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Data sheet 6ES7431-7QH00-0AB0



Figure similar

SIMATIC S7-400, analog input SM 431, isolated 16 AI; resolution 16 bit, U/I/Resistor/Thermocouple/Pt100 , alarm, diagnostics

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.	400 mA; for 16 connected, fully controlled 2-wire transmitters
from backplane bus 5 V DC, max.	700 mA
Power loss	
Power loss, typ.	4.5 W
Analog inputs	
Number of analog inputs	16
● For voltage/current measurement	16
● For resistance measurement	8
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
Constant measurement current for resistance-type transmitter, typ.	1.67 mA
Input ranges	
● Voltage	Yes
● Current	Yes
● Thermocouple	Yes
● 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
● -25 mV to +25 mV	Yes
— Input resistance (-25 mV to +25 mV)	1 MΩ
● -250 mV to +250 mV	Yes
— Input resistance (-250 mV to +250 mV)	1 MΩ
● -5 V to +5 V	Yes

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— Input resistance (-5 V to +5 V)	1 MΩ
● -50 mV to +50 mV	Yes
— Input resistance (-50 mV to +50 mV)	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
● -10 mA to +10 mA	Yes
— Input resistance (-10 mA to +10 mA)	50 Ω
● -20 mA to +20 mA	Yes
— Input resistance (-20 mA to +20 mA)	50 Ω
● 4 mA to 20 mA	Yes
— Input resistance (4 mA to 20 mA)	50 Ω
● -5 mA to +5 mA	Yes
— Input resistance (-5 mA to +5 mA)	50 Ω
Input ranges (rated values), thermocouples	
● type B	Yes
— Input resistance (Type B)	1 MΩ
● Type E	Yes
— Input resistance (Type E)	1 MΩ
● Type J	Yes
— Input resistance (type J)	1 MΩ
● Type K	Yes
— Input resistance (Type K)	1 MΩ
● Type L	Yes
— Input resistance (Type L)	1 MΩ
● Type N	Yes
— Input resistance (Type N)	1 MΩ
● Type R	Yes
— Input resistance (Type R)	1 MΩ
● Type S	Yes
— Input resistance (Type S)	1 MΩ
● Type T	Yes
— Input resistance (Type T)	1 MΩ
● Type U	Yes
— Input resistance (Type U)	1 MΩ
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
— Input resistance (Pt 100)	1 MΩ
● Pt 1000	Yes
— Input resistance (Pt 1000)	1 MΩ
● 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 48 ohms	Yes
— Input resistance (0 to 48 ohms)	1 MΩ
● 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

