## SIEMENS

## Data sheet

## 6ES7511-1CK01-0AB0



SIMATIC S7-1500 Compact CPU CPU 1511C-1PN, central processing unit with working 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 outputs for PTO/PWM/frequency output 1. interface: PROFINET IRT with 2 port switch, 60 NS bit-performance, incl. front connector push-in, SIMATIC memory card necessary

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
<ul> <li>Isochronous mode</li> </ul>	Yes; With minimum OB 6x cycle of 625 µs (distributed)
Engineering with	
<ul> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul>	V17 (FW V2.9) / V15 (FW V2.5) or higher; with older TIA Portal versions configurable as 6ES7511-1CK00-0AB0
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)	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	
<ul> <li>Mains/voltage failure stored energy time</li> </ul>	5 ms; Refers to the power supply on the CPU section
<ul> <li>Repeat rate, min.</li> </ul>	1/s
Input current	
Current consumption (rated value)	0.8 A; Without load; 9.8 A: CPU + load
Current consumption, max.	1 A; Without load; 10 A: CPU + load
Inrush current, max.	1.9 A; Rated value
l²t	0.34 A <sup>2</sup> ·s
Digital inputs	
<ul> <li>from load voltage L+ (without load), max.</li> </ul>	20 mA; per group
Digital outputs	
<ul> <li>from load voltage L+, max.</li> </ul>	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)

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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	0.5 W
	44.0.11
Power loss, typ.	11.8 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	175 khita
<ul> <li>integrated (for program)</li> <li>integrated (for data)</li> </ul>	175 kbyte 1 Mbyte
Load memory	i Mbyte
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	175 kbyte
<ul><li>Size, max.</li><li>Number of free cycle OBs</li></ul>	100
Number of time alarm OBs	20
Number of delay alarm OBs	20
Number of cyclic interrupt OBs	20; With minimum OB 3x cycle of 500 μs
Number of process alarm OBs	50
Number of DPV1 alarm OBs	3
<ul> <li>Number of isochronous mode OBs</li> </ul>	1
<ul> <li>Number of technology synchronous alarm OBs</li> </ul>	2
Number of startup OBs	100
<ul> <li>Number of asynchronous error OBs</li> </ul>	4
<ul> <li>Number of synchronous error OBs</li> </ul>	2
Number of diagnostic alarm OBs	1
Nesting depth	
per priority class	24
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	Van
— adjustable IEC counter	Yes
Number	Any (only limited by the main memory)
Retentivity	(any (only inflice by the main memory)
— adjustable	Yes
S7 times	
• Number	2 048
Retentivity	

— adjustable	Yes
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), max.	counters, DBs, and technology data (axes): 88 KB 1 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Flag	
• Size, max.	16 kbyte
<ul> <li>Number of clock memories</li> </ul>	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	
<ul> <li>Retentivity adjustable</li> </ul>	Yes
Retentivity preset	No
Local data	
<ul> <li>per priority class, max.</li> </ul>	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	22
Number of subprocess images, max.	32
Hardware configuration	20. A distributed U/O surfaces is above staring durational with sintermation
Number of distributed IO systems	32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
Number of DP masters	
● Via CM	4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
integrated	1
• Via CM	4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Rack	
Modules per rack, max.	32; CPU + 31 modules
Number of lines, max.	1
PtP CM	the number of connectable DtD CMs is only limited by the number of
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
<ul> <li>Deviation per day, max.</li> </ul>	10 s; Typ.: 2 s
Operating hours counter	
Number	16
Clock synchronization	
• supported	Yes
• in AS, master	Yes
• in AS, slave	Yes
<ul><li>in AS, slave</li><li>on Ethernet via NTP</li></ul>	
<ul> <li>in AS, slave</li> <li>on Ethernet via NTP</li> <li>Digital inputs</li> </ul>	Yes Yes
<ul><li>in AS, slave</li><li>on Ethernet via NTP</li></ul>	Yes

Source/sink input	P-reading
Input characteristic curve in accordance with IEC 61131,	Yes
type 3	
Digital input functions, parameterizable	Vee
Gate start/stop	Yes
Capture	Yes
Synchronization	Yes
Input voltage	<b>D</b> 0
Type of input voltage	DC
Rated value (DC)	24 V
• for signal "0"	-3 to +5V
• for signal "1"	+11 to +30V
Input current	
<ul> <li>for signal "1", typ.</li> </ul>	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	
<ul> <li>shielded, max.</li> </ul>	1 000 m; 600 m for technological functions; depending on input
	frequency, encoder and cable quality; max. 50 m at 100 kHz
<ul> <li>unshielded, max.</li> </ul>	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
• Response unesnou, typ.	details
Limitation of inductive shutdown voltage to	-0.8 V
Controlling a digital input	Yes
Accuracy of pulse duration	Up to $\pm 100$ ppm $\pm 2$ 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
<ul> <li>PWM output</li> </ul>	Yes
- Number, max.	4
— Cycle duration, parameterizable	Yes
— ON period, min.	0 %
	100 %
- ON period, max.	
