SIEMENS

Data sheet

6AG1412-5HK06-7AB0

SIPLUS S7-400 CPU 412-5H -25...+70°C with conformal coating based on 6ES7412-5HK06-0AB0 . Central processing unit for S7-400H and S7-400F/FH, 5 interfaces: 1x MPI/DP, 1x DP, 1x PN and 2 for SYNC modules, 1 MB memory (512 KB data/512 KB program)



Figure similar

General information	
Product type designation	CPU 412-5H PN/DP
HW functional status	1
Firmware version	V6.0
Product function	
 Isochronous mode 	No
Engineering with	
 Programming package 	As of STEP 7 V5.5 SP2 with HF1
CiR - Configuration in RUN	
CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O byte	0 µs
Supply voltage	
Rated value (DC)	
• 24 V DC	No; Power supply via system power supply
Input current	
from backplane bus 5 V DC, typ.	1.6 A

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from backplane bus 5 V DC, max.	1.9 A
from backplane bus 24 V DC, max.	150 mA; 150 mA per DP interface
from interface 5 V DC, max.	90 mA; At each DP interface
Power loss Power loss, typ.	7.5 W
Power loss, typ.	7.5 W
Memory	
Type of memory	RAM
Work memory	
 integrated 	1 Mbyte
 integrated (for program) 	512 kbyte
 integrated (for data) 	512 kbyte
• expandable	No
Load memory	
 expandable FEPROM 	Yes; with Memory Card (FLASH)
 expandable FEPROM, max. 	64 Mbyte
 integrated RAM, max. 	512 kbyte
• expandable RAM	Yes
• expandable RAM, max.	64 Mbyte
Backup	
• present	Yes
• with battery	Yes; all data
• without battery	No
Battery	
Backup battery	
 Backup current, typ. 	180 μA; Valid up to 40°C
 Backup current, max. 	1 000 μΑ
 Backup time, max. 	Dealt with in the module data manual with the secondary
	conditions and the factors of influence
 Feeding of external backup voltage to CPU 	5 V DC to 15 V DC
CPU processing times	
for bit operations, typ.	31.25 ns
for word operations, typ.	31.25 ns
for fixed point arithmetic, typ.	31.25 ns
for floating point arithmetic, typ.	62.5 ns
CPU-blocks	
DB	
• Number, max.	6 000; Number range: 1 to 16000
• Size, max.	64 kbyte
FB	
 Number, max. 	3 000; Number range: 0 to 7999

• Size, max.	64 kbyte
FC	
 Number, max. 	3 000; Number range: 0 to 7999
• Size, max.	64 kbyte
OB	
• Number, max.	see instruction list
• Size, max.	64 kbyte
 Number of free cycle OBs 	1; OB 1
 Number of time alarm OBs 	4; OB 10-13
 Number of delay alarm OBs 	4; OB 20-23
 Number of cyclic interrupt OBs 	4; OB 32-35
 Number of process alarm OBs 	4; OB 40-43
 Number of DPV1 alarm OBs 	3; OB 55-57
 Number of startup OBs 	2; OB 100, 102
 Number of asynchronous error OBs 	9; OB 80-88
 Number of synchronous error OBs 	2; OB 121, 122
Nesting depth	
 per priority class 	24
 additional within an error OB 	1
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	Z 0 to Z 7
Counting range	
— lower limit	0
— upper limit	999
IEC counter	
● present	Yes
• Туре	SFB
• Number	Unlimited (limited only by RAM capacity)
S7 times	
• Number	2 048
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	No times retentive

