SIMATIC S7-400 advanced controller

Brochures

For brochures serving as selection guides for SIMATIC products refer to:

www.siemens.com/simatic/printmaterial

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 performance-graded 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 technology-oriented 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: single-sided 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 reduntant PROFINET IO.

Overview (continued)

S7-400F/FH

- 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

Technical specifications

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 compatibility	
• Interference immunity	According to EN 61000-6-2
• Emitted interference	According to EN 61000-6-4
Mechanical load	
• Vibration, test according to / tested with	IEC 60068-2-6 (sine) 10 to 58 Hz; constant amplitude 0.075 mm; 58 to 500 Hz; constant acceleration 1 g; duration of oscillation: 10 frequency 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 each 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 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 in corrosive atmospheres!
• 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!

CPU 412

Overview

- 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

Technical specifications

Article number	**6ES7412-1XJ05-0AB0** CPU412-1, MPI/DP, 288 KB	**6ES7412-2XJ05-0AB0** CPU412-2, MPI/DP, 512 KB	**6ES7412-2EK06-0AB0** CPU412-2 PN, 1 MB, 2 INTERFACES
Product type designation			
General information			
Engineering with			
• Programming package	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V5.5 or higher / iMap V3.0 + iMap STEP7 Add-on V3.0 SP5
Supply voltage			
Rated value (DC)			
• 24 V DC			No; Power supply via system power supply
Power losses			
Power loss, typ.	2.5 W	4 W	5.5 W
Memory			
Work memory			
• Integrated	288 kbyte	512 kbyte	1 Mbyte
• Integrated (for program)	144 kbyte	256 kbyte	0.5 Mbyte
• Integrated (for data)	144 kbyte	256 kbyte	0.5 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.	75 ns	75 ns	75 ns
for word operations, typ.	75 ns	75 ns	75 ns
for fixed point arithmetic, typ.	75 ns	75 ns	75 ns
for floating point arithmetic, typ.	225 ns	225 ns	225 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.	4 kbyte	4 kbyte	4 kbyte; Size of bit memory address area

Technical specifications (continued)

Article number	**6ES7412-1XJ05-0AB0**	**6ES7412-2XJ05-0AB0**	**6ES7412-2EK06-0AB0**
	CPU412-1, MPI/DP, 288 KB	CPU412-2, MPI/DP, 512 KB	CPU412-2 PN, 1 MB, 2 INTERFACES
Address area			
I/O address area			
• Inputs	4 kbyte	4 kbyte	4 kbyte
• Outputs	4 kbyte	4 kbyte	4 kbyte
Process image			
• Inputs, adjustable	4 kbyte	4 kbyte	4 kbyte
• Outputs, adjustable	4 kbyte	4 kbyte	4 kbyte
Hardware configuration			
Slots			
• Required slots	1	1	1
Time of day			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
Operating hours counter			
• Number	8	8	16
Interfaces			
Interface/bus type			1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports)
Number of RS 485 interfaces	2	2	1
Number of other interfaces	0	0	0
1st interface			
Interface type	Integrated	Integrated	Integrated
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	RS 485 / PROFIBUS + MPI
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
DP master			
• Number of DP slaves, max.	32; Max. 544 slots	32	32
2nd interface			
Interface type		Integrated	PROFINET
Physics		RS 485 / PROFIBUS	Ethernet RJ45
Number of ports			2
Functionality			
• DP master		Yes	No
• DP slave		Yes	No
• PROFINET IO Controller			Yes
• PROFINET IO Device			Yes
• PROFINET CBA			Yes
DP master			
• Number of DP slaves, max.		64	
PROFINET IO Controller			
• Max. number of connectable IO devices for RT			256
• Number of IO devices with IRT and the option "high flexibility"			256
• Number of IO Devices with IRT and the option "high performance", max.			64
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes	Yes	Yes; Via PROFIBUS DP or PROFINET interface

Technical specifications (continued)

Article number	**6ES7412-1XJ05-0AB0**	**6ES7412-2XJ05-0AB0**	**6ES7412-2EK06-0AB0**
	CPU412-1, MPI/DP, 288 KB	CPU412-2, MPI/DP, 512 KB	CPU412-2 PN, 1 MB, 2 INTERFACES
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing			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 CP max. 10 and FC AG_SEND and FC AG_RECV)	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.			46
• ISO-on-TCP (RFC1006)	Via CP 443-1 Adv. and loadable FB	Via CP 443-1 Adv. and loadable FB	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
- Number of connections, max.	30		46
• UDP			Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.			46
Web server			
• supported	No; Via CP	No; Via CP	Yes
Number of connections			
• overall	32	32	48
Configuration			
Programming			
Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- STL	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
- CFC	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes
- HiGraph®	Yes	Yes	Yes
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption			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.	720 g	720 g	750 g

Ordering data

	Article No.
CPU 412-1 Main memory 288 KB, power supply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory card, incl. slot number labels	**6ES7412-1XJ05-0AB0**
CPU 412-2 Main memory 512 KB, power supply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory card, incl. slot number labels	**6ES7412-2XJ05-0AB0**
CPU 412-2 PN Main memory 1 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, slot for memory card, incl. slot number labels	**6ES7412-2EK06-0AB0**
Memory card RAM	
64 KB	**6ES7952-0AF00-0AA0**
256 KB	**6ES7952-1AH00-0AA0**
1 MB	**6ES7952-1AK00-0AA0**
2 MB	**6ES7952-1AL00-0AA0**
4 MB	**6ES7952-1AM00-0AA0**
8 MB	**6ES7952-1AP00-0AA0**
16 MB	**6ES7952-1AS00-0AA0**
64 MB	**6ES7952-1AY00-0AA0**
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 for connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
Slot number plates 1 set (spare part)	**6ES7912-0AA00-0AA0**

	Article No.
SIMATIC Manual Collection 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	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**
RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA12-0XA0**
• With PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA42-0XA0**
• With PG interface	**6ES7972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect connection system Max. transfer rate 12 Mbit/s	
• without PG interface	
- 1 unit	**6ES7972-0BA52-0XA0**
- 100 units	**6ES7972-0BA52-0XB0**
• with PG interface	
- 1 unit	**6ES7972-0BB52-0XA0**
- 100 units	**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 fast mounting, 2-core, shielded, sold by the meter; max. delivery unit 1 000 m, minimum ordering quantity 20 m	**6XV1830-0EH10**

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

Technical specifications

Article number	**6ES7414-2XK05-0AB0** CPU414-2, MPI/DP, 1 MB	**6ES7414-3XM05-0AB0** CPU414-3, 2.8 MB, 3 INTERFACES	**6ES7414-3EM06-0AB0** CPU414-3 PN/DP, 4 MB, 3 INTERFACES
Product type designation			
General information			
Engineering with			
• Programming package	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V5.5 or higher / iMap V3.0 + iMap STEP7 Add-on V3.0 SP5
Supply voltage			
Rated value (DC)			
• 24 V DC		No; Power supply via system power supply	No; Power supply via system power supply
Power losses			
Power loss, typ.	4 W	5.5 W	6.5 W
Memory			
Work memory			
• Integrated	1 Mbyte	2.8 Mbyte	4 Mbyte
• integrated (for program)	0.5 Mbyte	1.4 Mbyte	2 Mbyte
• integrated (for data)	0.5 Mbyte	1.4 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.	45 ns	45 ns	45 ns
for word operations, typ.	45 ns	45 ns	45 ns
for fixed point arithmetic, typ.	45 ns	45 ns	45 ns
for floating point arithmetic, typ.	135 ns	135 ns	135 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.	8 kbyte	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area

Technical specifications (continued)

Article number	**6ES7414-2XK05-0AB0** CPU414-2, MPI/DP, 1 MB	**6ES7414-3XM05-0AB0** CPU414-3, 2.8 MB, 3 INTERFACES	**6ES7414-3EM06-0AB0** CPU414-3 PN/DP, 4 MB, 3 INTERFACES
Address area			
I/O address area			
• Inputs	8 kbyte	8 kbyte	8 kbyte
• Outputs	8 kbyte	8 kbyte	8 kbyte
Process image			
• Inputs, adjustable	8 kbyte	8 kbyte	8 kbyte
• Outputs, adjustable	8 kbyte	8 kbyte	8 kbyte
Hardware configuration			
Slots			
• Required slots	1	2	2
Time of day			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
Operating hours counter			
• Number	8	16	16
Interfaces			
Interface/bus type		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	2	2
Number of other interfaces	0	0	0
1st interface			
Interface type	Integrated	Integrated	Integrated
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
DP master			
• Number of DP slaves, max.	32	32	32
2nd interface			
Interface type	Integrated	Integrated	PROFINET
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	Ethernet RJ45
Number of ports			2
Functionality			
• 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.	96	96	
PROFINET IO Controller			
• Max. number of connectable IO devices for RT			256
• Number of IO devices with IRT and the option "high flexibility"			256
• Number of IO Devices with IRT and the option "high performance", max.			64
3rd 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

Technical specifications (continued)

Article number	**6ES7414-2XK05-0AB0** CPU414-2, MPI/DP, 1 MB	**6ES7414-3XM05-0AB0** CPU414-3, 2.8 MB, 3 INTERFACES	**6ES7414-3EM06-0AB0** CPU414-3 PN/DP, 4 MB, 3 INTERFACES
Functionality			
• MPI		No	No
• DP master		Yes	Yes
• DP slave		Yes	Yes
DP master			
• Number of DP slaves, max.		96	96
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing		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 CP max. 10 and FC AG_SEND and FC 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_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 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.			62
• UDP			Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.			62
Web server			
• supported	No; Via CP	No	Yes
Number of connections			
• overall	32	32	64
Configuration			
Programming			
Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- STL	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
- CFC	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes
- HiGraph®	Yes	Yes	Yes
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption			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			
Weight, approx.	720 g	0.9 kg	900 g

Ordering data

	Article No.
CPU 414-2 Main memory 1 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, slot for memory card, incl. slot number labels	**6ES7414-2XK05-0AB0**
CPU 414-3 Main memory 2.8 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, module slots for 1 IF module, incl. slot number labels	**6ES7414-3XM05-0AB0**
CPU 414-3 PN/DP Main memory 4 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, slot for memory card, module slot for 1 IF module, incl. slot number labels	**6ES7414-3EM06-0AB0**
Memory card RAM	
64 KB	**6ES7952-0AF00-0AA0**
256 KB	**6ES7952-1AH00-0AA0**
1 MB	**6ES7952-1AK00-0AA0**
2 MB	**6ES7952-1AL00-0AA0**
4 MB	**6ES7952-1AM00-0AA0**
8 MB	**6ES7952-1AP00-0AA0**
16 MB	**6ES7952-1AS00-0AA0**
64 MB	**6ES7952-1AY00-0AA0**
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 for connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
IF 964-DP interface module To connect an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4	**6ES7964-2AA04-0AB0**

	Article No.
Slot number plates 1 set (spare part)	**6ES7912-0AA00-0AA0**
SIMATIC Manual Collection 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	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**
PROFIBUS bus components	
RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA12-0XA0**
• With PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA42-0XA0**
• With PG interface	**6ES7972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect connection system Max. transfer rate 12 Mbit/s	
• without PG interface	
- 1 unit	**6ES7972-0BA52-0XA0**
- 100 units	**6ES7972-0BA52-0XB0**
• with PG interface	
- 1 unit	**6ES7972-0BB52-0XA0**
- 100 units	**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 fast mounting, 2-core, shielded, sold by the meter; max. delivery unit 1 000 m, minimum ordering quantity 20 m	**6XV1830-0EH10**
RS 485 repeater for PROFIBUS Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	**6ES7972-0AA02-0XA0**

Ordering data	Article No.
PROFINET bus components	
IE FC TP standard cable GP 2x2 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	**6XV1840-2AH10**
FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	**6XV1873-2A**
SCALANCE X204-2 Industrial Ethernet switch Industrial Ethernet Switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 180 180° cable outlet	
• 1 unit	**6GK1901-1BB10-2AA0**
• 10 units	**6GK1901-1BB10-2AB0**
• 50 units	**6GK1901-1BB10-2AE0**
PROFIBUS/PROFINET bus components For establishing MPI/PROFIBUS/ PROFINET communication	See IK PI, CA 01 catalogs

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

Technical specifications

Article number	**6ES7416-2XN05-0AB0** CPU 416-2, MPI, PROFIBUS, 5.6 MB	**6ES7416-3XR05-0AB0** CPU 416-3, 11.2 MB, 3 INTERFACES	**6ES7416-3ES06-0AB0** CPU416-3 PN/DP, 16 MB, 3 INTERFACES
Product type designation			
General information			
Engineering with			
• Programming package	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V 5.3 SP2 or higher with HW update	STEP7 V5.5 or higher / iMap V3.0 + iMap STEP7 Add-on V3.0 SP5 or higher
Supply voltage			
Rated value (DC)			
• 24 V DC		No; Power supply via system power supply	No; Power supply via system power supply
Power losses			
Power loss, typ.	4 W	5.5 W	6.5 W
Memory			
Work memory			
• Integrated	5.6 Mbyte	11.2 Mbyte	16 Mbyte
• integrated (for program)	2.8 Mbyte	5.6 Mbyte	8 Mbyte
• integrated (for data)	2.8 Mbyte	5.6 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.	30 ns	30 ns	30 ns
for word operations, typ.	30 ns	30 ns	30 ns
for fixed point arithmetic, typ.	30 ns	30 ns	30 ns
for floating point arithmetic, typ.	90 ns	90 ns	90 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	16 kbyte; Size of bit memory address area	16 kbyte; Size of bit memory address area

Technical specifications (continued)

Article number	**6ES7416-2XN05-0AB0** CPU 416-2, MPI, PROFIBUS, 5.6 MB	**6ES7416-3XR05-0AB0** CPU 416-3, 11.2 MB, 3 INTERFACES	**6ES7416-3ES06-0AB0** CPU416-3 PN/DP, 16 MB, 3 INTERFACES
Address area			
I/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
Hardware configuration			
Slots			
• Required slots	1	2	2
Time of day			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
Operating hours counter			
• Number	8	16	16
Interfaces			
Interface/bus type		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	2	1
Number of other interfaces	0	0	0
1st interface			
Interface type	Integrated	Integrated	Integrated
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
DP master			
• Number of DP slaves, max.	32	32	32
2nd interface			
Interface type	Integrated	Integrated	PROFINET
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	Ethernet RJ45
Number of ports			2
Functionality			
• 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	
PROFINET IO Controller			
• Max. number of connectable IO devices for RT			256
• Number of IO devices with IRT and the option "high flexibility"			256
• Number of IO Devices with IRT and the option "high performance", max.			64
3rd 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

Technical specifications (continued)

Article number	**6ES7416-2XN05-0AB0** CPU 416-2, MPI, PROFIBUS, 5.6 MB	**6ES7416-3XR05-0AB0** CPU 416-3, 11.2 MB, 3 INTERFACES	**6ES7416-3ES06-0AB0** CPU416-3 PN/DP, 16 MB, 3 INTERFACES
Functionality			
• MPI		No	No
• DP master		Yes	Yes
• DP slave		Yes	Yes
DP master			
• Number of DP slaves, max.		125	125
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing		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 CP max. 10 and FC AG_SEND and FC 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_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.			94
• 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 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; Via CP	No	Yes
Number of connections			
• overall	64	64	96
Configuration			
Programming			
Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- STL	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
- CFC	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes
- HiGraph®	Yes	Yes	Yes
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption			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			
Weight, approx.	720 g	0.9 kg	900 g

