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SIMATIC S7-400

SIMATIC S7-400 advanced controller

Catalog ST 400 Edition May 2017

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SIMATIC S7-400



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The products contained in this catalog can also be found in the Interactive Catalog CA 01. Article No.: E86060-D4001-A500-D7-7600

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Introduction

SIMATIC S7-400 advanced controller



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Introduction

S7-400/S7-400H/S7-400F/FH

Overview

The S7-400 is the most powerful PLC in the family of SIMATIC controllers. It enables successful automation solutions with Totally Integrated Automation (TIA). The S7-400 is an automation platform for system solutions in production and process engineering, and it is characterized primarily by its modularity and performance reserves.



S7-400

- The power PLC for the mid to high-end performance ranges.
- The solution for even the most demanding tasks.
- With a comprehensive range of modules and performancegraded CPUs for optimal adaptation to the automation task.
- Flexible in use through simple implementation of distributed structures.
- User-friendly connections.
- · Optimal communication and networking options.
- User-friendly handling and uncomplicated design without a fan.
- Can be expanded without problems when the tasks increase.Multicomputing:

Simultaneous operation of several CPUs in one S7-400 central controller.

Multicomputing distributes the overall performance power of an S7-400. For example, complex tasks can be divided into technologies such as open-loop control, computing or communication, and assigned to different CPUs. And every CPU can be assigned its own local I/O.

Modularity:

The powerful backplane bus of the S7-400 and the communication interfaces that can be connected direct to the CPU enable high-performance operation of a host of communication lines. This enables, for example, division into one communication path for HMI and programming tasks, one for high-performance and equidistant motion control components, and one for a "normal" I/O fieldbus. Additionally required connections to MES/ERP systems or the Internet can also be implemented.

Engineering and diagnostics:

The S7-400 is configured and programmed extremely efficiently together with the SIMATIC Engineering Tools particularly in the case of extensive automation solutions with a high engineering component. For this purpose, high-level languages such as SCL and graphical engineering tools for sequential controls, state graph programs and technologyoriented diagrams are available, for example.



S7-400H

- Fault-tolerant automation system with redundant design.
- For applications with high fail-safety requirements. Processes with high restart costs, expensive downtimes, little supervision, and few maintenance options.
- Redundant central functions.
- Increases availability of I/O: switched I/O configuration.
- Also possible to use I/Os with standard availability: singlesided configuration.
- Hot stand-by: automatic reaction-free switching to the standby unit in the event of a fault.
- Configuration with two separate or one divided central rack.
- Connection of switched I/O via redundant PROFIBUS DP or via system-redundant PROFINET IO.

Introduction

S7-400/S7-400H/S7-400F/FH

S7-400F/FH

Overview (continued)

- Failsafe automation system for plants with increased safety requirements
- Complies with safety requirements to SIL 3 in accordance with IEC 61508, AK6 in accordance with DIN V 19250 and Cat. 4 in accordance with EN 954-1
- If required, also fault tolerant through redundant design
- · Without additional wiring of the safety-related I/O
- Safety-relevant communication via PROFIBUS DP with PROFIsafe profile
- Based on S7-400H and distributed IOs ET 200M with fail-safe modules
- Standard modules for non-safety-related applications can also be used in the automation system
- Isolation module for joint use of fail-safe and standard modules in safety mode in one ET 200M

General technical data SIMATIC S7-400			
Degree of protection	IP20		
Ambient temperature	0 to 60 °C		
Relative humidity	5 to 95 %, no condensation		
Atmospheric pressure	1080 to 795 hPa (corresponds to an altitude of -1000 m to +2,000 m)		
Electromagnetic compatibilityInterference immunity	According to EN 61000-6-2		
Emitted interference	According to EN 61000-6-4		
Mechanical load			
 Vibration, test according to / 	IEC 60068-2-6 (sine)		
tested with	10 to 58 Hz; constant amplitude 0.075 mm; 58 to 500 Hz; constant acceleration 1 g; duration of oscillation: 10 fre- quency sweeps per axis in each direction of the three mutually perpendicular axes		
 Shock, test according to / tested with 	IEC 60068-2-27 Type of shock: Half-sine; strength of the shock 10 g (peak value), duration 6 ms direction of shock: 100 shocks in eac of the 3 mutually perpendicular axes.		

General technical data SIPLUS S7-400

Ambient temperature range	-25/0 +60/70 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies except for the ambient conditions.

Ambient conditions

Extended ambient conditions

 Relative to ambient temperatureatmospheric pressure-installation altitude
 Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K)

Relative humidity

• With condensation, max.

Resistance

- against biologically active substances / conformity with EN 60721-3-3
- against chemically active substances / conformity with EN 60721-3-3
- against mechanically active substances / conformity with EN 60721-3-3

(1000 m.m. (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)

100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions)

Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation in corrosive atmospheres!

Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!

Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Central processing units Standard CPUs

CPU 412

Overview



CPU 412-1, CPU 412-2 and CPU 412-2 PN

Technical specifications

- The low-cost starter solution for the medium performance range
- Can be used in small and medium-sized systems with requirements of the medium performance range

6ES7412-1XJ07-0AB0	6ES7412-2XK07-0AB0	6ES7412-2EK07-0AB0
CPU412-1, MPI/DP, 512 KB	CPU412-2, MPI/DP, 1 MB	CPU412-2 PN, 1 MB, 2 INTERFACES
CPU 412-1	CPU 412-2	CPU 412-2 PN
STEP 7 V5.4 or higher with HSP 261	STEP 7 V5.4 or higher with HSP 261	STEP 7 V5.5 or higher with HSP 262
No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply
3.5 W	4.5 W	5.5 W
512 kbyte	1 Mbyte	1 Mbyte
256 kbyte	512 kbyte	512 kbyte
256 kbyte	512 kbyte	512 kbyte
64 Mbyte	64 Mbyte	64 Mbyte
512 kbyte	512 kbyte	512 kbyte
64 Mbyte	64 Mbyte	64 Mbyte
		· ·
31.25 ns	31.25 ns	31.25 ns
31.25 ns	31.25 ns	31.25 ns
31.25 ns	31.25 ns	31.25 ns
62.5 ns	62.5 ns	62.5 ns
2 048	2 048	2 048
Yes	Yes	Yes
2 048	2 048	2 048
Yes	Yes	Yes
4 kbyte; Size of bit memory address area	4 kbyte; Size of bit memory address area	4 kbyte; Size of bit memory address area
	CPU412-1, MPI/DP, 512 KB CPU 412-1 STEP 7 V5.4 or higher with HSP 261 No; Power supply via system power supply 3.5 W 512 kbyte 256 kbyte 256 kbyte 256 kbyte 31.25 ns 31.25 ns 31.25 ns 31.25 ns 31.25 ns 31.25 ns 2 048 Yes 2 048 Yes 4 kbyte; Size of bit memory address	CPU412-1, MPI/DP, 512 KBCPU412-2, MPI/DP, 1 MBCPU 412-1CPU 412-2STEP 7 V5.4 or higher with HSP 261STEP 7 V5.4 or higher with HSP 261No; Power supply via system power supplyNo; Power supply via system power supply3.5 W4.5 W512 kbyte1 Mbyte 512 kbyte526 kbyte512 kbyte

Central processing units Standard CPUs

CPU 412

Address area //O address area //O address area //O address area • Inputs 4 kby • Outputs 4 kby Process image //O adjustable • Inputs, adjustable 4 kby • Outputs, adjustable 4 kby • Hardware clock (real-time clock) Yes • Operating hours counter 16 Interfaces 11 Interfaces/bus type 1 x M Number of RS 485 interfaces 1; Co 1. Interface 1 Interface type Intege	yte	CPU412-2, MPI/DP, 1 MB 4 kbyte 4 kbyte 4 kbyte 4 kbyte 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated RS 485 / PROFIBUS + MPI	CPU412-2 PN, 1 MB, 2 INTERFACE 4 kbyte 4 kbyte 4 kbyte 4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated RS 485 / PROFIBUS + MPI
I/O address area• Inputs4 kby• Outputs4 kby• Outputs, adjustable4 kby• Inputs, adjustable4 kby• Outputs, adjustable4 kby• Number of dayYesOperating hours counter1• Number16Interfaces1Interfaces/bus type1 x lwNumber of RS 485 interfaces1; Co1. InterfaceIntegPhysicsRS 4FunctionalityYes• MPIYes• DP masterYes• Number of DP slaves, max.322. Interface typePhysicsPhysicsInterface types• Number of portsInterface types• Number of portsFunctionality• DP masterDP master• DP masterDP master• DP masterDP master• DP slaveHermitica and the point of	yte yte yte MPI/PROFIBUS DP ombined MPI / PROFIBUS DP	4 kbyte 4 kbyte 4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated	4 kbyte 4 kbyte 4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
 Inputs 4 kby Outputs 4 kby Outputs 4 kby Process image Inputs, adjustable 4 kby Outputs, adjustable 4 kby Outputs, adjustable 4 kby Outputs, adjustable 7 kby Operating hours counter 16 Interfaces Interfaces Interface 1 kby MPI 7 kes DP master 7 kes DP master 7 kes Number of DP slaves, max. 32 Interface type 8 kby Number of ports Functionality DP master DP master<td>yte yte yte MPI/PROFIBUS DP ombined MPI / PROFIBUS DP</td><td>4 kbyte 4 kbyte 4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated</td><td>4 kbyte 4 kbyte 4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated</td>	yte yte yte MPI/PROFIBUS DP ombined MPI / PROFIBUS DP	4 kbyte 4 kbyte 4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated	4 kbyte 4 kbyte 4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
 Outputs 4 kby Process image Inputs, adjustable 4 kby Outputs, adjustable 4 kby Outputs, adjustable 4 kby Time of day Clock Hardware clock (real-time clock) Yes Operating hours counter Number Number Interfaces Interface type Physics Physics Number of DP slaves, max. 22 Interface type Number of DP slaves, max. 32 Interface type Number of DP slaves, max. DP master Number of ports Functionality DP master <	yte yte yte MPI/PROFIBUS DP ombined MPI / PROFIBUS DP	4 kbyte 4 kbyte 4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated	4 kbyte 4 kbyte 4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
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 Outputs, adjustable 4 kby Time of day Clock Hardware clock (real-time clock) Yes Operating hours counter Number Interfaces Interfaces/bus type 1 x M Number of RS 485 interfaces 1; Co 1. Interface type Physics DP master Number of DP slaves, max. 22 Interface type Number of DP slaves, max. 32 2. Interface type Physics Interface type Physics Por master Number of DP slaves, max. 24 Interface type Physics Interface types Number of ports Functionality DP master DP master<td>/te /PI/PROFIBUS DP ombined MPI / PROFIBUS DP</td><td>4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 2; Combined MPI / PROFIBUS DP and PROFIBUS DP</td><td>4 kbyte Yes 16 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated</td>	/te /PI/PROFIBUS DP ombined MPI / PROFIBUS DP	4 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 2; Combined MPI / PROFIBUS DP and PROFIBUS DP	4 kbyte Yes 16 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
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Time of day Image: Clock Clock Yes Operating hours counter 1 Number 16 Interfaces 1 Interfaces/bus type 1 x M Number of RS 485 interfaces 1; Co Interface type Integ Physics RS 4 Functionality Yes • NUmber of DP slaves, max. 32 DP master Yes • Number of DP slaves, max. 32 2. Interface type Physics Physics S Interface type Physics DP master Yes • Number of DP slaves, max. 32 2. Interface Physics Interface type Physics Interface type Physics Interface types Number of ports Functionality DP master • DP master DP master • DP master DP master • DP master DP master • DP slave DP slave	IPI/PROFIBUS DP ombined MPI / PROFIBUS DP rrated	Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated	Yes 16 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
Hardware clock (real-time clock)YesOperating hours counter16Interfaces1Interfaces/bus type1 x MNumber of RS 485 interfaces1; Co1. Interface typeIntegPhysicsRS 4FunctionalityYes• DP masterYes• Number of DP slaves, max.322. Interface type1PhysicsYesDP masterYes• Number of DP slaves, max.322. Interface type1PhysicsYesDP master1• Number of DP slaves, max.322. Interface type1Physics1• DP master1• DP slave1	ombined MPI / PROFIBUS DP	16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated	16 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
Hardware clock (real-time clock)YesOperating hours counter16Interfaces16Interfaces/bus type1 x MNumber of RS 485 interfaces1; Co1. Interface (type)1 kmPhysicsRS 4FunctionalityYes• MPIYes• DP masterYes• Number of DP slaves, max.322. Interface typePhysicsPhysics12Interface typeYesDP masterYes• Number of DP slaves, max.322. Interface typeYesPhysicsInterface typePhysicsPhysicsInterface typePhysics• Number of portsInterface types• Number of portsDP master• DP masterDP master• DP masterDP master• DP masterDP master• DP masterDP master• DP slaveDP master	ombined MPI / PROFIBUS DP	16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated	16 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
Operating hours counter 16 Interfaces 1 Interfaces/bus type 1 x M Number of RS 485 interfaces 1; Co Interface type Integ Physics RS 4 Functionality • • Number of DP slave Yes • DP master Yes • Number of DP slaves, max. 32 2. Interface type Physics Interface type Physics Interface type Physics Functionality • • Number of DP slaves, max. 32 2. Interface type Physics Interface types • • Number of ports Functionality • DP master • • DP master	ombined MPI / PROFIBUS DP	16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated	16 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
 Number 16 Interfaces Interfaces/bus type 1 x M Number of RS 485 interfaces 1; Co Interface type Integ Physics RS 4 Functionality MPI Yes DP master Number of DP slaves, max. 32 Interface type Interface Interface type Physics Auronality MPI Yes DP master Number of DP slaves, max. 32 Interface types Number of ports Functionality DP master DP master DP slave 	ombined MPI / PROFIBUS DP	1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated	1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
Interfaces Interfaces/bus type 1 x M Number of RS 485 interfaces 1; Co 1. Interface Interface type Integ Physics RS 4 Functionality • MPI Yes • DP master Yes • DP master Yes • DP slave Yes DP master • Number of DP slaves, max. 32 2. Interface Interface type Physics • Number of ports • DP master • DP master • DP master • DP master	ombined MPI / PROFIBUS DP	1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated	1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
Interfaces/bus type 1 x M Number of RS 485 interfaces 1; Co 1. Interface 1; Co 1. In	ombined MPI / PROFIBUS DP	1 x PROFIBUS DP 2; Combined MPI / PROFIBUS DP and PROFIBUS DP Integrated	1 x PROFINET (2 ports) 1; Combined MPI / PROFIBUS DP Integrated
InterfaceInterface typeIntegPhysicsRS 4FunctionalityYes• MPIYes• DP masterYes• DP masterYes• Number of DP slaves, max.322. InterfaceInterface typePhysicsInterface types• Number of portsInterface types• Number of portsInterface type• Number of portsInterface type• Number of portsDP• Number of portsInterface type• Number of portsInterface type• Number of portsInterface type• Number of portsInterface type• DP master• DP• DP master• DP• DP slaveInterface type	rated	2; Combined MPI / PROFIBUS DP and PROFIBUS DP	1; Combined MPI / PROFIBUS DP Integrated
InterfaceInterface typeIntegPhysicsRS 4FunctionalityYes• MPIYes• DP masterYes• DP master322. InterfaceInterface typePhysicsYesInterface typeYes• Number of portsInterface types• Number of portsInterface type• DP master• DP master• DP slaveInterface type	rated	PROFIBUS DP Integrated	Integrated
Interface type Integ Physics RS 4 Functionality RS 4 MPI Yes DP master Yes DP master Yes DP master Yes Number of DP slaves, max. 32 Interface type Physics Interface types Number of ports Functionality DP master DP master DP master DP master		-	-
Physics RS 4 Functionality Yes • MPI Yes • DP master Yes • DP master Yes • Number of DP slaves, max. 32 2. Interface Interface type Physics Interface types • Number of ports Interface types • Number of ports Enceptionality • DP master • DP master • DP master • DP master		-	-
Functionality Yes • MPI Yes • DP master Yes • DP slave Yes DP master 32 2. Interface Physics • Number of ports Functionality • DP master	85 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	
• MPIYes• DP masterYes• DP slaveYes DP master 32• Number of DP slaves, max.322. InterfacePhysicsInterface type1• Number of ports1• Number of ports1• Number of ports1• DP master0• DP slave1			NO 400 / PRUFIBUS + MPI
DP masterYesDP slaveYesDP master32InterfacePhysicsInterface type1Physics1Interface types1Interface types1Interface types1Interface types1Interface types1Interface types1DP master1In DP slave1			
DP slave Yes DP master Number of DP slaves, max. 32 2. Interface Interface type Physics Interface types Number of ports Functionality DP master DP slave		Yes	Yes
DP master 32 • Number of DP slaves, max. 32 2. Interface Interface type Physics Interface types • Number of ports Functionality • DP master • DP slave		Yes	Yes
Number of DP slaves, max. 32 2. Interface Interface type Physics Interface types Number of ports Functionality DP master DP slave		Yes	Yes
2. Interface Interface type Physics Interface types • Number of ports Functionality • DP master • DP slave			
2. Interface Interface type Physics Interface types • Number of ports Functionality • DP master • DP slave		32	32
Interface type Physics Interface types Interface types Interface types Interface types Drumber of ports Interface types DP master DP slave			
Physics Interface types • Number of ports Interface types Functionality Image: Comparison of ports • DP master Image: Comparison of ports • DP slave Image: Comparison of ports		Integrated	PROFINET
Interface types • Number of ports Functionality • DP master • DP slave		RS 485 / PROFIBUS	Ethernet RJ45
Number of ports Functionality DP master DP slave			
DP master DP slave			2
DP master DP slave			<u> </u>
• DP slave		Yes	No
		Yes	No
PROFINET IO Controller		Tes	
- DDOFINIET IO Davidad			Yes
PROFINET IO Device			Yes
PROFINET CBA			Yes
DP master		24	
Number of DP slaves, max.		64	
sochronous mode			
Isochronous operation (application Yes; synchronized up to terminal)	For PROFIBUS only	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions			
PG/OP communication Yes		Yes	Yes
Data record routing Yes		Yes	Yes
Global data communication		100	100
		Yes	Yes
11		100	100
S7 basic communication		Vee	Yaa
• supported Yes		Yes	Yes
S7 communication			X
• supported Yes		Yes	Yes
S5 compatible communication			
	Via FC AG_SEND and AG_RECV,	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RE max. via 10 CP 443-1 or 443-5
Standard communication (FMS)	via 10 CP 443-1 or 443-5		

SIMATIC S7-400 advanced controller Central processing units Standard CPUs

CPU 412

Technical specifications (continued)

Article number	6ES7412-1XJ07-0AB0	6ES7412-2XK07-0AB0	6ES7412-2EK07-0AB0
	CPU412-1, MPI/DP, 512 KB	CPU412-2, MPI/DP, 1 MB	CPU412-2 PN, 1 MB, 2 INTERFACES
Open IE communication			
• TCP/IP			Yes; via integrated PROFINET interface and loadable FBs
 Number of connections, max. 			46
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB	Via CP 443-1 and loadable FB	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
- Number of connections, max.			46
• UDP			Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.			46
Web server			
 supported 	No	No	Yes
Number of connections			
• overall	48	48	48
Standards, approvals, certificates			
Use in hazardous areas			
• ATEX	ATEX II 3 G Ex nA IIC T4 Gc	ATEX II 3 G Ex nA IIC T4 Gc	ATEX II 3 G Ex nA IIC T4 Gc
Ambient conditions			
Ambient temperature during operation			
• min.	0° 0	0 °C	0 °C
• max.	60 °C	60 °C	60 °C
Configuration			
Know-how protection			
User program protection/password protection	Yes	Yes	Yes
 Block encryption 	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions			
Width	25 mm	25 mm	25 mm
Height	290 mm	290 mm	290 mm
Depth	219 mm	219 mm	219 mm
Weights			
Weight, approx.	700 g	700 g	750 g

Central processing units Standard CPUs

CPU 412

Ordering data	Article No.		Article No.
CPU 412-1	6ES7412-1XJ07-0AB0	RS 485 bus connector with 90° cable outlet	
Work memory 512 KB, power sup-			
ply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory		Max. transfer rate 12 Mbps • Without PG interface	6ES7972-0BA12-0XA0
card, incl. slot number labels		Without FG Interface With PG interface	6ES7972-0BB12-0XA0
CPU 412-2	6ES7412-2XK07-0AB0	RS 485 bus connector	0237372-00012-0A0
Work memory 1 MB, power supply		with angled cable outlet	
24 V DC, MPI/PROFIBUS DP master		Max. transfer rate 12 Mbps	
interface, slot for memory card, incl. slot number labels		Without PG interface	6ES7972-0BA42-0XA0
		With PG interface	6ES7972-0BB42-0XA0
CPU 412-2 PN	6ES7412-2EK07-0AB0	RS 485 bus connector	
Work memory 1 MB, power supply 24 V DC, MPI/PROFIBUS DP master		with 90° cable outlet for	
interface, PROFINET interface, slot		FastConnect system	
for memory card, incl. slot number		Max. transfer rate 12 Mbps	
labels		 Without PG interface 	
RAM memory card		- 1 unit	6ES7972-0BA52-0XA0
• 64 KB	6ES7952-0AF00-0AA0	- 100 units	6ES7972-0BA52-0XB0
• 256 KB	6ES7952-1AH00-0AA0	 With PG interface 	
• 1 MB	6ES7952-1AK00-0AA0	- 1 unit	6ES7972-0BB52-0XA0
• 2 MB	6ES7952-1AL00-0AA0	- 100 units	6ES7972-0BB52-0XB0
• 4 MB	6ES7952-1AM00-0AA0	RS 485 bus connector	6GK1500-0EA02
• 8 MB	6ES7952-1AP00-0AA0	with axial cable outlet	6GK1500-0EA02
• 16 MB	6ES7952-1AS00-0AA0	For SIMATIC OP, for connection to	
• 64 MB	6ES7952-1AY00-0AA0	PPI, MPI, PROFIBUS	
FEPROM memory card		PROFIBUS FastConnect	6XV1830-0EH10
• 64 KB	6ES7952-0KF00-0AA0	bus cable	
• 256 KB	6ES7952-0KH00-0AA0	Standard type with special design	
• 1 MB	6ES7952-1KK00-0AA0	for fast mounting, 2-core, shielded,	
• 2 MB	6ES7952-1KL00-0AA0	sold by the meter; max. delivery	
• 4 MB	6ES7952-1KM00-0AA0	unit 1 000 m, minimum ordering quantity 20 m	
• 8 MB	6ES7952-1KP00-0AA0	quantity 20 m	
• 16 MB • 32 MB	6ES7952-1KS00-0AA0 6ES7952-1KT00-0AA0		
• 64 MB	6ES7952-1KY00-0AA0		
		-	
	6ES7901-0BF00-0AA0		
For connection of SIMATIC S7 and PG via MPI; length: 5 m			
Slot number labels	6ES7912-0AA00-0AA0		
1 set (spare part)			
SIMATIC Manual Collection	6ES7998-8XC01-8YE0		
Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC			
SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2		
Current "Manual Collection" DVD and the three subsequent updates			

Central processing units Standard CPUs

Overview



CPU 414-2, CPU 414-3 and CPU 414-3 PN/DP

Technical specifications

- CPUs for high demands in the mid-level performance range
- Applicable for plants with additional demands on programming scope and processing speed
- Integrated PROFINET functions in CPU 414-3 PN/DP

Article number	6ES7414-2XL07-0AB0 CPU414-2, MPI/DP, 2 MB	6ES7414-3XM07-0AB0 CPU414-3, 4 MB, 3 INTERFACES	6ES7414-3EM07-0AB0 CPU414-3 PN/DP, 4 MB, 3 INTERFACES
General information			
Product type designation	CPU 414-2	CPU 414-3	CPU414-3 PN/DP
Engineering with			
 Programming package 	STEP 7 V5.4 or higher with HSP 261	STEP 7 V5.4 or higher with HSP 261	STEP 7 V5.5 or higher with HSP 262
Supply voltage			
Rated value (DC)			
• 24 V DC	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply
Power loss			
Power loss, typ.	4.5 W	5.5 W	6.5 W
Memory			
Work memory			
 integrated 	2 Mbyte	4 Mbyte	4 Mbyte
 integrated (for program) 	1 Mbyte	2 Mbyte	2 Mbyte
 integrated (for data) 	1 Mbyte	2 Mbyte	2 Mbyte
Load memory			
 expandable FEPROM, max. 	64 Mbyte	64 Mbyte	64 Mbyte
 integrated RAM, max. 	512 kbyte	512 kbyte	512 kbyte
 expandable RAM, max. 	64 Mbyte	64 Mbyte	64 Mbyte
CPU processing times			
for bit operations, typ.	18.75 ns	18.75 ns	18.75 ns
for word operations, typ.	18.75 ns	18.75 ns	18.75 ns
for fixed point arithmetic, typ.	18.75 ns	18.75 ns	18.75 ns
for floating point arithmetic, typ.	37.5 ns	37.5 ns	37.5 ns
Counters, timers and their reten- tivity			
S7 counter			
Number	2 048	2 048	2 048
IEC counter			
• present	Yes	Yes	Yes
S7 times			
Number	2 048	2 048	2 048
IEC timer			
• present	Yes	Yes	Yes
Data areas and their retentivity			
Flag			
• Number, max.	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area

Central processing units Standard CPUs

CPU 414

Address area VO address area VO address area Inputs Outputs Outputs Inputs, adjustable Outputs, adjust, adjust, adjust, adjust	U414-2, MPI/DP, 2 MB byte byte byte s s MPI/PROFIBUS DP, PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and OFIBUS DP	CPU414-3, 4 MB, 3 INTERFACES 8 kbyte 8 kbyte 8 kbyte 16 1 x MPI/PROFIBUS DP, 1 x PROFIBUS PROFIBUS DP, 1 x PROFIBUS PROFIB	CPU414-3 PN/DP, 4 MB, 3 INTERFACES 8 kbyte 8 kbyte 8 kbyte 9 kbyte 16 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports),
VO address area 8 kł • Inputs 8 kł • Outputs 8 kł Process image 8 kł • Inputs, adjustable 8 kł • Outputs, adjustable 9 kł • Number 16 Interfaces 1 x Number of RS 485 interfaces 2; C Number of other interfaces 9 RC Number of other interfaces 1 x	byte byte s MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	8 kbyte 8 kbyte 8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP (optionally pluggable)	8 kbyte 8 kbyte 8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports),
Inputs 8 kt Outputs 8 kt Outputs 8 kt Process image Inputs, adjustable 8 kt Outputs, adjustable 8 kt Outputs, adjustable 7 kt Outputs, adjustable 8 kt Clock Hardware clock (real-time clock) Yes Operating hours counter Number 16 Interfaces Interfaces/bus type 1 x 1 x Number of RS 485 interfaces 2; C RC Number of other interfaces 1. Interface	byte byte s MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	8 kbyte 8 kbyte 8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP (optionally pluggable)	8 kbyte 8 kbyte 8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports),
Outputs 8 kt Process image Inputs, adjustable 8 kt Outputs, adjustable 7 kt Outputs, adjustable 8 kt Outputs, adjustable 8 kt Outputs, adjustable 7 kt Outputs, ad	byte byte s MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	8 kbyte 8 kbyte 8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP (optionally pluggable)	8 kbyte 8 kbyte 8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports),
Process image 8 kl • Inputs, adjustable 8 kl • Outputs, adjustable 8 kl Time of day 7 Clock 7 • Hardware clock (real-time clock) Yes Operating hours counter 16 • Number 16 Interfaces 1 x Number of RS 485 interfaces 2; C PRO 1 Number of other interfaces 1	byte byte s MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	8 kbyte 8 kbyte 8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP (optionally pluggable)	8 kbyte 8 kbyte 8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports),
Inputs, adjustable 8 kt Outputs, adjustable 8 kt Outputs, adjustable 8 kt Time of day Clock Hardware clock (real-time clock) Yes Operating hours counter Number 16 Interfaces Interfaces/bus type 1 x 1 x Number of RS 485 interfaces 2; C Number of other interfaces I. Interface	MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	8 kbyte 8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP (optionally pluggable)	8 kbyte 8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports),
Inputs, adjustable 8 kt Outputs, adjustable 8 kt Outputs, adjustable 8 kt Time of day Time of day Clock Hardware clock (real-time clock) Yes Operating hours counter Number 16 Interfaces Interfaces 2; C Number of RS 485 interfaces 2; C Number of other interfaces I. Interface	MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP (optionally pluggable)	8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports),
Outputs, adjustable 8 kt Time of day Clock Hardware clock (real-time clock) Yes Operating hours counter Number 16 Interfaces Interfaces/bus type 1 x 1 x Number of RS 485 interfaces 2; C RC Number of other interfaces I. Interface	MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP (optionally pluggable)	8 kbyte Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports),
Time of day Yes Clock Yes • Hardware clock (real-time clock) Yes Operating hours counter 1 • Number 16 interfaces 1 x Number of RS 485 interfaces 2; C Number of other interfaces 2; C Interfaces 1 Number of the interfaces 1 Interface 1	MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	Yes 16 1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP, 1 x PROFIBUS DP (optionally pluggable)	Yes 16 1 × MPI/PROFIBUS DP, 1 × PROFINET (2 ports),
Clock Yes • Hardware clock (real-time clock) Yes Operating hours counter 16 • Number 16 Interfaces 1 x Number of RS 485 interfaces 2; C Number of other interfaces 2; C Number of other interfaces 2; C	MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	16 1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP, 1 x PROFIBUS DP (optionally pluggable)	16 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports),
Hardware clock (real-time clock) Yes Operating hours counter Number 16 Interfaces Interfaces/bus type 1 x Number of RS 485 interfaces Number of other interfaces I. Interface	MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	16 1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP, 1 x PROFIBUS DP (optionally pluggable)	16 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports),
Operating hours counter 1 • Number 16 Interfaces 1 x Interfaces/bus type 1 x Number of RS 485 interfaces 2; C PRC Number of other interfaces 1. Interface	MPI/PROFIBUS DP, PROFIBUS DP Combined MPI / PROFIBUS DP and	16 1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP, 1 x PROFIBUS DP (optionally pluggable)	16 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports),
Number 16 Interfaces Interfaces/bus type 1 x 1 x Number of RS 485 interfaces 2; C Number of other interfaces I. Interface	PROFIBUS DP Combined MPI / PROFIBUS DP and	1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP (optionally pluggable)	1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports),
Interfaces 1 x Interfaces/bus type 1 x Number of RS 485 interfaces 2; C Number of other interfaces 2; C Interface 2; C	PROFIBUS DP Combined MPI / PROFIBUS DP and	1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP, 1 × PROFIBUS DP (optionally pluggable)	1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports),
Interfaces/bus type 1 x 1 x Number of RS 485 interfaces 2; C PRC Number of other interfaces	PROFIBUS DP Combined MPI / PROFIBUS DP and	1 x PROFIBUS DP, 1 x PROFIBUS DP (optionally pluggable)	1 x PROFINET (2 ports),
1 x Number of RS 485 interfaces 2; C PRC Number of other interfaces 1. Interface	PROFIBUS DP Combined MPI / PROFIBUS DP and	1 x PROFIBUS DP, 1 x PROFIBUS DP (optionally pluggable)	1 x PROFINET (2 ports),
Number of other interfaces			1 x PROFIBUS DP (optionally pluggable)
I. Interface		PROFIBUS DP	,
		1; PROFIBUS DP with IF 964-DP (plug-in option; MLFB: 6ES7964-2AA04-0AB0)	1; PROFIBUS DP with IF 964-DP (plug-in option; MLFB: 6ES7964-2AA04-0AB0)
Interface type Inte	egrated	Integrated	Integrated
Physics RS	485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Functionality			
• MPI Yes	6	Yes	Yes
• DP master Yes		Yes	Yes
• DP slave Yes		Yes	Yes
DP master	-		
Number of DP slaves, max. 32		32	32
2. Interface			
	egrated	Integrated	PROFINET
	485 / PROFIBUS	RS 485 / PROFIBUS	Ethernet RJ45
,	465711011005	13 463 / FIOLIBOS	Literrier 1045
nterface types			0
Number of ports			2
Functionality			
• DP master Yes		Yes	No
DP slave Yes	3	Yes	No
PROFINET IO Controller			Yes
PROFINET IO Device			Yes
PROFINET CBA			Yes
DP master			
Number of DP slaves, max.		96	
3. Interface			
Interface type		Pluggable interface module (IF), technical data as for 2nd interface	Pluggable interface module (IF)
Plug-in interface modules		IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics		RS 485 / PROFIBUS	RS 485 / PROFIBUS
Functionality			
• MPI		No	No
DP master		Yes	Yes
• DP slave			Yes
DP master		tes	103
Number of DP slaves, max.		Yes	100

SIMATIC S7-400 advanced controller Central processing units Standard CPUs

CPU 414

Article number	6ES7414-2XL07-0AB0	6ES7414-3XM07-0AB0	6ES7414-3EM07-0AB0
	CPU414-2, MPI/DP, 2 MB	CPU414-3, 4 MB, 3 INTERFACES	CPU414-3 PN/DP, 4 MB, 3 INTERFACES
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes; For PROFIBUS only	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes
Global data communication			
 supported 	Yes	Yes	Yes
S7 basic communication			
 supported 	Yes	Yes	Yes
S7 communication			
• supported	Yes	Yes	Yes
S5 compatible communication			
supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
Standard communication (FMS)			
 supported 	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
Open IE communication • TCP/IP			Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.			62
ISO-on-TCP (RFC1006)	Via CP 443-1 and loadable FB	Via CP 443-1 and loadable FB	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
Number of connections, max.UDP			62 Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.			62
Web server			
supported	No	No	Yes
Number of connections			
• overall	64	64	64
Standards, approvals, certificates			
Use in hazardous areas			
• ATEX	ATEX II 3 G Ex nA IIC T4 Gc	ATEX II 3 G Ex nA IIC T4 Gc	ATEX II 3 G Ex nA IIC T4 Gc
Ambient conditions Ambient temperature during			
operation	0.00	0.00	0.80
• min.	0°C	0°C	0 °C
• max.	60 °C	0° C	0° C0
Configuration Know-how protection			
User program protection/password protection	Yes	Yes	Yes
Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions			ice, with or block invady
Width	25 mm	50 mm	50 mm
Height	290 mm	290 mm	290 mm
Depth	219 mm	219 mm	219 mm
Weights			
		900 g	900 g

Central processing units Standard CPUs

CPU 414

Ordering data	Article No.		Article No.
CPU 414-2	6ES7414-2XL07-0AB0	Slot number labels	6ES7912-0AA00-0AA0
Work memory 2 MB, power supply		1 set (spare part)	
24 V DC, MPI/PROFIBUS DP master		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
interface, slot for memory card, incl. slot number labels		Electronic manuals on DVD,	
	CE07444 0XN07 04 D0	multi-language: LOGO!, SIMADYN,	
CPU 414-3	6ES7414-3XM07-0AB0	SIMATIC bus components,	
Work memory 4 MB, power supply 24 V DC, MPI/PROFIBUS DP master		SIMATIC C7, SIMATIC distributed I/O.	
interface, PROFIBUS DP master		SIMATIC HML SIMATIC Sensors	
interface, slot for memory card,		SIMATIC NET, SIMATIC PC-based	
module slots for 1 IF module,		Automation, SIMATIC PCS 7,	
incl. slot number labels		SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
CPU 414-3 PN/DP	6ES7414-3EM07-0AB0	,	
Work memory 4 MB, power supply		SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
24 V DC, MPI/PROFIBUS DP master			
interface, PROFINET interface, slot for memory card, module slot for		Current "Manual Collection" DVD and the three subsequent updates	
1 IF module, incl. slot number labels			
RAM memory card		PROFIBUS bus components	
• 64 KB	6ES7952-0AF00-0AA0	RS 485 bus connector with 90° cable outlet	
• 256 KB	6ES7952-1AH00-0AA0		
• 1 MB	6ES7952-1AK00-0AA0	Max. transfer rate 12 Mbps	
• 2 MB	6ES7952-1AL00-0AA0	Without PG interface	6ES7972-0BA12-0XA0
• 4 MB	6ES7952-1AM00-0AA0	With PG interface	6ES7972-0BB12-0XA0
• 8 MB	6ES7952-1AP00-0AA0	RS 485 bus connector	
• 16 MB	6ES7952-1AS00-0AA0	with angled cable outlet	
• 64 MB	6ES7952-1AY00-0AA0	Max. transfer rate 12 Mbps	
FEPROM memory card		Without PG interface	6ES7972-0BA42-0XA0
• 64 KB	6ES7952-0KF00-0AA0	 With PG interface 	6ES7972-0BB42-0XA0
• 256 KB	6ES7952-0KH00-0AA0	RS 485 bus connector	
• 1 MB	6ES7952-1KK00-0AA0	with 90° cable outlet for	
• 2 MB	6ES7952-1KL00-0AA0	FastConnect connection system	
• 4 MB	6ES7952-1KM00-0AA0	Max. transfer rate 12 Mbps	
• 8 MB	6ES7952-1KP00-0AA0	 Without PG interface 	
• 16 MB	6ES7952-1KS00-0AA0	- 1 unit	6ES7972-0BA52-0XA0
• 32 MB	6ES7952-1KT00-0AA0	- 100 units	6ES7972-0BA52-0XB0
• 64 MB	6ES7952-1KY00-0AA0	 With PG interface 	
MPI cable	6ES7901-0BF00-0AA0	- 1 unit	6ES7972-0BB52-0XA0
for connection of SIMATIC S7 and		- 100 units	6ES7972-0BB52-0XB0
PG via MPI; length: 5 m		RS 485 bus connector	6GK1500-0EA02
IF 964-DP interface module	6ES7964-2AA04-0AB0	with axial cable outlet	
For connecting		For SIMATIC OP, for connection to	
an additional DP line;		PPI, MPI, PROFIBUS	
for CPU 414-3, CPU 414-3 PN/DP,		PROFIBUS FastConnect bus	6XV1830-0EH10
CPU 416-3, CPU 416-3 PN/DP,		cable	
CPU 417-4		Standard type with special design	
		for fast mounting, 2-core, shielded,	
		sold by the meter; max. delivery	
		unit 1 000 m, minimum ordering	

SIMATIC S7-400 advanced controller Central processing units

Standard CPUs

CPU 414

rdering data	Article No.		Article No.
RS 485 repeater for PROFIBUS	6ES7972-0AA02-0XA0	IE FC RJ45 plugs	
ransmission rate up to 12 Mbps; 24 V DC; IP20 enclosure		RJ45 plug connector for Industrial Ethernet with a rugged	
PROFINET bus components		metal enclosure and integrated insulation displacement contacts	
IE FC TP standard cable GP 2x2	6XV1840-2AH10	for connecting Industrial Ethernet	
4-core, shielded TP installation cable for connection to		IE FC RJ45 Plug 180	
IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval		180° cable outlet • 1 unit	6GK1901-1BB10-2AA0
Sold by the meter		 10 units 50 units 	6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
FO standard cable GP (50/125)	6XV1873-2A	PROFIBUS/PROFINET	See catalogs IK PI, CA 01
Standard cable, splittable, UL approval, sold by the meter		bus components For establishing MPI/PROFIBUS/	See Catalogs IN FI, CA UI
SCALANCE X204-2 Industrial Ethernet Switch	6GK5204-2BB10-2AA3	PROFINET communication	
Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configur- ing line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports			

Central processing units Standard CPUs

CPU 416

Overview



CPU 416-2, CPU 416-3 and CPU 416-3 PN/DP

Technical specifications

Article number	6ES7416-2XP07-0AB0 CPU 416-2, MPI, PROFIBUS, 8 MB	6ES7416-3XS07-0AB0 CPU 416-3, 16 MB, 3 INTERFACES	6ES7416-3ES07-0AB0 CPU416-3 PN/DP, 16 MB, 3 INTERFACES
General information			
Product type designation	CPU 416-2	CPU 416-3	CPU416-3 PN/DP
Engineering with			
 Programming package 	STEP 7 V5.4 or higher with HSP 261	STEP 7 V5.4 or higher with HSP 261	STEP 7 V5.5 or higher with HSP 262
Supply voltage			
Rated value (DC)			
• 24 V DC	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply
Power loss			
Power loss, typ.	4.5 W	5.5 W	6.5 W
Memory			
Work memory			
 integrated 	8 Mbyte	16 Mbyte	16 Mbyte
 integrated (for program) 	4 Mbyte	8 Mbyte	8 Mbyte
 integrated (for data) 	4 Mbyte	8 Mbyte	8 Mbyte
Load memory			
 expandable FEPROM, max. 	64 Mbyte	64 Mbyte	64 Mbyte
 integrated RAM, max. 	1 Mbyte	1 Mbyte	1 Mbyte
 expandable RAM, max. 	64 Mbyte	64 Mbyte	64 Mbyte
CPU processing times			
for bit operations, typ.	12.5 ns	12.5 ns	12.5 ns
for word operations, typ.	12.5 ns	12.5 ns	12.5 ns
for fixed point arithmetic, typ.	12.5 ns	12.5 ns	12.5 ns
for floating point arithmetic, typ.	25 ns	25 ns	25 ns
Counters, timers and their retentivity			
S7 counter			
Number	2 048	2 048	2 048
IEC counter			
present	Yes	Yes	Yes
S7 times			
Number	2 048	2 048	2 048
IEC timer			
• present	Yes	Yes	Yes
Data areas and their retentivity			
Flag			
• Number, max.	16 kbyte; Size of bit memory address area	16 kbyte; Size of bit memory address area	16 kbyte; Size of bit memory address area