Resolution of the duty cycle	0.0036 %; For S7 analog format, min. 40 ns
Frequency output	Yes
Switching capacity of the outputs	
<ul> <li>with resistive load, max.</li> </ul>	0.5 A; 0.1 A with high-speed output, i.e. when using a high-speed output; see manual for details
<ul> <li>on lamp load, max.</li> </ul>	5 W; 1 W with high-speed output, i.e. when using a high-speed output;
- on lamp load, max.	o w, i w with high-speed output, i.e. when using a high-speed output,
	see manual for details
	see manual for details
Load resistance range	
	48 $\Omega$ ; 240 ohms with high-speed output, i.e. when using a high-speed
Load resistance range ● lower limit	48 $\Omega$ ; 240 ohms with high-speed output, i.e. when using a high-speed output; see manual for details
Load resistance range • lower limit • upper limit	48 $\Omega$ ; 240 ohms with high-speed output, i.e. when using a high-speed
Load resistance range • lower limit • upper limit Output voltage	48 $\Omega;$ 240 ohms with high-speed output, i.e. when using a high-speed output; see manual for details 12 k $\Omega$
Load resistance range • lower limit • upper limit Output voltage • Type of output voltage	48 $\Omega;$ 240 ohms with high-speed output, i.e. when using a high-speed output; see manual for details 12 k $\Omega$
Load resistance range • lower limit • upper limit Output voltage	48 $\Omega;$ 240 ohms with high-speed output, i.e. when using a high-speed output; see manual for details 12 k $\Omega$
Load resistance range • lower limit • upper limit Output voltage • Type of output voltage	<ul> <li>48 Ω; 240 ohms with high-speed output, i.e. when using a high-speed output; see manual for details</li> <li>12 kΩ</li> <li>DC</li> <li>1 V; With high-speed output, i.e. when using a high-speed output; see</li> </ul>
Load resistance range • lower limit • upper limit Output voltage • Type of output voltage • for signal "0", max.	<ul> <li>48 Ω; 240 ohms with high-speed output, i.e. when using a high-speed output; see manual for details</li> <li>12 kΩ</li> <li>DC</li> <li>1 V; With high-speed output, i.e. when using a high-speed output; see manual for details</li> </ul>
Load resistance range • lower limit • upper limit Output voltage • Type of output voltage • for signal "0", max. • for signal "1", min.	<ul> <li>48 Ω; 240 ohms with high-speed output, i.e. when using a high-speed output; see manual for details</li> <li>12 kΩ</li> <li>DC</li> <li>1 V; With high-speed output, i.e. when using a high-speed output; see manual for details</li> </ul>

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<ul> <li>for signal "1" permissible range, min.</li> <li>for signal "1" permissible range, max.</li> </ul>	output, observe derating; see manual for details 2 mA 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	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	
<ul> <li>for logic links</li> </ul>	Yes; for technological functions: No
<ul> <li>for uprating</li> </ul>	No
<ul> <li>for redundant control of a load</li> </ul>	Yes; for technological functions: No
Switching frequency	
<ul> <li>with resistive load, max.</li> </ul>	100 kHz; For high-speed output, 100 Hz for standard output
<ul> <li>with inductive load, max.</li> </ul>	0.5 Hz; Acc. to IEC 60947-5-1, DC-13; observe derating curve
<ul> <li>on lamp load, max.</li> </ul>	10 Hz
Total current of the outputs	
Current per channel, max.	0.5 A; see additional description in the manual
<ul> <li>Current per group, max.</li> </ul>	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	
<ul> <li>Number of relay outputs</li> </ul>	0
Cable length	
<ul> <li>shielded, max.</li> </ul>	1 000 m; 600 m for technological functions; depending on output frequency, load, and cable quality; max. 50 m at 100 kHz
<ul> <li>unshielded, max.</li> </ul>	COO may fain to also also also also also also also als
	600 m; for technological functions: No
Analog inputs	600 m; for technological functions: No
Analog inputs	
	5; 4x for U/I, 1x for R/RTD 4; max.
Analog inputs Number of analog inputs	5; 4x for U/I, 1x for R/RTD
Analog inputs <ul> <li>Number of analog inputs</li> <li>For current measurement</li> </ul>	5; 4x for U/I, 1x for R/RTD 4; max.
Analog inputs Number of analog inputs For current measurement For voltage measurement For resistance/resistance thermometer	5; 4x for U/I, 1x for R/RTD 4; max. 4; max.
Analog inputs         Number of analog inputs         • For current measurement         • For voltage measurement         • For resistance/resistance thermometer measurement         permissible input voltage for voltage input (destruction	5; 4x for U/I, 1x for R/RTD 4; max. 4; max. 1
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 4; max. 4; max. 1 28.8 V
Analog inputs         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.	5; 4x for U/I, 1x for R/RTD 4; max. 4; max. 1 28.8 V 40 mA 1 ms; Dependent on the parameterized interference frequency
Analog inputs         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.	5; 4x for U/I, 1x for R/RTD 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
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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
Analog inputs         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)	5; 4x for U/I, 1x for R/RTD 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
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 10$ V
Analog inputs         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)	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ Yes
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ Yes 100 kΩ
Analog inputs         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)	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 k $\Omega$ Yes; Physical measuring range: $\pm 10$ V
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ Yes 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ Yes 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ
Analog inputs         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)	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ Yes 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 10$ V 100 kΩ
Analog inputs         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)	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 20$ mA 50 Ω; Plus approx. 55 ohm for overvoltage protection by PTC Yes 50 Ω; Plus approx. 55 ohm for overvoltage protection by PTC
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ 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
Analog inputs         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)	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ Yes; Physical measuring range: $\pm 20$ mA 50 Ω; Plus approx. 55 ohm for overvoltage protection by PTC Yes 50 Ω; Plus approx. 55 ohm for overvoltage protection by PTC
Analog inputs         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	5; 4x for U/I, 1x for R/RTD 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: $\pm 10$ V 100 kΩ 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

Input registance (Ni 100)	10 MO
— Input resistance (Ni 100)	10 MΩ
Pt 100     Input registered (Bt 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 M $\Omega$
• 0 to 300 ohms	Yes; Physical measuring range: 0 600 ohms
— Input resistance (0 to 300 ohms)	10 M $\Omega$
• 0 to 600 ohms	Yes
— Input resistance (0 to 600 ohms)	10 MΩ
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
	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	
• 0 to 20 mA	Yes
• -20 mA to +20 mA	Yes
• 4 mA to 20 mA	Yes
Load impedance (in rated range of output)	110
<ul> <li>with voltage outputs, min.</li> <li>with voltage outputs, capacitive load, max.</li> </ul>	1 kΩ 100 nF
<ul> <li>with voltage outputs, capacitive load, max.</li> <li>with current outputs, max.</li> </ul>	500 Ω
with current outputs, inductive load, max.	1 mH
Cable length	
• shielded, max.	200 m
Analog value generation for the inputs	
Analog value generation for the inputs Integration and conversion time/resolution per channel	
Analog value generation for the inputs Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max.	16 bit
Analog value generation for the inputs Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max. • Integration time, parameterizable	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels
Analog value generation for the inputs Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max.	16 bit
