



Figure similar

SIMATIC S7-300, Analog input SM 331, Isolated 8 AI, resolution 13 bits  
U/I/resistor/Pt100, NI100, NI1000, LG-NI1000, PTC/KTY, 66 ms conversion time;  
1x 40-pole

| Input current                                                         |                                          |
|-----------------------------------------------------------------------|------------------------------------------|
| from backplane bus 5 V DC, max.                                       | 90 mA                                    |
| Power loss                                                            |                                          |
| Power loss, typ.                                                      | 0.4 W                                    |
| Analog inputs                                                         |                                          |
| Number of analog inputs                                               | 8                                        |
| • For resistance measurement                                          | 8                                        |
| permissible input voltage for voltage input (destruction limit), max. | 30 V; 12 V continuous, 30 V for max. 1 s |
| permissible input current for current input (destruction limit), max. | 40 mA                                    |
| Input ranges                                                          |                                          |
| • Voltage                                                             | Yes                                      |
| • Current                                                             | Yes                                      |
| • Thermocouple                                                        | No                                       |
| • Resistance thermometer                                              | Yes                                      |
| • Resistance                                                          | Yes                                      |
| Input ranges (rated values), voltages                                 |                                          |
| • 0 to +10 V                                                          | Yes                                      |
| — Input resistance (0 to 10 V)                                        | 100 kΩ                                   |
| • 1 V to 5 V                                                          | Yes                                      |
| — Input resistance (1 V to 5 V)                                       | 100 kΩ                                   |
| • 1 V to 10 V                                                         | No                                       |
| • -1 V to +1 V                                                        | Yes                                      |
| — Input resistance (-1 V to +1 V)                                     | 100 kΩ                                   |
| • -10 V to +10 V                                                      | Yes                                      |
| — Input resistance (-10 V to +10 V)                                   | 100 kΩ                                   |
| • -2.5 V to +2.5 V                                                    | No                                       |
| • -250 mV to +250 mV                                                  | No                                       |
| • -5 V to +5 V                                                        | Yes                                      |
| — Input resistance (-5 V to +5 V)                                     | 100 kΩ                                   |
| • -50 mV to +50 mV                                                    | Yes                                      |
| — Input resistance (-50 mV to +50 mV)                                 | 100 kΩ                                   |
| • -500 mV to +500 mV                                                  | Yes                                      |
| — Input resistance (-500 mV to +500 mV)                               | 100 kΩ                                   |
| • -80 mV to +80 mV                                                    | No                                       |
| Input ranges (rated values), currents                                 |                                          |
| • 0 to 20 mA                                                          | Yes                                      |
| — Input resistance (0 to 20 mA)                                       | 100 Ω                                    |
| • -10 mA to +10 mA                                                    | No                                       |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• -20 mA to +20 mA <ul style="list-style-type: none"> <li>— Input resistance (-20 mA to +20 mA)</li> </ul> </li> <li>• -3.2 mA to +3.2 mA</li> <li>• 4 mA to 20 mA <ul style="list-style-type: none"> <li>— Input resistance (4 mA to 20 mA)</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                           | Yes<br>100 Ω<br>No<br>Yes<br>100 Ω                                                                                                                               |
| Input ranges (rated values), thermocouples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• Type B</li> <li>• Type C</li> <li>• Type E</li> <li>• Type J</li> <li>• Type K</li> <li>• Type L</li> <li>• Type N</li> <li>• Type R</li> <li>• Type S</li> <li>• Type T</li> <li>• Type U</li> <li>• Type TXK/TXK(L) to GOST</li> </ul>                                                                                                                                                                                                                                                                                                    | No<br>No<br>No<br>No<br>No<br>No<br>No<br>No<br>No<br>No<br>No<br>No                                                                                             |
| Input ranges (rated values), resistance thermometer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• Cu 10</li> <li>• Ni 100 <ul style="list-style-type: none"> <li>— Input resistance (Ni 100)</li> </ul> </li> <li>• Ni 1000 <ul style="list-style-type: none"> <li>— Input resistance (Ni 1000)</li> </ul> </li> <li>• LG-Ni 1000 <ul style="list-style-type: none"> <li>— Input resistance (LG-Ni 1000)</li> </ul> </li> <li>• Ni 120</li> <li>• Ni 200</li> <li>• Ni 500</li> <li>• Pt 100 <ul style="list-style-type: none"> <li>— Input resistance (Pt 100)</li> </ul> </li> <li>• Pt 1000</li> <li>• Pt 200</li> <li>• Pt 500</li> </ul> | No<br>Yes; Standard/climate<br>100 MΩ<br>Yes<br>100 MΩ<br>Yes; Standard/climate<br>100 MΩ<br>No<br>No<br>No<br>Yes; Standard/climate<br>100 MΩ<br>No<br>No<br>No |
| Input ranges (rated values), resistors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• 0 to 150 ohms</li> <li>• 0 to 300 ohms</li> <li>• 0 to 600 ohms <ul style="list-style-type: none"> <li>— Input resistance (0 to 600 ohms)</li> </ul> </li> <li>• 0 to 6000 ohms <ul style="list-style-type: none"> <li>— Input resistance (0 to 6000 ohms)</li> </ul> </li> </ul>                                                                                                                                                                                                                                                           | No<br>No<br>Yes<br>100 MΩ<br>Yes<br>100 MΩ                                                                                                                       |
| Thermocouple (TC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                  |
| Temperature compensation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>— parameterizable</li> <li>— internal temperature compensation</li> <li>— external temperature compensation with compensations socket</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              | No<br>No<br>No                                                                                                                                                   |
| Characteristic linearization                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• parameterizable <ul style="list-style-type: none"> <li>— for thermocouples</li> <li>— for resistance thermometer</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                     | Yes<br>No<br>yes; Pt100 standard/air con.; Ni100 standard/air con.; Ni1000 standard/air con.; LG-Ni1000 standard/air con.                                        |
| Cable length                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• shielded, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 200 m; max. 50 m at 50 mV                                                                                                                                        |
| Analog value generation for the inputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                  |
| Integration and conversion time/resolution per channel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• Resolution with overrange (bit including sign), max.</li> <li>• Integration time, parameterizable</li> <li>• Basic conversion time (ms)</li> <li>• Interference voltage suppression for interference frequency f1 in Hz</li> </ul>                                                                                                                                                                                                                                                                                                          | 13 bit<br>Yes; 60 / 50 ms<br>66 / 55 ms<br>50 / 60 Hz                                                                                                            |

