6ES7314-6EH04-0AB0

Data sheet



SIMATIC S7-300, CPU 314C-2PN/DP Compact CPU with 192 KB work memory, 24 DI/16 DO, 4 AI, 2 AO, 1 Pt100, 4 high-speed counters (60 kHz), 1st interface MPI/DP 12 Mbit/s, 2nd interface Ethernet PROFINET, with 2-port switch, Integr. power supply 24 V DC, Front connector (2x 40-pole) and Micro Memory Card required

General information	
HW functional status	01
Firmware version	V3.3
Product function	
Isochronous mode	Yes; For PROFINET only
Engineering with	
Programming package	STEP 7 V5.5 or higher with HSP 191
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
external protection for power supply lines (recommendation)	Miniature circuit breaker, type C; min. 2 A; miniature circuit breaker type B, min. 4 A
Mains buffering	
 Mains/voltage failure stored energy time 	5 ms
Repeat rate, min.	1 s
Load voltage L+	
Digital inputs	
— Rated value (DC)	24 V
Reverse polarity protection	Yes
Digital outputs	
— Rated value (DC)	24 V
— Reverse polarity protection	No
Input current	
Current consumption (rated value)	850 mA
Current consumption (in no-load operation), typ.	190 mA
Inrush current, typ.	5 A
l²t	0.7 A ² ·s
Digital inputs	
 from load voltage L+ (without load), max. 	80 mA
Digital outputs	
from load voltage L+, max.	50 mA
Power loss	
Power loss, typ.	14 W
Memory	
Work memory	
• integrated	192 kbyte
expandable	No
Load memory	
Plug-in (MMC)	Yes