Analog value generation for the inputs Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max. • Integration time, parameterizable • Interference voltage suppression for interference	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels
Analog value generation for the inputs Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max. • Integration time, parameterizable • Interference voltage suppression for interference frequency f1 in Hz Smoothing of measured values • parameterizable • Step: None	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10
Analog value generation for the inputs Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max. • Integration time, parameterizable • Interference voltage suppression for interference frequency f1 in Hz Smoothing of measured values • parameterizable • Step: None • Step: low	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes
Analog value generation for the inputs Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max. • Integration time, parameterizable • Interference voltage suppression for interference frequency f1 in Hz Smoothing of measured values • parameterizable • Step: None • Step: low • Step: Medium	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • Step: None         • Step: Iow         • Step: High	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: Iow         • Step: High	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: Iow         • Step: High    Analog value generation for the outputs Integration and conversion time/resolution per channel	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: low         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes Yes Yes Yes
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes Yes Yes 16 bit 1.5 ms
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: low         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for capacitive load	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes Yes 16 bit 1.5 ms 2.5 ms
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for inductive load         • for inductive load	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes Yes Yes 16 bit 1.5 ms
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: low         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for inductive load         • for inductive load	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes Yes 16 bit 1.5 ms 2.5 ms
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for inductive load         • for inductive load         • for inductive load	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes Yes 16 bit 1.5 ms 2.5 ms 2.5 ms
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for inductive load         • for inductive load         • for voltage measurement	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes Yes 16 bit 1.5 ms 2.5 ms 2.5 ms
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for inductive load         • for inductive load         • for voltage measurement         • for voltage measurement	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes Yes 16 bit 1.5 ms 2.5 ms 2.5 ms
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for inductive load         • for voltage measurement         • for voltage measurement         • for current measurement as 4-wire transducer         • for resistance measurement with two-wire	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes Yes 16 bit 1.5 ms 2.5 ms 2.5 ms
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for inductive load         • for voltage measurement         • for voltage measurement         • for current measurement as 4-wire transducer         • for resistance measurement with two-wire connection	16 bit         Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels         400 / 60 / 50 / 10         Yes
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for inductive load         • for voltage measurement         • for voltage measurement         • for current measurement as 4-wire transducer         • for resistance measurement with two-wire	16 bit Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels 400 / 60 / 50 / 10 Yes Yes Yes Yes Yes 16 bit 1.5 ms 2.5 ms 2.5 ms
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for inductive load         • for voltage measurement         • for voltage measurement         • for current measurement as 4-wire transducer         • for resistance measurement with two-wire connection         • for resistance measurement with three-wire	16 bit         Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels         400 / 60 / 50 / 10         Yes
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: None         • Step: None         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for capacitive load         • for voltage measurement         • for current measurement as 4-wire transducer         • for resistance measurement with two-wire connection         • for resistance measurement with three-wire connection	16 bit         Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels         400 / 60 / 50 / 10         Yes         16 bit         1.5 ms         2.5 ms         2.5 ms         Yes         Yes
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for resistive load         • for voltage measurement         • for current measurement as 4-wire transducer         • for resistance measurement with two-wire connection         • for resistance measurement with three-wire connection         • for resistance measurement with three-wire connection	16 bit         Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels         400 / 60 / 50 / 10         Yes         Ses         Yes
Analog value generation for the inputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         • Integration time, parameterizable         • Interference voltage suppression for interference frequency f1 in Hz         Smoothing of measured values         • parameterizable         • Step: None         • Step: None         • Step: Medium         • Step: High         Analog value generation for the outputs         Integration and conversion time/resolution per channel         • Resolution with overrange (bit including sign), max.         Settling time         • for resistive load         • for capacitive load         • for voltage measurement         • for voltage measurement         • for current measurement as 4-wire transducer         • for resistance measurement with two-wire connection         • for resistance measurement with three-wire connection         • for resistance measurement with four-wire connection	16 bit         Yes; 2.5 / 16.67 / 20 / 100 ms, acts on all channels         400 / 60 / 50 / 10         Yes         16 bit         1.5 ms         2.5 ms         2.5 ms         Yes         Yes

max.	
Encoder signals, incremental encoder (asymmetrical)	
Input voltage	24 V
<ul> <li>Input frequency, max.</li> </ul>	100 kHz
Counting frequency, max.	400 kHz; with quadruple evaluation
Signal filter, parameterizable	Yes
<ul> <li>Incremental encoder with A/B tracks, 90° phase offset</li> </ul>	Yes
<ul> <li>Incremental encoder with A/B tracks, 90° phase offset and zero track</li> </ul>	Yes
pulse encoder	Yes
<ul> <li>pulse encoder with direction</li> </ul>	Yes
<ul> <li>pulse encoder with one impulse signal per count direction</li> </ul>	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 kHz), (+/-)	0.02 %
Linearity error (relative to output range), (+/-)	0.15 %
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	
<ul> <li>Voltage, relative to input range, (+/-)</li> </ul>	0.3 %
<ul> <li>Current, relative to input range, (+/-)</li> </ul>	0.3 %
<ul> <li>Resistance, relative to input range, (+/-)</li> </ul>	0.3 %
• Resistance thermometer, relative to input range, (+/-	Pt100 Standard: ±2 K, Pt100 Climate: ±1 K, Ni100 Standard: ±1.2 K,
) $(1/)$	Ni100 Climate: ±1 K 0.3 %
<ul> <li>Voltage, relative to output range, (+/-)</li> <li>Current, relative to output range, (+/-)</li> </ul>	0.3 %
Basic error limit (operational limit at 25 °C)	0.5 %
Voltage, relative to input range, (+/-)	0.2 %
<ul> <li>Current, relative to input range, (+/-)</li> </ul>	0.2 %
<ul> <li>Resistance, relative to input range, (+/-)</li> </ul>	0.2 %
<ul> <li>Resistance thermometer, relative to input range, (+/-</li> </ul>	Pt100 Standard: ±1 K, Pt100 Climate: ±0.5 K, Ni100 Standard: ±0.6 K,
)	Ni100 Climate: ±0.5 K
<ul> <li>Voltage, relative to output range, (+/-)</li> </ul>	0.2 %
<ul> <li>Current, relative to output range, (+/-)</li> </ul>	0.2 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = i	nterference frequency
