Data sheet

6ES7511-1AK02-0AB0



SIMATIC S7-1500, CPU 1511-1 PN, Central processing unit with working memory 150 KB for program and 1 MB for data, 1. interface: PROFINET IRT with 2 port switch, 60 NS bit-performance, SIMATIC memory card necessary

General information	
Product type designation	CPU 1511-1 PN
HW functional status	FS03
Firmware version	V2.9
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	Yes; Distributed and central; with minimum OB $6x$ cycle of $625~\mu s$ (distributed) and 1 ms (central)
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V17 (FW V2.9) / V15 (FW V2.5) or higher; with older TIA Portal versions configurable as 6ES7511-1AK01-0AB0
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	3.45 cm
Control elements	
Number of keys	8
Mode buttons	2
Supply voltage	
Type of supply voltage	24 V DC
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
 Mains/voltage failure stored energy time 	5 ms
Repeat rate, min.	1/s
Input current	
Current consumption (rated value)	0.7 A
Current consumption, max.	0.95 A
Inrush current, max.	1.9 A; Rated value
l²t	0.02 A ² ·s
Power	
Infeed power to the backplane bus	10 W
Power consumption from the backplane bus (balanced)	5.5 W
Power loss	
Power loss, typ.	5.7 W
Memory	

Number of slots for SIMATIC memory card	1
SIMATIC memory card required	' Yes
Work memory	165
• integrated (for program)	150 kbyte
• integrated (for data)	
	1 Mbyte
Load memory	22 Chuto
Plug-in (SIMATIC Memory Card), max. Pagetup	32 Gbyte
Backup	Vaa
maintenance-free	Yes
CPU processing times	
for bit operations, typ.	60 ns
for word operations, typ.	72 ns
for fixed point arithmetic, typ.	96 ns
for floating point arithmetic, typ.	384 ns
CPU-blocks	
Number of elements (total)	4 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
Number range	1 60 999; subdivided into: number range that can be used by the user: 1 59 999, and number range of DBs created via SFC 86: 60 000 60 999
• Size, max.	1 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
Number range	0 65 535
Size, max.	150 kbyte
FC	·
Number range	0 65 535
• Size, max.	150 kbyte
OB	
Size, max.	150 kbyte
Number of free cycle OBs	100
Number of time alarm OBs	20
Number of delay alarm OBs	20
Number of cyclic interrupt OBs	20; With minimum OB 3x cycle of 500 μs
Number of process alarm OBs	50
Number of DPV1 alarm OBs	3
Number of isochronous mode OBs	2
Number of isochronous mode OBs Number of technology synchronous alarm OBs	2
	100
Number of startup OBs	
Number of asynchronous error OBs	4
Number of synchronous error OBs	2
Number of diagnostic alarm OBs	1
Nesting depth	
per priority class	24
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
S7 times	
Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
Number	Any (only limited by the main memory)
	, (, , , , , , , , , , , , , , , , , ,

- adjustable Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag • Size, max. • Number of clock memories • Retentivity adjustable • Retentivity adjustable • Retentivity adjustable • Retentivity areset No Local data • per priority class, max. • Inputs • Outputs per integrated IO subsystem — Inputs (volume) — Outputs (volume) — Outputs (volume) — Inputs (volume) — Inputs (volume) — Outputs (volume) — Skbyte — Outputs (volume) — Number of subprocess images, max. 128 kbyte (subrocess images, max. 128 kbyte; Intotal; available retentive memory bit memories, timers counters, DBs, and technology data (axes): 88 KB 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF 1 Mbyte; When using PS 6 0W 24/48/60 V DC	Retentivity	
Retentive data area (incl. timers, counters, flags), max. Circteded retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag Size, max. Size, max. Number of clock memories Retentivity adjustable Retentivity adjustable Retentivity preset Retentivity preset Retentivity preset Retentivity adjustable Per priority class, max. Retentivity adjustable Retentivity adjustable Retentivity adjustable Per priority class, max. Retentivity adjustable Retentivity adjustable Per priority class, max. Retentivity adjustable Retentivity adjust	•	Yes
Retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Extended retentive data area (incl. timers, counters, flags), max. Flag Size, max. Size, max. Size, max. Retentive process area Retentively adjustable Retentively preset R	Data areas and their retentivity	
Fise Size, max 16 kbyte Number of lock memories 8. 8 clock memory bit, grouped into one clock memory byte Data blocks 8. 8 clock memory bit, grouped into one clock memory byte Data blocks Petenthity adjustable Yes No No Petenthity preset No No Petenthity preset Petenthity preset No Petenthity preset Petenth		128 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 88 KB
Size, max. Number of clock memories Bate blocks Retentivity adjustable Retentivity preset Preserved by the consecution of the consecution of the consecution of the consecution of distributed I/O system is characterized not only by the integration of distributed I/O systems Number of I/O modules Prince of distributed I/O systems Prince of Demasters Prince of Dema	` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` `	1 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Number of clock memories Pata blocks Retentivity adjustable Patentivity preset Patentivity presetting	Flag	
Data blocks Retentivity adjustable Retentivity preset No No Local data Per priority class, max. Per priority class, max. Address area Pupus Portuguta (No modules) Portuguta (No modu	• Size, max.	16 kbyte
Retentivity adjustable Retentivity preset Per priority preset Per priority class, max. Retentivity preset Retentivity preset Per provincy present and submodules Retentive province province and submodules and submodules Retentive province province province and submodules and su	 Number of clock memories 	8; 8 clock memory bit, grouped into one clock memory byte
Retentivity preset No	Data blocks	
Local data • per priority class, max. 64 kbyte; max. 16 KB per block differs area Number of IO modules 10 address area • Inputs • Inputs • Inputs • Outputs • Outputs — Inputs (volume) — Outputs (volume) — Outputs (volume) — Inputs (volume) — Outputs (vo	 Retentivity adjustable 	Yes
Per priority class, max. ddress area Vumber of IC modules I/O address area I/O pubts I/O address area I/O addr	Retentivity preset	No
Number of IC modules 1 024; max. number of modules / submodules 0 01puts 0 02 02 02 02 02 02 02 02 02 02 02 02 0	Local data	
Number of IO modules 10 24; max. number of modules / submodules	per priority class, max.	64 kbyte; max. 16 KB per block
Inputs 32 kbyte; All inputs are in the process image • Outputs 32 kbyte; All outputs are in the process image • Outputs 32 kbyte; All outputs are in the process image Public (volume) 8 kbyte Per CM/CP 8 kbyte — Inputs (volume) 8 kbyte — Unputs (volume) 10 k	Address area	
Inputs Outputs Outputs Outputs Outputs (volume) - Inputs (volume) - Outputs (volume) - O	Number of IO modules	1 024; max. number of modules / submodules
Outputs (volume) 8 k byte 9 coupture (volume) 9 coup	I/O address area	
Per integrated IO subsystem - Inputs (volume) - Outputs (volume) - Sk byte - Outputs (volume) - Outputs (vo	• Inputs	32 kbyte; All inputs are in the process image
— Inputs (volume) — Outputs (volume) — Por CMCP — Inputs (volume) — Outputs (volume) — Outputs (volume) — Outputs (volume) — Sk byte Subprocess images ■ Number of subprocess images, max. 32 landware configuration Number of distributed I/O systems ■ Via CM ■ Anaximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Number of IO Controllers ■ integrated ■ Via CM ■ Anaximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack ■ Modules per rack, max. ■ Number of lines, max. ■ Number of lines, max. ■ Number of IP CMs ■ Number of IP CMs ■ Number of IP CMs ■ Number of Ipp CMs	Outputs	32 kbyte; All outputs are in the process image
Outputs (volume) per CM/CP Inputs (volume) Outputs (volume) Outputs (volume) Outputs (volume) Outputs (volume) Number of subprocess images, max. Number of distributed IO systems Number of distributed IO systems Standware configuration Number of distributed IO systems Standware configuration Number of DP masters Via CM -		
per CM/CP Inputs (volume) 8 k byte Subprocess images Number of subprocess images, max Number of subprocess images, max Number of distributed I/O systems Via CM V	— Inputs (volume)	8 kbyte
Inputs (volume) 8 kbyte Outputs (volume) 8 kbyte Subprocess images • Number of subprocess images, max. 32 lardware configuration Number of distributed IO systems 32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link) Number of DP masters • Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Number of IO Controllers • Integrated 1 • Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack • Modules per rack, max. 32; CPU + 31 modules • Number of lines, max. 1 PIP CM • Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots ime of day Clock • Type Hardware clock • Backup time 6 kk; At 40 °C ambient temperature, typically • Deviation per day, max. 10 s; Typ.: 2 s Operating hours counter • Number 16 • Number 16 Clock synchronization • supported Yes • in AS, slave Yes • on Ethernet via NTP Yes	Outputs (volume)	8 kbyte
Outputs (volume) Subprocess images Number of subprocess images, max. Number of distributed IO systems 32; A distributed I/O system is characterized not only by the integration of distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link) Number of DP masters • Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Number of IO Controllers • Integrated • Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack • Modules per rack, max. • Number of lines, max. 1 PIP CM • Number of PtP CMs • Number of PtP CMs • Number of PtP CMs • Sackup time • Owner of ay Clock • Type • Backup time • Owner of ay, max. 10 s; Typ: 2 s Operating hours counter • Number • Number • Number • Number • Supported • In AS, master • In AS, slave • on Ethernet via NTP Yes	per CM/CP	
Subprocess images Number of subprocess images, max. 32 lardware configuration Number of distributed I/O systems 32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)	— Inputs (volume)	8 kbyte
Number of subprocess images, max. Individual Properties of distributed I/O systems of distributed I/O systems of distributed I/O system is characterized not only by the integration of distributed I/O via PROFIBUS communication modules, but also by the connection of I/O via AS-I master modules or links (e.g., IE/PB-Link) Number of DP masters • Via CM **Number of IO Controllers • integrated • Via CM **Modules per rack, max. • Number of lines, max. • Number of lines, max. • Number of PtP CMs • Number of PtP CMs • Number of PtP CMs • Deviation per day, max. • Deviation per day, max. • Deviation per day, max. • Supported • Number • Number • Sacky time • Number • Nu	— Outputs (volume)	8 kbyte
Ardware configuration Number of distributed IO systems 32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link) Number of DP masters • Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Number of IO Controllers • integrated • Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack • Modules per rack, max. • Number of lines, max. PtP CM • Number of PtP CMs • Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots ime of day Clock • Type • Backup time • Deviation per day, max. Operating hours counter • Number • Number • Number 16 Clock synchronization • supported • supported • supported • ryes • in AS, master • in AS, slave • on Ethernet via NTP Yes	Subprocess images	
Number of distributed IO systems 32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link) Number of DP masters • Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Number of IO Controllers • integrated • Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack • Modules per rack, max. • Number of lines, max. 1 PtP CM • Number of PtP CMs • Number of PtP CMs • Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots ime of day Clock • Type • Backup time • Deviation per day, max. Operating hours counter • Number • Number • Number • Number 16 Clock synchronization • supported • In AS, master • in AS, slave • on Ethernet via NTP Yes	 Number of subprocess images, max. 	32
of distributed I/O via PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link) Number of DP masters • Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Number of IO Controllers • integrated • Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack • Modules per rack, max. • Number of lines, max. 1 PtP CM • Number of PtP CMs • Number of PtP CMs • Number of PtP CMs • Hardware clock • Type • Backup time • Deviation per day, max. 10 s; Typ.: 2 s Operating hours counter • Number • Number • Number • Supported • supported • supported • supported • in AS, slave • on Ethernet via NTP • Yes	lardware configuration	
Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Number of IO Controllers integrated Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack Modules per rack, max. Number of lines, max. Number of lines, max. 1 PtP CM Number of PtP CMs Number of PtP CMs A the number of connectable PtP CMs is only limited by the number of available slots Firme of day Clock Type Backup time Clock Sackup time Deviation per day, max. Number 10 s; Typ.: 2 s Operating hours counter Number Number Number Number PtP CM A tradware clock W; At 40 °C ambient temperature, typically Syrp.: 2 s Operating hours counter Number Number Number Number PtP CM A tradware clock A tradyare clock A trad	Number of distributed IO systems	modules, but also by the connection of I/O via AS-i master modules or
Number of IO Controllers integrated integrated Via CM A; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack Modules per rack, max. Number of lines, max. Number of lines, max. Number of PtP CM Number of PtP CMs Number of PtP CMs Number of PtP CMs Number of expectable PtP CMs is only limited by the number of available slots Fine of day Clock Type Backup time Sackup time Obeviation per day, max. Deviation per day, max. Operating hours counter Number Number Number Number Number PtP CM Hardware clock Sackup time time time time time time time time	Number of DP masters	
 integrated Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack Modules per rack, max. Number of lines, max. Number of PtP CMs Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots Time of day Clock Type Backup time Peviation per day, max. 10 s; Typ.: 2 s Operating hours counter Number 16 Clock synchronization supported in AS, master in AS, master in AS, slave on Ethernet via NTP 12 yes the maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 		· · · · · · · · · · · · · · · · · · ·
Via CM 4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total Rack • Modules per rack, max. • Number of lines, max. • Number of lines, max. • Number of PtP CMs • Number of PtP CMs • Number of PtP CMs • Type • Backup time • Deviation per day, max. Operating hours counter • Number • Number • Number • Supported • Supported • in AS, master • in AS, master • in AS, slave • on Ethernet via NTP 432; CPU + 31 modules 32; CPU + 31 modules 44; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 45; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 45; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 45; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 45; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 46; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 47; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 48; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 49; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total 49; A maximum of 4 CMs/CPs (PROFICE) and total 40; A maximum of 4 CMs/CPs (PROFICE) and total 40; A maximum of 4 CMs/CPs (PROFICE) and total 40; A maximum of 4 CMs/CPs (PROFICE) and total 40; A maximum of 4 CMs/CPs (PROFICE) and total 41; A maximum of 4 CMs/CPs (PROFICE) and total 41; A maximum of 4 CMs/CPs (PROFICE) and total 41; A maximum of 4 CMs/CPs (PROFICE) and total 42; A maximum of 4 CMs/CPs (PROFICE) and total 42; A maximum of 4 CMs/CPs (PROFICE) and total 43; A maximum of 4 CMs/CPs (PROFICE) and total 44; A maximum of contents and total 45; A maximum of contents and total 45; A maximum of contents and total 46; A maximum of contents and total 47; A maximum of contents and total 47; A maximum of contents and total 48; A maximum of contents and total 48; A maximum of contents	Number of IO Controllers	
Rack Modules per rack, max. Number of lines, max. Number of PtP CMs Number of connectable PtP CMs is only limited by the number of available slots Number Number Of Cambient temperature, typically Number Nu	integrated	1
Rack • Modules per rack, max. • Number of lines, max. • Number of PtP CMs • Number of PtP CMs • Number of PtP CMs • Number of Aday Clock • Type • Backup time • Deviation per day, max. Operating hours counter • Number • Number • Number • Number • Supported • in AS, master • in AS, slave • on Ethernet via NTP • Supported • Other and the supported of the support of the number of connectable PtP CMs is only limited by the number of available slots 10 the number of connectable PtP CMs is only limited by the number of available slots 10 supported of the number of connectable PtP CMs is only limited by the number of available slots 10 supported of the number of connectable PtP CMs is only limited by the number of available slots 10 supported of the number of connectable PtP CMs is only limited by the number of available slots 11 supported of the number of connectable PtP CMs is only limited by the number of available slots 12 supported of the number of connectable PtP CMs is only limited by the number of available slots 13 supported of the number of connectable PtP CMs is only limited by the number of available slots 14 supported of the number of connectable PtP CMs is only limited by the number of available slots 15 supported of the number of connectable PtP CMs is only limited by the number of available slots 16 supported of the number of connectable PtP CMs is only limited by the number of available slots 16 supported of the number of connectable PtP CMs is only limited by the number of available slots 16 supported of the number of connectable PtP CMs is only limited by the number of available slots 18 supported of the number of connectable PtP CMs is only limited by the number of available slots 18 supported of the number of connectable PtP CMs is only limited by the number of available slots 18 supported of the number of connectable PtP CMs is only limited by the number of available slots 18 supported of the number of connectable PtP CMs is only limited by the number of available slot	• Via CM	· · · · · · · · · · · · · · · · · · ·
 Modules per rack, max. Number of lines, max. Number of PtP CMS Number of connectable PtP CMs is only limited by the number of available slots Ime of day Clock Type Backup time Deviation per day, max. Operating hours counter Number Number Clock synchronization supported in AS, master in AS, slave on Ethernet via NTP 	D	be inserted in total
Number of lines, max. PtP CM Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots ime of day Clock Type Backup time Deviation per day, max. Operating hours counter Number Number 16 Clock synchronization supported in AS, master in AS, slave on Ethernet via NTP 10 11 12 14 14 15 16 16 16 16 17 18 19		00- ODLL + 04
PtP CM Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots Ime of day Clock Type Hardware clock Backup time 6 wk; At 40 °C ambient temperature, typically Deviation per day, max. 10 s; Typ.: 2 s Operating hours counter Number 16 Clock synchronization supported in AS, master in AS, master in AS, slave on Ethernet via NTP Yes	•	
 Number of PtP CMs the number of connectable PtP CMs is only limited by the number of available slots ime of day Clock Type Backup time Backup time Deviation per day, max. 10 s; Typ.: 2 s Operating hours counter Number Number Clock synchronization supported in AS, master in AS, slave on Ethernet via NTP the number of connectable PtP CMs is only limited by the number of available slots Hardware clock 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s Yes in AS, slave on Ethernet via NTP 		1
Clock Type Hardware clock Backup time Deviation per day, max. Operating hours counter Number Number Clock synchronization supported in AS, master in AS, slave on Ethernet via NTP Hardware clock 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s 16 Signature 16 Yes Yes Yes Yes Yes Yes		· · · · · · · · · · · · · · · · · · ·
Clock Type Hardware clock Wk; At 40 °C ambient temperature, typically Deviation per day, max. Deviation per day, max. Operating hours counter Number Number 16 Clock synchronization supported in AS, master in AS, slave on Ethernet via NTP Hardware clock Ward Ward Ward Ward C ambient temperature, typically 10 s; Typ.: 2 s 10 s; Typ.: 2 s Yes	ime of day	TAIRADIO OIOLO
 Type Backup time Deviation per day, max. Operating hours counter Number Clock synchronization supported in AS, master in AS, slave on Ethernet via NTP Hardware clock 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s 		
Backup time Deviation per day, max. Operating hours counter Number 16 Clock synchronization supported in AS, master in AS, slave on Ethernet via NTP 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s 16 Yes Yes Yes Yes Yes		Hardware clock
