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Data sheet

SIMATIC S7-300, CPU 317T-3 PN/DP, CENTRAL PROCESSING UNIT FOR PLC AND TECHNOLOGY, 1024 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

General information	
Hardware product version	01
Firmware version	CPU: V3.2; integrated technology V4.1.5
Engineering with	
• Programming package	STEP 7 V5.5 SP2 or higher and S7-Technology option package V4.2 SP3

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 power supply lines (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+

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— 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
I²t	1 A²·s

Power loss

Power loss, typ.	7.5 W

Memory

Work memory

• integrated	1 024 kbyte
• expandable	No
• Size of retentive memory for retentive data blocks	256 kbyte

Load memory

• Plug-in (MMC)	Yes
• Plug-in (MMC), max.	8 Mbyte
• Data management on MMC (after last programming), min.	10 y

Backup

• present	Yes; Guaranteed by MMC (maintenance-free)
• without battery	Yes; Program and data

CPU processing times

for bit operations, typ.	0.025 µs
for word operations, typ.	0.03 µs
for fixed point arithmetic, typ.	0.04 µs
for floating point arithmetic, typ.	0.16 µs

CPU-blocks

Number of blocks (total)	2 048; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.

DB

• Number, max.	2 048; Number range: 1 to 16000
• Size, max.	64 kbyte

FB

• Number, max.	2 048; Number range: 0 to 7999
• Size, max.	64 kbyte

FC

• Number, max.	2 048; Number range: 0 to 7999
• Size, max.	64 kbyte

OB

• Description	see instruction list

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• 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 cyclic 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 of 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	512
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	511
— 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	512
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	511
— 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	
retentive data area in total	All, max. 256 KB
Flag	
• Number, max.	4 096 byte
• Retentivity available	Yes; From MB 0 to MB 4095
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte
Data blocks	
• Number, max.	2 048; 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	8 192 byte
• Outputs	8 192 byte
of which distributed	
— Inputs	8 192 byte
— Outputs	8 192 byte
Process image	
• Inputs	8 192 byte
• Outputs	8 192 byte
• Inputs, adjustable	8 192 byte
• Outputs, adjustable	8 192 byte
• Inputs, default	256 byte
• Outputs, default	256 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	65 536

— of which central	256
• Outputs	65 536
— of which central	256

Analog channels	
• Inputs	4 096
— of which central	64
• Outputs	4 096
— of which central	64

Hardware configuration	
Number of expansion units, 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
• retentive and synchronizable	Yes
• Backup time	6 wk; At 40 °C ambient temperature
• Deviation per day, max.	10 s; Typ.: 2 s
• 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	4
• Number/Number range	0 to 3
• 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

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• 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
Number of simultaneously controllable inputs	
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
• for signal "1"	+15 to +30V
Input current	
• for signal "1", typ.	7 mA
Input delay (for rated value of input voltage)	
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 two outputs	
• for uprating	No
• for redundant control of a load	No
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.2 Hz; According to IEC 60947-5-1, DC-13
• on lamp load, max.	100 Hz
Total current of the outputs (per group)	
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

Encoder	
Connectable encoders	
• 2-wire sensor	No

Interfaces	
Number of industrial Ethernet interfaces	1
Number of RS 485 interfaces	2
Number of RS 422 interfaces	0

1. 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.	8 kbyte
— Outputs, max.	8 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

2. 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
3. Interface	
Interface type	PROFINET
Physics	Ethernet RJ45
Isolated	Yes
automatic detection of transmission rate	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	Yes
Interface types	
• Number of ports	2
• integrated switch	Yes
Media redundancy	
• supported	Yes
• Switchover time on line break, typ.	200 ms; PROFINET MRP
• Number of stations in the ring, max.	50
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
• Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
• Web server	Yes
— Number of HTTP clients	5
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes

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— S7 communication	Yes; with loadable FBs, max. configurable connections: 16, 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
— Shared device	Yes
— Number of connectable IO Devices, max.	128
— Number of IO Devices with IRT and the option "high performance", max.	64
— of which in line, max.	64
— Number of connectable IO Devices for RT, max.	128
— of which in line, max.	128
— Prioritized startup	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
— Number of IO Devices per tool, max.	8
— Device replacement without swap medium	Yes
— Send cycles	250 µs, 500 µs, 1 ms, 2 ms, 4 ms
— 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	
— Inputs, max.	8 kbyte
— Outputs, max.	8 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: 16, max. number of instances: 32
— Isochronous mode	No
— Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
— IRT	Yes
— PROFIenergy	Yes; With SFB 73 / 74 prepared for loadable PROFIenergy 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	
• Number of connections, max.	16
• 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
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	
• 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.	16
— 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.	16
— Data length, max.	32 768 byte
• UDP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	16
— Data length, max.	1 472 byte

Web server	
• supported	Yes
• Number of HTTP clients	5
• User-defined websites	Yes

Number of connections	
• overall	32
• usable for PG communication	31
— reserved for PG communication	1
— adjustable for PG communication, min.	1
— adjustable for PG communication, max.	31
• usable for OP communication	31
— reserved for OP communication	1
— adjustable for OP communication, min.	1
— adjustable for OP communication, max.	31
• usable for S7 basic communication	30
— reserved for S7 basic communication	0
— adjustable for S7 basic communication, min.	0
— adjustable for S7 basic communication, max.	30
• usable for S7 communication	16
— reserved for S7 communication	0
— adjustable for S7 communication, min.	0
— adjustable for S7 communication, max.	16
• total number of instances, max.	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.	32; Depending on the configured connections for PG/OP and S7 basic communication

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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
• Forcing, 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	No
Diagnostic functions	No

Diagnostics indication LED

• Status indicator digital output (green)	Yes
• Status indicator digital input (green)	Yes

Potential separation

Potential separation digital inputs

• between the channels and backplane bus	Yes

Potential separation digital outputs

• between the channels and backplane bus	Yes

Permissible potential difference

between different circuits	75 V DC/60 V AC

Isolation

Isolation tested with	500 V DC

Ambient conditions

Ambient temperature during operation

• min.	0 °C
• max.	60 °C

Configuration

Configuration software

• STEP 7	Yes; STEP 7 V5.5 SP2 or higher and S7-Technology option package V4.2 SP3

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

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