SIEMENS

Data sheet

6ES7412-5HK06-0AB0

SIMATIC S7-400H, CPU 412-5H, 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)



General information	
Product type designation	CPU 412-5H PN/DP
HW functional status	1
Firmware version	V6.0
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
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
Memory	
Type of memory	other
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 µA
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
ОВ	
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
• Type	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 aross and their retentivity	
Data areas and their retentivity retentive data area in total	Total working and load memory (with backup battery)
Flag	Total norming and rose montory (man bearing battery)
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	c, ,c., 2, to
adjustable, max.	16 kbyte
• preset	8 kbyte
preser	Chayto
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
Fime of day	
Clock	
 Hardware clock (real-time) 	Yes
 retentive and synchronizable 	Yes
 Resolution 	1 ms
 Resolution 	1 ms
 Deviation per day (buffered), max. 	1.7 s; Power off
 Deviation per day (unbuffered), max. 	8.6 s; Power on
Operating hours counter	
Number	16
NumberNumber/Number range	16 0 to 15
Number/Number range	0 to 15
Number/Number rangeRange of values	0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours
Number/Number rangeRange of valuesGranularity	0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h
Number/Number rangeRange of valuesGranularityretentive	0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h
 Number/Number range Range of values Granularity retentive Clock synchronization	0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h Yes
 Number/Number range Range of values Granularity retentive Clock synchronization supported 	0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h Yes
 Number/Number range Range of values Granularity retentive Clock synchronization supported to MPI, master 	0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h Yes Yes Yes
 Number/Number range Range of values Granularity retentive Clock synchronization supported to MPI, master to MPI, slave 	0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h Yes Yes Yes Yes
 Number/Number range Range of values Granularity retentive Clock synchronization supported to MPI, master to MPI, slave to DP, master 	0 to 15 SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours 1 h Yes Yes Yes Yes Yes

It me difference in system when synchronizing via Iterarces Interfaces Number of RS 485 interfaces Interface Ype Interface type Interface type Interface type Physics RS 485 / PROFIBUS + MPI Isolated Yes Power supply to interface (15 to 30 V DC), max. Number of connection resources Interface YPe Protocols Interface Ype Interface Ype Protocols Interface Ype Protocols Interface Ype Interface Ype Protocols Interface Ype Protocols Interface Ype Interface Ype Protocols Interface Ype Interface Ype Interface Ype Interface	on Ethernet via NTP	Yes; As client
Interfaces Number of RS 485 interfaces Number of RS 485 interfaces 2 ; Fiber-optic interface Interface type Physics RS 485 / PROFIBUS + MPI Isolated Power supply to interface (15 to 30 V DC), max. Number of connection resources MPI: 32, DP: 16 Protocols MPI PROFIBUS DP master PROFIBUS DP slave No MPI Number of connections 22; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1 PROFIBUS DP communication PS7 communication PS7 communication PS7 communication PS7 communication PS7 communication PROFIBUS DP master PROFIBUS DP master PROFIBUS DP slave 12 Mbit/s PROFIBUS DP master PS7 communication PS8 communication PS8 communication PS9 pasice communi	Time difference in system when synchronizing via	
Number of RS 485 interfaces 2; Fiber-optic interface 1. Interface 1. Interface 2. Fiber-optic interface 3. Interface 4. Interface type 4. Physics 5. RS 485 / PROFIBUS + MPI 5. Interface (15 to 30 V DC), max. 1. So mA 1. Number of connection resources 4. Prover supply to interface (15 to 30 V DC), max. 1. So mA 1. Number of connection resources 4. MPI: 32, DP: 16 1. PROFIBUS DP master 5. PROFIBUS DP master 6. PROFIBUS DP slave 7. Number of connections 7. Transmission rate, max. 7. It a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1 1. Transmission rate, max. 7. Services 7. PG/OP communication 7. Routing 7. Global data communication 7. S7 basic communication 7. S7 communication 7. S7 communication, as server 7. S7 communication, as server 7. Number of connections, max. 7. Connection resources on the line is reduced by 1 1. It a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1 1. Transmission rate, max. 1. Services 1. PG/OP communication 1. Ves 1. Transmission rate, max. 1. Services 1. PG/OP communication 1. Transmission rate, max. 1. Services 1. PG/OP communication 1. Services 1. PG/OP communication 1. Services 1. PG/OP communication 1. No 1. Transmission rate, max. 1. Services 1. PG/OP communication 1. Ves 1. Transmission rate, max. 1. Services 1. PG/OP communication 1. No 1. Services 1. PG/OP communication 2. Services 2. PG/OP communication 3. No 3. Services 3. Services 4. PG/OP communication 3. No 3. Services 3. Services 4. PG/OP communication 3. No 3. Services 3. Services 3. Services 4. PG/OP communication 3. No 3. Services 3. Services 3. Services 4. PG/OP communication 5. Services 5. PG/OP communication 7. No 7. Services 7. Services 7. Services 7. Services 7. Services 7. Services 7. Ser	• Ethernet, max.	10 ms; Via NTP
Number of RS 485 interfaces 2; Fiber-optic interface Interface Interface Type Integrated Physics RS 485 / PROFIBUS + MPI Isolated Yes Power supply to interface (15 to 30 V DC), max. 150 mA Number of connection resources Protocols • MPI Yes • PROFIBUS DP master Yes • PROFIBUS DP slave No MPI • Number of connections 22; 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 No — S7 basic communication Yes — S7 communication, as server Yes PROFIBUS DP master • Number of connections 2 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 No — S7 basic communication No — S7 communication 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 1 Mit a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1 1 Transmission rate, max. 12 Mbit/s • Transmission rate, max. 12 Mbit/s • Number of DP slaves, max. 32 Services — PG/OP communication Yes — PG/OP communication Yes — PG/OP communication No — S7 basic communication No — S7 com	• MPI, max.	200 ms
Number of RS 485 interfaces 2; Fiber-optic interface Interface Interface Type Integrated Physics RS 485 / PROFIBUS + MPI Isolated Yes Power supply to interface (15 to 30 V DC), max. 150 mA Number of connection resources Protocols • MPI Yes • PROFIBUS DP master Yes • PROFIBUS DP slave No MPI • Number of connections 22; 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 No — S7 basic communication Yes — S7 communication, as server Yes PROFIBUS DP master • Number of connections 2 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 No — S7 basic communication No — S7 communication 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 1 Mit a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1 1 Transmission rate, max. 12 Mbit/s • Transmission rate, max. 12 Mbit/s • Number of DP slaves, max. 32 Services — PG/OP communication Yes — PG/OP communication Yes — PG/OP communication No — S7 basic communication No — S7 com	lutania a a	
Number of other interfaces 2; Fiber-optic interface		2
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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 Clobal data communication No S7 basic communication Yes S7 communication Yes S7 communication 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. 22 Services PG/OP communication Yes Clobal data communication No S7 basic communication No S7 basic communication No S7 basic communication No S7 basic communication No S7 communication Yes		
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- Routing - Global data communication - S7 basic communication - S7 communication - S7 communication - S7 communication - S7 communication, as client - S7 communication, as server - S7 communication, as server 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. • Number of DP slaves, max. 2 Mbit/s - Routing - Routing - Global data communication - S7 basic communication No - S7 communication - S7 communication - Yes	Services	
- Global data communication No - S7 basic communication Yes - 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. • Number of DP slaves, max. 2 Mbit/s • Number of DP slaves, max. 7 Services - PG/OP communication - Routing - Global data communication - S7 basic communication No - S7 basic communication - S7 communication - No - S7 communication - No - S7 communication - S7 communicati	— PG/OP communication	Yes
- S7 basic communication - S7 communication - S7 communication, as client - S7 communication, as server Yes - S7 communication, as server 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. ● Number of DP slaves, max. 12 Mbit/s ■ Number of DP slaves, max. 32 Services - PG/OP communication - Routing - Global data communication - S7 basic communication No - S7 communication - S7 communication - S7 communication - Yes	— Routing	Yes
- 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 - Global data communication No - S7 basic communication No - S7 communication Yes	 Global data communication 	No
- S7 communication, as client - S7 communication, as server 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. • Number of DP slaves, max. 32 Services - PG/OP communication - Routing - Global data communication - S7 basic communication - S7 communication - S7 communication - S7 communication - S7 communication - Yes	 S7 basic communication 	No
- S7 communication, as server 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. Number of DP slaves, max. PG/OP communication Routing Global data communication S7 basic communication No S7 communication Yes Yes	— S7 communication	Yes
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 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. Number of DP slaves, max. Services — PG/OP communication — Routing — Global data communication — S7 basic communication — S7 communication Yes 	 S7 communication, as server 	Yes
connection resources on the line is reduced by 1 • Transmission rate, max. • Number of DP slaves, max. 32 Services — PG/OP communication — Routing — Global data communication — S7 basic communication — S7 communication — S7 communication Yes No Yes	PROFIBUS DP master	
 Number of DP slaves, max. Services — PG/OP communication — Routing — Global data communication — S7 basic communication — S7 communication — S7 communication Yes 	Number of connections, max.	
Services PG/OP communication Yes Routing Yes Global data communication No S7 basic communication No S7 communication Yes	 Transmission rate, max. 	12 Mbit/s
 — PG/OP communication — Routing — Global data communication — S7 basic communication — S7 communication — Yes No — S7 communication Yes 	 Number of DP slaves, max. 	32
 Routing Global data communication S7 basic communication No S7 communication Yes 	Services	
 Global data communication S7 basic communication No S7 communication Yes 	— PG/OP communication	Yes
— S7 basic communication— S7 communicationYes	— Routing	Yes
— S7 communication Yes	 Global data communication 	No
— S7 communication Yes	— S7 basic communication	No
		Yes
	— S7 communication, as client	Yes

- S7 communication, as server - Equidistance - Equidistance - Isochronous mode - Isochronous mode - SYNC/FREEZE - No - Activation/deactivation of DP slaves - Direct data exchange (slave-to-slave communication) - DPV1 - Yes - Address area - Inputs, max Outputs, max Outputs, max Outputs, max User data per DP slave - User data per DP slave - User data per DP slave, max 244 byte - Inputs, max Slots, max 244 byte - Unputs, max Slots, max yer slot, max yer slot, max PROFIBUS DP slave - Number of connections - No configuration of CPU as DP slave - Inputs, max Stots, max Yes, Autosensing - Ves, Autosensing - Autocrossing - Yes - Autocrossing - Yes - Number of connection resources - Number of stations in the ring, max Stots, max Yes - Number of stations in the ring, max Yes - Number of stations in the ring, max Stots - PROFIBUS DP master - No - PROFIBUS DP master		
Equidistance No No - Isochronous mode No - SYNC/FREEZE No No - Activation/deactivation of DP slaves No - Direct data exchange (slave-to-slave communication) - DPV1 Yes Address area - Inputs, max. 2 kbyte - Outputs, max. 244 byte - Slots, max. 244 byte - PROFINED DP slave - Number of connections No configuration of CPU as DP slave - Number of connections No configuration of CPU as DP slave - Number of connections - No configuration of CPU as DP slave - Interface type PROFINET - Physics Ethermet Ru45 - Slotated Yes - Slotated Yes - Slotated Yes - Autocrossing Yes - Autocrossing Yes - Autocrossing Yes - Autocrossing Yes - Outputs -	 S7 communication, as server 	Yes
Isochronous mode SYNC/FREEZE Activation/deactivation of DP slaves Direct data exchange (slave-to-slave communication) DPV1 Yes Address area Inputs, max Outputs, max Outputs, max User data per DP slave User data per DP slave, max User data per DP slave Voutputs, max User data per DP slave	— Equidistance	No
- SYNC/FREEZE No - Activation/deactivation of DP slaves No - Direct data exchange (slave-to-slave 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 - Outputs, max. 244 byte - Per slot, max. 244 byte - ProFIBUS DP slave - Number of connections - No configuration of CPU as DP slave Interface type - PROFINET - Physics - Isolated - Autocrossing - Autocrossing - Autocrossing - Change of IP address at runtime, supported - Number of connection resources - Number of stations in the ring, max Solome of IP address at runtime, supported - Switchover time on line break, typ Supported - Switchover time on line break, typ Supported - Switchover time on line break, typ PROFINET IO Controller - PROFINET IO Controller - PROFINET IC Device - PROFINET CBA - PROFINET SDA - PROFINET CBA - PROFINET SDA - PR	— Equidistance	No
- Activation/deactivation of DP slaves - Direct data exchange (slave-to-slave communication) - DPV1 - PDV1 - Yes Address area - Inputs, max. 2 kbyte - User data per DP slave - User data per DP slave, max. 244 byte - Inputs, max. 244 byte - User data per DP slave, max. 244 byte - User data per DP slave, max. 244 byte - User data per DP slave, max. 244 byte - User data per DP slave, max. 244 byte - Por slot, max. 244 byte - Slots, max. 244 byte - Slots, max. 245 byte PROFIBUS DP slave • Number of connections No configuration of CPU as DP slave 2 Interface Interface type PROFINET - Physics Isolated Yes automatic detection of transmission rate Yes; Autosensing Autorogotiation Yes - Autocrossing Yes - Change of IP address at runtime, supported No Number of connection resources - Number of connection resources - Number of ports 2 - interface types - Number of ports 2 - integrated switch Yes - Media redundancy - supported Yes - Switchover time on line break, typ. 200 ms - Number of stations in the ring, max. 50 - PROFINET IO Controller Yes - PROFINET IO Controller No - PROFINET IO Controller No - PROFINET CBA No - PROFINET CBA - PROFINET CBA - PROFINET CBA - PROFINET OF Device - PROFINET O	— Isochronous mode	No
Direct data exchange (slave-to-slave communication) — DPV1 Yes Address area — Inputs, max. 2 kbyte — User data per DP slave — User data per DP slave, max. 244 byte — Outputs, max. 244 byte — Outputs, max. 244 byte — Outputs, max. 244 byte — Siots, max. 244 byte — PROFIBUS DP slave • Number of connections No configuration of CPU as DP slave 2. Interface byte PROFISE Physics Ethernet RJ45 Isolated Yes Autocrossing Yes Autocrossing Yes Autocrossing Yes Automagoliation Yes Automagoliation Yes Automagoliation Yes Automagoliation Pyes • Number of connection resources Interface byte • Number of connection resources Automagoliation Yes Automagoliation Yes Autocrossing Yes Change of IP address at runtime, supported No Number of connection resources 48 Interface byte • Number of ports 2 • integrated switch Yes • Number of stations in the ring, max. 50 Proficools • PROFINET IO Controller Yes • PROFINET IO Controller Yes • PROFINET CBA No • PROFINET CBA • PROFIN	— SYNC/FREEZE	No
communication) — DPV1 Yes Address area — Inputs, max. 2 kbyte User data per DP slave — User data per DP slave, max. 244 byte — Uputs, max. 244 byte — Uputs, max. 244 byte — Uputs, max. 244 byte — Outputs, max. 244 byte — Por slot, max. 244 byte — Profibus DP slave • Number of connections No configuration of CPU as DP slave 2. Interface Interface type PROFINET Physics Ethernet RJ45 Isolated Yes automatic detection of transmission rate Yes; Autosensing Autoropositation Yes Autorossing Yes Autorossing Yes • Number of connection resources 48 Interface types • Number of ports 2 • integrated switch Yes • Switchover time on line break, typ. 200 ms • Number of stations in the ring, max. 50 Protocols • PROFINET IO Controller Yes • PROFINET IO Device No • PROFINET CBA No • PROFINET CBA • PROFINET CBA • PROFINET CBA • PROFINET OS DE Maxes No	 Activation/deactivation of DP slaves 	No
Address area		No
Inputs, max. 2 kbyte Outputs, max. 2 kbyte Outputs, max. 2 kbyte User data per DP slave User data per DP slave, max. 244 byte Outputs, max. 244 byte Outputs, max. 244 byte Slots, max. 244 byte Slots, max. 244 byte PROFIBUS DP slave Number of connections Number of connections No configuration of CPU as DP slave 2. Interface Interface type PROFINET Prysics Itelace automatic detection of transmission rate Autorogotiation Yes Autorogotiation Yes Autorogotiation Yes Autorogotiation Number of connection resources Interface types Number of ports Itelace types Number of ports Itelace types Number of ports Switchover time on line break, typ Number of stations in the ring, max. PROFINET IO Controller PROFINET IO Controller PROFINET IO Device PROFINET IO Device PROFINET OB PROFINET IO Device PROFINET CBA P	— DPV1	Yes
User data per DP slave - User data per DP slave, max. 244 byte - Inputs, max. 244 byte - Outputs, 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 2. Interface Interface type PROFINET Physics Ethernet RJ45 Isolated Yes automatic detection of transmission rate Yes; Autosensing Autocrossing Yes Change of IP address at runtime, supported No Number of connection resources 48 Interface types • Number of ports 2 • integrated switch Yes Media redundancy • supported • Switchover time on line break, typ. 200 ms • Number of stations in the ring, max. 50 Protocols • PROFINET IO Controller Yes • PROFINET IO Device No • PROFINET CBA No • PROFINET CBA No	Address area	
User data per DP slave - User data per DP slave, max Inputs, max Outputs, max Outputs, max Slots, max per slot, max per slot, max No configuration of CPU as DP slave • Number of connections PROFIBUS DP slave • Number of connections No configuration of CPU as DP slave PROFINET Physics Ethernet RJ45 Isolated Yes automatic detection of transmission rate Ves; Autosensing Autonegotiation Autocrossing Change of IP address at runtime, supported No Number of connection resources • Number of ports • integrated switch Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA • PROFIBUS DP master	— Inputs, max.	2 kbyte
- User data per DP slave, max Inputs, max Inputs, max Outputs, max Outputs, max Slots, max per slot, max per slot, max. PROFIBUS DP slave • Number of connections No configuration of CPU as DP slave PROFINET Physics Interface type Profined type Profined type Autocrossing Autonegotiation Autonegotiation Autonegotiation Autonegotiation For any of paddress at runtime, supported Number of connection resources Automatic detection of resources Interface type • Number of ports • integrated switch Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET IO Device • PROFIBUS DP master	— Outputs, max.	2 kbyte
