6ES7531-7NF00-0AB0

Data sheet



SIMATIC S7-1500 analog input module AI 8xU/I HF, up to 24 bit resolution, accuracy 0.1%, 8 channels in groups of 1; common mode voltage: 30 V AC/60 V DC, Diagnostics; Hardware interrupts Measured values scalable, measuring range adjustment, Calibrate in RUN; Delivery including infeed element, shield bracket and shield terminal: Front connector (screw terminals or push-in) to be ordered separately

General information	
Product type designation	AI 8xU/I HF
HW functional status	From FS01
Firmware version	V1.1.0
 FW update possible 	Yes
Product function	
● I&M data	Yes; I&M0 to I&M3
 Isochronous mode 	No
 Prioritized startup 	Yes
 Measuring range scalable 	No
 Scalable measured values 	Yes
 Adjustment of measuring range 	Yes
Engineering with	
 STEP 7 TIA Portal configurable/integrated from version 	V14 / -
 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.	50 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
For current measurement	8
For voltage measurement	8
permissible input voltage for voltage input (destruction limit), max.	28.8 V

permissible input current for current input (destruction limit),	40 mA
max. Input ranges (rated values), voltages	
• 0 to +5 V	No
• 0 to +10 V	No
• 1 V to 5 V	Yes
— Input resistance (1 V to 5 V)	100 kΩ
• -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)	100 kΩ
• -25 mV to +25 mV	No
• -250 mV to +250 mV	No
• -5 V to +5 V	Yes
— Input resistance (-5 V to +5 V)	100 kΩ
• -50 mV to +50 mV	No
• -500 mV to +500 mV	No
● -80 mV to +80 mV	No
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 mA to +20 mA	Yes
— Input resistance (-20 mA to +20 mA)	25 Ω ; Plus approx. 42 ohms for overvoltage protection by PTC
• 4 mA to 20 mA	Yes
— Input resistance (4 mA to 20 mA)	25 Ω ; Plus approx. 42 ohms for overvoltage protection by PTC
Input ranges (rated values), thermocouples	
• Type B	No
• Type C	No
• Type E	No
• Type J	No
• Type K	No
• Type L	No
• Type N	No
• Type R	No
Type S	No
• Type T	No
Type TXK/TXK(L) to GOST	No
Input ranges (rated values), resistance thermometer	
• Cu 10	No
Cu 10 according to GOST	No
• Cu 50	No
Cu 50 according to GOST	No
• Cu 100	No
Cu 100 Cu 100 according to GOST	No
• Ni 10	No
Ni 10 Ni 10 according to GOST	No
Ni 100 Ni 100 Ni 100	No
	No
Ni 100 according to GOSTNi 1000	
	No No
Ni 1000 according to GOST L C Ni 1000	No No
• LG-Ni 1000	No No
• Ni 120	No No
Ni 120 according to GOST	No
• Ni 200	No
Ni 200 according to GOST	No
● Ni 500	No
 Ni 500 according to GOST 	No
● Pt 10	No
 Pt 10 according to GOST 	No
• Pt 50	No
 Pt 50 according to GOST 	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	300 III	
Integration and conversion time/resolution per channel		
Resolution with overrange (bit including sign), max.	24 bit: When using the function "Scaling of the measured values" or "Measuring	
• Resolution with overlange (bit including sign), max.	24 bit; When using the function "Scaling of the measured values" or "Measuring range adaptation" (32 bit REAL format); 16 bit 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	
 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	Yes; with external transmitter supply	
for current measurement as 4-wire transducer	Yes	
for resistance measurement with two-wire connection	No	
for resistance measurement with three-wire connection for resistance measurement with four wire connection	No No	
for resistance measurement with four-wire connection	No	
Errors/accuracies	0.00.07	
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 %	
note regarding accuracy	at temperatures below 0 °C, the figures for operating error and temperature error are doubled	
Operational error limit in overall temperature range		
 Voltage, relative to input range, (+/-) 	0.1 %	
 Current, relative to input range, (+/-) 	0.1 %	
Basic error limit (operational limit at 25 °C)		
 Voltage, relative to input range, (+/-) 	0.05 %	
 Current, relative to input range, (+/-) 	0.05 %	
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.	80 dB; in the Standard operating mode, 40 dB in the Fast operating mode	
Common mode voltage, max.	60 V DC/30 V AC	
Common mode interference, min.	80 dB	
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Diagnostics function	Interrupts/diagnostics/status information	
Diagnostic alarm Yes Yes; two upper and two lower limit values in each case	Diagnostics function	Yes
Positive value alarm Ves; two upper and two lower limit values in each case Diagnoses • Monitoring the supply voltage • Wire-break • Overflow/underflow Pes; only for 1 5 V and 4 20 mA • Overflow/underflow Pes; only for 1 5 V and 4 20 mA • Overflow/underflow Person ten • RUN LED • REROR LED • Monitoring of the supply voltage (PWR-LED) • Channel status display • Overflow/underflow • Channel status display • Overflow/underflow • Channel status display • Overflow/underflow • FROR LED • Monitoring of the supply voltage (PWR-LED) • Channel status display • Over the Channel diagnostics • For module diagnostics • For module diagnostics • For module diagnostics • Detween the channels • Detween the channels in groups of • Detween the channels in groups of • Detween the channels and backplane bus • Detween the channels and backplane bus • Detween the channels and the power supply of the electronics Pormissible potential difference Detween different circuits • GOV DOON AC, insulation rated for 120 V AC basic insulation: between the channels and the backplane bus; between the channels and the backplane bus; between the channels and the supply voltage L+; between the channels and the backplane bus; between the channels and the supply voltage L+; and the backplane bus; Doon V DC between the channels and the supply voltage L+; and the backplane bus; Doon V DC between the channels and the supply voltage L+; and the backplane bus; Doon V DC between the channels and the backplane bus; Doon V DC between the channels and the backplane bus; Doon V DC between the channels and the backplane bus; Doon V DC between the channels and the supply voltage L+; and the backplane bus; Doon V DC between the channels and the supply voltage L+; and the backplane bus; Doon V DC between the channels and the backplane bus; Doon V DC between the channels and the backplane bus; Doon V DC between the channels and the backplane bus; Doon V DC between the channels and the backplane bus; Doon V DC between the channels and the back	Alarms	
Diagnoses • Monitoring the supply voltage • Wire-break • Overflowfunderflow Possional fide and the supply voltage • Wire-break • Overflowfunderflow Possional status display • Channel status display • Channel status display • For module diagnostics • For module diagnostics • For module diagnostics • For module diagnostics • Sessional separation Potential separation Potential separation Potential separation annels • between the channels and backplane bus • between the channels and backplane bus • between the channels and the power supply of the • between the channels and the power supply of the • between the channels and the power supply of the • between the channels and the power supply of the • between the channels and the power supply of the • between the channels and the power supply of the • between the channels and the power supply of the • between the channels and the power supply of the • between the channels and the power supply of the • between the channels and the supply voltage L+; between the channels and the backplane bus; between the channels Pormissible potential difference Solution Solutio	Diagnostic alarm	Yes
Monitoring the supply voltage Wire-break Wire-break Ves; only for 1 5 V and 4 20 mA Ves Overflow/underflow Pes RUN LED RUN LED RUN LED Channel status display Channel status display Or channel status display Or for channel diagnostics Of module diagnostics For module diagnostics I between the channels Detween the channels Detween the channels and backplane bus Detween the channels and backplane bus Detween the channels and backplane bus Detween different circuits Solation I solation So	Limit value alarm	Yes; two upper and two lower limit values in each case
Wire-break Overflow/underflow Overflow/underflow/un	Diagnoses	
Overflowlunderflow Diagnostics indication LED RUN LED RUN LED ROW Common status display Row Great LED Row Monitoring of the supply voltage (PWR-LED) Row Great LED Row Monitoring of the supply voltage (PWR-LED) Row Great LED Row LED Row LED Row LED Row LED Row Row	 Monitoring the supply voltage 	Yes
Diagnostics indication LED	Wire-break	Yes; only for 1 5 V and 4 20 mA
RUN LED ERROR LED Yes; green LED Yes; red LED Ontroining of the supply voltage (PWR-LED) Channel status display For channel diagnostics For channels For c	 Overflow/underflow 	Yes
ERROR LED Monitoring of the supply voltage (PWR-LED) Channel status display for channel diagnostics for module diagnostics Potential separation Potential separation channels between the channels between the channels in groups of between the channels and the power supply of the electronics Potential supporting the difference between different circuits 60 V DC/30 V AC; insulation rated for 120 V AC basic insulation; between the channels and the power supply of the electronics Potential supporting the difference between different circuits 60 V DC/30 V AC; insulation rated for 120 V AC basic insulation; between the channels and the power supply of the electronics Potential difference between the channels and the supply voltage L+; between the channels and the backplane bus; between the channels and the supply voltage L+; 2000 V DC between the channels and the supply voltage L+; 2000 V DC between the channels and the supply voltage L+ and the backplane bus; 2000 V DC between the channels and the supply voltage L+ and the backplane bus product functions / security / header signed firmware update data integrity No Ambient temperature during operation • horizontal installation, min. • horizontal installation, min. • horizontal installation, min. • vertical instal	Diagnostics indication LED	
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Channel status display For channel diagnostics for module diagnostics Fotential separation Potential separation channels • between the channels in groups of • between the channels and backplane bus • between the channels and backplane bus • between the channels and the power supply of the electronics Permissible potential difference between different circuits • between different circuits • between the channels and the power supply of the electronics Permissible potential difference between different circuits • 00 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; 707 V DC (type test) between the supply voltage L+; 2 000 V DC between the channels; 707 V DC (type test) between the supply voltage L+ and the backplane bus product functions / security / header signed firmware update No data integrity No Ambient conditions Ambient temperature during operation • horizontal installation, min. • orizontal installation, min. • orizontal installation, min. • vertical installation, min.	• ERROR LED	Yes; red LED
For channel diagnostics	 Monitoring of the supply voltage (PWR-LED) 	Yes; green LED
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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 and the supply voltage L+; 2000 V DC between the channels and the supply voltage L+; 2000 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 product functions / security / header signed firmware update data integrity No Ambient conditions Ambient temperature during operation • horizontal installation, min. • horizontal installation, max. • vertical installation, max.		Yes
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● vertical installation, max. Dimensions Width 35 mm Height 147 mm Depth 129 mm Weights	 horizontal installation, max. 	60 °C
Dimensions Width 35 mm Height 147 mm Depth 129 mm Weights	 vertical installation, min. 	-30 °C; From FS02
Width 35 mm Height 147 mm Depth 129 mm Weights	 vertical installation, max. 	40 °C
Height 147 mm Depth 129 mm Weights	Dimensions	
Depth 129 mm Weights	Width	35 mm
Weights	Height	147 mm
	Depth	129 mm
Weight, approx. 280 g	Weights	
	Weight, approx.	280 g

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