



SIMATIC ET 200SP, Analog input module, AI 4xRTD/TC High Feature, suitable for BU type A0, A1, Color code CC00, channel diagnostics, 16 bit, +/-0.1%, 2-/3-/4-wire

| General information                                                   |                                     |
|-----------------------------------------------------------------------|-------------------------------------|
| Product type designation                                              | AI 4xRTD/TC 2-/3-/4-wire HF         |
| Firmware version                                                      | V2.1                                |
| • FW update possible                                                  | Yes                                 |
| usable BaseUnits                                                      | BU type A0, A1                      |
| Color code for module-specific color identification plate             | CC00                                |
| Product function                                                      |                                     |
| • I&M data                                                            | Yes; I&M0 to I&M3                   |
| • Isochronous mode                                                    | No                                  |
| • Adjustment of measuring range                                       | Yes                                 |
| Engineering with                                                      |                                     |
| • STEP 7 TIA Portal configurable/integrated from version              | V12 SP1 / V13                       |
| • STEP 7 configurable/integrated from version                         | V5.5 SP3 / V5.5 SP4                 |
| • PCS 7 configurable/integrated from version                          | V8.1 SP1                            |
| • PROFIBUS from GSD version/GSD revision                              | GSD Revision 5                      |
| • PROFINET from GSD version/GSD revision                              | GSDML V2.3                          |
| CIR - Configuration in RUN                                            |                                     |
| Reparameterization possible in RUN                                    | Yes                                 |
| Calibration possible in RUN                                           | Yes                                 |
| Supply voltage                                                        |                                     |
| Rated value (DC)                                                      | 24 V                                |
| permissible range, lower limit (DC)                                   | 19.2 V                              |
| permissible range, upper limit (DC)                                   | 28.8 V                              |
| Reverse polarity protection                                           | Yes                                 |
| Input current                                                         |                                     |
| Current consumption (rated value)                                     | 30 mA                               |
| Current consumption, max.                                             | 32 mA                               |
| Power loss                                                            |                                     |
| Power loss, typ.                                                      | 0.75 W                              |
| Address area                                                          |                                     |
| Address space per module                                              |                                     |
| • Address space per module, max.                                      | 8 byte; + 1 byte for QI information |
| Hardware configuration                                                |                                     |
| Automatic encoding                                                    |                                     |
| • Type of mechanical coding element                                   | Type A                              |
| Analog inputs                                                         |                                     |
| Number of analog inputs                                               | 4                                   |
| permissible input voltage for voltage input (destruction limit), max. | 30 V                                |
| Constant measurement current for resistance-type transmitter,         | 2 mA                                |

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| typ.                                                                      |                                                                                                                                                                                                                          |
| Cycle time (all channels), min.                                           | Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels); for line compensation in case of a three-wire connection, an additional cycle is necessary |
| Technical unit for temperature measurement adjustable                     | Yes; °C/°F/K                                                                                                                                                                                                             |
| <b>Input ranges (rated values), voltages</b>                              |                                                                                                                                                                                                                          |
| • -1 V to +1 V<br>— Input resistance (-1 V to +1 V)                       | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • -250 mV to +250 mV<br>— Input resistance (-250 mV to +250 mV)           | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • -50 mV to +50 mV<br>— Input resistance (-50 mV to +50 mV)               | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • -80 mV to +80 mV<br>— Input resistance (-80 mV to +80 mV)               | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| <b>Input ranges (rated values), thermocouples</b>                         |                                                                                                                                                                                                                          |
| • Type B<br>— Input resistance (Type B)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type C<br>— Input resistance (Type C)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type E<br>— Input resistance (Type E)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type J<br>— Input resistance (type J)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type K<br>— Input resistance (Type K)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type L<br>— Input resistance (Type L)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type N<br>— Input resistance (Type N)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type R<br>— Input resistance (Type R)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type S<br>— Input resistance (Type S)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type T<br>— Input resistance (Type T)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type U<br>— Input resistance (Type U)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Type TXK/TXK(L) to GOST<br>— Input resistance (Type TXK/TXK(L) to GOST) | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| <b>Input ranges (rated values), resistance thermometer</b>                |                                                                                                                                                                                                                          |
| • Cu 10<br>— Input resistance (Cu 10)                                     | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Ni 100<br>— Input resistance (Ni 100)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Ni 1000<br>— Input resistance (Ni 1000)                                 | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • LG-Ni 1000<br>— Input resistance (LG-Ni 1000)                           | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Ni 120<br>— Input resistance (Ni 120)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Ni 200<br>— Input resistance (Ni 200)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Ni 500<br>— Input resistance (Ni 500)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Pt 100<br>— Input resistance (Pt 100)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Pt 1000<br>— Input resistance (Pt 1000)                                 | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Pt 200<br>— Input resistance (Pt 200)                                   | Yes; 16 bit incl. sign<br>1 MΩ                                                                                                                                                                                           |
| • Pt 500                                                                  | Yes; 16 bit incl. sign                                                                                                                                                                                                   |

