



Figure similar

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.	60 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 μ s
Input ranges	
<ul style="list-style-type: none"> • Voltage • Current • Thermocouple • Resistance thermometer • Resistance 	<ul style="list-style-type: none"> Yes; ± 10V, ± 5V, ± 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 <ul style="list-style-type: none"> — Input resistance (-10 V to +10 V) • -2.5 V to +2.5 V <ul style="list-style-type: none"> — Input resistance (-2.5 V to +2.5 V) • -5 V to +5 V <ul style="list-style-type: none"> — Input resistance (-5 V to +5 V) 	<ul style="list-style-type: none"> Yes ≥ 9 MOhm Yes ≥ 9 MOhm Yes ≥ 9 MOhm
Input ranges (rated values), currents	
<ul style="list-style-type: none"> • 0 to 20 mA <ul style="list-style-type: none"> — Input resistance (0 to 20 mA) • 4 mA to 20 mA <ul style="list-style-type: none"> — Input resistance (4 mA to 20 mA) 	<ul style="list-style-type: none"> Yes 280 Ω Yes 280 Ω
Thermocouple (TC)	
Temperature compensation	
— parameterizable	No
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. 	12 bit; + sign
<ul style="list-style-type: none"> Integration time, parameterizable 	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
Ecological footprint	
<ul style="list-style-type: none"> environmental product declaration 	Yes
Global warming potential	
— global warming potential, (total) [CO2 eq]	43.1 kg
— global warming potential, (during production) [CO2 eq]	7.62 kg
— global warming potential, (during operation) [CO2 eq]	36 kg
— global warming potential, (after end of life cycle) [CO2 eq]	-0.544 kg
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	
• 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)	
• Plastic	Yes
Dimensions	
Width	45 mm
Height	100 mm
Depth	75 mm
Weights	
Weight, approx.	180 g
Classifications	

	Version	Classification
eClass	14	27-24-22-01
eClass	12	27-24-22-01
eClass	9.1	27-24-22-01
eClass	9	27-24-22-01
eClass	8	27-24-22-01
eClass	7.1	27-24-22-01
eClass	6	27-24-22-01
ETIM	10	EC001420
ETIM	9	EC001420
ETIM	8	EC001420
ETIM	7	EC001420
IDEA	4	3562
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval



[Manufacturer Declaration](#)

[Miscellaneous](#)



[Metrological Approval](#)

General Product Approval **EMV** **For use in hazardous locations**



[China RoHS](#)

[Manufacturer Declaration](#)



For use in hazardous locations **Maritime application**



IECEX

[FM](#)



UL

[Miscellaneous](#)

[CCC-Ex](#)



Maritime application

Environment



[CCS \(China Classification Society\)](#)

[KR \(Korean Register of Shipping\)](#)



last modified:

5/16/2025