SIEMENS

Data sheet

6ES7312-5BF04-0AB0



SIMATIC S7-300, CPU 312C Compact CPU with MPI, 10 DI/6 DQ, 2 high-speed counters (10 kHz) Integr. power supply 24 V DC, work memory 64 KB, Front connector (1x 40-pole) and Micro Memory Card required

General information	
HW functional status	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
Supply voltage	
Rated value (DC)	
• 24 V DC	Yes
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
external protection for power supply lines (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
Load voltage L+	
Digital outputs	
— Rated value (DC)	24 V

— Reverse polarity protection	No
Input current	
Current consumption (rated value)	570 mA
Current consumption (in no-load operation), typ.	90 mA
Inrush current, typ.	5 A
l²t	0.7 A ² ·s
Digital outputs	
 from load voltage L+, max. 	25 mA
Power loss	
Power loss, typ.	8 W
Memory	
Work memory	
 integrated 	64 kbyte
• expandable	No
 Size of retentive memory for retentive data blocks 	64 kbyte
Load memory	
• Plug-in (MMC)	Yes
• Plug-in (MMC), max.	8 Mbyte
 Data management on MMC (after last programming), min. 	10 у
Backup	
• present	Yes; Guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data
CPU processing times	
for bit operations, typ.	0.1 µs
for word operations, typ.	0.24 µs
for fixed point arithmetic, typ.	0.32 µs
for floating point arithmetic, typ.	1.1 µs
CPU-blocks	
Number of blocks (total)	1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
DB	
● Number, max.	1 024; Number range: 1 to 16000
● Size, max.	64 kbyte
FB	
● Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
FC	
● Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte

OB	
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 cyclic interrupt 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
Nesting depth	
 per priority class 	16
 additional within an error OB 	4
Counters, timers and their retentivity S7 counter	
Number	256
	250
Retentivity — adjustable	Yes
— lower limit	0
	255
— upper limit	Z 0 to Z 7
— preset	
Counting range — lower limit	0
	999
— upper limit IEC counter	333
Number	Unlimited (limited only by RAM capacity)
S7 times	
Number	256
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	255
— preset	No retentivity
Time range	· · · · · · · · · · · · · · · · · · ·
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
● present	Yes
• Туре	SFB
• Number	Unlimited (limited only by RAM capacity)

Data areas and their retentivity	
retentive data area in total	All, max. 64 KB
Flag	
• 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
Data blocks	
 Retentivity adjustable 	Yes; via non-retain property on DB
 Retentivity preset 	Yes
Local data	
 per priority class, max. 	32 kbyte; Max. 2048 bytes per block
Address area	
I/O address area	
Inputs	1 024 byte
Outputs	1 024 byte
of which distributed	
— Inputs	none
— Outputs	none
Process image	
Inputs	1 024 byte
Outputs	1 024 byte
 Inputs, adjustable 	1 024 byte
 Outputs, adjustable 	1 024 byte
 Inputs, default 	128 byte
• Outputs, default	128 byte
Default addresses of the integrated channels	
— Digital inputs	124.0 to 125.1
— Digital outputs	124.0 to 124.5
Digital channels	
Inputs	266
— of which central	266
Outputs	262
— of which central	262
Analog channels	
Inputs	64
— of which central	64
Outputs	64
— of which central	64
Hardware configuration	
Number of expansion units, max.	0

