

SIEMENS

Product data sheet

6ES7318-3EL01-0AB0


SIMATIC S7-300 CPU 319-3 PN/DP,
CENTRAL PROCESSING UNIT WITH 2 MBYTE
WORKING MEMORY,

1. INTERFACE MPI/DP 12MBIT/S,
2. INTERFACE DP-MASTER/SLAVE,
3. INTERFACE ETHERNET PROFINET,
WITH 2 PORT SWITCH,
MICRO MEMORY CARD NECESSARY

General information

Hardware product version	01
Firmware version	V3.2

Engineering with

Programming package	STEP7 V 5.5 or higher
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Supply voltage

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.

Mains buffering

Mains/voltage failure stored energy time	5 ms
Repeat rate, min.	1 s

Input current

Current consumption (rated value)	1250 mA
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Current consumption (in no-load operation), typ.	500 mA
Inrush current, typ.	4 A
I^2t	1.2 A ² ·s
Power losses	
Power loss, typ.	14 W
Memory	
Work memory	
integrated	2048 kbyte
expandable	No
Size of retentive memory for retentive data blocks	700 kbyte
Load memory	
pluggable (MMC)	Yes
pluggable (MMC), max.	8 Mbyte
Data management on MMC (after last programming), min.	10 a
Backup	
present	Yes
without battery	Yes
CPU processing times	
for bit operations, min.	0.0040 μs
for word operations, min.	0.01 μs
for fixed point arithmetic, min.	0.01 μs
for floating point arithmetic, min.	0.04 μs
CPU-blocks	
Number of blocks (total)	4096 ; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
DB	
Number, max.	4096 ; Number range: 1 to 16000
Size, max.	64 kbyte
FB	
Number, max.	4096 ; Number range: 0 to 7999
Size, max.	64 kbyte
FC	
Number, max.	4096 ; 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 time 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 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	2048
Retentivity	
adjustable	Yes
lower limit	0
upper limit	2047
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	2048
Retentivity	
adjustable	Yes
lower limit	0
upper limit	2047
preset	No retentivity
Time range	
lower limit	10 ms
upper limit	9990 s
IEC timer	
present	Yes
Type	SFB
Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
retentive data area, total	All, max. 700 KB
Flag	
Number, max.	8192 byte
Retentivity available	Yes ; MB 0 to MB 8191
Retentivity preset	MB 0 to MB 15
Number of clock memories	8 ; 1 memory byte
Data blocks	
Number, max.	4096 ; 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.	32768 byte ; Max. 2048 bytes per block
Address area	
I/O address area	
Inputs	8192 byte
Outputs	8192 byte
of which, distributed	

Inputs	8192 byte
Outputs	8192 byte
Process image	
Inputs	8192 byte
Outputs	8192 byte
Inputs, adjustable	8192 byte
Outputs, adjustable	8192 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	65536
Outputs	65536
Inputs, of which central	1024
Outputs, of which central	1024
Analog channels	
Inputs	4096
Outputs	4096
Inputs, of which central	256
Outputs, of which central	256
Hardware configuration	
Racks, max.	4
Modules per rack, max.	8
Number of DP masters	
integrated	2
via CP	4
Configuration / Number of FMs and CPs that can be operated (recommendation)	
FM	8
CP, point-to-point	8
CP, LAN	10
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 ; 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
Interfaces	
Number of USB interfaces	0
Number of parallel interfaces	0
Number of 20 mA interfaces (TTY)	0
Number of RS 232 interfaces	0
Number of RS 422 interfaces	0
Number of other interfaces	1 ; Ethernet, 2-port switch, 2*RJ45
1st interface	
Type of interface	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	150 mA

Functionality	
MPI	Yes
DP master	Yes
DP slave	Yes
Point-to-point connection	No
MPI	
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
Transmission rate, max.	12 Mbit/s
DP master	
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	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
Transmission rate, max.	12 Mbit/s

