

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6ES7516-3AP03-0AB0

SIMATIC S7 1500 CPU MODULE

Used with the applicable PLC System configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens official manufacturer documentation

The following overview supports you in selecting the CPU and shows the respective maximum size of the data work memory:

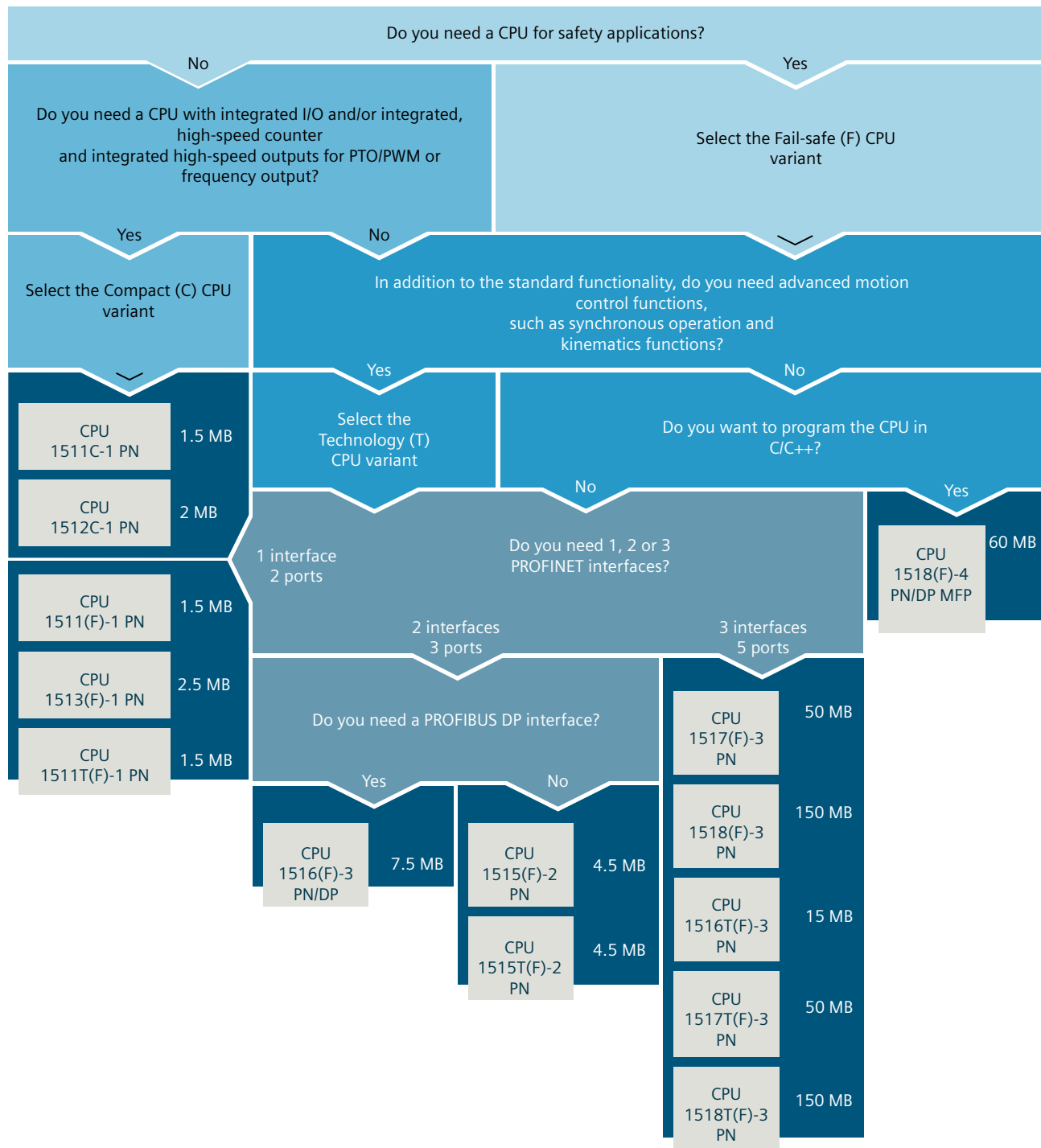


Figure 5-15 Selection guide for CPUs

5.4.2 Technical specifications of CPUs

Table 5-3 Standard CPUs and F-CPU

CPU	1511-1 PN 1511F-1 PN 1511T-1 PN 1511TF-1 PN	1513-1 PN 1513F-1 PN	1515-2 PN 1515F-2 PN 1515T-2 PN 1515TF-2 PN	1516-3 PN/DP 1516F-3 PN/DP	1517-3 PN 1517F-3 PN	1518-3 PN 1518F-3 PN 1518T-3 PN 1518TF-3 PN
				1516T-3 PN 1516TF-3 PN	1517T-3 PN 1517TF-3 PN	1518-4 PN/DP M-FP 1518F-4 PN/DP MFP
Article number						
Standard CPU:	6ES7511-1AL03--0AB0 (https://mall.industry.siemens.com/mall/de/de/-Cata-log/Product/6ES7-511-1AL03-0AB0)	6ES7513-1AM03-0AB0 (https://mall.industry.siemens.com/mall/en/de/-Cata-log/Product/6ES7-513-1AM03-0AB0)	6ES7515-2AN03--0AB0 (https://mall.industry.siemens.com/mall/en/de/C-ata-log/Product/6ES7-515-2AN03-0AB0)	6ES7516-3AP03--0AB0 (https://mall.industry.siemens.com/mall/en/de/-Cata-log/Product/6ES7-516-3AP03-0AB0)	6ES7517-3AQ10--0AB0 (https://mall.industry.siemens.com/mall/en/us/Catalog/Product/6ES7-517-3AQ10-0AB0)	6ES7518-3AT10--0AB0 (https://mall.industry.siemens.com/mall/en/us/C-ata-log/Product/6ES7-518-3AT10-0AB0)