Obligation (wince, in its.) Obligation (wince, in its	Plug-in (MMC), max.	8 Mbyte
min. Backup Present Present Whoolt battery Present For bit operations, typ. 0.06 µs for word operations, typ. 0.12 µs for fixed point arithmetic, typ. 0.19 µs for floating point arithmetic, typ. 0.59 µs CPU-blocks Number of blocks (total) B Number of blocks (total) 1 024; Number range: 1 to 16000 64 kbyte FB Number, max. 1 024; Number range: 0 to 7999 64 kbyte FB Number, max. 1 024; Number range: 0 to 7999 64 kbyte FB Number, max. 1 024; Number range: 0 to 7999 64 kbyte FB Number, max. 9 Size, max. 04 kbyte Number of floe cycle OBs Number of flee pidem OBs Number of process alarm OBs Number of pyrt alarm OBs Number of shartup OBs Number of shar		
• present		
### without battery Vesi, Program and data ### Out of the persons, typ. 0.06 µs ### Out of persons, typ. 0.12 µs ### Out of operations, typ. 0.15 µs ### Out of the point arithmetic, typ. 0.59 µs ### Out of the point arithmetic, typ. 0.59 µs ### Out of the point arithmetic, typ. 0.59 µs ### Out of the point arithmetic, typ. 0.59 µs ### Out of the point of the point arithmetic, typ. 0.59 µs ### Out of the point of the poin	Backup	
For Interpretations, typ. 0.08 μs		
for bit operations, typ. 0.08 µs for word operations, typ. 0.12 µs for fixed point arithmetic, typ. 0.59 µs CPUB-locks Number of blocks (total) 1 0.24; (D8s, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used. DB 1 0.24; (D8s, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used. BB • Number, max. • Size, max 64 kbyte FB • Number, max. • Size, max. 64 kbyte FC • Number, max. • Size, max. 64 kbyte • Number, max. 1 024; Number range: 0 to 7999 • Kize, max. 64 kbyte • Number of recepted OBs 1, 08 1 • Number of free cycle OBs 1, 08 10 • Number of delay alarm OBs 2, 0B 20, 21 • Number of process alarm OBs 1, 08 10 • Number of process alarm OBs 1, 08 40 • Number of startup OBs 1, 08 40 • Number of sanchronous made OBs 1, 08 61; only for PROFINET • Number of synchronous error OBs 6, 08 80 80, 28, 38, 85, 86, 87 (O883 only for PROFINET IO		Yes; Program and data
For word operations, typ. 0.12 μs		
Tor fixed point arithmetic, typ. 0.16 μs		
Tor floating point arithmetic, typ. 0.59 µs		
Total	·	
Number of blocks (total)		0.59 µs
Number, max. 1 024; Number range: 1 to 16000		4004 (DD 50 5D) #
Number, max. Size, max. Size, max. 1024; Number range: 1 to 16000 64 kbyte Remark. Size, max. 1024; Number range: 0 to 7999 64 kbyte Remark. Size, max. 1024; Number range: 0 to 7999 64 kbyte Remark. Size, max. 1024; Number range: 0 to 7999 64 kbyte Number, max. Size, m	Number of blocks (total)	
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● Size, max. 64 kbyte • Number, max. 1 1024; Number range: 0 to 7999 • Number, max. 64 kbyte FC • Number, max. 64 kbyte • Number, max. 64 kbyte • Number, max. 64 kbyte • Number of size, max. 64 kbyte • Number of free cycle OBs • Number of free cycle OBs • Number of time alam OBs • Number of time alam OBs • Number of delay alarm OBs • Number of delay alarm OBs • Number of opecial interrupt OBs • Number of process alarm OBs • Number of sold interrupt OBs • Number of sold interrupt OBs • Number of sold interrupt OBs • Number of process alarm OBs • Number of process alarm OBs • Number of sold interrupt OBs • OB 80, 82, 83, 85, 86, 87 (OB83 only for PROFINET IO) • 256 Countors, timers and their retentivity S7 counter • Number • Lower limit • upper limit • upper limit • upper limit • o - adjustable - lower limit • upper limit • o - upper limit • upper limit • o - upper limit • present • Yes		1 024; Number range: 1 to 16000
Number, max. Size, max.		
● Size, max. 64 kbyte ● Number, max. 1 024; Number range: 0 to 7999 ● Number, max. 64 kbyte ● Number of max. 8ee instruction list ● Size, max. 64 kbyte ● Number of fire cycle OBs 1; OB 1 • Number of fire cycle OBs 1; OB 1 • Number of of lime alarm OBs 1; OB 10 • Number of cyclic interrupt OBs 4; OB 32, 33, 34, 35 • Number of pcyclic interrupt OBs 4; OB 32, 33, 34, 35 • Number of process alarm OBs 1; OB 40 • Number of Isochronous mode OBs 1; OB 61; Only for PROFINET • Number of synchronous error OBs 1; OB 81; OB 88, 82, 83, 85, 86, 87 (OB83 only for PROFINET IO) • Number of synchronous error OBs 2; OB 121, 122 Nesting depth • per priority class 16 • Aumber of synchronous error OB 4 Counters, timers and their retentivity ST counter • Number	FB	
Number, max.	Number, max.	1 024; Number range: 0 to 7999
Number, max. Size, max. OB Number, max. Size, max. See instruction list Size, max. Size, max. See instruction list Size, max. Size, max. See instruction list Size, max. See instruction list Size, max. Size, max. Size, max. Size, max. Size, max. See instruction list Size, max. Size, max. Size, max. Size, max. See instruction list See instruction lister See instruction lister See instruction lister See instruction lister	• Size, max.	64 kbyte
● Size, max. 64 kbyte ● Number, max.	FC	
Number, max. see instruction list	Number, max.	1 024; Number range: 0 to 7999
 Number, max. Size, max. 64 kbyte Number of free cycle OBs Number of time alarm OBs Number of delay alarm OBs Number of cyclic interrupt OBs Number of process alarm OBs Number of process alarm OBs Number of DPV1 alarm OBs Number of isochronous mode OBs Number of isochronous mode OBs Number of startup OBs Number of startup OBs Number of synchronous error OBs Nesting depth eper priority class additional within an error OB Additional within an error OB Number S7 counter Number 256 Retentivity — adjustable — preset Z0 to Z7 Counting range — adjustable — lower limit — upper limit	• Size, max.	64 kbyte
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 Number of cyclic interrupt OBs Number of process alarm OBs Number of process alarm OBs Number of DPV1 alarm OBs Number of isochronous mode OBs Number of isochronous mode OBs Number of satrup OBs Number of synchronous error OBs OB 80, 82, 83, 85, 86, 87 (OB83 only for PROFINET IO) Number of synchronous error OB Additional within an error OB Additional within an error OB Additional within an error OB Augustable In our limit Our upper limit Our upper limit Our upper limit Out ot 7 Counting range Augustable Augustable		
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 Number of DPV1 alarm OBs Number of isochronous mode OBs Number of startup OBs Number of asynchronous error OBs Number of asynchronous error OBs Number of synchronous error OBs Number of synchronous error OBs Number of synchronous error OBs OB 80, 82, 83, 85, 86, 87 (OB83 only for PROFINET IO) Number of synchronous error OBs Per priority class additional within an error OB Additional within an error OB Number S7 counter Number Algustable — adjustable — lower limit — upper limit — 255 — preset Z 0 to Z 7 Counting range — adjustable — adjustable — upper limit — present — present 		
Number of isochronous mode OBs Number of startup OBs Number of asynchronous error OBs Number of synchronous error OB Number o		
Number of startup OBs Number of asynchronous error OBs Number of synchronous error OB of the synchronous error OBs Number of synchronous error OBs Numbe		
Number of asynchronous error OBs Number of synchronous error OBs Number of synchronous error OBs 2; OB 121, 122 Nesting depth per priority class additional within an error OB 4 Counters, timers and their retentivity S7 counter Number adjustable — lower limit — upper limit — preset — adjustable — adjustable — adjustable — adjustable — lower limit — upper limit		
Number of synchronous error OBs	·	
Nesting depth 16 • per priority class 4 • additional within an error OB 4 Counters, timers and their retentivity 57 counter • Number • Number 256 Retentivity Yes — lower limit 0 — upper limit 255 — preset Z 0 to Z 7 Counting range Yes — lower limit 0 — upper limit 999 IEC counter • present		
		2, 00 121, 122
■ additional within an error OB Counters, timers and their retentivity S7 counter ■ Number ■ Number Retentivity — adjustable — lower limit — upper limit — preset — adjustable — adjustable — upper limit — preset — adjustable — upper limit — preset — adjustable — upper limit —	<u> </u>	16
Counters, timers and their retentivity ● Number 256 Retentivity - adjustable — lower limit 0 — upper limit 255 — preset Z 0 to Z 7 Counting range Yes — lower limit 0 — upper limit 999 IEC counter Present ● present Yes		
S7 counter ● Number 256 Retentivity — adjustable Yes — lower limit 0 — upper limit 255 — preset Z 0 to Z 7 Counting range Yes — lower limit 0 — upper limit 999 IEC counter Yes ● present Yes		
Number 256 Retentivity — adjustable Yes — lower limit 0 — upper limit 255 — preset Z 0 to Z 7 Counting range — adjustable Yes — lower limit 0 — upper limit 0 — upper limit 9999 IEC counter ● present Yes Yes		
Retentivity — adjustable Yes — lower limit 0 — upper limit 255 — preset Z 0 to Z 7 Counting range — adjustable Yes — lower limit 0 — upper limit 999 IEC counter • present Yes		256
— adjustable Yes — lower limit 0 — upper limit 255 — preset Z 0 to Z 7 Counting range — adjustable Yes — lower limit 0 — upper limit 999 IEC counter • present Yes		
— lower limit 0 — upper limit 255 — preset Z 0 to Z 7 Counting range — adjustable Yes — lower limit 0 — upper limit 999 IEC counter • present Yes	•	Yes
— upper limit 255 — preset Z 0 to Z 7 Counting range — adjustable Yes — lower limit 0 — upper limit 999 IEC counter ◆ present Yes	•	
Counting range adjustable Yes lower limit 0 upper limit 999 IEC counter • present Yes	— upper limit	
— adjustable Yes — lower limit 0 — upper limit 999 IEC counter Yes	— preset	Z 0 to Z 7
— lower limit 0 — upper limit 999 IEC counter Yes	Counting range	
— upper limit 999 IEC counter ● present Yes	— adjustable	Yes
IEC counter ◆ present Yes	— lower limit	0
• present Yes	— upper limit	999
	IEC counter	
• Type SFB	• present	Yes
	• Type	SFB
Number Unlimited (limited only by RAM capacity)	Number	Unlimited (limited only by RAM capacity)
S7 times	S7 times	
• Number 256	Number	256
Retentivity	Retentivity	
— adjustable Yes	— adjustable	Yes
— lower limit 0		0
— upper limit 255	— upper limit	255