- Applicable for plants with high requirements in the high-end performance range
- Integrated PROFINET functions in CPU 416-3 PN/DP

SIMATIC S7-400 advanced controller Central processing units Standard CPUs

CPU 416

Technical specifications (continued)

Article number	6ES7416-2XP07-0AB0	6ES7416-3XS07-0AB0	6ES7416-3ES07-0AB0
	CPU 416-2, MPI, PROFIBUS, 8 MB	CPU 416-3, 16 MB, 3 INTERFACES	CPU416-3 PN/DP, 16 MB, 3 INTERFACES
ddress area			
O address area			
Inputs	16 kbyte	16 kbyte	16 kbyte
Outputs	16 kbyte	16 kbyte	16 kbyte
Process image			
 Inputs, adjustable 	16 kbyte	16 kbyte	16 kbyte
 Outputs, adjustable 	16 kbyte	16 kbyte	16 kbyte
Time of day		,	
Clock			
 Hardware clock (real-time clock) 	Yes	Yes	Yes
Departing hours counter	100	100	100
Number	16	16	16
nterfaces	10	10	10
Interfaces/bus type	1 × MPI/PROFIBUS DP, 1 × PROFIBUS DP	1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP, 1 x PROFIBUS DP (optionally pluggable)	1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports), 1 x PROFIBUS DP (optionally pluggable)
Number of RS 485 interfaces	2; Combined MPI / PROFIBUS DP and PROFIBUS DP	2; Combined MPI / PROFIBUS DP and PROFIBUS DP	
Number of other interfaces		1; PROFIBUS DP with IF 964-DP (plug-in option; MLFB: 6ES7964-2AA04-0AB0)	1; PROFIBUS DP with IF 964-DP (plug-in option; MLFB: 6ES7964-2AA04-0AB0)
lute de se		WILFB: 0E37904-2AA04-0AB0)	MLFB. 0E37904-2AA04-0AB0)
I. Interface	late such al	late maste d	late such al
Interface type Physics	Integrated RS 485 / PROFIBUS + MPI	Integrated RS 485 / PROFIBUS + MPI	Integrated RS 485 / PROFIBUS + MPI
Functionality			
• MPI	Yes	Yes	Yes
DP master	Yes	Yes	Yes
DP slave	Yes	Yes	Yes
OP master			
 Number of DP slaves, max. 	32	32	32
2. Interface	02	02	
Interface type	Integrated	Integrated	PROFINET
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	Ethernet RJ45
•	113 483 / FIGHB03	113 463 / 1101 1803	Lilemet 1040
 nterface types Number of ports 			2
1			2
Functionality	~	X	
• DP master	Yes	Yes	No
• DP slave	Yes	Yes	No
PROFINET IO Controller			Yes
 PROFINET IO Device 			Yes
PROFINET CBA			Yes
DP master			
 Number of DP slaves, max. 	125	125	
3. Interface			
Interface type		Pluggable interface module (IF), technical data as for 2nd interface	Pluggable interface module (IF)
Plug-in interface modules		IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics		RS 485 / PROFIBUS	RS 485 / PROFIBUS
Functionality			
• MPI		No	No
DP master		Yes	Yes
• DP slave		Yes	Yes
DP master			
Number of DP slaves, max.		125	125

Central processing units Standard CPUs

CPU 416

Article number	6ES7416-2XP07-0AB0	6ES7416-3XS07-0AB0	6ES7416-3ES07-0AB0
	CPU 416-2, MPI, PROFIBUS, 8 MB	CPU 416-3, 16 MB, 3 INTERFACES	CPU416-3 PN/DP, 16 MB, 3 INTERFACES
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes; For PROFIBUS only	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINE interface
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes
Global data communication			
 supported 	Yes	Yes	Yes
S7 basic communication			
 supported 	Yes	Yes	Yes
S7 communication			
 supported 	Yes	Yes	Yes
S5 compatible communication			
supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RE max. via 10 CP 443-1 or 443-5
Standard communication (FMS)			
supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
Open IE communication			
• TCP/IP			Yes; via integrated PROFINET interf
- Number of connections, max.			94
• ISO-on-TCP (RFC1006)	Via CP 443-1 and loadable FB	Via CP 443-1 and loadable FB	Yes; Via integrated PROFINET
			interface or CP 443-1 and loadable FBs
- Number of connections, max.			94
• UDP			Yes; via integrated PROFINET interfa
			and loadable FBs
- Number of connections, max.			94
Web server			
supported	No	No	Yes
Number of connections			
overall	96	96	96
Standards, approvals, certificates			
Use in hazardous areas			
• ATEX	ATEX II 3 G Ex nA IIC T4 Gc	ATEX II 3 G Ex nA IIC T4 Gc	ATEX II 3 G Ex nA IIC T4 Gc
Ambient conditions			
Ambient temperature during operation			
• min.	0°C	0 °C	0 °C
• max.	60 °C	60 °C	60 °C
Configuration			
Know-how protection			
User program protection/password protection	Yes	Yes	Yes
Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions			
Width	25 mm	50 mm	50 mm
Height	290 mm	290 mm	290 mm
Depth	219 mm	219 mm	219 mm
Weights			

SIMATIC S7-400 advanced controller Central processing units Standard CPUs

CPU 416

Ordering data	Article No.		Article No.
CPU 416-2	6ES7416-2XP07-0AB0	IF 964-DP interface module	6ES7964-2AA04-0AB0
Work memory 8 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels		For connecting an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4	
CPU 416-3	6ES7416-3XS07-0AB0	Slot number labels	6ES7912-0AA00-0AA0
Work memory 16 MB, power supply		1 set (spare part)	
24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
1 IF module, slot for memory card, incl. slot number labels		Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7. SIMATIC	
CPU 416-3 PN/DP	6ES7416-3ES07-0AB0	distributed I/O. SIMATIC HMI.	
Work memory 16 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, PROFIBUS DP master interface, module slot for 1 IF module, slot for		SIMATIC Sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
memory card, incl. slot number labels		SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
RAM memory card		Current "Manual Collection" DVD	
• 64 KB • 256 KB	6ES7952-0AF00-0AA0 6ES7952-1AH00-0AA0	and the three subsequent updates	
• 1 MB	6ES7952-1AK00-0AA0	PROFIBUS bus components	
• 2 MB	6ES7952-1AL00-0AA0	RS 485 bus connector	
• 4 MB	6ES7952-1AM00-0AA0	with 90° cable outlet	
• 8 MB	6ES7952-1AP00-0AA0	Max. transfer rate 12 Mbps	
• 16 MB	6ES7952-1AS00-0AA0	Without PG interface	6ES7972-0BA12-0XA0
• 64 MB	6ES7952-1AY00-0AA0	With PG interface	6ES7972-0BB12-0XA0
FEPROM memory card		RS 485 bus connector with angled cable outlet	
• 64 KB	6ES7952-0KF00-0AA0		
• 256 KB	6ES7952-0KH00-0AA0	Max. transfer rate 12 Mbps • Without PG interface	6ES7972-0BA42-0XA0
• 1 MB	6ES7952-1KK00-0AA0	Without FG Interface With PG interface	6ES7972-0BB42-0XA0
• 2 MB	6ES7952-1KL00-0AA0		0237372-00042-0000
• 4 MB	6ES7952-1KM00-0AA0	RS 485 bus connector with 90° cable outlet for	
• 8 MB • 16 MB	6ES7952-1KP00-0AA0 6ES7952-1KS00-0AA0	FastConnect connection system	
• 32 MB	6ES7952-1KS00-0AA0 6ES7952-1KT00-0AA0	Max. transfer rate 12 Mbps	
• 64 MB	6ES7952-1KY00-0AA0	Without PG interface	
		- 1 unit	6ES7972-0BA52-0XA0
MPI cable	6ES7901-0BF00-0AA0	- 100 units	6ES7972-0BA52-0XB0
For connection of SIMATIC S7 and PG via MPI; length: 5 m		 With PG interface 	
		- 1 unit - 100 units	6ES7972-0BB52-0XA0 6ES7972-0BB52-0XB0

Central processing units Standard CPUs

CPU 416

Ordering data	Article No.		Article No.
RS 485 bus connector with axial cable outlet	6GK1500-0EA02	SCALANCE X204-2 Industrial Ethernet Switch	6GK5204-2BB10-2AA3
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS		Industrial Ethernet Switches with integral SNMP access,	
PROFIBUS FastConnect bus cable Standard type with special design for fast mounting, 2-core, shielded, sold by the meter; max. delivery	6XV1830-0EH10	Web diagnostics, copper cable diagnostics and PROFINET diag- nostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports	
unit 1 000 m, minimum ordering quantity 20 m		IE FC RJ45 plugs RJ45 plug connector for	
RS 485 repeater for PROFIBUS	6ES7972-0AA02-0XA0	Industrial Ethernet with a rugged	
Transmission rate up to 12 Mbps; 24 V DC; IP20 enclosure		metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet	
PROFINET bus components		FC installation cables	
IE FC TP standard cable GP 2x2	6XV1840-2AH10	IE FC RJ45 Plug 180	
4-core, shielded TP installation		180° cable outlet	
cable for connection to		• 1 unit	6GK1901-1BB10-2AA0
IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible;		• 10 units	6GK1901-1BB10-2AB0
with UL approval		• 50 units	6GK1901-1BB10-2AE0
Sold by the meter		PROFIBUS/PROFINET bus components	See catalogs IK PI, CA 01
FO standard cable GP (50/125)	6XV1873-2A	For establishing MPI/PROFIBUS/	
Standard cable, splittable, UL approval, sold by the meter		PROFINET communication	

Central processing units Standard CPUs

CPU 417

Overview



CPU 417-4

Technical specifications

Article number	6ES7417-4XT07-0AB0
	CPU 417-4, 32 MB, 4 INTERFACES
General information	
Product type designation	CPU 417-4
Engineering with	
Programming package	STEP 7 V5.4 or higher with HSP 261
Supply voltage	
Rated value (DC)	
• 24 V DC	No; Power supply via system power supply
Power loss	
Power loss, typ.	6.5 W
Memory	
Work memory	
 integrated 	32 Mbyte
 integrated (for program) 	16 Mbyte
 integrated (for data) 	16 Mbyte
Load memory	
 expandable FEPROM, max. 	64 Mbyte
 integrated RAM, max. 	1 Mbyte
 expandable RAM, max. 	64 Mbyte
CPU processing times	
for bit operations, typ.	7.5 ns
for word operations, typ.	7.5 ns
for fixed point arithmetic, typ.	7.5 ns
for floating point arithmetic, typ.	15 ns
Counters, timers and their reten- tivity	
S7 counter	
Number	2 048
IEC counter	
• present	Yes
S7 times	
Number	2 048
IEC timer	
• present	Yes
Data areas and their retentivity	
Flag	
• Number, max.	16 kbyte; Size of bit memory address area

- The most powerful SIMATIC S7-400 CPU
- Can be used in the most sophisticated installations in the upper performance range
- With two slots for IF modules

Article number	6ES7417-4XT07-0AB0
Article Humber	CPU 417-4, 32 MB, 4 INTERFACES
Address area	CF0 417-4, 32 MB, 4 INTENIACES
I/O address area	
	16 kbyte
Inputs Outputs	· ·
Outputs	16 kbyte
Process image	10 1.4.4.
Inputs, adjustable	16 kbyte
Outputs, adjustable	16 kbyte
Time of day	
Clock	
Hardware clock (real-time clock)	Yes
Operating hours counter	
Number	16
Interfaces	
Interfaces/bus type	1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP, 2 x PROFIBUS DP (optionally pluggable)
Number of RS 485 interfaces	2; Combined MPI / PROFIBUS DP and PROFIBUS DP
Number of other interfaces	2; PROFIBUS DP with IF 964-DP (plug-in option; MLFB: 6ES7964-2AA04-0AB0)
1. Interface	
Interface type	Integrated
Physics	RS 485 / PROFIBUS + MPI
Functionality	
• MPI	Yes
DP master	Yes
• DP slave	Yes
DP master	
Number of DP slaves, max.	32
2. Interface	
Interface type	Integrated
Physics	RS 485 / PROFIBUS
1 11/01/00	

Central processing units Standard CPUs

CPU 417

Technical specifications (continued) 6ES7417-4XT07-0AB0 Article number CPU 417-4, 32 MB, 4 INTERFACES Functionality • DP master Yes • DP slave Yes DP master • Number of DP slaves, max. 125 3. Interface Pluggable interface module (IF), technical data as for 2nd interface Interface type Plug-in interface modules IF 964-DP (MLFB: 6ES7964-2AA04-0AB0) Physics RS 485 / PROFIBUS Functionality • MPI No • DP master Yes • DP slave Yes DP master • Number of DP slaves, max. 125 4. Interface Interface type Pluggable interface module (IF), technical data as for 2nd interface Plug-in interface modules IF 964-DP (MLFB: 6ES7964-2AA04-0AB0) Isochronous mode Isochronous operation (application Yes; For PROFIBUS only synchronized up to terminal) **Communication functions** PG/OP communication Yes Data record routing Yes Global data communication supported Yes S7 basic communication supported Yes S7 communication supported Yes

Article number	6ES7417-4XT07-0AB0
	CPU 417-4, 32 MB, 4 INTERFACES
S5 compatible communication	
supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
Standard communication (FMS)	
 supported 	Yes; Via CP and loadable FB
Open IE communication	
 ISO-on-TCP (RFC1006) 	Via CP 443-1 and loadable FB
Web server	
 supported 	No
Number of connections	
• overall	120
Standards, approvals, certificates	
Use in hazardous areas	
• ATEX	ATEX II 3 G Ex nA IIC T4 Gc
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Configuration	
Know-how protection	
User program protection/password protection	Yes
 Block encryption 	Yes; With S7 block Privacy
Dimensions	
Width	50 mm
Height	290 mm
Depth	219 mm
Weights	
Weight, approx.	900 g

Ordering data	Article No.	
CPU 417-4	6ES7417-4XT07-0AB0	F
Work memory 30 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, module slots for up to 2 additional IF modules, slot for memory card, incl. slot number labels		• • • • • • • • • • • • • • • • • • • •
RAM memory card		•
• 64 KB	6ES7952-0AF00-0AA0	•
• 256 KB	6ES7952-1AH00-0AA0	•
• 1 MB	6ES7952-1AK00-0AA0	M
• 2 MB	6ES7952-1AL00-0AA0	F
• 4 MB	6ES7952-1AM00-0AA0	P
• 8 MB	6ES7952-1AP00-0AA0	
• 16 MB	6ES7952-1AS00-0AA0	
• 64 MB	6ES7952-1AY00-0AA0	

	Article No.
FEPROM memory card	
• 64 KB	6ES7952-0KF00-0AA0
• 256 KB	6ES7952-0KH00-0AA0
• 1 MB	6ES7952-1KK00-0AA0
• 2 MB	6ES7952-1KL00-0AA0
• 4 MB	6ES7952-1KM00-0AA0
• 8 MB	6ES7952-1KP00-0AA0
• 16 MB	6ES7952-1KS00-0AA0
• 32 MB	6ES7952-1KT00-0AA0
• 64 MB	6ES7952-1KY00-0AA0
MPI cable	6ES7901-0BF00-0AA0
For connection of SIMATIC S7 and PG via MPI; length: 5 m	

Article No

SIMATIC S7-400 advanced controller Central processing units

Standard CPUs

CPU 417

Ordering data	Article No.		Article No.
IF 964-DP interface module For connecting	6ES7964-2AA04-0AB0	RS 485 bus connector with angled cable outlet	
an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4		Max. transfer rate 12 Mbps • Without PG interface • With PG interface	6ES7972-0BA42-0XA0 6ES7972-0BB42-0XA0
Slot number labels 1 set (spare part)	6ES7912-0AA00-0AA0	RS 485 bus connector with 90° cable outlet for FastConnect connection system	
SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC distributed I/O, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	6ES7998-8XC01-8YE0	Max. transfer rate 12 Mbps • Without PG interface - 1 unit - 100 units • With PG interface - 1 unit - 100 units RS 485 bus connector with axial cable outlet For SIMATIC OP, for connection to	6ES7972-0BA52-0XA0 6ES7972-0BA52-0XB0 6ES7972-0BB52-0XA0 6ES7972-0BB52-0XB0 6GK1500-0EA02
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7998-8XC01-8YE2	PPI, MPI, PROFIBUS PROFIBUS FastConnect bus cable	6XV1830-0EH10
RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbps • Without PG interface • With PG interface	6ES7972-0BA12-0XA0 6ES7972-0BB12-0XA0	Standard type with special design for fast mounting, 2-core, shielded, cut-to-length; max. delivery unit 1 000 m, minimum ordering quantity 20 m	

Central processing units SIPLUS S7-400 standard CPUs

SIPLUS S7-400 CPU 412

Overview		Technical specifications	
		Article number Based on Ambient conditions	6AG1412-2EK06-2AB0 6ES7412-2EK06-0AB0 SIPLUS S7-400 CPU 412-2 PN V6
			-25 °C; = Tmin
			70 °C; = Tmax; @ 60°C for UL/ATEX/FM use
The low-cost introduction to the mid performance range		 Relative to ambient temperature- atmospheric pressure-installation altitude 	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)
Can be used in small and me		 Relative humidity With condensation, tested in 	100 % · PH incl. condensation/fract
requirements in the mid perfo Note:	ormance range	accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under conden- sation conditions)
tive standard products. SIPLUS was added.	ere were taken from the respec- extreme-specific information	 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
	For further technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme		Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
		 against mechanically active substances / conformity with EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!
Ordering data	Article No.		Article No.
SIPLUS S7-400 CPU 412-2 PN		RS 485 bus connector	
CPU with main memory 1 MB (0.5 MB code and 0.5 MB data), 2 interfaces: 1x MPI/DP and PN each		with 90° cable outlet Max. transfer rate 12 Mbit/s Extended temperature range	
Extended temperature range and exposure to media	6AG1412-2EK06-2AB0	and exposure to media without PG interface 	6AG1972-0BA12-2XA0 6AG1972-0BB12-2XA0
Accessories Memory Card RAM		With PG interface RS 485 bus connector	0AG1972-0BB12-2AAU
Exposure to media		with angled cable outlet	
• 2 MB	6AG1952-1AL00-4AA0	Max. transmission rate 12 Mbit/s	
• 32 MB	6AG1952-1KT00-4AA0	Extended temperature range and exposure to media	
Extended temperature range and exposure to media		Without PG interface	6AG1972-0BA42-7XA0
• 4 MB	6AG1952-1AM00-7AA0	With PG interface RS 485 bus connector	6AG1972-0BB42-7XA0
• 8 MB • 16 MB	6AG1952-1AP00-7AA0 6AG1952-1AS00-7AA0	with axial cable outlet	
• 64 MB	6AG1952-1AY00-7AA0	For SIPLUS OP, for connection to PPI, MPI, PROFIBUS	
		Extended temperature range and exposure to media	6AG1500-0EA02-2AA0
		Further accessories	see SIMATIC S7-400 CPU 412, page 1/7

Central processing units SIPLUS S7-400 standard CPUs

SIPLUS S7-400 CPU 414

Overview

- CPUs for high demands in the mid-level performance range
- Applicable for plants with additional demands on programming scope and processing speed
- Integrated PROFINET functions in CPU 414-3 PN/DP

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For further technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Article number	6AG1414-3EM07-7AB0
Based on	6ES7414-3EM07-0AB0
	SIPLUS S7-400 CPU 414-3 PN/DP V7
Ambient conditions	
Ambient temperature in operation	
• Min.	-25 °C; = Tmin
• max.	70 °C; = Tmax
Extended ambient conditions	
 Relative to ambient temperature- atmospheric pressure-installation altitude 	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)
Relative humidity	
- With condensation, max.	100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions)
Resistance	
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
 against chemically active substances / conformity with EN 60721-3-3 	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data	Article No.		Article No.
SIPLUS S7-400 CPU 414-3 PN/DP		RS 485 repeater for PROFIBUS	
CPU with main memory 4 MB (2 MB code and 2 MB data),		Transfer rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	
3 interfaces: 1x MPI/DP, PN each and for IF964-DP (plug-in)		Extended temperature range and exposure to media	6AG1972-0AA02-7XA0
Extended temperature range and exposure to media	6AG1414-3EM07-7AB0	SIPLUS SCALANCE X204-2 Industrial Ethernet Switch	
Accessories		with integral SNMP access, Web	
Memory Card RAM	see SIPLUS S7-400 CPU 412, page 1/21	diagnostics, copper cable diagnos- tics and PROFINET diagnostics	
IF 964-DP interface module	6AG1964-2AA04-7AB0	for configuring line, star and ring topologies; four 10/100 Mbit/s	
For connecting an additional DP		RJ45 ports and two FO ports	
line; for SIPLUS CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4		Extended temperature range and exposure to media	6AG1204-2BB10-4AA3
RS 485 bus connector	see SIPLUS S7-400	IE FC RJ45 Plug 180	
with 90° cable outlet	CPU 412, page 1/21	180° cable outlet; 1 unit	
RS 485 bus connector with angled cable outlet	see SIPLUS S7-400 CPU 412, page 1/21	Extended temperature range and exposure to media	6AG1901-1BB10-7AA0
RS 485 bus connector with axial cable outlet	see SIPLUS S7-400 CPU 412, page 1/21	Further accessories	see SIMATIC S7-400 CPU 414, page 1/11

SIMATIC S7-400 advanced controller Central processing units SIPLUS S7-400 standard CPUs

Overview



High-performance CPUs in the high-end performance range

- Applicable for plants with high requirements in the high-end performance range
- Integrated PROFINET functions in CPU 416-3 PN/DP

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Technical specifications

Article number	6AG1416-3XR05-4AB0	6AG1416-3ES07-7AB0
Based on	6ES7416-3XR05-0AB0	6ES7416-3ES07-0AB0
	SIPLUS S7-400 CPU416-3	SIPLUS S7-400 CPU 416-3 PN/DP V7
Ambient conditions		
Ambient temperature in operation		
• Min.	0 °C; = Tmin	-25 °C; = Tmin
• max.	60 °C; = Tmax	70 °C; = Tmax
Extended ambient conditions		
Relative to ambient temperature- atmospheric pressure-installation altitude	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)
Relative humidity		
- With condensation, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions)
Resistance		
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
 against mechanically active substances / conformity with EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data

Article No.

Article No.

SIPLUS S7-400 CPU 416-3		SIPLUS accessories	see SIPLUS S7-400
CPU with main memory 11.2 MB (5.6 MB code and 5.6 MB data), 3 interfaces: 1x MPI/DP, DP each and module slot for 1 IF module		Further accessories	CPU 414, page 1/22 see SIMATIC S7-400 CPU 416, page 1/16
Exposure to media	6AG1416-3XR05-4AB0		
SIPLUS S7-400 CPU 416-3 PN/DP			
CPU with main memory 16 MB (8 MB code and 8 MB data), 3 interfaces: 1x MPI/DP, PN each and module slot for 1 IF module			
Extended temperature range and exposure to media	6AG1416-3ES07-7AB0		

Central processing units SIPLUS S7-400 standard CPUs

Overview



The most powerful SIMATIC S7-400 CPU

- · Applicable for plants with maximum requirements in the high-end performance range
- With 2 plug-in slots for IF modules

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Technical specifications 6AG1417-4XT07-4AB0 Article number Based on 6ES7417-4XT07-0AB0 SIPLUS S7-400 CPU417-4 Ambient conditions Ambient temperature in operation • Min 0 °C; = Tmin 60 °C; = Tmax • max Extended ambient conditions · Relative to ambient temperature-Tmin ... Tmax atmospheric pressure-installation at 1080 hPa ... 795 hPa altitude (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m) **Relative humidity** - With condensation, max. 100 %; RH incl. condensation/frost (no commissioning under condensation conditions) Resistance - against biologically active Yes; Class 3B2 mold, fungus and dry substances / conformity rot spores (with the exception of with EN 60721-3-3 fauna). The supplied connector covers must remain on the unused interfaces during operation! - against chemically active Yes; Class 3C4 (RH < 75 %) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the substances / conformity with EN 60721-3-3 unused interfaces during operation! Yes; Class 3S4 incl. sand, dust. - against mechanically active substances / conformity The supplied connector covers must with EN 60721-3-3 remain on the unused interfaces during operation! Article No

Ordering data	Article No.		Article No.
SIPLUS CPU 417-4		RS 485 bus connector with 90° cable outlet	See SIPLUS S7-400 CPU 412, page 1/21
CPU with main memory 32 MB (16 MB code and 16 MB data), 3 interfaces: 1x MPI/DP, DP each		RS 485 bus connector with angled cable outlet	See SIPLUS S7-400 CPU 412, page 1/21
and 2x for IFM modules (plug-in) Exposure to media	6AG1417-4XT07-4AB0	RS 485 bus connector with axial cable outlet	See SIPLUS S7-400 CPU 412, page 1/21
Accessories		RS 485 repeater for PROFIBUS	
Memory card RAM	See SIPLUS S7-400 CPU 412, page 1/21	Transfer rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	
FEPROM memory card Exposure to media		Extended temperature range and exposure to media	6AG1972-0AA02-7XA0
• 32 MB	6AG1952-1KT00-4AA0	Further accessories	See SIMATIC CPU 417, page 1/20

Central processing units Fail-safe CPUs

CPU 416F

Overview



CPU 416F-2 and CPU 416F-3 PN/DP

Technical specifications

Article number	6ES7416-2FP07-0AB0 CPU 416F-2, MPI,	6ES7416-3FS07-0AB0 CPU416F-3 PN/DP,
	PROFIBUS, 8 MB	16 MB, 3 INTERFACES
General information		
Product type designation	CPU 416F-2	CPU416F-3 PN/DP
Engineering with		
 Programming package 	STEP 7 V5.4 or higher with HSP 261	STEP 7 V5.5 or higher with HSP 262
Supply voltage		
Rated value (DC)		
• 24 V DC	No; Power supply via system power supply	No; Power supply via system power supply
Power loss		
Power loss, typ.	4.5 W	6.5 W
Memory		
Work memory		
 integrated 	8 Mbyte	16 Mbyte
 integrated (for program) 	4 Mbyte	8 Mbyte
 integrated (for data) 	4 Mbyte	8 Mbyte
Load memory		
 expandable FEPROM, max. 	64 Mbyte	64 Mbyte
 integrated RAM, max. 	1 Mbyte	1 Mbyte
• expandable RAM, max.	64 Mbyte	64 Mbyte
CPU processing times		
for bit operations, typ.	12.5 ns	12.5 ns
for word operations, typ.	12.5 ns	12.5 ns
for fixed point arithmetic, typ.	12.5 ns	12.5 ns
for floating point arithmetic, typ.	25 ns	25 ns
Counters, timers and their		
retentivity		
S7 counter		
Number	2 048	2 048
IEC counter		
present	Yes	Yes
S7 times		
Number	2 048	2 048
IEC timer		
 present 	Yes	Yes

- For constructing a fail-safe automation system for plants with increased safety requirements
- High-performance CPU in the top-end performance range
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to ISO 13849.1
- Standard and safety-related tasks can be performed with a single CPU
- Multi-processor mode is possible
- Safety-related communication with distributed I/O devices over PROFIBUS DP with the *PROFI*safe profile
- Fail-safe I/O modules can be connected decentralized over the integrated interfaces (DP and PN with CPU416F-3 PN/DP) and/or through communication modules (CP443-5 Ext. and CP443-1 Adv.)
- Standard modules for non-safety-related applications can be operated centrally and decentralized

Article number	6ES7416-2FP07-0AB0	
	CPU 416F-2, MPI, PROFIBUS, 8 MB	CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
Data areas and their retentivity		
Flag		
Number, max.	16 kbyte; Size of bit memory address area	16 kbyte; Size of bit memory address area
Address area		
I/O address area		
 Inputs 	16 kbyte	16 kbyte
Outputs	16 kbyte	16 kbyte
Process image		
 Inputs, adjustable 	16 kbyte	16 kbyte
 Outputs, adjustable 	16 kbyte	16 kbyte
Time of day		
Clock		
 Hardware clock (real- time clock) 	Yes	Yes
Operating hours counter		
Number	16	16
Interfaces		
Interfaces/bus type	1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP	1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports), 1 x PROFIBUS DP (optionally pluggable)
Number of RS 485 inter- faces	2; Combined MPI / PROFIBUS DP and PROFIBUS DP	1; Combined MPI / PROFIBUS DP
Number of other interfaces		1; PROFIBUS DP with IF 964-DP (plug-in option; MLFB: 6ES7964-2AA04-0AB0)
1. Interface		
Interface type	Integrated	Integrated
Physics	RS485/PROFIBUS+MPI	RS485/PROFIBUS+MPI
Functionality		
• MPI	Yes	Yes
DP master	Yes	Yes
• DP slave	Yes	Yes
 PROFIBUS DP master 	Yes	Yes
PROFIBUS DP slave	Yes	Yes
DP master		
Number of DP slaves, max.	32	32

Central processing units Fail-safe CPUs

CPU 416F

Technical specifications (continued)

Article number	6ES7416-2EP07-04B0	6ES7416-3FS07-0AB0
	CPU 416F-2, MPI, PROFIBUS, 8 MB	CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
2. Interface		TO MID, S INTENI AGES
Interface type	Integrated	PROFINET
Physics	RS 485 / PROFIBUS	Ethernet RJ45
Interface types	10 400 / 1 1101 1200	
Number of ports		2
Functionality		2
DP master	Yes	No
DP slave	Yes	No
PROFINET IO Controller	105	Yes
PROFINET IO Device		Yes
PROFINET CBA		Yes
PROFIBUS DP master	Yes	No
PROFIBUS DP slave	Yes	No
• FROFIBUS DF Slave	162	INU
	105	
 Number of DP slaves, max. 	125	
3. Interface		
Interface type		Pluggable interface module (IF)
Plug-in interface modules		IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics		RS 485 / PROFIBUS
Functionality		
• MPI		No
 DP master 		Yes
 DP slave 		Yes
 PROFIBUS DP master 		Yes
 PROFIBUS DP slave 		Yes
DP master		
 Number of DP slaves, max. 		125
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions		
PG/OP communication	Yes	Yes
Data record routing	Yes	Yes
Global data communi- cation		
 supported 	Yes	Yes
S7 basic communication		
 supported 	Yes	Yes
S7 communication		
 supported 	Yes	Yes
S5 compatible communication		
supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
Standard communication (FMS)		
 supported 	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB

Article number	6567416 25007 0AD0	6ES7416-3FS07-0AB0
Anticle humber	CPU 416F-2, MPI, PROFIBUS, 8 MB	CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
Open IE communication		
TCP/IP Number of connec-		Yes; via integrated PROFINET interface and loadable FBs 94
tions, max.		
ISO-on-TCP (RFC1006)	Via CP 443-1 and loadable FB	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
 Number of connections, max. 		94
• UDP		Yes; via integrated PROFINET interface and loadable FBs
 Number of connections, max. 		94
Web server		
 supported 	No	Yes
Web server	No	Yes
Number of connections		
overall	96	96
Standards, approvals, certificates		
Use in hazardous areas		
• ATEX	ATEX II 3 G Ex nA IIC T4 Gc	ATEX II 3 G Ex nA IIC T4 Gc
Ambient conditions		
Ambient temperature during operation		
• min.	0°C	0°C
• max.	60 °C	60 °C
Configuration		
Know-how protection		
 User program protection/ password protection 	Yes	Yes
 Block encryption 	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions		
Width	25 mm	50 mm
Height	290 mm	290 mm
Depth	219 mm	219 mm
Weights		
Weight, approx.	700 g	900 g

SIMATIC S7-400 advanced controller

Central processing units Fail-safe CPUs

CPU 416F

Ordering data	Article No.		Article No.
CPU 416F-2 For configuring safety-related automation systems; 8 MB work memory, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels CPU 416F-3 PN/DP For configuring safety-related automation systems; work memory 16 MB, 24 V DC power supply, MPI/PROFIBUS DP	6ES7416-2FP07-0AB0 6ES7416-3FS07-0AB0	FEPROM memory card • 64 KB • 256 KB • 1 MB • 2 MB • 4 MB • 8 MB • 16 MB • 32 MB • 64 MB MPI cable For connection of SIMATIC S7	6ES7952-0KF00-0AA0 6ES7952-0KH00-0AA0 6ES7952-1KK00-0AA0 6ES7952-1KL00-0AA0 6ES7952-1KM00-0AA0 6ES7952-1KP00-0AA0 6ES7952-1KS00-0AA0 6ES7952-1KY00-0AA0 6ES7952-1KY00-0AA0
master interface, PROFINET inter- face, PROFIBUS DP master inter- face, receptacle for 1 IF module, slot for memory card, incl. slot number labels		and PG via MPI; length: 5 m IF 964-DP interface module For connecting an additional DP line	6ES7964-2AA04-0AB0
S7 Distributed Safety programming tool V5.4 Task:		Slot number labels 1 set (spare part)	6ES7912-0AA00-0AA0
Engineering tool for configuring failsafe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 or higher • Floating License • Floating License for 1 user, license key download without software or documentation ¹ ;	6ES7833-1FC02-0YA5 6ES7833-1FC02-0YH5	SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGOI, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC HMI, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	6ES7998-8XC01-8YE0
e-mail address required for delivery S7 Distributed Safety upgrade	6ES7833-1FC02-0YE5	SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7998-8XC01-8YE2
From V5.x to V5.4; Floating License for 1 user		PROFIBUS bus components	
RAM memory card • 64 KB • 256 KB • 1 MB • 2 MB • 4 MB	6ES7952-0AF00-0AA0 6ES7952-1AH00-0AA0 6ES7952-1AK00-0AA0 6ES7952-1AL00-0AA0 6ES7952-1AL00-0AA0	RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbps • Without PG interface • With PG interface RS 485 bus connector	6ES7972-0BA12-0XA0 6ES7972-0BB12-0XA0
 8 MB 16 MB 64 MB 1) For up-to-date information and www.siemens.com/tia-online-sc 		with angled cable outlet Max. transfer rate 12 Mbps • Without PG interface • With PG interface RS 485 bus connector	6ES7972-0BA42-0XA0 6ES7972-0BB42-0XA0
******.5i0110113.0011/tta=01111118=50	ntwate-delivery	With 90° cable outlet for FastConnect system Max. transfer rate 12 Mbps	

Without PG interface

RS 485 bus connector with axial cable outlet

For SIMATIC OP, for connection to PPI, MPI, PROFIBUS

- 1 unit

- 1 unit

100 unitsWith PG interface

- 100 units

1

6ES7972-0BA52-0XA0 6ES7972-0BA52-0XB0

6ES7972-0BB52-0XA0

6ES7972-0BB52-0XB0

6GK1500-0EA02

Central processing units Fail-safe CPUs

CPU 416F

Ordering data	Article No.		Article No.
PROFIBUS FastConnect bus cable	6XV1830-0EH10	SCALANCE X204-2 Industrial Ethernet Switch	6GK5204-2BB10-2AA3
Standard type with special design for fast mounting, 2-core, shielded, sold by the meter; max. delivery unit 1 000 m, minimum ordering quantity 20 m		Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line,	
RS 485 repeater for PROFIBUS	6ES7972-0AA02-0XA0	star and ring topologies; four 10/100 Mbps RJ45 ports	
Transmission rate up to 12 Mbps; 24 V DC; IP20 enclosure		and two FO ports	
PROFINET bus components		RJ45 plug connector for	
IE FC TP standard cable GP 2x2	6XV1840-2AH10	Industrial Ethernet with a rugged	
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; DOCINET accordible with		metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
PROFINET-compatible; with UL approval		IE FC RJ45 Plug 180	
Sold by the meter		180° cable outlet	
FO standard cable GP (50/125)	6XV1873-2A	• 1 unit	6GK1901-1BB10-2AA0
Standard cable, splittable,		• 10 units	6GK1901-1BB10-2AB0
UL approval, sold by the meter		• 50 units	6GK1901-1BB10-2AE0
		PROFIBUS/PROFINET bus components	See catalog IK PI
		For establishing MPI/PROFIBUS/ PROFINET communication	

Central processing units Fail-safe CPUs

CPU 416F

Overview



CPU 416F-2 and CPU 416F-3 PN/DP

Technical specifications

Article number	6ES7416-2FP07-0AB0 CPU 416F-2, MPI,	6ES7416-3FS07-0AB0 CPU416F-3 PN/DP,
	PROFIBUS, 8 MB	16 MB, 3 INTERFACES
General information		
Product type designation	CPU 416F-2	CPU416F-3 PN/DP
Engineering with		
 Programming package 	STEP 7 V5.4 or higher with HSP 261	STEP 7 V5.5 or higher with HSP 262
Supply voltage		
Rated value (DC)		
• 24 V DC	No; Power supply via system power supply	No; Power supply via system power supply
Power loss		
Power loss, typ.	4.5 W	6.5 W
Memory		
Work memory		
 integrated 	8 Mbyte	16 Mbyte
 integrated (for program) 	4 Mbyte	8 Mbyte
 integrated (for data) 	4 Mbyte	8 Mbyte
Load memory		
 expandable FEPROM, max. 	64 Mbyte	64 Mbyte
 integrated RAM, max. 	1 Mbyte	1 Mbyte
• expandable RAM, max.	64 Mbyte	64 Mbyte
CPU processing times		
for bit operations, typ.	12.5 ns	12.5 ns
for word operations, typ.	12.5 ns	12.5 ns
for fixed point arithmetic, typ.	12.5 ns	12.5 ns
for floating point arithmetic, typ.	25 ns	25 ns
Counters, timers and their		
retentivity		
S7 counter		
Number	2 048	2 048
IEC counter		
present	Yes	Yes
S7 times		
Number	2 048	2 048
IEC timer		
 present 	Yes	Yes

- For constructing a fail-safe automation system for plants with increased safety requirements
- High-performance CPU in the top-end performance range
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to ISO 13849.1
- Standard and safety-related tasks can be performed with a single CPU
- Multi-processor mode is possible
- Safety-related communication with distributed I/O devices over PROFIBUS DP with the *PROFI*safe profile
- Fail-safe I/O modules can be connected decentralized over the integrated interfaces (DP and PN with CPU416F-3 PN/DP) and/or through communication modules (CP443-5 Ext. and CP443-1 Adv.)
- Standard modules for non-safety-related applications can be operated centrally and decentralized

Article number	6ES7416-2FP07-0AB0	
	CPU 416F-2, MPI, PROFIBUS, 8 MB	CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
Data areas and their retentivity		
Flag		
• Number, max.	16 kbyte; Size of bit memory address area	16 kbyte; Size of bit memory address area
Address area		
I/O address area		
 Inputs 	16 kbyte	16 kbyte
Outputs	16 kbyte	16 kbyte
Process image		
 Inputs, adjustable 	16 kbyte	16 kbyte
 Outputs, adjustable 	16 kbyte	16 kbyte
Time of day		
Clock		
 Hardware clock (real- time clock) 	Yes	Yes
Operating hours counter		
Number	16	16
Interfaces		
Interfaces/bus type	1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP	1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports), 1 x PROFIBUS DP (optionally pluggable)
Number of RS 485 inter- faces	2; Combined MPI / PROFIBUS DP and PROFIBUS DP	1; Combined MPI / PROFIBUS DP
Number of other interfaces		1; PROFIBUS DP with IF 964-DP (plug-in option; MLFB: 6ES7964-2AA04-0AB0)
1. Interface		
Interface type	Integrated	Integrated
Physics	RS485/PROFIBUS+MPI	RS485/PROFIBUS+MPI
Functionality		
• MPI	Yes	Yes
DP master	Yes	Yes
• DP slave	Yes	Yes
 PROFIBUS DP master 	Yes	Yes
PROFIBUS DP slave	Yes	Yes
DP master		
Number of DP slaves, max.	32	32

Central processing units Fail-safe CPUs

CPU 416F

Technical specifications (continued)

Article number	6ES7416-2EP07-04B0	6ES7416-3FS07-0AB0
	CPU 416F-2, MPI, PROFIBUS, 8 MB	CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
2. Interface		TO MID, S INTENI AGES
Interface type	Integrated	PROFINET
Physics	RS 485 / PROFIBUS	Ethernet RJ45
Interface types	10 400 / 1 1101 1200	
Number of ports		2
Functionality		2
DP master	Yes	No
DP slave	Yes	No
PROFINET IO Controller	105	Yes
PROFINET IO Device		Yes
PROFINET CBA		Yes
PROFIBUS DP master	Yes	No
PROFIBUS DP slave	Yes	No
• FROFIBUS DF Slave	162	INU
	105	
 Number of DP slaves, max. 	125	
3. Interface		
Interface type		Pluggable interface module (IF)
Plug-in interface modules		IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics		RS 485 / PROFIBUS
Functionality		
• MPI		No
 DP master 		Yes
 DP slave 		Yes
 PROFIBUS DP master 		Yes
 PROFIBUS DP slave 		Yes
DP master		
 Number of DP slaves, max. 		125
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions		
PG/OP communication	Yes	Yes
Data record routing	Yes	Yes
Global data communi- cation		
 supported 	Yes	Yes
S7 basic communication		
 supported 	Yes	Yes
S7 communication		
 supported 	Yes	Yes
S5 compatible communication		
supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
Standard communication (FMS)		
 supported 	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB

Article number	6567416 25007 0AD0	6ES7416-3FS07-0AB0
Anticle humber	CPU 416F-2, MPI, PROFIBUS, 8 MB	CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
Open IE communication		
TCP/IP Number of connec-		Yes; via integrated PROFINET interface and loadable FBs 94
tions, max.		
ISO-on-TCP (RFC1006)	Via CP 443-1 and loadable FB	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
 Number of connections, max. 		94
• UDP		Yes; via integrated PROFINET interface and loadable FBs
 Number of connections, max. 		94
Web server		
 supported 	No	Yes
Web server	No	Yes
Number of connections		
overall	96	96
Standards, approvals, certificates		
Use in hazardous areas		
• ATEX	ATEX II 3 G Ex nA IIC T4 Gc	ATEX II 3 G Ex nA IIC T4 Gc
Ambient conditions		
Ambient temperature during operation		
• min.	0°C	0°C
• max.	60 °C	60 °C
Configuration		
Know-how protection		
 User program protection/ password protection 	Yes	Yes
 Block encryption 	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions		
Width	25 mm	50 mm
Height	290 mm	290 mm
Depth	219 mm	219 mm
Weights		
Weight, approx.	700 g	900 g

SIMATIC S7-400 advanced controller

Central processing units Fail-safe CPUs

CPU 416F

Ordering data	Article No.		Article No.
CPU 416F-2 For configuring safety-related automation systems; 8 MB work memory, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels CPU 416F-3 PN/DP For configuring safety-related automation systems; work memory 16 MB, 24 V DC power supply, MPI/PROFIBUS DP	6ES7416-2FP07-0AB0 6ES7416-3FS07-0AB0	FEPROM memory card • 64 KB • 256 KB • 1 MB • 2 MB • 4 MB • 8 MB • 16 MB • 32 MB • 64 MB MPI cable For connection of SIMATIC S7	6ES7952-0KF00-0AA0 6ES7952-0KH00-0AA0 6ES7952-1KK00-0AA0 6ES7952-1KL00-0AA0 6ES7952-1KM00-0AA0 6ES7952-1KP00-0AA0 6ES7952-1KS00-0AA0 6ES7952-1KY00-0AA0 6ES7952-1KY00-0AA0
master interface, PROFINET inter- face, PROFIBUS DP master inter- face, receptacle for 1 IF module, slot for memory card, incl. slot number labels		and PG via MPI; length: 5 m IF 964-DP interface module For connecting an additional DP line	6ES7964-2AA04-0AB0
S7 Distributed Safety programming tool V5.4 Task:		Slot number labels 1 set (spare part)	6ES7912-0AA00-0AA0
Engineering tool for configuring failsafe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 or higher • Floating License • Floating License for 1 user, license key download without software or documentation ¹ ;	6ES7833-1FC02-0YA5 6ES7833-1FC02-0YH5	SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGOI, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC HMI, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	6ES7998-8XC01-8YE0
e-mail address required for delivery S7 Distributed Safety upgrade	6ES7833-1FC02-0YE5	SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	6ES7998-8XC01-8YE2
From V5.x to V5.4; Floating License for 1 user		PROFIBUS bus components	
RAM memory card • 64 KB • 256 KB • 1 MB • 2 MB • 4 MB	6ES7952-0AF00-0AA0 6ES7952-1AH00-0AA0 6ES7952-1AK00-0AA0 6ES7952-1AL00-0AA0 6ES7952-1AL00-0AA0	RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbps • Without PG interface • With PG interface RS 485 bus connector	6ES7972-0BA12-0XA0 6ES7972-0BB12-0XA0
 8 MB 16 MB 64 MB 1) For up-to-date information and www.siemens.com/tia-online-sc 		with angled cable outlet Max. transfer rate 12 Mbps • Without PG interface • With PG interface RS 485 bus connector	6ES7972-0BA42-0XA0 6ES7972-0BB42-0XA0
******.5i0110113.0011/tta=01111118=50	ntwate-delivery	With 90° cable outlet for FastConnect system Max. transfer rate 12 Mbps	

Without PG interface

RS 485 bus connector with axial cable outlet

For SIMATIC OP, for connection to PPI, MPI, PROFIBUS

- 1 unit

- 1 unit

100 unitsWith PG interface

- 100 units

1

6ES7972-0BA52-0XA0 6ES7972-0BA52-0XB0

6ES7972-0BB52-0XA0

6ES7972-0BB52-0XB0

6GK1500-0EA02

Central processing units Fail-safe CPUs

CPU 416F

Ordering data	Article No.		Article No.
PROFIBUS FastConnect bus cable	6XV1830-0EH10	SCALANCE X204-2 Industrial Ethernet Switch	6GK5204-2BB10-2AA3
Standard type with special design for fast mounting, 2-core, shielded, sold by the meter; max. delivery unit 1 000 m, minimum ordering quantity 20 m		Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line,	
RS 485 repeater for PROFIBUS	6ES7972-0AA02-0XA0	star and ring topologies; four 10/100 Mbps RJ45 ports	
Transmission rate up to 12 Mbps; 24 V DC; IP20 enclosure		and two FO ports	
PROFINET bus components		RJ45 plug connector for	
IE FC TP standard cable GP 2x2	6XV1840-2AH10	Industrial Ethernet with a rugged	
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; DOCINET accordible with		metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
PROFINET-compatible; with UL approval		IE FC RJ45 Plug 180	
Sold by the meter		180° cable outlet	
FO standard cable GP (50/125)	6XV1873-2A	• 1 unit	6GK1901-1BB10-2AA0
Standard cable, splittable,		• 10 units	6GK1901-1BB10-2AB0
UL approval, sold by the meter		• 50 units	6GK1901-1BB10-2AE0
		PROFIBUS/PROFINET bus components	See catalog IK PI
		For establishing MPI/PROFIBUS/ PROFINET communication	
Central processing units High-availability CPUs

CPU 412-5H, CPU 414-5H, CPU 416-5H, CPU 417-5H



- CPU for SIMATIC S7-400H and S7-400F/FH
- Can be used in S7-400H high-availability systems
- Can be used with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master and combined MPI/PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- Features 2 slots for sync modules

Article number	6ES7412-5HK06-0AB0	6ES7414-5HM06-0AB0	6ES7416-5HS06-0AB0	6ES7417-5HT06-0AB0
	CPU412-5H PN/DP, 1MB F. S7-400H/F/FH	CPU414-5H PN/DP, 4MB F. S7-400H/F/FH	CPU416-5H PN/DP, 16MB F. S7-400H/F/FH	CPU417-5H PN/DP, 32MB F. S7-400H/F/FH
Product type designation				
General information				
Engineering with				
 Programming package 	As of STEP 7 V5.5 SP2 with HF1	As of STEP 7 V5.5 SP2 with HF1	As of STEP 7 V5.5 SP2 with HF1	As of STEP 7 V5.5 SP2 with HF1
Supply voltage				
Rated value (DC)				
• 24 V DC	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply
Power losses				
Power loss, typ.	7.5 W	7.5 W	7.5 W	7.5 W
Memory				
Work memory				
 Integrated 	1 Mbyte	4 Mbyte	16 Mbyte	32 Mbyte
 integrated (for program) 	512 kbyte	2 Mbyte	6 Mbyte	16 Mbyte
 integrated (for data) 	512 kbyte	2 Mbyte	10 Mbyte	16 Mbyte
Load memory				
 expandable FEPROM, max. 	64 Mbyte	64 Mbyte	64 Mbyte	64 Mbyte
 integrated RAM, max. 	512 kbyte	512 kbyte	1 Mbyte	1 Mbyte
 expandable RAM, max. 	64 Mbyte	64 Mbyte	64 Mbyte	64 Mbyte
CPU processing times				
for bit operations, typ.	31.25 ns	18.75 ns	12.5 ns	7.5 ns
for word operations, typ.	31.25 ns	18.75 ns	12.5 ns	7.5 ns
for fixed point arithmetic, typ.	31.25 ns	18.75 ns	12.5 ns	7.5 ns
for floating point arithmetic, typ.	62.5 ns	37.5 ns	25 ns	15 ns
Counters, timers and their retentivity				
S7 counter				
Number	2 048	2 048	2 048	2 048
IEC counter				
• present	Yes	Yes	Yes	Yes
S7 times				
Number	2 048	2 048	2 048	2 048
IEC timer				
• present	Yes	Yes	Yes	Yes
Data areas and their retentivity				
Flag				
Number, max.	8 192 byte	8 192 byte	16 384 byte	16 384 byte

SIMATIC S7-400 advanced controller Central processing units

High-availability CPUs

CPU 412-5H, CPU 414-5H, CPU 416-5H, CPU 417-5H

Technical specifications (continued)

Article number	6ES7412-5HK06-0AB0	6ES7414-5HM06-0AB0	6ES7416-5HS06-0AB0	6ES7417-5HT06-0AB0
	CPU412-5H PN/DP, 1MB F. S7-400H/F/FH	CPU414-5H PN/DP, 4MB F. S7-400H/F/FH	CPU416-5H PN/DP, 16MB F. S7-400H/F/FH	CPU417-5H PN/DP, 32MB F. S7-400H/F/FH
Address area				
I/O address area				
Inputs	8 kbyte	8 kbyte	16 kbyte	16 kbyte
Outputs	8 kbyte	8 kbyte	16 kbyte	16 kbyte
Process image		,	,	
 Inputs, adjustable 	8 kbyte	8 kbyte	16 kbyte	16 kbyte
Outputs, adjustable	8 kbyte	8 kbyte	16 kbyte	16 kbyte
Hardware configuration		0 110 100	10 10 10	10110910
Slots				
Required slots	2	2	2	2
•	2	Ζ	2	2
Time of day				
Clock				N.
Hardware clock (real-time clock)	Yes	Yes	Yes	Yes
Operating hours counter				
• Number	16	16	16	16
Interfaces				
Number of RS 485 interfaces	2	2	2	2
Number of other interfaces	2; Fiber-optic interface	2; Fiber-optic interface	2; Fiber-optic interface	2; Fiber-optic interface
1st interface				
Interface type	Integrated	Integrated	Integrated	Integrated
Physics	RS 485 / PROFIBUS + MPI			
Functionality				
• MPI	Yes	Yes	Yes	Yes
DP master	Yes	Yes	Yes	Yes
• DP slave	No	No	No	No
DP master				
Number of DP slaves, max.	32	32	32	32
2nd interface				
Interface type	PROFINET	PROFINET	PROFINET	PROFINET
Physics	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45
Number of ports	2	2	2	2
Functionality	2	2	2	2
DP master	No	No	No	No
• DP slave	No	No	No	No
PROFINET IO Controller	Yes	Yes	Yes	Yes
PROFINET IO Device	No	No	No	No
PROFINET CBA	No	No	No	No
PROFINET IO Controller				
 Max. number of connectable IO devices for RT 	256	256	256	256
3rd interface				
Interface type	Integrated	Integrated	Integrated	Integrated
Physics	RS 485 / PROFIBUS			
Functionality				
DP master	Yes	Yes	Yes	Yes
DP slave	No	No	No	No
DP master				
Number of DP slaves, max.	64	96	125	125
4th interface				
Interface type	Pluggable synchronization submodule (FO)			
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0

Central processing units High-availability CPUs

CPU 412-5H, CPU 414-5H, CPU 416-5H, CPU 417-5H

Article number	6ES7412-5HK06-0AB0	6ES7414-5HM06-0AB0	6ES7416-5HS06-0AB0	6ES7417-5HT06-0AB0
	CPU412-5H PN/DP, 1MB F. S7-400H/F/FH	CPU414-5H PN/DP, 4MB F. S7-400H/F/FH	CPU416-5H PN/DP, 16MB F. S7-400H/F/FH	CPU417-5H PN/DP, 32M S7-400H/F/FH
5. Interface				
Interface type	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0
lsochronous mode				
lsochronous operation (application synchronized up to terminal)	No	No	No	No
Communication functions				
PG/OP communication	Yes	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes	Yes
S7 routing	Yes	Yes	Yes	Yes
Global data communication				
supported	No	No	No	No
S7 basic communication				
supported	No	No	No	No
S7 communication				
supported	Yes	Yes	Yes	Yes
S5-compatible communication				
supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
Standard communication (FMS)				
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadabl
Open IE communication				
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	46	62	94	118
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable
- Number of connections, max.	46	62	94	118
• UDP	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	46	62	94	118
Web server				
supported	No	No	No	No
Number of connections				
• overall	48	64	96	120
Configuration				
Programming				
Programming language				
- LAD	Yes	Yes	Yes	Yes
- FBD	Yes	Yes	Yes	Yes
- STL	Yes	Yes	Yes	Yes
- SCL	Yes	Yes	Yes	Yes
- CFC	Yes	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes	Yes
- HiGraph®	Yes	Yes	Yes	Yes
Know-how protection				
User program protection/password protection	Yes	Yes	Yes	Yes
Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Priva
Dimensions				
Width	50 mm	50 mm	50 mm	50 mm
	000	290 mm	290 mm	290 mm
Height	290 mm	290 11111	200 11111	200 11111
Height Depth	290 mm 219 mm	219 mm	219 mm	219 mm

CPU 412-5H, CPU 414-5H, CPU 416-5H, CPU 417-5H

Ordering data	Article No.		Article No.
CPU 412-5H	6ES7412-5HK06-0AB0	CPU 417-5H	6ES7417-5HT06-0AB0
For S7-400H and S7-400F/FH;		For S7-400H and S7-400F/FH;	
MB RAM, 1 combined MPI/		32 MB RAM, 1 combined MPI/	
ROFIBUS DP master interface, PROFIBUS DP interface,		PROFIBUS DP master interface, 1 PROFIBUS DP interface,	
PROFINET interfaces (switches),		2 PROFINET interfaces (switches),	
slots for sync modules, slot for		2 slots for sync modules, slot for	
emory card, incl. slot number bels		memory card, incl. slot number labels	
PU 412-5H system bundle		CPU 417-5H system bundle	
lot assembled, consisting of:		Not assembled, consisting of:	
JR2-H rack, 2 x PS 405/407 power		UR2-H rack, 2 x PS 405/407 power	
upply units, 2 x CPU 412-5H,		supply units, 2 x CPU 417-5H,	
x sync modules (for max. 10 m), x fiber optic cables for sync		4 x sync modules (for max. 10 m), 2 x fiber optic cables for sync mod-	
nodules (1 m), 4 x backup		ules (1 m), 4 x backup batteries;	
atteries; two additional memory		two additional memory cards	
ards required to be ordered separately)		required (to be ordered separately)	
CPU 412-5H system bundle,	6ES7400-0HR01-4AB0	 CPU 417-5H system bundle, 120/230 V AC, 10 A 	6ES7400-0HR04-4AB0
120/230 V AC, 10 A		CPU 417-5H system bundle,	6ES7400-0HR54-4AB0
CPU 412-5H system bundle, 24/48/60 V DC, 10 A	6ES7400-0HR51-4AB0	24/48/60 V DC, 10 A	
24/48/60 V DC, 10 A	6ES7414-5HM06-0AB0	Memory card RAM	
or S7-400H and S7-400F/FH:	0237414-31100-0480	1 MB	6ES7952-1AK00-0AA0
MB RAM, 1 combined MPI/		2 MB	6ES7952-1AL00-0AA0
PROFIBUS DP master interface, PROFIBUS DP interface,		4 MB	6ES7952-1AM00-0AA0
PROFINET interfaces (switches),		8 MB	6ES7952-1AP00-0AA0
slots for sync modules, slot for nemory card, incl. slot number		16 MB	6ES7952-1AS00-0AA0
abels		64 MB	6ES7952-1AY00-0AA0
CPU 414-5H system bundle		FEPROM memory card	
Not assembled, consisting of:		1 MB	6ES7952-1KK00-0AA0
JR2-H rack, 2 x PS 405/407 power upply units, 2 x CPU 414-5H,		2 MB	6ES7952-1KL00-0AA0
x sync modules (for max. 10 m), x fiber optic cables for sync mod-		4 MB	6ES7952-1KM00-0AA0
iles (1 m), 4 x backup batteries;		8 MB	6ES7952-1KP00-0AA0
additional two memory cards equired (to be ordered separately)		16 MB	6ES7952-1KS00-0AA0
CPU 414-5H system bundle,	6ES7400-0HR02-4AB0	32 MB	6ES7952-1KT00-0AA0
120/230 V AC, 10 A CPU 414-5H system bundle,	6ES7400-0HR52-4AB0	64 MB	6ES7952-1KY00-0AA0
24/48/60 V DC, 10 A		MPI cable	6ES7901-0BF00-0AA0
CPU 416-5H	6ES7416-5HS06-0AB0	For connection of SIMATIC S7 and	
or S7-400H and S7-400F/FH; 6 MB RAM, 1 combined MPI/		PG via MPI; 5 m in length Slot number plates	6ES7912-0AA00-0AA0
PROFIBUS DP master interface,			0237312-0AA00-0AA0
PROFIBUS DP interface, PROFINET interfaces (switches).		1 set (spare part)	
slots for sync modules, slot for		S7 F Systems RT License	6ES7833-1CC00-6YX0
nemory card, incl. slot number		For processing safety-related user	
abels		programs, for one S7-400H-based system each with CPU 412-5H,	
CPU 416-5H system bundle		CPU 414-5H, CPU 416-5H or	
Not assembled, consisting of:		CPU 417-5H	
JR2-H rack, 2 x PS 405/407 power		S7 F Systems V6.1	6ES7833-1CC02-0YA5
upply units, 2 x CPU 416-5H, x sync modules (for max. 10 m),		Programming and configuring envi-	
2 x fiber optic cables for sync mod-		ronment for creating and operating	
iles (1 m), 4 x backup batteries;		safety-related STEP 7 programs for	
two additional memory cards		an S7-400H-based target system, floating license for 1 user, runs with	
equired (to be ordered separately)		Windows XP Prof SP2, Windows XP	
 CPU 416-5H system bundle, 	6ES7400-0HR03-4AB0	Prof SP2/SP3 Windows Server	

Prof SP2/SP3, Windows Server

2 languages (English, German) Type of delivery: Certificate of License as well as software and electronic documenta-tion on CD

2003 SP2

6ES7400-0HR53-4AB0

CPU 416-5H system bundle, 120/230 V AC, 10 A
 CPU 416-5H system bundle, 24/48/60 V DC, 10 A

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Central processing units High-availability CPUs

CPU 412-5H, CPU 414-5H, CPU 416-5H, CPU 417-5H

Ordering data	Article No.		Article No.
S7 F systems upgrade from V5.x/V6.0 to V6.1	6ES7833-1CC02-0YE5	RS 485 bus connector with 90° cable outlet	
2 languages (English, German), floating license for 1 user Type of delivery: Certificate of License as well as		Max. transfer rate 12 Mbit/s • Without PG interface • With PG interface	6ES7972-0BA12-0XA0 6ES7972-0BB12-0XA0
software and electronic documentation on CD		RS 485 bus connector with angled cable outlet	
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7,	6ES7998-8XC01-8YE0	 Max. transfer rate 12 Mbit/s Without PG interface With PG interface Max. transfer rate 1.5 Mbit/s 	6ES7972-0BA42-0XA0 6ES7972-0BB42-0XA0
SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC		- Without PG interface Bus connector RS 485 with 90° cable outlet for FastConnect connection technology	6ES7972-0BA30-0XA0
SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2	Max. transfer rate 12 Mbit/s	
Current "Manual Collection" DVD and the three subsequent updates		Without PG interface 1 unit 100 units	6ES7972-0BA52-0XA0 6ES7972-0BA52-0XB0
		With PG interface 1 unit 100 units	6ES7972-0BB52-0XA0 6ES7972-0BB52-0XB0
		RS 485 bus connector with axial cable outlet	
		For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	6GK1500-0EA02
		PROFIBUS FastConnect bus cable	
		Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	6XV1830-0EH10

Central processing units High-availability CPUs

Sync-module for coupling the CPU 41xH

Overview



- For coupling the two CPU 41xH in the S7-400H subunits.
- Can be plugged direct into the CPU

Technical specifications

Article number	6ES7960-1AA06-0XA0	6ES7960-1AB06-0XA0
	S7 SYNC-MOD. V6 F. S7-400H/F/FH	S7 SYNC-MOD. V6 F. S7-400H/F/FH
Product type designation		
Input current		
from CPU, max.	220 mA	240 mA
Power losses		
Power loss, typ.	0.77 W	0.83 W
Dimensions		
Width	13 mm	13 mm
Height	14 mm	14 mm
Depth	58 mm	58 mm
Veights		
Weight, approx.	14 g	14 g

Ordering data

6ES7960-1AA06-0XA0

6ES7960-1AB06-0XA0

Sync module

For coupling the CPU 41xH for S7-400H/F/FH; 2 modules required per CPU

- For patch cable, can be used with fiber-optic cables up to 10 m
- For patch and installation cables, can be used with fiber-optic cables up to 10 km

Article No.

Fiber-optic connecting cable

For sync module 6ES7960-1AA06-0XA0

- •1m
- 2 m
- 10 m

For Sync module 6ES7960-1AB06-0XA0; fiber-optic monomode LC/LC duplex crossed 9/125 µ (max. 10 km)

Article No.

6ES7960-1AA04-5AA0 6ES7960-1AA04-5BA0 6ES7960-1AA04-5KA0

On request

Central processing units High-availability CPUs

Y-link for S7-400H

Overview



Article number	6ES7153-2BA70-0XB0 ET200M, INTERFACE IM153-2 HF
	OUTDOOR
General information	
Vendor identification (VendorID)	801Eh
Supply voltage	
Rated value (DC)	
• 24 V DC	Yes
permissible range (ripple included), lower limit (DC)	20.4 V
permissible range (ripple included), upper limit (DC)	28.8 V
external protection for power supply lines (recommendation)	2,5 A
Mains buffering	
Mains/voltage failure stored energy time	5 ms
Input current	
Current consumption, max.	650 mA
Inrush current, typ.	3 A
l ² t	0.1 A ^{2.} s
Output current	
for backplane bus (5 V DC), max.	1.5 A
Power loss	
Power loss, typ.	5.5 W
Address area	
Addressing volume	
Inputs	244 byte
Outputs	244 byte
Hardware configuration	
Number of modules per DP slave interface, max.	12
Time stamping	
Accuracy	1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules
Number of message buffers	15

- Transceiver for the transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- To connect devices with a single PROFIBUS DP interface to the redundant PROFIBUS DP master system of the SIMATIC S7-400H

Article number	6ES7153-2BA70-0XB0
Alticle humber	ET200M, INTERFACE IM153-2 HF
	OUTDOOR
Messages per message buffer	20
Number of stampable digital inputs, max.	128; Max. 128 signals/station; max. 32 signals/slot
Time format	RFC 1119
Time resolution	0.466 ns
Time interval for transmitting the message buffer if a message is present	1 000 ms
Time stamp on signal change	rising / falling edge as signal entering or exiting
Interfaces	
Interface physics, RS 485	Yes
Interface physics, FOC	No
PROFIBUS DP	
 Node addresses 	1 to 125 permitted
automatic detection of transmission rate	Yes
 Output current, max. 	70 mA
 Transmission rate, max. 	12 Mbit/s
 Transmission procedure 	RS 485
 SYNC capability 	Yes
 FREEZE capability 	Yes
 Direct data exchange (slave-to-slave communication) 	Yes; as publisher with all IO, as subscriber with F-IO only
Connector type	9-pin sub D
1. Interface	
DP slave	
GSD file	SI05801E.GSG
 automatic baud rate search 	Yes
Protocols	
Bus protocol/transmission protocol	PROFIBUS DP to EN 50170
Isolation	
Isolation tested with	Isolation voltage 500 V
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP20	Yes

Central processing units High-availability CPUs

Y-link for S7-400H

Article number	6ES7153-2BA70-0XB0		
	ET200M, INTERFACE IM153-2 HF	For use with STEP 7 from V5.4 or SIMATIC PCS 7 from V7.0	
Air pressure acc. to IEC 60068-2-13	OUTDOOR	Y link	6ES7197-1LA12-0XA0
 Operating altitude above sea level, max. 	3 000 m	For connecting devices with only one PROFIBUS DP interface to a redundant S7-400H, comprising:	
Configuration		 2 IM 153-2 High Feature Outdoor interface modules 	
Configuration software		(6ES7153-2BA70-0XA0)	
• STEP 7	Yes; STEP 7 / COM PROFIBUS / non- Siemens tools via GSD file	 1 Y coupler (6ES7197-1LB00-0XA0) 1 BM IM/IM bus module 	
Dimensions		(6ES7195-7HD80-0XA0)	
Width	40 mm	• 1 BM Y-coupler bus module	
Height	125 mm	(6ES7654-7HY00-0XA0)	
Depth	117 mm	Accessories	
Weights		Mounting rail	
Weight, approx.	360 g	For assembling the Y link	
	000 9	with active bus modules	
Article number	6ES7197-1LB00-0XA0 Y-COUPLER F. BUILDING Y-LINK, REDUNDANT	Length 483 mmLength 530 mm	6ES7195-1GA00-0XA0 6ES7195-1GF30-0XA0
General information	HEDONDANI		
Requirements for DP master system			
Length of parameter assignment telegram	244 byte		
Supply voltage			
Description	via bus module		
permissible range, lower limit (DC)	20.4 V		
permissible range, upper limit (DC)	28.8 V		
nterfaces	20.0 V		
PROFIBUS DP			
Properties of the lower-level DP naster system			
- Transmission rate, max.	12 Mbit/s; 45.45 kbit/s to 12 Mbit/s		
- Termination of lower-level DP master system	Active terminating resistor (Bus Terminator)		
- Use of OLM/OBT	Yes		
- Use of RS 485 repeaters, max.	9		
- Number of DP slaves, max.	31; 64 when using RS 485 repeaters or OLM/OBT		
Protocols			
PROFIBUS DP	Yes		
nterrupts/diagnostics/status infor- nation			
Status indicator	No		
Alarms	No		
Diagnostic functions	Yes		
Potential separation			
to lower-level DP master system	Yes		
Dimensions			
Width	40 mm		
Height	125 mm		
Depth	130 mm		

Central processing units SIPLUS S7-400 high-availability CPUs

SIPLUS S7-400 CPU 412H

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Overview		Technical specifications	
uc. a		Article number Based on	6AG1412-5HK06-7AB0 6ES7412-5HK06-0AB0 SIPLUS S7-400 CPU 412-5H
		Ambient conditions Ambient temperature in operation • Min. • max.	-25 °C; = Tmin 70 °C
		 Extended ambient conditions Relative to ambient temperature- atmospheric pressure-installation altitude 	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m). For "F-Systems" applications max. +2000 m above sea level permissible
• CPU for SIMATIC S7-400H a	nd S7-400F/FH	Relative humidity	pormodible
 Usable in high-availability sy Usable with F runtime licens S7-400F/FH safety-related sy 	e as F-capable CPU in ystems	 With condensation, tested in accordance with IEC 60068-2-38, max. Resistance 	100 %; RH incl. condensation/frost (no commissioning under conden- sation conditions)
 Features a combined MPI/PI Features 2 slots for sync mo Note: 		 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
SIPLUS extreme products are products. The contents listed h tive standard products. SIPLUS was added.	nere were taken from the respec-	- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. sa spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
		- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers mus remain on the unused interfaces during operation!
Ordering data	Article No.		Article No.
SIPLUS S7-400 CPU 412-5H		RS 485 bus connector	
CPU for S7-400H with 1 MB RAM		with angled cable outlet	
(0.5 MB code and 0.5 MB data); 5 interfaces: 1x MPI/DP, DP, PN each and 2 slots for sync modules		Max. transmission rate 12 Mbit/s Extended temperature range and	
Extended temperature range and exposure to media	6AG1412-5HK06-7AB0	exposure to media Without PG interface With PG interface 	6AG1972-0BA42-7XA0 6AG1972-0BB42-7XA0
Accessories		RS 485 bus connector	
Memory card RAM		with axial cable outlet	
(medial exposure) • 2 MB	6AG1952-1AL00-4AA0	For SIPLUS OP, for connection to PPI, MPI, PROFIBUS	
Extended temperature range and exposure to media		Extended temperature range and exposure to media	6AG1500-0EA02-2AA0
• 4 MB	6AG1952-1AM00-7AA0	RS 485 repeater for PROFIBUS	
• 8 MB	6AG1952-1AP00-7AA0	Transfer rate up to 12 Mbit/s;	
• 16 MB • 64 MB	6AG1952-1AS00-7AA0 6AG1952-1AY00-7AA0	24 V DC; IP20 enclosure	
FEPROM memory card		Extended temperature range and exposure to media	6AG1972-0AA02-7XA0
Exposure to media		Additional accessories	See SIMATIC CPU 412-5H,
32 MB	6AG1952-1KT00-4AA0		page 1/37
RS 485 bus connector			
with 90° cable outlet			
Many transferring to MAL 11/			

Max. transfer rate 12 Mbit/s Extended temperature range and

> 6AG1972-0BA12-2XA0 6AG1972-0BB12-2XA0

exposure to media • Without PG interface

With PG interface

Central processing units SIPLUS S7-400 high-availability CPUs

Overview



CPU for SIMATIC S7-400H and S7-400F/FH

- Usable in high-availability systems such as the S7-400H
- Usable with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integral PROFIBUS DP master interface
- Features 2 slots for sync modules

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical specifications

Article number	6AG1414-5HM06-7AB0
Based on	6ES7414-5HM06-0AB0
	SIPLUS S7-400 CPU 414-5H
Ambient conditions	
Ambient temperature in operation	
• Min.	-25 °C
• max.	70 °C; For "F-Systems" applications max. +60 °C permissible
Extended ambient conditions	
Relative to ambient temperature- atmospheric pressure-installation altitude	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m). For "F-Systems" applications max. +2000 m above sea level permissible
Relative humidity	
- With condensation, max.	100 %; RH incl. condensation/frost (no commissioning under conden- sation conditions)
Resistance	
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
 against mechanically active substances / conformity with EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!
	Article No.

Ordering data	Article No.		Article No.
SIPLUS S7-400 CPU 414-5H		RS 485 bus connector with angled cable outlet	
CPU for S7-400H with 4 MB RAM (2 MB code and 2 MB data);		Max. transmission rate 12 Mbit/s	
5 interfaces: 1x MPI/DP, DP, PN each and 2 slots for sync modules		Extended temperature range and exposure to media	
Extended temperature range and exposure to media	6AG1414-5HM06-7AB0	Without PG interface With PG interface	6AG1972-0BA42-7XA0 6AG1972-0BB42-7XA0
Accessories		RS 485 bus connector	
Memory Card RAM		with axial cable outlet	
Exposure to media 2 MB 	6AG1952-1AL00-4AA0	For SIPLUS OP, for connection to PPI, MPI, PROFIBUS	
Extended temperature range and exposure to media		Extended temperature range and exposure to media	6AG1500-0EA02-2AA0
• 4 MB	6AG1952-1AM00-7AA0	RS 485 repeater for PROFIBUS	
• 8 MB	6AG1952-1AP00-7AA0	Transfer rate up to 12 Mbit/s;	
16 MB64 MB	6AG1952-1AS00-7AA0 6AG1952-1AY00-7AA0	24 V DC; IP20 enclosure	
FEPROM memory card		Extended temperature range and exposure to media	6AG1972-0AA02-7XA0
Exposure to media		Additional accessories	see SIMATIC S7-400
• 32 MB	6AG1952-1KT00-4AA0		CPU 414-5H, page 1/37
RS 485 bus connector with 90° cable outlet			
Max. transfer rate 12 Mbit/s			
Extended temperature range and exposure to media			
 Without PG interface 	6AG1972-0BA12-2XA0		
 With PG interface 	6AG1972-0BB12-2XA0		

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Central processing units SIPLUS S7-400 high-availability CPUs

SIPLUS S7-400 CPU 416H

Overview

- CPU for SIMATIC S7-400H and S7-400F/FH
- Usable in high-availability systems such as the S7-400H
- Usable with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master and combined MPI/ PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- · Features 2 slots for sync modules

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical specifications

with EN 60721-3-3

Article number	6AG1416-5HS06-7AB0		
Based on	6ES7416-5HS06-0AB0		
	SIPLUS S7-400 CPU 416-5H		
Ambient conditions			
Ambient temperature in operation			
• Min.	-25 °C; = Tmin		
• max.	70 °C; For "F-Systems" applications max. +60 °C permissible		
Extended ambient conditions			
Relative to ambient temperature- atmospheric pressure-installation altitude	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m). For "F-Systems" applications max. +2000 m above sea level permissible		
Relative humidity			
- With condensation, max.	100 %; RH incl. condensation/frost (no commissioning under conden- sation conditions)		
Resistance			
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!		
 against chemically active substances / conformity with EN 60721-3-3 	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!		
 against mechanically active substances / conformity 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must		

The supplied connector covers must remain on the unused interfaces during operation!

Ordering data	Article No.
SIPLUS S7-400 CPU 416-5H	6AG1416-5HS06-7AB0
(medial exposure) CPU for S7-400H with 16 MB RAM (6 MB code and 10 MB data); 5 interfaces: 1x MPI/DP, DP, PN	
each and 2 slots for sync modules	
Accessories	
Memory card RAM	
Exposure to media • 2 MB	6AG1952-1AL00-4AA0
Extended temperature range and exposure to media • 4 MB • 8 MB	6AG1952-1AM00-7AA0 6AG1952-1AP00-7AA0
• 16 MB • 64 MB	6AG1952-1AS00-7AA0 6AG1952-1AY00-7AA0
FEPROM memory card	
Exposure to media • 32 MB	6AG1952-1KT00-4AA0
RS 485 bus connector with 90° cable outlet	
Max. transmission rate 12 Mbit/s	
Extended temperature range and exposure to media • Without PG interface	6AG1972-0BA12-2XA0
With PG interface	6AG1972-0BB12-2XA0
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Extended temperature range and exposure to media	
Without PG interfaceWith PG interface	6AG1972-0BA42-7XA0 6AG1972-0BB42-7XA0
RS 485 bus connector with axial cable outlet	
For SIPLUS OP, for connection to PPI, MPI, PROFIBUS	
Extended temperature range and exposure to media	6AG1500-0EA02-2AA0
RS 485 repeater for PROFIBUS	
Transfer rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	
Extended temperature range and exposure to media	6AG1972-0AA02-7XA0
Additional accessories	see SIMATIC S7-400 CPU 416-5H, page 1/37

Central processing units SIPLUS S7-400 high-availability CPUs

Overview



CPU for SIMATIC S7-400H and S7-400F/FH

- Usable in high-availability systems such as the S7-400H
- Usable with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integral PROFIBUS DP master interface
- Features 2 slots for sync modules

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical specifications	
Article number	6AG1417-5HT06-7AB0
Based on	6ES7417-5HT06-0AB0
	SIPLUS S7-400 CPU 417-5H
Ambient conditions	
Ambient temperature in operation	
• Min.	-25 °C
• max.	70 °C; For "F-Systems" applications max. +60 °C permissible
Extended ambient conditions	
 Relative to ambient temperature- atmospheric pressure-installation altitude 	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m). For "F-Systems" applications max. +2000 m above sea level permissible
Relative humidity	
- With condensation, max.	100 %; RH incl. condensation/frost (no commissioning under conden- sation conditions)
Resistance	
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and d rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on th unused interfaces during operation
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers mu remain on the unused interfaces during operation!
Ordering data	Article No.
SIPLUS S7-400 CPU 417-5H	
CPU for S7-400H with 32 MB RAM (16 MB code and 16 MB data); 5 interfaces: 1x MPI/DP, DP, PN each and 2 slots for sync modules	

Extended temperature range and exposure to media	6AG1417-5HT06-7AB0
SIPLUS accessories	see SIPLUS S7-400 CPU 416H, page 1/45
Additional accessories	see SIMATIC S7-400 CPU 417-5H, page 1/37

SIMATIC S7-400 advanced controller Central processing units SIPLUS S7-400 high-availability CPUs

SIPLUS sync module for connecting the CPU 41xH

Overview



- For linking the two CPUs 414-4H/417-4H in the subunits of the S7-400H
- Can be plugged directly into the CPU

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Article number	6AG1960-1AA06-7XA0	6AG1960-1AB06-7XA0
Based on	6ES7960-1AA06-0XA0	6ES7960-1AB06-0XA0
	SIPLUS S7-400H IF960-H 10M	SIPLUS S7-400H IF960-H 10KM
Ambient conditions		
Ambient temperature in operation		
• Min.	-25 °C	-25 °C
• max.	70 °C	70 °C
Extended ambient conditions		
Relative to ambient temperature- atmospheric pressure-installation altitude	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)
Relative humidity		
- With condensation, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance		
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75 %) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
 against mechanically active substances / conformity with EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Ordering data	Article No.		Article No.
SIPLUS sync module V6		SIPLUS S7-400 FO CABLE	
Extended temperature range and exposure to media		1 m long	6AG1960-1AA04-7AA0
 for patch cable, can be used with 	6AG1960-1AA06-7XA0	2 m long	6AG1960-1AA04-7BA0
fiber-optic cables up to 10 m		10 m long	6AG1960-1AA04-7KA0
 for patch and installation cables, can be used with fiber-optic cables up to 10 km 	6AG1960-1AB06-7XA0		

Central processing units SIPLUS high-availability CPUs

Overview



Technical specifications

6AG1153-2BA10-7XB0
6ES7153-2BA10-0XB0
SIPLUS ET200M IM153-2 HF
-40 °C; = Tmin; Startup @ -25 °C
70 °C; = Tmax
-40 °C
70 °C
Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)
-25 °C
100 %; RH incl. condensation/frost (no commissioning under conden- sation conditions)
Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

- Bus coupler for transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- For connection of devices with only one PROFIBUS DP interface to the redundant PROFIBUS DP master system of the SIMATIC S7-400H

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical documentation on SIPLUS can be found here: www.siemens.com/siplus-extreme

Article number	6AG1197-1LB00-4XA0		
Based on	6ES7197-1LB00-0XA0		
	SIPLUS S7 Y COUPLER		
Ambient conditions			
Ambient temperature during operation			
• min.	0 °C; = Tmin		
• max.	60 °C; = Tmax		
Ambient temperature during storage/transportation			
• min.	-40 °C		
• max.	70 °C		
Extended ambient conditions			
 relative to ambient temperature- atmospheric pressure-installation altitude 	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)		
Relative humidity			
 With condensation, tested in accordance with IEC 60068-2-38, max. 	100 %; RH incl. condensation/frost (no commissioning under conden- sation conditions)		
Resistance			
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!		
 against chemically active substances / conformity with EN 60721-3-3 	Yes; Class 3C4 (RH < 75%) incl. sal spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!		
 against mechanically active substances / conformity with EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers mus remain on the unused interfaces during operation!		

Central processing units SIPLUS high-availability CPUs

SIPLUS Y-Link for S7-400H

Technical specifications (continued)		Ordering data	Article No.	
Article number Based on	6AG1195-7HD10-2XA0 6ES7195-7HD10-0XA0	SIPLUS ET 200M IM 153-2 High Feature (2 units required)		
	SIPLUS ET200M DP BUS MODULE	Slave interface for connecting an		
Ambient conditions		ET 200M to PROFIBUS DP for a maximum of 12 S7-300 modules:		
Ambient temperature during operation		also for use in redundant systems Extended temperature range and 	6AG1153-2BA10-7XB0	
• min.	-40 °C; = Tmin	exposure to media		
• max.	70 °C; = Tmax; 60 °C @ UL/cUL, ATEX and FM use	Y coupler		
Ambient temperature during storage/transportation		For establishing a Y-link for redundant controllers		
• min.	-40 °C	Exposure to media	6AG1197-1LB00-4XA0	
• max.	70 °C	Bus module for SIPLUS ET 200M		
Extended ambient conditions		Bus module for accommodating		
 relative to ambient temperature- atmospheric pressure-installation altitude 	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa	 two IM-153 modules for the hot-swapping function; for setting up redundant systems Extended temperature range and exposure to media 	6AG1195-7HD10-2XA0	
	(+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa	SIPLUS S7 bus module BM Y-coupler to accommodate a Y-coupler		
	(+3500 m +5000 m)	incl. bus module cover		
- With condensation, tested in	100 %; RH incl. condensation/frost	 Extended temperature range and exposure to media 	6AG1654-7HY00-7XA0	
accordance with IEC 60068-2-38, max.	(no commissioning under conden- sation conditions)	Accessories		
Resistance	····· · · · · · · · · · · · · · · · ·	Consumables		
- against biologically active	Yes; Class 3B2 mold, fungus and dry	Mounting rail		
substances / conformity with EN 60721-3-3	rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	For assembling the Y-link with active bus modules • Length 483 mm	6ES7195-1GA00-0XA0	
 against chemically active substances / conformity with EN 60721-3-3 	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Length 530 mm	6ES7195-1GF30-0XA0	
 against mechanically active substances / conformity with EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!			