CPU 416

Ordering data	Article No.
CPU 416-2 Main memory 5.6 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels	**6ES7416-2XN05-0AB0**
CPU 416-3 Main memory 11.2 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, module slot for 1 IF module, slot for memory card, incl. slot number labels	**6ES7416-3XR05-0AB0**
CPU 416-3 PN/DP Main memory 16 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, module slot for 1 IF submodule, slot for memory card, incl. slot number labels	**6ES7416-3ES06-0AB0**
Memory card RAM	
64 KB	**6ES7952-0AF00-0AA0**
256 KB	**6ES7952-1AH00-0AA0**
1 MB	**6ES7952-1AK00-0AA0**
2 MB	**6ES7952-1AL00-0AA0**
4 MB	**6ES7952-1AM00-0AA0**
8 MB	**6ES7952-1AP00-0AA0**
16 MB	**6ES7952-1AS00-0AA0**
64 MB	**6ES7952-1AY00-0AA0**
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 for connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
IF 964-DP interface module To connect an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4	**6ES7964-2AA04-0AB0**

	Article No.
Slot number plates 1 set (spare part)	**6ES7912-0AA00-0AA0**
SIMATIC Manual Collection 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	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**
PROFIBUS bus components	
RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA12-0XA0**
• With PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA42-0XA0**
• With PG interface	**6ES7972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect connection system Max. transfer rate 12 Mbit/s	
• Without PG interface	
- 1 unit	**6ES7972-0BA52-0XA0**
- 100 units	**6ES7972-0BA52-0XB0**
• With PG interface	
- 1 unit	**6ES7972-0BB52-0XA0**
- 100 units	**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 fast mounting, 2-core, shielded, sold by the meter; max. delivery unit 1 000 m, minimum ordering quantity 20 m	**6XV1830-0EH10**
RS 485 repeater for PROFIBUS Transfer rate up to 12 Mbps; 24 V DC; IP20 enclosure	**6ES7972-0AA02-0XA0**

Ordering data

	Article No.
PROFINET bus components	
IE FC TP standard cable GP 2x2 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	**6XV1840-2AH10**
FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	**6XV1873-2A**
SCALANCE X204-2 Industrial Ethernet switch Industrial Ethernet Switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**

	Article No.
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 180 180° cable outlet	
• 1 unit	**6GK1901-1BB10-2AA0**
• 10 units	**6GK1901-1BB10-2AB0**
• 50 units	**6GK1901-1BB10-2AE0**
PROFIBUS/PROFINET bus components For establishing MPI/PROFIBUS/ PROFINET communication	See IK PI, CA 01 catalogs

CPU 417

Overview

- 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

Technical specifications

Article number	**6ES7417-4XT05-0AB0**
	CPU 417-4, 30 MB, 4 INTERFACES
Product type designation	
General information	
Engineering with	
• Programming package	STEP7 V 5.3 SP2 or higher with HW update
Supply voltage	
Rated value (DC)	
• 24 V DC	No; Power supply via system power supply
Power losses	
Power loss, typ.	7.5 W
Memory	
Work memory	
• Integrated	30 Mbyte
• integrated (for program)	15 Mbyte
• integrated (for data)	15 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.	18 ns
for word operations, typ.	18 ns
for fixed point arithmetic, typ.	18 ns
for floating point arithmetic, typ.	54 ns
Counters, timers and their retentivity	
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

Article number	**6ES7417-4XT05-0AB0**
	CPU 417-4, 30 MB, 4 INTERFACES
Address area	
I/O address area	
• Inputs	16 kbyte
• Outputs	16 kbyte
Process image	
• Inputs, adjustable	16 kbyte
• Outputs, adjustable	16 kbyte
Hardware configuration	
Slots	
• Required slots	2
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
Operating hours counter	
• Number	16
Interfaces	
Interface/bus type	1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP, 2 x PROFIBUS DP (optionally pluggable)
Number of RS 485 interfaces	2
Number of other interfaces	0
1st 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
2nd interface	
Interface type	Integrated
Physics	RS 485 / PROFIBUS
Functionality	
• DP master	Yes
• DP slave	Yes

Technical specifications (continued)

Article number	**6ES7417-4XT05-0AB0**
	CPU 417-4, 30 MB, 4 INTERFACES
DP master	
• Number of DP slaves, max.	125
3rd interface	
Interface type	Pluggable interface module (IF), technical data as for 2nd interface
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
4th 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 synchronized up to terminal)	Yes; For PROFIBUS only
Communication functions	
PG/OP communication	Yes
Data record routing	Yes
Global data communication	
• supported	Yes
S7 basic communication	
• supported	Yes
S7 communication	
• supported	Yes
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	64

Article number	**6ES7417-4XT05-0AB0**
	CPU 417-4, 30 MB, 4 INTERFACES
Configuration	
Programming	
Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- CFC	Yes
- GRAPH	Yes
- HiGraph®	Yes
Know-how protection	
• User program protection/ password protection	Yes
Dimensions	
Width	50 mm
Height	290 mm
Depth	219 mm
Weights	
Weight, approx.	0.9 kg

CPU 417

Ordering data	Article No.
CPU 417-4 Main 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	**6ES7417-4XT05-0AB0**
Memory card RAM	
64 KB	**6ES7952-0AF00-0AA0**
256 KB	**6ES7952-1AH00-0AA0**
1 MB	**6ES7952-1AK00-0AA0**
2 MB	**6ES7952-1AL00-0AA0**
4 MB	**6ES7952-1AM00-0AA0**
8 MB	**6ES7952-1AP00-0AA0**
16 MB	**6ES7952-1AS00-0AA0**
64 MB	**6ES7952-1AY00-0AA0**
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 for connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
IF 964-DP interface module To connect an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4	**6ES7964-2AA04-0AB0**
Slot number plates 1 set (spare part)	**6ES7912-0AA00-0AA0**

	Article No.
SIMATIC Manual Collection 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	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**
RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA12-0XA0**
• With PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA42-0XA0**
• With PG interface	**6ES7972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect connection system Max. transfer rate 12 Mbit/s	
• without PG interface	
- 1 unit	**6ES7972-0BA52-0XA0**
- 100 units	**6ES7972-0BA52-0XB0**
• with PG interface	
- 1 unit	**6ES7972-0BB52-0XA0**
- 100 units	**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 fast mounting, 2-core, shielded, sold by the meter; max. delivery unit 1 000 m, minimum ordering quantity 20 m	**6XV1830-0EH10**

Overview

- The low-cost introduction to the mid performance range
- Can be used in small and medium-sized plants with requirements in the mid performance range

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:
http://www.siemens.com/siplus-extreme

Technical specifications

Article number	**6AG1412-2EK06-2AB0**
Based on	**6ES7412-2EK06-0AB0**
	SIPLUS S7-400 CPU 412-2 PN V6
Ambient conditions	
Ambient temperature in operation	
• Min.	-25 °C; = Tmin
• Max.	70 °C; = Tmax; @ 60°C for UL/ATEX/FM use
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 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.
SIPLUS S7-400 CPU 412-2 PN	
CPU with main memory 1 MB (0.5 MB code and 0.5 MB data), 2 interfaces: 1x MPI/DP and PN each	
Extended temperature range and exposure to media	**6AG1412-2EK06-2AB0**
Accessories	
Memory Card RAM	
Exposure to media	
• 2 MB	**6AG1952-1AL00-4AA0**
Extended temperature range and exposure to media	
• 4 MB	**6AG1952-1AM00-7AA0**
• 8 MB	**6AG1952-1AP00-7AA0**
• 16 MB	**6AG1952-1AS00-7AA0**
• 64 MB	**6AG1952-1AY00-7AA0**

	Article No.
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**
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Extended temperature range and exposure to media	
• Without PG interface	**6AG1972-0BA42-7XA0**
• With PG interface	**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**
Further accessories	see SIMATIC S7-400 CPU 412, page 6/7

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:
http://www.siemens.com/siplus-extreme

Technical specifications

Article number	**6AG1414-3EM06-7AB0**
Based on	**6ES7414-3EM06-0AB0**
	SIPLUS S7-400 CPU 414-3 PN/DP V6
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.
SIPLUS S7-400 CPU 414-3 PN/DP	
CPU with main memory 4 MB (1 MB code and 1 MB data), 3 interfaces: 1x MPI/DP, PN each and for IF964-DP (plug-in)	
Extended temperature range and exposure to media	**6AG1414-3EM06-7AB0**
Accessories	
Memory Card RAM	see SIPLUS S7-400 CPU 412, page 6/21
IF 964-DP interface module	**6AG1964-2AA04-7AB0**
For connecting an additional DP line; for SIPLUS CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4	
RS 485 bus connector with 90° cable outlet	see SIPLUS S7-400 CPU 412, page 6/21
RS 485 bus connector with angled cable outlet	see SIPLUS S7-400 CPU 412, page 6/21
RS 485 bus connector with axial cable outlet	see SIPLUS S7-400 CPU 412, page 6/21

	Article No.
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**
SIPLUS SCALANCE X204-2 Industrial Ethernet Switch	
with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
Extended temperature range and exposure to media	**6AG1204-2BB10-4AA3**
IE FC RJ45 Plug 180	
180° cable outlet; 1 unit	
Extended temperature range and exposure to media	**6AG1901-1BB10-7AA0**
Further accessories	see SIMATIC S7-400 CPU 414, page 6/11

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:
http://www.siemens.com/siplus-extreme

Technical specifications

Article number	**6AG1416-3XR05-4AB0**	**6AG1416-3ES06-7AB0**
Based on	**6ES7416-3XR05-0AB0**	**6ES7416-3ES06-0AB0**
	SIPLUS S7-400 CPU416-3	SIPLUS S7-400 CPU 416-3 PN/DP V6
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.
SIPLUS S7-400 CPU 416-3	
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	
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	**6AG1416-3ES06-7AB0**

	Article No.
SIPLUS accessories	see SIPLUS S7-400 CPU 414, page 6/22
Further accessories	see SIMATIC S7-400 CPU 416, page 6/16

SIPLUS S7-400 CPU 417

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:
http://www.siemens.com/siplus-extreme

Technical specifications

Article number	**6AG1417-4XT05-4AB0**
Based on	**6ES7417-4XT05-0AB0**
	SIPLUS S7-400 CPU417-4
Ambient conditions	
Ambient temperature in operation	
• Min.	0 °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, max.	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!
- 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!

Ordering data

	Article No.
SIPLUS CPU 417-4	
CPU with main memory 30 MB (15 MB code and 15 MB data), 3 interfaces: 1x MPI/DP, DP each and 2x for IFM modules (plug-in)	
Exposure to media	**6AG1417-4XT05-4AB0**
Accessories	
Memory card RAM	See SIPLUS S7-400 CPU 412, page 6/21
FEPROM memory card	
Exposure to media	
• 32 MB	**6AG1952-1KT00-4AA0**

	Article No.
RS 485 bus connector with 90° cable outlet	See SIPLUS S7-400 CPU 412, page 6/21
RS 485 bus connector with angled cable outlet	See SIPLUS S7-400 CPU 412, page 6/21
RS 485 bus connector with axial cable outlet	See SIPLUS S7-400 CPU 412, page 6/21
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**
Further accessories	See SIMATIC CPU 417, page 6/20

Overview

- For constructing a fail-safe automation system for plants with increased safety requirements
- CPUs for high demands in the mid-level performance range
- Applicable for plants with additional demands on programming scope and processing speed
- 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
- Integrated PROFINET functions in CPU 414F-3 PN/DP
- Multi-processor mode is possible
- Safety-related communication with distributed I/O devices over PROFIBUS DP or PROFINET IO with PROFIsafe profile
- Fail-safe I/O modules can be connected in a distributed manner via the integrated interfaces (DP and PN with CPU 416F-3 PN/DP) and/or through communication modules (CP 443-5 Extended and CP 443-1 Adv.)
- Central and distributed use of standard modules for non-safety-oriented applications

Technical specifications

Article number	**6ES7414-3FM06-0AB0** CPU414F-3 PN/DP, 4 MB, 3 INTERFACES
Product type designation	
General information	
Engineering with	
• Programming package	STEP7 V5.5 or higher / iMap V3.0 + iMap STEP7 Add-on V3.0 SP5
Supply voltage	
Rated value (DC)	
• 24 V DC	No; Power supply via system power supply
Power losses	
Power loss, typ.	6.5 W
Memory	
Work memory	
• Integrated	4 Mbyte
• integrated (for program)	2 Mbyte
• integrated (for data)	2 Mbyte
Load memory	
• expandable FEPROM, max.	64 Mbyte
• integrated RAM, max.	512 kbyte
• expandable RAM, max.	64 Mbyte
CPU processing times	
for bit operations, typ.	45 ns
for word operations, typ.	45 ns
for fixed point arithmetic, typ.	45 ns
for floating point arithmetic, typ.	135 ns
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
IEC counter	
• present	Yes
S7 times	
• Number	2 048
IEC timer	
• present	Yes

Article number	**6ES7414-3FM06-0AB0** CPU414F-3 PN/DP, 4 MB, 3 INTERFACES
Data areas and their retentivity	
Flag	
• Number, max.	8 kbyte; Size of bit memory address area
Address area	
I/O address area	
• Inputs	8 kbyte
• Outputs	8 kbyte
Process image	
• Inputs, adjustable	8 kbyte
• Outputs, adjustable	8 kbyte
Hardware configuration	
Slots	
• Required slots	2
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
Operating hours counter	
• Number	16
Interfaces	
Number of RS 485 interfaces	2
Number of other interfaces	0
1st interface	
Interface type	Integrated
Physics	RS 485 / PROFIBUS + MPI
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes

Technical specifications (continued)

Article number	**6ES7414-3FM06-0AB0** CPU414F-3 PN/DP, 4 MB, 3 INTERFACES
DP master	
• Number of DP slaves, max.	32
2nd interface	
Interface type	PROFINET
Physics	Ethernet RJ45
Number of ports	2
Functionality	
• DP master	No
• DP slave	No
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• PROFINET CBA	Yes
PROFINET IO Controller	
• Max. number of connectable IO devices for RT	256
• Number of IO devices with IRT and the option "high flexibility"	256
• Number of IO Devices with IRT and the option "high performance", max.	64
3rd 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
DP master	
• Number of DP slaves, max.	96
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions	
PG/OP communication	Yes
Data record routing	Yes
Global data communication	
• supported	Yes
S7 basic communication	
• supported	Yes
S7 communication	
• supported	Yes
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	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	62
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs
- Number of connections, max.	62
• UDP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	62

