OFFICIAL MANUFACTURER DOCUMENT PACKAGE

Installation Instructions

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Selected official Siemens pages follow this cover.

Prepared for the future: A distributed I/O integration platform

One of the most important control trends today is the use of a controller as a distributed I/O integration platform – whether your application calls for rack, modular, block or third-party I/O, or the SIMATIC S5, S7 or 505 controllers, the open protocol of PROFIBUS-DP makes the best solution easy.

PROFIBUS-DP also enables you to integrate a wider variety of automation products than ever before. Now drives, valves, weigh scales and more- from both Siemens and third parties - can be integrated into your control schemes far easier than ever before.

You also have direct connectivity to AS-i at the sensor/actuator level from PROFIBUS. By simply incorporating the AS-i Link Module, you're able to take advantage of AS-i's inherent labor, installation and maintenance savings and give yourself more I/O choices. Plus, its high-speed transmission capabilities make AS-i the perfect solution for an environmentally hardened, high-performance network at the sensor/actuator level. And as with PROFIBUS, AS-i is an open technology, so you're able to incorporate solutions from Siemens as well as third parties.

Together, these features add up to a distributed I/O integration platform that's hard to beat now and in the future.

Savings you can count on

When compared to a traditional hard-wired 4-20 mA system, the proven labor, installation and maintenance savings of standard networks is remarkable. For example, an actual installation has demonstrated that a 2,500 foot hard-wiring run can be reduced to 520 feet with an 81% savings in wire, a 60% savings in screw terminals and a 50% savings in I/O cards *

And thanks to the combination of fewer terminations, a less complicated system and the system's ability to identify and locate problems, maintenance and troubleshooting are far easier to accomplish.

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505 System

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Introduction

Introduction

The SIMATIC 505 control systems are highly compact. We have used the latest Application Specific Integrated Circuits (ASIC) design and surface mounting technology to place more control in less space than ever. This reduces panel space and system costs, and at the same time increases reliability. The SIMATIC 505 control systems are built-in double Eurocard format and supplied in three DIN standard rack (base) sizes.

There are three types of SIMATIC 505 controllers:

- Classic, all discrete-oriented controllers - the SIMATIC 525 and 535
- Process control-oriented controllers - the SIMATIC 545 and 555.
- Integration platforms- the SIMATIC 575.

The 545 “Lite” is intended for small to medium- sized applications requiring discrete and analog control. Large discrete applications can be handled by the 545. For more complex or process control applications there is the 555. This top of the range controller is equipped to handle special mathematical functions, PID loops, alarms and high-level language programs. The 545 is also designed to handle complex process control applications, but of smaller dimensions. The 575 controller facilitates multi-vendor, multi-controller solutions.

The SIMATIC 505 controllers are supported by a complete range of digital, analog and intelligent I/O modules thereby optimizing the handling of thermocouples, RTD inputs, high-speed and special devices. The analog I/O modules are galvanically isolated . The SIMATIC 505 controllers communicate to the remote or distributed I/O racks (bases) using a 1 Mbps coaxial or twisted-pair cable. As a result, I/O racks (bases) can be located up to 4000 m (15,000 ft.) from the controller, eliminating the need for multiple cable runs and reducing installation costs.

In addition, the SIMATIC 505 controllers provide built-in support for the 12 MBaud PROFIBUS-DP Type I/O, which is the new open standard for remote I/O. This provides connectivity to I/O from other SIMATIC product lines as well as to Siemens drives and third-party I/O.

PROFIBUS-DP Slaves can be located up to 1200 meters from the controller when operating at 9.6 Kbaud or up to 100 meters at 12 Mbaud (even greater distances with fiber optic cable).

Note: For cabling, connectors, repeaters and other hardware components for PROFIBUS-DP, see Siemens IK 10 catalog under PROFIBUS sections.

General technical specifications

Safety and reliability

The SIMATIC 505 family uses the IEC 65A and DIN 41494 design standards for industry and process control equipment.

Insulation

Standard IEC 801, Part 2, Level 4. Ensures that the product is protected against the discharge of static electricity to15 kV.

Temperature cycle

Standard IEC 68-2-14 Nb. Ensures the product can operate in changing ambient temperatures from 0 to 60 ˚C.

