

*** SPARE PART*** SIMATIC S7-300 CPU 319-3 PN/DP, CENTRAL PROCESSING UNIT WITH 1,4 MBYTE WORKING MEMORY, 1. INTERFACE MPI/DP 12MBIT/S, 2. INTERFACE DP-MASTER/SLAVE, 3. INTERFACE ETHERNET PROFINET, MICRO MEMORY CARD NECESSARY



General information	
Hardware product version	09
Firmware version	V2.8
Engineering with	
<ul style="list-style-type: none"> Programming package 	STEP 7 V5.4 + SP5 or higher or STEP 7 V5.4 + SP4 or higher with HSP 186
Supply voltage	
Rated value (DC)	
<ul style="list-style-type: none"> 24 V DC 	Yes
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
external protection for power supply lines (recommendation)	2 A min.
Input current	
Current consumption (rated value)	1 050 mA
Current consumption (in no-load operation), typ.	400 mA
Inrush current, typ.	4 A
I^2t	1.2 A ² ·s

Power loss	
Power loss, typ.	14 W
Memory	
Work memory	
<ul style="list-style-type: none"> integrated 	1 400 kbyte
<ul style="list-style-type: none"> expandable 	No
<ul style="list-style-type: none"> Size of retentive memory for retentive data blocks 	700 kbyte
Load memory	
<ul style="list-style-type: none"> Plug-in (MMC) 	Yes
<ul style="list-style-type: none"> Plug-in (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.	0.01 μ s
for word operations, typ.	0.02 μ s
for fixed point arithmetic, typ.	0.02 μ s
for floating point arithmetic, typ.	0.04 μ s
CPU-blocks	
Number of blocks (total)	4 096; (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. 	4 096; Number range: 1 to 16000
<ul style="list-style-type: none"> Size, max. 	64 kbyte
FB	
<ul style="list-style-type: none"> Number, max. 	4 096; Number range: 0 to 7999
<ul style="list-style-type: none"> Size, max. 	64 kbyte
FC	
<ul style="list-style-type: none"> Number, max. 	4 096; Number range: 0 to 7999
<ul style="list-style-type: none"> Size, max. 	64 kbyte
OB	
<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 cyclic interrupt OBs 	4; OB 32, 33, 34, 35 (OB 35: smallest settable clock pulse = 500 μ s)
<ul style="list-style-type: none"> 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
• 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	2 048
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— 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	2 048
Retentivity	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— 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. 700 KB
Flag	

• Number, max.	8 192 byte
• Retentivity available	Yes; from MB 0 to MB 8191
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte
Data blocks	
• Number, max.	4 096; 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
Subprocess images	
• Number of subprocess images, max.	1
Digital channels	
• Inputs	65 536
— of which central	1 024
• Outputs	65 536
— of which central	1 024
Analog channels	
• Inputs	4 096
— of which central	256
• Outputs	4 096
— of which central	256
Hardware configuration	
Number of expansion units, max.	3
Number of DP masters	
• integrated	2

• via CP	4
Number of operable FMs and CPs (recommended)	
• FM	8
• CP, PtP	8
• CP, LAN	10
Rack	
• Racks, max.	4
• Modules per rack, max.	8
Time of day	
Clock	
• Hardware clock (real-time)	Yes
• retentive and synchronizable	Yes
• Backup time	6 wk; At 40 °C ambient temperature
• Deviation per day, max.	10 s
• 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; 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
Digital inputs	
integrated channels (DI)	0
Digital outputs	
integrated channels (DO)	0
Analog inputs	
integrated channels (AI)	0
Analog outputs	
integrated channels (AO)	0
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.	150 mA

Functionality	
• MPI	Yes
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
• Point-to-point connection	No

MPI	
• Number of connections	32
• 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	Yes
— Isochronous mode	No
— 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; with interface active
— 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
• PROFINET IO Controller	No
• PROFINET IO Device	No
• PROFINET CBA	No
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
• Open IE communication	No

• Web server	No
• Point-to-point connection	No
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; Connection configured on one side only
— Equidistance	Yes
— Isochronous mode	Yes; OB 61
— 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	
• GSD file	The latest GSD file is available at: http://www.siemens.com/profibus-gsd
• 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; with interface active
— 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

3. Interface

Interface type	PROFINET
Physics	Ethernet RJ45
Isolated	Yes
automatic detection of transmission rate	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Interface types	
• Number of ports	1
• integrated switch	No
Functionality	
• MPI	No
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	Yes
• PROFIBUS DP master	No
• PROFIBUS DP slave	No
• Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
• Web server	Yes; only read function
— Number of HTTP clients	5
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
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
— Prioritized startup	Yes
— Number of IO devices with prioritized startup, max.	32
— Number of connectable IO Devices, max.	256
— Number of IO Devices with IRT and the option "high flexibility"	256

— of which in line, max.	61
— Number of connectable IO Devices for RT, max.	256
— of which in line, max.	256
— 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
— Updating time	250 µs - 128 ms (with send cycle of 250 µs); 500 µs - 256 ms (with send cycle of 500 µs); 1 ms - 512 ms (with send cycle 1 ms); minimum value of the send cycle is also dependent on the set communication share for PROFINET IO, on the number of I/O devices, and on the volume of configured user data.

Address area

— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
— User data consistency, max.	254 byte

PROFINET CBA

• acyclic transmission	Yes
• cyclic transmission	Yes

Open IE communication

• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535

Isochronous mode

Isochronous operation (application synchronized up to terminal)	Yes; Via 2nd DP interface
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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	
<ul style="list-style-type: none"> • supported • User data per job, max. • User data per job (of which consistent), max. 	<p>Yes</p> <p>76 byte</p> <p>76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)</p>
S7 communication	
<ul style="list-style-type: none"> • supported • as server • as client • User data per job, max. 	<p>Yes</p> <p>Yes</p> <p>Yes; via integrated PROFINET interface and loadable FB or via CP and loadable FB</p> <p>See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)</p>
S5 compatible communication	
<ul style="list-style-type: none"> • supported 	<p>Yes; via CP and loadable FC</p>
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. • ISO-on-TCP (RFC1006) <ul style="list-style-type: none"> — Number of connections, max. — Data length, max. • UDP <ul style="list-style-type: none"> — Number of connections, max. — Data length, max. 	<p>Yes; via integrated PROFINET interface and loadable FBs</p> <p>32</p> <p>1 460 byte</p> <p>8 192 byte</p> <p>Yes; via integrated PROFINET interface and loadable FBs</p> <p>32</p> <p>8 192 byte</p> <p>Yes; via integrated PROFINET interface and loadable FBs</p> <p>32</p> <p>1 472 byte</p>
Web server	
<ul style="list-style-type: none"> • supported • Number of HTTP clients 	<p>Yes; only read function</p> <p>5</p>
PROFINET CBA (at set setpoint communication load)	
<ul style="list-style-type: none"> • Setpoint for the CPU communication load • Number of remote interconnection partners • Number of functions, master/slave • Total of all master/slave connections • Data length of all incoming connections master/slave, max. • Data length of all outgoing connections master/slave, max. • Number of device-internal and PROFIBUS interconnections • Data length of device-internal und PROFIBUS interconnections, max. • Data length per connection, max. 	<p>20 %</p> <p>32</p> <p>50</p> <p>3 000</p> <p>24 000 byte</p> <p>24 000 byte</p> <p>1 000</p> <p>8 000 byte</p> <p>1 400 byte</p>
Remote interconnections with acyclic transmission	

— Sampling frequency: Sampling time, min.	200 ms
— Number of incoming interconnections	100
— Number of outgoing interconnections	100
— Data length of all incoming interconnections, max.	3 200 byte
— Data length of all outgoing interconnections, max.	3 200 byte
— Data length per connection, max.	1 400 byte
Remote interconnections with cyclic transmission	
— Transmission frequency: Transmission interval, min.	1 ms
— Number of incoming interconnections	300
— Number of outgoing interconnections	300
— Data length of all incoming interconnections, max.	4 800 byte
— Data length of all outgoing interconnections, max.	4 800 byte
— Data length per connection, max.	250 byte
HMI variables via PROFINET (acyclic)	
— 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	600
— Data length of all HMI variables, max.	9 600 byte
PROFIBUS proxy functionality	
— supported	Yes
— Number of linked PROFIBUS devices	32
— Data length per connection, max.	240 byte; Slave-dependent
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

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

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
 - adjustable No
 - of which powerfail-proof 100
- Number of entries readable in RUN, max.
 - can be set Yes; From 10 to 499
 - preset 10

Service data

- can be read out Yes

Ambient conditions

Ambient temperature during operation	
• min.	0 °C
• max.	60 °C

Configuration

Configuration software	
• STEP 7	Yes; V5.4 SP4 or higher with HW update
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
Dimensions	
Width	120 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	1 250 g
last modified:	03/23/2017