

SIPLUS S7-1200 SM 1231 4AI with conformal coating based on
6ES7231-5ND32-0XB0 Analog input, SM 1231, 4 AI, +/-10 V, +/-5 V,
+/-2.5 V, +/-1.25 or 0-20 mA/4-20 mA, 15 bit+sign bit

General information	
Product type designation	SM 1231, AI 4x16 bit
Supply voltage	
Rated value (DC)	24 V
Input current	
Current consumption, typ.	65 mA
from backplane bus 5 V DC, typ.	80 mA
Power loss	
Power loss, typ.	1.8 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	
• Voltage	Yes; ± 10 V, ± 5 V, ± 2.5 V or ± 1.25 V
• Current	Yes; 4 to 20 mA, 0 to 20 mA
• Thermocouple	No
• Resistance thermometer	No
• Resistance	Yes
Input ranges (rated values), voltages	
• -1.25 V to +1.25 V	Yes
• -10 V to +10 V	Yes
— Input resistance (-10 V to +10 V)	≥ 9 MOhm
• -2.5 V to +2.5 V	Yes
— Input resistance (-2.5 V to +2.5 V)	≥ 9 MOhm
• -5 V to +5 V	Yes
— Input resistance (-5 V to +5 V)	≥ 9 MOhm
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• 4 mA to 20 mA	Yes

Analog value generation for the inputs

Integration and conversion time/resolution per channel

- | | |
|--|---|
| • Resolution with overrange (bit including sign), max. | 15 bit; + sign |
| • Integration time, parameterizable | Yes |
| • Interference voltage suppression for interference frequency f1 in Hz | 40 dB, DC to 60 V for interference frequency 50 / 60 Hz |

Smoothing of measured values

- | | |
|-------------------|-----|
| • parameterizable | Yes |
| • Step: None | Yes |
| • Step: low | Yes |
| • Step: Medium | Yes |
| • Step: High | Yes |

Errors/accuracies

Temperature error (relative to input range), (+/-)	25 °C ±0.1% / ±0.3% total measurement range
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Basic error limit (operational limit at 25 °C)

- | | |
|---|-------|
| • Voltage, relative to input range, (+/-) | 0.1 % |
| • Current, relative to input range, (+/-) | 0.1 % |

Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$, f1 = interference frequency

- | | |
|-----------------------------|------|
| • Common mode voltage, max. | 12 V |
|-----------------------------|------|

Interrupts/diagnostics/status information

Alarms	Yes
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Diagnostics function	Yes
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Alarms

- | | |
|--------------------|-----|
| • Diagnostic alarm | Yes |
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Diagnoses

- | | |
|---------------------------------|-----|
| • Monitoring the supply voltage | Yes |
| • Wire-break | Yes |

Diagnostics indication LED

- | | |
|----------------------------|-----|
| • for status of the inputs | Yes |
| • for maintenance | Yes |

Degree and class of protection

IP degree of protection	IP20
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Ambient conditions

Free fall

- | | |
|---------------------|---------------------------------------|
| • Fall height, max. | 0.3 m; five times, in product package |
|---------------------|---------------------------------------|

Ambient temperature during operation

- | | |
|--------|--|
| • min. | -20 °C; = Tmin (incl. condensation/frost); start-up @ 0 °C |
| • max. | 60 °C; = Tmax |

Ambient temperature during storage/transportation

- | | |
|--------|--------|
| • min. | -40 °C |
|--------|--------|

• max.	70 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	5 000 m
• Ambient air temperature-barometric pressure-altitude	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)
Relative humidity	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
Coolants and lubricants	
— Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems	
— to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
— to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
Use on ships/at sea	
— to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
— to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *
Usage in industrial process technology	
— Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
— Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)
Remark	
— Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life

- Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A

Yes; Conformal coating, Class A

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:

10/13/2020