Time range	
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
retentive data area in total	Total working and load memory (with backup battery)
Flag	
• Number, max.	8 192 byte
Retentivity available	Yes
Retentivity preset	MB 0 to MB 15
 Number of clock memories 	8; in 1 memory byte
Local data	
• adjustable, max.	16 kbyte
● preset	8 kbyte
Address area	
I/O address area	
Inputs	8 kbyte
Outputs	8 kbyte
Process image	
 Inputs, adjustable 	8 kbyte
Outputs, adjustable	8 kbyte
 Inputs, default 	256 byte
 Outputs, default 	256 byte
• consistent data, max.	244 byte
 Access to consistent data in process image 	Yes
Subprocess images	
 Number of subprocess images, max. 	15
Digital channels	
Inputs	65 536
— of which central	65 536
Outputs	65 536
— of which central	65 536
Analog channels	
Inputs	4 096
— of which central	4 096
• Outputs	4 096
— of which central	4 096



Hardware configuration	
Number of expansion units, max.	21
connectable OPs	47
Multicomputing	No
Interface modules	
 Number of connectable IMs (total), max. 	6
 Number of connectable IM 460s, max. 	6
 Number of connectable IM 463s, max. 	4; Single mode only
Number of DP masters	
• integrated	2
• via CP	10; CP 443-5 Extended
 Mixed mode IM + CP permitted 	No
• via interface module	0
Number of IO Controllers	
• integrated	1
• via CP	0
Number of operable FMs and CPs (recommended)	
• FM	See manual Automation System S7-400H fault-tolerant systems.
	Limited by number of slots and number of connections
• CP, PtP	See manual Automation System S7-400H fault-tolerant systems.
	Limited by number of slots and number of connections
 PROFIBUS and Ethernet CPs 	14; Of which max. 10 CP as DP master
Slots	
required slots	2
ime of day	
Clock	
 Hardware clock (real-time) 	Yes
 retentive and synchronizable 	Yes
Resolution	1 ms
ResolutionDeviation per day (buffered), max.	1 ms 1.7 s; Power off
• Deviation per day (buffered), max.	1.7 s; Power off
Deviation per day (buffered), max.Deviation per day (unbuffered), max.	1.7 s; Power off
 Deviation per day (buffered), max. Deviation per day (unbuffered), max. Operating hours counter 	1.7 s; Power off 8.6 s; Power on
 Deviation per day (buffered), max. Deviation per day (unbuffered), max. Operating hours counter Number 	1.7 s; Power off 8.6 s; Power on 16
 Deviation per day (buffered), max. Deviation per day (unbuffered), max. Operating hours counter Number Number/Number range Range of values 	1.7 s; Power off 8.6 s; Power on 16 0 to 15
 Deviation per day (buffered), max. Deviation per day (unbuffered), max. Operating hours counter Number Number Number/Number range Range of values Granularity 	1.7 s; Power off 8.6 s; Power on 16 0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours
 Deviation per day (buffered), max. Deviation per day (unbuffered), max. Operating hours counter Number Number/Number range Range of values Granularity retentive 	1.7 s; Power off 8.6 s; Power on 16 0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h
 Deviation per day (buffered), max. Deviation per day (unbuffered), max. Operating hours counter Number Number Number/Number range Range of values Granularity retentive Clock synchronization	1.7 s; Power off 8.6 s; Power on 16 0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h
 Deviation per day (buffered), max. Deviation per day (unbuffered), max. Operating hours counter Operating hours counter Number Number/Number range Range of values Granularity retentive Clock synchronization supported 	1.7 s; Power off 8.6 s; Power on 16 0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h Yes
 Deviation per day (buffered), max. Deviation per day (unbuffered), max. Operating hours counter Operating hours counter Number Number/Number range Range of values Granularity retentive Clock synchronization supported to MPI, master 	1.7 s; Power off 8.6 s; Power on 16 0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h Yes Yes
 Deviation per day (buffered), max. Deviation per day (unbuffered), max. Operating hours counter Operating hours counter Number Number/Number range Range of values Granularity retentive Clock synchronization supported 	1.7 s; Power off 8.6 s; Power on 16 0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h Yes

