

SIPLUS S7-1500 AI 8XU/R/RTD/TC HF 0 ... +60 °C with conformal coating Based on: 6ES7531-7PF00-0AB0 . Analog Input Module AI 8 X U/R/RTD/TC HF, 16 BITS OF RESOLUTION, Accuracy 0.1%, 8 Channels in groups of 1; common mode Voltage: 30 V AC/60 V DC, Diagnosis, Process alarms; incl. infeed element, Shield clamp and Shield terminal



Figure similar

General information	
Product type designation	AI 8xU/R/RTD/TC HF
Firmware version	
<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"> Measuring range scalable 	Yes
<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"> PROFIBUS as of GSD version/GSD revision 	V1.0 / V5.1
<ul style="list-style-type: none"> PROFINET as of 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)	20.4 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 available 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
<ul style="list-style-type: none"> • For voltage measurement • For resistance/resistance thermometer measurement • For thermocouple measurement 	8; Plus one additional RTD (reference) channel 8; Plus one additional RTD (reference) channel 8; Plus one additional RTD (reference) channel
permissible input voltage for voltage input (destruction limit), max.	20 V
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Input ranges (rated values), voltages	
<ul style="list-style-type: none"> • 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 	No No No Yes 10 MΩ No No Yes 10 MΩ Yes 10 MΩ No Yes 10 MΩ Yes 10 MΩ Yes

• Input resistance (-80 mV to +80 mV)	10 MΩ
Input ranges (rated values), currents	
• 0 to 20 mA	No
• -20 mA to +20 mA	No
• 4 mA to 20 mA	No
Input ranges (rated values), thermocouples	
• Type B	Yes
• Input resistance (Type B)	10 MΩ
• Type C	Yes
• Input resistance (Type C)	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 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	Yes
• Input resistance (Type TXK/TXK(L) to GOST)	10 MΩ
Input ranges (rated values), resistance thermometer	
• Cu 10	Yes; Standard/climate
• Input resistance (Cu 10)	10 MΩ
• Cu 10 according to GOST	Yes; Standard/climate
• Input resistance (Cu 10 according to GOST)	10 MΩ
• Cu 50	Yes; Standard/climate
• Input resistance (Cu 50)	10 MΩ
• Cu 50 according to GOST	Yes; Standard/climate
• Input resistance (Cu 50 according to GOST)	10 MΩ
• Cu 100	Yes; Standard/climate
• Input resistance (Cu 100)	10 MΩ
• Cu 100 according to GOST	Yes; Standard/climate
• Input resistance (Cu 100 according to GOST)	10 MΩ
• Ni 10	Yes; Standard/climate

• Input resistance (Ni 10)	10 MΩ
• Ni 10 according to GOST	Yes; Standard/climate
• Input resistance (Ni 10 according to GOST)	10 MΩ
• Ni 100	Yes; Standard/climate
• Input resistance (Ni 100)	10 MΩ
• Ni 100 according to GOST	Yes; Standard/climate
• Input resistance (Ni 100 according to GOST)	10 MΩ
• Ni 1000	Yes; Standard/climate
• Input resistance (Ni 1000)	10 MΩ
• Ni 1000 according to GOST	Yes; Standard/climate
• Input resistance (Ni 1000 according to GOST)	10 MΩ
• LG-Ni 1000	Yes; Standard/climate
• Input resistance (LG-Ni 1000)	10 MΩ
• Ni 120	Yes; Standard/climate
• Input resistance (Ni 120)	10 MΩ
• Ni 120 according to GOST	Yes; Standard/climate
• Input resistance (Ni 120 according to GOST)	10 MΩ
• Ni 200	Yes; Standard/climate
• Input resistance (Ni 200)	10 MΩ
• Ni 200 according to GOST	Yes; Standard/climate
• Input resistance (Ni 200 according to GOST)	10 MΩ
• Ni 500	Yes; Standard/climate
• Input resistance (Ni 500)	10 MΩ
• Ni 500 according to GOST	Yes; Standard/climate
• Input resistance (Ni 500 according to GOST)	10 MΩ
• Pt 10	Yes; Standard/climate
• Input resistance (Pt 10)	10 MΩ
• Pt 10 according to GOST	Yes; Standard/climate
• Input resistance (Pt 10 according to GOST)	10 MΩ
• Pt 50	Yes; Standard/climate
• Input resistance (Pt 50)	10 MΩ
• Pt 50 according to GOST	Yes; Standard/climate
• Input resistance (Pt 50 according to GOST)	10 MΩ
• Pt 100	Yes; Standard/climate
• Input resistance (Pt 100)	10 MΩ
• Pt 100 according to GOST	Yes; Standard/climate
• Input resistance (Pt 100 according to GOST)	10 MΩ
• Pt 1000	Yes; Standard/climate
• Input resistance (Pt 1000)	10 MΩ
• Pt 1000 according to GOST	Yes; Standard/climate
• Input resistance (Pt 1000 according to GOST)	10 MΩ

