

SIMATIC ET 200SP, Analog input module, AI 4xRTD/TC High Feature, suitable for BU type A0, A1, Color code CC00, channel diagnostics, 16 bit, +/-0.1%, 2-/3-/4-wire



General information	
Product type designation	AI 4xRTD/TC 2-/3-/4-wire HF
Firmware version	V2.0
<ul style="list-style-type: none"> FW update possible 	Yes
usable BaseUnits	BU type A0, A1
Color code for module-specific color identification plate	CC00
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 as of version 	V12 SP1 / V13
<ul style="list-style-type: none"> STEP 7 configurable/integrated as of version 	V5.5 SP3 / V5.5 SP4
<ul style="list-style-type: none"> PCS 7 configurable/integrated as of version 	V8.1 SP1
<ul style="list-style-type: none"> PROFIBUS as of GSD version/GSD revision 	GSD Revision 5
<ul style="list-style-type: none"> PROFINET as of GSD version/GSD revision 	GSDML V2.3
Operating mode	
<ul style="list-style-type: none"> Oversampling 	No
<ul style="list-style-type: none"> MSI 	No

CiR – Configuration in RUN	
Reparameterization possible in RUN	Yes
Calibration possible in RUN	Yes
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, max.	35 mA
Power loss	
Power loss, typ.	0.75 W
Address area	
Address space per module	
<ul style="list-style-type: none"> Address space per module, max. 	8 byte; + 1 byte for QI information
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.	30 V
Constant measurement current for resistance-type transmitter, typ.	0.7 mA; 1.7 mA for Cu10 sensors
Cycle time (all channels), min.	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels); for line compensation in case of a three-wire connection, an additional cycle is necessary
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Input ranges (rated values), voltages	
<ul style="list-style-type: none"> -1 V to +1 V 	Yes; 16 bit incl. sign
<ul style="list-style-type: none"> Input resistance (-1 V to +1 V) 	1 MΩ
<ul style="list-style-type: none"> -250 mV to +250 mV 	Yes; 16 bit incl. sign
<ul style="list-style-type: none"> Input resistance (-250 mV to +250 mV) 	1 MΩ
<ul style="list-style-type: none"> -50 mV to +50 mV 	Yes; 16 bit incl. sign
<ul style="list-style-type: none"> Input resistance (-50 mV to +50 mV) 	1 MΩ
<ul style="list-style-type: none"> -80 mV to +80 mV 	Yes; 16 bit incl. sign
<ul style="list-style-type: none"> Input resistance (-80 mV to +80 mV) 	1 MΩ
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)
- Type TXK/TXK(L) to GOST
- Input resistance (Type TXK/TXK(L) to GOST)

Yes; 16 bit incl. sign
1 MΩ
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1 MΩ
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1 MΩ
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1 MΩ
Yes; 16 bit incl. sign
1 MΩ

Input ranges (rated values), resistance thermometer

- Cu 10
- Input resistance (Cu 10)
- Ni 100
- Input resistance (Ni 100)
- Ni 1000
- Input resistance (Ni 1000)
- LG-Ni 1000
- Input resistance (LG-Ni 1000)
- Ni 120
- Input resistance (Ni 120)
- Ni 200
- Input resistance (Ni 200)
- Ni 500
- Input resistance (Ni 500)
- Pt 100
- Input resistance (Pt 100)

Yes; 16 bit incl. sign
1 MΩ
Yes; 16 bit incl. sign
1 MΩ
Yes; 16 bit incl. sign
1 MΩ
Yes; 16 bit incl. sign
1 MΩ
Yes; 16 bit incl. sign
1 MΩ
Yes; 16 bit incl. sign
1 MΩ
Yes; 16 bit incl. sign
1 MΩ
Yes; 16 bit incl. sign
1 MΩ

