



\*\*\*Spare part\*\*\* SIMATIC S7-300 CPU 319-3 PN/DP, Central processing unit with 1.4MB memory, 1st interface MPI/DP 12 Mbit/s, 2nd interface DP master/slave 3rd interface Ethernet PROFINET, Micro Memory Card required

General information	
HW functional status	09
Firmware version	V2.8
Product function	
<ul style="list-style-type: none"> <li>• Isochronous mode</li> </ul>	Yes; Via 2nd DP interface
Engineering with	
<ul style="list-style-type: none"> <li>• Programming package</li> </ul>	STEP 7 V5.4 + SP5 or higher or STEP 7 V5.4 + SP4 or higher with HSP 186
Supply voltage	
Rated value (DC)	24 V
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 <sup>2</sup> ·s
Power loss	
Power loss, typ.	14 W
Memory	
Work memory	
<ul style="list-style-type: none"> <li>• integrated</li> </ul>	1 400 kbyte
<ul style="list-style-type: none"> <li>• expandable</li> </ul>	No
Load memory	
<ul style="list-style-type: none"> <li>• Plug-in (MMC)</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Plug-in (MMC), max.</li> </ul>	8 Mbyte
<ul style="list-style-type: none"> <li>• Data management on MMC (after last programming), min.</li> </ul>	10 y
Backup	
<ul style="list-style-type: none"> <li>• present</li> </ul>	Yes; Guaranteed by MMC (maintenance-free)
<ul style="list-style-type: none"> <li>• without battery</li> </ul>	Yes; Program and data
CPU processing times	
for bit operations, typ.	0.01 μs
for word operations, typ.	0.02 μs
for fixed point arithmetic, typ.	0.02 μs
for floating point arithmetic, typ.	0.04 μs
CPU-blocks	
Number of blocks (total)	4 096; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.

<b>DB</b>	
<ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>	4 096; Number range: 1 to 16000 64 kbyte
<b>FB</b>	
<ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>	4 096; Number range: 0 to 7999 64 kbyte
<b>FC</b>	
<ul style="list-style-type: none"> <li>• Number, max.</li> <li>• Size, max.</li> </ul>	4 096; Number range: 0 to 7999 64 kbyte
<b>OB</b>	
<ul style="list-style-type: none"> <li>• Size, max.</li> <li>• Number of free cycle OBs</li> <li>• Number of time alarm OBs</li> <li>• Number of delay alarm OBs</li> <li>• Number of cyclic interrupt OBs</li> <li>• Number of process alarm OBs</li> <li>• Number of DPV1 alarm OBs</li> <li>• Number of isochronous mode OBs</li> <li>• Number of startup OBs</li> <li>• Number of asynchronous error OBs</li> <li>• Number of synchronous error OBs</li> </ul>	64 kbyte 1; OB 1 1; OB 10 2; OB 20, 21 4; OB 32, 33, 34, 35 (OB 35: smallest settable clock pulse = 500 µs) 1; OB 40 3; OB 55, 56, 57 1; OB 61 1; OB 100 6; OB 80, 82, 83, 85, 86, 87 (OB83 only for PROFINET IO) 2; OB 121, 122
<b>Nesting depth</b>	
<ul style="list-style-type: none"> <li>• per priority class</li> <li>• additional within an error OB</li> </ul>	16 4
<b>Counters, timers and their retentivity</b>	
<b>S7 counter</b>	
<ul style="list-style-type: none"> <li>• Number</li> </ul>	2 048
<b>Retentivity</b>	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	Z 0 to Z 7
<b>Counting range</b>	
— adjustable	Yes
— lower limit	0
— upper limit	999
<b>IEC counter</b>	
<ul style="list-style-type: none"> <li>• present</li> <li>• Type</li> <li>• Number</li> </ul>	Yes SFB Unlimited (limited only by RAM capacity)
<b>S7 times</b>	
<ul style="list-style-type: none"> <li>• Number</li> </ul>	2 048
<b>Retentivity</b>	
— adjustable	Yes
— lower limit	0
— upper limit	2 047
— preset	No retentivity
<b>Time range</b>	
— lower limit	10 ms
— upper limit	9 990 s
<b>IEC timer</b>	
<ul style="list-style-type: none"> <li>• present</li> <li>• Type</li> <li>• Number</li> </ul>	Yes SFB Unlimited (limited only by RAM capacity)
<b>Data areas and their retentivity</b>	
Retentive data area (incl. timers, counters, flags), max.	700 kbyte
<b>Flag</b>	
<ul style="list-style-type: none"> <li>• Size, max.</li> <li>• Retentivity available</li> <li>• Retentivity preset</li> <li>• Number of clock memories</li> </ul>	8 192 byte Yes; From MB 0 to MB 8 191 MB 0 to MB 15 8; 1 memory byte
<b>Data blocks</b>	
<ul style="list-style-type: none"> <li>• Retentivity adjustable</li> </ul>	Yes; via non-retain property on DB

