



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"> • -20 mA to +20 mA <ul style="list-style-type: none"> — Input resistance (-20 mA to +20 mA) • -3.2 mA to +3.2 mA • 4 mA to 20 mA <ul style="list-style-type: none"> — Input resistance (4 mA to 20 mA) 	<p>Yes</p> <p>100 Ω</p> <p>No</p> <p>Yes</p> <p>100 Ω</p>
Input ranges (rated values), thermocouples	
<ul style="list-style-type: none"> • Type B • Type C • Type E • Type J • Type K • Type L • Type N • Type R • Type S • Type T • Type U • Type TXK/TXK(L) to GOST 	<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>
Input ranges (rated values), resistance thermometer	
<ul style="list-style-type: none"> • Cu 10 • Ni 100 <ul style="list-style-type: none"> — Input resistance (Ni 100) • Ni 1000 <ul style="list-style-type: none"> — Input resistance (Ni 1000) • LG-Ni 1000 <ul style="list-style-type: none"> — Input resistance (LG-Ni 1000) • Ni 120 • Ni 200 • Ni 500 • Pt 100 <ul style="list-style-type: none"> — Input resistance (Pt 100) • Pt 1000 • Pt 200 • Pt 500 	<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>
Input ranges (rated values), resistors	
<ul style="list-style-type: none"> • 0 to 150 ohms • 0 to 300 ohms • 0 to 600 ohms <ul style="list-style-type: none"> — Input resistance (0 to 600 ohms) • 0 to 6000 ohms <ul style="list-style-type: none"> — Input resistance (0 to 6000 ohms) 	<p>No</p> <p>No</p> <p>Yes</p> <p>100 MΩ</p> <p>Yes</p> <p>100 MΩ</p>
Thermocouple (TC)	
Temperature compensation	
<ul style="list-style-type: none"> — parameterizable — internal temperature compensation — external temperature compensation with compensations socket 	<p>No</p> <p>No</p> <p>No</p>
Characteristic linearization	
<ul style="list-style-type: none"> • parameterizable <ul style="list-style-type: none"> — for thermocouples — for resistance thermometer 	<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>
Cable length	
<ul style="list-style-type: none"> • shielded, max. 	<p>200 m; max. 50 m at 50 mV</p>
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. • Integration time, parameterizable • Basic conversion time (ms) • Interference voltage suppression for interference frequency f1 in Hz 	<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 V , $1\text{ to }5\text{ V}$, $0\text{ to }10\text{ V}$); $\pm 0.5\%$ ($\pm 50\text{ mV}$, 500 mV , 1 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 Kelvin (Pt100, Ni100, climatic; Ni1000, LG-Ni1000, standard; Ni1000, LG-Ni1000, climatic); 1.2 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 V , $1\text{ to }5\text{ V}$, $0\text{ to }10\text{ V}$); 0.3% ($\pm 50\text{ mV}$, 500 mV , 1 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 Kelvin (Pt100, Ni100, standard); 0.8 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 V DC
connection method	
required front connector	40-pin
Dimensions	
Width	40 mm
Height	125 mm
Depth	117 mm
Weights	
Weight, approx.	250 g
last modified:	3/12/2024 