## **SIEMENS**

## Data sheet

## 6ES7313-5BG04-0AB0



SIMATIC S7-300, CPU 313C, Compact CPU with MPI, 24 DI/16 DO, 4 AI, 2 AO, 1 Pt100, 3 high-speed counters (30 kHz), Integr. power supply 24 V DC, work memory 128 KB, Front connector (2x 40-pole) and Micro Memory Card required

General information				
HW functional status	01			
Firmware version	V3.3			
Engineering with				
<ul> <li>Programming package</li> </ul>	STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203			
Supply voltage				
Rated value (DC)				
• 24 V DC	Yes 19.2 V 28.8 V			
permissible range, lower limit (DC)				
permissible range, upper limit (DC)				
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				
<ul> <li>Mains/voltage failure stored energy time</li> </ul>	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)	650 mA				
Current consumption (in no-load operation), typ.	150 mA				
Inrush current, typ.	5 A				
l <sup>2</sup> t	0.7 A <sup>2</sup> ·s				
Digital inputs	00 4				
• from load voltage L+ (without load), max.	80 mA				
Digital outputs	50 4				
<ul> <li>from load voltage L+, max.</li> </ul>	50 mA				
Power loss					
Power loss, typ.	12 W				
Memory					
Work memory					
• integrated	128 kbyte				
• expandable	No				
<ul> <li>Size of retentive memory for retentive data</li> </ul>	64 kbyte				
blocks					
Load memory					
• Plug-in (MMC)	Yes				
• Plug-in (MMC), max.	8 Mbyte				
<ul> <li>Data management on MMC (after last programming), min.</li> </ul>	10 y				
Backup					
● present	Yes; Guaranteed by MMC (maintenance-free)				
• without battery	Yes; Program and data				
CPU processing times					
for bit operations, typ.	0.07 μs				
for word operations, typ.	0.15 µs				
for fixed point arithmetic, typ.	0.2 μs				
for floating point arithmetic, typ.	0.72 µs				
CPU-blocks	1 024: (DDo ECo EDo); the maximum surplus of locately business				
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					