<ul> <li>Series mode interference (peak value of interference &lt; rated value of input range), min.</li> </ul>	30 dB
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	
<ul> <li>RJ 45 (Ethernet)</li> </ul>	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	

HeadFormous mode     HeadFormous		Vee
- Direct data acknange     Yes, Requirement, IRP and isochronous mode (MRPD optional)     - Water PT     Yes, Personal Program     Profile Profile Program     Profile Program     Profile Profile Program     Profile Profile Profile     Profile Profile Profile Profile     Profile Profile Profile Profile     Profile Profile Profile Profile     Profile Profile Profile Profile Profile     Profile Profile Profile Profile Profile Profile Profile Profile     Profile Profil	— PG/OP communication	Yes
IRT     Profile distrip     Prioritized statup     IRT     Intel accoss all interfaces     Intel accoss     Intel accoss     Intel accoss     Inter accos		
ProFilestry     Yes, per user program     Yes, Max 32 PROFINET devices     Aumber of connectable IO Devices, max.     Instal, un total, unp 256 distributed UO devices can be connected via AS-L LPROFILEUS or PROFINET     Second S	-	• • • • •
<ul> <li>— Prioritzed startup</li> <li>— Number of connectable IO Devices, max.</li> <li>— O' which ID devices with IRT, max.</li> <li>— Mumber of connectable IO Devices for RT, max.</li> <li>— Mumber of Connectable IO Devices for RT, max.</li> <li>— Mumber of IO Devices that can be simultaneously activated/deactavate, max.</li> <li>— Wumber of IO Devices bet can be simultaneously activated/deactavate, max.</li> <li>— Wumber of IO Devices bet can be simultaneously activated/deactavate, max.</li> <li>— Wumber of IO Devices bet can be simultaneously activated/deactavate, max.</li> <li>— Wumber of IO Devices bet can be simultaneously activated/deactavate, max.</li> <li>— Wumber of IO Devices bet can be simultaneously activated/deactavate, max.</li> <li>Mumber of IO Devices bet can be simultaneously activated/deactavate, max.</li> <li>Mumber of IO Devices bet can be simultaneously activated of Devices, and on the quantity of configured user data</li> <li>— Updating times</li> <li>— for send cycle of 500 µs</li> <li>— for send cycle of 500 µs</li> <li>— for send cycle of 1 ms</li> <li>— for send cycle of 1 ms</li> <li>— for send cycle of 2 ms</li> <li>— f</li></ul>		
	— PROFlenergy	Yes; per user program
I. PROFINIST     I. UPROFINIST     I. IPROFINIST     IL IPROFILIE     IL IPROFILI	<ul> <li>Prioritized startup</li> </ul>	
<ul> <li>- Number of connectable IO Devices for RT.</li> <li>- of which in line, max.</li> <li>- of which in line, max.</li> <li>Number of IO Devices plat can be simultaneously advatate/deadvated, max.</li> <li>Number of IO Devices plat can be sumultaneously advatate/deadvated, max.</li> <li>- Number of IO Devices plat can be quartify of configured user data</li> <li>- Updating times</li> <li>- Updating times</li> <li>- for send cycle of 250 µs</li> <li>- for send cycle of 28 ns</li> <li>- for send cycle of 30 µs</li> <li>- for send cycle of 4 ms</li> <li>- for send cycle of 4 ms</li> <li>- for send cycle of 4 ms</li> <li>- for send cycle of 4 ms<td><ul> <li>Number of connectable IO Devices, max.</li> </ul></td><td></td></li></ul>	<ul> <li>Number of connectable IO Devices, max.</li> </ul>	
max. 128	<ul> <li>— Of which IO devices with IRT, max.</li> </ul>	64
<ul> <li> of which in line, max.</li> <li> Number of IO Devices part tool, max.</li> <li> Number of IO Devices per tool, max.</li> <li> Number of IO Devices per tool, max.</li> <li> Updating times</li> <li> Update time for IRT</li> <li> for send cycle of 250 µs</li> <li> for send cycle of 500 µs</li> <li> for send cycle of 1ms</li> <li> for send cycle of 2 ms</li> <li> for send cycle of 1 ms</li> <li> for send cycle of 2 ms</li> <li> for send cycle of 2 ms</li> <li> for send cycle of 1 ms</li> <li> for send cycle of 4 ms</li> <li> for send cycle of 1 ms</li> <li> for send cycle of 1 ms</li> <li> for send cycle of 1 ms</li> <li> for send</li></ul>	<ul> <li>— Number of connectable IO Devices for RT,</li> </ul>	128
	max.	
imultaneously activated/deactivated, max. - Number of IO Devices per tool, max. - Updating times - for send cycle of 250 µs - for send cycle of 1ms - for send cycle of 250 µs - for send cycle of 1ms - for send cycle of 250 µs - for send cycle of 1ms - for send cycle of 250 µs - for send cycle of 250 µs - for send cycle of 1ms - for send cycle of 2ms - for send cy	— of which in line, max.	128
	<ul> <li>— Number of IO Devices that can be</li> </ul>	8; in total across all interfaces
— Updating times     The minimum value of the update time also devices, and on the quantity of configured user data.       Update time for IRT     — for send cycle of 250 µs     250 µs to 4 ms. Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous mode, the minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of the isochronous due due minimum update time of 625 µs of 12 ms       — for send cycle of 1 ms     1 ms to 16 ms       — or send cycle of 250 µs     250 µs to 12 ms       — for send cycle of 250 µs     250 µs to 12 ms       — for send cycle of 280 µs     250 µs to 12 ms       — for send cycle of 280 µs     250 µs to 12 ms       — for send cycle of 1 ms     1 ms to 512 ms       — for send cycle of 280 µs     500 µs to 256 ms       — for send cycle of 280 µs     1 ms to 512 ms       — for send cycle of 280 µs     Yes       = pROFINETI O bev	simultaneously activated/deactivated, max.	
share set for PROFINET IO (o, on the number of IO devices, and on the quartity of configured user data - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - kT - RJAG fementy - kT - RJAG fementy - kt Sync for mountaiton - for the sect management record - for send cycle of 1 elecct - for the sect management record - for the sect management record - for send cycle of the SPL ms - for send cycle of the SPL ms - for send cycle of the SPL ms - for the sect management record - for the sect ma	<ul> <li>— Number of IO Devices per tool, max.</li> </ul>	8
update time for IRT           - for send cycle of 250 µs         250 µs to 4 ms. Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive           - for send cycle of 1 ms         1 ms to 16 ms           - for send cycle of 4 ms         1 ms to 16 ms           - for send cycle of 4 ms         4 ms to 64 ms           - for send cycle of 4 ms         4 ms to 64 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 of RT           - for send cycle of 250 µs         250 µs to 28 ms           - for send cycle of 250 µs         250 µs to 28 ms           - for send cycle of 250 µs         250 µs to 28 ms           - for send cycle of 2 ms         2 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           - for send cycle of 2 ms         2 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           - for send cycle of 2 ms         2 ms to 512 ms           - for send cycle of 4 ms         4 ms to 512 ms           - RPG/Pencrupy         Yes; per user p	— Updating times	
Update time for IRT       250 µs to 4 ms. Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive         - for send cycle of 2 ms       500 µs to 4 ms. Note: In the case of IRT with isochronous OB is decisive         - for send cycle of 2 ms       2 ms to 32 ms         - for send cycle of 4 ms       1 ms to 16 ms         - for send cycle of 4 ms       4 ms to 64 ms         - for send cycle of 1 ms       1 ms to 12 ms         - for send cycle of 4 ms       2 ms to 32 ms         - 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 1 ms       1 ms to 12 ms         - for send cycle of 1 ms       1 ms to 52 ms         - for send cycle of 1 ms       1 ms to 512 ms         - for send cycle of 4 ms       2 ms to 512 ms         - for send cycle of 4 ms       4 ms to 512 ms         - for send cycle of 4 ms       4 ms to 512 ms         - PGOF communication       Yes         - IRT       Yes         - Schared device       Yes         - Number of IO-Controllers with shared device, max.       Yes; per user program         - Activation/decitivation of 1-devices       Yes; per user program         - Activation/decitivation of Letevices       Yes; per user program		
