SIEMENS

Data sheet

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SIMATIC S7-300, CPU 317TF-3 PN/DP, CENTRAL PROCESSING UNIT FOR PLC, TECHNOLOGY AND SAFETY, 1,5 MBYTE 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
Engineering with	
• Programming package	STEP 7 V5.5 SP2 or higher; S7-Technology option package V4.2 SP3 or higher, Distributed Safety V5.4 SP5 or higher, S7-F Configuration Pack V5.5 SP10 or higher

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)	1 100 mA

Current consumption (in no-load operation), typ.	270 mA
Inrush current, typ.	6.5 A
I²t	1 A²·s

Power losses

Power loss, typ.	8.5 W

Memory

Work memory

• Integrated	1 536 kbyte
• expandable	No
• Size of retentive memory for retentive data blocks	256 kbyte

Load memory

• pluggable (MMC)	Yes
• pluggable (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
• 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 - 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	
— can be set	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	
— can be set	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	
Total retentive data area	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	1 024 byte
● Outputs, default	1 024 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
— Inputs, of which central	256
● Outputs	65 536
— Outputs, of which central	256

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

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

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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	
● supported	Yes
● Switchover time on line break, typically	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
● 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 performance", max.	64
— of which in line, max.	64
● Shared device	Yes
● Prioritized startup	Yes
— Number of IO Devices, max.	32
● Activation/deactivation of IO Devices	Yes
— Maximum number of IO devices that can be activated/deactivated at the same time.	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
• 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: 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
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

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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
● 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.	32; 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
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