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Central processing units Interface modules

Overview



- To connect distributed I/Os over PROFIBUS DP
- Max. transmission rate 12 Mbit/s
- Electrically isolated RS 485 interface
- Connection via 9-pin sub-D connector
- The following connection options are available for each S7-400 CPU:
 - A PROFIBUS module in the CPUs 414-3, 414(F)-3 PN/DP, 416-3, 416(F)-3 PN/DP
 - Two PROFIBUS modules in the CPU 417-4

Note:

Can only be used with CPUs 6ES7414-3XM07-0AB0, 6ES7414-3EM07-0AB0, 6ES7414-3FM07-0AB0, 6ES7416-3XS07-0AB0, 6ES7416-3ES07-0AB0, 6ES7416-3FS07-0AB0 and 6ES7417-4XT07-0AB0.

Article number	6ES7964-2AA04-0AB0
	INTERFACE MOD. DP-MASTER F. S7-400
Product type designation	
Input current	
from CPU, max.	150 mA; Current consumption fror S7-400 bus: The module uses no current at 24 V, it provides this voltage only at the DP interface. To current consumption of the compo- nents connected to the DP interface but maximum 150 mA. Current carrying capacity of the isolated 5 (P5ext) maximum 90 mA, current carrying capacity of the 24 V maximum 150 mA.
Power losses	
Power loss, typ.	1 W
Interfaces	
PROFIBUS DP	
Cable length	
- Cable length, max.	1 200 m; At 9.6 kbit/s: max. 1200 at 12 Mbit/s: max. 100 m
1st interface	
Physics	RS 485
Isolated	Yes
Functionality	
DP master	Yes; Default setting
DP slave	Yes
DP master	
Transmission rate, min.	9.6 kbit/s
Transmission rate, max.	12 Mbit/s
Number of DP slaves, max.	125; depending on the CPU used
Services	
- PG/OP communication	Yes
- Equidistance mode support	Yes
- SYNC/FREEZE	Yes
	Yes
 Direct data exchange (slave-to-slave communication) 	ies
Address area	
- Inputs, max.	device-dependent
- Outputs, max.	device-dependent
User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
Communication functions	
Number of connections	
overall	device-dependent
Dimensions	
Width	26 mm
Height	54 mm
Depth	130 mm
Weights	
Weight, approx.	65 g
Ordering data	Article No.
IF 964-DP interface module	6ES7964-2AA04-0AB0

Central processing units SIPLUS S7-400 interface modules

SIPLUS S7-400 interface modules



SIPLUS interface module IF-964 DP

Interface module with integrated

PROFIBUS DP master interface Extended temperature range and exposure to media

6AG1964-2AA04-7AB0

Overview



- To connect distributed I/O via PROFIBUS DP
- Max. transmission rate 12 Mbit/s
- Electrically isolated RS 485 interface
- Connection via 9-pin Sub-D socket
- One or two PROFIBUS modules can be plugged in for each S7-400 CPU:
 - CPU 414-3/416-3: 1 module
 - CPU 417-4: 2 modules

Notes:

Can only be used with the CPUs 6AG1416-3XR05-4AB0, 6AG1416-3ER05-4AB0 and 6AG1417-4XT05-4AB0.

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For further technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

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Digital modules

Overview



- Digital inputs for the SIMATIC S7-400
- For connecting standard switches and two-wire proximity switches (BERO)

Supply voltage -oad voltage L+	Article number	6ES7421-7BH01- 0AB0	6ES7421-1BL01- 0AA0	6ES7421-1EL00- 0AA0	6ES7421-1FH20- 0AA0	6ES7421-7DH00- 0AB0
Supply voltage -oad voltage L+			SM421, 32DI, DC24V			
Load voltage L+ • Rated value (DC)24 V 24 V • permissible range, lower limit (DC)24 V 20.4 V 28.8 VAll contained	Product type designation					
Rated value (DC)24 V 20.4 V24 V 20.4 V24 V20 mAMathematical and the probability of the probabil	Supply voltage					
• permissible range, lower limit (DC) 20.4 V -<	Load voltage L+					
 bermissible range, upper limit (DC) 28.8 V nput current from backplane bus 5 V DC, max. 120 mA 20 mA 200 mA 80 mA 150 mA row ployses Fower losses Fo	 Rated value (DC) 	24 V				
Input current 130 mA 20 mA 200 mA 80 mA 150 mA from supply voltage L+, max. 120 mA 200 mA 80 mA 150 mA Power losses 5 W 6 W 16 W 12 W 8 W; 3.5 W (24 V DC); 6.5 W (48 V DC); 8.0 V (60 V DC) Digital inputs 5 W 6 W 16 W 12 W 8 W; 3.5 W (24 V DC); 8.0 V (60 V DC) Digital inputs 16 32 32 16 16 Number of digital inputs 16 32 32 16 16 Number of cligital inputs 16 32 32 16 16 - up to 60 °C, max. 16 32 32 16 16 - up to 60 °C, max. 16 32 32 16 16 - up to 60 °C, max. 16 32 32 16 16 - up to 60 °C, max. 16 32 32 16 16 - up to 60 °C, max. 16 32 32 16 16 - up to 60 °C, max. 16 32 32 16 16 - ot 0 °C, max. 1	• permissible range, lower limit (DC)	20.4 V				
Tom backplane bus 5 V DC, max. from supply voltage L+, max.130 mA 120 mA20 mA200 mA80 mA150 mAPower losses Power loss, max.5 W6 W16 W12 W8 W; 3.5 W (24 V DC) 	• permissible range, upper limit (DC)	28.8 V				
International standard International standard <thinternat< th=""> International standard <t< td=""><td>Input current</td><td></td><td></td><td></td><td></td><td></td></t<></thinternat<>	Input current					
Ower losses SW 6 W 16 W 12 W 8 W; 3.5 W (24 V DC) 6.5 W (48 V DC); 8.0 V (60 V DC) Digital inputs 5 W 6 W 16 W 12 W 8 W; 3.5 W (24 V DC) 6.5 W (48 V DC); 8.0 V (60 V DC) Digital inputs 16 32 32 16 16 Number of digital inputs sontrollable inputs all mounting positions - 16 32 32 16 16 - up to 40 °C, max. 16 32 32 16 16 16 - up to 60 °C, max. 16 32 32 16 16 16 - up to 60 °C, max. 16 32 32 16 16 16 - up to 60 °C, max. 16 32 32 16 16 16 - type of input voltage DC DC DC AC/DC AC/DC AC/DC 42 V / 24 V 60 V UC - Rated value (DC) - 30 V DC to +5 V DC - 30 V DC to +5 V DC - 30 V DC to +5 V DC 0 to 20 V UC 0 to 40 V AC/ -40 to +40 V DC - 6 to +6 V DC/ 0 to 5 V AC - for signal "1*	from backplane bus 5 V DC, max.	130 mA	20 mA	200 mA	80 mA	150 mA
Power loss, max.5 W6 W16 W12 W8 W; 3.5 W (24 V DC) 6.5 W (48 V DC); 8.0 V (60 V DC)Digital inputs1632321616Number of digital inputs1632321616Number of simultaneously controllable inputs1632321616- up to 40 °C, max.1632321616- up to 60 °C, max.1632321616- up to 60 °C, max.163232321616- up to 60 °C, max.16323232321616- up to 60 °C, max.161616161616- up to 60 °C, max.1612 °V230 °V, 120/230 °V °C24 °V cho °V °C- for signal "0"- 30 °V °C to +5 °V °C- 30 °V °C to +5 °V °C0 to 20 °V °C0 to 40 °V °C- 6 to +6 °V °C- for signal "1"11 °V °C to 30 °V °C13 °V °C to 30 °V °C79 to 132 °V °C80 to 264 °V °C- 15 to 60 °V °C- f	from supply voltage L+, max.	120 mA				
Digital inputs1632321616Number of digital inputs1632321616Number of digital inputs1632321616Number of simultaneously controllable inputs1632321616all mounting positions up to 40 °C, max.1632321616- up to 60 °C, max.1632321616- up to 60 °C, max.1632321616- up to 60 °C, max.1624241616- up to 60 °C, max.0 DCDCAC/DCAC/DCAC/DC- stated value (DC)24 V24 V120 V230 V; 120/230 V UC24 V; 24 to 60 V UC- for signal "0"-30 V DC to +5 V DC-30 V DC to +5 V DC0 to 20 V UC0 to 40 V AC/ -40 to +40 V DC-6 to +6 V DC/ 0 to 5 V AC- for signal "1"11 V DC to 30 V DC13 V DC to 30 V DC79 to 132 V AC; -80 to 264 V DC, -15 to 72 V DC; -80 to -264 V15 to 72 V DC; -15 to 60 V AC	Power losses					
Number of digital inputs1632321616Number of simultaneously controllable inputsall mounting positions	Power loss, max.	5 W	6 W	16 W	12 W	8 W; 3.5 W (24 V DC); 6.5 W (48 V DC); 8.0 W (60 V DC)
Number of simultaneously controllable inputs 16 32 32 16 16 all mounting positions - up to 40 °C, max. 16 32 32 16 16 - up to 60 °C, max. 16 32 32 16 16 nput voltage DC DC AC/DC AC/DC AC/DC • Type of input voltage DC DC AC/DC AC/DC AC/DC • Rated value (DC) 24 V 24 V 120 V 230 V; 120/230 V UC 24 V; 24 to 60 V UC • Rated value (UC) -30 V DC to +5 V DC -30 V DC to +5 V DC 0 to 20 V UC 0 to 40 V AC/ -40 to +40 V DC -6 to +6 V DC/ 0 to 5 V AC • for signal "0" -11 V DC to 30 V DC 13 V DC to 30 V DC 79 to 132 V AC; 80 to 132 V DC 74 to 264 V AC; 80 to 264 V DC, -15 to -72 V DC; 15 to 60 V AC 15 to 60 V AC	Digital inputs					
controllable inputs section section <td>Number of digital inputs</td> <td>16</td> <td>32</td> <td>32</td> <td>16</td> <td>16</td>	Number of digital inputs	16	32	32	16	16
up to 40°C, max. 16 32 32 16 16 - up to 60°C, max. 16 32 32 16 16 nput voltage DC DC AC/DC AC/DC AC/DC AC/DC • Type of input voltage DC 24 V 24 V 120 V 230 V; 120/230 V UC 24 V; 24 to 60 V UC • Rated value (UC) -30 V DC to +5 V DC -30 V DC to +5 V DC 0 to 20 V UC 230 V; 120/230 V UC 24 V; 24 to 60 V UC • for signal "0" -30 V DC to +5 V DC -30 V DC to +5 V DC 0 to 20 V UC -40 to +40 V DC -6 to +6 V DC/ -0 to 5 V AC • for signal "1" 11 V DC to 30 V DC 13 V DC to 30 V DC 79 to 132 V AC; 80 to 132 V DC 74 to 264 V AC; -80 to -264 V 15 to 72 V DC; -15 to 60 V AC	Number of simultaneously controllable inputs					
No bole 16 32 32 16 16 nput voltage DC DC AC/DC AC/DC AC/DC • Type of input voltage DC 24 V 24 V 24 V 210 V 230 V; 120/230 V UC 24 V; 24 to 60 V UC • Rated value (UC) -30 V DC to +5 V DC -30 V DC to +5 V DC 0 to 20 V UC 0 to 40 V AC/ -40 to +40 V DC -6 to +6 V DC/ 0 to 5 V AC • for signal "1" 11 V DC to 30 V DC 13 V DC to 30 V DC 79 to 132 V AC; 80 to 132 V DC 74 to 264 V AC; 80 to 264 V DC, -80 to -264 V 15 to 72 V DC; 15 to 60 V AC	all mounting positions					
nput voltageDCDCAC/DCAC/DCAC/DC• Type of input voltageDCDCAC/DCAC/DCAC/DC• Rated value (DC)24 V24 V120 V230 V; 120/230 V UC24 V; 24 to 60 V UC• Rated value (UC)-30 V DC to +5 V DC-30 V DC to +5 V DC0 to 20 V UC0 to 40 V AC/ -40 to +40 V DC-6 to +6 V DC/ 0 to 5 V AC• for signal "1"11 V DC to 30 V DC13 V DC to 30 V DC79 to 132 V AC; 80 to 132 V DC74 to 264 V AC; 80 to -264 V15 to 72 V DC; -15 to -72 V DC; 15 to 60 V AC	- up to 40 °C, max.	16	32	32	16	16
Type of input voltage DC DC AC/DC AC/DC AC/DC Rated value (DC) 24 V 24 V 120 V 230 V; 120/230 VUC 24 V; 24 to 60 VUC Rated value (UC) -30 V DC to +5 V DC -30 V DC to +5 V DC 0 to 20 V UC 0 to 40 V AC/ -40 to +40 V DC -6 to +6 V DC/ 0 to 5 V AC for signal "1" 11 V DC to 30 V DC 13 V DC to 30 V DC 79 to 132 V AC; 80 to 132 V DC 74 to 264 V AC; -80 to -264 V 15 to 72 V DC; -15 to 60 V AC	- up to 60 °C, max.	16	32	32	16	16
Rated value (DC) 24 V 120 V 230 V; 120/230 V UC 24 V; 24 to 60 V UC • Rated value (UC) -30 V DC to +5 V DC -30 V DC to +5 V DC 0 to 20 V UC 0 to 40 V AC/ -40 to +40 V DC -6 to +6 V DC/ 0 to 5 V AC • for signal "1" 11 V DC to 30 V DC 13 V DC to 30 V DC 79 to 132 V AC; 80 to 132 V DC 74 to 264 V AC; -80 to -264 V 15 to 72 V DC; -15 to 60 V AC	Input voltage					
• Rated value (UC) 120 V 230 V; 120/230 V UC 24 V; 24 to 60 V UC • for signal "0" -30 V DC to +5 V DC -30 V DC to +5 V DC 0 to 20 V UC 0 to 40 V AC/ -40 to +40 V DC -6 to +6 V DC/ 0 to 5 V AC • for signal "1" 11 V DC to 30 V DC 13 V DC to 30 V DC 79 to 132 V AC; 80 to 132 V DC 74 to 264 V AC; -15 to -72 V DC; -15 to 60 V AC 15 to 72 V DC; -15 to 60 V AC	 Type of input voltage 	DC	DC	AC/DC	AC/DC	AC/DC
• for signal "0" -30 V DC to +5 V DC -30 V DC to +5 V DC 0 to 20 V UC 0 to 40 V AC/ -40 to +40 V DC -6 to +6 V DC/ 0 to 5 V AC • for signal "1" 11 V DC to 30 V DC 13 V DC to 30 V DC 79 to 132 V AC; 80 to 132 V DC 74 to 264 V AC; -80 to -264 V 15 to 72 V DC; -15 to -72 V DC; 15 to 60 V AC	 Rated value (DC) 	24 V	24 V			
• for signal "1" 11 V DC to 30 V DC 13 V DC to 30 V DC 79 to 132 V AC; 80 to 132 V DC -40 to +40 V DC 0 to 5 V AC • for signal "1" 11 V DC to 30 V DC 13 V DC to 30 V DC 79 to 132 V AC; 80 to 132 V DC 74 to 264 V AC; 80 to 264 V DC, -80 to -264 V 15 to 72 V DC; 15 to 60 V AC	 Rated value (UC) 			120 V	230 V; 120/230 V UC	24 V; 24 to 60 V UC
80 to 132 V DC 80 to 264 V DC, -15 to -72 V DC; -80 to -264 V 15 to 60 V AC	• for signal "0"	-30 V DC to +5 V DC	-30 V DC to +5 V DC	0 to 20 V UC		
• Frequency range 47 63 Hz 47 63 Hz 47 to 63 Hz AC / DC	• for signal "1"	11 V DC to 30 V DC	13 V DC to 30 V DC		80 to 264 V DC,	-15 to -72 V DC;
	 Frequency range 			47 63 Hz	47 63 Hz	47 to 63 Hz AC / DC

Digital modules

SM 421 digital input module

Article number	6ES7421-7BH01- 0AB0	6ES7421-1BL01- 0AA0	6ES7421-1EL00- 0AA0	6ES7421-1FH20- 0AA0	6ES7421-7DH00- 0AB0
	SM421, 16DI, DC24V, 0.05MS INPUT DELAY	SM421, 32DI, DC24V	SM421, 32DI, DC/AC 120V	SM421, 16DE, UC120/230V	SM421, 16DE, UC24-60V
Input current					
 for signal "0", max. (permissible quiescent current) 		1.3 mA	1 mA	6 mA; AC: 6 mA; DC: 2 mA	
• for signal "1", typ.	6 mA; 6 8 mA	7 mA	2 mA; 2 5 mA	10 mA; at 120 V: 10 mA AC, 1.8 mA DC; at 230 V: 14 mA AC, 2 mA DC	4 mA; 4 10 mA
Input delay (for rated value of input voltage)					
for standard inputs					
- Parameterizable	Yes				Yes
- nominal					0.5 ms; 0.5 / 3 / 10 / 20 ms
Cable length					
• shielded, max.	1 000 m; 1000 m/3 ms; 70 m/0.5 ms; 30 m/0.1 ms; 30 m/0.05 ms	1 000 m	1 000 m	1 000 m	1 000 m
Unshielded, max.	600 m; 600 m: 3 ms; 50 m: 0,5 ms; 20 m: 0,1 ms; 20 m: 0,05 ms	600 m	600 m	600 m	600 m; 600 m: 3, 10, 20 ms; 100 n 0,5 ms
Encoder					
Connectable encoders					
2-wire sensor	Yes	Yes	Yes	Yes	Yes
 Permissible quiescent current (2-wire sensor), max. 	3 mA	1.5 mA	1 mA	5 mA; AC: 5 mA	0.5 mA; 0.5 to 2 mA
Interrupts/diagnostics/ status information					
Alarms					
Diagnostic alarm	Yes; Parameterizable				Yes; Parameterizab
Hardware interrupt	Yes; Parameterizable				Yes; Parameterizab
Diagnostic messages					
Diagnostics	Yes; internal/ external fault				Yes; internal/ extern fault
Galvanic isolation					
Galvanic isolation digital inputs					
\bullet between the channels, in groups of	8	32	8	4	1
 between the channels and the backplane bus 	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation checked with	500 V DC	500 V DC	1500 V AC	1500 V AC	1500 V AC
Dimensions					
Width	25 mm	25 mm	25 mm	25 mm	25 mm
Height	290 mm	290 mm	290 mm	290 mm	290 mm
Depth	210 mm	210 mm	210 mm	210 mm	210 mm
Weights					

Digital modules

SM 421 digital input module

Ordering data	Article No.		Article No.
SM 421 digital input modules		Labeling sheets for machine inscription	
16 inputs, 24 V DC, with process/diagnostics interrupt	6ES7421-7BH01-0AB0	DIN A4, for printing using laser	
32 inputs, 24 V DC	6ES7421-1BL01-0AA0	printer; pack of 10	
32 inputs, 120 V AC/DC	6ES7421-1EL00-0AA0	petrol	6ES7492-2AX00-0AA0
16 inputs, 120/230 V AC/DC, inputs	6ES7421-1FH20-0AA0	light-beige	6ES7492-2BX00-0AA0
according to IEC 1131-2 Type 2		yellow	6ES7492-2CX00-0AA0
16 inputs, 24 to 60 V AC/DC,	6ES7421-7DH00-0AB0	red	6ES7492-2DX00-0AA0
with process/diagnostics interrupt		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Front connector		Electronic manuals on DVD.	
48-pin		multilingual: LOGO!, SIMADYN,	
 with screw contacts, 1 unit 	6ES7492-1AL00-0AA0	SIMATIC bus components, SIMATIC C7,	
 with screw contacts, 84 units 	6ES7492-1AL00-1AB0	SIMATIC C7, SIMATIC distributed I/O,	
 with spring-loaded terminals, 1 unit 	6ES7492-1BL00-0AA0	SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based	
 with crimp contacts, 1 unit 	6ES7492-1CL00-0AA0	Automation, SIMATIC PCS 7,	
 with crimp contacts, 84 units 	6ES7492-1CL00-1AB0	SIMATIC PG/PC, SIMATIC S7,	
Cover film for labeling strips	6ES7492-2XX00-0AA0	SIMATIC Software, SIMATIC TDC	
Spare part		SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
		Current "Manual Collection" DVD and the three subsequent updates	

Digital modules

Overview



- Digital outputs for the SIMATIC S7-400
- For connecting solenoid valves, contactors, low-power motors, lamps and motor starters

Article number	6ES7422-1FH00- 0AA0	6ES7422-1HH00- 0AA0	6ES7422-1BH11- 0AA0	6ES7422-1BL00- 0AA0	6ES7422-7BL00- 0AB0
	SM422, 16DO, AC120/230V, 2A	SM422, 16DO, AC5-230V, 5A RELAY	SM422, 16DO, DC24V, 2A	SM422, 32DO, DC24V, 0,5A	SM422, 32DO, DC24V, 0,5A
Product type designation					
Supply voltage					
Load voltage L+					
 Rated value (DC) 		60 V	24 V	24 V	24 V
• permissible range, lower limit (DC)		1 V	20.4 V	20.4 V	20.4 V
• permissible range, upper limit (DC)		60 V	28.8 V	28.8 V	28.8 V
Load voltage L1					
 Rated value (AC) 	230 V; 120/230V AC	230 V			
• permissible range, lower limit (AC)	79 V	2 V			20.4 V
• permissible range, upper limit (AC)	264 V	264 V			28.8 V
Input current					
from load voltage L+ (without load), max.	1.5 mA		30 mA	30 mA	120 mA
from load voltage L1 (without load), max.	6 mA				
from backplane bus 5 V DC, max.	400 mA	1 A	160 mA	200 mA	200 mA
Power losses					
Power loss, max.	16 W	25 W	7 W	4 W	8 W
Digital outputs					
Number of digital outputs	16	16; Relays	16	32	32
Limitation of inductive shutdown voltage to			-30 V	-27 V	L+ (-45 V)
Switching capacity of the outputs					
 on lamp load, max. 	50 W	60 W	10 W	5 W	5 W
Output voltage					
 for signal "1", min. 	L1 (-18.1 V)		L+ (-0.5 V)	L+ (-0.3 V)	L+ (-0.8 V)

Digital modules

SM 422 digital output module

Technical specifications (continued)

Article number	6ES7422-1FH00- 0AA0	6ES7422-1HH00- 0AA0	6ES7422-1BH11- 0AA0	6ES7422-1BL00- 0AA0	6ES7422-7BL00- 0AB0
	SM422, 16DO, AC120/230V, 2A	SM422, 16DO, AC5-230V, 5A RELAY	SM422, 16DO, DC24V, 2A	SM422, 32DO, DC24V, 0,5A	SM422, 32DO, DC24V, 0,5A
Output current					
 for signal "1" rated value 	2 A	5 A	2 A	0.5 A	0.5 A
 for signal "1" permissible range for 0 to 60 °C, min. 	10 mA		5 mA	5 mA	5 mA
 for signal "1" permissible range for 0 to 60 °C, max. 			2.4 A	0.6 A	0.6 A
• for signal "0" residual current, max.	2.6 mA		0.5 mA	0.3 mA	0.5 mA
Switching frequency					
 with resistive load, max. 	10 Hz	10 Hz	100 Hz	100 Hz	100 Hz
 with inductive load, max. 	0.5 Hz		0.1 Hz	0.5 Hz	2 Hz
Aggregate current of outputs (per group)					
all mounting positions					
- up to 60 °C, max.	2 A; 5 A with fan subassembly; per 4 adjacent outputs	5 mA; 10 A with fan subassembly	2 A; 2 adjacent outputs each	2 A; 8 adjacent outputs each	2 A
Relay outputs					
Number of operating cycles, max.		100 000; 100 000 (AC 15 / DC 13); 3 000 000 mechanical			
Switching capacity of contacts					
- with inductive load, max.		5 A; 5 A (30 V DC); 5 A (230 V AC)			
- with resistive load, max.		5 A; 5 A (30 V DC); 5 A (230 V AC); 1.2 A (60 V DC); 0.2 A (125 V DC)			
Cable length					
• shielded, max.	1 000 m	1 000 m	1 000 m	1 000 m	1 000 m
 Unshielded, max. 	600 m	600 m	600 m	600 m	600 m
Interrupts/diagnostics/ status information					
Alarms					
Diagnostic alarm					Yes; Parameterizable
Diagnostic messages					
Diagnostics					Yes; internal/ external fault
Galvanic isolation					
Galvanic isolation digital outputs					
• between the channels, in groups of	4	2	8	32	8
 between the channels and the backplane bus 	Yes	Yes	Yes	Yes	Yes
Isolation					
Isolation checked with	1500 V AC	1500 V AC	500 V DC	500 V DC	500 V DC
Dimensions					
Width	25 mm	25 mm	25 mm	25 mm	25 mm
Height	290 mm	290 mm	290 mm	290 mm	290 mm
Depth	210 mm	210 mm	210 mm	210 mm	210 mm
Weights					
Weight, approx.	800 g	700 g	600 g	600 g	600 g

Digital modules

SM 422 digital output module

Ordering data	Article No.		Article No.
SM 422 digital output modules		Labeling sheets for machine inscription	
16 outputs, 24 V DC; 2 A	6ES7422-1BH11-0AA0	DIN A4, for printing using	
32 outputs, 24 V DC; 0.5 A	6ES7422-1BL00-0AA0	laser printer; pack of 10	
32 outputs, 24 V DC, 0.5 A; with diagnostics	6ES7422-7BL00-0AB0	petrol	6ES7492-2AX00-0AA0
16 outputs, 120/230 V AC; 2 A	6ES7422-1FH00-0AA0	light-beige	6ES7492-2BX00-0AA0
16 outputs, relay contacts	6ES7422-1HH00-0AA0	yellow	6ES7492-2CX00-0AA0
Front connector		red	6ES7492-2DX00-0AA0
		SIMATIC Manual Collection	6ES7998-8XC01-8YE0
 48-pin with screw contacts, 1 unit with screw contacts, 84 units with spring-loaded terminals, 1 unit with crimp contacts, 1 unit with crimp contacts, 84 units Cover film for labeling strips	6ES7492-1AL00-0AA0 6ES7492-1AL00-1AB0 6ES7492-1BL00-0AA0 6ES7492-1CL00-0AA0 6ES7492-1CL00-1AB0 6ES7492-2XX00-0AA0	Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7,	
Spare part		SIMATIC Software, SIMATIC TDC	
		SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
		Current "Manual Collection" DVD and the three subsequent updates	

SIPLUS S7-400 digital modules

SIPLUS S7-400 SM 421 digital input modules

Overview



- Digital inputs for SIMATIC S7-400
- For connection of switches and 2-wire proximity switches (BEROs)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Article number Based on	6AG1421-1BL01-2AA0 6ES7421-1BL01-0AA0
Based on	SIPLUS S7-400 SM421 32DE
Product type designation	511 E03 57-400 510142 1 52DE
Input current	
from backplane bus 5 V DC, max.	20 mA
Power losses	
Power loss, max.	6 W
Digital inputs	
Number of digital inputs	32
Number of simultaneously control- lable inputs	
all mounting positions	
- up to 40 °C, max.	32
- up to 60 °C, max.	32
Input voltage	
Type of input voltage	DC
 Rated value (DC) 	24 V
• for signal "0"	-30 V DC to +5 V DC
• for signal "1"	13 V DC to 30 V DC
Input current	
 for signal "0", max. (permissible quiescent current) 	1.3 mA
 for signal "1", typ. 	7 mA
Cable length	
 shielded, max. 	1 000 m
 Unshielded, max. 	600 m
Encoder	
Connectable encoders	
 2-wire sensor 	Yes
 Permissible quiescent current (2-wire sensor), max. 	1.5 mA
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels, in groups of	32
 between the channels and the backplane bus 	Yes
Isolation	
Isolation checked with	500 V DC
Dimensions	
Width	25 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	500 g
Ordering data	Article No.

SIPLUS S7-400 SM 421 digital input module	
32 inputs, 24 V DC	
Extended temperature range and exposure to media	6AG1421-1BL01-2AA0
Accessories	See SIMATIC S7-400 digital input modules, page 1/52

SIPLUS S7-400 digital modules

SIPLUS S7-400 SM 422 digital output modules



- Digital outputs for SIMATIC S7-400
- For connecting solenoid valves, contactors, small-power motors, lamps and motor starters

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Article number	6AG1422-1BL00-2AA0
Based on	6ES7422-1BL00-0AA0
	SIPLUS S7-400 SM422 32DA
Product type designation	
Digital outputs	
Number of digital outputs	32
Limitation of inductive shutdown voltage to	-27 V
Output voltage	
 for signal "1", min. 	L+ (-0.3 V)
Output current	
 for signal "1" rated value 	0.5 A
 for signal "1" permissible range for 0 to 60 °C, min. 	5 mA
 for signal "1" permissible range for 0 to 60 °C, max. 	0.6 A
Aggregate current of outputs	
(per group)	
all mounting positions	
- up to 60 °C, max.	2 A; 8 adjacent outputs each
Galvanic isolation	
Galvanic isolation digital outputs	20
• between the channels, in groups of	32
 between the channels and the backplane bus 	Yes
Dimensions	
Width	25 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	600 g
Ordering data	Article No.
SIPLUS S7-400 SM 422 digital output module	
32 outputs, 24 V DC	
Extended temperature rende	6AG1422-1BL00-2AA0
Extended temperature range and	

exposure to media

See SIMATIC S7-400 digital output modules,

page 1/55

Analog modules

Overview



- Analog inputs for the SIMATIC S7-400
- For connection of voltage and current sensors, thermocouples, resistors and resistance thermometers
- Resolution from 13 to 16 bit

Article number	6ES7431-0HH00-0AB0	6ES7431-1KF20-0AB0	6ES7431-1KF00-0AB0	6ES7431-1KF10-0AB0
	SM431, 16AE, +/-10V, +/-20MA, 4-20MA	SM431, 8AE, U/I/R, 14BIT, 0,416MS ZYKL	SM431, 8AE, U/I/R, 13BIT	SM431, 8AE, U/I/R, 14BIT
Product type designation				
Supply voltage				
Load voltage L+				
Rated value (DC)	24 V; Only required for supplying 2-wire transmitters	24 V; Only required for supplying 2-wire transmitters	not necessary	24 V; Only required for supplying 2-wire transmitters
 Reverse polarity protection 	Yes	Yes		Yes
Input current				
from load voltage L+ (without load), max.	400 mA; for 16 connected, fully controlled 2-wire transmitters	200 mA; for 8 connected, fully controlled 2-wire trans- mitters		200 mA; for 8 connected, fully controlled 2-wire transmitters
from backplane bus 5 V DC, max.	100 mA	1 000 mA	350 mA	600 mA
Power losses				
Power loss, typ.	2 W	4.9 W	1.8 W	3.5 W
Hardware configuration				
Slots				
 Required slots 	1	1	1	1
Analog inputs				
Number of analog inputs	16	8	8	8
 For voltage/current measurement 	16	8	8	8
 For resistance measurement 		4	4	4
permissible input voltage for voltage input (destruction limit), max.	20 V; 20 V DC permanent, 75 V DC for max. 1 s (duty factor 1:20) 40 mA	18 V; 18 V continuous, 75 V for 1 ms (mark to space ratio 1:20) 40 mA; Permanent	50 V	18 V; 18 V continuous, 75 V for 1 ms (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.	40 MA	40 mA; Permanent	50 mA; 40 mA continuous	40 mA; Permanent
Input ranges (rated values), voltages				
• 1 V to 5 V	Yes	Yes	Yes	Yes
• -1 V to +1 V	Yes	Yes	Yes	Yes
• -10 V to +10 V	Yes	Yes	Yes	Yes
• -2.5 V to +2.5 V				Yes
• -250 mV to +250 mV				Yes
• -5 V to +5 V				Yes
• -500 mV to +500 mV				Yes
• -80 mV to +80 mV				Yes

Analog modules

SM 431 analog input module

Article number	6ES7431-0HH00-0AB0	6ES7431-1KF20-0AB0	6ES7431-1KF00-0AB0	6ES7431-1KF10-0AB0
	SM431, 16AE, +/-10V, +/-20MA, 4-20MA	SM431, 8AE, U/I/R, 14BIT, 0,416MS ZYKL	SM431, 8AE, U/I/R, 13BIT	SM431, 8AE, U/I/R, 14BI
Input ranges (rated values), currents				
• 0 to 20 mA				Yes
• -20 mA to +20 mA	Yes	Yes	Yes	
• 4 mA to 20 mA	Yes	Yes	Yes	Yes
Input ranges (rated values), thermoelements				
• Туре В				Yes
• Type E				Yes
• Type J				Yes
• Type K				Yes
• Type L				Yes
• Type N				Yes
• Type R				Yes
• Type S				Yes
				Yes
• Type T				
Type U				Yes
Input ranges (rated values), resistance thermometer				
• Ni 100				Yes
• Ni 1000				Yes
• Pt 100				Yes
• Pt 1000				Yes
• Pt 10000				Yes
• Pt 200				Yes
• Pt 500				Yes
Input ranges (rated values),				
resistors				
• 0 to 150 ohms				Yes
• 0 to 300 ohms				Yes
• 0 to 48 ohms				Yes
• 0 to 600 ohms		Yes	Yes	Yes
• 0 to 6000 ohms				Yes; Usable up to 5000 c
Thermocouple (TC)				, ,
Temperature compensation				
- internal temperature compensation				No
 external temperature compen- sation with compensations socket 				Yes
 external temperature compen- sation with Pt100 				Yes
 dynamic reference temperature value 				Yes
Characteristic linearization				
Parameterizable				Yes
- for thermocouples				Type B, E, J, K, L, N, R, S U
- for resistance thermometer				Pt100, Pt200, Pt500, Pt10 Ni100, Ni1000
Cable length				
• shielded, max.	200 m	200 m	200 m	200 m; 50 m with thermo couples and input ranges <= 80 mV

Analog modules

SM 431 analog input module

Technical specifications (continued)

Article number	6ES7431-0HH00-0AB0	6ES7431-1KF20-0AB0	6ES7431-1KF00-0AB0	6ES7431-1KF10-0AB0
	SM431, 16AE, +/-10V, +/-20MA, 4-20MA	SM431, 8AE, U/I/R, 14BIT, 0,416MS ZYKL	SM431, 8AE, U/I/R, 13BIT	SM431, 8AE, U/I/R, 14BIT
Analog value creation				
Integration and conversion time/ resolution per channel				
 Resolution with overrange (bit including sign), max. 	13 bit	14 bit; 14 / 14 / 14	13 bit	14 bit; with activated filtering: 16 bits
 Integration time, parameterizable 	Yes	Yes	Yes	Yes
 Basic conversion time (ms) 	55 / 65 ms	52 µs	23 / 25 ms	20.1 / 23.5 ms
 Integration time (ms) 	50 / 60 ms		16,7 / 20 ms	16,7 / 20 ms
 Basic conversion time, including integration time (ms) 				
 additional conversion time for wire break monitoring 				4,3 ms
 additional conversion time for resistance measurement 				40.2 / 47 ms
 additional conversion time for wire break monitoring and resistance measurement 				5,5 ms
Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz	none / 400 / 60 / 50 Hz	50 / 60 Hz	50 / 60 Hz
Encoder				
Connection of signal encoders				
 for current measurement as 2-wire transducer 		Yes	Yes; with external transmitter supply	Yes
 for current measurement as 4-wire transducer 	Yes	Yes	Yes	Yes
 for resistance measurement with two-wire connection 		Yes; Line resistances are also measured	Yes; Line resistances are also measured	Yes; Line resistances are also measured
 for resistance measurement with three-wire connection 		Yes; Line resistances are also measured	Yes; Line resistances are also measured	Yes
 for resistance measurement with four-wire connection 		Yes	Yes	Yes
Errors/accuracies				
Operational limit in overall temperature range				
Voltage, relative to input area, (+/-)	0.65 %; 1.0 % at 1 to 5 V; 0.65 % at +/-1 V, +/-10 V	0.7 %; +/-0.7 % at +/-1 V; +/-0.9 % at +/-10 V, 1 to 5 V	1 %; +/-1.0 % at +/-1 V; +/-0.6 % at +/-10 V; +/-0.7 % at 1 to 5 V	0.38 %; +/-0.38 % at +/-80 mV; +/-0.35 % at +/-250 mV, +/-500mV, +/-1 V, +/-2,5 V, +/-5 V, 1 to 5 V, +/-10 V
• Current, relative to input area, (+/-)	0.65 %	0.8 %; at +/-20 mA, 4 to 20 mA	1 %; at +/-20 mA, 4 to 20 mA	0.35 %; +/-20 mA, 0 to 20 mA, 4 to 20 mA
• Resistance, relative to input area, (+/-)		1 %	1.25 %; 0 to 500 ohms (4-conductor measurement, in range of 600 ohms)	0.5 %
• Resistance thermometer, relative to input area, (+/-)				0.5 %
Basic error limit (operational limit at 25 °C)				
Voltage, relative to input area, (+/-)	0.25 %; 0.5 % at 1 to 5 V; 0.25 % at +/-1 V, +/-10 V	0.6 %; 0.6 % at +/-1 V; 0.75 % at +/-10 V, 1 to 5 V	0.7 %; 0.7 % at +/-1 V; 0.4 % at +/-10 V; 0.5 % at 1 to 5 V	0.15 %; +/-0.15 % (+/-250 mV, +/-500 mV, +/-1 V, +/-2.5 V, +/-5 V, 1 to 5 V, +/- 10 V); +/-0.17 % (+/- 80 mV);
• Current, relative to input area, (+/-)	0.25 %; at +/-20 mA, 4 to 20 mA	0.7 %; at +/-20 mA, 4 to 20 mA	0.7 %; at +/-20 mA, 4 to 20 mA	0.15 %; +/-20 mA, 0 to 20 mA, 4 to 20 mA

Analog modules

SM 431 analog input module

Article number	6ES7431-0HH00-0AB0	6ES7431-	1KF20-0AB0	6ES7431-1KF00-0	AB0	6ES7431-1KF10-0AB0
	SM431, 16AE, +/-10V, +/-20MA, 4-20MA	SM431, 8, 0,416MS	AE, U/I/R, 14BIT, ZYKL	SM431, 8AE, U/I/R,	13BIT	SM431, 8AE, U/I/R, 14BIT
 Resistance, relative to input area, (+/-) Resistance thermometer, relative to input area, (+/-) 			o 600 ohms	0.8 %; 0 to 500 ohr (4-conductor meas in range of 600 ohr	urement,	0.15 %; +/-0.15 % at 0 to 48 ohms (4-conductor measuremen 0 to 150 ohms (4-conductor measuremen 0 to 300 ohms (4-conductor measuremen 0 to 5000 ohms (4-conductor measuremen in range of 6000 ohms); +/-0.3 % at 0 to 300 ohms (3-conductor measuremen 0 to 5000 ohms (3-conductor measuremen 0 to 5000 ohms (3-conductor measuremen 0 to 5000 ohms (3-conductor measuremen in range of 6000 ohms) (3-conductor measuremen in range of 6000 ohms) 0.3 %
Galvanic isolation						
Galvanic isolation analog inputs						
Galvanic isolation analog inputs	No	Yes: interr	nal / external	Yes; internal / exter	nal	Yes; internal / external
between the channels	No	No		No		No
Permissible potential difference						
between the inputs (UCM)	2 V DC / 2 Vpp AC	8 V AC		30 V AC		120 V AC
Isolation						
	local ground	local grou 707 V DC part and L 2120 V D0 part and L	between bus and nd; between analog _+/M; C between analog ocal ground; C between L+/M	analog part; 500 V DC between local ground; 2120 V DC betwee part and local grou	n analog	L+/M; 2120 V DC between bus a analog part; 500 V DC between bus ar local ground; 707 V DC between analog part and L+/M; 2120 V DC between analog part and local ground; 2120 V DC between L+/M and local ground
Dimensions						
Width	25 mm	25 mm		25 mm		25 mm
Height	290 mm	290 mm		290 mm		290 mm
Depth	210 mm	210 mm		210 mm		210 mm
Weights Weight, approx.	500 g	500 g		500 g		500 g
Article number	6ES7431-7QH00-0AB0 SM 431, 16AE, U/I/R/PT100,		6ES7431-7KF00-0/ SM 431, 8AI, U/I/TH			-7KF10-0AB0 8AI, RESIST./PT100, 16BIT
Product type designation						
Supply voltage						
Load voltage L+						
Rated value (DC)	24 V; Only required for suppl 2-wire transmitters	lying				
Reverse polarity protection	Yes					
Input current			100 1			
from load voltage L+ (without load), max.	400 mA; for 16 connected, fu controlled 2-wire transmitters		400 mA		400 mA	
from backplane bus 5 V DC, max.	700 mA		1 200 mA		650 mA	
Power losses						
Power loss, typ.	4.5 W		4.6 W		3.3 W	
Hardware configuration						
Slots						
 Required slots 	1		1		1	

