



SIMATIC S7-1200, Analog input, SB 1231 TC, 1 AI thermocouples Type J or K

| General information                                                   |                                                                   |
|-----------------------------------------------------------------------|-------------------------------------------------------------------|
| Product type designation                                              | SB 1231, AI 1x16 bit TC                                           |
| Supply voltage                                                        |                                                                   |
| Rated value (DC)                                                      | 24 V                                                              |
| Input current                                                         |                                                                   |
| Current consumption, typ.                                             | 5 mA                                                              |
| from backplane bus 5 V DC, typ.                                       | 20 mA                                                             |
| Power loss                                                            |                                                                   |
| Power loss, typ.                                                      | 0.5 W                                                             |
| Analog inputs                                                         |                                                                   |
| Number of analog inputs                                               | 1; Thermocouples                                                  |
| permissible input voltage for current input (destruction limit), max. | ±35 V                                                             |
| permissible input voltage for voltage input (destruction limit), max. | ±35 V                                                             |
| Technical unit for temperature measurement adjustable                 | Degrees Celsius/degrees Fahrenheit                                |
| Input ranges                                                          |                                                                   |
| • Voltage                                                             | Yes                                                               |
| • Current                                                             | No                                                                |
| • Thermocouple                                                        | Yes; J, K, T, E, R & S, B, N, C, TXK/XK(L); voltage range: ±80 mV |
| • Resistance thermometer                                              | No                                                                |
| • Resistance                                                          | No                                                                |
| Input ranges (rated values), voltages                                 |                                                                   |
| • -80 mV to +80 mV                                                    | Yes                                                               |
| — Input resistance (-80 mV to +80 mV)                                 | ≥1 MOhm                                                           |
| Input ranges (rated values), thermocouples                            |                                                                   |
| • Type J                                                              | Yes                                                               |
| — Input resistance (type J)                                           | 1 200 °C                                                          |
| • Type K                                                              | Yes                                                               |
| — Input resistance (Type K)                                           | 1 372 °C                                                          |
| Thermocouple (TC)                                                     |                                                                   |
| Temperature compensation                                              |                                                                   |
| — parameterizable                                                     | No                                                                |
| Analog outputs                                                        |                                                                   |
| Number of analog outputs                                              | 0                                                                 |
| Cable length                                                          |                                                                   |
| • shielded, max.                                                      | 100 m; shielded, twisted pair                                     |
| Analog value generation for the inputs                                |                                                                   |
| Measurement principle                                                 | integrating                                                       |
| 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> | 15 bit; + sign<br>No<br>85 dB at 10 / 50 / 60 / 400 Hz     |
| <b>Smoothing of measured values</b>                                                                                                                                                                                             |                                                            |
| <ul style="list-style-type: none"> <li>parameterizable</li> </ul>                                                                                                                                                               | Yes                                                        |
| <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), (+/-)                                                                                                                                                      | 0.5 %                                                      |
| Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$ , $f_1$ = interference frequency                                                                                                                             |                                                            |
| <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                                       |
| Alarms                                                                                                                                                                                                                          |                                                            |
| <ul style="list-style-type: none"> <li>Diagnostic alarm</li> </ul>                                                                                                                                                              | Yes                                                        |
| Diagnoses                                                                                                                                                                                                                       |                                                            |
| <ul style="list-style-type: none"> <li>Wire-break</li> </ul>                                                                                                                                                                    | Yes                                                        |
| Diagnostics indication LED                                                                                                                                                                                                      |                                                            |
| <ul style="list-style-type: none"> <li>for status of the inputs</li> <li>for maintenance</li> </ul>                                                                                                                             | Yes<br>Yes                                                 |
| <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>                                                                                                                                                                                                       |                                                            |
| Free fall                                                                                                                                                                                                                       |                                                            |
| <ul style="list-style-type: none"> <li>Fall height, max.</li> </ul>                                                                                                                                                             | 0.3 m; five times, in product package                      |
| Ambient temperature during operation                                                                                                                                                                                            |                                                            |
| <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      |
| Ambient temperature during storage/transportation                                                                                                                                                                               |                                                            |
| <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                                                                                                                                                                                             |                                                            |
| <ul style="list-style-type: none"> <li>Operation, min.</li> <li>Operation, max.</li> <li>Storage/transport, min.</li> <li>Storage/transport, max.</li> </ul>                                                                    | 795 hPa<br>1 080 hPa<br>660 hPa<br>1 080 hPa               |
| Relative humidity                                                                                                                                                                                                               |                                                            |
| <ul style="list-style-type: none"> <li>Operation at 25 °C without condensation, max.</li> </ul>                                                                                                                                 | 95 %                                                       |
| Pollutant concentrations                                                                                                                                                                                                        |                                                            |
| <ul style="list-style-type: none"> <li>SO2 at RH &lt; 60% without condensation</li> </ul>                                                                                                                                       | SO2: < 0.5 ppm; H2S: < 0.1 ppm; RH < 60% condensation-free |
| <b>connection method</b>                                                                                                                                                                                                        |                                                            |
| required front connector                                                                                                                                                                                                        | Yes                                                        |
| <b>Mechanics/material</b>                                                                                                                                                                                                       |                                                            |
| Enclosure material (front)                                                                                                                                                                                                      |                                                            |
| <ul style="list-style-type: none"> <li>Plastic</li> </ul>                                                                                                                                                                       | Yes                                                        |
| <b>Dimensions</b>                                                                                                                                                                                                               |                                                            |
| Width                                                                                                                                                                                                                           | 38 mm                                                      |
| Height                                                                                                                                                                                                                          | 62 mm                                                      |

|                 |                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------|
| Depth           | 21 mm                                                                                       |
| Weights         |                                                                                             |
| Weight, approx. | 35 g                                                                                        |
| last modified:  | 8/16/2023  |