• Nonliner, max.     FO       • Size, max.     64 kbyte       FC     1024; Number range: 0 to 7999       • Size, max.     64 kbyte       OB     • Description       • Description     see instruction list       • Size, max.     64 kbyte       • Number of free cycle OBs     1: OB 1       • Number of free cycle OBs     1: OB 1       • Number of free cycle OBs     1: OB 10       • Number of free cycle OBs     1: OB 10       • Number of cycle interrupt OBs     1: OB 80       • Number of synchronous error OBs     1: OB 100       • Number of synchronous error OBs     1: OB 100       • Number of synchronous error OBs     1: OB 100       • Number of synchronous error OBs     1: OB 100       • Number of synchronous error OBs     1: OB 121, 122       • Number     1: OB 121, 122       • Number     1: OB 100       • Number     2: OB 121, 122       • Number     2: OB 121, 122       • Number     2: OB 121, 122       • Number     1: OB       • Number     2: OB       • Number     2: OB       • oper limit     0       • adjustable     Yes       • lower limit     0       • upper limit     999       • EC counter     • Number<	• Number may	1 024: Number range: 0 to 7000			
FC     ·       • Number, max.     1024. Number range: 0 to 7999       • Size, max.     64 kbyte       • Description     see instruction list       • Size, max.     64 kbyte       • Number of free cycle OBs     1,0B 1       • Number of free cycle OBs     1,0B 1       • Number of free cycle OBs     1,0B 1       • Number of delay alarn OBs     2,0B 20, 21       • Number of cyclic interrupt OBs     4,0B 32, 33, 34, 35       • Number of starup OBs     1,0B 40       • Number of starup OBs     1,0B 40       • Number of starup OBs     1,0B 40       • Number of synchronous error OBs     2,0B 80, 82, 85, 87       • Number of synchronous error OBs     2,0B 121, 122       Number of synchronous error OBs     2,0B 121, 122       Number of synchronous error OBs     2,0B 120, 120       • Strounter     256       Retentivity     256       • Retentivity     255       - adjustable     Ves       - lower limit     0       - upper limit     255       - preset     2 to z 7       Counting range     256       Retentivity     256       - lower limit     0       - upper limit     399       EC counter     256       • Number     256<	• Number, max.	1 024; Number range: 0 to 7999			
• Number, max.       1 024; Number range: 0 to 7999         • Size, max.       64 kbyte         • Description       see instruction list         • Size, max.       64 kbyte         • Number of free cycle OBs       1: 0B 1         • Number of time alarm OBs       1: 0B 10         • Number of delay alarm OBs       2: 0B 20, 21         • Number of vocies alarm OBs       1: 0B 40         • Number of process alarm OBs       1: 0B 10         • Number of synchronous error OBs       2: 0B 20, 21         • Number of synchronous error OBs       1: 0B 80, 82, 35, 87         • Number of synchronous error OBs       2: 0B 121, 122         Number       4         Counters, timers and their retentivity       57         S7 counter       256         Retentivity       255         - adjustable       Yes         - lower limit       0         - upper limit       999         IEC counter       256         Retentivity       56         S7 limes       256         Retentivity       0         - upper limit       999         IEC counter       0         • Number       256         Retentivity       256		04 KDyle			
• Size, max.64 kbyteOB• Descriptionsee instruction list• Size, max.64 kbyte• Number of free cycle OBs1, OB 1• Number of free cycle interrupt OBs1, OB 10• Number of cycle interrupt OBs4, OB 32, 33, 34, 35• Number of process alarn OBs1, OB 40• Number of synchronous error OBs1, OB 80• Number of synchronous error OBs2, OB 10, 12• Number of synchronous error OBs2, OB 12, 122• Number of synchronous error OBs2, OB 12, 122• Number of synchronous error OBs2, OB 12, 122• Number of synchronous error OBs4• Per priority class16• additional within an error OB4• Counters, timers and their retentivity• S7 counter256- ower limit0- upper limit255- preset2 to  Z 7• Counting range0- lower limit999• EC counter256• Number256• Number256• Retentivity256• Number255• Number256• Number255• Number255• Number255• Number255• Number255• Number255• Number255• Lower limit0• upper limit255• number255• number255• number255• number• number		1.024: Number range: 0 to 7000			
OB         see instruction list           • Description         see instruction list           • Size, max.         64 kbyte           • Number of free cycle OBs         1; 0B 1           • Number of free cycle interrupt OBs         1; 0B 10           • Number of cycle interrupt OBs         4; 0B 32, 33, 34, 35           • Number of startup OBs         1; 0B 10           • Number of startup OBs         1; 0B 10           • Number of startup OBs         1; 0B 80           • Number of startup OBs         1; 0B 10           • Number of startup OBs         1; 0B 10           • Number of startup OBs         1; 0B 100           • Number         256           Retentivity         255           • Over limit         0           • upper limit         256           Ret		-			
• Descriptionsee instruction list• Size, max.64 kbyte• Number of tere cycle OBs1.0B 1• Number of time atarm OBs1.0B 10• Number of delay alarm OBs2.0B 20, 21• Number of gyclic interrupt OBs4.0B 32, 33, 34, 35• Number of spacess alarm OBs1.0B 40• Number of spacess alarm OBs1.0B 800• Number of synchronous error OBs2.0B 82, 65, 87• Number of synchronous error OBs2.0B 121, 122Number of synchronous error OBs2.0B 121, 122Number of synchronous error OBs4• Number of synchronous error OBs4• Outlers, timers and their retentivity57 counter• Strouter256• Number256Retentivity255- nover limit0- upper limit255- preset256• Number256Retentivity10 luinited only by RAM capacity)§7 times10 luinited (limited only by RAM capacity)§7 times256• number256• number255• number					
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• Number of free cycle OBs1, OB 1• Number of time alarm OBs1, OB 10• Number of delay alarm OBs2, OB 20, 21• Number of cyclic interrupt OBs4, OB 32, 33, 34, 35• Number of process alarm OBs1, OB 10• Number of startup OBs108 10• Number of startup OBs2, OB 80, 82, 85, 87• Number of synchronous error OBs2, OB 121, 122Number of synchronous error OBs2, OB 121, 122Number of synchronous error OBs16• diditional within an error OB4Counters, timers and their retentivity• Number256• Number256Retentivity- adjustableYes- lower limit0- upper limit255- preset20 to 2 7CounterUnimited (limited only by RAM capacity)S7 times256Retentivity lower limit0- upper limit256- preset20 to 2 7Counter-• Number256- preset256- preset256- preset256- puper limit0- upper limit256- nower limit256- nower limit256- nower limit256- preset256- preset256- preset0- nower limit0- pore limit256- preset limit0- pore limit255- preset limit <t< td=""><td></td><td></td></t<>					
• Number of time alarm OBs1. OB 10• Number of delay alarm OBs2. OB 20, 21• Number of cyclic interrupt OBs4. OB 32, 33, 34, 35• Number of process alarm OBs1. OB 40• Number of asynchronous error OBs1. OB 800• Number of synchronous error OBs2. OB 80, 82, 85, 87• Number of synchronous error OBs2. OB 21, 122• Number of synchronous error OBs2. OB 121, 122• Number of synchronous error OBs2. OB 121, 122• Number of synchronous error OBs4• outper string depth4• outper string string of synchronous error OBs2. OB 20, 21, 122• Number of synchronous error OBs4• outper string string of synchronous error OBs4• outper string					
