

Siemens 6ES7961-3AA00-0AC0

High-Speed Counter Submodule

Product scope

- Counts one high-speed encoder or pulse channel across a full 32-bit range.
- Provides two threshold comparisons with two protected local outputs.
- Supports event interrupts for zero, limits, overflow and underflow conditions.

Manufacturer source

Exact-model technical record

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

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Siemens 6ES7961-3AA00-0AC0

High-Speed Counter Submodule

Product overview

Siemens 6ES7961-3AA00-0AC0 is the SIMATIC M7 IF 961-CT1 single-channel high-speed counter. It evaluates 5 V differential encoder signals to 500 kHz or 24 V pulse signals to 200 kHz and provides two comparison outputs.

6ES7961-3AA00-0AC0 counts signed or unsigned pulses over a 32-bit range and supports endless, one-shot or periodic operation in either direction. Inputs accept incremental encoder tracks or discrete 24 V counting signals.

Two comparison values can drive the pair of local outputs, while hardware and software gates control the measurement interval. Interrupts are available for comparison events, zero crossing, overflow and underflow.

Signal level, maximum pulse rate, encoder supply and gate wiring must match the selected mode. Restoring the original presets, comparison thresholds and direction settings is essential because a running counter replacement cannot infer them from the connector alone.

Technical specifications

Counter channels	1
Counter width	32 bit
Unsigned range	0 to 4,294,967,295
Signed range	-2,147,483,648 to +2,147,483,647
Maximum frequency at 5 V	500 kHz
Maximum frequency at 24 V	200 kHz
Counting modes	Endless, single or periodic
Counting directions	Up or down
Comparison values	2
Digital outputs	2
Output current range	5 mA to 0.3 A
Output protection	Electronic short-circuit protection
Digital control inputs	4
Input filter choices	50 kHz or 200 kHz
5 V interface	Differential, minimum 0.5 V
24 V logic 0	-30 to +5 V
24 V logic 1	+11 to +30 V
Typical 24 V input current	7 mA
Supported encoders	Incremental encoder A/B/N and 24 V pulse source
Submodule identifier	03H
M7-300 current consumption	0.053 A at 24 V
M7-400 current consumption	0.15 A at 5 V
Power loss	1.5 W

6ES7961-3AA00-0AC0 function and operating principle

Ordered configuration

This part is the IF 961-CT1 counter interface with submodule identification 03H.

System role

It converts encoder position or pulse accumulation into time-critical M7 application data.

Selection and installation

Encoder voltage class, filter, direction, gates and preset values must be taken from the original hardware configuration.

Functional path

- Counts one high-speed encoder or pulse channel across a full 32-bit range.
- Provides two threshold comparisons with two protected local outputs.
- Supports event interrupts for zero, limits, overflow and underflow conditions.

Application scenarios

- Packaging axes can monitor incremental encoder travel while using comparisons for registration events.
- Flow or production counters accumulate high-rate pulses beyond the range of standard digital inputs.
- Test rigs use gated periodic counting to measure frequency or movement during a defined sampling window.

6ES7961-3AA00-0AC0 engineering checks

Control

- Software and hardware gates determine when counting is enabled.
- Two comparison thresholds can independently control the local output functions.
- Interrupts report zero crossing, comparison events, overflow and underflow to the M7 program.

Diagnostics & Protection

- Diagnostics cover parameter faults and loss of an expected interrupt condition.
- The 5 V differential interface includes sensor-line monitoring for the encoder tracks.
- Both output channels include electronic protection against a short circuit.

Performance

- Differential 5 V signals can be counted at frequencies up to 500 kHz.
- The 24 V input path supports counting rates up to 200 kHz.
- Signed and unsigned 32-bit formats accommodate both directional position and large total values.

Critical technical note

Remove motion and save presets before replacing 6ES7961-3AA00-0AC0; an incorrect count direction or gate mode can create an unsafe position reference.

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