

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



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<b>Supply voltage</b>	
Load voltage L+	
<ul style="list-style-type: none"> <li>Rated value (DC)</li> </ul>	24 V
<b>Input current</b>	
from backplane bus 5 V DC, max.	120 mA
<b>Power loss</b>	
Power loss, typ.	0.6 W
<b>Analog inputs</b>	
Number of analog inputs	8; 8x thermocouples; 4x RTD thermoresistors
<b>Input ranges</b>	
<ul style="list-style-type: none"> <li>Voltage</li> <li>Current</li> <li>Thermocouple</li> <li>Resistance thermometer</li> <li>Resistance</li> </ul>	Yes No Yes Yes Yes
<b>Input ranges (rated values), voltages</b>	
<ul style="list-style-type: none"> <li>-1 V to +1 V</li> </ul>	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
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## 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)

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

## Interrupts/diagnostics/status information

Diagnostics function	Yes
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### Diagnostic messages

- |   |     |
|---|-----|
| • 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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### 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

- |  |     |
|--|-----|
| • 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

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

## Connection method

required front connector	20-pin
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## Weights

Weight, approx.	210 g
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<b>last modified:</b>	05/28/2020
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