• to DP, slave	Yes
● in AS, master	Yes
● in AS, slave	Yes
 on Ethernet via NTP 	Yes; As client
Time difference in system when synchronizing via	
• Ethernet, max.	10 ms; Via NTP
• MPI, max.	200 ms
Interfaces	
Interfaces Number of RS 485 interfaces	2
Number of other interfaces	2; Fiber-optic interface
Optical interface	No
1. Interface	
Interface type	Integrated
Physics	RS 485 / PROFIBUS + MPI
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA
Protocols	
• MPI	Yes
 PROFIBUS DP master 	Yes
PROFIBUS DP slave	No
MPI	
 Number of connections 	32; If a diagnostics repeater is used on the line, the number of
	connection resources on the line is reduced by 1
 Transmission rate, max. 	12 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	No
— S7 basic communication	No
— S7 communication	Yes
— S7 communication, as client	Yes
— S7 communication, as server	Yes
PROFIBUS DP master	
 Number of connections, max. 	16; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1
 Transmission rate, max. 	12 Mbit/s
Number of DP slaves, max.	32
Services	
— PG/OP communication	Yes
— Routing	Yes
-	No
— Global data communication	



— S7 basic communication	No
— S7 communication	Yes
- S7 communication, as client	Yes
— S7 communication, as server	Yes
— Equidistance	No
— Isochronous mode	No
- SYNC/FREEZE	No
— Activation/deactivation of DP slaves	No
— Direct data exchange (slave-to-slave	No
communication)	
— DPV1	Yes
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
User data per DP slave	
— User data per DP slave, max.	244 byte
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
PROFIBUS DP slave	
Number of connections	No configuration of CPU as DP slave
	No configuration of CPU as DP slave
Number of connections 2. Interface Interface type	No configuration of CPU as DP slave PROFINET
2. Interface	
2. Interface Interface type	PROFINET
2. Interface Interface type Physics	PROFINET Ethernet RJ45
2. Interface Interface type Physics Isolated	PROFINET Ethernet RJ45 Yes
2. Interface Interface type Physics Isolated automatic detection of transmission rate	PROFINET Ethernet RJ45 Yes Yes; Autosensing
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes Yes
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes Yes No
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes Yes No
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources Interface types	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources Interface types • Number of ports	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources Interface types • Number of ports • integrated switch	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources Interface types • Number of ports • integrated switch Protocols	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources Interface types • Number of ports • integrated switch Protocols • PROFINET IO Controller	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes Yes
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources Interface types • Number of ports • integrated switch Protocols • PROFINET IO Controller • PROFINET IO Device	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes Yes Yes
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources Interface types • Number of ports • integrated switch Protocols • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes Yes No No No
2. Interface Interface type Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources Interface types • Number of ports • integrated switch Protocols • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA • PROFIBUS DP master	PROFINET Ethernet RJ45 Yes Yes; Autosensing Yes No 48 2 Yes Yes No No No No