• integratednone• via CP4Number of operable FMs and CPs (recommended)• FM8• CP, PIP8• CP, LAN8Rack7• Racks, max.1• Modules per rack, max.8• Modules per rack, max.8• ColockYes• Software clockYes• retentive and synchronizableNo; Buffered: No, Can be synchronized: Yes• Deviation per day, max.10 s; Typ: 2 s• Behavior of the clock following POWER-ONThe clock continues at the time of day it had when power was switched offOperating hours counter0• Number1• Number range0• Range of values0 to 2^V31 hours (when using SFC 101)• retentiveYes• supportedYes• supportedYes• to MPI, masterYes• to MPI, slaveYes• in AS, masterYes• in AS, slaveYes• in AS, masterYes• in AS, slaveYes• in AS, slaveYes<	Number of DP masters	
• via CP4Numeer of operable FMs and CPs (recommended)• FM8• CP, IAN4Rack4Racks, max.1• Modules per rack, max.8• Modules per rack, max.1• Software clockVes• Enter of day10 or Typ. 2 s• Enter of dayThe clock continues at the time of day it had when power was switched off• Deviation per day, max.10 or Typ. 2 s• Behavior of the clock following POWER-ONThe clock continues at the time of day it had when power was switched off• Number1• Number1• Number1• Software clockVes• Range of values0 to 2*31 hours (when using SFC 101)• retentiveYes• Software of digital inputsYes• In AS, masterVes• In AS, masterVes• In AS, master10• In AS, siave10• Interactive in accordance with IEC of which inputs usable for technological functions10• In AS, master10• In AS, master10• In AS, masterYes• In AS, master10• In AS, masterYes• In AS, master10• In Apati DistallationYes• In		none
Number of operable FMs and CPs (recommended) 8 FM 8 • CP, PIP 8 • CP, LAN 4 Rack 1 • Racks, max. 1 • Modules per rack, max. 8 Time of day 5 Clock Ves • retentive and synchronizable No; Bufferd: No, Can be synchronized: Yes • Deviation per day, max. 10 s; Typ.: 2 s • Eehavior of the clock following POWER-ON switched off Operating hours counter 1 • Number 1 • Number fold values 0 to 2^31 hours (when using SFC 101) • etentive Yes; Must be restarted at each restart Clock synchronization Yes • upoported Yes • to MPI, stave Yes • to MPI, stave Yes • in AS, master 10 • of which inputs usable for technological functions 10 • in AS, stave 10 • of which insultation Yes • in AS, stave 10 • of which i		
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• Modules per rack, max. 8 Time of day Ves • Software clock Yes • Software clock No; Bufferd: No, Can be synchronized: Yes • Deviation per day, max. 10 s; Typ: 2 s • Behavior of the clock following POWER-ON The clock continues at the time of day it had when power was switched off Operating hours counter 1 • Number 1 • Number 0 • Range of values 0 • Range of values 0 to 2^31 hours (when using SFC 101) • referitive Yes; Must be restarted at each restart Clock synchronization Yes • supported Yes • to MPI, master Yes • to MPI, slave Yes • in AS, master Yes • of which inputs usable for technological functions 8 • of which inputs usable for technological functions 1 • of which inputs usable for technological functions 1 • of which inputs usable for technological functions 1 • of which inputs usable for technological functions 1 • tot which inputs usab	• Racks, max.	1
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Clock Yes • Software clock Yes • retentive and synchronizable No; Buffered: No, Can be synchronized: Yes • Deviation per day, max. 10 s; Typ: 2 s • Behavior of the clock following POWER-ON The clock continues at the time of day it had when power was switched off Operating hours counter 1 • Number 1 • Number for the clock following POWER-ON 1 • Number of the clock following POWER-ON 1 • Number counter 1 • Number for the clock following POWER-ON 1 • Number of dues 0 • Range of values 0 • retentive Yes; Must be restarted at each restart Clock synchronization Yes • to MPI, master Yes • to MPI, slave Yes • in AS, master Yes • in AS, slave No Digital inputs 10 • of which inputs usable for technological functions 10 integrated channels (DI) 10 Input characteristic curve in accordance with IEC 61131, type 1 10		
Software clockYes• retentive and synchronizableNo; Buffered: No, Can be synchronized: Yes• Deviation per day, max.10 s; Typ: 2 s• Behavior of the clock following POWER-ONThe clock continues at the time of day it had when power was switched offOperating hours counter1• Number1• Number/Number range0• Range of values0 to 2°31 hours (when using SFC 101) Yes; Must be restarted at each restart• Clock synchronizationYes• supportedYes• to MPI, masterYes• to MPI, slaveYes• in AS, masterYes• in AS, slave10Ord which inputs usable for technological functions10Integrated channels (DI)10Integrated channels (DI)10Input characteristic curve in accordance with IEC 61131 type 110• number of simultaneously controllable inputsYes• number of simultaneously controllable inputs10• number of simultaneously controllable inputs10• number of simultaneously controllable inputs10• up to 40 °C, max.10• up to 60 °C, max.5• vertical installation5• up to 40 °C, max.5		
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horizontal installation - up to 40 °C, max. 10 - up to 60 °C, max. 5 vertical installation - up to 40 °C, max. 5	-	Yes
	Number of simultaneously controllable inputs	
	horizontal installation	
vertical installation — up to 40 °C, max. 5	— up to 40 °C, max.	10
— up to 40 °C, max. 5	— up to 60 °C, max.	5
	vertical installation	
Input voltage	— up to 40 °C, max.	5
	Input voltage	

