

# SIEMENS

## Product data sheet

**6ES7314-6CH04-0AB0**


SIMATIC S7-300,  
 CPU 314C-2 DP COMPACT CPU WITH MPI,  
 24 DI/16 DO, 4AI, 2AO, 1 PT100,  
 4 FAST COUNTERS (60 KHZ),  
 INTEGRATED DP INTERFACE,  
 INTEGRATED 24V DC POWER SUPPLY,  
 192 KBYTE WORKING MEMORY,  
 FRONT CONNECTOR (2 X 40PIN) AND MICRO  
 MEMORY CARD REQUIRED

### General information

Hardware product version	01
Firmware version	V3.3

### Engineering with

Programming package	STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203
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### Supply voltage

24 V DC	Yes
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
External protection for supply cables (recommendation)	Miniature circuit breaker, type C; min 2 A; miniature circuit breaker type B, min. 4 A

### Mains buffering

Mains/voltage failure stored energy time	5 ms
Repeat rate, min.	1 s

### Digital inputs

<b>Load voltage L+</b>	
Rated value (DC)	24 V
Reverse polarity protection	Yes
<b>Digital outputs</b>	
<b>Load voltage L+</b>	
Rated value (DC)	24 V
Reverse polarity protection	No
<b>Input current</b>	
Current consumption (rated value)	880 mA
Current consumption (in no-load operation), typ.	150 mA
Inrush current, typ.	5 A
$I^2t$	0.7 A <sup>2</sup> ·s
<b>Digital inputs</b>	
from load voltage L+ (without load), max.	80 mA
<b>Digital outputs</b>	
from load voltage L+, max.	50 mA
<b>Power losses</b>	
Power loss, typ.	13 W
<b>Memory</b>	
<b>Work memory</b>	
integrated	192 kbyte
expandable	No
Size of retentive memory for retentive data blocks	64 kbyte
<b>Load memory</b>	
pluggable (MMC)	Yes
pluggable (MMC), max.	8 Mbyte
Data management on MMC (after last programming), min.	10 a
<b>Backup</b>	
present	Yes ; Guaranteed by MMC (maintenance-free)
without battery	Yes ; Program and data
<b>CPU processing times</b>	
for bit operations, min.	0.06 $\mu$ s
for word operations, min.	0.12 $\mu$ s

for fixed point arithmetic, min.	0.16 $\mu$ s
for floating point arithmetic, min.	0.59 $\mu$ s
<b>CPU-blocks</b>	
Number of blocks (total)	1024 ; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
<b>DB</b>	
Number, max.	1024 ; Number range: 1 to 16000
Size, max.	64 kbyte
<b>FB</b>	
Number, max.	1024 ; Number range: 0 to 7999
Size, max.	64 kbyte
<b>FC</b>	
Number, max.	1024 ; Number range: 0 to 7999
Size, max.	64 kbyte
<b>OB</b>	
Description	see instruction list
Size, max.	64 kbyte
Number of free cycle OBs	1 ; OB 1
Number of time alarm OBs	1 ; OB 10
Number of delay alarm OBs	2 ; OB 20, 21
Number of time interrupt OBs	4 ; OB 32, 33, 34, 35
Number of process alarm OBs	1 ; OB 40
Number of DPV1 alarm OBs	3 ; OB 55, 56, 57
Number of startup OBs	1 ; OB 100
Number of asynchronous error OBs	5 ; OB 80, 82, 85, 86, 87
Number of synchronous error OBs	2 ; OB 121, 122
<b>Nesting depth</b>	
per priority class	16
additional within an error OB	4
<b>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
Number	256
<b>Retentivity</b>	
adjustable	Yes

