



SIMATIC S7-300, CPU 315T-3 PN/DP, CENTRAL PROCESSING UNIT FOR PLC AND TECHNOLOGY, 384 KBYTE WORKING MEMORY, 1. INTERFACE MPI/DP 12MBIT/S, 2. INTERFACE DP(DRIVE), 3. INTERFACE ETHERNET PROFINET WITH 2 PORT SWITCH, INTEGRATED I/O FOR TECHNOLOGY, FRONT CONNECTOR (1 X 40PIN) AND MICRO MEMORY CARD MIN. 8 MB NECESSARY

Product type designation

General information

Hardware product version	01
Firmware version	CPU: V3.2; integrated technology V4.1.5

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 supply cables (recommendation)	2 A min.

Load voltage L+

• Rated value (DC)	24 V
• Reverse polarity protection	Yes

Digital outputs

Load voltage L+	
— Rated value (DC)	24 V; (2L+)
— Reverse polarity protection	No; (2L+)

Input current

Current consumption (rated value)	1 050 mA
Current consumption (in no-load operation), typ.	230 mA
Inrush current, typ.	6.5 A
I^2t	1 A ² ·s

Power losses

Power loss, typ.	7.5 W
Memory	
Work memory	
<ul style="list-style-type: none"> • Integrated 	384 kbyte
<ul style="list-style-type: none"> • expandable 	No
<ul style="list-style-type: none"> • Size of retentive memory for retentive data blocks 	128 kbyte
Load memory	
<ul style="list-style-type: none"> • pluggable (MMC) 	Yes
<ul style="list-style-type: none"> • pluggable (MMC), max. 	8 Mbyte
<ul style="list-style-type: none"> • Data management on MMC (after last programming), min. 	10 y
Backup	
<ul style="list-style-type: none"> • present 	Yes; Guaranteed by MMC (maintenance-free)
<ul style="list-style-type: none"> • without battery 	Yes; Program and data
CPU processing times	
for bit operations, typ.	0.05 μ s
for word operations, typ.	0.09 μ s
for fixed point arithmetic, typ.	0.12 μ s
for floating point arithmetic, typ.	0.45 μ s
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	
<ul style="list-style-type: none"> • Number, max. 	1 024; Number range: 1 to 16000
<ul style="list-style-type: none"> • Size, max. 	64 kbyte
FB	
<ul style="list-style-type: none"> • Number, max. 	1 024; Number range: 0 to 7999
<ul style="list-style-type: none"> • Size, max. 	64 kbyte
FC	
<ul style="list-style-type: none"> • Number, max. 	1 024; Number range: 0 to 7999
<ul style="list-style-type: none"> • Size, max. 	64 kbyte
OB	
<ul style="list-style-type: none"> • Description 	see instruction list
<ul style="list-style-type: none"> • Size, max. 	64 kbyte
<ul style="list-style-type: none"> • Number of free cycle OBs 	1; OB 1
<ul style="list-style-type: none"> • Number of time alarm OBs 	1; OB 10
<ul style="list-style-type: none"> • Number of delay alarm OBs 	2; OB 20, 21
<ul style="list-style-type: none"> • Number of time interrupt OBs 	4; OB 32, 33, 34, 35
<ul style="list-style-type: none"> • Number of process alarm OBs 	1; OB 40
<ul style="list-style-type: none"> • Number of DPV1 alarm OBs 	3; OB 55, 56, 57

• Number isochronous mode OBs	1; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
• Number of technology synchronous alarm OBs	1; OB 65
• 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
Nesting depth	
• per priority class	16
• additional within an error OB	4
Counters, timers and their retentivity	
S7 counter	
• Number	256
Retentivity	
— can be set	Yes
— lower limit	0
— upper limit	255
— preset	Z 0 to Z 7
Counting range	
— can be set	Yes
— lower limit	0
— upper limit	999
IEC counter	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
S7 times	
• Number	256
Retentivity	
— can be set	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
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Total retentive data area	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	
• Number, max.	1 024; Number range: 1 to 16000
• Size, max.	64 kbyte
• 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	
— Inputs	2 048 byte
— Outputs	2 048 byte
Process image	
• Inputs	2 048 byte
• Outputs	2 048 byte
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte
• Inputs, default	128 byte
• Outputs, default	128 byte
Default addresses of the integrated channels	
— Digital inputs	66
— Digital outputs	66
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
— Inputs, of which central	256
• Outputs	16 384
— Outputs, of which central	256
Analog channels	
• Inputs	1 024
— Inputs, of which central	64
• Outputs	1 024