Article number	**6ES7414-3FM06-0AB0** CPU414F-3 PN/DP, 4 MB, 3 INTERFACES
Web server	
• supported	Yes
Number of connections	
• overall	64
Configuration	
Programming	
Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- CFC	Yes
- GRAPH	Yes
- HiGraph®	Yes
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 414F-3 PN/DP For setting up safety-related automation system; main memory 4 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, slot for memory card, module slot for 1 IF module, incl. slot number labels	**6ES7414-3FM06-0AB0**
Distributed Safety V5.4 programming tool Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 and higher	
• Floating license	**6ES7833-1FC02-0YA5**
• Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FC02-0YH5**
Distributed Safety Upgrade From V5.x to V5.4; Floating license for 1 user	**6ES7833-1FC02-0YE5**
STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-1500F, S7-300F, S7-400F, WinAC RTX F, ET200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13	
• Floating license for 1 user	**6ES7833-1FA13-0YA5**
• Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FA13-0YH5**
Memory Card RAM	
64 KB	**6ES7952-0AF00-0AA0**
256 KB	**6ES7952-1AH00-0AA0**
1 MB	**6ES7952-1AK00-0AA0**
2 MB	**6ES7952-1AL00-0AA0**
4 MB	**6ES7952-1AM00-0AA0**
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 for connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
IF 964-DP interface module For connecting an additional DP line	**6ES7964-2AA04-0AB0**
Slot number plates 1 set (spare part)	**6ES7912-0AA00-0AA0**
SIMATIC Manual Collection 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	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**
PROFIBUS bus components	
RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA12-0XA0**
• With PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA42-0XA0**
• With PG interface	**6ES7972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect system Max. transfer rate 12 Mbit/s	
• Without PG interface	
- 1 unit	**6ES7972-0BA52-0XA0**
- 100 units	**6ES7972-0BA52-0XB0**
• With PG interface	
- 1 unit	**6ES7972-0BB52-0XA0**
- 100 units	**6ES7972-0BB52-0XB0**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

CPU 414F

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

Overview

- 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

Technical specifications

Article number	**6ES7416-2FN05-0AB0**	**6ES7416-3FS06-0AB0**
	CPU 416F-2, MPI, PROFIBUS, 5.6 MB	CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
Product type designation		
General information		
Engineering with		
• Programming package	STEP 7 V5.3 SP2 or higher with hardware update, Distributed Safety V5.2 SP2 or higher	STEP7 V5.5 or higher / iMap V3.0 + iMap STEP7 Add-on V3.0 SP5 or higher
Supply voltage		
Rated value (DC)		
• 24 V DC	No; Power supply via system power supply	No; Power supply via system power supply
Power losses		
Power loss, typ.	4.5 W	6.5 W
Memory		
Work memory		
• Integrated	5.6 Mbyte	16 Mbyte
• integrated (for program)	2.8 Mbyte	8 Mbyte
• integrated (for data)	2.8 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.	30 ns	30 ns
for word operations, typ.	30 ns	30 ns
for fixed point arithmetic, typ.	30 ns	30 ns
for floating point arithmetic, typ.	90 ns	90 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
Data areas and their retentivity		
Flag		
• Number, max.	16 kbyte; Size of bit memory address area	16 kbyte; Size of bit memory address area

Technical specifications (continued)

Article number	**6ES7416-2FN05-0AB0** CPU 416F-2, MPI, PROFIBUS, 5.6 MB	**6ES7416-3FS06-0AB0** CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
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
Hardware configuration		
Slots		
• Required slots	1	2
Time of day		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
Operating hours counter		
• Number	16	16
Interfaces		
Number of RS 485 interfaces	2	2
Number of other interfaces	0	0
1st interface		
Interface type	Integrated	Integrated
Physics	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
DP master		
• Number of DP slaves, max.	32	32
2nd interface		
Interface type	Integrated	PROFINET
Physics	RS 485 / PROFIBUS	Ethernet RJ45
Number of ports		2
Functionality		
• DP master	Yes	No
• DP slave	Yes	No
• PROFINET IO Controller		Yes
• PROFINET IO Device		Yes
• PROFINET CBA		Yes
DP master		
• Number of DP slaves, max.	125	
PROFINET IO Controller		
• Max. number of connectable IO devices for RT		256
• Number of IO devices with IRT and the option "high flexibility"		256
• Number of IO Devices with IRT and the option "high performance", max.		64
3rd 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
DP master		
• Number of DP slaves, max.		125

Technical specifications (continued)

Article number	**6ES7416-2FN05-0AB0** CPU 416F-2, MPI, PROFIBUS, 5.6 MB	**6ES7416-3FS06-0AB0** CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
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 communication		
• 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
Open IE communication		
• TCP/IP		Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.		94
• 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
Number of connections		
• overall	64	96
Configuration		
Programming		
Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- CFC	Yes	Yes
- GRAPH	Yes	Yes
- HiGraph®	Yes	Yes
Know-how protection		
• User program protection/password protection	Yes	Yes
• Block encryption		Yes; With S7 block Privacy
Dimensions		
Width	25 mm	50 mm
Height	290 mm	290 mm
Depth	219 mm	219 mm
Weights		
Weight, approx.	0.7 kg	900 g

CPU 416F

Ordering data	Article No.
CPU 416F-2 For configuring safety-related automation systems; 5.6 MB RAM, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels	**6ES7416-2FN05-0AB0**
CPU 416F-3 PN/DP For configuring safety-related automation systems; main memory 16 MB, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFINET interface, PROFIBUS DP master interface, receptacle for 1 IF module, slot for memory card, incl. slot number labels	**6ES7416-3FS06-0AB0**
S7 Distributed Safety V5.4 programming tool Task: Engineering tool for configuring fail-safe 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 and higher	
• Floating license	**6ES7833-1FC02-0YA5**
• Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FC02-0YH5**
S7 Distributed Safety upgrade From V5.x to V5.4; Floating license for 1 user	**6ES7833-1FC02-0YE5**
STEP 7 Safety Advanced V13 Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-1500F, S7-300F, S7-400F, WinAC RTX F, ET200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 Professional V13	
• Floating license for 1 user	**6ES7833-1FA13-0YA5**
• Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FA13-0YH5**
Memory card RAM	
64 KB	**6ES7952-0AF00-0AA0**
256 KB	**6ES7952-1AH00-0AA0**
1 MB	**6ES7952-1AK00-0AA0**
2 MB	**6ES7952-1AL00-0AA0**
4 MB	**6ES7952-1AM00-0AA0**
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 For connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
IF 964-DP interface module For connecting an additional DP line	**6ES7964-2AA04-0AB0**
Slot number plates 1 set (spare part)	**6ES7912-0AA00-0AA0**
SIMATIC Manual Collection 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	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**
PROFIBUS bus components	
RS 485 bus connector with 90° cable outlet Max. transfer rate 12 Mbit/s	
• without PG interface	**6ES7972-0BA12-0XA0**
• with PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbit/s	
• without PG interface	**6ES7972-0BA42-0XA0**
• with PG interface	**6ES7972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect system Max. transfer rate 12 Mbit/s	
• without PG interface	
- 1 unit	**6ES7972-0BA52-0XA0**
- 100 units	**6ES7972-0BA52-0XB0**
• with PG interface	
- 1 unit	**6ES7972-0BB52-0XA0**
- 100 units	**6ES7972-0BB52-0XB0**
RS 485 bus connector with axial cable outlet For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1500-0EA02**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

Ordering data	Article No.
PROFIBUS FastConnect bus cable 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	**6XV1830-0EH10**
RS 485 repeater for PROFIBUS Transfer rate up to 12 Mbps; 24 V DC; IP20 enclosure	**6ES7972-0AA02-0XA0**
PROFINET bus components	
IE FC TP standard cable GP 2x2 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	**6XV1840-2AH10**
FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	**6XV1873-2A**

	Article No.
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 180 180° cable outlet	
• 1 unit	**6GK1901-1BB10-2AA0**
• 10 units	**6GK1901-1BB10-2AB0**
• 50 units	**6GK1901-1BB10-2AE0**
PROFIBUS/PROFINET bus components For establishing MPI/PROFIBUS/ PROFINET communication	See IK PI, CA 01 catalogs

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

Overview

- 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

Technical specifications

Article number	**6ES7412-5HK06-0AB0** CPU412-5H PN/DP, 1MB F. S7-400H/F/FH	**6ES7414-5HM06-0AB0** CPU414-5H PN/DP, 4MB F. S7-400H/F/FH	**6ES7416-5HS06-0AB0** CPU416-5H PN/DP, 16MB F. S7-400H/F/FH	**6ES7417-5HT06-0AB0** 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

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				
Slots				
• Required slots	2	2	2	2
Time of day				
Clock				
• 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	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	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				
• 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	RS 485 / PROFIBUS	RS 485 / PROFIBUS	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)	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

Technical specifications (continued)

Article number	6ES7412-5HK06-0AB0 CPU412-5H PN/DP, 1MB F. S7-400H/F/FH	6ES7414-5HM06-0AB0 CPU414-5H PN/DP, 4MB F. S7-400H/F/FH	6ES7416-5HS06-0AB0 CPU416-5H PN/DP, 16MB F. S7-400H/F/FH	6ES7417-5HT06-0AB0 CPU417-5H PN/DP, 32MB F. 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
Isochronous mode				
Isochronous 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 loadable FB
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 FBs
- 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 Privacy
Dimensions				
Width	50 mm	50 mm	50 mm	50 mm
Height	290 mm	290 mm	290 mm	290 mm
Depth	219 mm	219 mm	219 mm	219 mm
Weights				
Weight, approx.	995 g	995 g	995 g	995 g

Ordering data

	Article No.
CPU 412-5H For S7-400H and S7-400F/FH; 1 MB RAM, 1 combined MPI/ PROFIBUS DP master interface, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7412-5HK06-0AB0**
CPU 412-5H system bundle Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 412-5H, 4 x sync modules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; two additional memory cards required (to be ordered separately)	
• CPU 412-5H system bundle, 120/230 V AC, 10 A	**6ES7400-0HR01-4AB0**
• CPU 412-5H system bundle, 24/48/60 V DC, 10 A	**6ES7400-0HR51-4AB0**
CPU 414-5H For S7-400H and S7-400F/FH; 4 MB RAM, 1 combined MPI/ PROFIBUS DP master interface, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7414-5HM06-0AB0**
CPU 414-5H system bundle Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 414-5H, 4 x sync modules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; additional two memory cards required (to be ordered separately)	
• CPU 414-5H system bundle, 120/230 V AC, 10 A	**6ES7400-0HR02-4AB0**
• CPU 414-5H system bundle, 24/48/60 V DC, 10 A	**6ES7400-0HR52-4AB0**
CPU 416-5H For S7-400H and S7-400F/FH; 16 MB RAM, 1 combined MPI/ PROFIBUS DP master interface, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7416-5HS06-0AB0**
CPU 416-5H system bundle Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 416-5H, 4 x sync modules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; two additional memory cards required (to be ordered separately)	
• CPU 416-5H system bundle, 120/230 V AC, 10 A	**6ES7400-0HR03-4AB0**
• CPU 416-5H system bundle, 24/48/60 V DC, 10 A	**6ES7400-0HR53-4AB0**
CPU 417-5H For S7-400H and S7-400F/FH; 32 MB RAM, 1 combined MPI/ PROFIBUS DP master interface, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7417-5HT06-0AB0**
CPU 417-5H system bundle Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 417-5H, 4 x sync modules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; two additional memory cards required (to be ordered separately)	
• CPU 417-5H system bundle, 120/230 V AC, 10 A	**6ES7400-0HR04-4AB0**
• CPU 417-5H system bundle, 24/48/60 V DC, 10 A	**6ES7400-0HR54-4AB0**
Memory card RAM	
1 MB	**6ES7952-1AK00-0AA0**
2 MB	**6ES7952-1AL00-0AA0**
4 MB	**6ES7952-1AM00-0AA0**
8 MB	**6ES7952-1AP00-0AA0**
16 MB	**6ES7952-1AS00-0AA0**
64 MB	**6ES7952-1AY00-0AA0**
FEPROM memory card	
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 For connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
Slot number plates 1 set (spare part)	**6ES7912-0AA00-0AA0**
S7 F Systems RT License For processing safety-related user programs, for one S7-400H-based system each with CPU 412-5H, CPU 414-5H, CPU 416-5H or CPU 417-5H	**6ES7833-1CC00-6YX0**
S7 F Systems V6.1 Programming and configuring environment for creating and operating safety-related STEP 7 programs for an S7-400H-based target system, floating license for 1 user, runs with Windows XP Prof SP2, Windows XP Prof SP2/SP3, Windows Server 2003 SP2 2 languages (English, German) Type of delivery: Certificate of License as well as software and electronic documentation on CD	**6ES7833-1CC02-0YA5**

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

Ordering data

	Article No.
S7 F systems upgrade from V5.x/V6.0 to V6.1 2 languages (English, German), floating license for 1 user Type of delivery: Certificate of License as well as software and electronic documentation on CD	**6ES7833-1CC02-0YE5**
SIMATIC Manual Collection 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	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

	Article No.
RS 485 bus connector with 90° cable outlet	
Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA12-0XA0**
• With PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
• Max. transfer rate 12 Mbit/s	
- Without PG interface	**6ES7972-0BA42-0XA0**
- With PG interface	**6ES7972-0BB42-0XA0**
• Max. transfer rate 1.5 Mbit/s	
- Without PG interface	**6ES7972-0BA30-0XA0**
Bus connector RS 485 with 90° cable outlet for FastConnect connection technology	
Max. transfer rate 12 Mbit/s	
• Without PG interface	
- 1 unit	**6ES7972-0BA52-0XA0**
- 100 units	**6ES7972-0BA52-0XB0**
• With PG interface	
- 1 unit	**6ES7972-0BB52-0XA0**
- 100 units	**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**

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
Weights		
Weight, approx.	14 g	14 g

Ordering data

	Article No.
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	**6ES7960-1AA06-0XA0**
• For patch and installation cables, can be used with fiber-optic cables up to 10 km	**6ES7960-1AB06-0XA0**

	Article No.
Fiber-optic connecting cable	
For sync module 6ES7960-1AA06-0XA0	
• 1 m	**6ES7960-1AA04-5AA0**
• 2 m	**6ES7960-1AA04-5BA0**
• 10 m	**6ES7960-1AA04-5KA0**
For Sync module 6ES7960-1AB06-0XA0; fiber-optic monomode LC/LC duplex crossed 9/125 µ (max. 10 km)	On request

Y-link for S7-400H

Overview

- 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

Technical specifications

Article number	**6ES7153-2BA02-0XB0**
	ET200M, INTERFACE IM153-2 HF
Product type designation	
General information	
Vendor identification (VendorID)	801Eh
Supply voltage	
Rated value (DC)	
• 24 V DC	Yes
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
permissible range (ripple included), lower limit (DC)	20.4 V
permissible range (ripple included), upper limit (DC)	28.8 V
External protection for supply cables (recommendation)	2,5 A
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
Input current	
Current consumption, max.	600 mA
Inrush current, typ.	3 A
I^2t	0.1 $A^2 \cdot s$
Output voltage	
Rated value (DC)	5 V
Output current	
for backplane bus (5 V DC), max.	1.5 A
Power losses	
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

Article number	**6ES7153-2BA02-0XB0**
	ET200M, INTERFACE IM153-2 HF
Time stamping	
Accuracy	1 ms; 1ms at up to 8 modules; 10ms at up to 12 modules
Number of message buffers	15
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 speed	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; Sender
• Connector type	9-pin sub D
1st interface	
DP slave	
• GSD file	SI04801.GSG
• Automatic baud rate search	Yes
Protocols	
Bus protocol/transmission protocol	PROFIBUS DP to EN 50170
Isolation	
Isolation checked with	Isolation voltage 500 V
Degree and class of protection	
Degree of protection to EN 60529	
• IP20	Yes

