

Overview



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

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

Article number	6ES7416-2FP07-0AB0	6ES7416-3FS07-0AB0
	CPU 416F-2, MPI, PROFIBUS, 8 MB	CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
Data areas and their retentivity		
Flag		
• Number, max.	16 kbyte; Size of bit memory address area	16 kbyte; Size of bit memory address area
Address area		
I/O address area		
• Inputs	16 kbyte	16 kbyte
• Outputs	16 kbyte	16 kbyte
Process image		
• Inputs, adjustable	16 kbyte	16 kbyte
• Outputs, adjustable	16 kbyte	16 kbyte
Time of day		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
Operating hours counter		
• Number	16	16
Interfaces		
Interfaces/bus type	1 x MPI/PROFIBUS DP, 1 x PROFIBUS DP	1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports), 1 x PROFIBUS DP (optionally pluggable)
Number of RS 485 interfaces	2; Combined MPI / PROFIBUS DP and PROFIBUS DP	1; Combined MPI / PROFIBUS DP
Number of other interfaces		1; PROFIBUS DP with IF 964-DP (plug-in option; MLFB: 6ES7964-2AA04-0AB0)
1. Interface		
Interface type	Integrated	Integrated
Physics	RS485/PROFIBUS+MPI	RS485/PROFIBUS+MPI
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
• PROFIBUS DP master	Yes	Yes
• PROFIBUS DP slave	Yes	Yes
DP master		
• Number of DP slaves, max.	32	32

SIMATIC S7-400 advanced controller

Central processing units

Fail-safe CPUs

CPU 416F

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Technical specifications (continued)

Article number	6ES7416-2FP07-0AB0 CPU 416F-2, MPI, PROFIBUS, 8 MB	6ES7416-3FS07-0AB0 CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
2. Interface		
Interface type	Integrated	PROFINET
Physics	RS 485 / PROFIBUS	Ethernet RJ45
Interface types		
• Number of ports		2
Functionality		
• DP master	Yes	No
• DP slave	Yes	No
• PROFINET IO Controller		Yes
• PROFINET IO Device		Yes
• PROFINET CBA		Yes
• PROFIBUS DP master	Yes	No
• PROFIBUS DP slave	Yes	No
DP master		
• Number of DP slaves, max.	125	
3. Interface		
Interface type		Pluggable interface module (IF)
Plug-in interface modules		IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics		RS 485 / PROFIBUS
Functionality		
• MPI		No
• DP master		Yes
• DP slave		Yes
• PROFIBUS DP master		Yes
• PROFIBUS DP slave		Yes
DP master		
• Number of DP slaves, max.		125
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes; For PROFIBUS only	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions		
PG/OP communication	Yes	Yes
Data record routing	Yes	Yes
Global data 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

Article number	6ES7416-2FP07-0AB0 CPU 416F-2, MPI, PROFIBUS, 8 MB	6ES7416-3FS07-0AB0 CPU416F-3 PN/DP, 16 MB, 3 INTERFACES
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
• Web server	No	Yes
Number of connections		
• overall	96	96
Standards, approvals, certificates		
Use in hazardous areas		
• ATEX	ATEX II 3 G Ex nA IIC T4 Gc	ATEX II 3 G Ex nA IIC T4 Gc
Ambient conditions		
Ambient temperature during operation		
• min.	0 °C	0 °C
• max.	60 °C	60 °C
Configuration		
Know-how protection		
• User program protection/ password protection	Yes	Yes
• Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions		
Width	25 mm	50 mm
Height	290 mm	290 mm
Depth	219 mm	219 mm
Weights		
Weight, approx.	700 g	900 g

Ordering data	Article No.	Ordering data	Article No.
CPU 416F-2 For configuring safety-related automation systems; 8 MB work memory, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFIBUS DP master interface, slot for memory card, incl. slot number labels	6ES7416-2FP07-0AB0	FEPROM memory card <ul style="list-style-type: none"> • 64 KB • 256 KB • 1 MB • 2 MB • 4 MB • 8 MB • 16 MB • 32 MB • 64 MB 	6ES7952-0KF00-0AA0 6ES7952-0KH00-0AA0 6ES7952-1KK00-0AA0 6ES7952-1KL00-0AA0 6ES7952-1KM00-0AA0 6ES7952-1KP00-0AA0 6ES7952-1KS00-0AA0 6ES7952-1KT00-0AA0 6ES7952-1KY00-0AA0
CPU 416F-3 PN/DP For configuring safety-related automation systems; work 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	6ES7416-3FS07-0AB0	MPI cable For connection of SIMATIC S7 and PG via MPI; length: 5 m	6ES7901-0BF00-0AA0
S7 Distributed Safety programming tool V5.4 Task: Engineering tool for configuring failsafe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco Requirement: STEP 7 V5.3 SP3 or higher <ul style="list-style-type: none"> • Floating License • Floating License for 1 user, license key download without software or documentation¹⁾; e-mail address required for delivery 	6ES7833-1FC02-0YA5 6ES7833-1FC02-0YH5	IF 964-DP interface module For connecting an additional DP line	6ES7964-2AA04-0AB0
S7 Distributed Safety upgrade From V5.x to V5.4; Floating License for 1 user	6ES7833-1FC02-0YE5	Slot number labels 1 set (spare part)	6ES7912-0AA00-0AA0
RAM memory card <ul style="list-style-type: none"> • 64 KB • 256 KB • 1 MB • 2 MB • 4 MB • 8 MB • 16 MB • 64 MB 	6ES7952-0AF00-0AA0 6ES7952-1AH00-0AA0 6ES7952-1AK00-0AA0 6ES7952-1AL00-0AA0 6ES7952-1AM00-0AA0 6ES7952-1AP00-0AA0 6ES7952-1AS00-0AA0 6ES7952-1AY00-0AA0	SIMATIC Manual Collection Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC-based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	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 Mbps <ul style="list-style-type: none"> • Without PG interface • With PG interface 	6ES7972-0BA12-0XA0 6ES7972-0BB12-0XA0
		RS 485 bus connector with angled cable outlet Max. transfer rate 12 Mbps <ul style="list-style-type: none"> • Without PG interface • With PG interface 	6ES7972-0BA42-0XA0 6ES7972-0BB42-0XA0
		RS 485 bus connector with 90° cable outlet for FastConnect system Max. transfer rate 12 Mbps <ul style="list-style-type: none"> • Without PG interface <ul style="list-style-type: none"> - 1 unit - 100 units • With PG interface <ul style="list-style-type: none"> - 1 unit - 100 units 	6ES7972-0BA52-0XA0 6ES7972-0BA52-0XB0 6ES7972-0BB52-0XA0 6ES7972-0BB52-0XB0
		RS 485 bus connector with axial cable outlet For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	6GK1500-0EA02

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