SIEMENS

Data sheet

6ES7412-2EK07-0AB0

SIMATIC S7-400, CPU 412-2 PN Central processing unit with: Work memory 1 MB, (0.5 MB code; 0.5 MB data) interfaces 1st interface MPI/DP 12 Mbit/s, (X1), 2nd interface Ethernet/PROFINET (X5)



General information	
Product type designation	CPU 412-2 PN
HW functional status	01
Firmware version	V7.0
Engineering with	
 Programming package 	STEP 7 V5.5 or higher with HSP 262
CiR – Configuration in RUN	
CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O byte	30 µs
	•
Supply voltage	
Supply voltage	No; Power supply via system power supply
Supply voltage Rated value (DC)	
Supply voltage Rated value (DC) • 24 V DC	
Supply voltage Rated value (DC) • 24 V DC Input current	No; Power supply via system power supply
Supply voltage Rated value (DC) • 24 V DC Input current from backplane bus 5 V DC, typ.	No; Power supply via system power supply

Power loss	
Power loss, typ.	5.5 W
Power loss, max.	7 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; with Memory Card (RAM)
 expandable RAM, max. 	64 Mbyte
Backup	
● present	Yes
 with battery 	Yes; all data
 without battery 	No
Battery Backup battery	
Backup current, typ.	180 μA; up to 40 °C
Backup current, max.	850 μA
Backup current, max.Backup time, max.	Dealt with in the module data manual with the secondary
• Backup unie, max.	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. for floating point arithmetic, typ.	31.25 ns 62.5 ns
for hoating point antimetic, typ.	02.5 115
CPU-blocks	
DB	
• Number, max.	3 000; Number range: 1 to 16000
• Size, max.	64 kbyte
FB	
• Number, max.	1 500; Number range: 0 to 7999
• Size, max.	64 kbyte
FC	
• Number, max.	1 500; 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 	2; OB 10, 11
 Number of delay alarm OBs 	2; OB 20, 21
 Number of cyclic interrupt OBs 	2; OB 32, 35 (shortest cycle that can be set = 500 μ s)
 Number of process alarm OBs 	2; OB 40, 41
 Number of DPV1 alarm OBs 	3; OB 55-57
 Number of isochronous mode OBs 	2; OB 61-62
 Number of multicomputing OBs 	1; OB 60
 Number of background OBs 	1; OB 90
 Number of startup OBs 	3; 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	
Counting range	
— lower limit	0
	0 999
— lower limit	999
— lower limit — upper limit	999 Yes
 — lower limit — upper limit IEC counter 	999 Yes SFB
 – lower limit – upper limit IEC counter present Type Number 	999 Yes
 lower limit upper limit IEC counter present Type Number S7 times 	999 Yes SFB Unlimited (limited only by RAM capacity)
 – lower limit – upper limit IEC counter present Type Number S7 times Number 	999 Yes SFB
 lower limit upper limit IEC counter present Type Number S7 times Number Retentivity 	999 Yes SFB Unlimited (limited only by RAM capacity) 2 048
 lower limit upper limit IEC counter present Type Number S7 times Number Retentivity adjustable 	999 Yes SFB Unlimited (limited only by RAM capacity) 2 048 Yes
 lower limit upper limit IEC counter present Type Number S7 times Number Retentivity adjustable lower limit 	999 Yes SFB Unlimited (limited only by RAM capacity) 2 048 Yes 0
 lower limit upper limit IEC counter present Type Number S7 times Number Retentivity adjustable 	999 Yes SFB Unlimited (limited only by RAM capacity) 2 048 Yes

Time range	
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
• present	Yes
• Туре	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.	4 kbyte; Size of bit memory address area
Retentivity available	Yes
Retentivity preset	MB 0 to MB 15
 Number of clock memories 	8; in 1 memory byte
Local data	
 adjustable, max. 	8 kbyte
● preset	4 kbyte
Address area	
I/O address area	
• Inputs	4 kbyte
Outputs	4 kbyte
Process image	
 Inputs, adjustable 	4 kbyte
 Outputs, adjustable 	4 kbyte
 Inputs, default 	128 byte
• Outputs, default	128 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	32 768
— of which central	32 768
Outputs	32 768
— of which central	32 768
Analog channels	
Inputs	2 048
— of which central	2 048
Outputs	2 048
— of which central	2 048

