9.8 CPU 319-3 PN/DP

Technical specifications

Table 9- 9 Technical specifications of the CPU 319-3 PN/DP

Technical specifications	
CPU and version	
• MLFB	6ES7318-3EL01-0AB0
• Hardware version	01
• Firmware version	V3.2.1
• Associated programming package	STEP 7 V5.5 or higher
Memory	
Main memory	
• Integrated	2048 KB
• Expandable	No
• Maximum size of non-volatile memory for retentive data blocks,	700 KB
Load memory	
• Pluggable (MMC)	Yes
• Pluggable (MMC), max.	8 MB
• Data retention on the Micro Memory Card (after the last programming action), min.	10 years
Backup	
• Available	Yes (ensured with Micro Memory Card - maintenance-free)
• Without battery	Yes (program and data)
Execution times	
• For bit operations, min.	0.004 µs
• For word operations, min.	0.01 µs
• for fixed-point arithmetic, min.	0.01 µs
• for floating-point arithmetic, min.	0.04 µs
Timers/counters and their retentivity	
S7 counters	
• Number	2048
Retentivity	
• Configurable	Yes
• Default	Z 0 to Z 7

Technical specifications	
Counting range	
• Low limit	0
• High limit	999
IEC counter	
• Available	Yes
• Type	SFB
• Number	Unlimited (limited only by main memory size)
S7 timers	
• Number	2048
Retentivity	
• Configurable	Yes
• Default	No retentivity
Time setting range	
• Low limit	10 ms
• High limit	9990 s
IEC timer	
• Available	Yes
• Type	SFB
• Number	Unlimited (limited only by main memory size)
Data areas and their retentivity	
Bit memory	
• Number, max.	8192 bytes
• Retentivity, available	Yes (MB 0 to MB 8191)
• Retentivity, default	MB 0 to MB 15
• Number of clock memories	8 (1 memory byte)
Data blocks	
• Number, max.	4096 (in the number range 1 to 16000)
• Size, max.	64 KB
• Retentivity, configurable	Yes, via non-retain feature on the DB
• Retentivity, default	Yes
Local data	
• Per priority class, max.	32 KB per execution level, 2 KB per block

Technical specifications	
Blocks	
• Number of blocks (total)	4096 (DBs, FCs, FBs) The maximum number of blocks that can be loaded may be reduced due to the Micro Memory Card you are using.
OB	See instruction list
• Size, max.	64 KB
• Number of free cycle OBs	1 (OB 1)
• Number of time-of-day interrupt OBs	1 (OB 10)
• Number of time-delay interrupt OBs	2 (OB 20, 21)
• Number of cyclic interrupt OBs	4 (OB 32, 33, 34, 35) (OB 35 as of 500 µs)
• Number of hardware interrupt OBs	1 (OB 40)
• Number of DPV1 interrupt OBs (only DP CPUs)	3 (OB 55, 56, 57)
• Number of isochronous interrupt OBs	1 (OB 61)
• Number of asynchronous error OBs	6 (OB 80, 82, 83, 85, 86, 87) (OB 83 only for PROFINET IO)
• Number of restart OBs	1 (OB 100)
• Number of synchronous error OBs	2 (OB 121, 122)
Nesting depth	
• Per priority class	16
• Additionally within an error OB	4
FB	See instruction list
• Number, max.	4096 (number range from 0 to 7999)
• Size, max.	64 KB
FC	See instruction list
• Number, max.	4096 (number range from 0 to 7999)
• Size, max.	64 KB
Address ranges (inputs/outputs)	
I/O address area	
• Inputs	8192 bytes
• Outputs	8192 bytes
Distributed	
• Inputs	8192 bytes
• Outputs	8192 bytes
I/O process image	

Technical specifications	
• Inputs	8192 bytes
• Outputs	8192 bytes
• Inputs, adjustable	8192 bytes
• Outputs, adjustable	8192 bytes
• Inputs, preset	256 bytes
• Outputs, preset	256 bytes
Process image partitions	
• Number of partial process images, max.	1
• Amount of user data in the process image partition for isochronous PROFINET IO, max.	1600 bytes
Digital channels	
• Inputs	65536
• Outputs	65536
• Inputs, of those central	1024
• Outputs, of those central	1024
Analog channels	
• Inputs	4096
• Outputs	4096
• Inputs, of those central	256
• Outputs, of those central	256
Hardware configuration	
• Racks, max.	4
• Modules per rack, max.	8
Number of DP masters	
• Integrated	2
• Via CP	4
Number of usable FMs and CPs (recommended)	
• FM	8
• CP, point-to-point	8
• CP, LAN	10
Time-of-day	
Clock	
• Hardware clock (real-time)	Yes
• Buffered, can be synchronized	Yes
• Factory setting	DT#1994-01-01-00:00:00

Technical specifications	
• Buffered period	Typically 6 weeks (at an ambient temperature of 40 °C)
• Behavior of the clock on expiration of the buffered period	The clock continues at the time of day it had when power was switched off.
• Behavior of the real-time clock after POWER ON	The clock continues running after POWER OFF.
• Deviation per day, max.	10 s, typ. 2 s
Runtime meter	
• Number	4
• Number/number range	0 to 3
• Range of values	0 to 2^{31} hours (using the SFC 101)
• Granularity	1 hour
• Retentive	Yes; must be manually restarted after every restart
Clock synchronization	
• supported	Yes
• On MPI, master	Yes
• On MPI, slave	Yes
• On DP, master	Yes (DP slave must be time slave)
• On DP, slave	Yes
• On the AS, master	Yes
• On the AS, slave	Yes
• On Ethernet via NTP	Yes (as client)
S7 signaling functions	
• Number of stations that can be logged on for signaling functions, max.	32 (depends on the number of connections configured for PG/OP and S7 basic communication)
• Process error diagnostic messages	Yes
• Simultaneously enabled interrupt S blocks, max.	300
Test and startup functions	
Status/modify	
• Status/modify variable	Yes
• Variables	Inputs, outputs, bit memories, DBs, timers, counters
• Maximum number of variables	30
• Status variables, max.	30

Technical specifications	
• Modify variables, max.	14
Forcing	
• Forcing	Yes
• Variables	Inputs, outputs
• Maximum number of tags	10
Status block	Yes (max. 2 blocks simultaneously)
Single step	Yes
• Number of breakpoints	4
Diagnostic buffer	
• Available	Yes
• No. of entries, max.	500
• Configurable	No
• of which are power-failure-proof	100, only the last 100 entries are retentive
• Maximum number of entries that can be read in RUN	499
• Number of entries that can be set in RUN	Yes (from 10 to 499)
• Number of preset entries in RUN	10
Service data	
• Can be read out	Yes
Monitoring functions	
• Status LEDs	Yes
Communication functions	
PG/OP communication	Yes
Prioritized OCM communication	
• supported	Yes
Routing	Yes
• Number of routing connections	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: Max. 48
• Data record routing	Yes
Global data communication	
• supported	Yes
• Number of GD circles, max.	8
• Number of GD packets, max.	8
• Number of GD packages, sender, max.	8

Technical specifications	
• Number of GD packets, receiver, max.	8
• Size of GD packets, max.	22 bytes
• Size of GD packets, of those consistent, max.	22 bytes
S7 basic communication	
• supported	Yes
• User data per job, max.	76 bytes
• User data per job, consistent, max.	76 bytes (for X_SEND or X_RCV) 64 bytes (for X_PUT or X_GET as server)
S7 communication	
• supported	Yes
• As server	Yes
• As client	Yes (via integrated PN interface and loadable FBs, or via CP and loadable FBs)
• User data per job, max.	See the STEP 7 Online Help, *Common parameters of SFBs/FBs and SFC/FC of the S7 communication)*
S5-compatible communication	
• supported	Yes (via CP and loadable FCs)
Web server	
• supported	Yes
• Number of HTTP clients	5
• User-defined web pages	Yes
Open IE communication	
• supported	Yes
• Maximum number of connections/access points	32
• Local port number used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
TCP/IP	Yes (via integrated PROFINET interface and loadable FBs)
• Maximum number of connections	32
• Data length for connection type 01_H, max.	1460 bytes
• Data length for connection type 11_H, max.	32768 bytes
• Multiple passive connections per port (multiport), supported	Yes
ISO on TCP	Yes (via integrated PROFINET interface and loadable FBs)
• Maximum number of connections	32
• Data length, max.	32768 bytes

