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## Data sheet 6ES7331-7SF00-0AB0

SIMATIC S7, ANALOG INPUT SM 331, OPTICALLY ISOLATATED, 8 AI THERMOCOUPLE/4 AI PT100, F. SIGNALS F. HAZARDOUS AREAS, CAPABLE OF DIAGNOST.,PTB-TESTED 1 X 20 PIN



| | |
|---|---|
| **Supply voltage** | |
| Load voltage L+ | |
| • Rated value (DC) | 24 V |
| **Input current** | |
| from backplane bus 5 V DC, max. | 120 mA |
| **Power loss** | |
| Power loss, typ. | 0.6 W |
| **Analog inputs** | |
| Number of analog inputs | 8; 8x thermocouples; 4x RTD thermoresistors |
| Input ranges | |
| • Voltage | Yes |
| • Current | No |
| • Thermocouple | Yes |
| • Resistance thermometer | Yes |
| • Resistance | Yes |
| Input ranges (rated values), thermocouples | |
| • Type B | Yes |


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| | |
|---|---|
| • Input resistance (Type B) | 10 MΩ |
| • Type E | Yes |
| • Input resistance (Type E) | 10 MΩ |
| • Type J | Yes |
| • Input resistance (type J) | 10 MΩ |
| • Type K | Yes |
| • Input resistance (Type K) | 10 MΩ |
| • Type L | Yes |
| • Input resistance (Type L) | 10 MΩ |
| • Type N | Yes |
| • Input resistance (Type N) | 10 MΩ |
| • Type R | Yes |
| • Input resistance (Type R) | 10 MΩ |
| • Type S | Yes |
| • Input resistance (Type S) | 10 MΩ |
| • Type T | Yes |
| • Input resistance (Type T) | 10 MΩ |
| • Type U | Yes |
| • Input resistance (Type U) | 10 MΩ |
| Input ranges (rated values), resistance thermometer | |
| • Ni 100 | Yes |
| • Input resistance (Ni 100) | 10 MΩ |
| • Pt 100 | Yes |
| • Input resistance (Pt 100) | 10 MΩ |
| • Pt 200 | Yes |
| • Input resistance (Pt 200) | 10 MΩ |
| Cable length | |
| • shielded, max. | 200 m; TC: 50 m |
| **Analog value generation for the inputs** | |
| Measurement principle | Sigma Delta |
| Integration and conversion time/resolution per channel | |
| • Resolution with overrange (bit including sign), max. | 16 bit; 10 bit to 15 bit + sign |
| • Integration time, parameterizable | Yes; 2.5 to 100 ms |
| • Interference voltage suppression for interference frequency f1 in Hz | 10 to 400 Hz |
| **Encoder** | |
| Connection of signal encoders | |
| • for current measurement as 2-wire transducer | Yes |
| • for current measurement as 4-wire transducer | Yes |
| **Errors/accuracies** | |


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| | |
|---|---|
| Temperature error (relative to input range), (+/-) | Temperature error: 0.001 to 0.002 %/K |
| Operational error limit in overall temperature range | |
| • Resistance thermometer, relative to input area, (+/-) | 0.09 to 0.04% |
| Basic error limit (operational limit at 25 °C) | |
| • Resistance thermometer, relative to input area, (+/-) | 0.1 % |
| Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 60 dB |
| • Common mode interference, min. | 130 dB |

| Interrupts/diagnostics/status information | |
|---|---|
| Diagnostic functions | Yes |
| Diagnostic messages | |
| • Diagnostic information readable | Yes |
| • Overrange | Yes |
| • Wire-break in signal transmitter cable | Yes |
| • Short-circuit of the signal encoder cable | Yes |
| Diagnostics indication LED | |
| • Group error SF (red) | Yes |
| • Channel fault indicator F (red) | Yes |

| Ex(i) characteristics | |
|---|---|
| Module for Ex(i) protection | Yes |
| Maximum values of input circuits (per channel) | |
| • Co (permissible external capacity), max. | 43 µF |
| • Io (short-circuit current), max. | 28.8 mA |
| • Lo (permissible external inductivity), max. | 40 mH |
| • Po (power of load), max. | 41.4 mW |
| • Uo (output no-load voltage), max. | 5.9 V |

| Potential separation | |
|---|---|
| Potential separation analog inputs | |
| • Potential separation analog inputs | Yes |

| Permissible potential difference | |
|---|---|
| between the inputs (UCM) | 60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area |
| Between the inputs and MANA (UCM) | 60 V DC/30 V AC when used in the hazardous area; 400 V DC/250 V AC when used in NON-hazardous area |

| Standards, approvals, certificates | |
|---|---|
| Use in hazardous areas | |
| • Type of protection acc. to EN 50020 (CENELEC) | [EEx ib] IIC |


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| | |
|---|---|
| • Type of protection acc. to FM | Class I, Division 2, Group A, B, C, D T4 |
| • Test number PTB | Ex-96.D.2108X |

## Ambient conditions

| | |
|---|---|
| Ambient temperature during operation | |
| • max. | 60 °C |

## Connection method

| | |
|---|---|
| required front connector | 20-pin |

## Weights

| | |
|---|---|
| Weight, approx. | 210 g |

**last modified:** 22.03.2016


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