SIEMENS

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
— 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
● 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	
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

last modified: 3/12/2024