for send cycle of 250 µs         250 µs to 4.ms. Note: In the case of IRT with isochronous mode, the minimum update time of 625 µs of the isochronous OB is decisive           for send cycle of 1 ms         1 ms to 16 ms           for send cycle of 4 ms         2 ms to 32 ms           for send cycle of 4 ms         4 ms to 64 ms           for send cycle of 4 ms         4 ms to 64 ms           with IRT and parameterization of "odd" send cycles         200 µs to 8 ms.           for send cycle of 250 µs         250 µs to 128 ms           for send cycle of 270 µs         250 µs to 128 ms           for send cycle of 270 µs         250 µs to 128 ms           for send cycle of 270 µs         250 µs to 128 ms           for send cycle of 270 µs         250 µs to 128 ms           for send cycle of 27 ms         2 ms to 512 ms           for send cycle of 27 ms         2 ms to 512 ms           for send cycle of 27 ms         2 ms to 512 ms           for send cycle of 27 ms         4 ms to 512 ms           for send cycle of 27 ms         4 ms to 512 ms           for send cycle of 27 ms         2 ms to 512 ms           PG/GP communication         Yes           Barded device            Number of 10 Controllers with shared device, max.         -		quantity of configured user data
minimum update time of 252 µs of the isochronous OB is decisive       - for send cycle of 1 ms     1 ms to 16 ms       - for send cycle of 2 ms     2 ms to 32 ms       - for send cycle of 4 ms     4 ms to 64 ms       - 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     250 µs to 128 ms       - for send cycle of 1 ms     1 ms to 512 ms       - for send cycle of 1 ms     1 ms to 512 ms       - for send cycle of 1 ms     1 ms to 512 ms       - for send cycle of 1 ms     1 ms to 512 ms       - for send cycle of 1 ms     1 ms to 512 ms       - for send cycle of 4 ms     2 ms to 512 ms       - for send cycle of 4 ms     4 ms to 512 ms       - for send cycle of 4 ms     4 ms to 512 ms       - for send cycle of 4 ms     4 ms to 512 ms       - PGOP communication     Yes       - IRT     Yes       - Services     -       - Number of 10 Controllers with shared device, max.     4       - activation/dectivation of 1-devices     Yes; per user program       - Asset management record     Yes; per user program       - Asset management record     Yes; per user program       - Autorosing     Yes       - Mumber of connections, max.     96; via integrated interfaces of the CPU and connec		
for send cycle of 500 μs     500 μs to 8 ms; Note: In the case of IRs: with isochronous OB is decisive       for send cycle of 1 ms     1 ms to 16 ms       for send cycle of 2 ms     2 ms to 32 ms       for send cycle of 4 ms     4 ms to 64 ms       With IRT and parameterization of "odd" send cycles     Update time of cdd" send cycle of 250 μs       for send cycle of 500 μs     250 μs to 128 ms       for send cycle of 500 μs     250 μs to 256 ms       for send cycle of 500 μs     250 μs to 256 ms       for send cycle of 2 ms     2 ms to 512 ms       for send cycle of 2 ms     2 ms to 512 ms       for send cycle of 2 ms     2 ms to 512 ms       for send cycle of 2 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       sectors     sectors       PG/OP communication     Yes       Number of 10 Controllers with shared device, max.     activation/deactivation of 1-devices       activation/deactivation of 1-devices     Yes; per user program	— for send cycle of 250 μs	
minimum update time of 625 µs of the isochronous OB is decisive — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — for send cycle of 250 µs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 1 ms — for send cycle of 4 m	(	
for send cycle of 1 ms     1 ms to 16 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 3875 µs)       Update time for RT     250 µs to 128 ms       for send cycle of 4 ms     1 ms to 512 ms       for send cycle of 1 ms     1 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       FOC/OP communication     Yes       Isochronous mode     No       IRT     Yes       PROFlemery     Yes; per user program       Asset management record     Yes; per user program       Asset management record     Yes; per user program       Attaction/deactivation of I-devices     Yes       Number of IO Controllers with shared device, Yes;     Yes       Number of connections, max.     96; via integrated interfaces of the CPU and connected CPs / CMs       - Number of connections reserved for ES/HMI/web     10       - Number of conn	— for send cycle of 500 µs	
	for cond cycle of 4 me	
for send cycle of 4 ms4 ms to 64 ms With IRT and parameterization of "odd" sendUpdate time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625Update time for RT500 µs to 256 ms for send cycle of 500 µs500 µs to 256 ms for send cycle of 2 ms2 ms to 512 ms for send cycle of 2 ms2 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms for send cycle of 4 ms4 ms to 512 ms For Self cycle of 4 msYes sochtronous modeNo IRTYes Number of IO Controllers with shared device, max.4 activation/deactivation of 1-devicesYes; per user program Asset management recordYes; per user program Asset management recordYes* Ideface typesYes* Ideface typesYes* Number of connections, max.96; via integrated interfaces of the CPU and connected CPs / CMs• Number of connections, max.96; via integrated interfaces of the CPU and connected CPs / CMs		
	-	
cycles     μ 5 3 875 μs)       Update time for RT       - for send cycle of 500 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 4 ms     4 ms to 512 ms       - for send cycle of 4 ms     4 ms to 512 ms       - for send cycle of 4 ms     4 ms to 512 ms       - For send cycle of 4 ms     4 ms to 512 ms       - For Send cycle of 4 ms     4 ms to 512 ms       - For Send cycle of 4 ms     4 ms to 512 ms       - For Send cycle of 4 ms     4 ms to 512 ms       - For Send cycle of 4 ms     4 ms to 512 ms       - For Send cycle of 4 ms     Yes       - Shared device     Yes       - Number of IO Controllers with shared device, max.     - activation/deactivation of I-devices       - Asset management record     Yes; per user program       - Asset management record     Yes; per user program       - Asset management record     Yes       • Autocrossing     Yes       • Autocrossing     Yes       • Number of connections, max.     96; via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections, max.     96; via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections, max.     96; via integrated interfaces of the CPU and connected CPs / CMs		
Update time for RT       - for send cycle of 250 µs       250 µs to 226 ms         - for send cycle of 500 µs       500 µs to 256 ms       - for send cycle of 2 ms       2 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         - for send cycle of 4 ms       4 ms to 512 ms       - for send cycle of 4 ms       4 ms to 512 ms         - for send cycle of 4 ms       4 ms to 512 ms       - for send cycle of 4 ms       - for send cycle of 4 ms         - for send cycle of 4 ms       4 ms to 512 ms       - for send cycle of 4 ms       - for send cycle of 4 ms         - for send cycle of 4 ms       4 ms to 512 ms       - for send cycle of 4 ms       - for send cycle of 4 ms         - for send cycle of 4 ms       4 ms to 512 ms       - for send cycle of 4 ms		
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 4 ms     4 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       For send cycle of 4 ms     4 ms to 512 ms       For send cycle of 4 ms     4 ms to 512 ms       PROFINET IO Device	•	μs 5 675 μs)
for send cycle of 500 µs500 µs to 256 ms for send cycle of 1 ms1 ms to 512 ms for send cycle of 2 ms2 ms to 512 ms for send cycle of 4 ms4 ms to 512 msPROFINET IO DeviceServices locotnonus modeNo lisochronous modeNo IRTYes PROFIenergyYes; per user program Shared deviceYes; activation/deactivation of I-devicesYes; per user program Asset management recordYes; per user program Asset management recordYes*- AutonegotationYes*- AutonegotationYes*- AutonegotationYes*- Number of connections, max.Yes*- Number of somections, max.96; via integrated interfaces of the CPU and connected CPs / CMs*- Number of ST routing paths10*- Number of ST routing paths16*- Number of ST routing paths16*- Number of ST routing pathsYes*- Number of ST routing pathsYes*- Number of Connections, max.96; via integrated interfaces of the CPU and connected CPs / CMs*- Number of ST routing paths10*- Number of ST routing paths16*- Hedia redundancyonly via 1st interface (X1) MRPMaxingar; MRP Automanager according to IEC 62439-2 Edition 2.0, MRPManager; MRP Automanager according to IEC 62439-2 Edition 3.0	· · ·	250 up to 120 mg
