



SIPLUS ET 200SP AI 8XRTD/TC HF T1 RAIL -25°C...60°C T1 with 70°C for 10 min with conformal coating based on 6ES7134-6JF00-0CA1. Analog input module, AI 8xRTD/TC 2-wire High Feature suitable for BU type A0, A1, Color code CC00, channel diagnostics, 16 bit, +/-0.1%

General information	
Product type designation	AI 8xRTD/TC 2-wire HF
Firmware version	
<ul style="list-style-type: none"> FW update possible 	Yes
usable BaseUnits	BU type A0, A1
Color code for module-specific color identification plate	CC00
Product function	
<ul style="list-style-type: none"> I&M data 	Yes; I&M0 to I&M3
<ul style="list-style-type: none"> Isochronous mode 	No
Operating mode	
<ul style="list-style-type: none"> Oversampling 	No
<ul style="list-style-type: none"> MSI 	No
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.	35 mA
---------------------------	-------

Power loss

Power loss, typ.	0.75 W
------------------	--------

Address area

Address space per module

<ul style="list-style-type: none"> Address space per module, max. 	16 byte; + 1 byte for QI information
--	--------------------------------------

Analog inputs

Number of analog inputs	8
permissible input voltage for voltage input (destruction limit), max.	30 V
Constant measurement current for resistance-type transmitter, typ.	2 mA
Cycle time (all channels), min.	Sum of the basic conversion times and additional processing times (depending on the parameterization of the active channels)
Technical unit for temperature measurement adjustable	Yes; °C/°F/K

Input ranges (rated values), voltages

<ul style="list-style-type: none"> -1 V to +1 V <ul style="list-style-type: none"> — Input resistance (-1 V to +1 V) -250 mV to +250 mV <ul style="list-style-type: none"> — Input resistance (-250 mV to +250 mV) -50 mV to +50 mV <ul style="list-style-type: none"> — Input resistance (-50 mV to +50 mV) -80 mV to +80 mV <ul style="list-style-type: none"> — Input resistance (-80 mV to +80 mV) 	<ul style="list-style-type: none"> Yes; 16 bit incl. sign 1 MΩ Yes; 16 bit incl. sign 1 MΩ Yes; 16 bit incl. sign 1 MΩ Yes; 16 bit incl. sign 1 MΩ
--	--

Input ranges (rated values), thermocouples

<ul style="list-style-type: none"> Type B <ul style="list-style-type: none"> — Input resistance (Type B) Type C <ul style="list-style-type: none"> — Input resistance (Type C) 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 L 	<ul style="list-style-type: none"> Yes; 16 bit incl. sign 1 MΩ Yes; 16 bit incl. sign 1 MΩ Yes; 16 bit incl. sign 1 MΩ Yes; 16 bit incl. sign 1 MΩ Yes; 16 bit incl. sign 1 MΩ Yes; 16 bit incl. sign
---	--

- Input resistance (Type L)
- Type N
 - Input resistance (Type N)
- Type R
 - Input resistance (Type R)
- Type S
 - Input resistance (Type S)
- Type T
 - Input resistance (Type T)
- Type U
 - Input resistance (Type U)
- Type TXK/TXK(L) to GOST
 - Input resistance (Type TXK/TXK(L) to GOST)

1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ

Input ranges (rated values), resistance thermometer

- Ni 100
 - Input resistance (Ni 100)
- Ni 1000
 - Input resistance (Ni 1000)
- LG-Ni 1000
 - Input resistance (LG-Ni 1000)
- Ni 120
 - Input resistance (Ni 120)
- Ni 200
 - Input resistance (Ni 200)
- Ni 500
 - Input resistance (Ni 500)
- Pt 100
 - Input resistance (Pt 100)
- Pt 1000
 - Input resistance (Pt 1000)
- Pt 200
 - Input resistance (Pt 200)
- Pt 500
 - Input resistance (Pt 500)

Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ
 Yes; 16 bit incl. sign
 1 MΩ

Input ranges (rated values), resistors

- 0 to 150 ohms
 - Input resistance (0 to 150 ohms)
- 0 to 300 ohms
 - Input resistance (0 to 300 ohms)
- 0 to 600 ohms

Yes; 15 bit
 1 MΩ
 Yes; 15 bit
 1 MΩ
 Yes; 15 bit

— Input resistance (0 to 600 ohms)	1 MΩ
• 0 to 3000 ohms	Yes; 15 bit
— Input resistance (0 to 3000 ohms)	1 MΩ
• 0 to 6000 ohms	Yes; 15 bit
— Input resistance (0 to 6000 ohms)	1 MΩ
• PTC	Yes; 15 bit
— Input resistance (PTC)	1 MΩ

Thermocouple (TC)

