

SIMATIC S7, analog input SM 331, isolated, 4 AE; 0/4 to 20 mA, 1 x 20-pole, for signals from the hazardous area, diagnostics-capable, PTB tested



Figure similar

| Supply voltage                            |                |
|-------------------------------------------|----------------|
| Load voltage L+                           |                |
| • Rated value (DC)                        | 24 V           |
| • Reverse polarity protection             | Yes            |
| Input current                             |                |
| from load voltage L+ (without load), max. | 250 mA         |
| from backplane bus 5 V DC, max.           | 60 mA          |
| Output voltage                            |                |
| Power supply to the transmitters          |                |
| • Rated value (DC)                        | 13 V; at 22 mA |
| • No-load voltage (DC)                    | 25.2 V         |
| Power loss                                |                |
| Power loss, typ.                          | 3 W            |
| Analog inputs                             |                |
| Number of analog inputs                   | 4              |

|                                                                                                                                 |                                 |
|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| permissible input current for current input (destruction limit), max.                                                           | 40 mA                           |
| <b>Input ranges</b>                                                                                                             |                                 |
| • Voltage                                                                                                                       | No                              |
| • Current                                                                                                                       | Yes                             |
| • Thermocouple                                                                                                                  | No                              |
| • Resistance thermometer                                                                                                        | No                              |
| • Resistance                                                                                                                    | No                              |
| <b>Input ranges (rated values), currents</b>                                                                                    |                                 |
| • 0 to 20 mA                                                                                                                    | Yes                             |
| • Input resistance (0 to 20 mA)                                                                                                 | 50 $\Omega$                     |
| • 4 mA to 20 mA                                                                                                                 | Yes                             |
| • Input resistance (4 mA to 20 mA)                                                                                              | 50 $\Omega$                     |
| <b>Cable length</b>                                                                                                             |                                 |
| • shielded, max.                                                                                                                | 200 m                           |
| <b>Analog value generation for the inputs</b>                                                                                   |                                 |
| Measurement principle                                                                                                           | Sigma Delta                     |
| <b>Integration and conversion time/resolution per channel</b>                                                                   |                                 |
| • 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                    |
| <b>Encoder</b>                                                                                                                  |                                 |
| <b>Connection of signal encoders</b>                                                                                            |                                 |
| • for current measurement as 2-wire transducer                                                                                  | Yes                             |
| • for current measurement as 4-wire transducer                                                                                  | Yes                             |
| <b>Errors/accuracies</b>                                                                                                        |                                 |
| <b>Operational error limit in overall temperature range</b>                                                                     |                                 |
| • Current, relative to input range, (+/-)                                                                                       | 0.45 %                          |
| <b>Basic error limit (operational limit at 25 °C)</b>                                                                           |                                 |
| • Current, relative to input range, (+/-)                                                                                       | 0.1 %                           |
| <b>Interference voltage suppression for <math>f = n \times (f_1 \pm 1 \%)</math>, <math>f_1</math> = interference frequency</b> |                                 |
| • Series mode interference (peak value of interference < rated value of input range), min.                                      | 60 dB                           |
| • Common mode interference, min.                                                                                                | 130 dB                          |
| <b>Interrupts/diagnostics/status information</b>                                                                                |                                 |
| Diagnostic functions                                                                                                            | Yes                             |
| <b>Diagnostic messages</b>                                                                                                      |                                 |
| • 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.      | 90 nF                                                                                              |
| • Io (short-circuit current), max.              | 68.5 mA                                                                                            |
| • Lo (permissible external inductivity), max.   | 7.5 mH                                                                                             |
| • Po (power of load), max.                      | 431 mW                                                                                             |
| • Ri, max.                                      | 50 $\Omega$                                                                                        |
| • Uo (output no-load voltage), max.             | 25.2 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                 | Class I, Division 2, Group A, B, C, D T4                                                           |
| • Test number PTB                               | Ex-96.D.2092X                                                                                      |
| Ambient conditions                              |                                                                                                    |
| Ambient temperature during operation            |                                                                                                    |
| • max.                                          | 60 °C                                                                                              |
| Connection method                               |                                                                                                    |
| required front connector                        | 20-pin                                                                                             |
| Weights                                         |                                                                                                    |
| Weight, approx.                                 | 290 g                                                                                              |
| last modified:                                  | 04/06/2018                                                                                         |