

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



Figure similar

Supply voltage	
Load voltage L+	
<ul style="list-style-type: none"> Rated value (DC) 	24 V; Only required for supplying 2-wire transmitters
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> For voltage/current measurement 	16
<ul style="list-style-type: none"> 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 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
• -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 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
• 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 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 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	
— external temperature compensation with compensations socket	Yes
— external temperature compensation with Pt100	Yes
— dynamic reference temperature value	Yes
Characteristic linearization	

<ul style="list-style-type: none"> • parameterizable <ul style="list-style-type: none"> — for thermocouples — for resistance thermometer 	Yes Type B, E, J, K, L, N, R, S, T, U Pt100, Pt200, Pt500, Pt1000, Ni100, Ni1000
Cable length	
<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Resolution with overrange (bit including sign), max. 	16 bit; 16 / 16 / 16
<ul style="list-style-type: none"> • Integration time, parameterizable 	Yes
<ul style="list-style-type: none"> • Basic conversion time (ms) 	6 / 20,1 / 23,5 ms
<ul style="list-style-type: none"> • Integration time (ms) 	2,5 / 16,7 / 20 ms
<ul style="list-style-type: none"> • Basic conversion time, including integration time (ms) <ul style="list-style-type: none"> — additional conversion time for wire-break monitoring — additional conversion time for resistance measurement — additional conversion time for wire-break monitoring and resistance measurement 	4.3 / 4.3 / 4.3 ms 12 / 40,2 / 47 ms 5,5 ms
<ul style="list-style-type: none"> • Interference voltage suppression for interference frequency f1 in Hz 	400 / 60 / 50 Hz

Encoder	
Connection of signal encoders	
<ul style="list-style-type: none"> • for voltage measurement 	Yes; possible
<ul style="list-style-type: none"> • for current measurement as 2-wire transducer 	Yes
<ul style="list-style-type: none"> • for current measurement as 4-wire transducer 	Yes
<ul style="list-style-type: none"> • for resistance measurement with two-wire connection 	Yes; Line resistances are also measured
<ul style="list-style-type: none"> • for resistance measurement with three-wire connection 	Yes
<ul style="list-style-type: none"> • for resistance measurement with four-wire connection 	Yes

Errors/accuracies	
Operational error limit in overall temperature range	
<ul style="list-style-type: none"> • 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;
<ul style="list-style-type: none"> • Current, relative to input range, (+/-) 	0.3 %; at 0 to 20 mA, +/-5 mA, +/-10 mA, +/- 20 mA, 4 to 20 mA

<ul style="list-style-type: none"> 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);
<ul style="list-style-type: none"> Resistance thermometer, relative to input range, (+/-) 	0.4 %
Basic error limit (operational limit at 25 °C)	
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> Current, relative to input range, (+/-) 	0.15 %; at 0 to 20 mA, +/-5 mA, +/-10 mA, +/- 20 mA, 4 to 20 mA
<ul style="list-style-type: none"> 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)
<ul style="list-style-type: none"> Resistance thermometer, relative to input range, (+/-) 	0.3 %

Interrupts/diagnostics/status information

Diagnostics	Yes; Parameterizable
Alarms	
<ul style="list-style-type: none"> Diagnostic alarm 	Yes; Parameterizable
<ul style="list-style-type: none"> Limit value alarm 	Yes; Parameterizable

Potential separation

Potential separation analog inputs	
<ul style="list-style-type: none"> Potential separation analog inputs 	Yes; internal/external
<ul style="list-style-type: none"> between the channels 	No

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
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Dimensions

Width	25 mm
Height	290 mm
Depth	210 mm

Weights

Weight, approx.	500 g
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last modified:

03/24/2017

