



Figure similar

SIMATIC ET 200SP HA, ET 200SP, analog ex-i input module, Ex-AI 4xTC/2xRTD 2-/3-/4-wire, suitable for BaseUnit type X1, channel diagnostics, 16bit, +/-0.05%

General information	
Product type designation	Ex-AI 4xTC/2xRTD 2-/3-/4-wire
Firmware version	V1.0
• FW update possible	Yes
usable BaseUnits	BU type X1
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	No
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	STEP 7 V16 or higher with HSP
• STEP 7 configurable/integrated from version	STEP 7 V5.6 SP2 or higher
• PCS 7 configurable/integrated from version	V9.1
Operating mode	
• MSI	Yes
Redundancy	
• Redundancy capability	No
CiR - Configuration in RUN	
Reparameterization possible in RUN	Yes
Input current	
Current consumption (rated value)	33 mA
Current consumption, max.	40 mA
Power loss	
Power loss, typ.	0.8 W
Address area	
Address space per module	
• Address space per module, max.	16 byte; + 1 byte for QI information
• Inputs	16 byte; + 1 byte for QI information
Hardware configuration	
Automatic encoding	
• Mechanical coding element	Yes
Selection of BaseUnit for connection variants	
• 2-wire connection	BU type X1
• 3-wire connection	BU type X1
• 4-wire connection	BU type X1
Analog inputs	
Number of analog inputs	
• For voltage measurement	4
• For resistance/resistance thermometer measurement	2
• For thermocouple measurement	4

Constant measurement current for resistance-type transmitter, typ.	0.5 mA
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Input ranges (rated values), voltages	
• -1 V to +1 V — Input resistance (-1 V to +1 V) • -250 mV to +250 mV — Input resistance (-250 mV to +250 mV) • -50 mV to +50 mV — Input resistance (-50 mV to +50 mV) • -80 mV to +80 mV — Input resistance (-80 mV to +80 mV)	- 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	
• 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 - 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	
• Cu 10 — Input resistance (Cu 10) • Ni 100 — Input resistance (Ni 100) • Ni 1000 — Input resistance (Ni 1000) • 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) • 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 1 MΩ - Yes; 16 bit incl. sign - 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	
• 0 to 150 ohms	Yes; 15 bit

— Input resistance (0 to 150 ohms)	1 M Ω
• 0 to 300 ohms	Yes; 15 bit
— Input resistance (0 to 300 ohms)	1 M Ω
• 0 to 600 ohms	Yes; 15 bit
— Input resistance (0 to 600 ohms)	1 M Ω
• 0 to 3000 ohms	Yes; 15 bit
— Input resistance (0 to 3000 ohms)	1 M Ω
• 0 to 6000 ohms	Yes; 15 bit
— Input resistance (0 to 6000 ohms)	1 M Ω
• PTC	Yes; 15 bit
— Input resistance (PTC)	1 M Ω
Thermocouple (TC)	
Temperature compensation	
— parameterizable	Yes
— internal comparison point	Yes; BU type X1
— Reference channel of the group	Yes
— Number of reference channel groups	4
— fixed reference temperature	Yes
Cable length	
• shielded, max.	200 m; Ex characteristic values must be observed; line resistance at RTD (simple) max. 25 ohm; loop resistance at TC max. 8 kOhm
Analog value generation for the inputs	
Measurement principle	integrating (Sigma-Delta)
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes; Channel-by-channel, results from the selected interference frequency suppression
• Basic conversion time, including integration time (ms)	
— additional processing time for wire-break check	20 ms; In the ranges resistance thermometers, resistors and thermocouples
— additional power line wire-break check	20 ms, for 3/4-wire transducer (resistance thermometer and resistor)
• Interference voltage suppression for interference frequency f1 in Hz	16.6 / 50 / 60 Hz, channel-by-channel
• Conversion time (per channel)	180 / 60 / 50 ms, results from the selected interference frequency suppression
Smoothing of measured values	
• parameterizable	Yes; none, weak, medium, strong, channel-by-channel
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	
• Voltage, relative to input range, (+/-)	0.1 %
• Resistance, relative to input range, (+/-)	0.1 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.05 %
• Resistance, relative to input range, (+/-)	0.05 %
Interference voltage suppression for $f = n \times (f1 \pm 1 \%)$, f1 = interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB
• Common mode voltage, max.	60 V; Applicable for use in non-hazardous areas; no common mode voltage permissible in hazardous areas
• Common mode interference, min.	90 dB
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes; channel by channel
• Overflow/underflow	Yes; channel by channel

Diagnostics indication LED	
• MAINT LED	Yes; Yellow 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
Ex(i) characteristics	
maximum values for connecting terminals for gas group IIC	
• Uo (no-load voltage), max.	5.9 V
• Io (short-circuit current), max.	18 mA
• Po (power output), max.	27 mW
• Co (permissible external capacity), max.	43 µF
• Lo (permissible external inductivity), max.	110 mH
• Um (voltage at non-intrinsically safe connecting terminals), max.	60 V
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; Electrical isolation between the channels and input voltage PME
Isolation	
Isolation tested with	further information on insulation can be found in the "ET 200SP HA / ET 200SP modules for devices in hazardous areas" System Manual
insulation of the field circuits to local ground acc. to IEC/EN 60079-11 tested with	707 V DC (type test)
Ambient conditions	
Ambient temperature during operation	
• horizontal installation, min.	-40 °C
• horizontal installation, max.	70 °C
• vertical installation, min.	-40 °C
• vertical installation, max.	60 °C
Altitude during operation relating to sea level	
• Installation altitude above sea level, max.	2 000 m
Dimensions	
Width	20 mm
Height	73 mm
Depth	58 mm
Weights	
Weight, approx.	55 g

last modified: 9/7/2023 