Temperature compensation	
— parameterizable	Yes
— Reference channel of the module	Yes
— internal comparison point	Yes; with BaseUnit type A1
— Reference channel of the group	Yes
— Number of reference channel groups	4; Group 0 to 3
— fixed reference temperature	Yes

Cable length

• shielded, max.	200 m; 50 m with thermocouples
------------------	--------------------------------

Analog value generation for the inputs

Measurement principle	integrating (Sigma-Delta)
-----------------------	---------------------------

Integration and conversion time/resolution per channel

• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Basic conversion time, including integration time (ms)	
— additional processing time for wire-break check	2 ms; In the ranges resistance thermometers, resistors and thermocouples
• Interference voltage suppression for interference frequency f1 in Hz	16.6 / 50 / 60 Hz
• Conversion time (per channel)	180 / 60 / 50 ms

Smoothing of measured values

• Number of smoothing levels	4; None; 4/8/16 times
• parameterizable	Yes

Encoder

Connection of signal encoders

• for voltage measurement	Yes
• for resistance measurement with two-wire connection	Yes
• for resistance measurement with three-wire connection	No
• for resistance measurement with four-wire connection	No

Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.01 %; ±0.1 % for resistance thermometers and resistance
Temperature error (relative to input range), (+/-)	0.0009 %/K; ±0.005 % / K at thermocouple
Crosstalk between the inputs, min.	-50 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.05 %
Operational error limit in overall temperature range	
• Voltage, relative to input range, (+/-)	0.2 %
• Resistance, relative to input range, (+/-)	0.2 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.05 %
• Resistance, relative to input range, (+/-)	0.05 %
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, $f_1 =$ interference frequency	
• Series mode interference (peak value of interference < rated value of input range), min.	70 dB
• Common mode voltage, max.	10 V
• Common mode interference, min.	90 dB
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
Diagnostic messages	
• Monitoring the supply voltage	Yes
• Wire-break	Yes; channel by channel
• Group error	Yes
• Overflow/underflow	Yes; channel by channel
Diagnostics indication LED	
• Monitoring of the supply voltage (PWR-LED)	Yes; green PWR LED
• Channel status display	Yes; green LED
• for channel diagnostics	Yes; red LED
• for module diagnostics	Yes; green/red DIAG LED
Potential separation	
Potential separation channels	
• between the channels	No
• 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)	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 • EN 50121-4 • EN 50124-1 • EN 50125-1 • EN 50125-2 • EN 50125-3 • EN 50155 • EN 61373 • Fire protection acc. to EN 45545-2 	<p>Yes; EMC for rail vehicles</p> <p>Yes; EMC for signal and telecommunications systems</p> <p>Yes; Railway applications - overvoltage category OV2; pollution degree PD2; rated surge voltage UNi = 0.5 kV; UNm = 24 V DC</p> <p>Yes; Rail vehicles - see ambient conditions</p> <p>Yes; Stationary electrical equipment - see ambient conditions</p> <p>Yes; Signal and telecommunications systems - see ambient conditions; vibrations and shocks: Application point outside of tracks (1 m to 3 m away from track)</p> <p>Yes; Rail vehicles - temperature class T1, horizontal mounting position, salt spray Class ST2</p> <p>Yes; Rail vehicles - vibrations and shocks: Category 1 Class A/B</p> <p>Yes; Rail vehicles - verification on request</p>
Ambient conditions	
Ambient temperature during operation	
<ul style="list-style-type: none"> • horizontal installation, min. • horizontal installation, max. 	<p>-40 °C; = Tmin (incl. condensation/frost); start-up @ -25 °C</p> <p>60 °C; = Tmax; +70 °C for 10 min (T1 acc. to EN 50155)</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>2 000 m</p> <p>Tmin ... Tmax at 1 140 hPa ... 795 hPa (-1 000 m ... +2 000 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 — Against mechanical environmental conditions acc. 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> <p>Yes; Class 3M8 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)</p>
Use on land craft, rail vehicles and special-purpose vehicles	
<ul style="list-style-type: none"> — to biologically active substances according to EN 60721-3-5 	<p>Yes; Class 5B2 mold, fungus and dry rot spores (with the exception of fauna); Class 5B3 on request</p>

— 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; *
— Against mechanical environmental conditions acc. to EN 60721-3-5	Yes; Class 5M2 using the SIPLUS Mounting Kit ET 200SP (6AG1193-6AA00-0AA0)

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	15 mm
Height	73 mm
Depth	58 mm

Weights

Weight, approx.	32 g
-----------------	------

Other

Note:	for use in railway applications, also observe the product information "SIPLUS extreme RAIL" A5E37661960A, Online Support article 109736776
-------	--

last modified: 05/28/2020