

CPU 313C-2 DP



Function

- Password protection;
a password concept protects the user program from unauthorized access.
- Block encryption;
the functions (FCs) and function blocks (FBs) can be stored in the CPU in encrypted form by means of S7-Block Privacy to protect the know-how of the application.
- Diagnostics buffer;
the last 500 error and interrupt events are stored in a buffer for diagnostic purposes, of which 100 are stored retentively.
- Maintenance-free data backup;
the CPU automatically saves all data (up to 64 KB) in case of a power failure so that the data are available again unchanged when the power returns.

Parameterizable properties

The S7 configuration as well as the properties and response of the CPUs can be parameterized using STEP 7:

- General;
definition of the name, system ID and location ID
- MPI multi-point interface;
determining station addresses
- Startup;
definition of the startup characteristics of the CPU and the monitoring time
- Cycle/clock memory;
specification of the maximum cycle time and load. Setting of the clock memory address.
- Retentivity;
definition of the number of retentive bit memories, counters, timers and data blocks
- Time-of-day interrupts;
setting of start date, start time and periodicity
- Cyclic interrupts;
setting of periodicity
- System diagnostics;
determining handling and scope of the diagnostic messages
- Clock;
setting the type of synchronization in the AS or on the MPI
- Protection level;
specifying the access rights to program and data
- Communication;
reservation of connection resources
- PROFIBUS DP master/slave interface;

- user-oriented address allocation for distributed I/O. Parameterizing the operating mode and configuring the transfer areas in the case of PROFIBUS DP. Parameterizing the time synchronization
- Digital inputs/outputs;
setting of addresses, input delay and process interrupt
- Integrated function "counting";
setting the addresses, parameter assignment of the modes "continuous counting", "single counting", "periodic counting", "frequency measurement" and "pulse width modulation"
- Integrated "Rules" function

Display and information functions

- Status and error indications;
LEDs indicate e.g. hardware, programming, time or I/O errors, as well as operating states such as RUN, STOP and start-up.
- Test functions;
the PG is used to indicate signal states during program execution, to modify process variables independently of the user program and to output the contents of stack memories.
- Information functions;
you can use the PG to obtain information about the storage capacity and operating mode of the CPU as well as the current loading of the main and load memories as well as current cycle times and diagnostic buffer contents in plain text.

Integrated communication functions

- PG/OP communication
- Global data communication
- S7 basic communication
- S7 communication (server only)
- Routing
- Data record routing

Integrated functions

- Counters;
3 counters (up to 30 kHz) with directionally-dependent comparators and to directly connect 24 V incremental encoders
- 3 channels for frequency measurement;
frequency measurement (up to max. 30 kHz) enables, for example, speed measurement of a shaft with speed range monitoring or throughput measuring (parts per measuring time) with range monitoring.
- Period measurement;
3 channels. The period duration of the counting signal can be measured up to a counting frequency of 1 kHz.
- Pulse width modulation;
3 outputs for direct control of valves, final controlling elements, switching devices, heating equipment, etc., switching frequency 2.5 kHz. The period length can be set and the pulse-pause ratio can be changed while running.
- Alarm inputs (all digital inputs);
the alarm inputs enable the detection of process events as well as the rapid triggering of responses.

Technical specifications

Technical specifications

6ES7 313-6CG04-0AB0	
Product version	
Hardware product version	01
Firmware version	V3.3
General information	
associated programming package	STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203
Supply voltage	
24 V DC	Yes
Input current	
Current consumption (rated value)	800 mA
Current consumption (in no-load operation), typ.	110 mA
Inrush current, typ.	5 A
I^2t	0.7 A ² .s
Power losses	
Power loss, typ.	9 W
Memory	

Work memory	
•integrated	128 Kibyte
•expandable	No
•Size of retentive memory for retentive data blocks	64 Kibyte
Load memory	
•pluggable (MMC)	Yes
•pluggable (MMC), max.	8 Mbyte
•Data management on MMC (after last programming), min.	10 a
Backup	
•present	Yes; Guaranteed by MMC (maintenance-free)
•without battery	Yes; Program and data
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 Kibyte
FB	
•Number, max.	1 024; Number range: 0 to 7999
•Size, max.	64 Kibyte

