General Specifications

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

GS 32Q01B10-31E

■ 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.

■ 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 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 CENTUM VP and CENTUM CS 3000 R3 (hereinafter, “VP/CS 3000”), an integrated production control system. The SCS can be operated and monitored by the HIS (human interface station) of the VP/CS 3000.

For specifications regarding the VP/CS 3000, refer to its general specifications.

For specifications in case of integrating the ProSafe-RS with the FAST/TOOLS, refer to the general specifications (GS 32Q04D20-31E) for the FAST/TOOLS Integration Engineering Package.

For specifications regarding the system on V net, refer to the general specifications (GS 32Q02B10-31E) for ProSafe-RS Safety Instrumented System Overview (for V net).

● Safety Engineering PC (SENG)

To configure the ProSafe system, the CHS5100 Safety System Generation and Maintenance Package needs to be installed on a PC (IBM PC/AT-compatible computers). 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 VP/CS 3000 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 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).

SCS with CPU node connectable to 9 I/O nodes
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).

Software
CFS1300 Safety Control Functions Package (for SSC60☐)
CFS1100 Safety Control Functions Package (for SSC50☐)
CFS1350 Node Expansion Package (for SSC60☐)
CFS1355 Node Expansion Package of SCS Simulator (for SSC60☐)
For details, refer to the general specifications “Safety Control Functions Package” (GS 32Q03B10-31E, GS 32Q03B20-31E).

YOKOGAWA

Yokogawa Electric Corporation
2-9-32, Nakacho, Musashino-shi, Tokyo, 180-8750 Japan

GS 32Q01B10-31E

12th Edition Nov. 27, 2015 (YK)

● Peripheral Equipment

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

Items	Models	General Specifications
Safety Node Unit	SNB10D	GS 32Q06K10-31E
I/O Modules		GS 32P06K60-01EN
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
Vnet/IP Interface Card	VI702	GS 33K50C10-50E, GS 33P06B11-31E
Power Supply Bus Unit	AEPV7D	GS 33K50K41-50E

● Layer 2 Switch (L2SW)

L2SW relays communications among devices connected to the Vnet/IP network. The Vnet/IP domain refers to the Vnet/IP system area connected by L2SW. In the Vnet/IP domain, use L2SW with 1 Gbps communication speed.

● Layer 3 Switch (L3SW)

L3SW relays communications among Vnet/IP domains. For communication among Vnet/IP domains, use L3SW with 1 Gbps communication speed.

● SNTP Server

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

● V net Router

V net router connects and transmits control communications between the Vnet/IP and V net domains. The control data can be sent and received in both ways between the Vnet/IP and V net domains. Control and monitoring of the safety control stations in the other domain, and vice versa, is enabled.

AVR10D Duplexed V net Router (duplexed communication modules and duplexed power supply modules)

For V net router engineering, VP/CS 3000 engineering function is required.

For more details, refer to the general specifications “Duplexed V net Router” (GS 33K50D10-50E).

● Related Software

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

Items	Models	General Specifications
CENTUM VP/CS 3000 Integration Engineering Package	CHS5200	GS 32Q04D10-31E
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

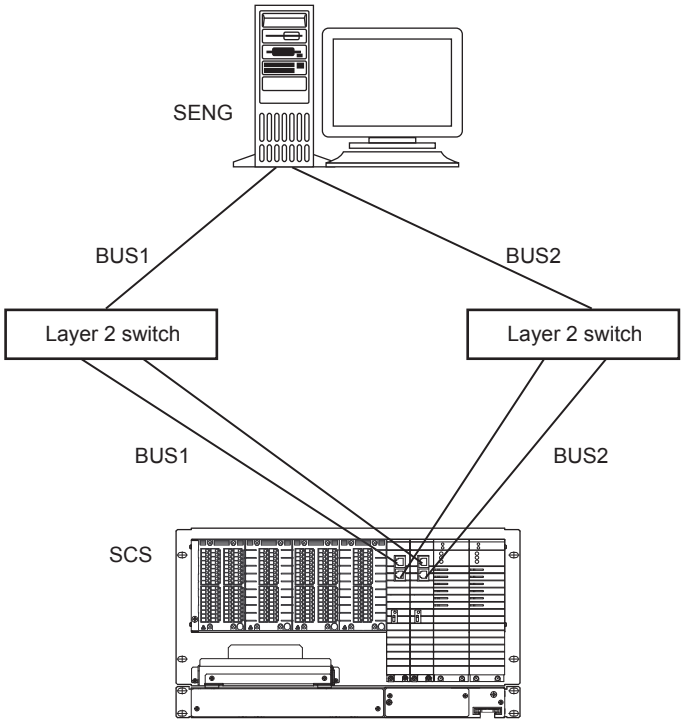
For details, refer to the general specification below.

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.

F01E.ai

Figure Example of Minimum Configuration of the System

● Maximum System Configuration

Vnet/IP domain: Maximum 16 domains
Vnet/IP station: Maximum 64 stations per domain
Maximum 256 stations per system

The Vnet/IP stations refer to a SCS for Vnet/IP, a V net router and a PC with Vnet/IP Interface Card (VI702).

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	– (*1)	– (*1)
R3.02.20	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 PCs, 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 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	
	Crest factor	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^3	
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^2 (9 Hz to 150 Hz)	
	Non-continuous vibration	Amplitude: 3.5 mm (5 Hz to 9 Hz) Acceleration: 9.8 m/s^2 (9 Hz to 150 Hz)	
	Seismic	Acceleration: 4.9 m/s^2 or less	
	Transportation	Horizontal: 4.9 m/s^2 or less Vertical: 9.8 m/s^2 or less	When packaged
Impact		147 m/s^2, 11 ms	
Altitude		2000 m above sea level or less	