— preset	No retentivity
Time range	
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	64 kbyte
Flag	
• Size, max.	256 byte
 Retentivity available 	Yes; MB 0 to MB 255
 Retentivity preset 	MB 0 to MB 15
Number of clock memories	8; 1 memory byte
Data blocks	
 Retentivity adjustable 	Yes; via non-retain property on DB
Retentivity preset	Yes
Local data	
• per priority class, max.	32 kbyte; Max. 2048 bytes per block
Address area	
I/O address area	
Inputs	2 048 byte
Outputs	2 048 byte
of which distributed	
— Inputs	2 003 byte
— Outputs	2 010 byte
Process image	
• Inputs	2 048 byte
Outputs	2 048 byte
 Inputs, adjustable 	2 048 byte
Outputs, adjustable	2 048 byte
Inputs, default	256 byte
Outputs, default	256 byte
Default addresses of the integrated channels	
— Digital inputs	136.0 to 138.7
— Digital outputs	136.0 to 137.7
— Analog inputs	800 to 809
— Analog outputs	800 to 803
Subprocess images	
 Number of subprocess images, max. 	1; With PROFINET IO, the length of the user data is limited to 1600 bytes
Digital channels	
• Inputs	16 048
— of which central	1 016
Outputs	16 096
— of which central	1 008
Analog channels	
• Inputs	1 006
— of which central	253
Outputs	1 007
— of which central	250
Hardware configuration	
Number of expansion units, max.	3
Number of DP masters	
• integrated	1
• via CP	4
Number of operable FMs and CPs (recommended)	
• FM	8
• CP, PtP	8
• CP, LAN	10
,	

Rack	
• Racks, max.	4
Modules per rack, max.	8; In rack 3 max. 7
Time of day	
Clock	
Hardware clock (real-time)	Yes
 retentive and synchronizable 	Yes
Backup time	6 wk; At 40 °C ambient temperature
 Deviation per day, max. 	10 s; Typ.: 2 s
 Behavior of the clock following POWER-ON 	Clock continues running after POWER OFF
Behavior of the clock following expiry of backup period	the clock continues at the time of day it had when power was switched off
Operating hours counter	
Number	1
Number/Number range	0
Range of values	0 to 2^31 hours (when using SFC 101)
Granularity	1 h
retentive	Yes; Must be restarted at each restart
Clock synchronization	
• supported	Yes
• to MPI, master	Yes
• to MPI, slave	Yes
● to DP, master	Yes; With DP slave only slave clock
● to DP, slave	Yes
• in AS, master	Yes
• in AS, slave	Yes
on Ethernet via NTP	Yes; As client
Digital inputs	
Number of digital inputs	24
of which inputs usable for technological functions	16
integrated channels (DI)	24
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Number of simultaneously controllable inputs	
horizontal installation	
— up to 40 °C, max.	24
— up to 60 °C, max.	12
vertical installation	
— up to 40 °C, max.	12
Input voltage	
Rated value (DC)	24 V
● for signal "0"	-3 to +5V
• for signal "1"	+15 to +30 V
Input current	
• for signal "1", typ.	8 mA
Input delay (for rated value of input voltage)	
for standard inputs	
— parameterizable	Yes; 0.1 / 0.3 / 3 / 15 ms (You can reconfigure the input delay of the standard
	inputs during program runtime. Please note that under certain circumstances your newly set filter time may not be effective until the next filter cycle.)
— Rated value	3 ms
for technological functions	
— at "0" to "1", max.	8 μs; Minimum pulse width/minimum pause between pulses at maximum
	counting frequency
Cable length	
• shielded, max.	1 000 m; 50 m for technological functions
unshielded, max.	600 m; for technological functions: No
for technological functions	
— shielded, max.	50 m; at maximum count frequency
— shielded, max.— unshielded, max.	50 m; at maximum count frequency not allowed
— unshielded, max.	

