



Figure similar

SIPLUS S7-1200 SM 1231 based on 6ES7231-5PD32-0XB0 with conformal coating, -20...+60 °C, analog input, SM 1231 RTD 4xAI RTD module

| General information                                                   |                                                                                                                                             |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Product type designation                                              | SM 1231, AI 4x16 bit RTD                                                                                                                    |
| based on                                                              | <a href="#">6ES7231-5PD32-0XB0</a>                                                                                                          |
| 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; Resistance thermometer                                                                                                                   |
| permissible input voltage for voltage input (destruction limit), max. | ±35 V                                                                                                                                       |
| Technical unit for temperature measurement adjustable                 | Degrees Celsius/degrees Fahrenheit                                                                                                          |
| Input ranges                                                          |                                                                                                                                             |
| • Voltage                                                             | No                                                                                                                                          |
| • Current                                                             | No                                                                                                                                          |
| • Thermocouple                                                        | No                                                                                                                                          |
| • Resistance thermometer                                              | Yes; Resistance-type transmitter: Pt10, Pt50, Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10, Cu50, Cu100, LG-Ni1000 |
| • Resistance                                                          | Yes; 150 Ω, 300 Ω, 600 Ω                                                                                                                    |
| Input ranges (rated values), resistance thermometer                   |                                                                                                                                             |
| • Cu 10                                                               | Yes                                                                                                                                         |
| — Input resistance (Cu 10)                                            | 10 Ω                                                                                                                                        |
| • Ni 100                                                              | Yes                                                                                                                                         |
| — Input resistance (Ni 100)                                           | 100 Ω                                                                                                                                       |
| • Ni 1000                                                             | Yes                                                                                                                                         |
| — Input resistance (Ni 1000)                                          | 1 000 Ω                                                                                                                                     |
| • LG-Ni 1000                                                          | Yes                                                                                                                                         |
| — Input resistance (LG-Ni 1000)                                       | 1 000 Ω                                                                                                                                     |
| • Ni 120                                                              | Yes                                                                                                                                         |
| — Input resistance (Ni 120)                                           | 120 Ω                                                                                                                                       |
| • Ni 200                                                              | Yes                                                                                                                                         |
| — Input resistance (Ni 200)                                           | 200 Ω                                                                                                                                       |
| • Ni 500                                                              | Yes                                                                                                                                         |
| — Input resistance (Ni 500)                                           | 500 Ω                                                                                                                                       |
| • Pt 100                                                              | Yes                                                                                                                                         |
| — Input resistance (Pt 100)                                           | 100 Ω                                                                                                                                       |
| • Pt 1000                                                             | Yes                                                                                                                                         |

|                                                                                                     |                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — Input resistance (Pt 1000)                                                                        | 1 000 $\Omega$                                                                                                                                                   |
| • Pt 200                                                                                            | Yes                                                                                                                                                              |
| — Input resistance (Pt 200)                                                                         | 200 $\Omega$                                                                                                                                                     |
| • Pt 500                                                                                            | Yes                                                                                                                                                              |
| — Input resistance (Pt 500)                                                                         | 500 $\Omega$                                                                                                                                                     |
| Input ranges (rated values), resistors                                                              |                                                                                                                                                                  |
| • 0 to 150 ohms                                                                                     | Yes                                                                                                                                                              |
| • 0 to 300 ohms                                                                                     | Yes                                                                                                                                                              |
| • 0 to 600 ohms                                                                                     | Yes                                                                                                                                                              |
| Thermocouple (TC)                                                                                   |                                                                                                                                                                  |
| Temperature compensation                                                                            |                                                                                                                                                                  |
| — parameterizable                                                                                   | No                                                                                                                                                               |
| Analog value generation for the inputs                                                              |                                                                                                                                                                  |
| Measurement principle                                                                               | integrating                                                                                                                                                      |
| Integration and conversion time/resolution per channel                                              |                                                                                                                                                                  |
| • Resolution with overrange (bit including sign), max.                                              | 15 bit; + sign                                                                                                                                                   |
| • Integration time, parameterizable                                                                 | No                                                                                                                                                               |
| • Interference voltage suppression for interference frequency $f_1$ in Hz                           | 85 dB at 50 / 60 / 400 Hz                                                                                                                                        |
| Errors/accuracies                                                                                   |                                                                                                                                                                  |
| Temperature error (relative to input range), (+/-)                                                  | 25 °C $\pm 0.1\%$ , to 55 °C $\pm 0.2\%$ total measurement range                                                                                                 |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)                          | 0.05 %                                                                                                                                                           |
| Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$ , $f_1$ = interference frequency |                                                                                                                                                                  |
| • Common mode interference, min.                                                                    | 120 dB                                                                                                                                                           |
| Interrupts/diagnostics/status information                                                           |                                                                                                                                                                  |
| Alarms                                                                                              | Yes                                                                                                                                                              |
| Diagnostics function                                                                                | Yes; Can be read out                                                                                                                                             |
| Alarms                                                                                              |                                                                                                                                                                  |
| • Diagnostic alarm                                                                                  | Yes                                                                                                                                                              |
| 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                                                                                                                                                             |
| Standards, approvals, certificates                                                                  |                                                                                                                                                                  |
| Ecological footprint                                                                                |                                                                                                                                                                  |
| • environmental product declaration                                                                 | Yes                                                                                                                                                              |
| Global warming potential                                                                            |                                                                                                                                                                  |
| — global warming potential, (total) [CO <sub>2</sub> eq]                                            | 43.1 kg                                                                                                                                                          |
| — global warming potential, (during production) [CO <sub>2</sub> eq]                                | 7.62 kg                                                                                                                                                          |
| — global warming potential, (during operation) [CO <sub>2</sub> eq]                                 | 36 kg                                                                                                                                                            |
| — global warming potential, (after end of life cycle) [CO <sub>2</sub> eq]                          | -0.544 kg                                                                                                                                                        |
| 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                                                                                                       |        |                                                                                                                                                                                     |                |
| ● Operation at 25 °C without condensation, max.                                                                         |        | 95 %                                                                                                                                                                                |                |
| ● 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.                                                                                                         |        | 220 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   | 9                                                                                                                                                                                   | EC001420       |
|                                                                                                                         | ETIM   | 8                                                                                                                                                                                   | EC001420       |

|        |    |             |
|--------|----|-------------|
| ETIM   | 7  | EC001420    |
| IDEA   | 4  | 3562        |
| UNSPSC | 15 | 32-15-17-05 |

Approvals / Certificates

General Product Approval

[Miscellaneous](#)



[Manufacturer Declaration](#)



[Metrological Approval](#)

EMV

For use in hazardous locations

Maritime application

[KC](#)



Environment



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