



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
Firmware version	
• FW update possible	Yes
based on	<a href="#">6ES7531-7KF00-0AB0</a>
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	No
• Prioritized startup	No
• Measuring range scalable	No
• Scalable measured values	No
• Adjustment of measuring range	No
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	see entry ID: 109746275
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.	255 mA; with 19.2 V supply
Encoder supply	
24 V encoder supply	
• Short-circuit protection	Yes
• 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; > +60 °C max. 2x ±20 mA or 4x ±10 V or 4x RTD permissible
• For current measurement	8

<ul style="list-style-type: none"> <li>• For voltage measurement</li> </ul>	8
<ul style="list-style-type: none"> <li>• For resistance/resistance thermometer measurement</li> </ul>	4
<ul style="list-style-type: none"> <li>• For thermocouple measurement</li> </ul>	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
<b>Input ranges (rated values), voltages</b>	
<ul style="list-style-type: none"> <li>• 0 to +5 V</li> </ul>	No
<ul style="list-style-type: none"> <li>• 0 to +10 V</li> </ul>	No
<ul style="list-style-type: none"> <li>• 1 V to 5 V <ul style="list-style-type: none"> <li>— Input resistance (1 V to 5 V)</li> </ul> </li> </ul>	Yes 100 kΩ
<ul style="list-style-type: none"> <li>• -1 V to +1 V <ul style="list-style-type: none"> <li>— Input resistance (-1 V to +1 V)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• -10 V to +10 V <ul style="list-style-type: none"> <li>— Input resistance (-10 V to +10 V)</li> </ul> </li> </ul>	Yes 100 kΩ
<ul style="list-style-type: none"> <li>• -2.5 V to +2.5 V <ul style="list-style-type: none"> <li>— Input resistance (-2.5 V to +2.5 V)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• -25 mV to +25 mV</li> </ul>	No
<ul style="list-style-type: none"> <li>• -250 mV to +250 mV <ul style="list-style-type: none"> <li>— Input resistance (-250 mV to +250 mV)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• -5 V to +5 V <ul style="list-style-type: none"> <li>— Input resistance (-5 V to +5 V)</li> </ul> </li> </ul>	Yes 100 kΩ
<ul style="list-style-type: none"> <li>• -50 mV to +50 mV <ul style="list-style-type: none"> <li>— Input resistance (-50 mV to +50 mV)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• -500 mV to +500 mV <ul style="list-style-type: none"> <li>— Input resistance (-500 mV to +500 mV)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• -80 mV to +80 mV <ul style="list-style-type: none"> <li>— Input resistance (-80 mV to +80 mV)</li> </ul> </li> </ul>	Yes 10 MΩ
<b>Input ranges (rated values), currents</b>	
<ul style="list-style-type: none"> <li>• 0 to 20 mA <ul style="list-style-type: none"> <li>— Input resistance (0 to 20 mA)</li> </ul> </li> </ul>	Yes 25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
<ul style="list-style-type: none"> <li>• -20 mA to +20 mA <ul style="list-style-type: none"> <li>— Input resistance (-20 mA to +20 mA)</li> </ul> </li> </ul>	Yes 25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
<ul style="list-style-type: none"> <li>• 4 mA to 20 mA <ul style="list-style-type: none"> <li>— Input resistance (4 mA to 20 mA)</li> </ul> </li> </ul>	Yes 25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
<b>Input ranges (rated values), thermocouples</b>	
<ul style="list-style-type: none"> <li>• type B <ul style="list-style-type: none"> <li>— Input resistance (Type B)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• type C</li> </ul>	No
<ul style="list-style-type: none"> <li>• Type E <ul style="list-style-type: none"> <li>— Input resistance (Type E)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• Type J <ul style="list-style-type: none"> <li>— Input resistance (type J)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• Type K <ul style="list-style-type: none"> <li>— Input resistance (Type K)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• Type L</li> </ul>	No
<ul style="list-style-type: none"> <li>• Type N <ul style="list-style-type: none"> <li>— Input resistance (Type N)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• Type R <ul style="list-style-type: none"> <li>— Input resistance (Type R)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• Type S <ul style="list-style-type: none"> <li>— Input resistance (Type S)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• Type T <ul style="list-style-type: none"> <li>— Input resistance (Type T)</li> </ul> </li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>• Type TXK/TXK(L) to GOST</li> </ul>	No
<b>Input ranges (rated values), resistance thermometer</b>	