F-CPU	6ES7511-1FL03--0AB0 (https://mall.industry.siemens.com/mall/en/de/-Cata-log/Product/6ES7-511-1FL03-0AB0)	6ES7513-1FM03-0AB0 (https://mall.industry.siemens.com/mall/en/de/-Cata-log/Product/6ES7-513-1FM03-0AB0)	6ES7515-2FN03--0AB0 (https://mall.industry.siemens.com/mall/en/de/C-ata-log/Product/6ES7-515-2FN03-0AB0)	6ES7516-3FP03--0AB0 (https://mall.industry.siemens.com/mall/en/de/-Cata-log/Product/6ES7-516-3FP03-0AB0)	6ES7517-3FQ10-0-AB0 (https://mall.industry.siemens.com/mall/en/us/Catalog/Product/6ES7-517-3FQ10-0AB0)	6ES7518-3FT10-0-AB0 (https://mall.industry.siemens.com/mall/en/us/C-ata-log/Product/6ES7-518-3FT10-0AB0)
T-CPU	6ES7511-1TL03--0AB0 (https://mall.industry.siemens.com/mall/en/en/-Cata-log/Product/6ES7-511-1TL03-0AB0)	---	6ES7515-2TN03--0AB0 (https://mall.industry.siemens.com/mall/en/en/C-ata-log/Product/6ES7-515-2TN03-0AB0)	6ES7516-3TP10--0AB0 (https://mall.industry.siemens.com/mall/en/us/-Cata-log/Product/6ES7-516-3TP10-0AB0)	6ES7517-3TQ10-0-AB0 (https://mall.industry.siemens.com/mall/en/us/Catalog/Product/6ES7-517-3TQ10-0AB0)	6ES7518-3TT10-0-AB0 (https://mall.industry.siemens.com/mall/en/us/C-ata-log/Product/6ES7-518-3TT10-0AB0)
TF-CPU	6ES7511-1UL03--0AB0 (https://mall.industry.siemens.com/mall/en/de/-Cata-log/Product/6ES7-511-1UL03-0AB0)	---	6ES7515-2UN03--0AB0 (https://mall.industry.siemens.com/mall/en/de/C-ata-log/Product/6ES7-515-2UN03-0AB0)	6ES7516-3UP10--0AB0 (https://mall.industry.siemens.com/mall/en/us/-Cata-log/Product/6ES7-516-3UP10-0AB0)	6ES7517-3UQ10--0AB0 (https://mall.industry.siemens.com/mall/en/us/Catalog/Product/6ES7-517-3UQ10-0AB0)	6ES7518-3UT10--0AB0 (https://mall.industry.siemens.com/mall/en/us/C-ata-log/Product/6ES7-518-3UT10-0AB0)
CPU 1518 MFP	---	---	---	---	---	6ES7518-4AX00--1AB0 (https://mall.industry.siemens.com/mall/en/de/C-ata-log/Product/6ES7-518-4AX00-1AB0)

