



SIMATIC S7-300, Analog input SM 331, Isolated 8 AI, resolution 13 bits  
U/I/resistor/Pt100, NI100, NI1000, LG-NI1000, PTC/KTY, 66 ms conversion time;  
1x 40-pole

Figure similar

Input current	
from backplane bus 5 V DC, max.	90 mA
Power loss	
Power loss, typ.	0.4 W
Analog inputs	
Number of analog inputs	8
• For resistance measurement	8
permissible input voltage for voltage input (destruction limit), max.	30 V; 12 V continuous, 30 V for max. 1 s
permissible input current for current input (destruction limit), max.	40 mA
Input ranges	
• Voltage	Yes
• Current	Yes
• Thermocouple	No
• Resistance thermometer	Yes
• Resistance	Yes
Input ranges (rated values), voltages	
• 0 to +10 V	Yes
— Input resistance (0 to 10 V)	100 kΩ
• 1 V to 5 V	Yes
— Input resistance (1 V to 5 V)	100 kΩ
• 1 V to 10 V	No
• -1 V to +1 V	Yes
— Input resistance (-1 V to +1 V)	100 kΩ
• -10 V to +10 V	Yes
— Input resistance (-10 V to +10 V)	100 kΩ
• -2.5 V to +2.5 V	No
• -250 mV to +250 mV	No
• -5 V to +5 V	Yes
— Input resistance (-5 V to +5 V)	100 kΩ
• -50 mV to +50 mV	Yes
— Input resistance (-50 mV to +50 mV)	100 kΩ
• -500 mV to +500 mV	Yes
— Input resistance (-500 mV to +500 mV)	100 kΩ
• -80 mV to +80 mV	No
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
— Input resistance (0 to 20 mA)	100 Ω
• -10 mA to +10 mA	No

<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>• -3.2 mA to +3.2 mA</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>	<p>Yes</p> <p>100 Ω</p> <p>No</p> <p>Yes</p> <p>100 Ω</p>
<b>Input ranges (rated values), thermocouples</b>	
<ul style="list-style-type: none"> <li>• Type B</li> <li>• Type C</li> <li>• Type E</li> <li>• Type J</li> <li>• Type K</li> <li>• Type L</li> <li>• Type N</li> <li>• Type R</li> <li>• Type S</li> <li>• Type T</li> <li>• Type U</li> <li>• Type TXK/TXK(L) to GOST</li> </ul>	<p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p> <p>No</p>
<b>Input ranges (rated values), resistance thermometer</b>	
<ul style="list-style-type: none"> <li>• Cu 10</li> <li>• Ni 100 <ul style="list-style-type: none"> <li>— Input resistance (Ni 100)</li> </ul> </li> <li>• Ni 1000 <ul style="list-style-type: none"> <li>— Input resistance (Ni 1000)</li> </ul> </li> <li>• LG-Ni 1000 <ul style="list-style-type: none"> <li>— Input resistance (LG-Ni 1000)</li> </ul> </li> <li>• Ni 120</li> <li>• Ni 200</li> <li>• Ni 500</li> <li>• Pt 100 <ul style="list-style-type: none"> <li>— Input resistance (Pt 100)</li> </ul> </li> <li>• Pt 1000</li> <li>• Pt 200</li> <li>• Pt 500</li> </ul>	<p>No</p> <p>Yes; Standard/climate</p> <p>100 MΩ</p> <p>Yes</p> <p>100 MΩ</p> <p>Yes; Standard/climate</p> <p>100 MΩ</p> <p>No</p> <p>No</p> <p>No</p> <p>Yes; Standard/climate</p> <p>100 MΩ</p> <p>No</p> <p>No</p> <p>No</p>
<b>Input ranges (rated values), resistors</b>	
<ul style="list-style-type: none"> <li>• 0 to 150 ohms</li> <li>• 0 to 300 ohms</li> <li>• 0 to 600 ohms <ul style="list-style-type: none"> <li>— Input resistance (0 to 600 ohms)</li> </ul> </li> <li>• 0 to 6000 ohms <ul style="list-style-type: none"> <li>— Input resistance (0 to 6000 ohms)</li> </ul> </li> </ul>	<p>No</p> <p>No</p> <p>Yes</p> <p>100 MΩ</p> <p>Yes</p> <p>100 MΩ</p>
<b>Thermocouple (TC)</b>	
<b>Temperature compensation</b>	
<ul style="list-style-type: none"> <li>— parameterizable</li> <li>— internal temperature compensation</li> <li>— external temperature compensation with compensations socket</li> </ul>	<p>No</p> <p>No</p> <p>No</p>
<b>Characteristic linearization</b>	
<ul style="list-style-type: none"> <li>• parameterizable <ul style="list-style-type: none"> <li>— for thermocouples</li> <li>— for resistance thermometer</li> </ul> </li> </ul>	<p>Yes</p> <p>No</p> <p>yes; Pt100 standard/air con.; Ni100 standard/air con.; Ni1000 standard/air con.; LG-Ni1000 standard/air con.</p>
<b>Cable length</b>	
<ul style="list-style-type: none"> <li>• shielded, max.</li> </ul>	<p>200 m; max. 50 m at 50 mV</p>
<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> <li>• Integration time, parameterizable</li> <li>• Basic conversion time (ms)</li> <li>• Interference voltage suppression for interference frequency f1 in Hz</li> </ul>	<p>13 bit</p> <p>Yes; 60 / 50 ms</p> <p>66 / 55 ms</p> <p>50 / 60 Hz</p>