Analog modules

SM 431 analog input module

Technical specifications (continued)

Article number	6ES7431-7QH00-0AB0	6ES7431-7KF00-0AB0	6ES7431-7KF10-0AB0
	SM 431, 16AE, U/I/R/PT100, 16BIT	SM 431, 8AI, U/I/THERMO, 16BIT	SM 431, 8AI, RESIST./PT100, 16BIT
Analog inputs			
Number of analog inputs	16	8	8
 For voltage/current measurement 	16	8	
 For resistance measurement 	8		8
permissible input voltage for voltage input (destruction limit), max.	18 V; 18 V continuous, 75 V for 1 ms (mark to space ratio 1:20)	35 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)	35 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)
permissible input current for current nput (destruction limit), max.	40 mA	32 mA	
nput ranges (rated values), oltages			
1 V to 5 V	Yes	Yes	
-1 V to +1 V	Yes	Yes	
• -10 V to +10 V	Yes	Yes	
• -100 mV to +100 mV		Yes	
• -2.5 V to +2.5 V	Yes	Yes	
• -20 mV to +20 mV		Yes	
• -25 mV to +25 mV	Yes	100	
• -250 mV to +250 mV	Yes	Yes	
• -5 V to +5 V	Yes	Yes	
• -50 mV to +50 mV	Yes	Yes	
• -500 mV to +500 mV	Yes	Yes	
• -80 mV to +80 mV	Yes	Yes	
		165	
nput ranges (rated values), currents • 0 to 20 mA	Yes	Yes	
• -10 mA to +10 mA	Yes	Yes	
-20 mA to +20 mA	Yes	Yes	
	les		
• -3.2 mA to +3.2 mA	Vaa	Yes	
• 4 mA to 20 mA	Yes	Yes	
• -5 mA to +5 mA	Yes	Yes	
nput ranges (rated values), hermoelements			
• Туре В	Yes	Yes	
• Туре Е	Yes	Yes	
• Type J	Yes	Yes	
• Туре К	Yes	Yes	
• Type L	Yes	Yes	
• Type N	Yes	Yes	
• Type R	Yes	Yes	
• Type S	Yes	Yes	
• Type T	Yes	Yes	
• Type U	Yes	Yes	
nput ranges (rated values), esistance thermometer			
 Ni 100 	Yes		Yes
• Ni 1000	Yes		Yes; Different characteristics selectable: Europe/U.S.
• Pt 100	Yes		Yes
• Pt 1000	Yes		Yes
• Pt 200	Yes		Yes
• Pt 500	Yes		Yes

Analog modules

SM 431 analog input module

Article number	6ES7431-7QH00-0AB0	6ES7431-7KF00-0AB0	6ES7431-7KF10-0AB0	
	SM 431, 16AE, U/I/R/PT100, 16BIT	SM 431, 8AI, U/I/THERMO, 16BIT	SM 431, 8AI, RESIST./PT100, 16BIT	
Input ranges (rated values), resistors				
• 0 to 150 ohms	Yes			
• 0 to 300 ohms	Yes			
• 0 to 48 ohms	Yes			
• 0 to 600 ohms	Yes			
• 0 to 6000 ohms	Yes; Usable up to 5000 ohms			
Thermocouple (TC)				
Temperature compensation				
 internal temperature compensation 		Yes		
 external temperature compen- sation with compensations socket 	Yes	Yes		
 external temperature compensation with Pt100 	Yes			
- dynamic reference temperature value	Yes	Yes		
Characteristic linearization				
Parameterizable	Yes	Yes	Yes	
- for thermocouples	Type B, E, J, K, L, N, R, S, T, U	Туре В, Е, Ј, К, L, N, R, S, T, U		
- for resistance thermometer	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000		Pt100, Pt200, Pt500, Pt1000, Ni10 Ni1000; different characteristics selectable (Europe/U.S.)	
Cable length				
• shielded, max.	200 m; 50 m with thermocouples and input ranges <= 80 mV	200 m	200 m; 50 m with thermocouples a input ranges +/-80 mV	
Analog value creation				
Integration and conversion time/ resolution per channel				
 Resolution with overrange (bit including sign), max. 	16 bit; 16 / 16 / 16	16 bit	16 bit	
 Integration time, parameterizable 	Yes	Yes	Yes	
 Basic conversion time (ms) 	6 / 20,1 / 23,5 ms	10 / 16,7 / 20 / 100	8 / 23 / 25 ms	
Integration time (ms)	2,5 / 16,7 / 20 ms	2,5 / 16,7 / 20 / 100	20 ms at 50 Hz (entire module incl. wire break)	
Basic conversion time, including integration time (ms)	40/40/40		110	
 additional conversion time for wire break monitoring additional conversion time 	4.3 / 4.3 / 4.3 ms 12 / 40,2 / 47 ms		110 ms / 4 ms	
 additional conversion time for resistance measurement additional conversion time for wire 		1 ms (module)	none	
break monitoring and resistance measurement	-,			
Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 Hz		none/ 60 / 50 Hz	
Encoder				
Connection of signal encoders				
 for current measurement as 2-wire transducer 	Yes			
 for current measurement as 4-wire transducer 	Yes	Yes		
• for resistance measurement with two-wire connection	Yes; Line resistances are also measured			
• for resistance measurement with three-wire connection	Yes		Yes	
 for resistance measurement with four-wire connection 	Yes	Yes	Yes	

Analog modules

SM 431 analog input module

Technical specifications (continued)

	/			
Article number	6ES7431-7QH00-0AB0 SM 431, 16AE, U/I/R/PT100, 16BIT	6ES7431-7KF00-0AB0 SM 431, 8AI, U/I/THERMO, 16BIT	6ES7431-7KF10-0AB0 SM 431, 8AI, RESIST./PT100, 16BIT	
Errors/accuracies				
Operational limit in overall temperature range				
Voltage, relative to input area, (+/-)	0.3 %; +/-0.3 % at +/-250 mV, +/-500 mV, +/-1 V, +/-2.5 V, +/-5 V, 1 to 5 V, +/- 10 V; +/-0.31 % at +/-80 mV; +/-0.32 % at +/-50 mV; +/-0.35 % at +/-25 mV;	0.3 %		
• Current, relative to input area, (+/-)	0.3 %; at 0 to 20 mA, +/-5 mA, +/-10 mA, +/- 20 mA, 4 to 20 mA	0.5 %		
• Resistance, relative to input area, (+/-)	0.3 %; +/-0.3 % at 0 to 48 Ohm (4-conductor measurement), 0 to 150 Ohm (4-conductor measurement), 0 to 300 Ohm (4-conductor measurement), 0 to 600 Ohm (4-conductor measurement), 0 to 5000 Ohm (4-conductor measurement, in range of 6000 Ohm); +/-0.4 % at 0 to 300 Ohm (3-conductor measurement), 0 to 600 Ohm (3-conductor measurement), 0 to 5000 Ohm (3-conductor measurement), 0 to 5000 Ohm (3-conductor measurement, in range of 6000 Ohm);			
Resistance thermometer, relative to input area, (+/-)	0.4 %		+/-1 °C	
Basic error limit (operational limit at 25 °C)				
Voltage, relative to input area, (+/-)	0.15 %; +/-0.15 % at +/-250 mV, +/-500 mV, +/-1 V, +/-2.5 V, +/-5 V, 1 to 5 V, +/-10 V; +/-0.17 % at +/-80 mV; +/-0.19 % at +/-25 mV;	0.1 %		
• Current, relative to input area, (+/-)	0.15 %; at 0 to 20 mA, +/-5 mA, +/-10 mA, +/- 20 mA, 4 to 20 mA	0.17 %		
 Resistance, relative to input area, (+/-) Resistance thermometer, relative to 	0.15 %; +/-0.15 % at 0 to 48 ohms (4-conductor measurement), 0 to 150 ohms (4-conductor measurement), 0 to 300 ohms (4-conductor measurement), 0 to 5000 ohms (4-conductor measurement, in range of 6000 ohms); +/-0.3 % at 0 to 300 ohms (3-conductor measurement), 0 to 600 ohms (3-conductor measurement), 0 to 5000 ohms (3-conductor measurement), 0 to 5000 ohms		+/-0,2 °C	
input area, (+/-)	0.3 %		+/-0,2 °C	
Interrupts/diagnostics/ status information				
Alarms				
Diagnostic alarm	Yes; Parameterizable	Yes; Parameterizable	Yes; Parameterizable	
Limit value alarm	Yes; Parameterizable	Yes	Yes	
Diagnostic messages				
Diagnostics	Yes; Parameterizable	Yes	Yes	
Galvanic isolation				
Galvanic isolation analog inputs				
Galvanic isolation analog inputs	Yes; internal / external	Yes; internal / external	Yes; internal / external	
 Galvanic isolation analog inputs between the channels 	No	Yes	No	
Permissible potential difference		100		
•	120 V AC	120 V AC	2020	
between the inputs (UCM)	IZU V AU	IZU V AU	none	

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Analog modules

SM 431 analog input module

Article number	6ES7431-7QH00-0AB0	6ES7431-7KF00-0AB0	6ES7431-7KF10-0AB0
	SM 431, 16AE, U/I/R/PT100, 16BIT	SM 431, 8AI, U/I/THERMO, 16BIT	SM 431, 8AI, RESIST./PT100, 16BIT
Isolation			
Isolation checked with	2120 V DC between bus and L+/M; 2120 V DC between bus and analog part; 500 V DC between bus and local ground; 707 V DC between analog part and L+/M; 2120 V DC between analog part and local ground; 2120 V DC between L+/M and local ground	1500 V DC	1500 V DC
Dimensions			
Width	25 mm	25 mm	25 mm
Height	290 mm	290 mm	290 mm
Depth	210 mm	210 mm	210 mm
Weights			
Weight, approx.	500 g	650 g	650 g

Ordering data Article No. Article No. SM 431 analog output modules Cover film for labeling strips 6ES7492-2XX00-0AA0 16 inputs, non-isolated, 13 bit 6ES7431-0HH00-0AB0 Spare part 8 inputs, isolated, 13 bit 6ES7431-1KF00-0AB0 Labeling sheets for machine inscription 6ES7431-1KF10-0AB0 8 inputs, isolated, 14 bit, with linearization DIN A4, for printing using laser printer; pack of 10 8 inputs, isolated, 14 bit 6ES7431-1KF20-0AB0 petrol 6ES7492-2AX00-0AA0 16 inputs, isolated, 16 bit, 6ES7431-7QH00-0AB0 6ES7492-2BX00-0AA0 process interrupt capability light-beige 8 inputs, isolated, 16 bit, 6ES7431-7KF00-0AB0 vellow 6ES7492-2CX00-0AA0 process interrupt capability, 6ES7492-2DX00-0AA0 red for thermocouples (I, U) SIMATIC Manual Collection 6ES7998-8XC01-8YE0 8 inputs, isolated, 16 bit, process interrupt capability, for thermal resistors 6ES7431-7KF10-0AB0 Electronic manuals on DVD, Multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, Front connector 48-pin SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based • with screw contacts, 1 unit 6ES7492-1AL00-0AA0 • with screw contacts, 84 units 6ES7492-1AL00-1AB0 Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC 6ES7492-1BL00-0AA0 • with spring-loaded terminals, 1 unit • with crimp contacts, 1 unit 6ES7492-1CL00-0AA0 SIMATIC Manual Collection 6ES7998-8XC01-8YE2 6ES7492-1CL00-1AB0 • with crimp contacts, 84 units update service for 1 year 1 unit; for 6ES7431-7KF00-0AB0; 6ES7431-7KF00-6AA0 Current "Manual Collection" DVD spare part, included in scope of and the three subsequent updates delivery Measuring range module for analog inputs 6ES7974-0AA00-0AA0 1 module for 2 inputs (spare part)

Analog modules

Overview



- Analog outputs for the SIMATIC S7-400
- For the connection of analog actuators

Article number	6ES7432-1HF00-0AB0
	SM 432, 8AO, U/I, 13BIT
Product type designation	
Supply voltage	
Load voltage L+	
 Rated value (DC) 	24 V
Input current	
from backplane bus 5 V DC, max.	150 mA
from supply voltage L+, max.	400 mA
Power losses	
Power loss, max.	9 W
Hardware configuration	
Slots	
Required slots	1
Analog outputs	
Number of analog outputs	8
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	30 mA
Current output, no-load voltage, max.	19 V
Output ranges, voltage	
• 0 to 10 V	Yes
• 1 V to 5 V	Yes
• -10 V to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes

Article number	6ES7432-1HF00-0AB0	
	SM 432, 8AO, U/I, 13BIT	
Load impedance (in rated range of output)		
 with voltage outputs, min. 	1 kΩ	
 with voltage outputs, capacitive load, max. 	1 µF	
• with current outputs, max.	500 $\Omega;$ 600 ohms if common-mode-voltage reduced to <1 V	
Cable length		
• shielded, max.	200 m	
Analog value creation		
Integration and conversion time/ resolution per channel		
 Resolution with overrange (bit including sign), max. 	13 bit	
Conversion time (per channel)	420 $\mu s;$ 420 μs in the ranges 1 to 5 V and 4 to 20 mA; 300 μs in all ranges	
Settling time		
 for resistive load 	0.1 ms	
 for capacitive load 	3.5 ms	
for inductive load	0.5 ms	
Errors/accuracies		
Operational limit in overall temperature range		
Voltage, relative to output area, (+/-)	0.5 %; +/-10 V, 0 to 10 V, 1 to 5 V	
Current, relative to output area, (+/-)	1 %; +/-20 mA, 4 to 20 mV	
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to output area, (+/-)	0.5 %; +/-10 V, 0 to 10 V, 1 to 5 V	
• Current, relative to output area, (+/-)	0.5 %; +/-20 mA, 0 to 20 mA	
Interrupts/diagnostics/ status information		
Substitute values connectable	No	
Galvanic isolation		
Galvanic isolation analog outputs		
 between the channels and the backplane bus 	Yes	
Isolation		
Isolation checked with	2120 V DC between bus and L+/M; 2120 V DC between bus and analog part; 500 V DC between bus and local ground; 707 V DC between analog part and L+/M; 2120 V DC between analog part and local ground; 2120 V DC between L+/M and local ground	
Dimensions		
Width	25 mm	
Height	290 mm	
Depth	210 mm	
Weights		
Weight, approx.	650 g	

Analog modules

SM 432 analog output module

Ordering data	Article No.		Article No.
SM 432 analog output module	6ES7432-1HF00-0AB0	SIMATIC Manual Collection	6ES7998-8XC01-8YE0
8 outputs, isolated, 13 bit		Electronic manuals on DVD,	
Front connector		multilingual: LOGO!, SIMADYN, SIMATIC bus components,	
 48-pin with screw contacts, 1 unit with screw contacts, 84 units with spring-loaded terminals, 1 unit 	6ES7492-1AL00-0AA0 6ES7492-1AL00-1AB0 6ES7492-1BL00-0AA0	SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7,	
 with crimp contacts, 1 unit 	6ES7492-1CL00-0AA0	SIMATIC Software, SIMATIC TDC	
 with crimp contacts, 84 units 	6ES7492-1CL00-1AB0	SIMATIC Manual Collection	6ES7998-8XC01-8YE2
Cover film for labeling strips	6ES7492-2XX00-0AA0	update service for 1 year	
Spare part		Current "Manual Collection" DVD and the three subsequent updates	
Labeling sheets for machine inscription		and the three subsequent updates	
DIN A4, for printing using laser printer; pack of 10			
petrol	6ES7492-2AX00-0AA0		
light-beige	6ES7492-2BX00-0AA0		
yellow	6ES7492-2CX00-0AA0		
red	6ES7492-2DX00-0AA0		

SIPLUS S7-400 analog modules

SIPLUS S7-400 SM 431 analog input modules

Overview



- Analog inputs for SIMATIC S7-400
- For connecting voltage sensors and current sensors, thermocouples, resistors and resistance thermometers
- Resolution 13 to 16 bit

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Technical specifications

Article number	6AG1431-0HH00-4AB0	
Based on	6ES7431-0HH00-0AB0	
	SIPLUS S7-400 SM431 16AI	
Ambient conditions		
Extended ambient conditions		
 Relative to ambient temperature- atmospheric pressure-installation altitude 	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)	
Relative humidity	· · · ·	
 With condensation, tested in accordance with IEC 60068-2-38, max. 	100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under conden- sation conditions)	
Resistance		
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and d rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	
 against chemically active substances / conformity with EN 60721-3-3 	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation	
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers mu remain on the unused interfaces during operation!	
Ordering data	Article No.	
_	AI IICIE NO.	
SIPLUS S7-400 SM 431 analog input module		

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Exposure to media

See SIMATIC S7-400 analog input modules, page 1/65

6AG1431-0HH00-4AB0
SIPLUS S7-400 analog modules

SIPLUS S7-400 SM 432 analog output modules

	Technical specifications	
	Article number	6AG1432-1HF00-4AB0
	Based on	6ES7432-1HF00-4AB0
		SIPLUS_SM432_8AA
	Ambient conditions	
	Extended ambient conditions	
	 Relative to ambient temperature- atmospheric pressure-installation altitude 	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)
	Relative humidity	
	 With condensation, tested in accordance with IEC 60068-2-38, max. 	100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under conden- sation conditions)
	Resistance	
	 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dr rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
ec- 1	 against chemically active substances / conformity with EN 60721-3-3 	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
	 against mechanically active substances / conformity with EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers mus remain on the unused interfaces during operation!
	Ordering data	Article No.
	SIPLUS S7-400 SM 432 analog output module	
	8 outputs, floating, 13 bit	
	Exposure to media	6AG1432-1HF00-4AB0
	Accessories	See SIMATIC S7-400 analog output modules, page 1/67

Overview



- Analog outputs for SIMATIC S7-400
- For connection of analog actuators

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Function modules

FM 450-1 counter module

Overview



Technical specifications

Article number	6ES7450-1AP01-0AE0
	FM 450-1, COUNTER MODULE, 2 CHANNELS
Product type designation	
Supply voltage	
Load voltage 1L+	
Reverse polarity protection	Yes
Load voltage 2L+	
 Reverse polarity protection 	Yes
Aux. voltage 1L+, load voltage 2L+	
 Rated value (DC) 	24 V
• permissible range, lower limit (DC)	20.4 V; Dynamic 18.5 V
• permissible range, upper limit (DC)	28.8 V; dynamic 30.2 V
non-periodic skip	
- Duration	500 ms
- Recovery time	50 s
- Value	35 V
Input current	
from load voltage 1L+ (without load), max.	50 mA
from load voltage 2L+ (without load), max.	60 µA
from backplane bus 5 V DC, max.	300 mA
Encoder supply	
5 V encoder supply	
• 5 V	Yes; 5.2 V +/-2 %
 short-circuit protection 	Yes
 Output current, max. 	300 mA
24 V encoder supply	
• 24 V	Yes; 1L+ (-3 V)
 short-circuit protection 	Yes
 Output current, max. 	300 mA
Power losses	
Power loss, typ.	6 W

- Two-channel intelligent counter module for simple counting tasks
- For direct connection of incremental encoders
- Comparison function with 2 specifiable comparison values
- Integrated digital outputs for outputting the response when the comparison values are reached

Note

SIMODRIVE Sensor/Motion Connect 500 feature incremental encoders and preassembled connecting cables for counting and positioning functions.

www.siemens.com/simatic-technology

Article number	6ES7450-1AP01-0AE0 FM 450-1, COUNTER MODULE, 2 CHANNELS
Digital inputs	
Number of digital inputs	6
Functions	1 for gate start, 1 for gate stop, 1 for setting the counter
Input voltage	
• for signal "0"	-28.8 +5V
• for signal "1"	+11 to +28.8V
Input current	
• for signal "1", typ.	9 mA
Input delay (for rated value of input voltage)	
 Input frequency (with a time delay of 0.1 ms), max. 	200 kHz
for standard inputs	
- Parameterizable	Yes
- at "0" to "1", max.	2.5 μs; >= 2.5 μs (200 kHz); <= 25 μs (20 kHz)
Digital outputs	
Number of digital outputs	4
short-circuit protection	Yes; Clocked electronically
Limitation of inductive shutdown voltage to	2L+ (-39 V)
Output voltage	
• for signal "0", max.	3 V
 for signal "1", min. 	2L+ (-1,5 V)
Output current	
 for signal "1" rated value 	0.5 A; Res. / P.D. 5 W tungsten 24 V DC
 for signal "1" permissible range for 0 to 60 °C, min. 	5 mA
 for signal "1" permissible range for 0 to 60 °C, max. 	0.6 A
Output delay with resistive load	
• "0" to "1", max.	300 µs

Function modules

FM 450-1	aguntar	modulo
FIVI 430-1	Counter	illouule

Article number	6ES7450-1AP01-0AE0
	FM 450-1, COUNTER MODULE, 2 CHANNELS
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes; With 2 pulse trains offset by
• Incremental encoder (asymmetrical)	Yes
24 V initiator	Yes
 24 V directional element 	Yes; 1 pulse train, 1 direction leve
Counter	
Number of counter inputs	2; 32 bit or +/-31 bit
Counter input 5 V	
• Туре	RS 422
 Terminating resistor 	220 Ω
 Differential input voltage 	min. 0.5 V
 Counting frequency, max. 	500 kHz
Counter input 24 V	
 Input voltage, for signal "0" 	-30 to +5V
 Input voltage, for signal "1" 	+11 to +30V
 Input current, for signal "1", typ. 	9 mA
Counting frequency, max.	200 kHz
Minimum pulse width	>= 2.5 µs (200 kHz);
· · · · · · · · · · · · · · · · · · ·	>= 25 µs (20 kHz) (parameteriza
Parameter	
Remark	Assigned binary addresses: 64 bytes / 64 bytes
Galvanic isolation	
Galvanic isolation digital inputs	
 between the channels and the backplane bus 	Yes; Optocoupler
Galvanic isolation digital outputs	
 between the channels and the backplane bus 	Yes; Optocoupler
Galvanic isolation counter	
 between the channels and the backplane bus 	Yes; Optocoupler
Permissible potential difference	
between different circuits	75V DC/60V AC
Isolation	
Isolation checked with	500 V
Connection method	
required front connector	1x 48-pin
Dimensions	
Width	25 mm
Height	290 mm
Depth	210 mm
Weights	

650 g

Weight, approx.

 Ordering data
 Article No.

 FM 450-1 counter module with 2 channels, max. 500 kHz;
 6ES7450-1AP01-0AE0

for incremental encoder	
Front connectors	
48-pin	
 with screw contacts, 1 item 	6ES7492-1AL00-0AA0
 with screw contacts, 84 items 	6ES7492-1AL00-1AB0
 with spring-loaded terminals, 1 item 	6ES7492-1BL00-0AA0
 with crimp contacts, 1 item 	6ES7492-1CL00-0AA0
 with crimp contacts, 84 items 	6ES7492-1CL00-1AB0
Front covers for CPU and function modules	6ES7492-1XL00-0AA0
Spare part	

Function modules

Overview



- Three-channel positioning module for rapid/slow-action drives
- 4 digital outputs per channel for motor control
- Displacement measurement incremental or synchronousserial

Note

Displacement measuring systems and precut/preassembled cables for counting and positioning functions are available under SIMODRIVE Sensor or Motion Connect 500.

www.siemens.com/simatic-technology

Article number	6ES7451-3AL00-0AE0
	FM 451 positioning module
Product type designation	
Supply voltage	
Rated value (DC)	
• 24 V DC	Yes
Input current	
Current consumption, max.	550 mA
Encoder supply	
5 V encoder supply	
• 5 V	Yes
 Output current, max. 	210 mA
 Cable length, max. 	35 m; at max. 210 mA
24 V encoder supply	
• 24 V	Yes
 Output current, max. 	300 mA
 Cable length, max. 	100 m; at max. 300 mA
Absolute encoder (SSI) encoder supply	
 Absolute encoder (SSI) 	Yes
 Type of output voltage 	24 V DC
 Output current, max. 	300 mA
 Cable length, max. 	300 m; At max. 156 kbit/s
Digital inputs	
Number of digital inputs	12; 4 per axis
Functions	Reference cams, reversing cams, flying actual value setting, start/stop positioning
Input voltage	
 Rated value (DC) 	24 V
• for signal "0"	-3 to +5V
 for signal "1" 	+11 to +30V
Input current	
 for signal "1", typ. 	6 mA
for 2-wire sensor	
- for signal "1", typ.	30 mA

Article number	6ES7451-3AL00-0AE0		
Digital outputs	FM 451 positioning module		
Number of digital outputs	12; 4 per axis		
Functions	Rapid traverse, creep, run right,		
	run left		
short-circuit protection	Yes		
Output voltage			
• for signal "1", min.	UP - 3 V		
Output current			
 for signal "1" permissible range for 0 to 55 °C, max. 	600 mA; with UPmax		
• for signal "0" residual current, max.	0.5 mA		
Encoder			
Connectable encoders			
 Incremental encoder (symmetrical) 	Yes		
 Incremental encoder (asymmetrical) 	Yes		
Absolute encoder (SSI)	Yes		
Encoder signals, incremental encoder (symmetrical)			
 Trace mark signals 	A, notA, B, notB		
 Zero mark signal 	N, notN		
 Input signal 	5 V difference signal (phys. RS 422)		
 Input frequency, max. 	1 MHz		
Encoder signals, incremental encoder (asymmetrical)			
 Trace mark signals 	А, В		
 Zero mark signal 	Ν		
 Input voltage 	24 V		
 Input frequency, max. 	50 kHz; for 25 m cable length, 25 kHz for 100 m cable length		
 Cable length, shielded, max. 	100 m		
Encoder signals, absolute encoder (SSI)			
 Input signal 	5 V difference signal (phys. RS 422)		
• Data signal	DATA, notDATA		
Clock signal	CL, notCL		
 Message frame length, parameterizable 	13 or 25 bit serial		
 Clock frequency, max. 	1.25 MHz		
Gray code	1		
 Cable length, shielded, max. 	300 m; At max. 156 kbit/s		

Function modules

FM 451 positioning module	
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Technical specifications (con	Ordering data	Ordering data Article No.				
Article number	6ES7451-3AL00-0AE0	Signal cable				
	FM 451 positioning module	Pre-assembled for SSI absolute	6FX50	2-2CC11		į,
Galvanic isolation		encoder, UL/DESINA				
Galvanic isolation digital inputs		Pre-assembled for TTL encoder	6FX50	2-2CD01		t I
 Galvanic isolation digital inputs 	Yes	6FX2001-1, UL/DESINA				
Galvanic isolation digital outputs		Pre-assembled for TTL encoder 24 V,	6FX50	2-2CD24		11
 Galvanic isolation digital outputs 	Yes	UL/DESINA				
Degree and class of protection						
Degree of protection to EN 60529		Not crimped		0		
• IP20	Yes	Module end crimped, connector case		1		
Ambient conditions		supplied				
Ambient temperature in operation		Motor end crimped, connector case		4		
• Min.	0 °C	supplied				
• max.	55 °C	0 m			1	
Storage/transport temperature		100 m			2	
• Min.	-40 °C	200 m			3	
• max.	70 °C	0 m			A	
Relative humidity		10 m			в	
Humidity class F	Yes					
Connection method		20 m			С	
required front connector	1x 48-pin	30 m			D	
Dimensions		40 m			E	
Width	50 mm	50 m			F	
Height	290 mm	60 m			G	
Depth	210 mm	70 m			н	
Weights						
Weight, approx.	1 300 g	80 m			J	
		90 m			к	
Ordering data	Article No.	0 m			1	A
	AITICIE NO.	1 m			I	в
FM 451 positioning module	6ES7451-3AL00-0AE0	2 m			(С
for rapid traverse and creep speed		3 m				D
drives		4 m				Е
Front connector		5 m				F
48-pin						
• with screw contacts, 1 item	6ES7492-1AL00-0AA0	6 m				G
 with screw contacts, 84 items 	6ES7492-1AL00-1AB0	7 m			I	н
 with spring-loaded terminals, 1 item 	6ES7492-1BL00-0AA0	8 m				J
with crimp contacts, 1 item	6ES7492-1CL00-0AA0	0 m			I	к
with crimp contacts, 84 items	6ES7492-1CL00-1AB0	0.0 m				
Front covers for CPU	6ES7492-1XL00-0AA0	0.1 m				
and function modules						
Spare part		0.2 m				
		0.3 m				1
		0.4 m				1
		0.5 m				
		0.6 m				
		0.7 m				
		0.8 m				1

Function modules

Overview



- Very high speed electronic cam controller
- Low-cost alternative to mechanical cam controllers
- 32 cam tracks, 16 onboard digital outputs for direct output of actions
- Incremental or synchronous-serial position feedback

Note:

We offer position measuring systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensor or Motion Connect 500.

www.siemens.com/simatic-technology

Article number	6ES7452-1AH00-0AE0
	FM 452 electronic cam controller
Product type designation	
Supply voltage	
Rated value (DC)	
• 24 V DC	Yes
Input current	
Current consumption, max.	500 mA
Encoder supply	
5 V encoder supply	
• 5 V	Yes
 Output current, max. 	300 mA
 Cable length, max. 	32 m
24 V encoder supply	
• 24 V	Yes
 Output current, max. 	300 mA
 Cable length, max. 	100 m
Digital inputs	
Number of digital inputs	11
Functions	Reference point switch, flying actual value setting/length measurement, brake release, enable track output nos. 3 to 10

Article number	6ES7452-1AH00-0AE0
	FM 452 electronic cam controller
Input voltage	
Rated value (DC)	24 V
• for signal "0"	-28.8 +5V
• for signal "1"	+11 to +28.8V
Input current	
 for signal "0", max. (permissible quiescent current) 	2 mA
for 2-wire sensor	
- for signal "1", typ.	9 mA
Digital outputs	
Number of digital outputs	16
Functions	Cam track
short-circuit protection	Yes
Output voltage	
Rated value (DC)	24 V
• for signal "1", min.	UP - 0.8 V
Output current	
 for signal "1" permissible range for 0 to 55 °C, max. 	600 mA; with UPmax
• for signal "0" residual current, max.	0.5 mA
Encoder	
Connectable encoders	
Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
 Absolute encoder (SSI) 	Yes
2-wire sensor	Yes
Encoder signals, incremental encoder (symmetrical)	
 Trace mark signals 	A, notA, B, notB
 Zero mark signal 	N, notN
 Input signal 	5 V difference signal (phys. RS 422
 Input frequency, max. 	1 MHz
Encoder signals, incremental encoder (asymmetrical)	
Trace mark signals	А, В
Zero mark signal	N
Input voltage	24 V
Input voltage Input frequency, max.	50 kHz;
lere edite (X) en	50 kHz for 25 m cable length; 25 kHz for 100 m cable length
Encoder signals, absolute encoder (SSI)	
Input signal	5 V difference signal (phys. RS 422
• Data signal	DATA, notDATA
 Clock signal 	CL, notCL
Message frame length, parameterizable	13 or 25 bit serial
 Clock frequency, max. 	1 MHz
Gray code	1
Cable length, shielded, max.	300 m; at max. 125 kHz
Galvanic isolation	
Galvanic isolation digital inputs	
Galvanic isolation digital inputs	No
Galvanic isolation digital outputs	
Galvanic isolation digital outputs	No
Degree and class of protection	
Degree of protection to EN 60529	×
• IP20	Yes

Function modules

FM 452 cam controller

Article number	6ES7452-1AH00-0AE0
	FM 452 electronic cam controller
Ambient conditions	
Ambient temperature in operation	
• Min.	0°0
• max.	55 °C
Storage/transport temperature	
• Min.	-40 °C
• max.	70 °C
Relative humidity	
 Humidity class F 	Yes
Connection method	
required front connector	1x 48-pin
Dimensions	
Width	25 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	650 g

Ordering data	Article No.
FM 452 electronic cam controller	6ES7452-1AH00-0AE0
Front covers for CPU and function modules	6ES7492-1XL00-0AA0
Spare part	
Front connector	
 48-pin with screw contacts, 1 item with screw contacts, 84 items with spring-loaded terminals, 1 item with crimp contacts, 1 item with crimp contacts, 84 items 	6ES7492-1AL00-0AA0 6ES7492-1AL00-1AB0 6ES7492-1BL00-0AA0 6ES7492-1CL00-0AA0 6ES7492-1CL00-1AB0
Signal cable Pre-assembled for HTL and TTL encoder, without Sub-D connector, UL/DESINA	6FX5002-2CA12-
Pre-assembled for SSI absolute encoder 6FX2001-5, without Sub-D connector, UL/DESINA	6FX5002-2CC12-
Length code	see FM 451, page 1/73

Function modules

Overview



- Positioning module for servo and/or stepper motors in machines with high clock-pulse rates
- Can be used for simple point-to-point positioning and for complex traversing profiles
- Up to 3 independent motors can be controlled

Note:

We offer position measuring systems and preassembled connecting cables for counting and positioning functions under SIMODRIVE Sensor or Motion Connect 500.

Further information can be found on the Internet at:

www.siemens.com/simatic-technology

Article number	6ES7453-3AH00-0AE0	
	FM 453 positioning module	
Product type designation		
Supply voltage		
Auxiliary voltage		
 Rated value (DC) 	24 V	
 dynamic range 	18.5 to 30.2 V	
static area	20.4 to 28.8V	
Input current		
from load voltage1L+, max.	1 A; with 24 V position encoder; 1 A for 5 V position encoder	
from load voltage 2L+ to 4L+, max.	2 A; Per channel	
from backplane bus 5 V DC, max.	1.6 A; Rated current	
Encoder supply		
5 V encoder supply		
• 5 V	Yes	
 Output current, max. 	300 mA	
Cable length, max.	35 m; at max. 210 mA; 25 m at max. 300 mA	
24 V encoder supply		
• 24 V	Yes	
 Cable length, max. 	100 m; at max. 300 mA	
Power losses		
Power loss, max.	8 W	
Digital inputs		
Number of digital inputs	6; for each channel / axis	
Functions	configurable	
Input voltage		
 Rated value (DC) 	24 V	
• for signal "0"	-3 to +5 V (max. 3 mA)	
 for signal "1" 	11 to 30 V (max. 7 mA)	
Input delay (for rated value of input voltage)		
for standard inputs		
- at "0" to "1", max.	15 μs; via input voltage range, 8 μs at 24 V DC	
- at "1" to "0", max.	45 µs; via input voltage range	

Article number	6ES7453-3AH00-0AE0
	FM 453 positioning module
Digital outputs	
Number of digital outputs	4; for each channel / axis
Functions	configurable
short-circuit protection	Yes
Output voltage	
 Rated value (DC) 	24 V
 for signal "1", min. 	UP - 0,3 V
Output current	
 for signal "1" rated value 	0.5 A; at 40 °C; 0.1 A at 60 °C
 for signal "1" permissible range for 0 to 40 °C, min. 	5 mA
 for signal "1" permissible range for 0 to 40 °C, max. 	0.6 A
 for signal "1" permissible range for 40 to 60 °C, min. 	5 mA
 for signal "1" permissible range for 40 to 60 °C, max. 	0.12 A
• for signal "0" residual current, max.	2 mA
Switching frequency	
 with resistive load, max. 	100 Hz
 with inductive load, max. 	0.25 Hz
Encoder	
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
 Absolute encoder (SSI) 	Yes
Encoder signals, incremental encoder (symmetrical)	
 Input signal 	5 V difference signal (phys. RS 422)
Input frequency, max.	1 MHz; for 10 m cable length; 0.5 MHz for 35 m cable length
Encoder signals, absolute encoder (SSI)	
 Input signal 	5 V difference signal (phys. RS 422)
Clock frequency, max.	1.25 Mbit/s at 10 cable length (2.5 Mbit/s available soon)
 Cable length, shielded, max. 	250 m; At max. 156 kbit/s

Function modules

FM 453 positioning module

Article number	6ES7453-3AH00-0AE0	ENA 47
	FM 453 positioning module	FM 45
Drive interface		with 3
Signal input I		Setpo
• Type	Drive interface step, signal input "READY 1"	for 3 s Lengt
Function	"Power section ready" where Ui < 1 V, Ii = 2mA	Front
Signal output I		48-pir
• Type	5 V (phys. RS 422)	• with
Function	Clock pulse, direction, enable, current control	 with with
 Differential output voltage, min. 	2 V; RL = 100 ohms	withwith
 Differential output voltage for signal "0", max. 	1.1 V; Io = 30 mA	Front and fu
 Differential output voltage, for signal "1", min. 	3.7 V; Io = -30 mA	Spare
 Load impedance 	55 Ω	Signa
 Pulse frequency 	200 kHz; 500 kHz available soon	Pre-as
Cable length, max.	35 m; 35 m with symm. transmission; 10 m with asymm. transmission	encoc Pre-as
Signal output II		6FX20
• Type	Contact relay	Pre-as
• Function	Drive disconnection for operation	UL/DE
• Load	1 A/50 V / 30 VA DC	Lengt
Signal output III		Leng
• Type	Analog output	
Function	Drive interface Servo: Setpoint output for drive	
Output current	-3 to +3 mA	
Cable length, max.	30 m	
Galvanic isolation		
Galvanic isolation digital inputs		
Galvanic isolation digital inputs	Yes; Optocoupler	
Galvanic isolation digital outputs		
Galvanic isolation digital outputs	Yes; Optocoupler	
Degree and class of protection		
Degree of protection to EN 60529		
• IP20	Yes	
Ambient conditions		
Ambient temperature in operation		
• Min.	0° 0	
• max.	55 °C	
Storage/transport temperature		
• Min.	-40 °C	
• max.	70 °C	
Relative humidity		
Humidity class F	No	
Connection method		
required front connector	1x 48-pin	
Dimensions		
Width	50 mm	
Height	290 mm	
Depth	210 mm	
Weights		

Ordering data	Article No.
FM 453 positioning module	6ES7453-3AH00-0AE0
with 3 channels/axes	
Setpoint connecting cable	
or 3 servo motors	6FX2002-3AD01-
Length code	See page 1/73
Front connector	
 48-pin with screw contacts, 1 item with screw contacts, 84 items with spring-loaded terminals, 1 item with crimp contacts, 1 item with crimp contacts, 84 items 	6ES7492-1AL00-0AA0 6ES7492-1AL00-1AB0 6ES7492-1BL00-0AA0 6ES7492-1CL00-0AA0 6ES7492-1CL00-1AB0
Front covers for CPU and function modules	6ES7492-1XL00-0AA0
Spare part	
Signal cable	
Pre-assembled for SSI absolute encoder, UL/DESINA	6FX50 2-2CC11-
Pre-assembled for TTL encoder SFX2001-1, UL/DESINA	6FX50 2-2CD01-
Pre-assembled for TTL encoder 24 V, JL/DESINA	6FX50 2-2CD24-
Length code	See page 1/73

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Function modules

Overview



16-channel closed-loop control module for universal control tasks

- Can be used for temperature, pressure and flow controls
- Convenient online self-optimization for temperature controls
- Predefined controller structures
- 2 control algorithms
- 2 versions:
 - FM 455 C as continuous controller
 FM 455 S as step or pulse controller
- With 16 analog outputs (FM 455 C) or 32 digital outputs
- With 16 analog outputs (FM 455 C) or 32 digital outputs (FM 455 S) for actuators

Article number	6ES7455-0VS00- 0AE0	6ES7455-1VS00- 0AE0
	FM 455 C controller module	FM 455 S controller module
Product type designation		
Supply voltage		
Load voltage L+		
 Rated value (DC) 	24 V	24 V
 permissible range, lower limit (DC) 	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Input current		
from load voltage L+ (without load), max.	440 mA; typ. 370 mA	400 mA; typ. 330 mA
Power losses		
Power loss, typ.	12 W	10.7 W
Power loss, max.	17.3 W	16.2 W
Digital inputs		
Number of digital inputs	16	16
Input characteristic curve in accordance with IEC 61131, type 2	Yes	Yes
Input voltage		
 Rated value (DC) 	24 V	24 V
 for signal "0" 	-3 to +5V	-3 to +5V
• for signal "1"	13 to 30V	13 to 30V
Input current		
 for signal "1", typ. 	7 mA	7 mA
Cable length		
 shielded, max. 	1 000 m	1 000 m
 Unshielded, max. 	600 m	600 m
Digital outputs		
Number of digital outputs		32
short-circuit protection		Yes; Electronic
Limitation of inductive shutdown voltage to		L+ (-1.5 V)
Controlling a digital input		Yes
Switching capacity of the outputs		
 on lamp load, max. 		5 W

Article number	6ES7455-0VS00- 0AE0	6ES7455-1VS00- 0AE0
	FM 455 C controller module	FM 455 S controller module
Load resistance range		
lower limit		240 Ω
• upper limit		4 kΩ
Output voltage		
• for signal "1", min.		L+ (-2.5 V)
Output current		
 for signal "1" rated value 		0.1 A
 for signal "1" permissible range for 0 to 60 °C, min. 		5 mA
 for signal "1" permissible range for 0 to 60 °C, max. 		150 mA
• for signal "0" residual current, max.		0.5 mA
Parallel switching of 2 outputs		
 for logic links 		Yes
Switching frequency		
 with resistive load, max. 		100 Hz
 with inductive load, max. 		0.5 Hz
 on lamp load, max. 		100 Hz
Cable length		
• shielded, max.		1 000 m
• Unshielded, max.		600 m
Analog inputs		
Number of analog inputs	16; With thermo- couples or 2-wire connection; 8 with Pt 100 or 4-wire connection	16; With thermo- couples or 2-wire connection; 8 with Pt 100 or 4-wire connection
permissible input voltage for voltage input (destruction limit), max.	20 V	20 V
permissible input current for current input (destruction limit), max.	40 mA	40 mA

Function modules

FM 455 controller module

Technical specifications (continued)

Article number	6ES7455-0VS00- 0AE0	6ES7455-1VS00- 0AE0
	FM 455 C controller module	FM 455 S
Input ranges (rated values),		controller module
voltages		
• 0 to +10 V	Yes	Yes
• -1.75 V to +11.75 V	Yes	Yes
• -80 mV to +80 mV	Yes	Yes
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes
• 0 to 23.5 mA	Yes	Yes
• -3.5 mA to +23.5 mA	Yes	Yes
• 4 mA to 20 mA	Yes	Yes
Input ranges (rated values), thermoelements		
• Туре В	Yes	Yes
• Type J	Yes	Yes
• Type K	Yes	Yes
• Type R	Yes	Yes
• Type S	Yes	Yes
Input ranges (rated values), resistance thermometer	103	103
Pt 100	Yes	Yes
Thermocouple (TC)	165	165
Temperature compensation		
	Yes;	Voc
- internal temperature compensation	Parameterizable	Yes; Parameterizable
 external temperature compensation with Pt100 	Yes; Parameterizable	Yes; Parameterizable
Characteristic linearization		
Parameterizable	Yes	Yes
- for thermocouples	Type B, J, K, R, S	Type B, J, K, R, S
- for resistance thermometer	Pt100 (standard)	Pt100 (standard)
Cable length	. ,	. ,
• shielded, max.	200 m; 50 m at 80 mV and thermocouples	200 m; 50 m at 80 mV and thermocouples
Analog outputs		
Number of analog outputs	16	
Voltage output, short-circuit protection	Yes	
Voltage output, short-circuit current, max.	25 mA	
Current output, no-load voltage, max.	18 V	
Output ranges, voltage		
• 0 to 10 V	Yes	
• -10 V to +10 V	Yes	
Output ranges, current		
• 0 to 20 mA	Yes	
 -20 mA to +20 mA 	Yes	
• 4 mA to 20 mA	Yes	
Connection of actuators		
 for voltage output two-wire connection 	Yes	
 for current output two-wire connection 	Yes	

Article number	6ES7455-0VS00- 0AE0	6ES7455-1VS00- 0AE0
	FM 455 C controller module	FM 455 S controller module
Load impedance (in rated range of output)		
 with voltage outputs, min. 	1 kΩ	
• with voltage outputs, capacitive load, max.	1 µF	
 with current outputs, max. 	500 Ω	
• with current outputs, inductive load, max.	1 mH	
Cable length		
shielded, max.	200 m; 50 m at 80 mV and thermocouples	
Analog value creation		
Measurement principle	integrating	integrating
Integration and conversion time/ resolution per channel		
Resolution with overrange (bit including sign), max.	14 bit; 12 or 14 bit, parameterizable	14 bit; 12 or 14 bit, parameterizable
Conversion time (per channel)	16.67 ms; for 12 bit: 16 2/3 ms for 60 Hz, 20 ms for 50 Hz; for 14 bit: 100 ms for 50 and 60 Hz	16.67 ms; for 12 bit: 16 2/3 ms for 60 Hz, 20 ms for 50 Hz; for 14 bit: 100 ms for 50 and 60 Hz
Settling time		
 for resistive load 	0.2 ms	0.1 ms
 for capacitive load 	3.3 ms	3.3 ms
 for inductive load 	0.5 ms	0.5 ms
Encoder		
Connection of signal encoders		
 for voltage measurement 	Yes	Yes
for current measurement as 4-wire transducer	Yes	Yes
Connectable encoders		
 2-wire sensor 	Yes	Yes
 Permissible quiescent current (2-wire sensor), max. 	1.5 mA	1.5 mA
Errors/accuracies		
Linearity error (relative to input range), (+/-)	0.05 %	0.05 %
Temperature error (relative to input range), (+/-)	0.005 %/K	0.005 %/K
Linearity error (relative to output range), (+/-)	0.05 %	
Temperature error (relative to output range), (+/-)	0.02 %/K	
Operational limit in overall temperature range		
 Voltage, relative to input area, (+/-) 	+/-0.6 to +/-1 %	+/-0.6 to +/-1 %
• Current, relative to input area, (+/-)	+/-0.6 to +/-1 %	+/-0.6 to +/-1 %
 Resistance thermometer, relative to input area, (+/-) 	+/-0.6 to +/-1 %	+/-0.6 to +/-1 %
• Voltage, relative to output area, (+/-)	0.5 %	
• Current, relative to output area, (+/-)		

SIMATIC S7-400 advanced controller

Function modules

FM 455 controller module

Technical specifications (continued)

Article number	6ES7455-0VS00- 0AE0	6ES7455-1VS00- 0AE0
	FM 455 C controller module	FM 455 S controller module
Basic error limit (operational limit at 25 °C)		
Voltage, relative to input area, (+/-)	+/-0.4 to +/-0.6 %	+/-0.4 to +/-0.6 %
• Current, relative to input area, (+/-)	+/-0.4 to +/-0.6 %	+/-0.4 to +/-0.6 %
 Resistance thermometer, relative to input area, (+/-) 	+/-0.4 to +/-0.6 %	+/-0.4 to +/-0.6 %
 Voltage, relative to output area, (+/-) 	0.4 %	
Current, relative to output area, (+/-)	0.5 %	
Interference voltage suppression for $f = n x (f1 +/- 1 \%)$, f1 = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB
 common mode voltage (USS < 2.5 V) , min. 	70 dB	70 dB
Interrupts/diagnostics/ status information		
Substitute values connectable	Yes; Parameterizable	Yes; Parameterizable
Control technology		
Number of closed-loop controllers	16; With thermo- couples or 2-wire connection; 8 with Pt 100 or 4-wire connection	16; With thermo- couples or 2-wire connection; 8 with Pt 100 or 4-wire connection
Galvanic isolation		
Galvanic isolation controller		
 between the channels 	No	No
 between the channels and the backplane bus 	Yes; Optocoupler	Yes; Optocoupler
Permissible potential difference		
between inputs and MANA (UCM)	2.5 V DC	2.5 V DC
between M internally and the inputs	75V DC/60V AC	75V DC/60V AC
Isolation		
Isolation checked with	500 V DC	500 V DC
Connection method		
required front connector	2x 48-pin	2x 48-pin
Dimensions		
Width	50 mm	50 mm
Height	290 mm	290 mm
Depth	210 mm	210 mm
Weights Weight, approx.	1 400 g	1 400 g

Ordering data	Article No.
FM 455 C controller module	6ES7455-0VS00-0AE0
with 16 analog outputs for 16 continuous controllers	
FM 455 S controller module	6ES7455-1VS00-0AE0
with 32 digital outputs for 16 step or pulse controllers	
Front connectors	
 48-pin with screw contacts, 1 item with screw contacts, 84 items with spring-loaded terminals, 1 item 	6ES7492-1AL00-0AA0 6ES7492-1AL00-1AB0 6ES7492-1BL00-0AA0
with crimp contacts, 1 itemwith crimp contacts, 84 items	6ES7492-1CL00-0AA0 6ES7492-1CL00-1AB0

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SIMATIC S7-400 advanced controller Function modules

FM 458-1 DP application module

Introduction

Overview



SIMATIC FM 458-1 DP integrated in SIMATIC S7-400

- Designed for high-performance and user-configurable closed-loop control tasks in the SIMATIC S7-400.
- Can be adapted to individual requirements as required, such as:
- Controlling, computing, closed-loop control as well as motion control. Can therefore be used flexibly for a wide variety of applications.
- Extensive library with approx. 300 function blocks:
 E.g. simple functions such as AND, ADD and OR through to complex GMC (general motion control) blocks as virtual master or gear functions.
- User-friendly graphical configuration with the SIMATIC engineering tool CFC (Continuous Function Chart) and the D7-SYS add-on software package: Optimum code generation by the compiler, therefore SCL is not required.
- PROFIBUS DP interface onboard.

SIMATIC FM 458-1 DP is based on more than 15 years experience with high-performance control systems and combines this know-how with the advantages of SIMATIC – the leading automation system for decades. In contrast to other function modules with static structures/functions, the FM 458-1 DP application module can be configured flexibly and adapted to individual requirements.

Function modules FM 458-1 DP application module

FM 458-1 DP basic module

Overview



- Basic module for handling arithmetic, closed-loop control and open-loop control tasks
- PROFIBUS DP interface for connection of distributed I/O and drives
- Modular design with expansion modules for I/O and communication

Article number	6DD1607-0AA2
	FM458-1 DP APPLICATION MODULE
Product type designation	
Supply voltage	
Rated value (DC)	
• 5 V DC	Yes
• 24 V DC	Yes
permissible range (ripple included), lower limit (DC)	4.8 V
permissible range (ripple included), upper limit (DC)	5.25 V
Input current	
Current consumption, typ.	1.5 A
Current consumption, max.	3 A
Memory	
Backup	
• present	Yes; SRAM
Battery	
Backup battery	
 Battery operation 	Yes
 Backup current, max. 	15 µA
Hardware configuration	
Slots	
 Required slots 	1
Time of day	
Clock	
 Hardware clock (real-time clock) 	Yes
Resolution	500 ms
Digital inputs	
Number of digital inputs	8; Connector X2
Input voltage	
 Rated value (DC) 	24 V
• for signal "0"	-1 to +6 V
• for signal "1"	13.5 V to 33 V

Article number	6DD1607-0AA2
	FM458-1 DP APPLICATION MODULE
nput current	
 for signal "0", max. (permissible quiescent current) 	0 mA
 for signal "1", typ. 	3 mA; at 24 V
nput delay for rated value of input voltage)	
or standard inputs	
- at "0" to "1", max.	5 µs
nterfaces	
PROFIBUS DP	
equidistance	Yes; With connection to interrupt tasks
 Direct data exchange (slave-to-slave communication) 	Yes
nterrupts/diagnostics/ status information	
Alarms	
Alarms	Yes
Galvanic isolation	
Galvanic isolation digital inputs	
 Galvanic isolation digital inputs 	No; only via optional interface modules
Veights	
Weight, approx.	1 000 g

Function modules FM 458-1 DP application module

FM 458-1 DP basic module

Ordering data	Article No.		Article No.
FM 458-1 DP application module	6DD1607-0AA2	RS 485 bus connector with 90° cable outlet	
Basic module for computing, closed-loop control and open-loop		Max. transfer rate 12 Mbit/s	
control tasks; with PROFIBUS DP interface		Without PG interface	6ES7972-0BA12-0XA0
Micro Memory Card		With PG interface	6ES7972-0BB12-0XA0
for FM 458-1 DP basic module		RS 485 bus connector with angled cable outlet	
2 MB	6ES7953-8LL31-0AA0	Max. transfer rate 12 Mbit/s	
4 MB	6ES7953-8LM31-0AA0	Without PG interface	6ES7972-0BA42-0XA0
8 MB	6ES7953-8LP31-0AA0	With PG interface	6ES7972-0BB42-0XA0
FM 458-1 DP Know-How-Protect	6DD1607-0GA0	RS 485 bus connector	
for protection of technological application modules against		with 90° cable outlet for FastConnect connection system	
unauthorized copying		Max. transfer rate 12 Mbit/s	
SC 64 interface cable	6DD1684-0GE0	Without PG interface	
To connect FM 458-1 to the serial port of a programming device/ PC		• 1 unit	6ES7972-0BA52-0XA0
SB10 interface module	6DD1681-0AE2	• 100 units	6ES7972-0BA52-0XB0
To connect 8 binary I/Os		With PG interface • 1 unit	6ES7972-0BB52-0XA0
to FM 458-1 DP		• 100 units	6ES7972-0BB52-0XB0
SB61 interface module	6DD1681-0EB3	PROFIBUS FastConnect	
To connect 8 binary I/Os to FM 458-1 DP,		bus cable Standard type with special design	6XV1830-0EH10
input voltage: 24/48 V DC		for quick mounting, 2-core,	
SU12 interface module	6DD1681-0AJ1	shielded, sold by the meter, max. delivery unit 1000 m,	
To connect 10 signals to FM 458-1 DP		minimum ordering quantity 20 m	
U FM 436-1 DF		Preferred lengths:	
		20 m	6XV1830-0EN20
		50 m	6XV1830-0EN50
		100 m	6XV1830-0ET10

Function modules FM 458-1 DP application module

EXM 438-1 input/output expansion

Overview



Article number	6DD1607-0CA1
	EXM 438-1 I/O EXPANSION
Product type designation	
Supply voltage	
Rated value (DC)	
• 5 V DC	Yes
• 24 V DC	Yes; to be set up externally
Input current	
Current consumption, typ.	1.5 A
Encoder supply	
Output voltage	about 14 V (non-isolated)
short-circuit protection	Yes; Electronic
Output current	
 Rated value 	100 mA
Hardware configuration	
Slots	
 Required slots 	1
Digital inputs	
Number of digital inputs	16
Input voltage	
 Rated value (DC) 	24 V
• for signal "0"	-1 to +6 V or input open
 for signal "1" 	+13 to +33 V
Input current	
 for signal "0", max. (permissible quiescent current) 	0 mA
 for signal "1", typ. 	3 mA
Input delay (for rated value of input voltage)	
for standard inputs	
- at "0" to "1", max.	200 µs
Digital outputs	
Number of digital outputs	8
short-circuit protection	Yes: electronic/thermal
Response threshold, typ.	250 mA
Limitation of inductive shutdown voltage to	Supply voltage +1 V

- Optional plug-in expansion module for the FM 458-1 DP basic module
- For input and output of time-critical signals
- With digital and analog inputs/outputs
- Incremental and absolute value encoders can be connected
- 4 high-resolution analog outputs
- Fan-free operation up to 40°C

Article number	6DD1607-0CA1
Article Humber	EXM 438-1 I/O EXPANSION
Output voltage	
 for signal "0", max. 	3 V
• for signal "1", max.	Supply voltage -2.5 V
Output current	
 for signal "1" rated value 	50 mA
 for signal "1" permissible range for 0 to 40 °C, min. 	100 mA
• for signal "0" residual current, max.	20 µA
Total switching current	80 % at 50 °C all outputs 50 mA
Output delay with resistive load	
• "0" to "1", max.	15 µs
Analog inputs	
Number of analog inputs	5; Differential inputs
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes; -10 V: +/-4 LSB; to +10 V: +/-4 LSB (1 LSB = 4.88 mV)
 Input resistance (-10 V to +10 V) 	470 kΩ
Analog outputs	
Number of analog outputs	8; 4 outputs 16 bit; 4 outputs12 bit
Voltage output, short-circuit protection	Yes; relative to frame
Voltage output, short-circuit current, max.	16 bits: 27 mA; 12 bits: 100 mA
Output ranges, voltage	
• -10 to +10 V	Yes
Analog value creation	
Integration and conversion time/ resolution per channel	
Resolution with overrange (bit including sign), max.	4 AO: 16 bits, 4 AO: 12 bits, 5 AI: 12 bits
Conversion time (per channel)	4 AO (16 bits):2 μs; 4 AO (12 bits): 4 μs; 5 AI: 45 μs
Encoder	
Number of connectable encoders, max.	12; 8 incremental encoders (synchronizable), 4 absolute encoders

Function modules FM 458-1 DP application module

EXM 438-1 input/output expansion

Technical specifications (cont	inued)	Ordering data	Article No.
Article number	6DD1607-0CA1 EXM 438-1 I/O EXPANSION	EXM 438-1 input/output expansion	6DD1607-0CA
Connectable encoders		for direct exchange of digital	
• Incremental encoder (symmetrical)	Yes	and analog signals between FM 458-1 DP and the plant	
• Incremental encoder (asymmetrical)	Yes		
Absolute encoder (SSI)	Yes; Single or multiturn encoder with SSI (synchronous serial) or EnDat interface	SB10 interface module To connect 8 binary inputs or outputs to FM 458-1 DP	6DD1681-0AE
Encoder signals, incremental encoder (symmetrical)		SB61 interface module	6DD1681-0EB
Trace mark signals	1) for tracks A and B (90° out of phase), poss. with zero pulse N; 2) for separate forward and	To connect 8 binary inputs to FM 458-1 DP, input voltage: 24/48 V DC	
	backward track	SB71 interface module	6DD1681-0DH
 Input signal 	With 0 signal: -5 to 0 V; with 1 signal: +3 to +5 V; permissible input voltage range: differential voltage -5 to +5 V; max. input current: 15 mA (important:	To connect 8 binary outputs to FM 458-1 DP, output voltage: 24/48 V DC	
	not limited on module side!)	SU12 interface module	6DD1681-0AJ
Encoder signals, incremental encoder (asymmetrical)		To connect 10 signals to FM 458-1 DP	
 Trace mark signals 	Track A and B (phase-shifted by	SU13 interface module	6DD1681-0G
Input voltage	90 degrees), possibly with zero pulse N with 0 signal: -30 to +4 V	To connect 50 signals to FM 458-1 DP	
• Input voltage	(at 15 mA load); with 1 signal:	SC 62 interface cable	6DD1684-0G0
	+8 to 30 V (at 15 mA load); permissible input voltage range: differential voltage -30 to +30 V	To connect EXM 438-1 with up to 5 SBxx or SU12	
Encoder signals, absolute encoder (SSI)		SC 63 interface cable To connect EXM 438-1	6DD1684-0GE
 Input signal 	5 V acc. to RS 422	with an SU13	
 Data signal 	Dual-, Gray-, Gray-Excess-Code		
Clock frequency, max.	2 MHz; 100 kHz to 2 MHz (depending on cable length)		
Errors/accuracies			
Linearity error (relative to output range), (+/-)	(+/- 1 LSB)		
Galvanic isolation			
Galvanic isolation digital inputs			
 Galvanic isolation digital inputs 	No		
Galvanic isolation digital outputs			
Galvanic isolation digital outputs	No		
Galvanic isolation analog inputs			
 Galvanic isolation analog inputs 	No		
Galvanic isolation analog outputs			
Galvanic isolation analog outputs	No		
Weights			
Weight, approx.	1 kg		

Function modules FM 458-1 DP application module

EXM 448 universal communications expansion module

Overview



- Optional expansion module for the FM 458-1 DP basic module
- For fast communication over PROFIBUS DP or SIMOLINK
- EXM 448: With vacant slot for a MASTERDRIVES option module

Technical specifications

Article No.
olo kg
0.8 kg
1
Yes
S7-400, EXM 448 F. FM458
6DD1607-0EA0

communications expansion module

For fast communication, for example, with drives; with free slot for MASTERDRIVES option module

EXM 448-2 universal communications expansion module



- Optional plug-in expansion module for the FM 458-1 DP basic module
- For high-speed communication over up to 2 SIMOLINK interfaces
- For coupling several FM 458-1 DP application modules in synchronism with the sampling time

Technical specifications

Ordering data	Article No.
Weight, approx.	0.9 kg
Weights	
 Required slots 	1
Slots	
Hardware configuration	
• 5 V DC	Yes
Rated value (DC)	
Supply voltage	
Product type designation	
	SIMATIC S7-400 EXM 448-2 COMMEXPANS.
Article number	6DD1607-0EA2

 EXM 448-2 universal communications expansion
 6DD1607-0EA2

 For high-speed communication with drives; for establishing two SIMOLINK fiber optic connections
 6DD1607-0EA2

Function modules FM 458-1 DP application module

1

D7-SYS

Overview



- Optional package for STEP 7 V5.5 for configuring closed-loop control and automation tasks with SIMATIC TDC, FM 458-1 DP and T400
- Extensive block library
- Generation of user libraries in ANSI C with D7-FB-GEN function block generator

Ordering data	Article No.
SIMATIC D7-SYS V8.1	
Reference hardware: SIMATIC TDC, FM 458-1 DP, T400 Requirement: MS Windows 7 Professional/ Enterprise/Ultimate + SP1 (32/64-bit); MS Windows XP Professional SP3 (32-bit); MS Windows Server 2003 R2 SP2 (32-bit) / 2008 R2 SP1 (64-bit); STEP 7 V5.5 SP4 or higher Type of delivery: on DVD, German, English, with electronic documentation	
Floating license	6ES7852-0CC04-0YA5
Upgrade License V7.x and higher	6ES7852-0CC04-0YE5
Software Update Service	6ES7852-0CC01-0YL5
SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC HMI, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
Current "Manual Collection" DVD and the three subsequent updates	

Function modules

Accessories

FM 458-1 DP application module

Overview SC64 interface cable



(Similar to figure)

Interface cable for FM 458-1 DP basic module and SB10, SB60, SB61 and SU12 interface modules.

Overview SC62 interface cable

This cable is used to connect the SIMATIC TDC SM500 peripheral (I/O) module or the SIMATIC S7-400 EXM 438-1 expansion module to a SU13 interface module.

Overview SB10 interface module

Overview SC63 interface cable



This cable is used to connect the SIMATIC TDC SM500 peripheral module (I/O) or the SIMATIC S7-400 EXM 438-1 expansion module to up to 5 interface modules SB10, SB60, SB70, SB61 SB71 and/ or SU12.



(Similar to figure)

The interface module is used to connect 8 digital inputs or outputs.

Function modules FM 458-1 DP application module

Accessories

Overv

Overview SU12 interface module



It is used to connect 8 digital inputs with conversion from 24/48 V DC to 24 V DC.

Overview SB71 interface module

Overview SB61 interface module



The interface module is used to connect 8 digital outputs with conversion of the 24 V DC voltage on the module side to a max. of 24/48 V DC/AC on the plant side using transistors.



The interface module is used to connect 10 signals; there is no electronic conversion.

Overview SU13 interface module



This interface module can be used to connect 50 signals; there is no electronic conversion.

Function modules FM 458-1 DP application module

Accessories

Technical specifications SB10 interface module		
Number of digital inputs or outputs	8	
Electrical isolation	No	
Max. cable cross-section	1.5 mm ²	
Dimensions (W x H x D) in mm	45 x 130 x 156	
Weight	0.3 kg	
Technical specifications SB61 inte	rface module	
Number of digital inputs for • Input voltage	8 24/48 V DC	
Electrical isolation	Yes, via optocoupler	
Max. cable cross-section	1.5 mm ²	
Dimensions (W x H x D) in mm	45 x 130 x 156	
Weight	0.32 kg	
Technical specifications SB71 inte	rface module	
Number of digital outputs Output voltage, max 	8 24/48 V DC	
Output current, max.	40 mA, short-circuit proof	
Electrical isolation	Yes, via optocoupler	
Max. cable cross-section	1.5 mm ²	
Dimensions (W x H x D) in mm	45 x 130 x 156	
Weight	0.32 kg	
Technical specifications SU12 inte	rface module	
Number of signal cables which can be connected	10	
Signal amplitude per signal, max.	60 V, 0.5 A	
Electrical isolation	No	
Max. cable cross-section	1.5 mm ²	
Dimensions (W x H x D) in mm	45 x 130 x 156	
Weight	0.28 kg	
Technical data S312 interface module		
Number of signal cables which can be connected	50	
Signal amplitude per signal, max.	60 V, 0.5 A	
Electrical isolation	No	
Max. cable cross-section	1.5 mm ²	
Dimensions (W x H x D) in mm	45 x 130 x 156	
Weight	0.3 kg	

Ordering data	Article No.
SC64 interface cable	6DD1684-0GE0
between FM 458-1 DP (X2) module with SBxx or SU12 interface module, 2 m long	
SC62 interface cable	6DD1684-0GC0
between SM500 or EXM 438-1 module and max. 5 SB10, SB60, SB70, SB61 SB71 interface modules and/or SU12, 2 m long	
SC63 interface cable	6DD1684-0GD0
between SM500 or EXM 438-1 module and SU13 interface module, 2 m long	
SB10 interface module	6DD1681-0AE2
8 digital inputs/outputs 24 V DC	
SB61 interface module	6DD1681-0EB3
8 digital inputs 24/48 V DC	
SB71 interface module	6DD1681-0DH1
8 digital outputs with transistors, 24/48 V DC	
SU12 interface module	6DD1681-0AJ1
with plug-in connector, 10-pole	
SU13 interface module	6DD1681-0GK0
with screw-type plug-in connector	

SIPLUS S7-400 function modules

SIPLUS DCF 77 radio clock module





This module can be used to synchronize the real-time clock of the SIMATIC/SIPLUS S7-200, S7-300 and S7-400 automation systems with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig, Germany.

The time is received by means of a DCF receiver (antenna with electronics) which is connected via two digital inputs on the SIMATIC PLC and SIPLUS together with a software driver available as a download (function block FB):

www.siemens.com/siplus - Support - Tools and Downloads!

Technical specifications

Radio clock module SIPLUS DCF 77		
Radio frequency	77.5 Hz	
Power supply	24 V DC (20.4 to 28.8 DC)	
Power consumption, typ.	50 mA	
Dimensions (W x H x D)	75 mm x 125 mm ¹⁾ x 75 mm	

 Additionally 25 mm (0.98 in) for heavy duty threaded joint and bending radius for cables

Article No.

6AG1057-1AA03-0AA0

Ordering data

SIPLUS DCF 77 radio clock module

For synchronizing SIMATIC S7-200, S7-300 and S7-400 with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig, Germany

Communication

Overview



- For high-performance transmission of messages via point-to-point connections (high message rate)
- Physical interface: RS 422/RS 485 (X.27)
- Up to 32 nodes
- Protocol implemented: ASCII, 3964 (R)
- Simple parameterization via a parameterization tool integrated into STEP 7

Article number	6ES7440-1CS00-0YE0
	CP 440-1, PTP-CONNECTIONS, 1 CHANNEL
Product type designation	
Supply voltage	
Rated value (DC)	
• 5 V DC	Yes
• 24 V DC	Yes
Input current	
from backplane bus 5 V DC, max.	360 mA
Power losses	
Power loss, typ.	1.7 W
Memory	
Memory requirements per interface in memory card of S7-CPU	1 to 5 Kbytes for parameters
Interfaces	
Number of interfaces	1
Interface physics, RS 422/RS 485 (X.27)	Yes
RS 422/485, cable length, shielded, max.	1 200 m
Point-to-point	
Integrated protocol driver	
- 3964 (R)	Yes
- ASCII	Yes
Transmission speed, RS 422/485	
- with 3964 (R) protocol, max.	115.2 kbit/s
- with ASCII protocol, max.	115.2 kbit/s
Configuration	
Configuration software	
• STEP 7	Yes; own parameter assignment forms
Dimensions	
Width	25 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	600 g
Ordering data	Article No.
CP 440 communications processor	6ES7440-1CS00-0YE0
with one RS 422/485 (X.27) interface	
DC 400/405 compositing achie	

interface		
RS 422/485 co	onnecting cable	
for linking to S	IMATIC S7	
5 m		6ES7902-3AB00-0AA0
10 m		6ES7902-3AC00-0AA0
50 m		6ES7902-3AG00-0AA0

Communication

CP 441-1, CP 441-2

Overview



• For fast, high-performance serial data exchange via point-to-point connection

- 2 versions:
 - CP 441-1 with 1 variable interface for easy point-to-point
 - CP 441-2 with 2 variable interfaces for high-performance point-to-point connection.
- Plug-in interface modules for different physical transmission properties:
 - RS 232C (V.24), 20 mA (TTY) or RS 422/RS 485 (X.27)
- Implemented protocols: ASCII, 3964 (R), printer driver; for CP 441-2 additional RK 512 and Modbus RTU (reloadable)
- Simple parameter assignment using tool integrated in STEP 7

Article number	6ES7441-1AA05-0AE0	6ES7441-2AA05-0AE0
	CP 441-1, PTP-CONN., 1 CHANNEL	CP 441-2, PTP-CONN., 2 CHANNELS
Product type designation		
Supply voltage		
Rated value (DC)		
• 5 V DC	Yes	Yes
• 24 V DC	Yes	Yes
Input current		
from backplane bus 5 V DC, max.	300 mA	300 mA
Power losses		
Power loss, typ.	2.1 W; incl. 1x20 mA TTY module	2.7 W; incl. 2x20mA TTY module
Memory		
Memory requirements per interface in memory card of S7-CPU	1 to 5 KB for parameters; 0 to 55 KB for message texts	1 to 5 KB for parameters; 0 to 55 KB for message texts; 0 to 64 KB for loadable drivers
Interfaces		
Number of interfaces	1; variable	2; variable
Interface physics, 20 mA (TTY)	Yes	Yes
Interface physics, RS 232C (V.24)	Yes	Yes
Interface physics, RS 422/RS 485 (X.27)	Yes	Yes
20 mA (TTY), cable length, shielded, max.	1 000 m; At 9600 bps	1 000 m; At 9600 bps
RS 232, cable length, shielded, max.	15 m; At 115200 bps	15 m; At 115200 bps
RS 422/485, cable length, shielded, max.	1 200 m; At 19200 bps	1 200 m; At 19200 bps
Point-to-point		
 Transmission rate, max. 	115.2 kbit/s; Min. 300 bps	115.2 kbit/s; Min. 300 bps
 supported printers 	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined	HP-Deskjet, HP-Laserjet, IBM-Proprinter, user-defined
Integrated protocol driver		
- 3964 (R)	Yes	Yes
- ASCII	Yes	Yes
- RK512	No	Yes
- Printer	Yes	Yes
 customer-specific drivers reloadable 	No	No
Transmission speed, 20 mA (TTY)		
- with 3964 (R) protocol, max.	19.2 kbit/s	19.2 kbit/s
- with ASCII protocol, max.	19.2 kbit/s	19.2 kbit/s
- with printer driver, max.,	19.2 kbit/s	19.2 kbit/s
- with RK 512 protocol, max.		19.2 kbit/s

Communication

CP 441-1, CP 441-2

Technical specifications (continued)

Article number	6ES7441-1AA05-0AE0	6ES7441-2AA05-0AE0
	CP 441-1, PTP-CONN., 1 CHANNEL	CP 441-2, PTP-CONN., 2 CHANNELS
Transmission speed, RS 422/485		
- with 3964 (R) protocol, max.	115.2 kbit/s	115.2 kbit/s
- with ASCII protocol, max.	115.2 kbit/s	115.2 kbit/s
- with printer driver, max.,	115.2 kbit/s	115.2 kbit/s
- with RK 512 protocol, max.		115.2 kbit/s
Transmission speed, RS232		
- with 3964 (R) protocol, max.	115.2 kbit/s	115.2 kbit/s
- with ASCII protocol, max.	115.2 kbit/s	115.2 kbit/s
- with printer driver, max.,	115.2 kbit/s	115.2 kbit/s
- with RK 512 protocol, max.		115.2 kbit/s
Ambient conditions		
Ambient temperature in operation		
• Min.	0°C	0 °C
• max.	60 °C	60 °C
Relative humidity		
 Operation, max. 	95 %	95 %
Dimensions		
Width	25 mm	25 mm
Height	290 mm	290 mm
Depth	210 mm	210 mm
Weights		
Weight, approx.	580 g; Interface modules: 80 g	580 g; Interface modules: 80 g

Ordering data	Article No.		Article No.
Communication module CP 441-1	6ES7441-1AA05-0AE0	TTY connecting cable	
With 1 variable interface for interface submodules; including		5 m 10 m	6ES7902-2AB00-0AA0 6ES7902-2AC00-0AA0
configuration package on CD Communication module CP 441-2	6ES7441-2AA05-0AE0	50 m	6ES7902-2AG00-0AA0
With 2 variable interfaces for interface submodules; including configuration package on CD		RS 422/485 connecting cable	6ES7902-3AB00-0AA0
Interface submodules RS 232C (V.24)	6ES7963-1AA10-0AA0	10 m 50 m	6ES7902-3AC00-0AA0 6ES7902-3AG00-0AA0
0 mA (TTY)	6ES7963-2AA10-0AA0	Loadable drivers for CP 441-2 Modbus master (RTU format)	
RS 422/485 (X.27) RS 232 connecting cable	6ES7963-3AA10-0AA0	Single license Single license, without software	6ES7870-1AA01-0YA0 6ES7870-1AA01-0YA1
5 m 10 m	6ES7902-1AB00-0AA0 6ES7902-1AC00-0AA0	Modbus slave (RTU format) • Single license	6ES7870-1AB01-0YA0
15 m	6ES7902-1AD00-0AA0	Single license, without software or documentation	6ES7870-1AB01-0YA1

Communication

verview			Adjustable		rate 300 bit/s up to 76800 bit/s
	odbus protoc	ol with RTU message format;	parameters (TTY up to 19200 bit/s)		,
	on as master			Character fram	me s of CP (1 to 255)
		1 and CP 441-2			· · · ·
(6ES7441-2A	A05-0AE0)			 With/without RS 485 operation for 2-wire connec With/without modem operation 	
Technical spec	cifications				ge characters)
-				 Factor for the 	character delay time 1-10
Parameterization	software	Loadable drivers for CP 441-2 and CP 341			ork DB (for FB processing)
Type of license		Simple license, copy license		0	nemory areas for writing by the mas
Target system		SIMATIC CP 341, SIMATIC CP 441-2			g of receive line when 7 interface module
Technical	Modbus Ma	aster		U U	f Modbus addresses to S7 data are
specifications		protocol with RTU format			
		ave coupling: SIMATIC S7 is master	Ordering data		Article No.
		codes implemented: 01, 02, 03, 04, 05, 06,	Modbus Master V3.1		
	• No V.24 co	ontrol and signal lines	Task:		
	CRC poly	nomial: $x^{16} + x^{15} + x^2 + 1$	Communication via Modbus protocol with		
	 Interfaces (RS 422/4 	: TTY (20 mA); V.24 (RS 232 C); X.27 85) 2-wire or 4-wire	SIMATIC S7 as master Requirement: CP 341 or CP 441-2; S		
	Receive m	nailbox specified on BRCV	and higher	51EI 7 ¥ 1.0E	
	Character thereof	delay time 3.5 characters or multiple	Delivery package: Driver program/docun English, German, Frer		
	Broadcast	t message possible	Single license		6ES7870-1AA01-0YA0
Adjustable parameters		ion rate 300 bit/s up to 76800 bit/s o 19200 bit/s)	Single license, withou and documentation	t software	6ES7870-1AA01-0YA1
	 Character 	frame	Modbus Slave V3.1		
	With/withc	out RS 485 operation for 2-wire connections	Task:		
		out modem operation nudge characters)	Communication via Modbus protocol with SIMATIC S7 as slave	RTU format,	
	 Response in steps of 	monitoring time 100 ms to 25.5 s f 100 ms	Requirement: CP 341 or CP 441-2; \$	STEP 7 V4.02	
	 Factor for 	the character delay time 1-10	and higher Delivery package:		
		tting of receive line when X.27 interface module	Driver program/docun English, German, Frer		
	Modbus sla	ave	Single license		6ES7870-1AB01-0YA0
	Modbus p	protocol with RTU format	Single license, withou and documentation	t software	6ES7870-1AB01-0YA1
		ave coupling: SIMATIC S7 is slave	SIMATIC Manual Col	lection	6ES7998-8XC01-8YE0
	• Function c 08, 15, 16	codes implemented: 01, 02, 03, 04, 05, 06,	Electronic manuals or multilingual: LOGO!, S	n DVD,	
	• No V.24 co	ontrol and signal line	SIMATIC bus compon SIMATIC C7.		
	CRC poly	nomial: $x^{16} + x^{15} + x^2 + 1$	SIMATIC distributed I/		
		: TTY (20 mA), V.24 (RS 232C), X.27 85) 2-wire or 4-wire	SIMATIC HMI, SIMATI SIMATIC NET, SIMATIC Automation, SIMATIC	C PC Based PCS 7,	
		cations FB 180, instance DB 180 nulti-instance)	SIMATIC PG/PC, SIMA SIMATIC Software, SIM	MATIC TDC	
	Conversio	n of the Modbus data address to S7 data	SIMATIC Manual Col update service for 1		6ES7998-8XC01-8YE2

- Conversion of the Modbus data address to S7 data areas. Data areas which can be processed: DB, bit memories, outputs, inputs, timers, counters
- Character delay time 3.5 characters or multiple thereof

update service for 1 year

Current "Manual Collection" DVD and the three subsequent updates

Communication

CP 443-5 Basic

Overview



DP-M	DP-S	FMS	PG/OP	S7/S5	
		•	•	•	G_M10, XX_10153

- Connection of the S7-400 to PROFIBUS
- Communication services:
 - PG/OP communication
 S7 communication

 - Open communication (SEND/RECEIVE) - PROFIBUS FMS
- Time synchronization
- Easy programming and configuration over PROFIBUS
- Cross-network programming device communication through S7 routing
- Can be easily integrated into the SIMATIC S7-400 system
- Modules can be replaced without the need for a PG
- SIMATIC H system operation for redundant S7 communication

Article number	6GK7443-5FX02-0XE0
Product type designation Transmission rate	CP 443-5 Basic
Transfer rate	
at the 1st interface acc. to	9.6 kbit/s 12 Mbit/s
PROFIBUS	
Interfaces	
Number of interfaces	0
acc. to Industrial Ethernet	
Number of electrical connections	1
 at the 1st interface acc. to PROFIBUS 	1
Type of electrical connection	
 at the 1st interface acc. to PROFIBUS 	9-pin Sub-D socket (RS 485)
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Supply voltage	5 V
Relative symmetrical tolerance for DC	
• at 5 V	5 %
Consumed current	
 from backplane bus for DC at 5 V typical 	1 A
 from external supply voltage for DC at 24 V typical 	1.2 A
Active power loss	5 W
Permitted ambient conditions	
Ambient temperature	
during operation	0 60 °C
during storage	-40 +70 °C -40 +70 °C
 during transport Relative humidity at 25 °C without 	-40 +70 C 95 %
condensation during operation maximum	30 /0
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-400 single width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.65 kg
Product properties, functions, components general	
Number of units	
per CPU maximum	14
• Note	depending on CPU type
Performance data open communication	
Number of possible connections for open communication by means of	
SEND/RECEIVE blocks	
• maximum	32
Amount of data	
 as user data per connection for open communication by means of SEND/ RECEIVE blocks maximum 	240 byte

Communication

CP 443-5 Basic

Fechnical specifications (cont	tinued)	Ordering data	Article No.
Article number	6GK7443-5FX02-0XE0	CP 443-5 Basic	6GK7443-5FX02-0XE0
Product type designation	CP 443-5 Basic	communications processor	
Performance data FMS functions Number of possible connections for FMS connection maximum Amount of data of the variables	48	Communications processor for con- nection of S7-400 to PROFIBUS, FMS, open communication, PG/OP and S7 communication; with electronic	
for READ job maximum	237 byte	manual on CD-ROM	
for WRITE job maximum	233 byte	STEP 7 Version 5.5	
Number of variables	233 Dyte	Target system:	
Configurable from server to FMS partner	512	SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements:	
Loadable from server to FMS partne	r 2 640	Windows XP Prof., Windows 7 Professional/Ultimate	
Performance data S7 communication		Type of delivery: German, English, French, Spanish,	
Number of possible connections for S7 communication		Italian; including license key on USB stick, with electronic documentation	
• maximum	48	Floating License on DVD	6ES7810-4CC10-0YA5
Performance data multi-protocol mode		 Rental license for 50 hours Software Update Service on DVD 	6ES7810-4CC10-0YA6 6ES7810-4BC01-0YX2
Number of possible connections of which 2 reserved for PG/OP commu- nication with multi-protocol mode maximum	59	 (requires current software version) Floating License upgrade 3.x/4.x/5.x to V5.4; on DVD Trial License STEP 7 V5.4; on DVD, 	6ES7810-4CC10-0YE5 6ES7810-4CC10-0YA7
Performance data telecontrol		operational for 14 days	
Protocol is supported	N	Accessories	
• TCP/IP	No	PROFIBUS FastConnect	
Product functions management, configuration		RS 485 connection plugs	
Configuration software • required	STEP 7 V5.2 SP1 or higher and NCM S7 for PROFIBUS	With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s • Without PG interface • With PG interface	6ES7972-0BA52-0XA0 6ES7972-0BB52-0XA0
		PROFIBUS IP20 bus connectors	
		With connection to PPI, MPI, PROFIBUS	
		Without PG interfaceWith PG interface	6ES7972-0BA12-0XA0 6ES7972-0BB12-0XA0
		PROFIBUS bus terminal 12M	
		Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	6GK1500-0AA10

Communication

CP 443-5 Extended

Overview



	•			•	•	G.IKIQ.XX.101
•	PROFIB	US DP ma	ster with el	ectrical inte	erface for c	onnecting

- the SIMATIC S7-400 to PROFIBUS at up to 12 Mbit/s (including 45.45 Kbit/s)
- For setting up additional PROFIBUS DP lines
- Communication services:
 - PROFIBUS DP
 - PG/OP communication
 - S7 communication
 - Open communication (SEND/RECEIVE)
- Time synchronization
- Easy programming and configuration over PROFIBUS
- Cross-network programming device communication through S7 routing
- Can be easily integrated into the SIMATIC S7-400 system
- Module replacement without PG
- SIMATIC H system operation for redundant S7 communication
 or DP master communication
- Data record routing (PROFIBUS DP)
- Adding or modifying distributed I/O during operation

Technical specifications

Article number	6GK7443-5DX05-0XE0
Product type designation	CP 443-5 Extended
Transmission rate	or 440-0 Extended
Transfer rate	
at the 1st interface acc. to PROFIBUS	9.6 kbit/s 12 Mbit/s
Interfaces	
Number of interfaces	0
acc. to Industrial Ethernet	
Number of electrical connections	
 at the 1st interface acc. to PROFIBUS 	1
Type of electrical connection	
 at the 1st interface acc. to PROFIBUS 	9-pin Sub-D socket (RS 485)
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Relative symmetrical tolerance for DC	
• at 5 V	5 %
Consumed current	
 from backplane bus for DC at 5 V typical 	0.6 A
Active power loss	3 W
Permitted ambient conditions	
Ambient temperature	
 during operation 	0 60 °C
 during storage 	-40 +70 °C
 during transport 	-40 +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-400 single width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.65 kg
Product properties, functions, components general	
Number of units	
 per CPU maximum 	14
• Note	The number of CPs that can be operated as DP masters depends on the number of CP 443-1 Advanced processors operating in the S7-400 station as PROFINET IO controllers. Up to 10 CPs can be operated in total: up to 4 as PROFINET IO controllers (CP 443-1 Advanced); up to 10 as DP masters (CP 443-5 Extended)

(CP 443-5 Extended)

SIMATIC S7-400 advanced controller

Communication

Technical specifications (cont	inued)	Ordering data	Article No.
Article number	6GK7443-5DX05-0XE0	CP 443-5 Extended	
Product type designation	CP 443-5 Extended	communications processor	
Performance data open communication		for connection of the SIMATIC S7-400 to PROFIBUS	
Number of possible connections for open communication by means of SEND/RECEIVE blocks		Extended version for PROFIBUS DP; with electronic manual on CD-ROM	6GK7443-5DX05-0XE0
• maximum	32	Accessories	
Amount of data		PROFIBUS FastConnect connection	
 as user data per connection for open communication by means of SEND/RECEIVE blocks maximum 	240 byte	plug RS 485 With 90° cable outlet; insulation displacement technology,	
Performance data PROFIBUS DP		max. transmission rate 12 Mbit/s Without PG interface 	6ES7972-0BA52-0XA0
Service as DP master		With DG interface	6ES7972-0BB52-0XA0
• DPV1	Yes	PROFIBUS bus connector IP20	
Number of DP slaves on DP master usable	125	With connection to PPI, MPI,	
Amount of data		PROFIBUSWithout PG interface	6ES7972-0BA12-0XA0
 of the address area of the inputs as DP master total 	4 096 byte	With PG interface	6ES7972-0BB12-0XA0
 of the address area of the outputs as DP master total 	4 096 byte	PROFIBUS FC Standard Cable 2-core bus cable, shielded, special	6XV1830-0EH10
 of the address area of the inputs per DP slave 	244 byte	design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m,	
 of the address area of the outputs per DP slave 	244 byte	sold by the meter PROFIBUS bus terminal 12M	
Performance data S7 communication		Bus terminal for connection of PROFIBUS nodes up to 12 Mbps	6GK1500-0AA10
Number of possible connections for S7 communication		with connecting cable	
• maximum	48		
Performance data multi-protocol mode			
Number of active connections with multi-protocol mode			
 without DP maximum 	59		
 with DP maximum 	54		
Performance data telecontrol			
Protocol is supported			
• TCP/IP	No		
Product functions management, configuration			
Configuration software			
• required	STEP 7 V5.4 SP4 or higher / STEP 7 Professional V12 (TIA Portal) or higher		

Note:

You can find order information for software for communication with PC systems in the IK PI catalog.

