

# SIEMENS

## Product data sheet

**6ES7314-6BH04-0AB0**

SIMATIC S7-300,  
 CPU 314C-2 PTP COMPACT CPU WITH MPI,  
 24 DI/16 DO, 4AI, 2AO, 1 PT100,  
 4 FAST COUNTERS (60 KHZ),  
 INTEGRATED INTERFACE RS485,  
 INTEGRATED 24V DC POWER SUPPLY,  
 192 KBYTE WORKING MEMORY,  
 FRONT CONNECTOR (2 X 40PIN) AND MICRO  
 MEMORY CARD REQUIRED

Product version	
Hardware product version	01
Firmware version	V3.3
General information	
associated programming package	STEP7 as of V5.5 + SP1 or STEP 7 V5.3 + SP2 or higher with HSP 204
Supply voltage	
Input 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
Digital inputs	
Load voltage L+	
Rated value (DC)	24 V
Reverse polarity protection	Yes
Digital outputs	
Load voltage L+	
Rated value (DC)	24 V
Reverse polarity protection	No
Input current	

Current consumption (rated value)	660 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 Kibyte
expandable	No
Size of retentive memory for retentive data blocks	64 Kibyte
<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-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 Kibyte
<b>FB</b>	
Number, max.	1024 ; Number range: 0 to 7999
Size, max.	64 Kibyte
<b>FC</b>	
Number, max.	1024 ; Number range: 0 to 7999

Size, max.	64 Kibyte
<b>OB</b>	
Description	See instruction list
Size, max.	64 Kibyte
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 alarm OBs	4 ; OB 32, 33, 34, 35
Number of process alarm OBs	1 ; OB 40
Number of startup OBs	1 ; OB 100
Number of asynchronous error OBs	4 ; OB 80, 82, 85, 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>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>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
Number	256
<b>Retentivity</b>	
can be set	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>	
can be set	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 Kibyte
Retentivity adjustable	Yes ; via non-retain property on DB
Retentivity preset	yes
<b>Local data</b>	
per priority class, max.	32 Kibyte ; 2048 bytes max. per block
<b>Address area</b>	
<b>I/O address area</b>	
Inputs	1024 byte

Outputs	1024 byte
of which, distributed	
Inputs	none
Outputs	none
<b>Process image</b>	
Inputs	1024 byte
Outputs	1024 byte
Inputs, adjustable	1024 byte
Outputs, adjustable	1024 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>	
integrated channels (DI)	24
integrated channels (DO)	16
Inputs	1016
Outputs	1008
Inputs, of which central	1016
Outputs, of which central	1008
<b>Analog channels</b>	
Integrated channels (AI)	5 ; 4 x current/voltage, 1 x resistance
Integrated channels (AO)	2
Inputs	253
Outputs	250
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	none
via CP	4
<b>Number of operable FMs and CPs (recommended)</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	The clock continues at the time of day it had when power was switched off
<b>Runtime meter</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
in AS, master	Yes
in AS, slave	No
<b>Digital inputs</b>	
Number of digital inputs	24
of which, inputs usable for technological functions	16
<b>Number of simultaneously controllable inputs</b>	
horizontal installation	

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
Input characteristic curve acc. to IEC 1131, Type 1	Yes
<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 of digital outputs	16
of which high-speed outputs	4 ; Notice: You cannot connect the fast outputs of your CPU in parallel

Short-circuit protection	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>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>	
<b>horizontal installation</b>	
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>Load resistance range</b>	
lower limit	48 Ω
upper limit	4 kΩ
<b>Cable length</b>	
Cable length, shielded, max.	1000 m
Cable length unshielded, max.	600 m



Analog inputs	
Number of analog inputs for voltage/current measurement	4
Number of analog inputs for resistance/temperature measurement	1
Cable length, shielded, max.	100 m
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
Input ranges	
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 $\Omega$
Input ranges (rated values), voltages	
0 to +10 V	Yes
Input resistance (0 to 10 V)	100 k $\Omega$
Input ranges (rated values), currents	
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 $\Omega$
Input ranges (rated values), resistance thermometers	
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>Resistance thermometer (RTD)</b>	
<b>Characteristic linearization</b>	
for resistance thermometer	Pt 100
<b>Characteristic linearization</b>	
parameterizable	Yes ; by software
<b>Temperature compensation</b>	
Parameterizable	No
<b>Analog outputs</b>	
Number of analog outputs	2
Cable length, shielded, max.	200 m
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>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>	
<b>Connection of signal encoders</b>	
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
<b>Connectable encoders</b>	
2-wire BEROs	Yes

permissible quiescent current (2-wire BEROS), max.	1.5 mA
<b>Errors/accuracies</b>	
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 %
<b>Operational limit in overall temperature range</b>	
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 %
<b>Basic error limit (operational limit at 25 °C)</b>	
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 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 hardware interfaces	0
<b>Point-to-point</b>	
Cable length, max.	1200 m
<b>Integrated protocol driver</b>	
3964 (R)	Yes
ASCII	Yes
RK512	Yes
<b>Transmission speed, RS 422/485</b>	
with 3964 (R) protocol, max.	19.2 kbit/s ; 38.4 Kbit/s half duplex; 19.2 Kbit/s full duplex
with ASCII protocol, max.	19.2 kbit/s ; 38.4 kbit/s half duplex; 19.2 kbit/s full duplex
with RK 512 protocol, max.	19.2 kbit/s ; 38.4 Kbit/s half duplex; 19.2 Kbit/s full duplex
<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	No
Global data communication	Yes
S7 basic communication	Yes
S7 communication	Yes ; Only server, configured on one side only
S7 communication, as client	No ; (but via CP and loadable FBs)

S7 communication, as server	Yes
Transmission rate, max.	187.5 kbit/s
<b>2nd interface</b>	
Type of interface	integrated RS 422/ 485 interface
Physics	RS 422/RS 485 (X.27)
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	No
<b>Functionality</b>	
MPI	No
DP master	No
DP slave	No
PROFINET IO Controller	No
PROFINET IO Device	No
PROFINET CBA	No
Local Operating Network	Yes
<b>Point-to-point connection</b>	
Transmission rate, max.	19.2 kbit/s ; 38.4 kbit/s half duplex; 19.2 kbit/s full duplex
Cable length, max.	1200 m
interface from the user program controllable	Yes
Interface can trigger alarm/interrupt in the user program	Yes ; Message on break - identification
Protocol driver	3964 (R); ASCII and RK 512
<b>Communication functions</b>	
PG/OP communication	Yes
Data record routing	No
<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

S7 basic communication	
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)
S7 communication	
supported	Yes
as server	Yes
as client	Yes ; via CP and loadable FB
User data per job, max.	180 Kibyte ; With PUT/GET
User data per job (of which consistent), max.	240 byte ; as server
S5-compatible communication	
supported	Yes ; via CP and loadable FC
Number of connections	
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
S7 message functions	
Number of login stations for message functions, max.	12 ; Depending on the connections configured for PG/OP and S7 basic communication
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	300
Test commissioning functions	
Status/control	

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
can be set	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 V DC/60 V AC
<b>Isolation</b>	
Isolation checked with	600 VDC
<b>Ambient conditions</b>	
<b>Operating temperature</b>	
Min.	0 °C
max.	60 °C

<b>Configuration</b>	
<b>Configuration software</b>	
STEP 7	Yes ; STEP7 as of V5.5 + SP1 or STEP 7 V5.3 + SP2 or higher with HSP 204
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 and weight</b>	
<b>Dimensions</b>	
Width	120 mm
Height	125 mm
Depth	130 mm
<b>Weight</b>	
Weight, approx.	680 g
Status	May 23, 2011