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Delivery release for the SIMATIC Controller CPU S7-1516T-3 PN/DP and S7-1516TF-3 PN/DP

The SIMATIC S7-1500 controller family will be expanded by two further technology CPUs. The CPU 1516T-3 PN/DP and CPU 1516TF-3 PN/DP have been released for general delivery.

With the CPU 1516T-3 PN/DP and the CPU 1516TF-3 PN/DP, the product portfolio of the Advanced Controller SIMATIC S7-1500 is extended, thus providing optimum scalability in terms of quantity structure and performance. They are based on the innovative firmware version V2.5 of the SIMATIC S7-1500 controllers and support extended motion control functions.

Product description of the CPU 1516T-3 PN/DP and CPU 1516TF-3 PN/DP:

The CPUs are suitable for applications with medium/high requirements in terms of program size and processing speed. In this way, they address sophisticated applications with a focus on motion control, such as cross-industry automation tasks in series machines, special purpose machines and plant engineering. In addition, the CPUs are also suitable for distributed configuration via PROFINET IO and PROFIBUS DP.

The CPUs have a total of 3 integrated interfaces. In addition to the PROFINET IO interface (IRT/RT) designed as a 2-port switch, the CPUs have an additional PROFINET interface (RT) with one port. This can be used for network separation, connection of further PROFINET IO RT-Devices or for fast communication as I-Device. In addition, a PROFIBUS DP interface is integrated as standard on the CPUs..

With a width of 175 mm, the dimensions of the CPU 1516T-3 PN/DP and CPU 1516TF-3 PN/DP are identical to the dimensions of the CPU 1517T-3 PN/DP and CPU 1517TF-3 PN/DP.



CPU S7-1516T-3 PN/DP



CPU S7-1516TF-3 PN/DP

Highlights:

- Integrated technology functions
- Motion Control performance (approx. 55 positioning axes with 4ms servo cycle and 35% system load by Motion Control)
- Security Integrated
- Innovative design and handling
- Integrated system diagnostics

Highlights of the fail-safe CPU 1516TF-3 PN/DP:

- Decentralized configuration via PROFINET IO and PROFIBUS DP with PROFIsafe
- Library with all common safety functions certified by the German Technical Inspectorate (TÜV)
- Support for validation through standard-compliant program documentation
- Easy reusability via library concept
- Can be used for safety-related tasks according to IEC 61508 up to SIL 3 and ISO 13849-1 up to PL e.

Motion control functions

The standard and fail-safe SIMATIC S7-1500 CPUs support the following Motion Control technology objects:

- Speed-controlled axes
- Positioning axes
- Synchronous axes (relative synchronous operation with synchronization without specification of the synchronous position, setpoint coupling)
- External encoders
- Output cams
- Cam track
- Measuring inputs

new with firmware V2.5:

- Instructions for torque control to use additive torque setpoint in the drive.
- Cyclic setting of torque limits in the drive.
- Evaluation of the actual torque value of the drive directly via the TO-DB (technology data block) of the axis.

In addition to the above-mentioned functionalities, the technology CPUs of the SIMATIC S7-1500 offer advanced motion control functions:

- Up to 4 encoders or measuring systems as actual position for closed loop position control
- Extended synchronous operation functions
 - Synchronization with specification of the synchronous position (absolute synchronous operation)
 - Actual value coupling
 - Shifting of the master value to the following axis
 - Camming
- Cam disks

new with firmware V2.5:

- Specification of cyclically calculated motion setpoints for velocity and acceleration as basic motion (MC_MotionInVelocity) for an axis.
- Specification of cyclically calculated motion setpoints for position, velocity and acceleration as basic motion (MC_MotionInPosition) for an axis.
- Kinematics technology object for the control of kinematics with up to 4 interpolating axes such as Cartesian portals, Roller pickers, Articulated arm robots, Delta pickers, SCARA, Tripods and Cylindrical robots. Furthermore, user-defined kinematics with up to 4 interpolating axes are also supported.
- Kinematics trace with tracer path recording and kinematics control panel for simple 3D visualization and diagnosis of movements as well as commissioning of the kinematics

Basic data

CPU	CPU 1516T-3 PN/DP	CPU 1516TF-3 PN/DP
Memory		

CPU	CPU 1516T-3 PN/DP	CPU 1516TF-3 PN/DP
Program / Data	1,5 MB / 5 MB	1,5 MB / 5 MB
Performance		
Bit operations	10 ns	
Word operations	12 ns	
Integer math instructions	16 ns	
Floting-point arithmetic	64 ns	
Bit memories, timers and counters		
S7 counters / S7 timers	2048	
IEC-Counter	Unlimited (limited only by work memory)	
IEC-Timer	Unlimited (limited only by work memory)	
Bit memories	16 kByte	
I/O address area		
Inputs	32 kByte (all inputs are stored in the process image)	
Outputs	32 kByte (all outputs are stored in the process image)	
Interfaces	X1: PN IO (IRT/RT) interface with 2 ports; X2: PN IO (RT) interface with 1 port; X3: PROFIBUS DP	
Motion Control		
Available Motion Control Resources (speed, positioning and synchronous axes, output cams, cam tracks, measuring inputs)	6400	
Available Extended Motion Control Resources (cams, kinematics)	192	
OPC UA	yes	
Webserver	yes	
Display	yes	
Mounting dimensions (mm)	175 x 147 x 129	

Required resources for Motion Control technology objects:

- Speed axis = 40
- Positioning axis = 80
- Synchronous axis = 160
- Output Cam = 20
- Cam track = 160
- Measuring Input = 40

Required resources for Extended Motion Control technology objects:

- Cams = 2
- Kinematics = 30

Compatibility and necessary components

The new S7-1500T/TF CPUs are delivered with the innovated CPU firmware version V2.5.

STEP 7

The new CPU 1516T-3 PN/DP and CPU 1516TF-3 PN/DP will be programmed and configured exclusively in the TIA Portal with STEP 7 Professional as of V15 and higher. Configuration with older STEP 7 versions is not possible.

Safety

The optional package STEP 7 Safety Advanced V15 is required for configuration of safety-related technology.

Order data

Type	Article number
CPU 1516T-3 PN/DP	6ES7516-3TN00-0AB0
CPU 1516TF-3 PN/DP	6ES7516-3UN00-0AB0

SIMATIC Memory Card

(required for operation of the CPU):

All S7-1500 CPUs make use of a SIMATIC Memory Card. It is used as plug-in loading memory or to perform a firmware update. The SIMATIC Memory Card can also be used to store STEP 7 projects including comments and symbolics, additional documentation or csv files (for recipes and archives). From the user program (via SFCs), data blocks can be created on the SIMATIC Memory Card and data can be stored or read.

The following types of SIMATIC memory cards can be used:

Type	Article number
SIMATIC Memory Card 4 MB	6ES7954-8LC02-0AA0
SIMATIC Memory Card 12 MB	6ES7954-8LE03-0AA0
SIMATIC Memory Card 24 MB	6ES7954-8LF03-0AA0
SIMATIC Memory Card 256 MB	6ES7954-8LL03-0AA0
SIMATIC Memory Card 2 GB	6ES7954-8LP02-0AA0
SIMATIC Memory Card 32 GB	6ES7954-8LT03-0AA0

Accessories

Type	Article number
Mounting rails	
Mounting rail, 160 mm (with drill hole)	6ES7590-1AB60-0AA0
Mounting rail, 245 mm (with drill hole)	6ES7590-1AC40-0AA0
Mounting rail, 482 mm (with drill hole)	6ES7590-1AE80-0AA0
Mounting rail, 530 mm (with drill hole)	6ES7590-1AF30-

Type	Article number
	0AA0
Mounting rail, 830 mm (with drill hole)	6ES7590-1AJ30-0AA0
Mounting rail, 2000 mm ((without drill hole) for self-customizing	6ES7590-1BC00-0AA0
PE connection element for mounting rail 2000 mm (spare part), 20 pcs.	6ES7590-5AA00-0AA0

Spare parts

Type	Article number
Display for SIMATIC CPU 1516 (F/T), CPU 1517(F/T/TF), CPU 1518	6ES7591-1BA01-0AA0
Plug, 2x 2-pin for 24 V DC power supply, push-in terminal, 10 pcs.	6ES7193-4JB00-0AA0

TIA Selection Tool

You can select, configure and order devices for Totally Integrated Automation (TIA) with the TIA Selection Tool or the TIA Selection Tool Cloud. The selection and configuration of the new S7-1500 T-CPUs is supported from version 2017.4.
For additional information, see: [↑http://www.siemens.com/tia-selection-tool](http://www.siemens.com/tia-selection-tool)

SIZER for Siemens Drives

The SIZER for Siemens Drives engineering tool decisively simplifies the project engineering for low-voltage drive systems. On the basis of your application, the tool will help you step by step to define the mechanical system and to design converters, motors and gear units. It also enables other system components to be configured, and open-loop and closed-loop controls to be designed. The selection and configuration of the new S7-1500 T-CPUs will be supported from version SIZER V3.18 update April 2018.
For additional information, see: [↑http://www.siemens.com/sizer](http://www.siemens.com/sizer)

Additional information

SIMATIC Technology CPUs

[↑www.siemens.com/t-cpu](http://www.siemens.com/t-cpu)
[↑www.siemens.com/simatic-technology](http://www.siemens.com/simatic-technology)

Security information

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept. For more information about industrial security, please visit <http://www.siemens.com/industrialsecurity>.

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