

SIMATIC S7-1200

Analog modules

SM 1231 analog input module

Overview



- Analog inputs for SIMATIC S7-1200
- With extremely short conversion times
- For connecting analog sensors without additional amplifiers
- For solving even more complex automation tasks

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Technical specifications

	6ES7 231-4HD30-0XB0	6ES7 231-4HF30-0XB0
Product type designation	SM 1231 AI 4x13 bit	SM 1231 AI 8 x 13 bit
Supply voltages		
Rated value		
• 24 V DC	Yes	Yes
Current consumption		
Current consumption, typ.	45 mA	45 mA
from backplane bus 5 V DC, typ.	80 mA	90 mA
Power losses		
Power loss, typ.	1.5 W	1.5 W
Connection method		
required front connector	Yes	Yes
Analog inputs		
Number of analog inputs	4; current or voltage differential inputs	8; current or voltage differential inputs
Permissible input frequency for current input (destruction limit), max.	± 35 V	± 35 V
Permissible input current for voltage input (destruction limit), max.	40 mA	40 mA
Cycle time (all channels) max.	625 μs	625 μs
Input ranges		
• Voltage	Yes; ±10 V, ±5 V, ±2.5 V	Yes; ±10 V, ±5 V, ±2.5 V
• Current	Yes; 0 to 20 mA	Yes; 0 to 20 mA
• Thermocouple	No	No
• Resistance thermometer	No	No
• Resistance	No	No
Input ranges (rated values), voltages		
• -10 V to +10 V	Yes	Yes
• Input resistance (-10 V to +10 V)	≥9 MOhm	≥9 MOhm
• -2.5 V to +2.5 V	Yes	Yes
• Input resistance (-2.5 V to +2.5 V)	≥9 MOhm	≥9 MOhm
• -5 V to +5 V	Yes	Yes
• Input resistance (-5 V to +5 V)	≥9 MOhm	≥9 MOhm
Input ranges (rated values), currents		
• 0 to 20 mA	Yes	Yes
• Input resistance (0 to 20 mA)	≥ 250 Ohm	≥ 250 Ohm
Voltage input		
• permissible input voltage for voltage input (destruction limit), max.	35 V	35 V

Technical specifications (continued)

	6ES7 231-4HD30-0XB0	6ES7 231-4HF30-0XB0
Current input		
• permissible input current for current input (destruction limit), max.	40 mA	40 mA
Temperature compensation		
• Temperature compensation parameterizable	No	No
Analog outputs		
Number of analog outputs	0	0
Analog value creation		
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	12 bit; + sign	12 bit; + sign
• Integration time, parameterizable	Yes	Yes
• Interference voltage suppression for interference frequency f_1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz
Smoothing of measured values		
• Parameterizable	Yes	Yes
• Step: None	Yes	Yes
• Step: Low	Yes	Yes
• Step: Medium	Yes	Yes
• Step: High	Yes	Yes
Errors/accuracies		
Temperature error (relative to input area)	25°C ±0.1% to 55°C ±0.2% total measurement range	25°C ±0.1% to 55°C ±0.2% total measurement range
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to input area	+/- 0.1 %	+/- 0.1 %
• Current, relative to input area	+/- 0.1 %	+/- 0.1 %
Interference voltage suppression for $f = n \times (f_1 \pm 1\%)$, f_1 = interference frequency		
• Common mode voltage, max.	12 V	12 V
Alarms/diagnostics/status information		
Alarms		
• Alarms	Yes	Yes
• Diagnostic alarm	Yes	Yes
Diagnostics		
• Diagnostic functions	Yes	Yes
• Monitoring the supply voltage to the electronics	Yes	Yes
• Wire break	No	No
Diagnostic indication LED		
• for status of the inputs	Yes	Yes
• for maintenance	Yes	Yes
Galvanic isolation		
Galvanic isolation analog outputs		
• between the channels and the power supply of the electronics	No	No
Climatic and mechanical conditions for storage and transport		
Climatic conditions for storage and transport		
• Free fall		
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
• Temperature		
- Permissible temperature range	-40 °C to +70 °C	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13		
- Permissible air pressure	1080 to 660 hPa	1080 to 660 hPa
• Relative humidity		
- Permissible range (without condensation) at 25 °C	95%	95%

