



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	V2.1
<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
<ul style="list-style-type: none"> Isochronous mode 	No
<ul style="list-style-type: none"> Adjustment of measuring range 	Yes
Engineering with	
<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/integrated from version 	V12 SP1 / V13
<ul style="list-style-type: none"> STEP 7 configurable/integrated from version 	V5.5 SP3 / V5.5 SP4
<ul style="list-style-type: none"> PCS 7 configurable/integrated from version 	V8.1 SP1
<ul style="list-style-type: none"> PROFIBUS from GSD version/GSD revision 	GSD Revision 5
<ul style="list-style-type: none"> PROFINET from GSD version/GSD revision 	GSDML V2.3
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
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
Hardware configuration	
Automatic encoding	
<ul style="list-style-type: none"> Type of mechanical coding element 	Type A
Analog inputs	
Number of analog inputs	4
permissible input voltage for voltage input (destruction limit), max.	30 V
Constant measurement current for resistance-type transmitter, typ.	2 mA
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 <ul style="list-style-type: none"> — Input resistance (-1 V to +1 V) ● -250 mV to +250 mV <ul style="list-style-type: none"> — Input resistance (-250 mV to +250 mV) ● -50 mV to +50 mV <ul style="list-style-type: none"> — Input resistance (-50 mV to +50 mV) ● -80 mV to +80 mV <ul style="list-style-type: none"> — Input resistance (-80 mV to +80 mV) 	<ul style="list-style-type: none"> 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
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) ● Type TXK/TXK(L) to GOST <ul style="list-style-type: none"> — Input resistance (Type TXK/TXK(L) to GOST) 	<ul style="list-style-type: none"> 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 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
Input ranges (rated values), resistance thermometer	
<ul style="list-style-type: none"> ● Cu 10 <ul style="list-style-type: none"> — Input resistance (Cu 10) ● Ni 100 <ul style="list-style-type: none"> — Input resistance (Ni 100) ● Ni 1000 <ul style="list-style-type: none"> — Input resistance (Ni 1000) ● LG-Ni 1000 <ul style="list-style-type: none"> — Input resistance (LG-Ni 1000) ● Ni 120 <ul style="list-style-type: none"> — Input resistance (Ni 120) ● Ni 200 <ul style="list-style-type: none"> — Input resistance (Ni 200) ● Ni 500 <ul style="list-style-type: none"> — Input resistance (Ni 500) ● Pt 100 <ul style="list-style-type: none"> — Input resistance (Pt 100) ● Pt 1000 <ul style="list-style-type: none"> — Input resistance (Pt 1000) ● Pt 200 <ul style="list-style-type: none"> — Input resistance (Pt 200) ● Pt 500 <ul style="list-style-type: none"> — Input resistance (Pt 500) 	<ul style="list-style-type: none"> 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 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
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) 	<ul style="list-style-type: none"> Yes; 15 bit 1 MΩ

<ul style="list-style-type: none"> ● 0 to 300 ohms <ul style="list-style-type: none"> — Input resistance (0 to 300 ohms) ● 0 to 600 ohms <ul style="list-style-type: none"> — Input resistance (0 to 600 ohms) ● 0 to 3000 ohms <ul style="list-style-type: none"> — Input resistance (0 to 3000 ohms) ● 0 to 6000 ohms <ul style="list-style-type: none"> — Input resistance (0 to 6000 ohms) ● PTC <ul style="list-style-type: none"> — Input resistance (PTC) 	<p>Yes; 15 bit</p> <p>1 MΩ</p> <p>Yes; 15 bit</p> <p>1 MΩ</p> <p>Yes; 15 bit</p> <p>1 MΩ</p> <p>Yes; 15 bit</p> <p>1 MΩ</p> <p>Yes; 15 bit</p> <p>1 MΩ</p>
Thermocouple (TC)	
Temperature compensation	
<ul style="list-style-type: none"> — parameterizable — Reference channel of the module — internal comparison point — Number of reference channel groups 	<p>Yes</p> <p>Yes</p> <p>Yes; with BaseUnit type A1</p> <p>4; Group 0 to 3</p>
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 ● Interference voltage suppression for interference frequency f_1 in Hz ● Conversion time (per channel) 	<p>16 bit</p> <p>Yes</p> <p>2 ms; In the ranges resistance thermometers, resistors and thermocouples 2 ms; for 3/4 wire transducer (resistance thermometer and resistor)</p> <p>16.6 / 50 / 60 Hz</p> <p>180 / 60 / 50 / (67.5 / 22.5 / 18.75) ms</p>
Smoothing of measured values	
<ul style="list-style-type: none"> ● Number of smoothing levels ● parameterizable 	<p>4; None; 4/8/16 times</p> <p>Yes</p>
Encoder	
Connection of signal encoders	
<ul style="list-style-type: none"> ● for voltage measurement ● for resistance measurement with two-wire connection ● for resistance measurement with three-wire connection ● for resistance measurement with four-wire connection 	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>
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, (+/-) ● Resistance, relative to input range, (+/-) 	<p>0.1 %</p> <p>0.1 %</p>
Basic error limit (operational limit at 25 °C)	
<ul style="list-style-type: none"> ● Voltage, relative to input range, (+/-) ● Resistance, relative to input range, (+/-) 	<p>0.05 %</p> <p>0.05 %</p>
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, $f_1 =$ interference frequency	
<ul style="list-style-type: none"> ● Series mode interference (peak value of interference < rated value of input range), min. ● Common mode voltage, max. ● Common mode interference, min. 	<p>70 dB; With conversion time 67.5 / 22.5 / 18.75 ms: 40 dB</p> <p>10 V</p> <p>90 dB</p>
Interrupts/diagnostics/status information	
Alarms	
<ul style="list-style-type: none"> ● Limit value alarm 	Yes; two upper and two lower limit values in each case
Diagnoses	
<ul style="list-style-type: none"> ● Monitoring the supply voltage ● Wire-break 	<p>Yes</p> <p>Yes; channel by channel</p>

• 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
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-30 °C; < 0 °C as of FS08
• horizontal installation, max.	60 °C
• vertical installation, min.	-30 °C; < 0 °C as of FS08
• vertical installation, max.	50 °C
Dimensions	
Width	15 mm
Height	73 mm
Depth	58 mm

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