Marine & Offshore

Certificate number: 16645/C2 BV
File number: AP 3751
Product code: 4501H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

YOKOGAWA ELECTRIC CORPORATION

Tokyo - JAPAN

for the type of product

PROGRAMMABLE LOGIC CONTROL UNITS

Safety Instrumented System
ProSafe-RS

Requirements:
BUREAU VERITAS Rules for the Classification of Steel Ships and Offshore Units.

EC Code: 31B

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 27 May 2021

For Bureau Veritas Marine & Offshore,
At BV KOBE, on 18 Dec 2017,
Shinichi Takemoto

BUREAU VERITAS SURVEYORS AT PARIS 1828 KOBE INTERNATIONAL REGISTER

This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

- Product model or type designation :
  ProSafe-RS

- Product description:
  ProSafe-RS is a Safety Instrumented System (SIL 3 according to IEC 61508) intented to be used as Alarm, Control and Monitoring System onboard of Vessels, Offshore Platforms and FPSO.

  The **ProSafe-RS** is composed of the Safety Control Station (SCS) comprising Safety Control Unit (SCU) and safety Node units (NODE), the Safety ENGineering PC (SENG) with exclusive I/F card (approved separately with CENTUM CS 3000), and the real time control bus called Vnet or Vnet/IP that connects SENG to SCS.

ProSafe-RS comprises the following Units and Modules:

Unit/Module type	Model	Description
I/F Cards	VI701, VI702	Vnet/IP communication card
	VF701, VF702	Vnet communication card
Comm.	ALR111	RS-232C module
Modules	ALR121	RS-422/485 module
	ALE111	Ethernet module
SCU	SSC10S	Safety Control Unit (CPU: SCP401-11)
	SSC10D	Duplexed Safety Control Unit (CPU: SCP401-11)
	SSC50S	Safety Control Unit for Vnet/IP (CPU: SCP451-11)
	SSC50D	Duplexed Safety Control Unit for Vnet/IP (CPU: SCP451-11)
	SSC57S	Safety Control Unit for Vnet/IP - Upstream (CPU: SCP451-11)
	SSC57D	Duplexed Safety Control Unit for Vnet/IP - Upstream (CPU: SCP451-11)
	SSC60S	Safety Control Unit for Vnet/IP (CPU SCP 461-11)
	SSC60D	Duplexed Safety Control Unit for Vnet/IP (CPU SCP 461-11)
Node	SNB10D	Safety Node Unit for Dual-Redundant ESB Bus
Unit	SNT10D	Unit for Optical Bus Repeater Module
Optical Module	SNT401	Optical ESB Bus Repeater Master Module
	SNT501	Optical ESB Bus Repeater Slave Module
	SNT411	Optical ESB Bus Repeater Master Module 5 km to 50 km
	SNT511	Optical ESB Bus Repeater Slave Module 5 km to 50 km
Analog I/O Modules	SAI143	Analogue Input module (4-20 mA, 16 channels, isolated)
	SAT145	TC/mV input module (16-channel, Isolated Channels)
	SAR145	RTD input module (16-channel, Isolated Channels)
	SAV144	Analogue Input module (1-5V, 1-10V, 16 channels, isolated)
	SAI533	Analogue Output module (4-20 mA, 8 channels, isolated)
Digital I/O Modules	SDV144	Digital Input module (16 channels, 24V, isolated)
	SDV521	Digital Output module (4 channels, 24VDC, isolated)
	SDV531	Digital Output module (8 channels, 24VDC, isolated)
	SDV541	Digital Output module (16 channels, 24VDC, isolated)
	SDV53A	Digital Output module (8 channels, 48VDC, isolated)
Bus Converter	AVR10D	Duplexed Vnet Router
Bus Interface Module	SEC401	ESB Bus Coupler Module
	SSB401	ESB Bus Interface Slave Module
	SEC402	ESB Bus Coupler Module (for 2-port)
Others	SCB100	Wiring Check Adapter for Digital Input (for ETS)
	SCB110	Wiring Check Adapter for Digital Input (for DTS)
	YCB148	V net terminator
	YCB146	T-type Connector of Control Bus for HIS
	YCB128	IRIG (GPS) Terminator
	SDCV01	Dummy Cover (for I/O Module)