• 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
<b>Input ranges (rated values), resistors</b>	
• 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
<b>Thermocouple (TC)</b>	
<b>Temperature compensation</b>	
— 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
<b>Cable length</b>	
• shielded, max.	800 m; for U/I, 200 m for R/RTD, 50 m for TC
<b>Analog value generation for the inputs</b>	

<b>Integration and conversion time/resolution per channel</b>	
<ul style="list-style-type: none"> <li>Resolution with overrange (bit including sign), max.</li> </ul>	16 bit
<ul style="list-style-type: none"> <li>Integration time, parameterizable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Integration time (ms)</li> </ul>	2,5 / 16,67 / 20 / 100 ms
<ul style="list-style-type: none"> <li>Basic conversion time, including integration time (ms)</li> </ul>	9 / 23 / 27 / 107 ms
<ul style="list-style-type: none"> <li>— additional conversion time for wire-break monitoring</li> </ul>	9 ms (to be considered in R/RTD/TC measurement)
<ul style="list-style-type: none"> <li>— additional conversion time for resistance measurement</li> </ul>	150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms, 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms
<ul style="list-style-type: none"> <li>Interference voltage suppression for interference frequency f1 in Hz</li> </ul>	400 / 60 / 50 / 10 Hz
<ul style="list-style-type: none"> <li>Time for offset calibration (per module)</li> </ul>	Basic conversion time of the slowest channel
<b>Smoothing of measured values</b>	
<ul style="list-style-type: none"> <li>parameterizable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Step: None</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Step: low</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Step: Medium</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Step: High</li> </ul>	Yes
<b>Encoder</b>	
<b>Connection of signal encoders</b>	
<ul style="list-style-type: none"> <li>for voltage measurement</li> </ul>	Yes
<ul style="list-style-type: none"> <li>for current measurement as 2-wire transducer</li> </ul>	Yes
<ul style="list-style-type: none"> <li>— Burden of 2-wire transmitter, max.</li> </ul>	820 Ω
<ul style="list-style-type: none"> <li>for current measurement as 4-wire transducer</li> </ul>	Yes
<ul style="list-style-type: none"> <li>for resistance measurement with two-wire connection</li> </ul>	Yes; Only for PTC
<ul style="list-style-type: none"> <li>for resistance measurement with three-wire connection</li> </ul>	Yes; All measuring ranges except PTC; internal compensation of the cable resistances
<ul style="list-style-type: none"> <li>for resistance measurement with four-wire connection</li> </ul>	Yes; All measuring ranges except PTC
<b>Errors/accuracies</b>	
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, max.	-80 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.02 %
Temperature error of internal compensation	±6 °C
<b>Operational error limit in overall temperature range</b>	
<ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> </ul>	0.4 %
<ul style="list-style-type: none"> <li>Current, relative to input range, (+/-)</li> </ul>	0.4 %
<ul style="list-style-type: none"> <li>Resistance, relative to input range, (+/-)</li> </ul>	0.4 %
<ul style="list-style-type: none"> <li>Resistance thermometer, relative to input range, (+/-)</li> </ul>	Ptxxx standard: ±1.5 K, Ptxxx climate: ±0.5 K, Nixxx standard: ±0.5 K, Nixxx climate: ±0.3 K
<ul style="list-style-type: none"> <li>Thermocouple, relative to input range, (+/-)</li> </ul>	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
<b>Basic error limit (operational limit at 25 °C)</b>	
<ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> </ul>	0.1 %
<ul style="list-style-type: none"> <li>Current, relative to input range, (+/-)</li> </ul>	0.1 %
<ul style="list-style-type: none"> <li>Resistance, relative to input range, (+/-)</li> </ul>	0.1 %
<ul style="list-style-type: none"> <li>Resistance thermometer, relative to input range, (+/-)</li> </ul>	Ptxxx standard: ±0.7 K, Ptxxx climate: ±0.2 K, Nixxx standard: ±0.3 K, Nixxx climate: ±0.15 K
<ul style="list-style-type: none"> <li>Thermocouple, relative to input range, (+/-)</li> </ul>	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
<b>Interference voltage suppression for <math>f = n \times (f1 \pm 1 \%)</math>, f1 = interference frequency</b>	
<ul style="list-style-type: none"> <li>Series mode interference (peak value of interference &lt; rated value of input range), min.</li> </ul>	40 dB
<ul style="list-style-type: none"> <li>Common mode voltage, max.</li> </ul>	10 V
<ul style="list-style-type: none"> <li>Common mode interference, min.</li> </ul>	60 dB
<b>Interrupts/diagnostics/status information</b>	
Diagnostics function	Yes
<b>Alarms</b>	
<ul style="list-style-type: none"> <li>Diagnostic alarm</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Limit value alarm</li> </ul>	Yes; two upper and two lower limit values in each case

