

SIMATIC S7-400, analog input SM 431, 8 AI, resolution 16 bit, U/I/Thermocouple, isolated with single routing, diagnostics, alarm, 20 ms conversion time



Input current	
from backplane bus 5 V DC, max.	1 200 mA
Power loss	
Power loss, typ.	4.6 W
Analog inputs	
Number of analog inputs	8
• For voltage/current measurement	8
permissible input voltage for voltage input (destruction limit), max.	35 V; 35 V continuous, 75 V for max. 1 s (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.	32 mA
Input ranges	
• Voltage	Yes
• Current	Yes
• Thermocouple	Yes
• Resistance thermometer	No
• Resistance	No
Input ranges (rated values), voltages	

• 1 V to 5 V	Yes
• Input resistance (1 V to 5 V)	> 2 000 ohms
• -1 V to +1 V	Yes
• -10 V to +10 V	Yes
• -100 mV to +100 mV	Yes
• -2.5 V to +2.5 V	Yes
• -20 mV to +20 mV	Yes
• -250 mV to +250 mV	Yes
• -5 V to +5 V	Yes
• -50 mV to +50 mV	Yes
• -500 mV to +500 mV	Yes
• -80 mV to +80 mV	Yes
<b>Input ranges (rated values), currents</b>	
• 0 to 20 mA	Yes
• -10 mA to +10 mA	Yes
• -20 mA to +20 mA	Yes
• -3.2 mA to +3.2 mA	Yes
• 4 mA to 20 mA	Yes
• Input resistance (4 mA to 20 mA)	50 Ω
• -5 mA to +5 mA	Yes
<b>Input ranges (rated values), thermocouples</b>	
• Type B	Yes
• Input resistance (Type B)	> 2 000 ohms
• Type E	Yes
• Type J	Yes
• Type K	Yes
• Type L	Yes
• Type N	Yes
• Input resistance (Type N)	> 2 000 ohms
• Type R	Yes
• Type S	Yes
• Type T	Yes
• Type U	Yes
<b>Thermocouple (TC)</b>	
<b>Temperature compensation</b>	
— parameterizable	Yes
— internal temperature compensation	Yes
— external temperature compensation with compensations socket	Yes
— dynamic reference temperature value	Yes
<b>Characteristic linearization</b>	

<ul style="list-style-type: none"> <li>parameterizable</li> <li>— for thermocouples</li> </ul>	Yes Type B, E, J, K, L, N, R, S, T, U
<b>Cable length</b>	
<ul style="list-style-type: none"> <li>shielded, max.</li> </ul>	200 m

<b>Analog value generation for the inputs</b>	
<b>Integration and conversion time/resolution per channel</b>	
<ul style="list-style-type: none"> <li>Resolution with overrange (bit including sign), max.</li> </ul>	16 bit
<ul style="list-style-type: none"> <li>Integration time, parameterizable</li> </ul>	Yes
<ul style="list-style-type: none"> <li>Basic conversion time (ms)</li> </ul>	10 / 16,7 / 20 / 100
<ul style="list-style-type: none"> <li>Integration time (ms)</li> </ul>	2,5 / 16,7 / 20 / 100
<ul style="list-style-type: none"> <li>Basic conversion time, including integration time (ms)</li> <li>— additional conversion time for wire-break monitoring and resistance measurement</li> </ul>	1 ms (module)
<ul style="list-style-type: none"> <li>Interference voltage suppression for interference frequency f1 in Hz</li> </ul>	400 / 60 / 50 / 10 Hz

<b>Encoder</b>	
<b>Connection of signal encoders</b>	
<ul style="list-style-type: none"> <li>for voltage measurement</li> </ul>	Yes; possible
<ul style="list-style-type: none"> <li>for current measurement as 4-wire transducer</li> </ul>	Yes
<ul style="list-style-type: none"> <li>for resistance measurement with four-wire connection</li> </ul>	Yes

<b>Errors/accuracies</b>	
<b>Operational error limit in overall temperature range</b>	
<ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> </ul>	0.3 %
<ul style="list-style-type: none"> <li>Current, relative to input range, (+/-)</li> </ul>	0.5 %
<b>Basic error limit (operational limit at 25 °C)</b>	
<ul style="list-style-type: none"> <li>Voltage, relative to input range, (+/-)</li> </ul>	0.1 %
<ul style="list-style-type: none"> <li>Current, relative to input range, (+/-)</li> </ul>	0.17 %

<b>Interrupts/diagnostics/status information</b>	
<b>Alarms</b>	
<ul style="list-style-type: none"> <li>Diagnostic alarm</li> </ul>	Yes; Parameterizable
<ul style="list-style-type: none"> <li>Limit value alarm</li> </ul>	Yes

<b>Potential separation</b>	
<b>Potential separation analog inputs</b>	
<ul style="list-style-type: none"> <li>Potential separation analog inputs</li> </ul>	Yes; internal/external
<ul style="list-style-type: none"> <li>between the channels</li> </ul>	Yes

<b>Isolation</b>	
Isolation tested with	1500 V DC

## Dimensions

Width	25 mm
Height	290 mm
Depth	210 mm

## Weights

Weight, approx.	650 g
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**last modified:** 12/24/2018