SIEMENS

Data sheet

6ES7416-3ES07-0AB0



SIMATIC S7-400, CPU 416-3 PN/DP Central processing unit with: Work memory 16 MB, (8 MB code, 8 MB data), interfaces 1st interface MPI/DP 12 Mbit/s, (X1), 2nd interface Ethernet/PROFINET (X5) 3rd interface IF 964-DP plug-in (IF1)

General information	
Product type designation	CPU 416-3 PN/DP
HW functional status	01
Firmware version	V7.0
Product function	
 Isochronous mode 	Yes; Via PROFIBUS DP or PROFINET interface
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	10 µs
Supply voltage	
Rated value (DC)	Power supply via system power supply
Input current	
from backplane bus 5 V DC, typ.	1.3 A
from backplane bus 5 V DC, max.	1.6 A
from backplane bus 24 V DC, max.	300 mA; 150 mA per DP interface
from interface 5 V DC, max.	90 mA; At each DP interface
Power loss	
Power loss, typ.	6.5 W
Power loss, max.	8 W
Memory	
Type of memory	RAM
Work memory	
integrated	16 Mbyte
integrated (for program)	8 Mbyte
integrated (for data)	8 Mbyte
expandable	No
Load memory	
expandable FEPROM	Yes; with Memory Card (FLASH)
 expandable FEPROM, max. 	64 Mbyte
integrated RAM, max.	1 Mbyte
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 μΑ
Backup time, max.	Dealt with in the module data manual with the secondary conditions and the
Fooding of external hardens walkens to ODL	factors of influence
Feeding of external backup voltage to CPU CPU processing times.	5 V DC to 15 V DC
CPU processing times	10 F no
for bit operations, typ.	12.5 ns
for word operations, typ.	12.5 ns
for fixed point arithmetic, typ.	12.5 ns
for floating point arithmetic, typ.	25 ns
CPU-blocks	
DB Number may	10,000: Number range: 1 to 16000
Number, max.	10 000; Number range: 1 to 16000
• Size, max.	64 kbyte
Number, max.	5 000; Number range: 0 to 7999
• Size, max.	64 kbyte
FC	04 kbyte
Number, max.	5 000; 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	8; OB 10-17
Number of delay alarm OBs	4; OB 20-23
Number of cyclic interrupt OBs	9; OB 30-38 (shortest cycle that can be set = 500 µs)
Number of process alarm OBs	8; OB 40-47
Number of DPV1 alarm OBs	3; OB 55-57
Number of isochronous mode OBs	4; OB 61-64
Number of isocinorious mode obs Number of multicomputing OBs	1; OB 60
Number of malacompating CBs Number of background OBs	1; OB 90
Number of startup OBs	3; OB 100-102
Number of startup OBs Number of asynchronous error OBs	9; OB 80-88
Number of asynchronous error OBs	2; OB 121, 122
Nesting depth	2, 00 121, 122
per priority class	24
additional within an error OB	2
Counters, timers and their retentivity	-
S7 counter	
Number	2 048
Retentivity	2010
— adjustable	Yes
— 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
— preset	No times retentive
Time range	
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
• present	Yes
* present	100

• Type	SFB
Type Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	Offinitiled (infilted offly by NAW capacity)
Retentive data area (incl. timers, counters, flags), max.	Total working and load memory (with backup battery)
Flag	Total working and load memory (with backup battery)
• Size, max.	16 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	o, iii i iiioiioiy syto
adjustable, max.	32 kbyte
• preset	16 kbyte
Address area	·
I/O address area	
• Inputs	16 kbyte
Outputs	16 kbyte
Process image	
Inputs, adjustable	16 kbyte
 Outputs, adjustable 	16 kbyte
 Inputs, default 	512 byte
 Outputs, default 	512 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	131 072
— of which central	131 072
Outputs	131 072
— of which central	131 072
Analog channels	0.400
Inputs— of which central	8 192 8 192
	8 192
Outputs — of which central	8 192
Hardware configuration	0 132
Number of expansion units, max.	21
connectable OPs	95
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
a via interfece module	PROFINET IO mode
via interface module Number of pluggable S5 modules (via adapter capsule in	1; IF 964-DP
 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 or 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	2
Time of day	
Clock	
Hardware clock (real-time)	Yes
 retentive and synchronizable 	Yes
Resolution	1 ms
 Deviation per day (buffered), max. 	1.7 s; Power off
 Deviation per day (unbuffered), max. 	8.6 s; For power On
Operating hours counter	
Number	16
 Number/Number range 	0 to 15
Range of values	SFCs 2, 3 and 4: 0 to 32767 hours SFC 101: 0 to 2^31 - 1 hours
 Granularity 	1 h
retentive	Yes
Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
• to DP, clave	Yes Yes
to DP, slavein AS, master	Yes
in AS, masterin AS, slave	Yes
on Ethernet via NTP	Yes; As client
• to IF 964 DP	Yes
Time difference in system when synchronizing via	166
• Ethernet, max.	10 ms
• MPI, max.	200 ms
Interfaces	
Interfaces/bus type	1 x MPI/PROFIBUS DP, 1 x PROFINET (2 ports), 1 x PROFIBUS DP
	(optionally pluggable)
Number of RS 485 interfaces	1; Combined MPI / PROFIBUS DP
Number of other interfaces	1; PROFIBUS DP with IF 964-DP (plug-in option; MLFB: 6ES7964-2AA04-0AB0)
1. Interface	UNDU)
Interface type	MPI/PROFIBUS DP
Isolated	Yes
Interface types	
• RS 485	Yes
Output current of the interface, max.	150 mA
Protocols	
• MPI	Yes
PROFIBUS DP master	Yes
PROFIBUS DP slave	Yes
MPI	
