



SIMATIC S7-300, Analog input SM 331, isolated, 2 AI, Resolution 9/12/14 bits, U/I/thermocouple/resistor, alarm, diagnostics, 1x 20-pole, Removing/inserting with active backplane bus

Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
from load voltage L+ (without load), max.	30 mA
from backplane bus 5 V DC, max.	50 mA
Power loss	
Power loss, typ.	1 W
Analog inputs	
Number of analog inputs	2
• For resistance measurement	1
permissible input voltage for voltage input (destruction limit), max.	20 V; continuous; 75 V for max. 1 s (mark to space ratio 1:20)
permissible input current for current input (destruction limit), max.	40 mA
Constant measurement current for resistance-type transmitter, typ.	1.67 mA
Input ranges	
• Voltage	Yes
• Current	Yes
• Thermocouple	Yes
• Resistance thermometer	Yes
• Resistance	Yes
Input ranges (rated values), voltages	
• 0 to +10 V	No
• 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)	10 MΩ
• -10 V to +10 V	Yes
— Input resistance (-10 V to +10 V)	100 kΩ
• -2.5 V to +2.5 V	Yes
— Input resistance (-2.5 V to +2.5 V)	100 kΩ
• -250 mV to +250 mV	Yes
— Input resistance (-250 mV to +250 mV)	10 MΩ
• -5 V to +5 V	Yes
— Input resistance (-5 V to +5 V)	100 kΩ
• -50 mV to +50 mV	No

• -500 mV to +500 mV — Input resistance (-500 mV to +500 mV) • -80 mV to +80 mV — Input resistance (-80 mV to +80 mV)	Yes 10 MΩ Yes 10 MΩ
Input ranges (rated values), currents	
• 0 to 20 mA — Input resistance (0 to 20 mA) • -10 mA to +10 mA — Input resistance (-10 mA to +10 mA) • -20 mA to +20 mA — Input resistance (-20 mA to +20 mA) • -3.2 mA to +3.2 mA — Input resistance (-3.2 mA to +3.2 mA) • 4 mA to 20 mA — Input resistance (4 mA to 20 mA)	Yes 25 Ω Yes 25 Ω Yes 25 Ω Yes 25 Ω Yes 25 Ω
Input ranges (rated values), thermocouples	
• Type B • Type E — Input resistance (Type E) • Type J — Input resistance (type J) • Type K — Input resistance (Type K) • Type L • Type N — Input resistance (Type N) • Type R • Type S • Type T • Type U • Type TXK/TXK(L) to GOST	No Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ No Yes 10 MΩ No No No No No No
Input ranges (rated values), resistance thermometer	
• Cu 10 • Ni 100 — Input resistance (Ni 100) • Ni 1000 • LG-Ni 1000 • Ni 120 • Ni 200 • Ni 500 • Pt 100 — Input resistance (Pt 100) • Pt 1000 • Pt 200 • Pt 500	No Yes 10 MΩ; Standard No No No No No Yes 10 kΩ; Standard No No No
Input ranges (rated values), resistors	
• 0 to 150 ohms — Input resistance (0 to 150 ohms) • 0 to 300 ohms — Input resistance (0 to 300 ohms) • 0 to 600 ohms — Input resistance (0 to 600 ohms) • 0 to 6000 ohms	Yes 10 MΩ Yes 10 MΩ Yes 10 MΩ No
Thermocouple (TC)	
Temperature compensation	
— parameterizable — internal temperature compensation — external temperature compensation with compensations socket — for definable comparison point temperature	Yes Yes Yes Yes

Characteristic linearization	
- parameterizable - for thermocouples - for resistance thermometer	Yes Type E, J, K, L, N Pt100 (standard, climatic range), Ni100 (standard, climatic range)
Cable length	
shielded, max.	200 m; 50 m at 80 mV and thermocouples
Analog value generation for the inputs	
Integration and conversion time/resolution per channel	
- Resolution with overrange (bit including sign), max. - Integration time, parameterizable - Basic conversion time (ms) - Interference voltage suppression for interference frequency f1 in Hz	15 bit; Unipolar: 9/12/12/14 bit; bipolar: 9 bit + sign/12 bit + sign/12 bit + sign/14 bit + sign Yes; 2,5 / 16,67 / 20 / 100 ms 3 / 17 / 22 / 102 ms 400 / 60 / 50 / 10 Hz
Encoder	
Connection of signal encoders	
- for voltage measurement - for current measurement as 2-wire transducer - for current measurement as 4-wire transducer - for resistance measurement with two-wire connection - for resistance measurement with three-wire connection - for resistance measurement with four-wire connection	Yes Yes Yes Yes Yes Yes
Errors/accuracies	
Operational error limit in overall temperature range	
- Voltage, relative to input range, (+/-) - Current, relative to input range, (+/-) - Resistance, relative to input range, (+/-) - Resistance thermometer, relative to input range, (+/-) - Thermocouple, relative to input range, (+/-)	1 %; $\pm 1\%$ (80 mV); $\pm 0.6\%$ (250 mV to 1 000 mV); $\pm 0.8\%$ (2.5 V to 10 V) 0.7 %; From 3.2 to 20 mA 0.7 %; 150, 300, 600 Ohm 0.7 %; $\pm 0.7\%$ (Pt100/ Ni100); $\pm 0.8\%$ (Pt100 climate) 1.1 %; Type E, J, K, L, N
Basic error limit (operational limit at 25 °C)	
- Voltage, relative to input range, (+/-) - Current, relative to input range, (+/-) - Resistance, relative to input range, (+/-) - Resistance thermometer, relative to input range, (+/-) - Thermocouple, relative to input range, (+/-)	0.6 %; $\pm 0.6\%$ (80 mV, 2.5 V to 10 V); $\pm 0.4\%$ (250 mV to 1 000 mV) 0.5 %; 3.2 to 20 mA 0.5 %; 150, 300, 600 Ohm 0.6 %; $\pm 0.5\%$ (Pt100/ Ni100), $\pm 0.6\%$ (Pt100 climate) 0.7 %; Type E, N, J, K, L
Interrupts/diagnostics/status information	
Diagnostics function	Yes; Parameterizable
Alarms	
- Diagnostic alarm - Limit value alarm	Yes Yes; Parameterizable, channel 0
Diagnoses	
Diagnostic information readable	Yes
Diagnostics indication LED	
Group error SF (red)	Yes
Potential separation	
Potential separation analog inputs	
- between the channels - between the channels and backplane bus - between the channels and the power supply of the electronics	No Yes Yes; Not for 2-wire transmitters
Isolation	
Isolation tested with	500 V DC
connection method / header	
required front connector	20-pin
Dimensions	
Width	40 mm

Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	250 g
last modified:	3/2/2021 