



SIMATIC S7-1200, Analog input, SM 1231, 8 AI, +/-10 V, +/-5 V, +/-2.5 V, or 0-20 mA/4-20 mA, 12 bit+sign or (13 bit ADC)

General information	
Product type designation	SM 1231, AI 8x13 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	45 mA
from backplane bus 5 V DC, typ.	90 mA
Power loss	
Power loss, typ.	1.5 W
Analog inputs	
Number of analog inputs	8; Current or voltage differential inputs
permissible input voltage for voltage input (destruction limit), max.	35 V
permissible input current for current input (destruction limit), max.	40 mA
Cycle time (all channels) max.	625 µs
Input ranges	
• Voltage	Yes; ±10V, ±5V, ±2.5V
• Current	Yes; 4 to 20 mA, 0 to 20 mA
• Thermocouple	No
• Resistance thermometer	No
• Resistance	Yes
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)	280 Ω
• 4 mA to 20 mA	Yes
— Input resistance (4 mA to 20 mA)	280 Ω
Thermocouple (TC)	
Temperature compensation	
— parameterizable	No
Analog value generation for the inputs	

Integration and conversion time/resolution per channel	
- Resolution with overrange (bit including sign), max. - Integration time, parameterizable - Interference voltage suppression for interference frequency f1 in Hz	12 bit; + sign Yes 40 dB, DC to 60 V for interference frequency 50 / 60 Hz
Smoothing of measured values	
- parameterizable - Step: None - Step: low - Step: Medium - Step: High	Yes Yes Yes Yes Yes
Errors/accuracies	
Temperature error (relative to input 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 range, (+/-) - Current, relative to input range, (+/-)	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
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostics function	Yes
Alarms	
Diagnostic alarm	Yes
Diagnoses	
- Monitoring the supply voltage - Wire-break	Yes Yes
Diagnostics indication LED	
- for status of the inputs - for maintenance	Yes Yes
Degree and class of protection	
IP degree of protection	IP20
Standards, approvals, certificates	
CE mark	Yes
CSA approval	Yes
UL approval	Yes
cULus	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
Marine approval	Yes
Ambient conditions	
Free fall	
Fall height, max.	0.3 m; five times, in product package
Ambient temperature during operation	
- min. - max. - horizontal installation, min. - horizontal installation, max. - vertical installation, min. - vertical installation, max.	-20 °C 60 °C -20 °C 60 °C -20 °C 50 °C
Ambient temperature during storage/transportation	
- min. - max.	-40 °C 70 °C
Air pressure acc. to IEC 60068-2-13	
- Operation, min. - Operation, max. - Storage/transport, min. - Storage/transport, max.	795 hPa 1 080 hPa 660 hPa 1 080 hPa

Relative humidity	
• Operation at 25 °C without condensation, max.	95 %
Pollutant concentrations	
• SO2 at RH < 60% without condensation	SO2: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free
Connection method	
required front connector	Yes
Mechanics/material	
Enclosure material (front)	
• Plastic	Yes
Dimensions	
Width	45 mm
Height	100 mm
Depth	75 mm
Weights	
Weight, approx.	180 g
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