Simatic S5 and Simatic S7

Distributed Control Systems
for Industrial Automation

Siemens

Product PDF

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1 Product Overview

The S7-200 series of micro-programmable logic controllers (Micro PLCs) can control a wide variety of devices to support your automation needs.

The S7-200 monitors inputs and changes outputs as controlled by the user program, which can include Boolean logic, counting, timing, complex math operations, and communications with other intelligent devices. The compact design, flexible configuration, and powerful instruction set combine to make the S7-200 a perfect solution for controlling a wide variety of applications.

In This Chapter

What's New?

The new features of the SIMATIC S7-200 include two new analog expansion modules:

- ❏ EM 231 Analog Input RTD, 4 Inputs
- ❏ EM 231 Analog Input Thermocouple 8 Inputs
- ❏ Appendix H, S7-200CN Products

S7-200 CPU

The S7-200 CPU combines a microprocessor, an integrated power supply, input circuits, and output circuits in a compact housing to create a powerful Micro PLC. See Figure 1-1. After you have downloaded your program, the S7-200 contains the logic required to monitor and control the input and output devices in your application.

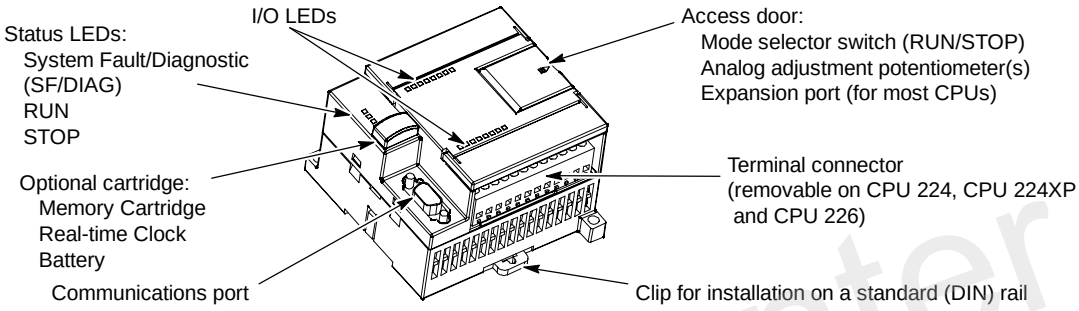

Figure 1-1 S7-200 Micro PLC

Siemens provides different S7-200 CPU models with a diversity of features and capabilities that help you create effective solutions for your varied applications. Table 1-1 briefly compares some of the features of the CPU. For detailed information about a specific CPU, see Appendix A.

Table 1-1 Comparison of the S7-200 CPU Models

Feature	CPU 221	CPU 222	CPU 224	CPU 224XP CPU 224XPsi	CPU 226
Physical size (mm)	90 x 80 x 62	90 x 80 x 62	120.5 x 80 x 62	140 x 80 x 62	190 x 80 x 62
Program memory: with run mode edit without run mode edit	 4096 bytes 4096 bytes	 4096 bytes 4096 bytes	 8192 bytes 12288 bytes	 12288 bytes 16384 bytes	 16384 bytes 24576 bytes
Data memory	2048 bytes	2048 bytes	8192 bytes	10240 bytes	10240 bytes
Memory backup	50 hours typical	50 hours typical	100 hours typical	100 hours typical	100 hours typical
Local on-board I/O Digital Analog	 6 In/4 Out –	 8 In/6 Out –	 14 In/10 Out –	 14 In/10 Out 2 In/1 Out	 24 In/16 Out –
Expansion modules	0 modules	2 modules[1]	7 modules[1]	7 modules[1]	7 modules[1]
High-speed counters Single phase Two phase	 4 at 30 kHz 2 at 20 kHz	 4 at 30 kHz 2 at 20 kHz	 6 at 30 kHz 4 at 20 kHz	 4 at 30 kHz 2 at 200 kHz 3 at 20 kHz 1 at 100 kHz	 6 at 30 kHz 4 at 20 kHz
Pulse outputs (DC)	2 at 20 kHz	2 at 20 kHz	2 at 20 kHz	2 at 100 kHz	2 at 20 kHz
Analog adjustments	1	1	2	2	2
Real-time clock	Cartridge	Cartridge	Built-in	Built-in	Built-in
Communications ports	1 RS-485	1 RS-485	1 RS-485	2 RS-485	2 RS-485
Floating-point math	Yes				
Digital I/O image size	256 (128 in, 128 out)				
Boolean execution speed	0.22 microseconds/instruction				

1 You must calculate your power budget to determine how much power (or current) the S7-200 CPU can provide for your configuration. If the CPU power budget is exceeded, you may not be able to connect the maximum number of modules. See Appendix A for CPU and expansion module power requirements, and Appendix B to calculate your power budget.

S7-200 Expansion Modules

To better solve your application requirements, the S7-200 family includes a wide variety of expansion modules. You can use these expansion modules to add additional functionality to the S7-200 CPU. Table 1-2 provides a list of the expansion modules that are currently available. For detailed information about a specific module, see Appendix A.

Table 1-2 S7-200 Expansion Modules

Expansion Modules	Type			
Discrete modules				
Input	8 x DC In	8 x AC In	16 x DC In	
Output	4 x DC Out	4 x Relays	8 x Relay	
	8 x DC Out	8 x AC Out		
Combination	4 x DC In/ 4 x DC Out	8 x DC In/ 8 x DC Out	16 x DC In/ 16 x DC Out	32 x DC In/ 32 x DC Out
	4 x DC In / 4 x Relay	8 x DC In / 8 x Relay	16 x DC In/ 16 x Relay	32 x DC In/ 32 x Relay
Analog modules				
Input	4 x Analog In	8 x Analog In	4 x Thermocouple In	8 x Thermocouple In
	2 x RTD In	4 x RTD In		
Output	2 x Analog Out	4 x Analog Out		
Combination	4 x Analog In 4 x Analog Out			
Intelligent modules				
	Position	Modem	PROFIBUS-DP	
	Ethernet	Ethernet IT		
Other modules				
	AS-Interface	SIWAREX MS[1]		

[1] Detailed information not included in Appendix A. Please refer to your module documentation.

