SIEMENS

Data sheet

6ES7511-1CK00-0AB0



*** Spare part *** SIMATIC S7-1500 Compact CPU CPU 1511C-1 PN, central processing unit with work memory 175 KB for program and 1 MB for data, 16 digital inputs, 16 digital outputs, 5 analog inputs, 2 analog outputs, 6 high-speed counters, 4 high-speed counters for PTO/PWM/frequency output 1st interface: PROFINET IRT with 2-port switch, 60 ns bit performance, incl. push-in front connector, SIMATIC Memory Card required

General information	
Product type designation	CPU 1511C-1 PN
HW functional status	FS03
Firmware version	V2.9
Product function	
 I&M data 	Yes; I&M0 to I&M3
 Isochronous mode 	Yes; With minimum OB 6x cycle of 625 µs (distributed)
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V17 (FW V2.9) / V13 SP1 Update 4 (FW V1.8) or higher
Configuration control	
via dataset	Yes
Display	
Screen diagonal [cm]	3.45 cm
Control elements	
Number of keys	6
Mode selector switch	1
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V; 20.4 V DC, for supplying the digital inputs/outputs
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
 Mains/voltage failure stored energy time 	5 ms; Refers to the power supply on the CPU section
Repeat rate, min.	1/s
Input current	
Current consumption (rated value)	0.8 A; Digital onboard I/O modules are supplied separately
Inrush current, max.	1.9 A; Rated value
l²t	0.34 A ² ·s
Digital inputs	
 from load voltage L+ (without load), max. 	20 mA; per group
Digital outputs	
 from load voltage L+, max. 	30 mA; Per group, without load
output voltage / header	
Rated value (DC)	24 V
Encoder supply	
Number of outputs	1; One common 24 V encoder supply
24 V encoder supply	
• 24 V	Yes; L+ (-0.8 V)
 Short-circuit protection 	Yes

Output current, max.	1 A
Power	
Infeed power to the backplane bus	10 W
Power consumption from the backplane bus (balanced)	8.5 W
Power loss	
Power loss, typ.	11.8 W
	11.0 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required Work memory	Yes
 integrated (for program) 	175 kbyte
 integrated (or program) integrated (for data) 	1 Mbyte
Load memory	1110310
 Plug-in (SIMATIC Memory Card), max. 	32 Gbyte
Backup	
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.	175 kbyte
FC	
Number range	0 65 535
• Size, max.	175 kbyte
OB	
• Size, max.	175 kbyte
Number of free cycle OBs	100
Number of time alarm OBs	20
Number of delay alarm OBs	20 20: With minimum OR 2v quale of 500 up
Number of cyclic interrupt OBs	20; With minimum OB 3x cycle of 500 µs
 Number of process alarm OBs Number of DPV1 alarm OBs 	50 3
Number of isochronous mode OBs	1
Number of technology synchronous alarm OBs	2
Number of technology synchronous alarm obs	100
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	0.040
Number Potentivity	2 048
Retentivity — adjustable	Yes
	103

IEC timer	
Number	Any (only limited by the main memory)
Retentivity	, (,
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	128 kbyte; In total; available retentive memory for bit memories, timers,
Extended retentive data area (incl. timers, counters, flags),	counters, DBs, and technology data (axes): 88 KB 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF
max. Flag	
• Size, max.	16 kbyte
Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	e, e deek memory bit, grouped into one deek memory byte
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	1 024; 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	4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
 integrated Via CM 	1 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
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	
•Туре	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 Clack symphratization	16
Clock synchronization	Vac
supportedin AS, master	Yes Yes
 In AS, master in AS, slave 	Yes
on Ethernet via NTP	Yes
Digital inputs	40
integrated channels (DI)	16 Voc
Digital inputs, parameterizable	Yes Preading
Source/sink input	P-reading

