

SIPLUS S7-1500 AI 8xU//RTD/TC -40°C ... +70°C with conformal coating based on 6ES7531-7KF00-0AB0 . Analog input module 16 bit resolution, Accuracy 0.3%, 8 channels in "groups of 8, ""Common mode" "voltage 10 V;"" ""diagnostics;" "hardware interrupts"" incl." infeed element, Shield bracket and shield terminal



Figure similar

General information	
Product type designation	AI 8xU//RTD/TC ST
Product function	
• I&M data	Yes; I&M0 to I&M3
CiR – Configuration in RUN	
Reparameterization possible in RUN	Yes
Calibration possible in RUN	Yes
Supply voltage	
Type of supply voltage	DC
Rated value (DC)	24 V
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Encoder supply	
24 V encoder supply	
• Short-circuit protection	Yes
• Output current, max.	53 mA

Power	
Power available from the backplane bus	0.7 W
Power loss	
Power loss, typ.	2.7 W
Analog inputs	
Number of analog inputs	8; > +60 °C max. 2x ±20 mA or 4x ±10 V or 4x RTD permissible
<ul style="list-style-type: none"> • For current measurement 	8
<ul style="list-style-type: none"> • For voltage measurement 	8
<ul style="list-style-type: none"> • For resistance/resistance thermometer measurement 	4
<ul style="list-style-type: none"> • 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
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Input ranges (rated values), voltages	
<ul style="list-style-type: none"> • 1 V to 5 V 	Yes
<ul style="list-style-type: none"> • Input resistance (1 V to 5 V) 	100 kΩ
<ul style="list-style-type: none"> • -1 V to +1 V 	Yes
<ul style="list-style-type: none"> • Input resistance (-1 V to +1 V) 	10 MΩ
<ul style="list-style-type: none"> • -10 V to +10 V 	Yes
<ul style="list-style-type: none"> • Input resistance (-10 V to +10 V) 	100 kΩ
<ul style="list-style-type: none"> • -2.5 V to +2.5 V 	Yes
<ul style="list-style-type: none"> • Input resistance (-2.5 V to +2.5 V) 	10 MΩ
<ul style="list-style-type: none"> • -250 mV to +250 mV 	Yes
<ul style="list-style-type: none"> • Input resistance (-250 mV to +250 mV) 	10 MΩ
<ul style="list-style-type: none"> • -5 V to +5 V 	Yes
<ul style="list-style-type: none"> • Input resistance (-5 V to +5 V) 	100 kΩ
<ul style="list-style-type: none"> • -50 mV to +50 mV 	Yes
<ul style="list-style-type: none"> • Input resistance (-50 mV to +50 mV) 	10 MΩ
<ul style="list-style-type: none"> • -500 mV to +500 mV 	Yes
<ul style="list-style-type: none"> • Input resistance (-500 mV to +500 mV) 	10 MΩ
<ul style="list-style-type: none"> • -80 mV to +80 mV 	Yes
<ul style="list-style-type: none"> • Input resistance (-80 mV to +80 mV) 	10 MΩ
Input ranges (rated values), currents	
<ul style="list-style-type: none"> • 0 to 20 mA 	Yes
<ul style="list-style-type: none"> • Input resistance (0 to 20 mA) 	25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
<ul style="list-style-type: none"> • -20 mA to +20 mA 	Yes
<ul style="list-style-type: none"> • 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 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 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
Input ranges (rated values), resistance thermometer	
• Ni 100	Yes; Standard/climate
• Input resistance (Ni 100)	10 MΩ
• Ni 1000	Yes; Standard/climate
• Input resistance (Ni 1000)	10 MΩ
• LG-Ni 1000	Yes; Standard/climate
• Input resistance (LG-Ni 1000)	10 MΩ
• Pt 100	Yes; Standard/climate
• Input resistance (Pt 100)	10 MΩ
• Pt 1000	Yes; Standard/climate
• Input resistance (Pt 1000)	10 MΩ
• Pt 200	Yes; Standard/climate
• Input resistance (Pt 200)	10 MΩ
• Pt 500	Yes; Standard/climate
• Input resistance (Pt 500)	10 MΩ
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 6000 ohms	Yes
• Input resistance (0 to 6000 ohms)	10 MΩ
• PTC	Yes
• Input resistance (PTC)	10 MΩ

Thermocouple (TC)

Temperature compensation	
— external temperature compensation via RTD	Yes
— Compensation for 0 °C reference point temperature	Yes; fixed value can be set

Cable length

• shielded, max.	800 m; for U/I, 200 m for R/RTD, 50 m for TC
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Encoder

Connection of signal encoders

• for voltage measurement	Yes
• for current measurement as 2-wire transducer	Yes
— Burden of 2-wire transmitter, max.	820 Ω
• for current measurement as 4-wire transducer	Yes
• for resistance measurement with two-wire connection	Yes; Only for PTC
• 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; With TC type T 0.02 ± % / K
Crosstalk between the inputs, min.	-80 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.02 %

Operational error limit in overall temperature range

• Voltage, relative to input range, (+/-)	0.5 %
• Current, relative to input range, (+/-)	0.5 %
• Resistance, relative to input range, (+/-)	0.5 %
• Resistance thermometer, relative to input range, (+/-)	Ptxxx standard: ±1.5 K, Ptxxx climate: ±0.5 K, Nixxx standard: ±0.5 K, Nixxx climate: ±0.3 K
• Thermocouple, relative to input range, (+/-)	Type B: > 600 °C ±4.6 K, type E: > -200 °C ±1.5 K, type J: > -210 °C ±1.9 K, type K: > -200 °C ±2.4 K, type N: > -200 °C ±2.9 K, type R: > 0 °C ±4.7 K, type S: > 0 °C ±4.6 K, type T: > -200 °C ±2.4 K

Basic error limit (operational limit at 25 °C)

• Voltage, relative to input range, (+/-)	0.1 %
• Current, relative to input range, (+/-)	0.1 %

<ul style="list-style-type: none"> • Resistance, relative to input range, (+/-) • Resistance thermometer, relative to input range, (+/-) • Thermocouple, relative to input range, (+/-) 	<p>0.1 %</p> <p>Ptxxx standard: ± 0.7 K, Ptxxx climate: ± 0.2 K, Nixxx standard: ± 0.3 K, Nixxx climate: ± 0.15 K</p> <p>Type B: > 600 °C ± 1.7 K, type E: > -200 °C ± 0.7 K, type J: > -210 °C ± 0.8 K, type K: > -200 °C ± 1.2 K, type N: > -200 °C ± 1.2 K, type R: > 0 °C ± 1.9 K, type S: > 0 °C ± 1.9 K, type T: > -200 °C ± 0.8 K</p>
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. 	<p>40 dB</p> <p>10 V</p> <p>60 dB</p>

Interrupts/diagnostics/status information

Diagnostics function	Yes
Alarms	
<ul style="list-style-type: none"> • Diagnostic alarm • Limit value alarm 	<p>Yes</p> <p>Yes; two upper and two lower limit values in each case</p>
Diagnostic messages	
<ul style="list-style-type: none"> • Monitoring the supply voltage • Wire-break • Overflow/underflow 	<p>Yes</p> <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
between M internally and the inputs	75 V DC/60 V AC (base isolation)

Isolation

Isolation tested with	707 V DC (type test)
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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>-40 °C; = Tmin (incl. condensation/frost)</p> <p>70 °C; = Tmax</p> <p>-40 °C; = Tmin</p> <p>40 °C; = Tmax</p>
Altitude during operation relating to sea level	
<ul style="list-style-type: none"> • Installation altitude above sea level, max. • Ambient air temperature-barometric pressure-altitude 	<p>5 000 m</p> <p>Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m) // Tmin ... (Tmax - 10 K) at 795 hPa ... 658 hPa (+2 000 m ... +3 500 m) // Tmin ... (Tmax -20 K) at 658 hPa ... 540 hPa (+3 500 m ... +5 000 m)</p>
Relative humidity	
<ul style="list-style-type: none"> • With condensation, tested in accordance with IEC 60068-2-38, max. 	<p>100 %; RH incl. condensation/frost (no commissioning under condensation conditions)</p>
Resistance	
Coolants and lubricants	
<ul style="list-style-type: none"> — Resistant to commercially available coolants and lubricants 	<p>Yes; Incl. diesel and oil droplets in the air</p>
Use in stationary industrial systems	
<ul style="list-style-type: none"> — to biologically active substances according to EN 60721-3-3 — to chemically active substances according to EN 60721-3-3 — to mechanically active substances according to EN 60721-3-3 	<p>Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request</p> <p>Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *</p> <p>Yes; Class 3S4 incl. sand, dust; *</p>
Use on ships/at sea	
<ul style="list-style-type: none"> — to biologically active substances according to EN 60721-3-6 — to chemically active substances according to EN 60721-3-6 — to mechanically active substances according to EN 60721-3-6 	<p>Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request</p> <p>Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *</p> <p>Yes; Class 6S3 incl. sand, dust; *</p>
Usage in industrial process technology	
<ul style="list-style-type: none"> — Against chemically active substances acc. to EN 60654-4 — Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04 	<p>Yes; Class 3 (excluding trichlorethylene)</p> <p>Yes; Level GX group A/B (excluding trichlorethylene; harmful gas concentrations up to the limits of EN 60721-3-3 class 3C4 permissible); level LC3 (salt spray) and level LB3 (oil)</p>
Remark	
<ul style="list-style-type: none"> — Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04 	<p>* The supplied plug covers must remain in place over the unused interfaces during operation!</p>
Conformal coating	

- Coatings for printed circuit board assemblies acc. to EN 61086
- Protection against fouling acc. to EN 60664-3
- Military testing according to MIL-I-46058C, Amendment 7
- Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A

Yes; Class 2 for high availability

Yes; Type 1 protection

Yes; Discoloration of coating possible during service life

Yes; Conformal coating, Class A

Dimensions

Width	35 mm
Height	147 mm
Depth	129 mm

Weights

Weight, approx.	200 g
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Other

Note:	Additional basic error and noise for integration time = 2.5 ms: Voltage: ± 250 mV ($\pm 0.02\%$), ± 80 mV ($\pm 0.05\%$), ± 50 mV ($\pm 0.05\%$); resistance: 150 ohms $\pm 0.02\%$; 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
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