




SIMATIC S7-300, Analog input SM 331, isolated, 2 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+ | |
| <ul style="list-style-type: none"> Rated value (DC) | 24 V |
| <ul style="list-style-type: none"> 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 | 2 |
| <ul style="list-style-type: none"> For resistance measurement | 1 |
| 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 | |
| <ul style="list-style-type: none"> Voltage Current Thermocouple Resistance thermometer Resistance | Yes |
| Input ranges (rated values), voltages | |
| <ul style="list-style-type: none"> 0 to +10 V | No |
| <ul style="list-style-type: none"> 1 V to 5 V <ul style="list-style-type: none"> — Input resistance (1 V to 5 V) | Yes 100 kΩ |
| <ul style="list-style-type: none"> 1 V to 10 V | No |
| <ul style="list-style-type: none"> -1 V to +1 V <ul style="list-style-type: none"> — Input resistance (-1 V to +1 V) | Yes 10 MΩ |
| <ul style="list-style-type: none"> -10 V to +10 V <ul style="list-style-type: none"> — Input resistance (-10 V to +10 V) | Yes 100 kΩ |
| <ul style="list-style-type: none"> -2.5 V to +2.5 V <ul style="list-style-type: none"> — Input resistance (-2.5 V to +2.5 V) | Yes 100 kΩ |
| <ul style="list-style-type: none"> -250 mV to +250 mV <ul style="list-style-type: none"> — Input resistance (-250 mV to +250 mV) | Yes 10 MΩ |
| <ul style="list-style-type: none"> -5 V to +5 V <ul style="list-style-type: none"> — Input resistance (-5 V to +5 V) | Yes 100 kΩ |
| <ul style="list-style-type: none"> -50 mV to +50 mV | No |

| | |
|---|---|
| <ul style="list-style-type: none"> ● -500 mV to +500 mV <ul style="list-style-type: none"> — Input resistance (-500 mV to +500 mV) ● -80 mV to +80 mV <ul style="list-style-type: none"> — Input resistance (-80 mV to +80 mV) | <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> |
| Input ranges (rated values), currents | |
| <ul style="list-style-type: none"> ● 0 to 20 mA <ul style="list-style-type: none"> — Input resistance (0 to 20 mA) ● -10 mA to +10 mA <ul style="list-style-type: none"> — Input resistance (-10 mA to +10 mA) ● -20 mA to +20 mA <ul style="list-style-type: none"> — Input resistance (-20 mA to +20 mA) ● -3.2 mA to +3.2 mA <ul style="list-style-type: none"> — Input resistance (-3.2 mA to +3.2 mA) ● 4 mA to 20 mA <ul style="list-style-type: none"> — Input resistance (4 mA to 20 mA) | <p>Yes</p> <p>25 Ω</p> <p>Yes</p> <p>25 Ω</p> <p>Yes</p> <p>25 Ω</p> <p>Yes</p> <p>25 Ω</p> <p>Yes</p> <p>25 Ω</p> |
| Input ranges (rated values), thermocouples | |
| <ul style="list-style-type: none"> ● Type B ● Type E <ul style="list-style-type: none"> — Input resistance (Type E) ● Type J <ul style="list-style-type: none"> — Input resistance (type J) ● Type K <ul style="list-style-type: none"> — Input resistance (Type K) ● Type L ● Type N <ul style="list-style-type: none"> — Input resistance (Type N) ● Type R ● Type S ● Type T ● Type U ● Type TXK/TXK(L) to GOST | <p>No</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>No</p> <p>Yes</p> <p>10 MΩ</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> |
| Input ranges (rated values), resistance thermometer | |
| <ul style="list-style-type: none"> ● Cu 10 ● Ni 100 <ul style="list-style-type: none"> — Input resistance (Ni 100) ● Ni 1000 ● LG-Ni 1000 ● Ni 120 ● Ni 200 ● Ni 500 ● Pt 100 <ul style="list-style-type: none"> — Input resistance (Pt 100) ● Pt 1000 ● Pt 200 ● Pt 500 | <p>No</p> <p>Yes</p> <p>10 MΩ; Standard</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>Yes</p> <p>10 kΩ; Standard</p> <p>No</p> <p>No</p> <p>No</p> |
| Input ranges (rated values), resistors | |
| <ul style="list-style-type: none"> ● 0 to 150 ohms <ul style="list-style-type: none"> — Input resistance (0 to 150 ohms) ● 0 to 300 ohms <ul style="list-style-type: none"> — Input resistance (0 to 300 ohms) ● 0 to 600 ohms <ul style="list-style-type: none"> — Input resistance (0 to 600 ohms) ● 0 to 6000 ohms | <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>No</p> |
| Thermocouple (TC) | |
| Temperature compensation | |
| <ul style="list-style-type: none"> — parameterizable — internal temperature compensation — external temperature compensation with compensations socket — for definable comparison point temperature | <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> |