Communication

Overview

CP 443-1



Communications processor for connecting a SIMATIC S7-400 to Industrial Ethernet networks, also as PROFINET IO controller or in SIMATIC H systems.

The CP supports:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication
- IT communication

The communications processor can also be used for redundant S7 communication in SIMATIC H systems and for fail-safe applications (PROFIsafe) in connection with an S7-400 F-CPU.

Article number	6GK7443-1EX30-0XE0
Product type designation	CP 443-1
Transmission rate	
Transfer rate	
at the 1st interface	10 100 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	2
Number of electrical connections	
 at the 1st interface acc. to Industrial Ethernet 	2
Type of electrical connection	
 at the 1st interface acc. to Industrial Ethernet 	RJ45 port
design of the removable storage C-PLUG	No
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Relative symmetrical tolerance for DC	
• at 5 V	5 %
Consumed current	
 from backplane bus for DC at 5 V typical 	1.4 A
Active power loss	7.25 W
Permitted ambient conditions	
Ambient temperature	
 during operation 	0 60 °C
 during storage 	-40 +70 °C
 during transport 	-40 +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-400 single width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.7 kg
Product properties, functions,	
components general	
Number of units	
 per CPU maximum 	14
Note	max. 4 as PN IO ctrl.

Communication

CP 443-1

Technical specifications (continued)

Article number	6GK7443-1EX30-0XE0	Article number	6GK7443-1EX30-0XE0
Product type designation	CP 443-1	Product type designation	CP 443-1
Performance data		Performance data telecontrol	
open communication		Protocol is supported	
Number of possible connections for open communication by means of		• TCP/IP	Yes
SEND/RECEIVE blocks		Product functions management,	
• maximum	64	configuration Product function MIB support	Yes
Amount of data		Protocol is supported	165
 as user data per ISO connection for open communication by means of 	8 Kibyte	SNMP v1	Yes
SEND/RECEIVE blocks maximum		• DCP	Yes
 as user data per ISO on TCP 	8 Kibyte	• LLDP	Yes
connection for open communication by means of SEND/RECEIVE blocks		Configuration software	
maximum		required	STEP 7 V5.5 SP3 or higher / STEP 7
• as user data per TCP connection for	8 Kibyte		Professional V12 (TIA Portal) or higher
open communication by means of SEND/RECEIVE blocks maximum		Product functions Diagnosis	light
as user data per UDP connection for	2 Kibyte	Product function Web-based	Yes
open IE communication by means of		diagnostics	
SEND/RECEIVE blocks maximum Number of possible connections for		Product functions switch	
open communication		Product feature Switch	Yes
 by means of T blocks maximum 	64	Product function	
Amount of data		switch-managed	No
as user data per ISO on TCP	1 452 byte	• with IRT PROFINET IO switch	Yes
connection for open communication by means of T blocks maximum		Configuration with STEP 7	Yes
Performance data		Product functions Redundancy Product function	
S7 communication		Ring redundancy	Yes
Number of possible connections for		Redundancy manager	Yes
S7 communication • maximum	128	Protocol is supported	Yes
with PG connections maximum	2	Media Redundancy Protocol (MRP)	
Note	when using several CPUs	Product functions Security	
Performance data		Product function	
multi-protocol mode		 password protection for Web applications 	No
Number of active connections with multi-protocol mode	128	ACL - IP-based	Yes
Performance data PROFINET		ACL - IP-based for PLC/routing	No
communication as PN IO-Controller		 switch-off of non-required services 	Yes
Product function PROFINET IO	Yes	 Blocking of communication via 	Yes
controller	100	physical ports	
Number of PN IO devices on PROFINET IO controller usable total	128	log file for unauthorized access	No
Number of PN IO IRT devices on	64	Product functions Time	Vaa
PROFINET IO controller usable		Product function SICLOCK support	Yes
Number of external PN IO lines with PROFINET per rack	4	Product function pass on time synchronization	Yes
Amount of data		Protocol is supported NTP	Yes
as user data for input variables as	4 Kibyte		
PROFINET IO controller maximum			
 as user data for input variables as PROFINET IO controller maximum 	4 Kibyte		
 as user data for input variables per PN IO device as PROFINET IO controller maximum 	1 433 byte		
 as user data for output variables per PN IO device as PROFINET IO controller maximum 	1 433 byte		
 as user data for input variables per PN IO device for each sub-module as PROFINET IO controller maximum 	240 byte		
 as user data for output variables per PN IO device for each sub-module as PROFINET IO controller maximum 	240 byte		

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Communication

Drdering data	Article No.		Article No.
CP 443-1 communications processor	6GK7443-1EX30-0XE0	IE FC TP Standard Cable GP 2 x 2 (Type A)	6XV1840-2AH10
For connecting SIMATIC S7-400 to ndustrial Ethernet through TCP/IP, SO and UDP; PROFINET IO Con- roller, MRP; integrated real-time switch ERTEC with two ports; 2 x RJ45 interface; 37 communication, open communi- cation (SEND/RECEIVE) with ETCH/WRITE, with and without		4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. order length 1000 m, minimum order 20 m	
RFC 1006, DHCP, SNMP V2,		IE FC TP Standard Cable GP 4 x 2	
diagnostics, multicast, access protection over IP access list, nitialization over LAN 10/100 Mbps with electronic manual on DVD		8-core, shielded TP installation cable for connection to IE FC RJ45 modular outlet for universal applications;	
Accessories		with UL approval; sold by the meter;	
E FC RJ45 Plug 180 2 x 2		max. order quantity 1000 m,	
RJ45 plug-in connector for Indu- strial Ethernet with a rugged metal enclosure and integrated insulation		minimum order 20 m • AWG22, for connection to IE FC RJ45 Modular Outlet	6XV1870-2E
displacement contacts for connect- ng Industrial Ethernet FC installa-		AWG24, for connection to IE FC RJ45 Plug 4 x 2	6XV1878-2A
ion cables; with 180° cable outlet; or network components and CPs/		IE FC Stripping Tool	6GK1901-1GA00
CPUs with Industrial Ethernet inter- ace		Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet	
1 pack = 1 unit	6GK1901-1BB10-2AA0	FC cables	
1 pack = 10 units	6GK1901-1BB10-2AB0	SCALANCE X204-2	6GK5204-2BB10-2AA3
1 pack = 50 units	6GK1901-1BB10-2AE0	Industrial Ethernet Switch	
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and inte- grated insulation displacement contacts for connecting Industrial Ethernet FC installation cables:		Industrial Ethernet Switches with integral SNMP access, Web diag- nostics, copper cable diagnostics and PROFINET diagnostics for con- figuring line, star and ring topolo- gies; four 10/100 Mbps RJ45 ports and two FO ports	
180° cable outlet; for network components and CPs/CPUs with		Industrial Ethernet Switch SCALANCE X308-2	6GK5308-2FL00-2AA3
ndustrial Ethernet interface 1 pack = 1 unit	6GK1901-1BB11-2AA0	2 x 1000 Mbps multimode fiber- optic cable ports (SC sockets),	
 1 pack = 10 units 1 pack = 50 units 	6GK1901-1BB11-2AB0 6GK1901-1BB11-2AE0	1 x 10/100/1000 Mbps RJ45 port, 7 x 10/100 Mbps RJ45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	

Note:

You'll find ordering data for software for communication to PC systems in catalog IK PI.

SIMATIC S7-400 advanced controller

Communication

CP 443-1 Advanced



Communications processor for connecting a SIMATIC S7-400 to Industrial Ethernet networks, also as PROFINET IO controller or in SIMATIC H systems.

The CP supports:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication
- IT communication
- Security functionality, firewall and VPN

The communications processor can also be used for redundant S7 communication in SIMATIC H systems and for fail-safe appli-cations (PROFIsafe) in connection with an S7-400 F-CPU. In addition, the CP 443-1 Advanced provides e-mail functions and user-created Web pages, offering ideal support for maintenance and guality assurance. The Internet functions such as FTP even allow connection to the most diverse PC-based systems. This CP is therefore the bridge between the field level and the management level for the S7-400. The CP 443-1 Advanced connects seamlessly to the security structures of the office and IT worlds.

Technical specifications	
Article number	6GK7443-1GX30-0XE0
Product type designation	CP 443-1 Advanced
Transmission rate	
Transfer rate	
 at the 1st interface 	10 1 000 Mbit/s
 at the 2nd interface 	10 100 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	5
Number of electrical connections	
 at the 1st interface acc. to Industrial Ethernet 	1
 at the 2nd interface acc. to Industrial Ethernet 	4
Type of electrical connection	
 at the 1st interface acc. to Industrial Ethernet 	RJ45 port
 at the 2nd interface acc. to Industrial Ethernet 	RJ45 port
design of the removable storage C-PLUG	Yes
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Relative symmetrical tolerance for DC	
• at 5 V	5%
Consumed current	
 from backplane bus for DC at 5 V typical 	1.8 A
Active power loss	9 W
Permitted ambient conditions	
Ambient temperature	
 during operation 	0 60 °C
 during storage 	-40 +70 °C
 during transport 	-40 +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-400 single width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.7 kg
Product properties, functions, components general	
Number of units	
per CPU maximum	14
Note	max. 4 as PN IO ctrl.
- NOLG	

Communication

CP 443-1 Advanced

Technical specifications (continued)

Article number	6GK7443-1GX30-0XE0	Article number	6GK7443-1GX30-0XE0
Product type designation	CP 443-1 Advanced	Product type designation	CP 443-1 Advanced
Performance data		Amount of data	
open communication		 as user data for input variables as PROFINET IO controllor maximum 	8 Kibyte
Number of possible connections for open communication by means of SEND/RECEIVE blocks		 PROFINET IO controller maximum as user data for input variables as PROFINET IO controller maximum 	8 Kibyte
• maximum	64	as user data for input variables	1 433 byte
Amount of data as user data per ISO connection for 	8 Kibyte	per PN IO device as PROFINET IO controller maximum	1 400 byte
open communication by means of SEND/RECEIVE blocks maximum	,	 as user data for output variables per PN IO device as PROFINET IO controller maximum 	1 433 byte
 as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks maximum 	8 Kibyte	 as user data for input variables per PN IO device for each sub- module as PROFINET IO controller 	240 byte
 as user data per TCP connection for open communication by means of SEND/RECEIVE blocks maximum 	8 Kibyte	 as user data for output variables per PN IO device for each sub-module 	240 byte
as user data per UDP connection for	2 Kibyte	as PROFINET IO controller maximum	
open IE communication by means of SEND/RECEIVE blocks maximum		Performance data PROFINET CBA	
Number of possible connections for open communication		Number of remote connection partners with PROFINET CBA	64
 by means of T blocks maximum Amount of data 	64	Number of connections with PROFINET CBA total	600
as user data per ISO on TCP	1 452 byte	Amount of data	
connection for open communication by means of T blocks maximum		 as user data for digital inputs with PROFINET CBA maximum 	8 Kibyte
erformance data 7 communication		 as user data for digital outputs with PROFINET CBA maximum 	8 Kibyte
Number of possible connections or S7 communication		 as user data for arrays and data types in the case of acyclic trans- 	8 Kibyte
maximum	128	mission with PROFINET CBA maximum	
with PG connections maximum	2	as user data for arrays and data	250 byte
Note	when using several CPUs	types with PROFINET CBA with cyclical transfer maximum	
Performance data nulti-protocol mode		as user data for arrays and data	2 400 byte
Number of active connections with nulti-protocol mode	128	types with PROFINET CBA in the case of local interconnection	
Performance data IT functions		maximum Performance data PROFINET CBA	
Number of possible connections		remote connection with acyclic	
as client by means of FTP maximum		transmission	
as server by means of FTP maximum		Refresh time of the remote intercon- nections in the case of acyclic trans-	100 ms
as server by means of HTTP maximum	4	mission with PROFINET CBA Number of remote connections to	150
as e-mail client maximum	1	input variables in the case of acyclic	
Amount of data as user data or email maximum	8 Kibyte	transmission with PROFINET CBA maximum	
Storage capacity of the user memory		Number of remote connections to output variables in the case of acyclic	150
e as flash memory file system	30 Mibyte	transmission with PROFINET CBÁ	
eas RAM	16 Mibyte	maximum	
 additionally buffered as RAM via central backup battery 	512 Kibyte	Amount of data	0.1711
Number of possible write cycles of the lash memory cells	100 000	 as user data for remote interconnec- tions with input variables in the case of acyclic transmission with PROFINET CBA 	8 Kibyte
Performance data PROFINET		PROFINET CBA as user data for remote interconnec-	8 Kibuta
Product function PROFINET IO controller	Yes	tions with output variables in the case of acyclic transmission with	U NIDYLE
Number of PN IO devices on	128	PROFINET CBA	
PROFINET IO controller usable total Number of PN IO IRT devices on	64	Performance data PROFINET CBA remote connection with cyclic transmission	
PROFINET IO controller usable Number of external PN IO lines with	4	Refresh time of the remote intercon-	10 ms
PROFINET per rack		nections with PROFINET CBA with cyclical transfer	
Communication

CP 443-1 Advanced

Article number	6GK7443-1GX30-0XE0	Article number	6GK7443-1GX30-0XE0
Product type designation	CP 443-1 Advanced	Product type designation	CP 443-1 Advanced
Number of remote connections to input variables with PROFINET CBA with cyclical transfer maximum	250	Product functions management, configuration	
Number of remote connections to	250	Product function MIB support	Yes
output variables with PROFINET CBA	250	Protocol is supported	
with cyclical transfer maximum		• SNMP v1	Yes
Amount of data		• SNMP v3	Yes
 as user data for remote interconnec- tions with input variables with 	2 000 byte	• DCP	Yes
PROFINET CBA with cyclical		• LLDP	Yes
transfer maximum		Configuration software	
 as user data for remote interconnec- tions with output variables with PROFINET CBA with cyclical 	2 000 byte	required	STEP 7 V5.5 SP3 or higher / ST Professional V12 (TIA Portal) or higher
transfer maximum		 for PROFINET CBA required 	SIMATIC iMap V3.0 SP1 and hi
Performance data PROFINET CBA		Product functions Diagnosis	
HMI variables via PROFINET acyclic Number of connectable HMI stations		Product function Web-based diagnostics	Yes
for HMI variables in the case of acyclic transmission with		Product functions switch	
PROFINET CBA		Product feature Switch	Yes
Refresh time of the HMI variables in	500 ms	Product function	
the case of acyclic transmission with PROFINET CBA		 switch-managed 	No
Number of HMI variables in the case	200	 with IRT PROFINET IO switch 	Yes
of acyclic transmission with	200	Configuration with STEP 7	Yes
PROFINET CBA maximum		Product functions Redundancy	
Amount of data as user data for HMI variables in the case of acyclic trans-	8 Kibyte	Product function	
mission with PROFINET CBA		Ring redundancy	Yes
maximum		Redundancy manager	Yes
Performance data PROFINET CBA device-internal connections		Protocol is supported Media Redun- dancy Protocol (MRP)	Yes
Number of internal connections with PROFINET CBA maximum	300	Product functions Security	
Amount of data of the internal connec-	2 400 byte	Firewall version	stateful inspection
tions with PROFINET CBA maximum	2 100 8910	Product function with VPN connection Type of encryption algorithms	AES-256, AES-192, AES-128,
Performance data PROFINET CBA connections to constants		with VPN connection Type of authentication procedure	3DES-168, DES-56 Preshared key (PSK),
Number of connections with constants with PROFINET CBA maximum	500	with VPN connection Type of hashing algorithms	X.509v3 certificates MD5, SHA-1
Amount of data as user data for inter- connections with constants with	4 000 byte	with VPN connection Number of possible connections	32
PROFINET CBA maximum Performance data PROFINET CBA		with VPN connection	02
PROFIBUS proxy functionality		Product function	
Product function with PROFINET CBA PROFIBUS proxy functionality	No	 password protection for Web applications 	Yes
Performance data telecontrol		ACL - IP-based	Yes
Protocol is supported		 ACL - IP-based for PLC/routing 	Yes
• TCP/IP	Yes	 switch-off of non-required services 	Yes
		 Blocking of communication via physical ports 	Yes
		log file for unauthorized access	No
		Product functions Time	
		Product function SICLOCK support	Yes
		Product function pass on time synchronization	Yes
		Protocol is supported NTP	Voc

Protocol is supported NTP

1

Yes

Communication

CP 443-1 Advanced

Ordering data	Article No.		Article No.
Communications processor CP 443-1 Advanced		IE FC TP Standard Cable GP 2 x 2 (Type A)	6XV1840-2AH10
for connecting the SIMATIC S7-400 CPU to Industrial Ethernet: 1 × 10/100/1000 Mbit/s; 4 × 10/100 Mbit/s (IE SWITCH); RJ45 ports; ISO; TCP; UDP; PROFINET IO controller, S7 communication; open communication		4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	
(SEND/RECEIVE); S7 routing; IP configuration via DHCP/block;		IE FC TP Standard Cable GP 4 x 2	
IP Access Control List; time synchronization; expanded web diagnostics; Fast Startup; PROFlenergy support; IP routing; FTP; web server; e-mail; PROFINET CBA		8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal applications; with UL approval; sold by the meter;	
 With security functionality (firewall and VPN) 	6GK7443-1GX30-0XE0	max. quantity 1000 m, minimum order 20 m	
Accessories		AWG22, for connection to IE FC BJ45 Modular Outlet	6XV1870-2E
IE FC RJ45 Plug 180 2 x 2		AWG24, for connection to IE FC RJ45 Plug 4 x 2	6XV1878-2A
RJ45 plug-in connector for Indu- strial Ethernet with a rugged metal		IE FC Stripping Tool	6GK1901-1GA00
enclosure and integrated insulation displacement contacts for connect- ing Industrial Ethernet FC installa- tion cables; with 180° cable outlet;		Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	
for network components and CPs/ CPUs with Industrial Ethernet Interface		Industrial Ethernet Switch SCALANCE X204-2	6GK5204-2BB10-2AA3
• 1 pack = 1 unit	6GK1901-1BB10-2AA0	Industrial Ethernet Switches with	
• 1 pack = 10 units	6GK1901-1BB10-2AB0	integral SNMP access, Web diag- nostics, copper cable diagnostics	
1 pack = 50 units	6GK1901-1BB10-2AE0	and PROFINET diagnostics for con-	
E FC RJ45 Plug 4 x 2		figuring line, star and ring topolo- gies; four 10/100 Mbit/s RJ45 ports	
RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a sturdy metal enclosure and inte-		and two FO ports Industrial Ethernet Switch SCALANCE X308-2	6GK5308-2FL00-2AA3
grated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network com- ponents and CPs/CPUs with Industrial Ethernet interface		2 x 1000 Mbit/s multimode fiber- optic cable ports (SC sockets), 1 x 10/100/1000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cable	
• 1 pack = 1 unit	6GK1901-1BB11-2AA0	(multimode) up to max. 750 m	
 1 pack = 10 units 1 pack = 50 units 	6GK1901-1BB11-2AB0 6GK1901-1BB11-2AE0		
le construction de la constructi		Nieter	

Note:

You can find order information for software for communication with PC systems in the IK PI catalog.

Communication

CP 443-1 OPC UA

Overview



CP 443-1 OPC UA communications processor

Technical specifications

Article number	6GK7443-1UX00-0XE0
Product type designation	CP 443-1 OPC UA
Transmission rate	
Transfer rate	
 for Industrial Ethernet 	10 1 000 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	1
Type of electrical connection	
 of Industrial Ethernet interface 	RJ45 port
Supply voltage, current consumption, power loss	
Type of voltage of the supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Relative symmetrical tolerance at DC	
• at 5 V	5 %
Consumed current	
 from backplane bus at DC at 5 V typical 	1.3 A
Power loss [W]	6.5 W
Permitted ambient conditions	
Ambient temperature	
 during operation 	0 60 °C
 during storage 	-40 +70 °C
 during transport 	-40 +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Protection class IP	IP20

Communications processor for connecting a SIMATIC S7-400 to Industrial Ethernet networks via OPC UA mechanisms.

The CP 443-1 OPC UA supports:

- PG/OP communication
- Communication via OPC UA as OPC UA server and/or OPC UA client for exchanging process data (data access)

The CP makes it possible to provide data for, or receive data from, other stations via a standardized OPC UA interface direct from the SIMATIC S7-400 controller. The CP can be used here as an OPC UA server and/or an OPC UA client. Communication as an OPC UA client takes place via user blocks standardized by the PLCopen organization. For more detailed information, see also:

www.plcopen.org/pages/tc4_communication/index.htm

It can be used in SIMATIC S7-400 H systems as well as in standard SIMATIC S7-400 systems, and for fail-safe applications (PROFIsafe) in connection with an S7-400 F-CPU.

Article number	6GK7443-1UX00-0XE0
Product type designation	CP 443-1 OPC UA
Design, dimensions and weight	
Module format	Compact module S7-400 single width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.7 kg
Product properties, functions, components general	
Number of units	
 per CPU maximum 	1
Performance data S7 communi- cation	
Number of possible connections for S7 communication	
 with PG connections maximum 	2
Performance data as OPC UA server	
Protocol is supported OPC UA Server	Yes
Number of possible connections to OPC UA clients maximum	10
Number of variables (items) maximum	64 000
Storage capacity for variables (items) in summary	64 000 byte
Number of monitorings (subscrip- tions)	
 per connection maximum permis- sible 	5
Number of variables (items)	
 per monitoring (subscriptions) maximum 	900
Memory capacity for monitored variables (items)	45 000 byte

Communication

CP 443-1 OPC UA

Technical specifications (continued)

Article number	6GK7443-1UX00-0XE0
Product type designation	CP 443-1 OPC UA
Performance data as OPC UA client	
Protocol is supported OPC UA Client	Yes
Number of possible cvonnections for OPC UA server maximum	5
Number of variables (items) over all connections reading/writing maximum	10 000
Protocol is supported	
SNMP v1	Yes
• SNMP v3	Yes

Article number	6GK7443-1UX00-0XE0
Product type designation	CP 443-1 OPC UA
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions Security	
Product function	
 password protection for Web appli- cations 	Yes
 encrypted data transmission 	Yes
 switch-off of non-required services 	Yes
 log file for unauthorized access 	Yes
Product functions Time	
Protocol is supported	
• NTP	Yes
NTP (secure)	Yes

Article No.		Article No.
6GK7443-1UX00-0XE0	IE FC TP Standard Cable GP 2 x 2 (Type A)	6XV1840-2AH10
	4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. order length 1000 m, minimum order 20 m	
	IE FC TP Standard Cable GP 4 x 2	
	8-core, shielded TP installation cable for connection to IE FC RJ45 modular outlet for universal applica- tions; with UL approval; sold by the meter; max. order quantity 1000 m,	
	AWG22, for connection to	6XV1870-2E
		6XV1878-2A
	IE FC RJ45 Plug 4 x 2	0.V1070-2A
	IE FC Stripping Tool	6GK1901-1GA00
	Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	
	SCALANCE X204-2	6GK5204-2BB10-2AA3
6GK1901-1BB10-2AA0		
	integral SNMP access, Web diag-	
	nostics, copper cable diagnostics	
	figuring line, star and ring topolo- gies; four 10/100 Mbps RJ45 ports and two FO ports	
	Industrial Ethernet Switch SCALANCE X308-2	6GK5308-2FL00-2AA3
6GK1901-1BB11-2AA0 6GK1901-1BB11-2AB0 6GK1901-1BB11-2AE0	2 x 1000 Mbit/s multimode fiber- optic cable ports (SC sockets), 1 x 10/100/1000 Mbps RJ45 port, 7 x 10/100 Mbps RJ45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	
	6GK7443-1UX00-0XE0 6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0 6GK1901-1BB10-2AE0	6GK7443-1UX00-0XE0 IE FC TP Standard Cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. order length 1000 m, minimum order 20 m IE FC TP Standard Cable GP 4 x 2 8-core, shielded TP installation cable for connection to IE FC RJ45 modular outlet for universal applica- tions; with UL approval; sold by the meter; max. order quantity 1000 m, minimum order 20 m • AWG22, for connection to IE FC RJ45 Modular Outlet • AWG22, for connection to IE FC RJ45 Plug 4 x 2 IE FC Stripping Tool • Pre-adjusted stripping tool for fast stripping of the industrial Ethernet FC cables SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diag- nostics, copper cable diagnostics and two FO ports Industrial Ethernet Switch SCALANCE X308-2 2 x 1000 Mbit/s multimode fiber- optic cable ports (SC sockets), 1 x 10/1100 Mbps RJ45 ports, 6GK1901-1BB11-2AB0

More information

You can find more information on the topic online at: www.siemens.com/simatic-classic-s7-opcua

Overview TIM 4R-IE DNP3

SIMATIC S7-400 advanced controller

Communication

TIM 4R-IE for WAN and Ethernet, TIM 4R-IE DNP3

Overview TIM 4R-IE for WAN and Ethernet



- SINAUT communications module TIM with four interfaces for SIMATIC S7-300 or as self-contained unit for the S7-400 for use in the wide area network (WAN)
- For universal use in a SINAUT station, node station and control center
- Internet communication via integrated MSC-VPN tunnel with direct connection to DSL router or operation via IPsec VPN with additional SIMATIC NET components
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dialup modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for complete recording of data and support of redundant communication paths
- Simple configuration and operation without specialist IT knowledge

For further information, see chapter 5, page 5/223.



In a station for the S7-CPU, the communication module TIM 4R-IE DNP3 (TeleControl Interface Module) handles the data exchange with the assigned SIMATIC PCS7 TeleControl V8.0 master system using the open DNP3 protocol. In addition, the V3.0 module now also supports master and node functionality.

- With the double-width S7-300 housing, the module can be fully integrated into the S7-300 system
- Can be connected as a stand-alone module to a SIMATIC S7-400 and SIMATIC S7-400 H System
- Two RS 232/RS 485 interfaces support connection of an external modem for data transmission via a conventional WAN or of a Modbus RTU slave to an S7-300 system
- The module has two RJ45 interfaces for data transmission via IP-based networks
- By using physically separate connection paths, the module permits media redundancy without loss of data during the switchover

For further information, see chapter 5, page 5/228.

SIPLUS S7-400 communication

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	8	
•	•	•	•	•		•	● ■	

- Connection of SIMATIC S7-400 to Industrial Ethernet - 2 x RJ45 interface for 10/100 Mbit/s full/half-duplex
 - 2 x RJ45 interface for 10/100 Mbit/s full/half-duplex connection with auto-sensing/auto-negotiation and auto-crossover function
 - Integrated real-time switch ERTEC with two ports
 - Multi-protocol operation for ISO, TCP/IP, UDP and PROFINET IO protocols
 - Adjustable Keep Alive function
- Communication services:
 - Open communication (ISO, TCP/IP, and UDP)
 - PROFINET IO Controller with real-time properties RT and IRT
 - PG/OP communication: Cross-network by means of S7
 - routing
 - S7 communication
- Media redundancy (MRP); the CP supports the media redundancy procedure MRP within an Ethernet network with ring topology.
- Multicast for UDP
- · Access protection via configurable access list
- Support for fail-safe programmable controllers together with SIMATIC S7-400 CPU 416F-3PN/DP
- Module replacement without PG
- Operation in the SIMATIC H system for redundant S7-communication
- Configuration with STEP 7
- Diagnostics possibilities in STEP 7 and via web browser
- Automatic CPU-clock setting via Industrial Ethernet with NTP or SIMATIC procedure
- Integration of network management systems via SNMP (MIB II diagnostic information)

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

	SIPLUS CP 443-1
Article No.	6AG1 443-1EX20-4XE0
Article number based on	6GK7 443-1EX20-0XE0
Ambient temperature range	0 +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies, except for the ambi- ent conditions
Ambient conditions	
Relative humidity	100 %, condensation/frost permissi- ble. No commissioning if condensa- tion present.
Biologically active substances, compliance with EN 60721-3-3	Class 3B2 mold spores, fungal spores (excluding fauna). The sup- plied plug covers must remain in place over the unused interfaces during operation!
Chemically active substances, compliance with EN 60721-3-3	Class 3C4 incl. salt spray in accor- dance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation!
Mechanically active substances, compliance with EN 60721-3-3	Class 3S4 incl. sand, dust. The sup- plied plug covers must remain in place over the unused interfaces during operation!
Air pressure (depending on the highest positive temperature range specified)	1080 795 hPa (-1000 +2000 m) see ambient temperature range 795 658 hPa (+2000 +3500 m) derating 10 K 658 540 hPa (+3500 +5000 m) derating 20 K

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

SIPLUS S7-400 communication

SIPLUS S7-400 CP 443-1

Ordering data	Article No.		Article No.
SIPLUS CP 443-1		Accessories	
communications processor For connecting SIMATIC S7-400 to		SIPLUS SCALANCE X204-2 Indu- strial Ethernet Switch	
Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO Con- troller, MRP; integrated real-time switch ERTEC with two ports; 2 x RJ-45 interface; S7 communica- tion, open communication (SEND/ RECEIVE) with FETCH/WRITE, with and without RFC 1006, DHCP,		Industrial Ethernet Switches with integral SNMP access, Web diag- nostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
SNMP V2, diagnostics, multicast, access protection over IP access		Extended temperature range and exposure to media	6AG1204-2BB10-4AA3
list, initialization over LAN 10/100 Mbit/s with electronic		IE FC RJ45 Plug 180	
manual on DVD		180° cable outlet; 1 unit	
Exposure to media 64	6AG1443-1EX20-4XE0	Extended temperature range and exposure to media	6AG1901-1BB10-7AA0
		Further accessories	See SIMATIC CP 443-1, page 1/102

SIPLUS S7-400 communication

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5	
•	•	•	•	•	•	•	G IKITO, XX, TOTEO	

- Connection of SIMATIC S7-400 to Industrial Ethernet
 Multi-protocol operation for ISO, TCP/IP, UDP and PROFINET IO protocols
 - Adjustable keep-alive function
- Two separate interfaces (integrated network separation):
 Gigabit interface with one RJ45 port with 10/100/1 000 Mbit/ s, full/half-duplex with auto-sensing capability
 - PROFINET interface with four RJ45 ports with 10/100 Mbit/s, full/half duplex with autosensing and autocrossover functionality via integrated 4-port switch
- · Communication services via both interfaces
 - Open communication (ISO, TCP/IP and UDP), multicast with UDP, including routing between both interfaces
 - PG/OP communication: Cross-network by means of S7 routing
 - S7 communication (client, server, multiplexing) including
 - routing between both interfaces - IT communication:
 - HTTP communication supports access to process data via own Web pages:

e-mail client function, sending of e-mails with authentication directly from user program;

FTP communication supports program-controlled FTP client communication;

access to data blocks through FTP server

- Communication services via PROFINET interface
- PROFINET IO controller with real-time properties (RT and IRT)
- PROFINET CBA

•

- IP address assignment via DHCP, simple PC tool or via the user program (e.g. HMI)
- Support of the prioritized startup of PROFINET IO devices
- Configuration with STEP 7
- Media redundancy (MRP); the CP supports the media redundancy procedure MRP within an Ethernet network with ring topology.
- · Access protection by means of configurable IP access list
- Module replacement without programming device; all information is stored on the C-PLUG (also file system for IT functions)

- Extensive diagnostic functions for all modules in the rack
- Integration into network management systems through the support of SNMP V1 MIB-II
- Operation in the SIMATIC H system for redundant S7-communication
- Operation in fail-safe applications (PROFIsafe) in combination with SIMATIC S7-400 CPU 416F

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

	SIPLUS CP 443-1 Advanced
Article No.	6AG1443-1GX30-4XE0
Article number based on	6GK7443-1GX30-0XE0
Ambient temperature range	0 +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical data	The technical data of the standard product applies, except for the ambient conditions
Ambient conditions	
Relative humidity	100 %, condensation/frost permissi- ble. No commissioning if condensa- tion present.
Biologically active substances, compliance with EN 60721-3-3	Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation!
Chemically active substances, compliance with EN 60721-3-3	Class 3C4 incl. salt spray in accor- dance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation!
Mechanically active substances, compliance with EN 60721-3-3	Class 3S4 incl. sand, dust. The sup- plied plug covers must remain in place over the unused interfaces during operation!
Air pressure (depending on the highest positive temperature range specified)	1 080 795 hPa (-1 000 +2 000 m) see ambient temperature range 795 658 hPa (+2 000 +3 500 m) derating 10 K 658 540 hPa (+3 500 +5 000 m) derating 20 K

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

SIPLUS S7-400 communication

SIPLUS S7-400 CP 443-1 Advanced

Ordering data	Article No.		Article No.
SIPLUS S7-400 CP 443-1 Advan-		Accessories	
ced communications processor		SIPLUS SCALANCE X204-2 Indu- strial Ethernet Switch	
For the connection of SIMATIC S7-400 to Industrial Ethernet; PROFINET IO Controller with RT and IRT, MRP, PROFINET CBA, TCP/IP, ISO and UDP; S7 communication, open communication (SEND/RECEIVE) with FETCH/		Industrial Ethernet Switches with integral SNMP access, Web diag- nostics, copper cable diagnostics and PROFINET diagnostics for con- figuring line, star and ring topolo- gies; four 10/100 Mbit/s RJ45 ports and two FO ports	
WRITE, with and without RFC 1006, diagnostic expansions, multicast, clock synchronization via		Extended temperature range and exposure to media	6AG1204-2BB10-4AA3
SIMATIĆ procedure or NTP, access protection via IP access list,		SIPLUS SCALANCE X308-2 Indu- strial Ethernet Switch	
TTP client/server, HTTP server, HTML diagnostics, SNMP, DHCP, e-mail, data storage on C-PLUG; PROFINET interface: 4 x RJ-45 (10/100 Mbit/s) over switch; Gigabit interface: 1 x RJ45 (10/100/1000 Mbit/s)		2 x 1000 Mbit/s multimode fiber-optic ports (SC sockets), 1 x 10/100/1000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	
Exposure to media	6AG1443-1GX30-4XE0	Exposure to media	6AG1308-2FL00-4AA3
		SIPLUS NET RJ45 Plug 180	
		180° cable outlet; 1 unit	
		Extended temperature range and exposure to media	6AG1901-1BB10-7AA0
		SIPLUS NET RJ45 Plug 90	
		90° cable outlet; 1 unit	
		Extended temperature range and exposure to media	6AG1901-1BB20-7AA0
		Further accessories	See SIMATIC CP 443-1 Advanced, page 1/106

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SIPLUS S7-400 communication

Overview



DP-IVI	DP-5	FIVIS	PG/OP	37/33	
•			•	•	G_M10_XX_10154

- DP-V1 master connection of the S7-400 to PROFIBUS
- · For setting up additional PROFIBUS DP lines
- Communication services:
 - PROFIBUS DP
 - PG/OP communication
 - S7 communication
 - S5-compatible communication (SEND/RECEIVE)
- Clock synchronization
- · Easy programming and configuration over PROFIBUS
- Cross-network programming device communication through S7 routing
- Can be easily integrated into the SIMATIC S7-400 system
- · Module replacement without PG
- SIMATIC H system operation for redundant S7 communication or DP master communication
- Data record routing (PROFIBUS DP)
- Adding or modifying distributed I/O during operation

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

	SIPLUS CP 443-5-Extended
Article No.	6AG1 443-5DX05-4XE0
Article No. based on	6GK7 443-5DX05-0XE0
Ambient temperature range	0 +60 °C
Conformal coating	Coating of the printed circuit boards and the electronic components
Technical specifications	The technical specifications of the standard product apply, except for the ambient conditions
Ambient conditions	
Relative humidity	100 %, condensation/frost permissi- ble. No commissioning if condensa- tion present.
Biologically active substances, com- pliance with EN 60721-3-3	Class 3B2 mold and fungal spores (excluding fauna). The supplied plug covers must remain in place over the unused interfaces during operation!
Chemically active substances, com- pliance with EN 60721-3-3	Class 3C4 incl. salt spray in accor- dance with EN60068-2-52 (degree of severity 3). The supplied plug covers must remain in place over the unused interfaces during operation!
Mechanically active substances, compliance with EN 60721-3-3	Class 3S4 incl. sand, dust. The sup- plied plug covers must remain in place over the unused interfaces during operation!
Air pressure (depending on the highest positive temperature range specified)	1080 795 hPa (-1000 +2000 m) see ambient temperature range 795 658 hPa (+2000 +3500 m) derating 10 K 658 540 hPa (+3500 +5000 m) derating 20 K

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Ordering data	Article No.	
SIPLUS S7-400 CP 443-5 Exten- ded communications processor		
for connecting SIMATIC S7-400 to PROFIBUS; Extended Version for PROFIBUS DP; with electronic manual, on CD-ROM		
Exposure to media	6AG1443-5DX05-4XE0	
Accessories	See SIMATIC CP 443-5 Extended, page 1/99	

Connection methods

Front connectors



- For simple and user-friendly connection of sensors and actuators
- For retaining the wiring when replacing modules
- With coding to avoid mistakes when replacing modules

Ordering data	Article No.
Front connectors	
 48-pin for signal modules, function modules; 1 unit With screw contacts With spring-loaded terminals With crimp contacts 	6ES7492-1AL00-0AA0 6ES7492-1BL00-0AA0 6ES7492-1CL00-0AA0
48-pin for signal modules, function modules; 84 units per packWith screw contactsWith crimp contacts	6ES7492-1AL00-1AB0 6ES7492-1CL00-1AB0
for 6ES7 431-7KF00-0AB0; spare part, included in scope of delivery; 1 piece	6ES7431-7KF00-6AA0
Crimp contacts	6XX3070
250 units	
Crimping tool	6XX3071
for crimping the contacts	
Front cover for front connector	6ES7492-2XL00-0AA0
6 units	
Connection terminal for modules	6ES7490-1BA00-0AA0
6 units	
SIMATIC Manual Collection	6ES7998-8XC01-8YE0
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	6ES7998-8XC01-8YE2
Current "Manual Collection" DVD and the three subsequent updates	

Connection methods

System cabling for SIMATIC S7-400

Overview

Wiring of SIMATIC S7 I/O modules with the sensors/actuators is a significant factor with respect to time/cost overhead, configuring, control cabinet installation, procurement and ease of service.

