



Figure similar

SIPLUS S7-1500 AI 8xU/I/RTD/TC based on 6ES7531-7KF00-0AB0 with conformal coating, -40...+70 °C, analog input module 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 including infeed element, shielding bracket and shield terminal

General information	
Product type designation	AI 8xU/I/RTD/TC ST
Product function	
<ul style="list-style-type: none"> I&M data 	Yes; I&M0 to I&M3
Engineering with	
<ul style="list-style-type: none"> STEP 7 TIA Portal configurable/integrated from version 	see entry ID: 109746275
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
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. 	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 <ul style="list-style-type: none"> — Input resistance (1 V to 5 V) -1 V to +1 V <ul style="list-style-type: none"> — Input resistance (-1 V to +1 V) 	Yes 100 kΩ Yes 10 MΩ

<ul style="list-style-type: none"> ● -10 V to +10 V <ul style="list-style-type: none"> — Input resistance (-10 V to +10 V) ● -2.5 V to +2.5 V <ul style="list-style-type: none"> — Input resistance (-2.5 V to +2.5 V) ● -250 mV to +250 mV <ul style="list-style-type: none"> — Input resistance (-250 mV to +250 mV) ● -5 V to +5 V <ul style="list-style-type: none"> — Input resistance (-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) 	<p>Yes</p> <p>100 kΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>100 kΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p>
Input ranges (rated values), currents	
<ul style="list-style-type: none"> ● 0 to 20 mA <ul style="list-style-type: none"> — Input resistance (0 to 20 mA) ● -20 mA to +20 mA <ul style="list-style-type: none"> — Input resistance (-20 mA to +20 mA) ● 4 mA to 20 mA <ul style="list-style-type: none"> — Input resistance (4 mA to 20 mA) 	<p>Yes</p> <p>25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC</p> <p>Yes</p> <p>25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC</p> <p>Yes</p> <p>25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC</p>
Input ranges (rated values), thermocouples	
<ul style="list-style-type: none"> ● Type B <ul style="list-style-type: none"> — Input resistance (Type B) ● 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 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) 	<p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p>
Input ranges (rated values), resistance thermometer	
<ul style="list-style-type: none"> ● Ni 100 <ul style="list-style-type: none"> — Input resistance (Ni 100) ● Ni 1000 <ul style="list-style-type: none"> — Input resistance (Ni 1000) ● LG-Ni 1000 <ul style="list-style-type: none"> — Input resistance (LG-Ni 1000) ● Pt 100 <ul style="list-style-type: none"> — Input resistance (Pt 100) ● Pt 1000 <ul style="list-style-type: none"> — Input resistance (Pt 1000) ● Pt 200 <ul style="list-style-type: none"> — Input resistance (Pt 200) ● Pt 500 <ul style="list-style-type: none"> — Input resistance (Pt 500) 	<p>Yes; Standard/climate</p> <p>10 MΩ</p> <p>Yes; Standard/climate</p> <p>10 MΩ</p> <p>Yes; Standard/climate</p> <p>10 MΩ</p> <p>Yes; Standard/climate</p> <p>10 MΩ</p> <p>Yes; Standard/climate</p> <p>10 MΩ</p> <p>Yes; Standard/climate</p> <p>10 MΩ</p> <p>Yes; Standard/climate</p> <p>10 MΩ</p>
Input ranges (rated values), resistors	
<ul style="list-style-type: none"> ● 0 to 150 ohms <ul style="list-style-type: none"> — Input resistance (0 to 150 ohms) ● 0 to 300 ohms <ul style="list-style-type: none"> — Input resistance (0 to 300 ohms) ● 0 to 600 ohms <ul style="list-style-type: none"> — Input resistance (0 to 600 ohms) 	<p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p> <p>Yes</p> <p>10 MΩ</p>

<ul style="list-style-type: none"> • 0 to 6000 ohms <ul style="list-style-type: none"> — Input resistance (0 to 6000 ohms) • PTC <ul style="list-style-type: none"> — Input resistance (PTC) 	Yes 10 M Ω Yes 10 M Ω
Thermocouple (TC)	
Temperature compensation	
<ul style="list-style-type: none"> — external temperature compensation via RTD — Compensation for 0 °C reference point temperature 	Yes Yes; fixed value can be set
Cable length	
<ul style="list-style-type: none"> • 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. 	16 bit
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, min.	-80 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.02 %
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, (+/-) 	0.5 % 0.5 % 0.5 % 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
between M internally and the inputs	75 V DC/60 V AC (base isolation)
Isolation	
Isolation tested with	707 V DC (type test)
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. 	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
Coolants and lubricants	
— Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
Use in stationary industrial systems	
— to biologically active substances according to EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna); Class 3B3 on request
— to chemically active substances according to EN 60721-3-3	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-3	Yes; Class 3S4 incl. sand, dust, *
Use on ships/at sea	
— to biologically active substances according to EN 60721-3-6	Yes; Class 6B2 mold and fungal spores (excluding fauna); Class 6B3 on request
— to chemically active substances according to EN 60721-3-6	Yes; Class 6C3 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity degree 3); *
— to mechanically active substances according to EN 60721-3-6	Yes; Class 6S3 incl. sand, dust; *
Usage in industrial process technology	
— Against chemically active substances acc. to EN 60654-4	Yes; Class 3 (excluding trichlorethylene)
— Environmental conditions for process, measuring and control systems acc. to ANSI/ISA-71.04	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)
Remark	
— Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and	* The supplied plug covers must remain in place over the unused interfaces during operation!

Conformal coating	
<ul style="list-style-type: none"> • 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 	<p>Yes; Class 2 for high reliability</p> <p>Yes; Type 1 protection</p> <p>Yes; Discoloration of coating possible during service life</p> <p>Yes; Conformal coating, Class A</p>
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	200 g
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
last modified:	11/11/2021 