MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6ES7313-6BE01-0AB0

CPU 313C-2 PTP COMPACT CONTROLLER

Used with the applicable SIMATIC S7-300 CPU 313C-2 PtP configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens S7-300 CPU Data A5E00105475-02, September 2002; CPU 313C-2 PtP column, not DP-column data.

Purpose of this manual

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Purpose of this manual

This manual contains all the information you will need concerning the structure, communication functions, memory concept, cycle, response times and the technical data for the CPUs. You will then learn the points to consider when upgrading to one of the CPUs discussed in this manual.

Basic knowledge required

To understand this manual, you will need a general knowledge of automation control engineering. backed up by a knowledge of the STEP 7 basic software. You may find it useful to read the *Programming with STEP 7 V5.1* manual first.

Applicability of this manual

This manual applies to the following CPUs with the following hardware and software versions:

CPU	Convention: In this manual, the CPUs are designated as follows:	Order No.	As of version	
			Firmware	Hardware
CPU 312C	CPU 31xC	6ES7312-5BD01-0AB0	V2.0.0	01
CPU 313C		6ES7313-5BE01-0AB0	V2.0.0	01
CPU 313C-2 PtP		6ES7313-6BE01-0AB0	V2.0.0	01
CPU 313C-2 DP		6ES7313-6CE01-0AB0	V2.0.0	01
CPU 314C-2 PtP		6ES7314-6BF01-0AB0	V2.0.0	01
CPU 314C-2 DP		6ES7314-6CF01-0AB0	V2.0.0	01
CPU 312	CPU 31x	6ES7312-1AD10-0AB0	V2.0.0	01
CPU 314		6ES7314-1AF10-0AB0	V2.0.0	01
CPU 315-2 DP		6ES7315-2AG10-0AB0	V2.0.0	01

6.4 CPU 313C-2 PtP and CPU 313C-2 DP

Technical Data

Table 6-4 Technical data for CPU 313C-2 PtP/ CPU 313C-2 DP

Technical Data		
CPU and version	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
MLFB	6ES7 313-6BE01-0AB0	6ES7 313-6CE01-0AB0
• Hardware version	01	01
• Firmware version	V2.0.0	V2.0.0
Associated programming package	STEP 7 V 5.2 or later (please use previous CPU for STEP 7 V 5.1 + SP 3 or later)	STEP 7 V 5.2 or later (please use previous CPU for STEP 7 V 5.1 + SP 3 or later)
Memory	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
RAM		
• Integrated	32 KB	
• Expandable	No	
Load memory	Plugged in with MMC (max. 8 MB)	
Buffering	Guaranteed by MMC (maintenance-free)	
Processing times	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Processing times for		
• Bit operations	min. 0.1 µs	
• Word instructions	Min. 0.2 µs	
• Fixed-point arithmetic	Min. 2 µs	
• Floating-point arithmetic	Min. 6 µs	
Timers/counters and their retentivity	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
S7 counters	256	
• Retentive memory	Configurable	
• Default	from C0 to C7	
• Counting range	0 to 999	
IEC Counters	Yes	
• Type	SFB	
• Number	Unlimited (limited only by RAM size)	
S7 timers	256	
• Retentive memory	Configurable	
• Default	Not retentive	
• Timer range	10 ms to 9990 s	
IEC Timers	Yes	
• Type	SFB	
• Number	Unlimited (limited only by RAM size)	

