

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 S7-1200, ANALOG INPUT SM 1231 TC, 4 AI	6ES7231-5QF32-0XB0 S7-1200, ANALOG INPUT SM 1231 TC, 8 AI
General information		
Product type designation	SM 1231 TC 4x16 bit	SM 1231 TC 8x16bit
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 loss		
Power loss, typ.	1.5 W	1.5 W
Analog inputs		
Number of analog inputs	4; Thermocouples	8; Thermocouples
permissible input voltage for current input (destruction limit), max.	± 35 V	± 35 V
permissible input voltage for voltage input (destruction limit), max.	± 35 V	± 35 V
Technical unit for temperature measurement adjustable	Degrees Celsius/degrees Fahrenheit	Degrees Celsius/degrees Fahrenheit
Input ranges		
• Voltage	Yes	Yes
• Current	No	No
• 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 ranges (rated values), thermocouples		
• 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)		
Temperature compensation		
- parameterizable	No	No

SIMATIC S7-1200 Basic Controllers

I/O modules

Analog modules

SM 1231 thermocouple modules

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 value generation for the inputs		
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
Smoothering 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 range), (+/-)	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	Yes	Yes
Diagnostic functions	Yes; Can be read out	Yes; Can be read out
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnostic messages		
• 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 acc. 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
Ambient conditions		
Free fall		
• Fall height, max.	0.3 m; five times, in product package	0.3 m; five times, in product package
Ambient temperature during 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
Pollutant concentrations		
- SO2 at RH < 60% without condensation	SO2: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free	SO2: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free

SIMATIC S7-1200 Basic Controllers

I/O modules

Analog modules

SM 1231 thermocouple modules**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
Connection method		
required front connector	Yes	Yes
Mechanics/material		
Enclosure material (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 6ES7231-5QD32-0XB0,
6ES7231-5QF32-0XB0

With 7 screws, gold-plated; 4 units

6ES7292-1BG30-0XA0**Extension cable for two-tier configuration**

For connecting digital/analog
signal modules;
length 2 m

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

For modules with a width of 45 mm

6ES7291-1BA30-0XA0

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Note:

SIPLUS extreme products are based on SIMATIC standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme specific information was added.

Technical specifications

Article number	6AG1231-5QF32-4XB0	6AG1231-5QD32-4XB0
Based on	6ES7231-5QF32-0XB0 SIPLUS S7-1200 SM 1231 8AI TC 16Bit	6ES7231-5QD32-0XB0 SIPLUS S7-1200 SM 1231 4AI TC 16Bit
Ambient conditions		
Free fall		
• Fall height, max.	0.3 m; five times, in product package	0.3 m; five times, in product package
Ambient temperature during operation		
• min.	-20 °C; = Tmin; Startup @ 0 °C	-20 °C; = Tmin; Startup @ 0 °C
• max.	60 °C; = Tmax	60 °C; = Tmax
Extended ambient conditions		
• relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity		
- With condensation, tested in accordance with IEC 60068-2-38, max.	100%; RH incl. condensation/frost (no commissioning under condensation conditions)	100%; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance		
- against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!
- against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
- against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

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

(Extended temperature range and exposure to media)

Ambient temperature range
-40 ... +70 °C

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

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

6AG1231-5QF32-4XB0**6AG1231-5QD32-4XB0****Accessories**

See SIMATIC S7-1200
thermocouple module SM 1231,
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