FC	
•Number, max.	1 024; Number range: 0 to 7999
•Size, max.	64 Kibyte
OB	
•Size, max.	64 Kibyte
Nesting depth	
•per priority class	16
•additional within an error OB	4
CPU processing times	
for bit operations, min.	0.07 μ s
for word operations, min.	0.15 μ s
for fixed point arithmetic, min.	0.2 μ s
for floating point arithmetic, min.	0.72 μ s
Counters, timers and their retentivity	
S7 counter	
•Number	256
•Retentivity	Yes
• adjustable	0
• lower limit	
• upper limit	255

- preset
- Counting range
 - lower limit
 - upper limit

Z 0 to Z 7

0

999

IEC counter

- present
- Type
- Number

Yes

SFB

Unlimited (limited only by RAM capacity)

S7 times

- Number
- Retentivity

256

Yes

- adjustable
- lower limit
- upper limit

0

255

No retentivity

- preset
- Time range

10 ms

<ul style="list-style-type: none"> • lower limit 	9 990 s
<ul style="list-style-type: none"> • upper limit 	
IEC timer	
•present	Yes
•Type	SFB
•Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
retentive data area, 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 Kibyte; Max. 2048 bytes per block
Address area	
I/O address area	
•Inputs	2 048 byte
•Outputs	2 048 byte
•of which, distributed	

<ul style="list-style-type: none"> Inputs 	2 030 byte
<ul style="list-style-type: none"> Outputs 	2 030 byte
Process image	
•Inputs, adjustable	2 048 byte
•Outputs, adjustable	2 048 byte
•Inputs, default	128 byte
•Outputs, default	128 byte
•Default addresses of the integrated channels	
<ul style="list-style-type: none"> Digital inputs 	124.0 to 125.7
<ul style="list-style-type: none"> Digital outputs 	124.0 to 125.7
Digital channels	
•integrated channels (DI)	16
•integrated channels (DO)	16
•Inputs	16 256
•Outputs	16 256
•Inputs, of which central	1 008
•Outputs, of which central	1 008
Analog channels	
•Integrated channels (AI)	0

•Integrated channels (AO)	0
•Inputs	1 015
•Outputs	1 015
•Inputs, of which central	248
•Outputs, of which central	248
Hardware configuration	
Racks, max.	4
Modules per rack, max.	8; In rack 3 max. 7
Expansion devices, max.	3
Number of DP masters	
•integrated	1
•via CP	4
Number of operable FMs and CPs (recommended)	
•FM	8
•CP, point-to-point	8
•CP, LAN	6
Time of day	
Clock	
•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-	Clock continues running after POWER OFF

ON	
•Behavior of the clock following expiry of backup period	Clock continues to run with the time at which the power failure occurred
Operating hours counter	
•Number	1
•Number/Number range	0
•Range of values	0 to 2 ³¹ hours (when using SFC 101)
•Granularity	1 hour
•retentive	Yes; Must be restarted at each restart
Clock synchronization	
•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
Digital inputs	
Number/binary inputs	16
•of which, inputs usable for technological functions	12
Input characteristic curve acc. to IEC 1131, Type 1	Yes
Number of simultaneously controllable	

Number of simultaneously controllable inputs

•horizontal installation

- up to 40 °C, max.
- up to 60 °C, max.

•vertical installation

- up to 40 °C, max.

•Technological functions

- shielded, max.
- Unshielded, max.

•Standard DI

- shielded, max.
- Unshielded, max.

Input voltage

•Rated value, DC

•for signal "0"

•for signal "1"

16

8

8

100 m; at maximum count frequency

not allowed

1 000 m

600 m

24 V

-3 to +5 V

15 to 30 V

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 •for counter/technological functions • at "0" to "1", max.	3 ms
Cable length •Cable length, shielded, max. •Cable length unshielded, max.	16 μ s; Minimum pulse width/minimum pause between pulses at maximum counting frequency
Digital outputs Number/binary outputs •of which high-speed outputs	1 000 m; 100 m for technological functions 600 m; For technological functions: No
	16
	4; Notice: You cannot connect the fast outputs of your CPU in parallel

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
Output voltage	
•for signal "1", min.	L+ (-0.8 V)
Output current	
•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
Parallel switching of 2 outputs	
•for increased power	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
Aggregate current of outputs (per group)	
•horizontal installation	

