SIEMENS

Data sheet

6ES7531-7PF00-0AB0



SIMATIC S7-1500 analog input module AI 8xU/R/RTD/TC HF, 16 bit resolution, up to 21 bit Resolution at RT and TC, accuracy 0.1%, 8 channels in groups of 1; common mode voltage: 30 V AC/60 V DC, Diagnostics; Hardware interrupts Scalable temperature measuring range, thermocouple type C, Calibrate in RUN; Delivery including infeed element, shield bracket and shield terminal: Front connector (screw terminals or push-in) to be ordered separately

Product type designation AI & XU/R/RTD/TC HF HW functional status FS01 Firmware version V1.1.0 • FW update possible Yes Product function Ves; I&M0 to I&M3	
Firmware version V1.1.0 • FW update possible Yes Product function V1.1.0	
• FW update possible Yes Product function	_
Product function	
I&M data Yes: I&M0 to I&M3	
Isochronous mode No	
Prioritized startup Yes	
Measuring range scalable Yes	
Scalable measured values No	
Adjustment of measuring range No	
Engineering with	
• STEP 7 TIA Portal configurable/integrated from V14 / - version	
STEP 7 configurable/integrated from version V5.5 SP3 / -	
PROFIBUS from GSD version/GSD revision V1.0 / V5.1	
PROFINET from GSD version/GSD revision V2.3 / -	
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. 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	
• For voltage measurement 8; Plus one additional RTD (reference) channel	
• For resistance/resistance thermometer 8; Plus one additional RTD (reference) channel	

measurement	
For thermocouple measurement	8; Plus one additional RTD (reference) channel
permissible input voltage for voltage input (destruction limit), max.	20 V
Constant measurement current for resistance-type transmitter, typ.	150 Ohm, 300 Ohm, 600 Ohm, Cu10, Cu50, Cu100, Ni10, Ni100, Ni120, Ni200, Pt10, Pt50, Pt100, Pt200 climate: 1 mA; 6 kOhm, Ni500, Ni1000, LG-Ni1000, Pt200 standard, Pt500, Pt1000, PTC: 0.25 mA
Technical unit for temperature measurement adjustable	Yes; °C/°F/K
Input ranges (rated values), voltages	
• 0 to +5 V	No
• 0 to +10 V	No
• 1 V to 5 V	No
• -1 V to +1 V	Yes
— Input resistance (-1 V to +1 V)	10 MΩ
• -10 V to +10 V	No
• -2.5 V to +2.5 V	No
• -25 mV to +25 mV	Yes
 Input resistance (-25 mV to +25 mV) 	10 MΩ
 -250 mV to +250 mV 	Yes
 Input resistance (-250 mV to +250 mV) 	10 MΩ
• -5 V to +5 V	No
• -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	N
• 0 to 20 mA	No
 -20 mA to +20 mA 4 mA to 20 mA 	No
Input ranges (rated values), thermocouples	No
• 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 ΜΩ
• Туре Т	
	Yes
— Input resistance (Type T)	10 ΜΩ
Input resistance (Type T)Type TXK/TXK(L) to GOST	10 MΩ Yes
 Input resistance (Type T) Type TXK/TXK(L) to GOST Input resistance (Type TXK/TXK(L) to GOST) 	10 ΜΩ
 Input resistance (Type T) Type TXK/TXK(L) to GOST Input resistance (Type TXK/TXK(L) to GOST) Input ranges (rated values), resistance thermometer 	10 MΩ Yes 10 MΩ
 Input resistance (Type T) Type TXK/TXK(L) to GOST Input resistance (Type TXK/TXK(L) to GOST) Input ranges (rated values), resistance thermometer Cu 10 	10 MΩ Yes 10 MΩ Yes; Standard/climate
 Input resistance (Type T) Type TXK/TXK(L) to GOST Input resistance (Type TXK/TXK(L) to GOST) Input ranges (rated values), resistance thermometer Cu 10 Input resistance (Cu 10) 	10 MΩ Yes 10 MΩ Yes; Standard/climate 10 MΩ
 Input resistance (Type T) Type TXK/TXK(L) to GOST Input resistance (Type TXK/TXK(L) to GOST) Input ranges (rated values), resistance thermometer Cu 10 Input resistance (Cu 10) Cu 10 according to GOST 	10 MΩ Yes 10 MΩ Yes; Standard/climate 10 MΩ Yes; Standard/climate
 Input resistance (Type T) Type TXK/TXK(L) to GOST Input resistance (Type TXK/TXK(L) to GOST) Input ranges (rated values), resistance thermometer Cu 10 Input resistance (Cu 10) Cu 10 according to GOST Input resistance (Cu 10 according to GOST) 	10 MΩ Yes 10 MΩ Yes; Standard/climate 10 MΩ Yes; Standard/climate 10 MΩ
 Input resistance (Type T) Type TXK/TXK(L) to GOST Input resistance (Type TXK/TXK(L) to GOST) Input ranges (rated values), resistance thermometer Cu 10 Input resistance (Cu 10) Cu 10 according to GOST Input resistance (Cu 10 according to GOST) Cu 50 	10 MΩ Yes 10 MΩ Yes; Standard/climate 10 MΩ Yes; Standard/climate 10 MΩ Yes; Standard/climate
 Input resistance (Type T) Type TXK/TXK(L) to GOST Input resistance (Type TXK/TXK(L) to GOST) Input ranges (rated values), resistance thermometer Cu 10 Input resistance (Cu 10) Cu 10 according to GOST Input resistance (Cu 10 according to GOST) 	10 MΩ Yes 10 MΩ Yes; Standard/climate 10 MΩ Yes; Standard/climate 10 MΩ