CPU	1511-1 PN 1511F-1 PN 1511T-1 PN 1511TF-1 PN	1513-1 PN 1513F-1 PN	1515-2 PN 1515F-2 PN 1515T-2 PN 1515TF-2 PN	1516-3 PN/DP 1516F-3 PN/DP	1517-3 PN 1517F-3 PN	1518-3 PN 1518F-3 PN 1518T-3 PN 1518TF-3 PN
				1516T-3 PN 1516TF-3 PN	1517T-3 PN 1517TF-3 PN	1518-4 PN/DP M-FP 1518F-4 PN/DP MFP
CPU 1518F MFP	---	---	---	---	---	6ES7518-4FX00--1AB0 (https://mall.industry.siemens.com/mall/en/de/Catalog/Product/6ES7-518-4AX00-1AB0)
Equipment Manual						
Standard CPU:	↓ (https://support.industry.siemens.com/cs/ww/en/view/109752841)	↓ (https://support.industry.siemens.com/cs/ww/en/view/109752842)	↓ (https://support.industry.siemens.com/cs/ww/en/view/109767406)	↓ (https://support.industry.siemens.com/cs/ww/en/view/109767407)	↓ (https://support.industry.siemens.com/cs/ww/en/view/109963203)	↓ (https://support.industry.siemens.com/cs/ww/en/view/109963204)
T-CPU	↓ (https://support.industry.siemens.com/cs/ww/en/view/109739188)	---	↓ (https://support.industry.siemens.com/cs/ww/en/view/109739189)	↓ (https://support.industry.siemens.com/cs/ww/en/view/109963205)	↓ (https://support.industry.siemens.com/cs/ww/en/view/109963206)	↓ (https://support.industry.siemens.com/cs/ww/en/view/109963207)
CPU 1518 MFP	---	---	---	---	---	↓ (https://support.industry.siemens.com/cs/ww/en/view/109749061)
F-CPU	↓ (https://support.industry.siemens.com/cs/de/en/view/109478599)					
Supply voltage, permissible range of all the CPUs 19.2 V DC ... 28.8 V DC						
Code work memory						
Standard CPU:	300 KB	600 KB	1 MB	2 MB	4 MB	12 MB
T-CPU	450 KB	---	1.5 MB	3 MB	6 MB	18 MB
F-CPU	450 KB	900 KB	1.5 MB	3 MB	6 MB	18 MB
TF-CPU	450 KB	---	1.5 MB	3 MB	6 MB	18 MB
MFP-CPU	---					6 MB
FMFP-CPU	---					9 MB
Data work memory	1.5 MB	2.5 MB	4.5 MB	7.5 MB	50 MB	150 MB
				25 MB		60 MB
Processing times						
Bit operations	6 ns	6 ns	6 ns	6 ns	0.6 ns	0.3 ns
				1.2 ns		1 ns
Word operations	7 ns	7 ns	7 ns	7 ns	1.3 ns	0.8 ns
				2.6 ns		2 ns

Procedure

To set up infeed only via the system power supply, follow these steps:

1. Open the "Properties" tab of the CPU/interface module in STEP 7 and select the "System power supply" in the navigation.
2. Select the option "No connection to supply voltage L+".

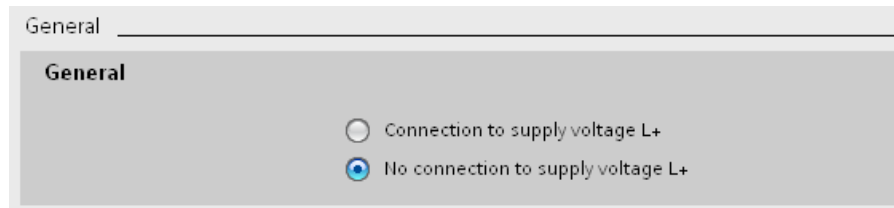


Figure 6-8 No infeed into the backplane bus by means of the CPU/interface module

6.2.3 Special requirements when using the power supply PS 60W 24/48/60VDC HF

S7-1500 - Extended retentive memory for CPUs as of FW V2.1.0

When you use the PS 60W 24/48/60VDC HF system power supply, the entire data area can be used as retentive memory for CPUs as of firmware version V2.1.0 and higher.

The PS 60W 24/48/60VDC HF supplies enough energy in case of a POWER OFF that the CPU can save the entire data area retentively.

Requirements

- STEP 7 V14 SP1 or higher
- PS 60W 24/48/60VDC HF system power supply
- CPU with firmware version as of V2.1.0, see table below

Applicable CPUs

The size of the retentive memory depends on the size of the work memory for data of the CPU used. The table below shows the applicable CPUs with the required hardware function versions.

CPU with firmware version V2.1.0 or higher	Hardware function version	Article number	Max. retentive memory
CPU 1511-1 PN	FS01 or higher	6ES7511-1AK01-0AB0	1 MB
		6ES7511-1AK02-0AB0	
		6ES7511-1AL03-0AB0	1.5 MB
CPU 1511F-1 PN	FS01 or higher	6ES7511-1FK01-0AB0	1 MB
		6ES7511-1FK02-0AB0	
		6ES7511-1FL03-0AB0	1.5 MB
CPU 1511T-1 PN	FS01 or higher	6ES7511-1TK01-0AB0	1 MB
		6ES7511-1TL03-0AB0	1.5 MB
CPU 1511TF-1 PN	FS01 or higher	6ES7511-1UK01-0AB0	1 MB
		6ES7511-1UL03-0AB0	1.5 MB

CPU with firmware version V2.1.0 or higher	Hardware function version	Article number	Max. retentive memory
CPU 1511C-1 PN	FS01 or higher	6ES7511-1CK00-0AB0	1 MB
		6ES7511-1CK01-0AB0	
		6ES7511-1CL03-0AB0	1.5 MB
CPU 1512C-1 PN	FS01 or higher	6ES7512-1CK00-0AB0	1 MB
		6ES7512-1CK01-0AB0	
		6ES7512-1CM03-0AB0	2 MB
CPU 1513-1 PN	FS01 or higher	6ES7513-1AL01-0AB0	1.5 MB
		6ES7513-1AL02-0AB0	
		6ES7513-1AM03-0AB0	2.5 MB
CPU 1513F-1 PN	FS01 or higher	6ES7513-1FL01-0AB0	1.5 MB
		6ES7513-1FL02-0AB0	
		6ES7513-1FM03-0AB0	2.5 MB
CPU 1515-2 PN	FS01 or higher	6ES7515-2AM01-0AB0	3 MB
		6ES7515-2AM02-0AB0	
		6ES7515-2AN03-0AB0	4.5 MB
CPU 1515F-2 PN	FS01 or higher	6ES7515-2FM01-0AB0	3 MB
		6ES7515-2FM02-0AB0	
		6ES7515-2FN03-0AB0	4.5 MB
CPU 1515T-2 PN	FS01 or higher	6ES7515-2TM01-0AB0	3 MB
		6ES7515-2TN03-0AB0	4.5 MB
CPU 1515TF-2 PN	FS01 or higher	6ES7515-2UM01-0AB0	3 MB
		6ES7515-2UN03-0AB0	4.5 MB
CPU 1516-3 PN/DP	FS01 or higher	6ES7516-3AN01-0AB0	5 MB
		6ES7516-3AN02-0AB0	
		6ES7516-3AP03-0AB0	7.5 MB
CPU 1516F-3 PN/DP	FS01 or higher	6ES7516-3FN01-0AB0	5 MB
		6ES7516-3FN02-0AB0	
		6ES7516-3AP03-0AB0	7.5 MB
CPU 1516T-3 PN	FS01 or higher	6ES7516-3TP10-0AB0	15 MB
CPU 1516T-3 PN/DP	FS01 or higher	6ES7516-3TN00-0AB0	5 MB
CPU 1516TF-3 PN	FS01 or higher	6ES7516-3UP10-0AB0	15 MB
CPU 1516TF-3 PN/DP	FS01 or higher	6ES7516-3UN00-0AB0	5 MB
CPU 1517-3 PN	FS01 or higher	6ES7517-3AQ10-0AB0	50 MB
CPU 1517-3 PN/DP	FS03 or higher	6ES7517-3AP00-0AB0	8 MB
CPU 1517F-3 PN	FS01 or higher	6ES7517-3FQ10-0AB0	50 MB
CPU 1517F-3 PN/DP	FS03 or higher	6ES7517-3FP00-0AB0	8 MB
	FS01 or higher	6ES7517-3FP01-0AB0	
CPU 1517T-3 PN	FS01 or higher	6ES7517-3TQ10-0AB0	50 MB
CPU 1517T-3 PN/DP	FS01 or higher	6ES7517-3TP00-0AB0	8 MB
CPU 1517TF-3 PN	FS01 or higher	6ES7517-3UQ10-0AB0	50 MB
CPU 1517TF-3 PN/DP	FS01 or higher	6ES7517-3UP00-0AB0	8 MB

CPU with firmware version V2.1.0 or higher	Hardware function version	Article number	Max. retentive memory
CPU 1518-3 PN	FS01 or higher	6ES7518-3AT10-0AB0	100 MB
CPU 1518F-3 PN	FS01 or higher	6ES7518-3FT10-0AB0	100 MB
CPU 1518T-3 PN	FS01 or higher	6ES7518-3TT10-0AB0	100 MB
CPU 1518TF-3 PN	FS01 or higher	6ES7 518-3UT10-0AB0	100 MB
CPU 1518-4 PN/DP	FS03 or higher	6ES7518-4AP00-0AB0	20 MB
CPU 1518F-4 PN/DP	FS03 or higher	6ES7518-4FP00-0AB0	20 MB
CPU 1518T-4 PN/DP	FS01 or higher	6ES7518-4TP00-0AB0	20 MB
CPU 1518TF-4 PN/DP	FS01 or higher	6ES7518-4UP00-0AB0	20 MB
CPU 1518-4 PN/DP MFP	FS01 or higher	6ES7518-4AX00-1AB0	20 MB
CPU 1518F-4 PN/DP MFP	FS01 or higher	6ES7518-4FX00-1AB0	20 MB

Connection, structure and configuration of an S7-1500 with PS 60W 24/48/60VDC HF

- You must insert the system power supply PS 60W 24/48/60VDC HF in slot 0.



Figure 6-9 Slot PS 60W 24/48/60VDC HF

- If you are using the PS 60W 24/48/60VDC HF, the 24 V supply of the CPU is not taken into account in the power budget calculation.

NOTE

You may only connect the 24 V DC supply voltage directly to the system power supply and not to the CPU.

CPU display

Introduction

The section below gives an overview of the mode of operation of the CPU display. Detailed information on the individual options, a training course and a simulation of the selectable menu items is available in the SIMATIC S7-1500 Display Simulator (<https://support.industry.siemens.com/cs/ww/en/view/109761758>).

Display

The S7-1500 CPU has a display and operating keys. The display of the CPU shows you the control and status information in different menus. You use operating keys to navigate through the menus and make a variety of settings in the process.

Advantages

The display of the CPU offers the following advantages:

- Reduced downtimes through diagnostic messages in plain text
- Time savings during commissioning, maintenance and downtime of the plant by changing the interface settings (e.g. IP address) of CPU and connected CMs/CPs. No programming device is required.
- Shorter downtimes due to read/write access to force tables and read/write access to watch tables.
This allows the current values of the individual tags of a user program or a CPU to be monitored and changed by the monitoring and force tables. You can find more information on the watch and force tables in section Test functions and fault correction (Page 404) and in the STEP 7 online help.
- On site, an image (backup copy) of the functioning plant can be
 - Backed up on the SIMATIC Memory Card of the CPU
 - Restored from the SIMATIC Memory Card of the CPU

You do not require an additional PG/PC.

- For F-CPU: Overview of status of safety mode and of F-parameters of F-CPU and F-I/O.

Password protection for the display

In the properties of the CPU, configure a password in STEP 7 for the display operation. Local access protection is thus protected via a local password.

Operating temperature for the display

To increase the service life of the display, the display switches off when the permitted operating temperature is exceeded. When the display has cooled down again, it switches on automatically again. When the display is switched off, the LEDs continue to show the status of the CPU.

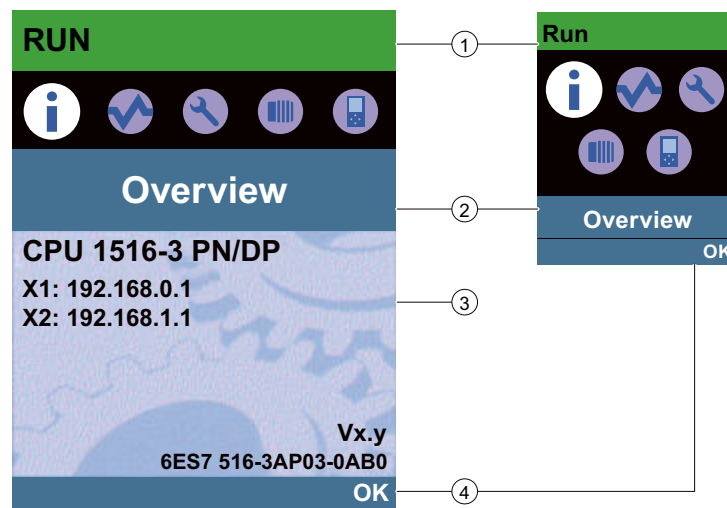
Information about the temperatures at which the display switches off and back on again is available in the technical data of the manuals of the CPUs.

NOTE

The S7-1500 CPU has no internal temperature measurement. Reading out the internal temperature of the S7-1500 CPU is not supported.

Display

The following figures show an example of a CPU with large display (left: for example, CPU 1516-3 PN/DP) and a CPU with small display (right: for example, CPU 1511-1 PN).



- ① CPU status information
- ② Names of the menus
- ③ Data display field
- ④ Navigation aid, e.g. OK/ESC or the page number

Figure 14-1 Example views of the displays