SIEMENS

Data sheet

6ES7314-6EH04-0AB0



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 40pole) 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
 Plug-in (MMC), max. 	8 Mbyte
Data management on MMC (after last	10 y
programming), min.	
Backup	Vac: Cuaranteed by MMC (maintenance free)
present	Yes; Guaranteed by MMC (maintenance-free)
without battery	Yes; Program and data
CPU processing times	
for bit operations, typ.	0.06 µs
for word operations, typ.	0.12 µs
for fixed point arithmetic, typ.	0.16 µs
for floating point arithmetic, typ.	0.59 µs
CPU-blocks	
Number of blocks (total)	1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can
	be reduced by the MMC used.
DB	
• Number, max.	1 024; Number range: 1 to 16000
• Size, max.	64 kbyte
FB	
• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
FC	
• Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
OB	
Number, max.	see instruction list
 Size, max. 	64 kbyte
Number of free cycle OBs	1; OB 1
Number of time alarm OBs	1; OB 10
 Number of delay alarm OBs 	2; OB 20, 21
Number of cyclic interrupt OBs	4; OB 32, 33, 34, 35
Number of process alarm OBs	1; OB 40
Number of DPV1 alarm OBs	3; OB 55, 56, 57
Number of br v raian Obs Number of isochronous mode OBs	1; OB 61; only for PROFINET
	1; OB 100
Number of startup OBs	
Number of asynchronous error OBs	6; OB 80, 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
 additional within an error OB 	4
Counters, timers and their retentivity	
S7 counter	
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	999
IEC counter	
• present	Yes
• Type	SFB
• Type • Number	
	Unlimited (limited only by RAM capacity)
S7 times	256
Number	256
Retentivity	N
— adjustable	Yes

— lower limit	0
	255
— upper limit	
— preset	No retentivity
Time range — lower limit	10 ms
— upper limit	9 990 s
IEC timer	Vee
• 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)	
Number of operable Fivis and GFS (recommended)	

• FM	8
• FM • CP, PtP	8
• CP, PIP • CP, LAN	8 10
Rack	10
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	1h
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	40
— 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
— unshielded, max.	not allowed
Digital outputs	
Number of digital outputs	16
 of which high-speed outputs 	4; Notice: You cannot connect the fast outputs of your CPU in parallel
integrated channels (DO)	16
Short-circuit protection	Yes; Clocked electronically
Response threshold, typ.	1A
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
 on lamp load, max. 	100 Hz
 of the pulse outputs, with resistive load, max. 	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	4 000
• 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	5 V; Permanent
limit), max.	
permissible input voltage for voltage input (destruction	30 V; Permanent
limit), max.	
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
No-load voltage for resistance-type transmitter, typ.	3.3 V
Constant measurement current for resistance-type transmitter, typ.	1.25 mA
Technical unit for temperature measurement adjustable	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin
Input ranges	

• Consider Yes • Current Yes • Resistance Yes • O to + 10 V Yes • Imput resistance (O to + 20 mA) Yes • Imput resistance (O to + 20 mA) Yes • Imput resistance (P1 100) Yes • Imput resistance (P1 100) Yes • Imput resistance (O to + 20 mA) Yes • Imput resistance (P1 00) Yes • Imput resistance (O to + 30 do + 30) Yes • Imput resistance (O to + 30 do + 30) Yes • Imput resistance (O to + 30 do + 30) Yes • Imput resistance (O to + 30 do + 30) Yes • O to 10 do + 30 Yes • O to + 10 V Yes • O to + 10 V Yes • O to + 10 V Yes •	Voltage	Yes; ±10 V / 100 kΩ; 0 V to 10 V / 100 kΩ
 elevisions thermoneter Yes, P1 100 / 10 M0 Input resistance (0 to 10 V) Yes - Input resistance (0 to 20 mA) Yes - Input resistance (0 to 20 mA) Yes - Input resistance (20 mA to 20 mA) Yes - Input resistance (20 mA to 20 mA) Yes - Input resistance (4 mA to 20 mA) Yes - Input resistance (4 mA to 20 mA) Yes - Input resistance (4 mA to 20 mA) Yes - Input resistance (4 mA to 20 mA) Yes - Input resistance (7 P1 00) Characteristic Inscination - Parameterizable Yes, by software - Input resistance (7 P1 00) - Steletick, max - Yes - Voltage output, storic-cut array resistance - Steletick, max - Yes - Voltage output, storic-cut array resistance - Invitage output, storic-cut array resis - Voltage output, storid cut array resistance<td>5</td><td></td>	5	
• Resistance Yes: 0 D to 600 Δ / 10 MΩ Input resistance (0 to 10 V) 100 KΩ • D to 20 mA Yes • D to 60 to 20 mA Yes • D to 60 to 20 mA Yes • D to 60 ob 20 mA Yes • D to 60 ob 00 mS Yes • D to 60 ob 00 mS Yes • D to 60 ob mS Yes • D to 70 materizable No Characteristic Insertification Yes • D to 70 materizable Yes by othware • parameterizable No		
