

SIEMENS

Product data sheet

6ES7431-7QH00-0AB0



SIMATIC S7-400,
SM 431 ANALOG INPUT MODULE OPTIC.
ISOLATED,
16 AI, 16 BIT RESOLUTION,
U/I/RESIST./
THERMOEL./PT100,ALARM,DIAGNOST.

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
from backplane bus 5 V DC, max.	700 mA
Power losses	
Power loss, typ.	4.5 W
Analog inputs	
Number of analog inputs	16
Number of analog inputs for voltage/current measurement	16
Number of analog inputs 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
Input ranges	
Voltage	Yes
Current	Yes
Thermocouple	Yes
Resistance thermometer	Yes
Resistance	Yes
Input ranges (rated values), voltages	
1 to 5 V	Yes
Input resistance (1 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
-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
Input resistance (-5 V to +5 V)	1 M Ω
-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 to +10 mA	Yes
Input resistance (-10 to +10 mA)	50 Ω
-20 to +20 mA	Yes
Input resistance (-20 to +20 mA)	50 Ω
4 to 20 mA	Yes
Input resistance (4 to 20 mA)	50 Ω
-5 to +5 mA	Yes
Input resistance (-5 to +5 mA)	50 Ω
Input ranges (rated values), thermoelements	
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 thermometers	
Ni 100	Yes
Input resistance (Ni 100)	1 M Ω
Ni 1000	Yes
Input resistance (Ni 1000)	1 M Ω
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 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)	
for thermocouples	Type B, E, J, K, L, N, R, S, T, U
Temperature compensation	
external temperature compensation with compensations socket	Yes
external temperature compensation with Pt100	Yes
dynamic reference temperature value	Yes
Resistance thermometer (RTD)	
Characteristic linearization	
for resistance thermometer	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000
Characteristic linearization	
Parameterizable	Yes
Cable length	
Cable length, shielded, max.	200 m ; 50 m with thermocouples and input ranges ≤ 80 mV
Analog value creation	
Integrations 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
Basic conversion time, including integration time, ms	

additional conversion time for wire break monitoring	4.3 / 4.3 / 4.3 ms
additional conversion time for resistance measurement	12 / 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	400 / 60 / 50 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 2-conductor connection	Yes ; Line resistances are also measured
for resistance measurement with 3-conductor connection	Yes
for resistance measurement with 4-conductor connection	Yes
Errors/accuracies	
Operational limit in overall temperature range	
Voltage, relative to input area	+/- 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 area	+/- 0,3 % ; at 0 to 20 mA, +/-5 mA, +/-10 mA, +/- 20 mA, 4 to 20 mA
Impedance, relative to input area	+/- 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-type thermometer, relative to input area	+/- 0,4 %
Basic error limit (operational limit at 25 °C)	

Voltage, relative to input area	+/- 0,15 % ; +/-0.15% at +/-250 mV, +/-500 mV, +/-1 V, +/-2.5 V, +/-5 V, 1 to 5 V, +/-10 V; +/-0.17% at +/-80 mV; +/-0.19% at +/-50 mV; +/-0.23% at +/-25 mV;
Current, relative to input area	+/- 0,15 % ; at 0 to 20 mA, +/-5 mA, +/-10 mA, +/- 20 mA, 4 to 20 mA
Impedance, 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 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-type thermometer, relative to input area	+/- 0,3 %
Interrupts/diagnostics/status information	
Alarms	
Diagnostic alarm	Yes ; Parameterizable
Limit value alarm	Yes ; Parameterizable
Diagnostic messages	
Diagnostics	Yes ; Parameterizable
Galvanic isolation	
Galvanic isolation analog inputs	
Galvanic isolation analog inputs	Yes ; internal/external
between the channels	No
Permissible potential difference	
between the inputs (UCM)	120 V AC
Isolation	
Isolation checked 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

Required slots	1
Weight	
Weight, approx.	500 g
Status	Jul 17, 2012