Unit/Module type	Model	Description
Terminal Boards	SBA4D	Terminal board for Analog: DIN Rail mount type (Single and Dual-redundant, 16-channel x 1)
	SBD2D	Terminal board for Digital output: DIN Rail mount type (Single and Dual-redundant, 4-channel x 1)
	SBD3D	Terminal board for Digital output: DIN Rail mount type (Single and Dual-redundant, 8-channel x 1)
	SBD4D	Terminal board for Digital output: DIN Rail mount type (Single and Dual-redundant, 16-channel x 1)
	SBR4D	Terminal board for RTD input: DIN Rail mount type (Single and Dual-redundant, 16-channel x 1)
	SBT4D	Terminal board for TC/mV: DIN Rail mount type (Single and Dual-redundant, 16-channel x 1)
	SEA4D	Terminal board for Analogue signals (Single/Dual-redundant, 16 Channels)
	SED2D, SED3D, SED4D	Terminal board for Digital signals (Single/Dual-redundant, 4/8/16 Channels)
Relay Boards	SBM54D	Relay board for Digital output: DIN rail mount type (Single and Dual redundant 16-channel x 1)
	SRM53D	8x2 dry contact Outputs (Safety Relay built-in, M4 terminals)
	SRM54D	16 dry contact Outputs (Safety Relay built-in, M4 terminals)
Cables:	YCB301	ESB bus cable
	YCB141	ER bus cable
	AKB161	RS-422/RS-485 cable
	AKB136	RS-232C Null modem cable
	YCB111	Vnet Cable (10Base-5)
	YCB141	Vnet Cable (10Base-2)
	AKB331	Cable between SDV144/SDV531/SDV541/SAT145 and Terminal Boards
	AKB651	Signal Cable (50-50 pins)
	AKB611	Signal cable for RTD input module
	KS1	Signal cable (40-40 pins)
Software Version:	ProSafe-RS	R3.xx.xx, R4.xx.xx

For modification C1 version:

Unit/Module type	Model	Description
SCU	S2SC70D Series	Duplexed Safety Control Unit (for N-IO/FIO, Rack Mountable Type) *1
	S2SC70S Series	Safety Control Unit (for N-IO/FIO, Rack Mountable Type) *1
Bus Interface Module	S2EN402 Series	N- ESB Bus Coupler Module (for N-IO, 2- port)
	S2EN404 Series	N- ESB Bus Coupler Module (for N- IO, 4- port)
Unit	S2NN30D Series	Node Interface Unit (for N- IO) *2
Cable	S2KLF10 Series	F- SB Bus Cable
	S2KPB10 Series	Power Supply Cable for Base plate
Base Plate	S2BN1D Series	Base Plate with disconnecting terminal(for N- IO, 16-channel) *2
	S2BN4D Series	Base Plate for Barrier (for N- IO, MTL Barrier
	S2BN5D Series	Base Plate for Barrier (for N- IO, P+F Barrier
Analog Digital I/O Mod.	S2MMM843 Series	Analog Digital I/O Module (16- channel, Isolated)
Digital I/O Module	S2MDV843 Series	Digital I/O Module (16- channel, Isolated)
Other	S2DCV02 Series	Dummy Cover (for N- IO, I/O module)
Terminal Board	S1BB4D Series	Terminal Board for Analog Input, 3- wire:DIN rail mount type

*1 - Wide range temperature type (-20 to +70 deg. C)
*2 - Exclude DIN mount type

For modification C2 version:

Unit/Module type	Model	Description
Comm. Modules	S2LP131	Fire and Gas Communication Module

2. DOCUMENTS AND DRAWINGS:

General Specification:
GS 32P01B10-01EN, GS 32Q01B20-31E, GS 32Q06J10-31E, GS 32P06K60-01EN, GS 33L50C10-40E, GS 33J50C10-01EN, GS 33M50C10-40E, GS 33K55C10-50E, GS 32P06K50-01EN, GS 32P06K51-01EN GS 32Q06D30-31E, GS 32Q06D20-31E, GS 32Q06D25-31E, GS 32Q06D11-31E, GS 32Q06K10-31E GS 32Q06K11-31E, GS 32Q06L15-31E, GS 32Q06K30-31E, GS 32Q06K40-31E, GS 32Q06L11-31E GS 32Q06L10-31E, GS 32P06E10-01EN, GS 32Q06L20-31E, GS 32Q06M10-31E

Technical Information (ProSafe-RS Installation Guidance):
TI 32P01J10-01EN

User's Manuals:
IM 32Q03B10-31E, IM 32Q06C10-31E

For modification C1 version:
General Specifications:
GS 32P06K31-01EN, GS 32P06K10-01EN, GS 32P06F10-01EN, GS 32P01B30-01EN, GS 32Q06D21-31E GS 32Q06D10-31E, GS 32P06D10-01EN, GS 32P06F20-01EN, GS 32P06K20-01EN, GS 32P06P10-01EN GS 32Q06L16-31E, GS 32P06K30-01EN, GS 33J50D10-01EN, GS 32P06M10-01EN

User's Manuals:
IM 33K50D10-50E, IM 32P01C10-01EN, IM 32P06C10-01EN, IM 32P56H20-01EN

Type Approval Definition:
Application (Type Approval Definition) for ProSafe-RS 2016 No: SHD-SIHW01-Z0025

Cover Letter:
R_Memo-0724-15-X0056

For modification C2 version:
- Application (Type Approval Definition) for CENTUM and ProSafe-RS 2017 Rev.0 No.SHD-NDEA00-Z0001, dated Mar 13, 2017.
- General Specifications I/O Adaptors (for N-IO) No.G 32P06K52-01EN, dated Jun 1, 2017.
- Cover letter : R Memo 0724-16-X0099

3. TEST REPORTS:

YOKOGAWA:
-Type Approval Test Planof ProSafe-RS System for use in Marine Application for BV No:SHD-SIHW01-D0020 Rev.1 dated 2013/12/6
-Type Approval Test Report of ProSafe-RS & CENTUM CS 3000 System for use in Marine Application No:SHD-SIHW01-D0025 Rev.0 dated 2013/12/6
-Type Approval Test Plan of ProSafe-RS System (R1.02) for use in Marine Application for BV No:SHD-SIHW01-D0050 Rev.1 dated 2005/12/27
-Type Approval Test Report of ProSafe-RS System(R1.02) for use in Marine Application No:SHD-SIHW01-D0064 Rev.0 dated 2006/4/6
-Type Approval Test Plan and Report of "ProSafe-RS System" and "CENTUM CS3000 and CENTUM VP System" (2009) for use in Marine Application for BV No:SHD-SIHW01-D0071 Rev.0 dated 2006/3/6
-Type Approval Test Plan and Report of "CENTUM CS3000 and CENTUM VP System" and "ProSafe-RS System" (2011) for use in Marine Application for BV No:SHD-SIHW01-D0108 Rev.0 dated 2006/4/6
-Type Approval Test Plan and Report of "CENTUM CS3000 and CENTUM VP System" and "ProSafe-RS System" (2013) for use in Marine Application for BV No:SHD-SIHW01-D0143 Rev.0 dated 2006/4/6

3. TEST REPORTS (to be continued):

Research Institute of Marine Engineering:

