

Siemens
EcoTech



SIMATIC S7-1500 analog input module AI 8xU/R/RTD/TC HF, 16 bit resolution, up to 21 bit Resolution at RT and TC, accuracy 0.1%, 8 channels in groups of 1; common mode voltage: 30 V AC/60 V DC, Diagnostics; Hardware interrupts Scalable temperature measuring range, thermocouple type C, Calibrate in RUN; Delivery including infeed element, shield bracket and shield terminal: Front connector (screw terminals or push-in) to be ordered separately

| General information | |
|--|--|
| Product type designation | AI 8xU/R/RTD/TC HF |
| HW functional status | from FS01 |
| Firmware version | V1.1.0 |
| <ul style="list-style-type: none"> FW update possible | Yes |
| 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"> Prioritized startup | Yes |
| <ul style="list-style-type: none"> Measuring range scalable | Yes |
| <ul style="list-style-type: none"> Scalable measured values | No |
| <ul style="list-style-type: none"> Adjustment of measuring range | No |
| Engineering with | |
| <ul style="list-style-type: none"> STEP 7 TIA Portal configurable/integrated from version | V14 / - |
| <ul style="list-style-type: none"> STEP 7 configurable/integrated from version | V5.5 SP3 / - |
| <ul style="list-style-type: none"> PROFIBUS from GSD version/GSD revision | V1.0 / V5.1 |
| <ul style="list-style-type: none"> PROFINET from GSD version/GSD revision | V2.3 / - |
| Operating mode | |
| <ul style="list-style-type: none"> Oversampling | No |
| <ul style="list-style-type: none"> MSI | Yes |
| 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. | 55 mA; with 24 V DC supply |
| Power | |
| Power consumption from the backplane bus | 0.85 W |
| Power loss | |
| Power loss, typ. | 1.9 W |
| Analog inputs | |
| Number of analog inputs | 8; Plus one additional RTD (reference) channel |

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| <ul style="list-style-type: none"> • For voltage measurement • For resistance/resistance thermometer measurement • For thermocouple measurement | 8; Plus one additional RTD (reference) channel |
| permissible input voltage for voltage input (destruction limit), max. | 20 V |
| Constant measurement current for resistance-type transmitter, typ. | 150 Ohm, 300 Ohm, 600 Ohm, Cu10, Cu50, Cu100, Ni10, Ni100, Ni120, Ni200, Pt10, Pt50, Pt100, Pt200 climate: 1 mA; 6 kOhm, Ni500, Ni1000, LG-Ni1000, Pt200 standard, Pt500, Pt1000, PTC: 0.25 mA |
| Technical unit for temperature measurement adjustable | Yes; °C/°F/K |
| Input ranges (rated values), voltages | |
| <ul style="list-style-type: none"> • 0 to +5 V • 0 to +10 V • 1 V to 5 V • -1 V to +1 V <ul style="list-style-type: none"> — Input resistance (-1 V to +1 V) • -10 V to +10 V • -2.5 V to +2.5 V • -25 mV to +25 mV <ul style="list-style-type: none"> — Input resistance (-25 mV to +25 mV) • -250 mV to +250 mV <ul style="list-style-type: none"> — Input resistance (-250 mV to +250 mV) • -5 V to +5 V • -50 mV to +50 mV <ul style="list-style-type: none"> — Input resistance (-50 mV to +50 mV) • -500 mV to +500 mV <ul style="list-style-type: none"> — Input resistance (-500 mV to +500 mV) • -80 mV to +80 mV <ul style="list-style-type: none"> — Input resistance (-80 mV to +80 mV) | No No No Yes 10 MΩ No No Yes 10 MΩ Yes 10 MΩ No Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ |
| Input ranges (rated values), currents | |
| <ul style="list-style-type: none"> • 0 to 20 mA • -20 mA to +20 mA • 4 mA to 20 mA | No No No |
| 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 • 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 TXK/TXK(L) to GOST <ul style="list-style-type: none"> — Input resistance (Type TXK/TXK(L) to GOST) | Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ No Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ Yes 10 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) • Cu 10 according to GOST <ul style="list-style-type: none"> — Input resistance (Cu 10 according to GOST) • Cu 50 | Yes; Standard/climate 10 MΩ Yes; Standard/climate 10 MΩ Yes; Standard/climate |

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| — Input resistance (0 to 150 ohms) | 10 MΩ |
| • 0 to 300 ohms | Yes |
| — Input resistance (0 to 300 ohms) | 10 MΩ |
| • 0 to 600 ohms | Yes |
| — Input resistance (0 to 600 ohms) | 10 MΩ |
| • 0 to 3000 ohms | No |
| • 0 to 6000 ohms | Yes |
| — Input resistance (0 to 6000 ohms) | 10 MΩ |
| • PTC | Yes |
| — Input resistance (PTC) | 10 MΩ |
| Thermocouple (TC) | |
| Temperature compensation | |
| — parameterizable | Yes |
| — internal temperature compensation | Yes |
| — external temperature compensation via RTD | Yes |
| — Compensation for 0 °C reference point temperature | Yes; fixed value can be set |
| — Reference channel of the module | Yes; 9th channel that can be used as a genuine 9th RTD channel regardless of the parameterization of the other channels, or that can be used for compensation in the case of TC measurement |
| Cable length | |
| • shielded, max. | 800 m; at U; 200 m at R/RTD/TC |
| Analog value generation for the inputs | |
| Integration and conversion time/resolution per channel | |
| • Resolution with overrange (bit including sign), max. | 21 bit; For measuring mode RTC and TC when using the function "Scalable temperature measuring range" (32 bit REAL format); 16 bit for measuring mode R and U; 16 bit for all measuring modes when using the S7 format (16 bit INTEGER) |
| • Integration time, parameterizable | Yes |
| • Integration time (ms) | Fast mode: 2.5 / 16.67 / 20 / 100 ms, standard mode: 7.5 / 50 / 60 / 300 ms |
| • Basic conversion time, including integration time (ms) | Fast mode: 4 / 18 / 22 / 102 ms; Standard mode: 9 / 52 / 62 / 302 ms |
| — additional conversion time for wire-break monitoring | Thermocouples, 150 Ohm, 300 Ohm, 600 Ohm, Cu10, Cu50, Cu100, Ni10, Ni100, Ni120, Ni200, Pt10, Pt50, Pt100: 4 ms; 6 kOhm, Ni500, Ni1000, LG-Ni1000, Pt200, Pt500, Pt1000: 13 ms |
| • Interference voltage suppression for interference frequency f1 in Hz | 400 / 60 / 50 / 10 Hz |
| • Basic execution time of the module (all channels released) | Corresponds to the channel with the highest basic conversion time |
| Smoothing of measured values | |
| • parameterizable | Yes |
| • Step: None | Yes |
| • Step: low | Yes |
| • Step: Medium | Yes |
| • Step: High | Yes |
| Encoder | |
| Connection of signal encoders | |
| • for voltage measurement | Yes |
| • for current measurement as 2-wire transducer | No |
| • for current measurement as 4-wire transducer | No |
| • for resistance measurement with two-wire connection | Yes |
| • for resistance measurement with three-wire connection | Yes; All measuring ranges except PTC; internal compensation of the cable resistances |
| • for resistance measurement with four-wire connection | Yes; All measuring ranges except PTC |
| Errors/accuracies | |
| Linearity error (relative to input range), (+/-) | 0.02 % |
| Temperature error (relative to input range), (+/-) | 0.005 %/K |
| Crosstalk between the inputs, max. | -80 dB |
| Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) | 0.02 % |
| Temperature error of internal compensation | ±1,5 °C |
| Operational error limit in overall temperature range | |
| • Voltage, relative to input range, (+/-) | 0.1 % |
| • Resistance, relative to input range, (+/-) | 0.1 % |

| | |
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| <ul style="list-style-type: none"> Resistance thermometer, relative to input range, (+/-) Thermocouple, relative to input range, (+/-) | Cuxxx Standard: ± 0.5 K, Cuxxx Klima: ± 0.5 K, Ptxxx Standard: ± 1 K, Ptxxx Klima: ± 0.5 K, Nixxx Standard: ± 0.5 K, Nixxx Klima: ± 0.3 K Type B: > 600 °C ± 2 K, Type E: > -200 °C ± 1 K, Type J: > -210 °C ± 1 K, Type K: > -200 °C ± 2 K, Type N: > -200 °C ± 2 K, Type R: > 0 °C ± 2 K, Type S: > 0 °C ± 2 K, Type T: > -200 °C ± 1 K, Type C: ± 4 K, Type TXK/TXK(L): ± 1 K |
| Basic error limit (operational limit at 25 °C) | |
| <ul style="list-style-type: none"> Voltage, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Thermocouple, relative to input range, (+/-) | 0.05 % 0.05 % Cuxxx Standard: ± 0.3 K, Cuxxx Klima: ± 0.2 K, Ptxxx Standard: ± 0.5 K, Ptxxx Klima: ± 0.2 K, Nixxx Standard: ± 0.3 K, Nixxx Klima: ± 0.15 K Type B: > 600 °C ± 1 K, Type E: > -200 °C ± 0.5 K, Type J: > -210 °C ± 0.5 K, Type K: > -200 °C ± 1 K, Type N: > -200 °C ± 1 K, Type R: > 0 °C ± 1 K, Type S: > 0 °C ± 1 K, Type T: > -200 °C ± 0.5 K, Type C: ± 2 K, Type TXK/TXK(L): ± 0.5 K |
| 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. | 80 dB; in the Standard operating mode, 40 dB in the Fast operating mode 60 V DC/30 V AC 80 dB |
| Interrupts/diagnostics/status information | |
| Diagnostics function | Yes |
| Alarms | |
| <ul style="list-style-type: none"> Diagnostic alarm Limit value alarm | Yes Yes; two upper and two lower limit values in each case |
| Diagnoses | |
| <ul style="list-style-type: none"> Monitoring the supply voltage Wire-break Overflow/underflow | Yes Yes; Only with TC, R, RTD Yes |
| Diagnostics indication LED | |
| <ul style="list-style-type: none"> RUN LED ERROR LED Monitoring of the supply voltage (PWR-LED) Channel status display for channel diagnostics for module diagnostics | Yes; green LED Yes; red LED Yes; green LED Yes; green LED Yes; red LED Yes; red LED |
| Potential separation | |
| Potential separation channels | |
| <ul style="list-style-type: none"> between the channels between the channels, in groups of between the channels and backplane bus between the channels and the power supply of the electronics | Yes 1 Yes Yes |
| Permissible potential difference | |
| between different circuits | 60 V DC/30 V AC; insulation rated for 120 V AC basic insulation: between the channels and the supply voltage L+; between the channels and the backplane bus; between the channels |
| Isolation | |
| Isolation tested with | 2 000 V DC between the channels and the supply voltage L+; 2 000 V DC between the channels and the backplane bus; 2 000 V DC between the channels; 707 V DC (type test) between the supply voltage L+ and the backplane bus |
| Standards, approvals, certificates | |
| Siemens Eco Profile (SEP) | Siemens EcoTech |
| Suitable for applications according to AMS 2750 | Yes; Declaration of Conformity, see online support entry 109757262 |
| Suitable for applications according to CQI-9 | Yes; Based on AMS 2750 E |
| Ecological footprint | |
| <ul style="list-style-type: none"> environmental product declaration | Yes |
| Global warming potential | |
| — global warming potential, (total) [CO ₂ eq] | 38.6 kg |
| — global warming potential, (during production) [CO ₂ eq] | 14.4 kg |
| — global warming potential, (during operation) [CO ₂ eq] | 24.6 kg |
| — global warming potential, (after end of life cycle) | -0.44 kg |

[CO2 eq]

Security

| | |
|------------------------|----|
| signed firmware update | No |
| data integrity | No |

Ambient conditions

| | |
|--------------------------------------|-------------------|
| Ambient temperature during operation | |
| • horizontal installation, min. | -30 °C; From FS02 |
| • horizontal installation, max. | 60 °C |
| • vertical installation, min. | -30 °C; From FS02 |
| • vertical installation, max. | 40 °C |

Dimensions

| | |
|--------|--------|
| Width | 35 mm |
| Height | 147 mm |
| Depth | 129 mm |

Weights

| | |
|-----------------|-------|
| Weight, approx. | 290 g |
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Other

| | |
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| Note: | for the R/RDT three-wire measurement, the conductor compensation is made alternating with the measurement; this then requires two module cycles for a measured value |
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Classifications

| | Version | Classification |
|--------|---------|----------------|
| eClass | 14 | 27-24-22-01 |
| eClass | 12 | 27-24-22-01 |
| eClass | 9.1 | 27-24-22-01 |
| eClass | 9 | 27-24-22-01 |
| eClass | 8 | 27-24-22-01 |
| eClass | 7.1 | 27-24-22-01 |
| eClass | 6 | 27-24-22-01 |
| ETIM | 10 | EC001420 |
| ETIM | 9 | EC001420 |
| ETIM | 8 | EC001420 |
| ETIM | 7 | EC001420 |
| IDEA | 4 | 3562 |
| UNSPSC | 15 | 32-15-17-05 |

Approvals / Certificates

General Product Approval



EMV Functional Safety Test Certificates Maritime application



[Type Examination Certificate](#)

[Special Test Certificate](#)

[Type Test Certificates/Test Report](#)

[Miscellaneous](#)



Maritime application other



[Confirmation](#)



[Miscellaneous](#)

[Confirmation](#)

[Miscellaneous](#)

Railway Environment

[Special Test Certificate](#)



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