Input characteristic curve in accordance with IEC 61131,	Yes
type 3	
Digital input functions, parameterizable	
Gate start/stop	Yes
Capture	Yes
 Synchronization 	Yes
Input voltage	
 Type of input voltage 	DC
 Rated value (DC) 	24 V
 for signal "0" 	-3 to +5V
• for signal "1"	+11 to +30V
Input current	
● for signal "1", typ.	2.5 mA
Input delay (for rated value of input voltage)	
for standard inputs	
— parameterizable	Yes; none / 0.05 / 0.1 / 0.4 / 1.6 / 3.2 / 12.8 / 20 ms
— at "0" to "1", min.	4 µs; for parameterization "none"
— at "0" to "1", max.	20 ms
— at "1" to "0", min.	
	4 µs; for parameterization "none"
— at "1" to "0", max.	20 ms
for interrupt inputs	
— parameterizable	Yes; Same as for standard inputs
for technological functions	
— parameterizable	Yes; Same as for standard inputs
Cable length	
 shielded, max. 	1 000 m; 600 m for technological functions; depending on input
	frequency, 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)	16
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	-0.8 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	
	Vee: As output signal of a high around sounter
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	
with resistive load, max.	0.5 A; 0.1 A with high-speed output, i.e. when using a high-speed
·	output; see manual for details
 on lamp load, max. 	5 W; 1 W with high-speed output, i.e. when using a high-speed output;
	see manual for details
Load resistance range	
lower limit	48 Ω ; 240 ohms with high-speed output, i.e. when using a high-speed
	output; see manual for details
upper limit	12 kΩ
Output voltage	
Type of output voltage	DC
• for signal "0", max.	1 V; With high-speed output, i.e. when using a high-speed output; see
	manual 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
<u> </u>	output, observe derating; see manual for details
	output, observe derating, see mandar 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
- fer eignel "O" residuel surrent men	output, observe derating; see manual for details
• for signal "0" residual current, max.	0.5 mA
Output delay with resistive load	000
• "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	
	5; 4x for U/I, 1x for R/RTD
Analog inputs Number of analog inputs • For current measurement	5; 4x for U/I, 1x for R/RTD 4; max.
Number of analog inputs	
Number of analog inputs • For current measurement	4; max.
Number of analog inputs • For current measurement • For voltage measurement	4; max. 4; max.
Number of analog inputs For current measurement For voltage measurement For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction	4; max. 4; max.
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max.	4; max. 4; max. 1 28.8 V
Number of analog inputs For current measurement For voltage measurement For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction	4; max. 4; max. 1
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max.	4; max. 4; max. 1 28.8 V 40 mA
Number of analog inputs For current measurement For voltage measurement For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min.	 4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V)	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V	$\begin{array}{l} 4; \mbox{ max.} \\ 4; \mbox{ max.} \\ 1 \\ 28.8 \ V \\ 40 \ mA \\ 1 \ ms; \ Dependent \ on \ the \ parameterized \ interference \ frequency \ suppression; \ for \ details, \ see \ conversion \ procedure \ in \ manual \ Yes; \ °C/°F/K \\ \end{array}$
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V)	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V	$\begin{array}{l} 4; \mbox{ max.} \\ 4; \mbox{ max.} \\ 1 \\ 28.8 \ V \\ 40 \ mA \\ 1 \ ms; \ Dependent \ on \ the \ parameterized \ interference \ frequency \ suppression; \ for \ details, \ see \ conversion \ procedure \ in \ manual \ Yes; \ ^C/^F/K \\ \end{array}$
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ Yes 100 kΩ
Number of analog inputs • For current measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • -5 V to +5 V	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • 5 V to +5 V — Input resistance (-5 V to +5 V)	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ Yes 100 kΩ
