

Siemens
EcoTech



SIMATIC S7-1500 analog input module AI 8xU/I/RTD/TC ST, 16 bit resolution, accuracy 0.3%, 8 channels in groups of 8; 4 channels for RTD measurement, common mode voltage 10 V; Diagnostics; Hardware interrupts; 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/I/RTD/TC ST
HW functional status	FS04
Firmware version	V2.0.0
<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 	No
<ul style="list-style-type: none"> Measuring range scalable 	No
<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 	V12 / V12
<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.	255 mA; with 19.2 V supply
Encoder supply	
24 V encoder supply	
<ul style="list-style-type: none"> Short-circuit protection 	Yes
<ul style="list-style-type: none"> Output current, max. 	20 mA; Max. 47 mA per channel for a duration < 10 s
Power	
Power consumption from the backplane bus	0.7 W
Power loss	

Power loss, typ.	2.7 W
Analog inputs	
Number of analog inputs	8
• For current measurement	8
• For voltage measurement	8
• For resistance/resistance thermometer measurement	4
• For thermocouple measurement	8
permissible input voltage for voltage input (destruction limit), max.	28.8 V
permissible input current for current input (destruction limit), max.	40 mA
Constant measurement current for resistance-type transmitter, typ.	150 Ohm, 300 Ohm, 600 Ohm, Pt100, Pt200, Ni100: 1.25 mA; 6 000 Ohm, Pt500, Pt1000, Ni1000, LG-Ni1000: 0.625 mA; PTC: 0.472 mA
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Input ranges (rated values), voltages	
• 0 to +5 V	No
• 0 to +10 V	No
• 1 V to 5 V	Yes
— Input resistance (1 V to 5 V)	100 kΩ
• -1 V to +1 V	Yes
— Input resistance (-1 V to +1 V)	10 MΩ
• -10 V to +10 V	Yes
— Input resistance (-10 V to +10 V)	100 kΩ
• -2.5 V to +2.5 V	Yes
— Input resistance (-2.5 V to +2.5 V)	10 MΩ
• -25 mV to +25 mV	No
• -250 mV to +250 mV	Yes
— Input resistance (-250 mV to +250 mV)	10 MΩ
• -5 V to +5 V	Yes
— Input resistance (-5 V to +5 V)	100 kΩ
• -50 mV to +50 mV	Yes
— Input resistance (-50 mV to +50 mV)	10 MΩ
• -500 mV to +500 mV	Yes
— Input resistance (-500 mV to +500 mV)	10 MΩ
• -80 mV to +80 mV	Yes
— Input resistance (-80 mV to +80 mV)	10 MΩ
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
— Input resistance (0 to 20 mA)	25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
• -20 mA to +20 mA	Yes
— Input resistance (-20 mA to +20 mA)	25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
• 4 mA to 20 mA	Yes
— Input resistance (4 mA to 20 mA)	25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
Input ranges (rated values), thermocouples	
• Type B	Yes
— Input resistance (Type B)	10 MΩ
• Type C	No
• Type E	Yes
— Input resistance (Type E)	10 MΩ
• Type J	Yes
— Input resistance (type J)	10 MΩ
• Type K	Yes
— Input resistance (Type K)	10 MΩ
• Type L	No
• Type N	Yes
— Input resistance (Type N)	10 MΩ
• Type R	Yes
— Input resistance (Type R)	10 MΩ
• Type S	Yes
— Input resistance (Type S)	10 MΩ
• Type T	Yes
— Input resistance (Type T)	10 MΩ

• Type TXK/TXK(L) to GOST	No
Input ranges (rated values), resistance thermometer	
• Cu 10	No
• Cu 10 according to GOST	No
• Cu 50	No
• Cu 50 according to GOST	No
• Cu 100	No
• Cu 100 according to GOST	No
• Ni 10	No
• Ni 10 according to GOST	No
• Ni 100	Yes; Standard/climate
— Input resistance (Ni 100)	10 MΩ
• Ni 100 according to GOST	No
• Ni 1000	Yes; Standard/climate
— Input resistance (Ni 1000)	10 MΩ
• Ni 1000 according to GOST	No
• LG-Ni 1000	Yes; Standard/climate
— Input resistance (LG-Ni 1000)	10 MΩ
• Ni 120	No
• Ni 120 according to GOST	No
• Ni 200 according to GOST	No
• Ni 500	No
• Ni 500 according to GOST	No
• Pt 10	No
• Pt 10 according to GOST	No
• Pt 50	No
• Pt 50 according to GOST	No
• Pt 100	Yes; Standard/climate
— Input resistance (Pt 100)	10 MΩ
• Pt 100 according to GOST	No
• Pt 1000	Yes; Standard/climate
— Input resistance (Pt 1000)	10 MΩ
• Pt 1000 according to GOST	No
• Pt 200	Yes; Standard/climate
— Input resistance (Pt 200)	10 MΩ
• Pt 200 according to GOST	No
• Pt 500	Yes; Standard/climate
— Input resistance (Pt 500)	10 MΩ
• Pt 500 according to GOST	No
Input ranges (rated values), resistors	
• 0 to 150 ohms	Yes
— 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
Cable length	
• shielded, max.	800 m; for U/I, 200 m for R/RTD, 50 m for TC
Analog value generation for the inputs	

Integration and conversion time/resolution per channel	
<ul style="list-style-type: none"> Resolution with overrange (bit including sign), max. Integration time, parameterizable Integration time (ms) Basic conversion time, including integration time (ms) <ul style="list-style-type: none"> — additional conversion time for wire-break monitoring — additional conversion time for resistance measurement Interference voltage suppression for interference frequency f_1 in Hz Time for offset calibration (per module) 	16 bit Yes 2,5 / 16,67 / 20 / 100 ms 9 / 23 / 27 / 107 ms 9 ms (to be considered in R/RTD/TC measurement) 150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms 400 / 60 / 50 / 10 Hz Basic conversion time of the slowest channel
Smoothing of measured values	
<ul style="list-style-type: none"> parameterizable Step: None Step: low Step: Medium Step: High 	Yes Yes Yes Yes Yes
Encoder	
Connection of signal encoders	
<ul style="list-style-type: none"> for voltage measurement for current measurement as 2-wire transducer <ul style="list-style-type: none"> — Burden of 2-wire transmitter, max. 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 Yes 820 Ω Yes Yes; Only for PTC 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; With TC type T 0.02 \pm % / 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	\pm 6 °C
Operational error limit in overall temperature range	
<ul style="list-style-type: none"> Voltage, relative to input range, (+/-) Current, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Thermocouple, relative to input range, (+/-) 	0.3 % 0.3 % 0.3 % Ptxxx standard: \pm 1.5 K, Ptxxx climate: \pm 0.5 K, Nixxx standard: \pm 0.5 K, Nixxx climate: \pm 0.3 K Type B: > 600 °C \pm 4.6 K, type E: > -200 °C \pm 1.5 K, type J: > -210 °C \pm 1.9 K, type K: > -200 °C \pm 2.4 K, type N: > -200 °C \pm 2.9 K, type R: > 0 °C \pm 4.7 K, type S: > 0 °C \pm 4.6 K, type T: > -200 °C \pm 2.4 K
Basic error limit (operational limit at 25 °C)	
<ul style="list-style-type: none"> Voltage, relative to input range, (+/-) Current, relative to input range, (+/-) Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Thermocouple, relative to input range, (+/-) 	0.1 % 0.1 % 0.1 % Ptxxx standard: \pm 0.7 K, Ptxxx climate: \pm 0.2 K, Nixxx standard: \pm 0.3 K, Nixxx climate: \pm 0.15 K Type B: > 600 °C \pm 1.7 K, type E: > -200 °C \pm 0.7 K, type J: > -210 °C \pm 0.8 K, type K: > -200 °C \pm 1.2 K, type N: > -200 °C \pm 1.2 K, type R: > 0 °C \pm 1.9 K, type S: > 0 °C \pm 1.9 K, type T: > -200 °C \pm 0.8 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. 	40 dB 10 V 60 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 	Yes

<ul style="list-style-type: none"> • Wire-break • Overflow/underflow 	<p>Yes; Only for 1 to 5 V, 4 to 20 mA, TC, R, and RTD</p> <p>Yes</p>		
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 	<p>Yes; green LED</p> <p>Yes; red LED</p> <p>Yes; green LED</p> <p>Yes; green LED</p> <p>Yes; red LED</p> <p>Yes; red LED</p>		
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 	<p>No</p> <p>8</p> <p>Yes</p> <p>Yes</p>		
Permissible potential difference			
between the inputs (UCM)	20 V DC		
Between the inputs and MANA (UCM)	10 V DC		
Isolation			
Isolation tested with	707 V DC (type test)		
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) [CO2 eq]	38.6 kg		
— global warming potential, (during production) [CO2 eq]	14.4 kg		
— global warming potential, (during operation) [CO2 eq]	24.6 kg		
— global warming potential, (after end of life cycle) [CO2 eq]	-0.44 kg		
product functions / security / header			
signed firmware update	No		
data integrity	No		
Ambient conditions			
Ambient temperature during operation			
<ul style="list-style-type: none"> • horizontal installation, min. • horizontal installation, max. • vertical installation, min. • vertical installation, max. 	<p>-25 °C; From FS08</p> <p>60 °C</p> <p>-25 °C; From FS08</p> <p>40 °C</p>		
Altitude during operation relating to sea level			
<ul style="list-style-type: none"> • Installation altitude above sea level, max. 	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual		
Dimensions			
Width	35 mm		
Height	147 mm		
Depth	129 mm		
Weights			
Weight, approx.	310 g		
Other			
Note:	Additional basic error and noise for integration time = 2.5 ms: Voltage: ±250 mV (±0.02%), ±80 mV (±0.05%), ±50 mV (±0.05%); resistance: 150 ohms ±0.02%; resistance thermometer: Pt100 climate: ±0.08 K, Ni100 climate: ±0.08 K; thermocouple: Type B, R, S: ±3 K, type E, J, K, N, T: ±1 K		
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](#)

[Miscellaneous](#)



General Product Approval

For use in hazardous locations

[Metrological Approval](#)

[KC](#)



IECEX

[FM](#)



For use in hazardous locations

[FM](#)

[CCC-Ex](#)



ATEX

[Type Examination Certificate](#)



IECEX

[Miscellaneous](#)

Maritime application



ABS



DNV



LRS

[NK / Nippon Kaiji Kyokai](#)



RINA

Maritime application

Environment



RMRS

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



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