<ul style="list-style-type: none"> • Pt 1000 • Input resistance (Pt 1000) • Pt 200 • Input resistance (Pt 200) • Pt 500 • Input resistance (Pt 500) 	Yes; 16 bit incl. sign 1 MΩ Yes; 16 bit incl. sign 1 MΩ Yes; 16 bit incl. sign 1 MΩ
Input ranges (rated values), resistors	
<ul style="list-style-type: none"> • 0 to 150 ohms • Input resistance (0 to 150 ohms) • 0 to 300 ohms • Input resistance (0 to 300 ohms) • 0 to 600 ohms • Input resistance (0 to 600 ohms) • 0 to 3000 ohms • Input resistance (0 to 3000 ohms) • 0 to 6000 ohms • Input resistance (0 to 6000 ohms) • PTC • Input resistance (PTC) 	Yes; 15 bit 1 MΩ Yes; 15 bit 1 MΩ Yes; 15 bit 1 MΩ Yes; 15 bit 1 MΩ Yes; 15 bit 1 MΩ Yes; 15 bit 1 MΩ
Thermocouple (TC)	
Temperature compensation	
<ul style="list-style-type: none"> — parameterizable — Reference channel of the module — internal comparison point — Reference channel of the group — Number of reference channel groups — fixed reference temperature 	Yes Yes Yes; with BaseUnit type A1 Yes 4; Group 0 to 3 Yes
Cable length	
<ul style="list-style-type: none"> • shielded, max. 	200 m; 50 m with thermocouples
Analog value generation for the inputs	
Measurement principle	integrating (Sigma-Delta)
Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> • Resolution with overrange (bit including sign), max. • Integration time, parameterizable • Basic conversion time, including integration time (ms) <ul style="list-style-type: none"> — additional processing time for wire-break check — additional power line wire-break check 	16 bit Yes 2 ms; In the ranges resistance thermometers, resistors and thermocouples 2 ms; for 3/4 wire transducer (resistance thermometer and resistor)

<ul style="list-style-type: none"> • Interference voltage suppression for interference frequency f1 in Hz 	16.6 / 50 / 60 Hz
<ul style="list-style-type: none"> • Conversion time (per channel) 	180 / 60 / 50 ms
Smoothing of measured values	
<ul style="list-style-type: none"> • Number of smoothing levels 	4; None; 4/8/16 times
<ul style="list-style-type: none"> • parameterizable 	Yes

Encoder

Connection of signal encoders	
<ul style="list-style-type: none"> • for voltage measurement 	Yes
<ul style="list-style-type: none"> • for resistance measurement with two-wire connection 	Yes
<ul style="list-style-type: none"> • for resistance measurement with three-wire connection 	Yes
<ul style="list-style-type: none"> • for resistance measurement with four-wire connection 	Yes

Errors/accuracies

Linearity error (relative to input range), (+/-)	0.01 %; ±0.1 % for resistance thermometers and resistance
Temperature error (relative to input range), (+/-)	0.0009 %/K; ±0.005 % / K at thermocouple
Crosstalk between the inputs, min.	-50 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.05 %
Operational error limit in overall temperature range	
<ul style="list-style-type: none"> • Voltage, relative to input range, (+/-) 	0.1 %
<ul style="list-style-type: none"> • Resistance, relative to input range, (+/-) 	0.1 %
Basic error limit (operational limit at 25 °C)	
<ul style="list-style-type: none"> • Voltage, relative to input range, (+/-) 	0.05 %
<ul style="list-style-type: none"> • Resistance, relative to input range, (+/-) 	0.05 %
Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$, f1 = interference frequency	
<ul style="list-style-type: none"> • Series mode interference (peak value of interference < rated value of input range), min. 	70 dB
<ul style="list-style-type: none"> • Common mode voltage, max. 	10 V
<ul style="list-style-type: none"> • Common mode interference, min. 	90 dB

Isochronous mode

Isochronous operation (application synchronized up to terminal)	No
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Interrupts/diagnostics/status information

Diagnostics function	Yes
Alarms	
<ul style="list-style-type: none"> • Diagnostic alarm 	Yes
<ul style="list-style-type: none"> • Limit value alarm 	Yes; two upper and two lower limit values in each case
Diagnostic messages	
<ul style="list-style-type: none"> • Monitoring the supply voltage 	Yes

• Wire-break	Yes; channel by channel
• Group error	Yes
• Overflow/underflow	Yes; channel by channel
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; Green LED
• for channel diagnostics	Yes; Red LED
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels	No
• between the channels and backplane bus	Yes
• between the channels and the power supply of the electronics	Yes
Permissible potential difference	
between the inputs (UCM)	10 V DC
Isolation	
Isolation tested with	707 V DC (type test)
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	30 g
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