



SIMATIC S7-400, analog input SM 431, isolated 8 AI, resolution 14 bit, U/I/Resistor 8 AI, cycle time 0.416 ms

Figure similar

Supply voltage	
Load voltage L+	
<ul style="list-style-type: none"> <li>Rated value (DC)</li> </ul>	24 V; Only required for supplying 2-wire transmitters
<ul style="list-style-type: none"> <li>Reverse polarity protection</li> </ul>	Yes
Input current	
from load voltage L+ (without load), max.	200 mA; for 8 connected, fully controlled 2-wire transmitters
from backplane bus 5 V DC, max.	1 000 mA
Power loss	
Power loss, typ.	4.9 W
Analog inputs	
Number of analog inputs	8
<ul style="list-style-type: none"> <li>For voltage/current measurement</li> </ul>	8
<ul style="list-style-type: none"> <li>For resistance measurement</li> </ul>	4
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; Permanent
Constant measurement current for resistance-type transmitter, typ.	1.67 mA
Input ranges	
<ul style="list-style-type: none"> <li>Voltage</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Current</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Thermocouple</li> </ul>	No
<ul style="list-style-type: none"> <li>Resistance thermometer</li> </ul>	No
<ul style="list-style-type: none"> <li>Resistance</li> </ul>	Yes
Input ranges (rated values), voltages	
<ul style="list-style-type: none"> <li>1 V to 5 V</li> <li>— Input resistance (1 V to 5 V)</li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>-1 V to +1 V</li> <li>— Input resistance (-1 V to +1 V)</li> </ul>	Yes 10 MΩ
<ul style="list-style-type: none"> <li>-10 V to +10 V</li> <li>— Input resistance (-10 V to +10 V)</li> </ul>	Yes 100 kΩ
Input ranges (rated values), currents	
<ul style="list-style-type: none"> <li>-20 mA to +20 mA</li> <li>— Input resistance (-20 mA to +20 mA)</li> </ul>	Yes 50 Ω
<ul style="list-style-type: none"> <li>4 mA to 20 mA</li> <li>— Input resistance (4 mA to 20 mA)</li> </ul>	Yes 50 kΩ
Input ranges (rated values), resistors	
<ul style="list-style-type: none"> <li>0 to 600 ohms</li> </ul>	Yes
Cable length	

• shielded, max.	200 m
<b>Analog value generation for the inputs</b>	
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	14 bit; 14 / 14 / 14
• Integration time, parameterizable	Yes
• Basic conversion time (ms)	52 $\mu$ s
• Interference voltage suppression for interference frequency f1 in Hz	none / 400 / 60 / 50 Hz
• Time constant of the input filter	15 $\mu$ s
• Basic execution time of the module (all channels released)	0.42 s
<b>Encoder</b>	
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; Line resistances are also measured
• for resistance measurement with four-wire connection	Yes
<b>Errors/accuracies</b>	
Temperature error (relative to input range), (+/-)	0.03 %/K
Operational error limit in overall temperature range	
• Voltage, relative to input range, (+/-)	0.7 %; $\pm 0.7$ % at $\pm 1$ V; $\pm 0.9$ % at $\pm 10$ V, 1 to 5 V
• Current, relative to input range, (+/-)	0.8 %; at $\pm 20$ mA, 4 to 20 mA
• Resistance, relative to input range, (+/-)	1 %
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.6 %; 0.6 % at $\pm 1$ V; 0.75 % at $\pm 10$ V, 1 to 5 V
• Current, relative to input range, (+/-)	0.7 %; at $\pm 20$ mA, 4 to 20 mA
• Resistance, relative to input range, (+/-)	0.7 %; 0 to 600 ohms
<b>Interrupts/diagnostics/status information</b>	
Diagnostics function	No
<b>Potential separation</b>	
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
<b>Isolation</b>	
Isolation tested with	2 120 V DC between bus and analog section; 500 V DC between bus and local ground; 500 V DC between analog part and L+/M; 2 120 V DC between analog part and local ground; 2 120 V DC between L+/M and local ground
<b>Dimensions</b>	
Width	25 mm
Height	290 mm
Depth	210 mm
<b>Weights</b>	
Weight, approx.	500 g
<b>last modified:</b>	2/20/2023 