



SIMATIC S7-1200, ANALOG INPUT, SM 1231,  
4 AI, +/-10V, +/-5V, +/-2.5V,  
+/-1.25 OR 0-20mA/4-20 mA,  
15 BIT + SIGN BIT

| Supply voltage                                                          |                                            |
|-------------------------------------------------------------------------|--------------------------------------------|
| 24 V DC                                                                 | Yes                                        |
| Input current                                                           |                                            |
| Current consumption, typ.                                               | 65 mA                                      |
| from backplane bus 5 V DC, typ.                                         | 80 mA                                      |
| Power losses                                                            |                                            |
| Power loss, typ.                                                        | 1.8 W                                      |
| Analog inputs                                                           |                                            |
| Number of analog inputs                                                 | 4 ; Current or voltage differential inputs |
| permissible input frequency for current input (destruction limit), max. | ± 35 V                                     |
| permissible input voltage for voltage input (destruction limit), max.   | 35 V                                       |
| permissible input current for voltage input (destruction limit), max.   | 40 mA                                      |
| permissible input current for current input (destruction limit), max.   | 40 mA                                      |
| Cycle time (all channels) max.                                          | 625 µs                                     |
| Input ranges                                                            |                                            |
| Voltage                                                                 | Yes ; ±10 V, ±5 V, ±2.5 V o. ±1.25 V       |
| Current                                                                 | Yes ; 4 to 20 mA, 0 to 20 mA               |
| Thermocouple                                                            | No                                         |

|                                                                                                 |                                                         |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Resistance thermometer                                                                          | No                                                      |
| Resistance                                                                                      | Yes                                                     |
| Input ranges (rated values), voltages                                                           |                                                         |
| -1.25 to +1.25 V                                                                                | Yes                                                     |
| -10 V to +10 V                                                                                  | Yes                                                     |
| Input resistance (-10 V to +10 V)                                                               | ≥9 MOhm                                                 |
| -2.5 V to +2.5 V                                                                                | Yes                                                     |
| Input resistance (-2.5 V to +2.5 V)                                                             | ≥9 MOhm                                                 |
| -5 V to +5 V                                                                                    | Yes                                                     |
| Input resistance (-5 V to +5 V)                                                                 | ≥9 MOhm                                                 |
| Input ranges (rated values), currents                                                           |                                                         |
| 0 to 20 mA                                                                                      | Yes                                                     |
| 4 to 20 mA                                                                                      | Yes                                                     |
| Analog outputs                                                                                  |                                                         |
| Number of analog outputs                                                                        | 0                                                       |
| Analog value creation                                                                           |                                                         |
| Integrations and conversion time/resolution per channel                                         |                                                         |
| Resolution with overrange (bit including sign), max.                                            | 15 bit ; + sign                                         |
| Integration time, parameterizable                                                               | Yes                                                     |
| Interference voltage suppression for interference frequency f1 in Hz                            | 40 dB, DC to 60 V for interference frequency 50 / 60 Hz |
| Smoothing of measured values                                                                    |                                                         |
| Parameterizable                                                                                 | Yes                                                     |
| Step: None                                                                                      | Yes                                                     |
| Step: low                                                                                       | Yes                                                     |
| Step: Medium                                                                                    | Yes                                                     |
| Step: High                                                                                      | Yes                                                     |
| Errors/accuracies                                                                               |                                                         |
| Temperature error (relative to input range), (+/-)                                              | 25 °C ±0.1% / ±0.3% total measurement range             |
| Basic error limit (operational limit at 25 °C)                                                  |                                                         |
| Voltage, relative to input area, (+/-)                                                          | 0.1 %                                                   |
| Current, relative to input area, (+/-)                                                          | 0.1 %                                                   |
| Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$ , f1 = interference frequency |                                                         |
| common mode voltage, max.                                                                       | 12 V                                                    |
| Interrupts/diagnostics/status information                                                       |                                                         |
| Alarms                                                                                          |                                                         |
| Alarms                                                                                          | Yes                                                     |
| Diagnostic alarm                                                                                | Yes                                                     |

|                                                                     |                                                                                                       |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Diagnostic messages</b>                                          |                                                                                                       |
| <b>Diagnostic functions</b>                                         | Yes                                                                                                   |
| <b>Monitoring the supply voltage</b>                                | Yes                                                                                                   |
| <b>Wire break</b>                                                   | Yes                                                                                                   |
| <b>Diagnostics indication LED</b>                                   |                                                                                                       |
| <b>for status of the inputs</b>                                     | Yes                                                                                                   |
| <b>for maintenance</b>                                              | Yes                                                                                                   |
| <b>Galvanic isolation</b>                                           |                                                                                                       |
| <b>Galvanic isolation analog outputs</b>                            |                                                                                                       |
| <b>between the channels and the power supply of the electronics</b> | No                                                                                                    |
| <b>Degree and class of protection</b>                               |                                                                                                       |
| <b>IP20</b>                                                         | Yes                                                                                                   |
| <b>Standards, approvals, certificates</b>                           |                                                                                                       |
| <b>CE mark</b>                                                      | Yes                                                                                                   |
| <b>CSA approval</b>                                                 | Yes                                                                                                   |
| <b>RCM (former C-TICK)</b>                                          | Yes                                                                                                   |
| <b>FM approval</b>                                                  | Yes                                                                                                   |
| <b>Marine approval</b>                                              |                                                                                                       |
| <b>Marine approval</b>                                              | Yes                                                                                                   |
| <b>Highest safety class achievable in safety mode</b>               |                                                                                                       |
| <b>acc. to IEC 61508</b>                                            | none                                                                                                  |
| <b>Climatic and mechanical conditions for storage and transport</b> |                                                                                                       |
| <b>Climatic conditions for storage and transport</b>                |                                                                                                       |
| <b>Free fall</b>                                                    |                                                                                                       |
| <b>Drop height, max. (in packaging)</b>                             | 0.3 m ; five times, in dispatch package                                                               |
| <b>Temperature</b>                                                  |                                                                                                       |
| <b>Permissible temperature range</b>                                | -40 °C to +70 °C                                                                                      |
| <b>Air pressure acc. to IEC 60068-2-13</b>                          |                                                                                                       |
| <b>Permissible air pressure</b>                                     | 1080 to 660 hPa                                                                                       |
| <b>Relative humidity</b>                                            |                                                                                                       |
| <b>Permissible range (without condensation) at 25 °C</b>            | 95 %                                                                                                  |
| <b>Mechanical and climatic conditions during operation</b>          |                                                                                                       |
| <b>Climatic conditions in operation</b>                             |                                                                                                       |
| <b>Temperature</b>                                                  |                                                                                                       |
| <b>Permissible temperature range</b>                                | -20 °C to +60 °C horizontal mounting, -20 °C to 50 °C vertical mounting, 95% humidity, non-condensing |
| <b>Min.</b>                                                         | -20 °C                                                                                                |
| <b>max.</b>                                                         | 60 °C                                                                                                 |

|                                      |                                                            |
|--------------------------------------|------------------------------------------------------------|
| Air pressure acc. to IEC 60068-2-13  |                                                            |
| Permissible air pressure             | 1080 to 795 hPa                                            |
| 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                   |                                                            |
| Type of housing (front)              |                                                            |
| Plastic                              | Yes                                                        |
| Dimensions                           |                                                            |
| Width                                | 45 mm                                                      |
| Height                               | 100 mm                                                     |
| Depth                                | 75 mm                                                      |
| Weights                              |                                                            |
| Weight, approx.                      | 180 g                                                      |
| Status                               | Jun 19, 2014                                               |