

SIMATIC S7-1200 basic controller

I/O modules

Analog modules

SM 1231 thermocouple modules**Overview**

- For the convenient recording of temperatures with great accuracy
- 7 common thermocouple types can be used
- Also for the measurement of analog signals with a low level (± 80 mV)
- Can easily be retrofitted to existing plant

Technical specifications

Article number	6ES7231-5QD32-0XB0	6ES7231-5QF32-0XB0
	S7-1200, ANALOG INPUT SM 1231 TC, 4 AI	S7-1200, ANALOG INPUT SM 1231 TC, 8 AI
Product type designation		
Supply voltage		
Rated value (DC)		
• 24 V DC	Yes	Yes
Input current		
Current consumption, typ.	40 mA	40 mA
from backplane bus 5 V DC, typ.	80 mA	80 mA
Power losses		
Power loss, typ.	1.5 W	1.5 W
Analog inputs		
Number of analog inputs	4; Thermocouples	8; Thermocouples
permissible input frequency for current input (destruction limit), max.	± 35 V	± 35 V
Technical unit for temperature measurement adjustable	Degrees Celsius/degrees Fahrenheit	Degrees Celsius/degrees Fahrenheit
Input ranges		
• Thermocouple	Yes; J, K, T, E, R, S, N, C, TXK/XK(L); voltage range: ± 80 mV	Yes; J, K, T, E, R & S, B, N, C, TXK/XK(L); voltage range: ± 80 mV
• Resistance thermometer	No	No
• Resistance	No	No
Input ranges (rated values), voltages		
• -80 mV to +80 mV	Yes	Yes
• Input resistance (-80 mV to +80 mV)	≥ 1 MOhm	≥ 1 MOhm
Input ranges (rated values), thermoelements		
• Type B	Yes	Yes
• Type C	Yes	Yes
• Type E	Yes	Yes
• Type J	Yes	Yes
• Type K	Yes	Yes
• Type N	Yes	Yes
• Type R	Yes	Yes
• Type S	Yes	Yes
• Type T	Yes	Yes
• Type TXK/TXK(L) to GOST	Yes	Yes
Thermocouple (TC)		
• permissible input voltage for voltage input (destruction limit), max.	± 35 V	± 35 V
Temperature compensation		
- Parameterizable	No	No

Technical specifications (continued)

Article number	6ES7231-5QD32-0XB0 S7-1200, ANALOG INPUT SM 1231 TC, 4 AI	6ES7231-5QF32-0XB0 S7-1200, ANALOG INPUT SM 1231 TC, 8 AI
Analog outputs		
Number of analog outputs	0	0
Analog value creation		
Measurement principle	integrating	integrating
Integration and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	15 bit; + sign	15 bit; + sign
• Integration time, parameterizable	No	No
• Interference voltage suppression for interference frequency f1 in Hz	85 dB at 50 / 60 / 400 Hz	85 dB at 50 / 60 / 400 Hz
Analog value generation (in isochronous mode)		
Smoothing of measured values		
• Parameterizable	Yes	Yes
Errors/accuracies		
Temperature error (relative to input range), (+/-)	25 °C ±0.1%, to 55 °C ±0.2% total measurement range	25 °C ±0.1%, to 55 °C ±0.2% total measurement range
Repeat accuracy in steady state at 25 °C (relative to output area), (+/-)	0.5 %	0.5 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency		
• Common mode interference, min.	120 dB	120 dB
Interrupts/diagnostics/ status information		
Alarms		
• Alarms	Yes	Yes
• Diagnostic alarm	Yes	Yes
Diagnostic messages		
• Diagnostic functions	Yes; Can be read out	Yes; Can be read out
• Monitoring the supply voltage	Yes	Yes
• Wire break	Yes	Yes
Diagnostics indication LED		
• for status of the inputs	Yes	Yes
• for maintenance	Yes	Yes
Degree and class of protection		
Degree of protection to EN 60529		
• IP20	Yes	Yes
Standards, approvals, certificates		
CE mark	Yes	Yes
CSA approval	Yes	Yes
FM approval	Yes	Yes
RCM (formerly C-TICK)	Yes	Yes
Highest safety class achievable in safety mode		
• SIL according to IEC 61508	none	none

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Ambient conditions		
Free fall		
• Drop height, max. (in packaging)	0.3 m; five times, in dispatch package	0.3 m; five times, in dispatch package
Ambient temperature in operation		
• Permissible temperature range	-20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing	-20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing
• Min.	-20 °C	-20 °C
• max.	60 °C	60 °C
Storage/transport temperature		
• Min.	-40 °C	-40 °C
• max.	70 °C	70 °C
Air pressure acc. to IEC 60068-2-13		
• Operation, min.	795 hPa	795 hPa
• Operation, max.	1 080 hPa	1 080 hPa
• Storage/transport, min.	660 hPa	660 hPa
• Storage/transport, max.	1 080 hPa	1 080 hPa
Relative humidity		
• Permissible range (without condensation) at 25 °C	95 %	95 %
Pollutant concentrations		
- SO ₂ at RH < 60% without condensation	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free	SO ₂ : < 0.5 ppm; H ₂ S: < 0.1 ppm; RH < 60% condensation-free
Connection method		
required front connector	Yes	Yes
Mechanics/material		
Type of housing (front)		
• plastic	Yes	Yes
Dimensions		
Width	45 mm	45 mm
Height	100 mm	100 mm
Depth	75 mm	75 mm
Weights		
Weight, approx.	180 g	220 g

Ordering data**Article No.****Article No.****SM 1231 thermocouple module**

4 inputs +/- 80 mV, resolution 15 bits + sign, thermocouple types J, K, S, T, R, E, N

8 inputs +/- 80 mV, resolution 15 bits + sign, thermocouple types J, K, T, E, R, S, N, C, TXK/XK(L)

6ES7231-5QD32-0XB0**6ES7231-5QF32-0XB0****Accessories****Terminal block (spare part)**

for 8/16-channel analog signal modules; with 7 screws, gold-plated; 4 units

6ES7292-1BG30-0XA0

for 32-channel analog signal modules; with 11 screws, gold-plated; 4 units

6ES7292-1BL30-0XA0**Extension cable for two-tier configuration**

for connecting digital/analog signal modules; length 2 m

6ES7290-6AA30-0XA0**Front flap set (spare part)**

for 8/16-channel signal modules

6ES7291-1BA30-0XA0