SIEMENS

Data sheet 6ES7416-2XK04-0AB0

	********** Replacement part ********* SIMATIC S7-400, CPU 416-2 Central processing unit with: work memory 2.8 MB, (1.4 MB code, 1.4 MB data), 1st interface MPI/DP 12 Mbit/s, 2nd interface PROFIBUS DP
General information	
Product type designation	CPU 416-2
Firmware version	V4.0
Product function	
● Isochronous mode	Yes
Engineering with	
● Programming package	STEP 7 V5.2 SP1 HF3 or higher with HW update
CiR - Configuration in RUN	
CiR synchronization time, basic load	100 ms
CiR synchronization time, time per I/O byte	40 µs
Supply voltage	
Rated value (DC)	Power supply via system power supply
Input current	
from backplane bus 5 V DC, typ.	1 A
from backplane bus 5 V DC, max.	1.2 A
from backplane bus 24 V DC, max.	Total current consumption of the components connected to the MPI/DP interfaces, but no more than 150 mA per interface
Power loss	
Power loss, typ.	4.5 W
Storage	
Type of memory	RAM
Work memory	
● integrated (for program)	1 400 kbyte
● integrated (for data)	1 400 kbyte
● expandable	No
Load memory	
● expandable FEPROM	Yes; with Memory Card (FLASH)
● expandable FEPROM, max.	64 Mbyte
● integrated RAM, max.	256 kbyte
● expandable RAM	Yes; with Memory Card (RAM)
● expandable RAM, max.	16 Mbyte
Backup	
● present	Yes
● with battery	Yes; all data
● without battery	No
Battery	
Backup battery	
● Backup current, typ.	550 µA
● Backup current, max.	1 539 µA
● Backup time, max.	144 d
● Feeding of external backup voltage to CPU	5 V DC to 15 V DC
CPU processing times	
for bit operations, typ.	0.04 µs
for word operations, typ.	0.04 µs
for fixed point arithmetic, typ.	0.04 µs
for floating point arithmetic, typ.	0.12 µs
CPU-blocks	
DB	

● Number, max.	4 095; DB 0 reserved
● Size, max.	64 kbyte
FB	
● Number, max.	2 048
● Size, max.	64 kbyte
FC	
● Number, max.	2 048
● Size, max.	64 kbyte
OB	
● Number, max.	see instruction list
● Size, max.	64 kbyte
● Number of time alarm OBs	8
● Number of delay alarm OBs	4
● Number of cyclic interrupt OBs	9
● Number of process alarm OBs	8
● Number of multicomputing OBs	1
Nesting depth	
● per priority class	24
● additional within an error OB	2
Counters, timers and their retentivity	
S7 counter	
● Number	2 048
Retentivity	
— can be set	Yes
— preset	Z 0 to Z 7
Counting range	
— lower limit	0
— upper limit	999
IEC counter	
● present	Yes
● Type	SFB
S7 timer	
● 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
● Type	SFB
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	Total working and load memory (with backup battery)
Flag	
● Size, max.	16 kbyte
● Retentivity available	Yes; MB 0 to MB 16383
● Retentivity preset	MB 0 to MB 15
● Number of clock memories	8; 1 memory byte
Local data	
● 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	
● Inputs	8 192
— of which central	8 192
● Outputs	8 192
— of which central	8 192
Hardware configuration	
Number of expansion units, max.	21; of which 6 ER with K-bus
connectable OPs	63 without message processing, 12 with message processing
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	2
● 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.
● Number of pluggable S5 modules (via adapter capsule in central device), max.	6
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 connections
● CP, LAN	Limited by number of slots and number of connections
● PROFIBUS and Ethernet CPs	14; incl. CP 443-5 Ext. and IM 467
Slots	
● required slots	1
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 on
● Deviation per day (unbuffered), max.	8.6 s; Power off
Operating hours counter	
● Number	8
● Number/Number range	0 to 7
● Range of values	0 to 32767 hours
● Granularity	1 h
● retentive	Yes
Clock synchronization	
● supported	Yes
● to MPI, master	Yes
● on MPI, device	Yes
● to DP, master	Yes
● on DP, device	Yes
● in AS, master	Yes
● in AS, device	Yes