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● 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	
— Parameterizable	Yes
— external temperature compensation with Pt100	Yes
— external temperature compensation with compensations socket	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 for the inputs	
Integration and conversion time/resolution per channel	
● Resolution with overrange (bit including sign), max.	16 bit; 16 / 16 / 16
● Integration time, parameterizable	Yes
● Basic conversion time (ms)	6 / 20,1 / 23,5 ms
● Integration time (ms)	2,5 / 16,7 / 20 ms
● Interference voltage suppression for interference frequency f1 in Hz	400 / 60 / 50 Hz
Encoder	
Connection of signal encoders	
● for voltage measurement	Yes; possible
● 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	
Temperature error (relative to input range), (+/-)	0.004 %/K
Operational error limit in overall temperature range	
● Voltage, relative to input range, (+/-)	0.3 %; ±0.3 % at ±250 mV, ±500 mV, ±1 V, ±2.5 V, ±5 V, 1 to 5 V, ±10 V; ±0.31 % at ±80 mV; ±0.32 % at ±50 mV; ±0.35 % at ±25 mV
● Current, relative to input range, (+/-)	0.3 %; at 0 to 20 mA, ±5 mA, ±10 mA, ±20 mA, 4 to 20 mA
● Resistance, relative to input range, (+/-)	0.3 %; ±0.3% at 0 to 48 Ohm (4-conductor measurement), 0 to 150 Ohm (4-conductor measurement), 0 to 300 Ohm (4-conductor measurement), 0 to 600 Ohm (4-conductor measurement), 0 to 5000 Ohm (4-conductor measurement, in range of 6000 Ohm); ±0.4% at 0 to 300 Ohm (3-conductor measurement), 0 to 600 Ohm (3-conductor measurement), 0 to 5000 Ohm (3-conductor measurement, in range of 6000 Ohm);
● Resistance thermometer, relative to input range, (+/-)	0.4 %
● Thermocouple, relative to input range, (+/-)	TC Type B (±11.5 K), TC Type R (±7.3 K), TC Type S (±8.3 K), TC Type T (±1.7 K), TC Type E (±3.2 K), TC Type J (±4.3 K), TC Type K (±6.2 K), TC Type U (±2.8 K), TC Type L (±4.2 K), TC Type N (±4.4 K)
Basic error limit (operational limit at 25 °C)	
● Voltage, relative to input range, (+/-)	0.15 %; ±0.15% at ±250 mV, ±500 mV, ±1 V, ±2.5 V, ±5 V, 1 V to 5 V, ±10 V; ±0.17% at ±80 mV; ±0.19% at ±50 mV; ±0.23% at ±25 mV
● Current, relative to input range, (+/-)	0.15 %; at 0 to 20 mA, ±5 mA, ±10 mA, ±20 mA, 4 to 20 mA
● Resistance, relative to input range, (+/-)	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 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 range, (+/-)	0.3 %
● Thermocouple, relative to input range, (+/-)	TC Type B (±7.6 K), TC Type R (±4.8 K) TC Type S (±5.4 K), TC Type T (±1.1 K), TC Type E (±1.8 K), TC Type J (±2.3 K), TC Type K (±3.4 K), TC Type U (±1.7 K), TC Type L (±2.3 K), TC Type N (±2.6 K)
Interrupts/diagnostics/status information	

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Diagnostics function	Yes; Parameterizable
Alarms	
● Diagnostic alarm	Yes; Parameterizable
● Limit value alarm	Yes; Parameterizable
● Hardware interrupt	Yes; Parameterizable
Diagnoses	
● Diagnostic information readable	Yes
Diagnostics indication LED	
● internal fault INTF (red)	Yes
● external fault EXTF (red)	Yes
Potential separation	
Potential separation analog inputs	
● Potential separation analog inputs	Yes; internal/external
● between the channels	No
● between the channels and backplane bus	Yes
● Between the channels and load voltage L+	Yes
Isolation	
Isolation tested with	2 120 V DC between bus and L+/M; 2 120 V DC between bus and analog section; 500 V DC between bus and local ground; 500 V DC between analog section and L+/M; 2 120 V DC between analog section and local ground; 2 120 V DC between L+/M and local ground
Dimensions	
Width	25 mm
Height	290 mm
Depth	210 mm
Weights	
Weight, approx.	500 g

Classifications

	Version	Classification
eClass	16	27-24-22-01
eClass	14	27-24-22-01
eClass	12	27-24-22-01
eClass	9.1	27-24-22-01
eClass	9	27-24-22-01
eClass	8	27-24-22-01
eClass	7.1	27-24-22-01
eClass	6	27-24-22-01
ETIM	10	EC001420
ETIM	9	EC001420
ETIM	8	EC001420
ETIM	7	EC001420
IDEA	4	3562
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval

Manufacturer Declaration | Miscellaneous

General Product Approval | **EMV**

Metrological Approval | China RoHS | Miscellaneous | Manufacturer Declaration

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EMV	For use in hazardous locations				
RCM	ATEX	IECEx	FM	CCC	IECEx

For use in hazardous locations	Maritime application				
Type Examination Certificate	ATEX	ABS	BUREAU VERITAS	DNV	LRS

Maritime application				
NK / Nippon Kaiji Kyokai	PRS	RINA	RMRS	CCS (China Classification Society)

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