

# General Specifications

GS 32Q01B30-31E

ProSafe-RS  
Safety Instrumented System  
Overview  
(for Vnet/IP-Upstream)



[Release 3]

## ■ GENERAL

The ProSafe-RS is a Safety Instrumented System that is certified by the German certification organization, Technische Überwachungs-Verein (TÜV) to meet Safety Integrity Level (SIL) 3 specified in IEC 61508.

Vnet/IP-Upstream is the control network integrating ProSafe-RS and FAST/TOOLS.

## ■ COMPONENTS AND SOFTWARE

The ProSafe-RS system is composed of the Safety Control Station (SCS), the Safety Engineering PC (SENG). ProSafe-RS communicates with each of those equipment via Vnet/IP-Upstream control network.

The SCS performs safety control, and the SENG performs engineering and maintenance for the SCS. The ProSafe-RS can be integrated with the FAST/TOOLS. The SCS can be operated and monitored by the HMI (human machine interface) of the FAST/TOOLS.

For specifications regarding the FAST/TOOLS, refer to its general specifications. When referring to the documents related to a system where ProSafe-RS and FAST/TOOLS are integrated, read the word "Vnet/IP" as "Vnet/IP-Upstream."

### ● Safety Engineering PC (SENG)

To configure the ProSafe system, the CHS5100 Safety System Generation and Maintenance Package needs to be installed on a computer. The SENG performs engineering and maintenance.

For details on the SENG's functions, refer to the general specifications (GS 32Q04C10-31E) for the CHS5100 Safety System Generation and Maintenance Package.

### ● Safety Control Station (SCS)

The SCS offers a safety control functions, the sequence-of-events-recorder (SOER) function, the FAST/TOOLS integration function, and the Modbus connection function which interfaces the SCS with another system.

The SCS consists of a safety control unit (CPU node) and safety node units (I/O node). There are two types of CPU nodes: a standard safety control unit and a wide range temperature safety control unit (equipped with a fan unit). The CPU node can be connected with the I/O node via the ESB bus.

I/O modules can be mounted both on the CPU node and I/O node alike.

#### SCS with CPU node connectable to 9 I/O nodes

- SSC57S-S: Safety Control Unit (for Vnet/IP-Upstream, Rack Mountable Type, Standard Type) (\*1)
- SSC57D-S: Duplexed Safety Control Unit (for Vnet/IP-Upstream, Rack Mountable Type, Standard Type) (\*1)
- SSC57S-F: Safety Control Unit (for Vnet/IP-Upstream, Rack Mountable Type, Wide Range Temperature Type) (\*1)
- SSC57D-F: Duplexed Safety Control Unit (for Vnet/IP-Upstream, Rack Mountable Type, Wide Range Temperature Type) (\*1).
- SSC50S-S: Safety Control Unit (for Vnet/IP, Rack Mountable Type, Standard Type)
- SSC50D-S: Duplexed Safety Control Unit (for Vnet/IP, Rack Mountable Type, Standard Type)
- SSC50S-F: Safety Control Unit (for Vnet/IP, Rack Mountable Type, Wide Range Temperature Type)
- SSC50D-F: Duplexed Safety Control Unit (for Vnet/IP, Rack Mountable Type, Wide Range Temperature Type)

For details, refer to the general specification "Safety Control Units for Vnet/IP (Rack Mountable Type), Duplexed Safety Control Units (Rack Mountable Type)" (GS 32Q06D20-31E) and "Safety Control Units for Vnet/IP-Upstream (Rack Mountable Type), Duplexed Safety Control Units (Rack Mountable Type)" (GS 32Q06D25-31E).

\*1: Firmware revision of CPU module (SCP451) for SSC57□ must be 19 or later.

#### SCS with CPU node connectable to 13 I/O nodes

- SSC60S-S: Safety Control Unit (for Vnet/IP, Rack Mountable Type, Standard Type)
- SSC60D-S: Duplexed Safety Control Unit (for Vnet/IP, Rack Mountable Type, Standard Type)
- SSC60S-F: Safety Control Unit (for Vnet/IP, Rack Mountable Type, Wide Range Temperature Type)
- SSC60D-F: Duplexed Safety Control Unit (for Vnet/IP, Rack Mountable Type, Wide Range Temperature Type)

For details, refer to the general specification "Safety Control Units for Vnet/IP (Rack Mountable Type), Duplexed Safety Control Units (Rack Mountable Type)" (GS 32Q06D10-31E).

**Software**

- CFS1300 Safety Control Functions Package (for SSC60□)
- CFS1350 Node Expansion Package (for SSC60□)
- CFS1100 Safety Control Functions Package (for SSC50□)
- CFS1170 Safety Control Functions Package (for SSC57□)

For details, refer to the general specifications “Safety Control Functions Package” (GS 32Q03B10-31E, GS 32Q03B20-31E, GS 32Q03B25-31E).

**● Peripheral Equipment**

For more details, refer to the General Specifications for the respective hardware below. As for SSC57□, read the model code “SSC50” as “SSC57” in the following GSs.

Items	Models	General Specifications
Safety Node Unit	SNB10D	GS 32Q06K10-31E
I/O Modules		GS 32Q06K20-31E
Communication Modules	ALR111, ALR121, ALE111	GS 32Q06K50-31E, GS 32Q06K51-31E
Unit for Optical Bus Repeater Module	SNT10D	GS 32Q06K11-31E
Optical ESB Bus Repeater Module	SNT401, SNT501, SNT411, SNT511	GS 32Q06L15-31E, GS 32Q06L16-31E
Cables		GS 32Q06M10-31E
Terminal Board, Relay Board		GS 32Q06L20-31E
Terminal Block		GS 32Q06L30-31E
Vnet/IP Interface Card	VI702 (*1)	GS 33K50C10-50E, GS 33P06B11-31E
Power Supply Bus Unit	AEPV7D	GS 33K50K41-50E

\*1: Firmware revision of VI702 must be 19 or later to connect with Vnet/IP-Upstream narrowband mode.

**● Layer 2 Switch (L2SW)**

L2SW relays communications among devices connected to the Vnet/IP-Upstream network. The Vnet/IP-Upstream domain refers to the Vnet/IP-Upstream system area connected by L2SW.

**● Layer 3 Switch (L3SW)**

L3SW relays communications among Vnet/IP-Upstream domains.

**● SNTP Server**

SNTP server performs time synchronization via networks. Connect Vnet/IP-Upstream station to SNTP server for synchronizing its time to the Universal Time, Coordinated (UTC).

**● Related Software**

For details, refer to the general specifications for the respective software application below.

