



Figure similar

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

| General information                                                    |                                                         |
|------------------------------------------------------------------------|---------------------------------------------------------|
| Product type designation                                               | SM 1231, AI 4x13 bit                                    |
| Supply voltage                                                         |                                                         |
| Rated value (DC)                                                       | 24 V                                                    |
| Input current                                                          |                                                         |
| Current consumption, typ.                                              | 45 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; 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 µs                                                  |
| Input ranges                                                           |                                                         |
| • Voltage                                                              | Yes; ±10V, ±5V, ±2.5V                                   |
| • 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)                                    | ≥9 MOhm                                                 |
| • -2.5 V to +2.5 V                                                     | Yes                                                     |
| — Input resistance (-2.5 V to +2.5 V)                                  | ≥9 MOhm                                                 |
| • -5 V to +5 V                                                         | Yes                                                     |
| — Input resistance (-5 V to +5 V)                                      | ≥9 MOhm                                                 |
| Input ranges (rated values), currents                                  |                                                         |
| • 0 to 20 mA                                                           | Yes                                                     |
| — Input resistance (0 to 20 mA)                                        | 280 Ω                                                   |
| • 4 mA to 20 mA                                                        | Yes                                                     |
| — Input resistance (4 mA to 20 mA)                                     | 280 Ω                                                   |
| Analog value generation for the inputs                                 |                                                         |
| Integration and conversion time/resolution per channel                 |                                                         |
| • Resolution with overrange (bit including sign), max.                 | 12 bit; + sign                                          |
| • Integration time, parameterizable                                    | Yes                                                     |
| • Interference voltage suppression for interference frequency f1 in Hz | 40 dB, DC to 60 V for interference frequency 50 / 60 Hz |

|                                                                                                                                 |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Smoothing of measured values</b>                                                                                             |                                                                                      |
| • parameterizable                                                                                                               | Yes                                                                                  |
| • Step: None                                                                                                                    | Yes                                                                                  |
| • Step: low                                                                                                                     | Yes                                                                                  |
| • Step: Medium                                                                                                                  | Yes                                                                                  |
| • Step: High                                                                                                                    | 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>                                                                           |                                                                                      |
| • Voltage, relative to input range, (+/-)                                                                                       | 0.1 %                                                                                |
| • Current, relative to input range, (+/-)                                                                                       | 0.1 %                                                                                |
| <b>Interference voltage suppression for <math>f = n \times (f_1 \pm 1 \%)</math>, <math>f_1</math> = interference frequency</b> |                                                                                      |
| • Common mode voltage, max.                                                                                                     | 12 V                                                                                 |
| <b>Interrupts/diagnostics/status information</b>                                                                                |                                                                                      |
| Alarms                                                                                                                          | Yes                                                                                  |
| Diagnostics function                                                                                                            | Yes                                                                                  |
| <b>Alarms</b>                                                                                                                   |                                                                                      |
| • Diagnostic alarm                                                                                                              | Yes                                                                                  |
| <b>Diagnoses</b>                                                                                                                |                                                                                      |
| • Monitoring the supply voltage                                                                                                 | Yes                                                                                  |
| • Wire-break                                                                                                                    | Yes                                                                                  |
| <b>Diagnostics indication LED</b>                                                                                               |                                                                                      |
| • for status of the inputs                                                                                                      | Yes                                                                                  |
| • for maintenance                                                                                                               | 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>Ambient conditions</b>                                                                                                       |                                                                                      |
| <b>Free fall</b>                                                                                                                |                                                                                      |
| • Fall height, max.                                                                                                             | 0.3 m; five times, in product package                                                |
| <b>Ambient temperature during operation</b>                                                                                     |                                                                                      |
| • 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                                                                                |
| <b>Ambient temperature during storage/transportation</b>                                                                        |                                                                                      |
| • min.                                                                                                                          | -40 °C                                                                               |
| • max.                                                                                                                          | 70 °C                                                                                |
| <b>Air pressure acc. to IEC 60068-2-13</b>                                                                                      |                                                                                      |
| • Operation, min.                                                                                                               | 795 hPa                                                                              |
| • Operation, max.                                                                                                               | 1 080 hPa                                                                            |
| • Storage/transport, min.                                                                                                       | 660 hPa                                                                              |
| • Storage/transport, max.                                                                                                       | 1 080 hPa                                                                            |
| <b>Relative humidity</b>                                                                                                        |                                                                                      |
| • Operation at 25 °C without condensation, max.                                                                                 | 95 %                                                                                 |
| <b>Pollutant concentrations</b>                                                                                                 |                                                                                      |
| • SO <sub>2</sub> at RH < 60% without condensation                                                                              | SO <sub>2</sub> : < 0.5 ppm; H <sub>2</sub> S: < 0.1 ppm; RH < 60% condensation-free |
| <b>connection method</b>                                                                                                        |                                                                                      |
| required front connector                                                                                                        | Yes                                                                                  |
| <b>Mechanics/material</b>                                                                                                       |                                                                                      |

|                            |                                                                                             |
|----------------------------|---------------------------------------------------------------------------------------------|
| Enclosure material (front) |                                                                                             |
| • Plastic                  | Yes                                                                                         |
| <b>Dimensions</b>          |                                                                                             |
| Width                      | 45 mm                                                                                       |
| Height                     | 100 mm                                                                                      |
| Depth                      | 75 mm                                                                                       |
| <b>Weights</b>             |                                                                                             |
| Weight, approx.            | 180 g                                                                                       |
| <b>last modified:</b>      | 8/23/2023  |