Hardware configuration	
Number of expansion units, max.	21
connectable OPs	47
Multicomputing	Yes; 4 CPUs max. (with UR1 or UR2)
Interface modules	
 Number of connectable IMs (total), max. 	6
 Number of connectable IM 460s, max. 	6
 Number of connectable IM 463s, max. 	4; IM 463-2
Number of DP masters	
• integrated	1
● via CP	10; CP 443-5 Extended
● via IM 467	4
 Mixed mode IM + CP permitted 	No; IM 467 cannot be used jointly with CP 443-5 Ext. or CP 443-1 in PROFINET IO mode
• via interface module	0
 Number of pluggable S5 modules (via adapter capsule in central device), max. 	6
Number of IO Controllers	
 integrated 	1
● via CP	4; Max. 4 in the central controller; no mixed operation of different CP 443-1 types in PROFINET IO mode
Number of operable FMs and CPs (recommended)	
● FM	Limited by number of slots and number of connections
● CP, PtP	CP 440: Limited by number of slots; CP 441: Limited by number of slots and number of connections
 PROFIBUS and Ethernet CPs 	14; In total max. 10 CPs as DP master and PROFINET controller, of which up to 10 IMs or CPs as DP master and up to 4 CPs as PROFINET controller
Slots	
 required slots 	1
Time of day	
Time 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 (buildred), max. Deviation per day (unbuffered), max. 	8.6 s; For power On
• Deviation per day (unbunered), max. Operating hours counter	
Number	16
	0 to 15
Number/Number range Pange of values	SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours
Range of valuesGranularity	1 h