Items	Models	General Specifications
SOE Viewer Package	CHS2100	GS 32Q02D10-31E
SOE OPC Interface Package	CHS2200	GS 32Q05D10-31E
Access Control and Operation History Management Package	CHS5170	GS 32Q04D30-31E
FAST/TOOLS Integration Engineering Package	CHS5700	GS 32Q04D20-31E

**● Document**

For details, refer to the general specification below.

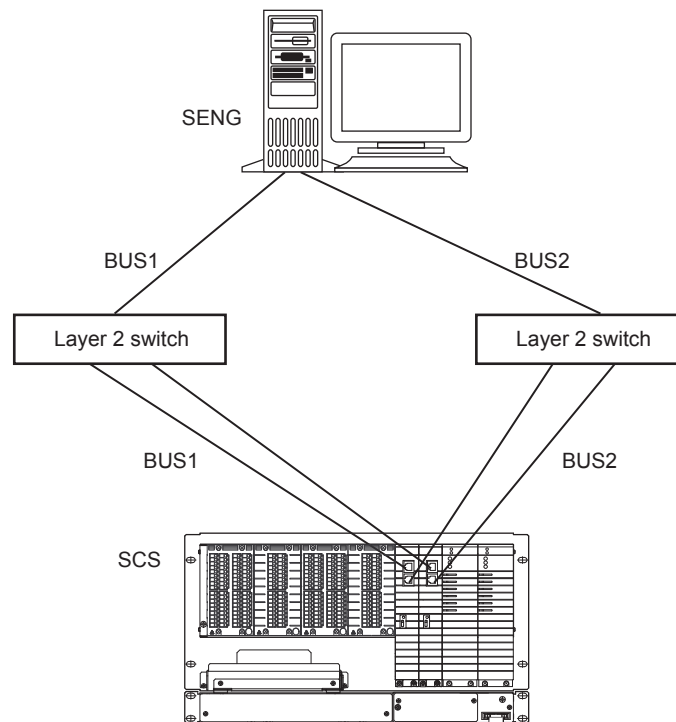
Item	Model	General Specification
Electronic Document	CHS5400	GS 32Q01W10-31E

## ■ SYSTEM CONFIGURATION

### ● Minimum System Configuration

The minimum system configuration is composed of the following equipment:

- SENG: 1 unit
- SCS: 1 unit
- Layer 2 switch: 2 units



Even in the minimum configuration of 1 unit of SCS and SENG each, one Layer 2 switch per bus and therefore, two switches for two busses are required.

When SCS is in operation, the Layer 2 switches of BUS1 and BUS2 must not be powered down at the same time.

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Figure Example of Minimum Configuration of the System

### ● Maximum System Configuration

Vnet/IP-Upstream domain: Maximum 31 domains

Vnet/IP-Upstream station: Maximum 64 stations per domain

Maximum 1984 stations per system (\*1)

\*1: Number of nodes connected to Vnet/IP-Upstream must be decided after confirming the validity of communication road.

● Configuration of FAST/TOOLS Integrated System

Vnet/IP-Upstream has 3 network modes: a standard mode, a wide-area mode, and a narrowband mode. For more details of the network mode, refer to “■NETWORK SPECIFICATIONS.”

The relations between the network modes and the SCS models are as follows:

	Standard mode	Wide-area mode	Narrowband mode
SSC60□	Yes	Yes	No
SSC50□	Yes	Yes	No
SSC57□	Yes	Yes	Yes