| | |
|---|--|
| Characteristic linearization | |
| <ul style="list-style-type: none"> parameterizable <ul style="list-style-type: none"> for thermocouples for resistance thermometer | Yes Type E, J, K, L, N Pt100 (standard, climatic range), Ni100 (standard, climatic range) |
| Cable length | |
| <ul style="list-style-type: none"> shielded, max. | 200 m; 50 m at 80 mV and thermocouples |
| Analog value generation for the inputs | |
| Integration and conversion time/resolution per channel | |
| <ul style="list-style-type: none"> Resolution with overrange (bit including sign), max. Integration time, parameterizable Basic conversion time (ms) Interference voltage suppression for interference frequency f1 in Hz | 15 bit; Unipolar: 9/12/12/14 bit; bipolar: 9 bit + sign/12 bit + sign/12 bit + sign/14 bit + sign Yes; 2,5 / 16,67 / 20 / 100 ms 3 / 17 / 22 / 102 ms 400 / 60 / 50 / 10 Hz |
| Encoder | |
| Connection of signal encoders | |
| <ul style="list-style-type: none"> for voltage measurement for current measurement as 2-wire transducer for current measurement as 4-wire transducer for resistance measurement with two-wire connection for resistance measurement with three-wire connection for resistance measurement with four-wire connection | Yes Yes Yes Yes Yes Yes |
| Errors/accuracies | |
| Operational error limit in overall temperature range | |
| <ul style="list-style-type: none"> Voltage, relative to input range, (+/-) Current, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Thermocouple, relative to input range, (+/-) | 1 %; ±1% (80 mV); ±0.6% (250 mV to 1 000 mV); ±0.8% (2.5 V to 10 V) 0.7 %; From 3.2 to 20 mA 0.7 %; 150, 300, 600 Ohm 0.7 %; ±0.7 % (Pt100/ Ni100); ±0.8 % (Pt100 climate) 1.1 %; Type E, J, K, L, N |
| Basic error limit (operational limit at 25 °C) | |
| <ul style="list-style-type: none"> Voltage, relative to input range, (+/-) Current, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Thermocouple, relative to input range, (+/-) | 0.6 %; ±0.6% (80 mV, 2.5 V to 10 V); ±0.4% (250 mV to 1 000 mV) 0.5 %; 3.2 to 20 mA 0.5 %; 150, 300, 600 Ohm 0.6 %; ±0.5% (Pt100/ Ni100), ±0.6% (Pt100 climate) 0.7 %; Type E, N, J, K, L |
| Interrupts/diagnostics/status information | |
| Diagnostics function | Yes; Parameterizable |
| Alarms | |
| <ul style="list-style-type: none"> Diagnostic alarm Limit value alarm | Yes Yes; Parameterizable, channel 0 |
| Diagnoses | |
| <ul style="list-style-type: none"> Diagnostic information readable | Yes |
| Diagnostics indication LED | |
| <ul style="list-style-type: none"> Group error SF (red) | Yes |
| Potential separation | |
| Potential separation analog inputs | |
| <ul style="list-style-type: none"> between the channels between the channels and backplane bus between the channels and the power supply of the electronics | No Yes Yes; Not for 2-wire transmitters |
| Isolation | |
| Isolation tested with | 500 V DC |
| connection method / header | |
| required front connector | 20-pin |
| Dimensions | |
| Width | 40 mm |

| | |
|-----------------------|--|
| Height | 125 mm |
| Depth | 120 mm |
| Weights | |
| Weight, approx. | 250 g |
| last modified: | 3/2/2021  |