— Inputs, max. — Outputs, max. — Outputs, max. — Slots, max. — per slot, max. — per slot, max. — PROFIBUS DP slave • Number of connections No configuration of CPU as DP slave 2. Interface Interface Interface type PROFINET Physics Ethernet RJ45 Isolated Yes automatic detection of transmission rate Autonegotiation Yes Autocarosing Change of IP address at runtime, supported No Number of connection resources Interface types • Number of ports • Number of ports • Switchover time on line break, typ. • Switchover time on line break, typ. • Number of stations in the ring, max. PROFINET IO Controller • PROFINET IO Controller • PROFINET CBA • PROFIBUS DP master	User data per DP slave	
— Outputs, max. — Slots, max. — per slot, max. — per slot, max. — per slot, max. — Number of connections PROFIBUS DP slave • Number of connections No configuration of CPU as DP slave 2. Interface Interface type Interface type PROFINET Physics Ethernet RJ45 Isolated Yes automatic detection of transmission rate Autonegotiation Yes Autocarosing Autocarosing Change of IP address at runtime, supported No Number of connection resources Interface types • Number of ports • Number of ports • Integrated switch Yes Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET IO Device • PROFIBUS DP master	— User data per DP slave, max.	244 byte
— Slots, max. — per slot, max. — per slot, max. PROFIBUS DP slave • Number of connections No configuration of CPU as DP slave 2. Interface Interface type PROFINET Physics Ethernet RJ45 Isolated Autonegotiation Autonegotiation Autocrossing Autocrossing Change of IP address at runtime, supported No Number of connection resources Alterface types • Number of ports • integrated switch Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET CBA • PROFIBUS DP master	— Inputs, max.	244 byte
— per slot, max. 128 byte PROFIBUS DP slave • Number of connections No configuration of CPU as DP slave 2. Interface Interface type PROFINET Physics Ethernet RJ45 Isolated Yes automatic detection of transmission rate Yes; Autosensing Autonegotiation Yes Autocrossing Yes Change of IP address at runtime, supported No Number of connection resources 48 Interface types • Number of ports 2 • integrated switch Yes Media redundancy • supported Yes • Switchover time on line break, typ. 200 ms • Number of stations in the ring, max. 50 Protocols • PROFINET IO Controller Yes • PROFINET CBA No • PROFIBUS DP master	— Outputs, max.	244 byte
PROFIBUS DP slave Number of connections No configuration of CPU as DP slave 2. Interface Interface type PROFINET Physics Ethernet RJ45 Isolated Autonegotiation Ves Autorossing Yes Change of IP address at runtime, supported No Number of connection resources Number of ports Number of ports Interface types Number of ports Supported Switchover time on line break, typ. Number of stations in the ring, max. Protocols PROFINET IO Controller PROFINET IO Device PROFINET CBA PROFIBUS DP master No No configuration of CPU as DP slave PROFINET of connections No configuration of CPU as DP slave PROFINET Osate No configuration of CPU as DP slave PROFINET of connections No configuration of CPU as DP slave PROFINET Osate No configuration of CPU as DP slave PROFINET Osate PROFINET CBA No PROFINET CBA No PROFINET CBA No	— Slots, max.	244
No configuration of CPU as DP slave 2. Interface Interface type PROFINET Physics Ethernet RJ45 Isolated Yes automatic detection of transmission rate Yes; Autosensing Autonegotiation Yes Change of IP address at runtime, supported No Number of connection resources 48 Interface types Number of ports 2 integrated switch Yes Media redundancy supported Yes Switchover time on line break, typ. 200 ms Number of stations in the ring, max. Protocols PROFINET IO Controller Yes PROFINET IO Device No PROFIBUS DP master No	— per slot, max.	128 byte
Interface Interface PROFINET	PROFIBUS DP slave	
Interface type PROFINET Physics Ethernet RJ45 Isolated Yes automatic detection of transmission rate Yes; Autosensing Autonegotiation Yes Autocrossing Yes Change of IP address at runtime, supported No Number of connection resources 48 Interface types • Number of ports 2 • integrated switch Yes Media redundancy • supported Yes • Switchover time on line break, typ. 200 ms • Number of stations in the ring, max. 50 Protocols • PROFINET IO Controller Yes • PROFINET IO Device No • PROFIBUS DP master	Number of connections	No configuration of CPU as DP slave
