

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electrical Control System

with type designation(s)
TSG505

Issued to

Wärtsilä SAM Electronics GmbH
Hamburg, Germany

is found to comply with

DNV GL rules for classification – Ships

DNV GL rules for classification – High speed and light craft

Application :

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

Temperature	B
Humidity	B
Vibration	B
EMC	A
Enclosure	-

Issued at **Hamburg** on **2020-09-29**

This Certificate is valid until **2025-09-28**.

DNV GL local station: **Hamburg CMC**

for **DNV GL**

Approval Engineer: **Marco Rinkel**

Joannis Papanuskas
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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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 module is used as thyristor control unit for ship drive systems.
The following features are included in the device:

- 24V power supply
- a microprocessor (144 MHz, 2MB FLASH, 352K RAM, FloatingPointUnit)
- a Micro SD-Card (storage for programs and parameters)
- F-RAM (2K x 8 non-volatile memory) for parameter storage
- an interface for testing and programming purposes (SWD/J-LINK)
- an ethernet interface (UDP/TCP)
- two galvanically isolated CAN transceivers
- 16 analogue inputs (voltage / current) galvanically isolated
- 5 digital inputs (galvanically isolated)
- 2 digital outputs (relays)
- a watchdog relais
- 3 digital outputs (optocouplers)
- 3 firing angle groups with 6 channels each

Power supply:	24 Volt
Current (24V):	0,24 A
CPU:	XMC4700 (144 MHz, 2M FLASH, 350K RAM, 2K EEPROM)
Analogue Inputs:	3 x 25 V, Synchronvoltage, galvanically isolated 3 x 600V, galvanically isolated 2 x 60 mV Shunt, isoliert 2 x 100V, galvanically isolated 6 x 1 A Current Transformers, galvanically isolated
Digital Outputs:	2 Relays (250 Volt / 3A) with changeover contacts 3 Logical Outputs MOSFET Ue = 10 – 30 V
Digital Inputs:	2 Channels Ue = 18 – 32V Ri = 8,6 kOhm 3 Channels Ue = 18 – 32V Ri = 6,4 kOhm All channels with the same reference potential.
Pulse Power supply:	max. 66 V
Ignition Channels:	max. 1 A
Monitoring:	Undervoltage, dead man => watchdog relay
SWD/J-LINK:	Internal programming and download interface
CAN 1,2:	Two isolated CAN busses (external busses)
Ethernet:	10/100 Mbit/s with Status-LED green
Removable Devices:	Micro-SD-card
F-RAM	2K x 8 non volatile memory
Ambient temperature:	0 to +70 degrees Celsius
Weight:	1900 g
Dimensions (DxWxH):	165 x 60 x 300 mm
Type of mounting:	DIN EN mounting rails or by 4 screws

Application/Limitation

This Type Approval covers hardware listed under Product description.

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

- Reference to this Type Approval Certificate
- Functional description
- System block diagram
- Power supply arrangement (may be part of the System block diagram)
- Test program for application software at manufacturer

Product certificate

Job Id: **262.1-033209-1**
Certificate No: **TAA00002V1**

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.

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

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, December 2019.

Marking of product

The products to be marked with:

- manufacturer name
- model name
- serial number
- power supply ratings

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 after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE