



SIMATIC ET 200SP, Analog input module, AI 2x U/I 2-/4-wire High Speed, suitable for BU type A0, A1, Color code CC00, channel diagnostics, 16 bit, +/-0.3%

General information	
Product type designation	AI 2xU/I 2-/4-wire HS
HW functional status	From FS07
Firmware version	
• FW update possible	Yes
usable BaseUnits	BU type A0, A1
Color code for module-specific color identification plate	CC00
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	Yes
• Measuring range scalable	No
• Scalable measured values	No
• Adjustment of measuring range	No
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V13 SP1
• STEP 7 configurable/integrated from version	V5.5 SP3 / -
• PROFIBUS from GSD version/GSD revision	One GSD file each, Revision 3 and 5 and higher
• PROFINET from GSD version/GSD revision	GSDML V2.3
Operating mode	
• Oversampling	Yes; 2 channels per module
• MSI	No
CiR - Configuration in RUN	
Reparameterization possible in RUN	Yes
Calibration possible in RUN	No
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption (rated value)	39 mA; without sensor supply
Encoder supply	
24 V encoder supply	
• 24 V	Yes; For current measurement
• Short-circuit protection	Yes
• Output current, max.	20 mA; max. 50 mA per channel for a duration < 10 s
Power loss	
Power loss, typ.	0.95 W; without sensor supply
Address area	
Address space per module	

- Address space per module, max.

4 byte; + 1 byte for QI information (32 bytes in the oversampling operating mode)

#### Hardware configuration

Automatic encoding	Yes
<ul style="list-style-type: none"> <li>• Mechanical coding element</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• Type of mechanical coding element</li> </ul>	Type A

#### Selection of BaseUnit for connection variants

<ul style="list-style-type: none"> <li>• 2-wire connection</li> </ul>	BU type A0, A1
<ul style="list-style-type: none"> <li>• 4-wire connection</li> </ul>	BU type A0, A1

#### Analog inputs

Number of analog inputs	2; Differential inputs
<ul style="list-style-type: none"> <li>• For current measurement</li> </ul>	2
<ul style="list-style-type: none"> <li>• For voltage measurement</li> </ul>	2
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.	125 $\mu$ s
Analog input with oversampling	Yes
<ul style="list-style-type: none"> <li>• Values per cycle, max.</li> </ul>	16
<ul style="list-style-type: none"> <li>• Resolution, min.</li> </ul>	50 $\mu$ s

#### Input ranges (rated values), voltages

<ul style="list-style-type: none"> <li>• 0 to +10 V <ul style="list-style-type: none"> <li>— Input resistance (0 to 10 V)</li> </ul> </li> </ul>	Yes; 15 bit 75 k $\Omega$
<ul style="list-style-type: none"> <li>• 1 V to 5 V <ul style="list-style-type: none"> <li>— Input resistance (1 V to 5 V)</li> </ul> </li> </ul>	Yes; 13 bit 75 k $\Omega$
<ul style="list-style-type: none"> <li>• -10 V to +10 V <ul style="list-style-type: none"> <li>— Input resistance (-10 V to +10 V)</li> </ul> </li> </ul>	Yes; 16 bit incl. sign 75 k $\Omega$
<ul style="list-style-type: none"> <li>• -5 V to +5 V <ul style="list-style-type: none"> <li>— Input resistance (-5 V to +5 V)</li> </ul> </li> </ul>	Yes; 15 bit incl. sign 75 k $\Omega$

#### Input ranges (rated values), currents

<ul style="list-style-type: none"> <li>• 0 to 20 mA <ul style="list-style-type: none"> <li>— Input resistance (0 to 20 mA)</li> </ul> </li> </ul>	Yes; 15 bit 130 $\Omega$
<ul style="list-style-type: none"> <li>• -20 mA to +20 mA <ul style="list-style-type: none"> <li>— Input resistance (-20 mA to +20 mA)</li> </ul> </li> </ul>	Yes; 16 bit incl. sign 130 $\Omega$
<ul style="list-style-type: none"> <li>• 4 mA to 20 mA <ul style="list-style-type: none"> <li>— Input resistance (4 mA to 20 mA)</li> </ul> </li> </ul>	Yes; 14 bit 130 $\Omega$

#### Cable length

<ul style="list-style-type: none"> <li>• shielded, max.</li> </ul>	1 000 m; 200 m for voltage measurement
--	--

#### Analog value generation for the inputs

Measurement principle	Actual value encryption (successive approximation)
Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> <li>• Resolution with overrange (bit including sign), max.</li> </ul>	16 bit
<ul style="list-style-type: none"> <li>• Interference voltage suppression for interference frequency <math>f_1</math> in Hz</li> </ul>	No
<ul style="list-style-type: none"> <li>• Conversion time (per channel)</li> </ul>	10 $\mu$ s

#### Smoothing of measured values

<ul style="list-style-type: none"> <li>• Number of smoothing levels</li> </ul>	7; none; 2-/4-/8-/16-/32-/64-fold
<ul style="list-style-type: none"> <li>• parameterizable</li> </ul>	Yes

#### Encoder

##### Connection of signal encoders

<ul style="list-style-type: none"> <li>• for voltage measurement</li> </ul>	Yes
<ul style="list-style-type: none"> <li>• for current measurement as 2-wire transducer <ul style="list-style-type: none"> <li>— Burden of 2-wire transmitter, max.</li> </ul> </li> </ul>	Yes 650 $\Omega$
<ul style="list-style-type: none"> <li>• for current measurement as 4-wire transducer</li> </ul>	Yes

#### Errors/accuracies

Linearity error (relative to input range), (+/-)	0.03 %
Temperature error (relative to input range), (+/-)	0.01 %/K
Crosstalk between the inputs, min.	-50 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.1 %
Operational error limit in overall temperature range	

<ul style="list-style-type: none"> <li>• Voltage, relative to input range, (+/-)</li> <li>• Current, relative to input range, (+/-)</li> </ul>	0.3 %
Basic error limit (operational limit at 25 °C)	
<ul style="list-style-type: none"> <li>• Voltage, relative to input range, (+/-)</li> <li>• Current, relative to input range, (+/-)</li> </ul>	0.2 %
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$ , $f_1 =$ interference frequency	
<ul style="list-style-type: none"> <li>• Common mode voltage, max.</li> <li>• Common mode interference, min.</li> </ul>	35 V 90 dB
<b>Isochronous mode</b>	
Filtering and processing time (TCI), min.	80 $\mu$ s
Bus cycle time (TDP), min.	125 $\mu$ s; Starting from firmware Version V2.0.1
<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>	Yes Yes; two upper and two lower limit values in each case
<b>Diagnoses</b>	
<ul style="list-style-type: none"> <li>• Wire-break</li> <li>• Short-circuit</li> <li>• Group error</li> <li>• Overflow/underflow</li> </ul>	Yes; channel-by-channel, at 4 to 20 mA only Yes; channel-by-channel, at 1 to 5 V or for current measuring ranges short-circuit in encoder supply Yes Yes
<b>Diagnostics indication LED</b>	
<ul style="list-style-type: none"> <li>• Monitoring of the supply voltage (PWR-LED)</li> <li>• Channel status display</li> <li>• for channel diagnostics</li> <li>• for module diagnostics</li> </ul>	Yes; green PWR LED Yes; green LED Yes; red LED Yes; green/red DIAG LED
<b>Potential separation</b>	
<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>	Yes Yes Yes
<b>Isolation</b>	
Isolation tested with	707 V DC (type test)
<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
<ul style="list-style-type: none"> <li>• horizontal installation, min.</li> <li>• horizontal installation, max.</li> <li>• vertical installation, min.</li> <li>• vertical installation, max.</li> </ul>	-30 °C 60 °C -30 °C 50 °C
<b>Altitude during operation relating to sea level</b>	
<ul style="list-style-type: none"> <li>• Installation altitude above sea level, max.</li> </ul>	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual
<b>Dimensions</b>	
Width	15 mm
Height	73 mm
Depth	58 mm
<b>Weights</b>	
Weight, approx.	32 g
<b>last modified:</b>	8/16/2023 