Technical specifications	
UDP	Yes (via integrated PROFINET interface and loadable FBs)
• Maximum number of connections	32
• Data length, max.	1472 bytes
iPAR server	
• supported	Yes
Number of connections	
• Total	32
Suitable for PG communication	31
• PG communication, reserved	1
• PG communication, configurable, min.	1
• PG communication, configurable, max.	31
Suitable for OP communication	31
• OP communication, reserved	1
• OP communication, configurable, min.	1
• OP communication, configurable, max.	31
Suitable for S7 basic communication	30
• S7 basic communication, reserved	0
• S7 basic communication, configurable, min.	0
• S7 basic communication, configurable, max.	30
Suitable for S7 communication	16
• S7 communication, reserved	0
• S7 communication, configurable, min.	0
• S7 communication, configurable, max.	16
Total number of instances, max.	32
PROFINET CBA (with communication load setpoint)	
• Reference setting for the CPU communication load	20 %
• Number of remote interconnecting partners	32
• Number of master/slave functions	50
• Total of all master/slave connections	3000
• Data length of all incoming master/slave connections, max.	24000 bytes
• Data length of all outgoing master/slave connections, max.	24000 bytes

Technical specifications	
• Changeover time on line break, typically	200 ms (PROFINET MRP)
• Number of nodes on the ring, max.	50
Change of the IP address at runtime, supported	Yes
Keep-alive function, supported	Yes
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO controller	Yes, even simultaneously with IO device functionality
• PROFINET IO device	Yes, even simultaneously with IO controller functionality
• PROFINET CBA	Yes (acyclic and cyclic transmission)
• Open IE communication	Yes; via TCP/IP, ISO on TCP, UDP
• Web server – Number of HTTP clients	Yes 5
PROFINET IO controller	
Services	
• PG/OP communication	Yes
• Routing	Yes
• S7 communication	Yes (with loadable FBs, max. configurable connections: 16; maximum number of instances: 32)
• Open IE communication	Yes; via TCP/IP, ISO on TCP, UDP
Number of integrated IO controllers	1
RT, supported	Yes
IRT, supported	Yes
Transmission rate, max.	100 Mbps
Maximum number of connectable IO devices	256
Number of connectable IO devices, for RT, max.	256
• of which in line, max.	256
Number of IO devices with IRT and "high flexibility" option	256
• of which in line, max.	61
Number of IO devices with IRT and "high performance" option, max.	64
• of which in line, max.	64
Shared Device, supported	Yes

Technical specifications	
• HiGraph®	Yes
Instruction set	See instruction list
• Nesting levels	8
Know-how protection	
• User program protection / password protection	Yes
• Encryption of blocks	Yes, using S7-Block Privacy
System functions (SFC)	See instruction list
System function blocks (SFB)	See instruction list
Dimensions	
• Mounting dimensions W x H x D (mm)	120 x 125 x 130
• Weight	1250 g
Voltages and currents	
• Power supply (rated value)	24 VDC
• Low limit of admissible range (DC)	19.2 V
• High limit of admissible range (DC)	28.8 V
• Current consumption (open-circuit), typically	500 mA
• Inrush current, typ.	4 A
• Current consumption (rated value)	1250 mA
• I^2t	1.2 A^2s
• External protection of power supply lines, min.	2 A
• Power loss, typically	14 W