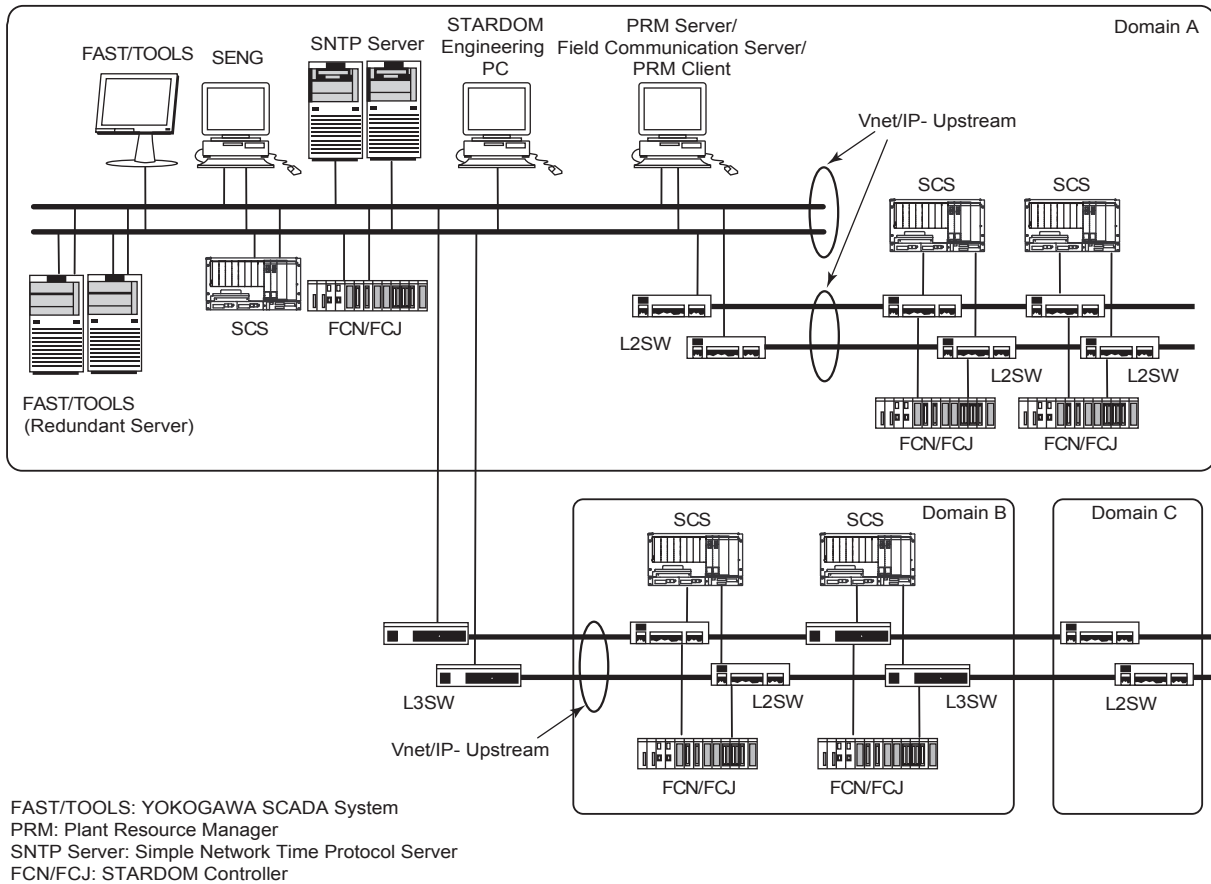
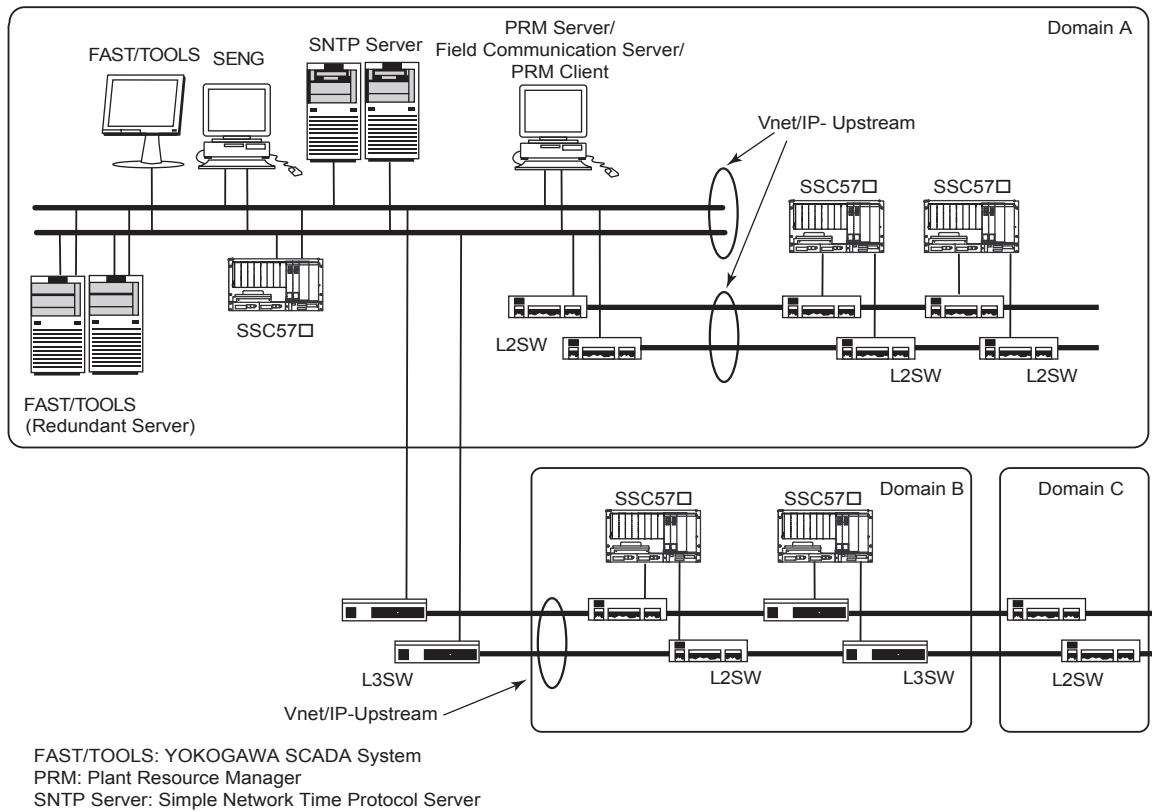


Figure Example of the ProSafe-RS and FAST/TOOLS Integration System (for Standard mode and Wide-area mode)



**Figure Example of the ProSafe-RS and FAST/TOOLS Integration System (for Narrowband mode)**

The Vnet/IP-Upstream system is composed of an SCS, an SENG, HMI of a FAST/TOOLS, and other components. The SENG software and the FAST/TOOLS should not reside in the same computer.

For operating and monitoring the SCS on a HMI of the FAST/TOOLS, following system revisions for ProSafe-RS and FAST/TOOLS are required.

	SSC60□	SSC50□	SSC57□
ProSafe-RS	R2.03 or later	R2.02 or later	R3.02.10 or later
FAST/TOOLS	R9.02 or later	R9.02 or later	R9.05 SP2 or later
PRM	R3.04 or later	R3.03 or later	R3.12 or later

● **Example of the Connection with Another System**

ProSafe-RS can communicate with other systems through Modbus connections. The following functions are available using an interference-free serial communication module or Ethernet communication module.

- Subsystem communication function  
SCS can communicate as a master station when ProSafe-RS acts as a Modbus master.
- Modbus slave communication function  
SCS can communicate as a slave station when the other system acts as a Modbus master.

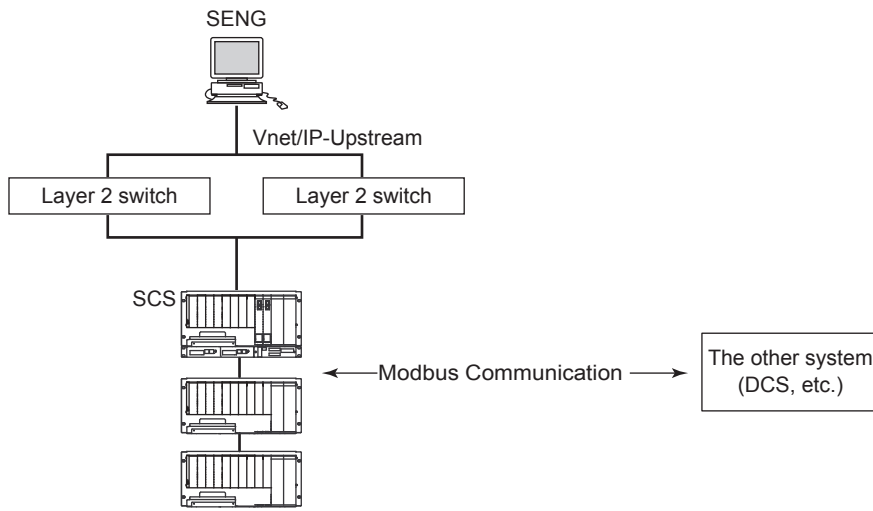
Modbus Communication Communication Module	Subsystem Communication Function	Modbus Slave Communication Function
<b>Serial Communication Module</b>	X	X
<b>Ethernet Communication Module</b>	-	X

X: Supported  
-: Not supported

The subsystem communication and modbus slave communication functions can be executed simultaneously; however, subsystem communication function and modbus slave communication function cannot coexist on one serial communication module.