Clock synchronization Ves • supported Yes • to MPI, master Yes • to MPI, slave Yes • to MPI, slave Yes • to DP, slave Yes • to DP, slave Yes • to AS, slave Yes • in AS, slave Yes • on Ehernet via NTP Yes, As client • to IF 964 DP No Time difference in system when synchronizing via • • Ethernet, max. 10 ms • MPI, max. 200 ms Interfaces/bus type 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports) Number of RS 485 interfaces 1; Combined MPI / PROFIBUS DP Interface type Integrated Physics RS 485 / PROFIBUS HMPI Isolated Yes Power supply to interface (15 to 30 V DC), max. 150 mA Number of connection resources WPI • PROFIBUS DP master Yes	• retentive	Yes
• supported Yes • to MPI, master Yes • to MPI, master Yes • to DP, master Yes • to DP, alave Yes • to DP, alave Yes • in AS, master Yes • in AS, slave Yes • on Ethernet via NTP Yes, so client • to Fl94DP No Time difference in system when synchronizing via 10 ms • Ethernet, max. 10 ms • MPI, max. 200 ms Interfaces/bus type 1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports) Number of RS 485 interfaces 1: Combined MPI / PROFIBUS DP Interface Integrated Prover supply to interface (15 to 30 V DC), max. 150 mA Number of connection resources MPI: 32, DP: 16 Proteods Yes • PROFIBUS DP master Yes • PROFIBUS DP slave Yes • PROFIBU		
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• to DP, masterYes• to DP, slaveYes• in AS, masterYes• in AS, masterYes• on Ethernet via NTPYes; As client• to IF 964 DPNoTime difference in system when synchronizing via• Ethernet, max.10 ms• Ethernet, max.200 ms• Number of RS 485 interfaces1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports)Number of RS 485 interfaces1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports)Interfaces/bus type1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports)Interfaces/bus type1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports)Number of RS 485 interfaces1 x Combined MPI / PROFIBUS DPInterface typeIntegratedProver supply to interface (15 to 30 v DC), max.MPI %es• PROFIBUS DP masterYes• PROFIBUS DP masterYes• PROFIBUS DP masterYes• Number of connection resourcesWHI %es• Number of connections32; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1• Transmission rate, max.20 WISServices—— PG/DP communicationYes— RoutingYes— RoutingYes— Global data communicationYes— S7 communication, as clientYes— S7 communication, as clientYes— S7 communication, as serverYes	● to MPI, slave	Yes
• to DP, slaveYes• in AS, masterYes• in AS, slaveYes• on Ethernet via NTPYes; As client• to IF 964 DPNoTime difference in system when synchronizing via• Ethernet, max.10 ms• MPI, max.200 msInterfaces/bus type1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports)Number of RS 485 interfaces1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports)Number of RS 485 interfaces1 combined MPI / PROFIBUS DP1 InterfaceIntegratedPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resourcesMPI: 32, DP: 16ProtocolsYes• PROFIBUS DP masterYes• PROFIBUS DP slave32; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1• Number of connection32; If a diagnostics repeater is used on the line, the number of connection resources on the line is reduced by 1• Transmission rate, max.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.Yes• PG/OP communicationYes• PG/OP communicationYes• RoutingYes• Global data communicationYes• S7 communication, as clientYes• S7 communication, as clientYes• S7 communication, as serverYes		Yes
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• in AS, slaveYes• on Ethernet via NTPYes; As client• to IF 964 DPNoTime difference in system when synchronizing via• Ethernet, max.10 ms• MPI, max.200 msInterfaces/bus type1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports)Number of RS 485 interfaces1; combined MPI / PROFIBUS DPInterface typeIntegratedInterface typeIntegratedPower supply to interface (15 to 30 V DC), max.150 mANumber of connection resourcesMPI• MPIYes• PROFIBUS DP masterYes• PROFIBUS DP masterYes• PROFIBUS DP slaveYesMPIYes• Number of connections32; 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/sServices PG/CP communicationYes- RoutingYes- Global data communicationYes- S7 basic communicationYes- S7 communication, as clientYes- S7 communication, as serverYes		Yes
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Physics RS 485 / PROFIBUS + MPI Isolated Yes Power supply to interface (15 to 30 V DC), max. 150 mA Number of connection resources MPI: 32, DP: 16 Protocols Yes • MPI Yes • PROFIBUS DP master Yes • PROFIBUS DP slave Yes MPI Services • Transmission rate, max. 12 Mbit/s Services - • PG/OP communication Yes • Routing Yes • Global data communication Yes • S7 basic communication Yes • S7 communication Yes • S7 communication Yes • S7 communication, as client Yes • S7 communication, as server Yes		
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Image: Normal sector of the		<u> </u>
• PROFIBUS DP slave Yes MPI 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. 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 Yes - S7 basic communication Yes - S7 communication Yes - S7 communication, as client Yes - S7 communication, as server Yes		
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 - Routing Yes - Global data communication Yes - S7 basic communication Yes - S7 communication, as client Yes - S7 communication, as server Yes		
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	— Routing	Yes
	— Global data communication	Yes
— S7 communication, as client Yes — S7 communication, as server Yes	— S7 basic communication	Yes
— S7 communication, as server Yes	— S7 communication	Yes
	— S7 communication, as client	Yes
PROFIBUS DP master	— S7 communication, as server	Yes
	PROFIBUS DP master	

