Data sheet

6ES7512-1CM03-0AB0



SIMATIC S7-1500 compact CPU, CPU 1512C-1 PN, central processing unit with work memory: 400 KB for program and 2 MB for data, 32 digital inputs, 32 digital outputs, 5 analog inputs, 2 analog outputs, 6 high-speed counters, 4 fast outputs for PTO/PWM/frequency output, 1st interface: PROFINET IRT with 2-port switch, 6 ns bit performance, including front connector push-in, SIMATIC Memory Card required

Product type designation	General information	
Firmware version • IW update possible • IW update possible Product function • I&M data • Isochronous mode • SysLog Engineering with • STEP 7 TIA Portal configurable/integrated from version versions as 6ES7512-1CK01-0AB0 Configuration control via dataset Yes Screen diagonal [cm] Control elements Number of keys Mode buttons 2 Supply voltage Rated value (DC) permissible range, lower limit (DC) permissible range, upper limit (DC) permissible range, upper limit (DC) Alains buffering • Mains buffering • Mains/voltage failure stored energy time • Repeat rate, min. Input current Current consumption (rated value) Current consumption, max. In vishout Di/DO load Inrush current, max. Pt Digital linputs • from load voltage L+ (without load), max. Digital outputs et or in a version of the vishout Di/DO load output voltage / hoadder Rated voltage (DC) Port of the power supply without load • from load voltage L+ (without load), max. Digital outputs • from load voltage L+ (without load), max. Digital outputs • from load voltage L+ (max. output voltage / hoadder Rated value (DC) Encoder supply	Product type designation	CPU 1512C-1 PN
Product function Ram data	HW functional status	FS01
Product function • I&M data • IsAchronous mode • SysLog Yes; with minimal OB 6x cycle of 500 µs (distributed) • SysLog Yes Engineering with • STEP 7 TIA Portal configurable/integrated from version • STEP 7 TIA Portal configurable/integrated from version V20 (FW V4.0) / V19 (FW V3.1) or higher; configurable with older TIA Portal versions as 6ES7512-1CK01-0AB0 Configuration control via dataset Yes Display Screen diagonal [cm] 3.45 cm Control elements Number of keys 8 Mode buttons 2 Supply voltage Rated value (DC) permissible range, lower limit (DC) permissible range, lower limit (DC) permissible range, upper limit (DC) 28.8 V Reverse polarity protection Wains buffering • Mains buffering • Mains/voltage failure stored energy time • Repeat rate, min. 1/s Input current Current consumption (rated value) Current consumption, max. In 1/a, without DI/DO load Current consumption, max. In 1/a, Rated value Pt 0.6 A*s Digital inputs • from load voltage L+ (without load), max. Digital outputs • from load voltage L+ (without load), max. Digital outputs • from load voltage L+, max. output voltage / heacter Rated value (DC) Encoder supply	Firmware version	V4.0
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Engineering with STEP 7 TIA Portal configurable/integrated from version V20 (FW V4.0) / V19 (FW V3.1) or higher; configurable with older TIA Portal versions as 6ES7512-1CK01-0AB0 Configuration control via dataset Yes Display Screen diagonal [cm] Control elements Number of keys 8 Mode buttons 2 Supply voltage Rated value (DC) permissible range, lower limit (DC) permissible range, upper limit (DC) permissible range, upper limit (DC) permissible range puper limit (DC) Alian buffering Mains buffering Mains buffering Mains voltage failure stored energy time Repeat rate, min. Input current Current consumption (rated value) Current consumption (rated value) Current consumption, max. In A; without DI/DO load Inrush current, max. Pt O.6 A*s Digital inputs Fr O.6 A*s O.6 A*s Digital inputs From load voltage L+ (without load), max. Digital outputs From load voltage L+, max. 30 mA; Per group, without load Output voltage / header Rated value (DC) Encoder supply	 Isochronous mode 	Yes; with minimal OB 6x cycle of 500 µs (distributed)
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output voltage / header Rated value (DC) Encoder supply	Digital outputs	
Rated value (DC) 24 V Encoder supply	from load voltage L+, max.	30 mA; Per group, without load
Encoder supply	output voltage / header	
	Rated value (DC)	24 V
Number of outputs 2: One common 24 \(\) encoder supply per 16 digital inputs	Encoder supply	
2, One confinion 24 v encoder supply per 10 digital inputs	Number of outputs	2; One common 24 V encoder supply per 16 digital inputs

** 24 V	200	
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■ Pilug-In (SIMATIC Memory Card), max. 32 Gbyte ■ maintenance-free Yes CPU processing times for lot operations, lyp. 6 ns. for word operations, lyp. 9 ns for fixed point arithmetic, lyp. 9 ns for flored point arithmetic, lyp. 9 ns CPU-blocks Number of elements (total) 4 000. Blocks (OB, FB, FC, DB) and UDTs BB ■ Number range 1 60 999; subdivided into: number range that can be used by the user; 1 65 989, and number range of DBs created via SFC 86: 60 000 60 999 ■ Size, max. 2 Mbyte; For DBs with absolute addressing, the max. size is 64 KB FB ■ Number range 0 65 535 ■ Size, max. 400 kbyte FC ■ Number range 0 65 535 ■ Size, max. 400 kbyte ■ Number of free cycle OBs 100 ■ Number of time alarm OBs 20 ■ Number of time alarm OBs 20 ■ Number of process alarm OBs 20 ■ Number of protess alarm OBs 30 ■ Number of provincins and OBs 100 ■ Number of provincins and OBs 100 ■ Number of provincins and OBs 100 ■ Number of scortnonus mode OBs 11 ■ Number of scortnonus mode OBs 12 ■ Number of scortnonus mode OBs 12 ■ Number of scortnonus mode OBs 12 ■ Number of sprichronous error OBs 4 ■ Number of sprichronous error OBs 5 ■ Number of sprichronous error OBs 4 ■ Number of sprichronous error OBs 5 ■ Number of sprichronous error OBs 5 ■ Number		
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for bit operations, typ. for word operations, typ. for word operations, typ. for fixed point arithmetic, typ. 9 ns for floating point arithmetic, typ. 37 ns CPU-biolocks Number of elements (total) 4 000; Blocks (OB, FB, FC, DB) and UDTs 8 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. 2 Mbyte; For DBs with absolute addressing, the max. size is 64 KB FB • Number range • Size, max. 400 kbyte FC • Number range • Size, max. 400 kbyte OB • Size, max. 400 kbyte OB • Size, max. 400 kbyte OB • Size, max. 400 kbyte Size, max. 500 • Number of free cycle OBs • Number of free cycle OBs • Number of delay alarm OBs • Number of cyclic interrupt OBs • Number of process alarm OBs • Number of sarchronous error OBs • Number of asynchronous error OBs • Number of sarchronous error OBs • Number of sarchr		
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Number range 0 65 535 Size, max.	Ü	
Number range	• Size, max.	2 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
• Size, max. 400 kbyte FC • Number range • Size, max. 400 kbyte OB • Size, max. 400 kbyte • Size, max. 400 kbyte • Size, max. 400 kbyte • Number of free cycle OBs • Number of free cycle OBs • Number of time alarm OBs • Number of delay alarm OBs • Number of cyclic interrupt OBs • Number of process alarm OBs • Number of process alarm OBs • Number of process alarm OBs • Number of isochronous mode OBs • Number of startup OBs • Number of startup OBs • Number of synchronous error OBs • Number of synchronous error OBs • Number of synchronous error OBs • Number of diagnostic alarm OBs • N	FB	
FC • Number range • Size, max. 400 kbyte OB • Size, max. 400 kbyte • Number of free cycle OBs • Number of time alarm OBs • Number of time alarm OBs • Number of delay alarm OBs • Number of cyclic interrupt OBs • Number of process alarm OBs • Number of process alarm OBs • Number of process alarm OBs • Number of isochronous mode OBs • Number of isochronous mode OBs • Number of isochronous mode OBs • Number of startup OBs • Number of startup OBs • Number of startup OBs • Number of asynchronous error OBs • Number of asynchronous error OBs • Number of diagnostic alarm OBs • Number of the include t	-	
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• Size, max. OB • Size, max. • Number of free cycle OBs • Number of time alarm OBs • Number of delay alarm OBs • Number of cyclic interrupt OBs • Number of process alarm OBs • Number of process alarm OBs • Number of DPV1 alarm OBs • Number of DeV1 alarm OBs • Number of technology synchronous alarm OBs • Number of technology synchronous alarm OBs • Number of startup OBs • Number of startup OBs • Number of asynchronous error OBs • Number of asynchronous error OBs • Number of asynchronous error OBs • Number of synchronous error OBs • Number of		
OB • Size, max. • Number of free cycle OBs • Number of time alarm OBs • Number of time alarm OBs • Number of cyclic interrupt OBs • Number of process alarm OBs • Number of process alarm OBs • Number of process alarm OBs • Number of isochronous mode OBs • Number of isochronous mode OBs • Number of technology synchronous alarm OBs • Number of startup OBs • Number of synchronous error OBs • Number of asynchronous error OBs • Number of diagnostic alarm OBs 1 Nesting depth • per priority class 2 Counters, timers and their retentivity S7 counter • Number	-	
 Size, max. Number of free cycle OBs Number of time alarm OBs Number of delay alarm OBs Number of cyclic interrupt OBs Number of cyclic interrupt OBs Number of process alarm OBs Number of process alarm OBs Number of process alarm OBs Number of isochronous mode OBs Number of isochronous mode OBs Number of startup OBs Number of startup OBs Number of saynchronous error OBs Number of synchronous error OBs Number of diagnostic alarm OBs Number of diagnostic alarm OBs Nesting depth per priority class per priority class Quunters, timers and their retentivity S7 counter Number Auginated by the main memory Retentivity Any (only limited by the main memory) 		400 Kbyte
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 Number of time alarm OBs Number of delay alarm OBs Number of cyclic interrupt OBs Number of process alarm OBs Number of DPV1 alarm OBs Number of isochronous mode OBs Number of technology synchronous alarm OBs Number of startup OBs Number of synchronous error OBs Number of asynchronous error OBs Number of diagnostic alarm OBs Number of diagnostic alarm OBs Number of asynchronous error OBs Number of diagnostic alarm OBs Nesting depth per priority class γe per priority class Aumber Number Aumber Augistable Yes IEC counter Number Any (only limited by the main memory) Retentivity 		
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 Number of cyclic interrupt OBs Number of process alarm OBs Number of DPV1 alarm OBs Number of isochronous mode OBs Number of technology synchronous alarm OBs Number of startup OBs Number of asynchronous error OBs Number of synchronous error OBs Number of diagnostic alarm OBs Number of diagnostic alarm OBs Per priority class Ounters, timers and their retentivity S7 counter Number Aumber Possible Pyes IEC counter Number Any (only limited by the main memory) Retentivity 		
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Number of technology synchronous alarm OBs Number of startup OBs Number of asynchronous error OBs Number of synchronous error OBs Number of diagnostic alarm OBs Nesting depth per priority class Counters, timers and their retentivity S7 counter Number Any (only limited by the main memory) Retentivity Any (only limited by the main memory)		
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Number of diagnostic alarm OBs Nesting depth per priority class Counters, timers and their retentivity S7 counter Number Number adjustable IEC counter Number Number Any (only limited by the main memory) Retentivity	•	
Nesting depth • per priority class Counters, timers and their retentivity S7 counter • Number Any (only limited by the main memory) Per priority class 24 Counters, timers and their retentivity 2048 2048 Retentivity Yes IEC counter • Number • Number Any (only limited by the main memory)	•	1
 per priority class Counters, timers and their retentivity S7 counter Number Retentivity — adjustable IEC counter Number Any (only limited by the main memory) Retentivity 		
S7 counter • Number 2 048 Retentivity — adjustable Yes IEC counter • Number Any (only limited by the main memory) Retentivity	-	24
 Number Retentivity — adjustable IEC counter Number Any (only limited by the main memory) Retentivity 	Counters, timers and their retentivity	
Retentivity — adjustable Yes IEC counter • Number Any (only limited by the main memory) Retentivity	S7 counter	
 — adjustable IEC counter ● Number Retentivity Any (only limited by the main memory)	• Number	2 048
IEC counter ● Number Any (only limited by the main memory) Retentivity	Retentivity	
• Number Any (only limited by the main memory) Retentivity	— adjustable	Yes
Retentivity	IEC counter	
·	Number	Any (only limited by the main memory)
— adjustable Yes	Retentivity	
	— adjustable	Yes

C7 times	
S7 times • Number	2 048
Retentivity	2 070
— adjustable	Yes
IEC timer	165
Number	Any (only limited by the main memory)
Retentivity	7 Try (Only miniod by the main memory)
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	256 kbyte; in total; available retentive memory for bit memories, timers,
	counters, DBs, and technology data (axes): 216 KB
Extended retentive data area (incl. timers, counters, flags), max.	2 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Flag	
• Size, max.	16 kbyte
Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	
Retentivity adjustable	Yes
Retentivity preset	No
Local data	
per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	2 048; max. number of modules / submodules
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
Number of subprocess images, max.	32
Hardware 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	6; A maximum of 6 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• integrated	1
● Via CM	6; A maximum of 6 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Rack	moorted in total
Modules per rack, max.	32; CPU + 31 modules
Number of lines, max.	1
PtP CM	
Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
Time 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	
	Yes
supported to DP_master	Yes; via PROFIBUS CM / CP
• to DP, master	
on DP, device	Yes; via PROFIBUS CM / CP Yes
 in AS, master 	

• in AS, device	Yes
on Ethernet via NTP	Yes
Digital inputs	
integrated channels (DI)	32
Digital inputs, parameterizable	Yes
Source/sink input	P-reading
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Digital input functions, parameterizable	103
Gate start/stop	Yes
Capture	Yes
Synchronization	Yes
Input voltage	103
Type of input voltage	DC
Rated value (DC)	24 V
• for signal "0"	-3 to +5V
• for signal "1"	+11 to +30V
Input current	111 10 1307
• for signal "1", typ.	2.5 mA
	2.0 IIIA
Input delay (for rated value of input voltage) for standard inputs	
·	Yes; none / 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms
— parameterizable	
— at "0" to "1", min.	4 μs; for parameterization "none"
— at "0" to "1", max. — at "1" to "0", min.	20 ms
	4 μs; for parameterization "none" 20 ms
— at "1" to "0", max.	20 IIIS
for interrupt inputs	Voc. Same as far standard inputs
— parameterizable	Yes; Same as for standard inputs
for technological functions	Voc. Same as far standard inputs
— parameterizable	Yes; Same as for standard inputs
Cable length	1 000 m; 600 m for technological functions; depending on input frequency,
shielded, max.	encoder and cable quality; max. 50 m at 100 kHz
• unshielded, max.	600 m; for technological functions: No
Digital outputs	
Type of digital output	Transistor
integrated channels (DO)	32
Current-sourcing	Yes; Push-pull output
Short-circuit protection	Yes; electronic/thermal
Response threshold, typ.	1.6 A with standard output, 0.5 A with high-speed output; see manual for details
Limitation of inductive shutdown voltage to	Connector X11: -0.8 V; connector X12: L+ (-53 V)
Controlling a digital input	Yes
Accuracy of pulse duration	Up to ±100 ppm ±2 µs at high-speed output; see manual for details
minimum pulse duration	2 µs; With High Speed output
Digital output functions, parameterizable	
Switching tripped by comparison values	Yes; As output signal of a high-speed counter
PWM output	Yes
— Number, max.	4
Cycle duration, parameterizable	Yes
— ON period, min.	0 %
— ON period, max.	100 %
Resolution of the duty cycle	0.0036 %; For S7 analog format, min. 40 ns
Frequency output	Yes
Switching capacity of the outputs	0.5 A; 0.1 A with high-speed output, i.e. when using a high-speed output; see
	0.5 A; 0.1 A with high-speed output, i.e. when using a high-speed output; see manual for details
Switching capacity of the outputs	manual for details 5 W; 1 W with high-speed output, i.e. when using a high-speed output; see
Switching capacity of the outputs • with resistive load, max. • on lamp load, max.	manual for details
Switching capacity of the outputs • with resistive load, max. • on lamp load, max. Load resistance range	manual for details 5 W; 1 W with high-speed output, i.e. when using a high-speed output; see manual for details
Switching capacity of the outputs • with resistive load, max. • on lamp load, max.	 manual for details 5 W; 1 W with high-speed output, i.e. when using a high-speed output; see manual for details 48 Ω; 240 ohms with high-speed output, i.e. when using a high-speed output;
Switching capacity of the outputs • with resistive load, max. • on lamp load, max. Load resistance range	manual for details 5 W; 1 W with high-speed output, i.e. when using a high-speed output; see manual for details

- Time of autout valtage	DC.
Type of output voltagefor signal "0", max.	DC 1 V; With high-speed output, i.e. when using a high-speed output; see manual
• Ioi signal o , max.	for details
• for signal "1", min.	23.2 V; L+ (-0.8 V)
Output current	
• for signal "1" rated value	0.5 A; 0.1 A with high-speed output, i.e. when using a high-speed output,
	observe derating; see manual for details
• for signal "1" permissible range, min.	2 mA
for signal "1" permissible range, max.	0.6 A; 0.12 A with high-speed output, i.e. when using a high-speed output, observe derating; see manual for details
for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	
• "0" to "1", max.	200 µs
• "1" to "0", max.	500 µs; Load-dependent
for technological functions	
— "0" to "1", max.	5 µs; Depending on the output used, see additional description in manual
— "1" to "0", max.	5 µs; Depending on the output used, see additional description in manual
Parallel switching of two outputs	
• for logic links	Yes; for technological functions: No
• for uprating	No
for redundant control of a load	Yes; for technological functions: No
Switching frequency	
with resistive load, max.	100 kHz; For high-speed output, 100 Hz for standard output
 with inductive load, max. 	0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve
on lamp load, max.	10 Hz
Total current of the outputs	
 Current per channel, max. 	0.5 A; see additional description in the manual
 Current per group, max. 	8 A; see additional description in the manual
Current per power supply, max.	4 A; 2 power supplies for each group, current per power supply max. 4 A, see additional description in manual
for technological functions	
— Current per channel, max.	0.5 A; see additional description in the manual
Relay outputs	
Number of relay outputs	0
Cable length	
• shielded, max.	1 000 m; 600 m for technological functions; depending on output frequency, load, and cable quality; max. 50 m at 100 kHz
• unshielded, max.	600 m; for technological functions: No
Analog inputs	
Number of analog inputs	5; 4x for U/I, 1x for R/RTD
For current measurement	4; max.
 For voltage measurement 	4; max.
For resistance/resistance thermometer measurement	1
integrated channels (AI)	5
permissible input voltage for voltage input (destruction limit), max.	28.8 V
permissible input current for current input (destruction limit), max.	40 mA
Cycle time (all channels), min.	1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Input ranges (rated values), voltages	
• 0 to +10 V	Yes; Physical measuring range: ± 10 V
— Input resistance (0 to 10 V)	100 kΩ
• 1 V to 5 V	Yes; Physical measuring range: ± 10 V
— Input resistance (1 V to 5 V)	100 kΩ
• -10 V to +10 V	Yes
— Input resistance (-10 V to +10 V)	100 kΩ
• -5 V to +5 V	Yes; Physical measuring range: ± 10 V
— Input resistance (-5 V to +5 V)	100 kΩ
— Input resistance (-5 V to +5 V) Input ranges (rated values), currents	100 kΩ
	100 kΩ Yes; Physical measuring range: \pm 20 mA

• -20 mA to +20 mA	Yes
— Input resistance (-20 mA to +20 mA)	50 Ω ; Plus approx. 55 ohm for overvoltage protection by PTC
• 4 mA to 20 mA	Yes; Physical measuring range: ± 20 mA
— Input resistance (4 mA to 20 mA)	50 Ω ; Plus approx. 55 ohm for overvoltage protection by PTC
Input ranges (rated values), resistance thermometer	
• Ni 100	Yes; Standard/climate
— Input resistance (Ni 100)	10 ΜΩ
• Pt 100	Yes; Standard/climate
— Input resistance (Pt 100)	10 ΜΩ
Input ranges (rated values), resistors	
• 0 to 150 ohms	Yes; Physical measuring range: 0 600 ohms
 Input resistance (0 to 150 ohms) 	10 ΜΩ
• 0 to 300 ohms	Yes; Physical measuring range: 0 600 ohms
 — Input resistance (0 to 300 ohms) 	10 ΜΩ
• 0 to 600 ohms	Yes
— Input resistance (0 to 600 ohms)	10 ΜΩ
Cable length	
shielded, max.	800 m; for U/I, 200 m for R/RTD
Analog outputs	, , , , , , , , , , , , , , , , , , , ,
integrated channels (AO)	2
	Yes
Voltage output, short-circuit protection	
Cycle time (all channels), min.	1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual
Output ranges, voltage	
• 0 to 10 V	Yes
• 1 V to 5 V	Yes
• -10 V to +10 V	Yes
Output ranges, current	100
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
Load impedance (in rated range of output)	165
	1 kΩ
with voltage outputs, min.	
 with voltage outputs, capacitive load, max. 	100 nF
with current outputs, max.	500 Ω
with current outputs, inductive load, max.	1 mH
Cable length	
• shielded, max.	200 m
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	
 Resolution with overrange (bit including sign), max. 	16 bit
 Integration time, parameterizable 	Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels
Interference voltage suppression for interference frequency fd in Ha	400 / 60 / 50 / 10
frequency f1 in Hz	
Smoothing of measured values	Ver
parameterizable	Yes
Step: None	Yes
• Step: low	Yes
Step: Medium	Yes
Step: High	Yes
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
 Resolution with overrange (bit including sign), max. 	16 bit
Settling time	
 for resistive load 	1.5 ms
• for capacitive load	2.5 ms
for inductive load	2.5 ms
Encoder	
Connection of signal encoders	
for voltage measurement	Yes
for current measurement as 4-wire transducer	Yes

• for resistance measurement with three-wire connection • for resistance measurement with three-wire connection • for resistance measurement with flour-wire connection • for resistance measurement with flour-wire connection • for resistance measurement with three-wire connection • for resistance measurement with flour-wire connection • for purple frequency, max. • for flour flourement and flour-wire with flour-wire connection • for flour-wire flour-wire with flour-wire connection • for flour-wire flour-wire with flour-wire connection • flour-wire flour-wire wire flour-wire wire flour-wire wire wire flour-wire wire flour-wire wire wire wire wire wire wire wire		
	 for resistance measurement with two-wire connection 	Yes
. 2 vivire sensor. - 2 vivire sensor. - 3 vivine sensor. - 4 vivine sensor. - 4 vivine sensor. - 5 vivinisable quisecent current (2-wire sensor), max. Encoder spriss, incrumental encoder (saymmetrical) - 1 linput frequency, max. - 5 lignal filter, parameterizable - 1 linput requency, max. - 5 lignal filter, parameterizable - 1 lincremontal encoder with API tracks, 90° phase offset elementary in the control of tracks of the control	 for resistance measurement with three-wire connection 	Yes
Post	 for resistance measurement with four-wire connection 	Yes
— permissable quiscont current (2-wire sensor), max 1.5 mA	Connectable encoders	
Production Programme Programme Production Produ	• 2-wire sensor	Yes
Encoder signals, incremental encoder (asymmetrical)	 permissible guiescent current (2-wire sensor), max. 	1.5 mA
Input voltage		
Topic frequency, max.		24 V
Counting frequency, max. 400 kHz; with quadruple evaluation Yes	· · · · · ·	
• Incommental encoder with A/B tracks, 90" phase offset encoder with A/B tracks, 90" phase offset encoder with area with A/B tracks, 90" phase offset encoder with direction encoder with one impulse signal per count direction by the encoder with offset on the plus encoder with one impulse signal per count direction by the encoder with one impulse signal per count direction by the encoder with one impulse signal per count direction by the encoder with one impulse signal per count direction by the encoder with one impulse signal per count direction by the encoder with one impulse signal per count direction by the encoder with one impulse signal per count direction by the encoder with one impulse signal per count direction by the encoder with encoder with a track of the encoder with encode		
• Incremental encoder with A/B tracks, 90° phase offset and zero track • pulse encoder • pulse encoder • pulse encoder with direction • pulse encoder with one impulse signal per count direction • yes	-	
and zero track		
- pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one impulse signal per count direction - pulse encoder with one inpulse signal per count direction - pulse encoder with one inpulse signal per count direction - pulse encoder with one inpulse signal per count direction - pulse encoder with one inpulse signal per count direction - pulse encoder with one inpulse signal per count direction - pulse encoder with encoder signal per count direction - pulse encoder with encoder signal per count direction - pulse encoder with encoder signal per count direction - pulse encoder with encoder signal per count direction - pulse encoder encoder encoder signal per count direction - pulse encoder encode	•	103
# pulse encoder with one impulse signal per count direction ###################################	 pulse encoder 	Yes
Energy Proof (relative to input range), (+/-)	 pulse encoder with direction 	Yes
Linearity error (relative to input range), (+/-)	pulse encoder with one impulse signal per count direction	Yes
Temperature error (relative to input range), (+/-)	Errors/accuracies	
Crosstalk between the inputs, max.	Linearity error (relative to input range), (+/-)	0.1 %
Repeat accuracy in steady state at 25 °C (relative to input range), (*/-)	Temperature error (relative to input range), (+/-)	0.005 %/K
range, (+/-) Cuput ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) 0.02 % (+/-) Linearity error (relative to output range), (+/-) 0.05 % Temperature error (relative to output range), (+/-) 0.005 %/K Crosstalk between the outputs, max. -80 dB Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) 0.05 % Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) 0.3 % • Current, relative to input range, (+/-) 0.3 % • Resistance, relative to input range, (+/-) 0.3 % • Voltage, relative to output range, (+/-) 0.3 % • Voltage, relative to output range, (+/-) 0.3 % • Current, relative to input range, (+/-) 0.3 % • Current, relative to input range, (+/-) 0.2 % • Current, relative to input range, (+/-) 0.2 % • Resistance, relative to input range, (+/-) 0.2 % • Resistance, relative to input range, (+/-) 0.2 % • Resistance thermometer, relative to input range, (+/-) 0.2 % • Resistance thermometer, relative to input range, (+/-) 0.2 % • Voltage, relative to output range, (+/-) 0.2 % </td <td>Crosstalk between the inputs, max.</td> <td>-60 dB</td>	Crosstalk between the inputs, max.	-60 dB
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) 0.02 % (+/-) Linearity error (relative to output range), (+/-) 0.15 % Temperature error (relative to output range), (+/-) 0.005 %/K Crosstalic betwenn the outputs, max. =80 dB Repeat accuracy in sleady state at 25 °C (relative to output range) 0.05 % Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) 0.3 % • Current, relative to input range, (+/-) 0.3 % • Resistance thermometer, relative to input range, (+/-) 0.3 % • Resistance thermometer, relative to output range, (+/-) 0.3 % • Current, relative to output range, (+/-) 0.3 % • Current, relative to input range, (+/-) 0.3 % • Current, relative to input range, (+/-) 0.2 % • Current, relative to input range, (+/-) 0.2 % • Current, relative to input range, (+/-) 0.2 % • Resistance thermometer, relative to input range, (+/-) 0.2 % • Resistance thermometer, relative to input range, (+/-) 0.2 % • Current, relative to output range, (+/-) 0.2 % • Current, relative to output range, (+/-) 0.2 %		0.05 %
Linearity error (relative to output range), (+/-)	Output ripple (relative to output range, bandwidth 0 to 50 kHz),	0.02 %
Temperature error (relative to output range, (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Current, relative to output range, (+/-) • Series mode interference (peak value of interference < rated value of input range, (+/-) • Series mode interference (peak value of interference < rated value of input range, (+/-) • Series mode interference, min. • Common mode voltage, max. • Common mode voltage, max. • Common mode voltage, max.		0.15 %
Crosstalk between the outputs, max. -80 dB Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) (potrago), (+/) (potrago), (+/) (potrago), (+/) (potrago), (+/		
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Voltage, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Output range, (+/-) • Current, relative to output range, (+/-) • Out		
Operational error limit in overall temperature range 0.3 % • Current, relative to input range, (+/-) 0.3 % • Resistance, relative to input range, (+/-) 0.3 % • Resistance, relative to input range, (+/-) 0.3 % • Resistance thermometer, relative to input range, (+/-) Pt100 Standard: ±2 K, Pt100 Climate: ±1 K, Ni100 Standard: ±1.2 K, Ni100 Climate: ±1 K • Voltage, relative to output range, (+/-) 0.3 % • Current, relative to output range, (+/-) 0.3 % • Voltage, relative to input range, (+/-) 0.2 % • Current, relative to input range, (+/-) 0.2 % • Resistance, relative to input range, (+/-) 0.2 % • Resistance, relative to input range, (+/-) 0.2 % • Resistance, relative to output range, (+/-) 0.2 % • Resistance, relative to output range, (+/-) 0.2 % • Voltage, relative to output range, (+/-) 0.2 % • Current, relative to output range, (+/-) 0.2 % • Current, relative to output range, (+/-) 0.2 % • Current perature to output range, (+/-) 0.2 % • Common mode voltage suppression for f = n x (ft +/- 1 %), ft = interference frequency • Series mode interference, min. <td< td=""><td>Repeat accuracy in steady state at 25 °C (relative to output</td><td></td></td<>	Repeat accuracy in steady state at 25 °C (relative to output	
Current, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Voltage, relative to output range, (+/-) Current, relative to output range, (+/-) Current, relative to output range, (+/-) Current, relative to input range, (+/-) Voltage, relative to input range, (+/-) Voltage, relative to input range, (+/-) Current, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Voltage, relative to output range, (+/-) Voltage, relative to output range, (+/-) Voltage, relative to output range, (+/-) Current, relative to output range, (+/-) O.2 % Current, relative to output range, (+/-) O.2 % Rolative to output range, (+/-) O.3 % Series mode interference (peak value of interference < rated value of input range), min. Common mode voltage, max. Oominate interference, min. Oom of PROFINET interfaces Number of PROFINET interfaces Interface types RJ 45 (Ethernet) Number of ports PROFINET interfaces Interface types Interface types Protocol PROFINET IO Controller PROFINET IO Device Profine Yes	·	0.3 %
Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Voltage, relative to output range, (+/-) Current, relative to output range, (+/-) Voltage, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Voltage, relative to output range, (+/-) Voltage, relative to input range, (+/-) Voltage, relative to input range, (+/-)		
Pt100 Standard: ±2 K, Pt100 Climate: ±1 K, Ni100 Standard: ±1.2 K, Ni100 Climate: ±1 K Voltage, relative to output range, (+/-) Current, relative to output range, (+/-) Voltage, relative to output range, (+/-) Voltage, relative to input range, (+/-) Current, relative to input range, (+/-) Current, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Voltage, relative to output range, (+/-) Resistance thermometer, relative to input range, (+/-) Voltage, relative to output range, (+/-) Series mode interference (peak value of interference < rafeto value of input range, (+/-) Common mode voltage, max. Common mode voltage, max. Common mode interference, min. Common mode interference, min. Common mode interference, min. Common mode of prots Common mode interference Registance thermometer, with the following the foll	,	
• Current, relative to output range, (+/-) Basic error limit (operational limit at 25 °C) • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current relative to input range, (+/-) • Current relative to input range, (+/-) • D.2 % • Old Bratis the Relative to input range, (+/-) • Current relative to output range, (+/-) • Current relative to input range, (+/-) • Current relative to output range, (+/-) • Current relative to output range, (+/-) • D.2 % • Old Bratis the Relative		Pt100 Standard: ±2 K, Pt100 Climate: ±1 K, Ni100 Standard: ±1.2 K, Ni100
Basic error limit (operational limit at 25 °C) • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Voltage, relative to output range, (+/-) • United to output range, (+/-) • Current, relative to output range, (+/-) • O.2 % Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency • Series mode interference (peak value of interference < rade value of input range), min. • Common mode voltage, max. • Common mode voltage, max. • Common mode interference, min. • Common mode interference, min. • Common mode interference, min. • Common mode interference (pin.) • ProFINET interfaces 1. Interface Interface types • RJ 45 (Ethernet) • Interface deswich • Yes; X1 • Number of ports • integrated switch • Yes Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Controller • PROFINET IO Device Yes	 Voltage, relative to output range, (+/-) 	0.3 %
Basic error limit (operational limit at 25 °C) • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Series mode interference (peak value of interference < rated value of input range), min. • Common mode voltage, max. • Common mode voltage, max. • Common mode interference, min. • Common mode interference, min. • Common mode interference (Pask Value of PROFINET interfaces Number of PROFINET interfaces 1. Interface Interface types • RJ 45 (Ethernet) • Interface deswitch • Interface deswitch • Protocol • Integrated switch • Yes; X1 • Number of ports • Integrated switch • Yes Protocols • IP protocol • PROFINET IO Controller • PROFINET IO Device Yes Yes		0.3 %
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Resistance thermometer, relative to input range, (+/-) Voltage, relative to output range, (+/-) Climate: ±0.5 K O.2 % Current, relative to output range, (+/-) O.2 % Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency Series mode interference (peak value of interference < rated value of input range), min. Common mode voltage, max. Common mode voltage, max. Common mode interference, min. Common mode interference, min. Common mode interference, min. Common mode interference, min. Common mode voltage, max. Common mode interference, min. Common mode voltage, max. Common mode voltage, value of interference frequency Common mode voltage, value of interference		
Voltage, relative to output range, (+/-) Current, relative to output range, (+/-) Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency Series mode interference (peak value of interference < 30 dB rated value of input range), min. Common mode voltage, max. Common mode interference, min. Common mode voltage, max. Common mode voltage value of interference frequency Common mode voltage value of interference frequency Common mode voltage value of interference frequency Common mode voltage, max. Common mode		Pt100 Standard: ±1 K, Pt100 Climate: ±0.5 K, Ni100 Standard: ±0.6 K, Ni100
Current, relative to output range, (+/-) Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency Series mode interference (peak value of interference < 30 dB rated value of input range), min. Common mode voltage, max. Common mode interference, min. Rumber of PROFINET interfaces Interfaces Interface types RJ 45 (Ethernet) Number of ports Integrated switch Yes; X1 Number of ports Integrated switch Yes Protocols PROFINET IO Controller PROFINET IO Device Yes Yes Yes Yes Yes Yes Yes Y	 Voltage, relative to output range, (+/-) 	0.2 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency • Series mode interference (peak value of interference < 30 dB rated value of input range), min. • Common mode voltage, max. 10 V • Common mode interference, min. 60 dB; at 400 Hz: 50 dB Interfaces Number of PROFINET interfaces 1 1. Interface Interface types • RJ 45 (Ethernet) Yes; X1 • Number of ports 2 • integrated switch Yes Protocols • IP protocol • IP protocol • PROFINET IO Controller • PROFINET IO Device Yes		
Series mode interference (peak value of interference < rated value of input range), min. Common mode voltage, max. Common mode interference, min. 60 dB; at 400 Hz: 50 dB Interfaces Number of PROFINET interfaces 1 Interface Interface types RJ 45 (Ethernet) Number of ports integrated switch Yes; X1 Number of ports integrated switch Yes Protocols IP protocol PROFINET IO Controller PROFINET IO Device 30 dB 30 dB 30 dB 30 dB 40 Hz: 50 dB 10 V 60 dB; at 400 Hz: 50 dB 11 V 60 dB; at 400 Hz: 50 dB 12 Ves; X1 13 Ves; X1 40 Ves; X1 41 Ves; X1 42 Ves Protocols Yes PROFINET IO Controller Yes PROFINET IO Device Yes		
Common mode voltage, max. Common mode interference, min. 60 dB; at 400 Hz: 50 dB Interfaces Number of PROFINET interfaces Interface types RJ 45 (Ethernet) Number of ports Number of ports Interface switch Protocols IP protocol PROFINET IO Controller PROFINET IO Device 10 V 60 dB; at 400 Hz: 50 dB 11 V 60 dB; at 400 Hz: 50 dB 12 V 60 dB; at 400 Hz: 50 dB 14 V 60 dB; at 400 Hz: 50 dB 15 V 60 dB; at 400 Hz: 50 dB 16 V 60 dB; at 400 Hz: 50 dB 17 V 98; X1 98; X1 98 98 98 99 99 99 99 99 99 9	Series mode interference (peak value of interference <	
Common mode interference, min. 60 dB; at 400 Hz: 50 dB Interfaces Number of PROFINET interfaces 1 I. Interface Interface types RJ 45 (Ethernet) Number of ports Number of ports Integrated switch Protocols IP protocol PROFINET IO Controller PROFINET IO Device 60 dB; at 400 Hz: 50 dB 1 Yes 50 dB		10 V
Interfaces Number of PROFINET interfaces 1 1. Interface Interface types • RJ 45 (Ethernet) Yes; X1 • Number of ports 2 • integrated switch Yes Protocols • IP protocol Yes; IPv4 • PROFINET IO Controller Yes • PROFINET IO Device Yes		
Number of PROFINET interfaces 1 1. Interface Interface types • RJ 45 (Ethernet) Yes; X1 • Number of ports 2 • integrated switch Yes Protocols • IP protocol Yes; IPv4 • PROFINET IO Controller Yes • PROFINET IO Device Yes		OO day, di TOO FIZ. OO da
1. Interface Interface types Page 1 Interface types Yes; X1 Number of ports 2 Integrated switch Yes Protocols Yes; IPv4 PROFINET IO Controller Yes PROFINET IO Device Yes		1
Interface types		'
 RJ 45 (Ethernet) Number of ports integrated switch Protocols IP protocol PROFINET IO Controller PROFINET IO Device Yes; IPv4 Yes 		
 Number of ports integrated switch Protocols IP protocol PROFINET IO Controller PROFINET IO Device Yes, IPv4 Yes Yes 	• •	VV4
 integrated switch Protocols IP protocol PROFINET IO Controller PROFINET IO Device Yes Yes 		
Protocols IP protocol PROFINET IO Controller PROFINET IO Device Yes Yes	·	
 IP protocol PROFINET IO Controller PROFINET IO Device Yes Yes 		Yes
 PROFINET IO Controller PROFINET IO Device Yes Yes 	Protocols	
PROFINET IO Device Yes	• IP protocol	Yes; IPv4
	PROFINET IO Controller	Yes
• SIMATIC communication Yes	PROFINET IO Device	Yes
	SIMATIC communication	Yes

Yes; Optionally also encrypted • Open IE communication Web server Yes Media redundancy Yes PROFINET IO Controller Services Isochronous mode - 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 512 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 - Number of IO Devices that can be simultaneously 8: in total across all interfaces activated/deactivated, max. - Number of IO Devices per tool, max. 8 The minimum value of the update time also depends on communication share - Updating times set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data - PROFINET Security Class 1 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 500 µs of the isochronous OB is decisive 500 µs to 8 ms — for send cycle of 500 µs - 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 - Isochronous mode No – IRT Yes - PROFlenergy Yes; per user program - Shared device Yes - Number of IO Controllers with shared device, max. - activation/deactivation of I-devices Yes; per user program - Asset management record Yes; per user program SNMP Configuration and DCP Read Only - PROFINET Security Class Interface types RJ 45 (Ethernet) • 100 Mbps Yes Autonegotiation Yes Autocrossing Yes • Industrial Ethernet status LED Yes Protocols Number of connections • Number of connections, max. 128; via integrated interfaces of the CPU and connected CPs / CMs • Number of connections reserved for ES/HMI/web 10 88 · Number of connections via integrated interfaces 16 . Number of S7 routing paths 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	30
PG/OP communication	Yes; encryption with TLS V1.3 pre-selected
• S7 routing	Yes
Data record 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	occ of the holp (or continuation, user data size)
• TCP/IP	Yes
— Data length, max.	64 kbyte
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. 78 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• Encryption	Yes; Optional
Web server	and the second s
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
• web API	
 Number of sessions, max. 	50
— number of simultaneous HTTP calls, max.	4
— HTTP request body, max.	131 072 byte
OPC UA	
Runtime license required	Yes; "Small" license required
OPC UA Client	Yes; Data Access (registered Read/Write), Method Call
 Application authentication 	Yes
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,	1 000
recommended max.	200
 — Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_I 	300
max.	
Number of elements for one call of	20
OPC_UA_NameSpaceGetIndexList, max.	
 Number of elements for one call of OPC_UA_MethodGetHandleList, max. 	100
Number of simultaneous calls of the client	1
instructions for session management, per connection, max.	
 Number of simultaneous calls of the client instructions for data access, per connection, max. 	5
— 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, alarms & condition (A&C), custom address space, role-based access control

— Application authentication	Yes
Application authentication Security policies	
— Security policies	available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss
— User authentication	"anonymous" or by user name & password
GDS support (certificate management)	Yes
— Number of sessions, max.	32
Number of accessible variables, max.	50 000
Number of registerable nodes, max.	10 000
Number of subscriptions per session, max.	50
— Sampling interval, min.	100 ms
— Publishing interval, min.	200 ms
Number of server methods, max.	20; max. 20 concurrently running jobs each for asynchronous instructions OPC_UA_ServerMethodPre and OPC_UA_ServerMethodPost
 Number of inputs/outputs per server method, max. 	20
Number of impuls/outputs per server method, max. Number of monitored items, recommended max.	4 000; 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
— Number of server interfaces, max.	type "Reference namespace"
 Number of nodes for user-defined server interfaces, 	15 000
max.	
 Alarms and Conditions 	Yes
 Number of program alarms 	100
 Number of alarms for system diagnostics 	50
Further protocols	
• MODBUS	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	32
number of subscriptions, max.	250
number of tags/attributes for subscriptions, max.	2 000
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.	5 000
Number of simultaneously active program alarms	
Number of program alarms	600
Number of plarms for system diagnostics	400
• Number of dialitis for system diagnostics	100
 Number of alarms for system diagnostics Number of alarms for motion technology objects 	160
Number of alarms for motion technology objects	
Number of alarms for motion technology objects Test commissioning functions	160
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 5 engineering systems
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients)
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable Variables	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control Variables Number of variables, max.	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control Status/control variable Variables Number of variables, max. — of which status variables, max.	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable Variables Number of variables, max. — of which status variables, max. — of which control variables, max.	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing Forcing	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control Status/control variable Variables Number of variables, max. — of which status variables, max. — of which control variables, max. Forcing Forcing Forcing, variables	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes Peripheral inputs/outputs
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control Status/control variable Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing Forcing Forcing Forcing, variables Number of variables, max.	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control Status/control variable Variables Number of variables, max. — of which status variables, max. — of which control variables, max. Forcing Forcing Forcing, variables	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes Peripheral inputs/outputs
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control Status/control variable Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing Forcing Forcing Forcing, variables Number of variables, max.	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes Peripheral inputs/outputs
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing Forcing Forcing, variables Number of variables, max. Diagnostic buffer	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes Peripheral inputs/outputs 200
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable Variables Number of variables, max. — of which status variables, max. — of which control variables, max. Forcing Forcing Forcing Forcing, variables Number of variables, max. Diagnostic buffer present	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes Peripheral inputs/outputs 200 Yes
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing Forcing Forcing Forcing, variables Number of variables, max. Diagnostic buffer present Number of entries, max. of which powerfail-proof Traces	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes Peripheral inputs/outputs 200 Yes 1 000
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control Status/control variable Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing Forcing Forcing Forcing, variables Number of variables, max. Diagnostic buffer present Number of entries, max. of which powerfail-proof	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes Peripheral inputs/outputs 200 Yes 1 000
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing Forcing Forcing Forcing, variables Number of variables, max. Diagnostic buffer present Number of entries, max. of which powerfail-proof Traces	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job Yes Peripheral inputs/outputs 200 Yes 1 000 500
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing Forcing Forcing, variables Number of variables, max. Diagnostic buffer present Number of entries, max. of which powerfail-proof Traces Number of configurable Traces	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes Peripheral inputs/outputs 200 Yes 1 000 500
 Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control variable Variables Number of variables, max. — of which status variables, max. — of which control variables, max. Forcing Forcing Forcing, variables Number of variables, max. Diagnostic buffer present Number of entries, max. — of which powerfail-proof Traces Number of configurable Traces Memory size per trace, max. 	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes Peripheral inputs/outputs 200 Yes 1 000 500
Number of alarms for motion technology objects Test commissioning functions Joint commission (Team Engineering) Status block Single step Number of breakpoints Profiling Status/control Status/control Status/control Status/control variable Variables Number of variables, max. of which status variables, max. of which control variables, max. Forcing Forcing Forcing Forcing, variables Number of variables, max. Diagnostic buffer present Number of entries, max. of which powerfail-proof Traces Number of configurable Traces Memory size per trace, max. Interrupts/diagnostics/status information	Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job Yes Peripheral inputs/outputs 200 Yes 1 000 500