for send cycle of 1 ms1 ms to 512 ms for send cycle of 2 ms2 ms to 512 ms for send cycle of 4 ms4 ms to 512 msPROFINET IO DeviceServicesServices PG/OP communicationYes Isochronous modeNo IRTYes PROFInergyYes; per user program Shared deviceYes Autority of 10 Controllers with shared device, max.4 activation/deactivation of 1-devicesYes; per user program Asset management recordYes; per user programInterface typesYesRJ 45 (Ethemet)Yes• 100 Mbp3Yes• AutonegotiationYes• AutonegotiationYes• Number of connections, max.96; via integrated interfaces of the CPU and connected CPs / CMs• Number of connections, max.96; via integrated interfaces of the CPU and connected CPs / CMs• Number of connections, max.96; via integrated interfaces of the CPU and connected CPs / CMs• Number of connections, max.96; via integrated interfaces of the CPU and connected CPs / CMs• Number of connections reserved for ES/HMI/web10• Number of ST routing paths16Redundancy64• Number of ST routing paths16• Media redundancyonly via 1st interface (X1) MRPManager; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client MRPYes; as MRP ring node according to IEC 62439-2 Edition 3.0		
for send cycle of 2 ms     2 ms to 512 ms       for send cycle of 4 ms     4 ms to 512 ms       PROFINET 10 Device     Services       PG/OP communication     Yes       Isochronous mode     No       IRT     Yes       PROFIenergy     Yes; per user program       Shared device     Yes       activation/deactivation of 1-devices     Yes; per user program       activation/deactivation of 1-devices     Yes; per user program       activation/deactivation of 1-devices     Yes; per user program       Asset management record     Yes       Number of IO Controllers with shared device, max.     Yes; per user program       Asset management record     Yes; per user program       Asset management record     Yes       Valtorcossing     Yes       - Number of connections, max.     Yes       - Number of connections, max.     96; via integrated interfaces of the CPU and connected CPs / CMs       - Number of connections, max.     96; via integrated interfaces of the CPU and connected CPs / CMs       - Number of connections via integrated interfaces     64       - Number of Sorouting paths		
for send cycle of 4 ms     4 ms to 512 ms       PROFINET IO Device       Services       - PG/OP communication     Yes       - Isochronous mode     No       - Isochronous mode     No       - IRT     Yes       - PROFIenergy     Yes; per user program       - Shared device     Yes;       - Number of 10 Controllers with shared device, max.     4       - activation/deactivation of I-devices     Yes; per user program       - Asset management record     Yes; per user program       Interface types     RI 45 (Ethernet)       * 100 Mbps     Yes       • Autocrossing     Yes       • Autocrossing     Yes       • Industrial Ethernet status LED     Yes       * Number of connections, max.     96; via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections reserved for ES/HMI/web     10       • Number of connections, max.     96; via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections reserved for ES/HMI/web     16       • Redundancy mode     Yes       • H-Sync forwarding     Yes       Media redundancy     only via 1st interface (X1)       - MRP     Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP       Manager; MRP Client     Yes; as MRP ring node according to IEC 62439-2 Editio		
PROFINET IO Device         Services	-	
Services         PG/OP communication       Yes         Isochronous mode       No         IRT       Yes         PROFlenergy       Yes; per user program         Shared device       Yes         Shared device       Yes;         Number of IO Controllers with shared device, max.       4         activation/deactivation of I-devices       Yes; per user program         Asset management record       Yes; per user program         Interface types	· · · · · · · · · · · · · · · · · · ·	4 ms to 512 ms
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         Interface types       -         RJ 45 (Ethernet)       Yes         • 100 Mbps       Yes         • Autoregotiation       Yes         • Autoregotiation       Yes         • Autorogotiation       Yes         • Autorogotiation       Yes         • Autorosing       Yes         • Industrial Ethernet status LED       Yes         Protocols       -         Number of connections, max.       96; via integrated interfaces of the CPU and connected CPs / CMs         • Number of connections, max.       96; via integrated interfaces of the CPU and connected CPs / CMs         • Number of connections, max.       96; via integrated interfaces of the CPU and connected CPs / CMs         • Number of connections reserved for ES/HMI/web       10         • Number of S7 routing paths       16         Redundancy       -         - MRP       Yes	Services	
- IRT       Yes         - PROFlenergy       Yes; per user program         - Shared device       Yes         - Number of IO Controllers with shared device, max.       4         - activation/deactivation of I-devices       Yes; per user program         - Asset management record       Yes; per user program         Interface types       -         RJ 45 (Ethemet)       -         • 100 Mbps       Yes         • Autonegotiation       Yes         • Autocrossing       Yes         • Industrial Ethernet status LED       Yes         Protocols       -         Number of connections, max.       96; via integrated interfaces of the CPU and connected CPs / CMs         • Number of connections, max.       96; via integrated interfaces of the CPU and connected CPs / CMs         • Number of connections reserved for ES/HMI/web       10         • Number of connections reserved for ES/HMI/web       10         • Number of sonnections reserved for ES/HMI/web       16         Redundancy mode       -         • I-LSync forwarding       Yes         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       Y		Vee
	— PG/OP communication	
Shared device       Yes         Number of IO Controllers with shared device, max.       4         activation/deactivation of I-devices       Yes; per user program         Asset management record       Yes; per user program         Interface types         RJ 45 (Ethernet)       Yes         • 100 Mbps       Yes         • Autonegotiation       Yes         • Autonegotiation       Yes         • Industrial Ethernet status LED       Yes         Protocols       Yes         Number of connections, max.       96; via integrated interfaces of the CPU and connected CPs / CMs         • Number of connections reserved for ES/HMI/web       10         • Number of strouting paths       16         Redundancy mode       -         • H-Sync forwarding       Yes         Media redundancy       only via 1st interface (X1)         • MRP       Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP         • MRP interconnection, supported       Yes; as MRP ring node a	<ul> <li>— PG/OP communication</li> <li>— Isochronous mode</li> </ul>	No
Number of IO Controllers with shared device, max.     4       activation/deactivation of I-devices     Yes; per user program       Asset management record     Yes; per user program       Asset management record     Yes; per user program       Interface types     RI 45 (Ethernet)       * 100 Mbps     Yes       • Autonegotiation     Yes       • Autocrossing     Yes       • Autocrossing     Yes       • Industrial Ethernet status LED     Yes       Protocols     Yes       Number of connections, max.     96; via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections reserved for ES/HMI/web     10       • Number of S7 routing paths     16       • Number of S7 routing paths     16       • H-Sync forwarding     Yes       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	<ul> <li>— PG/OP communication</li> <li>— Isochronous mode</li> <li>— IRT</li> </ul>	No Yes
max	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFIenergy</li> </ul>	No Yes Yes; per user program
	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFlenergy</li> <li>Shared device</li> </ul>	No Yes Yes; per user program Yes
— Asset management record       Yes; per user program         Interface types         RJ 45 (Ethernet)         • 100 Mbps       Yes         • Autonegotiation       Yes         • Autocrossing       Yes         • Industrial Ethernet status LED       Yes         Protocols       Yes         Number of connections, max.       96; via integrated interfaces of the CPU and connected CPs / CMs         • Number of connections reserved for ES/HMI/web       10         • Number of connections reserved for ES/HMI/web       10         • Number of s7 routing paths       16         Redundancy mode       Yes         • H-Sync forwarding       Yes         • 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	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFIenergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device,</li> </ul>	No Yes Yes; per user program Yes