For communication specifications, refer to “Safety Control Functions Package (GS 32Q03B10-31E)” and “ALR111/ALR121 Serial Communication Module (GS 32Q06K50-31E)” or “ALE111 Ethernet Communication Module (GS 32Q06K51-31E)”.

An example of the system configuration is shown below:



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● **Cautions for System Configuration**

- The maximum number of SCS units to which Inter-SCS safety communication is possible from one SCS unit is 16 (when any two SCS units perform bidirectional communication each other, the number of units is counted as 2).

● **Setting IT security function**

The security can be enhanced through the automatic setting at IT security function of ProSafe-RS. To perform this operation, the integrated FAST/TOOLS needs to be R9.02 or later, PRM needs to be R3.03 or later.

## ■ NETWORK SPECIFICATIONS

The ProSafe-RS uses Vnet/IP-Upstream and Ethernet for communications among configured devices.

### ● Vnet/IP-Upstream

Vnet/IP-Upstream is a gigabit Ethernet-based control network, and provides real-time communication with high reliability. Vnet/IP-Upstream is a dual-redundant control network, consisting of Bus 1 and Bus 2. Bus 1 is normally used for control communication to transmit control data; however, when the Bus 1 fails, it automatically switches its communication path and Bus 2 continues the control communication without stopping.

Following is an outline of network connection of ProSafe-RS system.

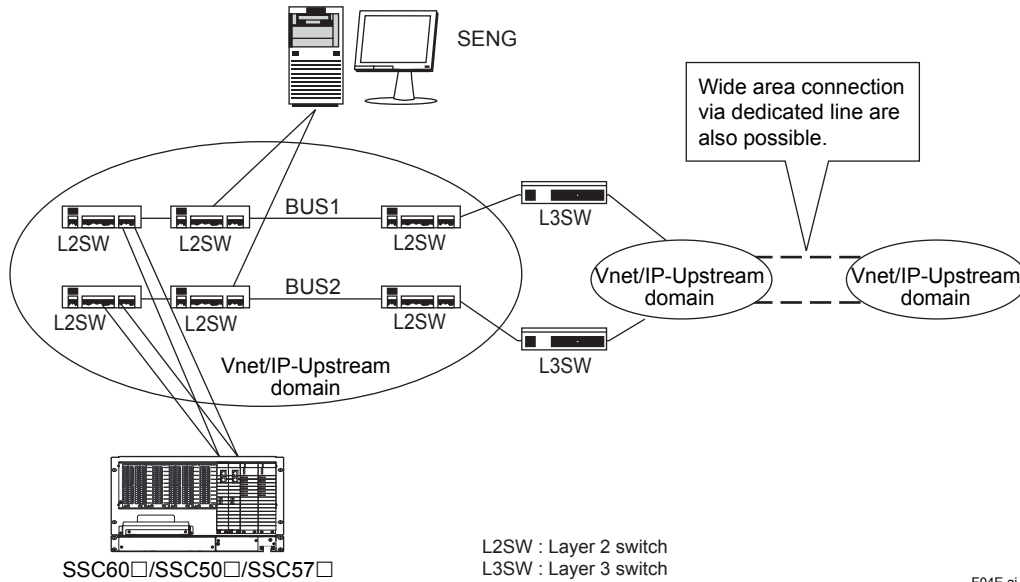


Figure Network Configuration

SSC60□/SSC50□/SSC57□ Safety Control Unit is connected with L2SW in Vnet/IP-Upstream domain, and other equipment like SENG, is connected with L2SW. As redundant Vnet/IP bus is separated as a subnet independent by bus, L2SW must be equipped in each bus.

Do not connect any two stations in a way that there exist more than one communication path.

Vnet/IP-Upstream has a standard mode, a wide-area mode, and a narrowband mode. Mixed use of the standard mode and the wide-area mode on the same project is available. ; however, the mixed use of the narrowband mode and other network mode(s) is not available.

Specifications of each of the network mode are as shown below.

		Standard mode	Wide-area mode	Narrowband mode
In a domain	Bandwidth	1 Gbps	100 Mbps or more	2 Mbps or more
	Distance between stations	40 km or less	1,000 km or less	10,000 km or less (*1)
	Transmission delay	1 ms or less	40 ms or less	500 ms or less
	Bus switch over	160 ms or less	480 ms or less	2 sec
	Levels of L2SW connections	Up to 7/domain	Unlimited	Unlimited
	Time sync accuracy	1 ms or less	5 ms or less	500 ms or less
Between domains	Bandwidth	1 Gbps	100 Mbps or more	2 Mbps or more
	Distance between stations	10,000 km or less		10,000 km or less (*1)
	Transmission delay	250 ms or less		500 ms or less
	Bus switch over	600 ms or less		5 sec
	Time sync accuracy	5 ms or less		500 ms or less

\*1: A satellite communication is applicable; however, an offline download via the satellite communication is not recommended because it takes longer time.

**Control Communication**

Communication method: Read/write communication, message communication, link transmission  
 Link transmission period: 100 ms

**Transmission specifications**

Network topology: Star topology  
 Transmission redundancy: Dual-redundant (for control network communication only)  
 Transmission cable: Unshielded twist-pair (UTP) with enhanced category 5 or superior

**Communications between Instruments**

Distance between the two arbitrary stations in a domain: Maximum 10000 km  
 One level (a pair) of media converters can be connected in between the instruments.

**Connecting Vnet/IP-Upstream domains**

Vnet/IP-Upstream domains are connected by layer 3 switches. Each redundant Vnet/IP-Upstream bus is connected via each layer 3 switch to other domains.  
 Do not connect any two domains in a way that there exist more than one communication path.

**Inter-SCS Safety Communication**

SCS can perform inter-SCS safety communication with other SCSs in the same domain as well as in different domains. The inter-SCS safety communication can be used to construct a safety loop up to SIL 3 (Safety Integrity Levels) for multiple SCSs via the Vnet/IP-Upstream.

Receiving end (Consumer)			Standard mode / Wide-area mode			Narrowband mode (*1)
			SSC50□	SSC60□	SSC57□	SSC57□
Sending end (Producer)			R2.02.00 to R3.02.10	R2.03.00 to R3.02.10	R3.02.10	R3.02.10
			Standard mode / Wide-area mode	SSC50□	R2.02.00 to R3.02.10	Yes
SSC60□	R2.03.00 to R3.02.10	Yes		Yes	Yes	No
SSC57□	R3.02.10	Yes		Yes	Yes	No
Narrowband mode (*1)	SSC57□	R3.02.10	No	No	No	Yes

\*1: The mixed use of the narrow band mode and other network mode(s) is not available.