Technical specifications (continued)

Article number	**6ES7153-2BA02-0XB0** ET200M, INTERFACE IM153-2 HF
Ambient conditions	
Ambient temperature in operation	
• Min.	0 °C
• max.	60 °C
Air pressure acc. to IEC 60068-2-13	
• Operating altitude above sea level, max.	3 000 m
Configuration	
Configuration software	
• STEP 7	Yes; STEP 7 / COM PROFIBUS / non-Siemens tools via GSD file
Dimensions	
Width	40 mm
Height	125 mm
Depth	117 mm
Weights	
Weight, approx.	360 g

Article number	**6ES7197-1LB00-0XA0** Y-COUPLER F. BUILDING Y-LINK, REDUNDANT
Product type designation	
General information	
Requirements for DP master system	
• Length of parameter assignment message	244 byte
Supply voltage	
Description	via bus module
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Interfaces	
PROFIBUS DP	
Properties of the lower-level DP master systems	
- 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
AS-Interface	No
Interrupts/diagnostics/ status information	
Status indicator	No
Alarms	
• Alarms	No
Diagnostic messages	
• Diagnostic functions	Yes
Galvanic isolation	
to lower-level DP master system	Yes
Dimensions	
Width	40 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	200 g

Ordering data

	Article No.
For use with STEP 7 from V5.4 or SIMATIC PCS 7 from V7.0	
Y link For connecting single-channel DP slaves to SIMATIC S7-400H; consisting of: 2 IM 153 interface modules (6ES7153-2BA02-0XB0), 1 Y-coupler (6ES7197-1LB00-0XA0), 1 BM IM/IM bus module (6ES7195-7HD80-0XA0), 1 BM Y-coupler bus module (6ES7654-7HY00-0XA0)	**6ES7197-1LA04-0XA0**

	Article No.
For use with SIMATIC PCS 7 V6.0 or higher	
Y link For connecting single-channel DP slaves to SIMATIC S7-400H; consisting of: 2 IM 153 interface modules (6ES7153-2BA82-0XB0), 1 Y-coupler (6ES7197-1LB00-0XA0), 1 BM IM/IM bus module (6ES7195-7HD80-0XA0), 1 BM Y-coupler bus module (6ES7654-7HY00-0XA0)	**6ES7197-1LA11-0XA0**
Accessories	
Mounting rail For assembling the Y link with active bus modules	
• Length 483 mm	**6ES7195-1GA00-0XA0**
• Length 530 mm	**6ES7195-1GF30-0XA0**

SIPLUS S7-400 CPU 412H

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
- Features a combined MPI/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	**6AG1412-5HK06-7AB0**
Based on	**6ES7412-5HK06-0AB0**
	SIPLUS S7-400 CPU 412-5H
Ambient conditions	
Ambient temperature in operation	
• Min.	-25 °C; = Tmin
• 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). For "F-Systems" applications max. +2000 m above sea level permissible
Relative humidity	
- With condensation, tested in accordance with IEC 60068-2-38, max.	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!
- 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!

Ordering data

	Article No.
SIPLUS S7-400 CPU 412-5H	
CPU for S7-400H with 1 MB RAM (0.5 MB code and 0.5 MB data); 5 interfaces: 1x MPI/DP, DP, PN each and 2 slots for sync modules	
Extended temperature range and exposure to media	**6AG1412-5HK06-7AB0**
Accessories	
Memory card RAM	
(medial exposure)	
• 2 MB	**6AG1952-1AL00-4AA0**
Extended temperature range and exposure to media	
• 4 MB	**6AG1952-1AM00-7AA0**
• 8 MB	**6AG1952-1AP00-7AA0**
• 16 MB	**6AG1952-1AS00-7AA0**
• 64 MB	**6AG1952-1AY00-7AA0**
FEPROM memory card	
Exposure to media	
32 MB	**6AG1952-1KT00-4AA0**
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**
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Extended temperature range and exposure to media	
• Without PG interface	**6AG1972-0BA42-7XA0**
• With PG interface	**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 CPU 412-5H, page 6/37

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 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 remain on the unused interfaces during operation!

Ordering data

	Article No.
SIPLUS S7-400 CPU 414-5H	
CPU for S7-400H with 4 MB RAM (2 MB code and 2 MB data); 5 interfaces: 1x MPI/DP, DP, PN each and 2 slots for sync modules	
Extended temperature range and exposure to media	**6AG1414-5HM06-7AB0**
Accessories	
Memory Card RAM	
Exposure to media	
• 2 MB	**6AG1952-1AL00-4AA0**
Extended temperature range and exposure to media	
• 4 MB	**6AG1952-1AM00-7AA0**
• 8 MB	**6AG1952-1AP00-7AA0**
• 16 MB	**6AG1952-1AS00-7AA0**
• 64 MB	**6AG1952-1AY00-7AA0**
FEPROM memory card	
Exposure to media	
• 32 MB	**6AG1952-1KT00-4AA0**
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**

	Article No.
RS 485 bus connector with angled cable outlet	
Max. transmission rate 12 Mbit/s	
Extended temperature range and exposure to media	
• Without PG interface	**6AG1972-0BA42-7XA0**
• With PG interface	**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 414-5H, page 6/37

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

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 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.
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	**6AG1952-1AM00-7AA0**
• 8 MB	**6AG1952-1AP00-7AA0**
• 16 MB	**6AG1952-1AS00-7AA0**
• 64 MB	**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 interface	**6AG1972-0BA42-7XA0**
• With PG interface	**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 6/37

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 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.
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 6/45
Additional accessories	see SIMATIC S7-400 CPU 417-5H, page 6/37

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.

Technical specifications

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.
SIPLUS sync module V6	
Extended temperature range and exposure to media	
• for patch cable, can be used with fiber-optic cables up to 10 m	**6AG1960-1AA06-7XA0**
• for patch and installation cables, can be used with fiber-optic cables up to 10 km	**6AG1960-1AB06-7XA0**

	Article No.
SIPLUS S7-400 FO CABLE	
1 m long	**6AG1960-1AA04-7AA0**
2 m long	**6AG1960-1AA04-7BA0**
10 m long	**6AG1960-1AA04-7KA0**

Overview

- 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.

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

Technical specifications

Article number	**6AG1197-1LA11-4XA0**
Based on	**6ES7197-1LA11-0XA0**
	SIPLUS S7-400 Y-LINK FOR S7-400H
Ambient conditions	
Ambient temperature in operation	
• Min.	0 °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 %; 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!
- 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!

Ordering data

	Article No.
For use with STEP 7 from V5.4 or PCS 7 from V7.0:	
SIPLUS Y-Link for S7-400H	
for connecting single-channel DP slaves to SIMATIC S7-400H; consisting of 2 IM 153 interface modules, 1 Y-coupler, 1 BM IM/IM bus module, 1 BM Y-coupler bus module	
Exposure to media	**6AG1197-1LA11-4XA0**

	Article No.
Accessories	
SIPLUS S7 BUS MODULE BM Y-coupler	
to accommodate a Y-coupler incl. bus module cover	
Extended temperature range and exposure to media	**6AG1654-7HY00-7XA0**
Further accessories	See SIMATIC Y-Link, page 6/41

PROFIBUS module IF-964 DP

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 6ES7414-3XM05-0AB0, 6ES7414-3EM05-0AB0, 6ES7414-3EM06-0AB0, 6ES7414-3FM06-0AB0, 6ES7416-3XR05-0AB0, 6ES7416-3ER05-0AB0, 6ES7416-3ES06-0AB0, 6ES7416-3FS06-0AB0 and 6ES7417-4XT05-0AB0.

Technical specifications

Article number	**6ES7964-2AA04-0AB0**
	INTERFACE MOD. DP-MASTER F. S7-400
Product type designation	
Input current	
from CPU, max.	150 mA; Current consumption from S7-400 bus: The module uses no current at 24 V, it provides this voltage only at the DP interface. Total current consumption of the components connected to the DP interface, but maximum 150 mA. Current carrying capacity of the isolated 5 V (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 m; 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
- Direct data exchange (slave-to-slave communication)	Yes
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**
Interface module with integrated PROFIBUS DP master interface	

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:
http://www.siemens.com/siplus-extreme

Technical specifications

Article number	**6AG1964-2AA04-7AB0**
Based on	**6ES7964-2AA04-0AB0**
	SIPLUS S7-400 IF964-DP
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.
SIPLUS interface module IF-964 DP	
Interface module with integrated PROFIBUS DP master interface	
Extended temperature range and exposure to media	**6AG1964-2AA04-7AB0**

SM 421 digital input module

Overview

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

Technical specifications

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
Product type designation					
Supply voltage					
Load voltage L+					
• Rated value (DC)	24 V				
• permissible range, lower limit (DC)	20.4 V				
• permissible range, upper limit (DC)	28.8 V				
Input current					
from backplane bus 5 V DC, max.	130 mA	20 mA	200 mA	80 mA	150 mA
from supply voltage L+, max.	120 mA				
Power losses					
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)
Digital inputs					
Number of digital inputs	16	32	32	16	16
Number of simultaneously controllable inputs					
all mounting positions					
- up to 40 °C, max.	16	32	32	16	16
- up to 60 °C, max.	16	32	32	16	16
Input voltage					
• Type of input voltage	DC	DC	AC/DC	AC/DC	AC/DC
• Rated value (DC)	24 V	24 V			
• 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; 80 to 264 V DC, -80 to -264 V	15 to 72 V DC; -15 to -72 V DC; 15 to 60 V AC
• Frequency range			47 ... 63 Hz	47 ... 63 Hz	47 to 63 Hz AC / DC

Technical specifications (continued)

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 m: 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; Parameterizable
• Hardware interrupt	Yes; Parameterizable				Yes; Parameterizable
Diagnostic messages					
• Diagnostics	Yes; internal/ external fault				Yes; internal/ external fault
Galvanic isolation					
Galvanic isolation digital inputs					
• 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					
Weight, approx.	600 g	500 g	600 g	650 g	600 g

SM 421 digital input module

Ordering data

	Article No.
SM 421 digital input modules	
16 inputs, 24 V DC, with process/diagnostics interrupt	**6ES7421-7BH01-0AB0**
32 inputs, 24 V DC	**6ES7421-1BL01-0AA0**
32 inputs, 120 V AC/DC	**6ES7421-1EL00-0AA0**
16 inputs, 120/230 V AC/DC, inputs according to IEC 1131-2 Type 2	**6ES7421-1FH20-0AA0**
16 inputs, 24 to 60 V AC/DC, with process/diagnostics interrupt	**6ES7421-7DH00-0AB0**
Front connector	
48-pin	
• with screw contacts, 1 unit	**6ES7492-1AL00-0AA0**
• with screw contacts, 84 units	**6ES7492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit	**6ES7492-1BL00-0AA0**
• with crimp contacts, 1 unit	**6ES7492-1CL00-0AA0**
• with crimp contacts, 84 units	**6ES7492-1CL00-1AB0**
Cover film for labeling strips	**6ES7492-2XX00-0AA0**
Spare part	

	Article No.
Labeling sheets for machine inscription	
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**
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	

Overview

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

Technical specifications

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)

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

Ordering data

	Article No.
SM 422 digital output modules	
16 outputs, 24 V DC; 2 A	**6ES7422-1BH11-0AA0**
32 outputs, 24 V DC; 0.5 A	**6ES7422-1BL00-0AA0**
32 outputs, 24 V DC, 0.5 A; with diagnostics	**6ES7422-7BL00-0AB0**
16 outputs, 120/230 V AC; 2 A	**6ES7422-1FH00-0AA0**
16 outputs, relay contacts	**6ES7422-1HH00-0AA0**
Front connector	
48-pin	
• with screw contacts, 1 unit	**6ES7492-1AL00-0AA0**
• with screw contacts, 84 units	**6ES7492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit	**6ES7492-1BL00-0AA0**
• with crimp contacts, 1 unit	**6ES7492-1CL00-0AA0**
• with crimp contacts, 84 units	**6ES7492-1CL00-1AB0**
Cover film for labeling strips	**6ES7492-2XX00-0AA0**
Spare part	

	Article No.
Labeling sheets for machine inscription	
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**
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
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SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
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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:
http://www.siemens.com/siplus-extreme

Technical specifications

Article number	**6AG1421-1BL01-2AA0**
Based on	**6ES7421-1BL01-0AA0**
	SIPLUS S7-400 SM421 32DE
Product type designation	
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 controllable 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 6/52

Overview

- 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:
http://www.siemens.com/siplus-extreme

Technical specifications

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	
• 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 range and exposure to media	**6AG1422-1BL00-2AA0**
Accessories	See SIMATIC S7-400 digital output modules, page 6/55

SM 431 analog input module

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

Technical specifications

Article number	**6ES7431-0HH00-0AB0** SM431, 16AE, +/-10V, +/-20MA, 4-20MA	**6ES7431-1KF20-0AB0** SM431, 8AE, U/I/R, 14BIT, 0,416MS ZYKL	**6ES7431-1KF00-0AB0** SM431, 8AE, U/I/R, 13BIT	**6ES7431-1KF10-0AB0** 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 transmitters		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)	18 V; 18 V continuous, 75 V for 1 ms (mark to space ratio 1:20)	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

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
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				
• Type B				Yes
• Type E				Yes
• Type J				Yes
• Type K				Yes
• Type L				Yes
• Type N				Yes
• Type R				Yes
• Type S				Yes
• Type T				Yes
• 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 ohms
Thermocouple (TC)				
Temperature compensation				
- internal temperature compensation				No
- external temperature compensation with compensations socket				Yes
- external temperature compensation with Pt100				Yes
- dynamic reference temperature value				Yes
Characteristic linearization				
• Parameterizable				Yes
- for thermocouples				Type B, E, J, K, L, N, R, S, T, U
- for resistance thermometer				Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000
Cable length				
• shielded, max.	200 m	200 m	200 m	200 m; 50 m with thermocouples and input ranges <= 80 mV

Technical specifications (continued)

Article number	6ES7431-0HH00-0AB0 SM431, 16AE, +/-10V, +/-20MA, 4-20MA	6ES7431-1KF20-0AB0 SM431, 8AE, U/I/R, 14BIT, 0,416MS ZYKL	6ES7431-1KF00-0AB0 SM431, 8AE, U/I/R, 13BIT	6ES7431-1KF10-0AB0 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

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
• Resistance, relative to input area, (+/-)		0.7 %; 0 to 600 ohms	0.8 %; 0 to 500 ohms (4-conductor measurement, in range of 600 ohms)	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 600 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, in range of 6000 ohms)
• Resistance thermometer, relative to input area, (+/-)				0.3 %
Galvanic isolation				
Galvanic isolation analog inputs				
• Galvanic isolation analog inputs	No	Yes; internal / external	Yes; internal / external	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				
Isolation checked with	500 V DC between bus and local ground	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	2120 V DC between bus and analog part; 500 V DC between bus and local ground; 2120 V DC between analog part and local ground	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	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**	**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
Product type designation			
Supply voltage			
Load voltage L+			
• Rated value (DC)	24 V; Only required for supplying 2-wire transmitters		
• Reverse polarity protection	Yes		
Input current			
from load voltage L+ (without load), max.	400 mA; for 16 connected, fully 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