Number of connections	44; 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	V
— PG/OP communication	Yes
— Routing	Yes
Global data communication S7 basis communication	Yes
S7 basic communication S7 communication	Yes Yes
S7 communication S7 communication, as client	Yes
S7 communication, as client S7 communication, as server	Yes
PROFIBUS DP master	163
Number of connections, 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
Transmission rate, max.	
Number of DP slaves, max.	32

DO/OD : ::	
— PG/OP communication	Yes
— Routing	Yes; S7 routing
 Global data communication 	No
 — S7 basic communication 	Yes
— S7 communication	Yes
 — S7 communication, as client 	Yes
 — S7 communication, as server 	Yes
— Equidistance	Yes
— Isochronous mode	Yes
— SYNC/FREEZE	Yes
 Activation/deactivation of DP slaves 	Yes
 Direct data exchange (slave-to-slave communication) 	Yes
— DPV1	Yes
Address area	165
— Inputs, max.	2 kbyte
•	•
— Outputs, max.	2 kbyte
User data per DP slave	244 byto
— 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	20
Number of connections	32
• GSD file	http://support.automation.siemens.com/WW/view/en/113652
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	Yes; with interface active
— 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
	. 55
Direct data exchange (slave-to-slave	No
communication)	No
communication) — DPV1	
communication) — DPV1 Transfer memory	No No
communication) — DPV1 Transfer memory — Inputs	No No 244 byte
communication) — DPV1 Transfer memory — Inputs — Outputs	No No
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface	No No 244 byte 244 byte
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type	No No 244 byte 244 byte PROFINET
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated	No No 244 byte 244 byte PROFINET Yes
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate	No No 244 byte 244 byte PROFINET Yes Yes; Autosensing
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation	No No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing	No No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation	No No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes Yes Yes Yes Yes Yes Ye
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported	No No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Interface types	No No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes Yes; Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF"
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Interface types • RJ 45 (Ethernet)	No No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes; Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF" Yes
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Interface types • RJ 45 (Ethernet) • Number of ports	No No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes Yes Yes, Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF" Yes 2
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch	No No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes; Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF" Yes
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch Protocols	No No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes; Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF" Yes 2 Yes
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch Protocols • PROFINET IO Controller	No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes Yes; Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF" Yes Yes Yes
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch Protocols • PROFINET IO Controller • PROFINET IO Device	No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes; Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF" Yes Yes Yes Yes
communication) — DPV1 Transfer memory — Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing Change of IP address at runtime, supported Interface types • RJ 45 (Ethernet) • Number of ports • integrated switch Protocols • PROFINET IO Controller	No 244 byte 244 byte PROFINET Yes Yes; Autosensing Yes Yes Yes; Assignment by higher-level IO-Controller or by the user program with SFB104 "IP_CONF" Yes Yes Yes

Devices changing during operation (partner ports) are supported Yes Send cycles Updating time Updating time Send cycles Send cycles Inputs, max. Updating time Send cycles Inputs, max. Send cycles to 4 ms in 125 µs frame Send cycles to 12 ms; minume value depends on preset communication shan propriet on the amount of configuration of the minume rate of the amount of configuration of the amount of configuration of the minume rate of the amount of configuration of the minume rate of the amount of configuration of the minume rate		
• Web server • Point-to-point connection • Nos • Moda edundancy • PROFINET IO Controller • Transmission rate, max. Services — PGIOP communication — S7 communication — Isochronous mode — Isochronous mode — Shared device — PINOTIZES startup Number of One necessary — Number of One devices with prioritized startup, max. — Number of One evices with prioritized startup, max. — Number of One evices with prioritized startup, max. — Of which in Old-evices with RT, max. — Of which in Old-evices with RT, max. — Of which in Inde, max. — Number of Connectable IO Devices, max. — Of which in Inde, max. — Number of Connectable IO Devices for RT, max. — Of which in Inde, max. — Number of Devices with RT and the option "high fiesibility" — Of which in Inde, max. — Number of IO Devices with RT and the option "high fiesibility" — Of which in Inde, max. — Number of IO Devices with RT and the option "high fiesibility" — Of which in Inde, max. — Activation/deactivation of IO Devices — Number of IO Devices but can be simultaneously and the report of the service of the serv	PROFIBUS DP slave	No