<ul style="list-style-type: none"> • up to 40 °C, max. 	3 A
<ul style="list-style-type: none"> • up to 60 °C, max. 	2 A
•vertical installation	
<ul style="list-style-type: none"> • up to 40 °C, max. 	2 A
Load resistance range	
•lower limit	48 Ω
•upper limit	4 kΩ
Cable length	
•Cable length, shielded, max.	1 000 m
•Cable length unshielded, max.	600 m
Encoder	
Connectable encoders	
•2-wire BEROS	Yes
	1.5 mA
<ul style="list-style-type: none"> • permissible quiescent current (2-wire BEROS), max. 	
Interfaces	
Number of USB interfaces	0
1st interface	
Type of interface	Integrated RS 485 interface
Physics	RS 485

Isolated	No
Power supply to interface (15 to 30 V DC), max.	200 mA
Functionality	
•MPI	Yes
•DP master	No
•DP slave	No
•Point-to-point connection	No
MPI	
•Services	
• 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 FBs)
• S7 communication, as server	Yes

•Transmission rate, max.	187.5 kbit/s
2nd interface	
Type of interface	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA
Functionality	
•MPI	No
•DP master	Yes
•DP slave	Yes
•PROFINET IO Controller	No
•PROFINET IO Device	No
•PROFINET CBA	No
DP master	
•Services	Yes
• PG/OP communication	No
• Global data communication	Yes; I blocks only
• S7 basic communication	Yes; Yes (only server; connection configured at one end)
• S7 communication	

• 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
•Address area	

<ul style="list-style-type: none"> Inputs, max. 	2 Kibyte
<ul style="list-style-type: none"> Outputs, max. 	2 Kibyte
• User data per DP slave	
<ul style="list-style-type: none"> Inputs, max. 	244 byte
<ul style="list-style-type: none"> Outputs, max. 	244 byte
DP slave	
• Services	
<ul style="list-style-type: none"> PG/OP communication 	Yes
<ul style="list-style-type: none"> Global data communication 	No
<ul style="list-style-type: none"> S7 basic communication 	No
<ul style="list-style-type: none"> S7 communication 	Yes; Yes (only server; connection configured at one end)
<ul style="list-style-type: none"> S7 communication, as client 	No
<ul style="list-style-type: none"> S7 communication, as server 	Yes
	Yes

<ul style="list-style-type: none"> • Direct data exchange (slave-to-slave communication) 	No
<ul style="list-style-type: none"> • DPV1 	
•GSD file	The latest GSD file is available on the Internet (http://www.siemens.com/profibus-gsd)
•Transmission rate, max.	12 Mbit/s
•Automatic baud rate search	Yes; only with passive interface
•Transfer memory	
	244 byte
<ul style="list-style-type: none"> • Inputs 	
	244 byte
<ul style="list-style-type: none"> • Outputs 	
•Address area, max.	32
•User data per address area, max.	32 byte
Communication functions	
PG/OP communication	Yes
Data record routing	Yes
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 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	
•usable for routing	4; max.
S7 message functions	
Number of login stations for message functions, max.	8; 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/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
•Force, variables	Inputs, outputs
•Number of variables, max.	10
Status block	Yes; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
Diagnostic buffer	
•present	Yes
•Number of entries, max.	500
	No
• adjustable	
	100; Only the last 100 entries are retained
• Of which powerfail-proof	

•Number of entries readable in RUN, max.	499
• adjustable	Yes; From 10 to 499
• preset	10
Integrated Functions	
Number of counters	3; See "Technological Functions" manual
Counter frequency (counter) max.	30 kHz
Frequency measurement	Yes
Number of frequency meters	3; up to 30 kHz (see "Technological Functions" manual)
controlled positioning	No
Integrated function blocks (closed-loop control)	Yes; PID controller (see "Technological Functions" manual)
PID controller	Yes
Number of pulse outputs	3; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)
Limit frequency (pulse)	2.5 kHz
Galvanic isolation	
Galvanic isolation digital inputs	
•Galvanic isolation digital inputs	Yes
•between the channels	No
•between the channels and the backplane bus	Yes

Galvanic isolation digital outputs	
•Galvanic isolation digital outputs	Yes
•between the channels	Yes
•between the channels, in groups of	8
•between the channels and the backplane bus	Yes
Permissible potential difference	
between different circuits	75 VDC / 60 VAC
Isolation	
Isolation checked with	600 V DC
Ambient conditions	
Operating temperature	
•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	
•Programming language	
• LAD	Yes

• FBD	Yes
• STL	Yes
• SCL	Yes
• CFC	Yes
• GRAPH	Yes
• HiGraph®	Yes
•Command set	see instruction list
•Nesting levels	8
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
Weight	
Weight, approx.	500 g