

SIEMENS

39SAMCAN 16133-71/13

Datasheet



APACS+ Standard Analog Module (SAM)

Official technical pages selected from: Siemens DP/IOBus Link Installation and Configuration Manual

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OFFICIAL MANUFACTURER TECHNICAL CONTENT

I/O Module and Channel Parameters

MinRange: MinRange is an optional parameter that allows you to specify a minimum operating value in EngUnits. If the reading drops below this value, an underrange error is reported.

MaxRange: MaxRange is an optional parameter that allows you to specify a maximum operating value in EngUnits. If the reading goes above this value, an overrange error is reported.

MinScale: The module will linearly scale raw data (ohms) to engineering units for each channel. The scaling algorithm uses the MinScale/MaxScale and MinRange/MaxRange parameters that you set. For example, given a MinScale of 0.0, a MaxScale of 100.0, a MinRange of 0.0, and a MaxRange of 1000, if the input to the channel is 500 ohms, the scaled value will be 50.0.

MinScale can be any REAL number (REAL numbers are valid between -3.4028e38 and +3.4028e38).

MaxScale: MaxScale can be any REAL number.

EngUnits: Engineering units for the scaled value can be selected from a list of common engineering units.

Bias: You can enter a bias in engineering units, on a per channel basis, to compensate for known offsets. The bias value is added to the linearized input.

InputFaultState (hidden from HW Config, cannot be changed in HW Config): For QUADLOG input channels, Siemens strongly recommends that customers configure and use the channel driver's substitute value to ensure that the input value is safe under fault conditions. Doing so may allow out-of-range values to be input for one or two scans, but then the channel driver stabilizes to the substitute value.

The original description of **InputFaultState** is as follows:

"If channel quality is bad or questionable, you can select to have the module return the actual reading (No_Change), the largest value for the channel (MaxRange), or the smallest value (MinRange). The default is to return the MinRange."

DigFiltTimeCnst: Digital filtering can be applied to resistance input channel signals to reduce the effects of electrical noise. The digital filter is a first order lag, adjustable for time constants of 0.0159 to 159.0 seconds. Equivalent breakpoint frequencies are 10.0 to 0.001 Hz. The default value can be increased for noisy signals.

StepResponseTime: This parameter determines the time for the channel to fully respond to a step input. A longer StepResponseTime provides more accurate readings. The valid range is between 0.1 and 40.00 seconds.

7.9 QUADLOG Standard Analog Module (SAM)

The Standard Analog Module (SAM) can interface both analog and discrete I/O signals to a control module's IOBUS. It provides 32 channels, each of which can be configured for standard I/O types. Related signals, such as the I/O for a particular loop, can be grouped together. To isolate field faults, each channel is electrically isolated from the module's CPU, IOBUS, and ground. Also, each channel uses an isolated 24 V power source, and all channels are current-limited to protect against short circuits.

OFFICIAL MANUFACTURER TECHNICAL CONTENT

I/O Module and Channel Parameters

QUADLOG SAM Channel Types

The channel types supported for the SAM are listed here. In a DP/IO Bus Link environment, configuration information in this document supersedes information in the section titled "Configuring I/O Channels" in the document [Using the ProcessSuite 4-mation Configuration Software Version 4.30 or Higher](#) (CG39-20)..

- SAM Analog In (SAIC)
- SAM Analog Out (SAOC)
- SAM Disc In (SADI)
- SAM Disc Out (ACDO)

7.9.1 QUADLOG SAM Analog In (SAIC)

The SAM Analog In channel type returns a REAL variable. The table below shows the softlist parameters for this channel type.

EngUnits (engineering units) is an optional parameter (no engineering units is an acceptable choice)

PARAMETER	SELECTION	DEFAULT
MinScale	Any REAL Number	0.0
MaxScale	Any REAL Number	100.0
EngUnits	ACFH, ACFM, AMPS, ATM, bar, BARG, bbl, bhp, BPD, bph, Btu, Btu/hr, Btu/lbm, Btu/SCF, cal, cal/hr, cal/lbm, cal/SCF, cm, cps, days, deg, degC, degF, degK, degR, ft, ft/sec, ft/sec2, ft3, ft3/lb, g, g/cm3, gal, gal/day, gal/hr, gal/min, GPD, GPH, GPM, hp, hr, Hz, in, in3, InH2O, InHg, joules, kcal, kcal/hr, kcal/lbm, kcal/SCF, kg, kg/cm2, kg/day, kg/hr, kg/m3, kPa, kPaa, kPag, KPPH, kVA, kW, 1/day, 1/hr, 1/min, lb, lb/ft3, lb/hr, liter, m, m/sec, m/sec2, m3, m3/day, m3/hr, m3/kg, mA, mbar, MBRA, MBRG, MCFH, mhos, mil, min, ml, Mlb/hr, mm, mmHg, mol, mol/m3, ms, mS/cm, mV, MW, NM3/H, Ohms, Percent, PCT_LVL, pH, PPH, ppm, psi, psia, psig, pulses, rad, rpm, S/cm, SCCM, SCFH, SCFM, sec, t/day, ton, tonne, tonne/day, VA, vars, Volts, W, yd3/day, yd3/hr	Percent
DigFiltTimeCnst	0.0 to 159.0 sec	0.0
Bias	Any REAL Number	0.0
OpenCircuitTest	Enabled, Disabled	Enabled
Shutdown_Channel	TRUE, FALSE	FALSE

MinScale: The module linearly scales raw data (4-20 mA) to engineering units for each channel. The scaling algorithm uses the MinScale/MaxScale parameters that you set. For example, given a MinScale of 0.0 and a MaxScale of 100.0, if the input to the channel is 12 mA, the scaled value will be 50.0.

