

SIMATIC S7-300 CPU 315-2 PN/DP, CENTRAL PROCESSING UNIT WITH 384 KBYTE WORKING MEMORY, 1. INTERFACE MPI/DP 12MBIT/S, 2. INTERFACE ETHERNET PROFINET, WITH 2 PORT SWITCH, MICRO MEMORY CARD NECESSARY



## Product type designation

## General information

Hardware product version	01
Firmware version	V3.2
Engineering with	
<ul style="list-style-type: none"> <li>Programming package</li> </ul>	STEP7 V 5.5 or higher

## Supply voltage

24 V DC	Yes
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
External protection for supply cables (recommendation)	2 A min.

## Mains buffering

<ul style="list-style-type: none"> <li>Mains/voltage failure stored energy time</li> </ul>	5 ms
<ul style="list-style-type: none"> <li>Repeat rate, min.</li> </ul>	1 s

## Input current

Current consumption (rated value)	750 mA
Current consumption (in no-load operation), typ.	150 mA

Inrush current, typ.	4 A
I <sup>2</sup> t	1 A <sup>2</sup> ·s
<b>Power losses</b>	
Power loss, typ.	4.65 W
<b>Memory</b>	
Type of memory	other
<b>Work memory</b>	
• Integrated	384 kbyte
• expandable	No
• Size of retentive memory for retentive data blocks	128 kbyte
<b>Load memory</b>	
• pluggable (MMC)	Yes
• pluggable (MMC), max.	8 Mbyte
• Data management on MMC (after last programming), min.	10 y
<b>Backup</b>	
• present	Yes; Guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data
<b>CPU processing times</b>	
for bit operations, typ.	0.05 µs
for word operations, typ.	0.09 µs
for fixed point arithmetic, typ.	0.12 µs
for floating point arithmetic, typ.	0.45 µs
<b>CPU-blocks</b>	
Number of blocks (total)	1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
<b>DB</b>	
• Number, max.	1 024; Number range: 1 to 16000
• Size, max.	64 kbyte
<b>FB</b>	
• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
<b>FC</b>	
• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
<b>OB</b>	
• 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 time interrupt OBs	4; OB 32, 33, 34, 35
• Number of process alarm OBs	1; OB 40

• Number of DPV1 alarm OBs	3; OB 55, 56, 57
• Number isochronous mode OBs	1; OB 61
• Number of startup OBs	1; OB 100
• Number of asynchronous error OBs	6; OB 80, 82, 83, 85, 86, 87 (OB83 only for PROFINET IO)
• Number of synchronous error OBs	2; OB 121, 122
<b>Nesting depth</b>	
• per priority class	16
• additional within an error OB	4
<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>	
— can be set	Yes
— 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	9 990 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, 128 KB max.
<b>Flag</b>	
• Number, max.	2 048 byte

<ul style="list-style-type: none"> <li>• Retentivity available</li> <li>• Retentivity preset</li> <li>• Number of clock memories</li> </ul>	Yes; MB 0 to MB 2047 MB 0 to MB 15 8; 1 memory byte
<b>Data blocks</b>	
<ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> <li>• Retentivity adjustable</li> <li>• Retentivity preset</li> </ul>	1 024; Number range: 1 to 16000 64 kbyte Yes; via non-retain property on DB Yes
<b>Local data</b>	
<ul style="list-style-type: none"> <li>• per priority class, max.</li> </ul>	32 768 byte; Max. 2048 bytes per block
<b>Address area</b>	
<b>I/O address area</b>	
<ul style="list-style-type: none"> <li>• Inputs</li> <li>• Outputs</li> </ul>	2 048 byte 2 048 byte
of which, distributed	
<ul style="list-style-type: none"> <li>— Inputs</li> <li>— Outputs</li> </ul>	2 048 byte 2 048 byte
<b>Process image</b>	
<ul style="list-style-type: none"> <li>• Inputs</li> <li>• Outputs</li> <li>• Inputs, adjustable</li> <li>• Outputs, adjustable</li> <li>• Inputs, default</li> <li>• Outputs, default</li> </ul>	2 048 byte 2 048 byte 2 048 byte 2 048 byte 128 byte 128 byte
<b>Subprocess images</b>	
<ul style="list-style-type: none"> <li>• Number of subprocess images, max.</li> </ul>	1; With PROFINET IO, the length of the user data is limited to 1600 bytes
<b>Digital channels</b>	
<ul style="list-style-type: none"> <li>• Inputs</li> <li>• Outputs</li> <li>• Inputs, of which central</li> <li>• Outputs, of which central</li> </ul>	16 384 16 384 1 024 1 024
<b>Analog channels</b>	
<ul style="list-style-type: none"> <li>• Inputs</li> <li>• Outputs</li> <li>• Inputs, of which central</li> <li>• Outputs, of which central</li> </ul>	1 024 1 024 256 256
<b>Hardware configuration</b>	
Expansion devices, max.	3
<b>Number of DP masters</b>	
<ul style="list-style-type: none"> <li>• Integrated</li> <li>• Via CP</li> </ul>	1 4
Number of operable FMs and CPs (recommended)	

