Siemens 6ES7214-1BG40-0XB0

01 Controller architecture and execution

Siemens 6ES7214-1BG40-0XB0 is an AC-powered CPU 1214C compact controller with 24 V DC digital inputs, mechanical relay outputs and voltage analog inputs. Its Ethernet interface connects the configured controller to programming, operator and automation devices.

AC CPU power	Program execution	Local / expanded I/O	Configured process

Circuit execution

The AC/DC/Relay execution uses AC for the CPU supply, DC for digital input sensing and mechanical contacts for digital output switching. These are separate circuit functions; an AC-powered CPU does not accept line voltage on its digital inputs. Load supplies and protective arrangements remain part of the machine electrical design.

Network integration

The Ethernet interface supports PROFINET controller and device functions within the applicable firmware configuration. A single Ethernet port is not an integrated two-port switch, and support for real-time I/O does not imply IRT or media-redundancy capability. Plan network topology and connection resources against the actual project.

Analog acquisition

Onboard analog channels are single-ended voltage inputs. Resolution, input accuracy, integration time and smoothing describe different measurement properties. The application must scale the acquired value and evaluate its useful response in conjunction with program execution, input conditioning and the process itself.

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02 Power domains and local I/O

CPU supply range	85–264 V AC; 47–63 Hz
CPU-only line current	100 mA at 120 V AC; 50 mA at 240 V AC
Line current with expansion accessories	300 mA at 120 V AC; 150 mA at 240 V AC
Maximum input inrush	20 A at 264 V AC; I^2t 0.8 A^2s
Supply hold-up	20 ms at 120 V AC; 80 ms at 240 V AC
CPU power dissipation	14 W
5 V SM/CM bus budget	1600 mA maximum
Sensor power output	20.4–28.8 V DC; 400 mA maximum, short-circuit protected
Onboard digital inputs	14; 24 V DC nominal, 4 mA per active input
Input logic thresholds	Logic 1: ≥15 V at 2.5 mA; logic 0: ≤5 V at 1 mA
Digital input topology	Sink/source; IEC Type 1 sink; one isolation group
Onboard digital outputs	10 mechanical relays; two isolation groups

Separate source budgets

The 5 V SM/CM current allowance supplies expansion electronics. The 24 V sensor output supplies a different circuit; compare each load with the correct source rather than summing unlike voltage domains.

AC interruption behavior

Hold-up differs with supply voltage: 20 ms at 120 V and 80 ms at 240 V. These figures describe the CPU supply and do not guarantee that separately powered field loads remain energized.

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03 Measurement and communication limits

Relay switching voltage	5–30 V DC or 5–250 V AC
Maximum relay point current	2 A; no internal overload protection
Relay operation	10 ms maximum switching delay; 1 Hz maximum switching frequency
Onboard analog inputs	2 single-ended voltage inputs; 0–10 V
Analog full-scale representation	0–27648; 10-bit resolution
Analog input impedance	≥100 kΩ; no isolation
Analog accuracy	3.0% of full scale at 25 °C; 3.5% from −20 to +60 °C
User memory, V4.6 basis	150 KB work; 4 MB internal load; 14 KB retentive
Local expansion capacity	Up to 8 SMs, 3 CMs and 1 SB/CB/BB
Ethernet interface	1 RJ45 port; 10/100 Mbit/s; no integrated switch
PROFINET IO controller capacity	Up to 16 IO devices; RT supported; IRT and MRP not supported

Voltage-to-count conversion

For the nominal 0–10 V range, counts = voltage × 27648 / 10. Thus 2.5 V corresponds to 6912 and 7.5 V to 20736 before measurement error and quantization are considered.

Thermal loading pattern

At 60 °C horizontal or 50 °C vertical, use the restricted nonadjacent-point activation limits rather than all-on assumptions. At 55 °C horizontal or 45 °C vertical, all fourteen inputs and ten relay outputs can be active under their stated ratings.

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04 Project integration boundaries

AC-powered machine panels

Run compact machine sequencing where the controller uses an AC supply and field inputs use the specified DC level.

Low-frequency load control

Switch compatible AC or DC control loads through the relay output groups with the required external protection.

Voltage process feedback

Acquire supported 0–10 V signals and scale the values in the application, allowing for the onboard analog accuracy and filtering.

Networked compact automation

Integrate programming, HMI and configured PROFINET devices within the available port, connection and firmware limits.

Power-service boundary

The internal CPU supply fuse is 3 A, 250 V, slow blow and is not user-replaceable. Treat its rating as a component specification, not permission to replace it in the field.

Relay endurance

The 10 million mechanical cycles are a no-load figure. Contact life at rated load is 100,000 cycles; actual load and switching conditions matter when planning service.

Analog settling example

At 50 Hz rejection, the nominal sample time is 5 ms, while strong smoothing takes 480 ms to reach 95% of a 0-to-10 V step. Sample interval and settled response are different quantities.

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05 Service decisions and technical basis

Lifecycle and replacement scope

The current manufacturing and support phase of this exact article number is unconfirmed. Retain the installed hardware identity and firmware context when evaluating continued service or replacement. Check the supply execution, I/O technology, configured module identity and project version before accepting a replacement.

Can the AC supply designation of 6ES7214-1BG40-0XB0 justify connecting 230 V to an onboard digital input?

No. AC describes the CPU power input; its onboard digital inputs remain 24 V DC circuits. Keep line supply, input sensing and relay load wiring separate according to their terminal assignments.

How much sensor-supply capacity remains on 6ES7214-1BG40-0XB0 when all fourteen onboard inputs are active?

At the nominal 4 mA per input, the inputs consume 56 mA. If they draw from the CPU sensor supply, 344 mA of the 400 mA budget remains before accounting for sensors and any other connected loads.

Technical basis

Siemens S7-1200 Programmable Controller System Manual, V4.6, A5E02486680-AP. Hardware values are scoped to the listed article number in the V4.6 system manual. Confirm the installed hardware and firmware before applying version-dependent capacities or configuration functions.

Other Siemens product references

Siemens 6AV2124-0GC01-0AX0

Siemens 6EP1336-3BA00

Siemens 6EP1437-2BA20

Separate product references; no substitution or compatibility is implied.