● Ethernet

Ethernet is a network used for file transfer and information communication among SENG and other general-purpose Ethernet instruments. Ethernet communication is usually performed via an Ethernet card mounted a computer.

Communication Protocol

Based on IEEE802.3

● ESB Bus

ESB buses are I/O communication buses that connect the safety node units (I/O nodes) with the safety control unit (CPU node) of the SCS.

The number of Connectable Units

Using SEC402 ESB bus coupler module, up to 13 I/O nodes can be connected to CPU node (SSC60□). (\*1)  
 SEC402 has two ports to connect ESB bus. Up to 9 I/O nodes can be connected to each of upper and lower port. Up to 13 I/O nodes can be connected to SEC402 as a total of upper and lower ports.

Using SEC401 ESB bus coupler module, up to 9 I/O nodes can be connected to CPU node (SSC60□/SSC50□/SSC57□).

\*1: To connect 10 or more I/O nodes, CFS1350 Node Expansion Package is required.  
 For details, refer to "Safety Control Functions Package (for SSC60□), Node Expansion Package (for SSC60□)" (GS 32Q03B10-31E).

Transmission Network Specifications

- Network topology: Bus topology
- Transmission channel redundancy: dual-redundant
- Network speed: 128 Mbits/sec
- Network cable: dedicated cable (YCB301)
- Maximum transmission distance: 10 m (ESB) (\*1)

\*1: Length of ESB buses must be 10 m or shorter each from upper and lower port of SEC402.

Following is an overview of connection of ESB buses using SEC402 in SSC60D.

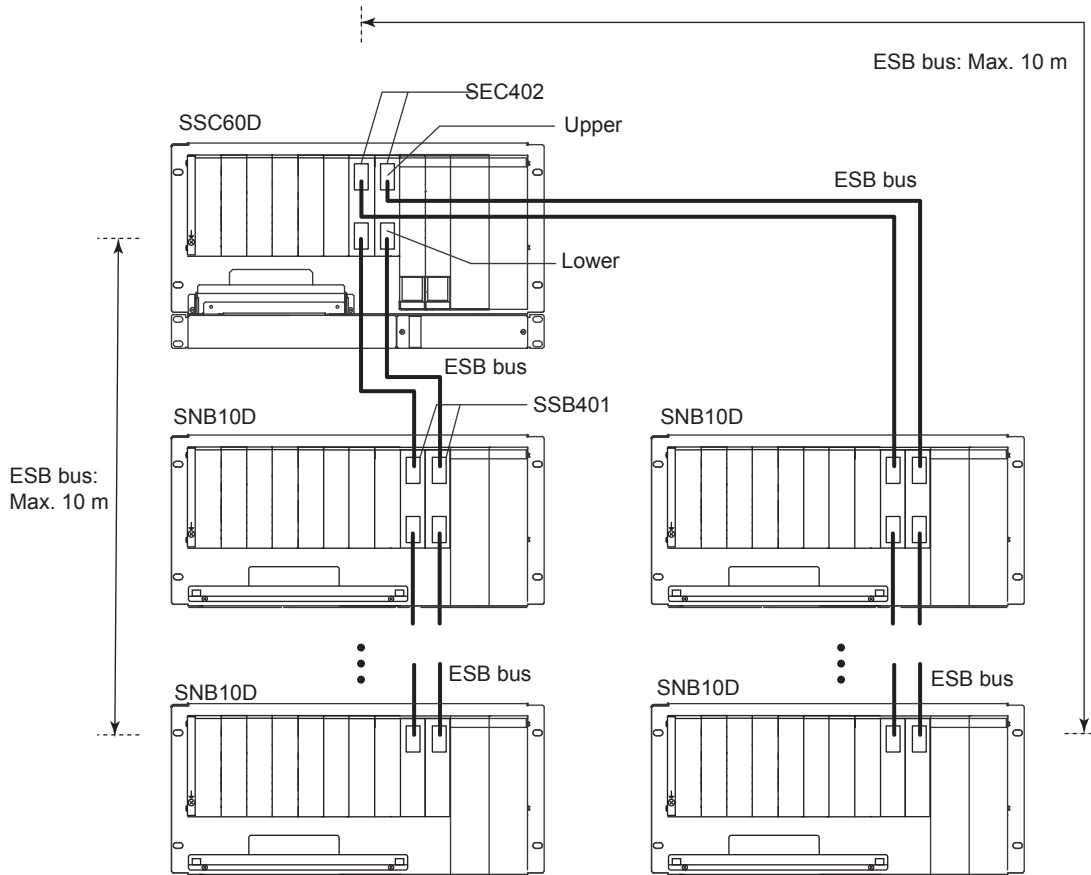


Figure Connection Overview of SEC402 ESB Bus Coupler Module

ESB Bus can be extended by using Optical ESB Bus Repeater Module (SNT401, SNT501, SNT411, SNT511).

Network cable: Fiber-optic cable (\*1)

Maximum transmission distance using Optical ESB Bus Repeater (SNT411, SNT511): 50 km (\*2)

Network topology: chain type and star type (Chain type and star type can be mixed.)

\*1: Fiber-optic Cable Specifications

Connector: LC type (IEC 61754-20 compliant)