Interface type PROFINET Physics Ethernet RJ45 Isolated Yes automatic detection of transmission rate Yes; Autosensing Autonegotiation Yes Autocrossing Yes Change of IP address at runtime, supported No Number of connection resources 48 Interface types • Number of ports 2 • integrated switch Yes Media redundancy • supported Yes • Switchover time on line break, typ. 200 ms • Number of stations in the ring, max. 50 Protocols • PROFINET IO Controller Yes • PROFINET IO Device No • PROFIBUS DP master	2 Interface	
Physics Isolated Yes automatic detection of transmission rate Yes; Autosensing Autonegotiation Yes Autocrossing Yes Change of IP address at runtime, supported No Number of connection resources Number of ports Number of ports Integrated switch Yes Media redundancy Switchover time on line break, typ. Number of stations in the ring, max. Protocols PROFINET IO Controller PROFINET CBA PROFIBUS DP master	Z. IIItoriaco	
automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported No Number of connection resources Number of ports Number of ports Interface types Integrated switch Media redundancy Switchover time on line break, typ. Number of stations in the ring, max. PROFINET IO Controller PROFINET CBA PROFIBUS DP master Yes Autocrossing Yes 48 Later Automatic detection of transmission rate Yes 2 48 Later Automatic detection of transmission rate Yes 2 2 48 Later Automatic detection of transmission rate Yes 2 Interface types Yes No No No PROFINET IO Device No PROFIBUS DP master	Interface type	PROFINET
Autocrossing Autocrossing Change of IP address at runtime, supported No Number of connection resources • Number of ports • Number of ports • Interface types • Number of ports • Integrated switch Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA • PROFIBUS DP master		
Autocrossing Change of IP address at runtime, supported No Number of connection resources 48 Interface types • Number of ports 2 • integrated switch Yes Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA • PROFIBUS DP master	Physics	Ethernet RJ45
Change of IP address at runtime, supported No Number of connection resources 48 Interface types • Number of ports • integrated switch Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA • PROFIBUS DP master	Physics Isolated	Ethernet RJ45 Yes
Number of connection resources Interface types Number of ports Integrated switch Nedia redundancy supported Switchover time on line break, typ. Number of stations in the ring, max. Protocols Protocols PROFINET IO Controller PROFINET IO Device PROFINET CBA PROFIBUS DP master	Physics Isolated automatic detection of transmission rate	Ethernet RJ45 Yes Yes; Autosensing
Interface types • Number of ports • integrated switch Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA • PROFIBUS DP master	Physics Isolated automatic detection of transmission rate Autonegotiation	Ethernet RJ45 Yes Yes; Autosensing Yes
 Number of ports integrated switch Media redundancy supported Switchover time on line break, typ. Number of stations in the ring, max. Protocols PROFINET IO Controller PROFINET IO Device PROFINET CBA PROFIBUS DP master 	Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No
 integrated switch Media redundancy supported Switchover time on line break, typ. Number of stations in the ring, max. Protocols PROFINET IO Controller PROFINET IO Device PROFINET CBA PROFIBUS DP master 	Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No
Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA • PROFIBUS DP master	Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources Interface types	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48
 supported Switchover time on line break, typ. Number of stations in the ring, max. Protocols PROFINET IO Controller PROFINET IO Device PROFINET CBA PROFIBUS DP master 	Physics Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Number of connection resources Interface types	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48
Switchover time on line break, typ. Number of stations in the ring, max. Protocols PROFINET IO Controller PROFINET IO Device PROFINET CBA PROFIBUS DP master 200 ms 50 No No No	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	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48