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Mechanical and climatic conditions during operation		
Climatic conditions in operation		
• Air pressure acc. to IEC 60068-2-13	1080 to 795 hPa	1080 to 795 hPa
- Permissible air pressure		
• Pollutant concentrations		
- SO ₂ at RH < 60% without condensation	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free
Degree of protection		
IP20	Yes	Yes
Standards, approvals, certificates		
CE mark	Yes	Yes
C-TICK	Yes	Yes
FM approval	Yes	Yes
Mechanics/material		
Type of housing (front)		
• Plastic	Yes	Yes
Dimensions and weight		
Dimensions		
• Width	45 mm	45 mm
• Height	100 mm	100 mm
• Depth	75 mm	75 mm
Weight		
• Weight, approx.	180 g	180 g

Ordering data	Order No.	Ordering data	Order No.
SM 1231 analog input signal module		S7-1200 automation system, Easy Book	
4 analog inputs ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA 12 bit + sign	6ES7 231-4HD30-0XB0	Brief instructions	
8 analog inputs ±10 V, ±5 V, ±2.5 V, or 0 ... 20 mA 12 bit + sign	6ES7 231-4HF30-0XB0	German	K 6ES7 298-8FA30-8AQ0
Extension cable for two-tier configuration	6ES7 290-6AA30-0XA0	English	K 6ES7 298-8FA30-8BQ0
for connecting digital/analog signal modules; length 2 m		French	K 6ES7 298-8FA30-8CQ0
Terminal block (spare part)		Spanish	K 6ES7 298-8FA30-8DQ0
for 8/16-channel analog signal modules		Italian	K 6ES7 298-8FA30-8EQ0
with 7 screws, gold-plated; 4 units	6ES7 292-1BG30-0XA0	Chinese	K 6ES7 298-8FA30-8KQ0
Front flap set (spare part)		STEP 7 Basic V11 engineering software	
for 8/16-channel signal modules	6ES7 291-1BA30-0XA0	Single license	6ES7 822-0AA01-0YA0
S7-1200 automation system, system manual		Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license	6ES7 822-0AA01-0YE0
For SIMATIC S7-1200 and STEP 7 Basic		Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license	6ES7 822-1AA01-0YC5
German	K 6ES7 298-8FA30-8AH0	STEP 7 Basic V11, trial license	6ES7 822-0AA01-0YA7
English	K 6ES7 298-8FA30-8BH0	STEP 7 Basic Software Update Service, 1 year	D 6ES7 822-0AA00-0YL0
French	K 6ES7 298-8FA30-8CH0		
Spanish	K 6ES7 298-8FA30-8DH0		
Italian	K 6ES7 298-8FA30-8EH0		
Chinese	K 6ES7 298-8FA30-8KH0		

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 I: Subject to export regulations AL: N and ECCN: EAR99H
 K: Subject to export regulations AL: N and ECCN: EAR99T

SIMATIC S7-1200

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SB 1231 analog input module

Overview

- Analog input module for the SIMATIC S7-1200
- With extremely short conversion times
- For the connection of analog sensors without additional amplifiers
- For the solution of more complex automation tasks as well
- Can be plugged directly into the CPU

Technical specifications

Product type designation	6ES7 231-4HA30-0XB0 SB1231 AI 1x12 BIT
Supply voltages	
Rated value	
• 24 V DC	Yes
Connection method	
required front connector	Yes
Analog inputs	
Number of analog inputs	1; Current or voltage differential inputs
permissible input frequency for current input (destruction limit), max.	± 35 V
Cycle time (all channels) max.	156.25 µs; 400 Hz suppression
Input ranges	
• Voltage	Yes; ± 10 V, ± 5 V, ± 2.5 V
• Current	Yes; 0 to 20 mA
• Thermocouple	No
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), voltages	
• -10 V to +10 V	Yes
• Input resistance (-10 V to +10 V)	≥ 9 MOhm
• -2.5 V to +2.5 V	Yes
• Input resistance (-2.5 V to +2.5 V)	≥ 9 MOhm
• -5 V to +5 V	Yes
• Input resistance (-5 V to +5 V)	≥ 9 MOhm
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	≥ 250 Ohm
Voltage input	
• permissible input voltage for voltage input (destruction limit), max.	35 V
Cable length	
• Cable length, shielded, max.	Twisted and shielded in pairs

