



SIMATIC ET 200SP HA, analog input module, AI 16XTC/8XRTD 2-/3-/4-wire HA, suitable for terminal block H1, M1, color code CC00, channel diagnostics, 16-bit, +/-0.05%, 2-/3-/4-wire

General information	
Product type designation	AI 16 x TC/8 x RTD 2/3/4-wire HA
Firmware version	V1.1
<ul style="list-style-type: none"> <li>FW update possible</li> </ul>	Yes
Usable terminal block	TB type H1, M1, P0 and N0
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
Engineering with	
<ul style="list-style-type: none"> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul>	V16
<ul style="list-style-type: none"> <li>STEP 7 configurable/integrated from version</li> </ul>	V5.6
<ul style="list-style-type: none"> <li>PCS 7 configurable/integrated from version</li> </ul>	V9.0
<ul style="list-style-type: none"> <li>PCS neo can be configured/integrated from version</li> </ul>	V3.0
<ul style="list-style-type: none"> <li>PROFINET from GSD version/GSD revision</li> </ul>	GSDML V2.3
Redundancy	
<ul style="list-style-type: none"> <li>Redundancy capability</li> </ul>	Yes; With TB type M1
CIR - Configuration in RUN	
Reparameterization 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)	75 mA
Current consumption, max.	100 mA
Power loss	
Power loss, typ.	1.8 W
Address area	
Address space per module	
<ul style="list-style-type: none"> <li>Address space per module, max.</li> </ul>	64 byte; + 2 bytes for QI information
Analog inputs	
Number of analog inputs	
<ul style="list-style-type: none"> <li>For voltage measurement</li> </ul>	16
<ul style="list-style-type: none"> <li>For resistance/resistance thermometer measurement</li> </ul>	8
<ul style="list-style-type: none"> <li>For thermocouple measurement</li> </ul>	16
permissible input voltage for voltage input (destruction limit), max.	5 V
Constant measurement current for resistance-type transmitter, typ.	2 mA

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> </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</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</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 <ul style="list-style-type: none"> <li>— Input resistance (0 to 150 ohms)</li> </ul> </li> <li>● 0 to 300 ohms</li> </ul>	<ul style="list-style-type: none"> <li>Yes; 15 bit 1 MΩ</li> <li>Yes; 15 bit</li> </ul>

— 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
— external temperature compensation via RTD	Yes
— Reference channel of the module	Yes
— internal comparison point	Yes; with terminal block H1 and M1
— Reference channel of the group	Yes
— Number of reference channel groups	4
— fixed reference temperature	Yes
<b>Cable length</b>	
• shielded, max.	200 m; Measurement ranges for thermocouples / voltages: shielded cable length max. 600 m, loop resistance max 8 k $\Omega$ m; measuring ranges RTD: shielded cable length max. 600 m, cable resistance (single) max. 75 ohms
<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; Channel-by-channel, results from the selected interference frequency suppression
• Interference voltage suppression for interference frequency f1 in Hz	16.6 / 50 / 60 Hz, channel-by-channel
• Conversion time (per channel)	60 ms; 180 / 50 ms, results from the selected interference frequency suppression
Smoothing of measured values	
• parameterizable	Yes; none, weak, medium, strong, channel-by-channel
<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 %
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 $f = n \times (f1 \pm 1 \%)$ , f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB
• Common mode voltage, max.	60 V
• Common mode interference, min.	90 dB
<b>Interrupts/diagnostics/status information</b>	
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
• Overflow/underflow	Yes; channel by channel
Diagnostics indication LED	
• MAINT LED	Yes; Yellow 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 load voltage L+ Yes

#### Permissible potential difference

between the inputs (UCM) 75 V DC/60 V AC

#### Isolation

Isolation tested with 1 500 V DC/1 min, type test

#### Ambient conditions

##### Ambient temperature during operation

- horizontal installation, min. -40 °C
- horizontal installation, max. 70 °C
- vertical installation, min. -40 °C
- vertical installation, max. 60 °C

#### Dimensions

Width 22.5 mm  
 Height 115 mm  
 Depth 138 mm

#### Weights

Weight, approx. 150 g

last modified: 9/7/2023 