Number of stations in the ring, max. Protocols PROFINET IO Controller PROFINET IO Device PROFINET CBA PROFIBUS DP master No No	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	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48
Protocols • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA • PROFIBUS DP master No	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 Media redundancy • supported	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes
 PROFINET IO Controller PROFINET IO Device PROFINET CBA PROFIBUS DP master 	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 Media redundancy • supported	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes Yes Yes Yes
 PROFINET IO Device PROFINET CBA PROFIBUS DP master No 	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 Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max.	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes Yes Yes Yes
 PROFINET CBA PROFIBUS DP master No 	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 Media redundancy supported Switchover time on line break, typ. Number of stations in the ring, max. Protocols	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes Yes Yes 200 ms 50
PROFIBUS DP master No	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 Media redundancy supported Switchover time on line break, typ. Number of stations in the ring, max. Protocols	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes Yes Yes Yes Yes Yes Yes
	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 Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes Yes Yes Yes Yes Yes Yes No Yes No Yes
PROFIBUS DP slave No	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 Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET IO Device	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes Yes Yes Yes Yes Yes No No No No
	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 Media redundancy • supported • Switchover time on line break, typ. • Number of stations in the ring, max. Protocols • PROFINET IO Controller • PROFINET IO Device • PROFINET CBA	Ethernet RJ45 Yes Yes; Autosensing Yes Yes No 48 2 Yes Yes Yes Yes Yes Yes No No No No No

• Open IF communication	Yes
Open IE communication Walk agreement	No
• Web server	
Point-to-point connection PROFINET IO Controller	No
	100 Mbit/s
• Transmission rate, max.	TOO INIDITYS
Services	Yes
— PG/OP communication	
— S7 routing	Yes
— S7 communication	Yes
— Isochronous mode	No
— Open IE communication	Yes
— 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
 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, 500 μs, 1 ms, 2 ms, 4 ms
— Updating time	250 μs to 512 ms, minimum value depends on the number of configured user data and the configured single or redundant mode
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
 User data consistency, max. 	1 024 byte
Open IE communication	
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	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 	Yes
PROFIBUS DP slave	No
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	
SIMATIC communication	
• S7 routing	Yes
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs

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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; 1452 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	
Isochronous operation (application synchronized up	No
to terminal)	
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	
Data record routing	Yes
Global data communication	
• supported	No
S7 basic communication	
• supported	No
S7 communication	
• supported	Yes
• 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	64/64
orders per CPU, max.	
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
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 	600
communication blocks, max.	
• preset, max.	300
Process control messages	Yes
Number of archives that can log on simultaneously	16
(SFB 37 AR_SEND)	

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, counters

Number of variables, max.	70
Forcing	
• Forcing	Yes
• Forcing, variables	Inputs/outputs, bit memories, distributed I/Os
Number of variables, max.	256
Diagnostic buffer	
• present	Yes
Number of entries, max.	3 200
— adjustable	Yes
— preset	120
Service data	
• 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
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
— 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	
Dimensions Width	50 mm
	50 mm 290 mm
Width	
Width Height	290 mm
Width Height Depth	290 mm