Input ranges (relative values), voltages - • 0 0 + 10 V Yes		
• 0 to -10 V Yes		165, 0 12 10 000 12 / 10 1012
— Input resistance (0 to 10 V) 100 kΩ Imput resistance (0 to 20 mA) Ves — Input resistance (10 z0 mA) 100 Ω • 20 m A Ves — Input resistance (20 mA to 4 z0 mA) 100 Ω • 4 m A to 20 mA Ves — Input resistance (2 m A to 4 z0 mA) 100 Ω • 10 mb tresistance (10 mb to 20 mA) 100 Ω Input resistance (10 mb to 20 mA) 100 Ω Input resistance (10 to 00 ohms) Ves — Input resistance (10 to 00 ohms) 100 MQ Temperature compensation — — Input resistance (10 to 50 ohms) 10 MQ Temperature compensation — — parameterizable No Characteristic Insertazion Pi 100 Characteristic Insertazion 2 • breadmeterizable Yes; by software — In or resistance fibermometer Pi 100 Cable lengt 2 Votage output, short-circuit protection Yes; by software — Intersistance (10 not 0 V) Yes • 0 to 10 V) Yes • 10 to 10 V) Yes<		Vac
Input ranges (neted values), ourrents Ves • 0 to 20 mA Ves		
• Io 1a 20 mA Yes - − Input resistance (10 to 20 mA) Yes - − Input resistance (20 mA to +20 mA) Yes - − Input resistance (Am A to 20 mA) Yes - − Input resistance (Am A to 20 mA) Yes - − Input resistance (P1 100) 10 0 0 Imput ranges (rated values), resistance thermoreter Yes - − Input resistance (P1 100) 10 MO Imput ranges (rated values), resistance thermoreter Yes - − Input resistance (P1 100) 10 MO Temperature compensation - - − parameterizable No Characteristic Interaction Yes: by software - for resistance thermometer Pt 100 Cable tengt No Characteristic Interaction 2 - Input resistance (D1 to 00 to 00 m) 10 MO Cable tengt 2 - for resistance thermometer Pt 100 Cable tengt 2 - for tresistance (D1 to 00 to 00 m) 2 Voltage output, short-forcut protection Yes - 10 to 10 V Yes - 0 to 10 V Yes - 10 to 10 V Yes		
- Input resistance (0 to 20 mA) 100 Ω • - 20 mA to +20 mA Yes - Input resistance (20 mA to +20 mA) 100 Ω • Ma to 20 mA Yes - Input resistance (20 mA to +20 mA) 100 Ω Input resistance (4 mA to 20 mA) 100 Ω Input resistance (14 mA to 20 mA) 100 MΩ Input resistance (14 mA to 20 mA) 100 MΩ Input resistance (16 to 600 ohms) 10 MΩ Input resistance (16 to 600 ohms) 10 MΩ Input resistance (16 to 600 ohms) 10 MΩ Temperature compensation - - parameterizable No Characteristic linearization Ves: by software - for analog outputs 2 Number of analog outputs 2 Number of analog outputs 2 Voltage output, short-circuit protection Yes Voltage output, short-circuit protection Yes Voltage output, short-circuit protection Yes • 10 to 10 V Yes • 10 to 20 mA Yes • 20 mA to +20 mA Yes • 0 to 10 V Yes </td <td></td> <td>Voo</td>		Voo
- 20 mÅ to +20 mÅ Yes - Input resistance (20 mÅ to ≠20 mÅ) 100 Ω • Am & 20 mÅ Yes - Input resistance (4 mÅ to 20 mÅ) 100 Ω • Piput ranges (rated values), resistance thermometer • • Pit 100 - Input resistance (Pt 100) 10 MΩ Imput ranges (rated values), resistance thermometer • • 0 to 600 ohms Yes Input resistance (D to 600 ohms) 10 MΩ Tremperature compensation - parameterizable No Characteristic Insertization • • parameterizable Yes: by software for resistance thermometer P1 100 Cable length 100 m • Analog outputs 2 • Sinkledet, max. 100 m Analog outputs 2 • Or to analog, outputs 2 • Using output, short-Circuit protection Yes • 0 to 3 00 M Yes • 0 to 3 00 M Yes • 0 to 10 V Yes • 0 to 3 00 M Yes • 0 to 20 mÅ		
Input resistance (-20 mA to +20 mA) 100 Ω •• A mA to 20 mA Yes Input resistance (et mA to 20 mA) 100 Ω Input ranges (rated values), resistance thermometer • •• P to 10 Yes Input resistance (P1 100) 10 MΩ Input ranges (rated values), resistors • •• 0 to 600 ohms Yes Input resistance (0 to 600 ohms) 10 MΩ Temperature compensation - parameterizable No Characteristic interization - •- analog outputs 100 m Analog outputs 2 insparate inzable Yes, by software for advego outputs 2 for advego outputs 2 for advego outputs 2 for advego output short-clicuit protection Yes for Votage output short-clicuit protection Yes for Votage - Votage output short-clicuit protection Yes for Votage - Output ranges, votage - f		
• 4 mA to 20 mA Yes - Input resistance (4 mA to 20 mA) 100 Ω Input ranges (rade values), resistance thermometer Yes • P 100 Yes - Input resistance (P1 100) 10 MΩ Input ranges (rade values), resistons Yes - Input resistance (P1 00) 10 MΩ Input resistance (P1 00) 10 MΩ Temporative compensation - parameterizable No Characteristic linearization - • parameterizable Yes; by software for resistance thermometer P1 100 Cable length - • or resistance thermometer P1 100 Cable length 2 • or resistance thermometer P1 100 Cable length 2 • or tesistance thermometer P1 100 Cable length 2 • log outputs 2 Number of analog outputs 2 Number of analog outputs 2 • or to 20 mA Yes • or to 10 V Yes • or to 10 N Yes • or to 10 and Yes • or to 20 mA Yes • or to 10 mA Yes • or to 10 mA Yes • for voltage ou		