• Pt 200	Yes; Standard/climate
• Input resistance (Pt 200)	10 MΩ
• Pt 200 according to GOST	Yes; Standard/climate
• Input resistance (Pt 200 according to GOST)	10 MΩ
• Pt 500	Yes; Standard/climate
• Input resistance (Pt 500)	10 MΩ
• Pt 500 according to GOST	Yes; Standard/climate
• Input resistance (Pt 500 according to GOST)	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 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; 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.	16 bit
• Integration time, parameterizable	Yes
• Integration time (ms)	Fast mode: 2.5 / 16.67 / 20 / 100 ms, standard mode: 7.5 / 50 / 60 / 300 ms
• Basic conversion time, including integration time (ms)	Fast mode: 4 / 18 / 22 / 102 ms; Standard mode: 9 / 52 / 62 / 302 ms

— additional conversion time for wire-break monitoring

Thermocouples, 150 Ohm, 300 Ohm, 600 Ohm, Cu10, Cu50, Cu100, Ni10, Ni50, Ni100, Ni120, Ni200, Pt10, Pt50, Pt100, Pt200: 4 ms; 6 kOhm, Ni500, Ni1000, LG-Ni1000, Pt500, Pt1000: 13 ms
400 / 60 / 50 / 10 Hz

- Interference voltage suppression for interference frequency f_1 in Hz
- Basic execution time of the module (all channels released)

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, (+/-) 0.1 %
- Resistance, relative to input range, (+/-) 0.1 %
- Resistance thermometer, relative to input range, (+/-)
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
- Thermocouple, relative to input range, (+/-)
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, (+/-) 0.05 %

<ul style="list-style-type: none"> Resistance, relative to input range, (+/-) Resistance thermometer, relative to input range, (+/-) Thermocouple, relative to input range, (+/-) 	<p>0.05 %</p> <p>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</p> <p>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</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>80 dB; in the Standard operating mode, 40 dB in the Fast operating mode</p> <p>60 V DC/30 V AC</p> <p>80 dB</p>
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
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 with TC, R, 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>Yes</p> <p>1</p> <p>Yes</p> <p>Yes</p>
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
Ambient conditions	
Ambient temperature during operation	
<ul style="list-style-type: none"> • horizontal installation, min. • horizontal installation, max. • vertical installation, min. • vertical installation, max. 	0 °C 60 °C 0 °C 40 °C
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 	5 000 m 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)
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 in bedewed state), horizontal installation
Resistance	
Coolants and lubricants	
— Resistant to commercially available coolants and lubricants	Yes
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; *
from supply voltage 1L+	
— Note regarding classification of environmental conditions acc. to EN 60721	* The supplied plug covers must remain in place over the unused interfaces during operation!
Decentralized operation	
Prioritized startup	Yes
Dimensions	

Width	35 mm
Height	147 mm
Depth	129 mm

Weights

Weight, approx.	290 g
-----------------	-------

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.

last modified: 05/16/2018