MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Selected official pages for procurement and maintenance review

PRODUCT BRAND

Siemens

PRODUCT MODEL

6ES7312-1AE13-0AB0

MPI Programmable Central Processor. Relevant section pages: 3, 93, 100, 101, 103, 104, 136. Adjacent model text on shared pages is outside this product reference.

OFFICIAL SOURCE

CPU 31xC and CPU 31x: Installation; 06/2008; A5E00105492-08

Siemens original documentation and product reference

AMIKON PRODUCT SUPPORT

+86-18020776786 INFO@AMIKON.CN

AMIKONG.COM

Amikon Limited prepared this independent reference package. Selected manufacturer pages follow with their original content and pagination visible.

SIEMENS

SIMATIC

S7-300 CPU 31xC and CPU 31x: Installation

Operating Instructions

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This manual is part of the documentation package with the order number:
6ES7398-8FA10-8BA0

06/2008
A5E00105492-08

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

⚠ WARNING

This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG
Industry Sector
Postfach 48 48
90026 NÜRNBERG
GERMANY

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Preface

Purpose of this manual

This manual contains essential information about:

- the configuration,
- the installation
- the wiring
- the addressing
- and commissioning

In addition, you will become familiar with the tools you can use to diagnose and eliminate errors in hardware and software.

Basic knowledge

- To understand this manual, you require a general knowledge of automation engineering.
- You require a knowledge of STEP 7 basic software.

Scope

Table 1 Scope of this manual

CPU	Convention: CPU designations:	Order No.	as of Version firmware
CPU 312C	CPU 31xC	6ES7312-5BE03-0AB0	V2.6
CPU 313C		6ES7313-5BF03-0AB0	V2.6
CPU 313C-2 PtP		6ES7313-6BF03-0AB0	V2.6
CPU 313C-2 DP		6ES7313-6CF03-0AB0	V2.6
CPU 314C-2 PtP		6ES7314-6BG03-0AB0	V2.6
CPU 314C-2 DP		6ES7314-6CG03-0AB0	V2.6
CPU 312	CPU 31x	6ES7312-1AE13-0AB0	V2.6
CPU 314		6ES7314-1AG13-0AB0	V2.6
CPU 315-2 DP		6ES7315-2AG10-0AB0	V2.6
CPU 315-2 PN/DP		6ES7315-2EH13-0AB0	V2.6
CPU 317-2 DP		6ES7317-2AJ10-0AB0	V2.6
CPU 317-2 PN/DP		6ES7317-2EK13-0AB0	V2.6
CPU 319-3 PN/DP		6ES7318-3EL00-0AB0	V2.7

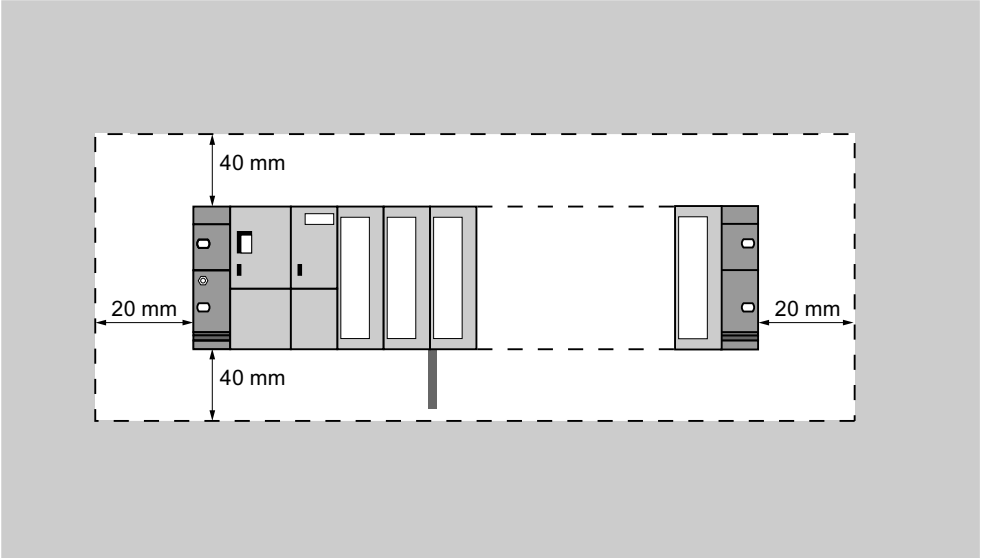
Installing the mounting rail

1. Install the mounting rails so that sufficient space is available for installing modules and to allow heat dissipation (clearance of at least 40 mm above and below the modules. See the figure below).
2. Mark up the mounting holes on the mounting surface. Drill the holes, diameter = 6.5 $^{+0.2}$ mm.
3. Screw the rail (M6 screws) onto the mounting surface.

Note

Always make sure of a low-impedance contact between the rail and a mounting surface, if the latter is a grounded metal panel or equipment mounting panel. On varnished or anodized metals, for instance, use a suitable contacting agent or contact washers.

The figure below shows the clearance required for the installation of an S7-300.



Wiring conditions for PS and CPU

Table 6- 3 Wiring conditions for PS and CPU

Connectable cables	to PS and CPU
Solid conductors	No
Flexible conductors • without wire end ferrule • With wire end ferrule	 0.25 mm^2 to 2.5 mm^2 0.25 mm^2 to 1.5 mm^2
Number of conductors per terminal	1 or 2, up to 1.5 mm^2 (total) in a common wire end ferrule
Diameter of the conductor insulation	max. 3.8 mm
Stripped length	11 mm
Wire end ferrules to DIN 46228 • without insulating collar • with insulating collar	 Design A, 10 mm to 12 mm length Design E, up to 12 mm length

Wiring conditions for front connectors

Table 6- 4 Wiring conditions for front connectors

Connectable cables	Front connectors	
	20-pole	40-pole
Solid conductors	No	No
Flexible conductors • without wire end ferrule • with wire end ferrule	 0.25 mm^2 to 1.5 mm^2 0.25 mm^2 to 1.5 mm^2	 0.25 mm^2 to 0.75 mm^2 0.25 mm^2 to 0.75 mm^2 • Mains feed 1.5 mm^2
Number of conductors per terminal	1 or 2, up to 1.5 mm^2 (total) in a common wire end ferrule	1 or 2, up to 0.75 mm^2 (total) in a common wire end ferrule
Diameter of the conductor insulation	max. 3.1 mm	• max. 2.0 mm for 40-pole cables • max. 3.1 mm for 20-pole cables
Stripped length	6 mm	6 mm
Wire end ferrules to DIN 46228 • without insulating collar • with insulating collar	 Design A, 5 mm to 7 mm length Design E, up to 6 mm length	 Design A, 5 mm to 7 mm length Design E, up to 6 mm length

6.2 Bonding the Protective Conductor to the Mounting Rail

Requirement

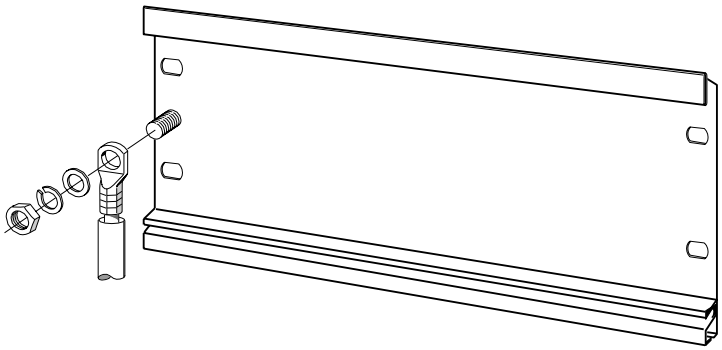
The mounting rail is fixed onto the mounting surface.

Connecting the protective conductor

Connect the mounting rail to the protective conductor.
The mounting rail is provided with a M6 protective conductor screw for this purpose.

Minimum cross-section of the protective conductor: 10 mm^2

The figure below shows how the protective conductor has to be bonded to the rail.



Note

Always make sure of a low-impedance contact between the protective conductor and the rail. You can achieve this by using a low-impedance cable, keeping it as short as possible and contacting it to a large surface.
For example, an S7-300 mounted on a hinged frame must be connected to ground using a flexible grounding strap.

6.4 Wiring the Power Supply Module and the CPU

Requirement

All modules are mounted onto the rail.

Wiring the PS and CPU

Note

The PS 307 power supply module is equipped with two additional 24 VDC terminals L+ and M for the supply to I/O modules.

Note

The power supply connector of your CPU is a plug-in device and can be removed.

WARNING

There is a risk of contact to live wires if the power supply module, or any additional load power supply units, are connected to the mains.

You should therefore isolate the S7-300 from power before you start wiring it. Always use crimp ferrules with insulating collars for the conductors. Close all front panels of the modules when you completed the wiring. This is conditional before you reconnect the S7-300 to power.

1. Open the PS 307 power supply module and CPU front panels.
2. Open the strain relief on the PS 307.
3. Strip the power cable to a length of 11 mm and connect it to L1, N and to the protective earth (PE) terminal of the PS 307.
4. Screw-tighten the strain relief again.
5. Next, wire the PS and CPU

   The power supply connector of the CPUs is a removable plug-in device.

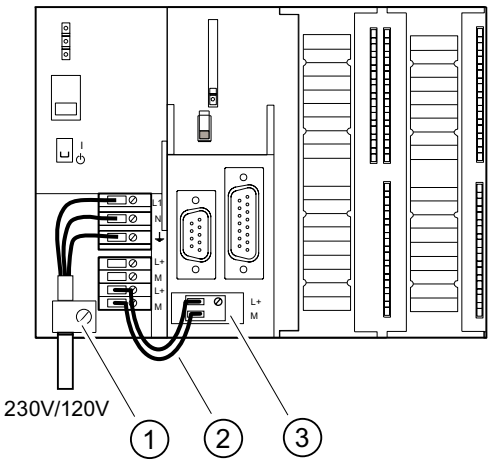
   Strip the connecting cables for the CPU power supply to a length of 11 mm. Wire the lower terminal M on the PS 307 to the terminal M of the CPU and the lower terminal L+ on the PS 307 to terminal L+ of the CPU.

   WARNING

   Reversing the polarity of the M and L+ terminals trips the internal fuse on your CPU. Always interconnect the M and L+ terminals of the power supply module and of the CPU.

6. Close the front panels.

The figure below illustrates the procedures described earlier.



Number	Identifier
①	Strain relief of the power supply cable
②	Connection cables between the PS and CPU
③	Removable power supply connector

Note

The PS 307 power supply module is equipped with two additional 24 VDC terminals L+ and M for the supply to I/O modules.

8.4.2 Initial turn-on

Requirements

- You must have installed and wired up the S7-300.
- Insert the Micro Memory Card into the CPU
- Your CPU's mode selector switch must be set to STOP.

Initial power on of a CPU with Micro Memory Card

Switch on the PS 307 power supply module.

Result:

- The 24 VDC LED on the power supply module is lit.
- The 5 VDC LED on the CPU
  - is lit.
  - The STOP LED flashes at 2 Hz when the CPU executes an automatic memory reset.
  - The STOP LED is lit after memory reset.