Certificate No.: 2408071523016354

TÜRK LOYDU

TYPE APPROVAL CERTIFICATE

This is to certify that the

Safety Control And Monitoring System

TL Project No	**24-1196**
Manufacturer	**MAN ENERGY SOLUTIONS SE**
Address	**Stadtbachstrasse 1, 86224 Augsburg**
Product Type	**SACOS5000 For Compliance With Cyber Resilience IACS UR E27**
Reference Rule	**TL Rules, Part B, Chapter 4-1, Automation, 01.01.2022** **TL Rules, Part E, Chapter 105 - Naval Ship Technology, Electrical Installations, 01.01.2022** **TL Rules, Part E, Chapter 106 - Naval Ship Technology, Automation, 01.01.2022** **TL Rules, Part B, Chapter 5, Electric, 01.07.2022** **IACS UR E27 Cyber resilience of on-board systems and equipment, 01.09.2023**
Expire Date of Previous Certificate	**-**
Place and Date	**ISTANBUL / 26.08.2024**

Subject to the conditions referred to in the following pages, this certificate is valid until 26.08.2029.

Emrah SÖĞÜTÇÜ

New Building Division Manager

131536

This certificate is subject to terms and conditions described below:

- Any significant change in design or construction may render this Certificate invalid. Type Approval Certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. This certificate is not valid for products without marking above mentioned. The manufacturer should notify TÜRK LOYDU of any modifications or changes to equipment in order to obtain valid certificate. This certificate shows that tested specimens as representative of the product complies of the TÜRK LOYDU rules, and revelant international instruments that apply to it.

Product	: Safety Control And Monitoring System
Type of Product	: SACOS5000 For Compliance With Cyber Resilience IACS UR E27
Product Description	: The S5k is utilized as control, alarm and safety system for the management of all 4-stroke internal combustion engine types developed by MAN Energy Solutions for marine propulsion, genset and offshore application. It complies with the requirements for periodically unmanned machinery spaces. The system is based on separate electronic modules.
Approval No / Date	: PAE-EPAS/019119/24-1196/MY/09.07.2024 PAE-EPAS/019158/24-1196/MY/17.07.2024
Documentation	: Following documentations have been approved by Plan Approval under the scope of Cyber Resilience: 1- 01_01_Hardware_u._Software-Inventory-List_Classes_4-S-V1.2_17.05.2024_SaCoS5000_signed (V_1.0) 2- 01_01a_Hardware_Inventory_List_V1.2 (003) (V_1.0) 3- 01_02b_EEA.SaCoS5000_Network architecture concept and design guide_EN_V1.8 (V_1.0) 4- 03_01b_DLC_Architecture_SaCoS_5000_1.0.5 (V_1.0) 5- 05_01a_KA_06042022_0.1.2_Mapping SDL practices to ADP (V_1.0) 6- 05_01b_KA_31032022_0.1.3_Mapping SDL roles and gates to ADP (V_1.0) 7- 05_01c_3096216-4.01_Practice 1-SM-1-Development Process (V_1.0) 8- 06_01d_S1S5K_DLC-EV-PC_Internal_OI_en_V1.3 (V_1.0) 9- 06_02a_S5K_32-44CR_8-5-0-0_SD_EN_V1.8 (1) (V_1.0) 10- 06_02e_Workinstruction_Testprocedure_EV-DLC_EA010.295.000-53-0001 (V_1.0) 11- 07_EEA.S5KEV Recovery Plan Concept and Processes_EN - 20240517 (V_1.0) 12- 08_S5k_TAT_CntMeas_V1.0 13- 10_01b_EEAPB.SaCoS5000_Requirements evaluation_EN_V1.1 (V_1.0) 14- 10_01c_EEAB.SaCoS5000_SCR_EngineVault_Requirement Evaluation (SR1.1 _u._ SR2.3)_EN_V1.3 (V_1.0) 15- 10_01d_EEAB.SaCoS5000_SCR_EngineVault_Requirement Evaluation (SR7.1)_EN_V1.2 (V_1.0) 16- 11_01b_P10-030-000-040 Automation ADP Development Process (V_1.0) 17- 43.9 07-02 Software_Versioning_Version1.8
Performed Tests	: Revew of SACOS 5000 (Automation) Type Approval Certificate Review of SACOS Cyber Security Risk Assessment Review of System Hardening and Recovery Review of Development Process and Software Versioning Following Type Test (HIL Test) Incl. Security Capabilities According to Approved Test Procedure for Manufacturer Acceptance /Type Testing have been performed; 1- SR 1.1 Human User Identification and Authentications 2- SR 1.5 Authenticator Management 3- SR 2.1 Authorization Enforcement 4- SR 2.8 Auditable Events 5- SR 2.10 Response to Audit Processing Failures 6- SR 3.2 Malicious Code Protection 7- SR 3.3 Security Functionality Verification 8- SR 3.5 Input Validation 9- SR 3.6 Deterministic Output 10- SR 5.1 Network Segmentation 11- SR 5.2 RE 2 Island Mode 12- SR 7.1 Denial of Service Protection 13- SR 7.3 Control System Backup

