CPU 315-2 PN/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.
- Maintenance-free data backup;
  the CPU automatically saves all data (up to 128 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.
- Startup;
  definition of the startup characteristics of the CPU and the monitoring time
- Synchronous cycle interrupts;
  setting of DP master system, process image partition number, and delay time
- Cycle/clock memory;

- specification of the maximum cycle time and load. Setting of the clock memory address. Enabling prioritized HMI communication
- Retentivity;
  setting retentive areas
- Clock interrupts;
  setting the start date, start time and periodicity
- Watchdog interrupts;
  setting of periodicity
- System diagnostics;
  determining handling and scope of the diagnostic alarms
- 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
- Web;
  settings for the Web server of the CPU
- MPI/PROFIBUS DP interface;
  setting the interface type. Determining node addresses. Parameterizing the operating mode and configuring the transfer areas in the case of PROFIBUS DP. Parameterizing the time synchronization
- PROFINET interface;
  setting of addresses. Parameterizing the PROFINET properties, the I-Device

- functionality, the type of synchronization on PROFINET, the time synchronization using NTP procedure, the media redundancy, and the KeepAlive function. Parameterizing port 1 and port 2

Display and information functions

- Status and error indications;
  LEDs indicate hardware, programming, time, I/O and bus errors, and operating statuses 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;
  the PG can be used to obtain information about the memory capacity and operating mode of the CPU, the current loading of the work and load memory, current cycle times and diagnostics buffer content in plain text.

Integrated communication functions

- PG/OP communication
- Global data communication
- S7 basic communication
- S7 communication
- S5-compatible communication

- Routing
- Data record routing
- PROFIBUS DP master/slave
- Open communication over TCP/IP, ISO-on-TCP and UDP
- PROFINET IO controller
- PROFINET I-Device
- PROFINET CBA
- Web server

System functions
The CPU provides many extensive system functions for diagnostics, parameterization, synchronization, alerting, time measurement, etc.
For detailed information, refer to the manual.

Technical specifications

SIEMENS

Technical specifications

	6ES7 315-2EH14-0AB0
Product version	
Hardware product version	01
Firmware version	V3.2
General information	
associated programming package	STEP7 V 5.5 or higher
Supply voltage	
24 V DC	Yes

Input current	
Current consumption (rated value)	750 mA
Current consumption (in no-load operation), typ.	150 mA
Inrush current, typ.	4 A
I²t	1 A²·s
Power losses	
Power loss, typ.	4.65 W
Memory	
Work memory	
•integrated	384 Kibyte
•expandable	No
•Size of retentive memory for retentive data blocks	128 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.	0.05 µs
for word operations, min.	0.09 µs
for fixed point arithmetic, min.	0.12 µs
for floating point arithmetic, min.	0.45 µs
Counters, timers and their retentivity	
S7 counter	
•Number	256

•Retentivity	Yes
• adjustable	0
• lower limit	255
• upper limit	Z 0 to Z 7
• preset	
•Counting range	Yes
• adjustable	0
• lower limit	999
• upper limit	
IEC counter	
•present	Yes
•Type	SFB
•Number	Unlimited (limited only by RAM capacity)
S7 times	
•Number	256
•Retentivity	Yes

• adjustable	
	0
• lower limit	
	255
• upper limit	
	No retentivity
• preset	
•Time range	
	10 ms
• lower limit	
	9 990 s
• 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, 128 KB max.
Flag	
•Number, max.	2 048 byte
•Retentivity available	Yes; MB 0 to MB 2047
•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.	32 768 byte; Max. 2048 bytes per block
Address area	
I/O address area	
•Inputs	2 048 byte
•Outputs	2 048 byte
•of which, distributed	
	2 048 byte
• Inputs	
	2 048 byte
• Outputs	
Process image	
•Inputs, adjustable	2 048 byte
•Outputs, adjustable	2 048 byte
•Inputs, default	128 byte
•Outputs, default	128 byte
Subprocess images	
•Number of subprocess images, max.	1; With PROFINET IO, the length of the user data is limited to 1600 bytes
Digital channels	
•Inputs	16 384
•Outputs	16 384

