



Figure similar

SIMATIC S7-1200, Analog input, SM 1231 RTD, 4xAI RTD module

| General information                                                   |                                                                                                                                             |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Product type designation                                              | SM 1231, AI 4x16 bit RTD                                                                                                                    |
| 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                                                                                                                                       |

|                                                                                                                                                                                                                                                                                                                                               |                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Pt 1000 <ul style="list-style-type: none"> <li>— Input resistance (Pt 1000)</li> </ul> </li> <li>• Pt 200 <ul style="list-style-type: none"> <li>— Input resistance (Pt 200)</li> </ul> </li> <li>• Pt 500 <ul style="list-style-type: none"> <li>— Input resistance (Pt 500)</li> </ul> </li> </ul> | Yes<br>1 000 Ω<br>Yes<br>200 Ω<br>Yes<br>500 Ω      |
| <b>Input ranges (rated values), resistors</b>                                                                                                                                                                                                                                                                                                 |                                                     |
| <ul style="list-style-type: none"> <li>• 0 to 150 ohms</li> <li>• 0 to 300 ohms</li> <li>• 0 to 600 ohms</li> </ul>                                                                                                                                                                                                                           | Yes<br>Yes<br>Yes                                   |
| <b>Thermocouple (TC)</b>                                                                                                                                                                                                                                                                                                                      |                                                     |
| <b>Temperature compensation</b>                                                                                                                                                                                                                                                                                                               |                                                     |
| — Parameterizable                                                                                                                                                                                                                                                                                                                             | No                                                  |
| <b>Analog value generation for the inputs</b>                                                                                                                                                                                                                                                                                                 |                                                     |
| Measurement principle                                                                                                                                                                                                                                                                                                                         | integrating                                         |
| <b>Integration and conversion time/resolution per channel</b>                                                                                                                                                                                                                                                                                 |                                                     |
| <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<br>No<br>85 dB at 50 / 60 / 400 Hz   |
| <b>Errors/accuracies</b>                                                                                                                                                                                                                                                                                                                      |                                                     |
| 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), (+/-)                                                                                                                                                                                                                                                                    | 0.05 %                                              |
| <b>Interference voltage suppression for <math>f = n \times (f_1 \pm 1 \%)</math>, <math>f_1</math> = interference frequency</b>                                                                                                                                                                                                               |                                                     |
| <ul style="list-style-type: none"> <li>• Common mode interference, min.</li> </ul>                                                                                                                                                                                                                                                            | 120 dB                                              |
| <b>Interrupts/diagnostics/status information</b>                                                                                                                                                                                                                                                                                              |                                                     |
| Alarms                                                                                                                                                                                                                                                                                                                                        | Yes                                                 |
| Diagnostics function                                                                                                                                                                                                                                                                                                                          | Yes; Can be read out                                |
| <b>Alarms</b>                                                                                                                                                                                                                                                                                                                                 |                                                     |
| <ul style="list-style-type: none"> <li>• Diagnostic alarm</li> </ul>                                                                                                                                                                                                                                                                          | Yes                                                 |
| <b>Diagnoses</b>                                                                                                                                                                                                                                                                                                                              |                                                     |
| <ul style="list-style-type: none"> <li>• Monitoring the supply voltage</li> <li>• Wire break</li> </ul>                                                                                                                                                                                                                                       | Yes<br>Yes                                          |
| <b>Diagnostics indication LED</b>                                                                                                                                                                                                                                                                                                             |                                                     |
| <ul style="list-style-type: none"> <li>• for status of the inputs</li> <li>• for maintenance</li> </ul>                                                                                                                                                                                                                                       | Yes<br>Yes                                          |
| <b>Degree and class of protection</b>                                                                                                                                                                                                                                                                                                         |                                                     |
| IP degree of protection                                                                                                                                                                                                                                                                                                                       | IP20                                                |
| <b>Standards, approvals, certificates</b>                                                                                                                                                                                                                                                                                                     |                                                     |
| 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                                                 |
| <b>Ecological footprint</b>                                                                                                                                                                                                                                                                                                                   |                                                     |
| <ul style="list-style-type: none"> <li>• environmental product declaration</li> </ul>                                                                                                                                                                                                                                                         | Yes                                                 |
| <b>Global warming potential</b>                                                                                                                                                                                                                                                                                                               |                                                     |
| — global warming potential, (total) [CO2 eq]                                                                                                                                                                                                                                                                                                  | 43.1 kg                                             |
| — global warming potential, (during production) [CO2 eq]                                                                                                                                                                                                                                                                                      | 7.62 kg                                             |
| — global warming potential, (during operation) [CO2 eq]                                                                                                                                                                                                                                                                                       | 36 kg                                               |
| — global warming potential, (after end of life cycle) [CO2 eq]                                                                                                                                                                                                                                                                                | -0.544 kg                                           |
| <b>Ambient conditions</b>                                                                                                                                                                                                                                                                                                                     |                                                     |
| Free fall                                                                                                                                                                                                                                                                                                                                     |                                                     |

|                                                   |                                                             |
|---------------------------------------------------|-------------------------------------------------------------|
| • Fall height, max.                               | 0.3 m; five times, in product package                       |
| Ambient temperature during operation              |                                                             |
| • min.                                            | -20 °C                                                      |
| • max.                                            | 60 °C                                                       |
| • horizontal installation, min.                   | -20 °C                                                      |
| • horizontal installation, max.                   | 60 °C                                                       |
| • vertical installation, min.                     | -20 °C                                                      |
| • vertical installation, max.                     | 50 °C                                                       |
| Ambient temperature during storage/transportation |                                                             |
| • min.                                            | -40 °C                                                      |
| • max.                                            | 70 °C                                                       |
| Air pressure acc. to IEC 60068-2-13               |                                                             |
| • Operation, min.                                 | 795 hPa                                                     |
| • Operation, max.                                 | 1 080 hPa                                                   |
| • Storage/transport, min.                         | 660 hPa                                                     |
| • Storage/transport, max.                         | 1 080 hPa                                                   |
| Relative humidity                                 |                                                             |
| • Operation at 25 °C without condensation, max.   | 95 %                                                        |
| Pollutant concentrations                          |                                                             |
| • SO2 at RH < 60% without condensation            | SO2: < 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.                                   | 220 g                                                       |

| Classifications |        |         |                |
|-----------------|--------|---------|----------------|
|                 |        | Version | Classification |
|                 | eClass | 16      | 27-24-22-01    |
|                 | 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   | 10      | EC001420       |
|                 | ETIM   | 9       | EC001420       |
|                 | ETIM   | 8       | EC001420       |
|                 | ETIM   | 7       | EC001420       |
|                 | IDEA   | 4       | 3562           |
|                 | UNSPSC | 15      | 32-15-17-05    |

| Approvals / Certificates |  |
|--------------------------|--|
| General Product Approval |  |



|                     |     |                   |                   |
|---------------------|-----|-------------------|-------------------|
| General Product Ap- | EMV | Functional Safety | Test Certificates |
|---------------------|-----|-------------------|-------------------|

|                                                                                   |                                                                                   |                                              |                               |                                          |                                                    |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------|-------------------------------|------------------------------------------|----------------------------------------------------|
| proval                                                                            |                                                                                   |                                              |                               |                                          |                                                    |
|  |  | <a href="#">Type Examination Certificate</a> | <a href="#">Miscellaneous</a> | <a href="#">Special Test Certificate</a> | <a href="#">Type Test Certificates/Test Report</a> |
| Maritime application                                                              | other                                                                             |                                              |                               |                                          |                                                    |
|  |  | <a href="#">Miscellaneous</a>                | <a href="#">Miscellaneous</a> | <a href="#">Confirmation</a>             | <a href="#">Miscellaneous</a>                      |
| other                                                                             | Railway                                                                           | Environment                                  |                               |                                          |                                                    |
|  | <a href="#">Special Test Certificate</a>                                          | <a href="#">Environmental Confirmations</a>  |                               |                                          |                                                    |

last modified: 7/2/2025 