

SIMATIC ET 200AL, AI 4XU/I/RTD, 4x M12, Degree of protection IP67



General information	
Product type designation	AI 4xU/I/RTD
HW functional status	FS04
Firmware version	V1.0.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 as of version</li> </ul>	STEP 7 V13 SP1 or higher
<ul style="list-style-type: none"> <li>STEP 7 configurable/integrated as of version</li> </ul>	From V5.5 SP4 Hotfix 3
<ul style="list-style-type: none"> <li>PROFIBUS as of GSD version/GSD revision</li> </ul>	GSD as of Revision 5
<ul style="list-style-type: none"> <li>PROFINET as of GSD version/GSD revision</li> </ul>	GSDML V2.3.1
Supply voltage	
Load voltage 1L+	
<ul style="list-style-type: none"> <li>Rated value (DC)</li> </ul>	24 V
<ul style="list-style-type: none"> <li>permissible range, lower limit (DC)</li> </ul>	20.4 V
<ul style="list-style-type: none"> <li>permissible range, upper limit (DC)</li> </ul>	28.8 V
<ul style="list-style-type: none"> <li>Reverse polarity protection</li> </ul>	Yes; against destruction

Input current	
Current consumption (rated value)	35 mA; without load
from load voltage 1L+ (unswitched voltage)	4 A; Maximum value
from load voltage 2L+, max.	4 A; Maximum value
Encoder supply	
Number of outputs	4
24 V encoder supply	
<ul style="list-style-type: none"> <li>• Short-circuit protection</li> </ul>	Yes; per channel, electronic
<ul style="list-style-type: none"> <li>• Output current, max.</li> </ul>	0.5 A; Per channel, total current of all channels max. 1 A
Power loss	
Power loss, typ.	1.5 W
Analog inputs	
Number of analog inputs	4
<ul style="list-style-type: none"> <li>• For current measurement</li> </ul>	4
<ul style="list-style-type: none"> <li>• For voltage measurement</li> </ul>	4
<ul style="list-style-type: none"> <li>• For resistance/resistance thermometer measurement</li> </ul>	4
permissible input voltage for voltage input (destruction limit), max.	30 V
permissible input current for current input (destruction limit), max.	50 mA
Cycle time (all channels), min.	8 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>• 0 to +10 V</li> </ul>	Yes
— Input resistance (0 to 10 V)	10 M $\Omega$
<ul style="list-style-type: none"> <li>• 1 V to 5 V</li> </ul>	Yes
— Input resistance (1 V to 5 V)	10 M $\Omega$
Input ranges (rated values), currents	
<ul style="list-style-type: none"> <li>• 0 to 20 mA</li> </ul>	Yes
— Input resistance (0 to 20 mA)	50 $\Omega$
<ul style="list-style-type: none"> <li>• 4 mA to 20 mA</li> </ul>	Yes
— Input resistance (4 mA to 20 mA)	50 $\Omega$
Input ranges (rated values), resistance thermometer	
<ul style="list-style-type: none"> <li>• Ni 100</li> </ul>	Yes; Standard/climate
— Input resistance (Ni 100)	10 M $\Omega$
<ul style="list-style-type: none"> <li>• Pt 100</li> </ul>	Yes; Standard/climate
— Input resistance (Pt 100)	10 M $\Omega$
Input ranges (rated values), resistors	
<ul style="list-style-type: none"> <li>• 0 to 150 ohms</li> </ul>	Yes

— Input resistance (0 to 150 ohms)	10 MΩ
• 0 to 300 ohms	Yes
— Input resistance (0 to 300 ohms)	10 MΩ

<b>Cable length</b>	
• shielded, max.	30 m

### Analog value generation for the inputs

Measurement principle	integrating
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### 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)	0,3 / 16,7 / 20 / 60
• Interference voltage suppression for interference frequency f1 in Hz	3 600 / 60 / 50 / 16.7
• Conversion time (per channel)	2 / 18 / 21 / 61 ms

### 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

### Encoder

#### Connection of signal encoders

• for voltage measurement	Yes
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
• for resistance measurement with two-wire connection	Yes
• for resistance measurement with three-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 %

### Operational error limit in overall temperature range

• Voltage, relative to input range, (+/-)	0.35 %
• Current, relative to input range, (+/-)	0.45 %
• Resistance, relative to input range, (+/-)	0.25 %
• Resistance thermometer, relative to input range, (+/-)	0.25 %

<b>Basic error limit (operational limit at 25 °C)</b>	
<ul style="list-style-type: none"> <li>• Voltage, relative to input range, (+/-)</li> <li>• Current, relative to input range, (+/-)</li> <li>• Resistance, relative to input range, (+/-)</li> <li>• Resistance thermometer, relative to input range, (+/-)</li> </ul>	<p>0.25 %</p> <p>0.25 %</p> <p>0.15 %</p> <p>0.15 %</p>
<b>Interference voltage suppression for <math>f = n \times (f_1 \pm 0.5 \%)</math>, <math>f_1</math> = interference frequency</b>	
<ul style="list-style-type: none"> <li>• Series mode interference (peak value of interference &lt; rated value of input range), min.</li> </ul>	40 dB
<b>Interrupts/diagnostics/status information</b>	
<b>Alarms</b>	
<ul style="list-style-type: none"> <li>• Diagnostic alarm</li> <li>• Limit value alarm</li> </ul>	<p>Yes; Parameterizable</p> <p>Yes; Parameterizable</p>
<b>Diagnostic messages</b>	
<ul style="list-style-type: none"> <li>• Wire-break</li> <li>• Short-circuit</li> <li>• Overflow/underflow</li> </ul>	<p>Yes; at 4 mA to 20 mA and 1 V to 5 V</p> <p>Yes; Encoder supply to M, channel by channel</p> <p>Yes</p>
<b>Diagnostics indication LED</b>	
<ul style="list-style-type: none"> <li>• Channel status display</li> <li>• for module diagnostics</li> </ul>	<p>Yes; green LED</p> <p>Yes; green/red LED</p>
<b>Potential separation</b>	
between the load voltages	Yes
<b>Potential separation channels</b>	
<ul style="list-style-type: none"> <li>• between the channels</li> <li>• between the channels and backplane bus</li> <li>• between the channels and the power supply of the electronics</li> </ul>	<p>No</p> <p>Yes</p> <p>No</p>
<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 FS02
<b>Highest safety class achievable for safety-related tripping of standard modules</b>	
<ul style="list-style-type: none"> <li>• Performance level according to ISO 13849-1</li> <li>• Category according to ISO 13849-1</li> <li>• SILCL according to IEC 62061</li> </ul>	<p>PL d</p> <p>Cat. 3</p> <p>SILCL 2</p>
<b>Ambient conditions</b>	
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

### Dimensions

Width	30 mm
Height	159 mm
Depth	40 mm

### Weights

Weight, approx.	168 g
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**last modified:** 02/04/2020