integrated channels (DO)	16
Short-circuit protection	Yes; Clocked electronically
Response threshold, typ.	1 A
Limitation of inductive shutdown voltage to	L+ (-48 V)
Controlling a digital input	Yes
Switching capacity of the outputs	
on lamp load, max.	5 W
Load resistance range	
• lower limit	48 Ω
• upper limit	4 kΩ
Output voltage	
• for signal "1", min.	L+ (-0.8 V)
Output current	
• for signal "1" rated value	500 mA
• for signal "1" permissible range, min.	5 mA
for signal "1" permissible range, max.	0.6 A
for signal "1" minimum load current	5 mA
for signal "0" residual current, max.	0.5 mA
Parallel switching of two outputs	
• for uprating	No
for redundant control of a load	Yes
Switching frequency	
with resistive load, max.	100 Hz
with inductive load, max.	0.5 Hz
	100 Hz
on lamp load, max. of the pulse outputs, with registive load, may.	
of the pulse outputs, with resistive load, max. Tatal surrent of the cuttouts (non group)	2.5 kHz
Total current of the outputs (per group)	
horizontal installation	
— up to 40 °C, max.	3 A
— up to 60 °C, max.	2 A
vertical installation	
— up to 40 °C, max.	2 A
Cable length	
• shielded, max.	1 000 m
unshielded, max.	600 m
Analog inputs	
Number of analog inputs	5
 For voltage/current measurement 	4
 For resistance/resistance thermometer measurement 	1
integrated channels (AI)	5; 4x current/voltage, 1x resistance
permissible input voltage for current input (destruction limit),	5 V; Permanent
max.	
permissible input voltage for voltage input (destruction limit),	30 V; Permanent
max.	0.5 mA: Dormonont
permissible input current for voltage input (destruction limit), max.	0.5 mA; Permanent
permissible input current for current input (destruction limit), max.	50 mA; Permanent
Electrical input frequency max	400 Hz
Electrical input frequency, max.	400 Hz
No-load voltage for resistance-type transmitter, typ.	3.3 V
No-load voltage for resistance-type transmitter, typ. Constant measurement current for resistance-type transmitter,	3.3 V
No-load voltage for resistance-type transmitter, typ. Constant measurement current for resistance-type transmitter, typ.	3.3 V 1.25 mA
No-load voltage for resistance-type transmitter, typ. Constant measurement current for resistance-type transmitter, typ. Technical unit for temperature measurement adjustable Input ranges	3.3 V 1.25 mA Yes; Degrees Celsius / degrees Fahrenheit / Kelvin
No-load voltage for resistance-type transmitter, typ. Constant measurement current for resistance-type transmitter, typ. Technical unit for temperature measurement adjustable Input ranges Voltage	3.3 V 1.25 mA Yes; Degrees Celsius / degrees Fahrenheit / Kelvin Yes; ±10 V / 100 kΩ; 0 V to 10 V / 100 kΩ
No-load voltage for resistance-type transmitter, typ. Constant measurement current for resistance-type transmitter, typ. Technical unit for temperature measurement adjustable Input ranges Voltage Current	3.3 V 1.25 mA Yes; Degrees Celsius / degrees Fahrenheit / Kelvin Yes; ± 10 V / 100 k Ω ; 0 V to 10 V / 100 k Ω Yes; ± 20 mA / 100 Ω ; 0 mA to 20 mA / 100 Ω ; 4 mA to 20 mA / 100 Ω
No-load voltage for resistance-type transmitter, typ. Constant measurement current for resistance-type transmitter, typ. Technical unit for temperature measurement adjustable Input ranges • Voltage • Current • Resistance thermometer	3.3 V 1.25 mA Yes; Degrees Celsius / degrees Fahrenheit / Kelvin Yes; ± 10 V / 100 k Ω ; 0 V to 10 V / 100 k Ω Yes; ± 20 mA / 100 Ω ; 0 mA to 20 mA / 100 Ω ; 4 mA to 20 mA / 100 Ω Yes; Pt 100 / 10 M Ω
No-load voltage for resistance-type transmitter, typ. Constant measurement current for resistance-type transmitter, typ. Technical unit for temperature measurement adjustable Input ranges • Voltage • Current • Resistance thermometer • Resistance	3.3 V 1.25 mA Yes; Degrees Celsius / degrees Fahrenheit / Kelvin Yes; ± 10 V / 100 k Ω ; 0 V to 10 V / 100 k Ω Yes; ± 20 mA / 100 Ω ; 0 mA to 20 mA / 100 Ω ; 4 mA to 20 mA / 100 Ω
No-load voltage for resistance-type transmitter, typ. Constant measurement current for resistance-type transmitter, typ. Technical unit for temperature measurement adjustable Input ranges • Voltage • Current • Resistance thermometer • Resistance Input ranges (rated values), voltages	3.3 V 1.25 mA Yes; Degrees Celsius / degrees Fahrenheit / Kelvin Yes; ± 10 V / 100 k Ω ; 0 V to 10 V / 100 k Ω Yes; ± 20 mA / 100 Ω ; 0 mA to 20 mA / 100 Ω ; 4 mA to 20 mA / 100 Ω Yes; Pt 100 / 10 M Ω Yes; 0 Ω to 000 Ω / 10 M Ω
No-load voltage for resistance-type transmitter, typ. Constant measurement current for resistance-type transmitter, typ. Technical unit for temperature measurement adjustable Input ranges Voltage Current Resistance thermometer Resistance Input ranges (rated values), voltages 0 to +10 V	3.3 V 1.25 mA Yes; Degrees Celsius / degrees Fahrenheit / Kelvin Yes; ± 10 V / 100 k Ω ; 0 V to 10 V / 100 k Ω Yes; ± 20 mA / 100 Ω ; 0 mA to 20 mA / 100 Ω ; 4 mA to 20 mA / 100 Ω Yes; Pt 100 / 10 M Ω Yes; 0 Ω to 000 Ω / 10 M Ω
No-load voltage for resistance-type transmitter, typ. Constant measurement current for resistance-type transmitter, typ. Technical unit for temperature measurement adjustable Input ranges • Voltage • Current • Resistance thermometer • Resistance Input ranges (rated values), voltages	3.3 V 1.25 mA Yes; Degrees Celsius / degrees Fahrenheit / Kelvin Yes; ± 10 V / ± 100 k Ω ; 0 V to ± 10 V / ± 100 k Ω Yes; ± 20 mA / ± 100 Ω ; 0 mA to ± 20 mA / ± 100 Ω ; 4 mA to ± 20 mA / ± 100 Ω Yes; Pt ± 100 / ± 100 M Ω Yes; ± 100 / ± 100 M Ω