• Retentivity preset	Yes
<b>Local data</b>	
• per priority class, max.	32 768 byte; Max. 2048 bytes per block
<b>Address area</b>	
<b>I/O address area</b>	
• Inputs	8 192 byte
• Outputs	8 192 byte
of which distributed	
— Inputs	8 192 byte
— Outputs	8 192 byte
<b>Process image</b>	
• 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
<b>Subprocess images</b>	
• Number of subprocess images, max.	1
<b>Digital channels</b>	
• Inputs	65 536
— of which central	1 024
• Outputs	65 536
— of which central	1 024
<b>Analog channels</b>	
• Inputs	4 096
— of which central	256
• Outputs	4 096
— of which central	256
<b>Hardware configuration</b>	
Number of expansion units, max.	3
<b>Number of DP masters</b>	
• integrated	2
• via CP	4
<b>Number of operable FMs and CPs (recommended)</b>	
• FM	8
• CP, PtP	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)	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	the clock continues at the time of day it had when power was switched off
<b>Operating hours counter</b>	
• Number	4
• Number/Number range	0 to 3
• Range of values	0 to 2 <sup>31</sup> hours (when using SFC 101)
• Granularity	1 h
• 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>	
integrated channels (DI)	0
<b>Digital outputs</b>	
integrated channels (DO)	0
<b>Analog inputs</b>	
integrated channels (AI)	0
<b>Analog outputs</b>	
integrated channels (AO)	0
<b>Interfaces</b>	
Number of industrial Ethernet interfaces	1
Number of PROFINET interfaces	1
Number of RS 485 interfaces	2
Number of RS 422 interfaces	0
<b>1. Interface</b>	
Interface type	Integrated RS 485 interface
Isolated	Yes
<b>Interface types</b>	
• RS 485	Yes
• Output current of the interface, max.	150 mA
<b>Protocols</b>	
• MPI	Yes
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
• Point-to-point connection	No
<b>MPI</b>	
• Number of connections	32
• Transmission rate, max.	12 Mbit/s
<b>Services</b>	
— 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
<b>PROFIBUS DP master</b>	
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	124
<b>Services</b>	
— 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
<b>Address area</b>	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
<b>User data per DP slave</b>	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
<b>PROFIBUS DP slave</b>	

<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> </ul>	12 Mbit/s
<ul style="list-style-type: none"> <li>• automatic baud rate search</li> </ul>	Yes; only with passive interface
<ul style="list-style-type: none"> <li>• Address area, max.</li> </ul>	32
<ul style="list-style-type: none"> <li>• User data per address area, max.</li> </ul>	32 byte
<b>Services</b>	
— 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
<b>Transfer memory</b>	
— Inputs	244 byte
— Outputs	244 byte
<b>2. Interface</b>	
Interface type	Integrated RS 485 interface
Isolated	Yes
<b>Interface types</b>	
<ul style="list-style-type: none"> <li>• RS 485</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Output current of the interface, max.</li> </ul>	200 mA
<b>Protocols</b>	
<ul style="list-style-type: none"> <li>• MPI</li> </ul>	No
<ul style="list-style-type: none"> <li>• PROFINET IO Controller</li> </ul>	No
<ul style="list-style-type: none"> <li>• PROFINET IO Device</li> </ul>	No
<ul style="list-style-type: none"> <li>• PROFINET CBA</li> </ul>	No
<ul style="list-style-type: none"> <li>• PROFIBUS DP master</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• PROFIBUS DP slave</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Open IE communication</li> </ul>	No
<ul style="list-style-type: none"> <li>• Web server</li> </ul>	No
<ul style="list-style-type: none"> <li>• Point-to-point connection</li> </ul>	No
<b>PROFIBUS DP master</b>	
<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> </ul>	12 Mbit/s
<ul style="list-style-type: none"> <li>• Number of DP slaves, max.</li> </ul>	124
<b>Services</b>	
— 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
<b>Address area</b>	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
<b>User data per DP slave</b>	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
<b>PROFIBUS DP slave</b>	
<ul style="list-style-type: none"> <li>• GSD file</li> </ul>	The latest GSD file is available at: <a href="http://www.siemens.com/profibus-gsd">http://www.siemens.com/profibus-gsd</a>
<ul style="list-style-type: none"> <li>• Transmission rate, max.</li> </ul>	12 Mbit/s
<ul style="list-style-type: none"> <li>• automatic baud rate search</li> </ul>	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; 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
<b>Transfer memory</b>	
— Inputs	244 byte
— Outputs	244 byte

### 3. Interface

Interface type	PROFINET
Isolated	Yes
automatic detection of transmission rate	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
<b>Interface types</b>	
• RJ 45 (Ethernet)	Yes
• Number of ports	1
• integrated switch	No
<b>Protocols</b>	
• 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
<b>PROFINET IO Controller</b>	
• Transmission rate, max.	100 Mbit/s
<b>Services</b>	
— PG/OP communication	Yes
— Routing	Yes
— S7 communication	Yes; with loadable FBs, max. configurable connections: 16, max. number of instances: 32
— Isochronous mode	No
— 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.

<b>Address area</b>	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
— User data consistency, max.	254 byte
<b>PROFINET CBA</b>	
• acyclic transmission	Yes
• cyclic transmission	Yes
<b>Open IE communication</b>	
• 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
<b>Protocols</b>	
PROFIsafe	No
<b>Open IE communication</b>	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	32
— Data length for connection type 01H, max.	1 460 byte
— Data length for connection type 11H, max.	8 192 byte
• ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	32
— Data length, max.	8 192 byte
• UDP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	32
— Data length, max.	1 472 byte
<b>Web server</b>	
• supported	Yes; only read function
• Number of HTTP clients	5
<b>communication functions / header</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>communication functions / PROFINET CBA (with set target communication load) / header</b>	
• Setpoint for the CPU communication load	20 %
• number of remote connection partners / with PROFINET CBA	32
• number of technological functions / with PROFINET CBA / for master or slave	50
• number of connections / with PROFINET CBA / for master or slave / total	3 000
• data volume / of the input variables / with PROFINET CBA / for master or slave	24 000 byte
• data volume / of the output variables / with PROFINET CBA / for master or slave	24 000 byte
• number of internal and PROFIBUS interconnections	1 000

/ with PROFINET CBA / maximum	
● data volume / of internal and PROFIBUS interconnections / with PROFINET CBA / for master or slave	8 000 byte
● data volume / with PROFINET CBA / per connection / maximum	1 400 byte
<b>performance data / PROFINET CBA / remote interconnection / with acyclic transfer / header</b>	
— update time / of the remote interconnections / in the case of acyclic transmission / with PROFINET CBA	200 ms
— number of remote connections to input variables / in the case of acyclic transmission / with PROFINET CBA / maximum	100
— number of remote connections to output variables / in the case of acyclic transmission / with PROFINET CBA / maximum	100
— data volume / as user data for remote interconnections with input variables / in the case of acyclic transmission / with PROFINET CBA	3 200 byte
— data volume / as user data for remote interconnections with output variables / in the case of acyclic transmission / with PROFINET CBA	3 200 byte
— data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum	1 400 byte
<b>performance data / PROFINET CBA / remote interconnection / with cyclic transfer / header</b>	
— update time / of the remote interconnections / with cyclical transfer / with PROFINET CBA	1 ms
— number of remote connections to input variables / with PROFINET CBA / with cyclic transfer / maximum	300
— number of remote connections to output variables / with cyclical transfer / with PROFINET CBA / maximum	300
— data volume / as user data for remote interconnections with input variables / with cyclical transfer / with PROFINET CBA / maximum	4 800 byte
— data volume / as user data for remote interconnections with output variables / with cyclical transfer / with PROFINET CBA / maximum	4 800 byte
— data volume / as user data for remote interconnections / with cyclical transfer / with PROFINET CBA / per connection / maximum	250 byte
<b>performance data / PROFINET CBA / HMI variables via PROFINET / acyclic / header</b>	
— number of connectable HMI stations / for HMI variables / in the case of acyclic transmission / with PROFINET CBA	3; 2x PN OPC/1x iMap
— update time / of the HMI variables / in the case of acyclic transmission / with PROFINET CBA	500 ms
— number of HMI variables / in the case of acyclic transmission / with PROFINET CBA / maximum	600
— data volume / as user data for HMI variables / in the case of acyclic transmission / with PROFINET CBA / maximum	9 600 byte
<b>performance data / PROFINET CBA / PROFIBUS proxy functionality / header</b>	
— product function / with PROFINET CBA / PROFIBUS proxy functionality	Yes
— number of coupled PROFIBUS devices / with PROFIBUS functionality	32
— data volume / with PROFIBUS proxy functionality / with PROFINET CBA / per connection / maximum	240 byte; Slave-dependent
<b>Number of connections</b>	
● overall	32
● usable for PG communication	31
— reserved for PG communication	1
— adjustable for PG communication, min.	1
— adjustable for PG communication, max.	31

<ul style="list-style-type: none"> <li>• usable for OP communication <ul style="list-style-type: none"> <li>— reserved for OP communication</li> <li>— adjustable for OP communication, min.</li> <li>— adjustable for OP communication, max.</li> </ul> </li> <li>• usable for S7 basic communication <ul style="list-style-type: none"> <li>— reserved for S7 basic communication</li> <li>— adjustable for S7 basic communication, min.</li> <li>— adjustable for S7 basic communication, max.</li> </ul> </li> <li>• usable for S7 communication <ul style="list-style-type: none"> <li>— reserved for S7 communication</li> <li>— adjustable for S7 communication, min.</li> <li>— adjustable for S7 communication, max.</li> </ul> </li> <li>• total number of instances, max.</li> </ul>	31 1 1 31 30 0 0 30 16 0 0 16 32
<b>S7 message functions</b>	
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
<b>Test commissioning functions</b>	
Status block	Yes; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
<b>Status/control</b>	
<ul style="list-style-type: none"> <li>• Status/control variable</li> <li>• Variables</li> <li>• Number of variables, max. <ul style="list-style-type: none"> <li>— of which status variables, max.</li> <li>— of which control variables, max.</li> </ul> </li> </ul>	Yes Inputs, outputs, memory bits, DB, times, counters 30 30 14
<b>Forcing</b>	
<ul style="list-style-type: none"> <li>• Forcing</li> <li>• Forcing, variables</li> <li>• Number of variables, max.</li> </ul>	Yes Inputs, outputs 10
<b>Diagnostic buffer</b>	
<ul style="list-style-type: none"> <li>• present</li> <li>• Number of entries, max. <ul style="list-style-type: none"> <li>— adjustable</li> <li>— of which powerfail-proof</li> </ul> </li> <li>• Number of entries readable in RUN, max. <ul style="list-style-type: none"> <li>— adjustable</li> <li>— preset</li> </ul> </li> </ul>	Yes 500 No 100 Yes; From 10 to 499 10
<b>Service data</b>	
<ul style="list-style-type: none"> <li>• can be read out</li> </ul>	Yes
<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
<ul style="list-style-type: none"> <li>• min.</li> <li>• max.</li> </ul>	0 °C 60 °C
<b>configuration / header</b>	
<b>Configuration software</b>	
<ul style="list-style-type: none"> <li>• STEP 7</li> </ul>	Yes; V5.4 SP4 or higher with HW update
<b>configuration / programming / header</b>	
<ul style="list-style-type: none"> <li>• Command set</li> <li>• Nesting levels</li> <li>• System functions (SFC)</li> <li>• System function blocks (SFB)</li> </ul>	see instruction list 8 see instruction list see instruction list
<b>Programming language</b>	
<ul style="list-style-type: none"> <li>— LAD</li> <li>— FBD</li> <li>— STL</li> <li>— SCL</li> <li>— CFC</li> <li>— GRAPH</li> <li>— HiGraph®</li> </ul>	Yes Yes Yes Yes Yes Yes Yes
<b>Know-how protection</b>	

• User program protection/password protection

Yes

#### Dimensions

Width	120 mm
Height	125 mm
Depth	130 mm

#### Weights

Weight, approx.	1 250 g
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**last modified:**

4/1/2022 