Siemens 6DD1607-0CA1

01 High-Speed Input and Output Expansion Module

Siemens 6DD1607-0CA1 collects time-critical field signals and supplies mixed-resolution analog outputs close to the FM processing path. Encoder type, output group and interface-module selection determine the usable signal arrangement.

1. **Field interface modules**
2. **Analog / binary / encoder channels**
3. **FM 458 application**
4. **Controlled machine response**

Physical and functional arrangement

The first four analog outputs have a different resolution and conversion time from outputs five through eight. Assign channels according to the required control function and verify scaling at the actual destination. A common voltage range does not make the two output groups identical.

Signal path and configuration

Analog inputs are differential but not galvanically isolated, and the binary and encoder interfaces also require the intended reference arrangement. Use the prescribed interface modules for field connections rather than wiring process conductors directly to the module connector.

Application boundary

EXM 438-1 is an expansion for the compatible FM 458 arrangement and is not a spare-part-compatible substitute for the earlier EXM 438. Retain the correct engineering configuration, interface modules and cable assignment when replacing the installed expansion.

Ratings apply to the stated hardware execution and operating conditions. Installed firmware, companion modules and configured functions must match the application.

Siemens 6DD1607-0CA1

02 Technical data and engineering limits

Analog outputs 1–4	4; ±10 V, 16 bit
Analog outputs 5–8	4; ±10 V, 12 bit
Analog output current	±10 mA
Conversion, outputs 1–4	2 µs typical per channel
Conversion, outputs 5–8	4 µs typical per channel
Analog inputs	5 differential; ±10 V; 12 bit
Analog input resistance	20 kohm
Binary inputs / outputs	16 / 8
Binary output nominal current	30 mA per channel
Incremental encoder inputs	8
Absolute encoder inputs	4; SSI or EnDat
5 V current	1.5 A typical

Additional interface data

Analog input conversion	Approximately 10 µs maximum per channel; 100 ksps
Analog input filter	34 kHz
Binary input delay	100 µs maximum per channel
Binary output delay	100 µs
Absolute encoder format	Gray or binary; RS485 differential signals
Incremental quadrature rate	1 MHz maximum
Forward/reverse pulse rate	2.5 MHz maximum
Power dissipation	7.5 W typical
Ambient limit	40 °C maximum in the cited arrangement
Digital output external supply	24 V nominal; 20–30 V permitted

Ratings apply to the stated hardware execution and operating conditions. Installed firmware, companion modules and configured functions must match the application.

Siemens 6DD1607-0CA1

03 Application map and integration boundaries

01 Time-critical analog control

Expand FM processing with the appropriate analog-output group.

02 Encoder-based motion measurement

Acquire compatible incremental or absolute encoder signals.

03 Fast binary acquisition

Connect the assigned machine states through the prescribed interface hardware.

04 Legacy FM expansion service

Restore an EXM 438-1 arrangement with its original software and cable mapping.

Output-group distinction

Four outputs use 16-bit conversion and four use 12-bit conversion. Retain group assignment and scaling.

Field-connection boundary

Use the specified interface modules and cables; non-isolated channels require the intended signal-reference design.

Replacement compatibility

Do not substitute EXM 438-1 for EXM 438 without engineering review of the FM hardware and project.

Configuration scope: Match the EXM 438-1 execution, FM configuration, interface hardware and encoder formats. The earlier EXM 438 is not a compatible spare execution.

Siemens 6DD1607-0CA1

04 Technical questions that affect operation

Why must analog output assignment be checked on 6DD1607-0CA1?

Outputs 1–4 and 5–8 have different resolution and conversion timing. Assign the control function to the intended group and verify the resulting signal.

Can field wires be connected directly to 6DD1607-0CA1 without its interface modules?

The specified arrangement uses the approved interface modules and matching plug-in cables. Preserve that field-connection boundary.

Does a differential analog input on 6DD1607-0CA1 provide galvanic isolation?

No. Differential measurement and galvanic isolation are different properties. Review signal references and common-mode conditions.

Can 6DD1607-0CA1 replace an earlier EXM 438 as an equivalent spare?

No. EXM 438-1 is not spare-part-compatible with EXM 438; review the complete FM expansion and engineering configuration.

How should encoder pulse format be matched to 6DD1607-0CA1?

Confirm quadrature versus forward/reverse signaling, voltage level, frequency and the configured encoder function. A matching connector does not establish format compatibility.

Why is external 24 V power checked separately for outputs on 6DD1607-0CA1?

The binary output stage uses its external supply arrangement. A powered backplane does not prove correct field-output voltage or load capability.

What should be verified when selecting SSI or EnDat on 6DD1607-0CA1?

Match the actual encoder protocol, data direction and format to the configured interface and cable assignment.

How should a high-speed control loop using 6DD1607-0CA1 be accepted?

Evaluate acquisition, processing and output timing together, then compare the physical response with the commanded signal under the approved operating envelope.

Siemens 6DD1607-0CA1

05 Selection, service planning and related equipment

Match the installed arrangement

Match the complete Siemens 6DD1607-0CA1 marking and installed configuration. Confirm 6DD1607-0CA1, FM partner, cable mapping and interface-module identities.

Support and migration

Cancelled product retained for legacy spare-part applications. Match the EXM 438-1 execution, FM configuration, interface hardware and encoder formats. The earlier EXM 438 is not a compatible spare execution.

Equipment boundary

Confirm the expansion module and any interface modules or cables specifically itemized. Companion hardware and accessories are included only when itemized; the function of the complete installed arrangement depends on the correct combination.

Engineering review before intervention

Archive the FM signal map	Record the FM project, analog-output groups, binary assignments and encoder types. Identify which control functions depend on fast signal timing and establish the required maintenance state.
Inspect interface modules and cables	Match the approved interface hardware and plug-in cable arrangement. Inspect connectors and signal references and avoid connecting field wiring directly to the expansion connector.

Related equipment navigation

Siemens 6ES7221-1BF22-0XA0

Siemens 6ES7153-4BA00-0XB0

Siemens 6ES7212-1AE40-0XB0

Related references support separate application assessment and do not imply replacement compatibility. Technical basis: Siemens FM 458-1 DP User Manual, A5E01078222-03.