



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
<b>Input ranges (rated values), voltages</b>	
• -1 V to +1 V — Input resistance (-1 V to +1 V)	Yes; 16 bit incl. sign 1 MΩ
• -250 mV to +250 mV — Input resistance (-250 mV to +250 mV)	Yes; 16 bit incl. sign 1 MΩ
• -50 mV to +50 mV — Input resistance (-50 mV to +50 mV)	Yes; 16 bit incl. sign 1 MΩ
• -80 mV to +80 mV — Input resistance (-80 mV to +80 mV)	Yes; 16 bit incl. sign 1 MΩ
<b>Input ranges (rated values), thermocouples</b>	
• Type B — Input resistance (Type B)	Yes; 16 bit incl. sign 1 MΩ
• Type C — Input resistance (Type C)	Yes; 16 bit incl. sign 1 MΩ
• Type E — Input resistance (Type E)	Yes; 16 bit incl. sign 1 MΩ
• Type J — Input resistance (type J)	Yes; 16 bit incl. sign 1 MΩ
• Type K — Input resistance (Type K)	Yes; 16 bit incl. sign 1 MΩ
• Type L — Input resistance (Type L)	Yes; 16 bit incl. sign 1 MΩ
• Type N — Input resistance (Type N)	Yes; 16 bit incl. sign 1 MΩ
• Type R — Input resistance (Type R)	Yes; 16 bit incl. sign 1 MΩ
• Type S — Input resistance (Type S)	Yes; 16 bit incl. sign 1 MΩ
• Type T — Input resistance (Type T)	Yes; 16 bit incl. sign 1 MΩ
• Type U — Input resistance (Type U)	Yes; 16 bit incl. sign 1 MΩ
• Type TXK/TXK(L) to GOST — Input resistance (Type TXK/TXK(L) to GOST)	Yes; 16 bit incl. sign 1 MΩ
<b>Input ranges (rated values), resistance thermometer</b>	
• Cu 10 — Input resistance (Cu 10)	Yes; 16 bit incl. sign 1 MΩ
• Ni 100 — Input resistance (Ni 100)	Yes; 16 bit incl. sign 1 MΩ
• Ni 1000 — Input resistance (Ni 1000)	1 MΩ
• LG-Ni 1000	Yes; 16 bit incl. sign
• Ni 120 — Input resistance (Ni 120)	Yes; 16 bit incl. sign 1 MΩ
• Ni 200 — Input resistance (Ni 200)	Yes; 16 bit incl. sign 1 MΩ
• Ni 500 — Input resistance (Ni 500)	Yes; 16 bit incl. sign 1 MΩ
• Pt 100 — Input resistance (Pt 100)	Yes; 16 bit incl. sign 1 MΩ
• Pt 1000 — Input resistance (Pt 1000)	Yes; 16 bit incl. sign 1 MΩ
• Pt 200 — Input resistance (Pt 200)	Yes; 16 bit incl. sign 1 MΩ
• Pt 500 — Input resistance (Pt 500)	Yes; 16 bit incl. sign 1 MΩ
<b>Input ranges (rated values), resistors</b>	
• 0 to 150 ohms — Input resistance (0 to 150 ohms)	Yes; 15 bit 1 MΩ
• 0 to 300 ohms	Yes; 15 bit

— Input resistance (0 to 300 ohms)	1 MΩ
• 0 to 600 ohms	Yes; 15 bit
— Input resistance (0 to 600 ohms)	1 MΩ
• 0 to 3000 ohms	Yes; 15 bit
— Input resistance (0 to 3000 ohms)	1 MΩ
• 0 to 6000 ohms	Yes; 15 bit
— Input resistance (0 to 6000 ohms)	1 MΩ
• PTC	Yes; 15 bit
— Input resistance (PTC)	1 MΩ
<b>Thermocouple (TC)</b>	
<b>Temperature compensation</b>	
— 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
<b>Cable length</b>	
• 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
<b>Analog value generation for the inputs</b>	
Measurement principle	integrating (Sigma-Delta)
<b>Integration and conversion time/resolution per channel</b>	
• 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
<b>Smoothing of measured values</b>	
• parameterizable	Yes; none, weak, medium, strong, channel-by-channel
<b>Errors/accuracies</b>	
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 %
<b>Operational error limit in overall temperature range</b>	
• Voltage, relative to input range, (+/-)	0.1 %
• Resistance, relative to input range, (+/-)	0.1 %
<b>Basic error limit (operational limit at 25 °C)</b>	
• Voltage, relative to input range, (+/-)	0.05 %
• Resistance, relative to input range, (+/-)	0.05 %
<b>Interference voltage suppression for <math>f = n \times (f1 \pm 1 \%)</math>, <math>f1</math> = interference frequency</b>	
• 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
<b>Interrupts/diagnostics/status information</b>	
Diagnostics function	Yes
<b>Alarms</b>	
• Diagnostic alarm	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case
<b>Diagnoses</b>	
• Monitoring the supply voltage	Yes
• Wire-break	Yes; channel by channel
• Overflow/underflow	Yes; channel by channel
<b>Diagnostics indication LED</b>	
• 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

• U <sub>0</sub> (no-load voltage), max.	5.9 V
• I <sub>0</sub> (short-circuit current), max.	18 mA
• P <sub>0</sub> (power output), max.	27 mW
• C <sub>0</sub> (permissible external capacity), max.	43 µF
• L <sub>0</sub> (permissible external inductivity), max.	110 mH
• U <sub>m</sub> (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: 10/20/2022 