




SIMATIC S7-300, Analog input SM 331, isolated, 8 AI, Resolution 9/12/14 bits, U/I/thermocouple/resistor, alarm, diagnostics, 1x 20-pole Removing/inserting with active backplane bus

| Supply voltage  |  |
|---|--|
| Load voltage L+   |  |
| • Rated value (DC)  | 24 V   |
| • Reverse polarity protection   | Yes  |
| Input current   |  |
| from load voltage L+ (without load), max.                             | 30 mA  |
| from backplane bus 5 V DC, max.                                       | 50 mA  |
| Power loss  |  |
| Power loss, typ.  | 1 W  |
| Analog inputs   |  |
| Number of analog inputs   | 8  |
| • For resistance measurement  | 4  |
| permissible input voltage for voltage input (destruction limit), max. | 20 V; continuous; 75 V for max. 1 s (mark to space ratio 1:20) |
| permissible input current for current input (destruction limit), max. | 40 mA  |
| Constant measurement current for resistance-type transmitter, typ.    | 1.67 mA  |
| Input ranges  |  |
| • Voltage   | Yes  |
| • Current   | Yes  |
| • Thermocouple  | Yes  |
| • Resistance thermometer  | Yes  |
| • Resistance  | Yes  |
| Input ranges (rated values), voltages                                 |  |
| • 0 to +10 V  | No   |
| • 1 V to 5 V  | Yes  |
| — Input resistance (1 V to 5 V)                                       | 100 kΩ   |
| • 1 V to 10 V   | No   |
| • -1 V to +1 V  | Yes  |
| — Input resistance (-1 V to +1 V)                                     | 10 MΩ  |
| • -10 V to +10 V  | Yes  |
| — Input resistance (-10 V to +10 V)                                   | 100 kΩ   |
| • -2.5 V to +2.5 V  | Yes  |
| — Input resistance (-2.5 V to +2.5 V)                                 | 100 kΩ   |
| • -250 mV to +250 mV  | Yes  |
| — Input resistance (-250 mV to +250 mV)                               | 10 MΩ  |
| • -5 V to +5 V  | Yes  |
| — Input resistance (-5 V to +5 V)                                     | 100 kΩ   |
| • -50 mV to +50 mV  | No   |

|  |               |
|--|---------------|
| • -500 mV to +500 mV                                       | Yes           |
| — Input resistance (-500 mV to +500 mV)                    | 10 M $\Omega$ |
| • -80 mV to +80 mV   | Yes           |
| — Input resistance (-80 mV to +80 mV)                      | 10 M $\Omega$ |
| <b>Input ranges (rated values), currents</b>               |               |
| • 0 to 20 mA   | Yes           |
| — Input resistance (0 to 20 mA)                            | 25 $\Omega$   |
| • -10 mA to +10 mA   | Yes           |
| — Input resistance (-10 mA to +10 mA)                      | 25 $\Omega$   |
| • -20 mA to +20 mA   | Yes           |
| — Input resistance (-20 mA to +20 mA)                      | 25 $\Omega$   |
| • -3.2 mA to +3.2 mA                                       | Yes           |
| — Input resistance (-3.2 mA to +3.2 mA)                    | 25 $\Omega$   |
| • 4 mA to 20 mA  | Yes           |
| — Input resistance (4 mA to 20 mA)                         | 25 $\Omega$   |
| <b>Input ranges (rated values), thermocouples</b>          |               |
| • Type B   | No            |
| • Type C   | No            |
| • Type E   | Yes           |
| — Input resistance (Type E)                                | 10 M $\Omega$ |
| • Type J   | Yes           |
| — Input resistance (type J)                                | 10 M $\Omega$ |
| • Type K   | Yes           |
| — Input resistance (Type K)                                | 10 M $\Omega$ |
| • Type L   | Yes           |
| — Input resistance (Type L)                                | 10 M $\Omega$ |
| • Type N   | Yes           |
| — Input resistance (Type N)                                | 10 M $\Omega$ |
| • Type R   | No            |
| • Type S   | No            |
| • Type T   | No            |
| • Type U   | No            |
| • Type TXK/TXK(L) to GOST                                  | No            |
| <b>Input ranges (rated values), resistance thermometer</b> |               |
| • Cu 10  | No            |
| • Ni 100   | Yes; Standard |
| — Input resistance (Ni 100)                                | 10 M $\Omega$ |
| • Ni 1000  | No            |
| • LG-Ni 1000   | No            |
| • Ni 120   | No            |
| • Ni 200   | No            |
| • Ni 500   | No            |
| • Pt 100   | Yes; Standard |
| — Input resistance (Pt 100)                                | 10 M $\Omega$ |
| • Pt 1000  | No            |
| • Pt 200   | No            |
| • Pt 500   | No            |
| <b>Input ranges (rated values), resistors</b>              |               |
| • 0 to 150 ohms  | Yes           |
| — Input resistance (0 to 150 ohms)                         | 10 M $\Omega$ |
| • 0 to 300 ohms  | Yes           |
| — Input resistance (0 to 300 ohms)                         | 10 M $\Omega$ |
| • 0 to 600 ohms  | Yes           |
| — Input resistance (0 to 600 ohms)                         | 10 M $\Omega$ |
| • 0 to 6000 ohms   | No            |
| <b>Thermocouple (TC)</b>                                   |               |
| <b>Temperature compensation</b>                            |               |
| — parameterizable  | Yes           |
| — internal temperature compensation                        | Yes           |
| — external temperature compensation with                   | Yes           |