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • 5 V to +5 V — Input resistance (-5 V to +5 V) Input ranges (rated values), currents	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • -5 V to +5 V — Input resistance (-5 V to +5 V) Input ranges (rated values), currents • 0 to 20 mA	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (-10 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • -5 V to +5 V — Input resistance (-5 V to +5 V) Input ranges (rated values), currents • 0 to 20 mA — Input resistance (0 to 20 mA)	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • -5 V to +5 V — Input resistance (-5 V to +5 V) Input ranges (rated values), currents • 0 to 20 mA — Input resistance (0 to 20 mA) • -20 mA to +20 mA	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • -5 V to +5 V — Input resistance (-5 V to +5 V) Input ranges (rated values), currents • 0 to 20 mA — Input resistance (0 to 20 mA) • -20 mA to +20 mA — Input resistance (-20 mA to +20 mA)	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 k Ω Yes; Physical measuring range: ± 20 mA 50 Ω ; Plus approx. 55 ohm for overvoltage protection by PTC Yes 50 Ω ; Plus approx. 55 ohm for overvoltage protection by PTC
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • -5 V to +5 V — Input resistance (-5 V to +5 V) Input ranges (rated values), currents • 0 to 20 mA — Input resistance (0 to 20 mA) • -20 mA to +20 mA — Input resistance (-20 mA to +20 mA) • 4 mA to 20 mA	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 20 mA 50 Ω; Plus approx. 55 ohm for overvoltage protection by PTC Yes; Physical measuring range: ± 20 mA
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • -5 V to +5 V — Input resistance (-5 V to +5 V) Input ranges (rated values), currents • 0 to 20 mA — Input resistance (0 to 20 mA) • -20 mA to +20 mA — Input resistance (-20 mA to +20 mA) • 4 mA to 20 mA — Input resistance (4 mA to 20 mA)	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ Yes 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 20 mA 50 Ω; Plus approx. 55 ohm for overvoltage protection by PTC Yes 50 Ω; Plus approx. 55 ohm for overvoltage protection by PTC
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • -5 V to +5 V — Input resistance (-5 V to +5 V) Input ranges (rated values), currents • 0 to 20 mA — Input resistance (0 to 20 mA) • -20 mA to +20 mA — Input resistance (-20 mA to +20 mA) • 4 mA to 20 mA — Input resistance (4 mA to 20 mA) Input ranges (rated values), resistance thermometer	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; $^{\circ}C/^{\circ}F/K$ Yes; Physical measuring range: $\pm 10 V$ 100 k Ω Yes; Physical measuring range: $\pm 20 mA$ 50 Ω ; Plus approx. 55 ohm for overvoltage protection by PTC Yes; Physical measuring range: $\pm 20 mA$ 50 Ω ; Plus approx. 55 ohm for overvoltage protection by PTC Yes; Physical measuring range: $\pm 20 mA$ 50 Ω ; Plus approx. 55 ohm for overvoltage protection by PTC Yes; Physical measuring range: $\pm 20 mA$ 50 Ω ; Plus approx. 55 ohm for overvoltage protection by PTC
Number of analog inputs • For current measurement • For voltage measurement • For resistance/resistance thermometer measurement permissible input voltage for voltage input (destruction limit), max. permissible input current for current input (destruction limit), max. Cycle time (all channels), min. Technical unit for temperature measurement adjustable Input ranges (rated values), voltages • 0 to +10 V — Input resistance (0 to 10 V) • 1 V to 5 V — Input resistance (1 V to 5 V) • -10 V to +10 V — Input resistance (-10 V to +10 V) • -5 V to +5 V — Input resistance (-5 V to +5 V) Input ranges (rated values), currents • 0 to 20 mA — Input resistance (0 to 20 mA) • -20 mA to +20 mA — Input resistance (-20 mA to +20 mA) • 4 mA to 20 mA — Input resistance (4 mA to 20 mA)	4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency suppression; for details, see conversion procedure in manual Yes; °C/°F/K Yes; Physical measuring range: ± 10 V 100 kΩ Yes; Physical measuring range: ± 20 mA 50 Ω; Plus approx. 55 ohm for overvoltage protection by PTC Yes; Physical measuring range: ± 20 mA

