SIEMENS

SIPLUS S7-1500 AI 8XU/I/RTD/TC -25 ... +70 DEGREES C WITH CONFORMAL COATING BASED ON 6ES7531-7KF00-0AB0 . ANALOG INPUT MODULE 16 BITS OF RESOLUTION, ACCURACY 0.3 %; 8 CHANNELS IN GROUPS OF 8; COMMON MODE VOLTAGE APPR. 10 V; DIAGNOSIS, PROCESSALARMS INCL. INFEED ELEMENT, SHIELD CLAMP AND SHIELD TERMINAL

Product type designation	
General information	
Hardware product version	E01
Firmware version	V1.0.0
Product function	
• I&M data	Yes; I&M0 to I&M3
Engineering with	
• STEP 7 TIA Portal can be configured/integrated as of version	V12 / V12
• STEP 7 can be configured/integrated as of version	V5.5 SP3 / -
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.	240 mA; with 24 V DC supply

Encoder supply	
24 V encoder supply	
• short-circuit protection	Yes
• Output current, max.	53 mA

Power	
Power available from the backplane bus	0.7 W

Power losses	
Power loss, typ.	2.7 W

Analog inputs	
Number of analog inputs	8
Number of analog inputs with current measurement	8
Number of analog inputs for voltage measurement	8
Number of analog inputs for resistance/resistance thermometer measurement	4
Number of analog inputs with 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
Input ranges (rated values), voltages	
• 1 to 5 V	Yes
• Input resistance (1 to 5 V)	100 kΩ
• -1 V to +1 V	Yes
• Input resistance (-1 V to +1 V)	10 MΩ
• -10 V to +10 V	Yes
• Input resistance (-10 V to +10 V)	100 kΩ
• -2.5 V to +2.5 V	Yes
• Input resistance (-2.5 V to +2.5 V)	10 MΩ
• -250 mV to +250 mV	Yes
• Input resistance (-250 mV to +250 mV)	10 MΩ
• -5 V to +5 V	Yes
• Input resistance (-5 V to +5 V)	100 kΩ
• -50 mV to +50 mV	Yes
• Input resistance (-50 mV to +50 mV)	10 MΩ
• -500 mV to +500 mV	Yes
• Input resistance (-500 mV to +500 mV)	10 MΩ
• -80 mV to +80 mV	Yes

• Input resistance (-80 mV to +80 mV)	10 MΩ
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
• -20 to +20 mA	Yes
• Input resistance (-20 to +20 mA)	25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
• 4 to 20 mA	Yes
• Input resistance (4 to 20 mA)	25 Ω; Plus approx. 42 ohms for overvoltage protection by PTC
Input ranges (rated values), thermoelements	
• Type B	Yes
• Input resistance (Type B)	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 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
Input ranges (rated values), resistance thermometer	
• Ni 100	Yes; Standard/climate
• Input resistance (Ni 100)	10 MΩ
• Ni 1000	Yes; Standard/climate
• Input resistance (Ni 1000)	10 MΩ
• LG-Ni 1000	Yes; Standard/climate
• Input resistance (LG-Ni 1000)	10 MΩ
• Pt 100	Yes; Standard/climate
• Input resistance (Pt 100)	10 MΩ
• Pt 1000	Yes; Standard/climate
• Input resistance (Pt 1000)	10 MΩ
• Pt 200	Yes; Standard/climate
• Input resistance (Pt 200)	10 MΩ
• Pt 500	Yes; Standard/climate
• Input resistance (Pt 500)	10 MΩ
Input ranges (rated values), resistors	
• 0 to 150 ohms	Yes
• Input resistance (0 to 150 ohms)	10 MΩ

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• 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 6000 ohms	Yes
• Input resistance (0 to 6000 ohms)	10 MΩ
• PTC	Yes
• Input resistance (PTC)	10 MΩ
Thermocouple (TC)	
• Technical unit for temperature measurement	°C/°F/K
Temperature compensation	
— External temperature compensation via RTD	Yes
— Compensation for 0 °C reference point temperature	Yes; fixed value can be set
Resistance thermometer (RTD)	
• Technical unit for temperature measurement	°C/°F/K
Cable length	
• Cable length, shielded, max.	800 m; for U/I, 200 m for R/RTD, 50 m for TC