Interface types         RJ 45 (Ethernet)         • 100 Mbps       Yes         • Autonegotiation       Yes         • Autocrossing       Yes         • Industrial Ethernet status LED       Yes         Protocols         Number of connections, max.         • Number of connections reserved for ES/HMI/web       10         • Number of connections reserved for ES/HMI/web       10         • Number of connections reserved for ES/HMI/web       64         • Number of S7 routing paths       16         Redundancy mode       64         • H-Sync forwarding       Yes         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	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFIenergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device, max.</li> </ul>	No Yes Yes; per user program Yes 4
RJ 45 (Ethernet)         • 100 Mbps       Yes         • Autonegotiation       Yes         • Autocrossing       Yes         • Industrial Ethernet status LED       Yes         Protocols       Yes         Number of connections, max.       96; via integrated interfaces of the CPU and connected CPs / CMs         • Number of connections reserved for ES/HMI/web       10         • Number of connections via integrated interfaces       64         • Number of S7 routing paths       16         Redundancy mode       Yes         • H-Sync forwarding       Yes         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	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFlenergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device, max.</li> <li>activation/deactivation of I-devices</li> </ul>	No Yes Yes; per user program Yes 4 Yes; per user program
<ul> <li>100 Mbps</li> <li>Yes</li> <li>Autonegotiation</li> <li>Yes</li> <li>Autocrossing</li> <li>Yes</li> <li>Industrial Ethernet status LED</li> <li>Yes</li> </ul> Protocols           Protocols           Number of connections, max.         96; via integrated interfaces of the CPU and connected CPs / CMs           Number of connections reserved for ES/HMI/web         10           Number of connections reserved for ES/HMI/web         10           Number of connections reserved for ES/HMI/web         10           Number of S7 routing paths         64           Number of S7 routing paths         16           Redundancy mode         -           — 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	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFIenergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device, max.</li> <li>activation/deactivation of I-devices</li> <li>Asset management record</li> </ul>	No Yes Yes; per user program Yes 4 Yes; per user program
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<ul> <li>Autocrossing</li> <li>Industrial Ethernet status LED</li> <li>Yes</li> <li>Protocols</li> <li>Number of connections</li> <li>Number of connections, max.</li> <li>96; via integrated interfaces of the CPU and connected CPs / CMs</li> <li>Number of connections reserved for ES/HMI/web</li> <li>Number of connections via integrated interfaces</li> <li>Number of S7 routing paths</li> <li>16</li> <li>Redundancy mode</li> <li>H-Sync forwarding</li> <li>Yes</li> <li>Media redundancy</li> <li>Only via 1st interface (X1)</li> <li>MRP</li> <li>MRP interconnection, supported</li> <li>Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client</li> </ul>	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFIenergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device, max.</li> <li>activation/deactivation of I-devices</li> <li>Asset management record</li> </ul> Interface types RJ 45 (Ethernet)	No Yes Yes; per user program Yes; per user program Yes; per user program
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• H-Sync forwarding       Yes         Media redundancy	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFlenergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device, max.</li> <li>activation/deactivation of I-devices</li> <li>Asset management record</li> </ul> Interface types RJ 45 (Ethernet) <ul> <li>100 Mbps</li> <li>Autonegotiation</li> <li>Autocrossing</li> <li>Industrial Ethernet status LED</li> </ul> Protocols Number of connections, max. <ul> <li>Number of connections, max.</li> </ul>	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes
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MRP       Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP         MRP interconnection, supported       Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFlenergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device, max.</li> <li>activation/deactivation of I-devices</li> <li>Asset management record</li> </ul> Interface types RJ 45 (Ethernet) <ul> <li>100 Mbps</li> <li>Autonegotiation</li> <li>Autocrossing</li> <li>Industrial Ethernet status LED</li> </ul> Protocols Number of connections, max. <ul> <li>Number of connections reserved for ES/HMI/web</li> <li>Number of connections via integrated interfaces</li> <li>Number of S7 routing paths</li> </ul>	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes
— MRP interconnection, supported       Manager; MRP Client         Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFlenergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device, max.</li> <li>activation/deactivation of I-devices</li> <li>Asset management record</li> </ul> Interface types RJ 45 (Ethernet) <ul> <li>100 Mbps</li> <li>Autonegotiation</li> <li>Autocrossing</li> <li>Industrial Ethernet status LED</li> </ul> Protocols Number of connections, max. <ul> <li>Number of connections reserved for ES/HMI/web</li> <li>Number of S7 routing paths</li> </ul> Redundancy mode <ul> <li>H-Sync forwarding</li> </ul>	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes
- MRP interconnection, supported Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFlenergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device, max.</li> <li>activation/deactivation of I-devices</li> <li>Asset management record</li> </ul> Interface types RJ 45 (Ethernet) <ul> <li>100 Mbps</li> <li>Autonegotiation</li> <li>Autocrossing</li> <li>Industrial Ethernet status LED</li> </ul> Protocols Number of connections, max. <ul> <li>Number of connections reserved for ES/HMI/web</li> <li>Number of connections via integrated interfaces</li> <li>Number of S7 routing paths</li> </ul> Redundancy mode <ul> <li>H-Sync forwarding</li> <li>Media redundancy</li> </ul>	No Yes Yes; per user program Yes; per user program Yes; per user program Yes Yes Yes Yes Yes Yes Yes Yes
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— MRPD Yes; Requirement: IRT	<ul> <li>PG/OP communication</li> <li>Isochronous mode</li> <li>IRT</li> <li>PROFlenergy</li> <li>Shared device</li> <li>Number of IO Controllers with shared device, max.</li> <li>activation/deactivation of I-devices</li> <li>Asset management record</li> </ul> Interface types RJ 45 (Ethernet) <ul> <li>100 Mbps</li> <li>Autonegotiation</li> <li>Autocrossing</li> <li>Industrial Ethernet status LED</li> </ul> Protocols Number of connections, max. <ul> <li>Number of connections reserved for ES/HMI/web</li> <li>Number of connections via integrated interfaces</li> <li>Number of S7 routing paths</li> </ul> Redundancy mode <ul> <li>H-Sync forwarding</li> <li>Media redundancy</li> <li>MRP</li> </ul>	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
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Quitebourg times on line breads to a	
— Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD
— Number of stations in the ring, max.	50
SIMATIC communication <ul> <li>PG/OP communication</li> </ul>	Voc: apprintian with TLS V/1.2 pro-palagted
S7 routing	Yes; encryption with TLS V1.3 pre-selected Yes
S7 communication, as server	Yes
S7 communication, as server	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,	Yes
supported	
<ul> <li>ISO-on-TCP (RFC1006)</li> </ul>	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
<ul> <li>Number of nodes of the client interfaces, recommended max.</li> </ul>	1 000
— Number of elements for one call of	300
OPC_UA_NodeGetHandleList/OPC_UA_ReadList/C	300
max.	