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• Web server No • Point-to-point connection No • Media redundancy Yes PROFINET IO Controller 100 MbH/s Services Vers - PG/OP communication Yes - S7 routing Yes - S7 communication Yes - S7 communication Yes - Stand device Yes; Single mode only - Frioritized startup No - Number of connectable IO Devices, max. 256; In redundant mode via both interfaces - of which in line, max. 256 - of which in line, max. 256 - Activation/deactivation of IO Devices No - IO Devices changing during operation No - Device replacement without swap medium Yes - Device replacement without swap medium Yes - Updating time 250 Jus 50 Jus 10 S12 ms, minimum value depends on the number of configured user data and the configured single or redundant mode values data end the configured single or redundant mode values data end the configured single or redundant mode values data end the configured single or redundant mode values data end the configured single or redundant mode values data end the configured single or redundant mode values data end the configured single o		
Media relandancy Yes PROFINET IO Controller 100 Mbl/s Fransmission rate, max. 100 Mbl/s Services - - PGOP communication Yes - S7 routing Yes - S7 communication Yes - Isochronous mode No - Shared device Yes: Single mode only - Number of connectable IO Devices, max. 256; In redundant mode via both interfaces - Number of connectable IO Devices for RT. 256 - a diviation in line, max. 256 - of which in line, max. 256 - of which in line, max. 256 - a diviation/deactivation of IO Devices No - ID Devices schanging during operation No - Device replacement without swap medium Yes - Send cycles 250 µs, 500 µs, 1 ms, 2 ms, 4 ms - Updating time 250 µs to 512 ms, minimum value depends on the number of configured single or redundant mode or for configured single or redundant mode - Updating time 1024 byte Open IE communication 1024 byte Open IE connections, max. 46 0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65533, 65	Web server	No
PROFINE I to Controlier 100 Mbi/s Services - - PG/OP communication Yes - S7 routing Yes - S7 communication Yes - S7 communication Yes - S7 communication Yes - Shared device No - Shared device Yes, Single mode only - Prointized starup No - Number of connectable IO Devices, max. 256 - of which in line, max. 256 - of which in line, max. 256 - Activation/deactivation of IO Devices No - Devices changing during operation (partner ports), supported No - Device replacement without swap medium Yes - Send cycles 250 µs, 500 µs, 1 ms, 2 ms, 4 ms - Updating time 250 µs, 500 µs, 1 ms, 2 ms, 4 ms - Updating time 250 µs, 500 µs, 1 ms, 2 ms, 4 ms - Updating time 250 µs, 500 µs, 1 ms, 2 ms, 4 ms - Updating time 250 µs, 500 µs, 1 ms, 2 ms, 4 ms - Updating time 250 µs, 500 µs, 1 ms, 2 ms, 4 ms - Updating time 250 µs, 500 µs, 1 ms, 2 ms, 4 ms	 Point-to-point connection 	No
• Transmission rate, max. 100 Mbil/s Services - - PG/OP communication Yes - S7 communication Yes - Isochronous mode No - Shared device Yes: Single mode only - Prioritized startup No - Number of connectable IO Devices, max. 256: In redundant mode via both interfaces - Number of connectable IO Devices for RT. 256 - Activation/deactivation of IO Devices No - of which in line, max. 256 - Activation/deactivation of IO Devices No - IO Devices changing during operation (partner ports), supported No - Device replacement without swap medium Yes - Send cycles 250 µs to 512 ms, minimum value depends on the number of configured user data and the configured single or redundant mode Address area 8 kbyte - Updating time 250 µs to 512 ms, minimum value depends on the number of configured user data consistency, max. - Updating time 0.20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535 • Keep-alive function, supported Yes • Local port numbers used at the system end 0.20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535	Media redundancy	Yes
Services	PROFINET IO Controller	
PG/OP communication Yes	 Transmission rate, max. 	100 Mbit/s
S7 routing Yes S7 routing Yes S7 communication Yes Isochronous mode No Isochronous mode Yes, Single mode only Shared device Yes, Single mode only Prioritized startup No Number of connectable IO Devices, max. 256; In redundant mode via both interfaces Number of connectable IO Devices for RT, max. 256 of which in line, max. 256 of which in line, max. 256 Otivices changing during operation (partner ports), supported No Device replacement without swap medium Yes Send cycles 250 µs to 512 ms, nimimum value depends on the number of configured user data and the configured single or redundant mode Updating time 250 µs to 512 ms, inimium value depends on the number of configured user data and the configured single or redundant mode Inputs, max. 8 kbyte Updating time 1024 byte Number of connections, max. 46 Outputs, max. 9 kbyte Number of connections, max. 46 Local port numbers used at the system end 0,20,21,25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65535,	Services	
