

Data sheet

6ES7331-1KF02-0AB0



Figure similar

spare part SIMATIC S7-300, analog input SM 331, isolated 8 AI, resolution 13 bit U/I/resistance/Pt100, NI100, NI1000, LG-NI1000, PTC/KTY, 66 ms conversion time; 1x 40-pole

| Input current | |
|---|---|
| from backplane bus 5 V DC, max. | 90 mA |
| Power loss | |
| Power loss, typ. | 0.4 W |
| Analog inputs | |
| Number of analog inputs | 8 |
| <ul style="list-style-type: none"> For resistance measurement | 8 |
| permissible input voltage for voltage input (destruction limit), max. | 30 V; 12 V continuous, 30 V for max. 1 s |
| permissible input current for current input (destruction limit), max. | 40 mA |
| Input ranges | |
| <ul style="list-style-type: none"> Voltage Current Thermocouple Resistance thermometer Resistance | Yes Yes No Yes Yes |
| Input ranges (rated values), voltages | |
| <ul style="list-style-type: none"> 0 to +10 V <ul style="list-style-type: none"> — Input resistance (0 to 10 V) 1 V to 5 V <ul style="list-style-type: none"> — Input resistance (1 V to 5 V) 1 V to 10 V -1 V to +1 V <ul style="list-style-type: none"> — Input resistance (-1 V to +1 V) -10 V to +10 V <ul style="list-style-type: none"> — Input resistance (-10 V to +10 V) -2.5 V to +2.5 V -250 mV to +250 mV -5 V to +5 V <ul style="list-style-type: none"> — Input resistance (-5 V to +5 V) -50 mV to +50 mV <ul style="list-style-type: none"> — Input resistance (-50 mV to +50 mV) -500 mV to +500 mV <ul style="list-style-type: none"> — Input resistance (-500 mV to +500 mV) -80 mV to +80 mV | Yes 100 kΩ Yes 100 kΩ No Yes 100 kΩ Yes 100 kΩ No No Yes 100 kΩ Yes 100 kΩ Yes 100 kΩ No |
| 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) | Yes 100 Ω |

| | |
|---|--|
| • -10 mA to +10 mA | No |
| • -20 mA to +20 mA | Yes |
| — Input resistance (-20 mA to +20 mA) | 100 Ω |
| • -3.2 mA to +3.2 mA | No |
| • 4 mA to 20 mA | Yes |
| — Input resistance (4 mA to 20 mA) | 100 Ω |
| Input ranges (rated values), thermocouples | |
| • Type B | No |
| • Type C | No |
| • Type E | No |
| • Type J | No |
| • Type K | No |
| • Type L | No |
| • Type N | No |
| • 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; Standard/climate |
| — Input resistance (Ni 100) | 100 MΩ |
| • Ni 1000 | Yes |
| — Input resistance (Ni 1000) | 100 MΩ |
| • LG-Ni 1000 | Yes; Standard/climate |
| — Input resistance (LG-Ni 1000) | 100 MΩ |
| • Ni 120 | No |
| • Ni 200 | No |
| • Ni 500 | No |
| • Pt 100 | Yes; Standard/climate |
| — Input resistance (Pt 100) | 100 MΩ |
| • Pt 1000 | No |
| • Pt 200 | No |
| • Pt 500 | No |
| Input ranges (rated values), resistors | |
| • 0 to 150 ohms | No |
| • 0 to 300 ohms | No |
| • 0 to 600 ohms | Yes |
| — Input resistance (0 to 600 ohms) | 100 MΩ |
| • 0 to 6000 ohms | Yes |
| — Input resistance (0 to 6000 ohms) | 100 MΩ |
| Thermocouple (TC) | |
| Temperature compensation | |
| — parameterizable | No |
| — internal temperature compensation | No |
| — external temperature compensation with compensations socket | No |
| Characteristic linearization | |
| • parameterizable | Yes |
| — for thermocouples | No |
| — for resistance thermometer | yes; Pt100 standard/air con.; Ni100 standard/air con.; Ni1000 standard/air con.; LG-Ni1000 standard/air con. |
| Cable length | |
| • shielded, max. | 200 m; max. 50 m at 50 mV |
| Analog value generation for the inputs | |
| Integration and conversion time/resolution per channel | |
| • Resolution with overrange (bit including sign), max. | 13 bit |
| • Integration time, parameterizable | Yes; 60 / 50 ms |

| | |
|--|------------|
| • Basic conversion time (ms) | 66 / 55 ms |
| • Interference voltage suppression for interference frequency f1 in Hz | 50 / 60 Hz |

Encoder**Connection of signal encoders**

| | |
|---|---------------------------|
| • for voltage measurement | Yes |
| • for current measurement as 2-wire transducer | Yes; with external supply |
| • 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, (+/-) | 0.6 %; ± 0.6 % (± 5 V, 10 V, 1 to 5 V, 0 to 10 V); ± 0.5 % (± 50 mV, 500 mV, 1 V) |
| • Current, relative to input range, (+/-) | 0.5 %; ± 20 mA, 0 to 20 mA, 4 to 20 mA |
| • Resistance, relative to input range, (+/-) | 0.5 %; 0 to 6 kohms, 0 to 600 kohms |
| • Resistance thermometer, relative to input range, (+/-) | 1 Kelvin (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic); 1.2 Kelvin (Pt100, Ni100, standard) |

Basic error limit (operational limit at 25 °C)

| | |
|--|--|
| • Voltage, relative to input range, (+/-) | 0.4 %; 0.4% (± 5 V, 10 V, 1 to 5 V, 0 to 10 V); 0.3% (± 50 mV, 500 mV, 1 V) |
| • Current, relative to input range, (+/-) | 0.3 %; ± 20 mA, 0 to 20 mA, 4 to 20 mA |
| • Resistance, relative to input range, (+/-) | 0.3 %; 0 to 6 kohms, 0 to 600 kohms |
| • Resistance thermometer, relative to input range, (+/-) | 1 Kelvin (Pt100, Ni100, standard); 0.8 Kelvin (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic) |

Interrupts/diagnostics/status information

| | |
|----------------------|----|
| Diagnostics function | No |
|----------------------|----|

Alarms

| | |
|---------------------|----|
| • Diagnostic alarm | No |
| • Limit value alarm | No |

Diagnoses

| | |
|-----------------------------------|----|
| • Diagnostic information readable | No |
|-----------------------------------|----|

Diagnostics indication LED

| | |
|------------------------|----|
| • Group error SF (red) | No |
|------------------------|----|

Potential separation**Potential separation analog inputs**

| | |
|--|-----|
| • between the channels | No |
| • between the channels and backplane bus | Yes |

Isolation

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

Connection method

| | |
|--------------------------|--------|
| required front connector | 40-pin |
|--------------------------|--------|

Dimensions

| | |
|--------|--------|
| Width | 40 mm |
| Height | 125 mm |
| Depth | 117 mm |

Weights

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

Classifications

| | Version | Classification |
|--------|---------|----------------|
| eClass | 14 | 27-24-22-01 |
| eClass | 12 | 27-24-22-01 |
| eClass | 9.1 | 27-24-22-01 |
| eClass | 9 | 27-24-22-01 |
| eClass | 8 | 27-24-22-01 |
| eClass | 7.1 | 27-24-22-01 |
| eClass | 6 | 27-24-22-01 |
| ETIM | 10 | EC001420 |
| ETIM | 9 | EC001420 |

| | | |
|--------|----|-------------|
| ETIM | 8 | EC001420 |
| ETIM | 7 | EC001420 |
| IDEA | 4 | 3562 |
| UNSPSC | 15 | 32-15-17-05 |

Approvals / Certificates

General Product Approval

[Miscellaneous](#)

[Manufacturer Declaration](#)



[China RoHS](#)



General Product Approval

EMV

For use in hazardous locations

[Metrological Approval](#)



For use in hazardous locations

[EM](#)



[Miscellaneous](#)

[CCC-Ex](#)

Maritime application



[NK / Nippon Kaiji Kyokai](#)



Maritime application

[CCS \(China Classification Society\)](#)

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