



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

General information	
Product type designation	SM 1231, AI 4x13 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	45 mA
from backplane bus 5 V DC, typ.	80 mA
Power loss	
Power loss, typ.	1.5 W
Analog inputs	
Number of analog inputs	4; 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 μ s
Input ranges	
<ul style="list-style-type: none"> • Voltage • Current • Thermocouple • Resistance thermometer • Resistance 	Yes; $\pm 10V$, $\pm 5V$, $\pm 2.5V$ Yes; 4 to 20 mA, 0 to 20 mA No No No
Input ranges (rated values), voltages	
<ul style="list-style-type: none"> • -10 V to +10 V — Input resistance (-10 V to +10 V) • -2.5 V to +2.5 V — Input resistance (-2.5 V to +2.5 V) • -5 V to +5 V — Input resistance (-5 V to +5 V) 	Yes ≥ 9 MOhm Yes ≥ 9 MOhm Yes ≥ 9 MOhm
Input ranges (rated values), currents	
<ul style="list-style-type: none"> • 0 to 20 mA — Input resistance (0 to 20 mA) • 4 mA to 20 mA — Input resistance (4 mA to 20 mA) 	Yes 280 Ω Yes 280 Ω
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> • Resolution with overrange (bit including sign), max. • Integration time, parameterizable 	12 bit; + sign Yes

<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> parameterizable 	Yes
<ul style="list-style-type: none"> Step: None 	Yes
<ul style="list-style-type: none"> Step: low 	Yes
<ul style="list-style-type: none"> Step: Medium 	Yes
<ul style="list-style-type: none"> Step: High 	Yes
Errors/accuracies	
Temperature error (relative to input range), (+/-)	25 °C \pm 0.1%, to 55 °C \pm 0.2% total measurement range
Basic error limit (operational limit at 25 °C)	
<ul style="list-style-type: none"> Voltage, relative to input range, (+/-) 	0.1 %
<ul style="list-style-type: none"> Current, relative to input range, (+/-) 	0.1 %
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, $f_1 =$ interference frequency	
<ul style="list-style-type: none"> Common mode voltage, max. 	12 V
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostics function	Yes
Alarms	
<ul style="list-style-type: none"> Diagnostic alarm 	Yes
Diagnoses	
<ul style="list-style-type: none"> Monitoring the supply voltage 	Yes
<ul style="list-style-type: none"> Wire-break 	Yes
Diagnostics indication LED	
<ul style="list-style-type: none"> for status of the inputs 	Yes
<ul style="list-style-type: none"> for maintenance 	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	
<ul style="list-style-type: none"> Fall height, max. 	0.3 m; five times, in product package
Ambient temperature during operation	
<ul style="list-style-type: none"> min. 	-20 °C
<ul style="list-style-type: none"> max. 	60 °C
<ul style="list-style-type: none"> horizontal installation, min. 	-20 °C
<ul style="list-style-type: none"> horizontal installation, max. 	60 °C
<ul style="list-style-type: none"> vertical installation, min. 	-20 °C
<ul style="list-style-type: none"> vertical installation, max. 	50 °C
Ambient temperature during storage/transportation	
<ul style="list-style-type: none"> min. 	-40 °C
<ul style="list-style-type: none"> max. 	70 °C
Air pressure acc. to IEC 60068-2-13	
<ul style="list-style-type: none"> Operation, min. 	795 hPa
<ul style="list-style-type: none"> Operation, max. 	1 080 hPa
<ul style="list-style-type: none"> Storage/transport, min. 	660 hPa
<ul style="list-style-type: none"> Storage/transport, max. 	1 080 hPa
Relative humidity	
<ul style="list-style-type: none"> Operation at 25 °C without condensation, max. 	95 %
Pollutant concentrations	

- SO2 at RH < 60% without condensation

S02: < 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

last modified: 2/26/2021 