Humidity

Standard IEC 68-2-3 Ca. Ensures that the product can operate in environmental conditions of 95% relative humidity (non-condensing) of 60 ˚C.

Mechanical shock test

Standard IEC 68-2-27 Ea. Ensures that the product is immune to non-repetitive shocks likely to be encountered during service.

There are four types of I/O communication techniques for connecting 505 controllers to their I/O:

- Distributed I/O connection
- Remote I/O connection
- PROFIBUS-DP connection
- AS-i actuator-sensor bus connection

Distributed I/O connection

This technique is only used by the 535 PLC. The Distributed I/O communications system consists of two modules:

- I/O channel controller (IOCC) (PPX:505-6830)
- Distributed Base Controller (DBC) (PPX:505-6840)

The IOCC is installed in the SIMATIC 535 local base. The DBC is installed in the distributed base. Up to 14 DBCs can be connected in a daisy chain configuration. The last DBC can be located up to 396m (1300 ft.) away from the IOCC.

Remote I/O connection

This technique is used by the 545/555/575 PLCs. The remote I/O communications system consists of two modules:

- Remote channel controller (RCC)
- Remote base controller (RBC)

Remote channel controller

The RCC controls all communications between the 545/555/575 PLCs and their remote I/O bases.

- The 545/555/575 PLC has the RCC built into the CPU board as standard. This RCC port supports up to 2048 digital points or a mixed configuration of up to 1024 digital and 1024 analog points. These I/O points can be located on up to 16 remote bases. The last RBC can be located up to 1000 m (3,300 ft.) from the CPU.

Remote base controller

The RBC is an intelligent interface between remote I/O bases and the 545/555/575 controllers. The RBC is installed in the remote I/O base. SIMATIC 505 RBCs are available with either coaxial or shielded twisted-pair cable. This allows the 545/555/575 controllers to be compatible with remote I/O bases. RBCs using coaxial cable, can be located up to 4000 m (13,200 ft.) from the PLC rack. RBCs using shielded twisted-pair, can be located up to 1000 m (3,300 ft.) from the PLC rack. Three models are available:

- Remote Base Controller RS485 (PPX:505-6851-A)
- Remote Base Controller COAX (PPX:505-6850-A)
- COAX to RS-485 converter (PPX:505-6860)

PROFIBUS-DP Remote I/O Connection

This technique is used by the 545/555/575 PLCs. Most 505 CPUs come with PROFIBUS-DP built-in. Others require an optional annex card.

- PROFIBUS-DP annex card (PPX:505-CP5434-DP)
- PROFIBUS-DP 505 RBC (PPX:505-6870)

The 505 PROFIBUS-DP I/O Channel supports up to 112 slaves (drops) of mixed analog and discrete modules. The 505 PROFIBUS-DP RBC can be installed in any 505 base to allow a 505 I/O base to perform as a PROFIBUS-DP I/O node on any PROFIBUS-DP system.

The 505 DP RBC has a serial port for remote programming when used on a 505 system only. However, SIMATIC 505 special function modules are not supported by the DP RBC.

Each PROFIBUS-DP node can have a maximum of 244 bytes of input and 244 bytes of output data. Each byte supports 8 digital inputs or outputs. Each analog point requires 2 bytes of data.

Depending on the baud rate selected, the PROFIBUS-DP cable length can extend up to 100 meters at 12 Mbaud and up to 1200 meters at 9.6 Kbaud. (up to 100km by using repeaters)

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Technical Specifications

Mounting racks (bases)

Type	PPX:	505-6504	505-6508	505-6511	505-6516
Slots					
Number of I/O slots		4	8	11	16
I/O points	max	128	256	352	512
Width	mm	203 (8.0")	286 (11.25")	448 (17.62")	448 (17.62")
Depth	mm	203 (8.0")	203 (8.0")	203 (8.0")	203 (8.0")
Height	mm	266 (10.47")	266 (10.47")	266 (10.47")	266 (10.47")
Dual media/power supply		no	no	yes	no

The internal power supply (5.1/±12/+24 V DC) is operated with an external feed voltage of 24 V DC/230 V AC.