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
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 input (destruction limit), max.	40 mA	32 mA	
Input ranges (rated values), voltages			
• 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		
• -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	
Input ranges (rated values), currents			
• 0 to 20 mA	Yes	Yes	
• -10 mA to +10 mA	Yes	Yes	
• -20 mA to +20 mA	Yes	Yes	
• -3.2 mA to +3.2 mA		Yes	
• 4 mA to 20 mA	Yes	Yes	
• -5 mA to +5 mA	Yes	Yes	
Input ranges (rated values), thermoelements			
• Type B	Yes	Yes	
• Type E	Yes	Yes	
• Type J	Yes	Yes	
• Type K	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	
Input ranges (rated values), resistance 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

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
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 compensation 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	Type B, E, J, K, L, N, R, S, T, U	
- for resistance thermometer	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000		Pt100, Pt200, Pt500, Pt1000, Ni100, 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 and 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)			
- additional conversion time for wire break monitoring	4.3 / 4.3 / 4.3 ms		110 ms / 4 ms
- additional conversion time for resistance measurement	12 / 40,2 / 47 ms		
- additional conversion time for wire break monitoring and resistance measurement	5,5 ms	1 ms (module)	none
• 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

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, 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 +/-50 mV; +/-0.23 % 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, (+/-)	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, in range of 6000 ohms)		
• Resistance thermometer, relative to 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
• between the channels	No	Yes	No
Permissible potential difference			
between the inputs (UCM)	120 V AC	120 V AC	none

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
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.
SM 431 analog output modules	
16 inputs, non-isolated, 13 bit	**6ES7431-0HH00-0AB0**
8 inputs, isolated, 13 bit	**6ES7431-1KF00-0AB0**
8 inputs, isolated, 14 bit, with linearization	**6ES7431-1KF10-0AB0**
8 inputs, isolated, 14 bit	**6ES7431-1KF20-0AB0**
16 inputs, isolated, 16 bit, process interrupt capability	**6ES7431-7QH00-0AB0**
8 inputs, isolated, 16 bit, process interrupt capability, for thermocouples (I, U)	**6ES7431-7KF00-0AB0**
8 inputs, isolated, 16 bit, process interrupt capability, for thermal resistors	**6ES7431-7KF10-0AB0**
Front connector	
48-pin	
• with screw contacts, 1 unit	**6ES7492-1AL00-0AA0**
• with screw contacts, 84 units	**6ES7492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit	**6ES7492-1BL00-0AA0**
• with crimp contacts, 1 unit	**6ES7492-1CL00-0AA0**
• with crimp contacts, 84 units	**6ES7492-1CL00-1AB0**
1 unit; for 6ES7431-7KF00-0AB0; spare part, included in scope of delivery	**6ES7431-7KF00-6AA0**
Measuring range module for analog inputs	**6ES7974-0AA00-0AA0**
1 module for 2 inputs (spare part)	

	Article No.
Cover film for labeling strips	**6ES7492-2XX00-0AA0**
Spare part	
Labeling sheets for machine inscription	
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**
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	

Overview

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

Technical specifications

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 Ω; 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 µs; 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

Ordering data

	Article No.
SM 432 analog output module	**6ES7432-1HF00-0AB0**
8 outputs, isolated, 13 bit	
Front connector	
48-pin	
• with screw contacts, 1 unit	**6ES7492-1AL00-0AA0**
• with screw contacts, 84 units	**6ES7492-1AL00-1AB0**
• with spring-loaded terminals, 1 unit	**6ES7492-1BL00-0AA0**
• with crimp contacts, 1 unit	**6ES7492-1CL00-0AA0**
• with crimp contacts, 84 units	**6ES7492-1CL00-1AB0**
Cover film for labeling strips	**6ES7492-2XX00-0AA0**
Spare part	
Labeling sheets for machine inscription	
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**

	Article No.
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	

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:
http://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 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.
SIPLUS S7-400 SM 431 analog input module	
16 inputs, non-floating, 13 bit	
Exposure to media	**6AG1431-0HH00-4AB0**
Accessories	See SIMATIC S7-400 analog input modules, page 6/65

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:
http://www.siemens.com/siplus-extreme

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 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.
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 6/67

FM 450-1 counter module

Overview

- 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.

http://www.siemens.com/simatic-technology

6

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

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

Technical specifications (continued)

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 90°
• Incremental encoder (asymmetrical)	Yes
• 24 V initiator	Yes
• 24 V directional element	Yes; 1 pulse train, 1 direction level
Counter	
Number of counter inputs	2; 32 bit or +/-31 bit
Counter input 5 V	
• Type	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) (parameterizable)
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	
Weight, approx.	650 g

Ordering data

	Article No.
FM 450-1 counter module with 2 channels, max. 500 kHz; for incremental encoder	**6ES7450-1AP01-0AE0**
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 Spare part	**6ES7492-1XL00-0AA0**

FM 451 positioning module

Overview

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

Note

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

http://www.siemens.com/simatic-technology

6

Technical specifications

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**
	FM 451 positioning module
Digital outputs	
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	A, B
• Zero mark signal	N
• 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

Technical specifications (continued)

Article number	**6ES7451-3AL00-0AE0** FM 451 positioning module
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	Yes
Galvanic isolation digital outputs	
• Galvanic isolation digital outputs	Yes
Degree and class of protection	
Degree of protection to EN 60529	
• IP20	Yes
Ambient conditions	
Ambient temperature in operation	
• Min.	0 °C
• 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	50 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	1 300 g

Ordering data

	Article No.
FM 451 positioning module	**6ES7451-3AL00-0AE0**
for rapid traverse and creep speed drives	
Front connector	
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	

Ordering data

	Article No.									
Signal cable										
Pre-assembled for HTL encoder, UL/DESINA	**6FX50**	■	**2-2AL00-**	■	■	■	■			
Pre-assembled for SSI absolute encoder, UL/DESINA	**6FX50**	■	**2-2CC11-**	■	■	■	■			
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	**6FX50**	■	**2-2CD01-**	■	■	■	■			
Pre-assembled for TTL encoder 24 V, UL/DESINA	**6FX50**	■	**2-2CD24-**	■	■	■	■			
Not crimped		**0**								
Module end crimped, connector case supplied		**1**								
Motor end crimped, connector case supplied		**4**								
0 m				**1**						
100 m				**2**						
200 m				**3**						
0 m					**A**					
10 m					**B**					
20 m					**C**					
30 m					**D**					
40 m					**E**					
50 m					**F**					
60 m					**G**					
70 m					**H**					
80 m					**J**					
90 m					**K**					
0 m						**A**				
1 m						**B**				
2 m						**C**				
3 m						**D**				
4 m						**E**				
5 m						**F**				
6 m						**G**				
7 m						**H**				
8 m						**J**				
0 m						**K**				
0.0 m							**0**			
0.1 m							**1**			
0.2 m							**2**			
0.3 m							**3**			
0.4 m							**4**			
0.5 m							**5**			
0.6 m							**6**			
0.7 m							**7**			
0.8 m							**8**			

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.

http://www.siemens.com/simatic-technology

Technical specifications

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	A, B
• Zero mark signal	N
• Input voltage	24 V
• Input frequency, max.	50 kHz; 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

Technical specifications (continued)

Article number	**6ES7452-1AH00-0AE0** FM 452 electronic cam controller
Ambient conditions	
Ambient temperature in operation	
• Min.	0 °C
• 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 Spare part	**6ES7492-1XL00-0AA0**
Front connector	
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**
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 6/73

FM 453 positioning module

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:

http://www.siemens.com/simatic-technology

6

Technical specifications

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

Technical specifications (continued)

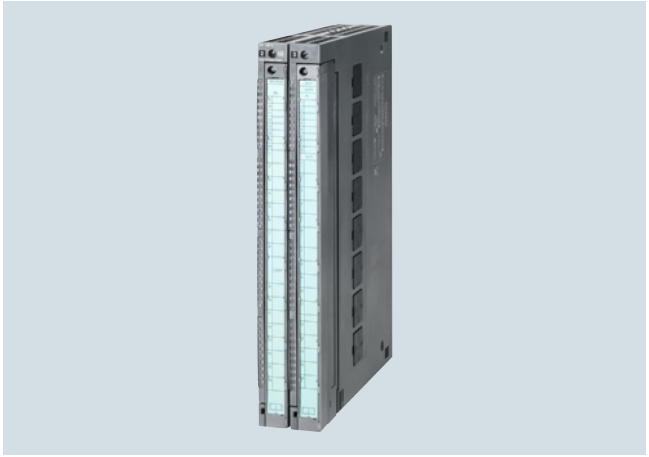
Article number	**6ES7453-3AH00-0AE0**
	FM 453 positioning module
Drive interface	
Signal input I	
• Type	Drive interface step, signal input "READY 1"
• Function	"Power section ready" where Ui < 1 V, Ii = 2mA
Signal output I	
• Type	5 V (phys. RS 422)
• Function	Clock pulse, direction, enable, current control
• Differential output voltage, min.	2 V; RL = 100 ohms
• Differential output voltage for signal "0", max.	1.1 V; Io = 30 mA
• Differential output voltage, for signal "1", min.	3.7 V; Io = -30 mA
• Load impedance	55 Ω
• Pulse frequency	200 kHz; 500 kHz available soon
• Cable length, max.	35 m; 35 m with symm. transmission; 10 m with asymm. transmission
Signal output II	
• Type	Contact relay
• Function	Drive disconnection for operation
• Load	1 A/50 V / 30 VA DC
Signal output III	
• 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 °C
• 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	
Weight, approx.	1 620 g

Ordering data

	Article No.
FM 453 positioning module	**6ES7453-3AH00-0AE0**
with 3 channels/axes	
Setpoint connecting cable	
for 3 servo motors	**6FX2002-3AD01-■■■■**
for 3 stepper motors	**6FX2002-3AB04-■■■■**
for 2 servo motors / 1 stepper motor	**6FX2002-3AB02-■■■■**
for 1 servo motor / 2 stepper motors	**6FX2002-3AB03-■■■■**
Length code	See page 6/73
Front connector	
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	
Signal cable	
Pre-assembled for SSI absolute encoder, UL/DESINA	**6FX50■2-2CC11-■■■■**
Pre-assembled for TTL encoder 6FX2001-1, UL/DESINA	**6FX50■2-2CD01-■■■■**
Pre-assembled for TTL encoder 24 V, UL/DESINA	**6FX50■2-2CD24-■■■■**
Length code	See page 6/73

FM 455 controller module

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 (FM 455 S) for actuators

6

Technical specifications

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

Technical specifications (continued)

Article number	6ES7455-0VS00-0AE0 FM 455 C controller module	6ES7455-1VS00-0AE0 FM 455 S controller module
Input ranges (rated values), 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		
• Type B	Yes	Yes
• Type J	Yes	Yes
• Type K	Yes	Yes
• Type R	Yes	Yes
• Type S	Yes	Yes
Input ranges (rated values), resistance thermometer		
• Pt 100	Yes	Yes
Thermocouple (TC)		
Temperature compensation		
- internal temperature compensation	Yes; 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 FM 455 C controller module	6ES7455-1VS00-0AE0 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, (+/-)	0.6 %	

Technical specifications (continued)

Article number	6ES7455-0VS00-0AE0 FM 455 C controller module	6ES7455-1VS00-0AE0 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 with 16 analog outputs for 16 continuous controllers	**6ES7455-0VS00-0AE0**
FM 455 S controller module with 32 digital outputs for 16 step or pulse controllers	**6ES7455-1VS00-0AE0**
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**

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.

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

Technical specifications

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
Input current	
• for signal "0", max. (permissible quiescent current)	0 mA
• for signal "1", typ.	3 mA; at 24 V
Input delay (for rated value of input voltage)	
for standard inputs	
- at "0" to "1", max.	5 µs
Interfaces	
PROFIBUS DP	
• equidistance	Yes; With connection to interrupt tasks
• Direct data exchange (slave-to-slave communication)	Yes
Interrupts/diagnostics/ status information	
Alarms	
• Alarms	Yes
Galvanic isolation	
Galvanic isolation digital inputs	
• Galvanic isolation digital inputs	No; only via optional interface modules
Weights	
Weight, approx.	1 000 g

Ordering data

	Article No.
FM 458-1 DP application module Basic module for computing, closed-loop control and open-loop control tasks; with PROFIBUS DP interface	**6DD1607-0AA2**
Micro Memory Card for FM 458-1 DP basic module	
2 MB	**6ES7953-8LL31-0AA0**
4 MB	**6ES7953-8LM31-0AA0**
8 MB	**6ES7953-8LP31-0AA0**
FM 458-1 DP Know-How-Protect for protection of technological application modules against unauthorized copying	**6DD1607-0GA0**
SC 64 interface cable To connect FM 458-1 to the serial port of a programming device/ PC	**6DD1684-0GE0**
SB10 interface module To connect 8 binary I/Os to FM 458-1 DP	**6DD1681-0AE2**
SB61 interface module To connect 8 binary I/Os to FM 458-1 DP, input voltage: 24/48 V DC	**6DD1681-0EB3**
SU12 interface module To connect 10 signals to FM 458-1 DP	**6DD1681-0AJ1**

	Article No.
RS 485 bus connector with 90° cable outlet	
Max. transfer rate 12 Mbit/s	
Without PG interface	**6ES7972-0BA12-0XA0**
With PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
Max. transfer rate 12 Mbit/s	
Without PG interface	**6ES7972-0BA42-0XA0**
With PG interface	**6ES7972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect connection system	
Max. transfer rate 12 Mbit/s	
Without PG interface	
• 1 unit	**6ES7972-0BA52-0XA0**
• 100 units	**6ES7972-0BA52-0XB0**
With PG interface	
• 1 unit	**6ES7972-0BB52-0XA0**
• 100 units	**6ES7972-0BB52-0XB0**
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**
Preferred lengths:	
20 m	**6XV1830-0EN20**
50 m	**6XV1830-0EN50**
100 m	**6XV1830-0ET10**

EXM 438-1 input/output expansion

Overview

- 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

Technical specifications

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

Article number	**6DD1607-0CA1**
	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

Technical specifications (continued)

Article number	**6DD1607-0CA1** EXM 438-1 I/O EXPANSION
Connectable encoders	
• Incremental encoder (symmetrical)	Yes
• Incremental encoder (asymmetrical)	Yes
• Absolute encoder (SSI)	Yes; Single or multiturn encoder with SSI (synchronous serial) or EnDat interface
Encoder signals, incremental encoder (symmetrical)	
• Trace mark signals	1) for tracks A and B (90° out of phase), poss. with zero pulse N; 2) for separate forward and backward track
• 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: not limited on module side!)
Encoder signals, incremental encoder (asymmetrical)	
• Trace mark signals	Track A and B (phase-shifted by 90 degrees), possibly with zero pulse N
• Input voltage	with 0 signal: -30 to +4 V (at 15 mA load); with 1 signal: +8 to 30 V (at 15 mA load); permissible input voltage range: differential voltage -30 to +30 V
Encoder signals, absolute encoder (SSI)	
• Input signal	5 V acc. to RS 422
• 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