• 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 MΩ
• 0 to 300 ohms	Yes; Physical measuring range: 0 600 ohms
 Input resistance (0 to 300 ohms) 	10 MΩ
• 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
Voltage output, short-circuit protection	Yes
Cycle time (all channels), min.	1 ms; Dependent on the parameterized interference frequency
Output ranges, voltage	suppression; for details, see conversion procedure in manual
• 0 to 10 V	Yes
• 1 V to 5 V	Yes
• -10 V to +10 V	Yes
Output ranges, current	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
Load impedance (in rated range of output)	
• with voltage outputs, min.	1 kΩ
 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 	400 / 60 / 50 / 10
frequency f1 in Hz	
Smoothing of measured values	
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	4.5
for resistive load	1.5 ms
for capacitive load	2.5 ms
for inductive load	2.5 ms
Encoder	
Connection of signal encoders	N .
for voltage measurement	Yes
for current measurement as 4-wire transducer for registrance measurement with two wire	Yes
 for resistance measurement with two-wire connection 	Yes
 for resistance measurement with three-wire connection 	Yes
 for resistance measurement with four-wire 	Yes
connection	
Connectable encoders	
 2-wire sensor 	Yes
 permissible quiescent current (2-wire sensor), 	1.5 mA
max.	

Encoder signals, incremental encoder (asymmetrical)	
Input voltage	24 V
 Input voltage Input frequency, max. 	100 kHz
Counting frequency, max.	400 kHz; with quadruple evaluation
Signal filter, parameterizable	Yes
 Incremental encoder with A/B tracks, 90° phase 	Yes
offset	
 Incremental encoder with A/B tracks, 90° phase 	Yes
offset and zero track	
 pulse encoder 	Yes
 pulse encoder with direction 	Yes
 pulse encoder with one impulse signal per count direction 	Yes
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.1 %
Temperature error (relative to input range), (+/-)	0.005 %/K
Crosstalk between the inputs, max.	-60 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.05 %
Output ripple (relative to output range, bandwidth 0 to 50	0.02 %
kHz), (+/-)	0.15 %
Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-)	0.15 % 0.005 %/K
Crosstalk between the outputs, max.	-80 dB
Repeat accuracy in steady state at 25 °C (relative to	0.05 %
output range), (+/-)	0.00 /0
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 %
 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 %
Basic error limit (operational limit at 25 °C)	0.0.%
• Voltage, relative to input range, (+/-)	0.2 %
• Current, relative to input range, (+/-)	0.2 %
Resistance, relative to input range, (+/-)	0.2 %
 Resistance thermometer, relative to input range, (+/-) 	Pt100 Standard: ±1 K, Pt100 Climate: ±0.5 K, Ni100 Standard: ±0.6 K, Ni100 Climate: ±0.5 K
 Voltage, relative to output range, (+/-) 	0.2 %
• Current, relative to output range, (+/-)	0.2 %
Interference voltage suppression for $f = n \times (f1 + /-1 \%), f1 = 1$	
Series mode interference (peak value of	30 dB
interference < 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	Yes; IPv4
PROFINET IO Controller	Yes
PROFINET IO Device	Yes
SIMATIC communication	Yes
Open IE communication	Yes; Optionally also encrypted
Web server	Yes
Media redundancy	Yes
PROFINET IO Controller	
Services	
— PG/OP communication	Yes

Isochropous mode	Yes
— 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 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, 	128
max. — of which in line, max.	128
— Number of IO Devices that can be	8: in total across all interfaces
simultaneously activated/deactivated, max.	
— 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
r	minimum update time of 625 μ s of the isochronous OB is decisive
— for send cycle of 500 μs	500 μ s to 8 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 625 μ s 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 2 ms	4 ms to 64 ms
— With IRT and parameterization of "odd" send	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625
cycles	μ s 3 875 μ s)
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
	Yes No
— PG/OP communication	
 — PG/OP communication — Isochronous mode 	No
 — PG/OP communication — Isochronous mode — IRT 	No Yes
 PG/OP communication Isochronous mode IRT PROFlenergy 	No Yes Yes; per user program
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device 	No Yes Yes; per user program Yes
 PG/OP communication Isochronous mode IRT PROFIenergy Shared device Number of IO Controllers with shared device, 	No Yes Yes; per user program Yes
 PG/OP communication Isochronous mode IRT PROFIenergy Shared device Number of IO Controllers with shared device, max. 	No Yes Yes; per user program Yes 4
 PG/OP communication Isochronous mode IRT PROFIenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices 	No Yes Yes; per user program Yes 4 Yes; per user program
 PG/OP communication Isochronous mode IRT PROFIenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record 	No Yes Yes; per user program Yes 4 Yes; per user program
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record 	No Yes Yes; per user program Yes 4 Yes; per user program
 PG/OP communication Isochronous mode IRT PROFIenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet)	No Yes Yes; per user program Yes; per user program Yes; per user program
 PG/OP communication Isochronous mode IRT PROFIenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps 	No Yes Yes; per user program Yes 4 Yes; per user program Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation 	No Yes Yes; per user program Yes; per user program Yes; per user program
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing 	No Yes Yes; per user program Yes; per user program Yes; per user program Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED 	No Yes Yes; per user program Yes; per user program Yes; per user program Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes
 PG/OP communication Isochronous mode IRT PROFIenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections	No Yes Yes; per user program Yes; per user program Yes; per user program Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections, max. Number of connections, max. 	No Yes Yes; per user program Yes 4 Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces 	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths 	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths 	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths 	No Yes Yes; per user program Yes 4 Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy 	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections, max. Number of connections reserved for ES/HMI/web Number of S7 routing paths Redundancy mode H-Sync forwarding 	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy — Media redundancy 	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes
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 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy MRP 	No Yes Yes; per user program Yes 4 Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes
 PG/OP communication Isochronous mode IRT PROFlenergy Shared device Number of IO Controllers with shared device, max. activation/deactivation of I-devices Asset management record Interface types RJ 45 (Ethernet) 100 Mbps Autonegotiation Autocrossing Industrial Ethernet status LED Protocols Number of connections, max. Number of connections reserved for ES/HMI/web Number of connections via integrated interfaces Number of S7 routing paths Redundancy mode H-Sync forwarding Media redundancy MRP MRP interconnection, supported 	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes Yes Yes

