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Data sheet 6ES7431-1KF10-0AB0



Figure similar

SIMATIC S7-400, SM 431 ANALOG INPUT MODULE OPTIC. ISOLATED, 8 AI, 14 BIT RESOLUTION, U/I/RESIST./ THERMOEL/PT100

Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V; Only required for supplying 2-wire transmitters
• Reverse polarity protection	Yes
Input current	
from load voltage L+ (without load), max.	200 mA; for 8 connected, fully controlled 2-wire transmitters
from backplane bus 5 V DC, max.	600 mA
Power loss	
Power loss, typ.	3.5 W
Hardware configuration	
Slots	
• required slots	1
Analog inputs	
Number of analog inputs	8
• For voltage/current measurement	8
• For resistance measurement	4
permissible input voltage for voltage input (destruction limit), max.	18 V; 18 V continuous, 75 V for 1 ms (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.	40 mA; Permanent
Input ranges	
• Voltage	Yes
• Current	Yes
• Thermocouple	Yes

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• Resistance thermometer	Yes
• Resistance	Yes
Input ranges (rated values), voltages	
• 1 V to 5 V	Yes
• Input resistance (1 V to 5 V)	1 MΩ
• -1 V to +1 V	Yes
• Input resistance (-1 V to +1 V)	1 MΩ
• -10 V to +10 V	Yes
• Input resistance (-10 V to +10 V)	1 MΩ
• -2.5 V to +2.5 V	Yes
• Input resistance (-2.5 V to +2.5 V)	1 MΩ
• -250 mV to +250 mV	Yes
• Input resistance (-250 mV to +250 mV)	1 MΩ
• -5 V to +5 V	Yes
• Input resistance (-5 V to +5 V)	1 MΩ
• -500 mV to +500 mV	Yes
• Input resistance (-500 mV to +500 mV)	1 MΩ
• -80 mV to +80 mV	Yes
• Input resistance (-80 mV to +80 mV)	1 MΩ
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	50 Ω
• 4 mA to 20 mA	Yes
• Input resistance (4 mA to 20 mA)	50 Ω
Input ranges (rated values), thermocouples	
• Type B	Yes
• Type E	Yes
• Type J	Yes
• Type K	Yes
• Type L	Yes
• Type N	Yes
• Type R	Yes
• Type S	Yes
• Type T	Yes
• Type U	Yes
Input ranges (rated values), resistance thermometer	
• Ni 100	Yes
• Input resistance (Ni 100)	1 MΩ
• Ni 1000	Yes
• Input resistance (Ni 1000)	1 MΩ
• Pt 100	Yes

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• Input resistance (Pt 100)	1 MΩ
• Pt 1000	Yes
• Pt 10000	Yes
• Pt 200	Yes
• Input resistance (Pt 200)	1 MΩ
• Pt 500	Yes
• Input resistance (Pt 500)	1 MΩ
Input ranges (rated values), resistors	
• 0 to 150 ohms	Yes
• Input resistance (0 to 150 ohms)	1 MΩ
• 0 to 300 ohms	Yes
• Input resistance (0 to 300 ohms)	1 MΩ
• 0 to 48 ohms	Yes
• Input resistance (0 to 48 ohms)	1 MΩ
• 0 to 600 ohms	Yes
• Input resistance (0 to 600 ohms)	1 MΩ
• 0 to 6000 ohms	Yes; Usable up to 5000 Ohm
• Input resistance (0 to 6000 ohms)	1 MΩ
Thermocouple (TC)	
Temperature compensation	
— internal temperature compensation	No
— external temperature compensation with compensations socket	Yes
— external temperature compensation with Pt100	Yes
— dynamic reference temperature value	Yes
Characteristic linearization	
• Parameterizable	Yes
— for thermocouples	Type B, E, J, K, L, N, R, S, T, U
— for resistance thermometer	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000
Cable length	
• shielded, max.	200 m; 50 m with thermocouples and input ranges <= 80 mV

Analog value generation	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit; with activated filtering: 16 bits
• Integration time, parameterizable	Yes
• Basic conversion time (ms)	20.1 / 23.5 ms
• Integration time (ms)	16,7 / 20 ms
• Basic conversion time, including integration time (ms)	

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— additional conversion time for wire-break monitoring	4,3 ms
— additional conversion time for resistance measurement	40.2 / 47 ms
— additional conversion time for wire-break monitoring and resistance measurement	5,5 ms
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz

Encoder	
Connection of signal encoders	
• for current measurement as 2-wire transducer	Yes
• for current measurement as 4-wire transducer	Yes
• for resistance measurement with two-wire connection	Yes; Line resistances are also measured
• for resistance measurement with three-wire connection	Yes
• for resistance measurement with four-wire connection	Yes

Errors/accuracies	
Operational error limit in overall temperature range	
• Voltage, relative to input area, (+/-)	0.38 %; +/-0.38% at +/-80 mV; +/-0.35% at +/-250 mV, +/-500mV, +/-1 V, +/-2,5 V, +/-5 V, 1 to 5 V, +/-10 V
• Current, relative to input area, (+/-)	0.35 %; +/-20 mA, 0 to 20 mA, 4 to 20 mA
• Resistance, relative to input area, (+/-)	0.5 %
• Resistance thermometer, relative to input area, (+/-)	0.5 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input area, (+/-)	0.15 %; +/-0.15% (+/-250 mV, +/-500 mV, +/-1 V, +/-2.5 V, +/-5 V, 1 to 5 V, +/- 10 V); +/-0.17% (+/- 80 mV);
• Current, relative to input area, (+/-)	0.15 %; +/-20 mA, 0 to 20 mA, 4 to 20 mA
• Resistance, relative to input area, (+/-)	0.15 %; +/-0.15% at 0 to 48 ohms (4-conductor measurement), 0 to 150 ohms (4-conductor measurement), 0 to 300 ohms (4-conductor measurement), 0 to 600 ohms (4-conductor measurement), 0 to 5000 ohms (4-conductor measurement, in range of 6000 ohms); +/-0.3% at 0 to 300 ohms (3-conductor measurement), 0 to 600 ohms (3-conductor measurement), 0 to 5000 ohms (3-conductor measurement, in range of 6000 ohms)
• Resistance thermometer, relative to input area, (+/-)	0.3 %

Potential separation	
Potential separation analog inputs	
• Potential separation analog inputs	Yes; internal/external
• between the channels	No

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Permissible potential difference	
between the inputs (UCM)	120 V AC

Isolation	
Isolation tested with	2120 V DC between bus and L+/M; 2120 V DC between bus and analog part; 500 V DC between bus and local ground; 707 V DC between analog part and L+/M; 2120 V DC between analog part and local ground; 2120 V DC between L+/M and local ground

Dimensions	
Width	25 mm
Height	290 mm
Depth	210 mm

Weights	
Weight, approx.	500 g

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