•Inputs, of which central	1 024
•Outputs, of which central	1 024
Analog channels	
•Inputs	1 024
•Outputs	1 024
•Inputs, of which central	256
•Outputs, of which central	256
Hardware configuration	
Racks, max.	4
Modules per rack, max.	8
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	10
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-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
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	Yes
•on Ethernet via NTP	Yes; as client
Interfaces	
Number of USB interfaces	0
1st 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	Yes
•DP master	Yes
•DP slave	Yes
•Point-to-point connection	No
MPI	
•Services	
• PG/OP communication	Yes
• Routing	Yes
• Global data communication	Yes
• S7 basic communication	Yes
• S7 communication	Yes
• S7 communication, as client	No; but via CP and loadable FB
	Yes

• S7 communication, as server	
•Transmission rate, max.	12 Mbit/s
DP master	
•Services	
• PG/OP communication	Yes
• Global data communication	No
• S7 basic communication	Yes; I blocks only
• S7 communication	Yes
• S7 communication, as client	No
• S7 communication, as server	Yes
• Equidistance mode support	Yes
• Isochronous mode	Yes; OB 61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO
• SYNC/FREEZE	Yes
	Yes

• Activation/deactivation of DP slaves	
• 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	
• Inputs, max.	2 Kibyte
• Outputs, max.	2 Kibyte
•User data per DP slave	
• Inputs, max.	244 byte
• Outputs, max.	244 byte
DP slave	
•Services	

• PG/OP communication	Yes
• Global data communication	No
• S7 basic communication	No
• S7 communication	Yes
• S7 communication, as client	No
• S7 communication, as server	Yes; Connection configured on one side only
• Direct data exchange (slave-to-slave communication)	Yes
• DPV1	No
•Transmission rate, max.	12 Mbit/s
•Automatic baud rate search	Yes; only with passive interface
•Transfer memory	
• Inputs	244 byte
• Outputs	244 byte

•Address area, max.	32
•User data per address area, max.	32 byte
2nd interface	
Type of interface	PROFINET
Physics	Ethernet RJ45
Isolated	Yes
Integrated switch	Yes
Number of ports	2
Automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
•supported	Yes
•Switchover time on line break, typically	200 ms; PROFINET MRP
•Number of stations in the ring, max.	50
Change of IP address at runtime, supported	Yes
Functionality	
•MPI	No
•DP master	No
•DP slave	No
•PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality
•PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality

•PROFINET CBA	Yes
PROFINET IO Controller	
•Services	
• PG/OP communication	Yes
• S7 communication	Yes; With loadable FBs, max. configurable connections: 14, max. number of instances: 32
• Isochronous mode	Yes; OB 61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO
• Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
•Transmission rate, max.	100 Mbit/s
•Number of connectable IO devices, max.	128
•Max. number of connectable IO devices for RT	128
• of which in line, max.	128
•Number of IO devices with IRT and the option "high flexibility"	128
• of which in line, max.	61
•Number of IO Devices with IRT and the	64

option "high performance", max.	64
• of which in line, max.	
•IRT, supported	Yes
•Shared device, supported	Yes
•Prioritized startup supported	Yes
• Number of IO Devices, max.	32
•Activation/deactivation of IO Devices	Yes
• Number of IO Devices that can be simultaneously activated/deactivated, max.	8
•IO Devices changing during operation (partner ports), supported	Yes
• Max. number of IO devices per tool	8
•Device replacement without swap medium	Yes
•Send cycles	250 µs, 500 µs,1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)
•Updating time	250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU

	31xC and CPU 31x, Technical Data" for more details)
•Address area	
	2 Kibyte
• Inputs, max.	
	2 Kibyte
• Outputs, max.	
•User data per address area, max.	
	1 024 byte
• User data consistency, max.	
PROFINET IO Device	
•Services	
	Yes
• PG/OP communication	
• S7 communication	Yes; With loadable FBs, max. configurable connections: 14, max. number of instances: 32
	No
• Isochronous mode	
	Yes; Via TCP/IP, ISO on TCP, and UDP
• Open IE communication	
	Yes
• IRT, supported	
	Yes; With SFB 73 / 74 prepared for

	loadable PROFIenergy standard FB for I-Device
• PROFIenergy, supported	Yes
• Shared device, supported	
• Number of IO controllers with shared device, max.	2
•Transfer memory	
• Inputs, max.	1 440 byte; Per IO Controller with shared device
• Outputs, max.	1 440 byte; Per IO Controller with shared device
•Submodules	
• Number, max.	64
• User data per submodule, max.	1 024 byte
Open IE communication	
•Open IE communication, supported	Yes
•Number of connections, max.	8
•Local port numbers used at the system end	0, 20, 21, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
•Keep-alive function, supported	Yes

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 integrated PROFINET interface and loadable FB or via CP and loadable FB
•User data per job, max.	See online help of STEP 7 (shared

	parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)
S5-compatible communication •supported	Yes; via CP and loadable FC
Open IE communication •TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
• Number of connections, max.	8
• Data length for connection type 01H, max.	1 460 byte
• Data length for connection type 11H, max.	32 768 byte
• Several passive connections per port, supported	Yes
•ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs
• Number of connections, max.	8
• Data length, max.	32 768 byte

	Yes
• Several passive connections per port, supported	
•ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs
• Number of connections, max.	8
• Data length, max.	32 768 byte
•UDP	Yes; via integrated PROFINET interface and loadable FBs
• Number of connections, max.	8
• Data length, max.	1 472 byte
Web server	
•supported	Yes
•Number of HTTP clients	5
•User-defined websites	Yes
PROFINET CBA (at set setpoint communication load)	
•Setpoint for the CPU communication load	50 %
•Number of remote interconnection partners	32
•Number of functions, master/slave	30

•Total of all Master/Slave connections	1 000
•Data length of all incoming connections master/slave, max.	4 000 byte
•Data length of all outgoing connections master/slave, max.	4 000 byte
•Number of device-internal and PROFIBUS interconnections	500
•Data length of device-internal und PROFIBUS interconnections, max.	4 000 byte
•Data length per connection, max.	1 400 byte
•Remote interconnections with acyclic transmission	
• Sampling frequency: Sampling time, min.	500 ms
• Number of incoming interconnections	100
• Number of outgoing interconnections	100
• Data length of all incoming interconnections, max.	2 000 byte
	2 000 byte

• Data length of all outgoing interconnections, max.	1 400 byte
• Data length per connection, max.	
•Remote interconnections with cyclic transmission	
• Transmission frequency: Transmission interval, min.	10 ms
• Number of incoming interconnections	200
• Number of outgoing interconnections	200
• Data length of all incoming interconnections, max.	2 000 byte
• Data length of all outgoing interconnections, max.	2 000 byte
• Data length per connection, max.	450 byte
•HMI variables via PROFINET (acyclic)	3; 2x PN OPC/1x iMap

• Number of stations that can log on for HMI variables (PN OPC/iMap)	
• HMI variable updating	500 ms
• Number of HMI variables	200
• Data length of all HMI variables, max.	2 000 byte
•PROFIBUS proxy functionality	
• supported	Yes
• Number of linked PROFIBUS devices	16
• Data length per connection, max.	240 byte; Slave-dependent
Number of connections	
•Max. total number of instances	32
•usable for routing	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: 24 max.
S7 message functions	
Number of login stations for message	16; Depending on the configured

functions, max.	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	

• 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
Isochronous mode	
Isochronous mode	Yes; Via PROFIBUS DP or PROFINET interface
Ambient conditions Operating temperature	
•Min.	0 °C
•max.	60 °C
Configuration programming •Programming language	
• LAD	Yes
• FBD	Yes
• STL	Yes
	Yes

• SCL	
	Yes
• CFC	
	Yes
• GRAPH	
	Yes
• HiGraph®	
•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	40 mm
Height	125 mm
Depth	130 mm
Weight	
Weight, approx.	340 g