MinScale can be any REAL number (REAL numbers are valid between -3.4028e38 and +3.4028e38)

MaxScale: MaxScale can be any REAL number.

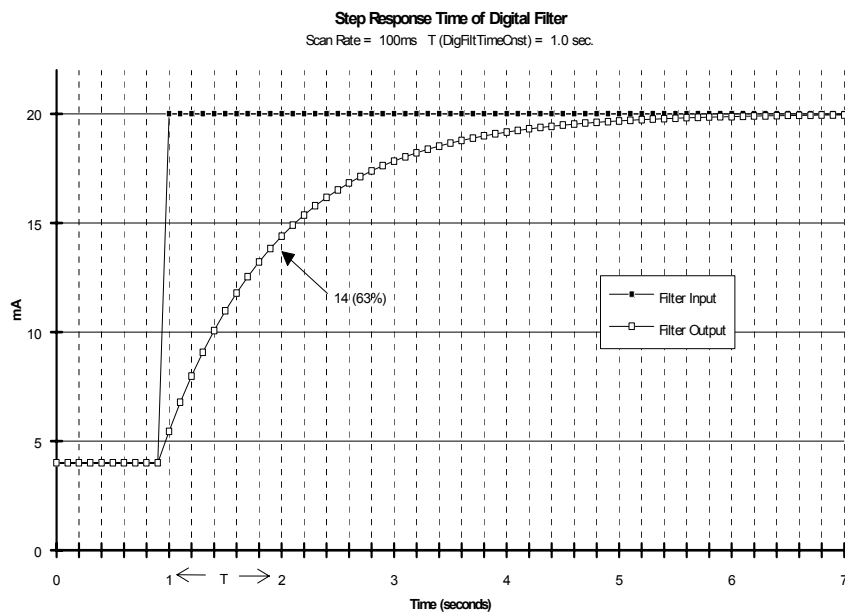
EngUnits: Engineering units for the scaled value can be selected from a list of common engineering units.

OFFICIAL MANUFACTURER TECHNICAL CONTENT

I/O Module and Channel Parameters

DigFiltTimeCnst: Digital filtering can be applied to analog input signals to reduce the effects of electrical noise. The digital filter is a first order lag, adjustable for time constants of 0.0159 to 159.0 seconds (0.0 disables the filter). Equivalent breakpoint frequencies are 10.0 to 0.001 Hz. The default value can be increased for noisy signals.

The figure below shows the step release time of the digital filter.



Bias: You can enter a bias, in engineering units, on a per channel basis to compensate for known offsets. The bias value is added to the scaled input.

OpenCircuitTest: You can enable or disable open circuit testing. An open circuit condition exists if the reading is < 0.02 mA.

Shutdown_Channel: When TRUE and channel quality is BAD or QUESTIONABLE, the SAM module disables (0 mA) all of its I/O and reports a shutdown error (Class 4, SSC 37, EC 31). Based on the default configuration supplied with QUADLOG, a class 4 error causes all outputs to shut down to their de-energized state (i.e. 0 volts or 0 mA). The configuration can be changed to only shut down the affected outputs or not to shut down at all. Only channels that are critical to the process should be configured as shutdown_channels. Note that in rack-to-rack redundant systems, a switchover to the standby side, rather than a system shutdown, occurs if an I/O failure occurs. Both sides of a redundant system would have to fail for a shutdown to occur. Refer to the section titled [Shutdown Logic](#).

OFFICIAL MANUFACTURER TECHNICAL CONTENT

I/O Module and Channel Parameters

7.9.2 QUADLOG SAM Analog Out (SAOC)

The SAM Analog Out channel type accepts a REAL variable. The table below shows the softlist parameters for this channel type.