Protect Production No No Note that redundancy PROFINET ID Controller * Transmission rate, max. Protection Controller * Transmission rate, max. Protection Communication Services - PGIOP communication Services - PGIOP communication Services - Protrollized startup Shared device Protrollized startup Shared device Protrollized startup Shared for Opevices with protrollized startup, max. Shumber of ID Devices with IRT, max. - Of which In line, max. - Of which In line, max. - Number of Devices with IRT and the option "high flashbilly" - Of which In line, max. - Number of Devices with IRT and the option "high flashbilly" - Of which In line, max. - Number of Opevices with IRT and the option "high flashbilly" - Of which In line, max. - Number of Opevices with IRT and the option "high flashbilly" - Of which In line, max. - Number of Opevices that can be simultaneously activated/descrivated, max. - ID Devices changing during operation (partner ports), supported - Number of IO Devices that can be simultaneously activated/descrivated, max. - ID Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max. - Devices replacement without swap medium - Send cycles - Updating time - Devices replacement without swap medium - Send cycles - Updating time - Devices replacement without swap medium - Send cycles - Injust, max. - Updating time - Protectific IO, on the marker of IO Devices and on the amount of configured to the service and on the amount of configured to the service and on the amount of configured to the service and on the amount of configured to the service and on the amount of configured to the service and on the amount of configured to the service and on the amount of configured to the service and on the amount of configured to the service and on the amount of configured to the service and on the amount of configured to the service and on the amount of configured to the service and on the amount of configured to the service and on the amount of configure	Open IE communication	Yes
• Media redundancy PROPINET IO Controller • Transmission rate, max. Services — PGIOP communication — S7 communication — Isochronous mode — Shared device — Prioritized startup — Number of IO devices with prioritized startup, max. — Number of IO devices with prioritized startup, max. — Number of IO devices with IRT max. — Of which In devices with IRT max. — of which In line, max. — Isochronous mode — of which in line, max. — of which in line, max. — Isochronous mode — of which in line, max. — of which in line, max. — which in line, max. — of which in line, max. —	Web server	Yes
■ Transmission rate, max. ■ Transmission rate, max. Services ■ PG/OP communication ■ S7 communication ■ S7 communication ■ S7 communication ■ S8 communication ■ Isochronous mode ■ Prioritized startup ■ Number of IO Devices with prioritized startup, max. ■ Number of Condecidate IO Devices, max. ■ Of which IO devices with IRT, max. ■ Of which IO devices with IRT, max. ■ Number of IO Devices with IRT and the option "high fiexhibiti" ■ of which in line, max. ■ Number of IO Devices with IRT and the option "high fiexhibiti" ■ of which in line, max. ■ Number of IO Devices that can be simultaneously activated deactivated, max. ■ IO Devices that can be simultaneously activated deactivated, max. ■ IO Devices that can be simultaneously activated deactivated, max. ■ IO Devices changing during operation (partner ports), supported ■ Number of IO Devices that to the prioritic ports of the services changing during operation (partner ports), supported ■ Updating time ■ Send cycles ■ Updating time ■ Updating time ■ Updating time ■ Updating time Address area ■ Inputs, max. ■ Inputs, max. ■ User data consistency, max. ■ PG/OP communication ■ S7 communication ■ S8 byte ■ PG/OP communication ■ S8 byte ■ Number of IO Controllers with shared device, max. Transfer memory ■ Inputs, max. ■ Updata pre submodule, max. 1 440 byte; Per IO Controller with shared device ■ Number of IO Controllers with shared device, max. Transfer memory ■ Inputs, max. ■ Updata pre submodule, max. ■ Number of IO Controllers with shared device ■ Number of IO Controllers with shared device. ■ Number of IO Con	 Point-to-point connection 	No
