

SIPLUS S7-1500 AI 8xU/I HS TX RAIL -40 ... +70°C TX with 85°C for 10 min with conformal coating based on 6ES7531-7NF10-0AB0 . 16 Bits of Resolution, Accuracy 0.3 "Percent; 8 Channels in Groups" "of 8; Common Mode Voltage" "Appr.10V; Diagnosis," "Processalarms; 8 Channels in" 0.0625 ms incl. Infeed element, Shield Clamp and Shield Terminal



General information	
Product type designation	AI 8xU/I HS
Firmware version	
<ul style="list-style-type: none"> FW update possible 	Yes
Product function	
<ul style="list-style-type: none"> I&M data Isochronous mode Prioritized startup Measuring range scalable Scalable measured values Adjustment of measuring range 	Yes; I&M0 to I&M3 Yes Yes No No No
Operating mode	
<ul style="list-style-type: none"> Oversampling MSI 	Yes Yes
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
Reverse polarity protection	Yes

Input current

Current consumption, max.	240 mA; with 24 V DC 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 available from the backplane bus	1.15 W
--	--------

Power loss

Power loss, typ.	3.4 W
------------------	-------

Analog inputs

Number of analog inputs	8; > +60 °C max. 4x ±20 mA or 4x ±10 V permissible
<ul style="list-style-type: none"> • For current measurement 	8
<ul style="list-style-type: none"> • For voltage 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

Input ranges (rated values), voltages

<ul style="list-style-type: none"> • 0 to +5 V 	No
<ul style="list-style-type: none"> • 0 to +10 V 	No
<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) 	50 kΩ
<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 	No
<ul style="list-style-type: none"> • -25 mV to +25 mV 	No
<ul style="list-style-type: none"> • -250 mV to +250 mV 	No
<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) 	50 kΩ
<ul style="list-style-type: none"> • -50 mV to +50 mV 	No
<ul style="list-style-type: none"> • -500 mV to +500 mV 	No
<ul style="list-style-type: none"> • -80 mV to +80 mV 	No

Input ranges (rated values), currents

<ul style="list-style-type: none"> • 0 to 20 mA 	Yes
--	-----

- Input resistance (0 to 20 mA)
- -20 mA to +20 mA
 - Input resistance (-20 mA to +20 mA)
- 4 mA to 20 mA
 - Input resistance (4 mA to 20 mA)

41 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
 Yes
 41 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
 Yes
 41 Ω; Plus approx. 42 ohms for overvoltage protection by PTC

Input ranges (rated values), thermocouples

- Type B
- Type C
- Type E
- Type J
- Type K
- Type L
- Type N
- Type R
- Type S
- Type T
- Type TXK/TXK(L) to GOST

No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No

Input ranges (rated values), resistance thermometer

- Cu 10
- Cu 10 according to GOST
- Cu 50
- Cu 50 according to GOST
- Cu 100
- Cu 100 according to GOST
- Ni 10
- Ni 10 according to GOST
- Ni 100
- Ni 100 according to GOST
- Ni 1000
- Ni 1000 according to GOST
- LG-Ni 1000
- Ni 120
- Ni 120 according to GOST
- Ni 200
- Ni 200 according to GOST
- Ni 500
- Ni 500 according to GOST
- Pt 10
- Pt 10 according to GOST
- Pt 50
- Pt 50 according to GOST

No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No
 No

• Pt 100	No
• Pt 100 according to GOST	No
• Pt 1000	No
• Pt 1000 according to GOST	No
• Pt 200	No
• Pt 200 according to GOST	No
• Pt 500	No
• Pt 500 according to GOST	No
Input ranges (rated values), resistors	
• 0 to 150 ohms	No
• 0 to 300 ohms	No
• 0 to 600 ohms	No
• 0 to 3000 ohms	No
• 0 to 6000 ohms	No
• PTC	No
Cable length	
• shielded, max.	800 m
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Basic execution time of the module (all channels released)	62.5 µs; independent of number of activated channels
Smoothing of measured values	
• parameterizable	Yes
• Step: None	Yes
• Step: low	Yes
• Step: Medium	Yes
• Step: High	Yes
Encoder	
Connection of signal encoders	
• for voltage measurement	Yes
• for current measurement as 2-wire transducer — Burden of 2-wire transmitter, max.	Yes 820 Ω
• for current measurement as 4-wire transducer	Yes
• for resistance measurement with two-wire connection	No
• for resistance measurement with three-wire connection	No
• for resistance measurement with four-wire connection	No

Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.02 %
Temperature error (relative to input range), (+/-)	0.005 %/K
Crosstalk between the inputs, max.	-60 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, (+/-)	0.6 %
• Current, relative to input range, (+/-)	0.6 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.2 %
• Current, relative to input range, (+/-)	0.2 %
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, $f_1 =$ interference frequency	
• Common mode voltage, max.	10 V
• Common mode interference, min.	50 dB at 400 Hz; 60 dB at 60 / 50 / 10 Hz
Isochronous mode	
Filtering and processing time (TCI), min.	80 μ s
Bus cycle time (TDP), min.	250 μ s
Interrupts/diagnostics/status information	
Diagnostics function	Yes
Alarms	
• Diagnostic alarm	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case
Diagnoses	
• Monitoring the supply voltage	Yes
• Wire-break	Yes; only for 1 ... 5 V and 4 ... 20 mA
• Overflow/underflow	Yes
Diagnostics indication LED	
• 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
Potential separation	
Potential separation channels	
• 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

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) and according to EN 50155 (routine test)

Standards, approvals, certificates

Railway application	
<ul style="list-style-type: none"> • EN 50121-3-2 	Yes; EMC for rail vehicles
<ul style="list-style-type: none"> • EN 50121-4 	Yes; EMC for signal and telecommunications systems
<ul style="list-style-type: none"> • EN 50124-1 	Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC
<ul style="list-style-type: none"> • EN 50125-1 	Yes; Rail vehicles - see ambient conditions
<ul style="list-style-type: none"> • EN 50125-2 	Yes; Stationary electrical equipment - see ambient conditions
<ul style="list-style-type: none"> • EN 50125-3 	Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)
<ul style="list-style-type: none"> • EN 50155 	Yes; Rail vehicles - temperature class Tx, horizontal mounting position, salt spray Class ST2
<ul style="list-style-type: none"> • EN 61373 	Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B
<ul style="list-style-type: none"> • Fire protection acc. to EN 45545-2 	Yes; For proof of conformity, see Service & Support

Ambient conditions

Ambient temperature during operation	
<ul style="list-style-type: none"> • horizontal installation, min. 	-40 °C; = Tmin (incl. condensation/frost)
<ul style="list-style-type: none"> • horizontal installation, max. 	70 °C; = Tmax; +85 °C for 10 min (Tx acc. to EN 50155)

Altitude during operation relating to sea level	
<ul style="list-style-type: none"> • Installation altitude above sea level, max. 	2 000 m
<ul style="list-style-type: none"> • Ambient air temperature-barometric pressure-altitude 	Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 m)

Relative humidity	
<ul style="list-style-type: none"> • With condensation, tested in accordance with IEC 60068-2-38, max. 	100 %; incl. condensation / frost permitted (no commissioning under condensation conditions)

Resistance

Coolants and lubricants	
<ul style="list-style-type: none"> — Resistant to commercially available coolants and lubricants 	Yes; Incl. diesel and oil droplets in the air

Use in stationary industrial systems	
<ul style="list-style-type: none"> — 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
<ul style="list-style-type: none"> — 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); *
<ul style="list-style-type: none"> — to mechanically active substances according to EN 60721-3-3 	Yes; Class 3S4 incl. sand, dust, *

Use on land craft, rail vehicles and special-purpose vehicles	
— to biologically active substances according to EN 60721-3-5	Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request
— to chemically active substances according to EN 60721-3-5	Yes; Class 5C3 (RH < 75 %) incl. salt spray acc. to EN 50155 (ST2); *
— to mechanically active substances according to EN 60721-3-5	Yes; Class 5S3 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 ANSI/ISA-71.04	* The supplied plug covers must remain in place over the unused interfaces during operation!
Conformal coating	
• 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
• Electronic equipment on rolling stock acc. to EN 50155	Yes; Class PC2 protective coating acc. to EN 50155:2017
• 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
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	300 g
Other	
Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776
last modified:	10/13/2020