— 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	
• 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. 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
— 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.	
— Number of elements for one call of	300
OPC_UA_NodeGetHandleList/OPC_UA_ReadList/C max.	
— Number of elements for one call of	20
OPC_UA_NameSpaceGetIndexList, max.	
- Number of elements for one call of	100
OPC_UA_MethodGetHandleList, max.	
 Number of simultaneous calls of the client 	1
instructions for session management, per connection, max.	
— Number of simultaneous calls of the client	5
instructions for data access, per connection, max.	
- Number of registerable nodes, max.	5 000
- Number of registerable method calls of	100
OPC_UA_MethodCall, max.	
 — Number of inputs/outputs when calling OPC_UA_MethodCall, max. 	20
OPC_UA_MethodCall, max. 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 accessible variables, max.	50 000
— Number of registerable nodes, max.	10 000
 Number of subscriptions per session, max. 	20
— Sampling interval, min.	100 ms
— Publishing interval, min.	500 ms
 — Number of server methods, max. 	20

 Number of inputsoupuits per sever method, max. Number of monitored items, recommanded mos. Number of server interfaces, max. Ord search "Server interfaces, max. Ord search "Server interfaces, max. Ord search "Server interfaces, max. Alows and Conditions Number of anders for used offend server interfaces, max. Alows and Conditions Number of anders for used offend server interfaces, max. Alows and Conditions Number of anders for used offend server Monous and Conditions Number of anders for used offend server MODUS Yes, MODBUS TCP Stackmones made Equidatance Yes, MODBUS TCP Stackmones made Section for message functions, max. Program dams Sock Product and Section for message functions, max. Number of atoms for mystem diagnostics Stackmones Number of atoms for message in RUN, max. Sock Product and Section for Program atoms Number of atoms for mology objects Sock Product access possible for up to 5 engineering systems Stackcontrol variable Yes, Parallel online access possible for up to 5 engineering systems Status block No Number of transformations Sock Product access possible for up to 5 engineering systems Status block No Number of transformations Sock Product access possible for up to 5 engineering systems Status block No No Number of transformations Sock Product access possible for up to 5 engineering systems Status block No No No No No No No		
Number of monitored items, recommended mox Number of encern interfaces, max Number of normal solutions Number of anomes items for system diagnosites	 Number of inputs/outputs per server method, 	20
max 10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace" - Number of nodes for user defined server interfaces" / "Companion specification" type and 20 not specification type and 20 not specification type and 20 not specification type and 20 not specification" type and 20 not specification thermology objects Invince of a dams for motion technology objects 500 not specification type and allon thermology objects Invince of or specification 100 not specification type and 20 not speci		
- Number of server interfaces, max. 10 of each "Server interfaces." / Companion specification" type and 20 of the type "Reference namespace" 1000 - Number of longen alerns 1000 - Number of pargen alerns 50 - Number of p		1 000; for 1 s sampling interval and 1 s send interval
- Number of nodes for user-defined server interfaces, max. Yes interface of program alorms in the server of program alorms in the server of program alorms in the server interface of program alorms in the server interface of the server of program alorms in the server of program messages functions, max. Yes in the server of the server of program messages in RUN, max. Solo; Program messages are generated by the "Program_Alarm" is block. Profager of GRAPH in the server of alorns for system diagnosities in the server of alorns for server of alorns in the server of alorns for alorn bechnology objects as server of alorns for alorn bechnology objects as server of alorns for alorns for alorn bechnology objects as server of alorns for alorn bechnology objects as server of alorns for alo	— Number of server interfaces, max.	
interfaces, max. Automs and Conditions Farther protocols Further protocols Further protocols Further protocols Further protocols For ther protocols For ther protocols For ther protocols For ther protocols For the protocols For t		
		Yes
Number of alarms for system diagnostics 50 Future protocols Functionous mode Equidistance Ves Some seage functions, max. Program alarms Ves Number of locable program messages functions, max. Program alarms 5000. Program messages are generated by the "Program_Alarm" block. ProDiag or GRAPH Number of dradatelp ergoram messages in RUM, max. Number of adatelp ergoram messages in RUM, max. Number of dradatelp ergoram messages in RUM, max. Number of adatelp ergoram messages in RUM, max. Number of adates for system diagnostics 100 Number of adates for system diagnostics 80 Status block Ves: Up to 8 simultaneously (in total across all ES cleints) Single stop Number of breakgoints 8 Status took Number of breakgoints 8 Status took Number of variables, max. - of which status variables, max. - of which portorial variables, max. - of which porter intergents - Number of entries, max. - of which portorial variables - Number of entries, max. - of which		