− Input resistance (4 mA to 20 mA) 100 Ω Input ranges (rated values), resistance thermometer Yes − Input resistance (P1 100) 10 MΩ Input ranges (rated values), resistors 0 to 600 ohms − Input resistance (0 to 600 ohms) 10 MΩ Temperature compensation 0 MΩ − input resistance (0 to 600 ohms) 10 MΩ Temperature compensation 0 MΩ − parameterizable No Characteristic linearization Yes, by software − for resistance thermometer P1 100 Cable length 100 m Analog outputs 2 Number of analog outputs 2 Number of analog outputs 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 • 0 to 20 mA Yes		
Input ranges (rated values), resistance thermometer • P1 100 Yes - Input resistance (P1 100) 10 MΩ Input ranges (rated values), resistors • 0 to 600 ohms • 0 to 600 ohms Yes - Input resistance (0 to 600 ohms) 10 MΩ Thermocouple (TC) Temperature compensation parametericable No Characteristic linearization • • parametericable Yes: by software - for resistance thermometer P1 100 Cable length • • shielded, max. 100 m Analog outputs 2 Integrated channels (AO) 2 Voltage output, short-circuit protection Yes Voltage output, short-circuit current, max. 65 mA Current output, no-load voltage, max. 14 V Output ranges quertable • • 0 to 10 V Yes • 0 to 10 V Yes • 0 to 20 mA Yes • 0 to 10 No Yes • 0 to 10 No Yes • 0 to 10 No Yes <tr< td=""><td></td><td></td></tr<>		
• Pt 100 Yes - Input resistance (Pt 100) 10 MΩ Input registance (Pt 000) 10 MΩ Thermoscupie (Tc) Yes Temperature compensation		100 12
		Voc
Input ranges (rated values), resistors • 0 to 600 ohms Yes		
• Io 600 ohms Yes Input resistance (0 to 600 ohms) 10 MΩ Temperature compensation • parameterizable No Characteristic linearization • • parameterizable Yes, by software for resistance thermometer P1 100 Cable length 00 m Analog outputs 2 Number of analog outputs 2 Integrated channels (AO) 2 Voltage output, short-circuit protection Yes Voltage output, no-load voltage, max. 14 V Output ranges, voltage • • 0 to 10 V Yes • 10 to 10 V Yes • 0 to 20 mA Yes • 0 to 10 V Yes • 0 to 10 V Yes • 0 to 20 mA Yes • 0 to 20 mA Yes • 0 to 20 mA Yes • 10 V to 420 mA Yes • 10 V to 10 V Yes • 10 Voltage output four-wire connection Yes • 10 voltage output four-wire connection Yes • 10 voltage output four-wire connection Yes • for voltage output four-wire connection Yes • for voltage output, spacetive load, max. 0.1 µF • with voltage output		10 10/122
— Input resistance (0 to 600 ohms) 10 MΩ Thermocoupie (TC)		Yes
Thermacouple (TG) Temperature compensation parameterizable No Characteristic linearization for resistance thermometer Pt 100 Cable length Yes; by software for resistance thermometer Pt 100 Cable length for resistance thermometer for resistance thermometer Pt 100 Cable length for resistance thermometer Number of analog outputs 2 integrated channels (AO) 2 Voltage output, short-circuit protection Yes Voltage output, short-circuit protection Yes 0 to 10 V Yes 0 to 10 V Yes 0 to 10 V Yes 0 Uptur tanges, current - 0 to 20 mA Yes 0 to 20 mA Yes 0 mA to 20 mA Yes 0 make output two-wire connection Yes for Nolage output two-wire connection Yes 0 with voltage outputs, min. 1 kΩ with voltage outputs, max. 0.1 μF with voltage outputs, max. 0.1 μF		
Temperature compensation No — parameterizable No • parameterizable Yes; by software — for resistance thermometer Pt 100 Cable length 9 • bielded, max. 100 m Analog outputs 2 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, non-load voltage, max. 14 V Output ranges, voltage 0 to 10 V • 10 to 10 V Yes • 0 to 10 V Yes • 0 to 20 mA Yes • 0 for voltage output two-wire connection Yes • 0 to 20 mA Yes • 0 to 20 mA Yes • 0 to toge output furw-wire connection Yes • 0 to toge output two-wire connection Yes • 0 to voltage output two-wire connection Yes • tor current output, min. 1 kD <td></td> <td></td>		
	,	
Characteristic linearization parameterizable Yes; by software Pr for resistance thermometer Pt 100 Cable length shielded, max. 100 m Analog outputs 2 integrated channels (AO) 2 Voltage output, short-circuit protection Yes Voltage output, short-circuit current, max. 25 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 10 V Yes -20 mA Yes Output ranges, current 0 to 20 mA Yes -20 mA to +20 mA Yes -20 mA to +20 mA Yes -20 mA to its and the owner connection Yes Yes -20 mA to +20 mA Yes -20 mA to its and the owner connection Yes -20 mA to its and the owner connection Yes -20 mA to put two-wire connection Yes -20 mA Yes -20 mA -20 mA	· · ·	No