Analog value creation	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit
• Integration time, parameterizable	Yes
• Integration time, ms	2.5 / 16.67 / 20 / 100
• Basic conversion time, including integration time, ms	9 / 23 / 27 / 107 ms
— additional conversion time for wire break monitoring	9 ms
— additional conversion time for resistance measurement	150 ohm, 300 ohm, 600 ohm, Pt100, Pt200, Ni100: 2 ms 6000 ohm, Pt500, Pt1000, Ni1000, LG-Ni1000, PTC: 4 ms
• Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 / 10
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	Yes
— Burden of 2-wire transmitter, max.	820 Ω

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• for current measurement as 4-wire transducer	Yes
• for resistance measurement with two-wire connection	Yes; Only for PTC
• for resistance measurement with three-wire connection	Yes; All measuring ranges except PTC; internal compensation of the cable resistances
• for resistance measurement with four-wire connection	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 +/- %/K
Crosstalk between the inputs, max.	-80 dB
Repeat accuracy in steady state at 25 °C (relative to input area), (+/-)	0.02 %
Temperature error of internal compensation	+/-6 °C

Operational limit in overall temperature range

• Voltage, relative to input area, (+/-)	0.3 %
• Current, relative to input area, (+/-)	0.3 %
• Resistance, relative to input area, (+/-)	0.3 %
• Resistance thermometer, relative to input area, (+/-)	Pt xxx standard: ±1.5 K, Pt xxx climate: ±0.5 K, Ni xxx standard: ±0.5 K, Ni xxx climate: ±0.3 K
• Thermocouple, relative to input area, (+/-)	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

Basic error limit (operational limit at 25 °C)

• Voltage, relative to input area, (+/-)	0.1 %
• Current, relative to input area, (+/-)	0.1 %
• Resistance, relative to input area, (+/-)	0.1 %
• Resistance thermometer, relative to input area, (+/-)	Pt xxx standard: ±0.7 K, Pt xxx climate: ±0.2 K, Ni xxx standard: ±0.3 K, Ni xxx climate: ±0.15 K
• Thermocouple, relative to input area, (+/-)	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

Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency

• Series mode interference (peak value of interference < rated value of input range), min.	40 dB
• common mode voltage, max.	10 V
• Common mode interference, min.	60 dB

Interrupts/diagnostics/status information

Alarms

• Diagnostic alarm	Yes
• Limit value alarm	Yes; two upper and two lower limit values in each case

Diagnostic messages

• Diagnostics	Yes

• 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
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

Galvanic isolation	
Electrical isolation channels	
• between the channels	No
• between the channels, in groups of	8
• between the channels and the backplane bus	Yes
• between the channels and the supply voltage of the electronics	Yes

Permissible potential difference	
between the inputs (UCM)	20 V DC
between inputs and MANA (UCM)	10 V DC
between M internally and the inputs	75 V DC/60 V AC (base isolation)

Isolation	
Isolation checked with	707 V DC (type test)

Ambient conditions	
Operating temperature	
• horizontal installation, min.	-25 °C; = Tmin
• horizontal installation, max.	70 °C; = Tmax
• vertical installation, min.	-25 °C; = Tmin
• vertical installation, max.	50 °C; = Tmax
Extended ambient conditions	
• Relative to ambient temperature-atmospheric pressure-installation altitude	Tmin ... Tmax at 1080 hPa ... 795 hPa (-1000 m ... +2000 m) // Tmin ... (Tmax - 10K) at 795 hPa ... 658 hPa (+2000 m ... +3500 m) // Tmin ... (Tmax - 20K) at 658 hPa ... 540 hPa (+3500 m ... +5000 m)
Relative humidity	
— with condensation, tested in accordance with IEC 60068-2-38, maximum	100 %; RH incl. condensation/frost (no commissioning under condensation conditions)
Resistance	
— against biologically active substances / conformity with EN 60721-3-3	Yes; Class 3B2 mold, fungus and dry rot spores (with the exception of fauna). The supplied connector covers must remain on the unused interfaces during operation!

— against chemically active substances / conformity with EN 60721-3-3	Yes; Class 3C4 (RH < 75%) incl. salt spray according to EN 60068-2-52 (degree of severity 3). The supplied connector covers must remain on the unused interfaces during operation!
— against mechanically active substances / conformity with EN 60721-3-3	Yes; Class 3S4 incl. sand, dust. The supplied connector covers must remain on the unused interfaces during operation!

Decentralized operation	
Supports fast startup	No

Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm

Weights	
Weight, approx.	310 g

other	
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
last modified:	14.10.2014