



Figure similar

SIMATIC S7-1200, Analog input, SM 1231, 8 AI,  $\pm 10$  V,  $\pm 5$  V,  $\pm 2.5$  V, or 0-20 mA/4-20 mA, 12 bit+sign or (13 bit ADC)

| General information                                                   |                                           |
|-----------------------------------------------------------------------|-------------------------------------------|
| Product type designation                                              | SM 1231, AI 8x13 bit                      |
| Supply voltage                                                        |                                           |
| Rated value (DC)                                                      | 24 V                                      |
| Input current                                                         |                                           |
| Current consumption, typ.                                             | 60 mA                                     |
| from backplane bus 5 V DC, typ.                                       | 90 mA                                     |
| Power loss                                                            |                                           |
| Power loss, typ.                                                      | 1.5 W                                     |
| Analog inputs                                                         |                                           |
| Number of analog inputs                                               | 8; 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 $\mu$ s                               |
| Input ranges                                                          |                                           |
| • Voltage                                                             | Yes; $\pm 10$ V, $\pm 5$ V, $\pm 2.5$ V   |
| • Current                                                             | Yes; 4 to 20 mA, 0 to 20 mA               |
| • Thermocouple                                                        | No                                        |
| • Resistance thermometer                                              | No                                        |
| • Resistance                                                          | No                                        |
| Input ranges (rated values), voltages                                 |                                           |
| • -10 V to +10 V                                                      | Yes                                       |
| — Input resistance (-10 V to +10 V)                                   | $\geq 9$ MOhm                             |
| • -2.5 V to +2.5 V                                                    | Yes                                       |
| — Input resistance (-2.5 V to +2.5 V)                                 | $\geq 9$ MOhm                             |
| • -5 V to +5 V                                                        | Yes                                       |
| — Input resistance (-5 V to +5 V)                                     | $\geq 9$ MOhm                             |
| Input ranges (rated values), currents                                 |                                           |
| • 0 to 20 mA                                                          | Yes                                       |
| — Input resistance (0 to 20 mA)                                       | 280 $\Omega$                              |
| • 4 mA to 20 mA                                                       | Yes                                       |
| — Input resistance (4 mA to 20 mA)                                    | 280 $\Omega$                              |
| Thermocouple (TC)                                                     |                                           |
| Temperature compensation                                              |                                           |
| — parameterizable                                                     | No                                        |
| Analog value generation for the inputs                                |                                           |
| Integration and conversion time/resolution per channel                |                                           |

|                                                                                                                                                                                                                                 |                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <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> | 12 bit; + sign<br>Yes<br>40 dB, DC to 60 V for interference frequency 50 / 60 Hz |
| <b>Smoothing of measured values</b>                                                                                                                                                                                             |                                                                                  |
| <ul style="list-style-type: none"> <li>parameterizable</li> <li>Step: None</li> <li>Step: low</li> <li>Step: Medium</li> <li>Step: High</li> </ul>                                                                              | Yes<br>Yes<br>Yes<br>Yes<br>Yes                                                  |
| <b>Errors/accuracies</b>                                                                                                                                                                                                        |                                                                                  |
| Temperature error (relative to input range), (+/-)                                                                                                                                                                              | 25 °C ±0.1%, to 55 °C ±0.2% total measurement range                              |
| <b>Basic error limit (operational limit at 25 °C)</b>                                                                                                                                                                           |                                                                                  |
| <ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> <li>Current, relative to input range, (+/-)</li> </ul>                                                                                      | 0.1 %<br>0.1 %                                                                   |
| <b>Interference voltage suppression for <math>f = n \times (f_1 \pm 1 \%)</math>, f1 = interference frequency</b>                                                                                                               |                                                                                  |
| <ul style="list-style-type: none"> <li>Common mode voltage, max.</li> </ul>                                                                                                                                                     | 12 V                                                                             |
| <b>Interrupts/diagnostics/status information</b>                                                                                                                                                                                |                                                                                  |
| Alarms                                                                                                                                                                                                                          | Yes                                                                              |
| Diagnostics function                                                                                                                                                                                                            | Yes                                                                              |
| <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>                                                                                                                                                                                                       |                                                                                  |
| <b>Free fall</b>                                                                                                                                                                                                                |                                                                                  |
| <ul style="list-style-type: none"> <li>Fall height, max.</li> </ul>                                                                                                                                                             | 0.3 m; five times, in product package                                            |
| <b>Ambient temperature during operation</b>                                                                                                                                                                                     |                                                                                  |
| <ul style="list-style-type: none"> <li>min.</li> <li>max.</li> <li>horizontal installation, min.</li> <li>horizontal installation, max.</li> <li>vertical installation, min.</li> <li>vertical installation, max.</li> </ul>    | -20 °C<br>60 °C<br>-20 °C<br>60 °C<br>-20 °C<br>50 °C                            |
| <b>Ambient temperature during storage/transportation</b>                                                                                                                                                                        |                                                                                  |
| <ul style="list-style-type: none"> <li>min.</li> <li>max.</li> </ul>                                                                                                                                                            | -40 °C<br>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.                                 | 180 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



[Manufacturer Declaration](#)



[Metrological Approval](#)



##### EMV

##### For use in hazardous locations



[FM](#)



##### For use in hazardous locations

##### Marine / Shipping

[CCC-Ex](#)



[CCS \(China Classification Society\)](#)



---

last modified:

3/14/2025 