| Encoder                                                  |                                                                                                                                  |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Connection of signal encoders                            |                                                                                                                                  |
| • for voltage measurement                                | Yes                                                                                                                              |
| • for current measurement as 2-wire transducer           | Yes; with external supply                                                                                                        |
| • for current measurement as 4-wire transducer           | Yes                                                                                                                              |
| • for resistance measurement with two-wire connection    | Yes                                                                                                                              |
| • for resistance measurement with three-wire connection  | Yes                                                                                                                              |
| • for resistance measurement with four-wire connection   | Yes                                                                                                                              |
| Errors/accuracies                                        |                                                                                                                                  |
| Operational error limit in overall temperature range     |                                                                                                                                  |
| • Voltage, relative to input range, (+/-)                | 0.6 %; $\pm 0.6$ % ( $\pm 5$ V, 10 V, 1 to 5 V, 0 to 10 V); $\pm 0.5$ % ( $\pm 50$ mV, 500 mV, 1 V)                              |
| • Current, relative to input range, (+/-)                | 0.5 %; $\pm 20$ mA, 0 to 20 mA, 4 to 20 mA                                                                                       |
| • Resistance, relative to input range, (+/-)             | 0.5 %; 0 to 6 kohms, 0 to 600 kohms                                                                                              |
| • Resistance thermometer, relative to input range, (+/-) | 1 Kelvin (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic); 1.2 Kelvin (Pt100, Ni100, standard) |
| Basic error limit (operational limit at 25 °C)           |                                                                                                                                  |
| • Voltage, relative to input range, (+/-)                | 0.4 %; 0.4% ( $\pm 5$ V, 10 V, 1 to 5 V, 0 to 10 V); 0.3% ( $\pm 50$ mV, 500 mV, 1 V)                                            |
| • Current, relative to input range, (+/-)                | 0.3 %; $\pm 20$ mA, 0 to 20 mA, 4 to 20 mA                                                                                       |
| • Resistance, relative to input range, (+/-)             | 0.3 %; 0 to 6 kohms, 0 to 600 kohms                                                                                              |
| • Resistance thermometer, relative to input range, (+/-) | 1 Kelvin (Pt100, Ni100, standard); 0.8 Kelvin (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic) |
| Interrupts/diagnostics/status information                |                                                                                                                                  |
| Diagnostics function                                     | No                                                                                                                               |
| Alarms                                                   |                                                                                                                                  |
| • Diagnostic alarm                                       | No                                                                                                                               |
| • Limit value alarm                                      | No                                                                                                                               |
| Diagnoses                                                |                                                                                                                                  |
| • Diagnostic information readable                        | No                                                                                                                               |
| Diagnostics indication LED                               |                                                                                                                                  |
| • Group error SF (red)                                   | No                                                                                                                               |
| Potential separation                                     |                                                                                                                                  |
| Potential separation analog inputs                       |                                                                                                                                  |
| • between the channels                                   | No                                                                                                                               |
| • between the channels and backplane bus                 | Yes                                                                                                                              |
| Isolation                                                |                                                                                                                                  |
| Isolation tested with                                    | 500 V DC                                                                                                                         |
| connection method                                        |                                                                                                                                  |
| required front connector                                 | 40-pin                                                                                                                           |
| Dimensions                                               |                                                                                                                                  |
| Width                                                    | 40 mm                                                                                                                            |
| Height                                                   | 125 mm                                                                                                                           |
| Depth                                                    | 117 mm                                                                                                                           |
| Weights                                                  |                                                                                                                                  |
| Weight, approx.                                          | 250 g                                                                                                                            |

last modified: 3/12/2024 