• FM	8
• CP, point-to-point	8
• CP, LAN	10
<b>Rack</b>	
• Racks, max.	4
• Modules per rack, max.	8
<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	Clock continues to run with the time at which the power failure occurred
<b>Operating hours counter</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
• 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
<b>Digital inputs</b>	
Number of digital inputs	0
<b>Digital outputs</b>	
Number of digital outputs	0
<b>Analog inputs</b>	
Number of analog inputs	0
<b>Analog outputs</b>	
Number of analog outputs	0
<b>Interfaces</b>	
Number of USB interfaces	0
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 interfaces	1; Ethernet, 2-port switch, 2*RJ45

#### 1st interface

Interface type	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

- |                           |           |
|---------------------------|-----------|
| • Transmission rate, max. | 12 Mbit/s |
|---------------------------|-----------|

#### 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 |
| — S7 communication, as server | Yes                            |

#### DP master

- |                             |           |
|-----------------------------|-----------|
| • Transmission rate, max.   | 12 Mbit/s |
| • Number of DP slaves, max. | 124       |

#### Services

- |  |   |
|--|---|
| — PG/OP communication  | Yes   |
| — Routing  | 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   |
| — 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
<b>Address area</b>	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
<b>User data per DP slave</b>	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
<b>DP slave</b>	
• Transmission rate, max.	12 Mbit/s
• Automatic baud rate search	Yes; only with passive interface
• Address area, max.	32
• User data per address area, max.	32 byte
<b>Services</b>	
— PG/OP communication	Yes
— Routing	Yes; Only with active interface
— 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
<b>Transfer memory</b>	
— Inputs	244 byte
— Outputs	244 byte
<b>2nd interface</b>	
Interface type	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
Change of IP address at runtime, supported	Yes
<b>Media redundancy</b>	
• supported	Yes
• Switchover time on line break, typically	200 ms; PROFINET MRP
• Number of stations in the ring, max.	50
<b>Functionality</b>	
• MPI	No
• DP master	No

<ul style="list-style-type: none"> <li>• DP slave</li> <li>• PROFINET IO Controller</li> <li>• PROFINET IO Device</li> <li>• PROFINET CBA</li> <li>• Open IE communication</li> <li>• Web server <ul style="list-style-type: none"> <li>— Number of HTTP clients</li> </ul> </li> </ul>	<p>No</p> <p>Yes; Also simultaneously with IO-Device functionality</p> <p>Yes; Also simultaneously with IO Controller functionality</p> <p>Yes</p> <p>Yes; Via TCP/IP, ISO on TCP, and UDP</p> <p>Yes</p> <p>5</p>
<b>PROFINET IO Controller</b>	
<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> <li>• Number of connectable IO devices, max.</li> <li>• Max. number of connectable IO devices for RT <ul style="list-style-type: none"> <li>— of which in line, max.</li> </ul> </li> <li>• Number of IO devices with IRT and the option "high flexibility" <ul style="list-style-type: none"> <li>— of which in line, max.</li> </ul> </li> <li>• Number of IO Devices with IRT and the option "high performance", max. <ul style="list-style-type: none"> <li>— of which in line, max.</li> </ul> </li> <li>• IRT, supported</li> <li>• Shared device, supported</li> <li>• Prioritized startup supported <ul style="list-style-type: none"> <li>— Number of IO Devices, max.</li> </ul> </li> <li>• Activation/deactivation of IO Devices <ul style="list-style-type: none"> <li>— Maximum number of IO devices that can be activated/deactivated at the same time.</li> </ul> </li> <li>• IO Devices changing during operation (partner ports), supported <ul style="list-style-type: none"> <li>— Max. number of IO devices per tool</li> </ul> </li> <li>• Device replacement without swap medium</li> <li>• Send cycles</li> <li>• Updating time</li> </ul>	<p>100 Mbit/s</p> <p>128</p> <p>128</p> <p>128</p> <p>128</p> <p>61</p> <p>64</p> <p>64</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>32</p> <p>Yes</p> <p>8</p> <p>Yes</p> <p>8</p> <p>Yes</p> <p>250 <math>\mu</math>s, 500 <math>\mu</math>s, 1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)</p> <p>250 <math>\mu</math>s to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details)</p>
<b>Services</b>	
<ul style="list-style-type: none"> <li>— PG/OP communication</li> <li>— Routing</li> <li>— S7 communication</li> <li>— Isochronous mode</li> <li>— Open IE communication</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes; With loadable FBs, max. configurable connections: 14, max. number of instances: 32</p> <p>Yes; OB 61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO</p> <p>Yes; Via TCP/IP, ISO on TCP, and UDP</p>
<b>Address area</b>	
<ul style="list-style-type: none"> <li>— Inputs, max.</li> <li>— Outputs, max.</li> </ul>	<p>2 kbyte</p> <p>2 kbyte</p>