• 0 to 20 mA	Yes
— Input resistance (0 to 20 mA)	Tes 100 Ω
• -20 mA to +20 mA	Yes
— Input resistance (-20 mA to +20 mA)	100 Ω
4 mA to 20 mA	Yes
	Tes 100 Ω
— Input resistance (4 mA to 20 mA)	72 000
Input ranges (rated values), resistance thermometer • Pt 100	Yes
	10 MΩ
— Input resistance (Pt 100)	10 IVISZ
Input ranges (rated values), resistors • 0 to 600 ohms	Yes
	10 MΩ
— Input resistance (0 to 600 ohms)	10 IVIZ
Thermocouple (TC)	
Temperature compensation	No
— parameterizable Characteristic linearization	NO
	Vacility asflying
parameterizable for registering the reporter.	Yes; by software
— for resistance thermometer	Pt 100
Cable length	100 m
• shielded, max.	100 m
Analog outputs	
Number of analog outputs	2
integrated channels (AO)	2
Voltage output, short-circuit protection	Yes
Voltage output, short-circuit current, max.	55 mA
Current output, no-load voltage, max.	14 V
Output ranges, voltage	
• 0 to 10 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
Connection of actuators	
 for voltage output two-wire connection 	Yes; Without compensation of the line resistances
 for voltage output four-wire connection 	No
for current output two-wire connection	Yes
Load impedance (in rated range of output)	
with voltage outputs, min.	1 kΩ
 with voltage outputs, capacitive load, max. 	0.1 μF
with current outputs, max.	300 Ω
with current outputs, inductive load, max.	0.1 mH
Destruction limits against externally applied voltages and currents	
 Voltages at the outputs towards MANA 	16 V; Permanent
Current, max.	50 mA; Permanent
Cable length	
• shielded, max.	200 m
Analog value generation for the inputs	
Measurement principle	Actual value encryption (successive approximation)
Integration and conversion time/resolution per channel	
 Resolution with overrange (bit including sign), max. 	12 bit
 Integration time, parameterizable 	Yes; 16.6 / 20 ms
 Interference voltage suppression for interference frequency f1 in Hz 	50 / 60 Hz
 Time constant of the input filter 	0.38 ms
 Basic execution time of the module (all channels released) 	1 ms
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	
 Resolution with overrange (bit including sign), max. 	12 bit
 Conversion time (per channel) 	1 ms

0 111 11	
Settling time	0.0
for resistive load	0.6 ms
for capacitive load	1 ms
for inductive load	0.5 ms
Encoder	
Connection of signal encoders	
 for voltage measurement 	Yes
 for current measurement as 2-wire transducer 	Yes; with external supply
 for current measurement as 4-wire transducer 	Yes
for resistance measurement with two-wire connection	Yes; Without compensation of the line resistances
for resistance measurement with three-wire connection	No
for resistance measurement with four-wire connection	No
Connectable encoders	
• 2-wire sensor	Yes
— permissible quiescent current (2-wire sensor), max.	1.5 mA
Errors/accuracies	
Temperature error (relative to input range), (+/-)	0.006 %/K
Crosstalk between the inputs, min.	60 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.06 %
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)	0.1 %
Linearity error (relative to output range), (+/-)	0.15 %
Temperature error (relative to output range), (+/-)	0.01 %/K
Crosstalk between the outputs, min.	60 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.06 %
Operational error limit in overall temperature range	
Voltage, relative to input range, (+/-)	1 %
• Current, relative to input range, (+/-)	1 %
Resistance, relative to input range, (+/-)	1 %
Voltage, relative to output range, (+/-)	1 %
Current, relative to output range, (+/-)	1 %
Basic error limit (operational limit at 25 °C)	0.007
Voltage, relative to input range, (+/-)	0.8 %; Linearity error ±0.06 %
• Current, relative to input range, (+/-)	0.8 %; Linearity error ±0.06 %
Resistance, relative to input range, (+/-)	0.8 %; Linearity error ±0.2 %
• Resistance thermometer, relative to input range, (+/-)	0.8 %
Voltage, relative to output range, (+/-)	0.8 %
Current, relative to output range, (+/-)	0.8 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference (nearly voltage frinterference c	
 Series mode interference (peak value of interference < rated value of input range), min. 	30 dB
Common mode interference, min.	40 dB
Interfaces	4.0 4.7 T. D. P. M. F.
Number of industrial Ethernet interfaces	1; 2 ports (switch) RJ45
Number of PROFINET interfaces	1; 2 ports (switch) RJ45
Number of RS 485 interfaces	1; Combined MPI / PROFIBUS DP
Number of RS 422 interfaces	0
1. Interface	
Interface type	Integrated RS 485 interface
Isolated	Yes
Interface types	Voc
• RS 485	Yes
Output current of the interface, max. Protocolo	200 mA
Protocols	Von
MPI DDCFIDUC DD masster	Yes
PROFIBUS DP master PROFIBUS DP alove	Yes
PROFIBUS DP slave Point to point connection	Yes
Point-to-point connection	No
MPI • Transmission rate, may	12 Mhit/o
Transmission rate, max.	12 Mbit/s

Services	
 PG/OP communication 	Yes
— Routing	Yes
 Global data communication 	Yes
 S7 basic communication 	Yes
— S7 communication	Yes
 — S7 communication, as client 	No; but via CP and loadable FB
— S7 communication, as server	Yes
PROFIBUS DP master	
Transmission rate, max.	12 Mbit/s
Number of DP slaves, max.	124
Services	127
— PG/OP communication	Von
	Yes
— Routing	Yes
 Global data communication 	No
 S7 basic communication 	Yes; I blocks only
— S7 communication	Yes
 — S7 communication, as client 	No
 S7 communication, as server 	Yes
— Equidistance	Yes
— Isochronous mode	No
— SYNC/FREEZE	Yes
 Activation/deactivation of DP slaves 	Yes
 Number of DP slaves that can be simultaneously activated/deactivated, max. 	8
 Direct data exchange (slave-to-slave communication) 	Yes; as subscriber
— DPV1	Yes
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
User data per DP slave	·
— Inputs, max.	244 byte
— Outputs, max.	244 byte
PROFIBUS DP slave	-,,
Transmission rate, max.	12 Mbit/s
automatic baud rate search	Yes; only with passive interface
Address area, max.	32
User data per address area, max.	32 byte
Services	V.
— PG/OP communication	Yes
— Routing	Yes; Only with active interface
 Global data communication 	No
 — S7 basic communication 	No
— S7 communication	Yes
 S7 communication, as client 	No
 S7 communication, as server 	Yes; Connection configured on one side only
 Direct data exchange (slave-to-slave 	Yes
communication)	
— DPV1	No
Transfer memory	
Transfer memory — Inputs	244 byte
·	244 byte 244 byte
— Inputs — Outputs	
— Inputs — Outputs 2. Interface	244 byte
Inputs Outputs 2. Interface Interface type	244 byte PROFINET
— Inputs — Outputs 2. Interface Interface type Isolated	PROFINET Yes
— Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate	PROFINET Yes Yes; 10/100 Mbit/s
— Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation	PROFINET Yes Yes; 10/100 Mbit/s Yes
— Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing	PROFINET Yes Yes; 10/100 Mbit/s Yes Yes
— Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autoregotiation Autocrossing Change of IP address at runtime, supported	PROFINET Yes Yes; 10/100 Mbit/s Yes
— Inputs — Outputs 2. Interface Interface type Isolated automatic detection of transmission rate Autonegotiation Autocrossing	PROFINET Yes Yes; 10/100 Mbit/s Yes Yes

Number of ports	2
integrated switch	Yes
Protocols	
• MPI	No
PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality
PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality
PROFINET CBA	Yes
PROFIBUS DP master	No
PROFIBUS DP slave	No
Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
Web server	Yes
Media redundancy PROFINITIO Contains	Yes
PROFINET IO Controller	400 MEH/-
Transmission rate, max.	100 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes
— S7 communication	Yes; With loadable FBs, max. configurable connections: 10, max. number of instances: 32
— Isochronous mode	Yes; OB 61
— IRT	Yes
— Shared device	Yes
 Prioritized startup 	Yes
 Number of IO devices with prioritized startup, max. 	32
 Number of connectable IO Devices, max. 	128
 Of which IO devices with IRT, max. 	64
— of which in line, max.	64
 Number of IO Devices with IRT and the option "high flexibility" 	128
— of which in line, max.	61
Number of connectable IO Devices for RT, max.	128
— of which in line, max.	128
Activation/deactivation of IO Devices	Yes
 Number of IO Devices that can be simultaneously activated/deactivated, max. 	8
 — IO Devices changing during operation (partner ports), supported 	Yes
- Number of IO Devices per tool, max.	8
Device replacement without swap medium	Yes
— Send cycles	250 μs, 500 μs,1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)
— Updating time	250 μs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU
· · ·	31xC and CPU 31x, technical Data" for more details)
Address area	Oliberto
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
— User data consistency, max.	1 024 byte
PROFINET IO Device	
Services	V
— PG/OP communication	Yes
— Routing	Yes
— S7 communication	Yes; With loadable FBs, max. configurable connections: 10, max. number of instances: 32
— Isochronous mode	No
— IRT	Yes
— PROFlenergy	Yes; With SFB 73 / 74 prepared for loadable PROFlenergy standard FB for I-Device
— Shared device	Yes
 Number of IO Controllers with shared device, max. 	2
Transfer memory	
— Inputs, max.	1 440 byte; Per IO Controller with shared device
— Outputs, max.	1 440 byte; Per IO Controller with shared device
Submodules	
Submodules	

Number, max User data per submodule, max. User data per submodule, max. PROFINET CBA expelic transmission expelic transmission expelic transmission Number of connections, max User an expelic transmission Number of connections, max User an expelic transmission Number of connections, max User an expelic transmission Number of submodule, max Number of stations in the ring, max Data length for connection type 01H, max Data length for connection type 11H, max several passive connections, per port, supported Number of connections, max Data length, max Data length	
expelic transmission yes oxpelic transmission Yes oxpelic transmission Yes oxpelic transmission Yes Open IE communication • Number of connections, max. • Local port numbers used at the system end • Keep-alive function, supported • Keep-alive function, supported PROFisafe Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TOPIP — Number of connections, max. — Data length for connection type 01H, max. — Deata length for connection type 11H, max. — several passive connections per port, supported • ISO-on-TCP (RFC1008) — Number of connections, max. — Data length, max. — Data length, max. • UIDP — Number of connections, max. — Data length, max. • UIDP — Number of connections, max. — Data length, max. • Yes; via integrated PROFINET interface and loadable FBs 8 • Yes • Sylve • Syl	
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• cyclic transmission Open IE communication • Number of connections, max. • Local port numbers used at the system end • Rep-alive function, supported PROFisafe Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. • Data length for connections type of 1H, max. — Data length for connections per port, supported • ISO-On-TCP (PRC1008) • Number of connections, max. — Data length, max. — Data length for connections, max. — Data length, max. — Data length for connections per port, supported • ISO-On-TCP (PRC1008) • Number of connections, max. — Data length, max. — Data length, max. • UIDP • Number of connections, max. — Data length, max. • Data length max. • UIDP • Number of connections, max. — Data length max. • Data length max. • UIDP • Number of connections, max. — Data length max. • UIDP • Number of connections, max. — Data length max. • UIDP • Number of connections, max. • Data length max. • UIDP • Number of connections, max. • Data length max. • UIDP • Number of Connections, max. • Data length max. • UIDP • Number of Connections, max. • Data length max. • UIDP • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interface and loadable FBs • Ves; via integrated PROFINET interfa	
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- Number of connections, max Data length, max Data length, max UDP - Number of connections, max Data length, max 1 472 byte Web server • supported • User-defined websites • Yes • Number of HTTP clients - Stocemmunication functions / header PG/OP communication - Yes Global data communication • supported • Number of GD loops, max. • Number of GD packets, max. • Number of GD packets, max. • Number of GD packets, transmitter, max. • Number of GD packets, receiver, max. • Size of GD packet (of which consistent), max. Size of GD packet (of which consistent), max. 76 byte • User data per job (of which consistent), max. 76 byte • User data per job (of which consistent), max.	
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Data record routing Global data communication supported Number of GD loops, max. Number of GD packets, max. Number of GD packets, transmitter, max. Number of GD packets, transmitter, max. Number of GD packets, receiver, max. Number of GD packets, receiver, max. Size of GD packets, max. Size of GD packet (of which consistent), max. Size of GD packet (of which consistent), max. Yes Yes Yes Yes Yes Yes Yes Ye	
Global data communication • supported • Number of GD loops, max. • Number of GD packets, max. • Number of GD packets, transmitter, max. • Number of GD packets, receiver, max. • Number of GD packets, receiver, max. • Size of GD packets, max. • Size of GD packets, max. • Size of GD packet (of which consistent), max. 22 byte S7 basic communication • supported • User data per job, max. • User data per job (of which consistent), max. 76 byte 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or as server)	
 supported Number of GD loops, max. Number of GD packets, max. Number of GD packets, transmitter, max. Number of GD packets, receiver, max. Number of GD packets, receiver, max. Size of GD packets, max. Size of GD packet (of which consistent), max. Size of GD packet (of which consistent), max. S7 basic communication supported User data per job, max. User data per job (of which consistent), max. 76 byte 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or as server) 	
 Number of GD loops, max. Number of GD packets, max. Number of GD packets, transmitter, max. Number of GD packets, transmitter, max. Number of GD packets, receiver, max. Size of GD packets, max. Size of GD packet (of which consistent), max. Size of GD packet (of which consistent), max. S7 basic communication supported User data per job, max. User data per job (of which consistent), max. 76 byte 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or as server) 	
 Number of GD packets, max. Number of GD packets, transmitter, max. Number of GD packets, receiver, max. Size of GD packets, max. Size of GD packet (of which consistent), max. Size of GD packet (of which consistent), max. S7 basic communication supported User data per job, max. User data per job (of which consistent), max. T6 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or as server) 	
 Number of GD packets, transmitter, max. Number of GD packets, receiver, max. Size of GD packets, max. Size of GD packet (of which consistent), max. Size of GD packet (of which consistent), max. S7 basic communication supported User data per job, max. User data per job (of which consistent), max. T6 byte T6 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or as server) 	
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 Size of GD packet (of which consistent), max. S7 basic communication supported User data per job, max. User data per job (of which consistent), max. Yes 76 byte 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or as server) 	
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• User data per job (of which consistent), max. 76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or as server)	
as server)	
	X_GET
O COMMUNICATION	
• supported Yes	
• as server Yes	
• as client • as client Yes; via integrated PROFINET interface and loadable FB or via CP and	d
loadable FB	
 User data per job, max. See online help of STEP 7 (shared parameters of the SFBs/FBs and of SFCs/FCs of S7 Communication) 	f the
S5 compatible communication	
• supported Yes; via CP and loadable FC	
communication functions / PROFINET CBA (with set target communication load) / header	
Setpoint for the CPU communication load 50 %	
• number of remote connection partners / with PROFINET 32	
CBA	
• number of technological functions / with PROFINET CBA 30	

/ for master or slave	
number of connections / with PROFINET CBA / for	1 000
master or slave / total	
 data volume / of the input variables / with PROFINET CBA / for master or slave 	4 000 byte
 data volume / of the output variables / with PROFINET CBA / for master or slave 	4 000 byte
 number of internal and PROFIBUS interconnections / with PROFINET CBA / maximum 	500
 data volume / of internal and PROFIBUS interconnections / with PROFINET CBA / for master or slave 	4 000 byte
 data volume / with PROFINET CBA / per connection / maximum 	1 400 byte
performance data / PROFINET CBA / remote interconnection	/ with acyclic transfer / header
 update time / of the remote interconnections / in the case of acyclic transmission / with PROFINET CBA 	500 ms
 number of remote connections to input variables / in the case of acyclic transmission / with PROFINET CBA / maximum 	100
 number of remote connections to output variables / in the case of acyclic transmission / with PROFINET CBA / maximum 	100
 data volume / as user data for remote interconnections with input variables / in the case of acyclic transmission / with PROFINET CBA 	2 000 byte
 data volume / as user data for remote interconnections with output variables / in the case of acyclic transmission / with PROFINET CBA 	2 000 byte
 data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum 	1 400 byte
performance data / PROFINET CBA / remote interconnection	/ with cyclic transfer / header
 update time / of the remote interconnections / with cyclical transfer / with PROFINET CBA 	10 ms
— number of remote connections to input variables / with PROFINET CBA / with cyclic transfer / maximum	200
 number of remote connections to output variables / with cyclical transfer / with PROFINET CBA / maximum 	200
 data volume / as user data for remote interconnections with input variables / with cyclical transfer / with PROFINET CBA / maximum 	2 000 byte
 data volume / as user data for remote interconnections with output variables / with cyclical transfer / with PROFINET CBA / maximum 	2 000 byte
 data volume / as user data for remote interconnections / with cyclical transfer / with PROFINET CBA / per connection / maximum 	450 byte
performance data / PROFINET CBA / HMI variables via PROF	INET / acyclic / header
 number of connectable HMI stations / for HMI variables / in the case of acyclic transmission / with PROFINET CBA 	3; 2x PN OPC/1x iMap
 update time / of the HMI variables / in the case of acyclic transmission / with PROFINET CBA 	500 ms
 number of HMI variables / in the case of acyclic transmission / with PROFINET CBA / maximum 	200
 data volume / as user data for HMI variables / in the case of acyclic transmission / with PROFINET CBA / maximum 	2 000 byte
performance data / PROFINET CBA / PROFIBUS proxy function	onality / header
— product function / with PROFINET CBA / PROFIBUS proxy functionality	Yes
 number of coupled PROFIBUS devices / with PROFIBUS functionality 	16
 data volume / with PROFIBUS proxy functionality / with PROFINET CBA / per connection / maximum 	240 byte; Slave-dependent
Number of connections	
• overall	12
usable for PG communication	11
— reserved for PG communication	1
— adjustable for PG communication, min.	1
— adjustable for PG communication, max.	11

 usable for OP communication 	11
 reserved for OP communication 	1
 adjustable for OP communication, min. 	1
 adjustable for OP communication, max. 	11
 usable for S7 basic communication 	8
 reserved for S7 basic communication 	0
 adjustable for S7 basic communication, min. 	0
 adjustable for S7 basic communication, max. 	8
 usable for S7 communication 	10
 reserved for S7 communication 	0
 adjustable for S7 communication, min. 	0
 adjustable for S7 communication, max. 	10
 total number of instances, max. 	32
usable for routing	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max.
07	14; X2 as PROFINET: 24 max.
S7 message functions	
Number of login stations for message functions, max.	12; Depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	300
Test commissioning functions	
Status block	Yes; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4
Status/control	
Status/control variable	Yes
 Variables 	Inputs, outputs, memory bits, DB, times, counters
Number of variables, max.	30
— of which status variables, max.	30
— of which control variables, max.	14
Forcing	
• Forcing	Yes
Forcing, variables	Inputs, outputs
Number of variables, max.	10
Diagnostic buffer	
• present	Yes
Number of entries, max.	500
— adjustable	No
of which powerfail-proof	100; Only the last 100 entries are retained
Number of entries readable in RUN, max.	499
— adjustable	Yes; From 10 to 499
— preset	10
Service data	
• can be read out	Yes
Interrupts/diagnostics/status information	
Diagnostics indication LED	
Status indicator digital input (green)	Yes
Status indicator digital output (green)	Yes
Integrated Functions	
Frequency measurement	Yes
Number of frequency meters	4; up to 60 kHz (see "Technological Functions" manual)
controlled positioning	Yes
integrated function blocks (closed-loop control)	Yes; PID controller (see "Technological Functions" manual)
PID controller	Yes
Number of pulse outputs	4; Pulse width modulation up to 2.5 kHz (see "Technological Functions"
	Manual)
Limit frequency (pulse)	2.5 kHz
Potential separation	
Potential separation digital inputs	
B	
 Potential separation digital inputs between the channels 	Yes No

between the channels and backplane bus	Yes
Potential separation digital outputs	
Potential separation digital outputs	Yes
between the channels	Yes
 between the channels, in groups of 	8
between the channels and backplane bus	Yes
Potential separation analog inputs	
 Potential separation analog inputs 	Yes; common for analog I/O
 between the channels 	No
between the channels and backplane bus	Yes
Potential separation analog outputs	
 Potential separation analog outputs 	Yes; common for analog I/O
 between the channels 	No
between the channels and backplane bus	Yes
Isolation	
Isolation tested with	600 V DC
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
configuration / header	
Configuration software	
• STEP 7	Yes; V5.5 or higher
configuration / programming / header	
 Command set 	see instruction list
 Nesting levels 	8
 System functions (SFC) 	see instruction list
 System function blocks (SFB) 	see instruction list
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes
— GRAPH	Yes
— HiGraph®	Yes
Know-how protection	
User program protection/password protection	Yes
Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	120 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	730 g
-	730 g

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