With SIMATIC TOP connect system cabling, it is simple and quick to establish a reliable connection for your SIMATIC S7-300/ 400.

With the TIA Selection Tool, a mouse click is all that is required to configure the connection from the SIMATIC S7 module to the I/O. The program automatically checks for plausibility and generates a parts list for the selected connection components that can then be ordered in the Industry Mall.

Further information can be found on the Internet at

www.siemens.com/tia-selection-tool

Flexible connection



Flexible connection enables fast, direct connection of the SIMATIC S7-300/400 input/output modules to the individual elements in the control cabinet.

Attached single cores reduce the wiring outlay.

Wire cross-sections of 0.5 mm² allow higher currents, too.

Connection methods

S7-400 front connector with single cores



- Can be used for modules of the SIMATIC S7-400.
- The front connectors with single wires replace the standard SIMATIC connectors:
 - 6ES7492-1AL00-0AA0
 - 6ES7492-1BL00-0AA0
 - 6ES7492-1CL00-0AA0

Technical specifications				
Front connector with single cores				
Rated operating voltage	24 V DC			
Max. permissible continuous current with simultaneous load on all cores	1.0 A			
Permissible ambient temperature	0 to +60 °C			
Core type	H05V-K or with UL style 1007/1569 CSA TR64			
Number of cores	46			
Core cross-section	0.5 mm², Cu			
Bundle diameter in mm	approx. 17			
Core color	Blue, RAL 5010			
Designation of cores	Numbered 3 to 48 (adapter contact = core number)			
Assembly	Screw-type or crimp contacts			

Ordering data	Article No.
Front connector with single cores for 32-channel module SIMATIC S7-400, 46 x 0.5 mm ²	
Core type H05V-K	
Screw connection	
Packaging unit: 1 unit Length: • 2.5 m • 3.2 m • 5 m • Custom lengths	6ES7922-4BC50-0AD0 6ES7922-4BD20-0AD0 6ES7922-4BF00-0AD0 On request
Packaging unit: 5 units Length: • 2.5 m • 3.2 m • 5 m	6ES7922-4BC50-5AD0 6ES7922-4BD20-5AD0 6ES7922-4BF00-5AD0
Crimp connection Packaging unit: 1 unit Length: • 2.5 m • 3.2 m • 5 m • Custom lengths	6ES7922-4BC50-0AE0 6ES7922-4BD20-0AE0 6ES7922-4BF00-0AE0 On request
Packaging unit: 5 units Length: • 2.5 m • 3.2 m • 5 m Core type UL/CSA-certified	6ES7922-4BC50-5AE0 6ES7922-4BD20-5AE0 6ES7922-4BF00-5AE0
Screw-type version	
Packaging unit: 1 unit • 3.2 m • 5 m • Custom lengths	6ES7922-4BD20-0UD0 6ES7922-4BF00-0UD0 On request

Racks

Overview



- The basic mechanical framework of the SIMATIC S7-400/S7-400H
- For accommodating the modules, supplying them with operating voltage and connecting them via the backplane bus
- Several versions for configuring central controllers and expansion racks

UR1 (Universal Rack)

- · For setting up central controllers and expansion units
- For holding up to 18 modules
- Also suitable for S7-400H
- Also available as aluminum rack

UR2 (Universal Rack)

- · For setting up central controllers and expansion units
- For holding up to 9 modules
- Also suitable for S7-400H
- Also available as aluminum rack

Technical specifications

6ES7400-1TA01-6ES7400-1TA11-6ES7400-1JA01-6ES7400-1JA11-6ES7401-2TA01-6ES7401-1DA01-Article number 0AA0 0AA0 0AA0 0AA0 0AA0 0AA0 S7-400, UR1 S7-400, UR1 S7-400, UR2 S7-400 SIMATIC S7-400, S7-400 RACK, 18 SLOTS RACK ALU, RACK, 9 SLOTS RACK ALU UR2, CR2 RACK, CR3 RACK, 18 SLOTS 9 SLOTS 18 SLOTS 4 SLOTS Product type designation Hardware configuration Rack Yes Yes Communication bus Yes Yes Yes Yes • P bus Yes Yes Yes Yes Yes Yes Slots 9 9 · Number of single-width slots, max. 18 18 18; 2 segments 4 with 8 or 10 slots Dimensions Width 482.5 mm 482.5 mm 257.5 mm 257.5 mm 482.5 mm 130 mm Height 290 mm 290 mm 290 mm 290 mm 290 mm 290 mm Depth 27.5 mm 27.5 mm 27.5 mm 27.5 mm 27.5 mm 27.5 mm Weights 2 200 g 4 200 g Weight, approx 4 200 g 3 000 g 1 500 g 750 g

CR2 (Central Rack)

- · For setting up central controllers
- For holding up to 18 modules
- Segmented rack:

For operating two mutually independent S7-400 CPUs without S7-400 Multicomputing, but with communication between the CPUs over the backplane bus (C bus). Both CPUs can address their own local I/O modules (segmented P bus).

CR3 (Central Rack)

- · For configuring central racks
- Optimized for distributed automation solutions due to holding up to 4 modules

UR2-H

- For configuring a complete S7-400H system in one subrack
- Also suitable for S7-400: Operation of 2 separate CPUs with their own I/O (separate P and C buses)
- Can also be used as an expansion unit
- For holding up to 18 modules
- Also available as aluminum rack

ER1 (Extension Rack)

- · For setting up expansion units economically
- For holding up to 18 modules with restricted functionality
- Also suitable for S7-400H
- Also available as aluminum rack

ER2 (Extension Rack)

- For setting up expansion units economically
- For holding up to 9 modules with restricted functionality
- Also suitable for S7-400H
- Also available as aluminum rack

Racks

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SIMATIC S7-400 advanced controller

Racks

Racks

Article number	6ES7400-2JA00- 0AA0	6ES7400-2JA10- 0AA0	6ES7403-1TA01- 0AA0	6ES7403-1TA11- 0AA0	6ES7403-1JA01- 0AA0	6ES7403-1JA11- 0AA0
	SIMATIC S7-400H, UR2-H RACK, 18 SLOTS	S7-400 MOD.TR ALU UR2-H, 18 SLOTS	SIMATIC S7-400, ER1 EXP. RACK,	S7-400, ER1 EXPANSION RACK ALU, 18 SLOTS	SIMATIC S7-400, ER2 EXP. RACK,	S7-400, ER2 EXPANSION RACK ALU, 9 SLOTS
Product type designation						
Hardware configuration						
Rack						
 Communication bus 	Yes	Yes				
• P bus	Yes	Yes	Yes	Yes	Yes	Yes
Slots						
• Number of single-width slots, max.	18	18	18	18	9	9
Dimensions						
Width	482.5 mm	482.5 mm	482.5 mm	482.5 mm	257.5 mm	257.5 mm
Height	290 mm	290 mm	290 mm	290 mm	290 mm	290 mm
Depth	27.5 mm	27.5 mm	27.5 mm	27.5 mm	27.5 mm	27.5 mm
Weights						
Weight, approx.	4 200 g	3 000 g	4 200 g	2 500 g	2 200 g	1 250 g

Article No.		Article No.
6ES7400-1TA01-0AA0	UR2-H rack	6ES7400-2JA00-0AA0
	for split CCs, 18 slots	
	UR2-H aluminum rack	6ES7400-2JA10-0AA0
6ES7400-1TA11-0AA0	for split CCs, 18 slots	
	ER1 rack	6ES7403-1TA01-0AA0
6ES7400-1JA01-0AA0	for expansion units, P bus only, 18 slots	
	ER1 aluminum rack	6ES7403-1TA11-0AA0
6ES7400-1JA11-0AA0	for expansion units, P bus only, 18 slots	
	ER2 rack	6ES7403-1JA01-0AA0
6ES7401-2TA01-0AA0	for expansion units, P bus only, 9 slots	
	ER2 aluminum rack	6ES7403-1JA11-0AA0
6ES7401-1DA01-0AA0	for expansion units, P bus only, 9 slots	
	Slot cover	6ES7490-1AA00-0AA0
	10 units (spare part)	
	6ES7400-1TA01-0AA0 6ES7400-1TA11-0AA0 6ES7400-1JA01-0AA0 6ES7400-1JA11-0AA0 6ES7401-2TA01-0AA0	6ES7400-1TA01-0AA0UR2-H rack for split CCs, 18 slots6ES7400-1TA11-0AA0IR2-H aluminum rack for split CCs, 18 slots6ES7400-1JA01-0AA0ER1 rack for expansion units, P bus only, 18 slots6ES7400-1JA11-0AA0ER1 aluminum rack for expansion units, P bus only, 18 slots6ES7400-1JA11-0AA0ER2 rack for expansion units, P bus only, 18 slots6ES7401-2TA01-0AA0ER2 rack for expansion units, P bus only, 9 slots6ES7401-1DA01-0AA0Slot cover

Racks

Overview



- The mechanical basic structure of SIPLUS S7-400/S7-400H
- For accommodating the modules, operating voltage supply, and connection of the modules via a backplane bus
- Several versions for setting up central controllers and expansion units
- SIPLUS rack material: Aluminum

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

For further technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Article number	6AG1400-1TA11-7AA0	6AG1400-1JA11-7AA0	6AG1400-2JA10-7AA0
Based on	6ES7400-1TA11-0AA0	6ES7400-1JA11-0AA0	6ES7400-2JA10-0AA0
	SIPLUS S7-400 RACK UR1 18SLOT ALU	SIPLUS S-400 RACK UR2 9SLOT ALU	SIPLUS S7-400 BGT UR2-H 2X9SLOT ALU
Ambient conditions			
Ambient temperature in operation			
• Min.	-25 °C; = Tmin	-25 °C; = Tmin	-25 °C
• max.	70 °C; = Tmax	70 °C; = Tmax	70 °C
Extended ambient conditions			
Relative to ambient temperature- atmospheric pressure-installation altitude	Tmin Tmax at 1080 hPa 795 hPa (Tmin (Tmax - 10K) at 795 hPa 658 Tmin (Tmax - 20K) at 658 hPa 540	3 hPa (+2000 m +3500 m) //	
Relative humidity			
- With condensation, max.	100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under condensation conditions)		
Resistance			
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!		
 against chemically active substances / conformity with EN 60721-3-3 	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!		
 against mechanically active substances / conformity with EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must re	emain on the unused interfaces during c	operation!
Ordering data	Article No.		Article No.

Ordering data	Article No.		Article No.
SIPLUS S7-400 rack		UR2-H aluminum rack	
UR1 aluminum rack		for central controllers and expansion units, 9 slots	
for central controllers and			CA C1 400 0 14 10 74 40
expansion units, 18 slots		Extended temperature range and exposure to media	6AG1400-2JA10-7AA0
Extended temperature range and exposure to media	6AG1400-1TA11-7AA0	Accessories	See SIMATIC rack S7-400,
UR2 aluminum rack			page 1/119
for central controllers and expansion units, 9 slots			
Extended temperature range and exposure to media	6AG1400-1JA11-7AA0		
exposure to media			

Interface modules

IM 460-0

Overview



- Send interface module for central expansion to 5 m
- Transmission of P and K bus
- Can be plugged into the central controller
- Up to 8 expansion racks can be connected (up to 4 per interface)
- Can be used exclusively with IM 461-0

Article number	6ES7460-0AA01-0AB0		
	TRANSMITT. INTERF.MOD. IM460-0, W. K BUS		
Product type designation			
Input current			
from backplane bus 5 V DC, max.	140 mA		
Power losses			
Power loss, max.	700 mW		
Hardware configuration			
Cable length between first and last interface module, max.	5 m		
Dimensions			
Width	25 mm		
Height	290 mm		
Depth	217 mm		
Weights			
Weight, approx.	600 g		

Ordering data	Article No.
IM 460-0 interface module	6ES7460-0AA01-0AB0
Send interface module for central connection up to 5 m; with C bus transmission	
468-1 connecting cable	
between IM 460-0 and IM 461-0; IM 460-3 and IM 461-3	
0.75 m	6ES7468-1AH50-0AA0
1.5 m	6ES7468-1BB50-0AA0
5 m	6ES7468-1BF00-0AA0

Interface modules

Overview

IM 461-0



- Receive interface for centralized expansion up to 5 m
- Transmission of P and K bus
- Can be plugged into expansion rack
- To be used exclusively with IM 460-0

Article number	6ES7461-0AA01-0AA0
	RECEIVER INTERF. MOD. IM461-0, W. K-BUS
Product type designation	
Input current	
from backplane bus 5 V DC, max.	290 mA
Power losses	
Power loss, max.	1 450 mW
Hardware configuration	
Cable length between first and last interface module, max.	5 m
Dimensions	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	610 g

Ordering data	Article No.
IM 461-0 interface module	6ES7461-0AA01-0AA0
Receive interface module for central connection up to 5 m; with C bus transmission	
468-1 connecting cable	
between IM 460-0 and IM 461-0; IM 460-3 and IM 461-3	
0.75 m	6ES7468-1AH50-0AA0
1.5 m	6ES7468-1BB50-0AA0
5 m	6ES7468-1BF00-0AA0
Terminating connector	6ES7461-0AA00-7AA0
for IM 461-0	

Interface modules

IM 460-1

Overview



- Send interface module for central expansion to 1.5 m
- Transmission of P bus
- With voltage supply for expansion units
- Can be plugged into the central controller
- Up to 2 expansion racks can be connected (up to 1 per interface)
- Can be used exclusively with IM 461-1

Article number	6ES7460-1BA01-0AB0
	TRANSMITT. INTERF.MOD. IM460-1,W/O K BUS
Product type designation	
Input current	
from backplane bus 5 V DC, max.	85 mA
Power losses	
Power loss, max.	425 mW
Hardware configuration	
Cable length between first and last interface module, max.	1.5 m
Dimensions	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	600 g

Ordering data	Article No.
IM 460-1 interface module	6ES7460-1BA01-0AB0
Send interface module for central connection up to 1.5 m; with 5 V power supply, without C bus transmission	
468-3 connecting cable	
between IM 460-1 and IM 461-1;	
0.75 m	6ES7468-3AH50-0AA0
1.5 m	6ES7468-3BB50-0AA0

Interface modules

Overview



- Receive interface connection for centralized extension up to 1.5 m
- Transmission of P bus
- With voltage supply for expansion units
- Can be plugged into expansion unit
- Can only be used with IM 460-1

Article number	6ES7461-1BA01-0AA0
	RECEIVER INTERF. MOD. IM461-1, W/O K-BUS
Product type designation	
Input current	
from backplane bus 5 V DC, max.	120 mA
Power losses	
Power loss, max.	600 mW
Hardware configuration	
Cable length between first and last interface module, max.	1.5 m
Dimensions	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	610 g

Ordering data	Article No.
IM 461-1 interface module	6ES7461-1BA01-0AA0
Receive IM for central coupling up to max. 1.5 m; without C bus transfer	
468-3 connecting cable	
For connecting IM 460-1 and IM 461-1	
0.75 m	6ES7468-3AH50-0AA0
1.5 m	6ES7468-3BB50-0AA0

SIMATIC S7-400 advanced controller

Interface modules

IM 460-3

Overview



- Send interface module for distributed expansion to 102 m
- Transmission of K and P bus
- Can be plugged into the central controller
- Up to 8 expansion racks can be connected (up to 4 per interface)
- Can be used exclusively with IM 461-3

Article number	6ES7460-3AA01-0AB0
	TRANSMITT. INTERF.MOD- IM460-3,UP TO 102M
Product type designation	
Input current	
from backplane bus 5 V DC, max.	1 550 mA
Power losses	
Power loss, max.	7 750 mW
Hardware configuration	
Cable length between first and last interface module, max.	102.25 m
Dimensions	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	630 g

Ordering data	Article No.
IM 460-3 interface module	6ES7460-3AA01-0AB0
Send interface module for distributed connection up to 102 m; with C bus transmission	
468-1 connecting cable	
between IM 460-3 and IM 461-3	
0.75 m	6ES7468-1AH50-0AA0
1.5 m	6ES7468-1BB50-0AA0
5 m	6ES7468-1BF00-0AA0
10 m	6ES7468-1CB00-0AA0
25 m	6ES7468-1CC50-0AA0
50 m	6ES7468-1CF00-0AA0
100 m	6ES7468-1DB00-0AA0

Interface modules

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Overview

IM 461-3



- Receive interface for distributed expansion up to 102 m
- Transmission of data from the P-bus and C-bus
- Can be plugged into expansion rack
- To be used exclusively with IM 460-3

Article number	6ES7461-3AA01-0AA0
	RECEIVER INTERF. MOD. IM461-3,UP TO 102M
Product type designation	
Input current	
from backplane bus 5 V DC, max.	620 mA
Power losses	
Power loss, max.	3 100 mW
Hardware configuration	
Cable length between first and last interface module, max.	102.25 m
Dimensions	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	620 g

Ordering data	Article No.
IM 461-3 interface module	6ES7461-3AA01-0AA0
Receive interface module for dis- tributed connection up to 102 m; with C bus transmission	
468-1 connecting cable	
between IM 460-3 and IM 461-3	
0.75 m	6ES7468-1AH50-0AA0
1.5 m	6ES7468-1BB50-0AA0
5 m	6ES7468-1BF00-0AA0
10 m	6ES7468-1CB00-0AA0
25 m	6ES7468-1CC50-0AA0
50 m	6ES7468-1CF00-0AA0
100 m	6ES7468-1DB00-0AA0
Terminating connector	6ES7461-3AA00-7AA0
for IM 461-3	

Interface modules

IM 463-2

Overview



- Send interface for distributed expansion with SIMATIC S5
 expansion racks up to 600 m
- Can be plugged into the central controller
- Up to 8 SIMATIC S5 expansion racks can be connected (up to 4 per interface)
- Can be used exclusively with IM 314

Article number	6ES7463-2AA00-0AA0
	TRANSMITT. INTERF.MOD- IM463-2 COUPL. M. S5
Product type designation	
Input current	
from backplane bus 5 V DC, max.	1 320 mA
Power losses	
Power loss, max.	6 600 mW
Hardware configuration	
Cable length between first and last interface module, max.	600 m
Dimensions	
Width	25 mm
Height	290 mm
Depth	217 mm
Weights	
Weight, approx.	360 g

Ordering data

IM 463-2 interface module

Receiving IM for distributed coupling of SIMATIC S5-EUs up to max. 600 m

Article No.

6ES7463-2AA00-0AA0

237403-2AA00-0

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SIPLUS S7-400 interface modules

Overview



- Send interface module for centralized expansion up to 5 m
- Transfer from P and K Bus
- Plug into central controller
- You may connect up to 8 expansion units (max. 4 per port)
- Usable exclusively with IM 461-0

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respec tive standard products. SIPLUS extreme specific information was added.

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Article number	6AG1460-0AA01-2AB0
Based on	6ES7460-0AA01-0AB0
	SIPLUS S7-400 IM460-0 TX
Ambient conditions	
Ambient temperature in operation	
• Min.	-25 °C; = Tmin
• max.	60 °C; = Tmax
Extended ambient conditions	
Relative to ambient temperature- atmospheric pressure-installation altitude	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)
Relative humidity	
- With condensation	100 %; Relative humidity, incl. condensation / frost permitte (no commissioning under conder sation conditions)
Resistance	
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and rot spores (with the exception of fauna). The supplied connector covers must remain on the unuse interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (deg of severity 3). The supplied connector covers must remain on unused interfaces during operation
 against mechanically active substances / conformity with EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers m remain on the unused interfaces during operation!
Ordering data	Article No.
SIPLUS S7-400 interface module	
IM 460-0	
Send IM for central coupling	

up to 5 m; with K-bus transfer Extended temperature range and	6AG1460-0AA01-2AB0
exposure to media	
Accessories	See SIMATIC IM 460-0, page 1/122

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Technical anasifications

SIMATIC S7-400 advanced controller

SIPLUS S7-400 interface modules

SIPLUS S7-400 IM 461-0



- Receive interface connection for central extension up to 5 m
- Transfer from P and K Bus
- Pluggable in extension device
- Usable exclusively with IM 460-0

Note:

Overview

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Article number	6AG1461-0AA01-2AA0
Based on	6ES7461-0AA01-0AA0
	SIPLUS S7-400 IM461-0 RX
Ambient conditions	
Ambient temperature in operation	
• Min.	-25 °C; = Tmin
• max.	60 °C; = Tmax
Extended ambient conditions	
 Relative to ambient temperature- atmospheric pressure-installation altitude 	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)
Relative humidity	
- With condensation	100 %; Relative humidity, incl. condensation / frost permitted (no commissioning under conden- sation conditions)
Resistance	
 against biologically active substances / conformity with EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
 against mechanically active substances / conformity with EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust. The supplied connector covers mus remain on the unused interfaces during operation!
Ordering data	Article No.

 Receiver IM for central coupling up to 5 m; with C-bus transfer
 6AG1461-0AA01-2AA0

 Extended temperature range and exposure to media
 6AG1461-0AA01-2AA0

 Accessories
 See SIMATIC IM 461-0, page 1/123

Power supplies

Overview



- Power supplies for SIMATIC S7-400
- For conversion of AC or DC line voltages to the 5 V DC and 24 V DC operating voltages required
- 4 A, 10 A and 20 A output currents
- In addition:
 - SIPLUS power supply 6AG1405-0KA02-2AA0 for temperature range of -25 to +60 °C and use under medium load (e.g. chlorine/sulfur atmosphere).
 Technical specifications similar to 6ES7405-0KA02-0AA0
 - SIPLUS power supply 6AG1407-0KA02-4AA0 for use under medium load (e.g. chlorine/sulfur atmosphere).
 - Technical specifications similar to 6ES7407-0KA02-0AA0 - SIPLUS power supply 6AG1407-0KR02-4AA0 for use under medium load (e.g. chlorine/sulfur atmosphere). Technical specifications as for 6ES7407-0KR02-0AA0

Article number	6ES7405-0DA02-0AA0	6ES7405-0KA02-0AA0	6ES7405-0KR02-0AA0	6ES7405-0RA02-0AA0
	PS405 POWER SUPPLY, DC24/48/60V, DC5V/4A	POWER SUPP. PS405, DC24/48/60V, DC5V/10A	POWER SUPP. PS405, DC24/48/60V, DC5V/10A, RED	PS405 POWER SUPPLY, DC24/48/60V, DC5V/20A
Product type designation				
Supply voltage				
Rated value (DC)				
• 24 V DC	Yes	Yes	Yes	Yes
• 48 V DC	Yes	Yes	Yes	Yes
• 60 V DC	Yes	Yes	Yes	Yes
permissible range, lower limit (DC)	19.2 V; Dynamic 18.5 V	19.2 V; Dynamic 18.5 V	19.2 V; Dynamic 18.5 V	19.2 V; Dynamic 18.5 V
permissible range, upper limit (DC)	72 V; dynamic 75.5 V	72 V; dynamic 75.5 V	72 V; dynamic 75.5 V	72 V; dynamic 75.5 V
Mains buffering				
Mains/voltage failure stored energy time	20 ms	20 ms	20 ms	20 ms
 Mains buffering according to NAMUR recommendation 	Yes	Yes	Yes	Yes
Input current				
Rated value at 24 V DC	2 A	4 A	4 A	7 A
Rated value at 48 V DC	1 000 mA	2 A	2 A	3.2 A
Rated value at 60 V DC	800 mA	1.6 A	1.6 A	2.5 A
Inrush current, max.	18 A; Full width at half maximum 20 ms	18 A; Full width at half maximum 20 ms	18 A; Full width at half maximum 20 ms	56 A; Full width at half maximum 1.5 ms
Output voltage				
Type of output voltage Rated value (DC)	DC	DC	DC	DC
• 5 V DC	Yes	Yes	Yes	Yes
• 24 V DC	Yes	Yes	Yes	Yes
Output current				
for backplane bus (5 V DC), max.	4 A; no base load required	10 A; no base load required	10 A; no base load required	20 A; no base load required
for backplane bus (24 V DC), max.	0.5 A; idling-proof	1 A; idling-proof	1 A; idling-proof	1 A; idling-proof
short-circuit protection	Yes	Yes	Yes	Yes
Power				
Power consumption, typ.	48 W	95 W	95 W	168 W
Power losses				
Power loss, typ.	16 W	20 W	20 W	44 W
Battery				
Backup battery				
Backup battery				
- Backup battery (optional)	Yes; 1 x lithium AA; 3.6 V/2.3 Ah	Yes; 2 x lithium AA; 3.6 V/2.3 Ah	Yes; 2 x lithium AA; 3.6 V/2.3 Ah	Yes; 2 x lithium AA; 3.6 V/2.3 Ah

Power supplies

PS 405/407 power supplies

Article number	6ES7405-0DA02-0AA0	6ES7405-0KA02-0AA0	6ES7405-0KR02-0AA0	6ES7405-0RA02-0AA0
	PS405 POWER SUPPLY, DC24/48/60V, DC5V/4A	POWER SUPP. PS405, DC24/48/60V, DC5V/10A	POWER SUPP. PS405, DC24/48/60V, DC5V/10A, RED	PS405 POWER SUPPLY, DC24/48/60V, DC5V/20A
Hardware configuration				
Slots				
 Required slots 	1	2	2	2
Galvanic isolation				
primary/secondary	Yes	Yes	Yes	Yes
Degree and class of protection				
Protection class	1; with protective conductor	1; with protective conductor	1; with protective conductor	1; with protective conduct
Standards, approvals, certificates				
FM approval	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4
Connection method				
Connecting cables/cross sections	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 mm to 9 mm	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 mm to 9 mm	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 mm to 9 mm	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter mm to 9 mm
Dimensions				
Width	25 mm	50 mm	50 mm	50 mm
Height	290 mm	290 mm	290 mm	290 mm
Depth	217 mm	217 mm	217 mm	217 mm
Weights				
Weight, approx.	760 g	1 200 g	1 200 g	1 300 g
Article number	6ES7407-0DA02-0AA0	6ES7407-0KA02-0AA0	6ES7407-0KR02-0AA0	6ES7407-0RA02-0AA0
	POWER SUPPLY PS407, 120/230V UC, 5V DC/4A	PS407 POWER SUPPLY, 120/230V UC, 5V DC/10A	POWER SUPP. PS407, UC120/230V, DC5V/10A, RED.	PS407 POWER SUPPLY, 120/230V UC, 5V DC/20A
Product type designation				
Supply voltage				
Rated value (DC)				
• 120 V DC	Yes	Yes	Yes	Yes
• 230 V DC	Yes	Yes	Yes	Yes
permissible range, lower limit (DC)	88 V	88 V	88 V	88 V
permissible range, upper limit (DC) Rated value (AC)	300 V	300 V	300 V	300 V
• 120 V AC	Yes	Yes	Yes	Yes
• 230 V AC	Yes	Yes	Yes	Yes
permissible range, lower limit (AC)	85 V	85 V	85 V	85 V
permissible range, upper limit (AC)	264 V	264 V	264 V	264 V
Line frequency		2011	2011	2011
Bated value 50 Hz	Yes	Yes	Yes	Yes
Rated value 60 Hz	Yes	Yes	Yes	Yes
 permissible frequency range, lower limit 	47 Hz	47 Hz	47 Hz	47 Hz
 permissible frequency range, upper limit 	63 Hz	63 Hz	63 Hz	63 Hz
Mains buffering				
 Mains/voltage failure stored energy time 	20 ms	20 ms	20 ms	20 ms
 Mains buffering according to NAMUR recommendation 	Yes	Yes	Yes	Yes
Input current				
Rated value at 110 V DC	350 mA; at 120 V DC	1 A; at 120 V DC	1 A; at 120 V DC	1.4 A; at 120 V DC
Rated value at 230 V DC	190 mA	0.5 A	0.5 A	0.7 A
Rated value at 120 V AC	0.42 A	0.9 A	0.9 A	1.4 A
Rated value at 230 V AC	0.22 A	0.5 A	0.5 A	0.7 A
Inrush current, max.	8.25 A; Full width at half maximum 5 ms	63 A; Full width at half maximum 1 ms	63 A; Full width at half maximum 1 ms	88 A; Full width at half maximum 1.1 ms

Power supplies

PS 405/407 power supplies

Technical specifications (continued)

Article number	6ES7407-0DA02-0AA0	6ES7407-0KA02-0AA0	6ES7407-0KR02-0AA0	6ES7407-0RA02-0AA0
	POWER SUPPLY PS407, 120/230V UC, 5V DC/4A	PS407 POWER SUPPLY, 120/230V UC, 5V DC/10A	POWER SUPP. PS407, UC120/230V, DC5V/10A, RED.	PS407 POWER SUPPLY, 120/230V UC, 5V DC/20A
Output voltage				
Type of output voltage	DC	DC	DC	DC
Rated value (DC)				
• 5 V DC	Yes	Yes	Yes	Yes
• 24 V DC	Yes	Yes	Yes	Yes
Output current				
for backplane bus (5 V DC), max.	4 A; no base load required	10 A; no base load required	10 A; no base load required	20 A; no base load required
for backplane bus (24 V DC), max.	0.5 A; idling-proof	1 A; idling-proof	1 A; idling-proof	1 A; idling-proof
short-circuit protection	Yes	Yes	Yes	Yes
Power				
Power consumption, typ.	52 W	95 W	95 W	158 W
Power losses				
Power loss, typ.	20 W	20 W	20 W	35 W
Battery				
Backup battery				
Backup battery				
- Backup battery (optional)	Yes; 1 x lithium AA; 3.6 V/2.3 Ah	Yes; 2 x lithium AA; 3.6 V/2.3 Ah	Yes; 2 x lithium AA; 3.6 V/2.3 Ah	Yes; 2 x lithium AA; 3.6 V/2.3 Ah
Hardware configuration				
Slots				
 Required slots 	1	2	2	2
Galvanic isolation				
primary/secondary	Yes	Yes	Yes	Yes
EMC				
Compliance with line harmonic distortion limits				
Observance of line harmonic distortion acc. to IEC 61000-3-2, IEC 61000-3-3	Yes	Yes	Yes	Yes
Degree and class of protection				
Protection class	1; with protective conductor			
Standards, approvals, certificates				
FM approval	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4	Yes; Ta: 0 °C to 60 °C T4
Connection method				
Connecting cables/cross sections	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 mm to 9 mm	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 mm to 9 mm	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 mm to 9 mm	3x 1.5 mm ² , solid or stranded wire with end sleeve, external diameter 3 mm to 9 mm
Dimensions				
Width	25 mm	50 mm	50 mm	50 mm
Height	290 mm	290 mm	290 mm	290 mm
Depth	217 mm	217 mm	217 mm	217 mm
Weights				

Power supplies

PS 405/407 power supplies

Ordering data	Article No.		Article No.
PS 405 power supply modules		PS 407 power supply modules	
24 V DC; 5 V DC, 24 V DC		120/230 V AC; 5 V DC, 24 V DC	
4 A	6ES7405-0DA02-0AA0	4 A	6ES7407-0DA02-0AA0
10 A, wide range	6ES7405-0KA02-0AA0	10 A	6ES7407-0KA02-0AA0
10 A, redundant, wide range	6ES7405-0KR02-0AA0	10 A, redundant	6ES7407-0KR02-0AA0
20 A, wide range	6ES7405-0RA02-0AA0	20 A	6ES7407-0RA02-0AA0
Power plug for PS 405	6ES7490-0AA00-0AA0	Power plug for PS 407	6ES7490-0AB00-0AA0
Spare part		Spare part	
Backup battery	6ES7971-0BA00	Backup battery	6ES7971-0BA00
Type AA; 3.6 V/2.3 Ah		Type AA; 3.6 V / 2.3 Ah	
		SITOP power supplies	Refer to Catalog KT 10.1
		For the 24 V supply of motors or sensors	
		Add-on modules and DC-UPS	Refer to Catalog KT 10.1
		To increase system availability	

SIPLUS power supplies

Overview



- Power supplies for SIPLUS S7-400
- For conversion of AC or DC line voltages to the 5 V DC and 24 V DC operating voltages required
- 4 A, 10 A and 20 A output currents

Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

For technical documentation on SIPLUS, see: www.siemens.com/siplus-extreme

Technical specifications

Article number	6AG1405-0KA02-7AA0	6AG1405-0KR02-7AA0	6AG1407-0KA02-7AA0	6AG1407-0KR02-7AA0
Based on	6ES7405-0KA02-0AA0	6ES7405-0KR02-0AA0	6ES7407-0KA02-0AA0	6ES7407-0KR02-0AA0
	SIPLUS PS 405 10A	SIPLUS S7-400 PS405 DC 10A RED	SIPLUS S7-400 PS407 UC 10A	SIPLUS S7-400 PS407 UC 10A RED
Ambient conditions				
Ambient temperature in operation				
• Min.	-25 °C; = Tmin	-25 °C; = Tmin; using the external battery box SIPLUS 6AG1971-0AA00-7AA0 for buffer mode	-25 °C; using the external battery box SIPLUS 6AG1971-0AA00-7AA0 for buffer mode	-25 °C; using the external battery box SIPLUS 6AG1971-0AA00-7AA0 for buffer mode
• max.	70 °C; = Tmax	70 °C; = Tmax; using the external battery box SIPLUS 6AG1971-0AA00-7AA0 for buffer mode	70 °C; using the external battery box SIPLUS 6AG1971-0AA00-7AA0 for buffer mode	70 °C; using the external battery box SIPLUS 6AG1971-0AA00-7AA0 for buffer mode
Extended ambient conditions				
Relative to ambient temperature- atmospheric pressure-installation altitude	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m) // Tmin (Tmax - 10K) at 795 hPa 658 hPa (+2000 m +3500 m) // Tmin (Tmax - 20K) at 658 hPa 540 hPa (+3500 m +5000 m)	Tmin Tmax at 1080 hPa 795 hPa (-1000 m +2000 m)
Relative humidity				
- With condensation, max.	100 %; RH incl. conden- sation / frost permitted (no commissioning under condensation conditions)	100 %; RH incl. conden- sation/frost (no commis- sioning if there is condensation). In buffer mode, use battery box SIPLUS 6AG1971-0AA00- 7AA0 for high humidity	100 %; RH incl. conden- sation/frost (no commis- sioning if there is condensation). In buffer mode, use battery box SIPLUS 6AG1971-0AA00- 7AA0 for high humidity	100 %; RH incl. conden- sation/frost (no commis- sioning if there is condensation). In buffer mode, use battery box SIPLUS 6AG1971-0AA00- 7AA0 for high humidity
Resistance		5	5 · · · · · ·	,
 against biologically active substances / conformity with EN 60721-3-3 		and dry rot spores (with the ended and dry rot spores (with the ended and the ended an		ied connector covers must

Yes; Class 3C4 incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!

substances / conformity with EN 60721-3-3 - against mechanically active Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

 against mechanically active substances / conformity with EN 60721-3-3

- against chemically active

SIPLUS power supplies

SIPLUS S7-400 power supplies

Ordering data	Article No.		Article No.
SIPLUS S7-400 PS 405 power supply modules		SIPLUS S7-400 PS 407 power supply modules	
n: 24/48/60 V DC - wide range 19.2 72 V DC);		In: 110/230 V DC; 120/230 V AC; Out: 24 V DC/1 A, 5 V DC/10 A	
Out: 24 V DC/1 Å, 5 V DC/10 A Extended temperature range and exposure to media	6AG1405-0KA02-7AA0	Extended temperature range and exposure to media	6AG1407-0KA02-7AA0
In: 24/48/60 V DC - wide range (19.2 72 V DC);		In: 110/230 V DC; 120/230 V AC; Out: 24 V DC/1 A, 5 V DC/10 A; for redundant use	
Out: 24 V DC/1 A, 5 V DC/10 A; for redundant use		Extended temperature range and exposure to media	6AG1407-0KR02-7AA0
Extended temperature range and exposure to media	6AG1405-0KR02-7AA0	Accessories	See SIMATIC PS 405/407 power supplies, page 1/133

Accessories

Labeling sheets

Overview

Labeling sheets

- · Film sheets for application-specific labeling of SIMATIC S7-400 I/O modules with commercial laser printers
- · Single-color films, tear-resistant, dirt-resistant
- · Easy handling:
 - Pre-perforated labeling sheets in DIN A4 format to allow easy separation of the labeling strips
 - The separated strips can be inserted directly into the I/O modules
- Different colors for distinction between module types or preferred areas of application: The labeling sheets are available in the colors teal, light beige, red and yellow. Yellow is reserved for failsafe systems.

Label cover

- · Film to cover and hold user-made labeling strips on normal paper
- Accessories, 10 pieces

Ordering data	Article No.
Labeling sheets	
DIN A4, for printing using laser printer; 10 pieces	
Petrol	6ES7492-2AX00-0AA0
Light beige	6ES7492-2BX00-0AA0
Yellow	6ES7492-2CX00-0AA0
Red	6ES7492-2DX00-0AA0
Cover film for labeling strips	6ES7492-2XX00-0AA0
10 pieces (spare part)	

6ES7490-0AB00-0AA0

Spare parts

Overview Ordering data Article No. Cover film for labeling strips Cover foil for labeling strip 6ES7492-2XX00-0AA0 · Petrol-colored film for covering and fixing labeling strips 10 units (spare part) created by the user 6ES7974-0AA00-0AA0 Range card for analog input On normal paper modules 1 card for 2 inputs; 2 units Spare part (spare part) Measuring range module for analog input modules Slot covers 6ES7490-1AA00-0AA0 · Pluggable module for selecting the input ranges in the case of for racks; 10 units (spare part) analog modules Power plug for PS 405 6ES7490-0AA00-0AA0 1 module for 2 inputs Spare part

Power plug for PS 407

Spare part

· Spare part

Slot cover

- · Cover plates for unused slots in module racks
- · Spare part, 10 units

Power supply connectors

- Plug for connecting the PS 405 and PS 407 power supply modules to the network
- · Spare part

Appendix





2/2 Conditions of sale and delivery

Appendix

Conditions of sale and delivery

1. General Provisions

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"¹⁾ and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany"¹⁾ and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"¹).

1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"¹⁾ and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany"¹⁾ and
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany"¹⁾.

2. Prices

The prices are in \in (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charget the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

An exact explanation of the metal factor can be downloaded at:

www.siemens.com/automation/salesmaterialas/catalog/en/terms_of_trade_en.pdf

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a onemonth buffer (details on the calculation can be found in the explanation of the metal factor).

3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding

Insofar as there are no remarks on the individual pages of this catalog - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export of goods listed in this catalog may be subject to licensing requirements. We will indicate in the delivery details whether licenses are required under German, European and US export lists. Goods labeled with "AL" not equal to "N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN" not equal to "N" are subject to US re-export authorization.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required i .a. due to the final disposition and intended use of goods.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Errors excepted and subject to change without prior notice.

 The text of the Terms and Conditions of Siemens AG can be downloaded at www.siemens.com/automation/salesmaterialas/catalog/en/terms_of_trade_en.pdf

Digital Factory, Process Industries and Drives and Energy Management

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	GAMMA Building Control	ET G1
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	SINAMICS G150 Drive Converter Cabinet Units	
	SINAMICS GM150, SINAMICS SM150	D 12
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	SINAMICS PERFECT HARMONY GH180 Medium-Voltage Air-Cooled Drives (Germany Edition)	D 15.1
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	SINAMICS S120 Chassis Format Units and	D 21.3
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	SINAMICS S120 and SIMOTICS	D 21.4
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	SINAMICS Inverters for Single-Axis Drives and	D 31
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	Digital: SINAMICS G120P and SINAMICS G120P	D 35
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	Frame Size 355 to 1000, Power Range 80 to 7100 kW	
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	High Voltage Three-phase Induction Motors SIMOTICS HV Series A-compact PLUS	D 84.9
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	SIMOTOCS S-1FG1 Servo geared motors SIMOTICS Low-Voltage Motors	D 41
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Process Analytical Instruments

Digital: Process Analytics, Components for Continuous Emission Monitoring

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	w-Voltage Power Distribution and ectrical Installation Technology	Catalog
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-	uipment for Machine Tools	
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	uipment for Machine Tools	
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SI	ATIC HMI / PC-based Automation	
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	-based Automation	ST PC
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Ind	lustrial Identification Systems	ID 10
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	oducts for Totally Integrated Automation	ST 70
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Get more information

Comprehensive information concerning SIMATIC S7-400: www.siemens.com/s7-400

Siemens AG Process Industries and Drives Automation and Engineering 76181 Karlsruhe Germany

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