— User data consistency, max.	1 024 byte
<b>PROFINET IO Device</b>	
<b>Services</b>	
— PG/OP communication	Yes
— Routing	Yes
— S7 communication	Yes; With loadable FBs, max. configurable connections: 14, max. number of instances: 32
— Isochronous mode	No
— Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
— IRT	Yes
— PROFINergy, supported	Yes; With SFB 73 / 74 prepared for loadable PROFINergy standard FB for I-Device
— Shared device	Yes
— Number of IO controllers with shared device, max.	2
<b>Transfer memory</b>	
— Inputs, max.	1 440 byte; Per IO Controller with shared device
— Outputs, max.	1 440 byte; Per IO Controller with shared device
<b>Submodules</b>	
— Number, max.	64
— User data per submodule, max.	1 024 byte
<b>PROFINET CBA</b>	
• acyclic transmission	Yes
• Cyclic transmission	Yes
<b>Open IE communication</b>	
• Open IE communication, supported	Yes
• Number of connections, max.	8
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 443, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes
<b>Isochronous mode</b>	
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface
<b>Communication functions</b>	
PG/OP communication	Yes
Data record routing	Yes
<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
<b>S7 basic communication</b>	
• 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)
<b>S7 communication</b>	
• 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)
<b>S5-compatible communication</b>	
• supported	Yes; via CP and loadable FC
<b>Open IE communication</b>	
• 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
• UDP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	8
— Data length, max.	1 472 byte
<b>Web server</b>	
• supported	Yes
• Number of HTTP clients	5
• User-defined websites	Yes
<b>PROFINET CBA (at set setpoint communication load)</b>	
• 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
<b>Remote interconnections with acyclic transmission</b>	
— 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
— Data length of all outgoing interconnections, max.	2 000 byte
— Data length per connection, max.	1 400 byte
<b>Remote interconnections with cyclic transmission</b>	
— 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
<b>HMI variables via PROFINET (acyclic)</b>	
— Number of stations that can log on for HMI variables (PN OPC/iMap)	3; 2x PN OPC/1x iMap
— HMI variable updating	500 ms
— Number of HMI variables	200
— Data length of all HMI variables, max.	2 000 byte
<b>PROFIBUS proxy functionality</b>	
— supported	Yes
— Number of linked PROFIBUS devices	16
— Data length per connection, max.	240 byte; Slave-dependent
<b>Number of connections</b>	
• overall	16
• usable for PG communication	15
— reserved for PG communication	1
— Adjustable for PG communication, min.	1
— Adjustable for PG communication, max.	15
• usable for OP communication	15
— reserved for OP communication	1
— adjustable for OP communication, min.	1
— adjustable for OP communication, max.	15
• usable for S7 basic communication	14
— Reserved for S7 basic communication	0
— adjustable for S7 basic communication, min.	0

— adjustable for S7 basic communication, max.	14
• usable for S7 communication	14
— reserved for S7 communication	0
— Adjustable for S7 communication, min.	0
— Adjustable for S7 communication, max.	14
• 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 functions, max.	16; 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
• Force, variables	Inputs, outputs
• Number of variables, max.	10

#### Diagnostic buffer

• 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
— can be set	Yes; From 10 to 499
— preset	10

#### Service data

• Can be read out	Yes
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### Ambient conditions

#### Operating temperature

• Min.	0 °C
• max.	60 °C

## Configuration

Configuration software	
• STEP 7	Yes; V5.5 or higher
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
— CFC	Yes
— GRAPH	Yes
— HiGraph®	Yes
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
Weights	
Weight, approx.	340 g
<b>last modified:</b>	23.10.2014