STEP 7-Micro/WIN Programming Package

The STEP 7-Micro/WIN programming package provides a user-friendly environment to develop, edit, and monitor the logic needed to control your application. STEP 7-Micro/WIN provides three program editors for convenience and efficiency in developing the control program for your application. To help you find the information you need, STEP 7-Micro/WIN provides an extensive online help system and a documentation CD that contains an electronic version of this manual, application tips, and other useful information.

Computer Requirements

STEP 7-Micro/WIN runs on either a personal computer or a Siemens programming device, such as a PG 760. Your computer or programming device should meet the following minimum requirements:

- Operating system:
  Windows 2000, Windows XP, Vista
- At least 350M bytes of free hard disk space
- Mouse (recommended)

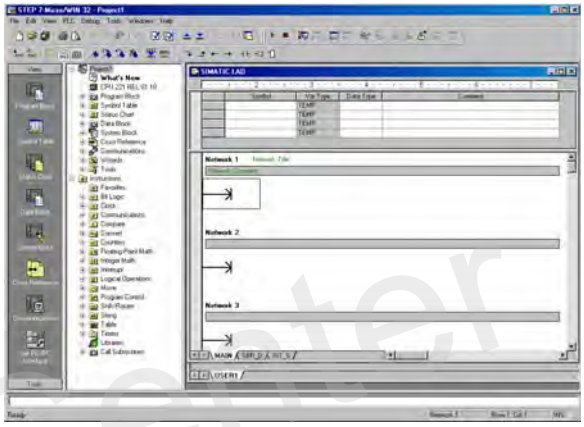

Figure 1-2 STEP 7-Micro/WIN

Installing STEP 7-Micro/WIN

Insert the STEP 7-Micro/WIN CD into the CD-ROM drive of your computer. The installation wizard starts automatically and prompts you through the installation process. Refer to the Readme file for more information about installing STEP 7-Micro/WIN.

Tip

To install STEP 7-Micro/WIN on a Windows 2000, Windows XP, or Windows Vista operating system, you must log in with Administrator privileges.

Communications Options

Siemens provides two programming options for connecting your computer to your S7-200: a direct connection with a PPI Multi-Master cable, or a Communications Processor (CP) card with an MPI cable.

The PPI Multi-Master programming cable is the most common and economical method of connecting your computer to the S7-200. This cable connects the communications port of the S7-200 to the serial communications of your computer. The PPI Multi-Master programming cable can also be used to connect other communications devices to the S7-200.

Display Panels

Text Display Units

The Text Display (TD) is a display device that can be connected to the S7-200. Using the Text Display wizard, you can easily program your S7-200 to display text messages and other data pertaining to your application.

The TD device provides a low cost interface to your application by allowing you to view, monitor, and change the process variables pertaining to your application.

The S7-200 product family provides four TD devices:

- The TD100C has a 4-line text display with 2 font choices.
- The TD 200C has a 2-line text display with 20 characters per line for a total of 40 characters.
- The TD 200 has a faceplate which provides four keys with predefined, set-bit functions and allows up to eight set-bit functions.
- The TD400C can have a 2- or 4-line text display depending on your font and character choice.

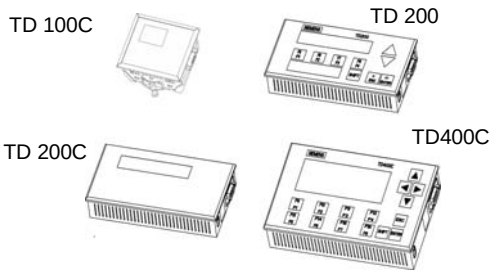

Figure 1-3 Text Display Units

Text Display

For more information about the Text Display Units, refer to the *SIMATIC Text Display (TD) User Manual* on the STEP 7–Micro/WIN docuCD.

The Text Display wizard in STEP 7–Micro/WIN helps you configure Text Display messages quickly and easily. To start the Text Display wizard, select the **Tools > Text Display Wizard** menu command.

Operator and Touch Panel Displays

The OP 73micro and TP 177micro panels are tailored to applications with SIMATIC S7-200 Micro PLC and provide operating and monitoring functions for small-scale machines and plants. Short configuration and commissioning times, and their configuration in WinCC flexible form the highlights of these panels. In addition, these panels support up to 32 configuration languages and five online languages, including the Asian and Cyrillic character sets.

The mounting dimensions of the Operator Panel OP 73micro with its graphical 3” display unit are compatible with OP3 and TD 200.

Touch Panel TP 177micro replaces the Touch Panel TP 070/TP 170micro. It can be mounted vertically to accommodate additional applications. This feature enables its use even when space is restricted.

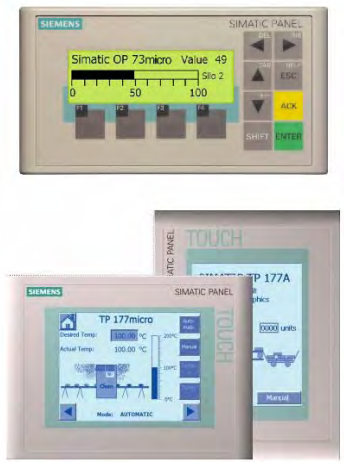

Figure 1-4 Operator and Touch Panel Displays