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		 Input resistance (Ni 100 according to GOST) 	10 MΩ
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		— Input resistance (Ni 1000)	10 MΩ
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		 Input resistance (Ni 1000 according to GOST) 	10 MΩ
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		— Input resistance (Ni 200)	10 MΩ
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		— Input resistance (Ni 500)	10 MΩ
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— Input resistance (0 to 150 ohms) 10 MΩ • 0 to 300 ohms Yes			Yes
0 to 300 ohms Yes			

	Vee
• 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 ΜΩ
Thermocouple (TC)	
Temperature compensation	N
— 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. 	21 bit; For measuring mode RTC and TC when using the function "Scalable temperature measuring range" (32 bit REAL format); 16 bit for measuring mode R and U; 16 bit for all measuring modes when using the S7 format (16 bit INTEGER)
 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, Ni100, Ni120, Ni200, Pt10, Pt50, Pt100: 4 ms; 6 kOhm, Ni500, Ni1000, LG-Ni1000, Pt200, Pt500, Pt1000: 13 ms
 Interference voltage suppression for interference frequency f1 in Hz 	400 / 60 / 50 / 10 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 	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 	No
 for current measurement as 4-wire transducer 	No
 for resistance measurement with two-wire connection 	Yes
 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
Crosstalk between the inputs, max.	-80 dB
Repeat accuracy in steady state at 25 °C (relative to input	0.02 %
range), (+/-)	
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 %
 Resistance, relative to input range, (+/-) 	0.05 %
• Resistance thermometer, relative to input range, (+/-	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
 Thermocouple, relative to input range, (+/-) 	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
Interference voltage suppression for $f = n x (f1 + - 1 \%), f1 = i$	interference frequency
 Series mode interference (peak value of 	80 dB; in the Standard operating mode, 40 dB in the Fast operating
interference < rated value of input range), min.	mode
Common mode voltage, max.	60 V DC/30 V AC
Common mode interference, min.	80 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
Diagnoses	
 Monitoring the supply voltage 	Yes
Wire-break	Yes; Only with TC, R, 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
Potential separation	
Potential separation channels	
 between the channels 	Yes
 between the channels, in groups of 	1
 between the channels and backplane bus 	Yes
 between the channels and the power supply of the electronics 	Yes
electronics	
Permissible potential difference	
between different circuits	60 V DC/30 V AC; insulation rated for 120 V AC basic insulation: between the channels and the supply voltage L+; between the channels
	and the backplane bus; between the channels
Isolation	
Isolation tested with	2 000 V DC between the channels and the supply voltage L+; 2 000 V
Isolation tested with	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
Standards, approvals, certificates	
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
Ambient conditions	
Ambient temperature during operation	
 horizontal installation, min. 	0 °C
 horizontal installation, max. 	60 °C
 vertical installation, min. 	0°C
 vertical installation, max. 	40 °C
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:

4/29/2021 🖸