<b>Diagnoses</b>	
• Monitoring the supply voltage	Yes
• Wire break	Yes; Only for 1 to 5 V, 4 to 20 mA, TC, R, and RTD
• Overflow/Underflow	Yes
<b>Diagnostics indication LED</b>	
• 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
<b>Potential separation</b>	
<b>Potential separation channels</b>	
• between the channels	No
• between the channels, in groups of	8
• between the channels and backplane bus	Yes
• between the channels and the power supply of the electronics	Yes
<b>Permissible potential difference</b>	
between the inputs (UCM)	20 V DC
Between the inputs and MANA (UCM)	10 V DC
<b>Isolation</b>	
Isolation tested with	707 V DC (type test)
<b>Standards, approvals, certificates</b>	
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
<b>Ecological footprint</b>	
• environmental product declaration	Yes
<b>Global warming potential</b>	
— 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
<b>Security</b>	
signed firmware update	No
data integrity	No
<b>Ambient conditions</b>	
<b>Ambient temperature during operation</b>	
• horizontal installation, min.	-40 °C; = Tmin (incl. condensation/frost)
• horizontal installation, max.	70 °C; = Tmax
• vertical installation, min.	-40 °C; = Tmin
• vertical installation, max.	40 °C; = Tmax
<b>Altitude during operation relating to sea level</b>	
• Installation altitude above sea level, max.	5 000 m
• Ambient air temperature-barometric pressure-altitude	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)
<b>Relative humidity</b>	
• With condensation, tested in accordance with IEC 60068-2-38, max.	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
<b>Resistance</b>	
<b>Coolants and lubricants</b>	
— Resistant to commercially available coolants and lubricants	Yes; Incl. diesel and oil droplets in the air
<b>Use in stationary industrial systems</b>	
— 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	Yes; Class 3C4 (RH < 75 %) incl. salt spray acc. to EN 60068-2-52 (severity

60721-3-3 — to mechanically active substances according to EN 60721-3-3	degree 3); * Yes; Class 3S4 incl. sand, dust, *	
<b>Use on ships/at sea</b>		
— 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; *	
<b>Usage in industrial process technology</b>		
— 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)	
<b>Remark</b>		
— Note regarding classification of environmental conditions acc. to EN 60721, EN 60654-4 and ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!	
<b>Conformal coating</b>		
• Coatings for printed circuit board assemblies acc. to EN 61086	Yes; Class 2 for high reliability	
• Protection against fouling acc. to EN 60664-3	Yes; Type 1 protection	
• Military testing according to MIL-I-46058C, Amendment 7	Yes; Discoloration of coating possible during service life	
• Qualification and Performance of Electrical Insulating Compound for Printed Board Assemblies according to IPC-CC-830A	Yes; Conformal coating, Class A	
<b>Dimensions</b>		
Width	35 mm	
Height	147 mm	
Depth	129 mm	
<b>Weights</b>		
Weight, approx.	310 g	
<b>Other</b>		
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	
<b>Classifications</b>		
	<b>Version</b>	<b>Classification</b>
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
<b>Approvals / Certificates</b>		
<b>General Product Approval</b>		



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[Manufacturer Declaration](#)



General Product Approval	EMV	For use in hazardous locations
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For use in hazardous locations	Maritime application	Environment
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