MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

YOKOGAWA PROSAFE-RS

SAI533-H33 S1

ANALOG CURRENT OUTPUT MODULE

Used with the applicable ProSafe-RS FIO analog I/O configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Yokogawa official General Specifications

● Current Output Module

This module outputs 4 to 20 mA signals to the field.
The SAI533 can be made dual redundant.

Item	Specifications
Model	SAI533
Number of output channels	8 channels, module isolation (*3)
Rated output range	4 to 20 mA
Maximum range of guaranteed precision	1.25 to 23 mA
Output range	1.25 to 23 mA
Allowable load resistance @ rated range	230 to 600 Ω
Accuracy	±48 μA
Data update frequency	40 ms
Temperature drift	±16 μA/10 ºC
Withstand voltage	1.5 kV AC between output signal and system for 1 minute (*1)
Maximum current consumption	5 V system: 320 mA 24 V system: 300 mA
Weight	Approx. 0.26 kg (For pressure clamp terminal block or MIL cable) Approx. 0.33 kg (With signal cable interface adapter)
External connection	Pressure clamp terminal MIL cable Dedicated signal cable
Support PST(*2)	Available (KS1)

*1: 500 V AC when dedicated signal cable is used.
*2: Diagnosis in operation of PST(Partial Stroke Test)
*3: When SAI533-H□3 is used in the ambient temperature more than 60°C, number of output channels which a user can use is restricted. Refer to “ProSafe-RS Outline of I/O Modules (for FIO)” (GS 32P06K60-01EN).

■ HART COMMUNICATION

Analog I/O module with HART communication on ProSafe-RS allows Plant Resource Manager (PRM) to manage the HART communication devices connected to input and output modules on SCS. Also, the analog output module allows PRM client to conduct Partial Stroke Test (PST) on HART-supported valve positioner equipped with the PST function.

The HART communication functions on ProSafe-RS are interference-free and have no impact on the safety functions on SCS.

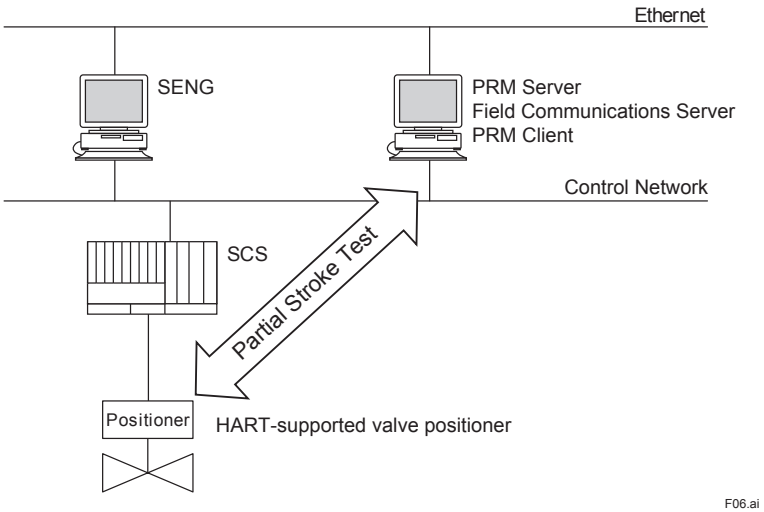


Figure Example of the HART Communication Function System Configuration

● Analog I/O Modules for HART Communication Function

The following table shows analog I/O modules for HART communication function available to ProSafe-RS.

Model	Module	Description
SAI143-H	Analog Input module (Current input)	4 to 20 mA, 16 channels, module isolation
SAI533-H	Analog Output module (Current output)	4 to 20 mA, 8 channels, module isolation

One HART device is connectable for each channel. Each channel is equipped with a power supply function to the HART device.

Each module has only one HART modem and is communicable concurrently with only one HART device.

● HART Communication Specifications

Table HART Communication Specifications

Function	Description
Communication mode	Serial half duplex, start-stop synchronization, 1 start/ 8 bit/ odd parity/ 1 stop
Applicable standard	HART Protocol Revision 5.7 (*1)
Transmission speed	1200 ±2 bps
Modulation technique	Binary phase-continuous FSK 1: 1200 Hz ±1 %, 0: 2200 Hz ±1%
Frame length	5 to 267 bytes Contents of max. 267 bytes: Delimiter: 1 Address: 5 Command: 1 Byte count: 1 Data: 255 (includes two bytes of response code) Check byte: 1
Frame detection	3 byte header byte-count carrier (ON/OFF) Preamble: 5 to 20 bytes
Error detection coding	Longitudinal/vertical parity
Response time	Max. 28 characters (256.7 ms)
No response timer	33 characters (305 ms) for primary, 41 characters (380 ms) for secondary
Bus monitor	8 characters (75 ms)
Response window	20 ms

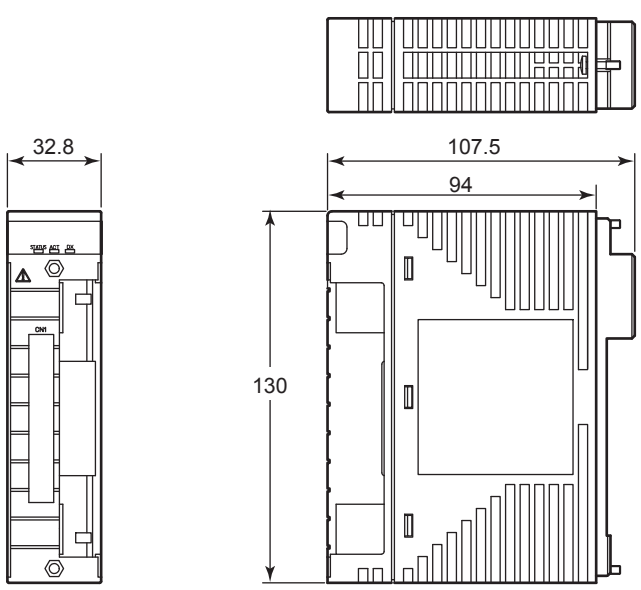
*1: The HART 5, 6, and 7 devices can be connected but applying the HART protocol 5.7 function.

■ EXTERNAL DIMENSIONS

● SAI143, SAV144 and SAI533 Analog Input/Output Modules

For pressure clamp and MIL cable

Unit : mm



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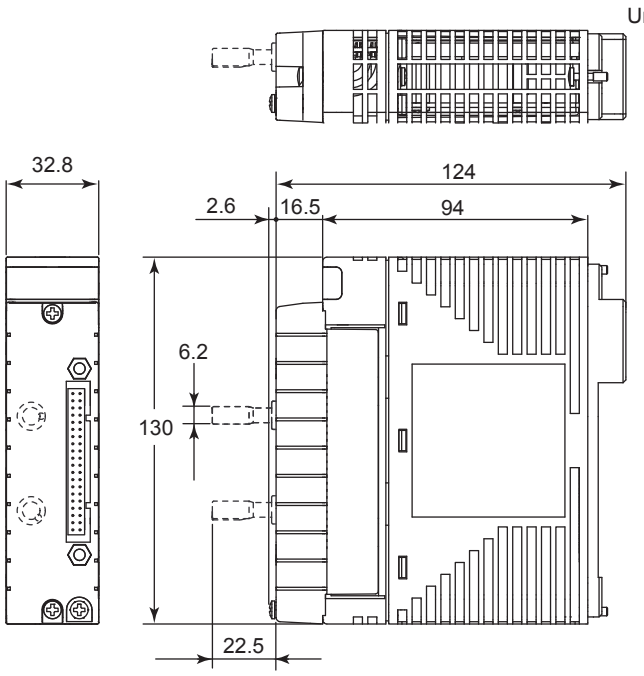
Nominal tolerance:

Nominal tolerance is ± 0.8 mm for the dimensions of 0.5 mm or more and 120 mm or less, and the combined nominal tolerance is ± 1.5 mm.
The nominal tolerance is in accordance with JEM 1459 for the dimensions over 120 mm.

With signal cable interface adapter

Unit: mm



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Nominal tolerance:

Nominal tolerance is ± 0.8 mm for the dimensions of 0.5 mm or more and 120 mm or less, and the combined nominal tolerance is ± 1.5 mm.
The nominal tolerance is in accordance with JEM 1459 for the dimensions over 120 mm.

Note: Dash line expresses prevention pin of false insertion. This pin is added if option code /PRP is specified.

		Description
Model	SAT145	TC/mV Input Module (16 channels, Isolated Channels)
Suffix Codes	-S	Standard type
	6	With signal cable interface adapter and no explosion protection
	F	With signal cable interface adapter and explosion protection
	3	With ISA Standard G3 and temperature (-20 to 70 ºC)
Option Codes	/PRP	With prevention pin of false insertion

		Description
Model	SAR145	RTD Input Module (16 channels, Isolated Channels)
Suffix Codes	-S	Standard type
	6	With signal cable interface adapter and no explosion protection
	F	With signal cable interface adapter and explosion protection
	3	With ISA Standard G3 and temperature (-20 to 70 ºC)
Option Codes	/PRP	With prevention pin of false insertion

		Description
Model	SAI533	Analog Output Module (4 to 20 mA, 8 channels, module isolation)
Suffix Codes	-H	With HART communication
	5	For pressure clamp terminal block or MIL cable with no explosion protection
	6	With signal cable interface adapter and no explosion protection (*1)
	E	For pressure clamp terminal block or MIL cable with explosion protection
	F	With signal cable interface adapter and explosion protection (*1)
	3	With ISA Standard G3 and temperature (-20 to 70 ºC)
Option Codes	/A4S00	With pressure clamp terminal block for analog [Model: STA4S-00]
	/A4S10	With pressure clamp terminal block for analog (with surge absorber) [Model: STA4S-10]
	/A4D00	With dual-redundant pressure clamp terminal block for analog (*2) [Model: STA4D-00]
	/A4D10	With dual-redundant pressure clamp terminal block for analog (with surge absorber) (*2) [Model: STA4D-10]
	/PRP	With prevention pin of false insertion (*3)
	/CCC01	With connector cover for MIL cable (for flat ribbon cable) [Model: SCCC01]

*1: When selecting SAI533-H63 or -HF3, you can not choose the option code of pressure clamp terminal block and MIL cable connector.
*2: When using this module in a dual-redundant configuration, order an additional module with the same specifications but without option codes.
*3: When SAI533-H63 or -HF3 is selected, you can choose the option code for prevention pin of false insertion. A mechanism to prevent wrong type I/O module insertion is supported with signal cable. The signal cable used with this I/O module must have option code /SAI533.

■ CONFORMITY STANDARDS

Refer to “ProSafe-RS Standards Compliant Models” (GS 32P01B60-01EN).

■ ORDERING INFORMATION

Specify the model and suffix codes.

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

■ TRADEMARKS

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