



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	
<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> <li>STEP 7 configurable/integrated from version</li> <li>PROFIBUS from GSD version/GSD revision</li> <li>PROFINET from GSD version/GSD revision</li> </ul>	STEP 7 V16 or higher V5.5 SP4 and higher GSD as of Revision 5 GSDML V2.34
Supply voltage	
power supply according to NEC Class 2 required	No
Load voltage 1L+	
<ul style="list-style-type: none"> <li>Rated value (DC)</li> <li>permissible range, lower limit (DC)</li> <li>permissible range, upper limit (DC)</li> <li>Reverse polarity protection</li> </ul>	24 V 20.4 V 28.8 V 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
<ul style="list-style-type: none"> <li>For voltage measurement</li> <li>For resistance/resistance thermometer measurement</li> <li>For thermocouple measurement</li> </ul>	4 4 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	
<ul style="list-style-type: none"> <li>-80 mV to +80 mV</li> <li>— Input resistance (-80 mV to +80 mV)</li> </ul>	Yes; 16 bit incl. sign 10 M $\Omega$
Input ranges (rated values), thermocouples	

- type B
  - Input resistance (Type B)
- type C
  - Input resistance (Type C)
- Type E
  - Input resistance (Type E)
- Type J
  - Input resistance (type J)
- Type K
  - Input resistance (Type K)
- Type L
  - Input resistance (Type L)
- Type N
  - Input resistance (Type N)
- Type R
  - Input resistance (Type R)
- Type S
  - Input resistance (Type S)
- Type T
  - Input resistance (Type T)
- Type U
  - 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  
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10 MΩ

Yes; 16 bit incl. sign  
10 MΩ

Yes; 16 bit incl. sign  
10 MΩ

#### Input ranges (rated values), resistance thermometer

- Ni 100
  - Input resistance (Ni 100)
- Ni 1000
  - Input resistance (Ni 1000)
- Pt 100
  - Input resistance (Pt 100)
- Pt 1000
  - 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

- 0 to 150 ohms
  - Input resistance (0 to 150 ohms)
- 0 to 300 ohms
  - Input resistance (0 to 300 ohms)

Yes  
10 MΩ

Yes  
10 MΩ

#### Thermocouple (TC)

##### Temperature compensation

- Parameterizable
- internal temperature compensation
- external temperature compensation with compensations socket
- dynamic reference temperature value
- fixed reference temperature

Yes

Yes

Yes

Yes

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  $f_1$  in Hz 60 / 50 / 16.7

##### Smoothing of measured values

- parameterizable

Yes

• Step: None	Yes; 1x cycle time
• Step: low	Yes; 4x cycle time
• Step: Medium	Yes; 16x cycle time
• Step: High	Yes; 32x cycle time
<b>Encoder</b>	
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
<b>Errors/accuracies</b>	
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
<b>Interrupts/diagnostics/status information</b>	
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
<b>Potential separation</b>	
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
<b>Isolation</b>	
Isolation tested with	707 V DC (type test)
<b>Degree and class of protection</b>	
IP degree of protection	IP65/67
<b>Standards, approvals, certificates</b>	
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
• remark on safety-oriented shutdown	<a href="https://support.industry.siemens.com/cs/de/en/view/39198632">https://support.industry.siemens.com/cs/de/en/view/39198632</a>

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	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](#)



[CCS \(China Classification Society\)](#)

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



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last modified:

10/23/2025 