

OFFICIAL MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

6ES7416-3ER05-0AB0

Siemens official documentation for the exact article number.

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Selected official Siemens pages follow this cover.

SIMATIC S7-400

Central processing units

CPU 416

Overview



- High-performance CPUs in the high-end performance range
- Applicable for plants with high requirements in the high-end performance range
- Integrated PROFINET functions in CPU 416-3 PN/DP

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Technical specifications

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
Product status			
Firmware version	V5.0	V5.0	V5.0
associated programming package	STEP7 V5.3 SP2 or higher with HW-update	STEP7 V5.3 SP2 or higher with HW-update	STEP7 V5.4 SP1 or higher
Feeding of external buffer voltage to CPU	5 to 15 V DC	5 to 15 V DC	5 to 15 V DC
Current consumption			
from backplane bus DC 5 V, max.	1.1 A	1.3 A	1.4 A
from interface DC 5 V, max.	90 mA; At each DP interface	90 mA; At each DP interface	90 mA; At each DP interface
Current consumption/power loss			
Power loss, typ.	4 W	4.5 W	5.5 W
Backup battery			
• Buffer current, typ.	125 µA; Valid up to 40°C	125 µA; Valid up to 40°C	125 µA; Valid up to 40°C
• Buffer current, max.	550 µA	550 µA	550 µA
Memory			
Type of storage			
RAM			
• integrated (for program)	2.8 MByte	5.6 MByte	5.6 MByte
• integrated (for data)	2.8 MByte	5.6 MByte	5.6 MByte
• expandable	No	No	No
Load memory			
• expandable FEPRM	Yes	Yes	Yes; with Memory Card (FLASH)
• expandable FEPRM, max.	64 MByte	64 MByte	64 MByte
• integrated RAM, max.	1 MByte	1 MByte	1 MByte
• expandable RAM	Yes	Yes	Yes; With Memory Card (RAM)
• expandable RAM, max.	64 MByte	64 MByte	64 MByte
Backup			
• present	Yes	Yes	Yes
• with battery	Yes	Yes	Yes
• without battery	No	No	No
CPU/blocks			
DB			
• Number, max.	10 000; Number range: 1 to 16,000	10 000; Number range: 1 to 16,000	10 000; Number range: 1 to 16,000
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte

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Central processing units

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
FB			
• Number, max.	5 000; Number range: 0 to 7999	5 000; Number range: 0 to 7999	5 000; Number range: 0 to 7999
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
FC			
• Number, max.	5 000; Number range: 0 to 7999	5 000; Number range: 0 to 7999	5 000; Number range: 0 to 7,999
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
OB			
• Size, max.	64 Kibyte	64 Kibyte	64 Kibyte
Nesting depth			
• per priority class	24	24	24
• additional within an error OB	2	2	2
CPU/processing times			
for bit operations, min.	30 ns	30 ns	30 ns
for word operations, min.	30 ns	30 ns	30 ns
for fixed point arithmetic, min.	30 ns	30 ns	30 ns
for floating point arithmetic, min.	90 ns	90 ns	90 ns
Times/counters and their remanence			
S7 counter			
• Number	2 048	2 048	2 048
• Remanence			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	2 047	2 047	2 047
- preset	From Z 0 to Z 7	From Z 0 to Z 7	From Z 0 to Z 7
• Counting range			
- lower limit	0	0	0
- upper limit	999	999	999
IEC counter			
• present	Yes	Yes	Yes
• Type	SFB	SFB	SFB
S7 times			
• Number	2 048	2 048	2 048
• Remanence			
- adjustable	Yes	Yes	Yes
- lower limit	0	0	0
- upper limit	2 047	2 047	2 047
- preset	No times retentive	No times retentive	No times retentive
• Time range			
- lower limit	10 ms	10 ms	10 ms
- upper limit	9 990 s	9 990 s	9 990 s
IEC timer			
• present	Yes	Yes	Yes
• Type	SFB	SFB	SFB
Data areas and their remanence			
remanent data area, total	Total working and load memory (with backup battery)	Total working and load memory (with backup battery)	Total working and load memory (with backup battery)

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
Flag			
• Number, max.	16 Kibyte	16 Kibyte	16 Kibyte; Size of bit memory address area
• Remanence available	Yes	Yes	Yes
• Number of clock memories	8; (in 1 memory byte)	8; (in 1 memory byte)	8; (in 1 memory byte)
Address area			
I/O address area			
• Inputs	16 Kibyte	16 Kibyte	16 Kibyte
• Outputs	16 Kibyte	16 Kibyte	16 Kibyte
• of which, distributed			
- MPI/DP interface, inputs	2 Kibyte	2 Kibyte	2 Kibyte
- MPI/DP interface, outputs	2 Kibyte	2 Kibyte	2 Kibyte
- DP interface, inputs	8 Kibyte	8 Kibyte	8 Kibyte
- DP interface, outputs	8 Kibyte	8 Kibyte	8 Kibyte
- PN interface, inputs			8 Kibyte
- PN interface, outputs			8 Kibyte
Process image			
• Inputs, adjustable	16 Kibyte	16 Kibyte	16 Kibyte
• Outputs, adjustable	16 Kibyte	16 Kibyte	16 Kibyte
• Inputs, preset	512 byte	512 byte	512 byte
• Outputs, preset	512 byte	512 byte	512 byte
• consistent data, max.	244 byte	244 byte	244 byte
• Access to consistent data in process image	Yes	Yes	Yes
Subprocess images			
• Number of subprocess images, max.	15	15	15
Digital channels			
• Inputs	131 072	131 072	131 072
• Outputs	131 072	131 072	131 072
• Inputs, of which central	131 072	131 072	131 072
• Outputs, of which central	131 072	131 072	131 072
Analog channels			
• Inputs	8 192	8 192	8 192
• Outputs	8 192	8 192	8 192
• Inputs, of which central	8 192	8 192	8 192
• Outputs, of which central	8 192	8 192	8 192
Hardware config.			
connectable OPs	63	63	63
Central devices, max.	1	1	1
Expansion devices, max.	21	21	21
Multicomputing	Yes; Max. 4 CPUs (with UR1 or UR2)	Yes; Max. 4 CPUs (with UR1 or UR2)	Yes; Max. 4 CPUs (with UR1 or UR2)
IM			
• Number of connectable IMs (total), max.	6	6	6
• Number of connectable IM 460s, max.	6	6	6
• Number of connectable IM 463s, max.	4; IM 463-2	4; IM 463-2	4; IM 463-2

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Technical specifications (continued)

	6ES7 416-2XN05-0AB0	6ES7 416-3XR05-0AB0	6ES7 416-3ER05-0AB0
Number of DP masters			
• integrated	2	2	1
• via IM 467	4	4	4
• via CP	10; CP 443-5 Extended	10; CP 443-5 Extended	10; CP 443-5 Extended
• Mixed mode IM + CP permitted	No; IM 467 cannot be used with CP 443-5 Ext.; IM 467 cannot be used with CP 443-1 EX40 in PN IO mode	No; IM 467 cannot be used with CP 443-5 Ext.; IM 467 cannot be used with CP 443-1 EX40 in PN IO mode	No; IM 467 cannot be used with CP 443-5 Ext.; IM 467 cannot be used with CP 443-1 EX40 in PN IO mode
• via interface module	0	1	1; IF 964-DP
• Number of pluggable S5 modules (via adapter capsule in central device), max.	6	6	6
Number of IO controllers			
• integrated			1
• via CP	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller	4; Via CP 443-1 EX 41 in PN mode; max. 4 in central controller
Number of operable FMs and CPs (recommended)			
• FM	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections
• CP, point-to-point	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections	Limited due to number of slots and number of connections
• PROFIBUS and Ethernet CPs	14; Of which 10 CP or IM max. as DP master and PN controller	14; Of which 10 CP or IM max. as DP master and PN controller	14; Of which 10 CP/IM max. as DP master and PN controller
Time			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
• buffered and synchronizable	Yes	Yes	Yes
• Resolution	1 ms	1 ms	1 ms
Operating hours counter			
• Number	8	8	8
Clock synchronization			
• supports	Yes	Yes	Yes
• to MPI, Master	Yes	Yes	Yes
• to MPI, Slave	Yes	Yes	Yes
• to DP, Master	Yes	Yes	Yes
• to DP, Slave	Yes	Yes	Yes
• in AS, Master	Yes	Yes	Yes
• in AS, Slave	Yes	Yes	Yes
• on Ethernet via NTP	Via CP	Via CP	Yes; as client
• to IF 964 DP		Yes	Yes
S7 message functions			
Number of login stations for message functions, max.	63; Max. 63 with ALARM_S and ALARM_D (OPs); max. 12 with ALARM_8 and ALARM_P (e.g. WinCC)	63; Max. 63 with ALARM_S and ALARM_D (OPs); max. 12 with ALARM_8 and ALARM_P (e.g. WinCC)	63; Max. 63 with ALARM_S and ALARM_D (OPs); max. 12 with ALARM_8 and ALARM_P (e.g. WinCC)
Symbol-related messages	Yes	Yes	Yes
Number of messages			
• overall, max.	1 024	1 024	1 024
Block related messages	Yes	Yes	Yes
Alarm 8-blocks	Yes	Yes	Yes
Instrumentation & control messages	Yes	Yes	Yes