— Outputs, of which central

64

Hardware configuration

Expansion devices, max.	0
Number of DP masters	
• Integrated	2; 1 DP and 1 DP (drive)
• Via CP	2; for DP
Number of operable FMs and CPs (recommended)	
• FM	8
• CP, point-to-point	8
• CP, LAN	8
Rack	
• Racks, max.	1
• Modules per rack, max.	8

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
• to DP, slave	Yes; Only time-of-day slave
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes; As client

Digital inputs

Number of digital inputs	4
• of which, inputs usable for technological functions	4

Input characteristic curve in accordance with IEC 61131, type 1	Yes
horizontal installation	
— up to 40 °C, max.	4
— up to 60 °C, max.	4
vertical installation	
— up to 40 °C, max.	4
Input voltage	
• Rated value (DC)	24 V
• for signal "0"	-3 to +5V
Input current	
• for signal "1", typ.	7 mA
for counter/technological functions	
— at "0" to "1", max.	10 µs; Typical
— at "1" to "0", max.	10 µs; Typical
Cable length	
• shielded, max.	1 000 m
Digital outputs	
Number of digital outputs	8
• of which high-speed outputs	8
Functions	For technology functions, e.g. high-speed cam switch signals
short-circuit protection	Yes
• Response threshold, typ.	1 A
Limitation of inductive shutdown voltage to	48 V
Controlling a digital input	No
Switching capacity of the outputs	
• on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	4 kΩ
Output voltage	
• for signal "0", max.	3 V; (2L+)
• for signal "1", min.	Rated voltage -2.5 V
Output current	
• for signal "1" rated value	0.5 A
• for signal "1" permissible range for 0 to 60 °C, min.	5 mA
• for signal "1" permissible range for 0 to 60 °C, max.	0.6 A
• for signal "0" residual current, max.	0.3 mA
Parallel switching of 2 outputs	
• for increased power	No

• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.2 Hz; to IEC 947-5-1, DC-13
• on lamp load, max.	100 Hz
horizontal installation	
— up to 40 °C, max.	4 A
— up to 60 °C, max.	3 A
all other mounting positions	
— up to 40 °C, max.	4 A
Integrated high-speed cams	
• Switching accuracy, (+/-)	70 µs
Cable length	
• shielded, max.	1 000 m
Analog inputs	
Number of analog inputs	0
Analog outputs	
Number of analog outputs	0
Connectable encoders	
• 2-wire sensor	No
Interfaces	
Number of RS 422 interfaces	0
Number of other interfaces	0
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
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
User data per DP slave	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
DP slave	
• 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
Services	
— 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
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte

2nd 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	No
• DP master	Yes; DP(DRIVE)-Master
• DP slave	No
• Point-to-point connection	No

DP master	
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	64

Services	
— PG/OP communication	No
— Routing	No
— Global data communication	No
— S7 basic communication	No
— S7 communication	No
— Equidistance mode support	Yes
— Isochronous mode	Yes
— SYNC/FREEZE	No
— Activation/deactivation of DP slaves	Yes
— DPV1	No

Address area	
— Inputs, max.	1 024 byte
— Outputs, max.	1 024 byte

User data per DP slave	
— Inputs, max.	244 byte
— Outputs, max.	244 byte

DP slave	
• GSD file	http://support.automation.siemens.com in Product Support area
• Transmission rate, max.	12 Mbit/s

