TYPE APPROVAL CERTIFICATE

This is to certify:

That the Remote Control System, Propulsion, Thruster and Steering

with type designation(s)
AutoChief C20, AutoChief C600, ,

Issued to
Kongsberg Maritime AS
Kongsberg, **Norway**

is found to comply with
  DNV rules for classification – Ships

Application :

The Type Approval applies to system design principle and programmed functions.

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**

···

Siri Tag
Head of Section

Product description

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

Hardware and basic software for the AutoChief C20 and C600 remote propulsion control systems.

The AutoChief systems are designed for the following application functions:
- Main Engine remote control and monitoring
- Safety protection of main engine
- Speed governing of main engine
- Engine telegraph

The AutoChief C600 system is implemented on the common platform C600. Hardware components which are common for the C600 platform are listed in the type approval certificate TAA0000018 for K-Chief 500/600.

Hardware components which are specific for the AutoChief systems are listed in this certificate.

For AutoChief C600, 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 AutoChief C20, 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.

Product name	Product Description	Product no.	Location Classes	Compass Safe Distance
PBT	Push Button Telegraph	8100278 8100318	C/B/B/B/*	
MPP	Multi Purpose Panel	8100290	C/B/B/B/*	
MPD	Multi Purpose Display	8100292	C/B/B/B/*	
MEI	Main Engine Interface Unit	8100276	B/B/B/B/*	
ESU	Engine Safety Unit	8100275	B/B/B/B/*	
ESU-12	Engine Safety Unit	366666		
DGU	Digital Governor Unit	8100272	B/B/B/B/*	
RPMU	RPM Unit	326894	B/B/B/B/*	
RPME	RPM Unit for engine mount	8100289	B/B/B/B/*	
NQB100	Metapower shaft power meter light fork	352445	B/B/B/B/*	100 mm
LTU11	Lever telegraph unit	364330	D/B/B/B/*	800 mm
LTU11ME	Lever telegraph and speedset unit	389505	B/B/A/B/*	600 mm
	Speed set dial unit	393267	B/B/B/B/B	500 mm
PB4	Push Button 4, Rev.A and Rev.B	400992	D/B/B/B/B	200 mm
Lever K-Thrust	Azimuth Lever with display	405846	B/B/A/B/A	1000 mm
Lever K-Thrust	Azimuth Lever	416533	B/B/A/B/A	1000 mm
Lever K-Thrust	Single Lever with display	405842	B/B/A/B/A	1300 mm
Lever K-Thrust	Single Lever	416533	B/B/A/B/A	200 mm
Lever K-Thrust	Dual Lever with display	405844	B/B/A/B/A	1300 mm
Lever K-Thrust	Dual Lever	416532	B/B/A/B/A	200 mm
Lever K-Thrust	Lever display	416534	B/B/A/B/A	1100 mm
Mini Wheel K-Thrust	Mini Wheel with display	412364	B/B/A/B/A	1000 mm
Mini Wheel K-Thrust	Mini Wheel	417835	B/B/A/B/A	1000 mm
Control Panel 12"	Computer with 12" touch screen	402586	B/B/A/B/A	750 mm
ABE11	ACP Button Extension	355146	B/B/B/B/B	50 mm
KBE15	Button Extension	401892	B/B/B/B/B	50 mm
ELACT 0516	Electrical actuator	442400	B/B/B/A/B	
ELACT 3812	Electrical actuator	468750	B/B/B/A/B	
DSU 38	Control cabinets	468770	A/B/A/A/B	
BWU21	Bridge Wing maneuvering Unit Left version	486233	D/B/A/B/A	600 mm

Product name	Product Description	Product no.	Location Classes	Compass Safe Distance
BWU21	Bridge Wing maneuvering Unit Left version	486200	D/B/A/B/A	600 mm
L2C	LAN to CAN Gateway	404654	D/B/B/B/*	100 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

This type approval covers the design principle and basic software for the AutoChief C20 and C600 as listed under section "Product Description".

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.
-

In case the propulsion system is more complex than a directly driven, fixed pitch propeller, the following document is also required for approval:
- Functional description

Two independent pick-up units RPC (393831) shall be installed for each engine when used for RPM control, monitoring and overspeed protection.

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 clause for application 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. The records of all changes are to be forwarded to DNV for evaluation and approval.
Major changes in the software are to be approved before being installed in the computer.
A repeat of the Certification Test may be required for the particular vessel.

Type Approval documentation

	TEST REPORT	EQUIPMENT (abstract)	Date

1) AC C20 instr. manual, propulsion control system, single screw applications, AA-0363-A
2) Type test setup, power supply and system configuration
3) Revision history for C20 system, CU-0315-H, software 0700318 (V08)
4) Revision history for C20 system, 307529-02, software (V09)
5) Revision history for C20 system, 311245/E, software (V10)
6) Revision history for C20 system, 311246/D, software 311245/DC60052.10.07 V10
7) Revision history for C600 system, 386083/E, software 359018.12, V12.16
8) Type approval test procedure AutoChief C20, AO-14125-B,
9) AutoChief C20 report after performance test, AA-00378-A
10) AutoChief C20 alarms and indication on ACP panel, AA-00372-A
11) Datasheets pickup unit (323519/C), RPM pickup CAN (398092/A), LTU11 (367938/A), ESU (372127/A), LTU11ME (389505/D)
12) DANAK test reports, 197561, 197329, 195838, 197309, 197316, 197322, 198709
13) DANAK test reports, 1910496, 1910472, 1911137, 1911809, 1912063, 191002/A, 1911279
14) DANAK test reports, 1913963, 1914404, 1914407
15) Class test procedure AC C20 SEFA 160, BWU-09 (340800/A)
16) Audit test procedure dated March 8. 2017
17) DANAK test reports, 19/15815, 19/15712, and 19/15862
18) Datasheets, PB4 (405886/A), RFU MK2 (406806/A) and TMI (409590/A)
19) Periodical assessment report dated March 8. 2017
20) Lever and Mini Wheel extension: Nemko Test Report K-Thrust Modules (E16203.00/A), Common Thruster lever (412948/A) with listing of new lever configurations and K-Thrust lever performance test (425239/A) dated September 7. 2017.
21) CP12, ABE11 and KBE15 extension: DANAK test reports 1911471 and 1915434, Datasheet Control Panel 12" (405149/B), ABE 11 Assembly Drawing (355196/B.1) and KBE15 Outline Drawing (402348/A1).
22) SEFA800 product reliability update: KM Change Report SEFA 800 update (ECN-003883/A), Servo Actuator maintenance SEFA800 (426578/A), KM ENV Test Report for SEFA800 (424791/A) and Electric Fuel Actuator SEFA800 datasheet (348589/D).
23) Nemko Report. No. E21088.03 Kongsberg Maritime modules, EMC 1-6 GHz IACS E10 Rev.8:2021
24) Nemko Report. No. E21017.03 DSU38 and ELACT 3812, IACS E10 Rev.8:2021
25) Nemko Report. No. E19116.02 ELACT 0516, IACS E10 Rev.8:2021
26) Nemko Report. No. E21239.03 BWU21 Left version and BWU21 Right version
27) TAC, TAA000035F

Tests carried out

− Tests according to DNV-CG-0339 (2021-08) as documented in the various test reports submitted.
− Type test of software as performed according to various test reports listed in section "Type Approval Documentation".

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