• Number of delay alarm OBs2, OB 20, 21• Number of cyclic interrupt OBs4; OB 32, 33, 34, 35• Number of process alarm OBs1; OB 40• Number of strupt OBs1; OB 100• Number of asynchronous error OBs4; OB 80, 82, 85, 87• Number of synchronous error OBs2; OB 121, 122• Number of synchronous error OBs16• additional within an error OB4• Outlers, timers and their retentivity57• S7 counter256• Number256- lower limit0- upper limit255- preset2 to tz 7• Counters10• Number999IEC counter999• Number256• Number256• number999• Number256• number99• Number256• number255• number255 <trr>• number255<td>-</td><td colspan="4"></td></trr>	-				
• Number of cyclic interrupt OBs4. 0B 32, 33, 34, 35• Number of process alarn OBs1. 0B 40• Number of synchronous error OBs4. 0B 80, 82, 85, 87• Number of synchronous error OBs2. 0B 121, 122Netting depth6- additional within an error OB4• Aumber of synchronous error OBs6• additional within an error OB4• Number of synchronous error OB6• Aumber56• Retentivity56• Aumber0- lower limit0- upper limit25 50• number25 50• Lower limit0- upper limit25 10 Z 7• Counters99IEC counter999IEC counter1• Number256• Number99IEC counter99• Number256• Number256• Number0- upper limit0- upper limit0- upper limit0- upper limit256• Number256• Number256• Number99IEC counter1• Number256• Number256• Unimited (limited only by RAM capacity)ST limes1• Lower limit0• Lower limit0• Lower limit0• Lower limit0• Lower limit0• Lower limit0• Lower limit0					
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Nesting depth           • per priority class         16           • additional within an error OB         4           Counters, timers and their retentivity         4           S7 counter         256           Retentivity         256           Retentivity         0           - adjustable         Yes           - lower limit         0           - upper limit         255           - preset         Z 0 to Z 7           Counter         0           - upper limit         999           IEC counter         0           • Number         Z56           Retentivity         0           - adjustable         999           IEC counter         0           • Number         Z56           Retentivity         256           Retentivity         256           Retentivity         - adjustable           • Number         256           Retentivity         - adjustable           - lower limit         0           - lower limit         255           - lower limit         255           - lower limit         0           - lower limit         255					
• per priority class       16         • additional within an error OB       4         Counters, timers and their retentivity       4         S7 counter       256         • Number       256         Retentivity       -         - adjustable       Yes         - lower limit       0         - upper limit       255         - preset       2 0 to Z 7         Counter       -         - lower limit       0         - upper limit       999         IEC counter       -         • Number       256         Retentivity       -         - lower limit       0         - upper limit       999         IEC counter       -         • Number       256         Retentivity       -         - adjustable       Yes         - adjustable       Yes         - lower limit       0         - lower limit       0         - lower limit       255         - lower limit       255         - lower limit       255         - lower limit       0         - upper limit       255         - preset		2; OB 121, 122			
• additional within an error OB       4         Counters, timers and their retentivity       256         S7 counter       256         • Number       256         Retentivity       -         - adjustable       Yes         - lower limit       0         - upper limit       255         - preset       Z 0 to Z 7         Counter       0         - lower limit       999         IEC counter       0         • Number       256         Retentivity       -         - lower limit       0         - upper limit       999         IEC counter       Unlimited (limited only by RAM capacity)         S7 times       -         • Number       256         Retentivity       -         - adjustable       Yes         - lower limit       0         - lower limit       256         Retentivity       -         - adjustable       Yes         - lower limit       0         - upper limit       255         - preset       No retentivity         - preset       No retentivity		10			
Counters, timers and their retentivity         S7 counter       256         Retentivity       256         - adjustable       Yes         - lower limit       0         - upper limit       255         - preset       Z 0 to Z 7         Counter       0         - lower limit       999         IEC counter       0         • Number       Unlimited (limited only by RAM capacity)         S7 times       256         Retentivity       - adjustable         • Number       256         Retentivity       - upper limit         • Number       Ves         • Number       256         Retentivity       - adjustable         - adjustable       Yes         - lower limit       0         - upper limit       255         - preset       No retentivity         - preset       No retentivity					
S7 counter       256         Retentivity       - adjustable         - adjustable       Yes         - lower limit       0         - upper limit       255         - preset       Z 0 to Z 7         Counting range       -         - lower limit       0         - upper limit       999         IEC counter       -         • Number       Unlimited (limited only by RAM capacity)         S7 times       -         • Number       256         Retentivity       -         - adjustable       9         • Number       256         Retentivity       -         - adjustable       Yes         - lower limit       0         - upper limit       255         - preset       No retentivity         Time range       Yes	<ul> <li>additional within an error OB</li> </ul>	4			
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- preset     Z 0 to Z 7       Counting range     0       - lower limit     0 999       IEC counter     Unlimited (limited only by RAM capacity)       S7 times     256       Retentivity     256       - adjustable     Yes       - lower limit     0       - upper limit     255       - preset     No retentivity       - preset     No retentivity	— lower limit	0			
Counting range       0         — lower limit       0         — upper limit       999         IEC counter       Unlimited only by RAM capacity)         • Number       Unlimited (limited only by RAM capacity)         \$7 times       256         Retentivity       9         — adjustable       Yes         — lower limit       0         — upper limit       255         — upper limit       255         — preset       No retentivity         Time range       Ventivity	— upper limit	255			
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• NumberUnlimited (limited only by RAM capacity)S7 times• Number256Retentivity- adjustableYes- lower limit0- upper limit255- presetNo retentivityTime range	— upper limit	999			
S7 times       256         Retentivity       256         - adjustable       Yes         - lower limit       0         - upper limit       255         - preset       No retentivity	IEC counter				
• Number       256         Retentivity       Yes         - adjustable       9         - lower limit       0         - upper limit       255         - preset       No retentivity	• Number	Unlimited (limited only by RAM capacity)			
Retentivity       - adjustable     Yes       - lower limit     0       - upper limit     255       - preset     No retentivity	S7 times				
	• Number	256			
— lower limit     0       — upper limit     255       — preset     No retentivity	Retentivity				
	— adjustable	Yes			
— preset     No retentivity Time range	— lower limit	0			
Time range	— upper limit	255			
	— preset	No retentivity			
— lower limit 10 ms	Time range				
	— lower limit	10 ms			

