



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
<ul style="list-style-type: none"> <li>FW update possible</li> </ul>	Yes
usable BaseUnits	BU type A0, A1
Color code for module-specific color identification plate	CC00
Product function	
<ul style="list-style-type: none"> <li>I&amp;M data</li> </ul>	Yes; I&M0 to I&M3
<ul style="list-style-type: none"> <li>Isochronous mode</li> </ul>	No
<ul style="list-style-type: none"> <li>Adjustment of measuring range</li> </ul>	Yes
Engineering with	
<ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul>	V12 SP1 / V13
<ul style="list-style-type: none"> <li>STEP 7 configurable/integrated from version</li> </ul>	V5.5 SP3 / V5.5 SP4
<ul style="list-style-type: none"> <li>PCS 7 configurable/integrated from version</li> </ul>	V8.1 SP1
<ul style="list-style-type: none"> <li>PROFIBUS from GSD version/GSD revision</li> </ul>	GSD Revision 5
<ul style="list-style-type: none"> <li>PROFINET from GSD version/GSD revision</li> </ul>	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
Power loss	
Power loss, typ.	0.75 W
Address area	
Address space per module	
<ul style="list-style-type: none"> <li>Address space per module, max.</li> </ul>	8 byte; + 1 byte for QI information
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, 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>	
<ul style="list-style-type: none"> <li>• -1 V to +1 V <ul style="list-style-type: none"> <li>— Input resistance (-1 V to +1 V)</li> </ul> </li> <li>• -250 mV to +250 mV <ul style="list-style-type: none"> <li>— Input resistance (-250 mV to +250 mV)</li> </ul> </li> <li>• -50 mV to +50 mV <ul style="list-style-type: none"> <li>— Input resistance (-50 mV to +50 mV)</li> </ul> </li> <li>• -80 mV to +80 mV <ul style="list-style-type: none"> <li>— Input resistance (-80 mV to +80 mV)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> </ul>
<b>Input ranges (rated values), thermocouples</b>	
<ul style="list-style-type: none"> <li>• Type B <ul style="list-style-type: none"> <li>— Input resistance (Type B)</li> </ul> </li> <li>• Type C <ul style="list-style-type: none"> <li>— Input resistance (Type C)</li> </ul> </li> <li>• Type E <ul style="list-style-type: none"> <li>— Input resistance (Type E)</li> </ul> </li> <li>• Type J <ul style="list-style-type: none"> <li>— Input resistance (type J)</li> </ul> </li> <li>• Type K <ul style="list-style-type: none"> <li>— Input resistance (Type K)</li> </ul> </li> <li>• Type L <ul style="list-style-type: none"> <li>— Input resistance (Type L)</li> </ul> </li> <li>• Type N <ul style="list-style-type: none"> <li>— Input resistance (Type N)</li> </ul> </li> <li>• Type R <ul style="list-style-type: none"> <li>— Input resistance (Type R)</li> </ul> </li> <li>• Type S <ul style="list-style-type: none"> <li>— Input resistance (Type S)</li> </ul> </li> <li>• Type T <ul style="list-style-type: none"> <li>— Input resistance (Type T)</li> </ul> </li> <li>• Type U <ul style="list-style-type: none"> <li>— Input resistance (Type U)</li> </ul> </li> <li>• Type TXK/TXK(L) to GOST <ul style="list-style-type: none"> <li>— Input resistance (Type TXK/TXK(L) to GOST)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> </ul>
<b>Input ranges (rated values), resistance thermometer</b>	
<ul style="list-style-type: none"> <li>• Cu 10 <ul style="list-style-type: none"> <li>— Input resistance (Cu 10)</li> </ul> </li> <li>• Ni 100 <ul style="list-style-type: none"> <li>— Input resistance (Ni 100)</li> </ul> </li> <li>• Ni 1000 <ul style="list-style-type: none"> <li>— Input resistance (Ni 1000)</li> </ul> </li> <li>• LG-Ni 1000 <ul style="list-style-type: none"> <li>— Input resistance (LG-Ni 1000)</li> </ul> </li> <li>• Ni 120 <ul style="list-style-type: none"> <li>— Input resistance (Ni 120)</li> </ul> </li> <li>• Ni 200 <ul style="list-style-type: none"> <li>— Input resistance (Ni 200)</li> </ul> </li> <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>	<ul style="list-style-type: none"> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> <li>Yes; 16 bit incl. sign 1 MΩ</li> </ul>
<b>Input ranges (rated values), resistors</b>	
<ul style="list-style-type: none"> <li>• 0 to 150 ohms</li> </ul>	Yes; 15 bit

— Input resistance (0 to 150 ohms)	1 M $\Omega$
• 0 to 300 ohms	Yes; 15 bit
— Input resistance (0 to 300 ohms)	1 M $\Omega$
• 0 to 600 ohms	Yes; 15 bit
— Input resistance (0 to 600 ohms)	1 M $\Omega$
• 0 to 3000 ohms	Yes; 15 bit
— Input resistance (0 to 3000 ohms)	1 M $\Omega$
• 0 to 6000 ohms	Yes; 15 bit
— Input resistance (0 to 6000 ohms)	1 M $\Omega$
• PTC	Yes; 15 bit
— Input resistance (PTC)	1 M $\Omega$
<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)
Integration and conversion time/resolution per channel	
• 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>Smoothing of measured values</b>	
• Number of smoothing levels	4; None; 4/8/16 times
• parameterizable	Yes
<b>Encoder</b>	
Connection of signal encoders	
• 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 %; $\pm 0.1$ % for resistance thermometers and resistance
Temperature error (relative to input range), (+/-)	0.0009 %/K; $\pm 0.005$ % / 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>, <math>f1 =</math> 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

## Interrupts/diagnostics/status information

### Alarms

- 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

## 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

## Dimensions

Width	15 mm
Height	73 mm
Depth	58 mm

**last modified:** 9/22/2021 