

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)	Yes
• 24 V DC	
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; $\pm 10\text{V}$, $\pm 5\text{V}$, $\pm 2.5\text{V}$
• 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)	$\geq 9\text{ MOhm}$
• -2.5 V to +2.5 V	Yes
• Input resistance (-2.5 V to +2.5 V)	$\geq 9\text{ MOhm}$
• -5 V to +5 V	Yes
• Input resistance (-5 V to +5 V)	$\geq 9\text{ MOhm}$
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	$280\ \Omega$
• 4 mA to 20 mA	Yes
• Input resistance (4 mA to 20 mA)	$280\ \Omega$
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.	12 bit; + sign
• Integration time, parameterizable	Yes
• Interference voltage suppression for interference frequency f_1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 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 range), (+/-)	$25\text{ °C} \pm 0.1\%$, to $55\text{ °C} \pm 0.2\%$ total measurement range
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.1 %
• Current, relative to input range, (+/-)	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
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes
Diagnostics indication LED	
• for status of the inputs	Yes
• for maintenance	Yes
Degree and class of protection	
Degree of protection acc. to EN 60529	
• IP20	Yes
Standards, approvals, certificates	
CE mark	Yes
CSA approval	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
Marine approval	Yes
Ambient conditions	
Free fall	
• Fall height, max.	0.3 m; five times, in product package
Ambient temperature during operation	
• min.	-20 °C
• max.	60 °C
• horizontal installation, min.	-20 °C
• horizontal installation, max.	60 °C
• vertical installation, min.	-20 °C
• vertical installation, max.	50 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Air pressure acc. to IEC 60068-2-13	
• Operation, min.	795 hPa
• Operation, max.	1 080 hPa
• Storage/transport, min.	660 hPa
• Storage/transport, max.	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)	Yes
• Plastic	
Dimensions	
Width	45 mm
Height	100 mm
Depth	75 mm
Weights	
Weight, approx.	180 g
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