• Rated value (DC)	24 V
● for signal "0"	-3 to +5V
● for signal "1"	+15 to +30V
Input current	
● for signal "1", typ.	8 mA
Input delay (for rated value of input voltage)	
for standard inputs	
— 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
for counter/technological functions	
— at "0" to "1", max.	48 μs; Minimum pulse width/minimum pause between pulses at maximum counting frequency
Cable length	
• shielded, max.	1 000 m; 100 m for technological functions
• unshielded, max.	600 m; For technological functions: No
for technological functions	
— shielded, max.	100 m; at maximum count frequency
— unshielded, max.	not allowed
Digital outputs	
Number of digital outputs	6
 of which high-speed outputs 	2; Notice: You cannot connect the fast outputs of your CPU in parallel
integrated channels (DO)	6
Short-circuit protection	
	Yes; Clocked electronically
Response threshold, typ.	Yes; Clocked electronically 1 A
Response threshold, typ. Limitation of inductive shutdown voltage to	
	1 A
Limitation of inductive shutdown voltage to	1 A L+ (-48 V)
Limitation of inductive shutdown voltage to Controlling a digital input	1 A L+ (-48 V)
Limitation of inductive shutdown voltage to Controlling a digital input Switching capacity of the outputs	1 A L+ (-48 V) Yes
Limitation of inductive shutdown voltage to Controlling a digital input Switching capacity of the outputs • on lamp load, max.	1 A L+ (-48 V) Yes
Limitation of inductive shutdown voltage to Controlling a digital input Switching capacity of the outputs • on lamp load, max. Load resistance range	1 A L+ (-48 V) Yes 5 W
Limitation of inductive shutdown voltage to Controlling a digital input Switching capacity of the outputs • on lamp load, max. Load resistance range • lower limit	1 A L+ (-48 V) Yes 5 W 48 Ω 48 Ω
Limitation of inductive shutdown voltage to Controlling a digital input Switching capacity of the outputs • on lamp load, max. Load resistance range • lower limit • upper limit	1 A L+ (-48 V) Yes 5 W 48 Ω
Limitation of inductive shutdown voltage to Controlling a digital input Switching capacity of the outputs • on lamp load, max. Load resistance range • lower limit • upper limit Output voltage	1 A L+ (-48 V) Yes 5 W 48 Ω 48 Ω
Limitation of inductive shutdown voltage to Controlling a digital input Switching capacity of the outputs • on lamp load, max. Load resistance range • lower limit • upper limit Output voltage • for signal "1", min.	1 A L+ (-48 V) Yes 5 W 48 Ω 48 Ω
Limitation of inductive shutdown voltage to Controlling a digital input Switching capacity of the outputs • on lamp load, max. Load resistance range • lower limit • upper limit Output voltage • for signal "1", min. Output current	1 A L+ (-48 V) Yes 5 W 48 Ω 48 Ω L+ (-0.8 V)
Limitation of inductive shutdown voltage to Controlling a digital input Switching capacity of the outputs • on lamp load, max. Load resistance range • lower limit • upper limit Output voltage • for signal "1", min. Output current • for signal "1" rated value	1 A L+ (-48 V) Yes 5 W 48 Ω 48 Ω L+ (-0.8 V) L+ (-0.8 V) 500 mA
Limitation of inductive shutdown voltage to Controlling a digital input Switching capacity of the outputs • on lamp load, max. Load resistance range • lower limit • upper limit Output voltage • for signal "1", min. Output current • for signal "1" rated value • for signal "1" permissible range, min.	1 A L+ (-48 V) Yes 5 W 48 Ω 48 Ω L+ (-0.8 V) L+ (-0.8 V) 500 mA 5 mA