lower limit	0
upper limit	255
preset	Z 0 to Z 7
<b>Counting range</b>	
lower limit	0
upper limit	999
<b>IEC counter</b>	
present	Yes
Type	SFB
Number	Unlimited (limited only by RAM capacity)
<b>S7 times</b>	
Number	256
<b>Retentivity</b>	
adjustable	Yes
lower limit	0
upper limit	255
preset	No retentivity
<b>Time range</b>	
lower limit	10 ms
upper limit	9990 s
<b>IEC timer</b>	
present	Yes
Type	SFB
Number	Unlimited (limited only by RAM capacity)
<b>Data areas and their retentivity</b>	
retentive data area, total	All, max. 64 KB
<b>Flag</b>	
Number, max.	256 byte
Retentivity available	Yes ; MB 0 to MB 255
Retentivity preset	MB 0 to MB 15
Number of clock memories	8 ; 1 memory byte
<b>Data blocks</b>	
Number, max.	1024 ; Number range: 1 to 16000

Size, max.	64 kbyte
Retentivity adjustable	Yes ; via non-retain property on DB
Retentivity preset	Yes
<b>Local data</b>	
per priority class, max.	32 kbyte ; Max. 2048 bytes per block
<b>Address area</b>	
<b>I/O address area</b>	
Inputs	2048 byte
Outputs	2048 byte
<b>of which, distributed</b>	
Inputs	2003 byte
Outputs	2010 byte
<b>Process image</b>	
Inputs	2048 byte
Outputs	2048 byte
Inputs, adjustable	2048 byte
Outputs, adjustable	2048 byte
Inputs, default	128 byte
Outputs, default	128 byte
<b>Default addresses of the integrated channels</b>	
Digital inputs	124.0 to 126.7
Digital outputs	124.0 to 125.7
Analog inputs	752 to 761
Analog outputs	752 to 755
<b>Digital channels</b>	
Inputs	16048
Outputs	16096
Inputs, of which central	1016
Outputs, of which central	1008
<b>Analog channels</b>	
Inputs	1006
Outputs	1007
Inputs, of which central	253

Outputs, of which central	250
<b>Hardware configuration</b>	
Racks, max.	4
Modules per rack, max.	8 ; In rack 3 max. 7
Expansion devices, max.	3
<b>Number of DP masters</b>	
integrated	1
via CP	4
<b>Configuration / Number of FMs and CPs that can be operated (recommendation)</b>	
FM	8
CP, point-to-point	8
CP, LAN	10
<b>Time of day</b>	
<b>Clock</b>	
Hardware clock (real-time clock)	Yes
battery-backed and synchronizable	Yes
Deviation per day, max.	10 s ; Typ.: 2 s
Backup time	6 wk ; At 40 °C ambient temperature
Behavior of the clock following POWER-ON	Clock continues running after POWER OFF
Behavior of the clock following expiry of backup period	Clock continues to run with the time at which the power failure occurred
<b>Operating hours counter</b>	
Number	1
Number/Number range	0
Range of values	0 to 2 <sup>31</sup> hours (when using SFC 101)
Granularity	1 hour
retentive	Yes ; Must be restarted at each restart
<b>Clock synchronization</b>	
supported	Yes
to MPI, master	Yes
to MPI, slave	Yes
to DP, master	Yes ; With DP slave only slave clock
to DP, slave	Yes
in AS, master	Yes

in AS, slave	No
<b>Digital inputs</b>	
Number/binary inputs	24
of which, inputs usable for technological functions	16
integrated channels (DI)	24
Input characteristic curve acc. to IEC 61131, Type 1	Yes
<b>Number of simultaneously controllable inputs</b>	
<b>horizontal installation</b>	
up to 40 °C, max.	24
up to 60 °C, max.	12
<b>vertical installation</b>	
up to 40 °C, max.	12
<b>Technological functions</b>	
shielded, max.	50 m ; at maximum count frequency
Unshielded, max.	not allowed
<b>Standard DI</b>	
shielded, max.	1000 m
Unshielded, max.	600 m
<b>Input voltage</b>	
Rated value, DC	24 V
for signal "0"	-3 to +5 V
for signal "1"	15 to 30 V
<b>Input current</b>	
for signal "1", typ.	8 mA
<b>Input delay (for rated value of input voltage)</b>	
<b>for standard inputs</b>	
Parameterizable	Yes ; 0.1 / 0.3 / 3 / 15 ms (You can reconfigure the input delay of the standard inputs during program runtime. Please note that under certain circumstances your newly set filter time may not be effective until the next filter cycle.)
Rated value	3 ms
<b>for counter/technological functions</b>	
at "0" to "1", max.	8 µs ; Minimum pulse width/minimum pause between pulses at maximum counting frequency