Encoder	
Connection of signal encoders	
• for voltage measurement	Yes
• for current measurement as 2-wire transducer	Yes; with external supply
• for current measurement as 4-wire transducer	Yes
• for resistance measurement with two-wire connection	Yes
• for resistance measurement with three-wire connection	Yes
• for resistance measurement with four-wire connection	Yes
Errors/accuracies	
Operational error limit in overall temperature range	
• Voltage, relative to input range, (+/-)	0.6 %; $\pm 0.6\%$ ( $\pm 5\text{ V}$ , $10\text{ V}$ , $1\text{ to }5\text{ V}$ , $0\text{ to }10\text{ V}$ ); $\pm 0.5\%$ ( $\pm 50\text{ mV}$ , $500\text{ mV}$ , $1\text{ V}$ )
• Current, relative to input range, (+/-)	$0.5\%$ ; $\pm 20\text{ mA}$ , $0\text{ to }20\text{ mA}$ , $4\text{ to }20\text{ mA}$
• Resistance, relative to input range, (+/-)	$0.5\%$ ; $0\text{ to }6\text{ kohms}$ , $0\text{ to }600\text{ kohms}$
• Resistance thermometer, relative to input range, (+/-)	$1\text{ Kelvin}$ (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic); $1.2\text{ Kelvin}$ (Pt100, Ni100, standard)
Basic error limit (operational limit at $25\text{ }^{\circ}\text{C}$ )	
• Voltage, relative to input range, (+/-)	$0.4\%$ ; $0.4\%$ ( $\pm 5\text{ V}$ , $10\text{ V}$ , $1\text{ to }5\text{ V}$ , $0\text{ to }10\text{ V}$ ); $0.3\%$ ( $\pm 50\text{ mV}$ , $500\text{ mV}$ , $1\text{ V}$ )
• Current, relative to input range, (+/-)	$0.3\%$ ; $\pm 20\text{ mA}$ , $0\text{ to }20\text{ mA}$ , $4\text{ to }20\text{ mA}$
• Resistance, relative to input range, (+/-)	$0.3\%$ ; $0\text{ to }6\text{ kohms}$ , $0\text{ to }600\text{ kohms}$
• Resistance thermometer, relative to input range, (+/-)	$1\text{ Kelvin}$ (Pt100, Ni100, standard); $0.8\text{ Kelvin}$ (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic)
Interrupts/diagnostics/status information	
Diagnostics function	No
Alarms	
• Diagnostic alarm	No
• Limit value alarm	No
Diagnoses	
• Diagnostic information readable	No
Diagnostics indication LED	
• Group error SF (red)	No
Potential separation	
Potential separation analog inputs	
• between the channels	No
• between the channels and backplane bus	Yes
Isolation	
Isolation tested with	$500\text{ V DC}$
connection method	
required front connector	40-pin
Dimensions	
Width	$40\text{ mm}$
Height	$125\text{ mm}$
Depth	$117\text{ mm}$
Weights	
Weight, approx.	$250\text{ g}$
last modified:	8/16/2023 