Deviation per day, max. Operating hours counter Number Number Clock synchronization supported in AS, master in AS, slave on Ethernet via NTP 10 s; Typ.: 2 s 16 16 Yes Yes Yes Yes Yes Yes Yes Yes Testing the problem of the problem	• •	
Operating hours counter • Number 16 Clock synchronization • supported Yes • in AS, master • in AS, slave • on Ethernet via NTP Yes	·	
 Number Clock synchronization supported in AS, master in AS, slave on Ethernet via NTP 16 Yes Yes Yes Yes 		10 0, 13p.: 2 0
Clock synchronization • supported Yes • in AS, master Yes • in AS, slave Yes • on Ethernet via NTP Yes	·	16
 supported in AS, master in AS, slave on Ethernet via NTP Yes Yes 		
 in AS, master in AS, slave on Ethernet via NTP Yes Yes 	-	Yes
 in AS, slave on Ethernet via NTP Yes 	• •	
on Ethernet via NTP Yes	·	

1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1
Number of ports	2
integrated switch	Yes
Protocols	165
IP protocol	Yes; IPv4
PROFINET IO Controller	Yes
PROFINET IO Device	Yes
SIMATIC communication	Yes
Open IE communication	Yes; Optionally also encrypted
Web server	Yes
	Yes
Media redundancy PROFINET IO Controller	Tes
Services	V
— PG/OP communication	Yes
Isochronous mode Direct data evaluance	Yes
— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
— IRT	Yes
— PROFlenergy	Yes; per user program
— Prioritized startup	Yes; Max. 32 PROFINET devices
 Number of connectable IO Devices, max. 	128; In total, up to 256 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
Of which IO devices with IRT, max.	64
 Number of connectable IO Devices for RT, max. 	128
of which in line, max.	128
 Number of IO Devices that can be simultaneously activated/deactivated, max. 	8; in total across all interfaces
 Number of IO Devices per tool, max. 	8
— Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
Update time for IRT	, ,
— for send cycle of 250 μs	250 μs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 μs of the isochronous OB is decisive
— for send cycle of 500 μs	500 μs to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 μs of the isochronous OB is decisive
— for send cycle of 1 ms	1 ms to 16 ms
— for send cycle of 2 ms	2 ms to 32 ms
— for send cycle of 4 ms	4 ms to 64 ms
 With IRT and parameterization of "odd" send cycles 	Update time = set "odd" send clock (any multiple of 125 μs : 375 μs , 625 μs 3 875 μs)
Update time for RT	
— for send cycle of 250 μs	250 μs to 128 ms
— for send cycle of 500 μs	500 μs to 256 ms
— for send cycle of 1 ms	1 ms to 512 ms
— for send cycle of 2 ms	2 ms to 512 ms
— for send cycle of 4 ms	4 ms to 512 ms
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— Isochronous mode	No
— IRT	Yes
— PROFlenergy	Yes; per user program
— Shared device	Yes
Number of IO Controllers with shared device,	4
max.	
 activation/deactivation of I-devices 	Yes; per user program
 Asset management record 	Yes; per user program
-	

terface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
Autonegotiation	Yes
Autocrossing	Yes
Industrial Ethernet status LED	Yes
	163
rotocols	
Number of connections	
Number of connections, max.	96; via integrated interfaces of the CPU and connected CPs / CMs
 Number of connections reserved for ES/HMI/web 	10
 Number of connections via integrated interfaces 	64
Number of S7 routing paths	16
Redundancy mode	
H-Sync forwarding	Yes
Media redundancy	
 Media redundancy 	only via 1st interface (X1)
— MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client
 MRP interconnection, supported 	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
— MRPD	Yes; Requirement: IRT
 Switchover time on line break, typ. 	200 ms; For MRP, bumpless for MRPD
 Number of stations in the ring, max. 	50
SIMATIC communication	
PG/OP communication	Yes; encryption with TLS V1.3 pre-selected
• S7 routing	Yes
S7 communication, as server	Yes
S7 communication, as client	Yes
User data per job, max.	See online help (S7 communication, user data size)
Open IE communication	Coc crimio nelp (er communication, acor data cizo)
• TCP/IP	Yes
— Data length, max.	64 kbyte
3 1	
— several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
UDP multicast	Yes; Max. 5 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Encryption	Yes; Optional
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	,
Runtime license required	Yes; "Small" license required
OPC UA Client	Yes
	Yes
Application authentication Security policies.	