3rd interface

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
Media redundancy	
<ul style="list-style-type: none"> • supported • Switchover time on line break, typically • Number of stations in the ring, max. 	<ul style="list-style-type: none"> Yes 200 ms; PROFINET MRP 50
Functionality	
<ul style="list-style-type: none"> • MPI • DP master • DP slave • PROFINET IO Controller • PROFINET IO Device • Open IE communication • Web server <ul style="list-style-type: none"> — Number of HTTP clients 	<ul style="list-style-type: none"> No No No Yes; Also simultaneously with IO-Device functionality Yes; Also simultaneously with IO Controller functionality Yes; Via TCP/IP, ISO on TCP, and UDP Yes 5
PROFINET IO Controller	
<ul style="list-style-type: none"> • Transmission rate, max. • Number of connectable IO devices, max. • Max. number of connectable IO devices for RT <ul style="list-style-type: none"> — of which in line, max. • Number of IO Devices with IRT and the option "high performance", max. <ul style="list-style-type: none"> — of which in line, max. • Shared device • Prioritized startup <ul style="list-style-type: none"> — Number of IO Devices, max. • Activation/deactivation of IO Devices <ul style="list-style-type: none"> — Maximum number of IO devices that can be activated/deactivated at the same time. • IO Devices changing during operation (partner ports), supported <ul style="list-style-type: none"> — Max. number of IO devices per tool • Device replacement without swap medium • Send cycles 	<ul style="list-style-type: none"> 100 Mbit/s 128 128 128 64 64 Yes Yes 32 Yes 8 Yes 8 Yes 250 µs, 500 µs, 1 ms, 2 ms, 4 ms

<ul style="list-style-type: none"> 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)
Services	
— PG/OP communication	Yes
— Routing	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
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
— User data consistency, max.	1 024 byte
PROFINET IO Device	
Services	
— 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
— PROFlenergy	Yes; With SFB 73 / 74 prepared for loadable PROFlenergy standard FB for I-Device
— Shared device	Yes
— 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	
<ul style="list-style-type: none"> Number of connections, max. Local port numbers used at the system end Keep-alive function, supported 	<p>8</p> <p>0, 20, 21, 23, 25, 80, 102, 135, 161, 443, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535</p> <p>Yes</p>
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface

Communication functions

PG/OP communication	Yes
Data record routing	Yes
Global data communication	
<ul style="list-style-type: none"> supported 	Yes
<ul style="list-style-type: none"> Number of GD loops, max. 	8
<ul style="list-style-type: none"> Number of GD packets, max. 	8
<ul style="list-style-type: none"> Number of GD packets, transmitter, max. 	8
<ul style="list-style-type: none"> Number of GD packets, receiver, max. 	8
<ul style="list-style-type: none"> Size of GD packets, max. 	22 byte
<ul style="list-style-type: none"> Size of GD packet (of which consistent), max. 	22 byte
S7 basic communication	
<ul style="list-style-type: none"> supported 	Yes
<ul style="list-style-type: none"> User data per job, max. 	76 byte
<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> supported 	Yes
<ul style="list-style-type: none"> as server 	Yes
<ul style="list-style-type: none"> As client 	Yes; via integrated PROFINET interface and loadable FB or via CP and loadable FB
<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> supported 	Yes; via CP and loadable FC
Open IE communication	
<ul style="list-style-type: none"> TCP/IP <ul style="list-style-type: none"> Number of connections, max. Data length for connection type 01H, max. Data length for connection type 11H, max. Several passive connections per port, supported 	Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte Yes
<ul style="list-style-type: none"> ISO-on-TCP (RFC1006) <ul style="list-style-type: none"> Number of connections, max. Data length, max. 	Yes; via integrated PROFINET interface and loadable FBs 8 32 768 byte
<ul style="list-style-type: none"> UDP <ul style="list-style-type: none"> Number of connections, max. Data length, max. 	Yes; via integrated PROFINET interface and loadable FBs 8 1 472 byte
Web server	
<ul style="list-style-type: none"> supported 	Yes
<ul style="list-style-type: none"> Number of HTTP clients 	5
<ul style="list-style-type: none"> User-defined websites 	Yes

Number of connections	
• 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; without continuation
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
Interrupts/diagnostics/status information	
Alarms	
• Alarms	No
Diagnostic messages	
• Diagnostic functions	No
Diagnostics indication LED	
• Status indicator digital output (green)	Yes
• Status indicator digital input (green)	Yes
Galvanic isolation	
Galvanic isolation digital inputs	
• between the channels and the backplane bus	Yes
Galvanic isolation digital outputs	
• between the channels and the backplane bus	Yes
Permissible potential difference	
between different circuits	75V DC/60V AC
Isolation	
Isolation checked with	500 V DC
Ambient conditions	
Ambient temperature in operation	
• Min.	0 °C
• max.	60 °C
Configuration	
Configuration software	
• STEP 7	Yes
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	120 mm
Height	125 mm
Depth	130 mm

Weights

Weight, approx.	640 g
-----------------	-------

last modified: 12.03.2015