



SIMATIC S7-1200, Analog input, SM 1231 TC, 4 AI thermocouples

General information	
Product type designation	SM 1231, AI 4x16 bit TC
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	40 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; Thermocouples
permissible input voltage for voltage input (destruction limit), max.	±35 V
Technical unit for temperature measurement adjustable	Degrees Celsius/degrees Fahrenheit
Input ranges	
<ul style="list-style-type: none"> <li>• Voltage</li> <li>• Current</li> <li>• Thermocouple</li> <li>• Resistance thermometer</li> <li>• Resistance</li> </ul>	Yes No Yes; J, K, T, E, R, S, N, C, TXK/XK(L); voltage range: ±80 mV No No
Input ranges (rated values), voltages	
<ul style="list-style-type: none"> <li>• -80 mV to +80 mV</li> <li>— Input resistance (-80 mV to +80 mV)</li> </ul>	Yes ≥1 MOhm
Input ranges (rated values), thermocouples	
<ul style="list-style-type: none"> <li>• Type B</li> <li>• Type C</li> <li>• Type E</li> <li>• Type J</li> <li>• Type K</li> <li>• Type N</li> <li>• Type R</li> <li>• Type S</li> <li>• Type T</li> <li>• Type TXK/TXK(L) to GOST</li> </ul>	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes
Thermocouple (TC)	
Temperature compensation	
— parameterizable	No

Analog value generation for the inputs	
Measurement principle	integrating
Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> <li>Resolution with overrange (bit including sign), max.</li> <li>Integration time, parameterizable</li> <li>Interference voltage suppression for interference frequency f1 in Hz</li> </ul>	15 bit; + sign No 85 dB at 50 / 60 / 400 Hz
Smoothing of measured values	
<ul style="list-style-type: none"> <li>parameterizable</li> </ul>	Yes
Errors/accuracies	
Temperature error (relative to input range), (+/-)	25 °C ±0.1%, to 55 °C ±0.2% total measurement range
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.5 %
Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$ , f1 = interference frequency	
<ul style="list-style-type: none"> <li>Common mode interference, min.</li> </ul>	120 dB
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostics function	Yes; Can be read out
Alarms	
<ul style="list-style-type: none"> <li>Diagnostic alarm</li> </ul>	Yes
Diagnoses	
<ul style="list-style-type: none"> <li>Monitoring the supply voltage</li> <li>Wire-break</li> </ul>	Yes Yes
Diagnostics indication LED	
<ul style="list-style-type: none"> <li>for status of the inputs</li> <li>for maintenance</li> </ul>	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	
<ul style="list-style-type: none"> <li>Fall height, max.</li> </ul>	0.3 m; five times, in product package
Ambient temperature during operation	
<ul style="list-style-type: none"> <li>min.</li> <li>max.</li> <li>horizontal installation, min.</li> <li>horizontal installation, max.</li> <li>vertical installation, min.</li> <li>vertical installation, max.</li> </ul>	-20 °C 60 °C -20 °C 60 °C -20 °C 50 °C
Ambient temperature during storage/transportation	
<ul style="list-style-type: none"> <li>min.</li> <li>max.</li> </ul>	-40 °C 70 °C
Air pressure acc. to IEC 60068-2-13	
<ul style="list-style-type: none"> <li>Operation, min.</li> <li>Operation, max.</li> <li>Storage/transport, min.</li> <li>Storage/transport, max.</li> </ul>	795 hPa 1 080 hPa 660 hPa 1 080 hPa
Relative humidity	
<ul style="list-style-type: none"> <li>Operation at 25 °C without condensation, max.</li> </ul>	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

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