|  |   |
|--|---|
| compensations socket<br>— for definable comparison point temperature     | Yes   |
| <b>Characteristic linearization</b>                                      |   |
| • parameterizable<br>— for thermocouples<br>— for resistance thermometer | Yes<br>Type E, J, K, L, N<br>Pt100 (standard, climatic range), Ni100 (standard, climatic range)   |
| <b>Cable length</b>  |   |
| • shielded, max.   | 200 m; 50 m at 80 mV and thermocouples  |
| <b>Analog value generation for the inputs</b>                            |   |
| <b>Integration and conversion time/resolution per channel</b>            |   |
| • Resolution with overrange (bit including sign), max.                   | 15 bit; Unipolar: 9/12/12/14 bit; bipolar: 9 bit + sign/12 bit + sign/12 bit + sign/14 bit + sign |
| • Integration time, parameterizable                                      | Yes; 2,5 / 16,67 / 20 / 100 ms  |
| • Basic conversion time (ms)   | 3 / 17 / 22 / 102 ms  |
| • Interference voltage suppression for interference frequency f1 in Hz   | 400 / 60 / 50 / 10 Hz   |
| <b>Encoder</b>   |   |
| <b>Connection of signal encoders</b>                                     |   |
| • for voltage measurement  | Yes   |
| • for current measurement as 2-wire transducer                           | Yes   |
| • for current measurement as 4-wire transducer                           | Yes   |
| • for resistance measurement with two-wire connection                    | Yes   |
| • for resistance measurement with three-wire connection                  | Yes   |
| • for resistance measurement with four-wire connection                   | Yes   |
| <b>Errors/accuracies</b>   |   |
| <b>Operational error limit in overall temperature range</b>              |   |
| • Voltage, relative to input range, (+/-)                                | 1 %; ±1% (80 mV); ±0.6% (250 mV to 1 000 mV); ±0.8% (2.5 V to 10 V)                               |
| • Current, relative to input range, (+/-)                                | 0.7 %; From 3.2 to 20 mA  |
| • Resistance, relative to input range, (+/-)                             | 0.7 %; 150, 300, 600 Ohm  |
| • Resistance thermometer, relative to input range, (+/-)                 | 0.7 %; ±0.7 % (Pt100/ Ni100); ±0.8 % (Pt100 climate)  |
| • Thermocouple, relative to input range, (+/-)                           | 1.1 %; Type E, J, K, L, N   |
| <b>Basic error limit (operational limit at 25 °C)</b>                    |   |
| • Voltage, relative to input range, (+/-)                                | 0.6 %; ±0.4 % (250 mV to 1 000 mV); ±0.6 % (2.5 mV to 10 mV); ±0.7 % (80 mV)                      |
| • Current, relative to input range, (+/-)                                | 0.5 %; 3.2 to 20 mA   |
| • Resistance, relative to input range, (+/-)                             | 0.5 %; 150, 300, 600 Ohm  |
| • Resistance thermometer, relative to input range, (+/-)                 | 0.6 %; ±0.5% (Pt100/ Ni100), ±0.6% (Pt100 climate)  |
| • Thermocouple, relative to input range, (+/-)                           | 0.7 %; Type E, N, J, K, L   |
| <b>Interrupts/diagnostics/status information</b>                         |   |
| Diagnostics function   | Yes; Parameterizable  |
| <b>Alarms</b>  |   |
| • Diagnostic alarm   | Yes; Parameterizable, channels 0 and 2  |
| • Limit value alarm  | Yes; Parameterizable  |
| <b>Diagnoses</b>   |   |
| • Diagnostic information readable  | Yes   |
| <b>Diagnostics indication LED</b>  |   |
| • Group error SF (red)   | Yes   |
| <b>Potential separation</b>  |   |
| <b>Potential separation analog inputs</b>                                |   |
| • between the channels   | No  |
| • between the channels and backplane bus                                 | Yes   |
| • between the channels and the power supply of the electronics           | Yes   |
| <b>Isolation</b>   |   |
| Isolation tested with  | 500 V DC  |
| <b>connection method / header</b>  |   |

|                          |  |
|--------------------------|--|
| required front connector | 20-pin   |
| <b>Dimensions</b>        |  |
| Width                    | 40 mm  |
| Height                   | 125 mm   |
| Depth                    | 117 mm   |
| <b>Weights</b>           |  |
| Weight, approx.          | 250 g  |
| <b>last modified:</b>    | 3/2/2021  |