-Vibration Test Report of ProSafe-RS & CENTUM CS 3000 System for use in Marine Application by Reserch Insutitute of Marine Engineering
No:SHD-SIHW01-D0027 Rev.0 dated 2007/10/22
-Environmental Test Report of ProSafe-RS & CS 3000 System for use in Marine Application by Reserch Insutitute of Marine Engineering
No:SHD-SIHW01-D0028 Rev.0 dated 2007/10/22
-Electrical Test Report of ProSafe-RS & CS 3000 System for use in Marine Application by Reserch Insutitute of Marine Engineering
No:SHD-SIHW01-D0029 Rev.0 dated 2007/10/22
-Vibration Test Report of ProSafe-RS System R1.02 for use in Marine Application by Reserch Insutitute of Marine Engineering
No:SHD-SIHW01-D0066 Rev.0 dated 2007/10/22
-Environmental Test Report of ProSafe-RS System R1.02 for use in Marine Application by Reserch Insutitute of Marine Engineering
No:SHD-SIHW01-D0067 Rev.0 dated 2007/10/22
-Electrical Test Report of ProSafe-RS System R1.02 for use in Marine Application by Reserch Insutitute of Marine Engineering
No:SHD-SIHW01-D0068 Rev.1 dated 2009/11/30
-Environmental Test Report of ProSafe-RS System FY09 for use in Marine Application by Reserch Insutitute of Marine Engineering
No:SHD-SIHW01-D0092 Rev.0 dated 2009/12/2
-Electrical Test Report of ProSafe-RS System FY09 for use in Marine Application by Research Institute of Marine Engineering
No:SHD-SIHW01-D0093 Rev.0 dated 2009/12/1
-Electrical Test Report of "CENTUM CS3000 and CENTUM VP system" and "ProSafe-RS system" FY11 for use in Marine Application by Research Institute of Marine Engineering
No:SHD-SIHW01-D0121 Rev.0 dated 2009/12/1
-Environmental Test Report of "CENTUM CS3000 and CENTUM VP system" and "ProSafe-RS system" FY11 for use in Marine Application by Research Institute of -Marine Engineering No:SHD-SIHW01-D0122 Rev.2 dated 2011/11/10
-Vibration Test Report of "ProSafe-RS System" FY11 for use in Marine Application by Research Institute of Marine Engineering
No:SHD-SIHW01-D0124 Rev.0 dated 2011/11/10
-Environmental Test Report of "CENTUM CS3000 and CENTUM VP system" and "ProSafe-RS system" FY13 for use in Marine Application by Research Institute of -Marine Engineering No:SHD-SIHW01-D0147 Rev.0 dated 2011/11/10
-Electrical Test Report of "CENTUM CS3000 and CENTUM VP system" and "ProSafe-RS system" FY13 for use in Marine Application by Research Institute of Marine Engineering
No:SHD-SIHW01-D0148 Rev.0 dated 2011/11/10
-Vibration Test Report of "CENTUM CS3000 and CENTUM VP system" and "ProSafe-RS system" FY13 for use in Marine Application by Research Institute of Marine Engineering
No:SHD-SIHW01-D0149 Rev.0 dated 2011/11/10

IPS CORPORATION:

-Test Report of ProSafe-RS # CENTUM CS 3000 System for usein Marine Application on EMC test etc by IPS corporation
No:SHD-SIHW01-D0026 Rev.1 dated 2009/12/1
-Test Report of ProSafe-RS System R1.02 for usein Marine Application on EMC test etc by IPS corporation
No:SHD-SIHW01-D0065 Rev.1 dated 2011/11/10
-Test Report of ProSafe-RS System FY09 for use in Marine Application on EMC test etc by IPS Corporation
No:SHD-SIHW01-D0091 Rev.0 dated 2013/7/22
-Test Report of "CENTUM CS3000 and CENTUM VP System" and "ProSafe-RS System" FY11 for use in Marine Application on EMC test etc by IPS Corporation
No:SHD-SIHW01-D0123 Rev.1 dated 2016/5/18
-Test Report of "CENTUM CS3000 and CENTUM VP System" and "ProSafe-RS System" FY13 for use in Marine Application on EMC test etc by IPS Corporation
No:SHD-SIHW01-D0146 Rev.0 dated 2007/7/24

3. TEST REPORTS (to be continued):

For modification C1 version:

YOKOGAWA:

-Type Approval Test Plan and Report of "ProSafe-RS System" (2016) for use in Marine Application
No:SHD-SIHW01-D0177 Rev.0 dated 2007/7/20

