



SIMATIC S7-400, analog input SM 431, 8 AI, resolution 16 bit, U/I/Thermocouple, isolated with single routing, diagnostics, alarm, 20 ms conversion time

Figure similar

| Input current                                                         |                                                                     |
|-----------------------------------------------------------------------|---------------------------------------------------------------------|
| from backplane bus 5 V DC, max.                                       | 1 200 mA                                                            |
| Power loss                                                            |                                                                     |
| Power loss, typ.                                                      | 4.6 W                                                               |
| Analog inputs                                                         |                                                                     |
| Number of analog inputs                                               | 8                                                                   |
| • For voltage/current measurement                                     | 8                                                                   |
| permissible input voltage for voltage input (destruction limit), max. | 35 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20) |
| permissible input current for current input (destruction limit), max. | 32 mA                                                               |
| Input ranges                                                          |                                                                     |
| • Voltage                                                             | Yes                                                                 |
| • Current                                                             | Yes                                                                 |
| • Thermocouple                                                        | Yes                                                                 |
| • Resistance thermometer                                              | No                                                                  |
| • Resistance                                                          | No                                                                  |
| Input ranges (rated values), voltages                                 |                                                                     |
| • 1 V to 5 V                                                          | Yes                                                                 |
| — Input resistance (1 V to 5 V)                                       | > 2 000 ohms                                                        |
| • -1 V to +1 V                                                        | Yes                                                                 |
| • -10 V to +10 V                                                      | Yes                                                                 |
| • -100 mV to +100 mV                                                  | Yes                                                                 |
| • -2.5 V to +2.5 V                                                    | Yes                                                                 |
| • -20 mV to +20 mV                                                    | Yes                                                                 |
| • -250 mV to +250 mV                                                  | Yes                                                                 |
| • -5 V to +5 V                                                        | Yes                                                                 |
| • -50 mV to +50 mV                                                    | Yes                                                                 |
| • -500 mV to +500 mV                                                  | Yes                                                                 |
| • -80 mV to +80 mV                                                    | Yes                                                                 |
| Input ranges (rated values), currents                                 |                                                                     |
| • 0 to 20 mA                                                          | Yes                                                                 |
| • -10 mA to +10 mA                                                    | Yes                                                                 |
| • -20 mA to +20 mA                                                    | Yes                                                                 |
| • -3.2 mA to +3.2 mA                                                  | Yes                                                                 |
| • 4 mA to 20 mA                                                       | Yes                                                                 |
| — Input resistance (4 mA to 20 mA)                                    | 50 Ω                                                                |
| • -5 mA to +5 mA                                                      | Yes                                                                 |
| Input ranges (rated values), thermocouples                            |                                                                     |
| • Type B                                                              | Yes                                                                 |

|                                                                        |                                    |
|------------------------------------------------------------------------|------------------------------------|
| — Input resistance (Type B)                                            | > 2 000 ohms                       |
| • Type E                                                               | Yes                                |
| • Type J                                                               | Yes                                |
| • Type K                                                               | Yes                                |
| • Type L                                                               | Yes                                |
| • Type N                                                               | Yes                                |
| — Input resistance (Type N)                                            | > 2 000 ohms                       |
| • Type R                                                               | Yes                                |
| • Type S                                                               | Yes                                |
| • Type T                                                               | Yes                                |
| • Type U                                                               | Yes                                |
| <b>Thermocouple (TC)</b>                                               |                                    |
| Temperature compensation                                               |                                    |
| — connection for compensating the cold junction                        | <a href="#">6ES7431-7KF00-6AA0</a> |
| — parameterizable                                                      | Yes                                |
| — internal temperature compensation                                    | Yes                                |
| — external temperature compensation with compensations socket          | Yes                                |
| — dynamic reference temperature value                                  | Yes                                |
| <b>Characteristic linearization</b>                                    |                                    |
| • parameterizable                                                      | Yes                                |
| — for thermocouples                                                    | Type B, E, J, K, L, N, R, S, T, U  |
| <b>Cable length</b>                                                    |                                    |
| • shielded, max.                                                       | 200 m                              |
| <b>Analog value generation for the inputs</b>                          |                                    |
| Integration and conversion time/resolution per channel                 |                                    |
| • Resolution with overrange (bit including sign), max.                 | 16 bit                             |
| • Integration time, parameterizable                                    | Yes                                |
| • Basic conversion time (ms)                                           | 10 / 16,7 / 20 / 100               |
| • Integration time (ms)                                                | 2,5 / 16,7 / 20 / 100              |
| • 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; possible                      |
| • for current measurement as 4-wire transducer                         | 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, (+/-)                              | 0.3 %                              |
| • Current, relative to input range, (+/-)                              | 0.5 %                              |
| Basic error limit (operational limit at 25 °C)                         |                                    |
| • Voltage, relative to input range, (+/-)                              | 0.1 %                              |
| • Current, relative to input range, (+/-)                              | 0.17 %                             |
| <b>Interrupts/diagnostics/status information</b>                       |                                    |
| Diagnostics function                                                   | Yes; Parameterizable               |
| <b>Alarms</b>                                                          |                                    |
| • Diagnostic alarm                                                     | Yes; Parameterizable               |
| • Limit value alarm                                                    | Yes                                |
| • Hardware interrupt                                                   | Yes; Parameterizable               |
| <b>Diagnoses</b>                                                       |                                    |
| • Diagnostic information readable                                      | Yes; possible                      |
| <b>Potential separation</b>                                            |                                    |
| Potential separation analog inputs                                     |                                    |
| • Potential separation analog inputs                                   | Yes; internal/external             |
| • between the channels                                                 | Yes                                |
| • between the channels and backplane bus                               | Yes                                |
| <b>Isolation</b>                                                       |                                    |
| Isolation tested with                                                  | 1 500 V DC                         |
| <b>Dimensions</b>                                                      |                                    |
| Width                                                                  | 25 mm                              |

|                 |                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------|
| Height          | 290 mm                                                                                      |
| Depth           | 210 mm                                                                                      |
| Weights         |                                                                                             |
| Weight, approx. | 650 g                                                                                       |
| last modified:  | 3/12/2024  |