



Figure similar

\*\*\*spare part\*\*\* SIMATIC S7-300, analog input SM 331, isolated, 8 AI, resolution 9/12/14 bits, U/I/thermocouple/resistor, alarm, diagnostics, 1x 20-pole removing/inserting with active backplane bus

| General information                                                   |                                                                |
|-----------------------------------------------------------------------|----------------------------------------------------------------|
| Product function                                                      |                                                                |
| • Isochronous mode                                                    | No                                                             |
| Supply voltage                                                        |                                                                |
| Load voltage L+                                                       |                                                                |
| • Rated value (DC)                                                    | 24 V                                                           |
| • Reverse polarity protection                                         | Yes                                                            |
| Input current                                                         |                                                                |
| from load voltage L+ (without load), max.                             | 30 mA                                                          |
| from backplane bus 5 V DC, max.                                       | 50 mA                                                          |
| Power loss                                                            |                                                                |
| Power loss, typ.                                                      | 1 W                                                            |
| Analog inputs                                                         |                                                                |
| Number of analog inputs                                               | 8                                                              |
| • For resistance measurement                                          | 4                                                              |
| permissible input voltage for voltage input (destruction limit), max. | 20 V; continuous; 75 V for max. 1 s (mark to space ratio 1:20) |
| permissible input current for current input (destruction limit), max. | 40 mA                                                          |
| Constant measurement current for resistance-type transmitter, typ.    | 1.67 mA                                                        |
| Input ranges                                                          |                                                                |
| • Voltage                                                             | Yes                                                            |
| • Current                                                             | Yes                                                            |
| • Thermocouple                                                        | Yes                                                            |
| • Resistance thermometer                                              | Yes                                                            |
| • Resistance                                                          | Yes                                                            |
| Input ranges (rated values), voltages                                 |                                                                |
| • 0 to +10 V                                                          | No                                                             |
| • 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)                                     | 10 MΩ                                                          |
| • -10 V to +10 V                                                      | Yes                                                            |
| — Input resistance (-10 V to +10 V)                                   | 100 kΩ                                                         |
| • -2.5 V to +2.5 V                                                    | Yes                                                            |
| — Input resistance (-2.5 V to +2.5 V)                                 | 100 kΩ                                                         |
| • -250 mV to +250 mV                                                  | Yes                                                            |

|                                                     |               |
|-----------------------------------------------------|---------------|
| — Input resistance (-250 mV to +250 mV)             | 10 MΩ         |
| • -5 V to +5 V                                      | Yes           |
| — Input resistance (-5 V to +5 V)                   | 100 kΩ        |
| • -50 mV to +50 mV                                  | No            |
| • -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), currents               |               |
| • 0 to 20 mA                                        | Yes           |
| — Input resistance (0 to 20 mA)                     | 25 Ω          |
| • -10 mA to +10 mA                                  | Yes           |
| — Input resistance (-10 mA to +10 mA)               | 25 Ω          |
| • -20 mA to +20 mA                                  | Yes           |
| — Input resistance (-20 mA to +20 mA)               | 25 Ω          |
| • -3.2 mA to +3.2 mA                                | Yes           |
| — Input resistance (-3.2 mA to +3.2 mA)             | 25 Ω          |
| • 4 mA to 20 mA                                     | Yes           |
| — Input resistance (4 mA to 20 mA)                  | 25 Ω          |
| Input ranges (rated values), thermocouples          |               |
| • Type B                                            | No            |
| • Type C                                            | No            |
| • 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                                            | No            |
| • Type S                                            | No            |
| • Type T                                            | No            |
| • Type U                                            | No            |
| • Type TXK/TXK(L) to GOST                           | No            |
| Input ranges (rated values), resistance thermometer |               |
| • Cu 10                                             | No            |
| • Ni 100                                            | Yes; Standard |
| — Input resistance (Ni 100)                         | 10 MΩ         |
| • Ni 1000                                           | No            |
| • LG-Ni 1000                                        | No            |
| • Ni 120                                            | No            |
| • Ni 200                                            | No            |
| • Ni 500                                            | No            |
| • Pt 100                                            | Yes; Standard |
| — Input resistance (Pt 100)                         | 10 MΩ         |
| • Pt 1000                                           | No            |
| • Pt 200                                            | No            |
| • Pt 500                                            | No            |
| Input ranges (rated values), resistors              |               |
| • 0 to 150 ohms                                     | Yes           |
| — Input resistance (0 to 150 ohms)                  | 10 MΩ         |
| • 0 to 300 ohms                                     | Yes           |
| — Input resistance (0 to 300 ohms)                  | 10 MΩ         |
| • 0 to 600 ohms                                     | Yes           |
| — Input resistance (0 to 600 ohms)                  | 10 MΩ         |
| • 0 to 6000 ohms                                    | No            |