 Transmission rate, max. 12 Mbit/s Number of DP slaves, max. 32 Services PG(OP communication Services Ves Routing Ves; S7 routing Global data communication No S7 basic communication S7 basic communication S7 communication, as elivent S7 communication, as server S7 communication of DP slaves S7 communication of DP slaves SVNC/FREEZE Ves SVNC/FREEZE Ves Address area Inputs, max. 2 kbyte Outputs, max. 2 kbyte Outputs, max. 2 kbyte User data per DP slave, max. 244 byte Inputs, max. Solts, max. Stots, max. Sub the FROFIBUS DP slave Transmission rate, max. Address area, max. Sub the PROFIBUS DP slave Number of connections Ith vision of the same. Sub the Subt, max. Sub the Subt, max. Address area, max. Sub the Subt, max. Address area, max. Sub the PROFIBUS DP slave No Ves with interface active Services 	 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
• Number of DP slaves, max. 32 Services - - PC/OP communication Yes - Routing Ves, S7 routing - Global data communication Na - S7 basic communication Yes - S7 communication Yes - S7 communication, as elever Yes - S7 communication, as server Yes - S7 communication, as server Yes - Equidistance Yes - Equidistance Yes - Sr WC/FREEZE Yes - Direct data exchange (slave-to-slave Yes Yes - Direct data exchange (slave-to-slave Yes Yes - Direct data per DP slave, max. 2 kbyte - Uptus, max. 2 kbyte - Outputs, max. 2 kbyte - Inputs, max. 244 byte - Soft, max. 244 byte - Soft, max. 242 byte -<	• Transmission rate, max	-
Services - PG/OP communication Yes - Routing Yes, S7 routing - Global data communication No - S7 basic communication Yes - S7 communication Yes - S7 communication Yes - S7 communication Yes - S7 communication, as client Yes - S7 communication, as server Yes - Equidistance Yes - Equidistance Yes - Equidistance Yes - Strochrous mode Yes - Direct data exchange (slave-to-slave Yes - Dired data exchange (slave-to-slave Yes - Outputs, max. 2 kbyte - User data per DP slave, max. 2 kbyte - User data per DP slave, max. 244 byte - Outputs, max. 244 byte - Stots, max. 244 byte - Stots, max. 24 byte - Stots, max. 12 byte		
PG/OP communicationYesRoutingYes: S7 routingGlobal data communicationNoS7 basic communicationYesS7 communicationYesS7 communication, as clientYesS7 communication, as serverYesEquidistanceYesEquidistanceYesEquidistanceYesStrochronous modeYesStrochronous modeYesStrochronous modeYesStrochronous modeYesStrochronous modeYesStrochronous modeYesDirect data exchange (slave-to-slave communication)YesDirect data exchange (slave-to-slave communication)YesDirect data per DP slaveYesDirect data per DP slave2 kbyteUser data per DP slave, max.24 kbyteInputs, max.244 byteStols, max.24 byteStols, max.128 bytePROFIBUS DP slave128 bytePROFIBUS DP slave128 byteStols, max.124 byteStols, max.129 bytePROFIBUS DP slave128 byteStols, max.129 byteStols, max.32 byteStols area, max.32 byteTransmission rate, max.32 byteOdytos, max.32 byteDef/OP communicationYes: with interface activeDef/OP communicationYes: with interface activeDef/OP communicationYes: with interface active		
RoutingYes; S7 routingGlobal data communicationNoS7 basic communicationYesS7 communication, as clientYesS7 communication, as serverYesEquidistanceYesEquidistanceYesEquidistanceYesBochroneus modeYesSrNC/FREEZEYesBochroneus modeYesBochroneus modeYesBochroneus modeYesBochroneus modeYesBochroneus modeYesBochroneus modeYesDEV1YesDEV1YesDEV1YesDEV1YesDEV1YesDEV1YesDUstr, max.2 kbyteDutyts, max.2 kbyteDutyts, max.244 byteDutyts, max.244 byteSlots, max.244 byteSlots, max.12 byteSlots, max.12 byteSlots, max.12 byteSlots, max.22 byteDersion mate, max.12 byteSlots, max.32 byteTersmission rate, max.32 byteTersmission rate, max.32 byteSlots-max.32 byteDersion		Yes