Surveyor Name : Abdullah DEMİRCİ

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14- SR 7.6 Network and Security Configuration Settings
15.a- Use Scenario: Access and Parametrization Via the Unthrusted Customer EDS
15.b- Use Scenario: Access Via the Demilitarised Zone
15.c- Use Scenario: mGuard Configuration Download
15.d- Use Scenario: CEON Data Connection
15.e- Use Scenario: Control Via Customer IAS/PMS

Test Place : MAN ENERGY SOLUTIONS SE Stadtbachstr, 1; 86224 Augsburg Germany

Last Inspection Date : 17.06.2024

Others : This type approval certificate covers following software version of engine type with the scope of Cyber Resilience;
1- SaCoS 5000 CR DF Engines (6-5.3.x)
2- SaCoS 5000 CR Engines (8-5.1.x)
3- SaCoS 5000 PPN Engines (9-5.0.x)
4- SaCoS 5000 High Speed Engines (10-5.0.x)
5- SaCoS 5000 Conv DF Engines (12-5.0.x)

	Component	Type of Component	Software Version	Hardware Version	Firmware Version
1	Gateway Communication Module	GCM	-	2.0	0-2.1.0.0.5
2	Control Module+	CM+_EC	10-5.0.0.2.0	2.0	0-2.1.0.0.5
3	Control Module+	CM+_Safety	10-5.0.0.2.0	2.0	0-2.1.0.0.5
4	Injection Module+	IM+	10-5.0.0.2.0	3.1	0-2.1.0.0.5
5	Display Module Large	DML (LOP)	10-5.0.0.2.0	2.0	0-2.1.0.0.5
6	Display Module Large (Optional)	DML (ROP)	10-5.0.0.2.0	2.0	0-2.1.0.0.5
7	Display Module Large (Optional)	DML (WOP)	10-5.0.0.2.0	2.0	0-2.1.0.0.5
8	Gateway Module	GM.G SCR	1.2.0	GM 1.5 HWD2R309	1.5.1
9	Gateway Module	GM.S SCR	1.2.0	GM 1.5 HWD2R309	1.3.3
10	Display Module	DM SCR	1.2.0	GM 1.5 HWD1R215	1.5.1

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11	Wago Controller	Controller PFC200 (750-8213)	1.2.0	-	-
12	Engine Vault System	Engine Vault PC.1 (SIEMENS Simatic IPC BX-39A)	BIOS Version: V290103 Windows Version: Version 10.0.17763 Image Version 1.0 Monitor VM Version: 1.5 Toolbox VM Version: 1.4	-	-
13	Managed Switch mS1 (MAN/VPN)	Managed Switch (Phoenix Contact FL Switch 2316)	Configuration Version: R 1.6	-	V 3.25
14	mGUARD	Managed Switch (Phoenix Contact FL MGUARD RS4000 TX/TX - MAN/VPN)	Configuration Profile: EngineVault Template AUG	-	8.9.1
15	Unmanaged Switch uS2	Unmanaged Switch (Wago 852-1106)	-	-	-
16	Unmanaged Switch uS5	Unmanaged Switch (Wago 852-1106)	-	-	-

Approval Conditions : 1 - Physical protection measures (walls, lockable doors, laying cables to protect against unauthorized access...) must be implemented to prevent unauthorized access and manipulation of SaCoS5000 hardware, software, cables, and data, as well as changing the network topology and connecting unauthorized devices not covered in this Type Approval Certificate.

2- This type approval certificate does not constitute by itself a TL automation type approval certificate. This type approval certificate is limited to cyber resilience as per UR E27 Rev. 1 dated Sept.2023

3- Any modification of the hardware, firmware or software having an impact on the product performance or functionality is to be reviewed by TL.

4- The Type Approval Certificate covers the equipment included in TO.DEB.23-1799 (240321433086354) which is valid until 13-March-2029.

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