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| — Input resistance (Pt 500)                                                                                      | 1 MΩ                                                                     |
| <b>Input ranges (rated values), resistors</b>                                                                    |                                                                          |
| • 0 to 150 ohms                                                                                                  | Yes; 15 bit                                                              |
| — Input resistance (0 to 150 ohms)                                                                               | 1 MΩ                                                                     |
| • 0 to 300 ohms                                                                                                  | Yes; 15 bit                                                              |
| — Input resistance (0 to 300 ohms)                                                                               | 1 MΩ                                                                     |
| • 0 to 600 ohms                                                                                                  | Yes; 15 bit                                                              |
| — Input resistance (0 to 600 ohms)                                                                               | 1 MΩ                                                                     |
| • 0 to 3000 ohms                                                                                                 | Yes; 15 bit                                                              |
| — Input resistance (0 to 3000 ohms)                                                                              | 1 MΩ                                                                     |
| • 0 to 6000 ohms                                                                                                 | Yes; 15 bit                                                              |
| — Input resistance (0 to 6000 ohms)                                                                              | 1 MΩ                                                                     |
| • PTC                                                                                                            | Yes; 15 bit                                                              |
| — Input resistance (PTC)                                                                                         | 1 MΩ                                                                     |
| <b>Thermocouple (TC)</b>                                                                                         |                                                                          |
| Temperature compensation                                                                                         |                                                                          |
| — parameterizable                                                                                                | Yes                                                                      |
| — Reference channel of the module                                                                                | Yes                                                                      |
| — internal comparison point                                                                                      | Yes; with BaseUnit type A1                                               |
| — Number of reference channel groups                                                                             | 4; Group 0 to 3                                                          |
| <b>Cable length</b>                                                                                              |                                                                          |
| • shielded, max.                                                                                                 | 200 m; 50 m with thermocouples                                           |
| <b>Analog value generation for the inputs</b>                                                                    |                                                                          |
| Measurement principle                                                                                            | integrating (Sigma-Delta)                                                |
| <b>Integration and conversion time/resolution per channel</b>                                                    |                                                                          |
| • Resolution with overrange (bit including sign), max.                                                           | 16 bit                                                                   |
| • Integration time, parameterizable                                                                              | Yes                                                                      |
| • Basic conversion time, including integration time (ms)                                                         |                                                                          |
| — additional processing time for wire-break check                                                                | 2 ms; In the ranges resistance thermometers, resistors and thermocouples |
| — additional power line wire-break check                                                                         | 2 ms; for 3/4 wire transducer (resistance thermometer and resistor)      |
| • Interference voltage suppression for interference frequency f1 in Hz                                           | 16.6 / 50 / 60 Hz                                                        |
| • Conversion time (per channel)                                                                                  | 180 / 60 / 50 / (67.5 / 22.5 / 18.75) ms                                 |
| <b>Smoothering of measured values</b>                                                                            |                                                                          |
| • Number of smoothering levels                                                                                   | 4; None; 4/8/16 times                                                    |
| • parameterizable                                                                                                | Yes                                                                      |
| <b>Encoder</b>                                                                                                   |                                                                          |
| <b>Connection of signal encoders</b>                                                                             |                                                                          |
| • for voltage measurement                                                                                        | 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>                                                                                         |                                                                          |
| Linearity error (relative to input range), (+/-)                                                                 | 0.01 %; ±0.1 % for resistance thermometers and resistance                |
| Temperature error (relative to input range), (+/-)                                                               | 0.0009 %/K; ±0.005 % / K at thermocouple                                 |
| Crosstalk between the inputs, min.                                                                               | -50 dB                                                                   |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)                                        | 0.05 %                                                                   |
| <b>Operational error limit in overall temperature range</b>                                                      |                                                                          |
| • Voltage, relative to input range, (+/-)                                                                        | 0.1 %                                                                    |
| • Resistance, relative to input range, (+/-)                                                                     | 0.1 %                                                                    |
| <b>Basic error limit (operational limit at 25 °C)</b>                                                            |                                                                          |
| • Voltage, relative to input range, (+/-)                                                                        | 0.05 %                                                                   |
| • Resistance, relative to input range, (+/-)                                                                     | 0.05 %                                                                   |
| <b>Interference voltage suppression for <math>f = n \times (f1 \pm 1 \%)</math>, f1 = interference frequency</b> |                                                                          |
| • Series mode interference (peak value of interference < rated value of input range), min.                       | 70 dB; With conversion time 67.5 / 22.5 / 18.75 ms: 40 dB                |
| • Common mode voltage, max.                                                                                      | 10 V                                                                     |
| • Common mode interference, min.                                                                                 | 90 dB                                                                    |
| <b>Interrupts/diagnostics/status information</b>                                                                 |                                                                          |
| <b>Alarms</b>                                                                                                    |                                                                          |

|                                              |                                                        |
|----------------------------------------------|--------------------------------------------------------|
| • Limit value alarm                          | Yes; two upper and two lower limit values in each case |
| <b>Diagnoses</b>                             |                                                        |
| • Monitoring the supply voltage              | Yes                                                    |
| • Wire-break                                 | Yes; channel by channel                                |
| • Group error                                | Yes                                                    |
| • Overflow/underflow                         | Yes; channel by channel                                |
| <b>Diagnostics indication LED</b>            |                                                        |
| • Monitoring of the supply voltage (PWR-LED) | Yes; green PWR LED                                     |
| • Channel status display                     | Yes; green LED                                         |
| • for channel diagnostics                    | Yes; red LED                                           |
| • for module diagnostics                     | Yes; green/red DIAG LED                                |
| <b>Isolation</b>                             |                                                        |
| Isolation tested with                        | 707 V DC (type test)                                   |
| <b>Ambient conditions</b>                    |                                                        |
| <b>Ambient temperature during operation</b>  |                                                        |
| • horizontal installation, min.              | -30 °C; < 0 °C as of FS08                              |
| • horizontal installation, max.              | 60 °C                                                  |
| • vertical installation, min.                | -30 °C; < 0 °C as of FS08                              |
| • vertical installation, max.                | 50 °C                                                  |
| <b>Dimensions</b>                            |                                                        |
| Width                                        | 15 mm                                                  |
| Height                                       | 73 mm                                                  |
| Depth                                        | 58 mm                                                  |

**last modified:**

10/13/2023 