1. Interface	
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 device	Yes
MPI	
● Number of connections	44
● Transmission rate, max.	12 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	Yes
— S7 basic communication	Yes
— S7 communication	Yes
PROFIBUS DP master	
● 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
● max. number of DP devices	32
Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	Yes
— S7 basic communication	Yes
— S7 communication	Yes
— Equidistance	Yes
— SYNC/FREEZE	Yes
— activation/deactivation of DP devices	Yes
— Direct data exchange (slave-to-slave communication)	Yes
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
User data per DP device	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
PROFIBUS DP device	
● GSD file	http://www.siemens.com/profibus-gsd
● Transmission rate, max.	12 Mbit/s
● Address area, max.	32
● User data per address area, max.	32 byte
— of which consistent, max.	32 byte
Services	
— PG/OP communication	Yes
— Routing	Yes
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte
2. Interface	
Interface type	PROFIBUS DP
Isolated	Yes
Interface types	

● RS 485	Yes
● Output current of the interface, max.	150 mA
Protocols	
● PROFIBUS DP master	Yes
● PROFIBUS DP device	Yes
PROFIBUS DP master	
● 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
● max. number of DP devices	125
Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	Yes
— S7 basic communication	Yes
— S7 communication	Yes
— Equidistance	Yes
— SYNC/FREEZE	Yes
— activation/deactivation of DP devices	Yes
— Direct data exchange (slave-to-slave communication)	Yes
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
User data per DP device	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
— Slots, max.	244
— per slot, max.	128 byte
PROFIBUS DP device	
● Transmission rate, max.	12 Mbit/s
● Address area, max.	32
● User data per address area, max.	32 byte
— of which consistent, max.	32 byte
Services	
— Routing	Yes
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte
Protocols	
SIMATIC communication	
● S7 routing	Yes
Isochronous mode	
Equidistance	Yes
User data per isochronous slave, max.	244 byte
shortest clock pulse	1 ms
max. cycle	32 ms
Communication functions	
PG/OP communication	Yes
● Number of connectable OPs with message processing	12
● Number of connectable OPs without message processing	63
Global data communication	
● 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.	64 byte
● Size of GD packet (of which consistent), max.	1 variable
S7 basic communication	

● supported	Yes; in MPI mode via: SFC X_SEND, X_RCV, X_GET and X_PUT; in DP master mode via: SFC I_GET and I_PUT
● 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
Standard communication (FMS)	
● supported	Yes; Via CP and loadable FB
Number of connections	
● overall	64
● usable for PG communication	
— reserved for PG communication	1
● usable for OP communication	
— reserved for OP communication	1
S7 message functions	
Number of login stations for message functions, max.	12
Symbol-related messages	Yes
Program alarms	Yes
simultaneously active Alarm_S blocks, max.	200; ALARM_S/SQ blocks or ALARM_D/DQ blocks
Alarm 8-blocks	Yes
● Number of instances for alarm 8 and S7 communication blocks, max.	1 800
● 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
Single step	Yes
Number of breakpoints	4
Status/control	
● Status/control variable	Yes
● Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
● Number of variables, max.	70
Forcing	
● Forcing	Yes
● Forcing, variables	Inputs/outputs, bit memories, distributed I/Os
● Number of variables, max.	512
Diagnostic buffer	
● present	Yes
● Number of entries, max.	3 200
— can be set	Yes
— preset	120
Configuration	

Configuration software	
● STEP 7	Yes
Programming	
● Command set	see instruction list
● Nesting levels	8
● 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
— D_ACT_DP	4
— RD_REC	8
— WR_REC	8
— WR_PARM	8
— PARM_MOD	1
— WR_DPARM	2
— DPNRM_DG	8
— RDSYSST	8; 1 to 8
— DP_TOPOL	1
Number of simultaneously active SFBs	
— RDREC	8
— WRREC	8
Know-how protection	
● User program protection/password protection	Yes
Dimensions	
Width	25 mm
Height	290 mm
Depth	219 mm
Weights	
Weight, approx.	720 g

Classifications

	Version	Classification
eClass	14	27-24-22-07
eClass	12	27-24-22-07
eClass	9.1	27-24-22-07
eClass	9	27-24-22-07
eClass	8	27-24-22-07
eClass	7.1	27-24-22-07
eClass	6	27-24-22-07
ETIM	10	EC000236
ETIM	9	EC000236
ETIM	8	EC000236
ETIM	7	EC000236
IDEA	4	3565
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval	For use in hazardous locations

UL		China RoHS	ATEX	Type Examination Certificate	IECEx

For use in hazardous locations	Maritime application				
ATEX	BUREAU VERITAS	DNV	PRS	RMRS	CCS (China Classification Society)

last modified: 7/21/2025