<b>Cable length</b>	
Cable length, shielded, max.	1000 m ; 50 m for technological functions
Cable length unshielded, max.	600 m ; For technological functions: No
<b>Digital outputs</b>	
Number/binary outputs	16
of which high-speed outputs	4 ; Notice: You cannot connect the fast outputs of your CPU in parallel
integrated channels (DO)	16
Functionality/short-circuit strength	Yes ; Clocked electronically
Response threshold, typ.	1 A
Limitation of inductive shutdown voltage to	L+ (-48 V)
Lamp load, max.	5 W
Controlling a digital input	Yes
<b>Load resistance range</b>	
lower limit	48 $\Omega$
upper limit	4 k $\Omega$
<b>Output voltage</b>	
for signal "1", min.	L+ (-0.8 V)
<b>Output current</b>	
for signal "1" rated value	500 mA
for signal "1" permissible range, min.	5 mA
for signal "1" permissible range, max.	0.6 A
for signal "1" minimum load current	5 mA
for signal "0" residual current, max.	0.5 mA
<b>Parallel switching of 2 outputs</b>	
for increased power	No
for redundant control of a load	Yes
<b>Switching frequency</b>	
with resistive load, max.	100 Hz
with inductive load, max.	0.5 Hz
on lamp load, max.	100 Hz
of the pulse outputs, with resistive load, max.	2.5 kHz
<b>Aggregate current of outputs (per group)</b>	
horizontal installation	



up to 40 °C, max.	3 A
up to 60 °C, max.	2 A
<b>vertical installation</b>	
up to 40 °C, max.	2 A
<b>Cable length</b>	
Cable length, shielded, max.	1000 m
Cable length unshielded, max.	600 m
<b>Analog inputs</b>	
Integrated channels (AI)	5 ; 4 x current/voltage, 1 x resistance
Number of analog inputs for voltage/current measurement	4
Number of analog inputs for resistance/resistance thermometer measurement	1
permissible input frequency for current input (destruction limit), max.	5 V ; Permanent
permissible input voltage for voltage input (destruction limit), max.	30 V ; Permanent
permissible input current for voltage input (destruction limit), max.	0.5 mA ; Permanent
permissible input current for current input (destruction limit), max.	50 mA ; Permanent
Technical unit for temperature measurement adjustable	Yes ; Degrees Celsius / degrees Fahrenheit / Kelvin
<b>Input ranges</b>	
Voltage	Yes ; $\pm 10$ V / 100 k $\Omega$ ; 0 V to 10 V / 100 k $\Omega$
Current	Yes ; $\pm 20$ mA / 100 $\Omega$ ; 0 mA to 20 mA / 100 $\Omega$ ; 4 mA to 20 mA / 100 $\Omega$
Resistance thermometer	Yes ; Pt 100 / 10 M $\Omega$
Resistance	Yes ; 0 $\Omega$ to 600 $\Omega$ / 10 M $\Omega$
<b>Input ranges (rated values), voltages</b>	
0 to +10 V	Yes
Input resistance (0 to 10 V)	100 k $\Omega$
<b>Input ranges (rated values), currents</b>	
0 to 20 mA	Yes
Input resistance (0 to 20 mA)	100 $\Omega$