Research Institute of Marine Engineering:

-Electrical Test Report of "ProSafe-RS System" FY16 for use in Marine Application by Research Institute of Marine Engineering
No:SHD-SIHW01-D0179 Rev.0 dated 2016/5/18
-Environmental Test Report of "ProSafe-RS System" FY16 for use in Marine Application by Research Institute of Marine Engineering
No:SHD-SIHW01-D0180 Rev.0 dated 2016/5/18
-Vibration Test Report of "ProSafe-RS System" FY16 for use in Marine Application by Research Institute of Marine Engineering
No:SHD-SIHW01-D0183 Rev.0 dated 2016/5/18

IPS CORPORATION:

-Test Report of "ProSafe-RS System" FY16 for use in Marine Application on EMC test etc by IPS Corporation
No:SHD-SIHW01-D0178 Rev.0 dated 2016/5/24

For modification C2 version:

YOKOGAWA:

- Type Approval Test Plan & Report of 'CENTUM System' & 'ProSafe RS System' (2017) for use in Marine Application No.SHD-NDEA00-D0025, dated Jul 24,2017.

e-OHTAMA:

- Test Report of 'CENTUM System' & 'ProSafe RS System' FY17 for use in Marine Application on EMC test etc. No. SHD-NDEA00-D0027, dated 21 Aug, 2017.

Research Institute of Marine Engineering:

- Environmental Test Report of 'CENTUM System' & 'ProSafe RS System' FY17 for use in Marine Application No.SHD-NDEA00-D0029, dated 21 Aug ,2017.

4. APPLICATION / LIMITATION:

4.1 - BUREAU VERITAS Rules for the Classification of Steel Ships.
4.2 - Approval valid for ships intended to be granted with the following additional class notations: **AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.**
4.3 - BUREAU VERITAS Environmental Category, **EC Code: 31B.**
4.4 - The equipment fulfils the EMC requirements for installation on the Bridge and Deck Zone.
4.5 - The equipment is to be installed in a metallic enclosure, and the noise filter, arresters and ferrite beads installed on AC lines and I/O lines are to be the same than those used during Type Tests.
4.6 - Approval also valid for units having to comply with IMO Resolution A649 (The "MODU Code").
4.7 - Not to be used on DC power lines.
4.8 - Only Hardware and Software successfully tested together in compliance with the regulations as referred to in page one, according to the declaration of the manufacturer are covered by this certificate.
4.9 - Each application and configuration is to be submitted to the Society's examination prior to fitting on board.
4.10 - The equipment, once installed on board ship, is to be tested in accordance with the above referred Regulations under the supervision of a Society's Surveyor.
4.11 - Depending on the Application, Factory Acceptance and On-board Tests are to be performed in accordance with requirements for Category II or III Equipment.

5. PRODUCTION SURVEY REQUIREMENTS:

5.1 - The above products are to be supplied by **YOKOGAWA Electric Corporation** in compliance with the type described in this certificate.

5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.

5.3 - **YOKOGAWA Electric Corporation** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.

5.4 - **YOKOGAWA Electric Corporation** has declared to Bureau Veritas the following production site(s):

Yokogawa Electric Asia Pte Ltd
5 Bedok South Road Singapore 469270
Republic of Singapore

PT Yokogawa Manufacturing Batam
Lot 339-340 Jalan Beringin Batamindo Industrial Park
Mukakuning Batam
Indonesia 29433

6. MARKING OF PRODUCT:

- Maker's name or trademark
- Catalogue Number and Serial Number
- Equipment type number or model identification under which it was type-tested.
- The title and version of each software element included in the installed software system shall be either marked or displayed on command on the equipment.

-When the marking and the title and version of the software are displayed only on the display, such information shall also be included in the equipment manual.

7. OTHERS:

7.1 - It is **YOKOGAWA Electric Corporation**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

7.2 - This certificate supersedes the Type Approval Certificate No.: 16645/C0 BV issued on 23 Aug. 2016 by the Society.

***** END OF CERTIFICATE *****