a Hardwara interrunt	Voc
Hardware interrupt	Yes
Diagnoses	Voc
Monitoring the supply voltage	Yes
Wire-break	Yes; for analog inputs/outputs, see description in manual
Short-circuit A/B to a sitting arrange to incomparate larger day.	Yes; for analog outputs, see description in manual
A/B transition error at incremental encoder	Yes
Diagnostics indication LED	v
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
STOP ACTIVE LED	Yes
Monitoring of the supply voltage (PWR-LED)	Yes
Channel status display	Yes
• for channel diagnostics	Yes; For analog inputs/outputs
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	1 120
technology objects	1 120
Required Motion Control resources	
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) 	11
 Number of positioning axes at motion control cycle of 8 ms (typical value) 	14
Controller	
PID_Compact	Yes; Universal PID controller with integrated optimization
PID_3Step	Yes; PID controller with integrated optimization for valves
PID-Temp	Yes; PID controller with integrated optimization for temperature
Counting and measuring	
High-speed counter	Yes
Integrated Functions	
Counter	
 Number of counters 	6
Counting frequency, max.	400 kHz; with quadruple evaluation
Counting functions	
Continuous counting	Yes
Counter response parameterizable	Yes
Hardware gate via digital input	Yes
Software gate	Yes
Event-controlled stop	Yes
Synchronization via digital input	Yes
Counting range, parameterizable	Yes
Comparator	
Number of comparators	2; per count channel; see manual for details
Direction dependency	Yes
Can be changed from user program	Yes
Position detection	
Incremental acquisition	Yes
Suitable for S7-1500 Motion Control	Yes
Measuring functions	
Measuring time, parameterizable	Yes
Dynamic measurement period adjustment	Yes
	2
Number of thresholds, parameterizable	2

Measuring range	0.0411-
— Frequency measurement, min.	0.04 Hz
— Frequency measurement, max.	400 kHz; with quadruple evaluation
Cycle duration measurement, min.	2.5 μs
Cycle duration measurement, max.	25 s
Accuracy	
Frequency measurement	100 ppm; depending on measuring interval and signal evaluation
 Cycle duration measurement 	100 ppm; depending on measuring interval and signal evaluation
— Velocity measurement	100 ppm; depending on measuring interval and signal evaluation
Potential separation	
Potential separation digital inputs	
 between the channels 	No
between the channels, in groups of	16
Potential separation digital outputs	
 between the channels 	No
 between the channels, in groups of 	16
Potential separation channels	
 between the channels and backplane bus 	Yes
 Between the channels and load voltage L+ 	No
product functions / security / header	
PROFINET Security Class	1
signed firmware update	Yes
Secure Boot	Yes
safely removing data	Yes
Ambient conditions	
Ambient temperature during operation	
horizontal installation, min.	-30 °C; No condensation
horizontal installation, max.	60 °C; note derating data for onboard I/O in the manual. Display: 50 °C, at an
• Honzontal installation, max.	operating temperature of typically 50 °C, the display is switched off
 vertical installation, min. 	-30 °C; No condensation
vertical installation, max.	40 °C; note derating data for onboard I/O in the manual. 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 / header	
configuration / programming / header	
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— GRAPH	Yes
Know-how protection	
User program protection/password protection	Yes
Copy protection	
Sopy protection	Vas
Rlock protection	Yes
Block protection Access protection	Yes Yes
Access protection	Yes
Access protection • protection of confidential configuration data	Yes Yes
Access protection • protection of confidential configuration data • Password for display	Yes Yes Yes
Access protection protection of confidential configuration data Password for display Protection level: Write protection	Yes Yes Yes Yes
Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection	Yes Yes Yes Yes Yes Yes
Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe	Yes Yes Yes Yes Yes Yes No
Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection	Yes Yes Yes Yes Yes Yes
Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe	Yes Yes Yes Yes Yes Yes No
Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection	Yes Yes Yes Yes Yes Yes Yes Yes Yes
Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection • User administration	Yes Yes Yes Yes Yes Yes Yes Yes No Yes Yes; device-wide and centralized
Access protection • protection of confidential configuration data • Password for display • Protection level: Write protection • Protection level: Read/write protection • Protection level: Write protection for Failsafe • Protection level: Complete protection • User administration • Number of users	Yes Yes Yes Yes Yes Yes Yes Yes No Yes Yes; device-wide and centralized 100

● lower limit

● upper limit

Dimensions

Width

Height

Depth

Depth

129 mm

Weights

Weight, approx.

1 235 g; with front connector

Version Classification eClass 14 27-24-22-07 27-24-22-07 eClass 12 27-24-22-07 eClass 9.1 eClass 9 27-24-22-07 8 27-24-22-07 eClass 27-24-22-07 eClass 7.1 eClass 6 27-24-22-07 ETIM EC000236 10 **ETIM** 9 EC000236 8 EC000236 **ETIM** ETIM EC000236 7

Approvals / Certificates

General Product Approval

Test Certificates









Type Test Certificates/Test Report

Special Test Certificate

Maritime application

other

Environment







Confirmation







Environment



Environmental Confirmations

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