Ordering data

	Article No.
EXM 438-1 input/output expansion for direct exchange of digital and analog signals between FM 458-1 DP and the plant	**6DD1607-0CA1**
SB10 interface module To connect 8 binary inputs or outputs to FM 458-1 DP	**6DD1681-0AE2**
SB61 interface module To connect 8 binary inputs to FM 458-1 DP, input voltage: 24/48 V DC	**6DD1681-0EB3**
SB71 interface module To connect 8 binary outputs to FM 458-1 DP, output voltage: 24/48 V DC	**6DD1681-0DH1**
SU12 interface module To connect 10 signals to FM 458-1 DP	**6DD1681-0AJ1**
SU13 interface module To connect 50 signals to FM 458-1 DP	**6DD1681-0GK0**
SC 62 interface cable To connect EXM 438-1 with up to 5 SBxx or SU12	**6DD1684-0GC0**
SC 63 interface cable To connect EXM 438-1 with an SU13	**6DD1684-0GD0**

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 number	**6DD1607-0EA0**
	S7-400, EXM 448 F. FM458
Product type designation	
Supply voltage	
Rated value (DC)	
• 5 V DC	Yes
Hardware configuration	
Slots	
• Required slots	1
Weights	
Weight, approx.	0.8 kg

Ordering data

	Article No.
EXM 448 universal communications expansion module For fast communication, for example, with drives; with free slot for MASTERDRIVES option module	**6DD1607-0EA0**

EXM 448-2 universal communications expansion module

Overview

- 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

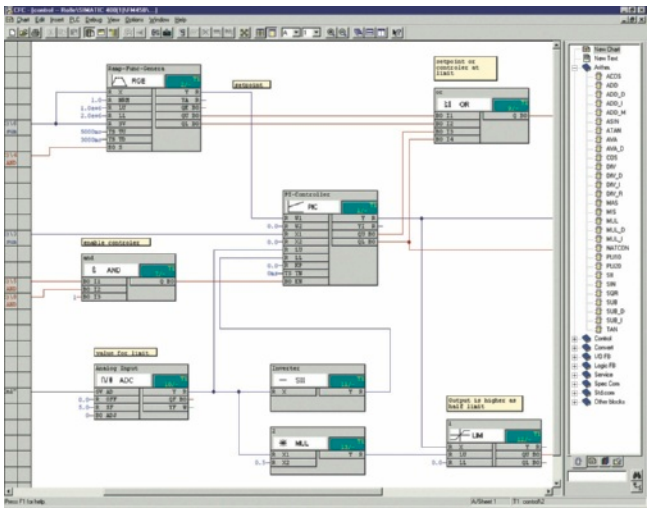
Technical specifications

Article number	**6DD1607-0EA2**
	SIMATIC S7-400 EXM 448-2 COMM.-EXPANS.
Product type designation	
Supply voltage	
Rated value (DC)	
• 5 V DC	Yes
Hardware configuration	
Slots	
• Required slots	1
Weights	
Weight, approx.	0.9 kg

Ordering data

	Article No.
EXM 448-2 universal communications expansion For high-speed communication with drives; for establishing two SIMOLINK fiber optic connections	**6DD1607-0EA2**

Overview



- Add-on for STEP 7/CFC/SFC for configuration of control and automation tasks with T400, FM 458, SIMADYN D or SIMATIC TDC
- Contains function blocks for every application
- Scope of delivery: Software packages D7-SYS, CFC, SFC, TH-PO
- Optional:
  D7-FB-Gen, function block generator for the creation of customized function blocks

Ordering data

	Article No.
SIMATIC D7-SYS V8.0 Task: Function block library for configuring closed-loop control and automation tasks Target system: SIMATIC S7-400/FM 458/ SIMATIC TDC/T400/ SIMADYN Requirement: Windows XP, Windows 7 32/64-bit, Windows Server 2003/2008 Type of delivery: on CD, German, English, with electronic documentation	
Floating license	**6ES7852-0CC03-0YA5**
Upgrade License V7.x and higher	**6ES7852-0CC03-0YE5**
Software Update Service[1]	**6ES7852-0CC01-0YL5**
SIMATIC D7 FB Gen V2.1 Function block generator	**6DD1805-5DA0**
SIMATIC Manual Collection 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	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

[1] For more information on the software update service, see Section 11, page 11/3.

6

Accessories

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 SC63 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 SC62 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.

Overview SB10 interface module

(Similar to figure)

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

Overview SB61 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

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.

Overview SU12 interface module

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.

Accessories

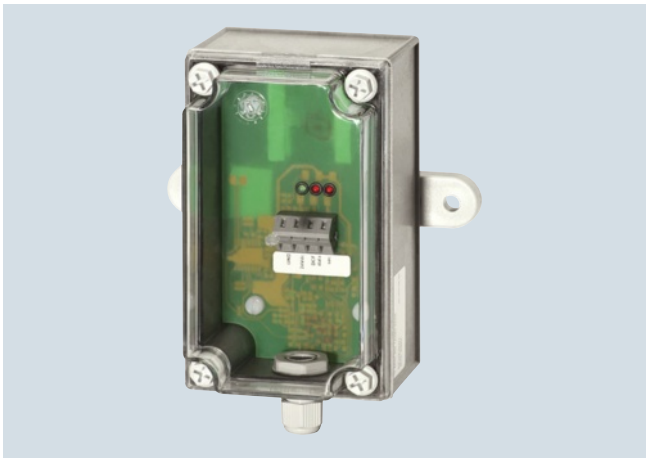
Technical specifications

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 interface 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 interface 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 interface 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 between FM 458-1 DP (X2) module with SBxx or SU12 interface module, 2 m long	**6DD1684-0GE0**
SC62 interface cable between SM500 or EXM 438-1 module and max. 5 SB10, SB60, SB70, SB61 SB71 interface modules and/or SU12, 2 m long	**6DD1684-0GC0**
SC63 interface cable between SM500 or EXM 438-1 module and SU13 interface module, 2 m long	**6DD1684-0GD0**
SB10 interface module 8 digital inputs/outputs 24 V DC	**6DD1681-0AE2**
SB61 interface module 8 digital inputs 24/48 V DC	**6DD1681-0EB3**
SB71 interface module 8 digital outputs with transistors, 24/48 V DC	**6DD1681-0DH1**
SU12 interface module with plug-in connector, 10-pole	**6DD1681-0AJ1**
SU13 interface module with screw-type plug-in connector	**6DD1681-0GK0**

Overview



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):

http://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

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

Ordering data

	Article No.
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	**6AG1057-1AA03-0AA0**

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

Technical specifications

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 with one RS 422/485 (X.27) interface	**6ES7440-1CS00-0YE0**
RS 422/485 connecting cable	
for linking to SIMATIC S7	
5 m	**6ES7902-3AB00-0AA0**
10 m	**6ES7902-3AC00-0AA0**
50 m	**6ES7902-3AG00-0AA0**

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 coupling.
  - 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

Technical specifications

Article number	**6ES7441-1AA05-0AE0** CP 441-1, PTP-CONN., 1 CHANNEL	**6ES7441-2AA05-0AE0** 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

Technical specifications (continued)

Article number	**6ES7441-1AA05-0AE0** CP 441-1, PTP-CONN., 1 CHANNEL	**6ES7441-2AA05-0AE0** 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.
Communication module CP 441-1	**6ES7441-1AA05-0AE0**
With 1 variable interface for interface submodules; including configuration package on CD	
Communication module CP 441-2	**6ES7441-2AA05-0AE0**
With 2 variable interfaces for interface submodules; including configuration package on CD	
Interface submodules	
RS 232C (V.24)	**6ES7963-1AA10-0AA0**
20 mA (TTY)	**6ES7963-2AA10-0AA0**
RS 422/485 (X.27)	**6ES7963-3AA10-0AA0**
RS 232 connecting cable	
5 m	**6ES7902-1AB00-0AA0**
10 m	**6ES7902-1AC00-0AA0**
15 m	**6ES7902-1AD00-0AA0**

	Article No.
TTY connecting cable	
5 m	**6ES7902-2AB00-0AA0**
10 m	**6ES7902-2AC00-0AA0**
50 m	**6ES7902-2AG00-0AA0**
RS 422/485 connecting cable	
5 m	**6ES7902-3AB00-0AA0**
10 m	**6ES7902-3AC00-0AA0**
50 m	**6ES7902-3AG00-0AA0**
Loadable drivers for CP 441-2	
Modbus master (RTU format)	
• Single license	**6ES7870-1AA01-0YA0**
• Single license, without software or documentation	**6ES7870-1AA01-0YA1**
Modbus slave (RTU format)	
• Single license	**6ES7870-1AB01-0YA0**
• Single license, without software or documentation	**6ES7870-1AB01-0YA1**

Overview

- Drivers for Modbus protocol with RTU message format; communication as master or slave
- Downloadable onto CP 341 and CP 441-2 (6ES7441-2AA04-0AE0)

Technical specifications

Parameterization software	**Loadable drivers for CP 441-2 and CP 341**
Type of license	Simple license, copy license
Target system	SIMATIC CP 341, SIMATIC CP 441-2

Technical specifications	**Modbus Master**
	• Modbus protocol with RTU format
	• Master/slave coupling: SIMATIC S7 is master
	• Function codes implemented: 01, 02, 03, 04, 05, 06, 07, 08, 11,12,15,16
	• No V.24 control and signal lines
	• CRC polynomial: $x^{16} + x^{15} + x^2 + 1$
	• Interfaces: TTY (20 mA); V.24 (RS 232 C); X.27 (RS 422/485) 2-wire or 4-wire
	• Receive mailbox specified on BRCV
	• Character delay time 3.5 characters or multiple thereof
	• Broadcast message possible
Adjustable parameters	• Transmission rate 300 bit/s up to 76800 bit/s (TTY up to 19200 bit/s)
	• Character frame
	• With/without RS 485 operation for 2-wire connections
	• With/without modem operation (ignore smudge characters)
	• Response monitoring time 100 ms to 25.5 s in steps of 100 ms
	• Factor for the character delay time 1-10
	• Default setting of receive line when using the X.27 interface module

	Modbus slave
	• Modbus protocol with RTU format
	• Master/slave coupling: SIMATIC S7 is slave
	• Function codes implemented: 01, 02, 03, 04, 05, 06, 08, 15, 16
	• No V.24 control and signal line
	• CRC polynomial: $x^{16} + x^{15} + x^2 + 1$
	• Interfaces: TTY (20 mA), V.24 (RS 232C), X.27 (RS 422/485) 2-wire or 4-wire
	• Communications FB 180, instance DB 180 (use of a multi-instance)
	• 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
Adjustable parameters	• Transmission rate 300 bit/s up to 76800 bit/s (TTY up to 19200 bit/s)
	• Character frame
	• Slave address of CP (1 to 255)
	• With/without RS 485 operation for 2-wire connection
	• With/without modem operation (ignore smudge characters)
	• Factor for the character delay time 1-10
	• Number of work DB (for FB processing)
	• Enabling of memory areas for writing by the master
	• Default setting of receive line when using the X.27 interface module
	• Conversion of Modbus addresses to S7 data areas

Ordering data

	Article No.
Modbus Master V3.1 Task: Communication via Modbus protocol with RTU format, SIMATIC S7 as master Requirement: CP 341 or CP 441-2; STEP 7 V4.02 and higher Delivery package: Driver program/documentation, English, German, French	
Single license	**6ES7870-1AA01-0YA0**
Single license, without software and documentation	**6ES7870-1AA01-0YA1**
Modbus Slave V3.1 Task: Communication via Modbus protocol with RTU format, SIMATIC S7 as slave Requirement: CP 341 or CP 441-2; STEP 7 V4.02 and higher Delivery package: Driver program/documentation, English, German, French	
Single license	**6ES7870-1AB01-0YA0**
Single license, without software and documentation	**6ES7870-1AB01-0YA1**
SIMATIC Manual Collection 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	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

Overview

DP-M	DP-S	FMS	PG/OP	S7/S5	
		●	●	●	

- 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

Technical specifications

Article number	**6GK7443-5FX02-0XE0**
Product type designation	CP 443-5 Basic
Transmission rate	
Transfer rate	
• at the 1st interface acc. to PROFIBUS	9.6 kbit/s ... 12 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	0
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
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
• 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	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

Technical specifications (continued)

Article number	**6GK7443-5FX02-0XE0**
Product type designation	CP 443-5 Basic
Performance data FMS functions	
Number of possible connections for FMS connection maximum	48
Amount of data of the variables	
• for READ job maximum	237 byte
• for WRITE job maximum	233 byte
Number of variables	
• Configurable from server to FMS partner	512
• Loadable from server to FMS partner	2 640
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	48
Performance data multi-protocol mode	
Number of possible connections of which 2 reserved for PG/OP communication with multi-protocol mode maximum	59
Performance data telecontrol	
Protocol is supported	
• TCP/IP	No
Product functions management, configuration	
Configuration software	
• required	STEP 7 V5.2 SP1 or higher and NCM S7 for PROFIBUS

Ordering data

	Article No.
CP 443-5 Basic communications processor Communications processor for connection of S7-400 to PROFIBUS, FMS, open communication, PG/OP and S7 communication; with electronic manual on CD-ROM	**6GK7443-5FX02-0XE0**
STEP 7 Version 5.5 Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC Requirements: Windows XP Prof., Windows 7 Professional/Ultimate Type of delivery: German, English, French, Spanish, Italian; including license key on USB stick, with electronic documentation	
• Floating License on DVD	**6ES7810-4CC10-0YA5**
• Rental license for 50 hours	**6ES7810-4CC10-0YA6**
• Software Update Service on DVD (requires current software version)	**6ES7810-4BC01-0YX2**
• Floating License upgrade 3.x/4.x/5.x to V5.4; on DVD	**6ES7810-4CC10-0YE5**
• Trial License STEP 7 V5.4; on DVD, operational for 14 days	**6ES7810-4CC10-0YA7**
Accessories	
PROFIBUS FastConnect RS 485 connection plugs With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA52-0XA0**
• With PG interface	**6ES7972-0BB52-0XA0**
PROFIBUS IP20 bus connectors With connection to PPI, MPI, PROFIBUS	
• Without PG interface	**6ES7972-0BA12-0XA0**
• With PG interface	**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**

Overview

DP-M	DP-S	FMS	PG/OP	S7/S5	
●			●	●	

- PROFIBUS DP master with electrical interface for connecting 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	
Transfer rate	
• at the 1st interface acc. to PROFIBUS	9.6 kbit/s ... 12 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	0
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)

Technical specifications (continued)

Article number	**6GK7443-5DX05-0XE0**
Product type designation	CP 443-5 Extended
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
Performance data PROFIBUS DP	
Service as DP master	
• DPV1	Yes
Number of DP slaves on DP master usable	125
Amount of data	
• of the address area of the inputs as DP master total	4 096 byte
• of the address area of the outputs as DP master total	4 096 byte
• of the address area of the inputs per DP slave	244 byte
• of the address area of the outputs per DP slave	244 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• 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

Ordering data

	Article No.
CP 443-5 Extended communications processor	
for connection of the SIMATIC S7-400 to PROFIBUS	
Extended version for PROFIBUS DP; with electronic manual on CD-ROM	**6GK7443-5DX05-0XE0**
Accessories	
PROFIBUS FastConnect connection plug RS 485	
With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA52-0XA0**
• With PG interface	**6ES7972-0BB52-0XA0**
PROFIBUS bus connector IP20	
With connection to PPI, MPI, PROFIBUS	
• Without PG interface	**6ES7972-0BA12-0XA0**
• With PG interface	**6ES7972-0BB12-0XA0**
PROFIBUS FC Standard Cable	
2-core bus cable, shielded, special design for fast mounting, delivery unit: max. 1000 m, minimum order 20 m, sold by the meter	**6XV1830-0EH10**
PROFIBUS bus terminal 12M	
Bus terminal for connection of PROFIBUS nodes up to 12 Mbps with connecting cable	**6GK1500-0AA10**

Note:

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

Overview

ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●		●	●

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.

Technical specifications

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.

Technical specifications (continued)

Article number	6GK7443-1EX30-0XE0
Product type designation	CP 443-1
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks	
• maximum	64
Amount of data	
• as user data per ISO connection for open communication by means of SEND/RECEIVE blocks maximum	8 Kibyte
• as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks maximum	8 Kibyte
• as user data per TCP connection for open communication by means of SEND/RECEIVE blocks maximum	8 Kibyte
• as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks maximum	2 Kibyte
Number of possible connections for open communication	
• by means of T blocks maximum	64
Amount of data	
• as user data per ISO on TCP connection for open communication by means of T blocks maximum	1 452 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	128
• with PG connections maximum	2
• Note	when using several CPUs
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	128
Performance data PROFINET communication as PN IO-Controller	
Product function PROFINET IO controller	Yes
Number of PN IO devices on PROFINET IO controller usable total	128
Number of PN IO IRT devices on PROFINET IO controller usable	64
Number of external PN IO lines with PROFINET per rack	4
Amount of data	
• as user data for input variables as PROFINET IO controller maximum	4 Kibyte
• 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

Article number	6GK7443-1EX30-0XE0
Product type designation	CP 443-1
Performance data telecontrol	
Protocol is supported	
• TCP/IP	Yes
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software	
• required	STEP 7 V5.5 SP3 or higher / STEP 7 Professional V12 (TIA Portal) or higher
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions switch	
Product feature Switch	Yes
Product function	
• switch-managed	No
• with IRT PROFINET IO switch	Yes
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes
Product functions Security	
Product function	
• password protection for Web applications	No
• ACL - IP-based	Yes
• ACL - IP-based for PLC/routing	No
• 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	Yes

6

Ordering data

	Article No.
CP 443-1 communications processor For connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO Controller, MRP; integrated real-time switch ERTEC with two ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with and without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbps with electronic manual on DVD	**6GK7443-1EX30-0XE0**
Accessories	
IE FC RJ45 Plug 180 2 x 2 RJ45 plug-in connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
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	**6XV1840-2AH10**
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 applications; 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	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**
IE FC Stripping Tool Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbps RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
Industrial Ethernet Switch SCALANCE X308-2 2 x 1000 Mbps 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	**6GK5308-2FL00-2AA3**

Note:

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

Overview

ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●	●	●	●

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 applications (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 quality 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.

Technical specifications (continued)

Article number	6GK7443-1GX30-0XE0
Product type designation	CP 443-1 Advanced
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks	
• maximum	64
Amount of data	
• as user data per ISO connection for open communication by means of SEND/RECEIVE blocks maximum	8 Kibyte
• as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks maximum	8 Kibyte
• as user data per TCP connection for open communication by means of SEND/RECEIVE blocks maximum	8 Kibyte
• as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks maximum	2 Kibyte
Number of possible connections for open communication	
• by means of T blocks maximum	64
Amount of data	
• as user data per ISO on TCP connection for open communication by means of T blocks maximum	1 452 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	128
• with PG connections maximum	2
• Note	when using several CPUs
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	128
Performance data IT functions	
Number of possible connections	
• as client by means of FTP maximum	20
• as server by means of FTP maximum	10
• as server by means of HTTP maximum	4
• as e-mail client maximum	1
Amount of data as user data for email maximum	8 Kibyte
Storage capacity of the user memory	
• as flash memory file system	30 Mibyte
• as RAM	16 Mibyte
• additionally buffered as RAM via central backup battery	512 Kibyte
Number of possible write cycles of the flash memory cells	100 000
Performance data PROFINET communication as PN IO-Controller	
Product function PROFINET IO controller	Yes
Number of PN IO devices on PROFINET IO controller usable total	128
Number of PN IO IRT devices on PROFINET IO controller usable	64
Number of external PN IO lines with PROFINET per rack	4

Article number	6GK7443-1GX30-0XE0
Product type designation	CP 443-1 Advanced
Amount of data	
• as user data for input variables as PROFINET IO controller maximum	8 Kibyte
• as user data for input variables as PROFINET IO controller maximum	8 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
Performance data PROFINET CBA	
Number of remote connection partners with PROFINET CBA	64
Number of connections with PROFINET CBA total	600
Amount of data	
• as user data for digital inputs with PROFINET CBA maximum	8 Kibyte
• as user data for digital outputs with PROFINET CBA maximum	8 Kibyte
• as user data for arrays and data types in the case of acyclic transmission with PROFINET CBA maximum	8 Kibyte
• as user data for arrays and data types with PROFINET CBA with cyclical transfer maximum	250 byte
• as user data for arrays and data types with PROFINET CBA in the case of local interconnection maximum	2 400 byte
Performance data PROFINET CBA remote connection with acyclic transmission	
Refresh time of the remote interconnections in the case of acyclic transmission with PROFINET CBA	100 ms
Number of remote connections to input variables in the case of acyclic transmission with PROFINET CBA maximum	150
Number of remote connections to output variables in the case of acyclic transmission with PROFINET CBA maximum	150
Amount of data	
• as user data for remote interconnections with input variables in the case of acyclic transmission with PROFINET CBA	8 Kibyte
• as user data for remote interconnections with output variables in the case of acyclic transmission with PROFINET CBA	8 Kibyte
Performance data PROFINET CBA remote connection with cyclic transmission	
Refresh time of the remote interconnections with PROFINET CBA with cyclical transfer	10 ms

Technical specifications (continued)

Article number	6GK7443-1GX30-0XE0
Product type designation	CP 443-1 Advanced
Number of remote connections to input variables with PROFINET CBA with cyclical transfer maximum	250
Number of remote connections to output variables with PROFINET CBA with cyclical transfer maximum	250
Amount of data	
• as user data for remote interconnections with input variables with PROFINET CBA with cyclical transfer maximum	2 000 byte
• as user data for remote interconnections with output variables with PROFINET CBA with cyclical transfer maximum	2 000 byte
Performance data PROFINET CBA HMI variables via PROFINET acyclic	
Number of connectable HMI stations for HMI variables in the case of acyclic transmission with PROFINET CBA	3
Refresh time of the HMI variables in the case of acyclic transmission with PROFINET CBA	500 ms
Number of HMI variables in the case of acyclic transmission with PROFINET CBA maximum	200
Amount of data as user data for HMI variables in the case of acyclic transmission with PROFINET CBA maximum	8 Kibyte
Performance data PROFINET CBA device-internal connections	
Number of internal connections with PROFINET CBA maximum	300
Amount of data of the internal connections with PROFINET CBA maximum	2 400 byte
Performance data PROFINET CBA connections to constants	
Number of connections with constants with PROFINET CBA maximum	500
Amount of data as user data for interconnections with constants with PROFINET CBA maximum	4 000 byte
Performance data PROFINET CBA PROFIBUS proxy functionality	
Product function with PROFINET CBA PROFIBUS proxy functionality	No
Performance data telecontrol	
Protocol is supported	
• TCP/IP	Yes

Article number	6GK7443-1GX30-0XE0
Product type designation	CP 443-1 Advanced
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v3	Yes
• DCP	Yes
• LLDP	Yes
Configuration software	
• required	STEP 7 V5.5 SP3 or higher / STEP 7 Professional V12 (TIA Portal) or higher
• for PROFINET CBA required	SIMATIC iMap V3.0 SP1 and higher
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions switch	
Product feature Switch	Yes
Product function	
• switch-managed	No
• with IRT PROFINET IO switch	Yes
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
Protocol is supported Media Redundancy Protocol (MRP)	Yes
Product functions Security	
Firewall version	stateful inspection
Product function with VPN connection	IPSec
Type of encryption algorithms with VPN connection	AES-256, AES-192, AES-128, 3DES-168, DES-56
Type of authentication procedure with VPN connection	Preshared key (PSK), X.509v3 certificates
Type of hashing algorithms with VPN connection	MD5, SHA-1
Number of possible connections with VPN connection	32
Product function	
• password protection for Web applications	Yes
• ACL - IP-based	Yes
• ACL - IP-based for PLC/routing	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	Yes

Ordering data	Article No.
Communications processor CP 443-1 Advanced for connecting the SIMATIC S7-400 CPU to Industrial Ethernet: 1 x 10/100/1000 Mbit/s; 4 x 10/100 Mbit/s (IE SWITCH); RJ45 ports; ISO; TCP; UDP; PROFINET IO controller, S7 communication; open communication (SEND/RECEIVE); S7 routing; IP configuration via DHCP/block; IP Access Control List; time synchronization; expanded web diagnostics; Fast Startup; PROFIenergy support; IP routing; FTP; web server; e-mail; PROFINET CBA	
• With security functionality (firewall and VPN)	**6GK7443-1GX30-0XE0**
Accessories	
IE FC RJ45 Plug 180 2 x 2 RJ45 plug-in connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a sturdy metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
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. length 1000 m, minimum order quantity 20 m	**6XV1840-2AH10**
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 applications; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m	
• AWG22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
Industrial Ethernet Switch SCALANCE X204-2 Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
Industrial Ethernet Switch SCALANCE X308-2 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 (multimode) up to max. 750 m	**6GK5308-2FL00-2AA3**

Note:

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

Overview

ISO	TCP/ UDP	PN	PRP	IT	IP-R	PG/OP	S7/S5
●	●		●			●	●

G_IK10_XX_10151

Communication processor for connecting a SIMATIC S7-400/S7-400H to Industrial Ethernet networks.

The CP supports:

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

The communications processor can be used in SIMATIC H systems and for fail-safe applications (PROFIsafe) in connection with an S7-400 F-CPU. The CP 443-1 RNA (**R**edundant **N**etwork **A**ccess) [1] offers the option of using the PRP procedure (**P**arallel **R**edundancy **P**rotocol in accordance with IEC 62439-3) to connect an S7-400 or S7-400H to parallel, separate networks where high availability is required.

The PRP functionality can be deactivated so that standard Industrial Ethernet communication is also possible with the CP.

The PRP redundancy procedure is based on double transmission of message frames over two separate networks (LAN A, LAN B). In the event of a fault in one of the two networks, transmission of the message frame from the second network is ensured without delay. A reconfiguration time (switchover of the communication paths) for the network, such as is required with other redundancy procedures, is thus not necessary.

[1] At Siemens Industry, RNA stands for hardware and software to implement redundancy solutions. RNA contains the PRP V1 protocol in accordance with the IEC 62439-3 standard (Parallel Redundancy Protocol) as well as the HSR protocol in accordance with IEC 62439-3 (High-availability Seamless Redundancy Protocol).

Technical specifications

Article number	**6GK7443-1RX00-0XE0**
Product type designation	CP 443-1 RNA
Transmission rate	
Transfer rate	
• at the 1st interface	10 ... 100 Mbit/s
• at the 2nd interface	100 Mbit/s
Interfaces	
Number of interfaces acc. to Industrial Ethernet	3
Number of electrical connections	
• at the 1st interface acc. to Industrial Ethernet	1
• at the 2nd interface acc. to Industrial Ethernet	2
Type of electrical connection	
• at the 1st interface acc. to Industrial Ethernet	RJ45 port
• at the 2nd interface acc. to Industrial Ethernet	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 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
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks	
• maximum	64
Amount of data	
• as user data per ISO connection for open communication by means of SEND/RECEIVE blocks maximum	8 Kibyte
• as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks maximum	8 Kibyte
• as user data per TCP connection for open communication by means of SEND/RECEIVE blocks maximum	8 Kibyte

Technical specifications (continued)

Article number	6GK7443-1RX00-0XE0
Product type designation	CP 443-1 RNA
Amount of data (continued)	
• as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks maximum	2 Kibyte
Number of possible connections for open communication	
• by means of T blocks maximum	64
Amount of data	
• as user data per ISO on TCP connection for open communication by means of T blocks maximum	1 452 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	128
• with PG connections maximum	2
• Note	when using several CPUs
Performance data multi-protocol mode	
Number of active connections with multi-protocol mode	128
Performance data telecontrol	
Protocol is supported	
• TCP/IP	Yes
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
Configuration software	
• required	STEP 7 V5.5 SP2 + HSP or higher
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	No
• Redundancy manager	No
• Parallel Redundancy Protocol (PRP)	Yes
Protocol is supported Media Redundancy Protocol (MRP)	No
Product functions Security	
Product function	
• ACL - IP-based	Yes
• ACL - IP-based for PLC/routing	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	Yes

Ordering data

	Article No.
CP 443-1 RNA communications processor for connecting the SIMATIC S7-400/ S7-400H CPU to Industrial Ethernet	**6GK7443-1RX00-0XE0**
Accessories	
SCALANCE X-200RNA Industrial Ethernet network access points Industrial Ethernet network access points with integrated SNMP access, web diagnostics and PROFINET diagnostics, for connecting non-PRP-enabled terminal equipment to PRP networks; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM; with electrical and optical ports for glass multimode fiber optic cables up to 5 km	
• **SCALANCE X204RNA** with four 100 Mbit/s RJ45 ports	**6GK5204-0BA00-2KB2**
• **SCALANCE X204RNA EEC** with two 100 Mbit/s RJ45 ports and two RJ45/SFP combo ports	**6GK5204-0BS00-3LA3**
• **SCALANCE X204RNA EEC** with two 100 Mbit/s RJ45 ports and two RJ45/SFP combo ports with PRP or HSR support	**6GK5204-0BS00-3PA3**
SOFTNET-IE RNA Software for connecting PCs to PRP-enabled networks with integrated SNMP, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A	
SOFTNET-IE RNA V12 for 32/64-bit Windows 7 Professional/Ultimate; for Windows 2008 Server R2; for 32/64-bit Windows 8 Professional/Enterprise; for Windows Server 2012 German/English	
• Single license for one installation	**6GK1711-1EW12-0AA0**
SOFTNET-IE RNA V8.1 for 32-bit Windows XP; German/English	
• Single license for one installation	**6GK1711-1EW08-1AA0**
Software Update Service for 1 year with automatic extension; requirement: Current software version	**6GK1711-1EW00-3AL0**

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.