— upper limit	9 990 s				
IEC timer					
• present	Yes				
• Туре	SFB				
• Number	Unlimited (limited only by RAM capacity)				
Data areas and their retentivity					
retentive data area in total	All, max. 64 KB				
Flag					
<ul> <li>Number, max.</li> </ul>	256 byte				
<ul> <li>Retentivity available</li> </ul>	Yes; MB 0 to MB 255				
<ul> <li>Retentivity preset</li> </ul>	MB 0 to MB 15				
<ul> <li>Number of clock memories</li> </ul>	8; 1 memory byte				
Data blocks					
<ul> <li>Retentivity adjustable</li> </ul>	Yes; via non-retain property on DB				
<ul> <li>Retentivity preset</li> </ul>	Yes				
Local data					
• per priority class, max.	32 kbyte; Max. 2048 bytes per block				
Address area					
I/O address area					
Inputs	1 024 byte				
Outputs	1 024 byte				
of which distributed					
— Inputs	none				
— Outputs	none				
Process image					
Inputs	1 024 byte				
Outputs	1 024 byte				
<ul> <li>Inputs, adjustable</li> </ul>	1 024 byte				
<ul> <li>Outputs, adjustable</li> </ul>	1 024 byte				
<ul> <li>Inputs, default</li> </ul>	128 byte				
<ul> <li>Outputs, default</li> </ul>	128 byte				
Default addresses of the integrated channels					
— Digital inputs	124.0 to 126.7				
— Digital outputs	124.0 to 125.7				
— Analog inputs	752 to 761				
— Analog outputs	752 to 755				
Digital channels					
Inputs	1 016				
— of which central	1 016				
Outputs	1 008				
— of which central	1 008				