Product type designation	6ES7 231-4HA30-0XB0 SB1231 AI 1x12 BIT
Analog value creation	
Measurement principle	Integrating
Integrations and conversion time/ resolution per channel	
• Resolution with overrange (bit including sign), max.	11 bit; + sign
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 Hz
Smoothing of measured values	
• parameterizable	Yes
• Step: None	Yes
• Step: Low	Yes
• Step: Medium	Yes
• Step: High	Yes
Errors/accuracies	
Temperature error (relative to input area)	25 °C ± 0.3% to 55 °C ± 0.6% total measurement range
Alarms/diagnostics/status information	
Alarms	
• Alarms	Yes
• Diagnostic alarm	Yes
Diagnostics	
• Diagnostic functions	Yes
• Wire break	No
Diagnostic indication LED	
• for status of the inputs	Yes
• for maintenance	Yes
Climatic and mechanical conditions for storage and transport	
Climatic conditions for storage and transport	
• Free fall	
- Drop height, max. (in packaging)	0.3 m; five times, in dispatch package
• Temperature	
- Permissible temperature range	-40 °C to +70 °C
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 660 hPa
• Relative humidity	
- Permissible range (without condensation) at 25 °C	95%
Mechanical and climatic conditions during operation	
Climatic conditions in operation	
• Air pressure acc. to IEC 60068-2-13	
- Permissible air pressure	1080 to 795 hPa
• Pollutant concentrations	
- SO ₂ at RH < 60% without condensation	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free

SIMATIC S7-1200

Analog modules

SB 1231 analog input module

Technical specifications (continued)

Product type designation	6ES7 231-4HA30-0XB0 SB1231 AI 1x12 BIT
Degree of protection IP20	Yes
Standards, approvals, certificates CE mark	Yes
C-TICK	Yes
FM approval	Yes
Mechanics/material Type of housing (front) • Plastic	Yes
Dimensions and weight Dimensions • Width • Height • Depth	38 mm 62 mm 21 mm
Weight • Weight, approx.	35 g

Ordering data

Order No.

SB 1231 signal board analog input module 1 analog input, ±10 V with 12 bit I or 0 ... 20 mA with 11 bit	6ES7 231-4HA30-0XB0
Terminal block (spare part) for signal board with 6 screws, gold-plated; 4 units I	6ES7 292-1BF30-0XA0
S7-1200 automation system, system manual For SIMATIC S7-1200 and STEP 7 Basic German K English K French K Spanish K Italian K Chinese K	6ES7 298-8FA30-8AH0 6ES7 298-8FA30-8BH0 6ES7 298-8FA30-8CH0 6ES7 298-8FA30-8DH0 6ES7 298-8FA30-8EH0 6ES7 298-8FA30-8KH0
S7-1200 automation system, Easy Book Brief instructions German K English K French K Spanish K Italian K Chinese K	6ES7 298-8FA30-8AQ0 6ES7 298-8FA30-8BQ0 6ES7 298-8FA30-8CQ0 6ES7 298-8FA30-8DQ0 6ES7 298-8FA30-8EQ0 6ES7 298-8FA30-8KQ0
STEP 7 Basic V11 engineering software Target system: SIMATIC S7-1200 controllers and the associated I/O. Requirements: Windows XP Home SP3, Windows XP Professional SP3 (32 bit), Windows 7 Home Premium, Windows 7 Professional (32 bit), Windows 7 Enterprise (32 bit), Windows 7 Ultimate (32 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32 bit) Type of delivery: German, English, Chinese, Italian, French, Spanish Single license Upgrade STEP 7 Basic V10.5 to STEP 7 Basic V11, single license Powerpack STEP 7 Basic V11 to STEP 7 Prof. V11, floating license STEP 7 Basic V11, trial license STEP 7 Basic Software Update Service, 1 year	6ES7 822-0AA01-0YA0 6ES7 822-0AA01-0YE0 6ES7 822-1AA01-0YC5 6ES7 822-0AA01-0YA7 6ES7 822-0AA00-0YL0

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