	— PG/OP communication	Yes
	— S7 routing	Yes
	— S7 communication	Yes
Prioritized startupNo- Number of connectable IO Devices, max.256; In redundant mode via both interfaces- Number of connectable IO Devices for RT, max.256- of which in line, max.256- Activation/deactivation of IO DevicesNo- IO Devices changing during operation (partner ports), supportedNo- Device replacement without swap mediumYes- Updating time250 µs, 500 µs, 1 ms, 2 ms, 4 ms- Send cycles250 µs to 512 ms, minimum value depends on the number of configured user data and the configured single or redundant mode- Inputs, max.8 kbyte- Outputs, max.1024 byte- Uuser data consistency, max.46- Uuser data consistency, max.40- Local port numbers used at the system end0,20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65536- Keep-alive function, supportedYes- Interface typeIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.16ProtocoisYes- PROFIBUS DP masterYes- PROFIBUS DP masterYes<	— Isochronous mode	No
Number of connectable IO Devices, max.256; In redundant mode via both interfaces- Number of connectable IO Devices for RT, max.256- of which in line, max.256- Activation/deactivation of IO DevicesNo- IO Devices changing during operation (partner ports), supportedNo- Device replacement without swap mediumYes- Send cycles250 µs, 500 µs, 1 ms, 2 ms, 4 ms- Updating time250 µs to 512 ms, minimum value depends on the number of configured user data and the configured single or redundant modeAddress area8 kbyte- Inputs, max.8 kbyte- Outputs, max.8 kbyte- Use data consistency, max.460 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYesInterfaceIntegratedPower supply to interface (15 to 30 V DC), max.16ProtocolsForos (15 D SD V DC), max.• PROFIBUS DP masterYes• PROFIBUS DP maste	— Shared device	Yes; Single mode only
Number of connectable IO Devices for RT, max.256— of which in line, max.256— of which in line, max.256— Activation/deactivation of IO DevicesNo— Activation/deactivation of IO DevicesNo— Activation/deactivation of IO DevicesNo— Activation/deactivation of IO DevicesNo— IO Devices changing during operation (partner ports), supportedNo— Device replacement without swap medium — Device replacement without swap mediumYes— Send cycles250 µs, 500 µs, 1 ms, 2 ms, 4 ms— Updating time250 µs to 512 ms, minimum value depends on the number of configured user data and the configured single or redundant modeAddress area8 kbyte— Inputs, max.8 kbyte— Outputs, max.1024 byteOpen IE communication1024 byte• Number of connections, max.46• Local port numbers used at the system end • Local port numbers used at the system end • Prosente0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYesPower supply to interface (15 to 30 V DC), max.16ProtocotsIntegrated• PROFIBUS DP masterYes• PROFIBUS DP	— Prioritized startup	No
max.256- of which in line, max.256- Activation/deactivation of IO DevicesNo- IO Devices changing during operation (partner ports), supportedNo- Device replacement without swap medium - Send cyclesYes- Updating time250 µs, 500 µs, 1 ms, 2 ms, 4 ms- Updating time250 µs to 512 ms, minimum value depends on the number of configured user data and the configured single or redundant modeAddress area8 kbyte- Inputs, max.8 kbyte- Outputs, max.1024 byteOutputs, max.0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYesInterfaceIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16ProtocolsYes• PROFIBUS DP masterYes• PROFIBUS DP masterYes <t< td=""><td>— Number of connectable IO Devices, max.</td><td>256; In redundant mode via both interfaces</td></t<>	— Number of connectable IO Devices, max.	256; In redundant mode via both interfaces
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Interface type(partner ports), supported— Device replacement without swap medium— Send cycles— Updating time250 µs, 500 µs, 1 ms, 2 ms, 4 ms— Updating time250 µs to 512 ms, minimum value depends on the number of configured user data and the configured single or redundant modeAddress area— Inputs, max.— Outputs, max.— Outputs, max.— User data consistency, max.— User data consistency, max.— User data consistency, max.• Local port numbers used at the system end0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYes2Interface typeInterface typeInterface typePhysicsPower supply to interface (15 to 30 V DC), max.16Protocols• PROFIBUS DP master• PROFIBUS DP masterYes• PROFIBUS DP masterPROFIBUS DP master	 Activation/deactivation of IO Devices 	No
Send cycles250 µs, 500 µs, 1 ms, 2 ms, 4 ms- Updating time250 µs to 512 ms, minimum value depends on the number of configured user data and the configured single or redundant modeAddress area8 kbyte- Inputs, max.8 kbyte- Outputs, max.1024 byteOpen IE communication46• Local port numbers used at the system end0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYesInterface typeIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16ProtocolsYes• PROFIBUS DP master • PROFIBUS DP masterYes• PROFIBUS DP masterYes </td <td></td> <td>No</td>		No
