SIEMENS 6ES7231-5PD32-0XB0

Siemens SIMATIC S7-1200 SM 1231 RTD Analog Input Module User Manual

Model: 6ES7 231-5PD32-0XB0

1. Introduction

This manual provides essential information for the installation, operation, and maintenance of the Siemens SIMATIC S7-1200 SM 1231 RTD Analog Input Module. This module is designed to expand the analog input capabilities of SIMATIC S7-1200 programmable logic controllers (PLCs) by providing four channels for Resistance Temperature Detector (RTD) measurements. Adherence to these instructions ensures safe and efficient operation.

2. Product Overview

The SM 1231 RTD module is a compact expansion module for the SIMATIC S7-1200 series. It allows for precise temperature acquisition using RTD sensors, integrating seamlessly into the S7-1200 system architecture. Key features include:

- 4 analog input channels for RTD sensors.
- High measurement accuracy and resolution.
- Direct connection to various RTD types (e.g., Pt100, Pt1000, Ni100, Ni1000).
- Diagnostic capabilities for easy troubleshooting.

Figure 1: Siemens SIMATIC S7-1200 SM 1231 RTD Analog Input Module. This image displays the front view of the gray-colored module, featuring the Siemens logo and 'SIMATIC S7-1200 SM 1231 AI' labeling on the right side. The center section shows a 'DIAG' indicator, input terminals labeled '0', '1', '2', '3' for AI, and a sliding switch. The bottom section includes regulatory markings and certifications.

3. Safety Instructions

Observe the following safety instructions to prevent personal injury and property damage:

- Installation and maintenance must be performed by qualified personnel only.
- Ensure the power supply is disconnected before performing any wiring or installation tasks.
- Protect the module from moisture, dust, and extreme temperatures.

- Use only approved tools and equipment.
- Adhere to all local and national electrical codes and safety regulations.

4. Setup and Installation

4.1 Mounting

1. Ensure the SIMATIC S7-1200 CPU is powered off.
2. Snap the SM 1231 RTD module onto the DIN rail next to the CPU or another module.
3. Connect the module to the adjacent module using the integrated sliding connector.

4.2 Wiring

Connect the RTD sensors to the module's terminals. The module supports 2-wire, 3-wire, and 4-wire RTD connections. Refer to the specific wiring diagrams in the detailed product documentation for your RTD type. Ensure proper shielding and grounding to minimize electrical noise.

- **Power Supply:** The module draws power directly from the backplane bus of the S7-1200 system. No external power supply connection is typically required for the module itself.
- **Sensor Connections:** Connect RTD sensors to the terminals labeled '0', '1', '2', '3' for the respective analog input channels.

5. Operating and Configuration

The SM 1231 RTD module is configured using Siemens TIA Portal software.

5.1 Hardware Configuration

1. Open your TIA Portal project and navigate to the device configuration of your S7-1200 CPU.
2. Drag and drop the SM 1231 RTD module from the hardware catalog to the appropriate slot next to your CPU.
3. In the module properties, configure each analog input channel:
    - Select the RTD type (e.g., Pt100, Pt1000).
    - Choose the connection type (2-wire, 3-wire, or 4-wire).
    - Set the measurement range (e.g., -200 to +850 °C).
    - Configure diagnostic settings as needed.
4. Compile and download the hardware configuration to the S7-1200 CPU.

5.2 Reading Sensor Values

After successful configuration, the RTD values can be read in your PLC program. The module converts the resistance values into temperature values, which are then available in the CPU's process image. Use appropriate instructions in your PLC program (e.g., MOVE, scaling functions) to process these values.

6. Maintenance

The SM 1231 RTD module is designed for minimal maintenance. Regular checks can help ensure long-term reliability.

- **Cleaning:** Keep the module clean and free from dust and debris. Use a soft, dry cloth for cleaning. Do not use abrasive cleaners or solvents.
- **Visual Inspection:** Periodically inspect the module for any signs of damage, loose connections, or

discoloration.

- **Firmware Updates:** Firmware updates are typically managed through the TIA Portal. Refer to Siemens support resources for information on available updates and procedures.

7. Troubleshooting

If issues arise, consider the following troubleshooting steps:

- **DIAG LED:** Check the 'DIAG' LED on the module. If it is illuminated, consult the S7-1200 system manual or TIA Portal diagnostics buffer for specific error codes and remedies.
- **Wiring:** Verify all RTD sensor connections are secure and correctly wired according to the sensor type and module configuration.
- **Configuration:** Ensure the module's hardware configuration in TIA Portal matches the physical setup and sensor type.
- **Sensor Integrity:** Test the RTD sensor independently to confirm it is functioning correctly.
- **Power Supply:** Confirm the S7-1200 CPU and system are receiving adequate power.

8. Specifications

Parameter	Value
Model Number	6ES7 231-5PD32-0XB0
Module Type	Analog Input Module (RTD)
Channels	4 (RTD)
Compatibility	SIMATIC S7-1200 PLCs
Supported RTD Types	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10 (configurable)
Connection Types	2-wire, 3-wire, 4-wire
Supply Voltage	24V DC (via S7-1200 backplane bus)
Item Weight	8.8 ounces
Dimensions (approx.)	Refer to S7-1200 system manual for exact dimensions of expansion modules.

9. Warranty and Support

Warranty information for the Siemens SIMATIC S7-1200 SM 1231 RTD Analog Input Module is typically provided at the point of purchase or can be found on the official Siemens Industry website. For technical support, documentation, and software updates, please visit the official Siemens support portal or contact your local Siemens representative.

Online Resources: Siemens Industry Online Support