Analog channels				
Inputs	253			
— of which central	253			
Outputs	250			
— of which central	250			
Hardware configuration Number of expansion units, max.	3			
Number of DP masters				
integrated	none			
• via CP	4			
Number of operable FMs and CPs (recommended)				
• FM	8			
• CP, PtP	8			
• CP, LAN	6			
Rack				
● Racks, max.	4			
<ul> <li>Modules per rack, max.</li> </ul>	8; In rack 3 max. 7			
<b>-</b>				
Time of day Clock				
Hardware clock (real-time)	Yes			
retentive and synchronizable	Yes			
Backup time	6 wk; At 40 °C ambient temperature			
<ul> <li>Deviation per day, max.</li> </ul>	10 s; Typ.: 2 s			
Behavior of the clock following POWER-ON	Clock continues running after POWER OFF			
<ul> <li>Behavior of the clock following expiry of backup</li> </ul>	Clock continues to run with the time at which the power failure			
period	occurred			
Operating hours counter				
Number	1			
<ul> <li>Number/Number range</li> </ul>	0			
<ul> <li>Range of values</li> </ul>	0 to 2^31 hours (when using SFC 101)			
retentive	Yes; Must be restarted at each restart			
Clock synchronization				
• supported	Yes			
• to MPI, master	Yes			
● to MPI, slave	Yes			
• in AS, master	Yes			
● in AS, slave	No			
Digital inputs				
Number of digital inputs	24			
<ul> <li>of which inputs usable for technological</li> </ul>	12			
functions				