- Number of elements for one call of	20
OPC_UA_NameSpaceGetIndexList, max.	400
<ul> <li>— Number of elements for one call of OPC UA MethodGetHandleList, max.</li> </ul>	100
— 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
<ul> <li>— Number of registerable method calls of OPC_UA_MethodCall, max.</li> </ul>	100
— Number of inputs/outputs when calling	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
<ul> <li>Number of accessible variables, max.</li> </ul>	50 000
— Number of registerable nodes, max.	10 000
<ul> <li>Number of subscriptions per session, max.</li> </ul>	20
— Sampling interval, min.	100 ms
— Publishing interval, min.	500 ms

<ul> <li>— Number of server methods, max.</li> </ul>	20
<ul> <li>Number of inputs/outputs per server method,</li> </ul>	20
max.	
<ul> <li>Number of monitored items, recommended max.</li> </ul>	1 000; for 1 s sampling interval and 1 s send interval
— Number of server interfaces, max.	10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace"
<ul> <li>— Number of nodes for user-defined server interfaces, max.</li> </ul>	1 000
<ul> <li>Alarms and Conditions</li> </ul>	Yes
<ul> <li>— Number of program alarms</li> </ul>	100
— Number of alarms for system diagnostics	50
Further protocols	
MODBUS	Yes; MODBUS TCP
Isochronous mode	
Equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	2 500
Number of simultaneously active program alarms	
Number of program alarms	600
Number of program diamits     Number of alarms for system diagnostics	100
Number of alarms for system alagnosites     Number of alarms for motion technology objects	80
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 5 engineering systems
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)
Single step	No
Number of breakpoints	8
Status/control	
<ul> <li>Status/control variable</li> </ul>	Yes
Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
<ul> <li>Number of variables, max.</li> </ul>	
— of which status variables, max.	200; per job
- of which control variables, max.	200; per job
Forcing	
Forcing	Yes
<ul> <li>Forcing, variables</li> </ul>	Peripheral inputs/outputs
<ul> <li>Number of variables, max.</li> </ul>	200
Diagnostic buffer	200
present	Yes
Number of entries, max.	1 000
— of which powerfail-proof	500
Traces	
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Alarms	
Diagnostic alarm	Yes
Hardware interrupt	Yes
Diagnoses	
<ul> <li>Monitoring the supply voltage</li> </ul>	Yes
Wire-break	Yes; for analog inputs/outputs, see description in manual
Short-circuit	Yes; for analog outputs, see description in manual
<ul> <li>A/B transition error at incremental encoder</li> </ul>	Yes
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	
	Yes
• STOP ACTIVE LED	Yes
<ul> <li>Monitoring of the supply voltage (PWR-LED)</li> </ul>	
	Yes
<ul> <li>Channel status display</li> <li>for channel diagnostics</li> </ul>	Yes Yes Yes; For analog inputs/outputs

<ul> <li>Connection display LINK TX/RX</li> </ul>	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of
<ul> <li>Number of available Motion Control resources for technology objects</li> </ul>	the PLC program; selection guide via the TIA Selection Tool 800
<ul> <li>Required Motion Control resources</li> </ul>	
— 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
<ul> <li>Positioning axis</li> <li>— Number of positioning axes at motion control</li> </ul>	5
cycle of 4 ms (typical value) — Number of positioning axes at motion control cycle of 8 ms (typical value)	10
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
<ul> <li>Synchronization via digital input</li> </ul>	Yes
Counting range, parameterizable	Yes
Comparator	
— Number of comparators	2; per count channel; see manual for details
<ul> <li>— Direction dependency</li> </ul>	Yes
<ul> <li>— Can be changed from user program</li> </ul>	Yes
Position detection	
<ul> <li>Incremental acquisition</li> </ul>	Yes
<ul> <li>Suitable for S7-1500 Motion Control</li> </ul>	Yes
Measuring functions	
<ul> <li>Measuring time, parameterizable</li> </ul>	Yes
<ul> <li>Dynamic measurement period adjustment</li> </ul>	Yes
Number of thresholds, parameterizable	2
Measuring range	
— 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 Fraguency mossurement	100 ppm; depending on measuring interval and signal such stars
— Frequency measurement     Cycle duration 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
<ul> <li>between the channels</li> <li>between the channels in groups of</li> </ul>	No 16
between the channels, in groups of	16
Potential separation digital outputs     • between the channels	No
	No 16
between the channels, in groups of     Potential separation channels	
between the channels and backplane bus	Yes
<ul> <li>Between the channels and backplane bus</li> <li>Between the channels and load voltage L+</li> </ul>	No
- Detween the channels and load voltage LT	

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Isolation	
Isolation tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
<ul> <li>horizontal installation, min.</li> </ul>	-25 °C; No condensation
<ul> <li>horizontal installation, max.</li> </ul>	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
<ul> <li>vertical installation, min.</li> </ul>	-25 °C; No condensation
<ul> <li>vertical installation, max.</li> </ul>	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	
<ul> <li>Installation altitude above sea level, max.</li> </ul>	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	
<ul> <li>User program protection/password protection</li> </ul>	Yes
<ul> <li>Copy protection</li> </ul>	Yes
<ul> <li>Block protection</li> </ul>	Yes
Access protection	
<ul> <li>protection of confidential configuration data</li> </ul>	Yes
<ul> <li>Password for display</li> </ul>	Yes
<ul> <li>Protection level: Write protection</li> </ul>	Yes
<ul> <li>Protection level: Read/write protection</li> </ul>	Yes
<ul> <li>Protection level: Complete protection</li> </ul>	Yes
Dimensions	
Width	85 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	1 050 g
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