-20 to +20 mA	Yes
Input resistance (-20 to +20 mA)	100 $\Omega$
4 to 20 mA	Yes
Input resistance (4 to 20 mA)	100 $\Omega$
<b>Input ranges (rated values), resistance thermometers</b>	
Pt 100	Yes
Input resistance (Pt 100)	10 M $\Omega$
<b>Input ranges (rated values), resistors</b>	
No-Load voltage, typ.	3.3 V
Measured current, typ.	1.25 mA
0 to 600 ohms	Yes
Input resistance (0 to 600 ohms)	10 M $\Omega$
<b>Thermocouple (TC)</b>	
<b>Temperature compensation</b>	
Parameterizable	No
<b>Resistance thermometer (RTD)</b>	
<b>Characteristic linearization</b>	
for resistance thermometer	Pt 100
<b>Characteristic linearization</b>	
Parameterizable	Yes ; by software
<b>Cable length</b>	
Cable length, shielded, max.	100 m
<b>Analog outputs</b>	
Integrated channels (AO)	2
Number of analog outputs	2
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	55 mA
Current output, no-load voltage, max.	14 V
<b>Output ranges, voltage</b>	
0 to 10 V	Yes
-10 to +10 V	Yes
<b>Output ranges, current</b>	
0 to 20 mA	Yes

-20 to +20 mA	Yes
4 to 20 mA	Yes
<b>Connection of actuators</b>	
for voltage output 2-conductor connection	Yes ; Without compensation of the line resistances
for voltage output 4-conductor connection	No
for current output 2-conductor connection	Yes
<b>Load impedance (in rated range of output)</b>	
with voltage outputs, min.	1 k $\Omega$
with voltage outputs, capacitive load, max.	0.1 $\mu$ F
with current outputs, max.	300 $\Omega$
with current outputs, inductive load, max.	0.1 mH
<b>Destruction limits against externally applied voltages and currents</b>	
Voltages at the outputs towards MANA	16 V ; Permanent
Current, max.	50 mA ; Permanent
<b>Cable length</b>	
Cable length, shielded, max.	200 m
<b>Analog value creation</b>	
Measurement principle	Actual value encryption (successive approximation)
<b>Integrations and conversion time/ resolution per channel</b>	
Resolution with overrange (bit including sign), max.	12 bit
Integration time, parameterizable	Yes ; 16.6 / 20 ms
permissible input frequency, max.	400 Hz
Interference voltage suppression for interference frequency f1 in Hz	60 / 50 Hz
Conversion time (per channel)	1 ms
Time constant of the input filter	0.38 ms
Basic execution time of the module (all channels released)	1 ms
<b>Settling time</b>	
for resistive load	0.6 ms
for capacitive load	1 ms
for inductive load	0.5 ms
<b>Encoder</b>	

Connection of signal encoders	
for voltage measurement	Yes
for current measurement as 2-wire transducer	Yes ; with external supply
for current measurement as 4-wire transducer	Yes
for resistance measurement with 2-conductor connection	Yes ; Without compensation of the line resistances
for resistance measurement with 3-conductor connection	No
for resistance measurement with 4-conductor connection	No
Connectable encoders	
2-wire sensor	Yes
Permissible quiescent current (2-wire sensor), max.	1.5 mA
Errors/accuracies	
Temperature error (relative to input area)	+/- 0,006 %/K
Crosstalk between the inputs, min.	60 dB
Repeat accuracy in settled status at 25 °C (relative to input area)	+/- 0,06 %
Output ripple (based on output area, bandwidth 0 to 50 kHz)	+/- 0,1 %
Linearity error (relative to output area)	+/- 0,15 %
Temperature error (relative to output area)	+/- 0,01 %/K
Crosstalk between the outputs, min.	60 dB
Repeat accuracy in settled status at 25 °C (relative to output area)	+/- 0,06 %
Operational limit in overall temperature range	
Voltage, relative to input area	+/- 1 %
Current, relative to input area	+/- 1 %
Impedance, relative to input area	+/- 1 %
Voltage, relative to output area	+/- 1 %
Current, relative to output area	+/- 1 %
Basic error limit (operational limit at 25 °C)	
Voltage, relative to input area	+/- 0,8 % ; Linearity error +/- 0.06 %
Current, relative to input area	+/- 0,8 % ; Linearity error +/- 0.06 %

