



SIMATIC S7-400, analog input SM 431, isolated 8 AI, resolution 13 bit, U/IResistor

Figure similar

Supply voltage	
Load voltage L+	
<ul style="list-style-type: none"> <li>Rated value (DC)</li> </ul>	not necessary
Input current	
from backplane bus 5 V DC, max.	350 mA
Power loss	
Power loss, typ.	1.8 W
Analog inputs	
Number of analog inputs	8
<ul style="list-style-type: none"> <li>For voltage/current measurement</li> <li>For resistance measurement</li> </ul>	8 4
permissible input voltage for voltage input (destruction limit), max.	50 V
permissible input current for current input (destruction limit), max.	50 mA; 40 mA continuous
Constant measurement current for resistance-type transmitter, typ.	1.67 mA
Input ranges	
<ul style="list-style-type: none"> <li>Voltage</li> <li>Current</li> <li>Thermocouple</li> <li>Resistance thermometer</li> <li>Resistance</li> </ul>	Yes Yes No No Yes
Input ranges (rated values), voltages	
<ul style="list-style-type: none"> <li>1 V to 5 V <ul style="list-style-type: none"> <li>Input resistance (1 V to 5 V)</li> </ul> </li> <li>-1 V to +1 V <ul style="list-style-type: none"> <li>Input resistance (-1 V to +1 V)</li> </ul> </li> <li>-10 V to +10 V <ul style="list-style-type: none"> <li>Input resistance (-10 V to +10 V)</li> </ul> </li> </ul>	Yes 200 kΩ Yes 200 kΩ Yes 200 kΩ
Input ranges (rated values), currents	
<ul style="list-style-type: none"> <li>-20 mA to +20 mA <ul style="list-style-type: none"> <li>Input resistance (-20 mA to +20 mA)</li> </ul> </li> <li>4 mA to 20 mA <ul style="list-style-type: none"> <li>Input resistance (4 mA to 20 mA)</li> </ul> </li> </ul>	Yes 80 Ω Yes 80 Ω
Input ranges (rated values), resistors	
<ul style="list-style-type: none"> <li>0 to 600 ohms <ul style="list-style-type: none"> <li>Input resistance (0 to 600 ohms)</li> </ul> </li> </ul>	Yes usable up to 500 ohms
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.	13 bit
• Integration time, parameterizable	Yes
• Basic conversion time (ms)	23 / 25 ms
• Integration time (ms)	16,7 / 20 ms
• Interference voltage suppression for interference frequency f1 in Hz	50 / 60 Hz
• Basic execution time of the module (all channels released)	200 ms; 184 / 200 ms
<b>Encoder</b>	
Connection of signal encoders	
• for voltage measurement	Yes; possible
• for current measurement as 2-wire transducer	Yes; with external transmitter supply
• 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), (+/-)	0.02 %/K; $\pm 0.02$ %/K in impedance measuring range; $\pm 0.007$ % in all other measuring ranges
Operational error limit in overall temperature range	
• Voltage, relative to input range, (+/-)	1 %; $\pm 1.0$ % at $\pm 1$ V; $\pm 0.6$ % at $\pm 10$ V; $\pm 0.7$ % at 1 to 5 V
• Current, relative to input range, (+/-)	1 %; at $\pm 20$ mA, 4 to 20 mA
• Resistance, relative to input range, (+/-)	1.25 %; 0 to 500 ohms (4-conductor measurement, in range of 600 ohms)
Basic error limit (operational limit at 25 °C)	
• Voltage, relative to input range, (+/-)	0.7 %; 0.7% at $\pm 1$ V; 0.4% at $\pm 10$ V; 0.5% at 1 to 5 V
• Current, relative to input range, (+/-)	0.7 %; at $\pm 20$ mA, 4 to 20 mA
• Resistance, relative to input range, (+/-)	0.8 %; 0 to 500 ohms (4-conductor measurement, in range of 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
<b>Isolation</b>	
Isolation tested with	2 120 V DC between bus and analog part; 500 V DC between bus and local ground; 2 120 V DC between analog part and local ground
<b>Dimensions</b>	
Width	25 mm
Height	290 mm
Depth	210 mm
<b>Weights</b>	
Weight, approx.	500 g
<b>Classifications</b>	

	Version	Classification
eClass	14	27-24-22-01
eClass	12	27-24-22-01
eClass	9.1	27-24-22-01
eClass	9	27-24-22-01
eClass	8	27-24-22-01
eClass	7.1	27-24-22-01
eClass	6	27-24-22-01
ETIM	10	EC001420
ETIM	9	EC001420
ETIM	8	EC001420

ETIM	7	EC001420
IDEA	4	3562
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval



EG-Konf.

[Miscellaneous](#)



UL

[Metrological Approval](#)



General Product Approval

EMV

For use in hazardous locations



RCM

[China RoHS](#)

[Miscellaneous](#)



RCM



RCM



ATEX

For use in hazardous locations

Maritime application

[EM](#)



CCC



IECEX

[Type Examination Certificate](#)



ATEX



ABS

Maritime application



BUREAU VERITAS



DNV



LRS

[NK / Nippon Kaiji Kyokai](#)



PRS



RINA

Maritime application



RMRS

[CCS \(China Classification Society\)](#)

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