SIEMENS

## Data sheet 6ES7331-7KB02-0AB0

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

Figure similar

Mobile: 00989122160416
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| | |
|---|---|
| **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 | 2 |
| • 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 |


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| | |
|---|---|
| **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 MΩ |
| • -80 mV to +80 mV | Yes |
| — Input resistance (-80 mV to +80 mV) | 10 MΩ |
| **Input ranges (rated values), currents** | |
| • 0 to 20 mA | Yes |
| — Input resistance (0 to 20 mA) | 25 Ω |
| • -10 mA to +10 mA | Yes |
| — Input resistance (-10 mA to +10 mA) | 25 Ω |
| • -20 mA to +20 mA | Yes |
| — Input resistance (-20 mA to +20 mA) | 25 Ω |
| • -3.2 mA to +3.2 mA | Yes |
| — Input resistance (-3.2 mA to +3.2 mA) | 25 Ω |
| • 4 mA to 20 mA | Yes |
| — Input resistance (4 mA to 20 mA) | 25 Ω |
| **Input ranges (rated values), thermocouples** | |
| • Type B | No |
| • Type E | Yes |
| — Input resistance (Type E) | 10 MΩ |


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| | |
|---|---|
| • Type J | Yes |
| — Input resistance (type J) | 10 MΩ |
| • Type K | Yes |
| — Input resistance (Type K) | 10 MΩ |
| • Type L | No |
| • Type N | Yes |
| — Input resistance (Type N) | 10 MΩ |
| • Type R | No |
| • Type S | No |
| • Type T | No |
| • Type U | No |
| • Type TXK/TXK(L) to GOST | No |
| Input ranges (rated values), resistance thermometer | |
| • Cu 10 | No |
| • Ni 100 | Yes |
| — Input resistance (Ni 100) | 10 MΩ; Standard |
| • Ni 1000 | No |
| • LG-Ni 1000 | No |
| • Ni 120 | No |
| • Ni 200 | No |
| • Ni 500 | No |
| • Pt 100 | Yes |
| — Input resistance (Pt 100) | 10 kΩ; Standard |
| • Pt 1000 | No |
| • Pt 200 | No |
| • Pt 500 | No |
| Input ranges (rated values), resistors | |
| • 0 to 150 ohms | Yes |
| — Input resistance (0 to 150 ohms) | 10 MΩ |
| • 0 to 300 ohms | Yes |
| — Input resistance (0 to 300 ohms) | 10 MΩ |
| • 0 to 600 ohms | Yes |
| — Input resistance (0 to 600 ohms) | 10 MΩ |
| • 0 to 6000 ohms | No |
| Thermocouple (TC) | |
| Temperature compensation | |
| — parameterizable | Yes |
| — internal temperature compensation | Yes |
| — external temperature compensation with compensations socket | Yes |
| — for definable comparison point temperature | Yes |


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| | |
|---|---|
| **Characteristic linearization** | |
| • parameterizable | Yes |
| **Cable length** | |
| • shielded, max. | 200 m; 50 m at 80 mV and thermocouples |

## Analog value generation for the inputs

| | |
|---|---|
| **Integration and conversion time/resolution per channel** | |
| • 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 |

## Encoder

| | |
|---|---|
| **Connection of signal encoders** | |
| • 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 |

## Errors/accuracies

| | |
|---|---|
| **Operational error limit in overall temperature range** | |
| • 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 |
| **Basic error limit (operational limit at 25 °C)** | |
| • Voltage, relative to input range, (+/-) | 0.6 %; ±0.6% (80 mV, 2.5 V to 10 V); ±0.4% (250 mV to 1 000 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 |

## Interrupts/diagnostics/status information

| | |
|---|---|
| Diagnostics function | Yes; Parameterizable |


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| | |
|---|---|
| **Alarms** | |
| • Diagnostic alarm | Yes |
| • Limit value alarm | Yes; Parameterizable, channel 0 |
| **Diagnostic messages** | |
| • Diagnostic information readable | Yes |
| **Diagnostics indication LED** | |
| • Group error SF (red) | Yes |

| | |
|---|---|
| **Potential separation** | |
| **Potential separation analog inputs** | |
| • between the channels | No |
| • between the channels and backplane bus | Yes |
| • between the channels and the power supply of the electronics | Yes; Not for 2-wire transmitters |

| | |
|---|---|
| **Isolation** | |
| Isolation tested with | 500 V DC |

| | |
|---|---|
| **Connection method** | |
| required front connector | 20-pin |

| | |
|---|---|
| **Dimensions** | |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |

| | |
|---|---|
| **Weights** | |
| Weight, approx. | 250 g |

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