

Siemens  
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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-coded label         | CC00                                |
| Product function                                         |                                     |
| • I&M data                                               | Yes; I&M0 to I&M3                   |
| • Isochronous mode                                       | No                                  |
| • Measuring range scalable                               | 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                          |
| Operating mode                                           |                                     |
| • Oversampling                                           | No                                  |
| • MSI                                                    | No                                  |
| 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                                                        |                                                                                                                                                                                                                          |
| • Mechanical coding element                                               | Yes                                                                                                                                                                                                                      |
| • Type of mechanical coding element                                       | Type A                                                                                                                                                                                                                   |
| <b>Analog inputs</b>                                                      |                                                                                                                                                                                                                          |
| Number of analog inputs                                                   | 4                                                                                                                                                                                                                        |
| permissible input voltage for voltage input (destruction limit), max.     | 30 V                                                                                                                                                                                                                     |
| Constant measurement current for resistance-type transmitter, typ.        | 2 mA                                                                                                                                                                                                                     |
| 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                                                                                                                                                                                           |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Ni 500 <ul style="list-style-type: none"> <li>— Input resistance (Ni 500)</li> </ul> </li> <li>• Pt 100 <ul style="list-style-type: none"> <li>— Input resistance (Pt 100)</li> </ul> </li> <li>• Pt 1000 <ul style="list-style-type: none"> <li>— Input resistance (Pt 1000)</li> </ul> </li> <li>• Pt 200 <ul style="list-style-type: none"> <li>— Input resistance (Pt 200)</li> </ul> </li> <li>• Pt 500 <ul style="list-style-type: none"> <li>— Input resistance (Pt 500)</li> </ul> </li> </ul>                                                                                                                                                                    | Yes; 16 bit incl. sign<br>1 MΩ<br>Yes; 16 bit incl. sign<br>1 MΩ<br>Yes; 16 bit incl. sign<br>1 MΩ<br>Yes; 16 bit incl. sign<br>1 MΩ<br>Yes; 16 bit incl. sign<br>1 MΩ                                                            |
| <b>Input ranges (rated values), resistors</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>• 0 to 150 ohms <ul style="list-style-type: none"> <li>— Input resistance (0 to 150 ohms)</li> </ul> </li> <li>• 0 to 300 ohms <ul style="list-style-type: none"> <li>— Input resistance (0 to 300 ohms)</li> </ul> </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 3000 ohms <ul style="list-style-type: none"> <li>— Input resistance (0 to 3000 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> <li>• PTC <ul style="list-style-type: none"> <li>— Input resistance (PTC)</li> </ul> </li> </ul> | Yes; 15 bit<br>1 MΩ<br>Yes; 15 bit<br>1 MΩ<br>Yes; 15 bit<br>1 MΩ<br>Yes; 15 bit<br>1 MΩ<br>Yes; 15 bit<br>1 MΩ<br>Yes; 15 bit<br>1 MΩ                                                                                            |
| <b>Thermocouple (TC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                   |
| <b>Temperature compensation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>— parameterizable</li> <li>— Reference channel of the module</li> <li>— internal comparison point</li> <li>— Reference channel of the group</li> <li>— Number of reference channel groups</li> <li>— fixed reference temperature</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                 | Yes<br>Yes<br>Yes; with BaseUnit type A1<br>Yes<br>4; Group 0 to 3<br>Yes                                                                                                                                                         |
| <b>Cable length</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>• shielded, max.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 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>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>• Resolution with overrange (bit including sign), max.</li> <li>• Integration time, parameterizable</li> <li>• Basic conversion time, including integration time (ms) <ul style="list-style-type: none"> <li>— additional processing time for wire-break check</li> <li>— additional power line wire-break check</li> </ul> </li> <li>• Interference voltage suppression for interference frequency f1 in Hz</li> <li>• Conversion time (per channel)</li> </ul>                                                                                                                                                                                                            | 16 bit<br>Yes<br>2 ms; In the ranges resistance thermometers, resistors and thermocouples<br>2 ms; for 3/4 wire transducer (resistance thermometer and resistor)<br>16.6 / 50 / 60 Hz<br>180 / 60 / 50 / (67.5 / 22.5 / 18.75) ms |
| <b>Smoothing of measured values</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>• Number of smoothing levels</li> <li>• parameterizable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4; None; 4/8/16 times<br>Yes                                                                                                                                                                                                      |
| <b>Encoder</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                   |
| <b>Connection of signal encoders</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>• for voltage measurement</li> <li>• for resistance measurement with two-wire connection</li> <li>• for resistance measurement with three-wire connection</li> <li>• for resistance measurement with four-wire connection</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | Yes<br>Yes<br>Yes<br>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 %                                                                                                                                                                                                                            |

|                                                                                                     |                                                                                        |
|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Operational error limit in overall temperature range                                                |                                                                                        |
| • Voltage, relative to input range, (+/-)                                                           | 0.1 %                                                                                  |
| • Resistance, relative to input range, (+/-)                                                        | 0.1 %                                                                                  |
| Basic error limit (operational limit at 25 °C)                                                      |                                                                                        |
| • Voltage, relative to input range, (+/-)                                                           | 0.05 %                                                                                 |
| • Resistance, relative to input range, (+/-)                                                        | 0.05 %                                                                                 |
| Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$ , $f_1$ = interference frequency |                                                                                        |
| • 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                                                                                  |
| Interrupts/diagnostics/status information                                                           |                                                                                        |
| Diagnostics function                                                                                | Yes                                                                                    |
| Alarms                                                                                              |                                                                                        |
| • Diagnostic alarm                                                                                  | Yes                                                                                    |
| • Limit value alarm                                                                                 | Yes; two upper and two lower limit values in each case                                 |
| Diagnoses                                                                                           |                                                                                        |
| • Monitoring the supply voltage                                                                     | Yes                                                                                    |
| • Wire-break                                                                                        | Yes; channel by channel                                                                |
| • Group error                                                                                       | Yes                                                                                    |
| • Overflow/underflow                                                                                | Yes; channel by channel                                                                |
| Diagnostics indication LED                                                                          |                                                                                        |
| • 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                                                                |
| Potential separation                                                                                |                                                                                        |
| Potential separation channels                                                                       |                                                                                        |
| • between the channels                                                                              | No                                                                                     |
| • between the channels and backplane bus                                                            | Yes                                                                                    |
| • between the channels and the power supply of the electronics                                      | Yes                                                                                    |
| Permissible potential difference                                                                    |                                                                                        |
| between the inputs (UCM)                                                                            | 10 V DC                                                                                |
| Isolation                                                                                           |                                                                                        |
| Isolation tested with                                                                               | 707 V DC (type test)                                                                   |
| Standards, approvals, certificates                                                                  |                                                                                        |
| Ecological footprint                                                                                |                                                                                        |
| • environmental product declaration                                                                 | Yes                                                                                    |
| Global warming potential                                                                            |                                                                                        |
| — global warming potential, (total) [CO2 eq]                                                        | 9.32 kg                                                                                |
| — global warming potential, (during production) [CO2 eq]                                            | 4.97 kg                                                                                |
| — global warming potential, (during operation) [CO2 eq]                                             | 4.79 kg                                                                                |
| — global warming potential, (after end of life cycle) [CO2 eq]                                      | -0.449 kg                                                                              |
| Ambient conditions                                                                                  |                                                                                        |
| Ambient temperature during operation                                                                |                                                                                        |
| • 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                                                                                  |
| Altitude during operation relating to sea level                                                     |                                                                                        |
| • Installation altitude above sea level, max.                                                       | 5 000 m; restrictions for installation altitudes > 2 000 m, see ET 200SP System Manual |
| Dimensions                                                                                          |                                                                                        |
| Width                                                                                               | 15 mm                                                                                  |
| Height                                                                                              | 73 mm                                                                                  |
| Depth                                                                                               | 58 mm                                                                                  |

## Classifications

|        | Version | Classification |
|--------|---------|----------------|
| eClass | 14      | 27-24-26-01    |
| eClass | 12      | 27-24-26-01    |
| eClass | 9.1     | 27-24-26-01    |
| eClass | 9       | 27-24-26-01    |
| eClass | 8       | 27-24-26-01    |
| eClass | 7.1     | 27-24-26-01    |
| eClass | 6       | 27-24-26-01    |
| ETIM   | 10      | EC001596       |
| ETIM   | 9       | EC001596       |
| ETIM   | 8       | EC001596       |
| ETIM   | 7       | EC001596       |
| IDEA   | 4       | 3562           |
| UNSPSC | 15      | 32-15-17-05    |

## Approvals / Certificates

### General Product Approval



[Manufacturer Declaration](#)

[Miscellaneous](#)

[China RoHS](#)



### General Product Approval

### For use in hazardous locations

[Metrological Approval](#)



[FM](#)

[CCC-Ex](#)

### For use in hazardous locations

### Maritime application



[Type Examination Certificate](#)



[Miscellaneous](#)



### Maritime application



[NK / Nippon Kaiji Kyokai](#)



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

### Maritime application

### Environment



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