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 +30V			
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 counter/technological functions				
— at "0" to "1", max.	16 μs; Minimum pulse width/minimum pause between pulses at maximum counting frequency			
Cable length				
• shielded, max.	1 000 m; 100 m for technological functions			
• unshielded, max.	600 m; For technological functions: No			
for technological functions				
— shielded, max.	100 m; at maximum count frequency			
— unshielded, max.	not allowed			
Digital outputs				
Number of digital outputs	16			
<ul> <li>of which high-speed outputs</li> </ul>	4; Notice: You cannot connect the fast outputs of your CPU in parallel			
integrated channels (DO)	16			
Short-circuit protection	Yes; Clocked electronically			
<ul> <li>Response threshold, typ.</li> </ul>	1 A			
Limitation of inductive shutdown voltage to	L+ (-48 V)			
Controlling a digital input	Yes			
Switching capacity of the outputs				
<ul> <li>on lamp load, max.</li> </ul>	5 W			
Load resistance range				

• Januar limit	48.0				
• lower limit	48 Ω 4 kΩ				
• upper limit	4 kΩ				
Output voltage					
• for signal "1", min.	L+ (-0.8 V)				
Output current					
<ul> <li>for signal "1" rated value</li> </ul>	500 mA				
<ul> <li>for signal "1" permissible range, min.</li> </ul>	5 mA				
<ul> <li>for signal "1" permissible range, max.</li> </ul>	0.6 A				
<ul> <li>for signal "1" minimum load current</li> </ul>	5 mA				
<ul> <li>for signal "0" residual current, max.</li> </ul>	0.5 mA				
Parallel switching of two outputs					
<ul> <li>for uprating</li> </ul>	No				
<ul> <li>for redundant control of a load</li> </ul>	Yes				
Switching frequency					
• with resistive load, max.	100 Hz				
<ul> <li>with inductive load, max.</li> </ul>	0.5 Hz				
<ul> <li>on lamp load, max.</li> </ul>	100 Hz				
<ul> <li>of the pulse outputs, with resistive load, max.</li> </ul>	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	4				
<ul> <li>For voltage/current measurement</li> </ul>	4				
<ul> <li>For resistance/resistance thermometer measurement</li> </ul>	1				
integrated channels (AI)	5; 4 x current/voltage, 1 x resistance				
permissible input voltage for current input (destruction limit), max.	5 V; Permanent				
permissible input voltage for voltage input (destruction limit), max.	30 V; Permanent				
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				
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				
Voltage	Yes; ±10 V / 100 kΩ; 0 V to 10 V / 100 kΩ			
Current	Yes; ±20 mA / 100 $\Omega;$ 0 mA to 20 mA / 100 $\Omega;$ 4 mA to 20 mA / 100 $\Omega$			
Resistance thermometer	Yes; Pt 100 / 10 MΩ			
Resistance	Yes; 0 Ω to 600 Ω / 10 MΩ			
Input ranges (rated values), voltages				
• 0 to +10 V	Yes			
<ul> <li>Input resistance (0 to 10 V)</li> </ul>	100 kΩ			
Input ranges (rated values), currents				
• 0 to 20 mA	Yes			
<ul> <li>Input resistance (0 to 20 mA)</li> </ul>	100 Ω			
• -20 mA to +20 mA	Yes			
<ul> <li>Input resistance (-20 mA to +20 mA)</li> </ul>	100 Ω			
• 4 mA to 20 mA	Yes			
<ul> <li>Input resistance (4 mA to 20 mA)</li> </ul>	100 Ω			
Input ranges (rated values), resistance thermometer				
• Pt 100	Yes			
<ul> <li>Input resistance (Pt 100)</li> </ul>	10 MΩ			
Input ranges (rated values), resistors				
• 0 to 600 ohms	Yes			
<ul> <li>Input resistance (0 to 600 ohms)</li> </ul>	10 MΩ			
Thermocouple (TC)				
Temperature compensation				
— parameterizable	No			
Characteristic linearization				
parameterizable	Yes; by software			
— for resistance thermometer	Pt 100			
Cable length				
<ul> <li>shielded, max.</li> </ul>	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	X			
• 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					
<ul> <li>for voltage output two-wire connection</li> </ul>	Yes; Without compensation of the line resistances				
<ul> <li>for voltage output four-wire connection</li> </ul>	No				
<ul> <li>for current output two-wire connection</li> </ul>	Yes				
Load impedance (in rated range of output)					
• with voltage outputs, min.	1 kΩ				
• with voltage outputs, capacitive load, max.	0.1 µF				
<ul> <li>with current outputs, max.</li> </ul>	300 Ω				
• with current outputs, inductive load, max.	0.1 mH				
Destruction limits against externally applied voltages an	d currents				
<ul> <li>Voltages at the outputs towards MANA</li> </ul>	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					
<ul> <li>Resolution with overrange (bit including sign), max.</li> </ul>	12 bit				
<ul> <li>Integration time, parameterizable</li> </ul>	Yes; 16.6 / 20 ms				
<ul> <li>Interference voltage suppression for interference frequency f1 in Hz</li> </ul>	50 / 60 Hz				
<ul> <li>permissible input frequency, max.</li> </ul>	400 Hz				
<ul><li>permissible input frequency, max.</li><li>Time constant of the input filter</li></ul>	400 Hz 0.38 ms				
• Time constant of the input filter	0.38 ms				
<ul><li>Time constant of the input filter</li><li>Basic execution time of the module (all channels released)</li></ul>	0.38 ms				
<ul><li>Time constant of the input filter</li><li>Basic execution time of the module (all channels released)</li></ul>	0.38 ms				
<ul> <li>Time constant of the input filter</li> <li>Basic execution time of the module (all channels released)</li> </ul>	0.38 ms				
Time constant of the input filter     Basic execution time of the module (all channels released)     Analog value generation for the outputs     Integration and conversion time/resolution per channel     Resolution with overrange (bit including sign),	0.38 ms 1 ms				
<ul> <li>Time constant of the input filter</li> <li>Basic execution time of the module (all channels released)</li> </ul> Analog value generation for the outputs Integration and conversion time/resolution per channel <ul> <li>Resolution with overrange (bit including sign), max.</li> </ul>	0.38 ms 1 ms 12 bit				
<ul> <li>Time constant of the input filter</li> <li>Basic execution time of the module (all channels released)</li> <li>Analog value generation for the outputs</li> <li>Integration and conversion time/resolution per channel</li> <li>Resolution with overrange (bit including sign), max.</li> <li>Conversion time (per channel)</li> </ul>	0.38 ms 1 ms 12 bit				
<ul> <li>Time constant of the input filter</li> <li>Basic execution time of the module (all channels released)</li> </ul> Analog value generation for the outputs Integration and conversion time/resolution per channel <ul> <li>Resolution with overrange (bit including sign), max.</li> <li>Conversion time (per channel)</li> </ul> Settling time	0.38 ms 1 ms 12 bit 1 ms				
<ul> <li>Time constant of the input filter</li> <li>Basic execution time of the module (all channels released)</li> </ul> Analog value generation for the outputs Integration and conversion time/resolution per channel <ul> <li>Resolution with overrange (bit including sign), max.</li> <li>Conversion time (per channel)</li> </ul> Settling time <ul> <li>for resistive load</li> </ul>	0.38 ms 1 ms 12 bit 1 ms 0.6 ms				