• parameterizable Yes; by software — for resistance thermometer P1 100 Gable length • shielded, max. • shielded, max. 100 m Analog outputs 2 Number of analog outputs 2 integrated channels (AO) 2 Voltage output, short-circuit protection Yes Voltage output, short-circuit protection Yes Output ranges, voltage - • 0 to 10 V Yes • 0 to 10 V Yes • 0 to 20 mA Yes • 0 to 20 mA Yes • 20 mA Yes • 0 to 10 V Yes • 0 to 10 Vath 0 + 20 mA Yes • 20 mA Yes Connection of actuators - • for voltage output two-wire connection Yes Load impedance (in rated range of output) - • with voltage output two-wire connection Yes Load impedance (in rated range of output) - • with voltage output two-wire connection Yes Load impedance (in rated range of output) - • with voltage output, max. 0.1 µF		
for resistance thermometer Pt 100 Cable length		Voc: by coffugro
Cable length • shielded, max. 100 m Analog outputs 2 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 • 0 to 10 V Yes • 0 to 20 mA Yes • 0 to 20 mA Yes • 0 to 20 mA Yes • 4 mA to 20 mA Yes • 4 mA to 20 mA Yes • 6 ro voltage output four-wire connection Yes; Without compensation of the line resistances • for voltage output four-wire connection Yes • for voltage output four-wire connection Yes • dard impedance (in rated range of output) • • with voltage outputs, max. 300 Ω • with voltage outputs, max. 300 Ω • with outputs, capactive load, max. 0.1 mH Destruction limits against externally applied voltages and currents • Voltages at the outputs towards MANA • Voltage length		
• shielded, max. 100 m Analog outputs 2 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 • 0 to 20 mA Yes • Output ranges, current - • 0 to 20 mA Yes Connection of actuators Yes • for voltage output fwo-wire connection Yes; Without compensation of the line resistances • for voltage output two-wire connection Yes Load impedance (in rated range of output) - • with voltage outputs, max. 0.1 µF • with voltage outputs, inductive load, max. 0.1 µF • with ourrent outputs, inductive load, max. 0.1 mH Destr		Ft100
Analog outputs 2 Integrated channels (AO) 2 Voltage output, short-circuit protection Yes Voltage output, short-circuit protection Yes Output ranges, voltage 6 0 to 10 V Yes -10 V to +10 V Yes Output ranges, current -10 V to +10 V 0 to 10 V Yes -10 V to +10 V Yes Output ranges, current -20 mA to +20 mA + and to 20 mA Yes Connection of actuators -10 V to +10 V of to voltage output two-wire connection Yes -20 mA to +20 mA Yes Connection of actuators -10 V to voltage output two-wire connection -10 voltage output two-wire connection Yes Voltage output two-wire connection No -10 voltage outputs, max. 300 Ω -10 with voltage outputs, max. 300 Ω -10 with voltage outputs, max. 50 mA; Permanent -10 voltages at the outputs towards MANA 16 V; Permanent -10 voltage st the outputs towards MANA 16 V; Permanent <		100 m
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 • 0 to 10 V Yes • 0 to 20 mA Yes • 0 to 20 mA Yes • 20 mA to +20 mA Yes • 20 mA to 20 mA Yes • 20 mA to 20 mA Yes • 10 v to 410 V Yes • 20 mA to 20 mA Yes • 4 mA to 20 mA Yes • for voltage output two-wire connection No • for voltage output two-wire connection Ne • for voltage output two-wire connection Yes Load impedance (in rated range of output) • with voltage outputs, max. 0.1 µF • with voltage outputs, max. 0.1 µF 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 • Voltag		100 111
integrated channels (AC) 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 14 V Output ranges, voltage Yes • 0 to 10 V Yes Output ranges, current Yes • 0 to 20 mA Yes • 20 mA to +20 mA Yes Connection of actuators Yes • for voltage output two-wire connection Yes • for voltage output four-wire connection Yes Load impedance (in rated range of output) • Ves Load impedance (in rated range of output) • Ves • with voltage outputs, inductive load, max. 0.1 µF • with current outputs, inductive load, max. 0.1 mH Destruction limits against externally applied voltages and currents • Voltages at the outputs towards MANA • with current outputs, inductive load, max. 0.1 mH Destruction limits against externally applied voltages and currents • Voltages at the outputs towards MANA • Suite current, max. 200 m		0
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 • 0 to 20 mA Yes • -20 mA to +20 mA Yes • -20 mA to +20 mA Yes • 4 mA to 20 mA Yes • for voltage output two-wire connection No • for voltage output two-wire connection No • for voltage output two-wire connection No • for current output two-wire connection No • with voltage output two-wire connection Yes Load impedance (in rated range of output) • kQ • with voltage outputs, min. 1 kQ • with voltage outputs, max. 300 Ω • with current outputs, inductive load, max. 0.1 µF • with current outputs, max. 50 mA; Permanent • Courrent, max. 50 mA; Permanent • Caurent, max. 200 m Analog value generation for the inputs Measurement principle Actual value encryption (successive approximation)<		
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 • for voltage output two-wire connection Yes; Without compensation of the line resistances • for voltage output two-wire connection Yes • for voltage output two-wire connection Yes • for voltage output two-wire connection Yes • to voltage output, capacitive load, max. 0.1 µF • with voltage outputs, max. 300 Ω • with current outputs, max. 0.1 µF • with current outputs, max. 0.1 mH Destruction limits against externally applied voltages and currents • Voltages at the outputs outputs (MANA • Stielded, 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.		
Current output, no-load voltage, max. 14 V Output ranges, voltage • 0 to 10 V • 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 two-wire connection Yes Load impedance (in rated range of output) • • with voltage outputs, capacitive load, max. 0.1 µF • with current outputs, inductive load, max. 0.1 mH Destruction limits against externally applied voltages and currents • • Voltages at the outputs lowards MANA 16 V; Permanent • Current, 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		
Output ranges, voltage 0 to 10 V Yes -10 V to +10 V Yes Output ranges, current Yes Output ranges, current 0 to 20 mA Yes -20 mA to +20 mA Yes -20 mA to +20 mA Yes ot roottage output two-wire connection Yes; Without compensation of the line resistances for voltage output two-wire connection Yes; of or current output two-wire connection Yes exit why voltage outputs, min. 1 kΩ with voltage outputs, capacitive load, max. 0.1 µF with ourrent outputs, inductive load, max. 0.1 µF with current outputs, inductive load, max. 0.1 mH Destruction limits against externally applied voltages and currents Voltages at the outputs towards MANA of V; Permanent Caurrent, max. 50 mA; Permanent Cable length 200 m Analog value generation for the inputs Measurement principle Actual value encryption (successive approximation) Integration and conversion time/resolution per channel 12 bit		
• 0 to 10 V Yes • -10 V to +10 V Yes Output ranges, current		14 V
• -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 • 4 mA to 20 mA Yes Connection of actuators · of voltage output two-wire connection Yes; Without compensation of the line resistances • for voltage output four-wire connection Yes • for current output two-wire connection Yes • for current output two-wire connection Yes • for current output two-wire connection Yes • for current outputs, min. 1 kΩ • with voltage outputs, gapacitive load, max. 0.1 μF • with voltage outputs, inductive load, max. 0.1 μF • with current outputs, inductive load, max. 0.1 mH Destruction limits against externally applied voltages and currents • Voltages at the outputs towards MANA • 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 Actual value encryption (successive approximation) Integration and conversion time/resolution per channel - • Resolution with overrange (bit including sign), max. 12 bit <td></td> <td>N</td>		N
Output ranges, current • 0 to 20 mA Yes • 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 Yes • for voltage output two-wire connection Yes Load impedance (in rated range of output) • • with voltage outputs, capacitive load, max. 0.1 μF • with voltage 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 • Calle 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		
• 0 to 20 mAYes• -20 mA to +20 mAYes• 4 mA to 20 mAYesConnection of actuatorsConnection of actuators• for voltage output two-wire connectionYes; Without compensation of the line resistances• for voltage output tour-wire connectionYes• for current output two-wire connectionYes• for current output two-wire connectionYes• for current output two-wire connectionYes• with voltage outputs, capacitive load, max.0.1 μF• with voltage outputs, max.300 Ω• with current outputs, inductive load, max.0.1 mHDestruction limits against externally applied voltages and currents• Voltages at the outputs towards MANA16 V; Permanent• Current, max.50 mA; Permanent• Shielded, max.200 mAnalog value generation for the inputsMeasurement principleActual value encryption (successive approximation)Integration and conversion time/resolution per channel12 bit		Yes
20 mA to +20 mAYes-4 mA to 20 mAYesConnection of actuatorsYes; Without compensation of the line resistances- for voltage output two-wire connectionYes; Without compensation of the line resistances- for voltage output four-wire connectionYes- for current output two-wire connectionYes- for current output two-wire connectionYes- for current output two-wire connectionYes- for current 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 current- Voltages at the outputs towards MANA16 V; Permanent- Cable lengthS00 mA; Permanent- Cable length200 m- shielded, max.200 m- Maalog value generation for the inputsActual value encryption (successive approximation)Integration and conversion time/resolution per channel12 bit		N.
• 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 current • • Voltages at the outputs towards MANA 16 V; Permanent • Current, max. 200 m Analog value generation for the inputs 200 m Measurement principle Actual value encryption (successive approximation) Integration and conversion time/resolution per channel • • Resolution with overrange (bit including sign), max. 12 bit		
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) Yes • 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 • Current, max. 50 mA; Permanent Cable length shielded, max. • shielded, max. 200 m Analog value generation for the inputs Measurement principle Actual value encryption (successive approximation) Integration and conversion time/resolution per channel 12 bit		
• 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 • Current, max. 50 mA; Permanent • Cable length • shielded, max. • 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.		Yes
• for voltage output four-wire connectionNo• for current output two-wire connectionYesLoad 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 mHDestruction limits against externally applied voltages and currents• Voltages at the outputs towards MANA• Voltages at the outputs towards MANA16 V; Permanent• Caurrent, max.50 mA; PermanentCable length200 m• shielded, max.200 mMeasurement principleActual value encryption (successive approximation)Integration and conversion time/resolution per channel12 bit		Vac Without componentian of the line resister
• 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 • Current, max. 50 mA; Permanent Cable length 50 mA; Permanent • shielded, max. 200 m Analog value generation for the inputs Actual value encryption (successive approximation) Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max.		
Load impedance (in rated range of output) 1 kΩ • 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 0.1 mH Voltages at the outputs towards MANA 16 V; Permanent • Current, max. 50 mA; Permanent Cable length shielded, max. • shielded, max. 200 m Analog value generation for the inputs Actual value encryption (successive approximation) Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max.		
• 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 • Voltages at the outputs towards MANA 16 V; Permanent • Current, max. 50 mA; Permanent Cable length 200 m • shielded, max. 200 m Analog value generation for the inputs Measurement principle Actual value encryption (successive approximation) Integration and conversion time/resolution per channel 12 bit		
• with voltage outputs, capacitive load, max.0.1 μF• with current outputs, max.300 Ω• with current outputs, inductive load, max.0.1 mHDestruction limits against externally applied voltages and currents0.1 mH• Voltages at the outputs towards MANA16 V; Permanent• Current, max.50 mA; PermanentCable length200 m• shielded, max.200 mAnalog value generation for the inputsActual value encryption (successive approximation)Integration and conversion time/resolution per channel12 bit		110
• 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 • Voltages at the outputs towards MANA 16 V; Permanent • Current, max. 50 mA; Permanent • Cable length 200 m • 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		
• with current outputs, inductive load, max.0.1 mHDestruction limits against externally applied voltages and currents• Voltages at the outputs towards MANA16 V; Permanent• Current, max.50 mA; PermanentCable length• shielded, max.200 mAnalog value generation for the inputsMeasurement principleActual value encryption (successive approximation)Integration and conversion time/resolution per channel12 bit		
Destruction limits against externally applied voltages and currents • Voltages at the outputs towards MANA 16 V; Permanent • Current, max. 50 mA; Permanent Cable length 50 mA • shielded, max. 200 m Analog value generation for the inputs Actual value encryption (successive approximation) Integration and conversion time/resolution per channel 12 bit		
 Voltages at the outputs towards MANA Current, max. ComA; 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 		
• Current, max. 50 mA; Permanent Cable length 200 m • shielded, max. 200 m Analog value generation for the inputs Actual value encryption (successive approximation) Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max. 12 bit 12 bit		
Cable length 200 m • shielded, max. 200 m Analog value generation for the inputs Measurement principle Measurement principle Actual value encryption (successive approximation) Integration and conversion time/resolution per channel 12 bit		
• shielded, max. 200 m Analog value generation for the inputs Actual value encryption (successive approximation) Measurement principle Actual value encryption (successive approximation) Integration and conversion time/resolution per channel 12 bit		ou ma, Permanent
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	-	000
Measurement principle Actual value encryption (successive approximation) Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max. 12 bit		200 m
Integration and conversion time/resolution per channel • Resolution with overrange (bit including sign), max. 12 bit		
Resolution with overrange (bit including sign), max.		Actual value encryption (successive approximation)
Integration time, parameterizable Yes; 16.6 / 20 ms		
	 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
Settling time	
 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)	0.8.9 linearity error 10.06.9
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 =	
• Series mode interference (peak value of interference < rated value of input range), min.	30 dB
Common mode interference, min.	40 dB
Interfaces	
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	100
• RS 485	Yes
 Output current of the interface, max. 	200 mA
Protocols	200 11/4
• MPI	Yes
PROFIBUS DP master	Yes
PROFIBUS DP slave	Yes
Point-to-point connection	No
MPI	
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	124
— PG/OP communication	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 client	Yes
— Equidistance	Yes
— Isochronous mode	No
— SYNC/FREEZE	Yes
 — STNO/FREEZE — Activation/deactivation of DP slaves 	Yes
— Number of DP slaves that can be	8
simultaneously activated/deactivated, max.	δ
— Direct data exchange (slave-to-slave	Yes; as subscriber
communication)	
— 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	
— 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 — Direct data exchange (slave-to-slave communication) 	Yes; Connection configured on one side only Yes
— DPV1	No
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte
2. Interface	
Interface type	PROFINET
Isolated	Yes
automatic detection of transmission rate	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	Yes
Interface types	
RJ 45 (Ethernet)	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	Yes
PROFINET IO Controller	400 MLW-
Transmission rate, max.	100 Mbit/s
Services	Vee
 PG/OP communication 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 $\mu s,$ 500 $\mu s,$ 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	

	0 librate
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
— User data consistency, max. PROFINET IO Device	1 024 byte
Services	
— 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 PROFIenergy 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	
— Number, max.	64
— User data per submodule, max.	1 024 byte
PROFINET CBA	
acyclic transmission	Yes
cyclic transmission	Yes
Open IE communication	
 Number of connections, max. 	8
 Local port numbers used at the system end 	0, 20, 21, 23, 25, 80, 102, 135, 161, 443, 8080, 34962, 34963, 34964,
- Keen alive function, augmented	65532, 65533, 65534, 65535
Keep-alive function, supported	Yes
Protocols	
	N.
PROFIsafe	No
Redundancy mode	No
Redundancy mode Media redundancy	
Redundancy mode Media redundancy — Switchover time on line break, typ.	200 ms; PROFINET MRP
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max.	
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication	200 ms; PROFINET MRP 50
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max.	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max.	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max.	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max.	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte Yes
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max. — several passive connections per port, supported • ISO-on-TCP (RFC1006)	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max. — several passive connections per port, supported • ISO-on-TCP (RFC1006) — Number of connections, max.	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte Yes Yes; via integrated PROFINET interface and loadable FBs 8
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max. — several passive connections per port, supported • ISO-on-TCP (RFC1006) — Number of connections, max. — Data length, max.	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte Yes Yes; via integrated PROFINET interface and loadable FBs 8 32 768 byte
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max. — several passive connections per port, supported • ISO-on-TCP (RFC1006) — Number of connections, max. — Data length, max. • UDP	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte Yes Yes; via integrated PROFINET interface and loadable FBs 8 32 768 byte Yes; via integrated PROFINET interface and loadable FBs
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max. — several passive connections per port, supported • ISO-on-TCP (RFC1006) — Number of connections, max. — Data length, max. • UDP — Number of connections, max.	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte Yes Yes; via integrated PROFINET interface and loadable FBs 8 32 768 byte Yes; via integrated PROFINET interface and loadable FBs 8 32 768 byte Yes; via integrated PROFINET interface and loadable FBs 8
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max. — several passive connections per port, supported • ISO-on-TCP (RFC1006) — Number of connections, max. — Data length, max. • UDP — Number of connections, max. — Data length, max.	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte Yes Yes; via integrated PROFINET interface and loadable FBs 8 32 768 byte Yes; via integrated PROFINET interface and loadable FBs
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max. — several passive connections per port, supported • ISO-on-TCP (RFC1006) — Number of connections, max. — Data length, max. • UDP — Number of connections, max. — Data length, max. • Web server	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte Yes Yes; via integrated PROFINET interface and loadable FBs 8 32 768 byte Yes; via integrated PROFINET interface and loadable FBs 8 1 472 byte
Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max. — several passive connections per port, supported • ISO-on-TCP (RFC1006) — Number of connections, max. — Data length, max. • UDP — Number of connections, max. — Data length, max. • UDP — Number of connections, max. — Data length, max. • UDP — Number of connections, max. — Data length, max.	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte Yes Yes; via integrated PROFINET interface and loadable FBs 8 32 768 byte Yes; via integrated PROFINET interface and loadable FBs 8 1 472 byte Yes
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Redundancy mode Media redundancy — Switchover time on line break, typ. — Number of stations in the ring, max. Open IE communication • TCP/IP — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max. — several passive connections per port, supported • ISO-on-TCP (RFC1006) — Number of connections, max. — Data length, max. • UDP — Number of connections, max. — Data length, max. • UDP — Number of connections, max. — Data length, max. • UDP — Number of connections, max. — Data length, max. • UDP — Number of connections, max. — Data length, max. • UDP — Number of connections, max. — Data length of the type of the type of HTTP clients Communication functions / header PG/OP communication	200 ms; PROFINET MRP 50 Yes; via integrated PROFINET interface and loadable FBs 8 1 460 byte 32 768 byte Yes Yes; via integrated PROFINET interface and loadable FBs 8 32 768 byte Yes; via integrated PROFINET interface and loadable FBs 8 1 472 byte Yes Yes 5
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Number of GD packets, receiver, max.	8
Size of GD packets, max.	22 byte
Size of GD packet (of which consistent), max.	22 byte
S7 basic communication	
• supported	Yes
User data per job, max.	76 byte
 User data per job (of which consistent), max. 	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)
S7 communication	
supported	Yes
• as server	Yes
• as client	Yes; via integrated PROFINET interface and loadable FB or via CP and
	loadable FB
• User data per job, max.	See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)
S5 compatible communication	
supported	Yes; via CP and loadable FC
communication functions / PROFINET CBA (with set target c	ommunication load) / header
 Setpoint for the CPU communication load 	50 %
Number of remote interconnection partners	32
 Number of functions, master/slave 	30
 Total of all master/slave connections 	1 000
 Data length of all incoming connections master/slave, max. 	4 000 byte
 Data length of all outgoing connections master/slave, max. 	4 000 byte
 Number of device-internal and PROFIBUS interconnections 	500
 Data length of device-internal und PROFIBUS interconnections, max. 	4 000 byte
 Data length per connection, max. 	1 400 byte
performance data / PROFINET CBA / remote interconne	
— Sampling interval, min.	500 ms
 Number of incoming interconnections 	100
 Number of outgoing interconnections 	100
 Data length of all incoming interconnections, max. 	2 000 byte
 Data length of all outgoing interconnections, max. 	2 000 byte
 — Data length per connection, max. 	1 400 byte
performance data / PROFINET CBA / remote interconne	
 Transmission frequency: Transmission interval, min. 	10 ms
 Number of incoming interconnections 	200
 Number of outgoing interconnections 	200
 Data length of all incoming interconnections, max. 	2 000 byte
 — Data length of all outgoing interconnections, max. 	2 000 byte
— Data length per connection, max.	450 byte
performance data / PROFINET CBA / HMI variables via I	PROFINET / acyclic / header
 Number of stations that can log on for HMI variables (PN OPC/iMap) 	3; 2x PN OPC/1x iMap
— HMI variable updating	500 ms
 — Number of HMI variables 	200
— Data length of all HMI variables, max.	2 000 byte
performance data / PROFINET CBA / PROFIBUS proxy	functionality / header
— supported	Yes
 — Number of linked PROFIBUS devices 	16
— Data length per connection, max.	240 byte; Slave-dependent
Number of connections	
• overall	12
 usable for PG communication 	11

recorded for DC communication	4
— reserved for PG communication	1
— adjustable for PG communication, min.	1
 — adjustable for PG communication, max. usable for OP communication 	11 11
usable for OP communication — reserved for OP communication	
	1
 — adjustable for OP communication, min. adjustable for OP communication, max 	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 — reserved for S7 communication 	10
	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. 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 niput (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	
 Potential separation digital inputs 	Yes
between the channels	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
	60 °C
• max.	00 C
configuration / header	
Configuration software	
• STEP 7	Yes; V5.5 or higher
configuration / programming / header	and instruction list
Command set	see instruction list
Nesting levels	8
System functions (SFC)	see instruction list
System function blocks (SFB)	see instruction list
Programming language — LAD	Vee
	Yes
— FBD	Yes
— STL — SCL	Yes
— SCL — CFC	Yes Yes
	Yes
— GRAPH	
— HiGraph®	Yes
Know-how protection • User program protection/password protection	Yes
Block encryption	Yes; With S7 block Privacy
Dimensions	400
Width	120 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	730 g
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