|                                                                        |                                                                                                   |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>Thermocouple (TC)</b>                                               |                                                                                                   |
| Temperature compensation                                               |                                                                                                   |
| — Parameterizable                                                      | Yes                                                                                               |
| — internal temperature compensation                                    | Yes                                                                                               |
| — external temperature compensation with compensations socket          | Yes                                                                                               |
| — for definable comparison point temperature                           | Yes                                                                                               |
| Characteristic linearization                                           |                                                                                                   |
| • Parameterizable                                                      | Yes                                                                                               |
| — for thermocouples                                                    | Type E, J, K, L, N                                                                                |
| — for resistance thermometer                                           | Pt100 (standard, climatic range), Ni100 (standard, climatic range)                                |
| Cable length                                                           |                                                                                                   |
| • shielded, max.                                                       | 200 m; 50 m at 80 mV and thermocouples                                                            |
| <b>Analog value generation for the inputs</b>                          |                                                                                                   |
| Integration and conversion time/resolution per channel                 |                                                                                                   |
| • Resolution with overrange (bit including sign), max.                 | 15 bit; Unipolar: 9/12/12/14 bit; bipolar: 9 bit + sign/12 bit + sign/12 bit + sign/14 bit + sign |
| • Integration time, parameterizable                                    | Yes; 2,5 / 16,67 / 20 / 100 ms                                                                    |
| • Basic conversion time (ms)                                           | 3 / 17 / 22 / 102 ms                                                                              |
| • Interference voltage suppression for interference frequency f1 in Hz | 400 / 60 / 50 / 10 Hz                                                                             |
| <b>Encoder</b>                                                         |                                                                                                   |
| Connection of signal encoders                                          |                                                                                                   |
| • for voltage measurement                                              | Yes                                                                                               |
| • for current measurement as 2-wire transducer                         | Yes                                                                                               |
| • 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                                                                                               |
| <b>Errors/accuracies</b>                                               |                                                                                                   |
| Operational error limit in overall temperature range                   |                                                                                                   |
| • Voltage, relative to input range, (+/-)                              | 1 %; $\pm 1\%$ (80 mV); $\pm 0.6\%$ (250 mV to 1 000 mV); $\pm 0.8\%$ (2.5 V to 10 V)             |
| • Current, relative to input range, (+/-)                              | 0.7 %; From 3.2 to 20 mA                                                                          |
| • Resistance, relative to input range, (+/-)                           | 0.7 %; 150, 300, 600 Ohm                                                                          |
| • Resistance thermometer, relative to input range, (+/-)               | 0.7 %; $\pm 0.7\%$ (Pt100/ Ni100); $\pm 0.8\%$ (Pt100 climate)                                    |
| • Thermocouple, relative to input range, (+/-)                         | 1.1 %; Type E, J, K, L, N                                                                         |
| Basic error limit (operational limit at 25 °C)                         |                                                                                                   |
| • Voltage, relative to input range, (+/-)                              | 0.6 %; $\pm 0.4\%$ (250 mV to 1 000 mV); $\pm 0.6\%$ (2.5 mV to 10 mV); $\pm 0.7\%$ (80 mV)       |
| • Current, relative to input range, (+/-)                              | 0.5 %; 3.2 to 20 mA                                                                               |
| • Resistance, relative to input range, (+/-)                           | 0.5 %; 150, 300, 600 Ohm                                                                          |
| • Resistance thermometer, relative to input range, (+/-)               | 0.6 %; $\pm 0.5\%$ (Pt100/ Ni100), $\pm 0.6\%$ (Pt100 climate)                                    |
| • Thermocouple, relative to input range, (+/-)                         | 0.7 %; Type E, N, J, K, L                                                                         |
| <b>Interrupts/diagnostics/status information</b>                       |                                                                                                   |
| Diagnostics function                                                   | Yes; Parameterizable                                                                              |
| Alarms                                                                 |                                                                                                   |
| • Diagnostic alarm                                                     | Yes; Parameterizable, channels 0 and 2                                                            |
| • Limit value alarm                                                    | Yes; Parameterizable                                                                              |
| Diagnoses                                                              |                                                                                                   |
| • Diagnostic information readable                                      | Yes                                                                                               |
| Diagnostics indication LED                                             |                                                                                                   |
| • Group error SF (red)                                                 | Yes                                                                                               |
| <b>Potential separation</b>                                            |                                                                                                   |
| Potential separation analog inputs                                     |                                                                                                   |
| • between the channels                                                 | No                                                                                                |
| • between the channels and backplane bus                               | Yes                                                                                               |
| • between the channels and the power supply of the electronics         | Yes                                                                                               |
| <b>Isolation</b>                                                       |                                                                                                   |
| Isolation tested with                                                  | 500 V DC                                                                                          |

| Connection method        |        |
|--------------------------|--------|
| required front connector | 20-pin |
| Dimensions               |        |
| Width                    | 40 mm  |
| Height                   | 125 mm |
| Depth                    | 117 mm |
| Weights                  |        |
| Weight, approx.          | 250 g  |
| Classifications          |        |

|        | Version | Classification |
|--------|---------|----------------|
| eClass | 16      | 27-24-22-01    |
| eClass | 14      | 27-24-22-01    |
| eClass | 12      | 27-24-22-01    |
| eClass | 9.1     | 27-24-22-01    |
| eClass | 9       | 27-24-22-01    |
| eClass | 8       | 27-24-22-01    |
| eClass | 7.1     | 27-24-22-01    |
| eClass | 6       | 27-24-22-01    |
| ETIM   | 10      | EC001420       |
| ETIM   | 9       | EC001420       |
| ETIM   | 8       | EC001420       |
| ETIM   | 7       | EC001420       |
| IDEA   | 4       | 3562           |
| UNSPSC | 15      | 32-15-17-05    |

| Approvals / Certificates |  |
|--------------------------|--|
| General Product Approval |  |

[Miscellaneous](#)



[Metrological Approval](#)



|                          |     |
|--------------------------|-----|
| General Product Approval | EMV |
|--------------------------|-----|



[China RoHS](#)

[Manufacturer Declaration](#)



|                                |
|--------------------------------|
| For use in hazardous locations |
|--------------------------------|



[FM](#)



[Miscellaneous](#)



|                                |                      |
|--------------------------------|----------------------|
| For use in hazardous locations | Maritime application |
|--------------------------------|----------------------|

[CCC-Ex](#)



[NK / Nippon Kaiji Kyokai](#)



|                      |
|----------------------|
| Maritime application |
|----------------------|



[CCS \(China Classification Society\)](#)

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