Technical Data		
Data areas and their retentivity	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Total retentive data area (includes flag bits; timers; counters)	All	
Flag bits	256 bytes	
• Retentive memory	Configurable	
• Default retentivity	MB0 to MB15	
Clock flag bits	8 (1 byte per flag bit)	
Data blocks	max. 511 (DB 1 to DB 511)	
• Size	max. 16 KB	
Local data per priority class	max. 510 bytes	
Blocks	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Total	1024 (DBs, FCs, FBs)	
OBs	See the Instruction List	
• Size	max. 16 KB	
Nesting depth		
• Per priority class	8	
• Additional within an error OB	4	
FBs	max. 512 (FB 0 to FB 511)	
• Size	max. 16 KB	
FCs	max. 512 (FC 0 to FC 511)	
• Size	max. 16 KB	
Address areas (I/Os)	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Total I/O address area	max. 1024 bytes/1024 bytes (can be freely addressed)	max. 1024 bytes/1024 bytes (can be freely addressed)
• Distributed	None	max. 1008 bytes
I/O process image	128 bytes/128 bytes	128 bytes/128 bytes
Digital channels	max. 1008	max. 8192
• Of those local	max. 992	max. 992
• Integrated channels	16 DI / 16 DO	16 DI / 16 DO
Analog channels	max. 248	max. 512
• Of those local	max. 248	max. 248
• Integrated channels	None	None
Assembly	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Racks	max. 4	
Modules per rack	max. 8; max. 7 in rack 3	
Number of DP masters		
• Integrated	No	1
• Via CP	max. 1	max. 1

Technical Data		
Number of function modules and communication processors you can operate		
• FM	max. 8	
• CP (PtP)	max. 8	
• CP (LAN)	max. 6	
Time-of-day	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Realtime clock	yes (HW clock)	
• Buffered	Yes	
• Buffered period	Typically 6 weeks (at an ambient temperature of 40 degC)	
• Accuracy	Deviation per day < 10 s	
Operating hours counter	1	
• Number	0	
• Range of values	2^{31} hours (if SFC 101 is used)	
• Granularity	1 hour	
• Retentive	yes; must be manually restarted after every restart	
Clock synchronization	Yes	
• In the PLC	Master	
• On MPI	Master/slave	
S7 signaling functions	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Number of stations that can log in for signaling functions (e.g. OS)	max. 8 (depends on the number of connections configured for PG / OP and S7 basic communication)	
Process diagnostic messages	Yes	
• Simultaneously enabled interrupt S blocks	max. 20	
Testing and commissioning functions	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Status/controlling of variables	Yes	
• Variable	Inputs, outputs, flags, DBs, timers, counters	
• Number of variables	max. 30	
Of those as status variable	max. 30	
Of those as control variable	max. 14	
Forcing	Yes	
• Variable	Inputs, outputs	
• Number of variables	max. 10	
Status block	Yes	
Single-step	Yes	
Breakpoints	2	
Diagnostic buffer	Yes	
• Number of entries (not	max. 100	

Technical Data		
configurable)		
Communication functions	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
PG/OP communication	Yes	
Global data communication	Yes	
• Number of GD circuits	4	
• Number of GD packets	max. 4	
Sending stations	max. 4	
Receiving stations	max. 4	
• Size of GD packets	max. 22 bytes	
Consistent data	22 bytes	
S7-based communication	Yes (server)	
• User data per job	max. 76 bytes	
Consistent data	76 bytes (for X_SEND or X_RCV) 64 bytes (for X_PUT or X_GET as the server)	
S7 communication		
• As server	Yes	
• As Client	Yes (via CP and loadable FBs)	
• User data per job	max. 180 bytes (with PUT/GET)	
Consistent data	64 bytes	
S5-compatible communication	Yes (via CP and loadable FCs)	
Number of connections	max. 8	
can be used for		
• PG communication	max. 7	
Reserved (Default)	1	
Configurable	from 1 to 7	
• OP communication	max. 7	
Reserved (Default)	1	
Configurable	from 1 to 7	
• S7-based communication	max. 4	
Reserved (Default)	4	
Configurable	from 0 to 4	
Routing	No	max. 4
Interfaces	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
1st interface		
Type of interface	Integrated RS485 interface	
Physics	RS485	
Electrically isolated	No	
Interface power supply (15 VDC to 30 VDC)	max. 200 mA	
Functionality		
• MPI	Yes	