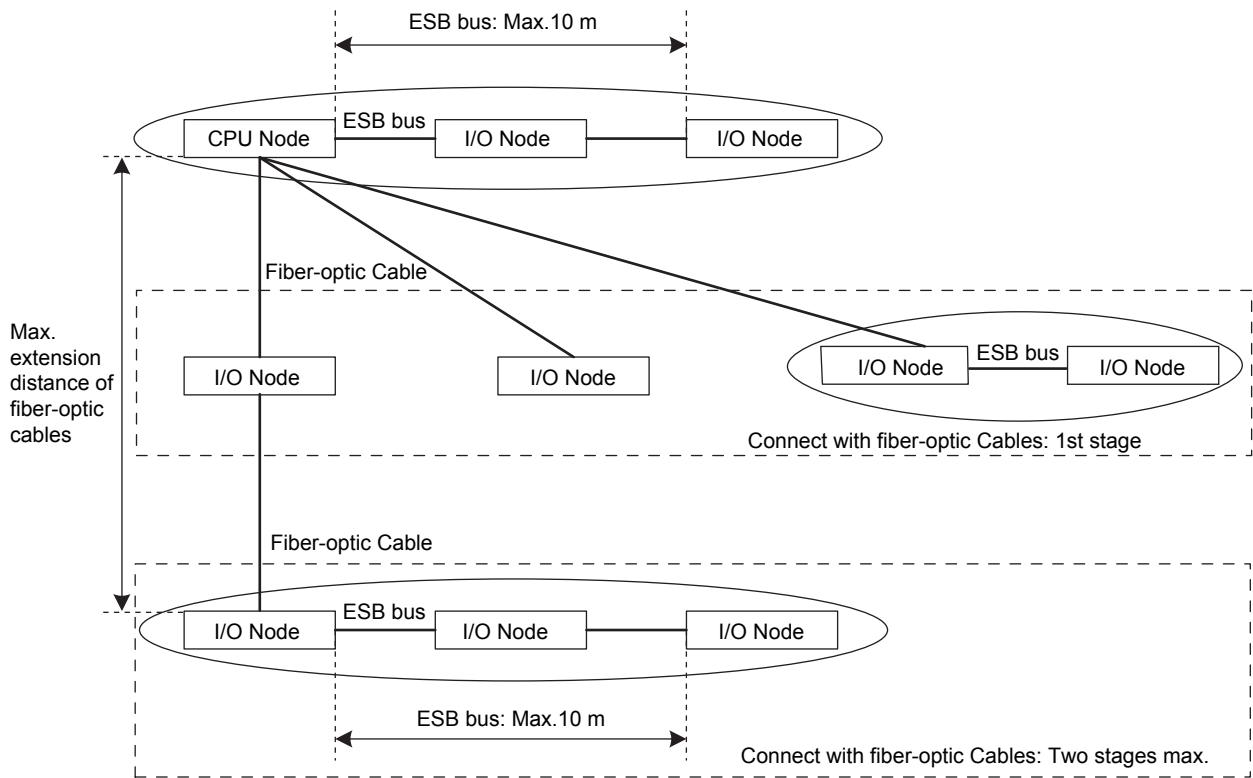
Recommended cable: Silica-Based Single-Mode Fiber (JIS C6835 SSMA -9.3/125, IEC 60793-2-50B1.1)

Number of cores: 2

\*2: Maximum transmission distance is 5 km in earlier than R1.03.00.

For the other restrictions about the length of fiber-optic cable, refer to "Optical ESB Bus Repeater Module 5 km to 50 km (for SSC60□/SSC50□)" (GS 32Q06L15-31E).

Following is an overview of connection of Fiber-optic cable and ESB buses using Optical ESB Bus Repeater Modules in CPU node.



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Figure Overview of ESB Bus and Optical ESB Bus Repeater

## ■ SYSTEM REQUIREMENTS

### ● Hardware Requirements

The Standard Operation and Monitoring Function runs on a computer which meets the following requirements:

#### For Windows 7

CPU	Required	Core2 Duo minimum 2.13 GHz
		Xeon dual core minimum 2.0 GHz
Main memory	Required	4 GB
Hard disc	Required	Free space of minimum 20 GB
	Recommended	Free space of minimum 40 GB When the operation history database is stored for access control and operation history management package, free space of minimum 100 GB
Display	Required	Minimum SXGA (1280 x 1024) resolution, True Color (min. 16.77 million colors)
	For wide screen	Minimum WXGA+ (1440 x 900) resolution, True Color (min. 16.77 million colors)
Graphics	Required	DirectX 9-class GPU(Graphics Processing Unit) that supports <ul style="list-style-type: none"> <li>• A WDDM(Windows Driver Display Model) Driver</li> <li>• Pixel Shader 2.0 in hardware</li> <li>• 32 bits per pixel</li> <li>• 128 MB Graphics memory</li> </ul>
Expansion slot	Required	1 slot is used for Vnet/IP interface (*1)
Mouse	Required	
Optical disc drive	Required	DVD-ROM

\*1: VI702 is required for Vnet/IP interface card.

#### For Windows Vista

CPU	Required	Core2 Duo minimum 2.13 GHz
		Xeon dual core minimum 2.0 GHz
Main memory	Required	Minimum 2 GB
Hard disc	Required	Free space of minimum 20 GB
	Recommended	Free space of minimum 40 GB When the operation history database is stored for access control and operation history management package, free space of minimum 100 GB
Display	Required	Minimum SXGA (1280 x 1024) resolution, True Color (min. 16.77 million colors)
	For wide screen	Minimum WXGA+ (1440 x 900) resolution, True Color (min. 16.77 million colors)
Graphics	Required	DirectX 9-class GPU(Graphics Processing Unit) that supports <ul style="list-style-type: none"> <li>• A WDDM(Windows Driver Display Model) Driver</li> <li>• Pixel Shader 2.0 in hardware</li> <li>• 32 bits per pixel</li> <li>• 128 MB Graphics memory</li> </ul>
Expansion slot	Required	1 slot is used for Vnet/IP interface (*1)
Mouse	Required	
Optical disc drive	Required	DVD-ROM

\*1: VI702 is required for Vnet/IP interface card.

#### For Windows Server 2008 R2

CPU	Required	Xeon dual core minimum 2.98 GHz
Main memory	Required	4 GB
Hard disc	Required	Free space of minimum 20 GB
	Recommended	Free space of minimum 40 GB When the operation history database is stored for access control and operation history management package, free space of minimum 100 GB
Display	Required	Minimum SXGA (1280 x 1024) resolution, True Color (min. 16.77 million colors)
	For wide screen	Minimum WXGA+ (1440 x 900) resolution, True Color (min. 16.77 million colors)
Graphics	Required	DirectX 9-class GPU(Graphics Processing Unit) that supports <ul style="list-style-type: none"> <li>• A WDDM(Windows Driver Display Model) Driver</li> <li>• Pixel Shader 2.0 in hardware</li> <li>• 32 bits per pixel</li> <li>• 128 MB Graphics memory</li> </ul>
Expansion slot	Required	1 slot is used for Vnet/IP interface (*1)
Mouse	Required	
Optical disc drive	Required	DVD-ROM

\*1: VI702 is required for Vnet/IP interface card.

**For Windows Server 2008**

CPU	Required	Core2 Duo minimum 2.13 GHz
		Xeon dual core minimum 2.0 GHz
Main memory	Required	Minimum 2 GB
Hard disc	Required	Free space of minimum 20 GB
	Recommended	Free space of minimum 40 GB When the operation history database is stored for access control and operation history management package, free space of minimum 100 GB
Display	Required	Minimum SXGA (1280 x 1024) resolution, True Color
	For wide screen	Minimum WXGA + (1440 x 900) resolution, True Color
Expansion slot	Required	1 slot is used for Vnet/IP bus interface (*1)
Mouse	Required	
Optical disc drive	Required	DVD-ROM

\*1: VI702 is required for Vnet/IP interface card.