Impedance, relative to input area	+/- 0,8 % ; Linearity error +/- 0.2%
Resistance-type thermometer, relative to input area	+/- 0,8 %
Voltage, relative to output area	+/- 0,8 %
Current, relative to output area	+/- 0,8 %
<b>Interference voltage suppression for <math>f = n \times (f_l \pm 1\%)</math>, <math>f_l</math> = interference frequency</b>	
Series mode interference (peak value of interference < rated value of input range), min.	30 dB
Common mode interference, min.	40 dB
<b>Interfaces</b>	
Number of USB interfaces	0
Number of parallel interfaces	0
Number of 20 mA interfaces (TTY)	0
Number of RS 232 interfaces	0
Number of RS 422 interfaces	0
Number of other interfaces	0
<b>1st interface</b>	
Type of interface	Integrated RS 485 interface
Physics	RS 485
Isolated	No
Power supply to interface (15 to 30 V DC), max.	200 mA
<b>Functionality</b>	
MPI	Yes
DP master	No
DP slave	No
Point-to-point connection	No
<b>MPI</b>	
<b>Services</b>	
PG/OP communication	Yes
Routing	Yes
Global data communication	Yes
S7 basic communication	Yes
S7 communication	Yes ; Only server, configured on one side
S7 communication, as client	No ; but via CP and loadable FB

S7 communication, as server	Yes
Transmission rate, max.	187.5 kbit/s
<b>2nd interface</b>	
Type of interface	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA
<b>Functionality</b>	
MPI	No
DP master	Yes
DP slave	Yes
PROFINET IO Controller	No
PROFINET IO Device	No
PROFINET CBA	No
Local Operating Network	No
<b>DP master</b>	
<b>Services</b>	
PG/OP communication	Yes
Routing	Yes
Global data communication	No
S7 basic communication	Yes ; I blocks only
S7 communication	Yes ; Only server, configured on one side
S7 communication, as client	No
S7 communication, as server	Yes
Equidistance mode support	Yes
Isochronous mode	No
SYNC/FREEZE	Yes
Activation/deactivation of DP slaves	Yes
Number of DP slaves that can be simultaneously activated/deactivated, max.	8
Direct data exchange (slave-to-slave communication)	Yes ; As subscriber
DPV1	Yes
Transmission rate, max.	12 Mbit/s

Number of DP slaves, max.	124
<b>Address area</b>	
Inputs, max.	2 kbyte
Outputs, max.	2 kbyte
<b>User data per DP slave</b>	
Inputs, max.	244 byte
Outputs, max.	244 byte
<b>DP slave</b>	
<b>Services</b>	
PG/OP communication	Yes
Routing	Yes ; Only with active interface
Global data communication	No
S7 basic communication	No
S7 communication	Yes ; Only server, configured on one side
S7 communication, as client	No
S7 communication, as server	Yes
Direct data exchange (slave-to-slave communication)	Yes
DPV1	No
GSD file	The latest GSD file is available on the Internet ( <a href="http://www.siemens.com/profibus-gsd">http://www.siemens.com/profibus-gsd</a> )
Transmission rate, max.	12 Mbit/s
Automatic baud rate search	Yes ; only with passive interface
<b>Transfer memory</b>	
Inputs	244 byte
Outputs	244 byte
Address area, max.	32
User data per address area, max.	32 byte
<b>Communication functions</b>	
PG/OP communication	Yes
Data record routing	Yes
<b>Global data communication</b>	
supported	Yes
Number of GD loops, max.	8

