new components at renewal Q4-2012:
347716 rev A 8 AIPC Module
347717 rev A 13.3 AIPC-XXL Module
347718 rev A 13.3 AIPC Module
347720 rev A 8 TCP Module
347721 rev A 13.3 TCP Module
347723 rev A KCC Module
341337 rev A RAi-10tcxe Module
341339 rev A C3GPxe Module
341340 rev A C4xe Module
350497 rev A SIUxe Module
350628 rev A RTixe Module
350629 rev A RTi-2xeL Module
367938 rev A LTU11 Unit
355191 rev A Metapower (NQB100)
2011-3419, HD 08T21 KMC-EP1-CACP Tech. report 2011-3419 Maritime rev 1, DNV, dated 2011-10-13
2010-3604, HD 13T21 KMD-EP1-CACP Tech. report 2010-3604 Maritime rev 1, DNV, dated 2010-12-13
DANAK-1911307 A507423 (for C3GPxe, C4xe and RAi-10tcxe), dated 2011-03-14
DANAK-1911846 A507423 (for C3xe C4xe), dated 2012-03-05 IEC 60255
DANAK-1910978 A506924-2 (for SIU,RTi-2xe,RTi-2xeL,NQB100), 2010-07-15

DANAK-1911279 A507329 KM (for RTixe, SIUxe, NQB101), dated 2011-02-14
DANAK-1911809 T200793 (for LTU11), dated 2012-01-30
346343 rev.L Release note for K-Chief 600
DOC100984-3, HD 08T21 KMx - HD 13T21 KMx - HT B21A0 KMC - IEC60945 & IACS E10 Statement, Hatteland, dated 2011-12-13

New documentation after extension of type approval with WCC 600 and renewal Q4-2013:
Delta test report of WCC 600, DANAK-19/12904
Datasheet WCC 600
FAT procedure for WCC 600, 343172/D
SW revision history 600, 386083/B
Watch calling configuration guide, CU-0270/E

New documentation after extension and renewal Q1-2015:
Touch Pad Panel datasheet, 389994/B
Touch Pad Panel product description, 390759/A
Touchpanel PC Hardware Module description, 389143/A
Tracker Ball Panel datasheet, 389995/C
Tracker Ball Panel product description, 390760/A
Speed set dial datasheet, 322851/A
Speed set dial outline drawing, 306704/A
Test report for speed set dial, DANAK-19/14407, project T208185-2
Software revision history for K-Chief C600, 386083/C
Test report from Svenska Provningsanstalten, 3P08182/2
Test report from NEMKO, E12103.01
Test report from DANAK, 1914440/A
Test report from Applica, 20018/1
K-Malware computer product description, 372300/B
K-Malware FAT Procedure, 372295/B

New documentation after implementation of new components Q2-2016:
DANAK-19/16085, test report Lan 2 Can gateway (L2C)
Datasheet L2C 409453/A

New documentation after renewal and software revision Q1-2017:
Audit test procedure dated March 8. 2017
Software revision history for C600 system, 386083/E, Software 359018.12 version 12.16

New documentation Q4-2021
Nemko Report No. E21088.03 EMC 1-6 GHz, IACS E10 Rev.8:2021

New documentation 2022
E21088 rev. 03 Test report Nemko, KM products, E10 rev. 8
IAT/FAT procedure for K-Chief doc 496335 rev. D
2022-08-11 K-Chief IAT/FAT test. Details is found in survey report J-198

New documentation 2023
386083/G, Revision history for K-Chief 600 / AutoChief 600 Software: 359018.12
TAC; TAA000035F

Tests carried out

- 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 (2021-08) 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

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