Transmission rate, max. Services PGOP communication ST communication Street Startup Shared device Prioritized startup Number of IO devices with prioritized startup, max. Number of IO devices with IRT and the option "high flexibility" of which in line, max. Number of Connectable IO Devices of RT, max. of which in line, max. Number of Connectable IO Devices for RT, max. of which in line, max. Number of IO Devices with IRT and the option "high flexibility" of which in line, max. Number of IO Devices with IRT and the option "high flexibility" of which in line, max. Number of IO Devices but a can be simultaneously advantagediscendrated, max. IO Devices changing during operation (partner ports) supported Number of IO Devices per tool, max. Updating time Send cycles Updating time Address area Inputs, max. Outputs, max. Outputs, max. Outputs, max. PGOP communication Yes PGOP communication Yes PROPINET IO Device Services PGOP communication Yes PROPINET IO Device Services PGOP communication Yes 1440 byte: Per IO Controller with shared device No PROPILE Communication Yes Outputs, max. Uper data per submodule, max. 1040 byte: Per IO Controller with shared device No PROPILE Communication Yes 20 up Controller with shared device No 1440 byte: Per IO Controller with shared device 1440 byte: Per IO Controller with shared device No Outputs, max. Uper data per submodule, max. 1040 byte: Per IO Controller with shared device No PROPILE Communication Pyes Optic transmission Yes Optic transmission Pyes Optic transmission Pyes Optic transmission Pyes Propried communication No Puts of Communication Pyes Propried communication No Propried communication Pyes Propried	Media redundancy	Yes
Services - PG/OP communication - S7 communication - Isochronous mode - Shared device - Prioritized startup - Number of Comerciable IO Devices, max Of which Indien, max Number of Comerciable IO Devices, max Of which In line, max Number of Comerciable IO Devices of RT, max of which in line, max Number of Comerciable IO Devices of RT, max Of which in line, max Number of Comerciable IO Devices for RT, max of which in line, max Number of Comerciable IO Devices for RT, max of which in line, max Number of Comerciable IO Devices for RT, max of which in line, max Activation/deactivation of IO Devices - Number of IO Devices that can be simultaneously activated/deactivated, max IO Devices changing during operation (partner ports), supported - Number of IO Devices that can be simultaneously activated/deactivated, max IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max Device replacement without swap medium - Send cycles - Updating time - Device replacement without swap medium - Send cycles - Updating time - Send cycles - Send cycles - Updating time - Send cycles - Send cyc	PROFINET IO Controller	
PCIOP communication S7 communication Yes S7 communication Yes Isochronous mode Shared device Prioritized startup Number of O Devices with prioritized startup, max. Of which in line, max. S8 communication Number of IO Devices with IRT and the option "high flexibility" Of which in line, max. Number of IO Devices with IRT and the option "high flexibility" Of which in line, max. Number of IO Devices with IRT and the option "high flexibility" Of which in line, max. Number of IO Devices with IRT and the option "high flexibility" Of which in line, max. Number of IO Devices with IRT and the option "high flexibility" Of which in line, max. Number of IO Devices with IRT and the option "high flexibility" Of which in line, max. Number of IO Devices that can be simultaneously schware/descrivate, max. Number of IO Devices that can be simultaneously schware/descrivated, max. Number of IO Devices that can be simultaneously schware/descrivated, max. Number of IO Devices that can be simultaneously schware/descrivated, max. Number of IO Devices per tool, max. Device replacement without swap medium Send cycles Updating time Updating time Percentage of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IC Devices changing during operation (partner ports) are supported Yes Sib part of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IC Devices changing during operation (partner ports) are supported Yes Sib part of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IC Devices changing during operation (partner ports) are supported Yes Sib part of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IC Devices changing during operation (partner ports) are supported Yes Sib part of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IC Devices changing during operation (partner ports) are supported Yes Sib part of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IC Devices changing during operation (partner ports) are supported Yes Sib part of the SFC 12 "D_ACT_DP" possible per line. Max. 32 IC Devices	Transmission rate, max.	100 Mbit/s
- S7 communication - Isochronous mode - Shared device - Prioritized startup - Number of 10 devices with prioritized startup, max Of which 10 devices with IRT, max of which in line, max Number of 10 Devices with IRT and the option "high flexibility" - of which in line, max Number of 10 Devices with IRT and the option "high flexibility" - of which in line, max Number of connectable 10 Devices for RT, max of which in line, max Activation/deactivation of 10 Devices - Number of 10 Devices that can be simultaneously activated/deactivated, max In Devices shanging during operation (partner pors), supported - Number of 10 Devices per tool, max Device replacement without swap medium - Send cycles - Updating time - Updating time - Send cycles - Updating time - Send cycles - Updating time - Send cycles - In Device Replacement without swap medium - Send cycles - Updating time - Send cycles - Updating time - Send cycles - Updating time - Send cycles - In Device Replacement without swap medium - Send cycles - Updating time - Send cycles - Updating time - Send cycles - Updating time - Send cycles - In Device Cycles - In Device Replacement without swap medium - Send cycles - In Device shanging during operation (partner ports) are supported - Sentines - Updating time - Send cycles - Updating time - Send cycles - In Device Send time time time time time time time time	Services	