● **Software Requirements**

ProSafe-RS Release No.	Windows 7 Professional	Windows Vista Business Edition	Windows Server 2008 Standard Edition R2	Windows Server 2008 Standard Edition	Windows Server 2003 Standard Edition R2	Windows Server 2003 Standard Edition
	64 bit	32 bit	64 bit	32 bit	32 bit	
	SP1	SP2	SP1	SP2	SP2	SP2
R3.01.00 to R3.02.10	X	X	X	X	-(*)	-(*)

X: Compatible

-: Not compatible

Note: Service Pack is abbreviated as SP (Example: SP1 stands for Service Pack 1).

\*1: The Windows Server 2003 is applicable as the file server of the project database.

## ■ CRITERIA FOR THE INSTALLATION ENVIRONMENT

The table below presents the criteria for the environment where the safety control unit and the safety node unit are to be installed. For computers, bus repeaters, optical bus repeaters, and I/O modules, refer to their respective general specifications.

Item		Specifications	Remarks
Temperature	Normal operation	-20 to 40 °C (basic safety control unit) -20 to 70 °C (wide range temperature safety control unit and safety node unit)	0 to 60 °C when the ALR111-S□1/ ALR121-S□1 is mounted. 0 to 70 °C when the ALR121-S□B is mounted. 0 to 60 °C when the ALE111-S□1 is mounted.
	Transportation/storage	-40 to 85 °C	
Humidity	Normal operation	5 to 95 % RH (non-condensing)	5 to 85 % RH when the SRM53D/ SRM54D/SBM54D is mounted.
	Transportation/storage	5 to 95 % RH (non-condensing)	
Temperature change	During operation	Within ±10 °C/h	
	Transportation/storage	Within ±20 °C/h	
Power supply	Voltage range	100 to 120 V AC: -15 % to +10 % 220 to 240 V AC: -15 % to +10 % 24 V DC: -10 % to +20 %	
	Frequency	50/60 Hz ± 3 Hz	
	Distortion factor	10 % or less	
	Peak value	100 V system: 118 V or larger 220 V system: 258 V or larger	
	Momentary failure	20 ms or less (when receiving the rated AC voltage)	
	DC power supply ripple rate	1 % P-P maximum	
Withstanding voltage		1500 V AC for 1 minute (for 100 to 120/220 to 240 V AC) 500 V AC for 1 minute (for 24 V DC)	Between power & ground terminals
Insulation resistance		20 M ohms at 500 V DC	Between power & ground terminals
Grounding		Apply the grounding system which is defined by the rules and standards of the country or the region.	
Dust		Maximum of 0.3 mg/m <sup>3</sup>	
Corrosive gas		ANSI/ISA S71.04 G3 (standard)	Excluding SRM53D/SRM54D/ SBM54D
Noise	Electric field	10 V/m maximum (80 MHz to 1 GHz)	
	Static electricity	4 kV or less (direct discharge) 8 kV or less (aerial discharge)	
Vibration	Continuous vibration	Amplitude: 1.75 mm (5 Hz to 9 Hz) Acceleration: 4.9 m/s <sup>2</sup> (9 Hz to 150 Hz)	
	Non-continuous vibration	Amplitude: 3.5 mm (5 Hz to 9 Hz) Acceleration: 9.8 m/s <sup>2</sup> (9 Hz to 150 Hz)	
	Seismic	Acceleration: 4.9 m/s <sup>2</sup> or less	
	Transportation	Horizontal: 4.9 m/s <sup>2</sup> or less Vertical: 9.8 m/s <sup>2</sup> or less	When packaged
Impact		147 m/s <sup>2</sup> , 11 ms	
Altitude		2000 m above sea level or less	

## ■ APPLICABLE STANDARDS

The hardware components of the ProSafe-RS comply with the standards below.

### PLC Standard

IEC 61131-2 (\*1) (\*2) (\*3)

### Functional Safety Standard

IEC 61508

### Application Standards (\*1)

EN 54 (\*4), EN 298 (\*3) (\*5), EN 50156-1,  
IEC 61511-1, IEC 62061, NFPA85, NFPA72

### Safety Standards (\*6) (\*7) (\*12)

[CSA]

CAN/CSA-C22.2 No.61010-1  
(for 100-120 V AC power supply)

[CE Marking] Low Voltage Directive

EN 61010-1, EN 61010-2-030  
(for 100-120 V AC, 220-240 V AC and 24 V DC  
power supply)

[EAC Marking]

CU TR 004

### EMC Conformity Standards (\*2) (\*6)

[CE Marking] EMC Directive

EN 55011 Class A Group 1 equivalent  
(for 100-120 V AC, 220-240 V AC and 24 V DC  
power supply) (\*8)

EN 61000-6-2  
(for 100-120 V AC, 220-240 V AC and 24 V DC  
power supply) (\*1)

EN 61000-3-2  
(for 220-240 V AC power supply) (\*9)

EN 61000-3-3  
(for 220-240 V AC power supply)

[RCM]

EN 55011 Class A Group 1  
(for 220-240 V AC and 24 V DC power supply)

[KC Marking]

Korea Electromagnetic Conformity Standard  
(for 100-120 V AC, 220-240 V AC and 24 V DC  
power supply)

[EAC Marking]

CU TR 020

### Standards for Hazardous Location Equipment (\*10)

For selecting the right products for explosion protection, please refer to TI 32S01J30-01E without fail.

[FM Non-Incendive]

Class I Division 2 Groups A, B, C and D Temperature  
Code T4

Class 3600: 2011

Class 3611: 2004

Class 3810: 2005

(for 100-120 V AC, 220-240 V AC and 24 V DC  
power supply)

[Type "n"] (\*11)

⊕ II 3 G Ex nA IIC T4 Gc X (\*13)

⊕ II 3 G Ex nA nC IIC T4 Gc X (\*14)

EN 60079-0:2009

EN 60079-0:2012

EN 60079-15:2010

(for 24 V DC power supply)

### Marine Standards (\*10)

ABS (American Bureau of Shipping)

BV (Bureau Veritas)