	0.5 mA
• for signal "0" residual current, max.	0.5 IIIA
Parallel switching of two outputs	
• for uprating	No
 for redundant control of a load 	Yes
Switching frequency	
 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
Total current of the outputs (per group)	
horizontal installation	
— up to 40 °C, max.	2 A
— up to 60 °C, max.	1.5 A
vertical installation	
— up to 40 °C, max.	1.5 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Analog inputs	
Number of analog inputs	0
integrated channels (AI)	0
Analog outputs	
Number of analog outputs	0
integrated channels (AO)	0
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
— permissible quiescent current (2-wire	1.5 mA
sensor), max.	
Interfaces	
Number of industrial Ethernet interfaces	0
Number of PROFINET interfaces	0
Number of RS 485 interfaces	1; MPI
Number of RS 422 interfaces	0
1. Interface	Integrated DS 485 interface
Interface type	Integrated RS 485 interface RS 485
Physics Isolated	No
Power supply to interface (15 to 30 V DC), max.	200 mA
Functionality	

• MPI	Yes
PROFIBUS DP master	No
PROFIBUS DP slave	No
 Point-to-point connection 	No
MPI	
• Transmission rate, max.	187.5 kbit/s
Services	
— PG/OP communication	Yes
— Routing	No
— 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
Communication functions	
PG/OP communication	Yes
Data record routing	No
Global data communication	
• 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 byte; (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	6
 usable for PG communication 	5

— reserved for PG communication	1
 adjustable for PG communication, min. 	1
 adjustable for PG communication, max. 	5
 usable for OP communication 	5
 reserved for OP communication 	1
 adjustable for OP communication, min. 	1
 adjustable for OP communication, max. 	5
 usable for S7 basic communication 	2
- reserved for S7 basic communication	0
— adjustable for S7 basic communication,	0
min.	
 — adjustable for S7 basic communication, 	2
max.	
S7 message functions	
Number of login stations for message functions, max.	6; Depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	300
Test commissioning functions	
Status block	Yes; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
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
Forcing	
• Forcing	Yes
 Forcing, variables 	Inputs, outputs
 Number of variables, max. 	10
Diagnostic buffer	
• 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
— can be set	Yes; From 10 to 499
— preset	10
Service data	

• can be read out	Yes
Interrupts/diagnostics/status information	
Diagnostics indication LED	
 Status indicator digital input (green) 	Yes
 Status indicator digital output (green) 	Yes
Integrated Functions Number of counters	2; See "Technological Functions" manual
Counting frequency (counter) max.	10 kHz
Frequency measurement	Yes
Number of frequency meters	2; up to 10 kHz (see "Technological Functions" manual)
controlled positioning	No
integrated function blocks (closed-loop control)	No
PID controller	No
Number of pulse outputs	2; Pulse width modulation up to 2.5 kHz (see "Technological
Number of pulse outputs	Functions" Manual)
Limit frequency (pulse)	2.5 kHz
Potential separation	
Potential separation digital inputs	
 Potential separation digital inputs 	Yes
between the channels	No
 between the channels and backplane bus 	Yes
Potential separation digital outputs	
Potential separation digital outputs	Yes
between the channels	No
	Yes
 between the channels and backplane bus 	1 65
Isolation	
Isolation tested with	600 V DC
Ambient conditions	
Ambient temperature during operation	
● min.	0 °C
• max.	60 °C
Configuration	
Configuration software	
• STEP 7	Yes; STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203
• STEP 7 Lite	No
Programming	
Command set	see instruction list
Nesting levels	8
System functions (SFC)	see instruction list
,	

 System function blocks (SFB) 	see instruction list
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— GRAPH	Yes
— HiGraph®	Yes
Know-how protection	
 User program protection/password protection 	Yes
 Block encryption 	Yes; With S7 block Privacy
Dimensions	
Width	80 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	410 g
last modified:	04/19/2018