Global data communicationNo- S7 basic communicationYes- S7 communication, as clientYes- S7 communication, as serverYes- S7 communication, as serverYes- EquidistanceYes- EquidistanceYes- Isochronous modeYes- Isochronous modeYes- SYNC/FREZEYes- Direct data exchange (slave-to-slave communication)Yes- Direct data exchange (slave-to-slave communication)Yes- Direct data exchange (slave-to-slave communication)Yes- User data per DP slaveYes- User data per DP slave, max.2 kbyte- Outputs, max.2 kbyte- Outputs, max.244 byte- Slots, max.244 byte- Slots, max.12 bytePROFIBUS DP slave12 byteFROFIBUS DP slave12 kbit/s- Transmission rate, max.12 byte- Tansmission rate, max.12 kbit/s- Address area, max.32 byte- Teddat per data searchNo- Address area, max.32 byte- Tensmission rate, max.32 byte- Tensmission rate, max.32 byte- Tensmission rate, max.32 byte- Derive sarea, max.32 byte- PG/OP communicationYes; with interface active- PG/OP communicationYes; with interface active- PG/OP communicationYes; with interface active- ST routingYes; with interface active		Yes; S7 routing
	•	-
		Yes
ST communication, as serverYes- EquidistanceYes- EquidistanceYes- Isochronous modeYes- Isochronous modeYes- SYNC/FREEZEYes- Activation/deactivation of DP slavesYes- Direct data exchange (slave-to-slave communication)Yes- DPV1YesAddress area2 kbyte- Outputs, max.2 kbyte- User data per DP slave, max.24 byte- User data per DP slave, max.244 byte- Slots, max.245 byte- Number of connections16• GSD filehttp://support.automation siemens.com/WW/view/en/113652• Transmission rate, max.32 byte• User data per address area, max.32 byte• Of which consistent, max.32 byte• Of which consistent, max.32 byte• SlotS32 byte• PG/OP communicationYes; with interface active- PG/OP		Yes
	- S7 communication, as client	Yes
EquidistanceYes EquidistanceYes Isochronous modeYes Isochronous modeYes SYNC/FREEZEYes Activation/deactivation of DP slavesYes Direct data exchange (slave-to-slave communication)Yes DPV1Yes DPV1Yes DPV1Yes Outputs, max.2 kbyte Outputs, max.2 kbyte Outputs, max.244 byte Outputs, max.244 byte Outputs, max.244 byte Slots, max.245 byte Slots, max.254 byte Slots, max.254 byte Slots, max.32 byte Slots, max.		Yes
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communication)Yes- DPV1YesAddress area2 kbyte- Inputs, max.2 kbyte- Outputs, max.2 kbyteUser data per DP slave244 byte- Inputs, max.244 byte- Outputs, max.244 byte- Outputs, max.244 byte- Outputs, max.244 byte- Slots, max.244- per slot, max.244- per slot, max.128 bytePROFIBUS DP slave16· Slots filehttp://support.automation.siemens.com/WW/view/en/113652· Transmission rate, max.12 Mbit/s· automatic baud rate searchNo· Address area, max.32; Virtual slots· User data per address area, max.32 byte· Outputs, max.32 byte· Services of which consistent, max.32 byte· Services PG/OP communicationYes; with interface active- S7 routingYes; with interface active	 Activation/deactivation of DP slaves 	Yes
- DPV1YesAddress area2 kbyte- Inputs, max.2 kbyteOutputs, max.2 kbyteUser data per DP slave, max.244 byte- User data per DP slave, max.244 byte- Outputs, max.244 byte- Outputs, max.244 byte- Outputs, max.244 byte- Slots, max.244 byte- per slot, max.244 byte- per slot, max.244 byte- Slots, max.244 byte- Slots, max.16• Number of connections16• GSD filehttp://support.automation.siemens.com/WW/view/en/113652• Transmission rate, max.12 Mbit/s• automatic baud rate searchNo• Address area, max.32 byte• User data per address area, max.32 byte• of which consistent, max.32 byteServices of which consistent, max.32 byte- Services PG/OP communicationYes; with interface active- ST routingYes; with interface active	— Direct data exchange (slave-to-slave	Yes
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- Slots, max.244- per slot, max.128 bytePROFIBUS DP slave128 byte• Number of connections16• GSD filehttp://support.automation.siemens.com/WW/view/en/113652• Transmission rate, max.12 Mbit/s• automatic baud rate searchNo• Address area, max.32; Virtual slots• User data per address area, max.32 byte- of which consistent, max.32 byteServices PG/OP communicationYes; with interface active- S7 routingYes; with interface active	— Inputs, max.	244 byte
per slot, max.128 bytePROFIBUS DP slave16• Number of connections16• GSD filehttp://support.automation.siemens.com/WW/view/en/113652• Transmission rate, max.12 Mbit/s• automatic baud rate searchNo• Address area, max.32; Virtual slots• User data per address area, max.32 byte- of which consistent, max.32 byteServices PG/OP communicationYes; with interface active- S7 routingYes; with interface active	— Outputs, max.	244 byte
PROFIBUS DP slave• Number of connections16• GSD filehttp://support.automation.siemens.com/WW/view/en/113652• Transmission rate, max.12 Mbit/s• automatic baud rate searchNo• Address area, max.32; Virtual slots• User data per address area, max.32 byte• of which consistent, max.32 byteServices- PG/OP communicationYes; with interface active- S7 routingYes; with interface active	— Slots, max.	244
• Number of connections16• GSD filehttp://support.automation.siemens.com/WW/view/en/113652• Transmission rate, max.12 Mbit/s• automatic baud rate searchNo• Address area, max.32; Virtual slots• User data per address area, max.32 byte- of which consistent, max.32 byteServices PG/OP communicationYes; with interface active- S7 routingYes; with interface active	— per slot, max.	128 byte
• GSD filehttp://support.automation.siemens.com/WW/view/en/113652• Transmission rate, max.12 Mbit/s• automatic baud rate searchNo• Address area, max.32; Virtual slots• User data per address area, max.32 byte- of which consistent, max.32 byteServices PG/OP communicationYes; with interface active- S7 routingYes; with interface active	PROFIBUS DP slave	
 Transmission rate, max. 12 Mbit/s automatic baud rate search No Address area, max. 32; Virtual slots User data per address area, max. 32 byte of which consistent, max. 32 byte Services — PG/OP communication — PG/OP communication — S7 routing Yes; with interface active	 Number of connections 	16
 automatic baud rate search Address area, max. User data per address area, max. Of which consistent, max. Services PG/OP communication S7 routing No No Services Services 	• GSD file	http://support.automation.siemens.com/WW/view/en/113652
 Address area, max. User data per address area, max. Of which consistent, max. Services PG/OP communication S7 routing Yes; with interface active 	 Transmission rate, max. 	12 Mbit/s
• User data per address area, max.32 byte- of which consistent, max.32 byteServices32 byte- PG/OP communicationYes; with interface active- S7 routingYes; with interface active	 automatic baud rate search 	No
- of which consistent, max. 32 byte Services - PG/OP communication - S7 routing Yes; with interface active	 Address area, max. 	32; Virtual slots
Services — PG/OP communication Yes; with interface active — S7 routing Yes; with interface active	 User data per address area, max. 	32 byte
— PG/OP communication Yes; with interface active — S7 routing Yes; with interface active	— of which consistent, max.	32 byte
— S7 routing Yes; with interface active	Services	
	— PG/OP communication	
— Global data communication No	— S7 routing	Yes; with interface active
	— Global data communication	No

— S7 basic communication	No
— S7 communication	Yes
- S7 communication, as client	Yes
— S7 communication, as server	Yes
 — Direct data exchange (slave-to-slave communication) 	No
— DPV1	No
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte

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	Yes; Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF"	
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	Yes	
PROFINET CBA	Yes	
 PROFIBUS DP master 	No	
 PROFIBUS DP slave 	No	
Open IE communication	Yes	
Web server	Yes	
 Point-to-point connection 	No	
PROFINET IO Controller		
• Transmission rate, max.	100 Mbit/s	
Services		
— PG/OP communication	Yes	
— S7 routing	Yes	
— S7 communication	Yes	

— Isochronous mode	Yes; Only with IRT and the High Performance option
— Open IE communication	Yes
— Shared device	Yes
— Prioritized startup	Yes
— Number of IO devices with prioritized	32
startup, max.	
— Number of connectable IO Devices, max.	256
— Of which IO devices with IRT, max.	64
— of which in line, max.	64
 — Number of IO Devices with IRT and the option "high flexibility" 	256
— of which in line, max.	61
— Number of connectable IO Devices for RT,	256
max.	
— of which in line, max.	256
 Activation/deactivation of IO Devices 	Yes
 — Number of IO Devices that can be simultaneously activated/deactivated, max. 	8
 — IO Devices changing during operation (partner ports), supported 	Yes
— Number of IO Devices per tool, max.	8; 8 parallel calls of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IO Devices changing during operation (partner ports) are supported
 Device replacement without swap medium 	Yes
— Send cycles	250 $\mu s,$ 500 $\mu s,$ 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 μs to 4 ms in 125 μs frame
— Updating time	250 μs to 512 ms; minimum value depends on preset communication share for PROFINET IO, on the number of IO Devices and on the amount of configured user data, see PROFINET system description
Address area	
— Inputs, max.	4 kbyte
— Outputs, max.	4 kbyte
— User data consistency, max.	1 024 byte
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— S7 communication	Yes
— Isochronous mode	No
— Open IE communication	Yes
— IRT	Yes
— Prioritized startup	Yes

Ob and day in a	Yes
— Shared device	
— Number of IO Controllers with shared	2
device, max.	
Transfer memory	1 440 huter Der IO Centreller with charad device
— Inputs, max.	1 440 byte; Per IO Controller with shared device
— Outputs, max.	1 440 byte; Per IO Controller with shared device
Submodules	
— Number, max.	64
— User data per submodule, max.	1 024 byte
PROFINET CBA	
 acyclic transmission 	Yes
 cyclic transmission 	Yes
Open IE communication	
 Number of connections, max. 	46
 Local port numbers used at the system end 	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
 Keep-alive function, supported 	Yes
Ductocolo	
Protocols Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	
— Data length, max.	32 kbyte
 — several passive connections per port, supported 	Yes
 ISO-on-TCP (RFC1006) 	Yes; Via integrated PROFINET interface or CP 443-1 Adv. 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	Yes
 User-defined websites 	Yes
 Number of HTTP clients 	5
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface
Equidistance	Yes
Number of DP masters with isochronous mode	
User data per isochronous slave, max.	1 244 byte
shortest clock pulse	1.5 ms; 0.5 ms without use of SFC 126, 127
Shorlest clock puise	1.5 ms, 0.5 ms without use 01 3FC 120, 121

max. cycle	32 ms
Communication functions	
PG/OP communication	Yes
 Number of connectable OPs without message processing 	47
 Number of connectable OPs with message processing 	47; When using Alarm_S/SQ and Alarm_D/DQ
Data record routing	Yes
Global data communication	
• supported	Yes
 Number of GD loops, max. 	8
 Number of GD packets, transmitter, max. 	8
Number of GD packets, receiver, max.	16
 Size of GD packets, max. 	54 byte
• Size of GD packet (of which consistent), max.	1 variable
S7 basic communication	
• supported	Yes
• User data per job, max.	76 byte
 User data per job (of which consistent), max. 	1 variable
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 FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
 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. 	24/24
Standard communication (FMS)	
• supported	Yes; Via CP and loadable FB
PROFINET CBA (at set setpoint communication load)	
 Setpoint for the CPU communication load 	20 %
 Number of remote interconnection partners 	32
 Number of functions, master/slave 	150
 Total of all master/slave connections 	4 500
 Data length of all incoming connections master/slave, max. 	45 000 byte

-	
 Data length of all outgoing connections master/slave, max. 	45 000 byte
 Number of device-internal and PROFIBUS interconnections 	1 000
 Data length of device-internal und PROFIBUS interconnections, max. 	16 000 byte
 Data length per connection, max. 	2 000 byte
Remote interconnections with acyclic transmission	
— Sampling frequency: Sampling time, min.	200 ms; Depending on preset communication load, number of interconnections and data length used
- Number of incoming interconnections	250
 — Number of outgoing interconnections 	250
 Data length of all incoming interconnections, max. 	8 000 byte
 Data length of all outgoing interconnections, max. 	8 000 byte
— Data length per connection, max.	2 000 byte
Remote interconnections with cyclic transmission	
— Transmission frequency: Transmission interval, min.	1 ms; Depending on preset communication load, number of interconnections and data length used
 Number of incoming interconnections 	300
— Number of outgoing interconnections	300
 — Data length of all incoming interconnections, max. 	4 800 byte
 Data length of all outgoing interconnections, max. 	4 800 byte
— Data length per connection, max.	450 byte
HMI variables via PROFINET (acyclic)	
— Number of stations that can log on for HMI variables (PN OPC/iMap)	2x PN OPC/1x iMap
— HMI variable updating	500 ms
— Number of HMI variables	1 000
— Data length of all HMI variables, max.	32 000 byte
PROFIBUS proxy functionality	
— supported	Yes; 32 PROFIBUS slaves max. connectable
— Data length per connection, max.	240 byte; Slave-dependent
Number of connections	
• overall	48
 usable for PG communication 	47
— reserved for PG communication	1
— adjustable for PG communication, max.	0
 usable for OP communication 	47
— reserved for OP communication	1

— adjustable for OP communication, max.	0
 usable for S7 basic communication 	46
- reserved for S7 basic communication	0
— adjustable for S7 basic communication,	0
max.	
 usable for S7 communication 	46
- reserved for S7 communication	0
— adjustable for S7 communication, max.	0
 usable for routing 	23
— reserved for routing	0
— adjustable for routing, max.	0

07		functions
S	maccada	tunctione
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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	Yes
SCAN procedure	Yes
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. 	300
● preset, max.	150
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	4
Number of messages	
• overall, max.	256
 in 100 ms grid, max. 	0
• in 500 ms grid, max.	256
• in 1000 ms grid, max.	256
Number of additional values	
• with 100 ms grid, max.	0
• with 500, 1000 ms grid, max.	1
Test commissioning functions	
Status block	Yes; Up to 16 simultaneously
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; Status/control
Forcing	
Forcing	Yes
 Forcing, variables 	Inputs/outputs, bit memories, distributed I/Os
 Number of variables, max. 	64
Diagnostic buffer	
• present	Yes
• Number of entries, max.	3 200
— adjustable	Yes
— preset	120
Service data	
● can be read out	Yes
Standards, approvals, certificates CE mark	Yes
CSA approval	Yes
UL approval	Yes
cULus	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
EAC (formerly Gost-R)	Yes
Use in hazardous areas	
• ATEX	ATEX II 3G Ex nA IIC T4 Gc
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
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	
— DPSYC_FR	2; SFC 11; per interface
— D_ACT_DP	8; SFC 12; per interface
- RD_REC	8; SFC 59; per interface
— WR_REC	8; SFC 58; per interface
— WR_PARM	8; SFC 55; per interface
— PARM_MOD	1; SFC 57; per interface
— WR_DPARM	2; SFC 56; per interface
— DPNRM_DG	8; SFC 13; per interface
— RDSYSST	8; SFC 51
- DP_TOPOL	1; SFC 103; per interface
Number of simultaneously active SFBs	
— RDREC	8; SFB 52; per interface, but not more than 32 across all external interfaces
— WRREC	8; SFB 53; per interface, but not more than 32 across all external interfaces
Know-how protection	
 User program protection/password protection 	Yes
Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	25 mm
Height	290 mm
Depth	219 mm
Weights	
Weight, approx.	750 g
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