Overview TIM 4R-IE DNP3

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 CP 443-5 Extended

Overview

DP-M	DP-S	FMS	PG/OP	S7/S5	
●			●	●	

- 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 permissible. No commissioning if condensation 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 accordance 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 supplied 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:
http://www.siemens.com/siplus-extreme

Ordering data

	Article No.
SIPLUS S7-400 CP 443-5 Extended 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 6/99

Overview

ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●		●	●

- Connection of SIMATIC S7-400 to Industrial Ethernet
  - 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 ambient conditions
Ambient conditions	
Relative humidity	100 %, condensation/frost permissible. No commissioning if condensation present.
Biologically active substances, compliance with EN 60721-3-3	Class 3B2 mold spores, 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 accordance 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 supplied 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:
http://www.siemens.com/siplus-extreme

Ordering data

	Article No.
SIPLUS CP 443-1 communications processor	
For connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO Controller, MRP; integrated real-time switch ERTEC with two ports; 2 x RJ-45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with and without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s with electronic manual on DVD	
Exposure to media	**6AG1443-1EX20-4XE0**

	Article No.
Accessories	
SIPLUS SCALANCE X204-2 Industrial Ethernet Switch	
Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
Extended temperature range and exposure to media	**6AG1204-2BB10-4AA3**
IE FC RJ45 Plug 180	
180° cable outlet; 1 unit	
Extended temperature range and exposure to media	**6AG1901-1BB10-7AA0**
Further accessories	See SIMATIC CP 443-1, page 6/102

Overview

ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●	●	●	●

- 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 permissible. No commissioning if condensation 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 accordance 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 supplied 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:
http://www.siemens.com/siplus-extreme

SIPLUS S7-400 CP 443-1 Advanced

Ordering data	Article No.
SIPLUS S7-400 CP 443-1 Advanced communications processor 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/WRITE, with and without RFC 1006, diagnostic expansions, multicast, clock synchronization via SIMATIC procedure or NTP, access protection via IP access list, FTP 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)	
Exposure to media	**6AG1443-1GX30-4XE0**

Accessories	Article No.
SIPLUS SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
Extended temperature range and exposure to media	**6AG1204-2BB10-4AA3**
SIPLUS SCALANCE X308-2 Industrial Ethernet Switch 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	**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 6/106

Overview

- 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	**6ES7492-1AL00-0AA0**
• With spring-loaded terminals	**6ES7492-1BL00-0AA0**
• With crimp contacts	**6ES7492-1CL00-0AA0**
48-pin for signal modules, function modules; 84 units per pack	
• With screw contacts	**6ES7492-1AL00-1AB0**
• With crimp contacts	**6ES7492-1CL00-1AB0**
for 6ES7 431-7KF00-0AB0; spare part, included in scope of delivery; 1 piece	**6ES7431-7KF00-6AA0**
Crimp contacts 250 units	**6XX3070**
Crimping tool for crimping the contacts	**6XX3071**
Front cover for front connector 6 units	**6ES7492-2XL00-0AA0**
Connection terminal for modules 6 units	**6ES7490-1BA00-0AA0**
SIMATIC Manual Collection 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	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

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

http://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 mm^2 allow higher currents, too.

Overview

- 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 mm^2, 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	**6ES7922-4BC50-0AD0**
• 3.2 m	**6ES7922-4BD20-0AD0**
• 5 m	**6ES7922-4BF00-0AD0**
• Custom lengths	On request
Packaging unit: 5 units Length:	
• 2.5 m	**6ES7922-4BC50-5AD0**
• 3.2 m	**6ES7922-4BD20-5AD0**
• 5 m	**6ES7922-4BF00-5AD0**
Crimp connection	
Packaging unit: 1 unit Length:	
• 2.5 m	**6ES7922-4BC50-0AE0**
• 3.2 m	**6ES7922-4BD20-0AE0**
• 5 m	**6ES7922-4BF00-0AE0**
• Custom lengths	On request
Packaging unit: 5 units Length:	
• 2.5 m	**6ES7922-4BC50-5AE0**
• 3.2 m	**6ES7922-4BD20-5AE0**
• 5 m	**6ES7922-4BF00-5AE0**
Core type UL/CSA-certified	
Screw-type version	
Packaging unit: 1 unit	
• 3.2 m	**6ES7922-4BD20-0UD0**
• 5 m	**6ES7922-4BF00-0UD0**
• Custom lengths	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

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

Technical specifications

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

Technical specifications (continued)

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

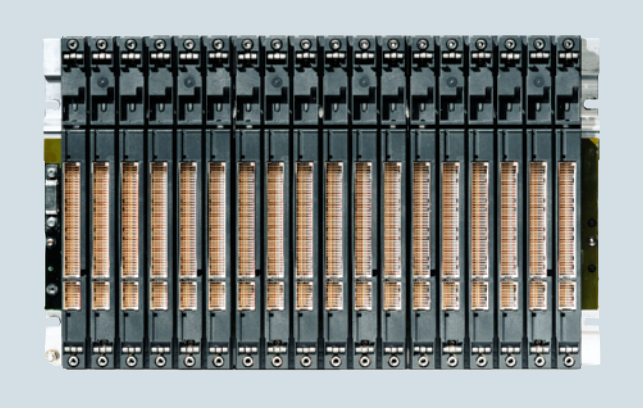
Ordering data

	Article No.
UR1 rack for central controllers and expansion units, 18 slots	**6ES7400-1TA01-0AA0**
UR1 aluminum rack for central controllers and expansion units, 18 slots	**6ES7400-1TA11-0AA0**
UR2 rack for central controllers and expansion units, 9 slots	**6ES7400-1JA01-0AA0**
UR2 aluminum rack for central controllers and expansion units, 9 slots	**6ES7400-1JA11-0AA0**
CR2 rack for segmented central controllers, 18 slots, 2 local segments	**6ES7401-2TA01-0AA0**
CR3 rack for central controllers and expansion units, 4 slots; optimized for distributed automation solutions	**6ES7401-1DA01-0AA0**

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

SIPLUS S7-400 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:
http://www.siemens.com/siplus-extreme

Technical specifications

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

Ordering data

	Article No.
SIPLUS S7-400 rack	
UR1 aluminum rack	
for central controllers and expansion units, 18 slots	
Extended temperature range and exposure to media	**6AG1400-1TA11-7AA0**
UR2 aluminum rack	
for central controllers and expansion units, 9 slots	
Extended temperature range and exposure to media	**6AG1400-1JA11-7AA0**

	Article No.
UR2-H aluminum rack	
for central controllers and expansion units, 9 slots	
Extended temperature range and exposure to media	**6AG1400-2JA10-7AA0**
Accessories	See SIMATIC rack S7-400, page 6/119

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

Technical specifications

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**

Overview

- 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

Technical specifications

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	

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

Technical specifications

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**

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

Technical specifications

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**

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

Technical specifications

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**

Overview

- 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

Technical specifications

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 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**
Terminating connector	**6ES7461-3AA00-7AA0**
for IM 461-3	

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

Technical specifications

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

	Article No.
IM 463-2 interface module Receiving IM for distributed coupling of SIMATIC S5-EUs up to max. 600 m	**6ES7463-2AA00-0AA0**

SIPLUS S7-400 IM 460-0

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 respective standard products. SIPLUS extreme specific information was added.

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

Technical specifications

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 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.
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 exposure to media	**6AG1460-0AA01-2AB0**
Accessories	See SIMATIC IM 460-0, page 6/122

Overview

- 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:

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:
http://www.siemens.com/siplus-extreme

Technical specifications

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 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.
SIPLUS S7-400 interface module IM 461-0	
Receiver IM for central coupling up to 5 m; with C-bus transfer	
Extended temperature range and exposure to media	**6AG1461-0AA01-2AA0**
Accessories	See SIMATIC IM 461-0, page 6/123

PS 405/407 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

6

Technical specifications

Article number	**6ES7405-0DA02-0AA0** PS405 POWER SUPPLY, DC24/48/60V, DC5V/4A	**6ES7405-0KA02-0AA0** POWER SUPP. PS405, DC24/48/60V, DC5V/10A	**6ES7405-0KR02-0AA0** POWER SUPP. PS405, DC24/48/60V, DC5V/10A, RED	**6ES7405-0RA02-0AA0** 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	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.	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

Technical specifications (continued)

Article number	**6ES7405-0DA02-0AA0** PS405 POWER SUPPLY, DC24/48/60V, DC5V/4A	**6ES7405-0KA02-0AA0** POWER SUPP. PS405, DC24/48/60V, DC5V/10A	**6ES7405-0KR02-0AA0** POWER SUPP. PS405, DC24/48/60V, DC5V/10A, RED	**6ES7405-0RA02-0AA0** 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 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 mm², solid or stranded wire with end sleeve, external diameter 3 mm to 9 mm	3x 1.5 mm², solid or stranded wire with end sleeve, external diameter 3 mm to 9 mm	3x 1.5 mm², solid or stranded wire with end sleeve, external diameter 3 mm to 9 mm	3x 1.5 mm², 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				
Weight, approx.	760 g	1 200 g	1 200 g	1 300 g

Article number	**6ES7407-0DA02-0AA0** POWER SUPPLY PS407, 120/230V UC, 5V DC/4A	**6ES7407-0KA02-0AA0** PS407 POWER SUPPLY, 120/230V UC, 5V DC/10A	**6ES7407-0KR02-0AA0** POWER SUPP. PS407, UC120/230V, DC5V/10A, RED.	**6ES7407-0RA02-0AA0** 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)	300 V	300 V	300 V	300 V
Rated value (AC)				
• 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				
• Rated 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

Technical specifications (continued)

Article number	6ES7407-0DA02-0AA0 POWER SUPPLY PS407, 120/230V UC, 5V DC/4A	6ES7407-0KA02-0AA0 PS407 POWER SUPPLY, 120/230V UC, 5V DC/10A	6ES7407-0KR02-0AA0 POWER SUPP. PS407, UC120/230V, DC5V/10A, RED.	6ES7407-0RA02-0AA0 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	1; with protective conductor	1; with protective conductor	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				
Weight, approx.	760 g	1 200 g	1 200 g	1 300 g

Ordering data

	Article No.
PS 405 power supply modules	
24 V DC; 5 V DC, 24 V DC	
4 A	**6ES7405-0DA02-0AA0**
10 A, wide range	**6ES7405-0KA02-0AA0**
10 A, redundant, wide range	**6ES7405-0KR02-0AA0**
20 A, wide range	**6ES7405-0RA02-0AA0**
Power plug for PS 405	**6ES7490-0AA00-0AA0**
Spare part	
Backup battery	**6ES7971-0BA00**
Type AA; 3.6 V/2.3 Ah	

	Article No.
PS 407 power supply modules	
120/230 V AC; 5 V DC, 24 V DC	
4 A	**6ES7407-0DA02-0AA0**
10 A	**6ES7407-0KA02-0AA0**
10 A, redundant	**6ES7407-0KR02-0AA0**
20 A	**6ES7407-0RA02-0AA0**
Power plug for PS 407	**6ES7490-0AB00-0AA0**
Spare part	
Backup battery	**6ES7971-0BA00**
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 S7-400 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:
http://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. condensation / frost permitted (no commissioning under condensation conditions)	100 %; RH incl. condensation/frost (no commissioning if there is condensation). In buffer mode, use battery box SIPLUS 6AG1971-0AA00-7AA0 for high humidity	100 %; RH incl. condensation/frost (no commissioning if there is condensation). In buffer mode, use battery box SIPLUS 6AG1971-0AA00-7AA0 for high humidity	100 %; RH incl. condensation/frost (no commissioning if there is condensation). In buffer mode, use battery box SIPLUS 6AG1971-0AA00-7AA0 for high humidity
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 in corrosive atmospheres!			
- 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.
SIPLUS S7-400 PS 405 power supply modules	
In: 24/48/60 V DC - wide range (19.2 ... 72 V DC); Out: 24 V DC/1 A, 5 V DC/10 A	
Extended temperature range and exposure to media	**6AG1405-0KA02-7AA0**
In: 24/48/60 V DC - wide range (19.2 ... 72 V DC); Out: 24 V DC/1 A, 5 V DC/10 A; for redundant use	
Extended temperature range and exposure to media	**6AG1405-0KR02-7AA0**

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

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)	

6

Spare parts

Overview

Cover film for labeling strips

- Petrol-colored film for covering and fixing labeling strips created by the user
- On normal paper
- Spare part

Measuring range module for analog input modules

- Pluggable module for selecting the input ranges in the case of analog modules
- 1 module for 2 inputs
- 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

Ordering data

	Article No.
Cover foil for labeling strip	**6ES7492-2XX00-0AA0**
10 units (spare part)	
Range card for analog input modules	**6ES7974-0AA00-0AA0**
1 card for 2 inputs; 2 units (spare part)	
Slot covers	**6ES7490-1AA00-0AA0**
for racks; 10 units (spare part)	
Power plug for PS 405	**6ES7490-0AA00-0AA0**
Spare part	
Power plug for PS 407	**6ES7490-0AB00-0AA0**
Spare part	

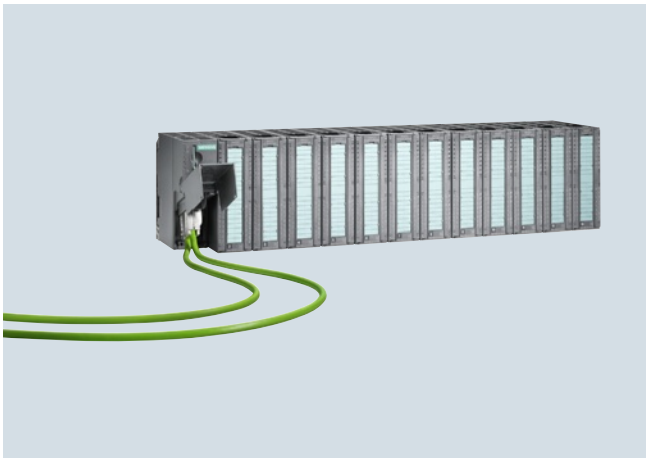
Overview

- 4 high-availability CPUs (CPU 412-5H, CPU 414-5H, CPU 416-5H, CPU 417-5H)
- Graded performance spectrum for a wide range of different applications

For further information, see pages 6/34 and 6/38.

ET 200M, Fail-safe I/O modules

Overview ET 200M



- Modular I/O system with IP20 degree of protection, particularly suitable for user-specific and complex automation tasks.
- Consists of a PROFIBUS DP or PROFINET interface module IM 153, up to 8 or 12 I/O modules of the S7-300 automation system (structure with bus connection or with active bus modules), and a power supply if applicable
- Can be expanded with S7-300 automation system signal, communication and function modules
- Applicable Ex analog input or output modules with HART optimize the ET 200M for use in process engineering.
- Can be used in redundant systems (S7-400H, S7-400F/FH)
- Modules can be replaced during operation (hot swapping) with the bus modules active
- Transmission rates up to 12 Mbit/s
- Ex approval to Cat. 3 for Zone 2 acc. to ATEX100 a
- Failsafe digital in/outputs as well as analog inputs for safety-oriented signal processing in accordance with PROFIsafe
- Support of modules with expanded user data, e.g. HART modules with HART minor variables

For further information, see chapter 9, page 9/268 ff.

Overview Fail-safe I/O modules

- Failsafe input/output modules for use with the SIMATIC S7-400F/FH
- With integrated safety functions
- Can only be plugged into the ET 200M
- Achievable safety classes in safety operation: SIL 2, SIL 3 to IEC 61508, AK 4, AK 6 to DIN V 19250, Category 3, 4 to EN 954-1
- Use in standard mode with high diagnostics requirements
- Also suitable for redundant operation

For further information, see chapter 5, page 5/108.