Connection of signal encoders	
<ul> <li>for voltage measurement</li> </ul>	Yes
<ul> <li>for current measurement as 2-wire transducer</li> </ul>	Yes; with external supply
<ul> <li>for current measurement as 4-wire transducer</li> </ul>	Yes
<ul> <li>for resistance measurement with two-wire</li> </ul>	Yes; Without compensation of the line resistances
connection	
• for resistance measurement with three-wire	No
connection	
• for resistance measurement with four-wire	No
connection	
Connectable encoders	
• 2-wire sensor	Yes
— permissible quiescent current (2-wire	1.5 mA
sensor), max.	
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	0.06 %
input range), (+/-)	
Output ripple (relative to output range, bandwidth 0 to	0.1 %
50 kHz), (+/-)	0.45.0/
Linearity error (relative to output range), (+/-)	0.15 %
Temperature error (relative to output range), (+/-) Crosstalk between the outputs, min.	0.01 %/K 60 dB
Repeat accuracy in steady state at 25 °C (relative to	0.06 %
output range), (+/-)	0.00 %
Operational error limit in overall temperature range	
<ul> <li>Voltage, relative to input range, (+/-)</li> </ul>	1 %
• Current, relative to input range, (+/-)	1 %
• Resistance, relative to input range, (+/-)	1 %
<ul> <li>Voltage, relative to output range, (+/-)</li> </ul>	1 %
• Current, relative to output range, (+/-)	1 %
Basic error limit (operational limit at 25 °C)	
<ul> <li>Voltage, relative to input range, (+/-)</li> </ul>	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 %
<ul> <li>Resistance thermometer, relative to input</li> </ul>	0.8 %
range, (+/-)	
<ul> <li>Voltage, relative to output range, (+/-)</li> </ul>	0.8 %
• Current, relative to output range, (+/-)	0.8 %
Interference voltage suppression for $f = n x (f1 +/- 1 \%)$ ,	f1 = interference frequency
<ul> <li>Series mode interference (peak value of</li> </ul>	30 dB
interference < rated value of input range), min.	

Common mode interference, min.	40 dB				
Interfaces					
Number of industrial Ethernet interfaces	0				
Number of PROFINET interfaces	0				
Number of RS 485 interfaces	1; MPI				
Number of RS 422 interfaces	0				
1. Interface					
Interface type	Integrated RS 485 interface				
Physics	RS 485				
Isolated	No				
Power supply to interface (15 to 30 V DC), max.	200 mA				
Functionality					
• MPI	Yes				
<ul> <li>PROFIBUS DP master</li> </ul>	No				
PROFIBUS DP slave	No				
<ul> <li>Point-to-point connection</li> </ul>	No				
MPI					
• Transmission rate, max.	187.5 kbit/s				
Services					
— PG/OP communication	Yes				
— Routing	No				
— Global data communication	Yes				
— S7 basic communication	Yes				
— S7 communication	Yes; Only server, configured on one side				
— S7 communication, as client	No; but via CP and loadable FB				
— S7 communication, as server	Yes				
Communication functions					
PG/OP communication	Yes				
Data record routing	No				
Global data communication					
supported	Yes				
<ul> <li>Number of GD loops, max.</li> </ul>	8				
<ul> <li>Number of GD packets, max.</li> </ul>	8				
Number of GD packets, transmitter, max.	8				
Number of GD packets, receiver, max.	8				
Size of GD packets, max.	22 byte				
<ul> <li>Size of GD packet (of which consistent), max.</li> </ul>	22 byte				
S7 basic communication					
supported	Yes				
<ul> <li>User data per job, max.</li> </ul>	76 byte				
- 0361 data per job, max.					

