

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), 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                                 |                                 |
| 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                                                      |                                 |

|                                                                                                     |                                                                                                    |
|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Temperature error (relative to input range), (+/-)                                                  | 0.001 %/K; Temperature error: 0.001 to 0.002 %/K                                                   |
| 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%                                                                          |
| Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$ , $f_1$ = 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                                                           |                                                                                                    |
| Diagnostics function                                                                                | 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)                                                     | [Ex ib] IIC                                                                                        |

- Type of protection acc. to FM
- Test number PTB

Class I, Division 2, Group A, B, C, D T4  
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:**

06/19/2019