

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Control and Monitoring System

with type designation(s)
K-Chief 700 and K-Safe

Issued to
KONGSBERG MARITIME AS
Kongsberg, Norway

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

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

Location classes:

Temperature	A
Humidity	B
Vibration	A
EMC	B
Enclosure	Required protection according to the Rules to be provided upon installation on board

Issued at **Høvik** on **2018-10-01**

for **DNV GL**

This Certificate is valid until **2020-09-30**.

DNV GL local station: **Sandefjord**

Approval Engineer: **Jens Erling Bråten**

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Odd Magne Nesvåg
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.



Job Id: **262.1-007619-7**
Certificate No: **TAA00000W5**
Revision No: **2**

Product description

The following equipment and functions are included in the Type Approval:

K-Chief 700:

Equipment and basic Alarm, Monitoring and Control functionality as described in the Product Description 304844/C, including:

- Operator Station (sec.3)
- History Station (sec.4)
- Field Station (sec.5)
- Network (sec.6)

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

K-Safe:

Alarm Management System:

- Alarm Monitoring
- Alarm System

Emergency Shutdown System (ESD):

- K-Safe 3 (1oo2 redundancy), Dual I/O
- K-Safe 2 (1oo2 computer redundancy), Shared I/O

Process Shutdown System (PSD):

- K-Safe 3 (1oo2 redundancy), Dual I/O
- K-Safe 2 (1oo2 computer redundancy), Shared I/O
- K-Safe 1 (single system)

Fire and Gas Detection and Protection System (F&G):

- K-Safe 3 (1oo2 redundancy), Dual I/O
- K-Safe 2 (1oo2 computer redundancy), Shared I/O
- K-Safe 1 (single system)

System functionality as described in K-Safe Product Description 163875/H

Common for K-Chief 700 and K-Safe:

AIM Basis Software Release 8.3, 8.5, 8.6, 8.7 and 8.8 for the above functions used in K-Chief 700 and K-Safe.

The K-Chief 700/K-Safe system is implemented on a common HW platform. This certificate includes the hardware components listed in the tables below.

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Module	Product Description	Part No.	HW module descr. No.	Location Classes	Compass Safe Distance	
Cabinets	FS400 Cabinet	700933		**		
	FS240 Cabinet	701449		**		
	Network Distribution Unit Cabinet (NDU)	310123		**		
	FS 120 Cabinet	318775		**		
Console	Cabinet / OS-650-KM05	603495	1012662	IP22	350 mm	
	Wire Isolators / KM damper kit	603185				
	Deep Line / Navigation OS	303399				
	Rubber isolation / MS2040+	305083				
COP	Input Panel Mk2 COP 05	330951	300984	B/B/A/A/*	350 mm	
	COP05 Input Panel	603524	300984	B/B/A/A/*	350 mm	
	Control Room Panel	603525	300989	B/B/A/A/*	350 mm	
	ALC Panel	603526	300977	B/B/A/A/*	300 mm	
	BU AUT Panel	603529	301028	B/B/A/A/*	250 mm	
EFI	Earth Failure Indicator (EFI)	318367	320518	B/B/A/A/IP20	500 mm	
	EFI-16	318367	324876	B/B/A/A/IP20	500 mm	
EAP	Extension Alarm Panel (EAP200)	370304	383722	A/B/A/B/IP22	1200 mm	
Media Converter	Fiber Converter RMC-ST	321520	325472	B/B/A/B/IP20	200 mm	
Printer	Matrix Printer OKI ML 280 Elite	703654	179057	***		
	Printer HP Laserjet Pro M401dn	380589	384405	***		
	Lexmark CS510 230/115VAC	394774 394775	397559	***		
Watch Call	WCC600	373860	381827	B/B/B/B/IP44	1200 mm	
Controller	RCU501 Remote Control Unit	603439	300991	B/B/A/B/IP20	150 mm	
	RCU502	330924	358190	B/B/A/B/IP20	150 mm	
	RCU602	383964	429804	B/B/A/B/IP20	300 mm	
	RCU502i	421768	408644	B/B/A/B/IP20	300 mm	
IO Units	RMP420	306712	311165	B/B/A/B/IP20	50 mm	
	RMP420S	306712	323936	B/B/A/B/IP20	50 mm	
	RDIOR420	306713	311163	B/B/A/B/IP20	50 mm	
	RTB420	326843	326849	B/B/A/B/IP20	150 mm	
	RDIO401S	603432	301087	B/B/A/B/IP20	1800 mm	
	RDIO420S	316564	323936	B/B/A/B/IP20	1850 mm	
	RMP422	363350	402128	B/B/A/B/IP20	350 mm	
	RMP422S	363350	381885	B/B/A/B/IP20	350 mm	
	RMP422i	408442	424828	B/B/A/B/IP20	350 mm	
	RMP422Si	408406	424829	B/B/A/B/IP20	350 mm	
	RMP200-8	603443	300992	B/B/A/B/IP20	50 mm	
	Other	RSER200-4	603444	300993	B/B/A/B/IP20	50 mm
		RHUB200-5	603442	300994	B/B/A/B/IP20	50 mm

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Components marked with "***" are cabinets, tested for shock and vibration.
Printers, (marked with "****"), are tested for radiated disturbance/emissions only.

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.

Approval conditions

The following documentation of the actual application is to be submitted for approval in each case:

- Reference to this Type Approval Certificate
- System block diagram
- Functional description
- Power supply arrangement (may be part of the System block diagram)
- I/O list
- Test program for certification

The Type Approval covers hardware and software listed under Product description.

The type approval is valid for AIM basis software release: 8.3, 8.5, 8.6, 8.7 and 8.8, with content as described in Release Notes for AIM Basis ver. AIM 8.3/8.5/8.6/8.7/8.8.

When the type approved software is revised (affecting all future deliveries) DNV GL is to be informed by forwarding updated software version documentation. If the changes are judged to affect functionality for which rule requirements apply a new functional type test may be required and the certificate may have to be renewed to identify the new software version.

Product certificate

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

Clause for application software control

All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV GL for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Type Approval documentation

CDQM-0020, rev.C Type Approval Documentation K-Chief 700 and K-safe, including the below listed documentation.

- Product Description, KONGSBERG – K-Chief 700, doc.no. 304844/B. A System overview of the Vessel Control Concept, Operator Station, History Station, Field Station, Network, and basic functionality as well as a description of the vessel related functions.
- Operator Manual, KONGSBERG K-Chief 700, doc. no. 338309/A.
- Product Description, KONGSBERG – K-Safe, doc.no. 163875/G.
- Operator Manual, KONGSBERG K-Safe, doc. no. 343964/A.
- IP22 Kit for OS-650-KM05 K-Bridge, installation manual, doc. No. 311729, rev. C, (July 2013)

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Test reports:

TEST REPORT	EQUIPMENT (abstract)	Date
DANAK-193886 K 250600-3	WBU, WCU and OCP	1998-06-08
DANAK-197537 E 502029-3	WBU, WCU and OCP	2004-07-06
DANAK-198195 A503298-1 Rev.1	KM Common Operator Panels 2005	2007-06-15
DANAK-198508 A503547-1	RIO New HW Line modules RCU501, RSER200-4, RHUB200-5, RMP200-8	2006-10-17
DANAK-198575 DELTA- A504273-3	Vibration testing of KM05 Deep line console with PC (MP7600) on wire isolators (KM kit 603185), for marine applications	2006-12-04
DANAK-198577 DELTA- A504327-2	Vibration testing of KM05 Deep line console with PC (MP7600) on rubber isolators (MS2040+305083), for marine applications	2006-12-04
DANAK-198637 DELTA- A504352-1	IP22 test of KM-05 Deepline and Slimline operator stations	2007-01-30
DANAK-198696 A504446-1	RMP420, RMP420S and RDIOR420	2007-03-15
DANAK-1910121 A505138	RDIO401S and RDIO420S	2008-03-27
DANAK-1910264 A505037	EFI	2008-09-01
DANAK-1910280 A505687	RMC-ST	2008-09-19
DANAK-1910281 A505749 Rev.1	EFI-16	2008-10-14
DANAK-1910541 A506114	RCU501, RHUB200-5, RMP420 & RSER200-4 according to IEC 62061	2009-06-11
DANAK-1910830 A506580	RTB420	2010-03-19
DANAK-1910979 A506924-1	Input Panel Mk2 COP 05	2010-07-13
DANAK-1911523 A507567	RCU502	2012-10-26
NEMKO-E15165.01	RCU602/RMC-ST	2017-04-28
DANAK-19/12618 T202566	EAP	2012-11-21
NEMKO-E14200.00	Lexmark, Single-Function Color Laser Printer	2014-08-13
NEMKO 69187	Common Operator Panel	2006-08-31
Nemko_39760	OKI ML 280 Elite	2005-02-25
Nemko_E13012.00	HP Laserjet Pro M401dn	2013-01-25
DANAK-1912904	WatchCall panel, WCC 600	2013-09-05
NEMKO-E14127.00	WatchCall panel, WCC 600	2014-05-21
TI-3010-13-014234	WatchCall panel, WCC 600	2013-10-17
DANAK-1911658 Rev.1	RMP420	2011-12-08
NEMKO-E13144.02	RMP422S and RMP422	2015-03-11
NEMKO-E13144.03	RMP422i and RMP422Si	2017-08-17
NEMKO-E18081.00	RCU 502i DS	2018-04-23

Type approval periodical assessment report dated September 2018.

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Tests carried out

Applicable tests according to Standard for Certification 2.4 (April 2006), and Class Guidance document DNVGL-CG-0039 (Edition November 2016) (replacing SfC 2.4).

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 renewal of this certificate.