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
User authentication	"anonymous" or by user name & password
 Number of connections, max. 	4
 Number of nodes of the client interfaces, max. 	1 000
 Number of elements for one call of 	300
OPC_UA_NodeGetHandleList/OPC_UA_ReadList/ max.	C

 Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max. 	20
Number of elements for one call of OPC_UA_MethodGetHandleList, max.	100
Number of simultaneous calls of the client	1
instructions per connection (except OPC_UA_ReadList,OPC_UA_WriteList,OPC_UA_M max.	
 Number of simultaneous calls of the client 	5
instructions OPC_UA_ReadList,OPC_UA_WriteList and OPC_UA_MethodCall, max.	
 Number of registerable nodes, max. 	5 000
 Number of registerable method calls of OPC_UA_MethodCall, max. 	100
 Number of inputs/outputs when calling OPC_UA_MethodCall, max. 	20
OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space
 Application authentication 	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
 User authentication 	"anonymous" or by user name & password
— GDS support (certificate management)	Yes
— Number of sessions, max.	32
Number of sessions, max. Number of accessible variables, max.	50 000
Number of registerable nodes, max.	10 000
•	20
Number of subscriptions per session, max.	
— Sampling interval, min.	100 ms
— Publishing interval, min.	500 ms
 Number of server methods, max. 	20
 Number of inputs/outputs per server method, max. 	20
 Number of monitored items, max. 	1 000; for 1 s sampling interval and 1 s send interval
 Number of server interfaces, max. 	10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace"
 Number of nodes for user-defined server interfaces, max. 	1 000
 Alarms and Conditions 	Yes
 Number of program alarms 	100
Number of alarms for system diagnostics	50
Further protocols	
MODBUS	Yes; MODBUS TCP
Isochronous mode	
Equidistance	Yes
·	100
S7 message functions	00
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	2 500
Number of simultaneously active program alarms	
 Number of program alarms 	600
 Number of alarms for system diagnostics 	100
 Number of alarms for motion technology objects 	80
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 5 engineering systems
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)
	No
Single step	
Number of breakpoints	8
Status/control	V
 Status/control variable 	Yes

 Variables 	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
 Number of variables, max. 	
— of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	Yes
ForcingForcing, variables	Peripheral inputs/outputs
Number of variables, max.	200
Diagnostic buffer	200
• present	Yes
Number of entries, max.	1 000
— of which powerfail-proof	500
Traces	
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
STOP ACTIVE LED	Yes
 Connection display LINK TX/RX 	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of
	the PLC program; selection guide via the TIA Selection Tool
 Number of available Motion Control resources for 	800
technology objects	
Required Motion Control resources	40
— per speed-controlled axis	40
— per positioning axis	80
— per synchronous axis	160
— per external encoder	80
— per output cam	20
— per cam track	160
— per probe	40
Positioning axis	-
Number of positioning axes at motion control cycle of 4 ms (typical value)	5
Number of positioning axes at motion control cycle of 8 ms (typical value)	10
Controller	Voc. Universal DID controller with interreted at 12 in 12
PID_Compact PID_3Stars	Yes; Universal PID controller with integrated optimization
PID_3Step PID_Tomp	Yes; PID controller with integrated optimization for valves
PID-Temp Counting and measuring	Yes; PID controller with integrated optimization for temperature
Counting and measuring	Yes
High-speed counter Ambient conditions	1 63
Ambient temperature during operation • horizontal installation, min.	-25 °C; No condensation
horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the
vertical installation, min.	display is switched off -25 °C; No condensation
•	
 vertical installation, max. 	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Altitude during operation relating to sea level	
 Installation altitude above sea level, max. 	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
Configuration	

Programming	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— GRAPH	Yes
Know-how protection	
 User program protection/password protection 	Yes
 Copy protection 	Yes
Block protection	Yes
Access protection	
 protection of confidential configuration data 	Yes
 Password for display 	Yes
 Protection level: Write protection 	Yes
 Protection level: Read/write protection 	Yes
Protection level: Complete protection	Yes
Cycle time monitoring	
lower limit	adjustable minimum cycle time
upper limit	adjustable maximum cycle time
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	405 g

5/12/2021

last modified: