



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	
<ul style="list-style-type: none"> I&M data 	Yes; I&M0 to I&M3
Engineering with	
<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/integrated from version 	STEP 7 V16 or higher
<ul style="list-style-type: none"> STEP 7 configurable/integrated from version 	V5.5 SP4 and higher
<ul style="list-style-type: none"> PROFIBUS from GSD version/GSD revision 	GSD as of Revision 5
<ul style="list-style-type: none"> PROFINET from GSD version/GSD revision 	GSDML V2.34
Supply voltage	
power supply according to NEC Class 2 required	No
Load voltage 1L+	
<ul style="list-style-type: none"> Rated value (DC) 	24 V
<ul style="list-style-type: none"> permissible range, lower limit (DC) 	20.4 V
<ul style="list-style-type: none"> permissible range, upper limit (DC) 	28.8 V
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> For voltage measurement 	4
<ul style="list-style-type: none"> For resistance/resistance thermometer measurement 	4
<ul style="list-style-type: none"> 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 μ 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	
<ul style="list-style-type: none"> -80 mV to +80 mV 	Yes; 16 bit incl. sign
— Input resistance (-80 mV to +80 mV)	10 M Ω

Input ranges (rated values), thermocouples	
• Type B — Input resistance (Type B)	Yes; 16 bit incl. sign 10 MΩ
• Type C — Input resistance (Type C)	Yes; 16 bit incl. sign 10 MΩ
• Type E — Input resistance (Type E)	Yes; 16 bit incl. sign 10 MΩ
• Type J — Input resistance (type J)	Yes; 16 bit incl. sign 10 MΩ
• Type K — Input resistance (Type K)	Yes; 16 bit incl. sign 10 MΩ
• Type L — Input resistance (Type L)	Yes; 16 bit incl. sign 10 MΩ
• Type N — Input resistance (Type N)	Yes; 16 bit incl. sign 10 MΩ
• Type R — Input resistance (Type R)	Yes; 16 bit incl. sign 10 MΩ
• Type S — Input resistance (Type S)	Yes; 16 bit incl. sign 10 MΩ
• Type T — Input resistance (Type T)	Yes; 16 bit incl. sign 10 MΩ
• Type U — Input resistance (Type U)	Yes; 16 bit incl. sign 10 MΩ
Input ranges (rated values), resistance thermometer	
• Ni 100 — Input resistance (Ni 100)	Yes; Standard/climate 10 MΩ
• Ni 1000 — Input resistance (Ni 1000)	Yes; Standard/climate 10 MΩ
• Pt 100 — Input resistance (Pt 100)	Yes; Standard/climate 10 MΩ
• Pt 1000 — Input resistance (Pt 1000)	Yes; Standard/climate 10 MΩ
Input ranges (rated values), resistors	
• 0 to 150 ohms — Input resistance (0 to 150 ohms)	Yes 10 MΩ
• 0 to 300 ohms — Input resistance (0 to 300 ohms)	Yes 10 MΩ
Thermocouple (TC)	
Temperature compensation	
— parameterizable	Yes
— internal temperature compensation	Yes
— external temperature compensation with compensations socket	Yes
— dynamic reference temperature value	Yes
— fixed reference temperature	Yes
Cable length	
• shielded, max.	30 m
Analog value generation for the inputs	
Measurement principle	integrating
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes; channel by channel
• Integration time (ms)	16.7 / 20 / 60
• Basic conversion time, including integration time (ms)	18 / 21 / 61 ms
— additional conversion time for wire-break monitoring	4 ms
— additional conversion time for resistance measurement	2 ms
• Interference voltage suppression for interference frequency f1 in Hz	60 / 50 / 16.7

Smoothing of measured values	
<ul style="list-style-type: none"> • parameterizable • Step: None • Step: low • Step: Medium • Step: High 	Yes Yes; 1x cycle time Yes; 4x cycle time Yes; 16x cycle time Yes; 32x cycle time
Encoder	
Connection of signal encoders	
<ul style="list-style-type: none"> • for resistance measurement with two-wire connection • for resistance measurement with three-wire connection • for resistance measurement with four-wire connection 	Yes Yes 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	
<ul style="list-style-type: none"> • Voltage, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Thermocouple, relative to input range, (+/-) 	0.35 % 0.25 % 0.25 % 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)	
<ul style="list-style-type: none"> • Voltage, relative to input range, (+/-) • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Thermocouple, relative to input range, (+/-) 	0.25 % 0.15 % 0.15 % 0.25 %
Interference voltage suppression for $f = n \times (f_1 \pm 0.5 \%)$, $f_1 =$ interference frequency	
<ul style="list-style-type: none"> • Series mode interference (peak value of interference < rated value of input range), min. 	40 dB
Interrupts/diagnostics/status information	
Alarms	
<ul style="list-style-type: none"> • Diagnostic alarm • Limit value alarm 	Yes; Parameterizable Yes; Parameterizable
Diagnoses	
<ul style="list-style-type: none"> • Wire-break • Overflow/underflow 	Yes; Not for ±80 mV Yes
Diagnostics indication LED	
<ul style="list-style-type: none"> • Channel status display • for module diagnostics 	Yes; green LED Yes; green/red LED
Potential separation	
between the load voltages	Yes
Potential separation channels	
<ul style="list-style-type: none"> • between the channels • between the channels and backplane bus • between the channels and the power supply of the electronics 	No Yes 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	
<ul style="list-style-type: none"> • Performance level according to ISO 13849-1 • Category according to ISO 13849-1 • SIL acc. to IEC 62061 	PL d Cat. 3 SIL 2
Ambient conditions	
Ambient temperature during operation	
<ul style="list-style-type: none"> • min. • max. 	-30 °C 55 °C
connection method / header	
Design of electrical connection for the inputs and outputs	M12, 5-pole
Design of electrical connection for supply voltage	M8, 4-pole
ET-Connection	
<ul style="list-style-type: none"> • ET-Connection 	M8, 4-pin, shielded
Dimensions	
Width	30 mm
Height	159 mm
Depth	40 mm
Weights	
Weight, approx.	168 g
last modified:	3/7/2022 