Technical Data		
• PROFIBUS-DP	No	
• PtP communication	No	
MPI		
Number of connections	8	
Services		
• PG/OP communication	Yes	
• Routing	No	Yes
• Global data communication	Yes	
• S7-based communication	Yes	
• S7 communication		
As server	Yes	
As Client	Yes (via CP and loadable FBs)	
• Transmission rates	max. 187.5 kbps	
2nd interface	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Type of interface	Integrated RS422/RS485 interface	integrated RS485 interface
Physics	RS 422/485	RS485
Electrically isolated	Yes	Yes
Interface power supply (15 VDC to 30 VDC)	No	max. 200 mA
Number of connections	None	8
Functionality		
• MPI	No	No
• PROFIBUS-DP	No	Yes
• PtP communication	Yes	No
DP master		
Number of connections	–	8
Services		
• PG/OP communication	–	Yes
• Routing	–	Yes
• Global data communication	–	No
• S7-based communication	–	No
• S7 communication	–	No
• Equidistance	–	Yes
• SYNC/FREEZE	–	Yes
• Enable/disable DP slaves	–	Yes
• DPV1	–	Yes
• Transmission rates	–	Up to 12 Mbps
• Number of DP slaves per station	–	max. 32;
• Address area	–	max. 1 KB I / 1 KB O

Technical Data		
• User data per DP slave	–	max. 244 bytes I / 244 bytes O
DP Slave		
Number of connections	–	8
Services		
• PG/OP communication	–	Yes
• Routing	–	Yes (only if interface is active)
• Global data communication	–	No
• S7-based communication	–	No
• S7 communication	–	No
• Direct data exchange	–	Yes
• Transmission rates	–	Up to 12 Mbps
• Automatic baud rate search	–	Yes (only if interface is passive)
• Transfer memory	–	244 bytes I / 244 bytes O
• Address areas	–	max. 32 with max. 32 bytes each
• DPV1	–	No
GSD file	–	The latest GSD file is available at: http://www.ad.siemens.de/support in the Product Support area
Point-to-Point communication		
• Transmission rates	38.4 kbps half duplex 19.2 kbps full duplex	–
• Cable length	max. 1200 m	–
• The user program can control the interface	Yes	–
• The interface can trigger a break or an interrupt in the user program	Yes (message with break ID)	–
• Protocol driver	3964(R); ASCII	–
Programming	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Programming language	LAD/FBD/STL	
Available instructions	See the Instruction List	
Nesting levels	8	
System functions (SFCs)	See the Instruction List	
System function blocks (SFBs)	See the Instruction List	
User program security	Yes	
Integrated I/O	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
• Default addresses of the integrated		
Digital inputs	124.0 to 125.7	
Digital outputs	124.0 to 125.7	

Technical Data		
Integrated functions		
Counters	3 channels (see the Manual *Technological Functions*)	
Frequency counters	3 channels, max. 30 kHz (see the Manual *Technological Functions*)	
Pulse outputs	3 channels for pulse width modulation, up to max. 2.5 kHz (see the Manual *Technological Functions*)	
Positioning control	No	
Integrated "Controlling" SFB	PID controller (see the Manual *Technological Functions*)	
Dimensions	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Mounting dimensions W x H x D (mm)	120 x 125 x 130	
Weight	Approx. 566 g	
Voltages and currents	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
Power supply (nominal value)	24 VDC	
• Permitted range	20.4 V to 28.8 V	
Current consumption (no-load operation)	Typically 100 mA	
Inrush current	Typically 11 A	
Power consumption (nominal value)	700 mA	900 mA
I^2t	0.7 A^2s	
External fusing of power supply lines (recommended)	LS switch Type C min. 2 A, type B min. 4 A	
Power loss	Typically 10 W	
Standards and Approvals	**CPU 313C-2 PtP**	**CPU 313C-2 DP**
PNO certificate		
• DP Master	–	
• DP Slave	–	

Cross-reference

In the *Technical data of the integrated I/O* chapter, you can find

- the technical data of integrated I/Os under *Digital inputs of CPUs 31xC* and *Digital outputs of CPUs 31xC*.
- the block diagrams of the integrated I/Os, under *Arrangement and usage of integrated I/Os*.