Fulter probability Yes; MODBUS • MODBUS Yes; MODBUS TCP Schemage Nucleons Yes Number of login stations for message functions, max. Program alarms Yes Number of configurable program messages, max. Number of configurable program messages, max. Number of configurable program messages, max. 32 Number of cadable program messages, max. Number of adable program messages may expensive program_alarms 600 • Number of adables program messages may expensive program_alarms 600 • Number of adams for motion technology objects 80 • Unither of alarms for motion technology objects 80 • Statuscentrol adams for motion technology objects 80 • Statuscentrol variables, max. 100 • Statuscentrol variables, max. 200; per job • Variables Yes • Number of variables, max. 200; per job • Forcing, variables, max. 200; per job • Forcing, variables, max. 200 • Or which sotatus variables, max. 200; per job • Forcing, variables, max. 200; per job • Forcing Yes • Number of configurable fraces 4; Up to 512 KB of data per		
• MODBUS Yes; MODBUS TCP isochronous mode Equidistance Yes S7 message functions 32 Program alarms Yes 5000, Program messages are generated by the "Program_Alarm" bbcck. ProDiag or GRAPH Number of loadbel program messages in RUN, max. 5000, Program messages are generated by the "Program_Alarm" bbcck. ProDiag or GRAPH Number of isinutaneously active program alarms 600 • Number of alarms for system diagnostics 100 • Number of alarms for molon technology objects 80 Status block Yes; Up to 8 simultaneously (in total across all ES clients) • Number of variables, max. 200; per job • Oreing Yes • Variables Inpuls/outputs, memory bits, DBs, distributed I/Os, timers, counters • Number of or invariables, max. 200; per job <t< td=""><td></td><td></td></t<>		
Sochronous mode Yes Equidistance Yes Stressage functions 32 Number of login stations for message functions, max. 7es Number of configurable program messages, max. book. ProDiag or GRAPH Number of configurable program messages, max. book. ProDiag or GRAPH Number of configurable program messages, max. book. ProDiag or GRAPH Number of configurable program messages, max. book. ProDiag or GRAPH Number of loadable program messages in PUN, max. 600 Number of adams for motion technology objects 800 Test commissioning functions 600 Number of variables, max. 100 - Statuscontrol variables, max. 200; per job - of which status variables, max. 200; per job - of which control variables, max. 200; per job - of which control variables, max. 200; per job - Forcing Yes - persent Yes - Number of configurable max. 200 Diagnostic buffer Yes - Number of configurables, max. 1000 - of which powerlabi proof <t< td=""><td>1</td><td></td></t<>	1	
Equidistance Yes S7 message functions 32 Program alarms Yes Number of login stations for messages max. Yes Number of configurable program messages, max. Yes Number of logindup program messages in RUN, max. Solo: Program messages are generated by the "Program_Alarm" block. ProDiag or GRAPH Number of logindup program messages in RUN, max. Solo: Program messages are generated by the "Program_Alarm" block. ProDiag or GRAPH Number of alarms for rostion technology objects 80 * Number of alarms for rostion technology objects 80 Joint commission (Team Engineering) Yes: Up to 8 aimultaneously (in total across all ES clients) Single step No Number of variables Yes • Orwhich status variables, max. 200; per job • Orwhich control variables, max. 200 • Orwhich status variables, max. 200 • Number of configurable Traces Yes • Number of configurable Traces 4: Up to 512 KB of data per trace are possible • Number of configurable Traces 4: Up to 512 KB of data per trace are possible Interruptical diagnostice alarm Yes • Number		
ST message functions 32 Number of login stations for message functions, max. 32 Program atems Yes Number of configurable program messages, max. 5000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH Number of loadable program messages in RUN, max. 600 Number of program alarms 600 Number of alarms for notion technology objects 80 Test commissioning functions 100 Joint commission (Fear Engineering) Yes; Parallel online access possible for up to 5 engineering systems Status block Yes: Up to 8 simultaneously status Single step No Number of variables, max. 200; per job - of which control variables, max. 200; per job - or which control variables, max. 200; per job - or which control variables, max. 200; per job Diagnostic buffer 9 • present Yes • Number of configurable Traces 4; Up to 512 KB of data per trace are possible Interruptid/lagnostic/status Information 1000 Diagnostic buffer Yes • Diagnostic balarm Yes • Number of configurable Traces		
