

**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
• FW update possible	Yes
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	No
• Prioritized startup	Yes
• Measuring range scalable	Yes
• Scalable measured values	No
• Adjustment of measuring range	No
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V14 / -
• STEP 7 configurable/integrated from version	V5.5 SP3 / -
• PROFIBUS from GSD version/GSD revision	V1.0 / V5.1
• PROFINET from GSD version/GSD revision	V2.3 / -
Operating mode	
• Oversampling	No
• 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
• For voltage measurement	8; Plus one additional RTD (reference) channel

• 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	
• 0 to +5 V • 0 to +10 V • 1 V to 5 V • -1 V to +1 V — Input resistance (-1 V to +1 V) • -10 V to +10 V • -2.5 V to +2.5 V • -25 mV to +25 mV — Input resistance (-25 mV to +25 mV) • -250 mV to +250 mV — Input resistance (-250 mV to +250 mV) • -5 V to +5 V • -50 mV to +50 mV — Input resistance (-50 mV to +50 mV) • -500 mV to +500 mV — Input resistance (-500 mV to +500 mV) • -80 mV to +80 mV — 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	
• 0 to 20 mA • -20 mA to +20 mA • 4 mA to 20 mA	No No No
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 • 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 TXK/TXK(L) to GOST — 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	
• Cu 10 — Input resistance (Cu 10) • Cu 10 according to GOST — Input resistance (Cu 10 according to GOST) • Cu 50 — Input resistance (Cu 50) • Cu 50 according to GOST — Input resistance (Cu 50 according to GOST)	Yes; Standard/climate 10 MΩ Yes; Standard/climate 10 MΩ Yes; Standard/climate 10 MΩ Yes; Standard/climate 10 MΩ

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• 0 to 3000 ohms • 0 to 6000 ohms — Input resistance (0 to 6000 ohms) • PTC — Input resistance (PTC)	No Yes 10 MΩ Yes 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. • Integration time, parameterizable • Integration time (ms) • Basic conversion time, including integration time (ms) — additional conversion time for wire-break monitoring • Interference voltage suppression for interference frequency f1 in Hz • Basic execution time of the module (all channels released)	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) Yes Fast mode: 2.5 / 16.67 / 20 / 100 ms, standard mode: 7.5 / 50 / 60 / 300 ms Fast mode: 4 / 18 / 22 / 102 ms; Standard mode: 9 / 52 / 62 / 302 ms 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 400 / 60 / 50 / 10 Hz Corresponds to the channel with the highest basic conversion time
Smoothing of measured values	
• parameterizable • Step: None • Step: low • Step: Medium • Step: High	Yes Yes Yes Yes Yes
Encoder	
Connection of signal encoders	
• for voltage measurement • for current measurement as 2-wire transducer • for current measurement as 4-wire transducer • for resistance measurement with two-wire connection • for resistance measurement with three-wire connection • for resistance measurement with four-wire connection	Yes No No Yes Yes; All measuring ranges except PTC; internal compensation of the cable resistances 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, (+/-) • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Thermocouple, relative to input range, (+/-)	0.1 % 0.1 % 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)	
• Voltage, relative to input range, (+/-) • Resistance, relative to input range, (+/-)	0.05 % 0.05 %

Resistance thermometer, relative to input range, (+/-)	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
Thermocouple, relative to input range, (+/-)	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	
Series mode interference (peak value of interference < rated value of input range), min.	80 dB; in the Standard operating mode, 40 dB in the Fast operating mode
Common mode voltage, max.	60 V DC/30 V AC
Common mode interference, min.	80 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; Only with TC, R, RTD
Overflow/underflow	Yes
Diagnostics indication LED	
RUN LED	Yes; green LED
ERROR LED	Yes; red LED
Monitoring of the supply voltage (PWR-LED)	Yes; green LED
Channel status display	Yes; green LED
for channel diagnostics	Yes; red LED
for module diagnostics	Yes; red LED
Potential separation	
Potential separation channels	
between the channels	Yes
between the channels, in groups of	1
between the channels and backplane bus	Yes
between the channels and the power supply of the electronics	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	
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) [CO ₂ eq]	-0.44 kg
product functions / security / header	
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

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	9	EC001420
ETIM	8	EC001420
ETIM	7	EC001420
IDEA	4	3562
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval



[Manufacturer Declaration](#)

[Declaration of Conformity](#)

[KC](#)

[Miscellaneous](#)

General Product Approval

EMV

For use in hazardous locations



[KC](#)



[KC](#)

[FM](#)



For use in hazardous locations

[FM](#)

[CCC-Ex](#)



[Type Examination Certificate](#)



[Miscellaneous](#)

Marine / Shipping



[NK / Nippon Kaiji Kyokai](#)



Marine / Shipping

Environment



[CCS \(China Classification Society\)](#)



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