



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

General information	
Product type designation	AI 4xRTD/TC
HW functional status	FS03
Firmware version	V2.0.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)	30 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.	1.5 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 µA
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 MΩ
Input ranges (rated values), thermocouples	

<ul style="list-style-type: none"> • type B <ul style="list-style-type: none"> — Input resistance (Type B) • type C <ul style="list-style-type: none"> — Input resistance (Type C) • Type E <ul style="list-style-type: none"> — Input resistance (Type E) • Type J <ul style="list-style-type: none"> — Input resistance (type J) • Type K <ul style="list-style-type: none"> — Input resistance (Type K) • Type L <ul style="list-style-type: none"> — Input resistance (Type L) • Type N <ul style="list-style-type: none"> — Input resistance (Type N) • Type R <ul style="list-style-type: none"> — Input resistance (Type R) • Type S <ul style="list-style-type: none"> — Input resistance (Type S) • Type T <ul style="list-style-type: none"> — Input resistance (Type T) • Type U <ul style="list-style-type: none"> — Input resistance (Type U) 	Yes; 16 bit incl. sign 10 MΩ Yes; 16 bit incl. sign 10 MΩ Yes; 16 bit incl. sign 10 MΩ Yes; 16 bit incl. sign 10 MΩ Yes; 16 bit incl. sign 10 MΩ Yes; 16 bit incl. sign 10 MΩ Yes; 16 bit incl. sign 10 MΩ Yes; 16 bit incl. sign 10 MΩ Yes; 16 bit incl. sign 10 MΩ Yes; 16 bit incl. sign 10 MΩ Yes; 16 bit incl. sign 10 MΩ
Input ranges (rated values), resistance thermometer	
<ul style="list-style-type: none"> • Ni 100 <ul style="list-style-type: none"> — Input resistance (Ni 100) • Ni 1000 <ul style="list-style-type: none"> — Input resistance (Ni 1000) • Pt 100 <ul style="list-style-type: none"> — Input resistance (Pt 100) • Pt 1000 <ul style="list-style-type: none"> — Input resistance (Pt 1000) 	Yes; Standard/climate 10 MΩ Yes; Standard/climate 10 MΩ Yes; Standard/climate 10 MΩ Yes; Standard/climate 10 MΩ
Input ranges (rated values), resistors	
<ul style="list-style-type: none"> • 0 to 150 ohms <ul style="list-style-type: none"> — Input resistance (0 to 150 ohms) • 0 to 300 ohms <ul style="list-style-type: none"> — Input resistance (0 to 300 ohms) 	Yes 10 MΩ Yes 10 MΩ
Thermocouple (TC)	
Temperature compensation	
<ul style="list-style-type: none"> — Parameterizable — internal temperature compensation — external temperature compensation with compensations socket — dynamic reference temperature value — fixed reference temperature 	Yes Yes Yes Yes Yes
Cable length	
<ul style="list-style-type: none"> • shielded, max. 	30 m
Analog value generation for the inputs	
Measurement principle	integrating
Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> • Resolution with overrange (bit including sign), max. • Integration time, parameterizable • Integration time (ms) • Basic conversion time, including integration time (ms) <ul style="list-style-type: none"> — additional conversion time for wire-break monitoring — additional conversion time for resistance measurement • Interference voltage suppression for interference frequency f1 in Hz 	16 bit Yes; channel by channel 16.7 / 20 / 60 18 / 21 / 61 ms 4 ms 2 ms 60 / 50 / 16.7
Smoothering of measured values	
<ul style="list-style-type: none"> • Parameterizable 	Yes

<ul style="list-style-type: none"> • Step: None • Step: low • Step: Medium • Step: High 	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 • remark on safety-oriented shutdown 	PL d Cat. 3 SIL 2 https://www.modulplc.com/?s=6ES7144-5KD50-0BA0

Security	
signed firmware update	Yes
data integrity	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	-30 °C
• max.	55 °C
Altitude during operation relating to sea level	
• Ambient air temperature-barometric pressure-altitude	Up to max. 5 000 m, at installation height > 2 000 m additional restrictions
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
Dimensions	
Width	30 mm
Height	159 mm
Depth	40 mm
Weights	
Weight, approx.	168 g
Classifications	

	Version	Classification
eClass	16	27-24-26-01
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

[Miscellaneous](#)

[Manufacturer Declaration](#)



[Declaration of Conformity](#)



General Product Approval

Functional Safety



[China RoHS](#)

[TUEV](#)

Maritime application



[NK / Nippon Kaiji Kyokai](#)



Maritime application	other
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[CCS \(China Classification Society\)](#)

[KR \(Korean Register of Shipping\)](#)



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