

SIMATIC S7, analog input SM 331, isolated, 8 AI thermocouples/4 AI Pt100, for signals from the hazardous area, diagnostics-capable, PTB tested 1 x 20-pole



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), voltages	
• -1 V to +1 V	Yes

— Input resistance (-1 V to +1 V)	10 MΩ
• -25 mV to +25 mV	Yes
— Input resistance (-25 mV to +25 mV)	10 MΩ
• -250 mV to +250 mV	Yes
— Input resistance (-250 mV to +250 mV)	10 MΩ
• -50 mV to +50 mV	Yes
— Input resistance (-50 mV to +50 mV)	10 MΩ
• -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), thermocouples	
• Type B	Yes
— 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

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

Operational error limit in overall temperature range

- | | |
|--|-----------------------|
| • Resistance thermometer, relative to input range, (+/-) | 0.04 %; 0.09 to 0.04% |
|--|-----------------------|

Basic error limit (operational limit at 25 °C)

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|--|---------------------------|
| • Resistance thermometer, relative to input range, (+/-) | 0.008 %; 0.018 ... 0.008% |
|--|---------------------------|

Interrupts/diagnostics/status information

Diagnostics function	Yes
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Diagnoses

- | | |
|---|-----|
| • Diagnostic information readable | Yes |
| • Overage | 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
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Max. values of input circuits for gas group IIC (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

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

Standards, approvals, certificates

Use in hazardous areas

- | | |
|---|--|
| • Type of protection acc. to EN 50020 (CENELEC) | [EEx ib] IIC |
| • 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

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|--------|-------|
| • max. | 60 °C |
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Connection method

required front connector	20-pin
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Weights

Weight, approx.	210 g
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last modified:	10/09/2020
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