- Isochronous mode - Shared device - Prioritized startup, max Number of IO devices with prioritized startup, max Of which IO devices with IRT, max of which In Ine, max In Ine, max Number of IO Devices with IRT and the option "high flexibility" - of which in Ine, max Activation-decaltivation of IO Devices for RT, max of which in Ine, max Activation-decaltivation of IO Devices and the simultaneously activated/deactivated, max IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max Device replacement without swap medium - Send cycles - Updating time - Updating time - Updating time - Updating time - Send cycles - Inputs, max Updating time - Send device, max User data consistency, max Updation - FPGPINET IO Devices - Prioritized startup - Shared device - Number of IO Controllers with shared device, max Updats, max User data per submodule, max User data per submodule, max Updats, max Updats, max Updations and the prioritized startup Shared device - Number of IO Controllers with shared device, max Updats, max Updats, max Updations and the prioritized startup Shared device - Number of IO Controllers with shared device, max Updats, max.	— PG/OP communication	Yes
- Shared device - Prioritized startup - Ves - Prioritized startup - Number of IO devices with prioritized startup, max Number of IO devices with IRT, max Of which In line, max Number of IO Devices with IRT and the option "high flexibility" - of which in line, max Number of IO Devices with IRT and the option "high flexibility" - of which in line, max Of which in line, max Of which in line, max Activation/deactivation of IO Devices - Number of IO Devices that can be simultaneously activated/deactivated, max IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max Device replacement without swap medium - Send cycles - Updating time - Send cycles - Updating time - 250 µs to 12 ms, minimum value depends on preset communication shan PROFINET IO, on the number of IO Devices communication - Services - Number of IO Devices with shared device, max User data consistency, max Bkbyte - Shared device - Number of IO Devices with shared device, max PROFINET IO Device - Number of IO Devices with shared device, max User data for minimum with shared device, max Industry -	— S7 communication	Yes
- Prioritized startup - Number of IO devices with prioritized startup, max Number of Connectable IO Devices, max Of which in line, max Of which in line, max Number of IO Devices with IRT and the option "high flexibility" - of which in line, max Number of IO Devices with IRT and the option "high flexibility" - of which in line, max Number of IO Devices for RT, max Of which in line, max Number of IO Devices that can be simultaneously activate/deactivation of IO Devices - Number of IO Devices that can be simultaneously activate/deactivated, max IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max Device replacement without swap medium - Send cycles - Updating time - Inputs, max Outputs, max Uptyputs, max User data consistency, max User data consistency max User data per submodule, max 1 440 byte; Per IO Controller with shared device - Number of Connections, max 4 440 byte; Per IO Controller with shared device - Number of Connections, max 4 440 byte; Per IO Controller with shared device - Solution of the communication - Solution of the	— Isochronous mode	Yes; Only with IRT and the High Performance option
Number of IO devices with prioritized startup, max Number of connectable IO Devices, max Or which in line, max Use of the control	— Shared device	Yes
- Number of connectable IO Devices, max Of which IO devices with IRT, max of which In Ine, max Number of IO Devices with IRT and the option "high flexibility" - of which in line, max Number of Oronnectable IO Devices for RT, max Of which in line, max Of which in line, max Of which in Ine, max Activation/deactivation of IO Devices - Number of IO Devices that can be simultaneously activate/deactivated, max IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max Device replacement without swap medium - Send cycles - Updating time Max. 32 IC - Updating ti	— Prioritized startup	Yes
- Of which I lo devices with IRT, max of which in line, max Number of I O Devices with IRT and the option "high flexibility" - of which in line, max Number of connectable I O Devices for RT, max of which in line, max Activation/deactivation of I O Devices - Number of I D Devices that can be simultaneously activated/deactivated, max I O Devices changing during operation (partner ports), supported - Number of I O Devices per tool, max Device replacement without swap medium - Send cycles - Updating time	 Number of IO devices with prioritized startup, max. 	32
of which in line, max Number of IO Devices with IRT and the option "high flexibility" of which in line, max Number of connectable Io Devices for RT, max Number of Connectable Io Devices for RT, max Activation/deactivation of IO Devices Number of IO Devices that can be simultaneously activated/deactivated, max IO Devices changing during operation (partner ports), supported Number of IO Devices per tool, max Device replacement without swap medium Send cycles Updating time Send cycles Updating time Send cycles Updating time Send send send send send send send send s	 Number of connectable IO Devices, max. 	256
- Number of IO Devices with IRT and the option "high flexibility" - of which in line, max Number of connectable IO Devices for RT, max of which in line, max Activation/deactivation of IO Devices - Activation/deactivation of IO Devices - Number of IO Devices that can be simultaneously activated/deactivated/max IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max Number of IO Devices per tool, max Device replacement without swap medium - Send cycles - Updating time - Send cycles - Updating time - Updating time - Send cycles - PG/FINET IO, on the number of IO Devices and on the amount of configurater during time and the send cycles area - Inputs, max Outputs, max Outputs, max User data consistency, max User data consistency, max PROFINET IO Bevice - PC/OP communication - Sr communication - Sr communication - Shared device - Number of IO Controllers with shared device, max Transfer memory - Inputs, max Outputs, max Outputs, max Outputs, max Outputs, max Outputs, max 1440 byte; Per IO Controller with shared device - Number, max Outputs, max	 Of which IO devices with IRT, max. 	64
flexibility" - of which in line, max. - Number of connectable IO Devices for RT, max. - of which in line, max. - or wh	— of which in line, max.	64
- Number of connectable IO Devices for RT, max of which in line, max Activation/deactivation of IO Devices - Number of IO Devices that can be simultaneously activate/deactivated, max IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max Device replacement without swap medium - Send cycles - Send cycles - Updating time - Send cycles - Updating time Updating operation (partiner ports) are supported - Ves - Updating time Updating		256
- of which in line, max. - Activation/deactivation of IO Devices - Number of IO Devices that can be simultaneously activated/deactivated, max. - IO Devices changing during operation (partner ports), supported - Number of IO Devices per tool, max. - Device replacement without swap medium - Send cycles - Updating time - Updating time additionally with IRT with high performar 250 µs to 4 ms in 125 µs frame - Updating time additionally with IRT with high performar 250 µs to 4 ms in 125 µs frame - Updating time additionally with IRT with high performar 250 µs to 4 ms in 125 µs frame - Updating time additionally with IRT with high performar 250 µs to 4 ms in 125 µs frame - Updating time additionally with IRT with high performar 250 µs to 4 ms in 125 µs frame - Updating time additionally with IRT with high performar 250 µs to 4 ms in 125 µs frame - Updating time additionally with IRT with high performar 250 µs to 4 ms in 125 µs frame - Updating time additionally with IRT with high performar 250 µs to 4 ms in 125 µs frame - Updating time additionally with IRT with high	— of which in line, max.	61
— Activation/deactivation of IO Devices — Number of IO Devices that can be simultaneously activated/deactivated, max. — IO Devices changing during operation (partner ports), supported — Number of IO Devices per tool, max. — Device replacement without swap medium — Send cycles — Updating time — Send cycles — Updating time — Inputs, max. — Inputs, max. — User data consistency, max. — 1024 byte PROFINET IO Device Services — PG/OP communication — S7 communication — S7 communication — S7 communication — Shared device — Number of IO Controllers with shared device, max. — Inputs, max. — Usumber of IO Controllers with shared device, max. 2 Transfer memory — Inputs, max. — Usur data per submodule, max. — 1440 byte; Per IO Controller with shared device — Number of government and the submodule, max. — User data per submodule, max. — User data per submodule, max. — 1440 byte; Per IO Controller with shared device — Number of connections, max. — 1024 byte PROFINET CBA • acyclic transmission • Number of connections, max. 94	 Number of connectable IO Devices for RT, max. 	256
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activated/deactivated, max. — IO Devices changing during operation (partner ports), supported — Number of IO Devices per tool, max. — Device replacement without swap medium — Send cycles — Updating time — Updating time — Updating time — 250 µs to 512 ms; minimum value depends on preset communication shan PROFINET IO, on the number of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the standard process of IO Devices and on the amount of configurate variety and the number of IO Devices and on the amount of configurate variety and the number of IO Devices and on the amount of configuration share device and the standard process of IO Devices and on the amount of configuration share device and the standard process of IO Devices and on the amount of Configuration share device and the standard process of IO Devices and on the amount of Configuration share device and the standard process of IO Devices and on the amount of Configuration share device and the standard process of IO Devices and on the amount of Configuration share device and the standard process of IO Devices and on the amount of Configuration share device and the standard process of IO Device and IO Devices and on the amount of Configuration share device	 Activation/deactivation of IO Devices 	Yes
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Updating time 250 µs to 512 ms; minimum value depends on preset communication shan PROFINET IO, on the number of IO Devices and on the amount of configurated data, see PROFINET system description Address area Inputs, max Outputs, max User data consistency, max. PROFINET IO Device Services PG/OP communication S7 communication S7 communication IRT Prioritized startup Shared device Number of IO Controllers with shared device, max. Transfer memory Inputs, max User data per submodule, max. PROFINET CBA • acyclic transmission • Number of connections, max. 94	— Send cycles	250 μs, 500 μs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance:
Address area	— 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
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- Outputs, max User data consistency, max. PROFINET IO Device Services - PG/OP communication - S7 communication - S7 communication - IRT - Prioritized startup - Prioritized startup - Shared device - Number of IO Controllers with shared device, max. Transfer memory - Inputs, max Outputs, max Outputs, max Number, max User data per submodule, max. PROFINET CBA - acyclic transmission - occurrence of the communication - Number of connections, max. 94		8 khyte
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• cyclic transmission Yes Open IE communication • Number of connections, max. 94		Von
Open IE communication • Number of connections, max. 94	•	
Number of connections, max. 94	·	Yes
	·	
	Number of connections, max.Local port numbers used at the system end	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534,
Keep-alive function, supported Yes	Keep-alive function, supported	
3. Interface		

Interface type	Pluggable interface module (IF)
Plug-in interface modules	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Isolated	Yes
automatic detection of transmission rate	No
Interface types	
• RS 485	Yes
Output current of the interface, max.	150 mA
Protocols	100 1111 (
• MPI	No
PROFIBUS DP master	Yes
PROFIBUS DP slave	Yes
PROFIBUS DP master	
Number of connections, max.	32
Transmission rate, max. Transmission rate, max.	12 Mbit/s
Number of DP slaves, max.	125
Services	120
— PG/OP communication	Yes
— Routing	Yes; S7 routing
Global data communication	No
— S7 basic communication	Yes
— S7 communication	Yes
— S7 communication — S7 communication, as client	Yes
— S7 communication, as circle — S7 communication, as server	Yes
— Equidistance	Yes
Legitaristance Isochronous mode	Yes
— SYNC/FREEZE	Yes
Activation/deactivation of DP slaves	Yes
Direct data exchange (slave-to-slave)	Yes
communication)	165
— DPV0	Yes
— DPV1	Yes
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 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 	32
• GSD file	http://support.automation.siemens.com/WW/view/en/113652
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	Yes
— 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)	No
communication)	
— DPV1	No
Transfer memory	
— Inputs	244 byte

— Outputs	244 byte
Protocols	
Redundancy mode	
Media redundancy	
 Switchover time on line break, typ. 	200 ms
 Number of stations in the ring, max. 	50
SIMATIC communication	
S7 routing	Yes
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
Number of connections, max.	94
— 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 and loadable FBs
— Number of connections, max.	94
— 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.	94
— Data length, max.	1 472 byte
Web server	Von
supported Hear defined websites	Yes
User-defined websites	Yes
Number of HTTP clients Isoshrapus mede	5
Isochronous mode	Von
Equidistance	Yes 2
Number of DP masters with isochronous mode	
User data per isochronous slave, max.	244 byte
shortest clock pulse	1 ms; 0.5 ms without use of SFC 126, 127
max. cycle communication functions / header	02 1110
PG/OP communication	Vac
	Yes 95
 Number of connectable OPs without message processing Number of connectable OPs with message processing 	95; When using Alarm_S/SQ and Alarm_D/DQ
Data record routing	95, When using Alarm_5/5Q and Alarm_D/DQ Yes
Global data communication	165
supported	Yes
Number of GD loops, max.	16
Number of GD packets, transmitter, max.	16
Number of GD packets, receiver, max.	32
Size of GD packets, max.	54 byte
Size of GD packets, max. Size of GD packet (of which consistent), max.	1 variable
S7 basic communication	
communication function / S7 basic communication	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 	64/64
CPU, max.	
Standard communication (FMS)	
	V Vi- OD II I-I- FD
• supported	Yes; Via CP and loadable FB
supported communication functions / PROFINET CBA (with set target commu Setpoint for the CPU communication load	

 Number of remote interconnection partners 	32
 Number of functions, master/slave 	150
 Total of all master/slave connections 	6 000
 Data length of all incoming connections master/slave, max. 	65 000 byte
 Data length of all outgoing connections master/slave, max. 	65 000 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
performance data / PROFINET CBA / remote interconnection /	/ with acyclic transfer / header
— Sampling interval, min.	200 ms; Depending on preset communication load, number of interconnections and data length used
 Number of incoming interconnections 	500
 Number of outgoing interconnections 	500
 Data length of all incoming interconnections, max. 	16 000 byte
 Data length of all outgoing interconnections, max. 	16 000 byte
 data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum 	2 000 byte
performance data / PROFINET CBA / remote interconnection /	/ with cyclic transfer / header
— Transmission frequency: Transmission interval, min.	1 ms; Depending on preset communication load, number of interconnections and data length used
 number of remote connections to input variables / with PROFINET CBA / with cyclic transfer / maximum 	300
 number of remote connections to output variables / with cyclical transfer / with PROFINET CBA / maximum 	300
 — data volume / as user data for remote interconnections with input variables / with cyclical transfer / with PROFINET CBA / maximum 	4 800 byte
 data volume / as user data for remote interconnections with output variables / with cyclical transfer / with PROFINET CBA / maximum 	4 800 byte
 — data volume / as user data for remote interconnections / with cyclical transfer / with PROFINET CBA / per connection / maximum 	450 byte
performance data / PROFINET CBA / HMI variables via PROF	INET / acyclic / header
 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 	1 500
 Data length of all HMI variables, max. 	48 000 byte
performance data / PROFINET CBA / PROFIBUS proxy function	onality / header
— supported	Yes; 32 PROFIBUS slaves max. connectable
 Data length per connection, max. 	240 byte; Slave-dependent
Number of connections	
• overall	96
 usable for PG communication 	95
 reserved for PG communication 	1
 adjustable for PG communication, max. 	0
 usable for OP communication 	95
 reserved for OP communication 	1
— adjustable for OP communication, max.	0
usable for S7 basic communication	94
reserved for S7 basic communication	0
adjustable for S7 basic communication, max.	0
usable for S7 communication	94
— reserved for S7 communication	0
adjustable for S7 communication, max.	0
-	
usable for routing	47
— reserved for routing	0
adjustable for routing, max.	0
S7 message functions	
Number of login stations for message functions, max.	95; Max. 95 with Alarm_S/SQ and Alarm_D/DQ (OPs); max. 16 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.	1 000; 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. 	4 000
• preset, max.	600
Process control messages	Yes
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	32
Number of messages	
• overall, max.	1 024
• in 100 ms grid, max.	128
• in 500 ms grid, max.	512
 • in 1000 ms grid, max. 	1 024
Number of additional values	
• with 100 ms grid, max.	1
• with 500, 1000 ms grid, max.	10
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	- of outdoord of
• Forcing	Yes
Forcing, variables	Inputs/outputs, bit memories, distributed I/Os
Number of variables, max.	512
Diagnostic buffer	312
·	Yes
Number of entries may	
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 / header	
Configuration software	
STEP 7	Yes
	100
configuration / programming / header • Command set	see instruction list
● Command Set	see instruction list
Nesting levels	7

Access to consistent data in process image	Yes
System functions (SFC)	see instruction list
System functions (OF S) System function blocks (SFB)	see instruction list
Programming language	See instruction list
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes
— GRAPH	Yes
— GRAFTI — HiGraph®	Yes
configuration / programming / number of simultaneously ac	
— DPSYC FR	2; SFC 11; per interface
— D_ACT_DP	8; SFC 12; per interface
— D_ACT_DF — 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
— WK_DFARWI — DPNRM DG	8; SFC 13; per interface
— RDSYSST	8: SFC 51
— RDS1351 — DP_TOPOL	1; SFC 103; per interface
configuration / programming / number of simultaneously ac	
— RDREC	
— WRREC	8; SFB 52; per interface, but not more than 32 across all external interfaces
	8; SFB 53; per interface, but not more than 32 across all external interfaces
Know-how protection	Yes
 User program protection/password protection Block encryption 	
	Yes; With S7 block Privacy
Dimensions	50
Width	50 mm
Height	290 mm
Depth	219 mm
Weights	
Weight, approx.	900 g

last modified:

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