Updating time250 µs to 512 ms, minimum value depends on the number of configured user data and the configured single or redundant modeAddress area Inputs, max.8 kbyte Outputs, max.8 kbyte User data consistency, max.1 024 byteOpen IE communication-• Number of connections, max.46• Local port numbers used at the system end0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYesInterface	— Device replacement without swap medium	Yes
Address areaConfigured user data and the configured single or redundant modeAddress area8 kbyte- Inputs, max.8 kbyte- Outputs, max.1 024 byteOpen IE communication46• Local port numbers used at the system end0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYesInterfaceIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16ProtocolsYes• PROFIBUS DP masterYes• PROFIBUS DP slaveNo• PROFIBUS DP masterYes	— Send cycles	250 μs, 500 μs, 1 ms, 2 ms, 4 ms
Inputs, max.8 kbyte Outputs, max.8 kbyte User data consistency, max.1 024 byteOpen IE communication46• Number of connections, max.46• Local port numbers used at the system end0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYesInterfaceInterfaceInterface typeIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16ProtocolsYes• PROFIBUS DP masterYes• PROFIBUS DP slaveNoPROFIBUS DP masterYes	— Updating time	
- Outputs, max.8 kbyte- User data consistency, max.1 024 byteOpen IE communication46• Number of connections, max.46• Local port numbers used at the system end0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYesInterfaceInterface typeIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16ProtocolsYes• PROFIBUS DP masterYes• PROFIBUS DP slaveNoPROFIBUS DP masterYes	Address area	
— User data consistency, max.1 024 byteOpen IE communication46• Number of connections, max.46• Local port numbers used at the system end0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYesInterfaceInterface typeIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16ProtocolsYes• PROFIBUS DP masterYes• PROFIBUS DP slaveNoPROFIBUS DP masterYes• PROFIBUS DP masterNo	— Inputs, max.	8 kbyte
Open IE communication 46 • Number of connections, max. 46 • Local port numbers used at the system end 0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535 • Keep-alive function, supported Yes 3. Interface Interface type Interface type Integrated Physics RS 485 / PROFIBUS Power supply to interface (15 to 30 V DC), max. 150 mA Number of connection resources 16 Protocols Yes • PROFIBUS DP master Yes • PROFIBUS DP slave No PROFIBUS DP master Yes	— Outputs, max.	8 kbyte
• Number of connections, max.46• Local port numbers used at the system end0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYes3. InterfaceIntegratedInterface typeIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16ProtocolsYes• PROFIBUS DP masterYes• PROFIBUS DP slaveNoPROFIBUS DP masterYes• PROFIBUS DP masterNo	— User data consistency, max.	1 024 byte
• Local port numbers used at the system end0, 20, 21, 25, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535• Keep-alive function, supportedYes3. InterfaceYesInterface typeIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16ProtocolsYes• PROFIBUS DP masterYes• PROFIBUS DP slaveNoPROFIBUS DP masterYes• PROFIBUS DP masterYes• PROFIBUS DP masterYes• PROFIBUS DP masterNo	Open IE communication	
• Keep-alive function, supported65534, 65535 Yes 3. Interface YesInterface typeIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16ProtocolsYes• PROFIBUS DP masterYes• PROFIBUS DP slaveNoPROFIBUS DP masterYes• PROFIBUS DP masterYes	 Number of connections, max. 	46
3. Interface Interface type Integrated Physics RS 485 / PROFIBUS Power supply to interface (15 to 30 V DC), max. 150 mA Number of connection resources 16 Protocols • PROFIBUS DP master • PROFIBUS DP slave No PROFIBUS DP master No	 Local port numbers used at the system end 	
Interface typeIntegratedPhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16Protocols•• PROFIBUS DP masterYes• PROFIBUS DP slaveNoPROFIBUS DP master•• PROFIBUS DP master•	 Keep-alive function, supported 	Yes
PhysicsRS 485 / PROFIBUSPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16Protocols•• PROFIBUS DP masterYes• PROFIBUS DP slaveNoPROFIBUS DP masterNo	3. Interface	
Power supply to interface (15 to 30 V DC), max.150 mANumber of connection resources16Protocols• PROFIBUS DP masterYes• PROFIBUS DP slaveNoPROFIBUS DP master• PROFIBUS DP master	Interface type	Integrated
Number of connection resources 16 Protocols • PROFIBUS DP master • PROFIBUS DP slave Yes • PROFIBUS DP slave No	Physics	RS 485 / PROFIBUS
Protocols • PROFIBUS DP master • PROFIBUS DP slave PROFIBUS DP master		150 mA
• PROFIBUS DP master Yes • PROFIBUS DP slave No PROFIBUS DP master Yes		16
PROFIBUS DP slave No PROFIBUS DP master		
PROFIBUS DP master	 PROFIBUS DP master 	Yes
		No
Number of connections, max.	PROFIBUS DP master	
	 Number of connections, max. 	16

 Transmission rate, max. 	12 Mbit/s
 Number of DP slaves, max. 	64
Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	No
- S7 basic communication	No
— S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
— Equidistance	No
— Isochronous mode	No
— SYNC/FREEZE	No
- Activation/deactivation of DP slaves	No
 — Direct data exchange (slave-to-slave communication) 	No
— DPV0	Yes
— DPV1	Yes
Address area	
— Inputs, max.	4 kbyte
— Outputs, max.	4 kbyte
User data per DP slave	
— User data per DP slave, max.	244 byte
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
4. Interface	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960- 1AB06-0XA0
5. Interface	
Interface type	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960- 1AB06-0XA0
Protocols	
Redundancy mode	
Media redundancy	
— Switchover time on line break, typ.	200 ms
— Number of stations in the ring, max.	50
SIMATIC communication	

Ö PNAP

• S7 routing	Yes
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	46
— Data length, max.	32 kbyte
— several passive connections per port,	Yes
supported	
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
 — Number of connections, max. 	46
— Data length, max.	32 kbyte; 1 452 bytes via CP 443-1 Adv.
• UDP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	46
— Data length, max.	1 472 byte
Web server	
• supported	No
Isochronous mode	
Equidistance	No
Communication functions	
PG/OP communication	Yes
 Number of connectable OPs without message 	47
processing	
 Number of connectable OPs with message 	47; When using Alarm_S/SQ and Alarm_D/DQ
processing	Ver
Data record routing	Yes
Global data communication	No
• supported	No
S7 basic communication	No
• supported	No
S7 communication	Yes
• supported	
• as server	Yes
• as client	Yes
• User data per job, max.	64 kbyte
• User data per job (of which consistent), max.	462 byte; 1 variable
S5 compatible communication	
• supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
• User data per job, max.	8 kbyte
• User data per job (of which consistent), max.	240 byte
 Number of simultaneous AG-SEND/AG-RECV orders per CPU, max. 	64/64
Standard communication (FMS)	

