



SIMATIC ET 200AL, AI 4xRTD/TC, 4x M12, degree of protection IP67

General information	
Product type designation	AI 4xRTD/TC
HW functional status	FS01
Firmware version	V1.0.x
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	STEP 7 V16 or higher
• STEP 7 configurable/integrated from version	V5.5 SP4 and higher
• PROFIBUS from GSD version/GSD revision	GSD as of Revision 5
• PROFINET from GSD version/GSD revision	GSDML V2.34
Supply voltage	
power supply according to NEC Class 2 required	No
Load voltage 1L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
• Reverse polarity protection	Yes; against destruction
Input current	
Current consumption (rated value)	25 mA; without load
from load voltage 1L+ (unswitched voltage)	4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value
Power loss	
Power loss, typ.	0.6 W
Analog inputs	
Number of analog inputs	4
• For voltage measurement	4
• For resistance/resistance thermometer measurement	4
• For thermocouple measurement	4
permissible input voltage for voltage input (destruction limit), max.	15 V
Constant measurement current for resistance-type transmitter, typ.	230 ... 300 $\mu$ A
Cycle time (all channels), min.	90 ms
Technical unit for temperature measurement adjustable	Yes; Degrees Celsius / degrees Fahrenheit / Kelvin
Input ranges (rated values), voltages	
• -80 mV to +80 mV	Yes; 16 bit incl. sign
— Input resistance (-80 mV to +80 mV)	10 M $\Omega$
Input ranges (rated values), thermocouples	
• Type B	Yes; 16 bit incl. sign
— Input resistance (Type B)	10 M $\Omega$

<ul style="list-style-type: none"> <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> </ul>	<p>Yes; 16 bit incl. sign 10 MΩ</p> <p>Yes; 16 bit incl. sign 10 MΩ</p> <p>Yes; 16 bit incl. sign 10 MΩ</p> <p>Yes; 16 bit incl. sign 10 MΩ</p> <p>Yes; 16 bit incl. sign 10 MΩ</p> <p>Yes; 16 bit incl. sign 10 MΩ</p> <p>Yes; 16 bit incl. sign 10 MΩ</p> <p>Yes; 16 bit incl. sign 10 MΩ</p> <p>Yes; 16 bit incl. sign 10 MΩ</p> <p>Yes; 16 bit incl. sign 10 MΩ</p>
<b>Input ranges (rated values), resistance thermometer</b>	
<ul style="list-style-type: none"> <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>• 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> </ul>	<p>Yes; Standard/climate 10 MΩ</p> <p>Yes; Standard/climate 10 MΩ</p> <p>Yes; Standard/climate 10 MΩ</p> <p>Yes; Standard/climate 10 MΩ</p>
<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> </ul>	<p>Yes 10 MΩ</p> <p>Yes 10 MΩ</p>
<b>Thermocouple (TC)</b>	
<b>Temperature compensation</b>	
<ul style="list-style-type: none"> <li>— parameterizable</li> <li>— internal temperature compensation</li> <li>— external temperature compensation with compensations socket</li> <li>— dynamic reference temperature value</li> <li>— fixed reference temperature</li> </ul>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
<b>Cable length</b>	
<ul style="list-style-type: none"> <li>• shielded, max.</li> </ul>	30 m
<b>Analog value generation for the inputs</b>	
Measurement principle	integrating
<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>• Integration time (ms)</li> <li>• Basic conversion time, including integration time (ms) <ul style="list-style-type: none"> <li>— additional conversion time for wire-break monitoring</li> <li>— additional conversion time for resistance measurement</li> </ul> </li> <li>• Interference voltage suppression for interference frequency f1 in Hz</li> </ul>	<p>16 bit</p> <p>Yes; channel by channel</p> <p>16.7 / 20 / 60</p> <p>18 / 21 / 61 ms</p> <p>4 ms</p> <p>2 ms</p> <p>60 / 50 / 16.7</p>
<b>Smoothing of measured values</b>	
<ul style="list-style-type: none"> <li>• parameterizable</li> <li>• Step: None</li> <li>• Step: low</li> <li>• Step: Medium</li> <li>• Step: High</li> </ul>	<p>Yes</p> <p>Yes; 1x cycle time</p> <p>Yes; 4x cycle time</p> <p>Yes; 16x cycle time</p> <p>Yes; 32x cycle time</p>

Encoder	
Connection of signal encoders	
• for resistance measurement with two-wire connection	Yes
• for resistance measurement with three-wire connection	Yes
• for resistance measurement with four-wire connection	Yes
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.025 %
Temperature error (relative to input range), (+/-)	0.01 %/K
Crosstalk between the inputs, max.	-70 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.01 %; 0.02% for Pt1000
Temperature error of internal compensation	±4 °C
Operational error limit in overall temperature range	
• Voltage, relative to input range, (+/-)	0.35 %
• Resistance, relative to input range, (+/-)	0.25 %
• Resistance thermometer, relative to input range, (+/-)	0.25 %
• Thermocouple, relative to input range, (+/-)	TC type E, J, K, N, C, U, L: 0.35 %; TC type R, S, T: 0.4 %; TC type B: 0.45 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.25 %
• Resistance, relative to input range, (+/-)	0.15 %
• Resistance thermometer, relative to input range, (+/-)	0.15 %
• Thermocouple, relative to input range, (+/-)	0.25 %
Interference voltage suppression for $f = n \times (f_1 \pm 0.5 \%)$ , $f_1$ = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
Interrupts/diagnostics/status information	
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Limit value alarm	Yes; Parameterizable
Diagnoses	
• Wire-break	Yes; Not for ±80 mV
• Overflow/underflow	Yes
Diagnostics indication LED	
• Channel status display	Yes; green LED
• for module diagnostics	Yes; green/red LED
Potential separation	
between the load voltages	Yes
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• between the channels and the power supply of the electronics	No
Isolation	
Isolation tested with	707 V DC (type test)
Degree and class of protection	
IP degree of protection	IP65/67
Standards, approvals, certificates	
Suitable for safety-related tripping of standard modules	Yes; From FS01
Suitable for applications according to AMS 2750	Yes; Declaration of Conformity, see online support entry 109757262
Suitable for applications according to CQI-9	Yes; Based on AMS 2750 E
Highest safety class achievable for safety-related tripping of standard modules	
• Performance level according to ISO 13849-1	PL d
• Category according to ISO 13849-1	Cat. 3
• SIL acc. to IEC 62061	SIL 2
Ambient conditions	
Ambient temperature during operation	
• min.	-30 °C
• max.	55 °C
connection method	
Design of electrical connection for the inputs and outputs	M12, 5-pole
Design of electrical connection for supply voltage	M8, 4-pole

ET-Connection	
• ET-Connection	M8, 4-pin, shielded
<b>Dimensions</b>	
Width	30 mm
Height	159 mm
Depth	40 mm
<b>Weights</b>	
Weight, approx.	168 g

**last modified:** 3/7/2022 