Number of DP slaves, max.	124
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	
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
Transmission rate, max.	12 Mbit/s
Automatic baud rate search	Yes ; only with passive interface
Transfer memory	
Inputs	244 byte
Outputs	244 byte
Address area, max.	32
User data per address area, max.	32 byte
2nd interface	
Type of interface	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 slave	Yes
PROFINET IO Controller	No
PROFINET IO Device	No
PROFINET CBA	No
Open IE communication	No
Web server	No
DP master	
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 mode support	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
Transmission rate, max.	12 Mbit/s
Number of DP slaves, max.	124
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	

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
GSD file	The latest GSD file is available at: http://www.siemens.de/profibus-gsd
Transmission rate, max.	12 Mbit/s
Automatic baud rate search	Yes ; only with passive interface
Transfer memory	
Inputs	244 byte
Outputs	244 byte
Address area, max.	32
User data per address area, max.	32 byte
3rd interface	
Type of interface	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
Media redundancy	
supported	Yes
Switchover time on line break, typically	200 ms ; PROFINET MRP
Number of stations in the ring, max.	50
Change of IP address at runtime, supported	Yes

Functionality	
MPI	No
DP master	No
DP slave	No
PROFINET IO Controller	Yes ; Also simultaneously with I-Device functionality
PROFINET IO Device	Yes ; Also simultaneously with IO Controller functionality
PROFINET CBA	Yes
Open IE communication	Yes ; Via TCP/IP, ISO on TCP, and UDP
Web server	Yes
Number of HTTP clients	5
PROFINET IO Controller	
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)
Open IE communication	Yes ; Via TCP/IP, ISO on TCP, and UDP
Transmission rate, max.	100 Mbit/s
Number of connectable IO devices, max.	256
Max. number of connectable IO devices for RT	256
of which in line, max.	256
Number of IO devices with IRT and the option "high flexibility"	256
of which in line, max.	61
Number of IO Devices with IRT and the option "high performance", max.	64
of which in line, max.	64
Shared device, supported	Yes
Prioritized startup supported	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 μ s, 500 μ s, 1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)
Updating time	250 μ s 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 per address area, max.	
User data consistency, max.	1024 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, supported	Yes
PROFInergy, supported	Yes ; With SFB 73 / 74 prepared for loadable PROFInergy standard FB for I-Device
Shared device, supported	Yes
Number of IO controllers with shared device, max.	2
Transfer memory	
Inputs, max.	1440 byte ; Per IO Controller with shared device
Outputs, max.	1440 byte ; Per IO Controller with shared device
Submodules	
Number, max.	64

User data per submodule, max.	1024 byte
PROFINET CBA	
acyclic transmission	Yes
Cyclic transmission	Yes
Open IE communication	
Open IE communication, supported	Yes
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
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes ; Via 2nd 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.	32
Data length for connection type 01H, max.	1460 byte
Data length for connection type 11H, max.	32768 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.	32768 byte
UDP	Yes ; via integrated PROFINET interface and loadable FBs
Number of connections, max.	32
Data length, max.	1472 byte
Web server	
supported	Yes
Number of HTTP clients	5
User-defined websites	Yes
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	3000
Data length of all incoming connections master/slave, max.	24000 byte
Data length of all outgoing connections master/slave, max.	24000 byte
Number of device-internal and PROFIBUS interconnections	1000

Data length of device-internal und PROFIBUS interconnections, max.	8000 byte
Data length per connection, max.	1400 byte
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.	3200 byte
Data length of all outgoing interconnections, max.	3200 byte
Data length per connection, max.	1400 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.	4800 byte
Data length of all outgoing interconnections, max.	4800 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.	9600 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
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 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 communication
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	300
Test commissioning functions	
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
Status block	Yes ; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
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	
Operating temperature	
Min.	0 °C
max.	60 °C
Configuration	
Configuration software	
STEP 7	Yes ; V5.5 or higher
programming	
Programming language	
LAD	Yes
FBD	Yes
STL	Yes
SCL	Yes
CFC	Yes
GRAPH	Yes
HiGraph®	Yes
Command set	see instruction list
Nesting levels	8

Software libraries	
System functions (SFC)	see instruction list
System function blocks (SFB)	see instruction list
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
Weight	
Weight, approx.	1250 g
Status	Jul 13, 2012