EngUnits (engineering units) is an optional parameter (no engineering units is an acceptable choice)

PARAMETER	SELECTION	DEFAULT
OutputRange	mA_4to20, mA_0to20	mA_4to20
MinScale	Any REAL Number	0.0
MaxScale	Any REAL Number	100.0
EngUnits	ACFH, ACFM, AMPS, ATM, bar, BARG, bbl, bhp, BPD, bph, Btu, Btu/hr, Btu/lbm, Btu/SCF, cal, cal/hr, cal/lbm, cal/SCF, cm, cps, days, deg, degC, degF, degK, degR, ft, ft/sec, ft/sec2, ft3, ft3/lb, g, g/cm3, gal, gal/day, gal/hr, gal/min, GPD, GPH, GPM, hp, hr, Hz, in, in3, InH2O, InHg, joules, kcal, kcal/hr, kcal/lbm, kcal/SCF, kg, kg/cm2, kg/day, kg/hr, kg/m3, kPa, kPaa, kPag, KPPH, kVA, kW, 1/day, 1/hr, 1/min, lb, lb/ft3, lb/hr, liter, m, m/sec, m/sec2, m3, m3/day, m3/hr, m3/kg, mA, mbar, MBRA, MBRG, MCFH, mhos, mil, min, ml, Mlb/hr, mm, mmHg, mol, mol/m3, ms, mS/cm, mV, MW, NM3/H, Ohms, Percent, PCT_LVL, pH, PPH, ppm, psi, psia, psig, pulses, rad, rpm, S/cm, SCCM, SCFH, SCFM, sec, t/day, ton, tonne, tonne/day, VA, vars, Volts, W, yd3/day, yd3/hr	Percent
ProtectedOutput	Enabled, Disabled	Enabled
Bias	Any REAL Number	0.0
ReadBack	Enabled, Disabled	Enabled
Shutdown_Channel	TRUE, FALSE	FALSE

OutputRange: SAM Analog Output channels are configurable to operate with two current ranges: 4-20 mA and 0-20 mA

MinScale: The module performs a linear conversion from engineering units to the selected OutputRange for each channel. The scaling algorithm uses the MinScale/MaxScale and OutputRange parameter values that you set. For example, given a MinScale of 0.0, a MaxScale of 100.0, and an OutputRange of 4-20 mA, if the value written to the SAM Analog Output Channel is 50, the module will output 12 mA.

MinScale can be any REAL number (REAL numbers are valid between - 3.4028e38 and +3.4028e38).

MaxScale: MaxScale can be any REAL number.

EngUnits: Engineering units for the scaled value can be selected from a list of common engineering units.

ProtectedOutput: Each output can be configured to turn off (0 mA) all SAM outputs in the event that diagnostics determine that the output current is greater than it is intended to be by 9% or more. You may want to configure an output as a ProtectedOutput if it is critical to the process or if it may present a hazard to personnel or equipment.

Bias: You can enter a bias in engineering units, on a per channel basis, to compensate for known offsets. The bias value is added to the scaled output.

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ReadBack: The state of an output channel is automatically “read back” by input circuitry on the same channel. The readback is used to diagnose and report faults. You can disable readback, which, in turn, disables reporting of readback-related faults (i.e. Open Circuit, Readback Lower than Output, Readback > Output, Readback > Output on Critical Channel).

Shutdown_Channel: When TRUE and channel quality is BAD or QUESTIONABLE, the SAM module disables (0 mA) all of its I/O and reports a shutdown error (Class 4, SSC 37, EC 31). Based on the default configuration supplied with QUADLOG, a class 4 error causes all outputs to shut down to their de-energized state (i.e. 0 volts or 0 mA). The configuration can be changed to only shut down the affected outputs or not to shut down at all. Only channels that are critical to the process should be configured as shutdown_channels. Note that in rack-to-rack redundant systems, a switchover to the standby side, rather than a system shutdown, occurs if an I/O failure occurs. Both sides of a redundant system would have to fail for a shutdown to occur. Refer to the section titled [Shutdown Logic](#).

7.9.3 QUADLOG SAM Disc In (SADI)

The SAM Disc In channel type returns a BOOL variable. The table below shows the softlist parameters for this channel type.

PARAMETER	SELECTION	DEFAULT
MinOnStatePct	0.0 to 100.0	80.0
MaxOffStatePct	0.0 to 100.0	20.0
Shutdown_Channel	TRUE, FALSE	FALSE

MinOnStatePct: The reading is automatically scaled from 0-10 mA to 0-100%. A scaled reading greater than or equal to MinOnStatePct will report a Boolean TRUE to the control module.

MaxOffStatePct: The reading is automatically scaled from 0-10 mA to 0-100%. A reading less than or equal to MaxOffStatePct will report a Boolean FALSE to the control module.

Shutdown_Channel: When TRUE and channel quality is BAD or QUESTIONABLE, the SAM module disables (0 mA) all of its I/O and reports a shutdown error (Class 4, SSC 37, EC 31). Based on the default configuration supplied with QUADLOG, a class 4 error causes all outputs to shut down to their de-energized state (i.e. 0 volts or 0 mA). The configuration can be changed to only shut down the affected outputs or not to shut down at all. Only channels that are critical to the process should be configured as shutdown_channels. Note that in rack-to-rack redundant systems, a switchover to the standby side, rather than a system shutdown, occurs if an I/O failure occurs. Both sides of a redundant system would have to fail for a shutdown to occur. Refer to the section titled [Shutdown Logic](#).

7.9.4 QUADLOG SAM Disc Out (ACDO)

The SAM Disc Out channel type accepts a BOOL variable. The table below shows the softlist parameters for this channel type.



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