Number of login stations for message functions, max. 32 Program alarms 5000, Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH Number of configurable program messages, max. 5000, Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH Number of simultaneously active program alarms 600 • Number of alarms for motion technology objects 100 • Number of alarms for motion technology objects 80 Test 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) Number of breakpoints 8 Status/control variables, max. 200; per job • O which status variables, max. 200; per job • Forcing, variables Propheral inputs/outputs • O which status variables, max. 200; per job • Forcing, variables, max. 200 • O which powerfal-proof 500 • Instructions 4; Up to 512 KB of data per trace are possible • Number of configurable Traces 4; Up to 512 KB of data per trace are possible • Number of configurable Traces Yes • Numbe	Equidistance	Yes
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block, ProDiag or GRAPH Number of loadable program messages in RUN, max. Number of simultaneously active program alarms • Number of program alarms • Number of alarms for system diagnostics • Number of status for functions • Number of alarms for system diagnostics • Number of status/control variables • No Number of breakpoints • Status/control variables • Vers • Variables • Number of variables, max of which status variables, max of which status variables, max of which control variables, max of which status variables, max of which control variable,	Program alarms	Yes
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• Number of alarms for motion technology objects 80 Test 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) Single step No Number of breakpoints 8 Status/control 8 • Status/control 1 • Status/control variables, max. 1nputs/outputs, memory bits, DBs, distributed I/Os, timers, counters • Number of variables, max. 200; per job - of which status variables, max. 200; per job - of which status variables, max. 200; per job • Forcing Yes • Forcing, variables, max. 200; per job • Forcing, variables, max. 200 • Peripheral inputs/outputs 9 • Number of variables, max. 1000 - of which powerfail-proof 500 Traces 4; Up to 512 KB of data per trace are possible Interrupts/diagnostic alarm Yes • Mamber of configurable Traces 4; Up to 512 KB of data per trace are possible Interrupts/diagnostic alarm Yes		100
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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 No Number of breakpoints 8 Status/control variable Yes • Status/control variables, max. 200; per job - of which control variables, max. 200; per job - of which control variables, max. 200; per job Forcing Yes • Forcing, variables, max. 200; per job • Number of ariables, max. 200; per job • Number of oriables, max. 200 • Number of oriables, max. 200 • Number of oriables, max. 200 • Number of oring.variables, max. 200 • Number of oringly variables, max. 200 • Number of oringly variables, max. 1000 - of which powerfail-proof 500 Traces 4; Up to 512 KB of data per trace are possible Interrupts/diagnostic alarm Yes • Diagnostic alarm Yes • Diagnostic alarm Yes • Montring the supply voltage Yes • Number		
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for channel diagnostics Yes; For analog inputs/outputs Connection display LINK TX/RX Yes		
Connection display LINK TX/RX Yes		
	-	
Supported technology objects		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 - per speed-controlled axis 40 - per positioning axis 80 - per synchronous axis 160 - per external encoder 80 20 - per output cam 160 - per cam track per probe 40 · Positioning axis - Number of positioning axes at motion control 5 cycle of 4 ms (typical value) - Number of positioning axes at motion control 10 cycle of 8 ms (typical value) 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** 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 Yes Direction dependency - 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 Measuring range 0.04 Hz Frequency measurement, min. 400 kHz; with quadruple evaluation - Frequency measurement, max. - 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 No between the channels • 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 <u>Isolation</u>

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Isolation tested with
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707 V DC (type test)

Ambient conditions	
Ambient temperature during operation	
 horizontal installation, min. 	0°C
 horizontal installation, max. 	60 °C; note derating data for onboard I/O in the manual. Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
 vertical installation, min. 	0 °C
• 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 	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
Dimensions	
Width	85 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	1 050 g
last modified:	11/3/2021 🖸