•	User	data	per	job	(of	which	consistent),	max.
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76 byte; 76 bytes (with X\_SEND or X\_RCV); 64 bytes (with X\_PUT or X\_GET as server)

	X_PUT or X_GET as server)
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes; Via CP and loadable FB
<ul> <li>User data per job, max.</li> </ul>	180 byte; With PUT/GET
<ul> <li>User data per job (of which consistent), max.</li> </ul>	240 byte; as server
S5 compatible communication	
• supported	Yes; via CP and loadable FC
Number of connections	
• overall	8
<ul> <li>usable for PG communication</li> </ul>	7
— reserved for PG communication	1
— adjustable for PG communication, min.	1
— adjustable for PG communication, max.	7
<ul> <li>usable for OP communication</li> </ul>	7
— reserved for OP communication	1
— adjustable for OP communication, min.	1
— adjustable for OP communication, max.	7
<ul> <li>usable for S7 basic communication</li> </ul>	4
— reserved for S7 basic communication	0
— adjustable for S7 basic communication,	0
min.	
<ul> <li>— adjustable for S7 basic communication,</li> </ul>	4
max.	
S7 message functions	
Number of login stations for message functions, max.	8; 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
<ul> <li>Number of variables, max.</li> </ul>	30
— of which status variables, max.	30
of which control veriables may	14
<ul> <li>— of which control variables, max.</li> <li>Forcing</li> </ul>	

Forcing	Yes
<ul> <li>Forcing, variables</li> </ul>	Inputs, outputs
<ul> <li>Number of variables, max.</li> </ul>	10
Diagnostic buffer	
● present	Yes
<ul> <li>Number of entries, max.</li> </ul>	500
— adjustable	No
— of which powerfail-proof	100; Only the last 100 entries are retained
<ul> <li>Number of entries readable in RUN, max.</li> </ul>	499
— can be set	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
<ul> <li>Status indicator digital output (green)</li> </ul>	Yes
Integrated Functions	
Number of counters	3; See "Technological Functions" manual
Counting frequency (counter) max.	30 kHz
Frequency measurement	Yes
Number of frequency meters	3; up to 30 kHz (see "Technological Functions" manual)
controlled positioning	No
integrated function blocks (closed-loop control)	Yes; PID controller (see "Technological Functions" manual)
PID controller	Yes
Number of pulse outputs	3; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)
Limit frequency (pulse)	2.5 kHz
Potential separation	
Potential separation digital inputs	
<ul> <li>Potential separation digital inputs</li> </ul>	Yes
between the channels	No
<ul> <li>between the channels and backplane bus</li> </ul>	Yes
Potential separation digital outputs	
Potential separation digital outputs	Yes
between the channels	Yes
• between the channels, in groups of	8
<ul> <li>between the channels and backplane bus</li> </ul>	Yes
Potential separation analog inputs	
Potential separation analog inputs	Yes; common for analog I/O
<ul> <li>between the channels</li> </ul>	No

<ul> <li>between the channels and backplane bus</li> </ul>	Yes
Potential separation analog outputs	
Potential separation analog outputs	Yes; common for analog I/O
between the channels	No
<ul> <li>between the channels and backplane bus</li> </ul>	Yes
Permissible potential difference	
Between the inputs and MANA (UCM)	8 V DC
Isolation	
Isolation tested with	600 V DC
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Configuration	
Configuration software	
• STEP 7	Yes; STEP 7 V5.5 + SP1 or higher or STEP 7 V5.3 + SP2 or higher with HSP 203
• STEP 7 Lite	No
Programming	
Command set	see instruction list
Nesting levels	8
System functions (SFC)	see instruction list
<ul> <li>System functions (SFC)</li> <li>System function blocks (SFB)</li> </ul>	see instruction list
Programming language	
	Yes
	Yes
— FBD	Yes
— STL	Yes
— SCL	
- 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.	660 g

last modified: