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Data sheet 6ES7318-3EL01-0AB0

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

General information	
Firmware version	V3.2
Product function	
● Isochronous mode	Yes; Via 2nd PROFIBUS DP or PROFINET interface
Engineering with	
● Programming package	STEP 7 V5.5 or higher
Supply voltage	
Rated value (DC)	24 V
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.
Mains buffering	
● Mains/voltage failure stored energy time	5 ms
● Repeat rate, min.	1 s
Input current	
Current consumption (rated value)	1 250 mA
Current consumption (in no-load operation), typ.	500 mA
Inrush current, typ.	4 A
I^2t	1.2 $A^2 \cdot s$
Power loss	
Power loss, typ.	14 W
Memory	
Work memory	
● integrated	2 048 kbyte
● expandable	No
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
● without battery	Yes
CPU processing times	
for bit operations, typ.	0.004 µs
for word operations, typ.	0.01 µs
for fixed point arithmetic, typ.	0.01 µs

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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.
DB	
● Number, max.	4 096; Number range: 1 to 16000
● Size, max.	64 kbyte
FB	
● Number, max.	4 096; Number range: 0 to 7999
● Size, max.	64 kbyte
FC	
● Number, max.	4 096; Number range: 0 to 7999
● Size, max.	64 kbyte
OB	
● 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 (OB 35: smallest settable clock pulse = 500 µs)
● 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	
— adjustable	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)

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Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	700 kbyte
Flag	
● Size, max.	8 192 byte
● Retentivity available	Yes; From MB 0 to MB 8 191
● Retentivity preset	MB 0 to MB 15
● Number of clock memories	8; 1 memory byte
Data blocks	
● 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; With PROFINET IO, the length of the user data is limited to 1600 bytes
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 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; Typ.: 2 s
● Behavior of the clock following POWER-ON	Clock continues running after POWER OFF
● Behavior of the clock following expiry of backup	Clock continues to run with the time at which the power failure occurred

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period	
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 h
● 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	
Number of digital inputs	0
Digital outputs	
Number of digital outputs	0
Analog inputs	
Number of analog inputs	0
Analog outputs	
Number of analog outputs	0
Interfaces	
Number of industrial Ethernet interfaces	1; 2 ports (switch) RJ45
Number of PROFINET interfaces	1; 2 ports (switch) RJ45
Number of RS 485 interfaces	2; Combined MPI / PROFIBUS DP and PROFIBUS DP
Number of RS 422 interfaces	0
1. Interface	
Interface type	Integrated RS 485 interface
Isolated	Yes
Interface types	
● RS 485	Yes
● Output current of the interface, max.	150 mA
Protocols	
● MPI	Yes
● PROFIBUS DP master	Yes
● PROFIBUS DP slave	Yes; A DP slave at both interfaces simultaneously is not possible
● 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
PROFIBUS 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

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— 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
PROFIBUS 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
Isolated	Yes
Interface types	
● RS 485	Yes
● Output current of the interface, max.	200 mA
Protocols	
● MPI	No
● PROFINET IO Controller	No
● PROFINET IO Device	No
● PROFINET CBA	No
● PROFIBUS DP master	Yes
● PROFIBUS DP slave	Yes; A DP slave at both interfaces simultaneously is not possible
● Open IE communication	No
● Web server	No
PROFIBUS DP master	
● Transmission rate, max.	12 Mbit/s
● Number of DP slaves, max.	124
Services	
— PG/OP communication	Yes
— Routing	Yes

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— 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 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
— 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
PROFIBUS 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
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	
● RJ 45 (Ethernet)	Yes
● Number of ports	2
● integrated switch	Yes
Protocols	
● MPI	No
● PROFINET IO Controller	Yes; Also simultaneously with I-Device functionality
● PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality
● PROFINET CBA	Yes
● PROFIBUS DP master	No
● PROFIBUS DP slave	No

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● Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
● Web server	Yes
● Media redundancy	Yes
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	Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
— Shared device	Yes
— Prioritized startup	Yes
— Number of IO devices with prioritized startup, max.	32
— Number of connectable IO Devices, max.	256
— Of which IO devices with IRT, max.	64
— of which in line, max.	64
— 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; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)
— 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
— 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
PROFINET CBA	
● acyclic transmission	Yes

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● 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, 443, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
● Keep-alive function, supported	Yes
Protocols	
Redundancy mode	
Media redundancy	
— Switchover time on line break, typ.	200 ms; PROFINET MRP
— Number of stations in the ring, max.	50
Open IE communication	
● 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.	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.	32
— Data length, max.	32 768 byte
● UDP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	32
— Data length, max.	1 472 byte
Web server	
● supported	Yes
● User-defined websites	Yes
● Number of HTTP clients	5
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
PROFINET CBA (at set setpoint communication load)	
● Setpoint for the CPU communication load	20 %
● Number of remote interconnection partners	32
● Number of functions, master/slave	50
● Total of all master/slave connections	3 000
● Data length of all incoming connections	24 000 byte

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master/slave, max.	
● Data length of all outgoing connections master/slave, max.	24 000 byte
● Number of device-internal and PROFIBUS interconnections	1 000
● Data length of device-internal und PROFIBUS interconnections, max.	8 000 byte
● Data length per connection, max.	1 400 byte
Remote interconnections with acyclic transmission	
— Sampling interval, 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.	450 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
● usable for routing	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as DP master: max. 24; X2 as DP slave (active): max. 14; X3 as PROFINET: 48 max.
S7 message functions	
Number of login stations for message functions, max.	32; Depending on the configured connections for PG/OP and S7 basic

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	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.	499
— adjustable	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; V5.5 or higher
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.	1 250 g

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