• supported	Yes; Via CP and loadable FB
Number of connections	
• overall	48
 usable for PG communication 	
- reserved for PG communication	1
— adjustable for PG communication, max.	0
 usable for OP communication 	
— reserved for OP communication	1
— adjustable for OP communication, max.	0
 usable for S7 basic communication 	
— reserved for S7 basic communication	0
— adjustable for S7 basic communication,	0
max.	
 usable for S7 communication 	
- reserved for S7 communication	0
— adjustable for S7 communication, max.	0
 usable for routing 	
— reserved for routing	0
— adjustable for routing, max.	0
S7 message functions	
Number of login stations for message functions, max.	47; Max. 47 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 8
	with Alarm, Alarm_8, Alarm_8P, Notify and Notify_8 (e.g. WinCC)
Symbol-related messages	No

Symbol-related messages	No
SCAN procedure	No
Program alarms	Yes
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	250; Simultaneously active alarm_S/SQ blocks or alarm_D/DQ blocks
Alarm 8-blocks	Yes
 Number of instances for alarm 8 and S7 communication blocks, max. 	600
• preset, max.	300
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	16

Test commissioning functions	
Status block	Yes
Single step	Yes
Number of breakpoints	16
Status/control	
Status/control variable	Yes; Up to 16 variable tables



Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers,
 Number of variables, max. 	counters 70
Forcing	10
• Forcing	Yes
 Forcing, variables 	Inputs/outputs, bit memories, distributed I/Os
 Number of variables, max. 	256
Diagnostic buffer	200
• present	Yes
 Number of entries, max. 	3 200
	Yes
— adjustable	
— preset	120
Service data	No.
• can be read out	Yes
EMC	
Emission of radio interference acc. to EN 55 011	
 Limit class A, for use in industrial areas 	Yes
• Limit class B, for use in residential areas	No
Standards, approvals, certificates	
CE mark	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	-25 °C; = Tmin
• max.	70 °C; = Tmax; @ 60°C for UL/ATEX/FM and safety-related application
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
 Installation altitude above sea level, max. 	5 000 m
 Ambient air temperature-barometric pressure- altitude 	Tmin Tmax at 1 140 hPa 795 hPa (-1 000 m +2 000 m) // Tmin (Tmax - 10 K) at 795 hPa 658 hPa (+2 000 m +3 500 m) // Tmin (Tmax - 20 K) at 658 hPa 540 hPa (+3 500 m +5 000 m); with "F-System" applications max. +2 000 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	
Use in stationary industrial systems	
 — to biologically active substances according to EN 60721-3-3 	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request



 — to chemically active substances according to EN 60721-3-3 	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2- 52 (severity degree 3); *
 — to mechanically active substances according to EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust, *
Use on ships/at sea	
 — to biologically active substances according to EN 60721-3-6 	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
 — to chemically active substances according to EN 60721-3-6 	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2- 52 (severity degree 3); *
 — to mechanically active substances according to EN 60721-3-6 	Yes; Class 6S3 incl. sand, dust; *
Usage in industrial process technology	
 Against chemically active substances acc. to EN 60654-4 	Yes; Class 3 (excluding trichlorethylene)
 Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04 	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
Remark	
 — Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04 	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
 Coatings for printed circuit board assemblies acc. to EN 61086 	Yes; Class 2 for high reliability
 Protection against fouling acc. to EN 60664-3 	Yes; Type 1 protection
 Military testing according to MIL-I-46058C, Amendment 7 	Yes; Discoloration of coating possible during service life
 Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A 	Yes; Conformal coating, Class A
Configuration	
Configuration software	
• STEP 7	Yes
Programming	
Command set	see instruction list
Nesting levels	7
 Access to consistent data in process image 	Yes
 System functions (SFC) 	see instruction list
 System function blocks (SFB) 	see instruction list
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes

PNAP

— SCL	Yes
— CFC	Yes
— GRAPH	Yes
— HiGraph®	Yes
Number of simultaneously active SFCs	
- RD_REC	8
— WR_REC	8
— WR_PARM	8
— PARM_MOD	1
— WR_DPARM	2
— DPNRM_DG	8
— RDSYSST	8
- DP_TOPOL	1
Number of simultaneously active SFBs	
— RDREC	8
— WRREC	8
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.	995 g
last modified:	10/09/2020