Lloyd's Register

- \*1: For surge immunity, an external device, such as a lightning arrester, is needed.
- \*2: The 24 V DC and 48 V DC power supply lines from the field power supply to DI and DO needs to be 30 m or less.
- \*3: When 24 V DC (SPW484) is used for the system power supply, a UPS should be attached externally.
- \*4: The clamp filter (A1193MN) needs to be added to the V net cable.
- \*5: The 24 V DC and 48 V DC power supply lines from the field power supply to DI and DO needs to be 10 m or less.
- \*6: For a rack-mounted device to comply with safety standards and EMC standards, it needs to be housed in a lockable metal cabinet.
- \*7: Measurement inputs of this equipment are applied to Measurement category I for IEC/EN/CSA 61010-1:2001 and O (Other) for EN 61010-2-030. For details, refer to the ProSafe-RS Installation Guidance (TI 32S01J10-01E).
- \*8: A Class A hardware device is designed for use in the industrial environment. Please use this device in the industrial environment only.
- \*9: To restrain the power supply's harmonic waves, a power supply device with harmonic wave restraining capability or an external device with such a capability (e.g. active filter) needs to be connected.
- \*10: See the "List of Application Standard."
- \*11: To be compatible with Type "n", for example the requirements of cabinet must be met. The trailing "X" in symbols indicates specific conditions of use. For details, refer to the ProSafe-RS Explosion Protection (TI 32S01J30-01E).
- \*12: For ensuring all the hardware devices to satisfy the safety standards, the dedicated breakers in the power supply distribution board must conform to the following specifications.  
[CSA] CSA C22.2 No.5 or UL 489  
[CE Marking] EN 60947-1 and EN 60947-3  
[EAC Marking] EN 60947-1 and EN 60947-3
- \*13: Applied for products complied with Type "n", except for SBD2D, SBD3D and SBD4D.
- \*14: Applied for the below products.  
SBD2D, SBD3D and SBD4D

In relation to the CE Marking, the manufacturer and the authorised representative for ProSafe-RS in the EEA are indicated below:

Manufacturer: YOKOGAWA Electric Corporation  
(2-9-32 Nakacho, Musashino-shi, Tokyo 180-8750, Japan.)

Authorised representative in the EEA: Yokogawa Europe B.V.  
(Euroweg 2, 3825 HD Amersfoort, The Netherlands.)

Table List of Applicable Standard (1/2)

Models	Standards for Hazardous Location Equipment (*1)		Marine Standards (*2)			remarks
	FM Non-Incendive	Type "n"	ABS (American Bureau of Shipping)	BV (Bureau Veritas)	Lloyd's Register	
SSC60D	X	X	X (*3)	X (*3)	X (*3)	Including SCP461, SPW481, SPW482, SPW484
SSC60S	X	X	X (*3)	X (*3)	X (*3)	Including SCP461, SPW481, SPW482, SPW484
SSC50D	X	X	X	X	X	Including SCP451, SPW481, SPW482, SPW484
SSC50S	X	X	X	X	X	Including SCP451, SPW481, SPW482, SPW484
SSC57D	X	X	X	X	X	Including SCP451, SPW481, SPW482, SPW484
SSC57S	X	X	X	X	X	Including SCP451, SPW481, SPW482, SPW484
SNB10D	X	X	X	X	X	Including SPW481, SPW482, SPW484, SSB401
SAI143	X	X	X	X	X	Including SCCC01, STA4D, STA4S, STK4A SAI143-H□C does not comply with Marine Standards.
SAV144	X	X	X	X	X	Including SCCC01, STA4D, STA4S, STK4A
SAT145	X	X	X	X	X	
SAR145	X	X	X	X	X	
SAI533	X	X	X	X	X	Including SCCC01, STA4D, STA4S, STK4A
SDV144	X	X	X	X	X	Including SCCC01, SCCC02, STB4D, STB4S, STD4A SDV144-S□C does not comply with Marine Standards.
SDV521	X	X	X	X	X	SDV521-S□C does not comply with Marine Standards.
SDV526	-	-	-	-	-	
SDV531	X	X	X	X	X	Including SCCC01, SCCC02, STB4D, STB4S, STD4A SDV531-L complies with Marine Standards from style code S3. SDV531-L□C does not comply with Marine Standards.
SDV53A	X	X	X	X	X	
SDV541	X	X	X	X	X	Including SCCC01, SCCC02, STB4D, STB4S, STD4A SDV541-S□C does not comply with Marine Standards.
SCB100	X	X	X	X	X	
SCB110	X	X	X	X	X	
SNT10D	X	X	X	X	X	Including SPW481, SPW482, SPW484
SNT401	X	X	X	X	X	
SNT411	X	X	X	X	X	
SNT501	X	X	X	X	X	
SNT511	X	X	X	X	X	
SEC401	X	X	X	X	X	
SEC402	X	X	X	X	X	
ALR111	X	X	X	X	X	
ALR121	X	X	X	X	X	ALR121-S□B does not comply with Marine Standards.
ALE111	X	X	X	X	X	
SDCV01	X	X	X	X	X	
SEA4D	X	X	X	X	X	
SED2D	X	X	X	X	X	
SED3D	X	X	X	X	X	

X: Certified                      -: Non-Certified

\*1: For details, refer to "Explosion Protection (for ProSafe-RS)" (TI 32S01J30-01E).

\*2: For details, refer to "ProSafe-RS Installation Guidance (for Vnet/IP)" (TI 32S01J10-01E).

\*3: SSC60D-F and SSC60S-F comply with Marine Standards.  
SSC60D-S and SSC60S-S do not comply with Marine Standards.

Table List of Applicable Standard (2/2)

Models	Standards for Hazardous Location Equipment (*1)		Marine Standards (*2)			remarks
	FM Non-Incendive	Type "n"	ABS (American Bureau of Shipping)	BV (Bureau Veritas)	Lloyd's Register	
SED4D	X	X	X	X	X	
SWD2D	-	-	-	-	-	
SBT4D	X	X	X	X	X	
SBR4D	X	X	X	X	X	
SBA4D	X	X	X	X	X	
SBD2D	X	X	X	X	X	
SBD3D	X	X	X	X	X	
SBD4D	X	X	X	X	X	
SRM53D	-	-	X	X	X	
SRM54D	-	-	X	X	X	
SBM54D	-	-	X	X	X	
VI702	-	-	X	X	X	
VI701	-	-	X	X	X	
YCB301	X	X	X	X	X	
YCB141	X	X	X	X	X	
YCB111	-	-	X	X	X	
AKB136	X	X	X	X	X	
AKB161	X	X	X	X	X	
AKB331	X	X	X	X	X	
AKB611	X	X	X	X	X	
AKB651	X	X	X	X	X	
KS1	X	X	X	X	X	
YCB148	X	X	X	X	X	
YCB146	-	-	X	X	X	
YCB128	X	X	X	X	X	
AVR10D	-	-	X	X	X	

X: Certified                      -: Non-Certified  
 \*1: For details, refer to "Explosion Protection (for ProSafe-RS)" (TI 32S01J30-01E).  
 \*2: For details, refer to "ProSafe-RS Installation Guidance (for Vnet/IP)" (TI 32S01J10-01E).

**■ TRADEMARKS**

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