Number of GD packets, max.	8
Number of GD packets, transmitter, max.	8
Number of GD packets, receiver, max.	8
Size of GD packets, max.	22 byte
Size of GD packet (of which consistent), max.	22 byte
<b>S7 basic communication</b>	
supported	Yes
User data per job, max.	76 byte
User data per job (of which consistent), max.	76 byte ; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)
<b>S7 communication</b>	
supported	Yes
as server	Yes
as client	Yes ; Via CP and loadable FB
User data per job, max.	180 kbyte ; With PUT/GET
User data per job (of which consistent), max.	240 byte ; as server
<b>S5-compatible communication</b>	
supported	Yes ; via CP and loadable FC
<b>Number of connections</b>	
overall	12
usable for PG communication	11
reserved for PG communication	1
Adjustable for PG communication, min.	1
Adjustable for PG communication, max.	11
usable for OP communication	11
reserved for OP communication	1
adjustable for OP communication, min.	1
adjustable for OP communication, max.	11
usable for S7 basic communication	8
Reserved for S7 basic communication	0
adjustable for S7 basic communication, min.	0
adjustable for S7 basic communication, max.	8
usable for routing	4 ; max.
<b>S7 message functions</b>	



Number of login stations for message functions, max.	12 ; Depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	300
<b>Test commissioning functions</b>	
<b>Status/control</b>	
Status/control variable	Yes
Variables	Inputs, outputs, memory bits, DB, times, counters
Number of variables, max.	30
of which status variables, max.	30
of which control variables, max.	14
<b>Forcing</b>	
Forcing	Yes
Force, variables	Inputs, outputs
Number of variables, max.	10
Status block	Yes ; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
<b>Diagnostic buffer</b>	
present	Yes
Number of entries, max.	500
adjustable	No
Of which powerfail-proof	100 ; Only the last 100 entries are retained
Number of entries readable in RUN, max.	499
adjustable	Yes ; From 10 to 499
preset	10
<b>Service data</b>	
Can be read out	Yes
<b>Interrupts/diagnostics/status information</b>	
<b>Diagnostics indication LED</b>	
Status indicator digital output (green)	Yes
Status indicator digital input (green)	Yes
<b>Integrated Functions</b>	
Number of counters	4 ; See "Technological Functions" manual

Counter frequency (counter) max.	60 kHz
Frequency measurement	Yes
Number of frequency meters	4 ; up to 60 kHz (see "Technological Functions" manual)
controlled positioning	Yes
Integrated function blocks (closed-loop control)	Yes ; PID controller (see "Technological Functions" manual)
PID controller	Yes
Number of pulse outputs	4 ; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)
Limit frequency (pulse)	2.5 kHz
<b>Galvanic isolation</b>	
<b>Galvanic isolation digital inputs</b>	
Galvanic isolation digital inputs	Yes
between the channels	No
between the channels and the backplane bus	Yes
<b>Galvanic isolation digital outputs</b>	
Galvanic isolation digital outputs	Yes
between the channels	Yes
between the channels, in groups of	8
between the channels and the backplane bus	Yes
<b>Galvanic isolation analog inputs</b>	
Galvanic isolation analog inputs	Yes ; common for analog I/O
between the channels	No
between the channels and the backplane bus	Yes
<b>Galvanic isolation analog outputs</b>	
Galvanic isolation analog outputs	Yes ; common for analog I/O
between the channels	No
between the channels and the backplane bus	Yes
<b>Permissible potential difference</b>	
between different circuits	75 VDC / 60 VAC
between inputs and MANA (UCM)	8.0 V DC
between MANA and M internally (UISO)	75 VDC / 60 VAC
<b>Isolation</b>	

Isolation checked with	600 V DC
<b>Ambient conditions</b>	
<b>Operating temperature</b>	
Min.	0 °C
max.	60 °C
<b>Configuration</b>	
<b>Configuration software</b>	
STEP 7 Lite	No
<b>programming</b>	
<b>Programming language</b>	
LAD	Yes
FBD	Yes
STL	Yes
SCL	Yes
CFC	Yes
GRAPH	Yes
HiGraph®	Yes
Command set	see instruction list
Nesting levels	8
<b>Software libraries</b>	
System functions (SFC)	see instruction list
System function blocks (SFB)	see instruction list
<b>Know-how protection</b>	
User program protection/password protection	Yes
Block encryption	Yes ; With S7 block Privacy
<b>Dimensions</b>	
Width	120 mm
Height	125 mm
Depth	130 mm
<b>Weight</b>	
Weight, approx.	680 g
Status	Jul 13, 2012