

**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**  
**Horten, Norway**is found to comply with  
**DNV GL 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 GL.****Location classes are listed in the certificate**Issued at **Høvik** on **2019-05-10**This Certificate is valid until **2021-07-02**.  
DNV GL local station: **Sandefjord**Approval Engineer: **Jabber Abbas**for **DNV GL**.....  
**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.



Job Id: **262.1-014576-10**  
 Certificate No: **TAA0000017**  
 Revision No: **4**

## Product description

This type approval certificate covers 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/E).

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
BWU09	Bridge Wing Unit	321211	B/B/B/B/*	
ACP	AutoChief® Lever Telegraph Unit with Electronic Shaft System	348100 307939	C/B/B/B/*	
PBT	Push Button Telegraph	8100278 8100318 8100333	C/B/B/B/*	
MPP	Multi Purpose Panel	8100290 8100291	C/B/B/B/*	
MPD	Multi Purpose Display	8100292 8100293	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	366539 366666		
DGU	Digital Governor Unit	8100272	B/B/B/B/*	
RPMU	RPM Unit	8100274	B/B/B/B/*	
RPME	RPM Unit for engine mount	8100289	B/B/B/B/*	
RPC	RPM pickup unit CAN	393831	B/B/B/B/C	
ELACT	Electric Fuel Actuators ELACT 0512 ELACT 1325 ELACT 1335 ELACT 2945	3900461 3900462 3900463 3900464	B/B/A/B/C	
SEFA160	Electric Fuel Actuator, SEFA 160 NM	332014		
SEFA800	Electric Fuel Actuator, SEFA 800 NM	346504		

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Product name	Product Description	Product no.	Location Classes	Compass Safe Distance
DSU 05	Digital Servo Unit 0.5 kW	3900458	B/B/B/B/*	
DSU 15	Digital Servo Unit 1.5 kW (306475)	3900459		
DSU 30	Digital Servo Unit 3.0 kW (306476)	3900460		
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
TMI	Torque Motor Interface	398644	D/B/B/B/*	50 mm
RFU MK2	Rudder Feedback Unit mk2	402007	D/B/B/B/*	500 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	416531	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	402584	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

Components marked with "\*\*\*" are 3rd party equipment and are type approved separately.

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 GL 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.

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
- Power supply arrangement (may be part of the system block diagram)
- Equipment list

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- List of control and monitored points
- Test program for product certification

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 GL 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 GL 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**

- 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).

Type approval renewal assessment report for TAA0000017, DNV GL Sandefjord 2019-04-23.

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## Tests carried out

- Tests according to DNV GL CG 0339 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, PO box 1009, 3194 Horten
- Kongsberg Maritime Korea Ltd, 1058-7, Dalsan-ri, Jungkwan-myeon, Gijang-gun, 619-961, Busan, Korea
- Kongsberg Maritime China Ltd - Kongsberg Maritime China Waigaoqiao Ltd., 136 North Fute Road , China (Shanghai), Pilot Free Trade Zone, 200131 Shanghai, 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