

Yokogawa SAI533-H33/PRP S1

HART Analog Output Module

Product scope

- Generates eight isolated 4–20 mA control outputs for ProSafe-RS field devices.
- Carries HART diagnostics and parameters over the same two-wire current loops.
- Supports engineered redundant use and a prevention-keyed I/O arrangement.

Manufacturer source

Exact-model technical record

Verified model-specific overview, function, operating principle, applications and technical data.

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Yokogawa SAI533-H33/PRP S1

HART Analog Output Module

Product overview

Yokogawa SAI533-H33/PRP S1 is an eight-channel 4–20 mA analog output module with channel-to-channel isolation and HART communication. The /PRP execution includes prevention-keying for the ProSafe-RS I/O assembly.

SAI533-H33/PRP S1 provides eight module-isolated current outputs for safety and process-control final elements. Each channel offers an extended 1.25–23 mA output span for diagnostic underrange and overrange handling.

HART frequency-shift-keyed communication is superimposed on the analog current so device variables and diagnostics can be exchanged without interrupting the primary signal. The module supports redundant arrangement where the engineered node configuration calls for it.

Terminal style, redundancy, HART revision and prevention pin must match the existing ProSafe-RS installation. The H33 and S1 suffixes should be preserved exactly because the available public table does not justify substituting another SAI533 ordering combination.

Technical specifications

Analog output channels	8
Signal standard	4 to 20 mA
Extended output span	1.25 to 23 mA
Isolation	Channel-to-channel module isolation
Load resistance	230 to 600 Ω
Output accuracy	$\pm 48 \mu\text{A}$
Update period	40 ms
Temperature drift	$\pm 16 \mu\text{A}$ per 10 °C
Withstand voltage	1.5 kV AC
Withstand voltage with dedicated cable	500 V AC
5 V current consumption	320 mA
24 V current consumption	300 mA
HART mode	Serial half-duplex
HART data rate	1200 bit/s $\pm 2\%$
HART revision	5.7
HART frequencies	1200 and 2200 Hz FSK
HART frame length	5 to 267 bytes
Maximum response field	28 characters / 256.7 ms
Redundant installation	Supported
Prevention key	/PRP
ProSafe-RS style	S1

SAI533-H33/PRP S1 function and operating principle

Ordered configuration

The complete H33/PRP S1 suffix is retained without inferring an undocumented terminal substitution.

System role

It commands analog final elements while providing a digital service channel to intelligent field devices.

Selection and installation

Loop resistance, HART compatibility and node redundancy should be checked in the installed ProSafe-RS project.

Functional path

- Generates eight isolated 4–20 mA control outputs for ProSafe-RS field devices.
- Carries HART diagnostics and parameters over the same two-wire current loops.
- Supports engineered redundant use and a prevention-keyed I/O arrangement.

Application scenarios

- Safety systems drive valve positioners while reading HART status for device-health supervision.
- Process shutdown panels use isolated channels to prevent one field loop fault from propagating to neighbouring outputs.
- Commissioning teams access supported smart-device parameters without lifting the 4–20 mA wiring.

SAI533-H33/PRP S1 engineering checks

Communication

- HART data uses 1200 and 2200 Hz FSK over the active analog current loop.
- The interface operates half-duplex at 1200 bit/s within the documented tolerance.
- Frame handling supports HART revision 5.7 messages from 5 to 267 bytes.

Monitoring & Control

- Each channel controls current across the extended 1.25 to 23 mA operating span.
- The 40 ms update period refreshes commanded output values for all configured channels.
- HART diagnostics add device information without replacing the primary 4–20 mA control variable.

Safety & Compliance

- Channel-to-channel isolation separates field-loop potentials within the module.
- Withstand voltage is 1.5 kV AC, or 500 V AC when the specified dedicated cable condition applies.
- The /PRP prevention key helps stop an incompatible module or terminal arrangement from being inserted.

Critical technical note

Preserve the H33/PRP S1 suffix when replacing SAI533-H33/PRP S1; terminal and prevention-key differences can block installation or alter wiring.

The technical content in this document is limited to the exact product identity shown above and the verified manufacturer material used for preparation.



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