

Siemens 6ES7431-7QH00-0AB0 Manual

Brand	Siemens
Product Series	Siemens
Product Type	transmitter,

Description

6ES7431-7QH00-0AB0

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 M Ω

- -1 V to +1 V Yes

— Input resistance (-1 V to +1 V) 1 M Ω

- -10 V to +10 V Yes

— Input resistance (-10 V to +10 V) 1 M Ω

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- -2.5 V to +2.5 V Yes
- Input resistance (-2.5 V to +2.5 V) 1 M Ω
- -25 mV to +25 mV Yes
- Input resistance (-25 mV to +25 mV) 1 M Ω
- -250 mV to +250 mV Yes
- Input resistance (-250 mV to +250 mV) 1 M Ω
- -5 V to +5 V Yes

- -50 mV to +50 mV Yes
- Input resistance (-50 mV to +50 mV) 1 M Ω
- -500 mV to +500 mV Yes
- Input resistance (-500 mV to +500 mV) 1 M Ω
- -80 mV to +80 mV Yes
- Input resistance (-80 mV to +80 mV) 1 M Ω

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 M Ω
- Type E Yes
- Input resistance (Type E) 1 M Ω
- Type J Yes
- Input resistance (type J) 1 M Ω
- Type K Yes
- Input resistance (Type K) 1 M Ω
- Type L Yes
- Input resistance (Type L) 1 M Ω
- Type N Yes
- Input resistance (Type N) 1 M Ω
- Type R Yes
- Input resistance (Type R) 1 M Ω
- Type S Yes
- Input resistance (Type S) 1 M Ω
- Type T Yes
- Input resistance (Type T) 1 M Ω
- Type U Yes
- Input resistance (Type U) 1 M Ω

Input ranges (rated values), resistance thermometer

- Ni 100 Yes
- Input resistance (Ni 100) 1 M Ω
- Ni 1000 Yes
- Input resistance (Ni 1000) 1 M Ω

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- Pt 100 Yes
 - Input resistance (Pt 100) 1 M Ω
- Pt 1000 Yes
 - Input resistance (Pt 1000) 1 M Ω
- Pt 200 Yes
 - Input resistance (Pt 200) 1 M Ω
- Pt 500 Yes
 - Input resistance (Pt 500) 1 M Ω
- Input ranges (rated values), resistors
 - 0 to 48 ohms Yes
 - Input resistance (0 to 48 ohms) 1 M Ω
 - 0 to 150 ohms Yes
 - Input resistance (0 to 150 ohms) 1 M Ω
 - 0 to 300 ohms Yes
 - Input resistance (0 to 300 ohms) 1 M Ω
 - 0 to 600 ohms Yes
 - Input resistance (0 to 600 ohms) 1 M Ω
 - 0 to 6000 ohms Yes; Usable up to 5000 Ohm
 - Input resistance (0 to 6000 ohms) 1 M Ω
- 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

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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)

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

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